

Project Final Report

“Stormwater BMP Practices: Sevenmile River Watershed, Spencer Massachusetts”  
Project Number 17-09/319

Dates: 2017-2019

Town of Spencer, MA

Spencer Town Offices  
157 Main Street  
Spencer, MA 01562  
(508) 885-7500

MassDEP 319 Program Coordinator- Malcom Harper  
MassDEP / Division of Municipal Services - 627 Main St, Worcester, MA  
(508) 767-2792

PREPARED FOR:

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION  
BUREAU OF RESOURCE PROTECTION

AND

US ENVIRONMENTAL PROTECTION AGENCY  
REGION 1

MASSACHUSETTS EXECUTIVE OFFICE OF ENERGY AND ENVIRONMENTAL  
AFFAIRS

Kathleen Theoharides, Secretary

DEPARTMENT OF ENVIRONMENTAL PROTECTION  
Martin Suuberg, Commissioner

BUREAU OF RESOURCE PROTECTION  
Douglas Fine, Assistant Commissioner

DIVISION OF MUNICIPAL SERVICES  
Steven J. McCurdy, Director

Final – June 30, 2019

## A. Project Snapshot

Project Number and Title: “Stormwater BMPs: Sevenmile River Watershed”, No. 17-09/319

A1. Project start date: March 24, 2017 (effective date of Notice to Proceed)

A2. Date closed: June 30, 2019

A3. Basin and HUC 12 subwatershed: Massachusetts Chicopee Basin, the Sevenmile River, HUC12 I.D. 010802040301

A4. Segment and/or waterbody number(s): Sevenmile River (MA36-11)

A5. Status of waterbody (e.g., Category 5): Sevenmile River (Chicopee River Watershed), Sevenmile River, Category 5

A6. Priority Pollutant(s) targeted: Bacteria, nitrogen, phosphorus, sediment.

A7. Estimated Annual Pollutant removal (quantity, not percentage)

TN: 135 lbs

BOD: 555 lbs

TP: 26 lbs

COD: 10,519 lbs

TSS: 36,458 lbs

Bacteria: 60,814 billion colonies

Method of Determination: EPA Urban Runoff BMP Pollutant Load Reduction Worksheet

A8. BMPs installed, number and type:

Overall, eight individual BMPs were constructed at three sites throughout the watershed as part of the 319 grant. These include a rain garden with a deep sump manhole (upstream) and a sediment forebay, a rain garden with a deep sump sediment forebay, and a rain garden with a sediment forebay and grass channel.

## **B. Descriptive Project Summary**

### **MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION SECTION 319 NPS PROJECT 17-09/319**

PROJECT TITLE: “Stormwater BMPs: Sevenmile River Watershed”  
NPS CATEGORY: Urban Runoff  
INVESTIGATOR: Spencer Town Offices  
LOCATION: Chicopee River Watershed

#### **DESCRIPTION:**

This Project improved the water quality and protection of the Sevenmile River Watershed through the design, environmental permitting, and construction of stormwater control and treatment systems within these watersheds in the Town of Spencer Massachusetts. These designs utilized structural best management practice (BMP) solutions and incorporated low impact development (LID) strategies to contain and minimize runoff flows and nonpoint source pollution loading into these waters. Structural BMP improvement options considered included hooded deep sump catch basins, deep sump manholes, rain gardens, bioretention swales, and sediment forebays. The options utilized include deep sump catch basins, deep sump manholes, bioretention rain gardens, and a bioretention swale. The stormwater BMPs were sited within public rights-of-way and/or on Town-owned property.

A secondary goal of this Project was to implement a public outreach and education program for Spencer residents and local watershed protection groups. This program informed residents of the stormwater BMPs and the effectiveness of stormwater BMPs. This program also educated and encouraged residents to participate in the reduction of NPS pollution by using innovative LID treatment systems and basic maintenance of their own properties.

PROJECT COST: \$ 177,500  
  
FUNDING: \$ 106,500 by the U.S. EPA  
\$ 71,000 by the Town of Spencer  
  
DURATION: 2017-2019

## **C. Project Finances**

Project Budget. The contract budget (Scope of Work Attachment B) has been provided. Federally funding was used for design, permitting, and construction purposes throughout the project. The table below, Attachment B, shows the project budget after Amendment 1:

**Attachment B (from the Grant Contract Documents)**  
**Stormwater BMPs: Sevenmile River Watershed**  
**Project # 17-09/319**

Expense Items		s.319 Amount	Non-Federal Match	Total Amount
<b>Salary</b>				
	Utilities & Facilities Superintendent		\$3,300	\$3,300
	Conservation Agent - \$45/hour		\$450	\$450
	Utilities & Facilities Field Crew \$720-\$1,080/day		\$16,500	\$16,500
	Police Details \$370/day and \$60/Hour OT		\$750	\$750
<b>Subtotal</b>			<b>\$21,000</b>	<b>\$21,000</b>
<b>Subcontractual Services</b>				
	Design, Permitting	\$21,300	\$14,200	\$35,500
	Education and Outreach	\$3,000	\$2,000	\$5,000
	Construction Services	\$9,600	\$6,400	\$16,000
	Construction (by procured contract/contractor)	\$23,150	\$1,500	\$24,650
	Operations and Maintenance Plan	\$1,800	\$1,200	\$3,000
	Reporting (Progress Reports, etc.)	\$4,800	\$3,200	\$8,000
<b>Subtotal</b>		<b>\$63,650</b>	<b>\$28,500</b>	<b>\$92,150</b>
<b>Materials and Supplies</b>				
	Construction Materials	\$39,000	\$21,500	\$60,500
	Reproduction	\$2,300		\$2,300
	Mailing	\$350		\$350
	DEP-Approved Interpretive Signage	\$1,200		\$1,200
<b>Subtotal</b>		<b>\$42,850</b>	<b>\$21,500</b>	<b>\$64,350</b>
<b>Totals</b>		<b>\$106,500</b>	<b>\$71,000</b>	<b>\$177,500</b>
<b>Percent</b>		<b>60%</b>	<b>40%</b>	

The Disadvantaged Business Enterprise, (DBE) program "Fair Share" goals for the project are: \$6035 for D/MBE (3.4%) and for \$6,745 D/WBE (3.8%). Firms utilized in Federally Assisted Projects must be certified as either an MBE or WBE and a DBE.

The department will retain 10% of the total maximum obligation of the 319 grant funds or the final invoice submitted by the Grantee, whichever is greater, until all contract provisions are satisfied and final reports and other products are delivered and accepted. This 10% retainage shall be reflected on each invoice submitted by the grantee and will cumulative int eh amount of \$10,650 (10% of the contract amount).

Match Documentation. The 40% match for the project was provided by funds that the Conservation Commission had obtained from a legal settlement with a local contractor; and by a mixture of in-kind services, including project oversight from the two Superintendents of the Department of Utilities and Facilities (Tyler and Krukowski), the Highway Foreman, the Chief Water Operator, the Light Equipment Operator, and two Heavy Equipment Operators, as well as construction services. The table below shows the project spending through contract closeout:

**Project Spending (final, at close of contract)**  
**Stormwater BMP Practices: Sevenmile River Watershed, Spencer Massachusetts**  
**Project Number 17-09/319**

Expense Item	319 Amount	Non-Federal Match	Total
<b>Salaries</b>			
Town of Spencer			
<b>Subtotal Salaries</b>	<b>\$ 0</b>	<b>\$ \$32,236.52</b>	<b>\$ \$32,236.52</b>
<b>Subcontractual</b>			
Design, engineering, oversight, reporting	\$39,268.60	\$54,995.23	\$ \$94,263.83
Construction	\$43,208.00	\$0.00	\$43,208.00
<b>Subtotal Subcontractual</b>	<b>\$82,476.60</b>	<b>\$54,995.23</b>	<b>\$137,471.83</b>
<b>Materials and Supplies</b>			
BMP materials	\$23,913.12	\$3,977.50	\$27,890.62
Copying, postage, misc. office	\$110.28	\$ 0.00	\$110.28
<b>Subtotal Other</b>	<b>\$24,023.40</b>	<b>\$3,977.50</b>	<b>\$28,000.90</b>
<b>Totals</b>	<b>\$106,500.00</b>	<b>\$91,209.25</b>	<b>\$197,709.25</b>
Percent	54%	46%	100%

D. BMPs

BMP Type and Location:	Deep sump manhole, sediment forebay, rain Garden at Powder Mill Park (Smithville Road)
Date of Implementation:	March 18, 2019
Size of Treatment Area:	1.27± acres
Pollutant Load Removed:	36 lbs/yr BOD, 727 lbs/yr COD, 2,737 lbs/yr TSS, 2 lbs/yr LEAD, 3 lbs/yr ZINC, 10 lbs/yr TN, 2 lbs/yr TP, 4,381 billion colonies/yr

BMP Type and Location:	Catch basin, sediment forebay, rain Garden at 3 Old Meadow Road (Spencer Water Department)
Date of Implementation:	March 25, 2019
Size of Treatment Area:	1.1± acres
Pollutant Load Removed:	31 lbs/yr BOD, 630 lbs/yr COD, 2,371 lbs/yr TSS, 2 lbs/yr LEAD, 3 lbs/yr ZINC, 8 lbs/yr TN, 2 lbs/yr TP, 3,292 billion colonies/yr

BMP Type and Location:	Deep sump manhole, grass sediment forebay, grass swale, rain Garden at 7 Meadow Road (Spencer Department of Public Works)
Date of Implementation:	June 28, 2019
Size of Treatment Area:	14.1± acres
Pollutant Load Removed:	488 lbs/yr BOD, 9,162 COD, 31,350 TSS, 34 lbs/yr LEAD, 4 lbs/yr COPPER, 39 lbs/yr ZINC, 117 lbs/yr TN, 22 lbs/yr TP, 53,141 billion colonies/yr.

The EPA BMP Pollutant Load Reduction Workbook (EPA Region 5 Model) is the method of determination for pollutant load removal for the stormwater BMPs listed above. See Attachment 10.

The estimations in this report were determined using the appropriate estimation model(s) and applied according to the procedures prescribed for the model. To the best of my knowledge, these are reasonable estimates using appropriate methods. Documentation is kept on file by the grantee and is available for review by DEP / EPA.

*Bill Krukowski, PE*  
\_\_\_\_\_  
Bill Krukowski, P.E., Office of Utilities & Facilities – Superintendent  
*by: Kim Snyder, Senior Clerk*

## **E. Lessons Learned**

One valuable lesson which was learned during this project was the process for selecting locations for stormwater Best Management Practices (BMPs). The process of selecting locations for possible BMPs is obviously different for each project which is undertaken. However, during this project there are a few simple steps which can be taken to help streamline this process. First a meeting should be held with projects contact (ie. town engineer) and potential sites should be discussed and any as-built or town survey plans of these sites should be transferred to the engineer at this time. During our project we did not receive town as-built or town survey plans in a timely fashion which would have aided the engineers in the planning process. Next, the engineers should do a desk top review of all information which is given by the town and which can be processed from sources such as MassGIS Oliver or other GIS data locations. Once the desktop review is complete on-site test pits should be conducted as soon as possible. This was another lesson learned during this project since the coordination, conservation filing, and other test pit related tasks took longer to perform than anticipated. Since the organization for the test pits took more time than anticipated, the development of the engineering plans was pushed back unnecessarily. Since groundwater and soil conditions are some of the most restrictive aspects of BMP design, the test pit analysis will drastically affect the locations which are utilized for proposed BMPs. In summation from the first meeting on the town should supply any information such as as-built or survey of the areas which could be utilized for BMPs. Also, test pits should be conducted as soon as possible in the BMP planning process to ensure sites which can support stormwater BMPs are selected and the design process can start in a timely manner.

The second lesson learned during the project is to have effective communication between the engineers and the Town's representative. This communication was put to the test when the Town engineer who started alongside Stantec during this project (Mr. Steven Tyler, P.E.) left during the final stages of the project. Mr. Billy Krukowski, P.E. was later hired as the new Town engineer and took over the responsibilities as the Town's representative during the final stages of the project. To effectively on-board Mr. Krukowski and ensure he was up to date on all aspects of the project a meeting was held between Stantec and Mr. Krukowski. During this meeting all aspects (past, present, and future) of the project were discussed with a focus on the tasks which needed to be completed before the closeout of the project. However, one meeting did not seem to be sufficient in effectively on-boarding the new town engineer. Project planning and implementation most likely would have been more effective if a weekly conference call was held between the new Town engineer and Stantec. This weekly conference call would have reduced the amount of time the Town engineer spent on construction management and the financial reporting.

## **F. Attachments**

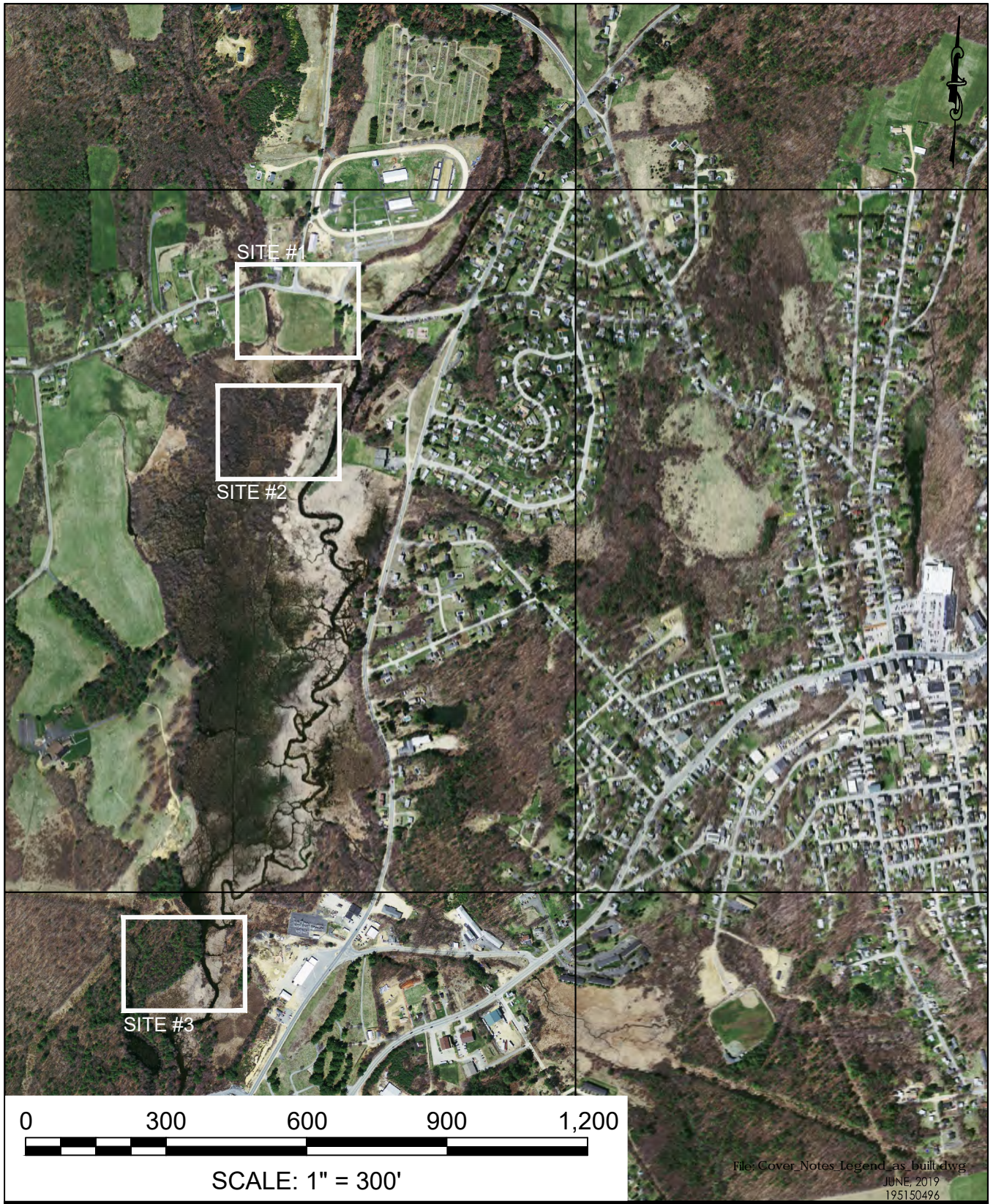
1. Locus Map showing construction BMPs, Powder Mill Park, Spencer Water Department, Spencer Department of Public Works
2. As-built Plans (Powder Mill Park, Spencer Water Department, Spencer Department of Public Works)
3. Operation and Maintenance Manual
4. Public Outreach Documents (newsletter titled Water Quality Sevenmile River Watershed 2019).
5. Notice of Intent (NOI) Documentation (NOI package, forms, appendix; WPA form updated 8-15-2018)
6. Conservation Documents (Order of conditions, MESA approved documentation)
7. EPA BMP Pollutant Load Reduction Worksheets

## **Attachment 1**

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Locus Map showing the constructed BMPs  
Powder Mill Park, Spencer Water Department, Spencer Department of Public Works





400 CROWN COLONY DRIVE  
QUINCY, MASSACHUSETTS 02169

Client/Project  
TOWN OF SPENCER, MA  
319 GRANT  
STORMWATER IMPROVEMENTS  
Figure No.  
1.0  
Title  
LOCUS MAP



## **Attachment 2**

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As-built Plans

- Powder Mill Park
- Spencer Water Department
- Spencer Department of Public Works





# TOWN OF SPENCER

STORMWATER IMPROVEMENTS (TOWN PROPERTY)  
SPENCER, MASSACHUSETTS  
01562

## SPENCER 319 GRANT STORMWATER BMP PROJECT (AS BUILT)

### INDEX OF SHEETS\*

SHEET NO.	TITLE
1.	COVER
2.	NOTES AND LEGEND
3.	SITE 1 - POWDER MILL PARK
4.	SITE 2 - SPENCER WATER DEPARTMENT
5.	SITE 3 - SPENCER DEPARTMENT OF PUBLIC WORKS

\*FOR CONSTRUCTED SITES (3)

PROJECT NO. 195150496

JUNE 12, 2019 - AS BUILT

#### OWNER

TOWN OF SPENCER  
3 OLD MEADOW ROAD  
SPENCER, MA 01562

#### CIVIL ENGINEER

STANTEC CONSULTING INC.  
400 CROWN COLONY DRIVE  
QUINCY, MA 02169

#### SURVEYOR

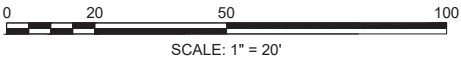
CDW CONSULTANTS, INC.  
6 HURON DRIVE  
NATICK, MA 01760











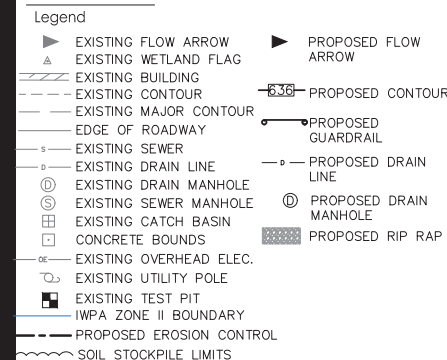




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## Consultants



NOTES:

1. AN ON THE GROUND SURVEY OF THIS SITE WAS CONDUCTED IN JUNE OF 2018 BY CDW CONSULTANTS INC. OF NATICK, MASSACHUSETTS. ALL SURVEY INFORMATION MUST BE FIELD VERIFIED DURING CONSTRUCTION.
2. ALL NEWLY DISTURBED SLOPES SHALL BE SEEDED OR PROTECTED BY TEMPORARY TREATMENTS SUCH AS HAY, STRAW OR FIBER MULCH OR PROTECTION COVERS SUCH AS A MAT OR FIBER LINING (BURLAP, JUTE FIBERGLASS NETTING, EXCELSIOR BLANKETS). THEY SHALL BE MAINTAINED AND MONITORED UNTIL THE WORK IS WARRANTED OR AS ORDERED BY THE OWNER OR ITS DESIGNATED AGENT.

THESE AS BUILT PLANS WERE DEVELOPED USING INFORMATION GIVEN TO STANTEC BY THE TOWN OF SPENCER HIGHWAY DEPARTMENT AND HAVE NOT BEEN SURVEYED BY A PROFESSIONAL LAND SURVEYOR.

Revision	By	Appd.	YY.MM.DD
AS-BUILT	WAS	MSB	19.06.19
CONSTRUCTION SET	WAS	MSB	18.10.19
CONSERVATION FILING	WAS	MSB	18.08.09
Issued	By	Appd.	YY.MM.DD

File Name: <b>SPENCER-319 GRANT</b>	<b>WAS</b>	<b>MSB</b>	<b>WAS</b>	<b>18.08.0</b>
	Dwn.	Chkd.	Dsgn.	YY.MM.DD

Permit-Seal



Client/Project

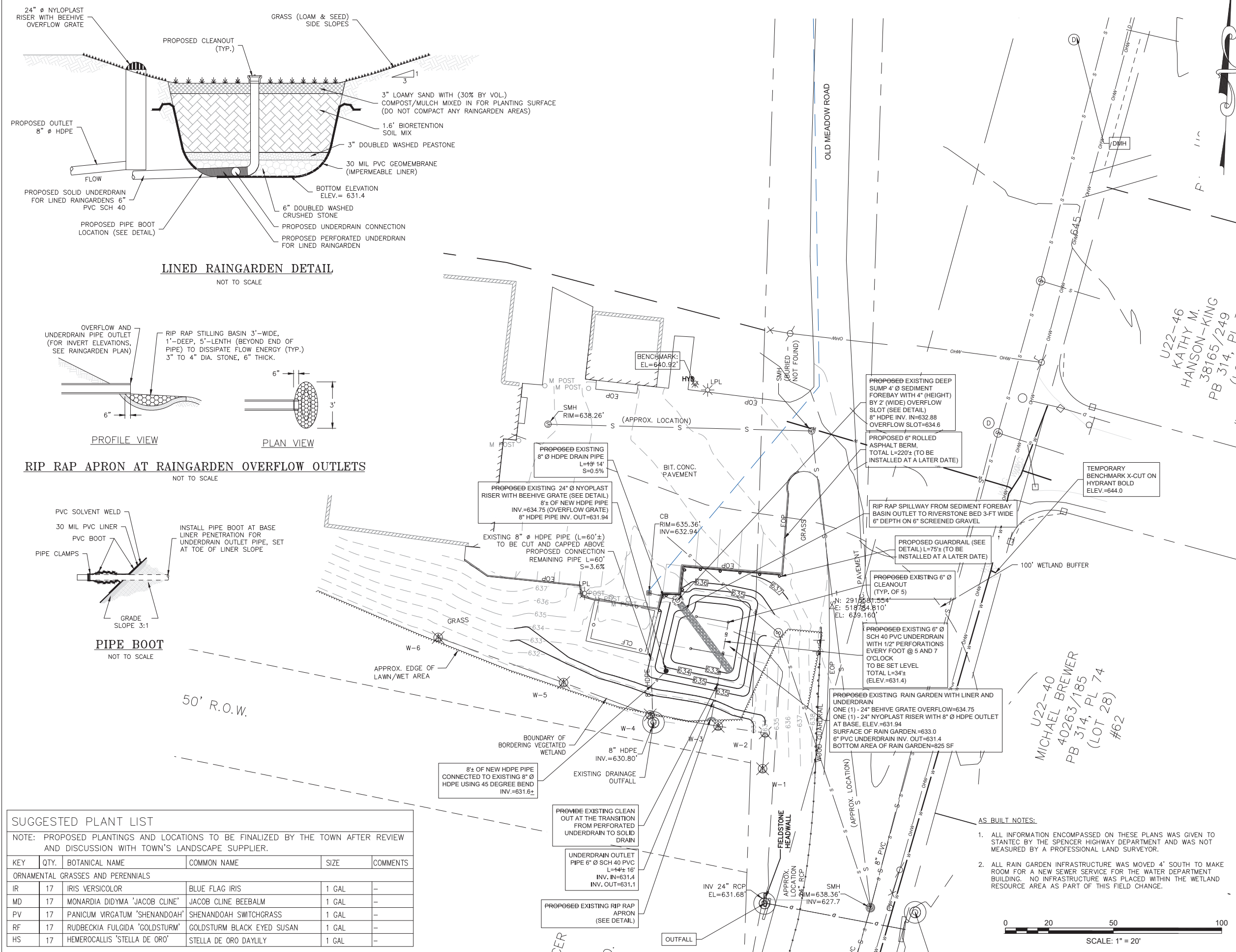
THE TOWN OF SPENCER  
319 STORMWATER GRANT

SITE 2 - SPENCER WATER DEPARTMENT - AS BUILT  
3 OLD MEADOW ROAD

Title

Project No. 195150496	Scale 1" = 20'
Drawing No.	Sheet      Revision

04 of 05 01



SUGGESTED PLANT LIST					
NOTE: PROPOSED PLANTINGS AND LOCATIONS TO BE FINALIZED BY THE TOWN AFTER REVIEW AND DISCUSSION WITH TOWN'S LANDSCAPE SUPPLIER.					
KEY	QTY.	BOTANICAL NAME	COMMON NAME	SIZE	COMMENTS
ORNAMENTAL GRASSES AND PERENNIALS					
IR	17	IRIS VERSICOLOR	BLUE FLAG IRIS	1 GAL	—
MD	17	MONARDIA DIDYMA 'JACOB CLINE'	JACOB CLINE BEEBALM	1 GAL	—
PV	17	PANICUM VIRGATUM 'SHENANDOAH'	SHENANDOAH SWITCHGRASS	1 GAL	—
RF	17	RUDBECKIA FULGIDA 'GOLDSTURM'	GOLDSTURM BLACK EYED SUSAN	1 GAL	—
HS	17	HEMEROCALLIS 'STELLA DE ORO'	STELLA DE ORO DAYLILY	1 GAL	—



























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### Legend

- |   |                         |   |                        |
|---|-------------------------|---|------------------------|
|  | EXISTING FLOW ARROW     |  | PROPOSED FLOW ARROW    |
|  | EXISTING WETLAND FLAG   |   |                        |
|  | EXISTING BUILDING       |   |                        |
|  | EXISTING CONTOUR        |   |                        |
|  | EXISTING MAJOR CONTOUR  |  | WETLAND BOUNDARY       |
|  | EDGE OF ROADWAY         |  | RIPARIAN BOUNDARY      |
|  | EXISTING SEWER          |  | PROPOSED DRAIN LINE    |
|  | EXISTING DRAIN LINE     |   |                        |
|  | EXISTING DRAIN MANHOLE  |  | PROPOSED DRAIN MANHOLE |
|  | EXISTING SEWER MANHOLE  |   |                        |
|  | EXISTING CATCH BASIN    |  | PROPOSED RIP RAP       |
|  | CONCRETE BOUNDS         |   |                        |
|  | EXISTING OVERHEAD ELEC. |   |                        |
|  | EXISTING UTILITY POLE   |   |                        |
|  | EXISTING TEST PIT       |   |                        |
|  | I/WPA ZONE II BOUNDARY  |   |                        |

1. SURVEY INFORMATION AND WETLAND FLAGS WERE TAKEN FROM THE PLAN ENTITLED "PLAN OF LAND IN SPENCER, MA PREPARED FOR HIGHWAY GARAGE" COMPLETED BY SHERMAN & FRYDRYK, LLC. LAND SURVEYING AND ENGINEERING. THE PLAN OF LAND IS DATED FEBRUARY 9, 2017. SURVEY INFORMATION MUST BE FIELD VERIFIED DURING CONSTRUCTION.
2. ALL NEWLY DISTURBED SLOPES SHALL BE SEEDED OR COVERED BY TEMPORARY TREATMENT SUCH AS STRAW, STRAW OR FIBER MULCH OR PROTECTION COVERS SUCH AS A MAT OR FIBER LINING (BURLAP, JUTE FIBERGLASS NETTING, EXCELSIOR BLANKETS). THEY SHALL BE INCORPORATED INTO THE WORK AS WARRANTED OR AS ORDERED BY THE OWNER OR ITS DESIGNATED AGENT.

THESE AS BUILT PLANS WERE DEVELOPED USING INFORMATION GIVEN TO STANTEC BY THE TOWN OF SPENCER HIGHWAY DEPARTMENT AND HAVE NOT BEEN SURVEYED BY A PROFESSIONAL LAND SURVEYOR.

Revision	By	Appd.	YY.MM.DD

AS-BUILT	WAS	MSB	19.06.14
CONSTRUCTION SET	WAS	MSB	18.10.18
CONSERVATION FILING	WAS	MSB	18.08.01
Issued	By	Appd.	YY.MM.DD

File Name: SPENCER-319 GRANT	WAS	MSB	WAS	18.08.01
	Dwn.	Chkd.	Dsan.	YY.MM.DD

Permit-Seal



Client/Project

THE TOWN OF SPENCER  
319 STORMWATER GRANT

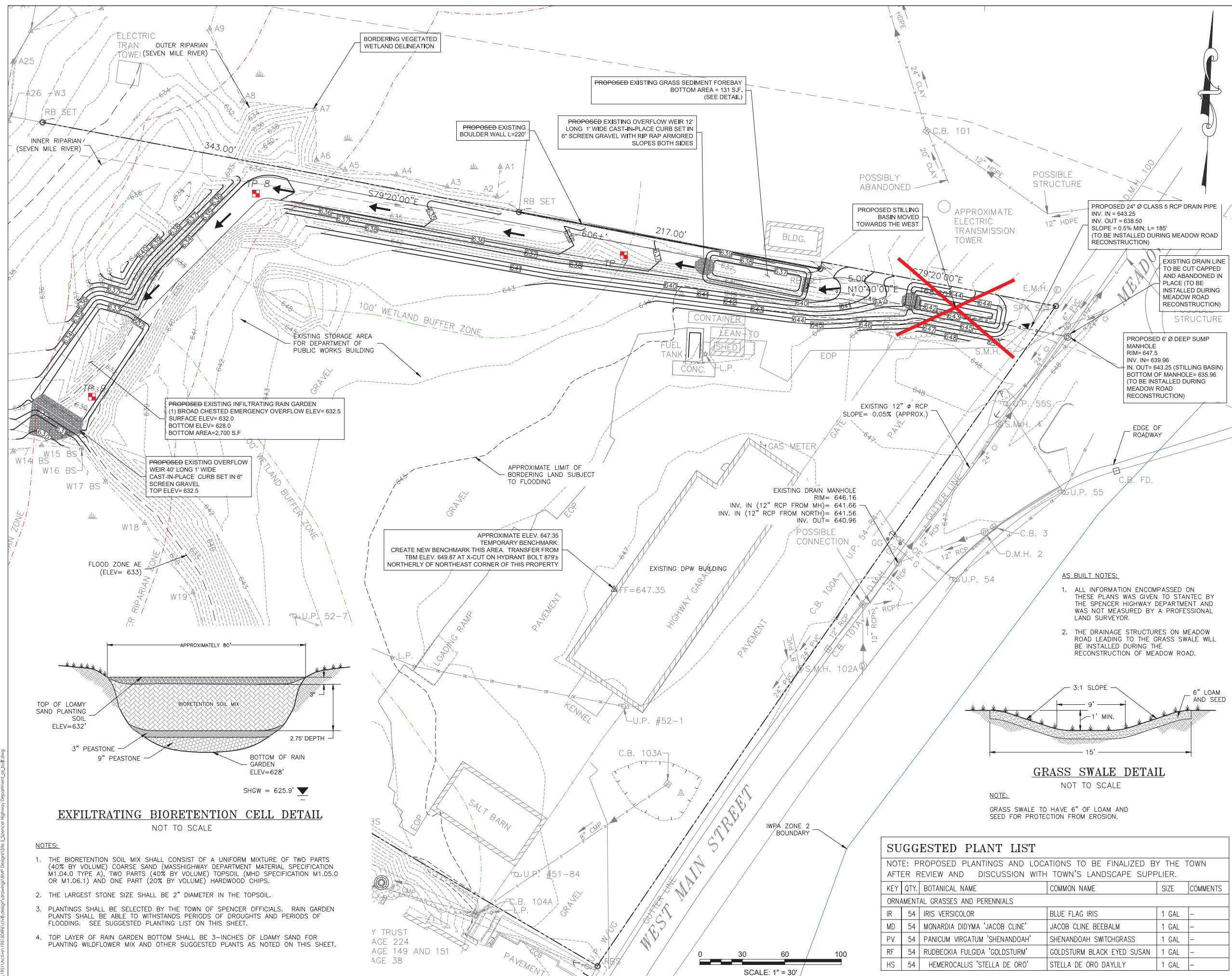
SITE 3 - SPENCER DEPARTMENT OF PUBLIC WORKS  
7 MEADOW ROAD

Title

Project No.	Scale
195150496	1" = 30'

Drawing No.	Sheet	Revision
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05 of 05 01





## **Attachment 3**

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Operation & Maintenance manual (all BMP locations)



**Operation & Maintenance Plan  
for  
Stormwater Improvements (Town Property –  
Smithville Rd, 3 Old Meadow Road, 7 Meadow  
Road, 30 Meadow Road, Meadowbrook Lane)  
In  
Spencer, MA**

**Prepared for:**

Office of Utilities & Facilities  
Management  
and  
Conservation Commission  
157 Main Street  
Spencer, MA 01562  
(508) 885-7500 x 180

**Applicant/Owner:**

Town of Spencer  
157 Main Street  
Spencer, MA 01562

**Prepared by:**

Stantec Consulting Services  
Inc.  
400 Crown Colony Drive  
Suite 200  
Quincy, MA 02169  
[www.stantec.com](http://www.stantec.com)  
617-786-7960

**Project No. 195150496**

**February 5, 2019**



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## **1.0 Introduction**

Stormwater Best Management Practices (BMPs) have been designed by Stantec Consulting Services Inc. (Stantec) for the Town of Spencer in various locations throughout the Town. The locations of these stormwater BMPs are Smithville Road – across from Power Mill Park, 3 Old Meadow Road – Spencer Water Department, 7 Meadow Road – Spencer Department of Public Works, 30 Meadow Road – within the right of way, and 9 Meadowbrook lane – within the right of way. The stormwater BMPs include deep sump catch basins/manholes, deep sump sediment forebays, Grass Sediment Forebay, Grass Swale, Rain Gardens, Cultec Infiltration system, and sand/oil water interceptor pre-treatment tank. All BMPs have been designed to improve water quality, and capture and treatment of “first-flush” stormwater runoff from the developed areas.

## **2.0 Purpose**

This Operation & Maintenance Plan (O&M Plan) is intended to provide a mechanism for the consistent inspection and maintenance of BMPs to be installed for this project. Included in this O&M Plan is a description of each BMP type, the location of individual BMPs, an inspection schedule for each stormwater system, and forms to be utilized to document the inspection and maintenance of each BMP. This O&M Plan is intended for use by the Town of Spencer, as the Town, acting through its Office of Utilities & Facilities Management, will be responsible for O&M of the stormwater BMPs.

## **3.0 Descriptions and Locations of Stormwater BMPs**

The following post-construction stormwater best management practices (BMPs) have been designed for the Town, and these proposed stormwater management systems include low impact development (LID) strategies, which are designed to capture, treat, and recharge (where applicable) stormwater runoff:

1. Powder Mill Park, Smithville Road – 4’ diameter sediment forebay structure, lined rain garden with underdrain and overflow device which discharge to flared end sections and rip rap aprons.
2. Spencer Water Department, 3 Old Meadow Road – 4’ diameter sediment forebay structure and lined rain garden with overflow grate and underdrain to rip rap apron.
3. Spencer Department of Public Works, 7 Meadow Road – Deep sump manhole, grassed sediment forebay, overflow weir, grass conveyance swale, and infiltrating rain garden with overflow weir.
4. In right of way, near 30 Meadow Road – 4’ diameter sediment forebay structure and infiltration rain garden with overflow grate which discharges to existing 24” dia. drainage pipe beneath meadow road.
5. In right of way, near 9 Meadowbrook Lane – drain manhole, sand/oil interceptor pretreatment tank and infiltration chamber system.

The locations of all stormwater BMPs are provided in the Stormwater BMP Plans in Appendix A (Locus Map) and Appendix B. These plans are titled “Spencer 319 Grant Stormwater BMP Project (Set no. 1 issued to Conservation Commission)” revised October 19, 2018 and “Spencer 319 Grant Stormwater BMP Project (Set no. 2 Issued to Utilities & Facilities Management) dated October 19, 2018.

The sections which follow provide a summary description of the stormwater BMPs located within the project site.

- 3.1 Pretreatment for the rain gardens provided by Deep Sump Manholes (4), Deep Sediment Forebays (3), Grass Sediment Forebay (1), and conveyance by Grass Swale (1); and, pretreatment prior to groundwater recharge system by a sand/oil water interceptor pre-treatment tank (1)

#### Deep Sump Manholes

In certain locations as noted on the site plans, typically where space is limited or where more intense sediment loadings are anticipated, deep sump catch manholes are placed upstream of the stormwater BMPs, to provide for removal of Total Suspended Solids from paved surface runoff. The outlet from these deep sump manholes will have an oil trap hood to contain floating oil and debris. Such deep sump manholes will act as pre-treatment devices before release to other stormwater BMPs.

#### Deep Sump Sediment Forebays

In certain locations as noted on the site plans, sediment forebays, in the form of a modified deep sump catch basin with a higher outlet are placed prior to rain gardens to settle out suspended solids in stormwater runoff. These sediment traps will appear on the surface to be a manhole, but they have a flat top rather than conical upper section. Also, the discharge from these sediment traps is released via a 4-inch high by 2-foot wide opening in the concrete on the rain garden side that will discharge the pre-treated water onto a stone/rip-rap pad conveyance into the rain garden. Each structure also has a baffle to contain floating oil and debris.

#### Grass Sediment Forebay

At the 7 Meadow Road Site the stormwater captured from the roadway will first be treated by a deep sump manhole but will then flow to a Grass Sediment Forebay. This Grass Sediment forebay will feature a flared end section with a rip rap splash pad and rip rap armored overflow device which will allow for the slowing, settling, and ultimately treating of the stormwater runoff from Meadow Road. The stormwater will then overflow from the sediment forebay and be discharged into the grass swale.

#### Grass Swale

A grass swale is a gently-sloping grass surface located between the sediment forebay and rain garden at the 7 Meadow Road site. This grass swale conveys water from the sediment forebay adjacent to Meadow Road to the proposed rain garden at the rear of the site. The surface of the swale is gently sloped to convey stormwater through the swale which is vegetated with grass and may be planted with shrubs; and this vegetation will help to filter the stormwater. The gently sloped surface will allow stormwater to enter the swale at the high end and flow through the swale connected to the downgradient rain garden.

#### Sand and Oil Water Interceptor Pretreatment Tank

At the site located adjacent to 9 Meadowbrook Lane there is a proposed Sand and Oil Water Interceptor Pretreatment Tank. The purpose of this tank is to separate out all the

sand and oil which is suspended within the stormwater before the stormwater is discharged to the Cultec infiltration facility. This structure is to be a 3,500-gallon sand and oil water separator. This tank is equipped with a sediment chamber followed by a baffle, oil chamber, inverted baffle and finally a discharge chamber. The tank shall also be equipped with three risers to grade with frames and covers for both inspection and cleaning purposes. The covers over the tank shall have "Drain" imprinted in 3" letters to designate the use of the structure below.

### 3.2 Rain Gardens

#### Infiltrating Rain Garden

Two (2) infiltration rain gardens are provided, one at the 7 Meadow Road Site and one at the 30 Meadow Road Site. The 7 Meadow Road Rain Garden will capture, treat and infiltrate at least first flush runoff, after pre-treatment via a deep sump manhole, a grass sediment forebay, and a grass swale. This basin is located on the east side of the site. Any excess flow not managed within this basin is directed to an overflow on the south side of the raingarden which overflows to the adjacent wetlands.

The 30 Meadow Road Rain Garden will capture, treat and infiltrate at least first flush runoff, after pre-treatment via a deep sump manhole and a deep sump sediment forebay. The rain garden is located on the east side of the Meadow Road within the right of way, adjacent to 30 Meadow Road. Any excess flow not managed by this rain garden will overflow through a Nyloplast riser directly to an existing drain pipe which flows underneath Meadow Road and daylights on the west side of Meadow Road. These infiltrating rain gardens will be planted with vegetation that is appropriate for a rain garden setting, one that experiences occasional flooding. The plantings enhance basin aesthetics, and the plants' root growth provides benefits in the form of water and nutrient uptake, and preservation of soil permeability within the basin. Care of these plants is therefore an important part of maintenance in this location.

#### Lined Rain Gardens

Two (2) lined rain gardens are provided: one at the Smithville Road Site and one at the 3 Old Meadow Road Site. These rain gardens will treat at least first flush runoff, after pre-treatment via deep sump manholes and sediment forebays. Any excess flow not managed within these basins is directed to a beehive overflow which overflows to the adjacent wetlands. These lined, filtering rain gardens, will be planted with vegetation that is appropriate for a rain garden setting, one that experiences occasional flooding. The plantings enhance basin aesthetics, and the plants' root growth provides benefits in the form of water and nutrient uptake, and preservation of soil permeability within the basin. Care of these plants is therefore an important part of maintenance in this location. Also, the underdrain system at each rain garden should be inspected periodically, as noted on the inspection forms, to ensure that treated water is released from these rain gardens to the adjacent wetlands.

### 3.3 Infiltration Facilities

#### Cultec Infiltration System

There is one Cultec infiltration system, located at the Meadowbrook Lane Site. The infiltration system consists of 16 Cultec 330XL chambers, with inlet pipe(s), and a system of overflow pipes to a discharge header. Most storm flows will be recharged back to the ground

at this facility; however, any overflow discharge from this recharge system (during larger storm events) is released back to the existing drainage system underneath Meadowbrook Lane. The system has 2 inspection ports which will be utilized to ensure the system is functioning properly during the systems inspections.

### 3.4 Prohibition of Illicit Discharges

No illicit discharges are allowed to enter the stormwater system at these various locations in the Town of Spencer. Illicit discharges (non-stormwater flows) are defined in Section 40 CFR 122.34(b)(3) of the Phase II Stormwater Regulations under the Clean Water Act and include:

6. Chemicals, petroleum products, paint, varnishes, solvents, oil and grease and other automotive fluids, pesticides, herbicides, and fertilizers, or other toxic materials;
7. Non-hazardous liquid, solid wastes, and yard wastes;
8. Hazardous materials, sewage, fecal coliform, and pathogens, dissolved and particulate metals;
9. Trash, refuse, rubbish, garbage, food wastes, pet wastes, litter, other discarded or abandoned objects, floatables and cleaning products;
10. Landscaping materials, sediment, lawn clippings, leaves, branches or other landscaping and yard debris;
11. Construction activities wastes and residues including but not limited to, painting, paving, concrete placement, sawcutting, material storage and earthwork;
12. Wastes and residues that result from mobile washing operations; discharges from toilets; sinks; industrial processes; cooling systems; boilers; fabric cleaning, equipment cleaning; commercial vehicle cleaning and substances added to the storm drain to control root growth;
13. Any other material that is considered harmful to humans, animals, or aquatic life and its habitat.

Illicit discharges can enter the stormwater system through either direct connection (e.g., mistaken, or deliberate connection to a drain) or indirect connection (e.g., spills or dumpings near a drainage system). The result is untreated discharges that contribute high levels of pollutants, including heavy metals, toxics, oil and grease, solvents, nutrients, viruses, and bacteria to receiving waterbodies. Pollutant levels from illicit discharges can degrade receiving water quality and threaten aquatic, wildlife, and human health.

#### Illicit Discharge Exemptions:

The following discharges, when properly managed, are exempt from the discharge prohibitions noted above:

14. Water line flushing or other potable water sources, landscape irrigation or lawn watering, irrigation return flows, diverted stream flows, rising ground water, uncontaminated ground water infiltration to storm drains, uncontaminated pumped ground water, foundation or footing drains, crawl space pumps, air conditioning condensation, springs, individual residential car washing, natural riparian habitat or wetland flows, swimming pools (if dechlorinated—less than 0.05 ppm chlorine), fire fighting activities, street wash water and any other water source not containing pollutants;

15. Discharges approved by the authorized enforcement agency necessary to protect public health and safety, such as flows from firefighting;
16. Dye testing, provided the person undertaking such testing provides verbal notification to the authorized enforcement agency twenty-four (24) hours prior to the time of the test.
17. Runoff of roadway anti-icing and deicing agents; provided that they are applied according to Best Management Practices;

### 3.5 Snow and Ice Management

Snow and ice management procedures are to be performed on all paved surfaces (i.e., roadways, driveways, parking areas, and walkways), as described in Section 5.8.

### 3.6 Street Sweeping

Street sweeping procedures are to be performed on all paved surfaces (i.e., roadways, driveways, parking areas, including pervious pavement areas), as described in Section 5.9.

## **4.0 Inspection Frequency, Inspection Safety, and Maintenance Safety**

### 4.1 Inspection Frequency:

Initially, all BMPs shall be inspected once a month during the first six (6) months and then on a quarterly or semi-annual basis depending upon the BMP. A complete and thorough inspection of the stormwater BMP systems shall be performed at the frequency outlined for each BMP within Section **5.0 Inspection and Maintenance Procedures** using the Inspection and Maintenance Forms provided in Appendix C.

For all rain gardens and the grass swale, a qualified landscape contractor shall complete an Inspection and Maintenance Form for each rain garden and swale visit. Completed forms shall be stored in a binder to be kept by the Town at the Office of Utilities and Facilities, as described in Section 6.0. See Section 5.0 Implementation and Maintenance Procedures for a complete description of the inspection activities.

### 4.2 Inspection Safety:

The inspector performing the inspections on the drainage structures shall have the proper safety equipment (heavy duty gloves, steel-toed boots, hard hat, and first aid kits, etc.) and training before conducting any inspections. If the inspection of the drainage structures reveals any safety problems the site activities may need to be modified to reduce or eliminate the safety risk. The following is a list of safety precautions an inspector shall be aware of when conducting the drainage structure inspections.

18. Never enter a confined space unless you have proper Occupational Health and Safety Administration (OSHA) training. Do not enter any confined space until the atmosphere has been checked and proper safety equipment is worn or erected.
19. Avoid entering pipes or conduits without another individual present. If the structural strength of a pipe or conduit is questionable, do not enter the pipe or conduit.
20. Check the ventilation in the drainage structures before using any ignitable materials. Some drainage structures may be sealed or have poor ventilation, posing a safety risk to the inspector if the vapor comes in contact with an open flame. Also, be sure to allow the drainage structures to vent for a period of time if a peculiar odor is present.

21. Wear gloves if any mechanical parts or structures components are going to be handled. Wearing gloves not only reduces the risk of getting cuts and abrasions, but also reduces the exposure of pollutants to the skin.
22. Lift manhole covers or other structural covers (access covers, grates, etc.) carefully. These items can be very heavy and if wet, can be slippery. Also, learn the correct way to lift heavy items to avoid back injury.
23. Check the water depth of the system before taking a step in the water. The water may be deeper than it seems or there may be steep slopes below the water line.
24. Be aware that nails, broken glass, or other sharp debris may be in the storm water system and can cause injury. Wearing the proper safety clothing will reduce the safety risk associated with these objects.

#### 4.3 Maintenance Safety:

All maintenance work should be done in accordance with OSHA regulations. Maintenance personnel should have the proper safety equipment (heavy duty gloves, steel-toed boots, hard hat, first aid kits, etc.) and training before performing any maintenance on the drainage structures. The following is a list of safety precautions maintenance personnel shall be aware of when they perform maintenance on the drainage structures.

25. Operate equipment safely and in accordance with the manufacturer's specifications. Equipment operators must remain aware of site personnel at all times to avoid causing injury to others.
  26. Contact Dig Safe System Inc. at 1-888-DIG-SAFE seventy-two (72) hours before excavating a site. Underground utility wires and pipes may be present. Cover or clearly mark excavated areas that cannot be filled in at the end of the day to alert site employees of the potential risk. Also, be aware of overhead electrical wires that could come in contact with maintenance equipment.
  27. Identify where removed sediment or wastes will be disposed of prior to cleaning the drainage structures. Use shovels, trowels, or a high-suction vacuum to remove wastes. Do not clean sediment or waste with bare hands. The sediment or waste may be hazardous. Place the sediment or waste in an area where it can not be washed into a storm drain or water body.
- Wear gloves if any mechanical parts or structural components are going to be handled. Wearing gloves not only reduces the risk of getting cuts and abrasions, but also reduces the exposure of pollutants to the skin.

### **5.0 Inspection and Maintenance Procedures**

The Town is responsible for the inspections and maintenance of the stormwater system components. The following list of inspections and maintenance shall be performed on the required schedule. All sediment, debris, and hydrocarbons that are removed during the maintenance of the stormwater system components should be properly handled and disposed.

#### 5.1 Deep Sump Manholes & Deep Sump Sediment Forebays

All Deep Sump Catch Basins & Sediment Forebays shall be inspected at least twice a year: once in early spring and once during the fall; and inlets and outlets shall be inspected to be sure they are free and clear of any accumulated debris. Any oil, if accumulated to any visible degree should be removed using absorptive pads (and disposed of according to required regulations). Sediment that has accumulated in the sumps up to 50% of sump depth shall be removed.

## 5.2 Grass Sediment Forebay

All grass sediment forebays shall be inspected at least three times per a year (i.e. excludes winter inspection), and regularly cleaned of debris and/or mowing as appropriate. Do not use heavy equipment within the grass sediment forebay as it will lead to undesirable compaction of soil. Inlets and outlets shall be inspected to make sure they are free and clear of any accumulated debris. Any sediment accumulation over 1" shall be removed during the regular inspections.

## 5.3 Grass Swale

All grass swales shall be inspected at least three times per a year (i.e. excludes winter inspection), and regularly cleaned of debris and/or mowing as appropriate. Do not use heavy equipment within the grass swale as it will lead to undesirable compaction of soil. Inlets and outlets shall be inspected to make sure they are free and clear of any accumulated debris. Any sediment accumulation over 1" shall be removed during the regular inspections.

## 5.4 Sand and Oil Water Separator Pretreatment Tank

The sand and oil water separator pretreatment tank shall be inspected at least twice a year: once in early spring and once during the fall. Inspections shall be conducted by opening all the 24" dia. covers which are to be installed over the tank and ensuring all aspects of the tank look to be in acceptable and working order. Any accumulated sediment, oil, and other debris shall be removed (vacuumed out) at least annually from the tank. The inspector shall also look at the inlet and outlet pipes to ensure there is no clogged or broken pipes. The bottom and sides of the tanks shall be visually inspected to ensure that no cracks other signs of fatigue have developed.

## 5.5 Infiltrating and Lined Rain Gardens

The Infiltration and lined rain gardens shall be inspected at least three times per a year (i.e. excludes winter inspection), and landscaped regularly (cleaned of debris, with plants pruned and replaced if necessary, with fresh mulch, and/or mowing as appropriate). Do not use heavy equipment within the rain gardens as it will lead to undesirable compaction of soil. Inspections and maintenance procedures shall occur as required for landscaping, but as noted, and at least three times per year; once in each season excluding winter. The primary maintenance functions are: (1) the removal of accumulated sediment and debris, (2) erosion repair, (3) inspect proper functioning of outlet devices after major storms, and (4) inspect and clean pretreatment devices, and pruning and/or replacement of plants.

Also, the underdrain system for the two lined rain gardens (Smithville Rd. and 3 Old Meadow Rd.) should be checked by opening inspection ports and shining light down into the inspection ports during site inspection visits. In addition, the ends of the outlet pipes from the rain garden underdrains shall also be inspected to confirm that flow is discharged from each. The inspection shall focus on checking the outlet pipes to ensure that there is free and clear

flow from the underdrains. For obvious reasons, such inspections should occur during significant rainfall events when flow is being generated from the rain garden underdrains.

## 5.6 Subsurface Cultec Recharge Chambers

The subsurface Cultec recharge chambers shall be inspected at least twice per year: once in early spring and once during the fall. Inspection ports are provided for this inspection to provide access to the subsurface structures. During the inspection, the inlet and outlet pipes shall be inspected for clogging of sediment, debris, and litter. Any accumulated sediment and debris within the structures shall be removed (vacuumed out) at least annually. The inspector shall also look for signs of ponding of water and oil/grease inside of the structures. Ponding water may be an indication of clogging or a high groundwater table.

## 5.7 Prohibition of Illicit Discharges

Illicit discharge detection and elimination (IDDE) procedures should be implemented at the site to ensure that no illicit discharges enter the stormwater drainage system. All contractors performing work at the site are instructed to follow the IDDE procedures.

The illicit discharge detection and elimination (IDDE) procedures are as follows<sup>1</sup>:

### Step 1 – Locate Problem Areas

Methods to locate problem areas include visual inspection, water sampling from drain catch basins and outfalls, and public complaints.

### Step 2 – Find the Source

Methods that can find the source of the illicit discharge include tracing the discharge upstream in the stormwater drainage system, using video to inspect the storm sewers, and questioning potential witnesses of the illicit discharge.

### Step 3 – Remove/Correct Illicit Connections

Once the source is identified, the offending discharger should be notified and directed to correct the problem. Education efforts and working with the discharger should be implemented before taking legal action.

### Step 4 – Document Actions Taken

All actions taken under to detect and eliminate illicit discharges should be documented. Such records shall be retained with completed inspection and maintenance forms, as described in Section 6.0.

## 5.8 Snow and Ice Management

Prior to the winter season, the limits of all paved surfaces (i.e., roadways, driveways, parking areas, and walkways) near the stormwater BMPs shall be marked with rebar stakes, driven into the ground, with orange caps. All paved surfaces shall be plowed when at least two (2) inches of snow accumulates. Snow removal can be achieved using a truck-mounted plow, push-blower, or shovel.

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<sup>1</sup> Fact Sheet, Illicit Discharge Detection and Elimination Minimum Control Measure, U.S. Environmental Protection Agency, revised December 2005

Typically, snow shall be plowed, pushed, or blown to the sides of the paved areas; however, snow shall not be stored in or over the rain gardens, within any grass drainage swales, or within any grassed sediment forebays. During extremely large snow storms, snow shall be collected and deposited in piles in the pre-designated snow storage areas, as determined by the Town. Otherwise, snow can be removed from the site and legally disposed of off-site.

Sodium chloride (NaCl), “rock salt”, calcium chloride (CaCl), or a mixture of NaCl and CaCl shall be used for de-icing and anti-icing paved surfaces except for any porous pavement areas. No sand or de-icing materials should be used on porous pavement to ensure no fines get trapped in the pavement and no longer allow for infiltration. De-icing is the reactive application to melt existing snow and ice. De-icing shall be performed after snow-removal operations to melt the remaining snow and ice. Anti-icing is the proactive application to melt snow and ice before a storm. Anti-icing helps prevent snow and ice from bonding to pavement and can help create safe walking and driving conditions. De-icing and anti-icing products can be applied using a truck-mounted spreader or push-spreader.

Excessive sanding is prohibited for snow and ice management near the stormwater BMPs, since sand can be carried into the stormwater drainage features and to minimize the amount of spring clean up to remove sand. We understand minimal amounts of sand may be needed to supplement salt use and to make it easier to spread the salt. In summary, the acceptable and prohibited products are listed below.

Acceptable Ice Management Products: Sodium chloride (NaCl), “rock salt”  
Calcium chloride (CaCl)

Prohibited Ice Management Products: Use of excessive Sand. Only minimal amounts as necessary to supplement salt use.

## 5.9 Street Sweeping

The paved surfaces (i.e., roadway, driveways, and parking areas) near stormwater BMPs should be swept annually in the early spring using a vacuum-type sweeper.

## 6.0 Record Keeping

An “Inspection and Maintenance Form” shall be filled out each time inspectional or maintenance work is performed. A binder shall be kept by the Town (at the Office of Utilities and Facilities) that contains all the completed inspections forms and/or photographs and related material. A review of all Operation & Maintenance actions should take place annually by the Director of Utilities & Facilities to ensure that these Stormwater BMPs are being taken care of in the manner illustrated in this Operation & Maintenance Plan.

## 7.0 Maintenance Responsibilities

As noted earlier, the Town’s Office of Utilities and Facilities is solely responsible for compliance with this Operation & Maintenance (O&M) Plan. The Town is responsible for completing all the operation and maintenance tasks, and if a said task cannot be completed by the Town an outside contractor must be hired to complete the task. BMP’s are solely owned by the Town of Spencer, Massachusetts. The money needed to both operate and maintain the stormwater BMP’s as outlined in this Operation and Maintenance manual will come from the from the Office of Utilities and Facilities annual budget.

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## APPENDICES

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Appendix A Location Map of Stormwater BMP's

Appendix B Plans (11"x17") Spencer 319 Grant Stormwater BMP Project

- Set Number 1 Issued to Conservation Commission (8 Pages)
  - Powder Mill Park
  - Spencer Water Department
  - Spencer Department of Public Works
- Set Number 2 Issued to Utilities and Facilities Management (6 Pages)
  - Meadow Road
  - Meadowbrook Lane

Appendix C Inspection and Maintenance Forms

- Deep Sump Manholes and Deep Sump Sediment Forebays
- Grass Sediment Forebay
- Grass Swale
- Rain Gardens
- Sand and Oil Water Separator Pretreatment Tank
- Subsurface Cultec Recharge Chambers

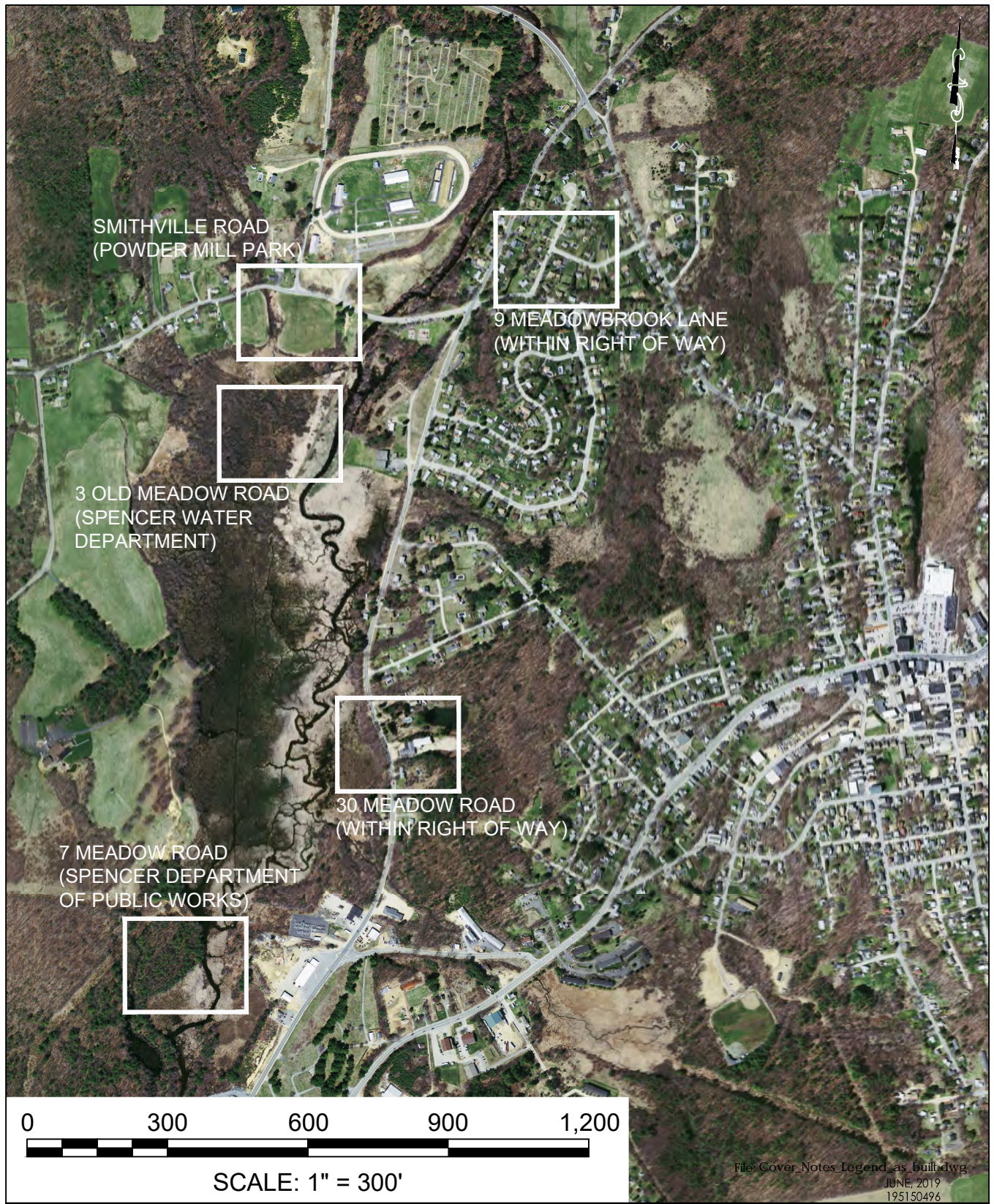
Appendix D Illicit Discharge Compliance Statement

## **APPENDIX A**

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### STORMWATER BMP LOCATION MAP





400 CROWN COLONY DRIVE  
QUINCY, MASSACHUSETTS 02169

Client/Project  
TOWN OF SPENCER, MA  
319 GRANT  
STORMWATER IMPROVEMENTS  
Figure No.  
1.0  
Title  
LOCUS MAP



## **APPENDIX B**

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### SPENCER 319 GRANT STORMWATER BMP PROJECT PLANS (11" x 17")

- Set Number 1 Issued to Conservation Commission (8 Pages)
  - Powder Mill Park
  - Spencer Water Department
  - Spencer Department of Public Works
- Set Number 2 Issued to Utilities and Facilities Management (6 Pages)
  - Meadow Road
  - Meadowbrook Lane



**STORMWATER IMPROVEMENTS (TOWN PROPERTY)  
SPENCER, MASSACHUSETTS  
01562**

PROJECT NO. 195150496

AUGUST 1, 2018 - ISSUED TO CONSERVATION COMMISSION  
REV. OCTOBER 19, 2018 FOR CONSTRUCTION

TOWN OF SPENCER  
3 OLD MEADOW ROAD  
SPENCER, MA 01562

STANTEC CONSULTING INC.  
400 CROWN COLONY DRIVE  
QUINCY, MA 02169

CDW CONSULTANTS, INC.  
6 HURON DRIVE  
NATICK, MA 01760

SHEET NO.      TITLE

1. COVER
2. NOTES AND LEGEND
3. SITE 1 - POWDER MILL PARK
4. SITE 2 - SPENCER WATER DEPARTMENT
5. SITE 3 - SPENCER DEPARTMENT OF PUBLIC WORKS
6. DETAIL SHEET - 1
7. DETAIL SHEET - 2
8. DETAIL SHEET - 3

THESE PLANS SHALL NOT BE UTILIZED FOR CONSTRUCTION  
UNTIL WRITTEN AUTHORIZATION IS OBTAINED FROM THE  
ENGINEER.



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ORIGINAL SHEET - ARCH D

GENERAL SPECIFICATIONS

- ALL UTILITIES INTERFERED WITH OR DAMAGED SHALL BE PROPERLY RESTORED IMMEDIATELY, BY THE CONTRACTOR. THE CONTRACTOR SHALL CAREFULLY BED, TAMP, AND FULLY CONSOLIDATE REFILL MATERIAL AROUND AND UNDER ALL EXISTING UTILITIES ENCOUNTERED OR CROSSED UNLESS OTHERWISE SHOWN ON THE DRAWINGS.
- ALL OPEN EXCAVATIONS SHALL BE ADEQUATELY SAFEGUARDED BY PROVIDING TEMPORARY BARRICADES, CAUTION SIGNS, LIGHTS AND OTHER MEANS TO PREVENT ACCIDENTS TO PERSONS, AND DAMAGE TO PROPERTY. THE CONTRACTOR SHALL, AT HIS OWN EXPENSE, PROVIDE SUITABLE AND SAFE BRIDGES AND OTHER CROSSINGS FOR ACCOMMODATING TRAVEL BY PEDESTRIANS AND WORKMEN. NO EXCAVATIONS SHALL REMAIN OPEN OVERNIGHT.
- THE CONTRACTOR SHALL, AT ALL TIMES, CONTROL DUST FROM ROAD SURFACES AND ELSEWHERE WITHIN THE AREA TO THE ENGINEER'S SATISFACTION.
- THE EXACT LOCATION OF ALL PROPOSED PIPES, VALVES, FITTINGS, TANKS, PUMPS, ELECTRIC/CONTROL WIRING, ETC. IS TO BE DETERMINED BY THE CONTRACTOR IN THE FIELD.
- SAW CUTTING OF PAVEMENT –THE ROADWAY AND/OR PARKING LOT PAVEMENT ARE TO BE SAW CUT TO NEAT, TRUE LINES AS DIRECTED. SUCH CUTTING SHALL BE TO A DEPTH BELOW THE PAVEMENT AS TO PREVENT TEARING OF THE SURFACE DURING EXCAVATION.
- TRENCH EXCAVATION – CONTRACTOR SHALL OBTAIN ALL NECESSARY STATE/LOCAL TRENCH/EXCAVATION PERMITS AND COMPLY WITH ASSOCIATED TRENCH/EXCAVATION SAFETY LAWS. TRENCH EXCAVATION SHALL CONSIST OF THE REMOVAL OF ALL MATERIALS ENCOUNTERED. EXCAVATIONS SHALL BE MADE TO ACCOMMODATE THE ELEVATION, DEPTH OF COVER, OR DETAIL SHOWN ON THE DRAWINGS OR SPECIFIED. TRENCH WIDTHS SHALL BE KEPT TO THE MINIMUM PRACTICABLE BUT SHALL BE AT LEAST TWO FEET WIDE. THE BOTTOM OF THE TRENCHES SHALL BE FIRM AND FREE OF WATER AND SHALL BE ACCURATELY GRADED AND SHAPED TO ALLOW THE REQUIRED BEDDING BENEATH THE BOTTOM OF ALL PIPES INSTALLED.
- UNSUITABLE MATERIAL – ALL EXCAVATED MATERIAL IS TO BE DISCARDED UNLESS OTHERWISE SUITABLE; AND IF NOT SUITABLE, TO BE REPLACED WITH THE FOLLOWING MATERIAL OR EQUIVALENT, 1/2" TO 3/4" CRUSHED PROCESSED GRAVEL FOR THE BED AND ALSO ABOVE THE ITEMS PLACED IN THE EXCAVATION, FOR A DEPTH NOT LESS THAN SIX (6) INCHES BELOW THE BOTTOM MOST PORTION OF THE ITEM AND FOR A THICKNESS NOT LESS THAN SIX (6) INCHES ABOVE THE TOPMOST PORTION OF THE ITEM.
- DISPOSAL OF DISCARDED MATERIALS – ALL DISCARDED MATERIALS, RUBBISH, AND DEBRIS THAT ARE DUMPED OR FALL WITHIN THE LIMITS OF THE PROJECT SHALL BE REMOVED FROM THE SITE AND DISPOSED OF BY THE CONTRACTOR. ALL COSTS ASSOCIATED WITH THE LEGAL DISPOSAL OF EXCESS MATERIALS SHALL BE BORNE BY THE CONTRACTOR.
- BACKFILL MATERIAL – THE BACKFILL MATERIAL USED SHALL BE OF A QUALITY SATISFACTORY TO THE ENGINEER, AND SHALL BE FREE FROM LARGE OR FROZEN LUMPS OF WOOD, ORGANIC MATTER AND OTHER EXTRANEOUS MATERIAL AND SHALL CONTAIN NO ROCKS OR STONES GREATER THAN 3" DIAMETER.
- COMPACTION OF BACKFILL – BACKFILL SHALL BE UNIFORMLY DISTRIBUTED IN SUCCESSIVE LAYERS, EACH LAYER BEING THOROUGHLY COMPACTED BEFORE THE SUCCEEDING LAYER IS PLACED. THE ENTIRE WIDTH OF THE TRENCH SHALL BE MECHANICALLY OR HAND TAMPED IN SIX (6) INCH LIFTS, EXTENDING A MINIMUM OF TWO (2) FEET ABOVE THE UTILITY INSTALLATION, AND MECHANICALLY TAMPED THE REMAINDER OF THE FILL IN LIFT DEPTHS NOT GREATER THAN TWO (2) FEET.
- TEMPORARY PAVING SHALL BE PLACED OVER TRENCHES IN HARD-SURFACED STREETS AND ROADS, AND SHALL BE OF BITUMINOUS CONCRETE BASE COURSE, LAID IN ONE-COURSE, 2 INCHES THICK, BACKFILL AT TOP OF TRENCH SHALL BE REMOVED TO ALLOW FOR PLACING TEMPORARY SURFACING. CONTRACTOR SHALL MAINTAIN TEMPORARY SURFACING IN GOOD CONDITION. TRENCHES SHALL BE INSPECTED AT LEAST ONCE A WEEK AND IMMEDIATELY AFTER EACH STORM. HOLES AND SETTLEMENTS SHALL BE PROMPTLY REFILLED WITH BITUMINOUS MIXTURE.
- RESTORATION OF PERMANENT PAVING – THE BITUMINOUS CONCRETE BASE AND TOP SHALL BE LAID AND ROLLED IN TWO (2) COURSES. THE BINDER (BASE COURSE) SHALL NOT BE LESS THAN THE EXISTING ROADWAY BASE COURSE AND SHALL NOT BE LESS THAN TWO AND ONE-HALF (2-1/2") INCHES IN DEPTH AND THE TOP COURSE SHALL BE ONE AND ONE-HALF (1-1/2") INCHES IN DEPTH. THE BASE COURSE OF THE PERMANENT PAVEMENT SHALL BE PLACED AND CAREFULLY RAKED TO MINIMUM SURFACE AND THOROUGHLY ROLLED TO THE REQUIRED THICKNESS. BEFORE PLACING THE BASE COURSE OF THE PERMANENT PAVEMENT, THE EDGE OF THE ORIGINAL BITUMINOUS SURFACING SHALL RECEIVE AN APPLICATION OF APPROVED ASPHALT EMULSION SO THAT NEW PAVEMENT MATERIAL MAY BE PROPERLY BONDED TO THE EXISTING PAVEMENT. ALL SEAMS SHALL BE SEALED WITH AN APPROVED EMULSIFIED LIQUID ASPHALT AND SAND. THE TOP COURSE OF THE PERMANENT PAVING SHALL BE PLACED TO A GRADE THAT WILL MATCH THE EXISTING BITUMINOUS SURFACE AFTER ROLLING.
- THE PERMANENT PAVING SHALL NOT OVERLAP THE EXISTING PAVEMENT AND SHALL NOT BE APPLIED WITH A MECHANICAL SPREADER UNLESS OTHERWISE DIRECTED BY THE TOWN ENGINEER. THE CONTRACTOR SHALL FURNISH, PLACE, GRADE, AND COMPACT BITUMINOUS CONCRETE PAVEMENT OF CLASS I AS SHOWN AND SPECIFIED IN THE LATEST MASS D.O.T. STANDARD SPECIFICATION.
- DISTURBING EXISTING UTILITIES – SPECIAL CARE SHALL BE EXERCISED DURING EXCAVATION TO AVOID INJURY TO UNDERGROUND STRUCTURES, SUCH AS ELECTRICAL OR CABLES, WATER OR GAS MAINS, PIPES, CONDUITS, MANHOLES, CATCH BASINS, ETC.
- THE CONTRACTOR SHALL CONTROL ALL SURFACE WATER WITHIN THE WORK AREA. EXCAVATIONS SHALL BE PROTECTED FROM FLOODING BY SURFACE WATER BY USE OF BERMS, DITCHES, OR OTHER SUITABLE MEANS DEEMED APPROPRIATE BY THE CONTRACTOR.
- THE CONTRACTOR SHALL PREVENT SILTATION OF ANY WETLANDS OR WATER BODIES FROM RUN-OFF AND OR PUMPING OPERATIONS ASSOCIATED WITH THE CONSTRUCTION OPERATIONS, THROUGH THE USE OF HAY BALES, SILTATION FENCES OR OTHER METHODS APPROVED BY THE ENGINEER.
- THE CONTRACTOR SHALL PROSECUTE THE WORK SO THAT NO DAMAGE OCCURS TO ADJACENT UTILITIES, STRUCTURES, PROPERTY, OR ANY OTHER INSTALLATION LOCATED IN OR ADJACENT TO WORK AREAS. DAMAGED UTILITIES SHALL BE REPLACED OR REPAIRED WITH SIMILAR OR BETTER MATERIALS OF THE SAME SIZE AND TO THE REQUIREMENTS OF THE UTILITY OR SITE OWNER. THE CONTRACTOR SHALL HAVE ON SITE THE NECESSARY MANPOWER, MATERIALS, AND EQUIPMENT SUCH AS PUMPS, PIPING, AND THE LIKE AS REQUIRED TO PROTECT AND MAINTAIN UNINTERRUPTED FLOWS IN EXISTING UTILITIES DURING CONSTRUCTION. FLOW FROM BUILDINGS TO SEPTIC TANKS TO EXISTING LEACHING AREAS SHALL BE MAINTAINED (OR PUMPED AND REMOVED BY TOWN APPROVED SEPTIC PUMPER IF NECESSARY) UNTIL FINAL SEWER CONNECTIONS ARE COMPLETED AND APPROVED BY ENGINEER.
- EXCAVATIONS SHALL BE KEPT FREE FROM WATER, SNOW, AND ICE DURING CONSTRUCTION. BEDDING AND BACKFILL MATERIAL SHALL NOT BE PLACED IN WATER. WATER SHALL NOT BE ALLOWED TO RISE UPON OR FLOW OVER BEDDING AND BACKFILL MATERIAL.
- THE CONTRACTOR SHALL MAINTAIN ALL BENCHMARKS, MONUMENTS, AND OTHER REFERENCE POINTS AND IF DISTURBED, SHALL REPLACE THEM AT NO ADDITIONAL COST TO THE OWNER.
- THE CONTRACTOR SHALL PROTECT ALL EXISTING SEWERS AND UTILITIES, AND REPAIR OR REPLACE ANY DAMAGED PIPES OR UTILITIES AS PART OF THE CONTRACT WORK.
- VEHICLE TRAFFIC, VEHICLE PARKING, STOCKPILING OF MATERIALS, AND STORAGE OF EQUIPMENT IS PROHIBITED AT ALL TIMES OVER THE RAIN GARDENS AND INFILTRATION BASINS DURING CONSTRUCTION. COMPACTION SHALL NOT OCCUR WITHIN ANY RAINGARDEN.
- ALL STRUCTURES SHALL BE DESIGNED FOR H-25 LOADING.

EROSION CONTROL & SOIL STABILIZATION PROGRAM

- DENUDED SLOPES SHALL NOT BE LEFT EXPOSED FOR EXCESSIVE PERIODS OF TIME.
- ALL DISTURBED SLOPES EITHER NEWLY CREATED OR EXPOSED PRIOR TO OCTOBER 15 SHALL BE SEEDED OR PROTECTED BY THAT DATE FOR ANY WORK COMPLETED DURING EACH CONSTRUCTION YEAR.
- TEMPORARY TREATMENTS SHALL CONSIST OF A HAY, STRAW OR FIBER MULCH OR PROTECTIVE COVERS SUCH AS A MAT OR FIBER LINING (BURLAP, JUTE, FIBERGLASS NETTING, EXCELSIOR BLANKETS). THEY SHALL BE INCORPORATED INTO THE WORK AS WARRANTED OR AS ORDERED BY THE OWNER OR ITS DESIGNATED AGENT.
- ALL STRAW WATTLES OR TEMPORARY PROTECTION SHALL BE INSTALLED AS SHOWN ON THE PLANS PRIOR TO COMMENCING ANY EARTH DISTURBANCE, AND SHALL REMAIN IN PLACE UNTIL AN ACCEPTABLE STAND OF GRASS OR APPROVED GROUND COVER IS ESTABLISHED.
- THE TOPSOIL SHALL HAVE SANDY LOAM TEXTURE RELATIVELY FREE OF SUBSOIL MATERIAL, STONES, ROOTS, LUMPS OF SOIL, TREE LIMBS, TRASH OR CONSTRUCTION DEBRIS AND SHALL BE PLACED TO A DEPTH OF 4" ON ALL LOAM AND SEED AREAS.
- THE SEED MIX SHALL BE INOCULATED WITHIN 24 HOURS, BEFORE MIXING AND PLANTING, WITH APPROPRIATE INOCULUM FOR EACH VARIETY.
- THE DESIGN MIX FOR ANY SITE GRASS SHALL BE COMPRISED OF THE FOLLOWING:

LOAM AND SEED AREAS		
TYPE	BY WEIGHT	
RED FESCUE	75%	
COLONIAL BENTGRASS, "EXETER"	5%	
BIRDSFOOT TREFOIL, "EMPIRE"	15%	
PERENNIAL RYEGRASS	5%	
APPLICATION RATE	100 LBS/ACRE	

- NO MATERIALS SHALL BE DEPOSITED WITHIN ANY WATERCOURSE, WETLANDS AREA OR DRAINAGE FACILITY.

EROSION CONTROL & SOIL STABILIZATION PROGRAM

- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE FURNISHING OF ALL LABOR, MATERIALS, TOOLS, EQUIPMENTS, ACCESSORIES AND APPURTENANCES NECESSARY TO SATISFACTORILY COMPLETE ALL STRIPPING OF TOPSOIL, EXCAVATION OF EARTH AND ROCK, STOCKPILING, REMOVAL OF UNSATISFACTORY MATERIALS, BACKFILLING, FILLING, COMPACTION, AND GRADING, AND ALL INCIDENTAL WORK PERTAINING THERETO.
- THE CONTRACTOR SHALL PROSECUTE THE WORK SO THAT NO DAMAGE OCCURS TO ADJACENT UTILITIES, STRUCTURES, PROPERTY, OR ANY OTHER INSTALLATION LOCATED IN OR ADJACENT TO WORK AREAS. DAMAGED UTILITIES SHALL BE REPAIRED WITH SIMILAR OR BETTER MATERIALS OF THE SAME SIZE AND TO THE REQUIREMENTS OF THE UTILITY OWNER. THE CONTRACTOR SHALL HAVE ON SITE THE NECESSARY MANPOWER, MATERIALS AND EQUIPMENT SUCH AS PUMPS, PIPING, AND THE LIKE AS REQUIRED TO PROTECT AND TO MAINTAIN UNINTERRUPTED FLOWS IN EXISTING UTILITIES DURING CONSTRUCTION.
- EXCAVATION EQUIPMENT SHALL BE OF SUCH SIZE AND TYPE, AND USED IN A MANNER, THAT WILL NOT DAMAGE EXISTING ITEMS SUCH AS BUT NOT LIMITED TO PAVED SURFACES, UTILITIES, STRUCTURES AND TREES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLIANCE WITH ALL APPROPRIATE SAFETY REGULATIONS. THE CONTRACTORS PARTICULAR ATTENTION IS CALLED TO THE RULES AND REGULATIONS INCLUDED IN PUBLIC LAW 91-596 KNOWN AS THE "OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970" (OSHA).

GENERAL CONSTRUCTION SEQUENCING

- PRE-CONSTRUCTION MEETING WITH OWNER AND OWNER'S ENGINEER PRIOR TO COMMENCING ANY WORK.
- PLACE CONSTRUCTION SAFETY FENCE AROUND PROPERTY TO LIMIT ACCESS AND PROTECT THE PUBLIC.
- MOBILIZE TO SITE AND DEVELOP A CONSTRUCTION STAGING AREA APPROVED BY OWNER AND THE OWNERS ENGINEER.
- PLACE ENVIRONMENTAL PROTECTION DEVICES INCLUSIVE OF STRAW WATTLES, SILTATION FENCING, AND TEMPORARY STABILIZATION. ESTABLISH SOIL STOCKPILE AREAS AND PLACE SILTATION FENCING AROUND THE STOCKPILE AREAS TO CONTAIN THE SOIL. ALSO, PROVIDE SILT SACKS AT EXISTING DOWN-GRADIENT CATCH BASINS.
- THE OWNER RESERVES THE RIGHT TO SCHEDULE THE CONTRACTOR TO CONSTRUCT AT ANY LOCATIONS WITHIN THE PROJECT AREA. AT THE SAME TIME THE OWNER MAY SCHEDULE THE SUSPENSION OF CONSTRUCTION AT ANY LOCATION.
- AFTER THE CONTRACTOR HAS STAKED OUT THE FACILITIES TO BE CONSTRUCTED AND HAS THE APPROVED MATERIALS ON THE JOB, THE OWNER'S ENGINEER SHALL BE NOTIFIED AT LEAST TWO WORKING DAYS IN ADVANCE OF CONSTRUCTION TO ARRANGE INSPECTIONS. THE SPENCER OFFICES OF UTILITIES AND FACILITIES, SHALL BE PROVIDED NOTIFICATION FOR DAILY INSPECTIONS IF REQUIRED. NOTIFY TOWN 2 WEEKS PRIOR TO STARTING CONSTRUCTION.
- CLEAR AND GRUB WITHIN WORK LIMITS ONLY.
- HAVE A WATER TRUCK ON-SITE TO MINIMIZE FUGITIVE DUST DURING BUILDING DEMOLITION, EXCAVATION, PAVEMENT OR PARKING SURFACE DEMOLITION, SHED FOUNDATION EXCAVATIONS AND GENERAL CONSTRUCTION PROCESSES.
- FOR THE PROTECTION OF LIFE AND PROPERTY, ALL BACKFILL OPERATIONS SHALL FOLLOW CLOSELY BEHIND ANY OPEN EXCAVATION OR PIPE LAYING. THE CONTRACTOR SHALL INSURE THAT NO EXCAVATION BE LEFT OPEN, UNGUARDED, OR WATER FILLED DURING ANY PERIOD OF TIME WHEN WORK IS NOT ACTUALLY IN PROGRESS. IT IS THE PURPOSE AND INTENT THAT ALL EXCAVATIONS AND BACKFILLING, INCLUDING CONSOLIDATION OPERATIONS, AND TEMPORARY SURFACING WITHIN AN AREA BE ACCOMPLISHED EXPEDITIOUSLY BEFORE PROCEEDING TO OTHER WORK AREAS.
- SHOULD DEWATERING BE NECESSARY, THE CONTRACTOR SHALL DESIGN AND INSTALL A DEWATERING FACILITY, SEE GENERAL SPECIFICATIONS NOTE 16. CONTRACTOR'S DESIGN SHALL BE APPROVED BY OWNERS ENGINEERING AND CONSERVATION COMMISSION AGENT.
- BACKFILLING WILL ONLY OCCUR IN THE DESIGNATED AREAS, AND EROSION CONTROL PRACTICES SHALL BE SET IN PLACE PRIOR TO BACKFILLING TO ENSURE NO SEDIMENT MIGRATION OFF-SITE OR TO DRAINAGE SYSTEMS DURING THE BACKFILLING PROCEDURE. BACKFILLING SHALL OCCUR IN 6-12 INCH LIFTS, AND SHALL BE COMPACTED TO A DENSITY NOT LESS THAN 95% OF THE MAXIMUM DRY DENSITY (HOWEVER RAINGARDENS SHALL NOT BE COMPACTED).
- EXCAVATE AND REMOVE THE EXISTING PAVED SURFACES TO BE REPLACED, AS NOTED ON THE SITE PLANS, AND SUCH SOILS ARE TO BE USED AS COMMON FILL WHERE ACCEPTABLE TO THE ENGINEER OR TRUCKED AWAY AND DISPOSED OF IN A LEGAL MANNER.
- ROUGH GRADE PARKING AREAS AND ACCESS WAY SUB GRADE AND REFILL GRAVEL TO MAINTAIN ROAD GRADES.
- ROUGH GRADE THE GROUND AROUND FOUNDATIONS, PARKING LOT AREAS, RAINGARDENS, AND INFILTRATION BASINS.
- INSTALL NEW CATCH BASINS, SEDIMENT FOREBAYS, DRAIN PIPES, RAIN GARDENS, SPILLWAYS AND RIP RAP APRONS. INSTALL SILT SACKS ONCE NEW CATCH BASINS ARE INSTALLED.
- PLACE BINDER FOR ALL PARKING LOT OR PAVEMENT REPLACEMENT AREAS AND ANY NEW PARKING LOT OR PAVED AREAS, AND INSTALL ACCESS WAYS AND PARKING LOT ROLLED ASPHALT BERM AS CALLED FOR ON PLANS.
- PLACE TOPSOIL ON AREAS NOT BEING PAVED OR COMPLETED WITH OTHER FEATURES.
- INSTALL FINAL LANDSCAPING, INCLUDING HYDROSEEDING OF LOAM AREAS TO BECOME LAWN.
- MONITOR ROAD AND TRENCH SETTLEMENT DURING CONSTRUCTION PROCESS.
- FINALIZE ALL GRADING FOR THE RAINGARDENS AND INFILTRATION BASINS, INCLUDING THE OVERFLOW DEVICES.
- REMOVE AND PROPERLY DISPOSE OF SILT AND COLLECTED DEBRIS FROM ALL ENVIRONMENTAL PROTECTION DEVICES. CLEAN UP SITE, REMOVE SILT SACKS, CLEAN CATCH BASINS.
- REMOVE ENVIRONMENTAL PROTECTION DEVICES AFTER RECEIVING APPROVAL FROM THE OWNER'S ENGINEER AND AND THE TOWN OF SPENCER CONSERVATION COMMISSION.
- DEMOBILIZE FROM SITE.



BMP SITE MAP



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Consultants

Legend

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Revision	By	Appd.	YY.MM.DD
CONSTRUCTION SET	WAS	MSB	18.10.18
CONSERVATION FILING	WAS	MSB	18.08.01
Issued	By	Appd.	YY.MM.DD

File Name:	SPENCER-319 GRANT	WAS	MSB	WAS	18.08.01
		Dwn.	Chkd.	Dign.	YY.MM.DD

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Client/Project

THE TOWN OF SPENCER  
319 STORMWATER GRANT

NOTES AND LEGEND

Title

Project No.	Scale		
195150496			
Drawing No.	Sheet	Revision	
































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### Legend

- |   |                          |   |                        |
|---|--------------------------|---|------------------------|
|  | EXISTING FLOW ARROW      |  | PROPOSED FLOW ARROW    |
|  | EXISTING WETLAND FLAG    |   |                        |
|  | EXISTING BUILDING        |  | PROPOSED CONTOUR       |
|  | EXISTING CONTOUR         |   |                        |
|  | EXISTING MAJOR CONTOUR   |  | PROPOSED GUARDRAIL     |
|  | EDGE OF ROADWAY          |   |                        |
|  | EXISTING SEWER           |  | PROPOSED DRAIN LINE    |
|  | EXISTING DRAIN LINE      |   |                        |
|  | EXISTING DRAIN MANHOLE   |  | PROPOSED DRAIN MANHOLE |
|  | EXISTING SEWER MANHOLE   |   |                        |
|  | EXISTING CATCH BASIN     |  | PROPOSED RIP RAP       |
|  | CONCRETE BOUNDS          |   |                        |
|  | EXISTING OVERHEAD ELEC.  |   |                        |
|  | EXISTING UTILITY POLE    |   |                        |
|  | EXISTING TEST PIT        |   |                        |
|  | IWPA ZONE II BOUNDARY    |   |                        |
|  | INNER RIPARIAN           |   |                        |
|  | OUTER RIPARIAN           |   |                        |
|  | WETLAND                  |   |                        |
|  | PROPOSED EROSION CONTROL |   |                        |
|  | SOIL STOCKPILE LIMITS    |   |                        |

NOTES:

1. AN ON THE GROUND SURVEY OF THIS SITE WAS CONDUCTED IN JUNE OF 2018 BY CDW CONSULTANTS INC. OF NATICK, MASSACHUSETTS. ALL SURVEY INFORMATION MUST BE FIELD VERIFIED DURING CONSTRUCTION.
2. ALL NEWLY DISTURBED SLOPES SHALL BE SEEDED OR PROTECTED BY TEMPORARY TREATMENTS SUCH AS HAY, STRAW OR FIBER MULCH OR PROTECTION COVERS SUCH AS A MAT OR FIBER LINING (BURLAP, JUTE FIBERGLASS NETTING, ETC.) OR BURLAP. THEY SHALL BE INCORPORATED INTO THE WORK AS WARRANTED, OR AS ORDERED BY THE OWNER OR ITS DESIGNATED AGENT.

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THE ENGINEER.

THE ENGINEER:			

Revision	By	Appd.	YY.MM.DD

CONSTRUCTION SET	WAS	MSB	18.10.18
CONSERVATION FILING	WAS	MSB	18.08.01
Issued	By	Appd.	YY.MM.DD

File Name: <b>SPENCER-319 GRANT</b>	<b>WAS</b>	<b>MSB</b>	<b>WAS</b>	<b>18.08.01</b>
	Dwn.	Chkd.	Dsgn.	YY.MM.DD

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Client/Project

THE TOWN OF SPENCER  
319 STORMWATER GRANT

SITE 1 - POWDER MILL PARK  
SMITHVILLE ROAD

Title

Project No.  
195150496

Scale  
1" = 20'

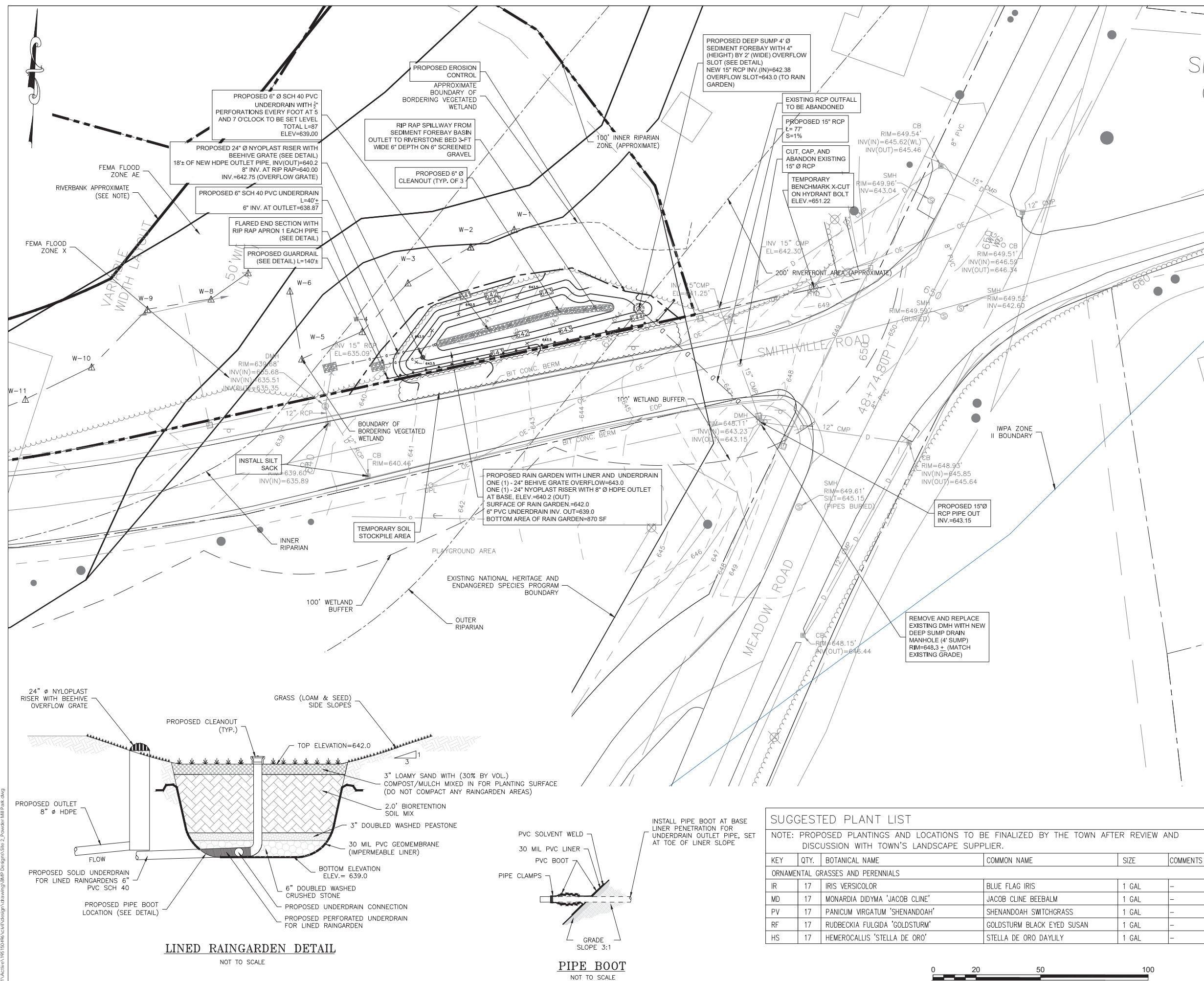
Drawing No.

Sheet

Revision

03 of 08

01

































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### Legend

- |   |                         |   |                        |
|---|-------------------------|---|------------------------|
|  | EXISTING FLOW ARROW     |  | PROPOSED FLOW ARROW    |
|  | EXISTING WETLAND FLAG   |   |                        |
|  | EXISTING BUILDING       |   |                        |
|  | EXISTING CONTOUR        |   |                        |
|  | EXISTING MAJOR CONTOUR  |  | WETLAND BOUNDARY       |
|  | EDGE OF ROADWAY         |  | RIPARIAN BOUNDARY      |
|  | EXISTING SEWER          |  | PROPOSED DRAIN LINE    |
|  | EXISTING DRAIN LINE     |   |                        |
|  | EXISTING DRAIN MANHOLE  |  | PROPOSED DRAIN MANHOLE |
|  | EXISTING SEWER MANHOLE  |   |                        |
|  | EXISTING CATCH BASIN    |  | PROPOSED RIP RAP       |
|  | CONCRETE BOUNDS         |   |                        |
|  | EXISTING OVERHEAD ELEC. |   |                        |
|  | EXISTING UTILITY POLE   |   |                        |
|  | EXISTING TEST PIT       |   |                        |
|  | I/WPA ZONE II BOUNDARY  |   |                        |

1. SURVEY INFORMATION AND WETLAND FLAGS WERE TAKEN FROM THE PLAN ENTITLED "PLAN OF LAND IN SPENCER, MA PREPARED FOR HIGHWAY GARAGE" COMPLETED BY SHERMAN & FRYDRYK, LLC. LAND SURVEYING AND ENGINEERING. THE PLAN OF LAND IS DATED FEBRUARY 9, 2017. SURVEY INFORMATION MUST BE FIELD VERIFIED DURING CONSTRUCTION.
2. ALL NEWLY DISTURBED SLOPES SHALL BE SEEDED OR COVERED BY TEMPORARY TREATMENT SUCH AS STRAW, STRAW OR FIBER MULCH OR PROTECTION COVERS SUCH AS A MAT OR FIBER LINING (BURLAP, JUTE FIBERGLASS NETTING, EXCELSIOR BLANKETS). THEY SHALL BE INCORPORATED INTO THE WORK AS WARRANTED OR AS ORDERED BY THE OWNER OR ITS DESIGNATED AGENT.

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Revision	By	Appd.	YY.MM.DD
CONSTRUCTION SET	WAS	MSB	18.10.18
CONSERVATION FILING	WAS	MSB	18.08.01
Issued	By	Appd.	YY.MM.DD

File Name: <b>SPENCER-319 GRANT</b>	<b>WAS</b>	<b>MSB</b>	<b>WAS</b>	<b>18.08.01</b>
	Down	Chkd	Down	YY MM DD

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Client/Project

THE TOWN OF SPENCER  
319 STORMWATER GRANT

SITE 3 - SPENCER DEPARTMENT OF PUBLIC WORKS  
7 MEADOW ROAD

Title

Project No.  
195150496

Drawing No.

Scale  
1" = 30'

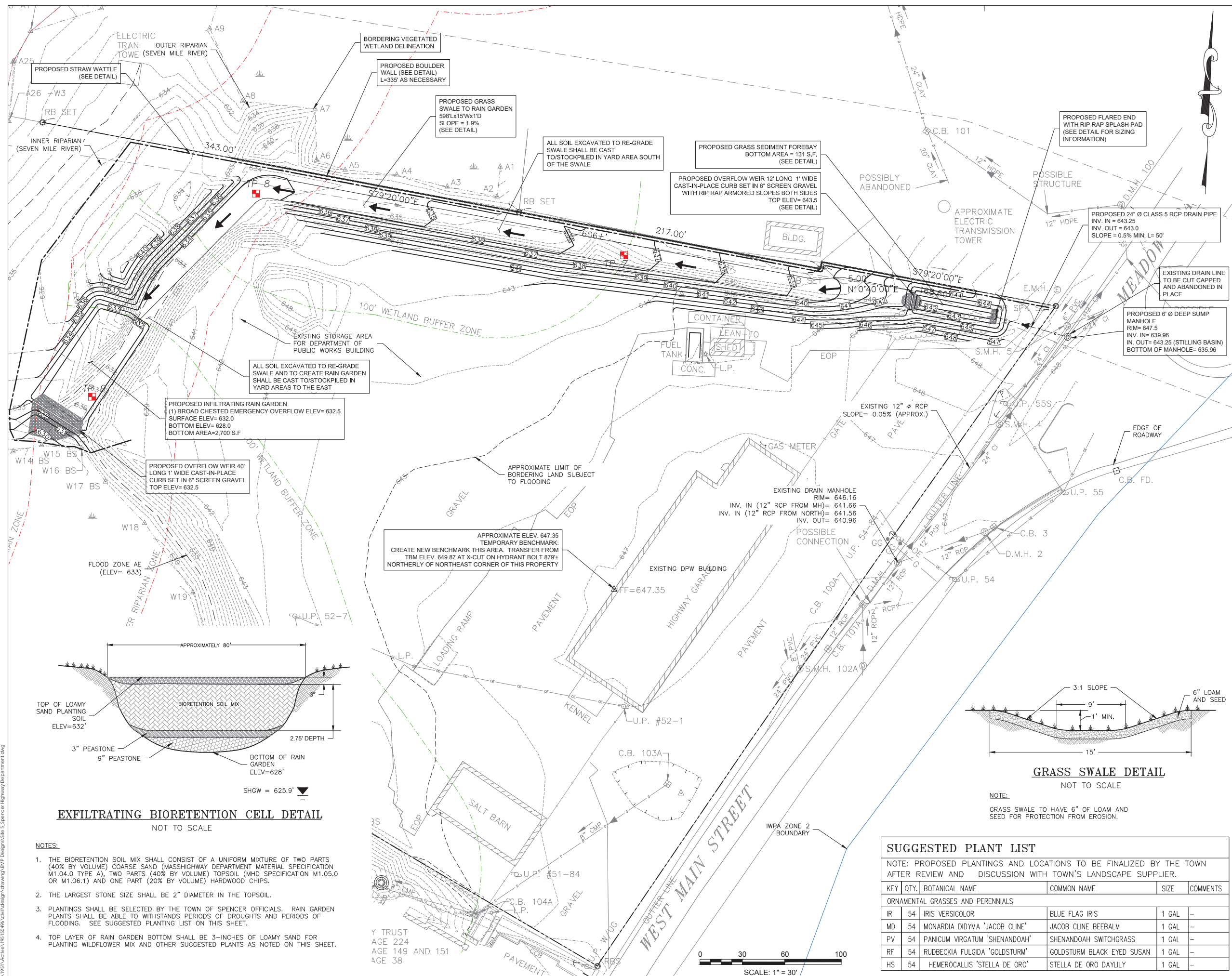
Sheet

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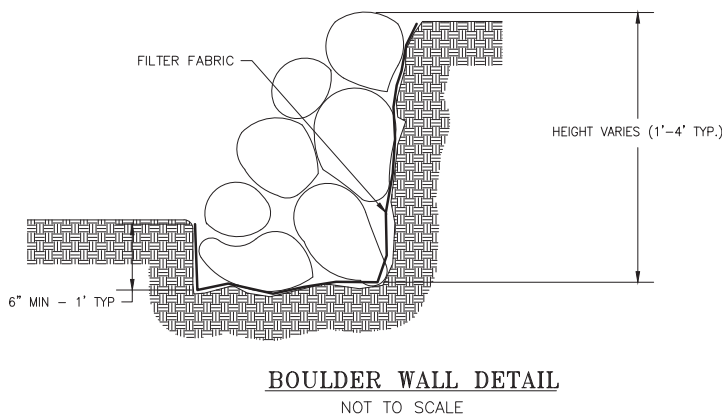
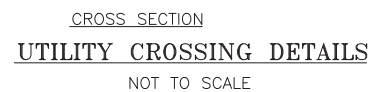
Revisi

05 of 08

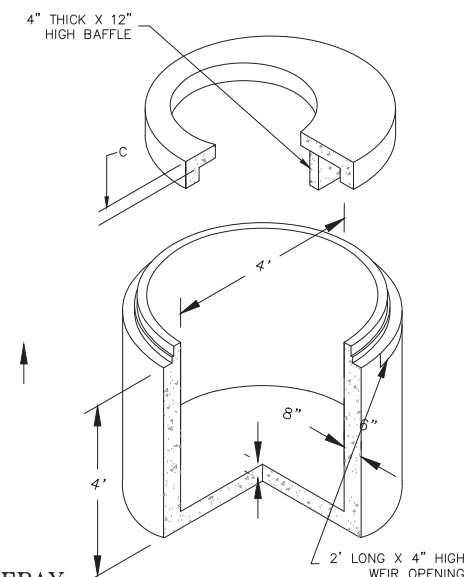
01







1. TYPE 1 W/ 24" DIA. OPENING  
2" HIGH LOW PROFILE FRAME AND GRATE TO BE SET ON FLAT TOP  
SECTION OF SEDIMENT TRAP
2. DESIGNED FOR HS-25 LOADING
3. BASE SUPPORT BEDDING AS PER STANDARD CATCH BASIN DETAIL ON  
THIS SHEET.



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CONSTRUCTION SET	WAS	MSB	18.10.18
CONSERVATION FILING	WAS	MSB	18.08.01
Issued	By	Appd.	YY.MM.DD

File Name: <b>SPENCER-319 GRANT</b>	<b>WAS</b> Dwn.	<b>MSB</b> Chkd.	<b>WAS</b> Dsgn.	<b>18.08.01</b> YY.MM.DD
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Client/Project

THE TOWN OF SPENCER  
319 STORMWATER GRANT

DETAIL SHEET 1

Title
-------

Project No.  
195150496

Scale

Drawing No.

Sheet

Revision

06 of 08

01







TEST PIT LOG

SOIL EVALUATOR NAME: WADE STANLEY #SE14123  
PROJECT NUMBER: 195150496  
DATE: 5/9/2018  
LOCATION: MEADOWBROOK LANE  
PIT #: TP-4

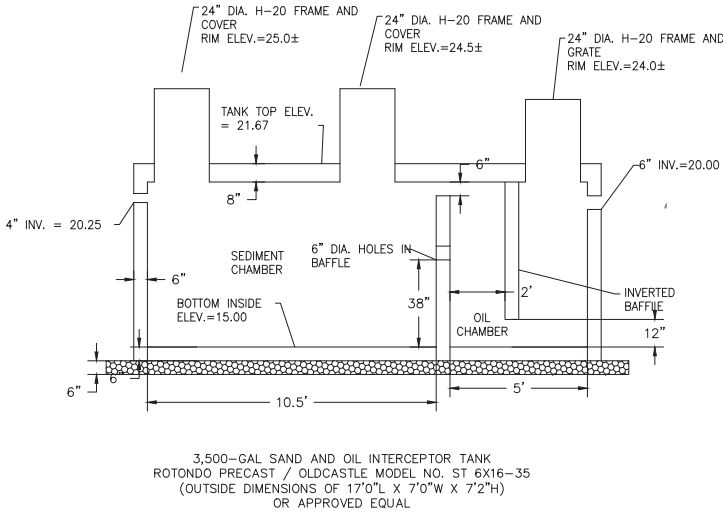
DEPTH (IN)	SOIL HORIZ/LAYER	(MUNSELL) COLOR	REDOXIMORPHIC FEATURES (MOTTLES)		SOIL TEXTURE
			DEPTH	COLOR	
0-39	FILL	-	-	-	-
39-43	A (BURIED)	10 YR 2/2	-	-	SANDY LOAM
43-56	B	10 YR 3/4	-	-	LOAMY SAND
56-100	C	10 YR 5/8	-	-	SAND

NOTES: 100" TO BOTTOM OF PIT, NO WATER/REDOX WAS ENCOUNTERED IN THE PIT.

SOIL EVALUATOR NAME: WADE STANLEY #SE14123  
PROJECT NUMBER: 195150496  
DATE: 5/9/2018  
LOCATION: MEADOWBROOK LANE  
PIT #: TP-5

DEPTH (IN)	SOIL HORIZ/LAYER	(MUNSELL) COLOR	REDOXIMORPHIC FEATURES (MOTTLES)		SOIL TEXTURE
			DEPTH	COLOR	
0-11	A	10 YR 2/2	-	-	SANDY LOAM
11-37	Bw	10 YR 4/6	-	-	LOAMY SAND
37-67	C	10 YR 4/1	37	7.5 YR 4/6	SANDY LOAM

NOTES: STANDING WATER AT 66", VERY TIGHT AT BOTTOM OF PIT.



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CONSERVATION FILING	WAS	MSB	18.08.01
Issued	By	Appd.	YY.MM.DD

File Name: SPENCER-319 GRANT	WAS	MSB	WAS	18.08.01
	Dwn.	Chkd.	Dign.	YY.MM.DD

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Client/Project

THE TOWN OF SPENCER  
319 STORMWATER GRANT

Title

Project No. 195150496	Scale	
Drawing No.	Sheet	Revision





# TOWN OF SPENCER

STORMWATER IMPROVEMENTS (TOWN PROPERTY)  
SPENCER, MASSACHUSETTS  
01562

## SPENCER 319 GRANT STORMWATER BMP PROJECT (SET NO. 2 ISSUED TO UTILITIES & FACILITIES MANAGEMENT)

PROJECT NO. 195150496

OCTOBER 19, 2018

### OWNER

TOWN OF SPENCER  
3 OLD MEADOW ROAD  
SPENCER, MA 01562

### CIVIL ENGINEER

STANTEC CONSULTING INC.  
400 CROWN COLONY DRIVE  
QUINCY, MA 02169

### SURVEYOR

CDW CONSULTANTS, INC.  
6 HURON DRIVE  
NATICK, MA 01760

### INDEX OF SHEETS\*

SHEET NO.	TITLE
1.	COVER
2.	NOTES AND LEGEND
3.	SITE 1 - 30 MEADOW ROAD BMP DESIGN
4.	SITE 2 - MEADOWBROOK LANE BMP DESIGN
5.	DETAIL SHEET - 1
6.	DETAIL SHEET - 2

THESE PLANS SHALL NOT BE UTILIZED FOR CONSTRUCTION  
UNTIL WRITTEN AUTHORIZATION IS OBTAINED FROM THE  
ENGINEER.



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GENERAL SPECIFICATIONS

- ALL UTILITIES INTERFERED WITH OR DAMAGED SHALL BE PROPERLY RESTORED IMMEDIATELY, BY THE CONTRACTOR. THE CONTRACTOR SHALL CAREFULLY BED, TAMP, AND FULLY CONSOLIDATE REFILL MATERIAL AROUND AND UNDER ALL EXISTING UTILITIES ENCOUNTERED OR CROSSED UNLESS OTHERWISE SHOWN ON THE DRAWINGS.
- ALL OPEN EXCAVATIONS SHALL BE ADEQUATELY SAFEGUARDED BY PROVIDING TEMPORARY BARRICADES, CAUTION SIGNS, LIGHTS AND OTHER MEANS TO PREVENT ACCIDENTS TO PERSONS, AND DAMAGE TO PROPERTY. THE CONTRACTOR SHALL, AT HIS OWN EXPENSE, PROVIDE SUITABLE AND SAFE BRIDGES AND OTHER CROSSINGS FOR ACCOMMODATING TRAVEL BY PEDESTRIANS AND WORKMEN. NO EXCAVATIONS SHALL REMAIN OPEN OVERNIGHT.
- THE CONTRACTOR SHALL, AT ALL TIMES, CONTROL DUST FROM ROAD SURFACES AND ELSEWHERE WITHIN THE AREA TO THE ENGINEER'S SATISFACTION.
- THE EXACT LOCATION OF ALL PROPOSED PIPES, VALVES, FITTINGS, TANKS, PUMPS, ELECTRIC/CONTROL WIRING, ETC. IS TO BE DETERMINED BY THE CONTRACTOR IN THE FIELD.
- SAW CUTTING OF PAVEMENT –THE ROADWAY AND/OR PARKING LOT PAVEMENT ARE TO BE SAW CUT TO NEAT, TRUE LINES AS DIRECTED. SUCH CUTTING SHALL BE TO A DEPTH BELOW THE PAVEMENT AS TO PREVENT TEARING OF THE SURFACE DURING EXCAVATION.
- TRENCH EXCAVATION – CONTRACTOR SHALL OBTAIN ALL NECESSARY STATE/LOCAL TRENCH/EXCAVATION PERMITS AND COMPLY WITH ASSOCIATED TRENCH/EXCAVATION SAFETY LAWS. TRENCH EXCAVATION SHALL CONSIST OF THE REMOVAL OF ALL MATERIALS ENCOUNTERED. EXCAVATIONS SHALL BE MADE TO ACCOMMODATE THE ELEVATION, DEPTH OF COVER, OR DETAIL SHOWN ON THE DRAWINGS OR SPECIFIED. TRENCH WIDTHS SHALL BE KEPT TO THE MINIMUM PRACTICABLE BUT SHALL BE AT LEAST TWO FEET WIDE. THE BOTTOM OF THE TRENCHES SHALL BE FIRM AND FREE OF WATER AND SHALL BE ACCURATELY GRADED AND SHAPED TO ALLOW THE REQUIRED BEDDING BENEATH THE BOTTOM OF ALL PIPES INSTALLED.
- UNSUITABLE MATERIAL – ALL EXCAVATED MATERIAL IS TO BE DISCARDED UNLESS OTHERWISE SUITABLE, AND IF NOT SUITABLE, TO BE REPLACED WITH THE FOLLOWING MATERIAL OR EQUIVALENT, 1/2" TO 3/4" CRUSHED PROCESSED GRAVEL FOR THE BED AND ALSO ABOVE THE ITEMS PLACED IN THE EXCAVATION, FOR A DEPTH NOT LESS THAN SIX (6) INCHES BELOW THE BOTTOM MOST PORTION OF THE ITEM AND FOR A THICKNESS NOT LESS THAN SIX (6) INCHES ABOVE THE TOPMOST PORTION OF THE ITEM.
- DISPOSAL OF DISCARDED MATERIALS – ALL DISCARDED MATERIALS, RUBBISH, AND DEBRIS THAT ARE DUMPED OR FALL WITHIN OF THE LIMITS OF THE PROJECT SHALL BE REMOVED FROM THE SITE AND DISPOSED OF BY THE CONTRACTOR. ALL COSTS ASSOCIATED WITH THE LEGAL DISPOSAL OF EXCESS MATERIALS SHALL BE BORNE BY THE CONTRACTOR.
- BACKFILL MATERIAL – THE BACKFILL MATERIAL USED SHALL BE OF A QUALITY SATISFACTORY TO THE ENGINEER, AND SHALL BE FREE FROM LARGE OR FROZEN LUMPS OF WOOD, ORGANIC MATTER AND OTHER EXTRANEIOUS MATERIAL AND SHALL CONTAIN NO ROCKS OR STONES GREATER THAN 3" DIAMETER.
- COMPACTION OF BACKFILL – BACKFILL SHALL BE UNIFORMLY DISTRIBUTED IN SUCCESSIVE LAYERS, EACH LAYER BEING THOROUGHLY COMPACTED BEFORE THE SUCCEEDING LAYER IS PLACED. THE ENTIRE WIDTH OF THE TRENCH SHALL BE MECHANICALLY OR HAND TAMPED IN SIX (6) INCH LIFTS, EXTENDING A MINIMUM OF TWO (2) FEET ABOVE THE UTILITY INSTALLATION, AND MECHANICALLY TAMPED THE REMAINDER OF THE FILL IN LIFT DEPTHS NOT GREATER THAN TWO (2) FEET.
- TEMPORARY PAVING SHALL BE PLACED OVER TRENCHES IN HARD–SURFACED STREETS AND ROADS, AND SHALL BE OF BITUMINOUS CONCRETE BASE COURSE, LAID IN ONE–COURSE, 2 INCHES THICK, BACKFILL AT TOP OF TRENCH SHALL BE REMOVED TO ALLOW FOR PLACING TEMPORARY SURFACING. CONTRACTOR SHALL MAINTAIN SURFACING IN GOOD CONDITION. TRENCHES SHALL BE INSPECTED AT LEAST ONCE A WEEK AND IMMEDIATELY AFTER EACH STORM. HOLES AND SETTLEMENTS SHALL BE PROMPTLY REFILLED WITH BITUMINOUS MIXTURE.
- RESTORATION OF PERMANENT PAVING – THE BITUMINOUS CONCRETE BASE AND TOP SHALL BE LAID AND ROLLED IN TWO (2) COURSES. THE BINDER (BASE COURSE) SHALL NOT BE LESS THAN THE EXISTING ROADWAY BASE COURSE AND SHALL NOT BE LESS THAN TWO AND ONE–HALF (2–1/2") INCHES IN DEPTH AND THE TOP COURSE SHALL BE ONE AND ONE–HALF (1–1/2") INCHES IN DEPTH. THE BASE COURSE OF THE PERMANENT PAVEMENT SHALL BE PLACED AND CAREFULLY RAKED TO MINIMUM SURFACE AND THOROUGHLY ROLLED TO THE REQUIRED THICKNESS. BEFORE PLACING THE BASE COURSE OF THE PERMANENT PAVEMENT, THE EDGE OF THE ORIGINAL BITUMINOUS SURFACING SHALL RECEIVE AN APPLICATION OF APPROVED ASPHALT EMULSION SO THAT NEW PAVEMENT MATERIAL MAY BE PROPERLY BONDED TO THE EXISTING PAVEMENT. ALL SEAMS SHALL BE SEALED WITH AN APPROVED EMULSIFIED LIQUID ASPHALT AND SAND. THE TOP COURSE OF THE PERMANENT PAVING SHALL BE PLACED TO A GRADE THAT WILL MATCH THE EXISTING BITUMINOUS SURFACE AFTER ROLLING.
- THE PERMANENT PAVING SHALL NOT OVERLAP THE EXISTING PAVEMENT AND SHALL NOT BE APPLIED WITH A MECHANICAL SPREADER UNLESS OTHERWISE DIRECTED BY THE TOWN ENGINEER. THE CONTRACTOR SHALL FURNISH, PLACE, GRADE, AND COMPACT BITUMINOUS CONCRETE PAVEMENT OF CLASS I AS SHOWN AND SPECIFIED IN THE LATEST MASS D.O.T. STANDARD SPECIFICATION.
- DISTURBING EXISTING UTILITIES – SPECIAL CARE SHALL BE EXERCISED DURING EXCAVATION TO AVOID INJURY TO UNDERGROUND STRUCTURES, SUCH AS ELECTRICAL OR CABLES, WATER OR GAS MAINS, PIPES, CONDUITS, MANHOLES, CATCH BASINS, ETC.
- THE CONTRACTOR SHALL CONTROL ALL SURFACE WATER WITHIN THE WORK AREA. EXCAVATIONS SHALL BE PROTECTED FROM FLOODING BY SURFACE WATER BY USE OF BERMS, DITCHES, OR OTHER SUITABLE MEANS DEEMED APPROPRIATE BY THE CONTRACTOR.
- THE CONTRACTOR SHALL PREVENT SILTATION OF ANY WETLANDS OR WATER BODIES FROM RUN–OFF AND OR PUMPING OPERATIONS ASSOCIATED WITH THE CONSTRUCTION OPERATIONS, THROUGH THE USE OF HAY BALES, SILTATION FENCES OR OTHER METHODS APPROVED BY THE ENGINEER.
- THE CONTRACTOR SHALL PROSECUTE THE WORK SO THAT NO DAMAGE OCCURS TO ADJACENT UTILITIES, STRUCTURES, PROPERTY, OR ANY OTHER INSTALLATION LOCATED IN OR ADJACENT TO WORK AREAS. DAMAGED UTILITIES SHALL BE REPLACED OR REPAIRED WITH SIMILAR OR BETTER MATERIALS OF THE SAME SIZE AND TO THE REQUIREMENTS OF THE UTILITY OR SITE OWNER. THE CONTRACTOR SHALL HAVE ON SITE THE NECESSARY MANPOWER, MATERIALS, AND EQUIPMENT SUCH AS PUMPS, PIPING, AND THE LIKE AS REQUIRED TO PROTECT AND MAINTAIN UNINTERRUPTED FLOWS IN EXISTING UTILITIES DURING CONSTRUCTION. FLOW FROM BUILDINGS TO SEPTIC TANKS TO EXISTING LEACHING AREAS SHALL BE MAINTAINED (OR PUMPED AND REMOVED BY TOWN APPROVED SEPTIC PUMPER IF NECESSARY) UNTIL FINAL SEWER CONNECTIONS ARE COMPLETED AND APPROVED BY ENGINEER.
- EXCAVATIONS SHALL BE KEPT FREE FROM WATER, SNOW, AND ICE DURING CONSTRUCTION. BEDDING AND BACKFILL MATERIAL SHALL NOT BE PLACED IN WATER. WATER SHALL NOT BE ALLOWED TO RISE UPON OR FLOW OVER BEDDING AND BACKFILL MATERIAL.
- THE CONTRACTOR SHALL MAINTAIN ALL BENCHMARKS, MONUMENTS, AND OTHER REFERENCE POINTS AND IF DISTURBED, SHALL REPLACE THEM AT NO ADDITIONAL COST TO THE OWNER.
- THE CONTRACTOR SHALL PROTECT ALL EXISTING SEWERS AND UTILITIES, AND REPAIR OR REPLACE ANY DAMAGED PIPES OR UTILITIES AS PART OF THE CONTRACT WORK.
- VEHICLE TRAFFIC, VEHICLE PARKING, STOCKPILING OF MATERIALS, AND STORAGE OF EQUIPMENT IS PROHIBITED AT ALL TIMES OVER THE RAIN GARDENS AND INFILTRATION BASINS DURING CONSTRUCTION. COMPACTION SHALL NOT OCCUR WITHIN ANY RAINGARDEN.
- ALL STRUCTURES SHALL BE DESIGNED FOR H–25 LOADING.

EROSION CONTROL & SOIL STABILIZATION PROGRAM

- DENUDED SLOPES SHALL NOT BE LEFT EXPOSED FOR EXCESSIVE PERIODS OF TIME.
- ALL DISTURBED SLOPES EITHER NEWLY CREATED OR EXPOSED PRIOR TO OCTOBER 15 SHALL BE SEEDED OR PROTECTED BY THAT DATE FOR ANY WORK COMPLETED DURING EACH CONSTRUCTION YEAR.
- TEMPORARY TREATMENTS SHALL CONSIST OF A HAY, STRAW OR FIBER MULCH OR PROTECTIVE COVERS SUCH AS A MAT OR FIBER LINING (BURLAP, JUTE, FIBERGLASS NETTING, EXCELSIOR BLANKETS). THEY SHALL BE INCORPORATED INTO THE WORK AS WARRANTED OR AS ORDERED BY THE OWNER OR ITS DESIGNATED AGENT.
- ALL STRAW WATTLES OR TEMPORARY PROTECTION SHALL BE INSTALLED AS SHOWN ON THE PLANS PRIOR TO COMMENCING ANY EARTH DISTURBANCE, AND SHALL REMAIN IN PLACE UNTIL AN ACCEPTABLE STAND OF GRASS OR APPROVED GROUND COVER IS ESTABLISHED.
- THE TOPSOIL SHALL HAVE SANDY LOAM TEXTURE RELATIVELY FREE OF SUBSOIL MATERIAL, STONES, ROOTS, LUMPS OF SOIL, TREE LIMBS, TRASH OR CONSTRUCTION DEBRIS AND SHALL BE PLACED TO A DEPTH OF 4" ON ALL LOAM AND SEED AREAS.
- THE SEED MIX SHALL BE INOCULATED WITHIN 24 HOURS, BEFORE MIXING AND PLANTING, WITH APPROPRIATE INOCULUM FOR EACH VARIETY.
- THE DESIGN MIX FOR ANY SITE GRASS SHALL BE COMPRISED OF THE FOLLOWING:

LOAM AND SEED AREAS		
TYPE	BY WEIGHT	
RED FESCUE		75%
COLONIAL BENTGRASS, "EXETER"		5%
BIRDSFOOT TREFOIL, "EMPIRE"		15%
PERENNIAL RYEGRASS		5%
APPLICATION RATE	100 LBS/ACRE	

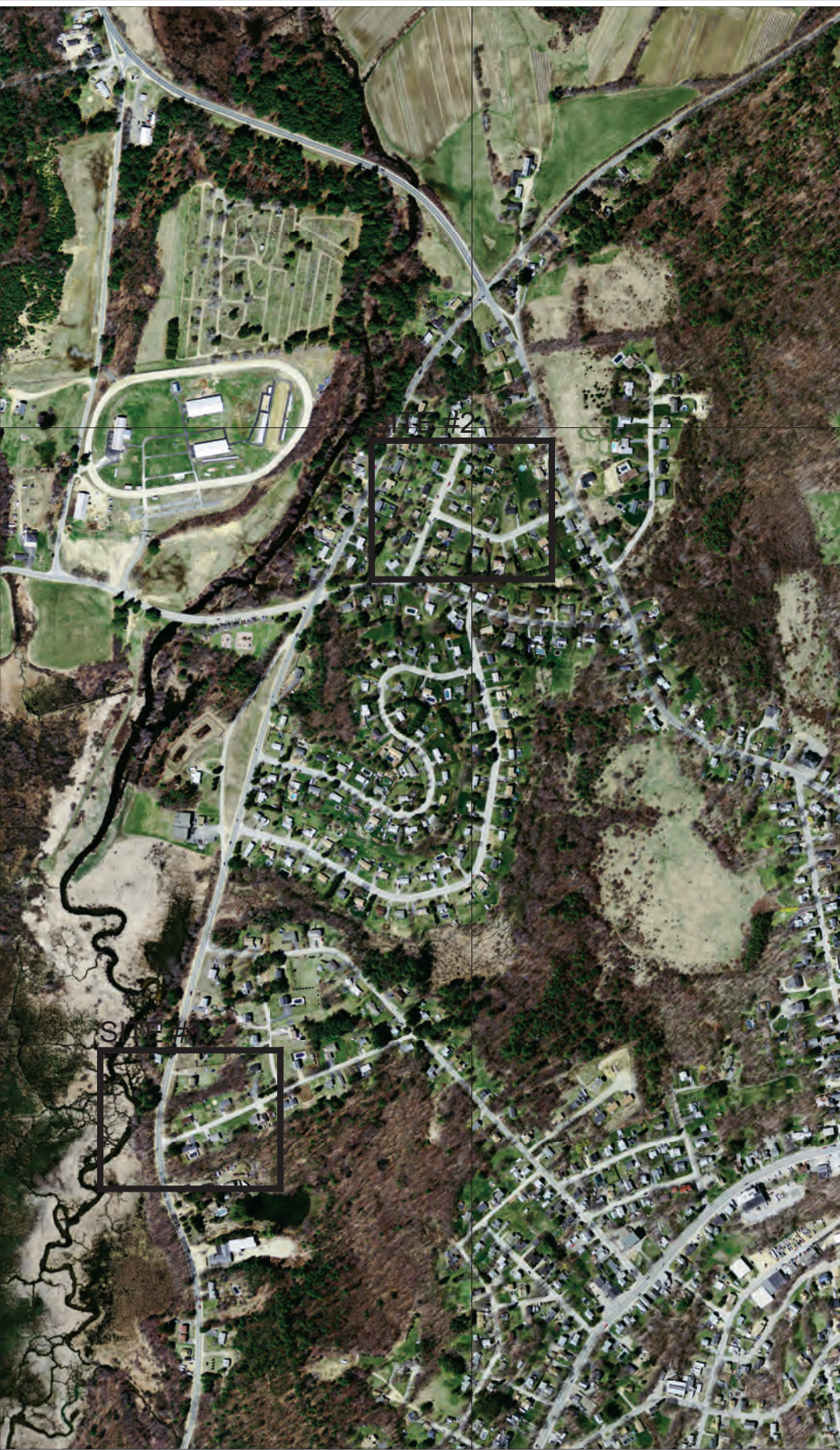
- NO MATERIALS SHALL BE DEPOSITED WITHIN ANY WATERCOURSE, WETLANDS AREA OR DRAINAGE FACILITY.

EROSION CONTROL & SOIL STABILIZATION PROGRAM

- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE FURNISHING OF ALL LABOR, MATERIALS, TOOLS, EQUIPMENTS, ACCESSORIES AND APPURTENANCES NECESSARY TO SATISFACTORILY COMPLETE ALL STRIPPING OF TOPSOIL, EXCAVATION OF EARTH AND ROCK, STOCKPILING, REMOVAL OF UNSATISFACTORY MATERIALS, BACKFILLING, FILLING, COMPACTION, AND GRADING, AND ALL INCIDENTAL WORK PERTAINING THERETO.
- THE CONTRACTOR SHALL PROSECUTE THE WORK SO THAT NO DAMAGE OCCURS TO ADJACENT UTILITIES, STRUCTURES, PROPERTY, OR ANY OTHER INSTALLATION LOCATED IN OR ADJACENT TO WORK AREAS. DAMAGED UTILITIES SHALL BE REPAIRED WITH SIMILAR OR BETTER MATERIALS OF THE SAME SIZE AND TO THE REQUIREMENTS OF THE UTILITY OWNER. THE CONTRACTOR SHALL HAVE ON SITE THE NECESSARY MANPOWER, MATERIALS AND EQUIPMENT SUCH AS PUMPS, PIPING, AND THE LIKE AS REQUIRED TO PROTECT AND TO MAINTAIN UNINTERRUPTED FLOWS IN EXISTING UTILITIES DURING CONSTRUCTION.
- EXCAVATION EQUIPMENT SHALL BE OF SUCH SIZE AND TYPE, AND USED IN A MANNER, THAT WILL NOT DAMAGE EXISTING ITEMS SUCH AS BUT NOT LIMITED TO PAVED SURFACES, UTILITIES, STRUCTURES AND TREES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLIANCE WITH ALL APPROPRIATE SAFETY REGULATIONS. THE CONTRACTORS PARTICULAR ATTENTION IS CALLED TO THE RULES AND REGULATIONS INCLUDED IN PUBLIC LAW 91–596 KNOWN AS THE "OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970" (OSHA).

GENERAL CONSTRUCTION SEQUENCING

- PRE–CONSTRUCTION MEETING WITH OWNER AND OWNER'S ENGINEER PRIOR TO COMMENCING ANY WORK.
- PLACE CONSTRUCTION SAFETY FENCE AROUND PROPERTY TO LIMIT ACCESS AND PROTECT THE PUBLIC.
- MOBILIZE TO SITE AND DEVELOP A CONSTRUCTION STAGING AREA APPROVED BY OWNER AND THE OWNERS ENGINEER.
- PLACE ENVIRONMENTAL PROTECTION DEVICES INCLUSIVE OF STRAW WATTLES, SILTATION FENCING, AND TEMPORARY STABILIZATION. ESTABLISH SOIL STOCKPILE AREAS AND PLACE SILTATION FENCING AROUND THE STOCKPILE AREAS TO CONTAIN THE SOIL. ALSO, PROVIDE SILT SACKS AT EXISTING DOWN–GRADIENT CATCH BASINS.
- THE OWNER RESERVES THE RIGHT TO SCHEDULE THE CONTRACTOR TO CONSTRUCT AT ANY LOCATIONS WITHIN THE PROJECT AREA. AT THE SAME TIME THE OWNER MAY SCHEDULE THE SUSPENSION OF CONSTRUCTION AT ANY LOCATION.
- AFTER THE CONTRACTOR HAS STAKED OUT THE FACILITIES TO BE CONSTRUCTED AND HAS THE APPROVED MATERIALS ON THE JOB, THE OWNER'S ENGINEER SHALL BE NOTIFIED AT LEAST TWO WORKING DAYS IN ADVANCE OF CONSTRUCTION TO ARRANGE INSPECTIONS. THE SPENCER OFFICES OF UTILITIES AND FACILITIES. SHALL BE PROVIDED NOTIFICATION FOR DAILY INSPECTIONS IF REQUIRED. NOTIFY TOWN 2 WEEKS PRIOR TO STARTING CONSTRUCTION.
- CLEAR AND GRUB WITHIN WORK LIMITS ONLY.
- HAVE A WATER TRUCK ON–SITE TO MINIMIZE FUGITIVE DUST DURING BUILDING DEMOLITION, EXCAVATION, PAVEMENT OR PARKING SURFACE DEMOLITION, SHED FOUNDATION EXCAVATIONS AND GENERAL CONSTRUCTION PROCESSES.
- FOR THE PROTECTION OF LIFE AND PROPERTY, ALL BACKFILL OPERATIONS SHALL FOLLOW CLOSELY BEHIND ANY OPEN EXCAVATION OR PIPE LAYING. THE CONTRACTOR SHALL INSURE THAT NO EXCAVATION BE LEFT OPEN, UNGUARDED, OR WATER FILLED DURING ANY PERIOD OF TIME WHEN WORK IS NOT ACTUALLY IN PROGRESS. IT IS THE PURPOSE AND INTENT THAT ALL EXCAVATIONS AND BACKFILLING, INCLUDING CONSOLIDATION OPERATIONS, AND TEMPORARY SURFACING WITHIN AN AREA BE ACCOMPLISHED EXPEDITIOUSLY BEFORE PROCEEDING TO OTHER WORK AREAS.
- SHOULD DEWATERING BE NECESSARY, THE CONTRACTOR SHALL DESIGN AND INSTALL A DEWATERING FACILITY, SEE GENERAL SPECIFICATIONS NOTE 16. CONTRACTOR'S DESIGN SHALL BE APPROVED BY OWNERS ENGINEERING AND CONSERVATION COMMISSION AGENT.
- BACKFILLING WILL ONLY OCCUR IN THE DESIGNATED AREAS, AND EROSION CONTROL PRACTICES SHALL BE SET IN PLACE PRIOR TO BACKFILLING TO ENSURE NO SEDIMENT MIGRATION OFF–SITE OR TO DRAINAGE SYSTEMS DURING THE BACKFILLING PROCEDURE. BACKFILLING SHALL OCCUR IN 6–12 INCH LIFTS, AND SHALL BE COMPACTED TO A DENSITY NOT LESS THAN 95% OF THE MAXIMUM DRY DENSITY (HOWEVER RAINGARDENS SHALL NOT BE COMPACTED).
- EXCAVATE AND REMOVE THE EXISTING PAVED SURFACES TO BE REPLACED, AS NOTED ON THE SITE PLANS, AND SUCH SOILS ARE TO BE USED AS COMMON FILL WHERE ACCEPTABLE TO THE ENGINEER OR TRUCKED AWAY AND DISPOSED OF IN A LEGAL MANNER.
- ROUGH GRADE PARKING AREAS AND ACCESS WAY SUB GRADE AND REFILL GRAVEL TO MAINTAIN ROAD GRADES.
- ROUGH GRADE THE GROUND AROUND FOUNDATIONS, PARKING LOT AREAS, RAINGARDENS, AND INFILTRATION BASINS.
- INSTALL NEW CATCH BASINS, SEDIMENT FOREBAYS, DRAIN PIPES, RAIN GARDENS, SPILLWAYS AND RIP RAP APRONS. INSTALL SILT SACKS ONCE NEW CATCH BASINS ARE INSTALLED.
- PLACE BINDER FOR ALL PARKING LOT PAVEMENT REPLACEMENT AREAS AND ANY NEW PARKING LOT OR PAVED AREAS, AND INSTALL ACCESS WAYS AND PARKING LOT ROLLED ASPHALT BERM AS CALLED FOR ON PLANS.
- PLACE TOPSOIL ON AREAS NOT BEING PAVED OR COMPLETED WITH OTHER FEATURES.
- INSTALL FINAL LANDSCAPING, INCLUDING HYDROSEEDING OF LOAM AREAS TO BECOME LAWN.
- MONITOR ROAD AND TRENCH SETTLEMENT DURING CONSTRUCTION PROCESS.
- FINALIZE ALL GRADING FOR THE RAINGARDENS AND INFILTRATION BASINS, INCLUDING THE OVERFLOW DEVICES.
- REMOVE AND PROPERLY DISPOSE OF SILT AND COLLECTED DEBRIS FROM ALL ENVIRONMENTAL PROTECTION DEVICES. CLEAN UP SITE, REMOVE SILT SACKS, CLEAN CATCH BASINS.
- REMOVE ENVIRONMENTAL PROTECTION DEVICES AFTER RECEIVING APPROVAL FROM THE OWNER'S ENGINEER AND AND THE TOWN OF SPENCER CONSERVATION COMMISSION.
- DEMOBILIZE FROM SITE.



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Consultants

Legend

THESE PLANS SHALL NOT BE UTILIZED FOR CONSTRUCTION UNTIL WRITTEN AUTHORIZATION IS OBTAINED FROM THE ENGINEER.

Revision	By	Appd.	YY/MM/DD

SPENCER UTILITIES AND MAINTENANCE	WAS	MSB	18.10.18
Issued	By	Appd.	YY/MM/DD

File Name: SPENCER-319 GRANT	WAS	MSB	WAS	18.10.18
	Dwn.	Chkd.	Dign.	YY/MM/DD

Permit-Seal



Client/Project

THE TOWN OF SPENCER  
319 STORMWATER GRANT

NOTES AND LEGEND

Title

Project No. 195150496	Scale		
Drawing No.	Sheet	Revision	



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Consultants

Legend

- ▲ EXISTING FLOW ARROW  
▲ EXISTING WETLAND FLAG  
--- EXISTING BUILDING  
--- EXISTING CONTOUR  
--- EXISTING MAJOR CONTOUR  
--- EDGE OF ROADWAY  
--- EXISTING SEWER  
--- EXISTING DRAIN LINE  
① EXISTING DRAIN MANHOLE  
② EXISTING SEWER MANHOLE  
--- EXISTING CATCH BASIN  
--- CONCRETE BOUNDS  
--- EXISTING OVERHEAD ELEC.  
--- EXISTING UTILITY POLE  
--- EXISTING TEST PIT  
--- I/WPA ZONE II BOUNDARY  
--- INNER RIPARIAN  
--- OUTER RIPARIAN  
--- WETLAND  
--- PROPOSED EROSION CONTROL  
--- SOIL STOCKPILE LIMITS
- ▲ PROPOSED FLOW ARROW  
--- PROPOSED CONTOUR  
--- PROPOSED GUARDRAIL  
--- PROPOSED DRAIN LINE  
--- PROPOSED DRAIN MANHOLE  
--- PROPOSED RIP RAP

NOTES:

- AN ON THE GROUND SURVEY OF THIS SITE WAS CONDUCTED IN JUNE OF 2018 BY CDW CONSULTANTS INC. OF NATICK, MASSACHUSETTS. ALL SURVEY INFORMATION MUST BE FIELD VERIFIED DURING CONSTRUCTION.
- ALL NEWLY DISTURBED SLOPES SHALL BE SEEDED OR PROTECTED BY TEMPORARY TREATMENTS SUCH AS HAY, STRAW OR FIBER MULCH OR PROTECTION COVERS SUCH AS A MAT OR FIBER LINING (BURLAP, JUTE FIBERGLASS NETTING, EXCELSIOR BLANKETS). THEY SHALL BE INCORPORATED INTO THE WORK AS WARRANTED OR AS ORDERED BY THE OWNER OR ITS DESIGNATED AGENT.
- THE ENTIRE SITE IS WITHIN AN I/WPA ZONE II THESE PLANS SHALL NOT BE UTILIZED FOR CONSTRUCTION UNTIL WRITTEN AUTHORIZATION IS OBTAINED FROM THE ENGINEER.

Revision	By	Appd.	YY/MM/DD

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	Dwn.	Chkd.	Dgn.	YY/MM/DD

Permit-Seal



Client/Project

THE TOWN OF SPENCER  
319 STORMWATER GRANT

Title

STORMWATER BMP AT EDGE OF RIGHT OF WAY  
30 MEADOW ROAD

Project No.	Scale
195150496	1" = 20'

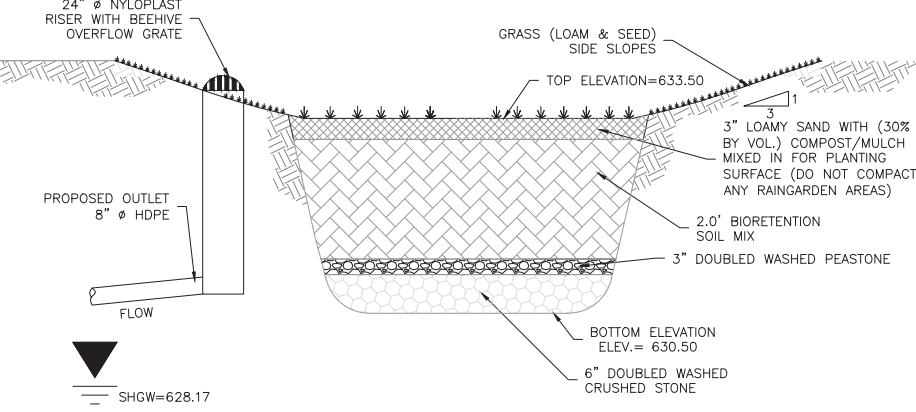
Drawing No.	Sheet	Revision
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TEST PIT LOG

SOIL EVALUATOR NAME: WADE STANLEY #SE14123  
PROJECT NUMBER: 195150496  
DATE: 5/9/2018  
LOCATION: 30 MEADOW ROAD (IN RIGHT OF WAY)  
PIT #: TP-6

DEPTH (IN)	SOIL HORIZ/LAYER	(MUNSELL) COLOR	REDOXIMORPHIC FEATURES (MOTTLES) DEPTH	COLOR	SOIL TEXTURE
0-53	FILL	-	-	-	-
53-88	C	10 YR 5/8	-	-	LOAMY SAND

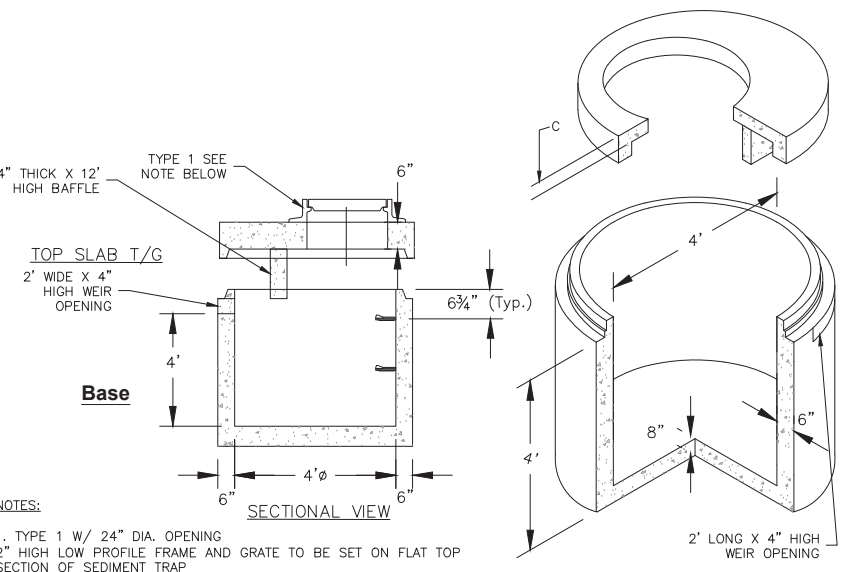
NOTES: 82" STANDING WATER, TEST PIT WAS NEXT TO WATER LINE. STONE BEDDING FROM WATER LINE WAS OBSERVED WITHIN THE PIT.



RAINGARDEN SECTION  
NOT TO SCALE

NOTES:

- BIORETENTION SOIL TO BE A 60% SAND AND 40% COMPOST MIX.



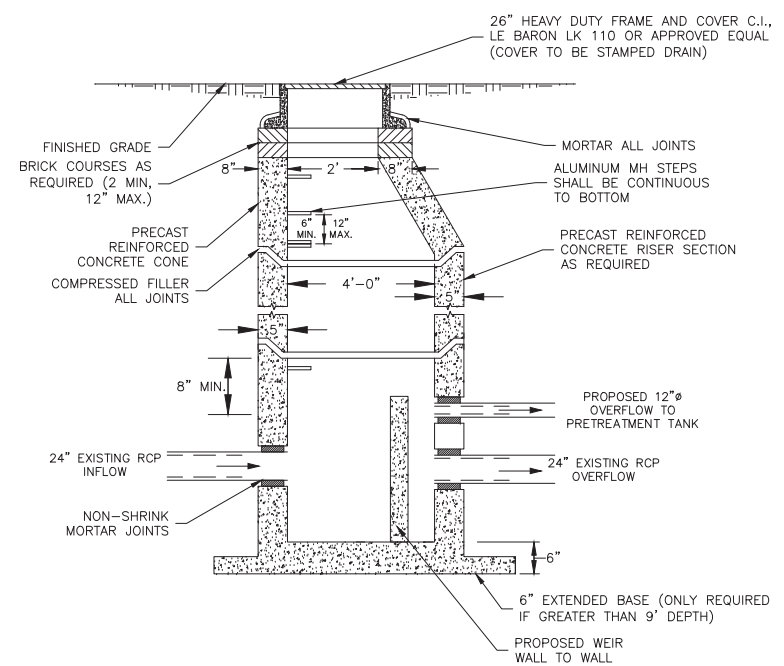
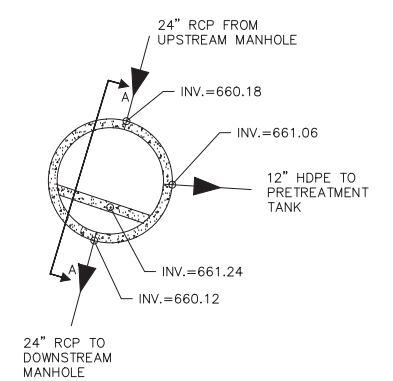
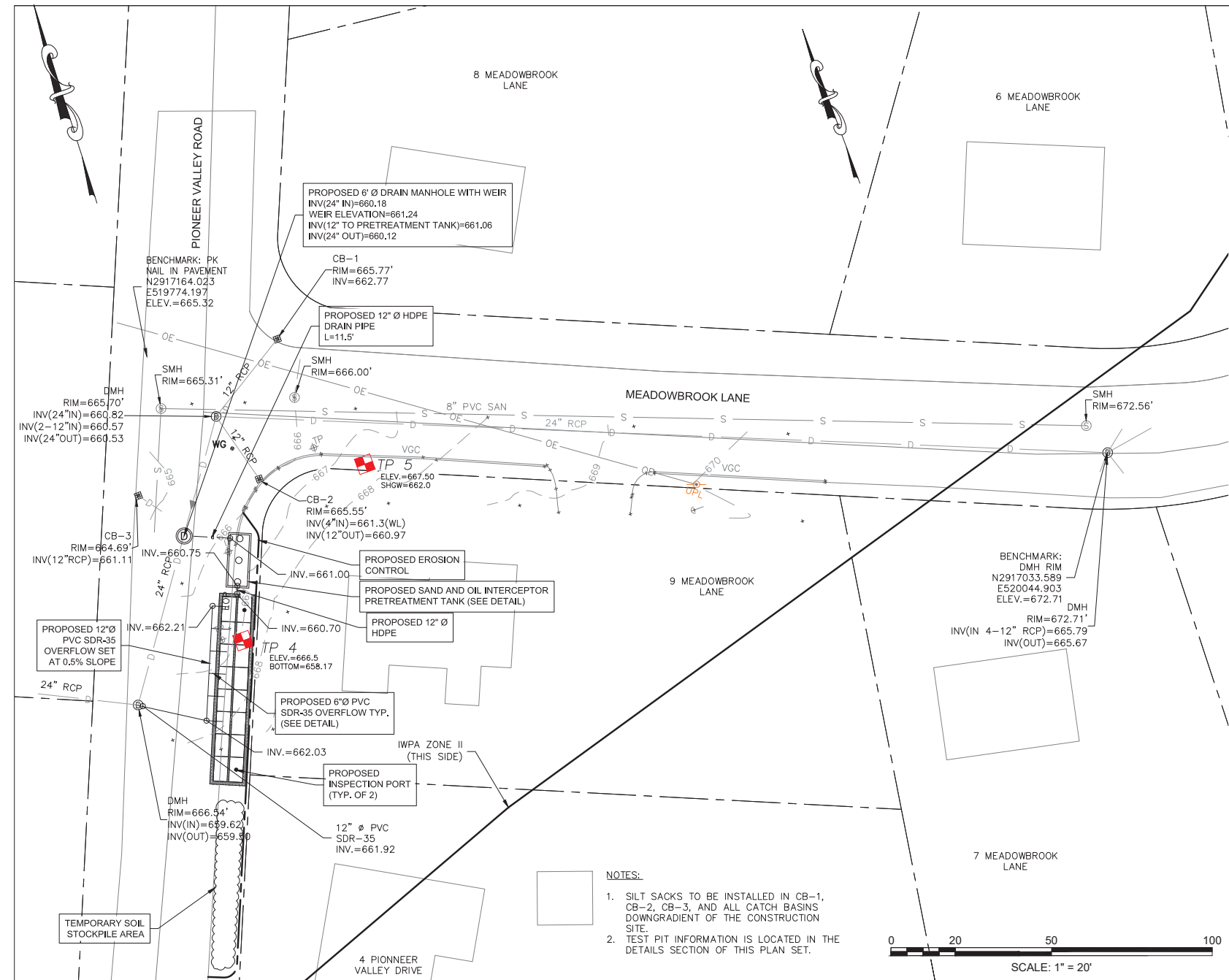
4' DIA. PRECAST CONCRETE SEDIMENT FOREBAY  
AS MANUFACTURED BY SCITUATE RAY PRECAST  
NOT TO SCALE

SUGGESTED PLANT LIST

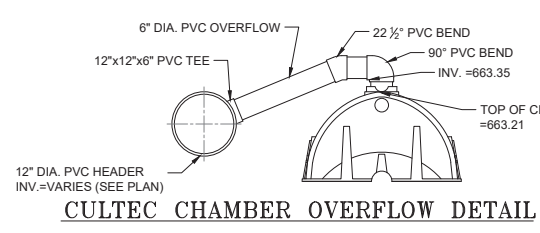
NOTE: PROPOSED PLANTINGS AND LOCATIONS TO BE FINALIZED BY THE TOWN AFTER REVIEW AND DISCUSSION WITH TOWN'S LANDSCAPE SUPPLIER.

KEY	QTY.	BOTANICAL NAME	COMMON NAME	SIZE	COMMENTS
ORNAMENTAL GRASSES AND PERENNIALS					
IR	30	IRIS VERSICOLOR	BLUE FLAG IRIS	1 GAL	-
MD	30	MONARDIA DIDYMA 'JACOB CLINE'	JACOB CLINE BEEBALM	1 GAL	-
PV	30	PANICUM VIRGATUM 'SHENANDOAH'	SHENANDOAH SWITCHGRASS	1 GAL	-
RF	30	RUDBECKIA FULGIDA 'GOLDSTURM'	GOLDSTURM BLACK EYED SUSAN	1 GAL	-
HS	30	HEMEROCALLIS 'STELLA DE ORO'	STELLA DE ORO DAYLILY	1 GAL	-

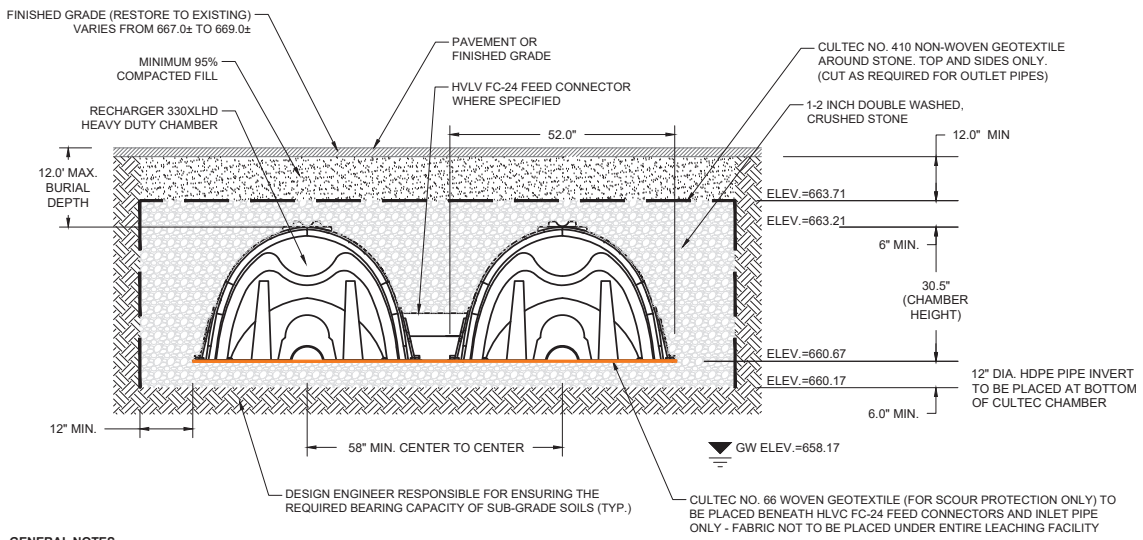
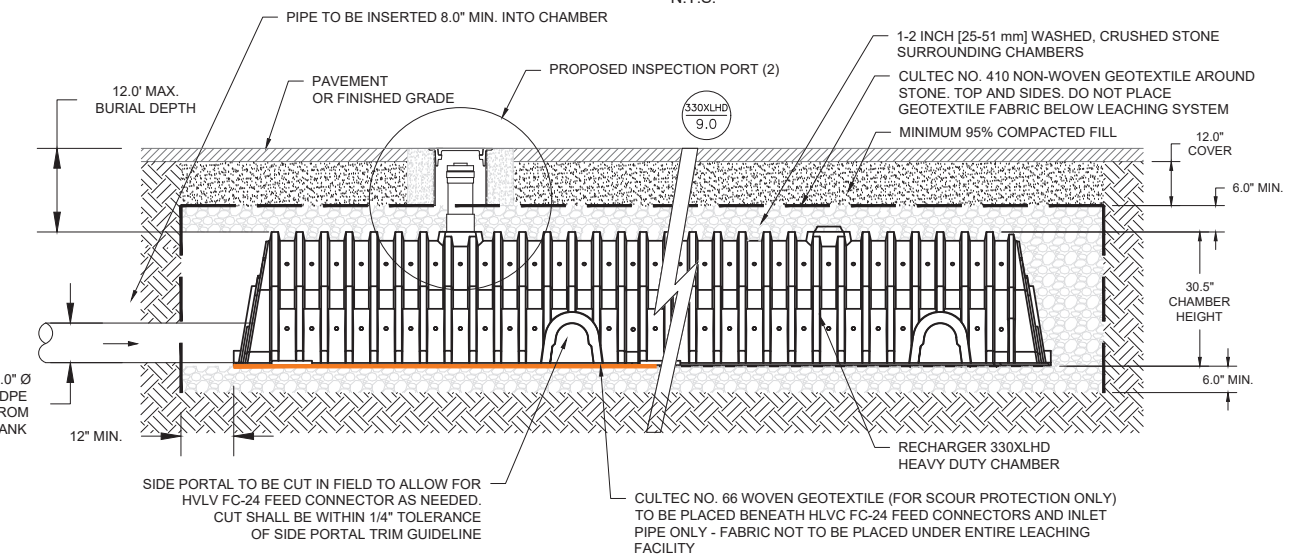




PROPOSED 4' Ø PRECAST CONCRETE DRAIN MANHOLE (SECTION A-A')



CULTEC CHAMBER OVERFLOW DETAIL



**GENERAL NOTES**  
RECHARGER 330XL HD BY CULTEC, INC. OF BROOKFIELD, CT.  
STORAGE PROVIDED = 11.32 CF/FT PER DESIGN UNIT.  
REFER TO CULTEC, INC.'S CURRENT RECOMMENDED INSTALLATION GUIDELINES.  
THE CHAMBER WILL BE DESIGNED TO WITHSTAND TRAFFIC LOADS WHEN INSTALLED ACCORDING TO CULTEC'S RECOMMENDED INSTALLATION INSTRUCTIONS

1. SILT SACKS TO BE INSTALLED IN CB-1, CB-2, CB-3, AND ALL CATCH BASINS DOWNGRADIENT OF THE CONSTRUCTION SITE.  
2. TEST PIT INFORMATION IS LOCATED IN THE DETAILS SECTION OF THIS PLAN SET.

DESIGN ENGINEER RESPONSIBLE FOR ENSURING THE REQUIRED BEARING CAPACITY OF SUB-GRADE SOILS (TYP.)

CULTEC NO. 410 NON-WOVEN GEOTEXTILE AROUND STONE. TOP AND SIDES ONLY. (CUT AS REQUIRED FOR OUTLET PIPES)

1-2 INCH DOUBLE WASHED, CRUSHED STONE

12.0" MIN

ELEV.=663.71

ELEV.=663.21

6" MIN.

30.5" (CHAMBER HEIGHT)

ELEV.=660.67

ELEV.=660.17

12" DIA. HDPE PIPE INVERT TO BE PLACED AT BOTTOM OF CULTEC CHAMBER

6.0" MIN.

GW ELEV.=658.17

CULTEC NO. 66 WOVEN GEOTEXTILE (FOR SCOUR PROTECTION ONLY) TO BE PLACED BENEATH HLVC FC-24 FEED CONNECTORS AND INLET PIPE ONLY - FABRIC NOT TO BE PLACED UNDER ENTIRE LEACHING FACILITY

ALL RECHARGER 330XL HD HEAVY DUTY UNITS ARE MARKED WITH A COLOR STRIPE FORMED INTO THE PART ALONG THE LENGTH OF THE CHAMBER.  
ALL RECHARGER 330XL HD CHAMBERS MUST BE INSTALLED IN ACCORDANCE WITH ALL APPLICABLE LOCAL, STATE AND FEDERAL REGULATIONS

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  - EXISTING BUILDING
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  - EXISTING MAJOR CONTOUR
  - EDGE OF ROADWAY
  - EXISTING SEWER
  - EXISTING DRAIN LINE
  - EXISTING DRAIN MANHOLE
  - EXISTING SEWER MANHOLE
  - EXISTING CATCH BASIN
  - CONCRETE BOUNDS
  - EXISTING OVERHEAD ELEC.
  - EXISTING UTILITY POLE
  - EXISTING TEST PIT
  - IWPA ZONE II BOUNDARY
  - INNER RIPARIAN
  - OUTER RIPARIAN
  - WETLAND
  - PROPOSED EROSION CONTROL
  - SOIL STOCKPILE LIMITS
  - PROPOSED FLOW ARROW
  - PROPOSED CONTOUR
  - PROPOSED GUARDRAIL
  - PROPOSED DRAIN LINE
  - PROPOSED DRAIN MANHOLE
  - PROPOSED RIP RAP

- NOTES:
- AN ON THE GROUND SURVEY OF THIS SITE WAS CONDUCTED IN JUNE OF 2018 BY CDW CONSULTANTS INC. OF NATICK, MASSACHUSETTS. ALL SURVEY INFORMATION MUST BE FIELD VERIFIED DURING CONSTRUCTION.
  - ALL NEWLY DISTURBED SLOPES SHALL BE SEED OR PROTECTED BY TEMPORARY TREATMENTS SUCH AS HAY, STRAW OR FIBER MULCH OR PROTECTION COVERS SUCH AS A MAT OR FIBER LINING (BURLAP, JUTE FIBERGLASS NETTING, EXCELSIOR BLANKETS). THEY SHALL BE INCORPORATED INTO THE WORK AS WARRANTED OR AS ORDERED BY THE OWNER OR ITS DESIGNATED AGENT.

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Revision	By	Appd.	YY.MM.DD

SPENCER UTILITIES AND MAINTENANCE	WAS	MSB	18.10.18
Issued	By	Appd.	YY.MM.DD

File Name: SPENCER-319 GRANT	WAS	MSB	WAS	18.10.18
	Dwn.	Chkd.	Dgn.	YY.MM.DD

Permit-Seal

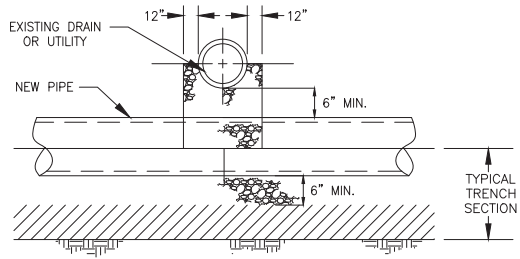


Client/Project  
THE TOWN OF SPENCER  
319 STORMWATER GRANT

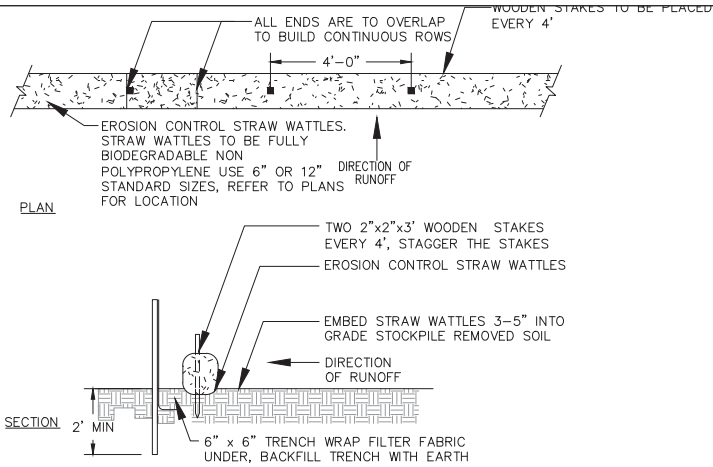
Title  
STORMWATER BMP TANK AND INFILTRATION FACILITY MEADOWBROOK LANE

Project No. 195150496	Scale	Revision
Drawing No.	Sheet	Revision

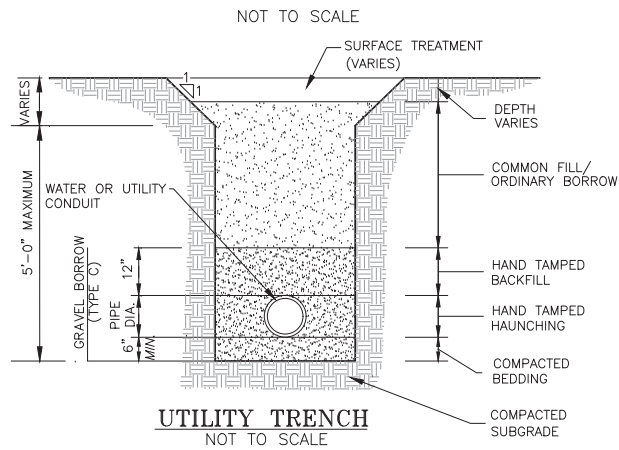




CROSS SECTION  
**UTILITY CROSSING DETAILS**  
NOT TO SCALE



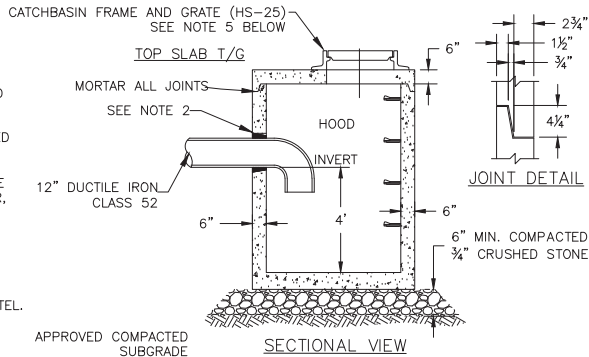
**STRAW WATTLES WITH SILTATION BARRIER**  
NOT TO SCALE



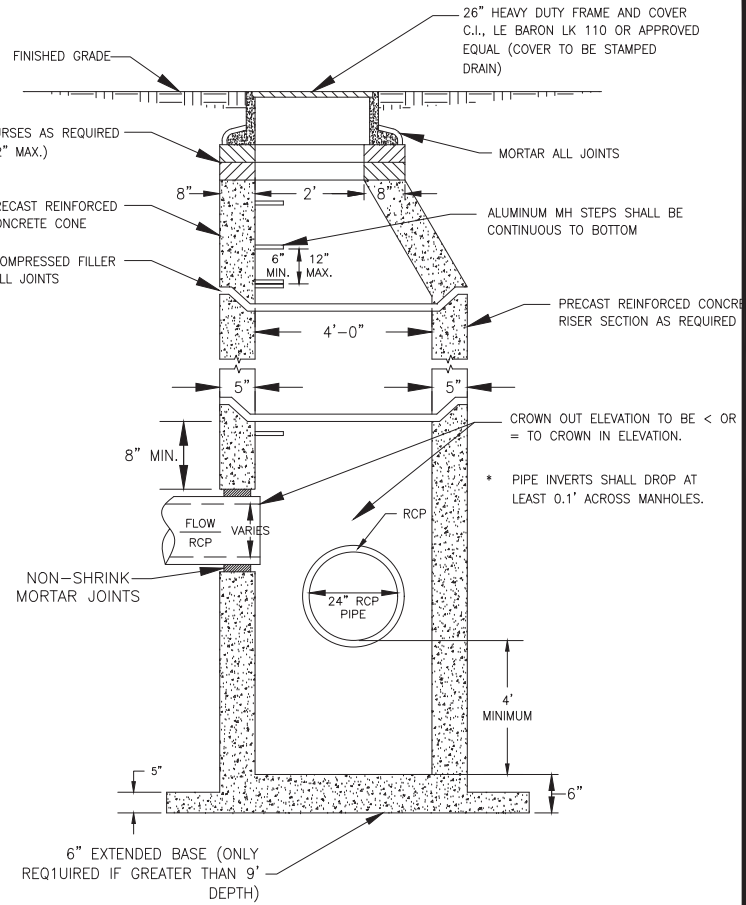
**UTILITY TRENCH**  
NOT TO SCALE

**NOTES:**

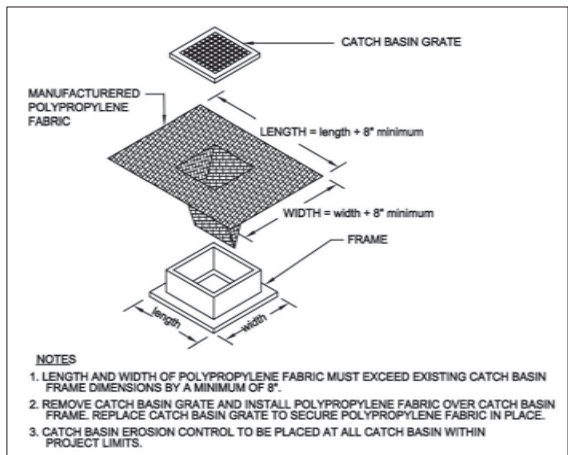
1. ALL SECTIONS SHALL BE DESIGNED FOR HS-25 LOADING.
2. PROVIDE "V" KNOCKOUTS FOR PIPES WITH 2" MAX. CLEARANCE TO OUTSIDE OF PIPE. MORTAR ALL PIPE CONNECTIONS.
3. JOINT SEALANT BETWEEN PRECAST SECTIONS SHALL BE PREFORMED BUTYL RUBBER.
4. CATCH BASIN FRAME AND GRATE SHALL BE SET IN FULL 12" WIDE MORTAR BED. ADJUST TO GRADE WITH PRECAST CONCRETE RISER, MORTAR, OR BRICK, IF NECESSARY.
5. TYPE 1 W/ 24" DIA. OPENING 2" HIGH LOW PROFILE FRAME AND GRATE TO BE SET ON FLAT TOP SECTION OF STRUCTURE.
6. HOOD SHALL BE "THE ELIMINATOR" OIL & FLOATING DEBRIS TRAP (MANUFACTURED BY GROUND WATER RESCUE, INC., QUINCY, MA., TEL. 617-773-1128 ON THE WEB @ WWW.KLEANSTREAM.COM) OR APPROVED EQUIVALENT.
7. STRUCTURE SHALL BE AS MANUFACTURED BY SCITUATE PRECAST OR APPROVED EQUAL.



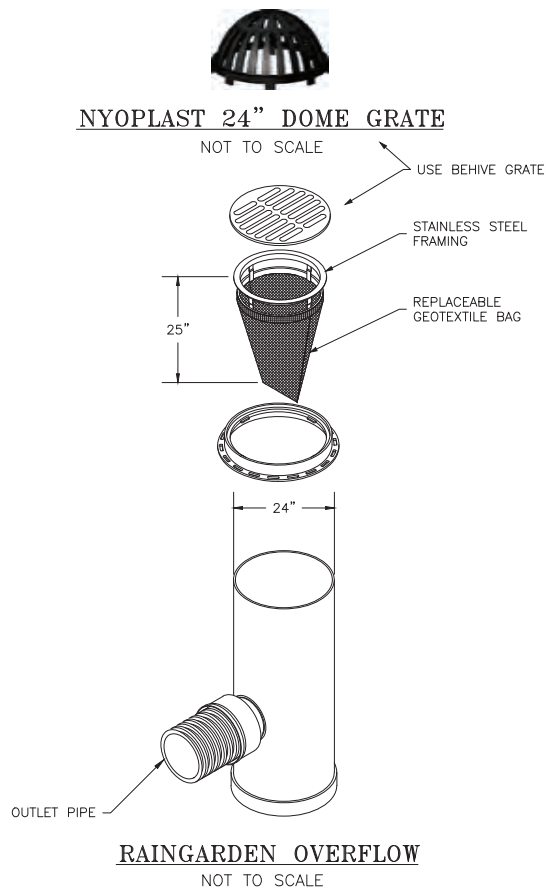
**4' DIA. PRECAST CONCRETE FLAT TOP CATCH BASIN (HS-25)**  
NOT TO SCALE



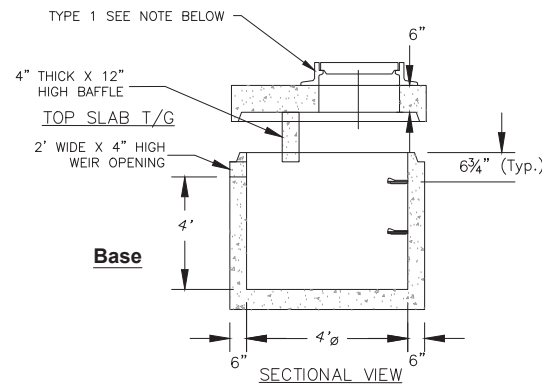
**DEEP SUMP MANHOLE**  
NOT TO SCALE



**CATCH BASIN EROSION CONTROL PROTECTION - SILT SACK**  
NOT TO SCALE



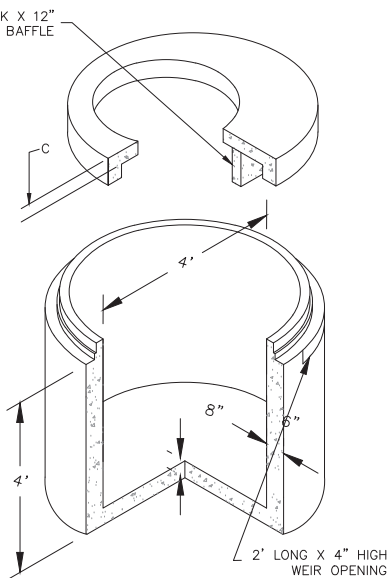
**RAINGARDEN OVERFLOW**  
NOT TO SCALE



**NOTES:**

1. TYPE 1 W/ 24" DIA. OPENING 2" HIGH LOW PROFILE FRAME AND GRATE TO BE SET ON FLAT TOP SECTION OF SEDIMENT TRAP
2. DESIGNED FOR HS-25 LOADING
3. BASE SUPPORT BEDDING AS PER STANDARD CATCH BASIN DETAIL ON THIS SHEET.

**4' DIA. PRECAST CONCRETE SEDIMENT FOREBAY**  
AS MANUFACTURED BY SCITUATE RAY PRECAST  
NOT TO SCALE



Stantec Consulting Services Inc.  
400 Crown Colony Drive  
Quincy Massachusetts 02169 U.S.A.  
Tel. 617.786.7960  
Fax. 617.786.7962  
www.stantec.com

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**Consultants**

**Legend**

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Revision	By	Appd.	YY.MM.DD

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	Dwn.	Chkd.	Dsgn.

Permit-Seal



Client/Project  
THE TOWN OF SPENCER  
319 STORMWATER GRANT

Title

DETAIL SHEET 1

Project No.	Scale
195150496	
Drawing No.	Sheet
	Revision



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S:\1951\Activities\195150496\Civil\Design\drawing\BMP Design\BMP\_Details\_Uilities.dwg

TEST PIT LOG

SOIL EVALUATOR NAME: WADE STANLEY #SE14123

PROJECT NUMBER: 195150496

DATE: 5/9/2018

LOCATION: MEADOWBROOK LANE

PIT #: TP-4

DEPTH (IN)	SOIL HORIZ/LAYER	(MUNSELL) COLOR	REDOXIMORPHIC FEATURES (MOTTLES) DEPTH	COLOR	SOIL TEXTURE
0-39	FILL	-	-	-	-
39-43	A (BURIED)	10 YR 2/2	-	-	SANDY LOAM
43-56	B	10 YR 3/4	-	-	LOAMY SAND
56-100	C	10 YR 5/8	-	-	SAND

NOTES: 100" TO BOTTOM OF PIT, NO WATER/REDOX WAS ENCOUNTERED IN THE PIT.

SOIL EVALUATOR NAME: WADE STANLEY #SE14123

PROJECT NUMBER: 195150496

DATE: 5/9/2018

LOCATION: MEADOWBROOK LANE

PIT #: TP-5

DEPTH (IN)	SOIL HORIZ/LAYER	(MUNSELL) COLOR	REDOXIMORPHIC FEATURES (MOTTLES) DEPTH	COLOR	SOIL TEXTURE
0-11	A	10 YR 2/2	-	-	SANDY LOAM
11-37	Bw	10 YR 4/6	-	-	LOAMY SAND
37-67	C	10 YR 4/1	37	7.5 YR 4/6	SANDY LOAM

NOTES: STANDING WATER AT 66", VERY TIGHT AT BOTTOM OF PIT.

SOIL EVALUATOR NAME: WADE STANLEY #SE14123

PROJECT NUMBER: 195150496

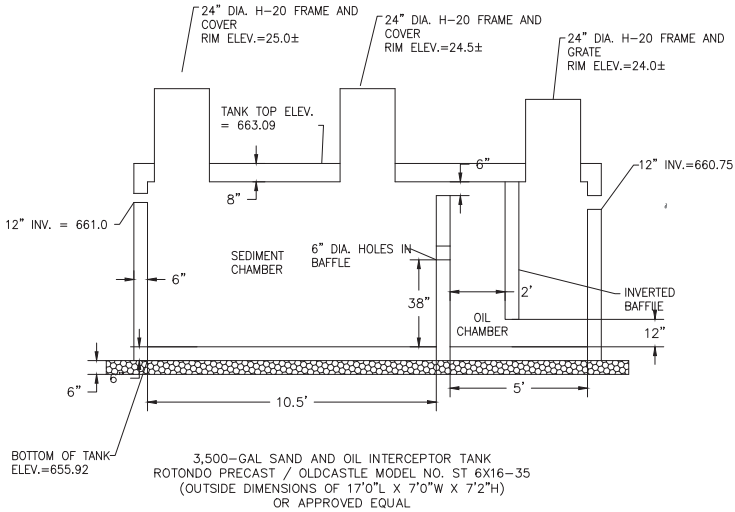
DATE: 5/9/2018

LOCATION: 30 MEADOW ROAD (IN RIGHT OF WAY)

PIT #: TP-6

DEPTH (IN)	SOIL HORIZ/LAYER	(MUNSELL) COLOR	REDOXIMORPHIC FEATURES (MOTTLES) DEPTH	COLOR	SOIL TEXTURE
0-53	FILL	-	-	-	-
53-88	C	10 YR 5/8	-	-	LOAMY SAND

NOTES: 82" STANDING WATER, TEST PIT WAS NEXT TO WATER LINE. STONE BEDDING FROM WATER LINE WAS OBSERVED WITHIN THE PIT.



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SPENCER UTILITIES AND MAINTENANCE WAS MSB 18.10.18  
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File Name: SPENCER-319 GRANT WAS MSB WAS 18.10.18  
Dwn. Chkd. Dsgn. YY.MM.DD

Permit-Seal



Client/Project  
THE TOWN OF SPENCER  
319 STORMWATER GRANT

Title

DETAIL SHEET 2

Project No. 195150496 Scale

Drawing No. Sheet of Revision

06 of 06 00



## **APPENDIX C**

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### INSPECTION AND MAINTENANCE FORMS

- Deep Sump Manholes and Deep Sump Sediment Forebays
- Grass Sediment Forebay
- Grass Swale
- Infiltrating and Lined Rain Gardens
- Sand and Oil Water Separator Pretreatment Tank
- Subsurface Cultec Recharge Chambers



**Powder Mill Park**  
**Spencer Water Department**  
**Spencer Department of Public Works**  
**Meadow Road**  
**Meadowbrook Lane**

N/A = Not Applicable  
N/I = Not Investigated  
0 = Not a problem

1 = Monitor (potential for future problems exist)  
2 = Routine Maintenance Required  
3 = Immediate Repair Necessary

Broken	N/A	N/I	0	1	2	3
Clogged	N/A	N/I	0	1	2	3
Submerged Outlet Pipe	N/A	N/I	0	1	2	3

[illegible]

Page 1 of 1

**INSPECTION AND MAINTENANCE FORM**  
**STORMWATER BEST MANAGEMENT PRACTICES (BMPs)**

Drainage System: Grass Sediment Forebay Date: \_\_\_\_\_ Time: \_\_\_\_\_

Weather/Temp.: \_\_\_\_\_ Inspector(s): \_\_\_\_\_

Date of Last Precipitation: \_\_\_\_\_ Precipitation Amount: \_\_\_\_\_ Inches

Precipitation Type: \_\_\_\_\_ Location: 7 Meadow Road

**Scoring Breakdown:**

N/A = Not Applicable

1 = Monitor (potential for future problems exist)

N/I = Not Investigated

2 = Routine Maintenance Required

0 = Not a problem

3 = Immediate Repair Necessary

**1. Grass Sediment Forebay**

Sediment accumulation >1" No Yes 0 1 2 3 Amount: \_\_\_\_\_ in. \*

Ponding more than 24 hrs after rain No Yes 0 1 2 3 Amount: \_\_\_\_\_ in.

Soil pH

Oil/chemical accumulation in soil bed N/A N/I 0 1 2 3

Other

**2. Grass in Bottom/Sides**

Disease/pest problems N/A N/I 0 1 2 3

Weeds N/A N/I 0 1 2 3

Excess growth and/or dead branches N/A N/I 0 1 2 3

**3. Grass on Surface**

Overall Condition N/A N/I 0 1 2 3

Erosion N/A N/I 0 1 2 3

Sediment accumulation >1" No Yes 0 1 2 3 Amount: \_\_\_\_\_ in. \*

**5. Inlet**

Broken or in need of repair N/A N/I 0 1 2 3

Clogged N/A N/I 0 1 2 3

Submerged Outlet Pipe N/A N/I 0 1 2 3

**5. Outlet Weir**

Broken or in need of repair N/A N/I 0 1 2 3

Clogged N/A N/I 0 1 2 3

Submerged Overflow N/A N/I 0 1 2 3

Overflow (At Discharge Point) N/A N/I 0 1 2 3

**6. Rip Rap/Stone (if any)**

Stability N/A N/I 0 1 2 3

Erosive Conditions N/A N/I 0 1 2 3

Clogged or Sediment Filled N/A N/I 0 1 2 3

**Overall Condition**

**Inspector's Summary:**


\*If sediment depths are greater than half an inch, sediments should be removed as soon as possible.

Precipitation Type: \_\_\_\_\_ Location: **7 Meadow Road**

N/A = Not Applicable  
N/I = Not Investigated  
0 = Not a problem

1 = Monitor (potential for future problems exist)  
2 = Routine Maintenance Required  
3 = Immediate Repair Necessary

Overall Condition	N/A	N/I	0	1	2	3	
Erosion	N/A	N/I	0	1	2	3	
Sediment accumulation >1"	No	Yes	0	1	2	3	Amount: _____ in. *

## This image shows a single page of white paper with horizontal black lines, resembling notebook paper. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

Page 1 of 1

**Powder Mill Park**  
**Spencer Water Department**  
**Spencer Department of Public Works**  
**Meadow Road (within ROW)**

N/A = Not Applicable  
N/I = Not Investigated  
0 = Not a problem

1 = Monitor (potential for future problems exist)  
2 = Routine Maintenance Required  
3 = Immediate Repair Necessary

Broken or in need of repair	N/A	N/I	0	1	2	3
Clogged	N/A	N/I	0	1	2	3
Submerged Outlet Pipe	N/A	N/I	0	1	2	3

[illegible]

Page 1 of 1

Location: Meadowbrook Lane

3 = Immediate Repair Necessary

Submerged Outlet Pipe	N/A	N/I	0	1	2	3
-----------------------	-----	-----	---	---	---	---

## This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

Page 1 of 1

## Page 1 of 1

**\*\*If sediment depths are greater than one inch, sediments should be removed as soon as possible.**

## **APPENDIX D**

---

### ILLICIT DISCHARGE COMPLIANCE STATEMENT



## Illicit Discharge Compliance Statement

**Project Name:**       Town of Spencer, Massachusetts

By signing this statement, I confirm that no illicit discharges (as defined in Section 40 CFR 122.34(b)(3) of the Phase II Stormwater Regulations under the Clean Water Act) are proposed to enter the stormwater systems that have been constructed under the Town of Spencer 319 Grant Stormwater Project in Spencer, MA. Illicit discharge detection and elimination procedures will be implemented at the site during construction and during post-construction, as described in the Town's NPDES stormwater management documentation. Routine visual inspections are scheduled to prevent illicit discharges into the stormwater system. Construction workers and the Town's homeowners will be informed of the illicit discharge detection and elimination procedures and that no illicit discharges are allowed to enter the Town's stormwater system.

Signature: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

Company: Town of Spencer\_\_\_\_\_

Address: 157 Main Street\_\_\_\_\_

Telephone Number: (508)-885-7500\_\_\_\_\_



## **Attachment 4**

---

### Public Outreach Documents

- Newsletter titled Water Quality Sevenmile River Watershed 2019





# Newsletter

## Water Quality

Sevenmile River  
Watershed  
2019

Spencer, Massachusetts



# Introduction

The purpose of this newsletter is to inform Spencer residents concerning some Town projects that are intended to improve water quality in the Sevenmile River Watershed.

Ongoing since 2017, the Town's Department of Utilities and Facilities has planned, designed, and is presently constructing several stormwater system upgrades which will help improve the quality of stormwater that is draining from streets and parking lots into the Sevenmile River. This project is made possible through matching grant funds received from the Commonwealth's 319 Grant Program (under Section 319 of the Federal Clean Water Act as amended in 1987). Each year, the Massachusetts Department of Environmental Protection (MassDEP), in conjunction with the United States Environmental Protection Agency (EPA), provides funds for projects that address prevention, control, and abatement of NonPoint Source (NPS) pollution associated with stormwater runoff. The program objective is to attain environmental results by restoring beneficial uses and/or meeting or maintaining state water quality standards. This newsletter discusses the Sevenmile River watershed, the goals of the 319 Grant Project in Spencer, and the proposed types and locations of stormwater Best Management Practices (BMP).

Read on to Learn how you can help better manage stormwater and help improve overall water quality within the Town.

---

<sup>1</sup> The 1987 amendments to the Clean Water Act (CWA) of 1972 established the "Section 319 Nonpoint Source Management Program", which addressed the need for greater federal leadership to help fund state and local nonpoint source pollution control efforts.

# What is the Sevenmile River Watershed?

**A watershed is an area of land which has an input of water (rain), surface water runoff (creeks, streams, drainage systems) and an outlet (typically a river, a pond or a reservoir). The Sevenmile River is part of the Chicopee River Watershed which flows predominantly north to south through the Town of Spencer.**

The river is approximately 9.8 miles in length and discharges into the Brookfield River. Stormwater runoff from Meadow Road, Smithville Road and the surrounding neighborhoods are a large component of the water which influence the Sevenmile River. The Sevenmile River is integral to supporting a significant wetland ecosystem and a significant percentage of the water supply within the Town of Spencer. The Town's drinking water supply is drawn from wells located within this watershed. This does not necessarily mean that the wells take water directly from the Sevenmile River, but it does mean that stormwater flowing into the Sevenmile River can affect the quality of the drinking water source. For these reasons, it is important that the town implement strategies to treat stormwater to the fullest extent practical before it flows into the Sevenmile River.

**GOAL:** To protect the existing health of the Sevenmile River and the Town's Aquifer Protection District for the Town's primary public water supply wells.

The Town of Spencer recognizes that untreated stormwater discharges and pollution carried by that stormwater runoff are a threat to the existing health of the Sevenmile River. The Town's goal in implementing these stormwater Best Management Practices (BMPs) is to reduce the potential degradation of water quality within the river.



**Spencer has two public water supply wells: Meadow Road and Cranberry Brook. The proposed stormwater improvements will not only improve water quality to the Sevenmile River but will also improve the water quality within the Zone II or recharge area for the Meadow Road Well.**

MassDEP completed a source Water Assessment and Protection (SWAP) Report in 2002 for the Town of Spencer's public water supply. The assessment recommended that the Town promote the construction of stormwater BMPs to manage potential pollutant sources within the public water supply aquifer. This Project is aligned with those recommendations as it implements various stormwater BMPs throughout the targeted watershed.

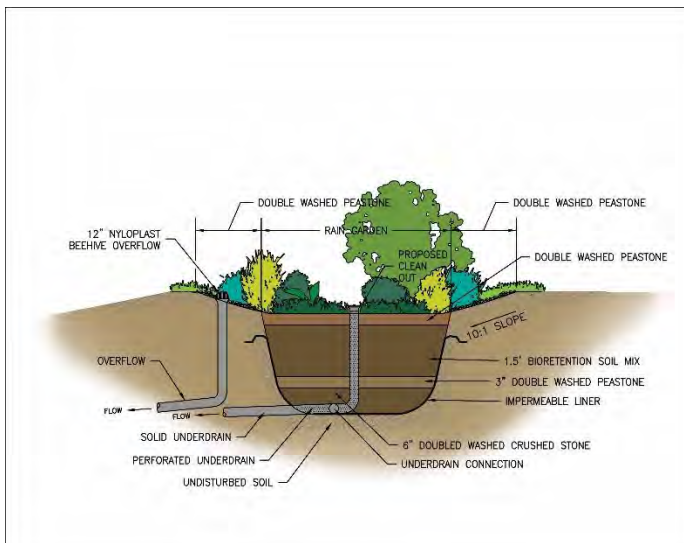
The Stormwater infrastructure proposed as part of this project was developed following guidance within the Department of Environmental Protection Stormwater Handbook Best Management Practices. These practices include structural and non-structural measures providing stormwater quantity and quality management. The proposed BMP's will primarily function to minimize potential adverse water quality impacts to the Sevenmile River and associated groundwater reaching the Town's public water supply wells. The ultimate goal for implementing these BMP's will be to erase the stormwater "footprint" of runoff from the targeted areas to the greatest extent practicable.

### **Description of Stormwater BMPs and their Locations Within Spencer**

There are five (5) locations in the Town for which stormwater BMP's have been designed; the Town plans to construct three or four of these BMPs by the end of May 2019, with the fifth BMP design to be constructed as soon as possible thereafter. Basically, two (2) types of BMPs are proposed: Rain gardens (a.k.a. bioretention facilities) are proposed at four (4) locations; and a Subsurface Infiltration facility is proposed at the fifth location. As part of this project, in 2017 the Town designed and built a demonstration rain garden at the Cranberry Road public works facility. The graphics included in this newsletter help to describe this facility and help to explain the intent and purpose of a rain garden in treating stormwater runoff.

# Rain Gardens

**Rain Gardens, also known as bioretention areas, are shallow depressions which are constructed using sand, gravel, and bioretention soil mix.** The top of the rain garden consists of a mulch layer planted with native vegetation which helps to filter and absorb stormwater pollutants. Stormwater is either piped or flows overland into the rain garden where it percolates through the bioretention soil mix and the native vegetation. The native vegetation and bioretention soil mix act as a filter for the stormwater which helps to reduce pollutants in the discharged stormwater. There are two types of rain gardens, defined by the way in which stormwater is discharged from a rain garden: (1) Filtering Bioretention Areas are lined to capture the stormwater that has filtered down through the plants and BSM<sup>2</sup> (Bioretention Soil Mix), and the filtered stormwater is collected by an underdrain (above the liner) that captures and directs the filtered stormwater to a point beyond and downgradient of the rain garden; and (2) Exfiltrating Bioretention Areas are rain gardens that allow the stormwater to percolate through the rain garden down into the underlying ground, and ultimately into the groundwater. In short, Filtering Rain Gardens have an impermeable barrier underneath the rain garden which does not allow stormwater to infiltrate into the groundwater, typically because the minimum required depth to groundwater is not available, or because the permeability of the underlying soils is poor; and Exfiltrating Rain Gardens do not have a liner because it is feasible to allow the stormwater which percolates through the rain garden to be recharged directly back to the ground.

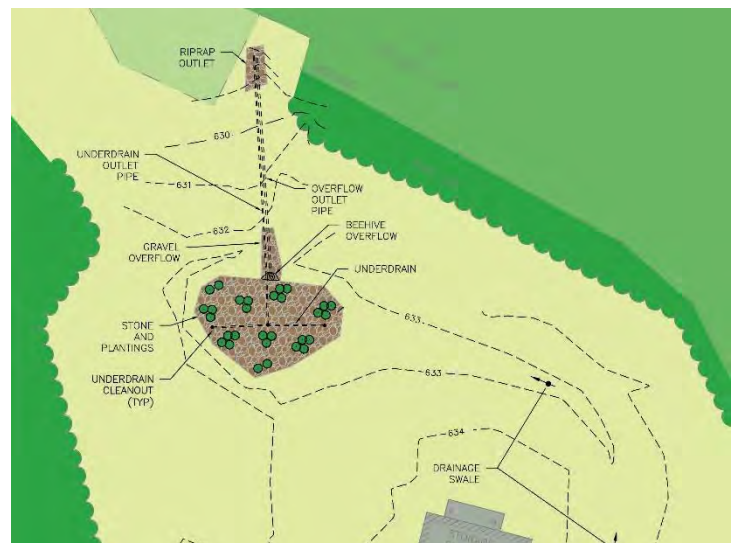


## Subsurface Infiltration Facility

A subsurface infiltration facility is an underground system of chambers which collects and ultimately exfiltrates stormwater through the subsoil and into the water table. Once these chambers are installed you cannot see them from aboveground. These chambers are capable of being driven over by vehicles and will not disrupt any aesthetics which are currently in place at their proposed location. Bioretention Soil Mix (BSM) is a special mix of organic compost, sand and loam. It is typically installed with BSM depths varying from 2 to 4 feet, which helps to support plant growth and to provide filtration and treatment of stormwater, removing dissolved pollutants such as phosphorous, metals, and petroleum hydrocarbons.

The Massachusetts Stormwater Policy requires a minimum depth of 2-feet of naturally occurring soils below the lowest level of any proposed exfiltrating rain garden.

**2** Bioretention Soil Mix (BSM) is a special mix of organic compost, sand and loam. It is typically installed with BSM depths varying from 2 to 4-feet, which helps to support plant growth and to provide filtration and treatment of stormwater, removing dissolved pollutants such as phosphorous, metals, and petroleum hydrocarbons.





## The Importance of Pre-Treatment Prior to BMPs

Pre-treatment devices are critical to the removal of total suspended solids (TSS) and other contaminants within the stormwater. The pre-treatment devices which are utilized throughout the sites listed are deep sump catch basins (also deep sump manholes), sediment forebays, and vegetated filter strips. These components of the stormwater treatment train are critical to the capture, treatment, and ultimate discharge of the stormwater. The pre-treatment devices are integral to the treatment process because they are what effectively treat the stormwater (to remove TSS) before the stormwater is discharged to the stormwater BMP. It is imperative that these devices are inspected, maintained, and cleaned at regular intervals to remove captured sediment which will help to ensure sediment is not transported into the rain gardens or infiltration facilities.

## Pollutants to be removed

Some of the major pollutants which will be removed by the rain gardens and the infiltration facilities and their associated pre-treatment systems will be as follows: Total suspended solids (TSS), total nitrogen, total phosphorus, metals (copper, zinc, lead, cadmium), and petroleum hydrocarbons. These BMP systems will also help to remove pathogens such as E. coli and coliform bacteria.

### Summary of Stormwater BMP Locations Funded By The MassDEP 319 Grant Project

Best Management Practice (BMP) Type	Location
Filtering (non-infiltrating) Rain Garden	Smithville Road (across from Powder Mill Park)
Filtering (non-infiltrating) Rain Garden	3 Old Meadow Road (Spencer Water Department)
Exfiltrating Rain Garden	7 Meadow Road (Spencer Department of Public Works)
Exfiltrating Rain Garden*	Meadow Road (within right of way)
Infiltration Facility*	Meadowbrook Lane

\*One or both of these BMP facilities will be built at a later date depending upon available Town funding and timing of other Town infrastructure projects.

<sup>3</sup> The Massachusetts Stormwater Policy requires a minimum depth of 2-feet of naturally occurring soils below the lowest level of any proposed exfiltrating rain garden.



# Do Your Part to Reduce Stormwater Pollutants

**Although the Town is implementing stormwater improvements as feasible within town roadways and public areas, you, as a resident of the Town, can help to improve the quality of, and reduce the quantity of, stormwater runoff by following one or all of the following seven recommendations:**

1. **Pick up after you pet** - always remove your pet waste from public areas and your backyard before it washes into waterways or the storm drain system. Please dispose of your pet waste properly.
2. **Catch your rain** – Capture your roof runoff in a rain barrel and use it to water your garden or lawn. This is a fun and easy way to reduce the stormwater runoff from your property.
3. **Reduce or Eliminate the Use of Fertilizers** – Over fertilization of lawns and gardens can lead to excess runoff of chemicals which end up polluting waterways. If a fertilizer is needed on your lawn use a slow release phosphorus free fertilizer which is safer for the environment.
4. **Bag your leaves** – When conducting your fall clean up be sure to bag and properly dispose of the leaves from your lawn. When leaves are picked up and rot in local water ways it leads to un-needed pollution.
5. **Use deicers sparingly** – Deicers are a part of winter to ensure the safety of driveways and walkways however, over use of these products can lead to un-needed pollution of waterways. Use these products sparingly when needed during the winter time.
6. **Install your own rain garden** – often, rain gardens can be integrated into your homes landscaping to capture stormwater runoff from roofs, lawns and driveways. See the graphics included in this newsletter for guidance, and do not hesitate to contact the Towns Department of Utilities and Facilities for additional guidance and suggestions.
7. **Dispose of oils and household chemicals properly** – never dispose of such materials into a town catch basin or drainage system, as it is very likely that such pollution will drain directly into a town water resource area. The Town of Spencer offers hazardous waste collection days; please check the Town of Spencer's website ([www.spencerma.gov](http://www.spencerma.gov)) or call the Town at 508.885.7518 for more information on location, dates and procedures for disposing of household chemicals.



# Water Quality

## Sevenmile River Watershed



---

Spencer, Massachusetts  
2019



## **Attachment 5**

---

### Notice of Intent (NOI) Documentation

- NOI Package, Forms, Appendix
- WPA Form (Updated 8-15-2018)



**TOWN OF SPENCER  
319 STORMWATER GRANT**

INTRODUCTION  
August 1, 2018

**TOWN OF SPENCER  
319 STORMWATER GRANT**

**Notice of Intent**

**Submitted to the  
Spencer Conservation Commission**

**Locations:**

Smithville Road – Across from Powder Mill  
Park

3 Old Meadow Road – Spencer Water  
Department

7 Meadow Road – Spencer Department  
of Public Works

Spencer, MA  
01562



**Applicant:**

Town of Spencer

**Prepared by:**

Stantec Consulting Services Inc.

**Stantec Project 195150496**

August 1, 2018

**TOWN OF SPENCER  
319 STORMWATER GRANT**

INTRODUCTION  
August 1, 2018

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**Massachusetts Department of Environmental Protection**  
Bureau of Resource Protection - Wetlands

**WPA Form 3 – Notice of Intent**

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:

MassDEP File Number

Document Transaction Number

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City/Town

**Important:**

When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



Note:  
Before completing this form consult your local Conservation Commission regarding any municipal bylaw or ordinance.

**A. General Information**

1. Project Location (**Note:** electronic filers will click on button to locate project site):

(a) Smithville Rd (b) 3 Old Meadow Rd (c) 7 Meadow Road

Latitude and Longitude:

(a)U21 (b)U23 (c) U11

f. Assessors Map/Plat Number

Spencer

b. City/Town

(a) 42.2 (b) 42.24

(c)42.24

(a) 58 (b) 2-1 (c) 8

g. Parcel /Lot Number

01562

c. Zip Code

(a) -72.0 (b) -72.0 (c)

-72.01

2. Applicant:

Eben

a. First Name

Town of Spencer Highway Department

c. Organization

3 Old Meadow Road

d. Street Address

Spencer

e. City/Town

508-885-7515

h. Phone Number

508-885-9416

i. Fax Number

MA

f. State

ebutler@spencerma.gov

j. Email Address

01562

g. Zip Code

3. Property owner (required if different from applicant):

☐ Check if more than one owner

N/A

a. First Name

Town of Spencer

c. Organization

3 Old Meadow Road

d. Street Address

Spencer

e. City/Town

h. Phone Number

i. Fax Number

MA

f. State

j. Email address

01562

g. Zip Code

4. Representative (if any):

Mark

a. First Name

Stantec

c. Company

400 Crown Colony

d. Street Address

Quincy

e. City/Town

508-591-4331

h. Phone Number

617-786-7962

i. Fax Number

MA

f. State

Mark.Bartlett@stantec.com

j. Email address

02169

g. Zip Code

5. Total WPA Fee Paid (from NOI Wetland Fee Transmittal Form):

Fee Exempt

a. Total Fee Paid

Fee Exempt

b. State Fee Paid

Fee Exempt

c. City/Town Fee Paid



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**A. General Information (continued)**

6. General Project Description:

This project involves the construction of stormwater BMPs on three (3) locations, which are town owned parcels of land along (or off of) Meadow Road in Spencer Massachusetts.

7a. Project Type Checklist: (Limited Project Types see Section A. 7b.)

- |   |   |
|---|---|
| 1. <input type="checkbox"/> Single Family Home                        | 2. <input type="checkbox"/> Residential Subdivision       |
| 3. <input type="checkbox"/> Commercial/Industrial                     | 4. <input type="checkbox"/> Dock/Pier                     |
| 5. <input type="checkbox"/> Utilities                                 | 6. <input type="checkbox"/> Coastal engineering Structure |
| 7. <input type="checkbox"/> Agriculture (e.g., cranberries, forestry) | 8. <input type="checkbox"/> Transportation                |
| 9. <input checked="" type="checkbox"/> Other                          |   |

7b. Is any portion of the proposed activity eligible to be treated as a limited project (including Ecological Restoration Limited Project) subject to 310 CMR 10.24 (coastal) or 310 CMR 10.53 (inland)?

1. ☐ Yes ☒ No If yes, describe which limited project applies to this project. (See 310 CMR 10.24 and 10.53 for a complete list and description of limited project types)

2. Limited Project Type

If the proposed activity is eligible to be treated as an Ecological Restoration Limited Project (310 CMR 10.24(8), 310 CMR 10.53(4)), complete and attach Appendix A: Ecological Restoration Limited Project Checklist and Signed Certification.

8. Property recorded at the Registry of Deeds for:

Worcester

a. County

BK 12032 for 3 Old Meadow Rd, and  
BK 01297 for 7 Meadow Road

b. Certificate # (if registered land)

PG 0316 for 3 Old Meadow Rd., and  
PG 0153 for 7 Meadow Rd.

**B. Buffer Zone & Resource Area Impacts (temporary & permanent)**

- ☒ Buffer Zone Only – Check if the project is located only in the Buffer Zone of a Bordering Vegetated Wetland, Inland Bank, or Coastal Resource Area.
- ☐ Inland Resource Areas (see 310 CMR 10.54-10.58; if not applicable, go to Section B.3, Coastal Resource Areas).

Check all that apply below. Attach narrative and any supporting documentation describing how the project will meet all performance standards for each of the resource areas altered, including standards requiring consideration of alternative project design or location.



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## B. Buffer Zone & Resource Area Impacts (temporary & permanent) (cont'd)

For all projects affecting other Resource Areas, please attach a narrative explaining how the resource area was delineated.

Resource Area	Size of Proposed Alteration	Proposed Replacement (if any)
a. <input type="checkbox"/> Bank	1. linear feet	2. linear feet
b. <input type="checkbox"/> Bordering Vegetated Wetland	1. square feet	2. square feet
c. <input type="checkbox"/> Land Under Waterbodies and Waterways	1. square feet 3. cubic yards dredged	2. square feet

Resource Area	Size of Proposed Alteration	Proposed Replacement (if any)
d. <input checked="" type="checkbox"/> Bordering Land Subject to Flooding	20,440 1. square feet 0 3. cubic feet of flood storage lost	20,440 2. square feet 0 4. cubic feet replaced
e. <input type="checkbox"/> Isolated Land Subject to Flooding	1. square feet 2. cubic feet of flood storage lost	3. cubic feet replaced
f. <input checked="" type="checkbox"/> Riverfront Area	Sevenmile River 1. Name of Waterway (if available) - <b>specify coastal or inland</b>	

2. Width of Riverfront Area (check one):

- ☐ 25 ft. - Designated Densely Developed Areas only
- ☐ 100 ft. - New agricultural projects only
- ☒ 200 ft. - All other projects

3. Total area of Riverfront Area on the site of the proposed project:

321,045  
square feet

4. Proposed alteration of the Riverfront Area:

19,721	0	19,721
a. total square feet	b. square feet within 100 ft.	c. square feet between 100 ft. and 200 ft.

5. Has an alternatives analysis been done and is it attached to this NOI? ☐ Yes ☒ No

6. Was the lot where the activity is proposed created prior to August 1, 1996? ☒ Yes ☐ No

3. ☐ Coastal Resource Areas: (See 310 CMR 10.25-10.35)

**Note:** for coastal riverfront areas, please complete **Section B.2.f.** above.



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**B. Buffer Zone & Resource Area Impacts (temporary & permanent) (cont'd)**

Check all that apply below. Attach narrative and supporting documentation describing how the project will meet all performance standards for each of the resource areas altered, including standards requiring consideration of alternative project design or location.

Online Users:  
Include your document transaction number (provided on your receipt page) with all supplementary information you submit to the Department.

<u>Resource Area</u>	<u>Size of Proposed Alteration</u>	<u>Proposed Replacement (if any)</u>
a. <input type="checkbox"/> Designated Port Areas	Indicate size under Land Under the Ocean, below	
b. <input type="checkbox"/> Land Under the Ocean	1. square feet _____ 2. cubic yards dredged _____	
c. <input type="checkbox"/> Barrier Beach	Indicate size under Coastal Beaches and/or Coastal Dunes below	
d. <input type="checkbox"/> Coastal Beaches	1. square feet _____	2. cubic yards beach nourishment _____
e. <input type="checkbox"/> Coastal Dunes	1. square feet _____	2. cubic yards dune nourishment _____
	<u>Size of Proposed Alteration</u>	<u>Proposed Replacement (if any)</u>
f. <input type="checkbox"/> Coastal Banks	1. linear feet _____	
g. <input type="checkbox"/> Rocky Intertidal Shores	1. square feet _____	
h. <input type="checkbox"/> Salt Marshes	1. square feet _____	2. sq ft restoration, rehab., creation _____
i. <input type="checkbox"/> Land Under Salt Ponds	1. square feet _____	
	2. cubic yards dredged _____	
j. <input type="checkbox"/> Land Containing Shellfish	1. square feet _____	
k. <input type="checkbox"/> Fish Runs	Indicate size under Coastal Banks, inland Bank, Land Under the Ocean, and/or inland Land Under Waterbodies and Waterways, above	
	1. cubic yards dredged _____	
l. <input type="checkbox"/> Land Subject to Coastal Storm Flowage	1. square feet _____	
4. <input type="checkbox"/> Restoration/Enhancement		
If the project is for the purpose of restoring or enhancing a wetland resource area in addition to the square footage that has been entered in Section B.2.b or B.3.h above, please enter the additional amount here.		
a. square feet of BVW _____	b. square feet of Salt Marsh _____	

5. ☐ Project Involves Stream Crossings

a. number of new stream crossings \_\_\_\_\_

b. number of replacement stream crossings \_\_\_\_\_



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**C. Other Applicable Standards and Requirements**

- ☐ This is a proposal for an Ecological Restoration Limited Project. Skip Section C and complete Appendix A: Ecological Restoration Limited Project Checklists – Required Actions (310 CMR 10.11).

**Streamlined Massachusetts Endangered Species Act/Wetlands Protection Act Review**

1. Is any portion of the proposed project located in **Estimated Habitat of Rare Wildlife** as indicated on the most recent Estimated Habitat Map of State-Listed Rare Wetland Wildlife published by the Natural Heritage and Endangered Species Program (NHESP)? To view habitat maps, see the *Massachusetts Natural Heritage Atlas* or go to [http://maps.massgis.state.ma.us/PRI\\_EST\\_HAB/viewer.htm](http://maps.massgis.state.ma.us/PRI_EST_HAB/viewer.htm).

a. ☒ Yes ☐ No

**If yes, include proof of mailing or hand delivery of NOI to:**

**Natural Heritage and Endangered Species Program  
Division of Fisheries and Wildlife  
1 Rabbit Hill Road  
Westborough, MA 01581**

August 1, 2017

b. Date of map

If yes, the project is also subject to Massachusetts Endangered Species Act (MESA) review (321 CMR 10.18). To qualify for a streamlined, 30-day, MESA/Wetlands Protection Act review, please complete Section C.1.c, and include requested materials with this Notice of Intent (NOI); *OR* complete Section C.2.f, if applicable. *If MESA supplemental information is not included with the NOI, by completing Section 1 of this form, the NHESP will require a separate MESA filing which may take up to 90 days to review (unless noted exceptions in Section 2 apply, see below).*

- c. Submit Supplemental Information for Endangered Species Review\*

1. ☒ Percentage/acreage of property to be altered:

(a) within wetland Resource Area 0 %  
percentage/acreage

(b) outside Resource Area 4 %  
percentage/acreage

2. ☒ Assessor's Map or right-of-way plan of site

2. ☒ Project plans for entire project site, including wetland resource areas and areas outside of wetlands jurisdiction, showing existing and proposed conditions, existing and proposed tree/vegetation clearing line, and clearly demarcated limits of work \*\*

(a) ☒ Project description (including description of impacts outside of wetland resource area & buffer zone)

(b) ☐ Photographs representative of the site

\* Some projects **not** in Estimated Habitat may be located in Priority Habitat, and require NHESP review (see <http://www.mass.gov/eea/agencies/dfg/dfw/natural-heritage/regulatory-review/>). Priority Habitat includes habitat for state-listed plants and strictly upland species not protected by the Wetlands Protection Act.

\*\* MESA projects may not be segmented (321 CMR 10.16). The applicant must disclose full development plans even if such plans are not required as part of the Notice of Intent process.



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**C. Other Applicable Standards and Requirements (cont'd)**

- (c) ☐ MESA filing fee (fee information available at [http://www.mass.gov/dfwele/dfw/nhosp/regulatory\\_review/ mesa/ mesa\\_fee\\_schedule.htm](http://www.mass.gov/dfwele/dfw/nhosp/regulatory_review/ mesa/ mesa_fee_schedule.htm)).  
Make check payable to "Commonwealth of Massachusetts - NHESP" and **mail to NHESP** at above address

*Projects altering 10 or more acres of land, also submit:*

- (d) ☐ Vegetation cover type map of site
- (e) ☐ Project plans showing Priority & Estimated Habitat boundaries
- (f) OR Check One of the Following
1. ☐ Project is exempt from MESA review.  
Attach applicant letter indicating which MESA exemption applies. (See 321 CMR 10.14, [http://www.mass.gov/dfwele/dfw/nhosp/regulatory\\_review/ mesa/ mesa\\_exemptions.htm](http://www.mass.gov/dfwele/dfw/nhosp/regulatory_review/ mesa/ mesa_exemptions.htm); the NOI must still be sent to NHESP if the project is within estimated habitat pursuant to 310 CMR 10.37 and 10.59.)
  2. ☐ Separate MESA review ongoing. a. NHESP Tracking # \_\_\_\_\_ b. Date submitted to NHESP \_\_\_\_\_
  3. ☐ Separate MESA review completed.  
Include copy of NHESP "no Take" determination or valid Conservation & Management Permit with approved plan.
3. For coastal projects only, is any portion of the proposed project located below the mean high water line or in a fish run?
- a. ☐ Not applicable – project is in inland resource area only      b. ☐ Yes    ☐ No

If yes, include proof of mailing, hand delivery, or electronic delivery of NOI to either:

South Shore - Cohasset to Rhode Island border, and the Cape & Islands:

Division of Marine Fisheries -  
Southeast Marine Fisheries Station  
Attn: Environmental Reviewer  
836 South Rodney French Blvd.  
New Bedford, MA 02744  
Email: [DMF.EnvReview-South@state.ma.us](mailto:DMF.EnvReview-South@state.ma.us)

North Shore - Hull to New Hampshire border:

Division of Marine Fisheries -  
North Shore Office  
Attn: Environmental Reviewer  
30 Emerson Avenue  
Gloucester, MA 01930  
Email: [DMF.EnvReview-North@state.ma.us](mailto:DMF.EnvReview-North@state.ma.us)

Also if yes, the project may require a Chapter 91 license. For coastal towns in the Northeast Region, please contact MassDEP's Boston Office. For coastal towns in the Southeast Region, please contact MassDEP's Southeast Regional Office.



**Massachusetts Department of Environmental Protection**  
Bureau of Resource Protection - Wetlands

# **WPA Form 3 – Notice of Intent**

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

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## **C. Other Applicable Standards and Requirements (cont'd)**

**Online Users:**

Include your document transaction number (provided on your receipt page) with all supplementary information you submit to the Department.

4. Is any portion of the proposed project within an Area of Critical Environmental Concern (ACEC)?
  - a. ☐ Yes ☒ No If yes, provide name of ACEC (see instructions to WPA Form 3 or MassDEP Website for ACEC locations). **Note:** electronic filers click on Website.
  - b. ACEC
5. Is any portion of the proposed project within an area designated as an Outstanding Resource Water (ORW) as designated in the Massachusetts Surface Water Quality Standards, 314 CMR 4.00?
  - a. ☐ Yes ☒ No
6. Is any portion of the site subject to a Wetlands Restriction Order under the Inland Wetlands Restriction Act (M.G.L. c. 131, § 40A) or the Coastal Wetlands Restriction Act (M.G.L. c. 130, § 105)?
  - a. ☐ Yes ☒ No
7. Is this project subject to provisions of the MassDEP Stormwater Management Standards?
  - a. ☐ Yes. Attach a copy of the Stormwater Report as required by the Stormwater Management Standards per 310 CMR 10.05(6)(k)-(q) and check if:
    1. ☐ Applying for Low Impact Development (LID) site design credits (as described in Stormwater Management Handbook Vol. 2, Chapter 3)
    2. ☒ A portion of the site constitutes redevelopment
    3. ☐ Proprietary BMPs are included in the Stormwater Management System.
  - b. ☒ No. Check why the project is exempt:
 

<ol style="list-style-type: none"> <li>1. <input type="checkbox"/> Single-family house</li> <li>2. <input type="checkbox"/> Emergency road repair</li> <li>3. <input type="checkbox"/> Small Residential Subdivision (less than or equal to 4 single-family houses or less than or equal to 4 units in multi-family housing project) with no discharge to Critical Areas.</li> </ol>	<b>STORMWATER BMP IMPROVEMENTS ONLY:</b> NO INCREASE IN IMPERVIOUS AREA NO CHANGE IN LAND COVER TYPE NO INCREASE IN VOLUME OF STORMWATER
--	---

## **D. Additional Information**

- ☐ This is a proposal for an Ecological Restoration Limited Project. Skip Section D and complete Appendix A: Ecological Restoration Notice of Intent – Minimum Required Documents (310 CMR 10.12).

Applicants must include the following with this Notice of Intent (NOI). See instructions for details.

**Online Users:** Attach the document transaction number (provided on your receipt page) for any of the following information you submit to the Department.

1. ☐ USGS or other map of the area (along with a narrative description, if necessary) containing sufficient information for the Conservation Commission and the Department to locate the site. (Electronic filers may omit this item.)
2. ☐ Plans identifying the location of proposed activities (including activities proposed to serve as a Bordering Vegetated Wetland [BVW] replication area or other mitigating measure) relative to the boundaries of each affected resource area.



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**D. Additional Information (cont'd)**

3. ☒ Identify the method for BVW and other resource area boundary delineations (MassDEP BVW Field Data Form(s), Determination of Applicability, Order of Resource Area Delineation, etc.), and attach documentation of the methodology.
4. ☒ List the titles and dates for all plans and other materials submitted with this NOI.
- “Spencer 319 Grant Stormwater BMP Project” (7 sheets)
- |                                      |                          |          |
|--------------------------------------|--------------------------|----------|
| a. Plan Title                        |                          |          |
| Mark Bartlett                        | Mark Bartlett            |          |
| b. Prepared By                       | c. Signed and Stamped by |          |
| 8/1/2018                             | Various                  |          |
| d. Final Revision Date               | e. Scale                 |          |
| Spencer Notice of Intent             |                          | 8/1/2018 |
| f. Additional Plan or Document Title |                          | g. Date  |
5. ☐ If there is more than one property owner, please attach a list of these property owners not listed on this form.
6. ☒ Attach proof of mailing for Natural Heritage and Endangered Species Program, if needed.
7. ☐ Attach proof of mailing for Massachusetts Division of Marine Fisheries, if needed.
8. ☒ Attach NOI Wetland Fee Transmittal Form
9. ☐ Attach Stormwater Report, if needed.

**E. Fees**

1. ☒ Fee Exempt: No filing fee shall be assessed for projects of any city, town, county, or district of the Commonwealth, federally recognized Indian tribe housing authority, municipal housing authority, or the Massachusetts Bay Transportation Authority.

Applicants must submit the following information (in addition to pages 1 and 2 of the NOI Wetland Fee Transmittal Form) to confirm fee payment:

2. Municipal Check Number

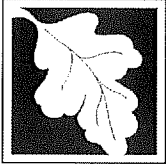
3. Check date

4. State Check Number

5. Check date

6. Payor name on check: First Name

7. Payor name on check: Last Name



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**F. Signatures and Submittal Requirements**

I hereby certify under the penalties of perjury that the foregoing Notice of Intent and accompanying plans, documents, and supporting data are true and complete to the best of my knowledge. I understand that the Conservation Commission will place notification of this Notice in a local newspaper at the expense of the applicant in accordance with the wetlands regulations, 310 CMR 10.05(5)(a).

I further certify under penalties of perjury that all abutters were notified of this application, pursuant to the requirements of M.G.L. c. 131, § 40. Notice must be made by Certificate of Mailing or in writing by hand delivery or certified mail (return receipt requested) to all abutters within 100 feet of the property line of the project location.

<p><u><i>E. Ben Butler</i> for TOWN OF SPENCER</u></p> <p>1. Signature of Applicant</p>	<p><u>7/31/18</u></p> <p>2. Date</p>
<p><u><i>Anna Bartlett</i></u></p> <p>3. Signature of Property Owner (if different)</p>	<p><u>8/1/18</u></p> <p>4. Date</p>
<p>5. Signature of Representative (if any)</p>	<p>6. Date</p>

**For Conservation Commission:**

Two copies of the completed Notice of Intent (Form 3), including supporting plans and documents, two copies of the NOI Wetland Fee Transmittal Form, and the city/town fee payment, to the Conservation Commission by certified mail or hand delivery.

**For MassDEP:**

One copy of the completed Notice of Intent (Form 3), including supporting plans and documents, one copy of the NOI Wetland Fee Transmittal Form, and a **copy** of the state fee payment to the MassDEP Regional Office (see Instructions) by certified mail or hand delivery.

**Other:**

If the applicant has checked the "yes" box in any part of Section C, Item 3, above, refer to that section and the Instructions for additional submittal requirements.

The original and copies must be sent simultaneously. Failure by the applicant to send copies in a timely manner may result in dismissal of the Notice of Intent.



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**NOI Wetland Fee Transmittal Form**  
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

**Important:** When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



## A. Applicant Information

### 1. Location of Project:

(a) Smithville Rd (b) 3 Old Meadow Rd (c) 7 Meadow Road

Spencer

b. City/Town

Fee Exempt

d. Fee amount

c. Check number

### 2. Applicant Mailing Address:

Eben

a. First Name

Butler

b. Last Name

Spencer Highway Department

c. Organization

3 Old meadow Road

d. Mailing Address

Spencer

e. City/Town

MA

f. State

01562

g. Zip Code

508-885-7525

h. Phone Number

508-885-9416

i. Fax Number

ebutler@spencerma.gov

j. Email Address

### 3. Property Owner (if different):

N/A

a. First Name

N/A

b. Last Name

Town of Spencer

c. Organization

3 Old Meadow Road

d. Mailing Address

Spencer

e. City/Town

MA

f. State

01562

g. Zip Code

508-885-7515

h. Phone Number

508-885-9416

i. Fax Number

j. Email Address

## B. Fees

Fee should be calculated using the following process & worksheet. **Please see Instructions before filling out worksheet.**

**Step 1/Type of Activity:** Describe each type of activity that will occur in wetland resource area and buffer zone.

**Step 2/Number of Activities:** Identify the number of each type of activity.

**Step 3/Individual Activity Fee:** Identify each activity fee from the six project categories listed in the instructions.

**Step 4/Subtotal Activity Fee:** Multiply the number of activities (identified in Step 2) times the fee per category (identified in Step 3) to reach a subtotal fee amount. Note: If any of these activities are in a Riverfront Area in addition to another Resource Area or the Buffer Zone, the fee per activity should be multiplied by 1.5 and then added to the subtotal amount.

**Step 5/Total Project Fee:** Determine the total project fee by adding the subtotal amounts from Step 4.

**Step 6/Fee Payments:** To calculate the state share of the fee, divide the total fee in half and subtract \$12.50. To calculate the city/town share of the fee, divide the total fee in half and add \$12.50.

To calculate filing fees, refer to the category fee list and examples in the instructions for filling out WPA Form 3 (Notice of Intent).



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Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

**B. Fees** (continued)

Step 1/Type of Activity	Step 2/Number of Activities	Step 3/Individual Activity Fee	Step 4/Subtotal Activity Fee

Step 5/Total Project Fee: \_\_\_\_\_

**Step 6/Fee Payments:**

Total Project Fee: \_\_\_\_\_ Fee Exempt  
a. Total Fee from Step 5

State share of filing Fee: \_\_\_\_\_ b. 1/2 Total Fee **less** \$12.50

City/Town share of filing Fee: \_\_\_\_\_ c. 1/2 Total Fee **plus** \$12.50

**C. Submittal Requirements**

- a.) Complete pages 1 and 2 and send with a check or money order for the state share of the fee, payable to the Commonwealth of Massachusetts.

Department of Environmental Protection  
Box 4062  
Boston, MA 02211

- b.) **To the Conservation Commission:** Send the Notice of Intent or Abbreviated Notice of Intent; a **copy** of this form; and the city/town fee payment.

**To MassDEP Regional Office** (see Instructions): Send a copy of the Notice of Intent or Abbreviated Notice of Intent; a **copy** of this form; and a **copy** of the state fee payment. (E-filers of Notices of Intent may submit these electronically.)

**TOWN OF SPENCER  
319 STORMWATER GRANT**

August 1, 2018

**Appendix A Narrative**

# **TOWN OF SPENCER**

## **319 STORMWATER GRANT**

INTRODUCTION  
August 1, 2018

### **1.0 INTRODUCTION**

In 2016, the Town of Spencer, through its Office of Utilities and Facilities, applied for a Massachusetts Department of Environmental Protection's (MassDEP) federal Clean Water Act Section 319 Nonpoint Source Pollution Grant. The Spencer Conservation Commission was a strong supporter of this application, and in fact, provided a substantial share of the local matching funds by committing the \$30,000 "settlement fund" that was part of a Consent Decree between Clean Water Action and Bond Construction Company. In April 2017, MassDEP awarded a Section 319 Nonpoint Source Pollution Grant to the Town of Spencer (the 319 Grant). The 319 Grant is for design and construction of stormwater Best Management Practices (BMPs) within the Sevenmile River Watershed<sup>1</sup> and is intended to enhance protection of the Sevenmile River Watershed and its associated public water supply aquifer by addressing issues pertaining to non-point source pollution near Meadow Road. The BMP designs to be implemented will utilize structural best management practice (BMPs) solutions and will incorporate green infrastructure (GI) practices to treat runoff and reduce pollutant loads reaching the Sevenmile River. The Project will also incorporate on-going operation and maintenance, and a public outreach and education component. This component will explain the Project and effectiveness of stormwater BMPs to residents and encourage residents to participate in reducing nonpoint source pollution.

The Town's proposed grant funded Project involves five (5) sites for BMP implementation within the watershed; however only two (2) sites, one on at 30 Meadow Road, and one at the intersection of Meadowbrook Lane and Pioneer Valley Road, are not located within 100-feet of wetland resource areas. The other three (3) sites are located within jurisdiction of the Conservation Commission, and the purpose of this Notice of Intent (NOI) is to address those three project sites.

Therefore, on behalf of the Town of Spencer (the Applicant), Stantec Consulting Services Inc. (Stantec) is pleased to submit this NOI to the Town of Spencer Conservation Commission (Commission), pursuant to the Massachusetts Wetlands Protection Act (WPA; 310 CMR 10.00), the Town of Spencer Conservation Commission Rules and Regulations and the Town of Spencer Stormwater Regulations, for work to implement new stormwater BMPs on town owned upland within the 100' buffer of several wetland areas. As noted, there are three (3) areas within the 100' buffer that will be improved through the construction of stormwater Best Management Practices (BMPs). These three BMP areas are located at Smithville Road (opposite Powder Mill Park), at 3 Old Meadow Road, and at 7 Meadow Road. All of the stormwater BMPs will be constructed on town land and these can be seen in the various Figures in appendix B. The scope of the Project involves the construction of three bioretention rain gardens which will capture and treat stormwater before it reaches resources areas within the Town. These raingardens have been designed to provide maximum practicable treatment to remove stormwater pollutants before final discharge of stormwater to adjacent resource areas. Currently, stormwater to be treated by the bioretention rain gardens is directly discharged to the adjacent wetlands without any type of treatment.

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<sup>1</sup> MassDEP Project 17-09/319, Stormwater BMPs: Sevenmile River Watershed

## **TOWN OF SPENCER**

### **319 STORMWATER GRANT**

#### INTRODUCTION

August 1, 2018

In addition to this narrative (Appendix A), provided herewith are several other appendices: Appendix B which contains a U.S. Geological Survey (USGS) Site Locus (Figure 1), Massachusetts Department of Environmental Protection (MA DEP) Priority Resource Maps (Figure 2), Natural Heritage and Endangered Species Program (NHESP) Maps (Figure 3), and Town of Spencer Tax/Parcel Maps (Figure 4), which illustrate the Project location and surrounding physical features and resource areas; Appendix C which is the Town of Spencer Stormwater Permit Application Checklist; Appendix D which is the abutter notification documentation; Appendix E which is the submittal to the MESA office concerning endangered species; Appendix F which contains wetlands determination reports from LEC Environmental; and Appendix G which contains the Project Plans. The Project and proposed measures to minimize and avoid impacts to the resource areas are described in the following sections of this narrative.

**TOWN OF SPENCER**  
**319 STORMWATER GRANT**

EXISTING CONDITIONS  
August 1, 2018

## **2.0 EXISTING CONDITIONS**

This section provides a site description and resource area characterization for three (3) Project Sites that require the filing of this NOI (the sites). Land use in the general vicinity of the site was determined based on desktop surveys of information available through the Massachusetts Geographic Information System (MassGIS) and from the Town of Spencer, as well as direct observations made during data collection site visits.

### **2.1 GENERAL**

In general, most of the sites which were chosen as part of this 319 Stormwater grant are relatively similar. Any differences in site characteristics will be discussed below.

**Site 1** - The first site is located on the northerly side of Smithville Road, Assessor Map ID# U21-58 (opposite Powder Mill Park) west of the intersection with Meadow Road. This town property is approximately 1.35 acres in size and consists of upland grassy area adjacent to the roadway and a steep drop off towards the northerly end of the site which leads to a wetland and then ultimately the Sevenmile River.

**Site 2** - The second site is located at 3 Old Meadow Road, Assessor Map ID# U23-2-1. This site is also where the Spencer Water Department is located. This town property is approximately 7.68 acres in size and consists of upland area on most of the northeast side of the property. The property then grades down towards the western and southerly side to a wetland area which is adjacent to the Sevenmile River. Two buildings are located in the northeast corner of the property adjacent to Old Meadow Road. There is also a small paved parking lot adjacent to the buildings.

**Site 3** - The third and final site is located at 7 Meadow Road, Assessor Map ID# U11-8. This site is also the location the Spencer Department of Public Works. This town property is approximately 12.92 acres in size and consists of a large garage with associated driveway, parking lot and storage areas. Wetlands are located on the western side of the property adjacent to the Sevenmile River.

The remainder of this NOI will refer to these sites noted above as Sites 1, 2 and 3 respectively.

### **2.2 METHODOLOGY OF RESOURCE AREA INVESTIGATIONS**

The limits of jurisdictional wetland resource areas and waterways were identified by Stantec during review of available online resources, as well as a site visit with Margaret Washburn (Spencer Conservation Commission) conducted on August 14, 2017. Based on online research and observations made during the site visit, it was determined that portions of the proposed Project are located within the 100' wetland buffer. Previously developed Riverfront Area was identified by online research but not delineated in the field.

Wetlands at Site 1 and Site 2 were delineated by LEC Environmental using the methodologies outlined in Delineating Bordering Vegetated Wetlands Under the Massachusetts Wetlands

# **TOWN OF SPENCER**

## **319 STORMWATER GRANT**

EXISTING CONDITIONS  
August 1, 2018

Protection Act: A Handbook; the U.S. Army Corps of Engineers' (Corps) 1987 Wetlands Delineation Manual; the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (Version 2.0, January 2012); and the Bylaw. Sequentially labeled survey flags were placed to field-delineate the jurisdictional boundaries of BVW. Wetland flags were located with a global positioning system (GPS) unit capable of sub-meter accuracy (also performed by LEC Environmental). Wetlands at Site 3 (the DPW site) are based on a plan of existing topography and wetland limits, as provided to Stantec by the Town's Office of Utilities and Facilities<sup>2</sup>.

Descriptions of the each of the resource areas observed during the site visit are provided below and depicted on the Project Plans included in Appendix G of this NOI.

### **2.3 MASSACHUSETTS WETLANDS PROTECTION ACT RESOURCE AREAS**

#### **2.3.1 Riverfront Area**

For Site 1 (opposite Power Mill Park) The 200-foot Riverfront Area extends from the Bank-Mean Annual High-Water Line associated with the Sevenmile River and includes the adjacent BVW, fill slope embankment, gravel/vegetated shoulders of Smithville Road and portions of Power Mill Park; therefore, the Site 1 Project area will be located within this riverfront area. As noted in LEC's report, the regulatory references for this are as follows:

State: *Riverfront Area is the area of land between a river's mean annual high waterline measured horizontally outward from the river and a parallel line located 200 feet away [310 CMR 10.58(2), (2)(1)(e)]; and*

Town: Riverfront Area is the area 200 feet out from the top of the bank of a River. Riverfront Area is NOT a buffer. It is itself a resource area [Section 1.5, Bylaw Regulations].

For Site 2 (Water Department) the Bank-Mean Annual High-Water Line associated with Sevenmile River is located more than 200 feet from the respective Projects.

For Site 3 (DPW building & yard) the 200-foot Riverfront Area extends from the Bank-Mean Annual High-Water Line associated with the Sevenmile River and includes the adjacent BVW, and some of the proposed work area, primarily the rain garden and the final 170 linear feet of the 600-foot grass swale that leads to the raingarden, will take place within the outer 200-foot riparian zone.

#### **2.3.2 Bordering Vegetated Wetlands**

Site 1 – Smithville Road. Wetland flags W-1 through W-12 delineate the boundaries of the BVW located adjacent to the Sevenmile River. All proposed work at this site will take place within the 100' wetland buffer. All proposed work will also take place within the outer riparian zone for the

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<sup>2</sup> Survey information and wetland flags were taken from the plan entitled "Plan of Land in Spencer, MA Prepared for Highway Garage" completed by Sherman & Frydryk, LLC. Land Surveying and Engineering, dated February 9, 2017.

## **TOWN OF SPENCER**

### **319 STORMWATER GRANT**

#### **EXISTING CONDITIONS**

August 1, 2018

Sevenmile River. Although this proposed work will take place adjacent to or in these resource areas respectively, all proposed work will be within previously disturbed areas adjacent to Smithville Road.

Site 2 – 3 Old Meadow Road. Wetland Flags W-1 through W-6 delineate the boundaries of the BVW located adjacent to the Sevenmile River system. All proposed work at this site will take place within the 100' wetland buffer. Although this proposed work will take place adjacent to these resource areas all proposed work will be within previously disturbed areas adjacent to the Spencer Water Department.

Site 3 – 7 Meadow Road. Wetland flags A1 through A24 on the northern side and W3 through W25 on the western and southern sides of the property. All rain garden work and about half of the swale work at this site will take place within the 100' wetland buffer. Also, based on review of aerial photography and existing mapping, it appears that some of the proposed work, primarily the rain garden and the final 170 linear feet of grass swale, will take place within the outer 200-foot riparian zone of the Sevenmile River. Although much of the proposed work will take place adjacent to or in these resource areas, all proposed work will be within previously disturbed areas adjacent to the Spencer Highway Department Building.

### **2.3.3 Bordering Land Subject to Flooding**

According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) which covers delineates flood zones AE, A and Zone X on all the above-mentioned sites. Although these flood zones are delineated on each of the three sites special care has been taken to not create net fill within these zones. Any areas which have proposed BMP infrastructure within the flood zones will also increase flood storage.

## **2.4 RARE SPECIES**

The Massachusetts Natural Heritage and Endangered Species Program (NHESP) 14<sup>th</sup> Edition of the Massachusetts Natural Heritage Atlas effective beginning August 1, 2017, were reviewed during the preparation of this NOI. Site 1 and Site 3 are within the Priority Habitats of Rare Species and the Estimated Habitats of Rare Wildlife, and Site 2 is partially within the Priority Habitats of Rare Species and the Estimated Habitats of Rare Wildlife. As such, the Project does require review pursuant to the Massachusetts Endangered Species Act (MESA) by NHESP per 310 CMR 10.59. A request for this review has been submitted concurrent with this NOI filing (see Appendix E.)

# TOWN OF SPENCER

## 319 STORMWATER GRANT

PROJECT DESCRIPTION  
August 1, 2018

### 3.0 PROJECT DESCRIPTION

The scope of the Project subject to this NOI will involve the construction of various stormwater best management practices (BMPs) at three locations: Site 1 at Smithville Road (across from Powder Mill Park), Site 2 at 3 Old Meadow Road (Spencer Water Department), and Site 3 at 7 Meadow Road (Spencer Department of Public Works). These Stormwater BMPs will enhance water quality by diverting water from the existing drainage systems on the adjunct roadways and treating them with stormwater BMPs before release to the adjacent wetlands.

The proposed site improvements will involve the following work:

- Site 1: Construction of a raingarden (bottom area of about 870 square feet), with associated collection and pretreatment infrastructure on Smithville Road, across the street from Powder Mill Park. This rain garden will be fed by diverting stormwater from the drainage system currently constructed in Smithville Road to the raingarden. Flow from some of the existing street catch basins will be directed to a deep sump basin (manhole), and flow from this basin will be released to the raingarden via a 4-inch high by 2-foot wide opening onto a rip rap spillway that will be connected to a 4-ft wide river rock spreading device at the base of the raingarden. The rain garden will feature plantings and a substantial depth of bioretention soil, supported by a base layer of double washed peastone, underlain by a layer of double washed crushed stone; and then at its base a 30-mil PVC geomembrane (impermeable liner). Because of this site's proximity to the Town's water supply well, located south of the site, the design includes a liner to ensure that stormwater which could contain sodium (from de-icing agents used on the roadways) will not be infiltrated<sup>3</sup>. Because this rain garden is lined, it will feature a perforated underdrain (buried within the crushed stone base) to allow treated stormwater to be safely drained away to the adjacent wetlands. For stormflow that may significantly exceed the first-flush capacity of the rain garden, the raingarden will have a 24-inch diameter beehive grate overflow device, connected to a 24-inch riser pipe, which will in turn be drained out via an 8-inch HDPE relief pipe, that will direct the overflow safely back to the wetlands via a flared pipe-end discharged onto a rip rap spill pad. This raingarden will be planted with a variety of plant species that can be inundated with water but can also survive during periods with very little rainfall. For more information on plantings, see the design drawings which are submitted as part of this report.
- Site 2: Construction of a raingarden (bottom area of about 825 square feet), with associated infrastructure at 3 Old Meadow Road, the current location of the Spencer Water Department. This rain garden will capture and treat stormwater from the Water Departments building, driveway, parking lot, lawn, and some runoff from Old Meadow Road. Currently, this stormwater runs to a catch basin located in the southeast area of the Water Department

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<sup>3</sup> Stantec conducted a review of the existing Meadow Road Water Supply Well records, including pumping tests, reports, and other hydrogeological data; and, based on this review, recommend to the Town that any infiltration practices at Sites 1 and 2 should not include infiltration to the ground. This will ensure that there will be no potential for the transport of sodium (from road salt de-icing) directly to the aquifer which could be under the influence of the Town's nearest water supply pumping well(s).

## TOWN OF SPENCER

### 319 STORMWATER GRANT

#### PROJECT DESCRIPTION

August 1, 2018

parking lot, and then water from this catch basin is released to an outfall in the adjacent wetlands on the southern side of the property. The proposed design calls for a new deep sump basin (manhole) to be constructed adjacent to the existing catch basin. Flow will continue to enter the existing catch basin, but then this flow will be directed to the new deep sump manhole; and, flow from this basin will be released to the raingarden via a 4-inch high by 2-foot wide opening onto a rip rap spillway that will be connected to a 4-ft wide river rock spreading device at the base of the raingarden. The raingarden will feature plantings and a substantial depth of bioretention soil, supported by a base layer of double washed peastone, unlaied by a layer of double washed crushed stone; and then at its base a 30-mil PVC geomembrane (impermeable liner). Similar to the site above, because of this site's proximity to the Town's water supply well, located west of the site, the design includes a liner to ensure that stormwater which could contain sodium (from de-icing agents used on the roadways) will not be infiltrated. Because this rain garden is lined, it will feature a perforated underdrain (buried within the crushed stone base) to allow treated stormwater to be safely drained away to the adjacent wetlands. For stormflow that may significantly exceed the first-flush capacity of the rain garden, the raingarden will have a 24-inch diameter beehive grate overflow device, connected to a 24-inch riser pipe, which will in turn be drained out via an 8-inch HDPE relief pipe. The overflow relief pipe will be connected to the existing 8-inch outfall pipe, thereby utilizing the existing well-established outfall to direct excess storm flow safely back to the wetlands. This raingarden will be planted with a variety of plant species that can be inundated with water but can also survive during periods with very little rainfall. For more information on plantings, see the design drawings which are submitted as part of this report.

- Site 3: Construction of a 600-foot grass swale and raingarden (bottom area of about 2700 square feet) at 7 Meadow Road, the current location of the Spencer Department highway department and storage facility. At this facility, stormwater from Meadow Road will be diverted from the nearby existing drainage system and piped to a deep sump manhole, then to a sediment forebay which will overflow to a grass swale. The grass swale will both convey and help filter stormwater on to the proposed raingarden, to be located on the westerly side of the site. Even though this site is within an IWPA Zone II area the location of the proposed rain garden is sufficiently far from, and down gradient of the Town's Well such that infiltration is considered in this case an acceptable practice<sup>4</sup>. Also, as represented later in this narrative, the proposed raingarden will receive a high level of pretreatment, which will exceed the 44% TSS removal and other parameters as set forth by the Massachusetts Stormwater Policy for BMPs located in an aquifer protection district. The proposed raingarden will feature an inlet from the proposed grass swale. Water that collects within the raingarden will support the vegetation and excess water will exfiltrate through the bioretention soils and bottom stone layers back into the existing ground and wetlands aquifer. For stormflow that may significantly exceed the first-flush capacity of the rain garden, the raingarden will have a broad crested overflow weir to act as the emergency overflow. The emergency overflow will consist of a concrete cast in place broad crested

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<sup>4</sup> Per mutual understanding between Stantec and Town Engineer, Steven Tyler, P.E.

## **TOWN OF SPENCER 319 STORMWATER GRANT**

### **PROJECT DESCRIPTION**

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weir armored on both sides with rip rap. This emergency overflow will safely spread and slow the release of stormwater back into the adjacent downgradient wetlands.

The proposed Project will help to improve water quality at the three locations noted. These improvements will be made by diverting stormwater (which is currently directly discharged to wetlands adjacent to the Sevenmile River) and treating the stormwater to the fullest extent practical before being discharged to the wetlands. This treatment of stormwater will help to improve water quality within the Sevenmile River watershed. Construction of these stormwater BMPs will involve work within the 100' wetland buffer zone at all three locations; and in two locations work will be within outer riparian zone; and in one case work will be within the 100-year flood plain. For this location, special care has been taken to ensure that no compensatory flood storage has been lost. Also, it should be noted that no wetlands will be impacted due to the construction of these stormwater BMPs. The only permanent disturbance will take place within the buffer zones. All the necessary measures to ensure that wetlands are not adversely impacted during construction will be taken. One such measure will be the placement of straw wattles adjacent to all downgradient wetlands while construction is taking place. Please see the sections in this narrative that follow and see the construction drawings attached to this filing for more information on measures to be taken to protect the wetlands adjacent to the project sites.

### **3.1 PROJECT SCOPE OF WORK SUMMARY**

In summary, the major activities associated with this Project will involve the following:

1. Site 1 at Smithville Road, across the street from Powder Mill Park, will involve construction of a lined raingarden. This raingarden will be preceded by two deep sump pre-treatment basins. The underdrain will release treated stormwater back to the wetland. Stormflows that may significantly exceed the first flush capacity of the rain garden will be safely released back to the wetland via the overflow device noted on the plans.
2. Site 2 located at 3 Old Meadow Road, the Town of Spencer Water Department parking lot (which also receives flow from Meadow Road), will involve construction of a lined raingarden. This raingarden will be preceded by two deep sump pre-treatment basins. The underdrain will release treated stormwater back to the wetland. Stormflows that may significantly exceed the first flush capacity of the rain garden will be safely released back to the wetland via the overflow device, which will be connected to the existing/former outfall pipe noted on the plans.
3. Site 3 located at 7 Meadow Road, the Spencer Department of Public Works, will involve a much larger system which starts with construction of a deep sump manhole, followed by a sediment forebay, with associated piping, followed by a grass swale (approximately 600-feet in length), leading to an unlined raingarden. The raingarden will exfiltrate to the ground and recharge the surrounding wetland aquifer. Stormflows that may significantly exceed the first flush capacity of this rain garden will be safely released back to the wetland via the overflow weir that is noted and detailed on the plans.

## **TOWN OF SPENCER 319 STORMWATER GRANT**

PROJECT DESCRIPTION  
August 1, 2018

### **3.2 CONSTRUCTION PERIOD EROSION CONTROL MANAGEMENT**

Construction period management of sedimentation and erosion control will be accomplished primarily by placing straw wattles on all down gradient slopes and adjacent to all wetlands. These straw wattles will ensure that any sediment produced during construction will be contained and not be transported onto any adjacent property or into wetlands. As added precaution, construction staging, and materials storage will only be allowed in a construction staging area designated by the Town. These areas have not yet been outlined on the construction plans, however such areas, when selected by the Town, will be located outside of any 100-foot wetland buffer zone, and outside of any Riverfront Protection areas; and stockpiles of materials, if any, will include proper coverage and perimeter containment.

### **3.3 CONSTRUCTION SEQUENCE**

Site construction of BMPs will be performed by the Town utilizing workers and staff working under the Town's Office of Utilities and Facilities Management (Highway Department, Water Department, Sewer Department, etc.), and the Town will be assisted as needed by their on-call contractor, which has been pre-selected by the Town. The actual sequence of construction will be left to the discretion of the Town, but it is anticipated to include the following general components, at a minimum;

- Pre-construction meeting with Town's engineer (Stantec) to discuss the work requirements at each site, and the worker and public safety procedures that are proposed.
- Install erosion and sediment control measures to protect adjacent property and water resource areas at the site where work is to be performed
- Mobilize equipment and materials to the site (anticipate one site to be done at a time)
- Construct the stormwater BMPs as outlined in the attached plans for the site.
- Apply seed and mulch to all disturbed non-BMP upland areas and all newly graded areas and apply erosion control netting as appropriate for sloped areas. By design, sloped areas should not exceed a ratio of 3 horizontal to 1 vertical.
- Maintain erosion and sediment control measures until the completed area is fully stabilized
- Remove erosion and sediment controls once the completed area is fully stabilized and upon receipt of authorization from the Spencer Conservation Commission.

See the Project Plans in Appendix G for more information on construction sequencing and installation of erosion and sediment control measures, dewatering, and other related features.

### **3.4 CONSTRUCTION MITIGATION MEASURES**

#### **3.4.1 Project Timing**

Since the project will require work in close proximity to wetlands and to implement drainage system piping, construction is proposed to occur within the low-flow (or no-flow) period (i.e., late summer and fall) of 2018. However, it should be noted that timing of project construction will ultimately be subject to the Town's preference and is subject to the timing of issuance to the Town of an Order of Conditions by the Conservation Commission.

## **TOWN OF SPENCER 319 STORMWATER GRANT**

PROJECT DESCRIPTION  
August 1, 2018

### **3.4.2 Erosion and Sediment Control**

Mapped resource areas at the site will be protected through the use of erosion and sediment control measures, which may include but are not limited to:

- Staked or stapled orange barrier mesh tape (for construction limits, vehicle limits, etc.)
- Silt fence and/or Staked fiber rolls
- Biodegradable erosion control blankets
- Seed and mulch application
- Inlet and outlet protection (rip rap on crushed stone bedding)
- Dust control
- Street and driveway sweeping
- On-going temporary and/or permanent stabilization

In addition, The Town will be required to maintain a reserve supply of erosion and sediment control measures on-site to make repairs, as necessary. The Town will also be required to inspect and repair measures prior to and as soon as possible after significant precipitation events, as necessary. Following restoration of grades within upland work areas and disturbed slopes will be seeded and protected with biodegradable erosion control blanket or mulch as warranted based on slope grades. Erosion control measures will remain in place until final stabilization has been achieved and their removal has been authorized by the Conservation Commission.

More information pertaining to the erosion and sediment control measures to be implemented on site, including inspection and reporting requirements, and approximate locations of erosion and sediment control measures, are provided in the Project plans (Appendix G).

**TOWN OF SPENCER  
319 STORMWATER GRANT**

REGULATORY COMPLIANCE  
August 1, 2018

## **4.0 REGULATORY COMPLIANCE**

This section summarizes the Project's relationship to and compliance with pertinent local, state, and federal regulations.

### **4.1 SUMMARY OF RESOURCE AREA ALTERATIONS**

As previously presented in this narrative, the Project will involve alteration of the following areas which are subject to protection under 310 CMR 10.00 and the Town of Spencer's Wetlands Regulations.

<b>Table 4-1 Summary of Alterations to Areas Jurisdictional Under 310 CRM 10.00 and the Town of Spencer's Wetland Regulations</b>				
<b>BMP Location</b>	<b>100' Wetland Buffer Disturbance (s.f.)</b>	<b>Inner Riparian Disturbance (s.f.)</b>	<b>Outer Riparian (s.f.)</b>	<b>Flood Plain Area (s.f.)</b>
Smithville Road (Across from Powder Mill Park)	5,650	0	3,449	0
3 Old Meadow Road (Spencer Water Department)	5,145	0	0	0
7 Meadow Road (Spencer Highway Department)	35,220	0	16,272	20,440

#### **4.1.1 Stormwater Management**

All three sites for the proposed BMPs presently employ outdated stormwater drainage management systems. The existing systems include the capture of rainwater via catch basins, with piping of the stormwater directly to an outfall adjacent to the wetlands. This current system of stormwater management does not employ any stormwater best management practices to help and treat the stormwater before it is discharged to the wetlands. Although this project is disturbing some buffer area, the proposed BMP upgrades will allow for the capture and treatment of first-flush (typically first inch of rainfall) stormwater, at a minimum, before water is discharged to the wetlands. The proposed bioretention area treatment, will help to improve water quality within the wetlands adjacent to the Sevenmile River.

As required for stormwater BMPs located within an aquifer protection zone, each or the proposed bioretention areas will be preceded by pretreatment practices designed per the Massachusetts Stormwater Policy as adequate to remove 44% of TSS prior to the raingarden areas. Pretreatment at Sites 1 and 2 will consist of dual deep sump basins in series; and pretreatment at Site 3 will consist of a deep sump basin, followed by a sediment forebay, followed by substantial grass swale leading to the bioretention area.

**TOWN OF SPENCER**  
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REGULATORY COMPLIANCE  
August 1, 2018

Because the proposed project is not a land development project, and because new impervious areas are not being created, there will be no increase in stormwater runoff volumes or peak flows from this BMP improvement project. Moreover, the entire purpose of the project is to enhance stormwater quality that is being released to the wetland resource areas. In addition, there will be some increase in infiltration of stormwater at Site 3. For these reasons, a stormwater report has not been submitted with this NOI. However, as required. A Town of Spencer Stormwater Permit Application Checklist has been prepared and is attached to this NOI (see Appendix C. Also, all of the areas that are being disturbed for construction of the proposed stormwater BMP “retrofits” are locations that have already been altered in the past.

**4.1.2 Abutter Notification**

Abutters were notified in accordance with the WPA regulations and the Bylaw. A copy of the list of abutters and the abutter notification form are provided in Appendix D.

**TOWN OF SPENCER**  
**319 STORMWATER GRANT**

August 1, 2018

**Appendix B Figures**

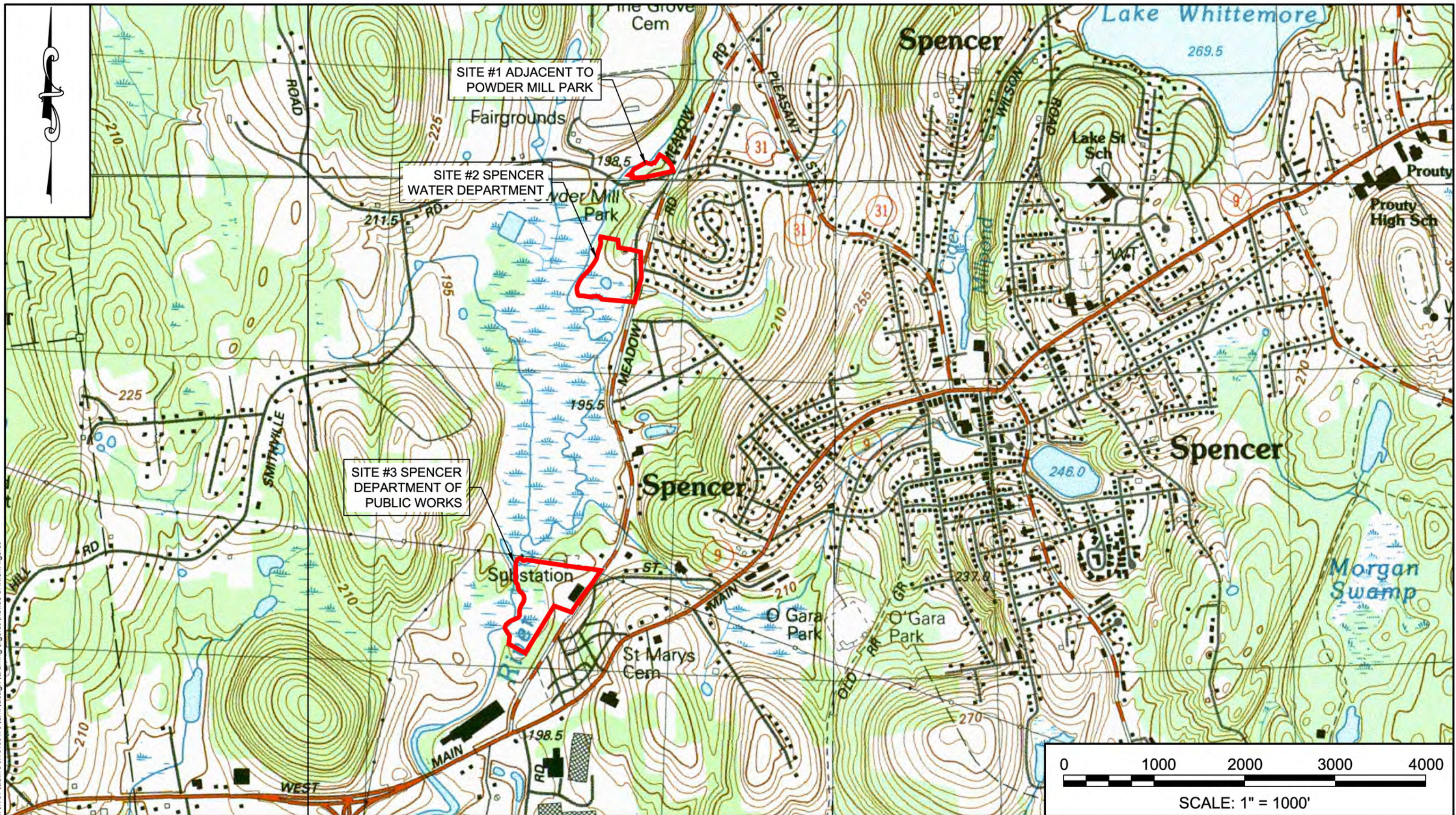
Figure 1 USGS Topographic Site Locus Map

Figure 2 MA DEP Priority Resource Map/NHESP MAP

Figure 3 FEMA Flood Map

Figure 4 Assessors Office Tax Maps for each parcel

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2018.08.01 7:56:03 AM



Stantec Consulting Services Inc.  
400 Crown Colony Drive Suite 200  
Quincy MA 02169-0982  
Tel: (617) 786-7960  
www.stantec.com

Notes

Client/Project  
TOWN OF SPENCER  
319 STORMWATER GRANT

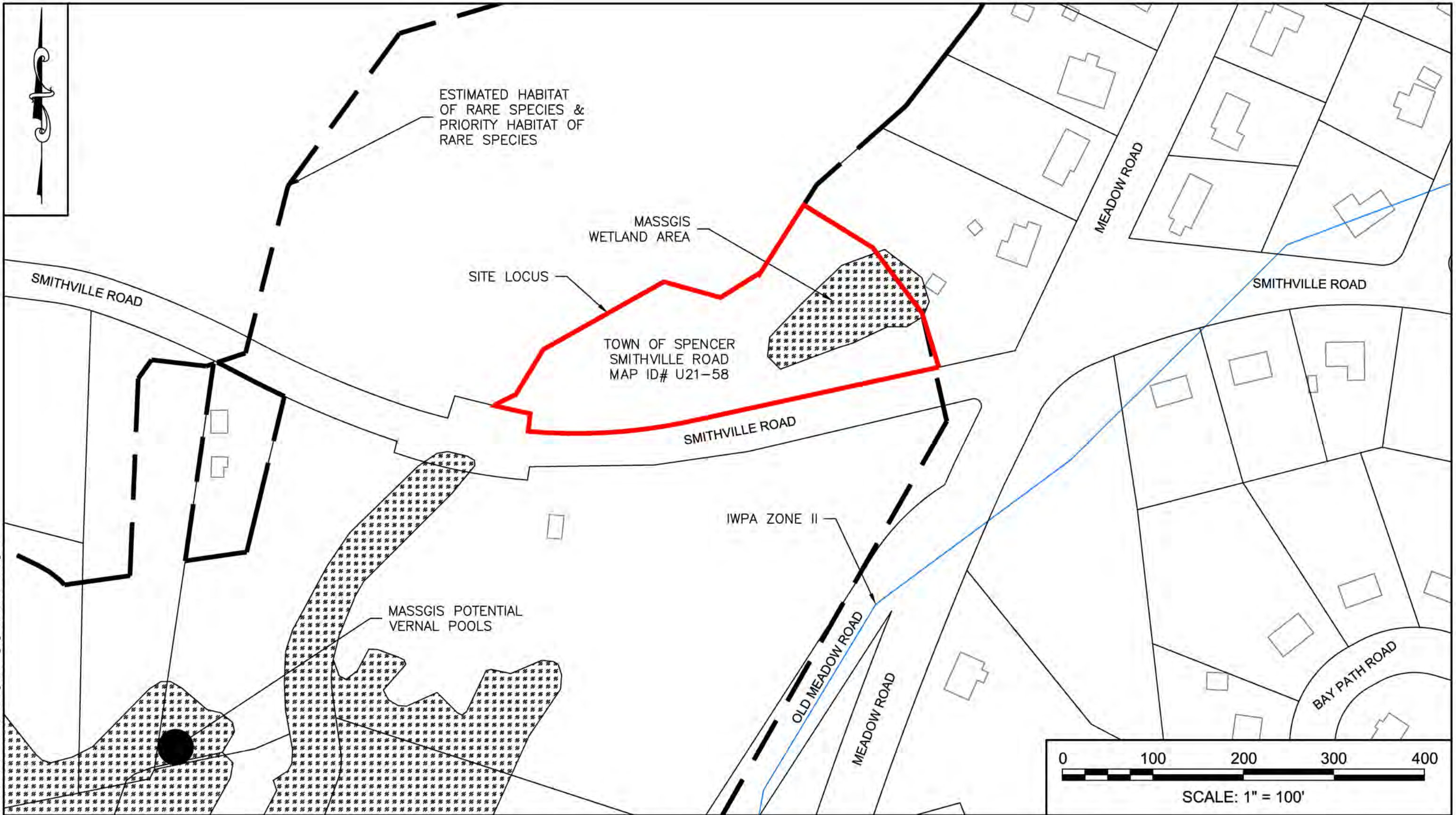
Project No.  
195150496

Title  
USGS TOPOGRAPHIC  
MAP OF ALL SITES

Revision 0	Date 2018.08.01
Reference Sheet NOI	Figure No. 1

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Stantec Consulting Services Inc.  
400 Crown Colony Drive Suite 200  
Quincy MA 02169-0982  
Tel: (617) 786-7960  
www.stantec.com

Notes

- LIST OF RESOURCE AREAS WHICH ARE DELINEATED (IF APPLICABLE) ON THIS PLAN INCLUDE THE FOLLOWING. ALL INFORMATION WAS TAKEN FROM THE ONLINE RESOURCES PUBLISHED BY MASSGIS.
- AREA OF CRITICAL ENVIRONMENTAL CONCERN
  - CERTIFIED VERNAL POOLS, POTENTIAL VERNAL POOLS
  - ESTABLISHED HABITAT OF RARE SPECIES
  - PRIORITY HABITATE OF RARE SPECIES
  - IWPA, IWPA-ZONE I, IWPA-ZONE II
  - WETLANDS

Client/Project

TOWN OF SPENCER  
319 STORMWATER GRANT

Project No.

195150496

Title

POWDER MILL PARK  
RESOURCE AREAS

Revision

0

Reference Sheet

NOI

Date

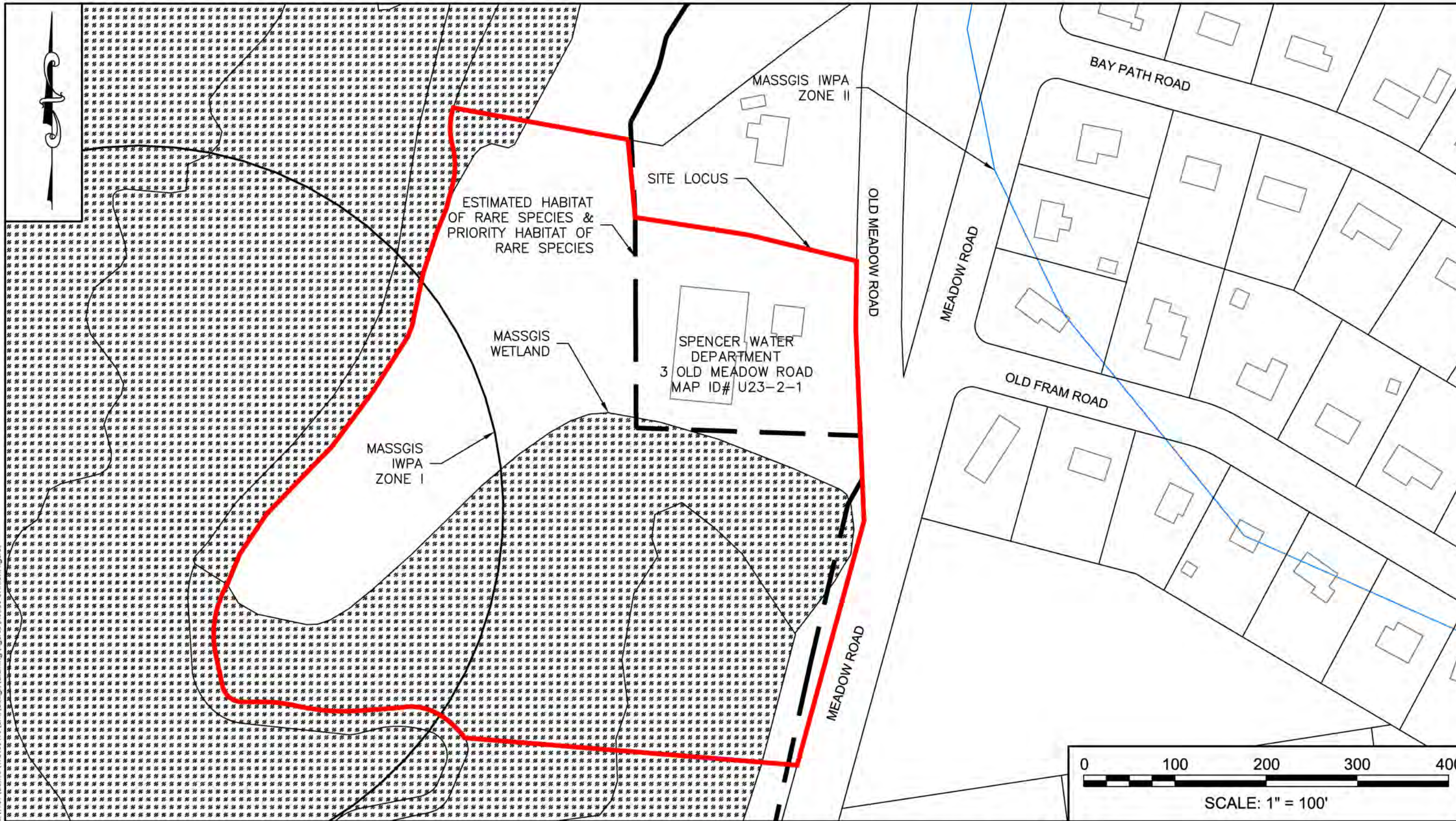
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Figure No.

2-A

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2018.08.01 10:13:21 AM



Stantec Consulting Services Inc.  
400 Crown Colony Drive Suite 200  
Quincy MA 02169-0982  
Tel: (617) 786-7960  
www.stantec.com

Notes

LIST OF RESOURCE AREAS WHICH ARE DELINEATED (IF APPLICABLE) ON THIS PLAN INCLUDE THE FOLLOWING. ALL INFORMATION WAS TAKEN FROM THE ONLINE RESOURCES PUBLISHED BY MASSGIS.

- AREA OF CRITICAL ENVIRONMENTAL CONCERN
- CERTIFIED VERNAL POOLS, POTENTIAL VERNAL POOLS
- ESTABLISHED HABITAT OF RARE SPECIES
- PRIORITY HABITUATE OF RARE SPECIES
- IWPA, IWPA-ZONE I, IWPA-ZONE II
- WETLANDS

Client/Project

TOWN OF SPENCER

319 STORMWATER GRANT

Project No.

195150496

Title

SPENCER WATER  
DEPARTMENT  
RESOURCE AREAS

Revision

0

Reference Sheet

NOI

Date

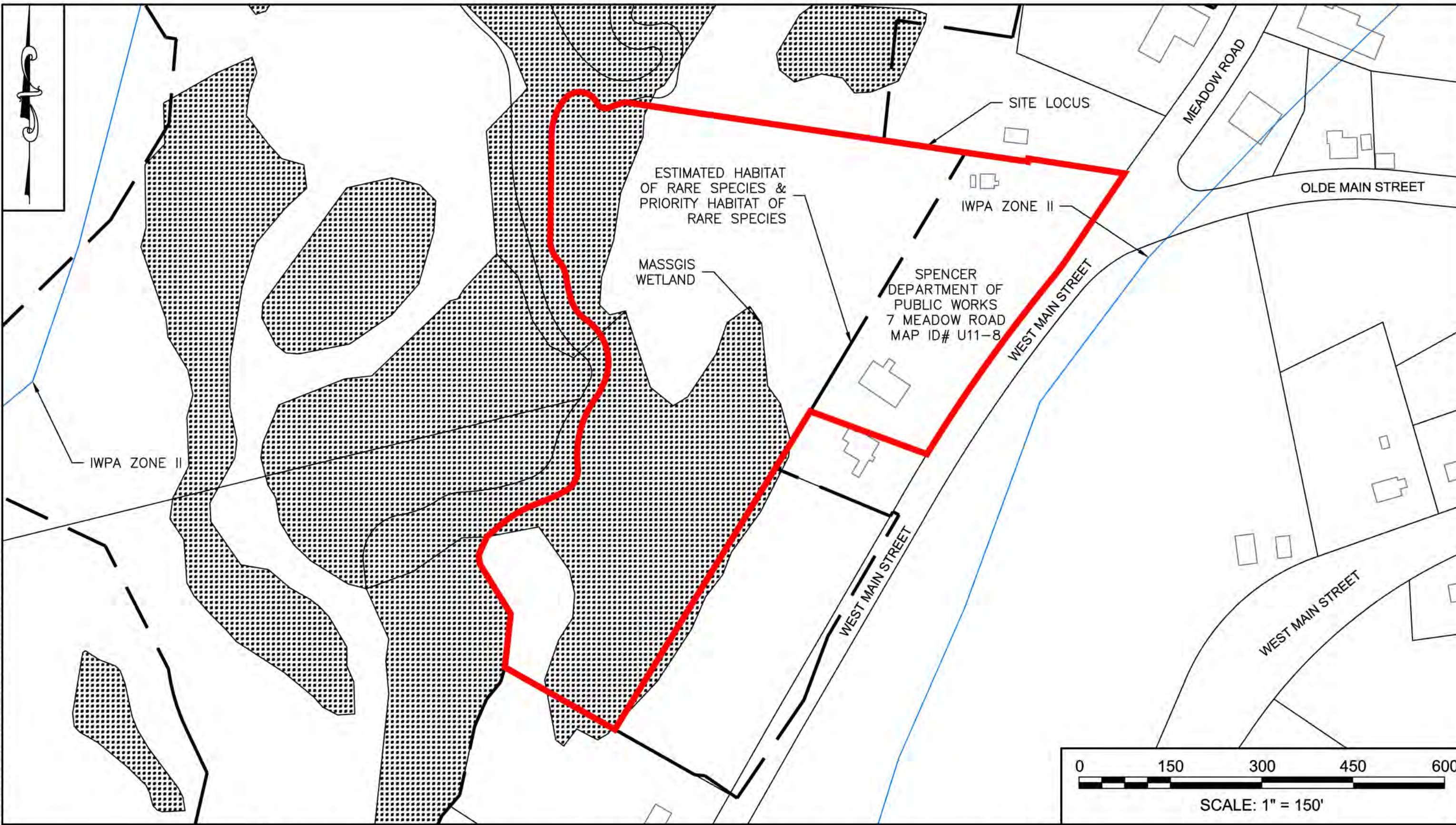
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Figure No.

2-B

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400 Crown Colony Drive Suite 200  
Quincy MA 02169-0982  
Tel: (617) 786-7960  
www.stantec.com

Notes

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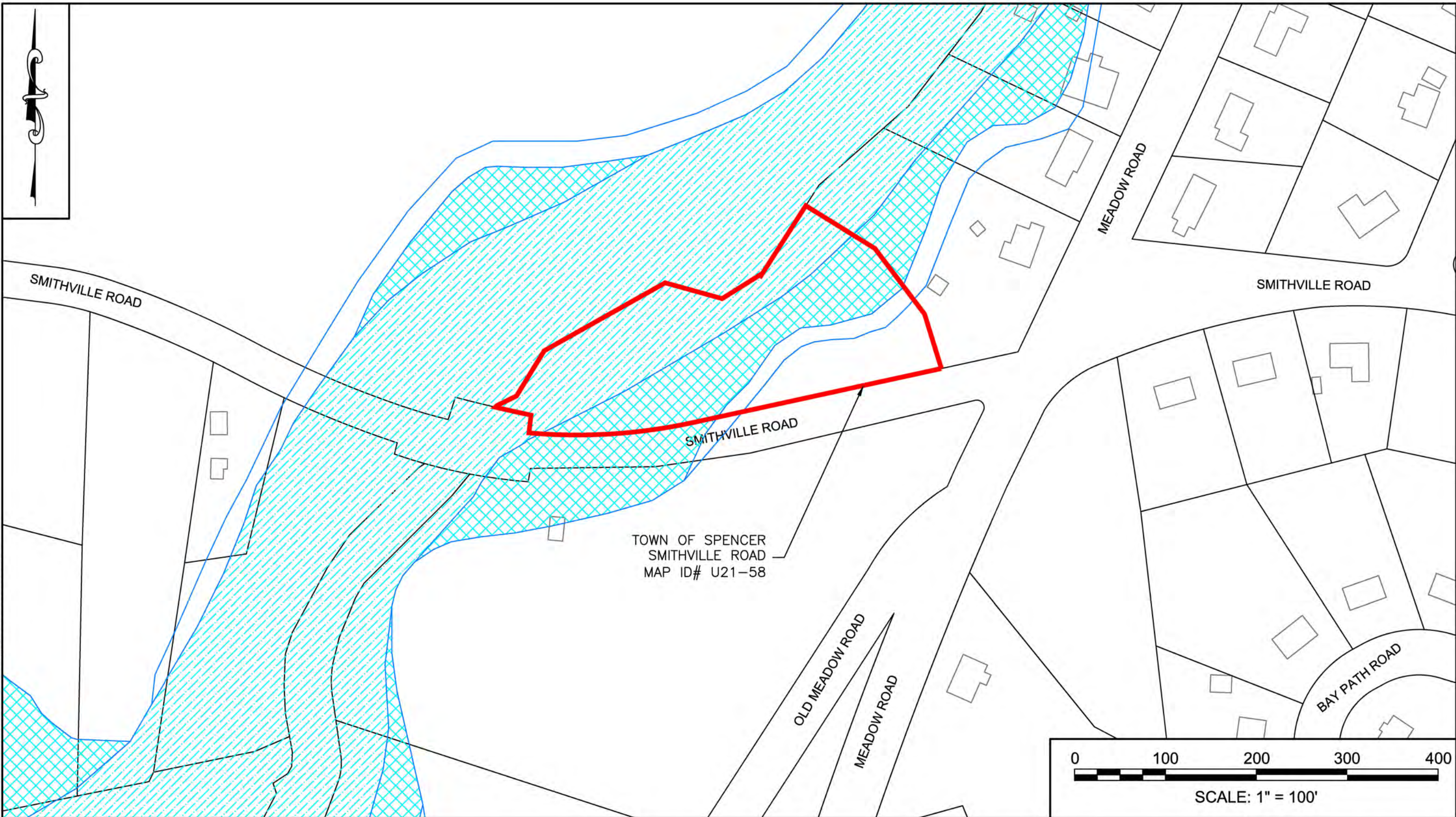
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- CERTIFIED VERNAL POOLS, POTENTIAL VERNAL POOLS
- ESTABLISHED HABITAT OF RARE SPECIES
- PRIORITY HABITUATE OF RARE SPECIES
- IWPA, IWPA-ZONE I, IWPA-ZONE II
- WETLANDS

Client/Project  
TOWN OF SPENCER  
319 STORMWATER GRANT  
Project No.  
195150496

Title  
SPENCER DPW  
RESOURCE AREAS  
Revision  
0  
Reference Sheet  
NOI  
Date  
2018.08.01  
Figure No.  
2-C

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400 Crown Colony Drive Suite 200  
Quincy MA 02169-0982  
Tel: (617) 786-7960  
www.stantec.com

Notes

- ZONE AE (ELEVATION 636-639)
- ZONE A
- ZONE X

Client/Project

TOWN OF SPENCER  
319 STORMWATER GRANT

Project No.  
195150496

Title

POWDER MILL PARK  
RESOURCE AREAS

Revision  
0

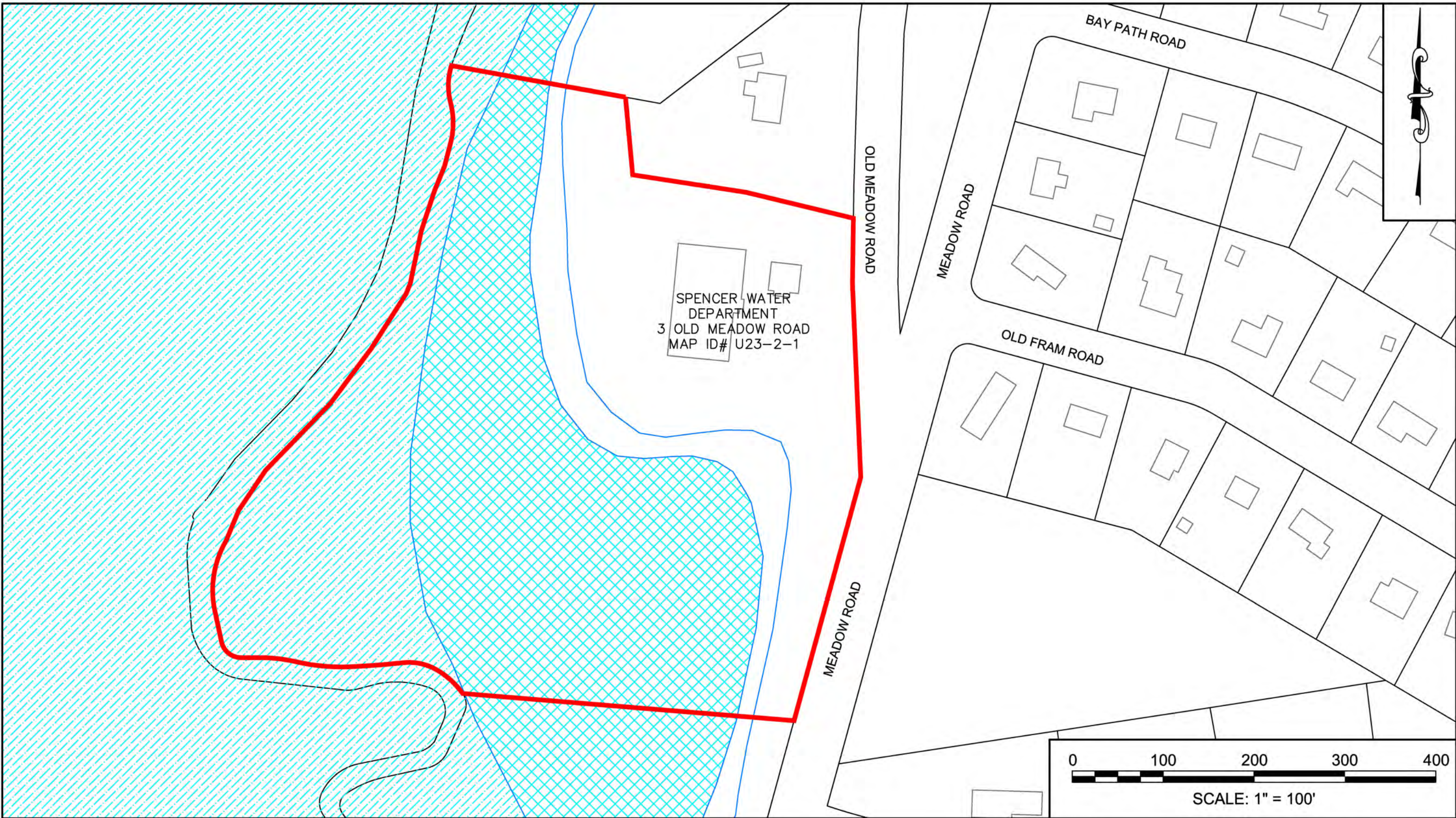
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Date  
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Figure No.  
3-A




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Stantec Consulting Services Inc.  
400 Crown Colony Drive Suite 200  
Quincy MA 02169-0982  
Tel: (617) 786-7960  
www.stantec.com

Notes

-  ZONE AE (ELEVATION 636-635)
-  ZONE A
-  ZONE X

Client/Project

TOWN OF SPENCER  
319 STORMWATER GRANT

Project No.  
195150496

Title

SPENCER WATER  
DEPARTMENT  
RESOURCE AREAS

Revision  
0

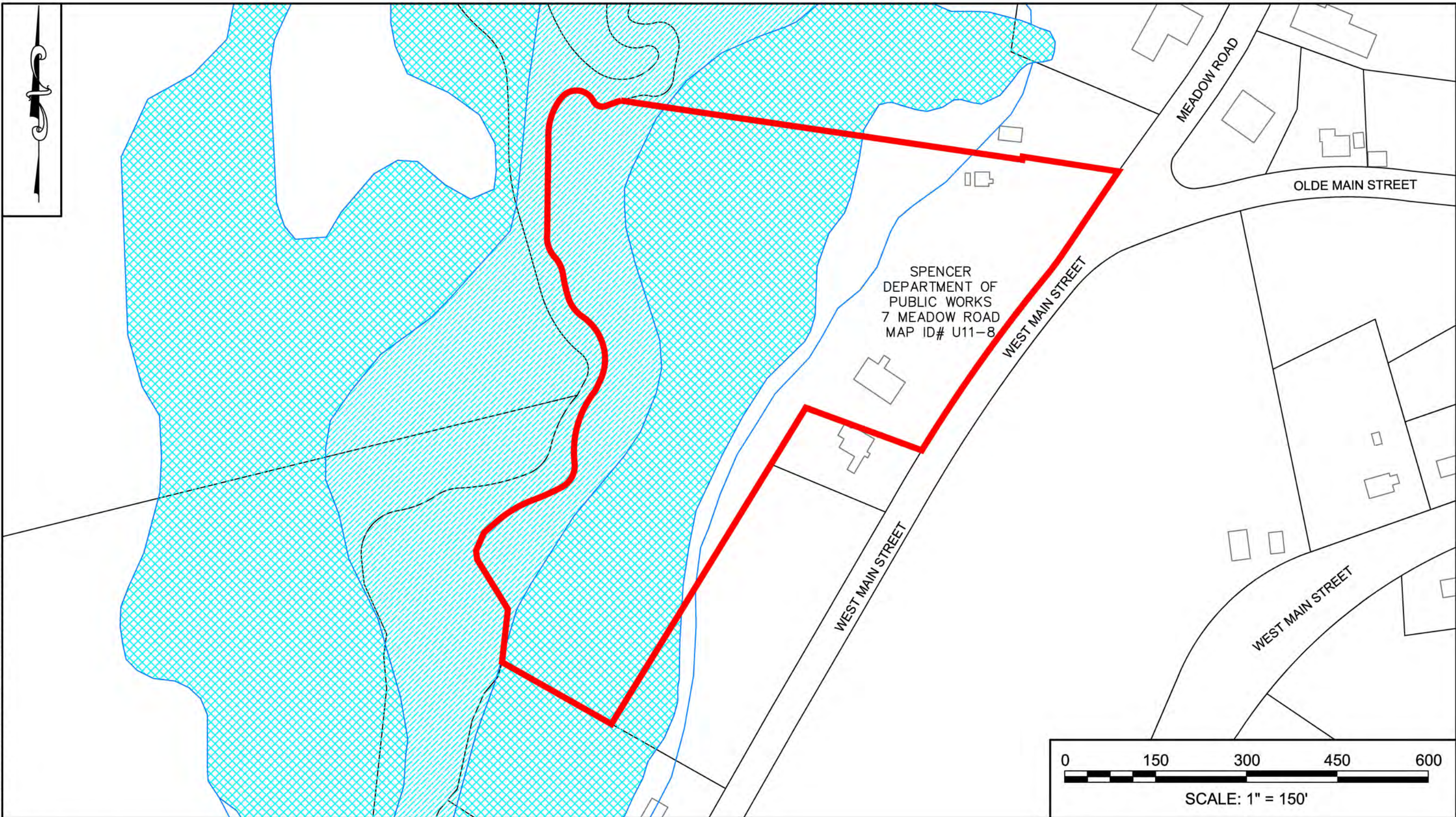
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Date  
2018.08.01

Figure No.  
3-B

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Stantec Consulting Services Inc.  
400 Crown Colony Drive Suite 200  
Quincy MA 02169-0982  
Tel: (617) 786-7960  
www.stantec.com

Notes

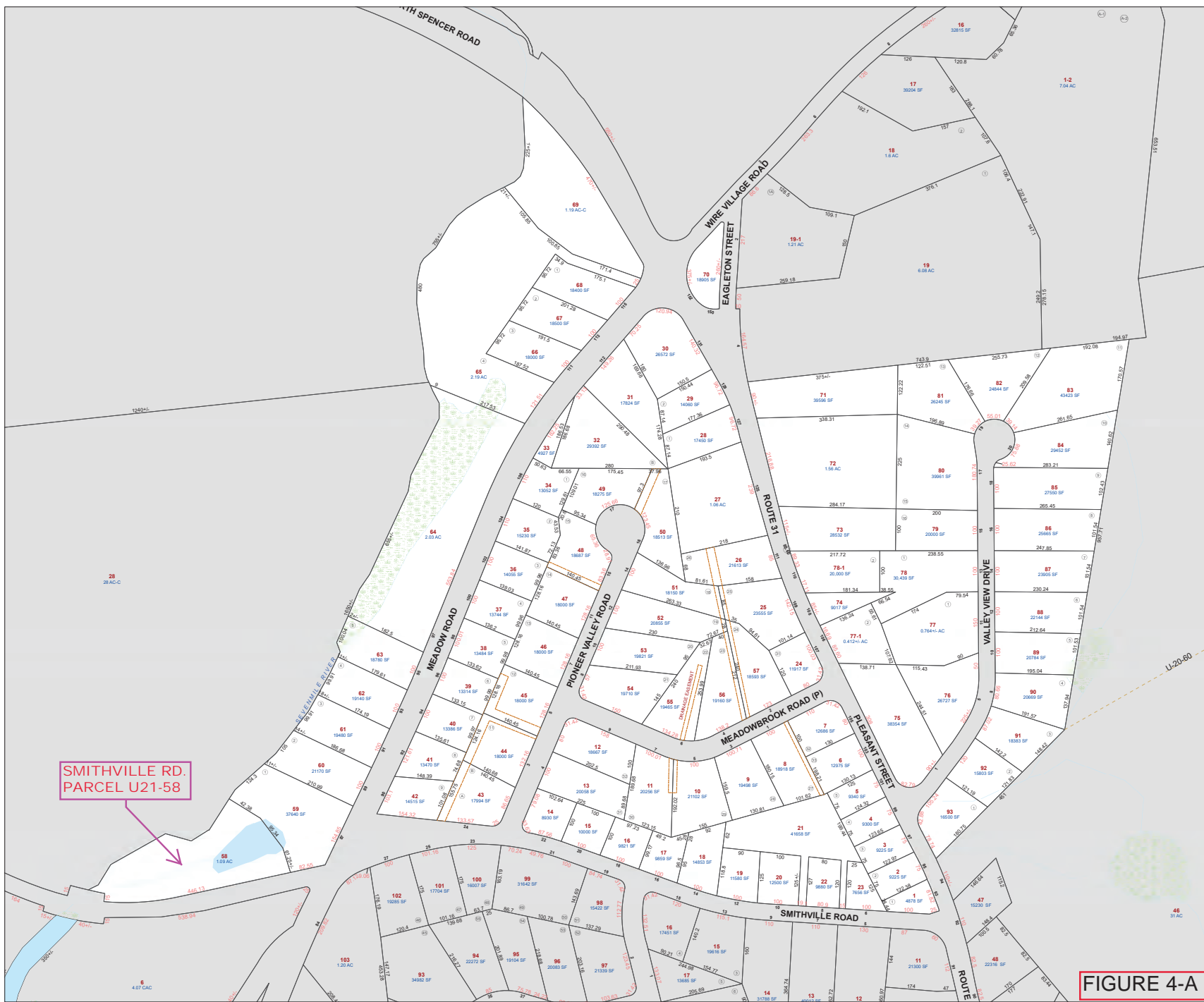
- ZONE AE (ELEVATION 633)
- ZONE A
- ZONE X

Client/Project  
TOWN OF SPENCER  
319 STORMWATER GRANT

Project No.  
195150496

Title  
SPENCER DPW  
RESOURCE AREAS

Revision 0	Date 2018.08.01
Reference Sheet NOI	Figure No. 3-C

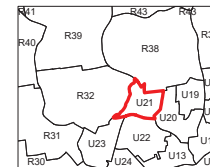
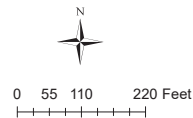


**FIGURE 4-A**

- Legend**
- Easements
  - ✓ Common Ownership
  - ▭ Town Boundary
  - ▭ Parcels
  - ▭ Surrounding Tax Map Parcels
  - Water Bodies
  - Wetlands
  - Ⓢ Development Lot Number
  - Text Parcel Number
  - Text Parcel Area
  - Text Address Number

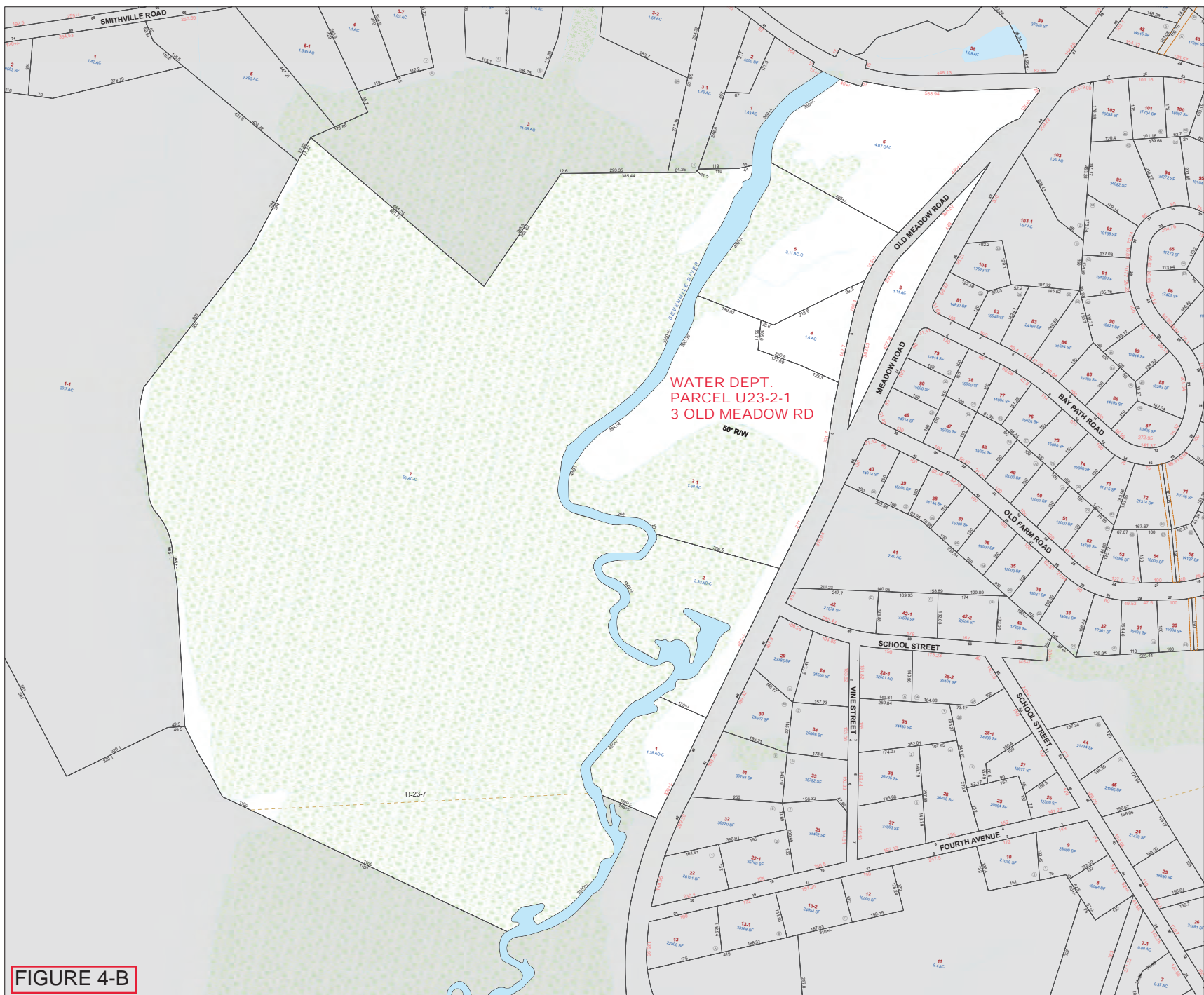


**Town of Spencer  
MASSACHUSETTS**



The data displayed on this map is for assessment purposes only.

**Tax Map: U21**



**FIGURE 4-B**

**Legend**

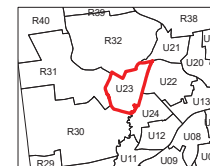
- Easements
- ✓ Common Ownership
- Town Boundary
- Parcels
- Surrounding Tax Map Parcels
- ~ Water Bodies
- ~ Wetlands
- 8 Development Lot Number
- Text Parcel Number
- Text Parcel Area
- Text Address Number



**Town of Spencer  
MASSACHUSETTS**



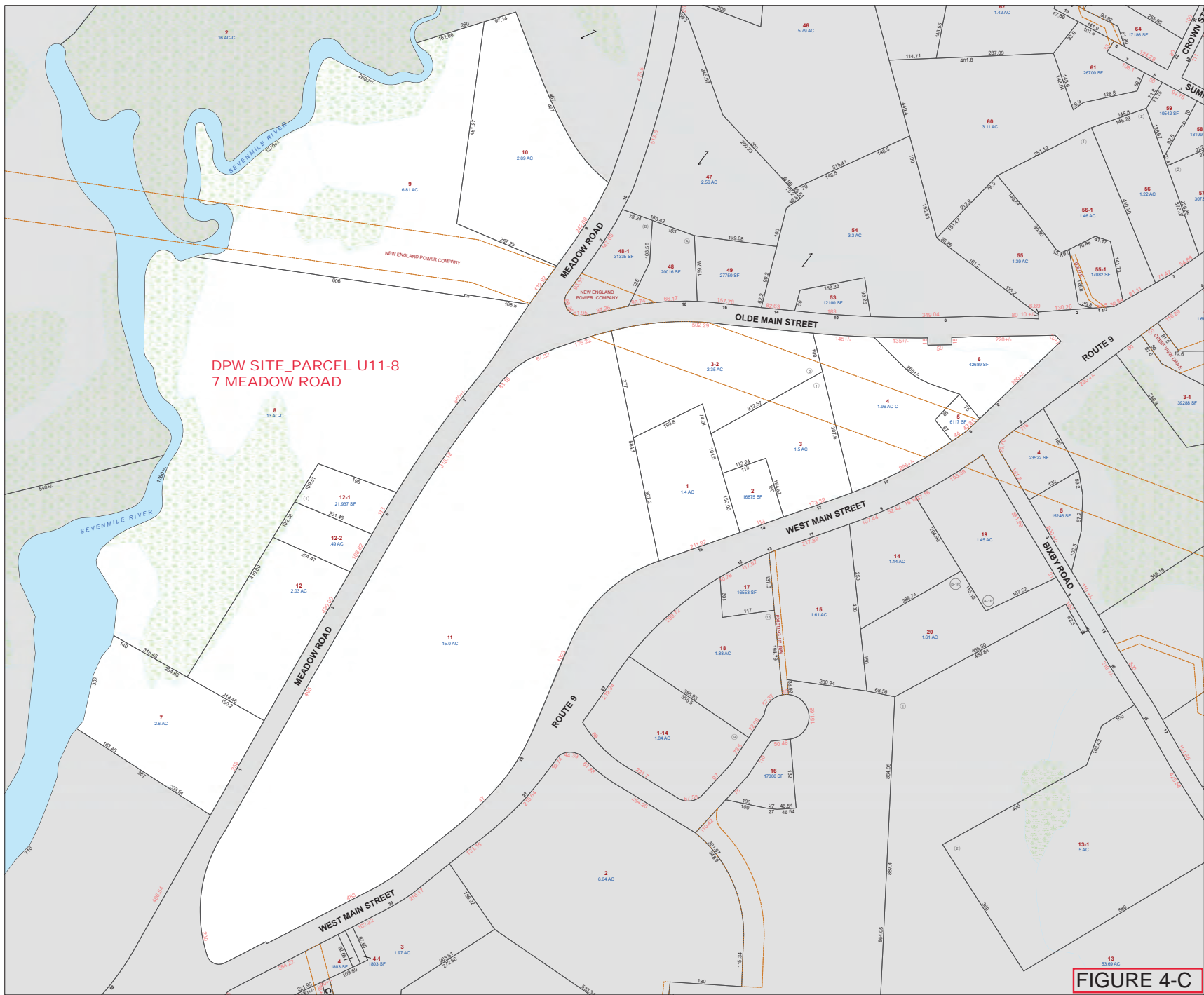
0 62.5 125 250 Feet



The data displayed on this map is for assessment purposes only.

**Tax Map: U23**





#### Legend

- Easements
- ✓ Common Ownership
- Town Boundary
- Parcels
- Surrounding Tax Map Parcels

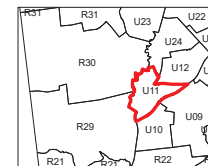
- ~ Water Bodies
- ~ Wetlands
- 8 Development Lot Number
- Text Parcel Number
- Text Parcel Area
- Text Address Number



## Town of Spencer MASSACHUSETTS



0 55 110 220 Feet



The data displayed on this map is for assessment purposes only.

Tax Map: **U11**

Map Prepared By:  
**AppGeo**  
December 2012

**TOWN OF SPENCER  
319 STORMWATER GRANT**

August 1, 2018

**Appendix C**

**Town of Spencer Stormwater Permit Application Checklist**

## Spencer Stormwater Permit Application Checklist

Date 7/31/18

Name of Applicant Town of Spencer Tel # 508-885-7515

Signature of Applicant *Shan Butler* 8/1/18

Address of Applicant(s) 3 Old Meadow Road, Spencer, MA 01562

Type of Permit\* Notice of Intent

Location of property 3 locations: (1) at Smithville Rd & Meadow Rd.  
(2) at 3 Old Meadow Rd, and (3) at 7 Meadow Road Map/Parcel#

Name(s) of Property Owner(s) Town of Spencer Tel # 508-885-7515

Address(es) of Property Owner(s) 3 Old Meadow Road, Spencer, MA 01562

Is proposed Land Conversion Activity\*\* Equal to or Greater than 1 Acre?

(check one):

Yes  No x

**If Yes, Stormwater Permit Required. If No, Answer Questions 1 – 3, below:**

1. Is proposed work located within 100 feet of any existing or proposed inlet to any storm drain, catch basin, or other storm drain system component discharging to any lake, pond, river, stream, or wetland?

(check yes or no)

Yes x No

2. Does project occur on or result in a slope of 15% or greater?

(check yes or no)

Yes  No x

3. Does proposed Land Conversion Activity disturb greater than 10,000 square feet in area? (check yes or no)

Yes X at 1 location No X for two locations

**If Yes to 2 or more of the above, Stormwater Permit Required. If Yes to less than 2 of the above, No Stormwater Permit Required.**

Other approvals/permits required: Notice of Intent

Is project located in the Aquifer Protection District? (check yes or no) Yes x No

Will this project relocate/reconfigure/repave an existing driveway or build a new driveway?

(check yes or no) Yes  No x

---

*\* This form must be completed for all projects that disturb soil or vegetation.*

*\*\*Definition of Land Conversion Activity: Any new Development, Redevelopment, Clearing\*\*\*, or Disturbance of Land\*\*\*\*.*

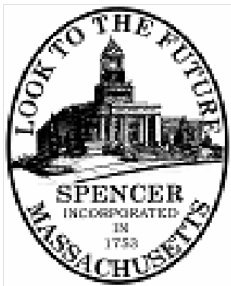
*\*\*\* Definition of Clearing: Any activity that removes or disturbs the vegetative surface cover.*

*\*\*\*\* Definition of Disturbance of Land: Any action, including clearing, that causes a change in the position, location, or arrangement of soil, sand, rock, gravel or similar earth material.*

TOWN OF SPENCER  
319 STORMWATER GRANT

July 30, 2018

**Appendix D** Abutter Notification Documentation



## *TOWN OF SPENCER*

### BOARD OF ASSESSORS

157 MAIN STREET  
SPENCER, MA 01562

TEL: 508-885-7500 x165

FAX: 508-885-7512

ASSESSED OWNER: Town of Spencer

MAILING ADDRESS: 157 Main St Spencer, Ma 01562

TELEPHONE NUMBER:

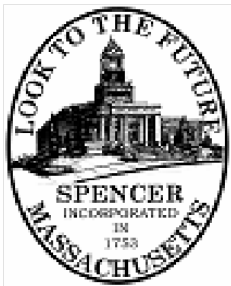
PROPERTY LOCATION: Smithville Rd – Powder Mill Park U21/58

The following is a list of abutters to the property designated on the application for appeal. "Parties in interest" shall mean the petitioners, abutters, owners of land directly opposite on any public or private street or way, and abutters to the abutters within 300 feet of the property line of the petitioner as they appear on the most recent taxable tax list, notwithstanding that the land of such owner is located in another city or town, the planning board of the city or town, and the planning board of every abutting city or town.

MAP/PARCEL	OWNERS NAME	MAILING ADDRESS
U32/1	Ronald Derosier	190 Belchertown Rd Ware, Ma 01082
R32/2	Arthur Derosier	190 Belchertown Rd Ware, Ma 01082
U21/42	Joseph Sespaniak	90 Meadow Rd Spencer, Ma 01562
U21/59	Gary Aubin	87 Meadow Rd Spencer, Ma 01562
U21/60	Krystal Mockus	89 Meadow Rd Spencer, Ma 01562
U21/61	Donald O'Clair	91 Meadow Rd Spencer, Ma 01562
U22/93	Stephen Karcasinas	33 Bay Path Rd Spencer, Ma 01562
U22/101	Myron Rogers	25 Smithville Rd Spencer, Ma 01562
U22/102	Jake Metterville	27 Smithville Rd Spencer, Ma 01562
U22/103	Goldstein & Gurwitz	PO Box 590657 Newton Center, Ma 02459
U22/103/1	Derek Lacourse	82 Meadow Rd Spencer, Ma 01562
U23/3	Spencer Agricultural Assoc	PO Box 46 Spencer, Ma 01562

Date Certified: July 10, 2018

ejj



## *TOWN OF SPENCER*

### BOARD OF ASSESSORS

157 MAIN STREET  
SPENCER, MA 01562

TEL: 508-885-7500 x165

FAX: 508-885-7512

ASSESSED OWNER: Town of Spencer

MAILING ADDRESS: 157 Main St Spencer, Ma 01562

TELEPHONE NUMBER:

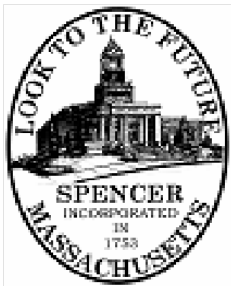
PROPERTY LOCATION: 3 Old Meadow Rd – Water Dept – U23/2/1

The following is a list of abutters to the property designated on the application for appeal. “Parties in interest” shall mean the petitioners, abutters, owners of land directly opposite on any public or private street or way, and abutters to the abutters within 300 feet of the property line of the petitioner as they appear on the most recent taxable tax list, notwithstanding that the land of such owner is located in another city or town, the planning board of the city or town, and the planning board of every abutting city or town.

MAP/PARCEL	OWNERS NAME	MAILING ADDRESS
U22/38	Derick Brown	43 Old Farm Rd Spencer, Ma 01562
U22/39	Mark Johnson	45 Old Farm Rd Spencer, Ma 01562
U22/40	Michael Brewer	62 Meadow Rd Spencer, Ma 01562
U22/41	Richard Bruley	34 Meadow Rd Spencer, Ma 01562
U22/42	John Harvey	60 School St Spencer, Ma 01562
U22/42/1	Ryan Wall	58 School St Spencer, Ma 01562
U22/46	Kathy Hanson-King	38 Old Farm Rd Spencer, Ma 01562
U22/47	John Gagne	36 Old Farm Rd Spencer, Ma 01562
U22/79	Timothy Ryzewski	2 Bay Path Rd Spencer, Ma 01562
U22/80	Paul Webber	74 Meadow Rd Spencer, Ma 01562
U23/2	Goldstein & Gurwitz	PO Box 590657 Newton Center, Ma 02459
U23/3	Spencer Agricultural Assoc	PO Box 46 Spencer, Ma 01562
U23/4	Frances Thibeault	5 Old Meadow Rd Spencer, Ma 01562
U24/24	Jordan Comeau	2 Vine St Spencer, Ma 01562
U24/29	Peter Skudalski	2 W Boat Dr Little Egg Harbor, NJ 08067
U24/30	James Hicks	46 Meadow Rd Spencer, Ma 01562

Date Certified: July 10, 2018

ejj



## *TOWN OF SPENCER*

### BOARD OF ASSESSORS

157 MAIN STREET  
SPENCER, MA 01562

TEL: 508-885-7500 x165

FAX: 508-885-7512

ASSESSED OWNER: Town of Spencer

MAILING ADDRESS: 157 Main St Spencer, Ma 01562

TELEPHONE NUMBER:

PROPERTY LOCATION: 7 Meadow Rd – Highway Dept – U11/8

The following is a list of abutters to the property designated on the application for appeal. “Parties in interest” shall mean the petitioners, abutters, owners of land directly opposite on any public or private street or way, and abutters to the abutters within 300 feet of the property line of the petitioner as they appear on the most recent taxable tax list, notwithstanding that the land of such owner is located in another city or town, the planning board of the city or town, and the planning board of every abutting city or town.

MAP/PARCEL	OWNERS NAME	MAILING ADDRESS
R29/25	Commonwealth of Ma	1 Ashburton Place Boston, Ma 02108
R29/27	Jonlee Spencer LC	5050 Belmont Ave Youngstown, OH 44505
R30/1	Peter Zukas	89 Smithville Rd Spencer, Ma 01562
U11/3/2	Highland Grove LLC	16 W Main St Spencer, Ma 01562
U11/7	Pallotta Family Realty Trust	61 Fox Run Rd Bolton, Ma 01740
U11/9 & 10	New England Power Co	40 Sylvan Rd Watham, Ma 02451
U11/11	Holy Rosary Cemetery	60 Maple St Spencer, Ma 01562
U11/12	Mark Andrews	PO Box 524 Spencer, Ma 01562
U11/12/1,12/2,12/3 & 12/4	Steve Turner	265 Causeway St Holden, Ma 01520
U12/48	Brian Gobi	98 Mechanic St Spencer, Ma 01562
U12/48/1	LTJ LLC	8 Meadow Rd Spencer, Ma 01562

Date Certified: July 10, 2018

ejj

## NOTIFICATION TO ABUTTERS

Massachusetts General Laws, Chapter 131, section 40, Wetlands  
Protection Act Spencer General Bylaws, Article 7, Wetlands  
Protection

A **Request to Amend an Order of Conditions** has been filed with Spencer  
Conservation Commission, Town of Spencer, Worcester County, Massachusetts

By: Town of Spencer, Department of Utilities & Facilities Management (applicant)

**For work in or within 100 feet of a protected wetland resource at:** 3 Locations, which are: (1) at Smithville Road, across from Powder Mill Park; (2) at 3 Old Meadow Road, Spencer Water Department; and (3) at 7 Meadow Road, Spencer Department of Public Works, Spencer, Massachusetts

**The work proposed is:** (General Project Description)

Construction of three bioretention rain gardens to help improve the capture and treatment of stormwater from impervious areas before said stormwater reaches wetland resource areas. The rain gardens have been designed to provide maximum practicable treatment to remove stormwater pollutants before final discharge of stormwater to adjacent resource areas.

---

Copies of the **Notice of Intent** may be examined at the Spencer Office of Inspectional Services, Memorial Town Hall, 157 Main Street, Spencer, Massachusetts on Monday through Wednesday.

Copies of the **Notice of Intent** may be obtained by contacting the Applicant's Representative:

Mr. Wade Stanley, E.I.T., Project Engineer  
Stantec Consulting Services, Inc.  
400 Crown Colony Drive, Suite 200  
Quincy, MA 02169

or by email to: [wade.stanley@stantec.com](mailto:wade.stanley@stantec.com)

or by calling: 508-591-4317 between the hours of 8:30 a.m. and 5:00 p.m.

A **PUBLIC HEARING** on this application will be held at a meeting of the Spencer Conservation Commission. The date, time, and place of the Hearing may be obtained from Spencer Conservation Commission by calling 508-885-7500 Extension 180 between the hours of 7:30 a.m. and 4:30 p.m. Monday through Wednesday, and between the hours of 7:30 a.m. and 12:00 p.m. on Thursday.

Notice of the Hearing, including its date, time and place will be published at least five (5) business days in advance of the Hearing in the Spencer New Leader AND posted in Spencer Town Hall not less than 48 hours in advance.

You may also contact the Department of Environmental Protection Central Region Office for more information about this application. To contact DEP, call 508-792-7650.

**AFFIDAVIT OF SERVICE**  
Under the Massachusetts Wetlands  
Protection Act and  
Spencer General Bylaws, Article 7, Wetlands Protection

I, Wade Stanley, of Stantec Consulting Services, Inc., hereby certify under the pains and penalties of perjury that on August 1, 2018 I gave notification to abutters in compliance with 310 CMR 10.05(4)(a) and Spencer General Bylaws, Article 7, in connection with the following matter:

**A Notice of Intent** filed under the Massachusetts Wetlands Protection Act by  
Town of Spencer, Department of Utilities and Facilities Management  
(applicant's name)

Filed with the Spencer Conservation Commission on August 1, 2018,

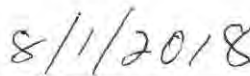
For Properties located:

- (1) at Smithville Road, across from Powder Mill Park;
- (2) at 3 Old Meadow Road, Spencer Water Department; and
- (3) at 7 Meadow Road, Spencer Department of Public Works.

All in the Town of Spencer, Massachusetts



(signature)



(date)

*\*\*Submit this Affidavit of Service to the Massachusetts Department of Environmental Protection and the Conservation Commission with the Notice of Intent.*

TOWN OF SPENCER  
319 STORMWATER GRANT

July 30, 2018

**Appendix E – MESA Submittal (copy)**



## DIVISION OF FISHERIES & WILDLIFE

1 Rabbit Hill Road, Westborough, MA 01581

p: (508) 389-6300 | f: (508) 389-7890

MASS.GOV/MASSWILDLIFE

### MESA Project Review Checklist

*Massachusetts Endangered Species Act M.G.L. c.131A and Regulations (321 CMR 10.00)*

#### Contact Information

##### 1) Project Location:

Three locations on Meadow Road, Spencer, MA	01562	
Street Address/Location	City/Town	Zip Code
Assessors Map/Plat Number	Parcel /Lot Number	

##### 2) Applicant:

First Name	Last Name	Company
Mailing Address		
City/Town	State	Zip Code
Phone Number	Fax Number	Email address

##### 3) Property owner (if different from applicant):

First Name	Last Name	Company
Mailing Address		
City/Town	State	Zip Code
Phone Number	Fax Number	Email address

##### 4) Representative (if any):

Company		
Contact Person First Name	Contact Person Last Name	
Mailing Address		
City/Town	State	Zip Code
Phone Number	Fax Number	Email address

### Additional Information

1. Will this project require a filing with the Conservation Commission and/or DEP? ☐ No ☒ Yes
2. Has this project previously been issued a NHESP Tracking Number (either by previous NOI Submittal or MESA Information Request Form)? ☒ No ☐ Yes, if Yes -Tracking No. \_\_\_\_\_

### Project Description (attach separate sheet, as needed)

Please note, certain projects or activities are exempt from review, see 321 CMR 10.14. The MESA does not allow project segmentation. Your filing must reflect all anticipated work associated with the proposed project (CMR 321 10.16). Project for construction of 3 bioretention rain gardens (1 at each location) to capture and treat stormwater before discharge to adjacent wetlands within the Town's Sevenmile River Watershed.

All 3 locations are previously altered upland (Town land) within 100-ft buffer zone of bordering veg.

raingardens are designed to provide maximum practicable treatment to remove stormwater pollutants

from first-flush stormwater runoff. These stormwater BMPs capture & treat runoff prior to existing wetland outfalls located within the Town's drainage system along Meadow Road.

### Include the Following Information:

ALL Applicants must submit:

- ☐ USGS map (1:24,000 or 1:25,000) with property boundary clearly outlined
- ☐ Project plans for entire site (including wetland Resource Areas, showing existing and proposed conditions, existing and proposed tree/vegetation clearing line, and clearly demarcated limits of work)
- ☐ Assessor's map or right-of-way plan of site
- ☐ Statement/proof that applicant is the Record Owner or that applicant is a person authorized in writing by the record owner to submit this filing
- ☐ Photographs representative of the site

Projects altering 10 or more acres, must also submit:

- ☐ A vegetation cover type map of the site
- ☐ Project plans showing Priority Habitat boundaries

The NHESP may request additional information, such as, but not limited to, species and habitat surveys, wetland reports, soil map and reports, and stormwater management reports (321 CMR 10.16). The NHESP will notify the applicant within 30 days if the materials submitted do not satisfy requirements for a filing and request submission of any missing materials (321 CMR 10.18(1)).

### Filing Fee, Payable to Comm. of MA - NHESP (see website for fee information)

a. Total MESA Fee Paid request fee waiver b. Acreage of Disturbance 0.89 ac\* c. Total Site Acreage 21.95 ac\*

\* total for 3 sites, see NOI for details

### Required Signatures

I hereby certify under the penalties of perjury that the foregoing MESA filing and accompanying plans, documents, and supporting data are true and complete to the best of my knowledge.

Eben Butler for TOWN of SPENCER 7/31/18  
Signature of Property Owner/Record Owner of Property Date

Eben Butler for TOWN of SPENCER 7/31/18  
Signature of Applicant (if different from Owner) Date

**TOWN OF SPENCER  
319 STORMWATER GRANT**

July 30, 2018

**Appendix F Wetland Determination Reports**

October 12, 2017

**Email** (mark.bartlett@stantec.com)

Mr. Mark Bartlett

Stantec

400 Crown Colony Drive, Suite 200

Quincy, MA 02169-0982

**Re: Wetland Resource Area Analysis Report  
Town of Spencer Powder Mill Park  
Smithville Road (U21-58) & Meadow Road (U23-6)  
Spencer, Massachusetts**

[LEC File #: SI\17-294.04]

Dear Mr. Bartlett:

Pursuant to your request, LEC Environmental Consultants, Inc., (LEC) conducted a site evaluation and Wetland Resource Area boundary determination on October 4, 2017 proximate to Powder Mill Park off Smithville Road in Spencer, Massachusetts. Our site evaluation was conducted in accordance with the *Massachusetts Wetlands Protection Act* (Act, M.G.L. c. 131, s. 40) and its implementing Regulations (Act Regulations, 310 CMR 10.00), the *Town of Spencer Wetlands Protection Bylaw* (Articles 7 of the Spencer General Bylaws, *Bylaw*) and its implementing Regulations (*Bylaw Regulations*), and the criteria provided in *Delineating Bordering Vegetated Wetlands Under the Massachusetts Wetlands Protection Act* (March 1995) and *Field Indicators for Identifying Hydric Soils in New England* (Version 4, May 2017). The following report provides a general site description, wetland delineation methodology, and a description of the Wetland Resource Areas and potential regulatory implications.

## General Site Description

Powder Mill Park is located within the west central portion of Spencer and is bound by Old Meadow Road, Meadow Road, and residential development to the east, Smithville Road to the north, and the Seven Mile River to the north and west. The Spencer Fair Grounds are located further to the north. The Project Area includes the northeastern corner of Powder Mill Park extending to the northern gravel/vegetated shoulder of Smithville Road. Topography is generally level, however, beyond the gravel/vegetated shoulder to the north, the land descends steeply along a fill slope embankment towards wetland areas.

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### LEC Environmental Consultants, Inc.

[www.lecenvironmental.com](http://www.lecenvironmental.com)

12 Resnik Road  
Suite 1  
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508-746-9491  
508-746-9492 (Fax)

PLYMOUTH, MA

380 Lowell Street  
Suite 101  
Wakefield, MA 01880  
781-245-2500  
781-245-6677 (Fax)

WAKEFIELD, MA

100 Grove Street  
Suite 302  
Worcester, MA 01605  
508-753-3077  
508-753-3177 (Fax)

WORCESTER, MA

P. O. Box 590  
Rindge, NH 03461  
603-899-6726  
603-899-6726 (Fax)

RINDGE, NH

Vegetation along the fill slope embankment includes red oak (*Quercus rubra*), white ash (*Fraxinus americana*), silver maple (*Acer sacharrinum*), black cherry (*Prunus serotina*), multiflora rose (*Rosa multiflora*), and bittersweet (*Celastrus* sp.).

According to the Natural Resource Conservation Service (NRCS) Soil Survey (Web Soil Survey) for Worcester County, Southern Part, the Project Area is comprised of Hinckley loamy sand 3-8% slopes and described by NRCS as very deep, gently sloping, excessively drained soils on broad flat areas on outwash plains. To the north of the Project Area, soil is comprised of Scarboro and Walpole soils, 0-3% slopes. NRCS describes this soil complex as very deep, nearly level, very poorly drained organic soil in low areas or depressions on stream terraces and outwash plains.

### **Natural Heritage and Endangered Species Program (NHESP) Designation**

According to the 14<sup>th</sup> Edition (August 1, 2017) of the Natural Heritage Endangered Species Program (NHESP) *Massachusetts Natural Heritage Atlas* and confirmed current from MassGIS on October 11, 2017, the Project Area is located within *Estimated and Priority Habitat of Rare Species* or *Priority Habitat of Rare Species* (PH 1203/EH 900). There are no certified or potential vernal pools at or proximate to the site.

### **Wetland Boundary Determination**

On October 4, 2017, LEC conducted a site evaluation to identify and characterize existing protectable Wetland Resource Areas located at and immediately adjacent to the Project Area. Based on our observations, LEC determined that the Project Area includes a Bordering Vegetated Wetland (BVW) and Riverfront Area associated with the Seven Mile River. Additional protected Wetland Resource Areas on or proximate to the Project Area include Bordering Land Subject to Flooding and 100-foot Buffer Zone (*Bylaw* only).

LEC delineated the boundary of BVW located north of the Project Area. The BVW boundary was established with sequentially-numbered, blaze-orange surveyor's tape with the words "LEC Resource Area" printed in black. LEC flagging stations W-1 through W-12 demarcate the BVW associated with the Seven Mile River.

### **Bordering Vegetated Wetland**

BVW is defined as: *freshwater wetlands which border on creeks, rivers, streams, ponds, and lakes...Bordering Vegetated Wetlands are areas where the soils are saturated and/or inundated such that they support a predominance of wetland indicator plants...The boundary of Bordering Vegetated Wetlands is the line within which 50% or more of the vegetational community consists of wetland indicator plants and saturated or inundated conditions exist* [310 CMR 10.55(2)].

A Wetland is an area where water is at, above, or close below the ground surface for a significant portion of the year. Where water is below the surface its persistent proximity to the surface is shown by the presence of plants dependent on saturated or inundated conditions or by the presence of hydric soils. Wetlands include vernal pools [Section 1.5, Bylaw Regulations].

A BVW, characterized as a palustrine scrub-shrub wetland system, is located north of the Project Area and is associated the Seven Mile River. The shrub/sapling layer includes specimens of red maple (*Acer rubrum*), speckled alder (*Alnus rugosa*), common winterberry (*Ilex verticillata*), redosier dogwood (*Cornus sericea*), and glossy buckthorn (*Frangula alnus*), while the ground cover includes rice cutgrass (*Leersia oryzoides*), sensitive fern (*Onoclea sensibilis*), woolgrass (*Scirpus cyperinus*), shallow sedge (*Carex lurida*), fringed sedge (*Carex crinita*), jewelweed (*Impatiens capensis*), purple loosestrife (*Lythrum salicaria*), nettle (*Urtica spp*), and arrowleaf tearthumb (*Polygonum sagittatum*).

Utilizing a hand-held, Dutch-style auger, LEC inspected soils within the wetland and observed a mucky topsoil (O-horizon) measuring 0-24+ inches with a soil matrix color of 10 YR 2/1. Redoximorphic concentrations of 10YR 4/6 were within 5 inches of the soil surface. This soil profile is considered 'hydric' in accordance with the *Field Indicators Guide*.

### Riverfront Area

*Riverfront Area is the area of land between a river's mean annual high waterline measured horizontally outward from the river and a parallel line located 200 feet away* [310 CMR 10.58(2), (2)(1)(e)].

Riverfront Area is the area 200 feet out from the top of the bank of a River. Riverfront Area is NOT a buffer. It is itself a resource area [Section 1.5, Bylaw Regulations].

The 200-foot Riverfront Area extends from the Bank-Mean Annual High Water Line associated with the Seven Mile River and includes the adjacent BVW, fill slope embankment, gravel/vegetated shoulders of Smithville Road and portions of Power Mill Park.

### Bordering Land Subject to Flooding

Bordering Land Subject to Flooding (BLSF) is an area with low, flat topography adjacent to and inundated by flood waters rising from creeks, rivers, streams, ponds or lakes. It extends from the banks of these waterways and waterbodies; where a bordering vegetated wetland occurs, it extends from said wetland [310 CMR 10.57(2)(a)].

According to the July 4, 2011 *Federal Emergency Management Agency Flood Insurance Rate Map (FEMA FIRM)* and *Flood Boundary and Floodway Map* for Worcester County, Massachusetts (Community Panel 25027C0569E), a portion of the Site, and possibly the Project Area, is located within a Zone AE (base flood EL 638): *The 1% annual chance flood (100-year floodplain), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special*



*Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Any land at or below elevation 638 that is upgradient to the BVW is considered BLSF.*

### 100-Foot Buffer Zone

A Spencer Wetlands Bylaw Protected Resource Area is an area protected by the Spencer Wetlands Bylaw as listed in section 3 of the Bylaw. These include all places...In or within one hundred (100) feet of any freshwater wetland, marsh, wet meadow, bog, or swamp [Section 1.5, *Bylaw Regulations*].

The on-site Buffer is characterized as previously disturbed and/or developed areas and contains lawn, paved roadway, and gravel/vegetated shoulders.

### **Summary**

LEC conducted a site evaluation and wetland delineation on October 4, 2017 to determine the presence and extent of Wetland Resource Areas subject to jurisdiction under the *Act, Act Regulations, Bylaw, and Bylaw Regulation*. Based on our site evaluation and review of pertinent maps, LEC determined that the Wetland Resource Areas associated with the Project Area include BVW, Riverfront Area, possibly BLSF, and 100-Foot Buffer Zone (*Bylaw*). Filing for the appropriate permits with the Town of Spencer Conservation Commission and/or Massachusetts Department of Environmental Protection would only be required should work be planned within BVW, Riverfront Area, 100-foot Buffer Zone and/or BLSF and may require additional wetlands permitting depending on the extent and scope of alteration.

Thank you for the opportunity to provide these services. Should you have any questions or require additional information, please do not hesitate to contact me in our Worcester office at (508) 753-3077 or via email at [akendall@lecenvironmental.com](mailto:akendall@lecenvironmental.com).

Sincerely,

**LEC Environmental Consultants, Inc.**

Andrea L. Kendall

Senior Environmental Scientist

Enclosures:

USGS Color Ortho Imagery with NHESP Estimated & Priority Habitats

USGS Topographic Map

Flood Insurance Rate Map

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alk: projects\17-294.04 NEI WRAA.doc



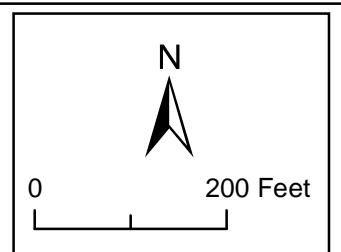
Environmental Consultants, Inc.

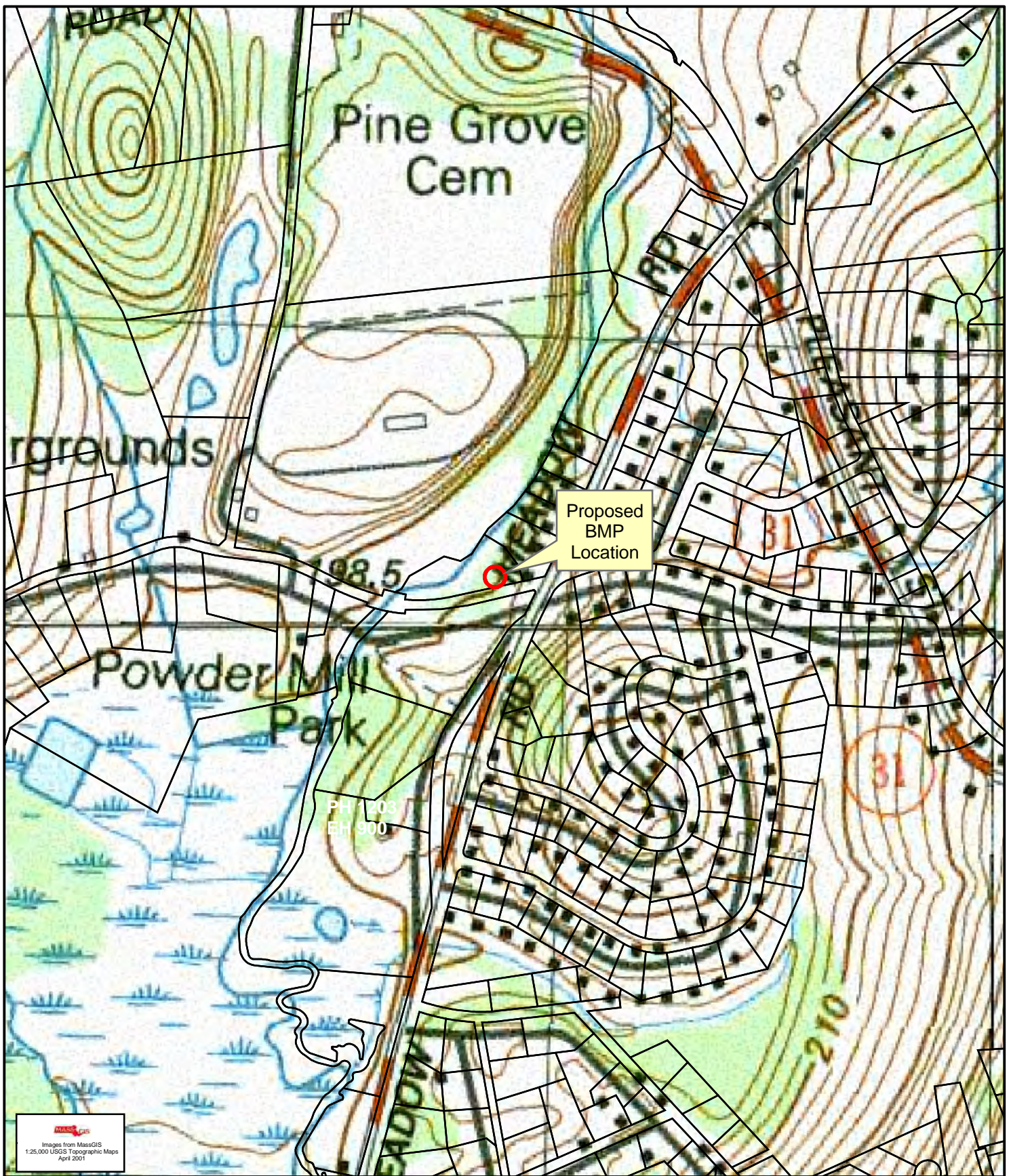
Wakefield, MA  
781.245.2500

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Powder Mill Park  
Spencer, MA

October 12, 2017





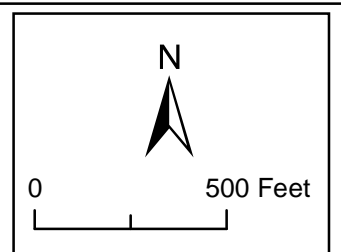
Environmental Consultants, Inc.

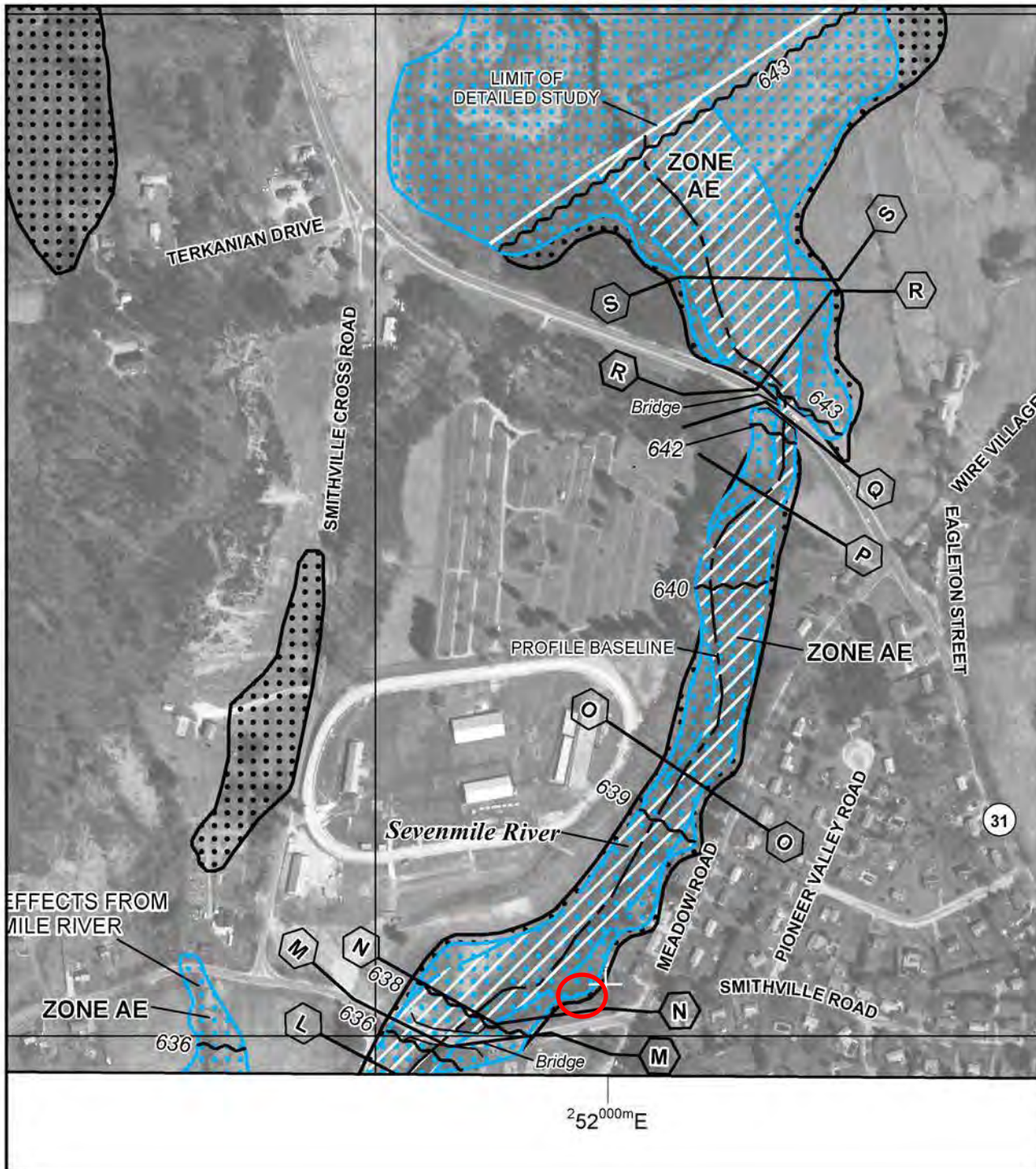
Wakefield, MA  
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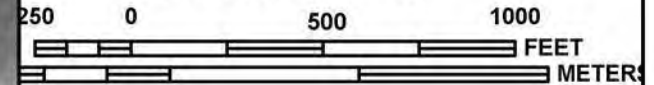
Powder Mill Park  
Spencer, MA

October 12, 2017





MAP SCALE 1" = 500'



NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0569E

## FIRM

FLOOD INSURANCE RATE MAP  
WORCESTER COUNTY,  
MASSACHUSETTS  
(ALL JURISDICTIONS)

PANEL 569 OF 1075

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

### CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
NORTH BROOKFIELD, TOWN OF	250323	0569	E
SPENCER, TOWN OF	250335	0569	E

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.



MAP NUMBER  
25027C0569E  
EFFECTIVE DATE  
JULY 4, 2011

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at [www.msc.fema.gov](http://www.msc.fema.gov)

October 12, 2017

**Email** (mark.bartlett@stantec.com)

Mr. Mark Bartlett

Stantec

400 Crown Colony Drive, Suite 200

Quincy, MA 02169-0982

**Re: Wetland Resource Area Analysis Report  
Town of Spencer Water Department  
3 Old Meadow Road (U23-2-1)  
Spencer, Massachusetts**

[LEC File #: SI\17-294.04]

Dear Mr. Bartlett:

Pursuant to your request, LEC Environmental Consultants, Inc., (LEC) conducted a site evaluation and Wetland Resource Area boundary determination on October 4, 2017 at the Town of Spencer Water Department located at 3 Old Meadow Road in Spencer, Massachusetts. Our site evaluation was conducted in accordance with the *Massachusetts Wetlands Protection Act* (Act, M.G.L. c. 131, s. 40) and its implementing Regulations (*Act Regulations*, 310 CMR 10.00), the *Town of Spencer Wetlands Protection Bylaw* (Articles 7 of the Spencer General Bylaws, *Bylaw*) and its implementing *Regulations* (*Bylaw Regulations*), and the criteria provided in *Delineating Bordering Vegetated Wetlands Under the Massachusetts Wetlands Protection Act* (March 1995) and *Field Indicators for Identifying Hydric Soils in New England* (Version 4, May 2017). The following report provides a general site description, wetland delineation methodology, and a description of the Wetland Resource Areas and potential regulatory implications.

## General Site Description

The Town of Spencer Water Department is located within the west central portion of Spencer and is bound by Old Meadow Road, Meadow Road, and residential development to the east, Smithville Road to the north, and open space areas associated with the Seven Mile River and its extensive wetland system to the south and west. The Site is comprised of 7.68± acres of land consisting of two buildings, lawn and landscaped areas, parking lot, an above-ground fuel storage area, and site appurtenances. Topography is generally level and descends gently to the south and west. The Project Area is limited to the lawn area south of the parking lot where a stormwater best management practice (BMP) is planned.

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WORCESTER, MA

P. O. Box 590  
Rindge, NH 03461  
603-899-6726  
603-899-6726 (Fax)

RINDGE, NH

According to the Natural Resource Conservation Service (NRCS) Soil Survey (Web Soil Survey) for Worcester County, Southern Part, the Project Area is comprised of Hinckley loamy sand 8-15% slopes and described by NRCS as very deep, strongly sloping, excessively drained soils on eskers, kames, and ridges of outwash plains. Soils to the west of the Project Area is comprised of Freetown muck, 0-1% slopes. NRCS describes this soil complex as very deep, nearly level, very poorly drained organic soil in depressional or flat areas on outwash plains and till plains. Utilizing a hand-held, Dutch-style auger, LEC inspected soils within the lawn area and observed a loamy sand topsoil (A-horizon) measuring 0-14 inches with a soil matrix color of 10 YR 4/4. The A-horizon is underlain by a loamy sand substrate (B-horizon) measuring 14-28 inches with a soil matrix color of 10YR YR 5/6. This soil profile is not considered 'hydric' in accordance with the *Field Indicators Guide*.

### **Natural Heritage and Endangered Species Program (NHESP) Designation**

According to the 14<sup>th</sup> Edition (August 1, 2017) of the Natural Heritage Endangered Species Program (NHESP) *Massachusetts Natural Heritage Atlas* and confirmed current from MassGIS on October 11, 2017, a portion of the Project Area (i.e., lawn) is located within *Estimated and Priority Habitat of Rare Species* or *Priority Habitat of Rare Species* (PH 1203/EH 900). There are no certified or potential vernal pools at or proximate to the site.

### **Wetland Boundary Determination**

On October 4, 2017, LEC conducted a site evaluation to identify and characterize existing protectable Wetland Resource Areas located at and immediately adjacent to the Project Area. Based on our observations, LEC determined that the Project Area includes a Bordering Vegetated Wetland (BVW). The Bank-Mean Annual High Water Line associated with Seven Mile River is located more than 200 feet from the Project Area. Additional protected Wetland Resource Areas on or proximate to the Project Area include Bordering Land Subject to Flooding and 100-foot Buffer Zone (*Bylaw*).

LEC delineated the boundary of BVW located proximate to the Project Area. The BVW boundary was established with sequentially-numbered, blaze-orange surveyor's tape with the words "LEC Resource Area" printed in black. LEC flagging stations W-1 through W-6 demarcate the BVW associated with the Seven Mile River.

### **Bordering Vegetated Wetland**

BVW is defined as: *freshwater wetlands which border on creeks, rivers, streams, ponds, and lakes...Bordering Vegetated Wetlands are areas where the soils are saturated and/or inundated such that they support a predominance of wetland indicator plants...The boundary of Bordering Vegetated Wetlands is the line within which 50% or more of the vegetational community consists of wetland indicator plants and saturated or inundated conditions exist* [310 CMR 10.55(2)].

*A Wetland is an area where water is at, above, or close below the ground surface for a significant portion of the year. Where water is below the surface its persistent proximity to the surface is shown by the presence of plants dependent on saturated or inundated conditions or by the presence of hydric soils. Wetlands include vernal pools [Section 1.5, Bylaw Regulations].*

A BVW is located on the south and west side of the Site and is associated with an extensive wetland system bordering on the Seven Mile River. The BVW is characterized as a palustrine scrub-shrub wetland system and contains specimens red maple (*Acer rubrum*), redosier dogwood (*Cornus sericea*), pussy willow (*Salix discolor*), elderberry (*Sambucus canadensis*), and multiflora rose (*Rosa multiflora*) in the shrub/sapling layer and joe pyeweed (*Eupatorium maculatum/purpureum*), sensitive fern (*Onoclea sensibilis*), sedge (*Carex* spp), jewelweed (*Impatiens capensis*), blue vervain (*Verbena hastata*), and arrowleaf tearthumb (*Polygonum sagittatum*) in the groundcover.

Utilizing a hand-held, Dutch-style auger, LEC inspected soils within the BVW and observed a fine sandy loam topsoil (A<sub>1</sub>-horizon) measuring 0-8 inches with a soil matrix color of 10 YR 2/2. Prominent mottles (10YR 5/8) were encountered at the soil surface. The A<sub>1</sub>-horizon is underlain by a mucky substrate (A<sub>2</sub>-horizon) measuring 8-22 inches with a soil matrix color of 10YR 2/1. This soil profile is considered 'hydric' in accordance with the *Field Indicators Guide*.

#### Bordering Land Subject to Flooding

Bordering Land Subject to Flooding (BLSF) is an area with low, flat topography adjacent to and inundated by flood waters rising from creeks, rivers, streams, ponds or lakes. It extends from the banks of these waterways and waterbodies; where a bordering vegetated wetland occurs, it extends from said wetland [310 CMR 10.57(2)(a)].

According to the July 4, 2011 *Federal Emergency Management Agency Flood Insurance Rate Map (FEMA FIRM)* and *Flood Boundary and Floodway Map* for Worcester County, Massachusetts (Community Panel 25027C0757E), a portion of the Site, and possibly the Project Area, is located within a Zone AE (base flood EL 636): *The 1% annual chance flood (100-year floodplain), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Any land at or below elevation 636 that is upgradient to the BVW is considered BLSF.*

#### 100-Foot Buffer Zone

A Spencer Wetlands Bylaw Protected Resource Area is an area protected by the Spencer Wetlands Bylaw as listed in section 3 of the Bylaw. These include all places...In or within one hundred (100) feet of any freshwater wetland, marsh, wet meadow, bog, or swamp [Section 1.5, *Bylaw Regulations*].



The on-site Buffer is characterized as previously disturbed and/or developed areas and contains lawn, a fuel storage area, building, and paved parking lot.

## Summary

LEC conducted a site evaluation and wetland delineation on October 4, 2017 to determine the presence and extent of Wetland Resource Areas subject to jurisdiction under the *Act, Act Regulations, Bylaw, and Bylaw Regulation*. Based on our site evaluation and review of pertinent maps, LEC determined that the Wetland Resource Areas associated with the Project Area include BVW, possibly BLSF, and 100-Foot Buffer Zone (*Bylaw*). Filing for the appropriate permits with the Town of Spencer Conservation Commission and/or Massachusetts Department of Environmental Protection would only be required should work be planned within BVW and/or associated 100-foot Buffer Zone and/or BLSF and may require additional wetlands permitting depending on the extent and scope of alteration.

Thank you for the opportunity to provide these services. Should you have any questions or require additional information, please do not hesitate to contact me in our Worcester office at (508) 753-3077 or via email at [akendall@lecenvironmental.com](mailto:akendall@lecenvironmental.com).

Sincerely,

**LEC Environmental Consultants, Inc.**

A handwritten signature in black ink that reads "Andrea Kendall".

Andrea L. Kendall

Senior Environmental Scientist

Enclosures:

USGS Color Ortho Imagery with NHESP Estimated & Priority Habitats

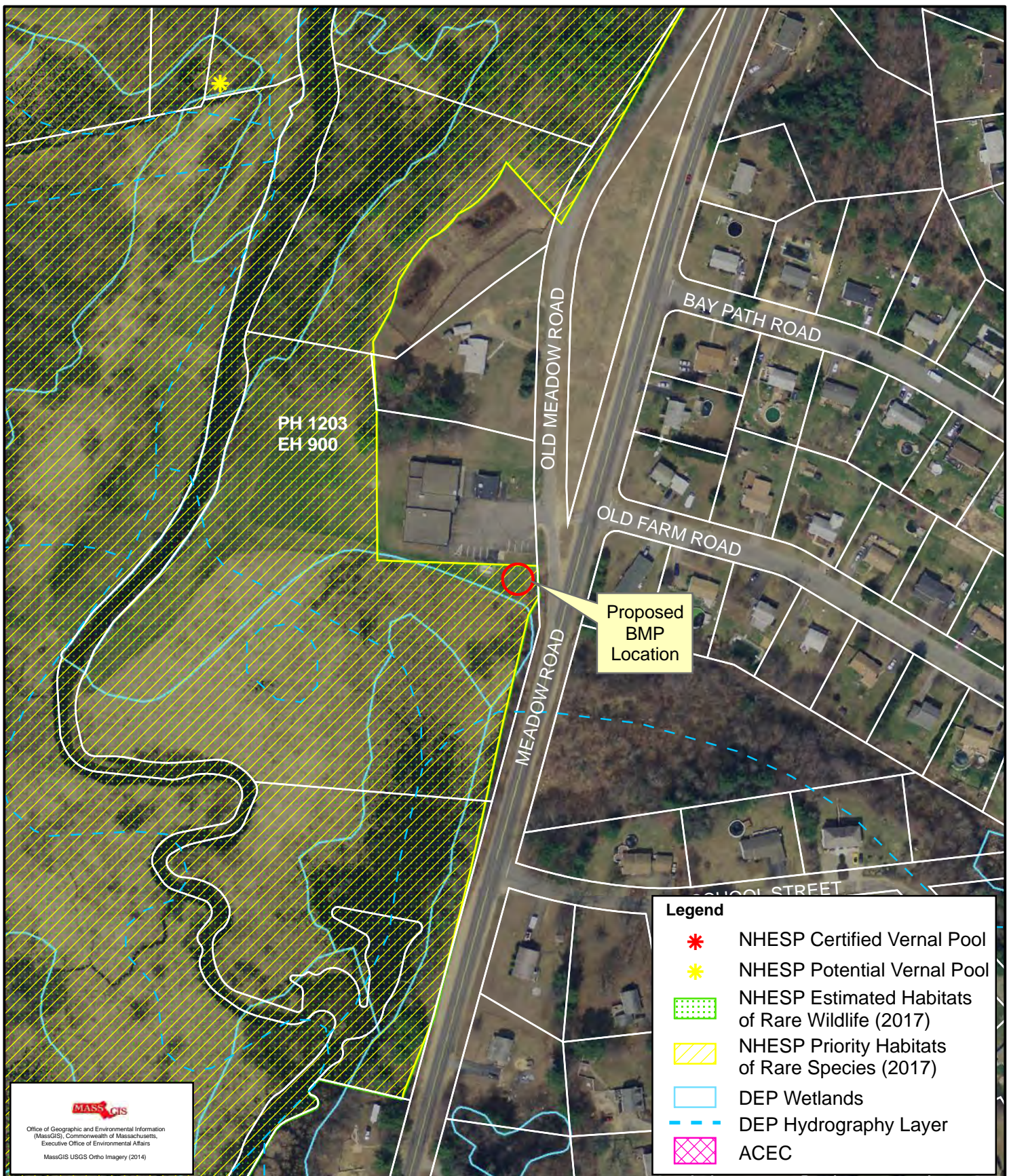
USGS Topographic Map

Flood Insurance Rate Map

BVW Delineation Field Data Forms

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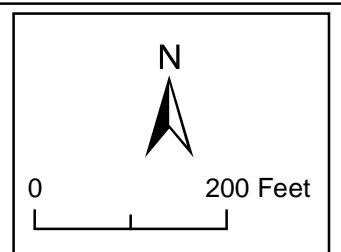
Environmental Consultants, Inc.

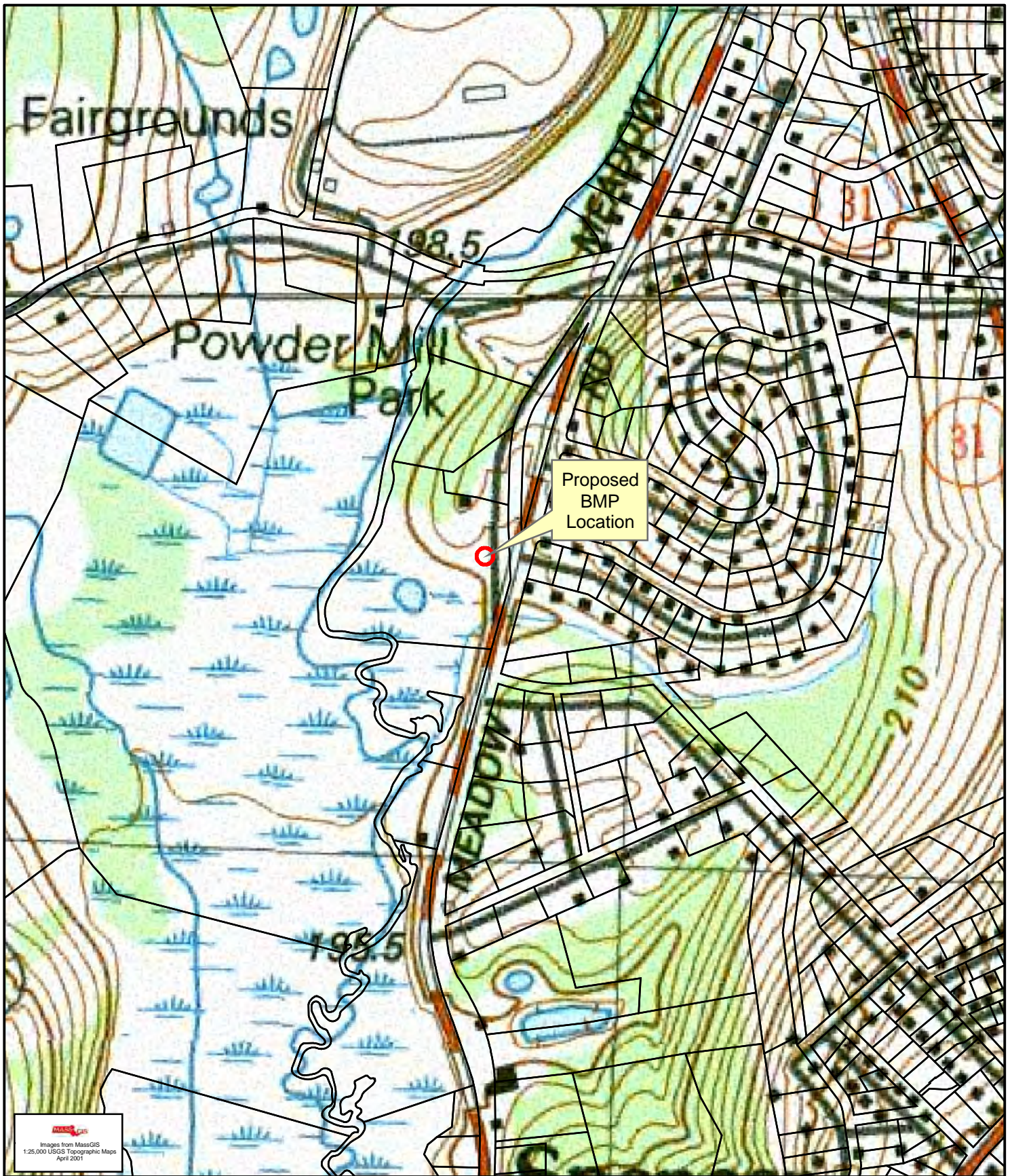
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Water Treatment Plant  
3 Old Meadow Road  
Spencer, MA

October 12, 2017



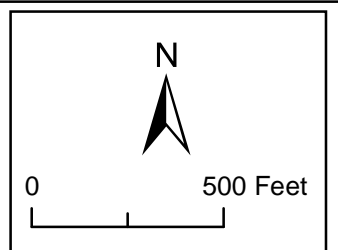


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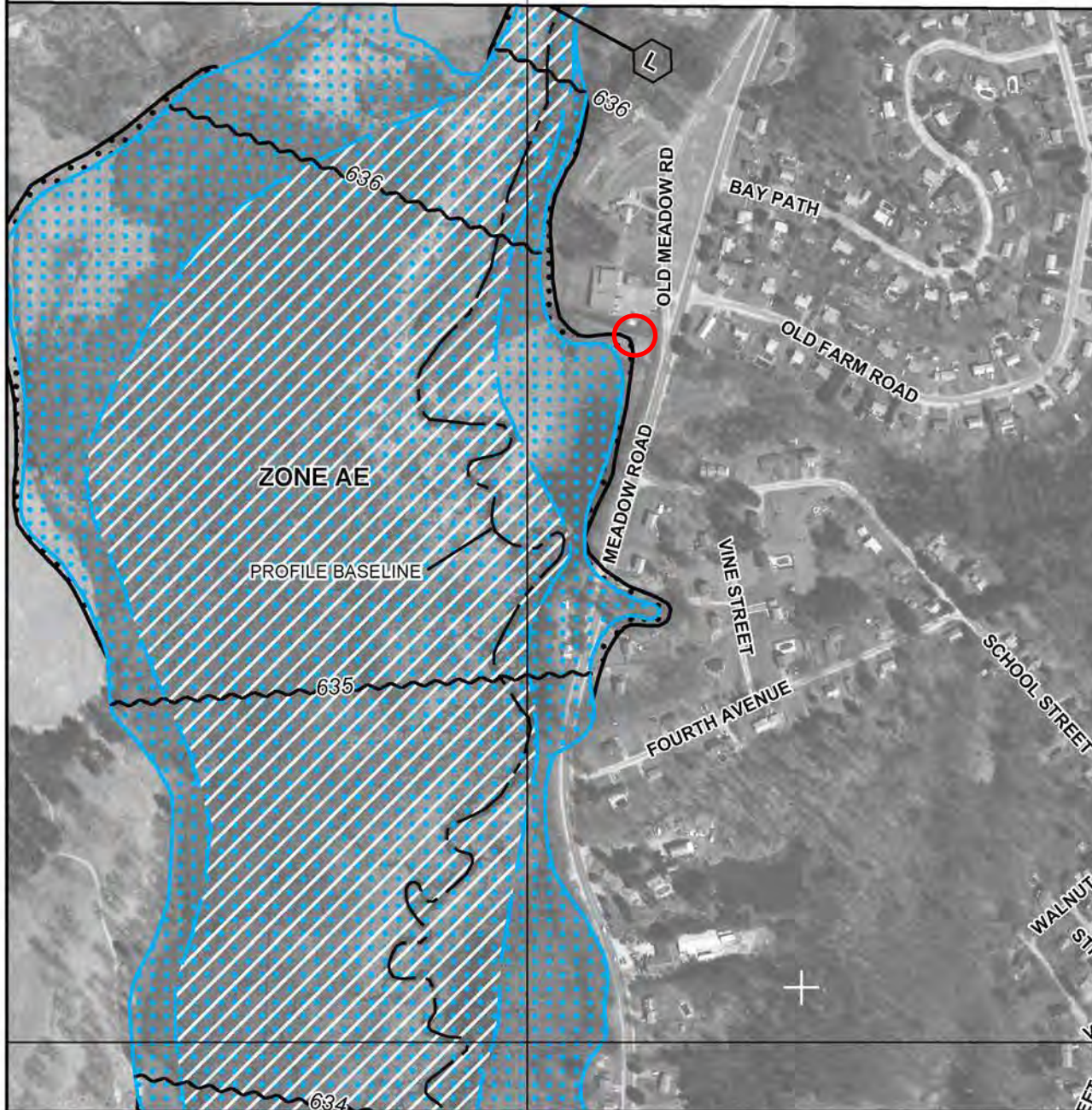
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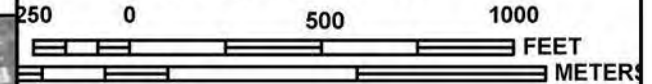
October 12, 2017



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MAP SCALE 1" = 500'



NFP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0757E

# FIRM

FLOOD INSURANCE RATE MAP  
WORCESTER COUNTY,  
MASSACHUSETTS  
(ALL JURISDICTIONS)

PANEL 757 OF 1075

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

## CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
EAST BROOKFIELD, TOWN OF	250303	0757	E
NORTH BROOKFIELD, TOWN OF	250323	0757	E
SPENCER, TOWN OF	250335	0757	E

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.



**MAP NUMBER**  
25027C0757E  
**EFFECTIVE DATE**  
JULY 4, 2011

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at [www.msc.fema.gov](http://www.msc.fema.gov)

## MassDEP Bordering Vegetated Wetland (310 CMR 10.55) Delineation Field Data Form

Applicant: Town of Spencer Prepared by: LEC Environmental Consultants Project location: Town of Spencer Water Department (Old Meadow Road)  
LEC Project #: SI\17-294.04 DEP File #: \_\_\_\_\_

Check all that apply:

- ☐ Vegetation alone presumed adequate to delineate BVW boundary: fill out Section I only
- ☒ Vegetation and other indicators of hydrology used to delineate BVW boundary: fill out Sections I and II
- ☐ Method other than dominance test used (attach additional information)

### Section I.

Vegetation	Observation Plot Number: 1 (upland)		Transect Number: 1 (WF3)	Date of Delineation: 10/4/2017
A. Sample Layer & Plant Species (by common/scientific name)	B. Percent Cover (or basal Area)	C. Percent Dominance	D. Dominant Plant (yes or no)	E. Wetland Indicator Category*

**No Trees**

**No Shrubs**

**Groundcover**

Lawn	100%	100%	Yes	Presumed Upl
------	------	------	-----	--------------

\* Use an asterisk to mark wetland indicator plants: plant species listed in the Wetlands Protection Act (MGL c.131, s.40); plants in the genus *Sphagnum*; plants listed as FAC, FAC+, FACW-, FACW, FACW+, or OBL; or plants with physiological or morphological adaptations. If any plants are identified as wetland indicator plants due to physiological or morphological adaptations, describe the adaptation next to the asterisk.

### Vegetation conclusion:

Number of dominant wetland indicator plants: 0                      Number of dominant non-wetland indicator plants: 1

Is the number of dominant wetland plants equal to or greater than the number of dominant non-wetland plants? yes no

If vegetation alone is presumed adequate to delineate the BVW boundary, submit this form with the Request for Determination of Applicability or Notice of Intent

## Section II. Indicators of Hydrology

### Hydric Soil Interpretation

#### 1. Soil Survey

Is there a published soil survey for this site? yes no  
title/date: Soil Survey of Worcester County, MA, Southern Part/Version  
9, September 15, 2016  
map number: Web Soil Survey  
soil type mapped: Hinckley fine loamy sand, 8 to 15 percent  
hydric soil inclusions:

Are field observations consistent with soil survey? yes no  
Remarks: moderately sloping lawn from parking lot to wetland

#### 2. Soil Description

Horizon	Depth	Matrix Color	Mottles Color
A	0"-14"	10YR 4/4 sl	
B	14"-18"	10YR 5/6 sl	

Remarks: refusal encountered at 18 inches.

#### 3. Other:

Conclusion: Is soil hydric? yes no

#### Other Indicators of Hydrology: (check all that apply & describe)

- ☐ Site Inundated: \_\_\_\_\_
- ☐ Depth to free water in observation hole: \_\_\_\_\_
- ☐ Depth to soil saturation in observation hole: 8 inches
- ☐ Water marks: \_\_\_\_\_
- ☐ Drift lines: \_\_\_\_\_
- ☐ Sediment Deposits: \_\_\_\_\_
- ☐ Drainage patterns in BVW: \_\_\_\_\_
- ☐ Oxidized rhizospheres: \_\_\_\_\_
- ☐ Water-stained leaves: \_\_\_\_\_
- ☐ Recorded Data (streams, lake, or tidal gauge; aerial photo; other):  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
- ☐ Other: \_\_\_\_\_

#### Vegetation and Hydrology Conclusion

	Yes	No
Number of wetland indicator plants ≥ # of non-wetland indicator plants		X
<b>Wetland hydrology present:</b>		
Hydric soil present		X
Other indicators of hydrology present		X
<b>Sample location is in a BVW</b>		X

Submit this form with the Request for Determination of Applicability or Notice of Intent.

# MassDEP Bordering Vegetated Wetland (310 CMR 10.55) Delineation Field Data Form

Applicant: Town of Spencer Prepared by: LEC Environmental Consultants Project location: Town of Spencer Water Department (3 Old Meadow Road)

LEC Project #: SI\17-294.04 DEP File #: \_\_\_\_\_

Check all that apply:

- ☐ Vegetation alone presumed adequate to delineate BVW boundary: fill out Section I only
- ☒ Vegetation and other indicators of hydrology used to delineate BVW boundary: fill out Sections I and II
- ☐ Method other than dominance test used (attach additional information)

## Section I.

Vegetation	Observation Plot Number: 1 (wetland)		Transect Number: 1 (WF3)	Date of Delineation: 10/4/2017
A. Sample Layer & Plant Species (by common/scientific name)	B. Percent Cover (or basal Area)	C. Percent Dominance	D. Dominant Plant (yes or no)	E. Wetland Indicator Category*

### No Overstory

#### Shrub

Pussy Willow ( <i>Salix discolor</i> )	10.5%	32%	Yes	*FacW
Redosier Dogwood ( <i>Cornus sericia</i> )	3.0%	9%	No	
Elderberry ( <i>Sambucus</i> sp.)	3.0%	9%	No	
Quaking Aspen ( <i>Populus tremuloides</i> )	10.5%	32%	Yes	FacU
Honeysuckle ( <i>Lonicera</i> sp.)	3.0%	9%	No	
Multiflora Rose ( <i>Rosa multiflora</i> )	3.0%	9%	No	

#### Groundcover

Joe Pyeweed ( <i>Eupatorium maculatum/purpureum</i> )	38.0%	46%	Yes	*FacW/Fac
Jewelweed ( <i>Impatiens capensis</i> )	20.5%	25%	Yes	*FacW
Sensitive Fern ( <i>Onoclea sensibilis</i> )	20.5%	25%	Yes	*FacW
Goldenrod ( <i>Solidago</i> sp.)	3.0%	4%	No	

\* Use an asterisk to mark wetland indicator plants: plant species listed in the Wetlands Protection Act (MGL c.131, s.40); plants in the genus *Sphagnum*; plants listed as FAC, FAC+, FACW-, FACW, FACW+, or OBL; or plants with physiological or morphological adaptations. If any plants are identified as wetland indicator plants due to physiological or morphological adaptations, describe the adaptation next to the asterisk.

### Vegetation conclusion:

Number of dominant wetland indicator plants: 4                      Number of dominant non-wetland indicator plants: 1

Is the number of dominant wetland plants equal to or greater than the number of dominant non-wetland plants? (yes) no

If vegetation alone is presumed adequate to delineate the BVW boundary, submit this form with the Request for Determination of Applicability or Notice of Intent

## Section II. Indicators of Hydrology

### Hydric Soil Interpretation

#### 1. Soil Survey

Is there a published soil survey for this site? ☒ yes ☐ no  
title/date: Soil Survey of Worcester County, MA, Southern Part/Version  
9, September 15, 2016  
map number: Web Soil Survey  
soil type mapped: Hinckley fine loamy sand, 8 to 15 percent  
hydric soil inclusions:

Are field observations consistent with soil survey? yes ☐ no ☒  
Remarks:

#### 2. Soil Description

Horizon	Depth	Matrix Color	Mottles Color
A <sub>1</sub>	0"-8"	10YR 2/2 fsl	10YR 5/8
A <sub>2</sub>	8"-22"	10YR 2/1 fsl (mucky)	

Remarks: prominent mottles at surface

#### 3. Other:

Conclusion: Is soil hydric? ☒ yes ☐ no

#### Other Indicators of Hydrology: (check all that apply & describe)

- ☐ Site Inundated: \_\_\_\_\_
- ☐ Depth to free water in observation hole: \_\_\_\_\_
- ☒ Depth to soil saturation in observation hole: 8 inches
- ☐ Water marks: \_\_\_\_\_
- ☐ Drift lines: \_\_\_\_\_
- ☐ Sediment Deposits: \_\_\_\_\_
- ☐ Drainage patterns in BVW: \_\_\_\_\_
- ☐ Oxidized rhizospheres: \_\_\_\_\_
- ☐ Water-stained leaves: \_\_\_\_\_
- ☐ Recorded Data (streams, lake, or tidal gauge; aerial photo; other):  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
- ☐ Other: \_\_\_\_\_

#### Vegetation and Hydrology Conclusion

	Yes	No
Number of wetland indicator plants ≥ # of non-wetland indicator plants	X	
<b>Wetland hydrology present:</b>		
Hydric soil present	X	
Other indicators of hydrology present	X	
<b>Sample location is in a BVW</b>	X	

Submit this form with the Request for Determination of Applicability or Notice of Intent.



TOWN OF SPENCER  
319 STORMWATER GRANT

July 30, 2018

**Appendix G “Spencer 319 Grant Stormwater BMP Project” (7 sheets)**





# TOWN OF SPENCER

## STORMWATER IMPROVEMENTS (TOWN PROPERTY) SPENCER, MASSACHUSETTS 01562

# SPENCER 319 GRANT STORMWATER BMP PROJECT

PROJECT NO. 195150496

AUGUST 1, 2018

### OWNER

TOWN OF SPENCER  
3 OLD MEADOW ROAD  
SPENCER, MA 01562

### CIVIL ENGINEER

STANTEC CONSULTING INC.  
400 CROWN COLONY DRIVE  
QUINCY, MA 02169

### SURVEYOR

CDW CONSULTANTS, INC.  
6 HURON DRIVE  
NATICK, MA 01760

### INDEX OF SHEETS\*

SHEET NO.	TITLE
-----------	-------

- |    |   |
|----|---|
| 1. | COVER                                       |
| 2. | NOTES AND LEGEND                            |
| 3. | SITE 1 - POWDER MILL PARK                   |
| 4. | SITE 2 - SPENCER WATER DEPARTMENT           |
| 5. | SITE 3 - SPENCER DEPARTMENT OF PUBLIC WORKS |
| 6. | DETAIL SHEET - 1                            |
| 7. | DETAIL SHEET - 2                            |

THESE PLANS SHALL NOT BE UTILIZED FOR CONSTRUCTION  
UNTIL WRITTEN AUTHORIZATION IS OBTAINED FROM THE  
ENGINEER.



S:\1951\active\195150496\civil\design\drawing\BPM\Design\Cover\_Notes\_Legend.dwg  
ORIGINAL SHEET - ARCHD

GENERAL SPECIFICATIONS

- ALL UTILITIES INTERFERED WITH OR DAMAGED SHALL BE PROPERLY RESTORED IMMEDIATELY, BY THE CONTRACTOR. THE CONTRACTOR SHALL CAREFULLY BED, TAMP, AND FULLY CONSOLIDATE REFILL MATERIAL AROUND AND UNDER ALL EXISTING UTILITIES ENCOUNTERED OR CROSSED UNLESS OTHERWISE SHOWN ON THE DRAWINGS.
- ALL OPEN EXCAVATIONS SHALL BE ADEQUATELY SAFEGUARDED BY PROVIDING TEMPORARY BARRICADES, CAUTION SIGNS, LIGHTS AND OTHER MEANS TO PREVENT ACCIDENTS TO PERSONS, AND DAMAGE TO PROPERTY. THE CONTRACTOR SHALL, AT HIS OWN EXPENSE, PROVIDE SUITABLE AND SAFE BRIDGES AND OTHER CROSSINGS FOR ACCOMMODATING TRAVEL BY PEDESTRIANS AND WORKMEN. NO EXCAVATIONS SHALL REMAIN OPEN OVERNIGHT.
- THE CONTRACTOR SHALL, AT ALL TIMES, CONTROL DUST FROM ROAD SURFACES AND ELSEWHERE WITHIN THE AREA TO THE ENGINEER'S SATISFACTION.
- THE EXACT LOCATION OF ALL PROPOSED PIPES, VALVES, FITTINGS, TANKS, PUMPS, ELECTRIC/CONTROL WIRING, ETC. IS TO BE DETERMINED BY THE CONTRACTOR IN THE FIELD.
- SAW CUTTING OF PAVEMENT –THE ROADWAY AND/OR PARKING LOT PAVEMENT ARE TO BE SAW CUT TO NEAT, TRUE LINES AS DIRECTED. SUCH CUTTING SHALL BE TO A DEPTH BELOW THE PAVEMENT AS TO PREVENT TEARING OF THE SURFACE DURING EXCAVATION.
- TRENCH EXCAVATION – CONTRACTOR SHALL OBTAIN ALL NECESSARY STATE/LOCAL TRENCH/EXCAVATION PERMITS AND COMPLY WITH ASSOCIATED TRENCH/EXCAVATION SAFETY LAWS. TRENCH EXCAVATION SHALL CONSIST OF THE REMOVAL OF ALL MATERIALS ENCOUNTERED. EXCAVATIONS SHALL BE MADE TO ACCOMMODATE THE ELEVATION, DEPTH OF COVER, OR DETAIL SHOWN ON THE DRAWINGS OR SPECIFIED. TRENCH WIDTHS SHALL BE KEPT TO THE MINIMUM PRACTICABLE BUT SHALL BE AT LEAST TWO FEET WIDE. THE BOTTOM OF THE TRENCHES SHALL BE FIRM AND FREE OF WATER AND SHALL BE ACCURATELY GRADED AND SHAPED TO ALLOW THE REQUIRED BEDDING BENEATH THE BOTTOM OF ALL PIPES INSTALLED.
- UNSUITABLE MATERIAL – ALL EXCAVATED MATERIAL IS TO BE DISCARDED UNLESS OTHERWISE SUITABLE, AND IF NOT SUITABLE, TO BE REPLACED WITH THE FOLLOWING MATERIAL OR EQUIVALENT, 1/2" TO 3/4" CRUSHED PROCESSED GRAVEL FOR THE BED AND ALSO ABOVE THE ITEMS PLACED IN THE EXCAVATION, FOR A DEPTH NOT LESS THAN SIX (6) INCHES BELOW THE BOTTOM MOST PORTION OF THE ITEM AND FOR A THICKNESS NOT LESS THAN SIX (6) INCHES ABOVE THE TOPMOST PORTION OF THE ITEM.
- DISPOSAL OF DISCARDED MATERIALS – ALL DISCARDED MATERIALS, RUBBISH, AND DEBRIS THAT ARE DUMPED OR FALL WITHIN THE LIMITS OF THE PROJECT SHALL BE REMOVED FROM THE SITE AND DISPOSED OF BY THE CONTRACTOR. ALL COSTS ASSOCIATED WITH THE LEGAL DISPOSAL OF EXCESS MATERIALS SHALL BE BORNE BY THE CONTRACTOR.
- BACKFILL MATERIAL – THE BACKFILL MATERIAL USED SHALL BE OF A QUALITY SATISFACTORY TO THE ENGINEER, AND SHALL BE FREE FROM LARGE OR FROZEN LUMPS OF WOOD, ORGANIC MATTER AND OTHER EXTRANEOUS MATERIAL AND SHALL CONTAIN NO ROCKS OR STONES GREATER THAN 3" DIAMETER.
- COMPACTION OF BACKFILL – BACKFILL SHALL BE UNIFORMLY DISTRIBUTED IN SUCCESSIVE LAYERS, EACH LAYER BEING THOROUGHLY COMPACTED BEFORE THE SUCCEEDING LAYER IS PLACED. THE ENTIRE WIDTH OF THE TRENCH SHALL BE MECHANICALLY OR HAND TAMPED IN SIX (6) INCH LIFTS, EXTENDING A MINIMUM OF TWO (2) FEET ABOVE THE UTILITY INSTALLATION, AND MECHANICALLY TAMPED THE REMAINDER OF THE FILL IN LIFT DEPTHS NOT GREATER THAN TWO (2) FEET.
- TEMPORARY PAVING SHALL BE PLACED OVER TRENCHES IN HARD-SURFACED STREETS AND ROADS, AND SHALL BE OF BITUMINOUS CONCRETE BASE COURSE, LAID IN ONE-COURSE, 2 INCHES THICK. BACKFILL AT TOP OF TRENCH SHALL BE REMOVED TO ALLOW FOR PLACING TEMPORARY SURFACING. CONTRACTOR SHALL MAINTAIN TEMPORARY SURFACING IN GOOD CONDITION. TRENCHES SHALL BE INSPECTED AT LEAST ONCE A WEEK AND IMMEDIATELY AFTER EACH STORM. HOLES AND SETTLEMENTS SHALL BE PROMPTLY REFILLED WITH BITUMINOUS MIXTURE.
- RESTORATION OF PERMANENT PAVING – THE BITUMINOUS CONCRETE BASE AND TOP SHALL BE LAID AND ROLLED IN TWO (2) COURSES. THE BINDER (BASE COURSE) SHALL NOT BE LESS THAN THE EXISTING ROADWAY BASE COURSE AND SHALL NOT BE LESS THAN TWO AND ONE-HALF (2-1/2) INCHES IN DEPTH AND THE TOP COURSE SHALL BE ONE AND ONE-HALF (1-1/2) INCHES IN DEPTH. THE BASE COURSE OF THE PERMANENT PAVEMENT SHALL BE PLACED AND CAREFULLY RAKED TO MINIMUM SURFACE AND THOROUGHLY ROLLED TO THE REQUIRED THICKNESS. BEFORE PLACING THE BASE COURSE OF THE PERMANENT PAVEMENT, THE EDGE OF THE ORIGINAL BITUMINOUS SURFACING SHALL RECEIVE AN APPLICATION OF APPROVED ASPHALT EMULSION SO THAT NEW PAVEMENT MATERIAL MAY BE PROPERLY BONDED TO THE EXISTING PAVEMENT. ALL SEAMS SHALL BE SEALED WITH AN APPROVED EMULSIFIED LIQUID ASPHALT AND SAND. THE TOP COURSE OF THE PERMANENT PAVING SHALL BE PLACED TO A GRADE THAT WILL MATCH THE EXISTING BITUMINOUS SURFACE AFTER ROLLING.
- THE PERMANENT PAVING SHALL NOT OVERLAP THE EXISTING PAVEMENT AND SHALL NOT BE APPLIED WITH A MECHANICAL SPREADER UNLESS OTHERWISE DIRECTED BY THE TOWN ENGINEER. THE CONTRACTOR SHALL FURNISH, PLACE, GRADE, AND COMPACT BITUMINOUS CONCRETE PAVEMENT OF CLASS I AS SHOWN AND SPECIFIED IN THE LATEST MASS D.O.T. STANDARD SPECIFICATION.
- DISTURBING EXISTING UTILITIES – SPECIAL CARE SHALL BE EXERCISED DURING EXCAVATION TO AVOID INJURY TO UNDERGROUND STRUCTURES, SUCH AS ELECTRICAL OR CABLES, WATER OR GAS MAINS, PIPES, CONDUITS, MANHOLES, CATCH BASINS, ETC.
- THE CONTRACTOR SHALL CONTROL ALL SURFACE WATER WITHIN THE WORK AREA. EXCAVATIONS SHALL BE PROTECTED FROM FLOODING BY SURFACE WATER BY USE OF BERMS, DITCHES, OR OTHER SUITABLE MEANS DEEMED APPROPRIATE BY THE CONTRACTOR.
- THE CONTRACTOR SHALL PREVENT SILTATION OF ANY WETLANDS OR WATER BODIES FROM RUN-OFF AND OR PUMPING OPERATIONS ASSOCIATED WITH THE CONSTRUCTION OPERATIONS, THROUGH THE USE OF HAY BALES, SILTATION FENCES OR OTHER METHODS APPROVED BY THE ENGINEER.
- THE CONTRACTOR SHALL PROSECUTE THE WORK SO THAT NO DAMAGE OCCURS TO ADJACENT UTILITIES, STRUCTURES, PROPERTY, OR ANY OTHER INSTALLATION LOCATED IN OR ADJACENT TO WORK AREAS. DAMAGED UTILITIES SHALL BE REPLACED OR REPAIRED WITH SIMILAR OR BETTER MATERIALS OF THE SAME SIZE AND TO THE REQUIREMENTS OF THE UTILITY OR SITE OWNER. THE CONTRACTOR SHALL HAVE ON SITE THE NECESSARY MANPOWER, MATERIALS, AND EQUIPMENT SUCH AS PUMPS, PIPING, AND THE LIKE AS REQUIRED TO PROTECT AND MAINTAIN UNINTERRUPTED FLOWS IN EXISTING UTILITIES DURING CONSTRUCTION. FLOW FROM BUILDINGS TO SEPTIC TANKS TO EXISTING LEACHING AREAS SHALL BE MAINTAINED (OR PUMPED AND REMOVED BY TOWN APPROVED SEPTIC PUMPER IF NECESSARY) UNTIL FINAL SEWER CONNECTIONS ARE COMPLETED AND APPROVED BY ENGINEER.
- EXCAVATIONS SHALL BE KEPT FREE FROM WATER, SNOW, AND ICE DURING CONSTRUCTION. BEDDING AND BACKFILL MATERIAL SHALL NOT BE PLACED IN WATER. WATER SHALL NOT BE ALLOWED TO RISE UPON OR FLOW OVER BEDDING AND BACKFILL MATERIAL.
- THE CONTRACTOR SHALL MAINTAIN ALL BENCHMARKS, MONUMENTS, AND OTHER REFERENCE POINTS AND IF DISTURBED, SHALL REPLACE THEM AT NO ADDITIONAL COST TO THE OWNER.
- THE CONTRACTOR SHALL PROTECT ALL EXISTING SEWERS AND UTILITIES, AND REPAIR OR REPLACE ANY DAMAGED PIPES OR UTILITIES AS PART OF THE CONTRACT WORK.
- VEHICLE TRAFFIC, VEHICLE PARKING, STOCKPILING OF MATERIALS, AND STORAGE OF EQUIPMENT IS PROHIBITED AT ALL TIMES OVER THE RAIN GARDENS AND INFILTRATION BASINS DURING CONSTRUCTION. COMPACTION SHALL NOT OCCUR WITHIN ANY RAINGARDEN.
- ALL STRUCTURES SHALL BE DESIGNED FOR H-25 LOADING.

EROSION CONTROL & SOIL STABILIZATION PROGRAM

- DENUDED SLOPES SHALL NOT BE LEFT EXPOSED FOR EXCESSIVE PERIODS OF TIME.
- ALL DISTURBED SLOPES EITHER NEWLY CREATED OR EXPOSED PRIOR TO OCTOBER 15 SHALL BE SEEDED OR PROTECTED BY THAT DATE FOR ANY WORK COMPLETED DURING EACH CONSTRUCTION YEAR.
- TEMPORARY TREATMENTS SHALL CONSIST OF A HAY, STRAW OR FIBER MULCH OR PROTECTIVE COVERS SUCH AS A MAT OR FIBER LINING (BURLAP, JUTE, FIBERGLASS NETTING, EXCELSIOR BLANKETS). THEY SHALL BE INCORPORATED INTO THE WORK AS WARRANTED OR AS ORDERED BY THE OWNER OR ITS DESIGNATED AGENT.
- ALL STRAW WATTLES OR TEMPORARY PROTECTION SHALL BE INSTALLED AS SHOWN ON THE PLANS PRIOR TO COMMENCING ANY EARTH DISTURBANCE, AND SHALL REMAIN IN PLACE UNTIL AN ACCEPTABLE STAND OF GRASS OR APPROVED GROUND COVER IS ESTABLISHED.
- THE TOPSOIL SHALL HAVE SANDY LOAM TEXTURE RELATIVELY FREE OF SUBSOIL MATERIAL, STONES, ROOTS, LUMPS OF SOIL, TREE LIMBS, TRASH OR CONSTRUCTION DEBRIS AND SHALL BE PLACED TO A DEPTH OF 4" ON ALL LOAM AND SEED AREAS.
- THE SEED MIX SHALL BE INOCULATED WITHIN 24 HOURS, BEFORE MIXING AND PLANTING, WITH APPROPRIATE INOCULUM FOR EACH VARIETY.
- THE DESIGN MIX FOR ANY SITE GRASS SHALL BE COMPRISED OF THE FOLLOWING:

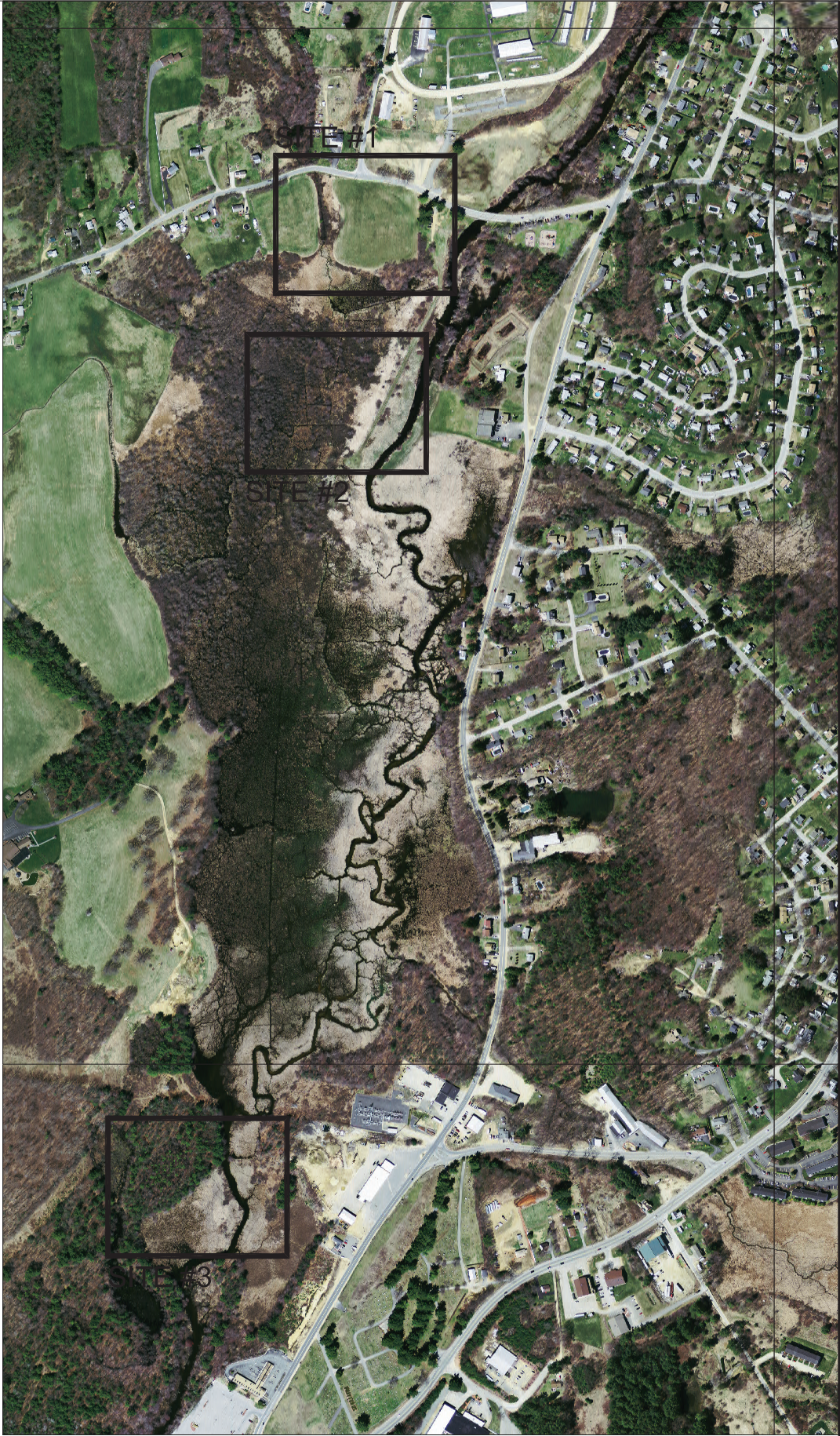
LOAM AND SEED AREAS		
TYPE	BY WEIGHT	
RED FESCUE		75%
COLONIAL BENTGRASS, "EXETER"		5%
BIRDSFOOT TREFOIL, "EMPIRE"		15%
PERENNIAL RYEGRASS		5%
APPLICATION RATE	100 LBS/ACRE	

- NO MATERIALS SHALL BE DEPOSITED WITHIN ANY WATERCOURSE, WETLANDS AREA OR DRAINAGE FACILITY.

EROSION CONTROL & SOIL STABILIZATION PROGRAM

- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE FURNISHING OF ALL LABOR, MATERIALS, TOOLS, EQUIPMENTS, ACCESSORIES AND ADJUSTMENTS NECESSARY TO SATISFACTORILY COMPLETE ALL STRIPPING OF TOPSOIL, EXCAVATION OF EARTH AND ROCK, STOCKPILING, REMOVAL OF UNSATISFACTORY MATERIALS, BACKFILLING, FILLING, COMPACTION, AND GRADING, AND ALL INCIDENTAL WORK PERTAINING THERETO.
  - THE CONTRACTOR SHALL PROSECUTE THE WORK SO THAT NO DAMAGE OCCURS TO ADJACENT UTILITIES, STRUCTURES, PROPERTY, OR ANY OTHER INSTALLATION LOCATED IN OR ADJACENT TO WORK AREAS. DAMAGED UTILITIES SHALL BE REPAIRED WITH SIMILAR OR BETTER MATERIALS OF THE SAME SIZE AND TO THE REQUIREMENTS OF THE UTILITY OWNER. THE CONTRACTOR SHALL HAVE ON SITE THE NECESSARY MANPOWER, MATERIALS AND EQUIPMENT SUCH AS PUMPS, PIPING, AND THE LIKE AS REQUIRED TO PROTECT AND TO MAINTAIN UNINTERRUPTED FLOWS IN EXISTING UTILITIES DURING CONSTRUCTION.
  - EXCAVATION EQUIPMENT SHALL BE OF SUCH SIZE AND TYPE, AND USED IN A MANNER, THAT WILL NOT DAMAGE EXISTING ITEMS SUCH AS BUT NOT LIMITED TO PAVED SURFACES, UTILITIES, STRUCTURES AND TREES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLIANCE WITH ALL APPROPRIATE SAFETY REGULATIONS. THE CONTRACTORS PARTICULAR ATTENTION IS CALLED TO THE RULES AND REGULATIONS INCLUDED IN PUBLIC LAW 91-596 KNOWN AS THE "OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970" (OSHA).
- GENERAL CONSTRUCTION SEQUENCING
- PRE-CONSTRUCTION MEETING WITH OWNER AND OWNER'S ENGINEER PRIOR TO COMMENCING ANY WORK.
  - PLACE CONSTRUCTION SAFETY FENCE AROUND PROPERTY TO LIMIT ACCESS AND PROTECT THE PUBLIC.
  - MOBILIZE TO SITE AND DEVELOP A CONSTRUCTION STAGING AREA APPROVED BY OWNER AND THE OWNERS ENGINEER.
  - PLACE ENVIRONMENTAL PROTECTION DEVICES INCLUSIVE OF STRAW WATTLES, SILTATION FENCING, AND TEMPORARY STABILIZATION. ESTABLISH SOIL STOCKPILE AREAS AND PLACE SILTATION FENCING AROUND THE STOCKPILE AREAS TO CONTAIN THE SOIL. ALSO, PROVIDE SILT SACKS AT EXISTING DOWN-GRADE CATCH BASINS.
  - THE OWNER RESERVES THE RIGHT TO SCHEDULE THE CONTRACTOR TO CONSTRUCT AT ANY LOCATIONS WITHIN THE PROJECT AREA. AT THE SAME TIME THE OWNER MAY SCHEDULE THE SUSPENSION OF CONSTRUCTION AT ANY LOCATION.
  - AFTER THE CONTRACTOR HAS STAKED OUT THE FACILITIES TO BE CONSTRUCTED AND HAS THE APPROVED MATERIALS ON THE JOB, THE OWNER'S ENGINEER SHALL BE NOTIFIED AT LEAST TWO WORKING DAYS IN ADVANCE OF CONSTRUCTION TO ARRANGE INSPECTIONS. THE SPENCER OFFICES OF UTILITIES AND FACILITIES. SHALL BE PROVIDED NOTIFICATION FOR DAILY INSPECTIONS IF REQUIRED. NOTIFY TOWN 2 WEEKS PRIOR TO STARTING CONSTRUCTION.
  - CLEAR AND GRUB WITHIN WORK LIMITS ONLY.
  - HAVE A WATER TRUCK ON-SITE TO MINIMIZE FUGITIVE DUST DURING BUILDING DEMOLITION, EXCAVATION, PAVEMENT OR PARKING SURFACE DEMOLITION, SHED FOUNDATION EXCAVATIONS AND GENERAL CONSTRUCTION PROCESSES.
  - FOR THE PROTECTION OF LIFE AND PROPERTY, ALL BACKFILL OPERATIONS SHALL FOLLOW CLOSELY BEHIND ANY OPEN EXCAVATION OR PIPE LAYING. THE CONTRACTOR SHALL INSURE THAT NO EXCAVATION BE LEFT OPEN, UNGUARDED, OR WATER FILLED DURING ANY PERIOD OF TIME WHEN WORK IS NOT ACTUALLY IN PROGRESS. IT IS THE PURPOSE AND INTENT THAT ALL EXCAVATIONS AND BACKFILLING, INCLUDING CONSOLIDATION OPERATIONS, AND TEMPORARY SURFACING WITHIN AN AREA BE ACCOMPLISHED EXPEDITIOUSLY BEFORE PROCEEDING TO OTHER WORK AREAS.

- SHOULD DEWATERING BE NECESSARY, THE CONTRACTOR SHALL DESIGN AND INSTALL A DEWATERING FACILITY, SEE GENERAL SPECIFICATIONS NOTE 16. CONTRACTOR'S DESIGN SHALL BE APPROVED BY OWNERS ENGINEERING AND CONSERVATION COMMISSION AGENT.
- BACKFILLING WILL ONLY OCCUR IN THE DESIGNATED AREAS, AND EROSION CONTROL PRACTICES SHALL BE SET IN PLACE PRIOR TO BACKFILLING TO ENSURE NO SEDIMENT MIGRATION OFF-SITE OR TO DRAINAGE SYSTEMS DURING THE BACKFILLING PROCEDURE. BACKFILLING SHALL OCCUR IN 6-12 INCH LIFTS, AND SHALL BE COMPACTED TO A DENSITY NOT LESS THAN 95% OF THE MAXIMUM DRY DENSITY (HOWEVER RAINGARDENS SHALL NOT BE COMPACTED).
- EXCAVATE AND REMOVE THE EXISTING PAVED SURFACES TO BE REPLACED, AS NOTED ON THE SITE PLANS, AND SUCH SOILS ARE TO BE USED AS COMMON FILL WHERE ACCEPTABLE TO THE ENGINEER OR TRUCKED AWAY AND DISPOSED OF IN A LEGAL MANNER.
- ROUGH GRADE PARKING AREAS AND ACCESS WAY SUB GRADE AND REFILL GRAVEL TO MAINTAIN ROAD GRADES.
- ROUGH GRADE THE GROUND AROUND FOUNDATIONS, PARKING LOT AREAS, RAINGARDENS, AND INFILTRATION BASINS.
- INSTALL NEW CATCH BASINS, SEDIMENT FOREBAYS, DRAIN PIPES, RAIN GARDENS, SPILLWAYS AND RIP RAP APRONS. INSTALL SILT SACKS ONCE NEW CATCH BASINS ARE INSTALLED.
- PLACE BINDER FOR ALL PARKING LOT REPLACEMENT AREAS AND ANY NEW PARKING LOT AREAS, AND INSTALL ACCESS WAY AND PARKING LOT ROLLED ASPHALT BERM.
- PLACE TOPSOIL ON AREAS NOT BEING PAVED OR COMPLETED WITH OTHER FEATURES.
- INSTALL FINAL LANDSCAPING, INCLUDING HYDROSEEDING OF LOAM AREAS TO BECOME LAWN.
- MONITOR ROAD AND TRENCH SETTLEMENT DURING CONSTRUCTION PROCESS.
- FINALIZE ALL GRADING FOR THE RAINGARDENS AND INFILTRATION BASINS, INCLUDING THE OVERFLOW DEVICES.
- REMOVE AND PROPERLY DISPOSE OF SILT AND COLLECTED DEBRIS FROM ALL ENVIRONMENTAL PROTECTION DEVICES. CLEAN UP SITE, REMOVE SILT SACKS, CLEAN CATCH BASINS.
- REMOVE ENVIRONMENTAL PROTECTION DEVICES AFTER RECEIVING APPROVAL FROM THE OWNER'S ENGINEER AND AND THE TOWN OF SPENCER CONSERVATION COMMISSION.
- DEMOBILIZE FROM SITE.



Stantec Consulting Services Inc.  
400 Crown Colony Drive  
Quincy Massachusetts 02169 U.S.A.  
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www.stantec.com

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Consultants

Legend

Notes

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Revision	By	Appd.	YY.MM.DD
CONSERVATION FILING	WAS	MSB	18.08.01
Issued	By	Appd.	YY.MM.DD

File Name:	SPENCER-319 GRANT	WAS	MSB	WAS	18.08.01
		Dwn.	Chkd.	Dgn.	YY.MM.DD

Permit-Seal



Client/Project

THE TOWN OF SPENCER  
319 STORMWATER GRANT

NOTES AND LEGEND

Title

Project No.	Scale		
195150496			
Drawing No.	Sheet	Revision	



Legend

- EXISTING FLOW ARROW
- EXISTING WETLAND FLAG
- EXISTING BUILDING
- EXISTING CONTOUR
- EXISTING MAJOR CONTOUR
- EDGE OF ROADWAY
- EXISTING SEWER
- EXISTING DRAIN LINE
- EXISTING DRAIN MANHOLE
- EXISTING SEWER MANHOLE
- EXISTING CATCH BASIN
- CONCRETE BOUNDS
- EXISTING OVERHEAD ELEC.
- EXISTING UTILITY POLE
- EXISTING TEST PIT
- IWPA ZONE II BOUNDARY
- INNER RIPARIAN
- OUTER RIPARIAN
- WETLAND
- PROPOSED FLOW ARROW
- PROPOSED CONTOUR
- PROPOSED GUARDRAIL
- PROPOSED DRAIN LINE
- PROPOSED DRAIN MANHOLE
- PROPOSED RIP RAP

Notes

THESE PLANS SHALL NOT BE UTILIZED FOR CONSTRUCTION UNTIL WRITTEN AUTHORIZATION IS OBTAINED FROM THE ENGINEER.

Revision By Appd. YY.MM.DD

CONSERVATION FILING WAS MSB 18.08.01  
Issued By Appd. YY.MM.DD

File Name: SPENCER-319 GRANT WAS MSB WAS 18.08.01  
Dwn. Chkd. Dgn. YY.MM.DD

Permit-Seal

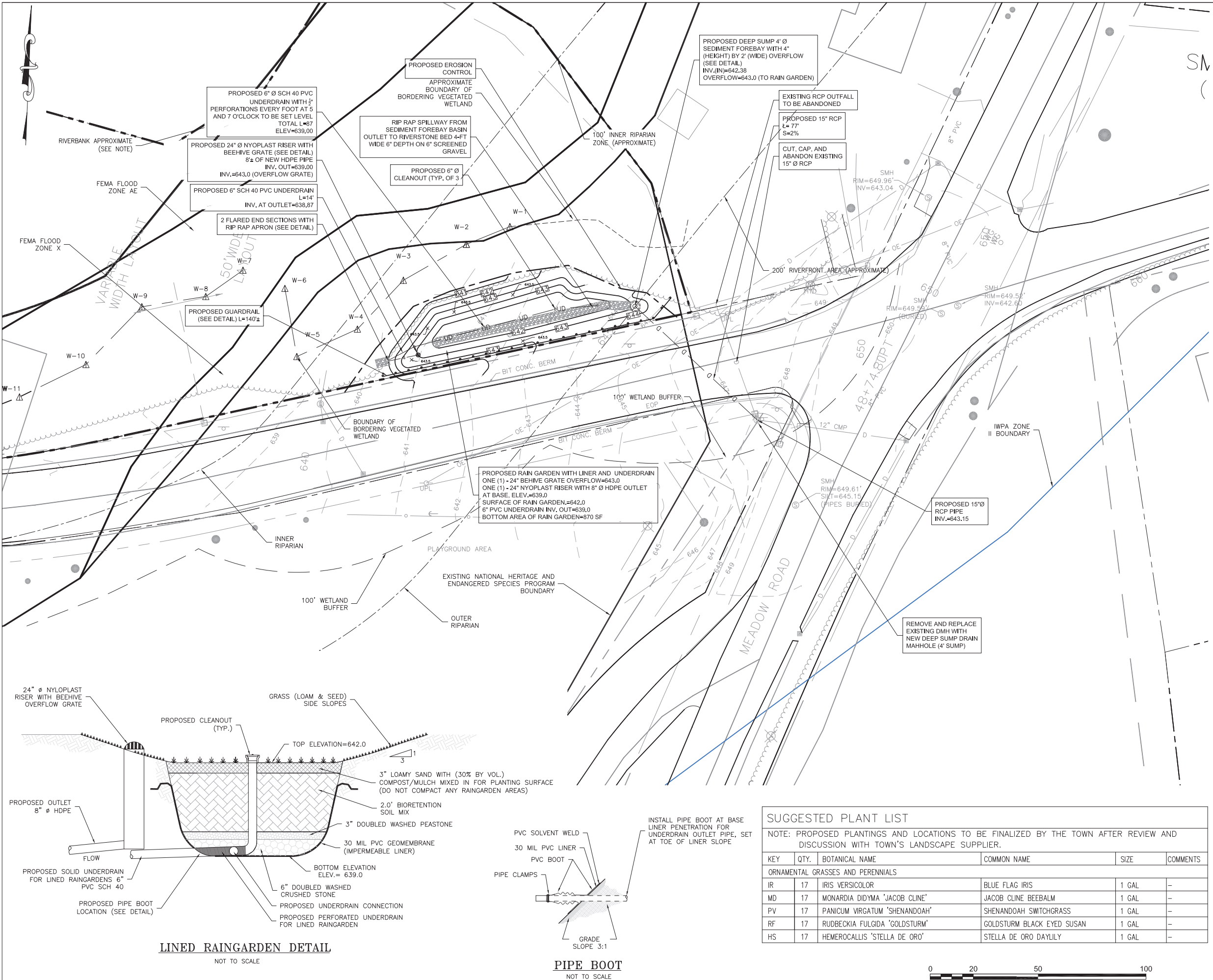


Client/Project  
THE TOWN OF SPENCER  
319 STORMWATER GRANT  
SITE 1 - POWDER MILL PARK  
SMITHVILLE ROAD

Title

Project No. 195150496 Scale 1" = 20'

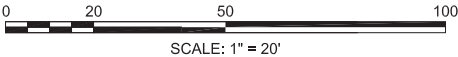
Drawing No. Sheet Revision



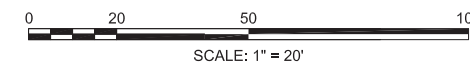
SUGGESTED PLANT LIST

NOTE: PROPOSED PLANTINGS AND LOCATIONS TO BE FINALIZED BY THE TOWN AFTER REVIEW AND DISCUSSION WITH TOWN'S LANDSCAPE SUPPLIER.

KEY	QTY.	BOTANICAL NAME	COMMON NAME	SIZE	COMMENTS
ORNAMENTAL GRASSES AND PERENNIALS					
IR	17	IRIS VERSICOLOR	BLUE FLAG IRIS	1 GAL	-
MD	17	MONARDIA DIDYMA 'JACOB CLINE'	JACOB CLINE BEEBALM	1 GAL	-
PV	17	PANICUM VIRGATUM 'SHENANDOAH'	SHENANDOAH SWITCHGRASS	1 GAL	-
RF	17	RUDBECKIA FULGIDA 'GOLDSTURM'	GOLDSTURM BLACK EYED SUSAN	1 GAL	-
HS	17	HEMEROCALLIS 'STELLA DE ORO'	STELLA DE ORO DAYLILY	1 GAL	-









Legend

- |                             |                          |
|-----------------------------|--------------------------|
| ▲ EXISTING FLOW ARROW       | ▶ PROPOSED FLOW ARROW    |
| ▲ EXISTING WETLAND FLAG     |                          |
| ▬ EXISTING BUILDING         |                          |
| --- EXISTING CONTOUR        |                          |
| --- EXISTING MAJOR CONTOUR  |                          |
| --- EDGE OF ROADWAY         | --- WETLAND BOUNDARY     |
| --- EXISTING SEWER          | --- RIPARIAN BOUNDARY    |
| --- EXISTING DRAIN LINE     | --- PROPOSED DRAIN LINE  |
| ⊙ EXISTING DRAIN MANHOLE    | ⊙ PROPOSED DRAIN MANHOLE |
| ⊙ EXISTING SEWER MANHOLE    | ⊙ PROPOSED SEWER MANHOLE |
| ⊙ EXISTING CATCH BASIN      | ⊙ PROPOSED CATCH BASIN   |
| ⊙ EXISTING CONCRETE BOUNDS  | ⊙ PROPOSED RIP RAP       |
| --- EXISTING OVERHEAD ELEC. |                          |
| --- EXISTING UTILITY POLE   |                          |
| --- EXISTING TEST PIT       |                          |
| --- IWPA ZONE II BOUNDARY   |                          |

1. SURVEY INFORMATION AND WETLAND FLAGS WERE TAKEN FROM THE PLAN ENTITLED "PLAN OF LAND IN SPENCER, MA PREPARED FOR HIGHWAY GARAGE" COMPLETED BY SHERMAN & FRYDRYK, LLC. LAND SURVEYING AND ENGINEERING. THE PLAN OF LAND IS DATED FEBRUARY 9, 2017. SURVEY INFORMATION MUST BE FIELD VERIFIED DURING CONSTRUCTION.

Notes

2. ALL NEWLY DISTURBED SLOPES SHALL BE SEEDED OR PROTECTED BY TEMPORARY TREATMENTS SUCH AS HAY, STRAW OR FIBER MULCH OR PROTECTION COVERS SUCH AS A MAT OR FIBER LINING (BURLAP, JUTE FIBERGLASS NETTING, EXCELSIOR BLANKETS). THEY SHALL BE INCORPORATED INTO THE WORK AS WARRANTED OR AS ORDERED BY THE OWNER OR ITS DESIGNATED AGENT.

THESE PLANS SHALL NOT BE UTILIZED FOR CONSTRUCTION UNTIL WRITTEN AUTHORIZATION IS OBTAINED FROM THE ENGINEER.

Revision	By	Appd.	YYMMDD

Revision	By	Appd.	YYMMDD

CONSERVATION FILING	WAS	MSB	18.08.01
Issued	By	Appd.	YYMMDD

File Name: SPENCER-319 GRANT	WAS	MSB	WAS	18.08.01
	Dwn.	Chkd.	Dgn.	YYMMDD

Permit-Seal



Client/Project

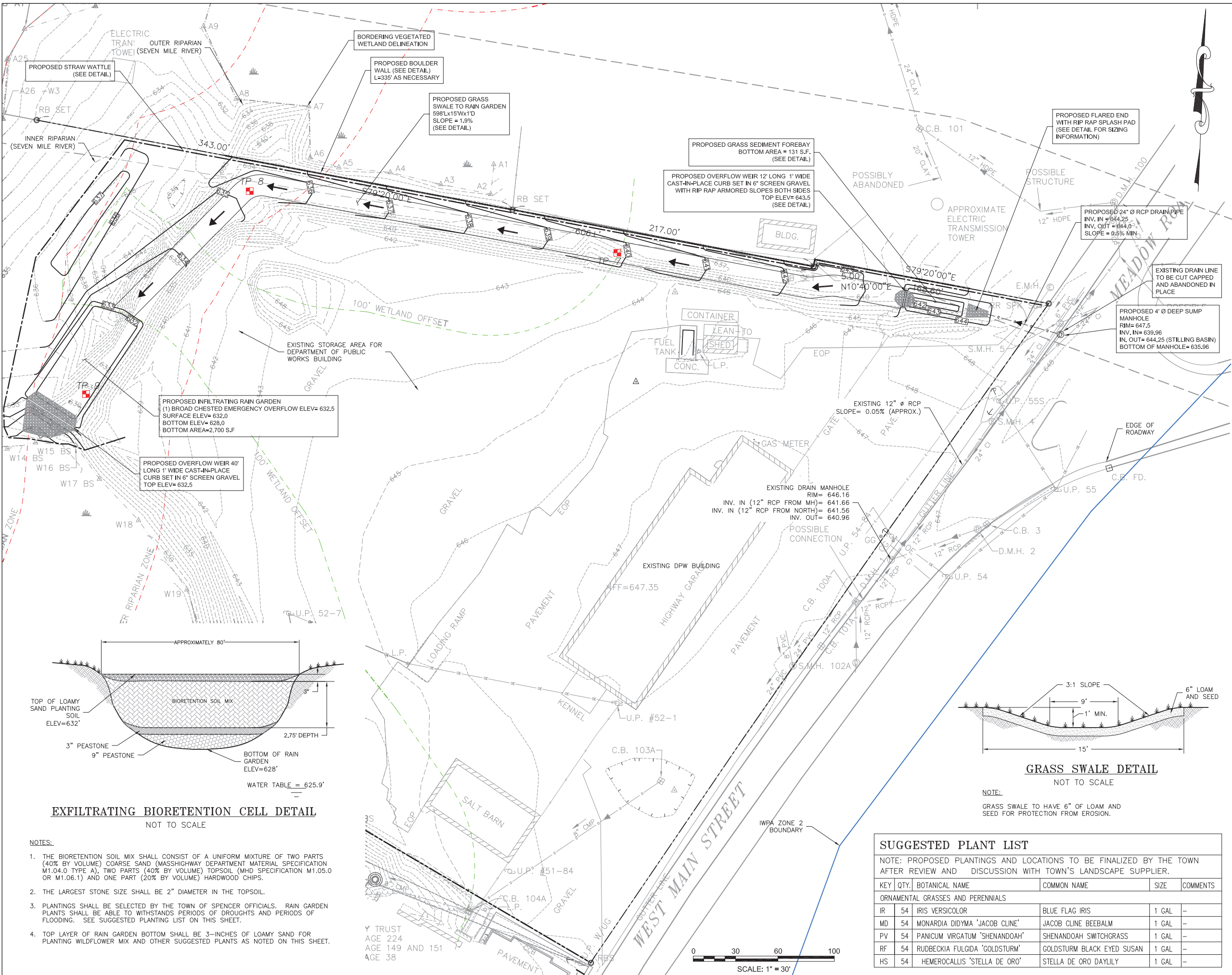
THE TOWN OF SPENCER  
319 STORMWATER GRANT

SITE 3 - SPENCER DEPARTMENT OF PUBLIC WORKS  
7 MEADOW ROAD

Title

Project No. 195150496 Scale 1" = 30'

Drawing No. Sheet Revision







The Contractor shall verify and be responsible for all dimensions. DO NOT scale the drawing - any errors or omissions shall be reported to Stantec without delay.  
The Copyrights to all designs and drawings are the property of Stantec. Reproduction or use for any purpose other than that authorized by Stantec is forbidden.

Legend

---

Notes

THESE PLANS SHALL NOT BE UTILIZED  
FOR CONSTRUCTION UNTIL WRITTEN  
AUTHORIZATION IS OBTAINED FROM  
THE ENGINEER.

Revision	By	Appd.	YY.MM.DD
CONSERVATION FILING	WAS	MSB	18.08.01
Issued	By	Appd.	YY.MM.DD

File Name: SPENCER-319 GRANT	WAS	MSB	WAS	18.08.0
	Dwn.	Chkd.	Dsn.	YY.MM.DD

Permit-Seal



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Client/Project

THE TOWN OF SPENCER  
319 STORMWATER GRANT  
DETAIL SHEET 1

---

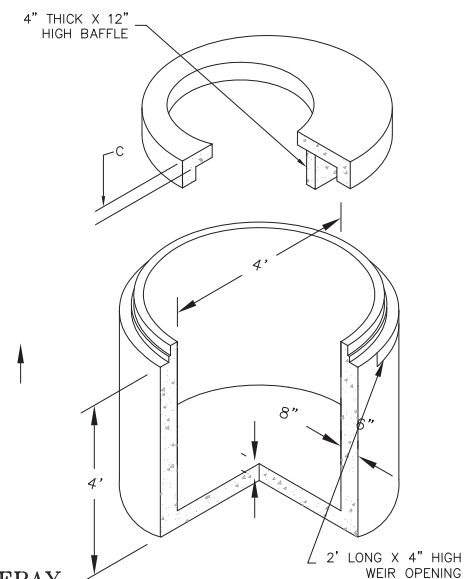
Title

Project No. 195150496	Scale	
Drawing No.	Sheet	Revision



1. TYPE 1 W/ 24" DIA. OPENING  
2" HIGH LOW PROFILE FRAME AND GRATE TO BE SET ON FLAT TOP  
SECTION OF SEDIMENT TRAP
2. DESIGNED FOR HS-25 LOADING
3. BASE SUPPORT BEDDING AS PER STANDARD CATCH BASIN DETAIL ON  
THIS SHEET.

4' DIA. PRECAST CONCRETE SEDIMENT FOREBAY  
AS MANUFACTURED BY SCITUATE RAY PRECAST  
NOT TO SCALE





SOIL EVALUATOR NAME:	WADE STANLEY #SE14123
PROJECT NUMBER:	195150496
DATE:	5/9/2018
LOCATION:	7 MEADOW ROAD
PIT #:	TP-8

DEPTH (IN)	SOIL HORIZ/LAYER	(MUNSELL) COLOR	REDOXIMORPHIC FEATURES (MOTTLES)		SOIL TEXTURE
			DEPTH	COLOR	
0-26	FILL		-	-	-
26-109	C	10YR 4/6	-	-	V. GRV. LOAMY SAND

NOTES: WEEPING AT 69'

PROJECT NUMBER:	195150496
DATE:	5/9/2018
LOCATION:	7 MEADOW ROAD
PIT #:	TP-9

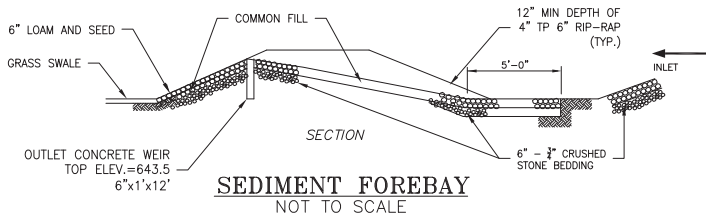
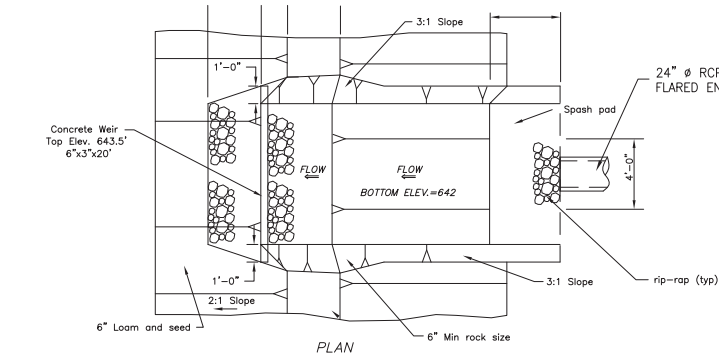
DEPTH (IN)	SOIL HORIZ/LAYER	(MUNSELL) COLOR	REDOXIMORPHIC FEATURES (MOTTLES)		SOIL TEXTURE
			DEPTH	COLOR	
0-16	FILL		-	-	LOAMY SAND
16-50	B	10YR 6/6	-	-	SAND
50-87	C	GLE Y 1 5/10G	-	-	SAND

NOTES: WEEPING AT 67", STANDING WATER AT BOTTOM OF PIT. GROUNDWATER AT ELEVATION 625.9'

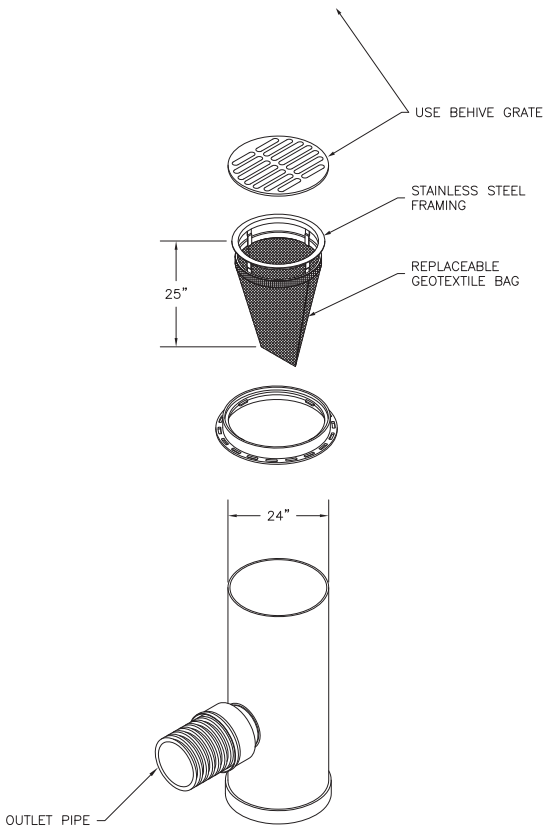
PROJECT NUMBER:	195150496
DATE:	5/9/2018
LOCATION:	7 MEADOW ROAD
PIT #:	TP-7

DEPTH (IN)	SOIL HORIZ/LAYER	(MUNSELL) COLOR	REDOXIMORPHIC FEATURES (MOTTLES)		SOIL TEXTURE
			DEPTH	COLOR	
0-39	FILL	-	-	-	-
39-116	C	10YR 6/2	-	-	SAND

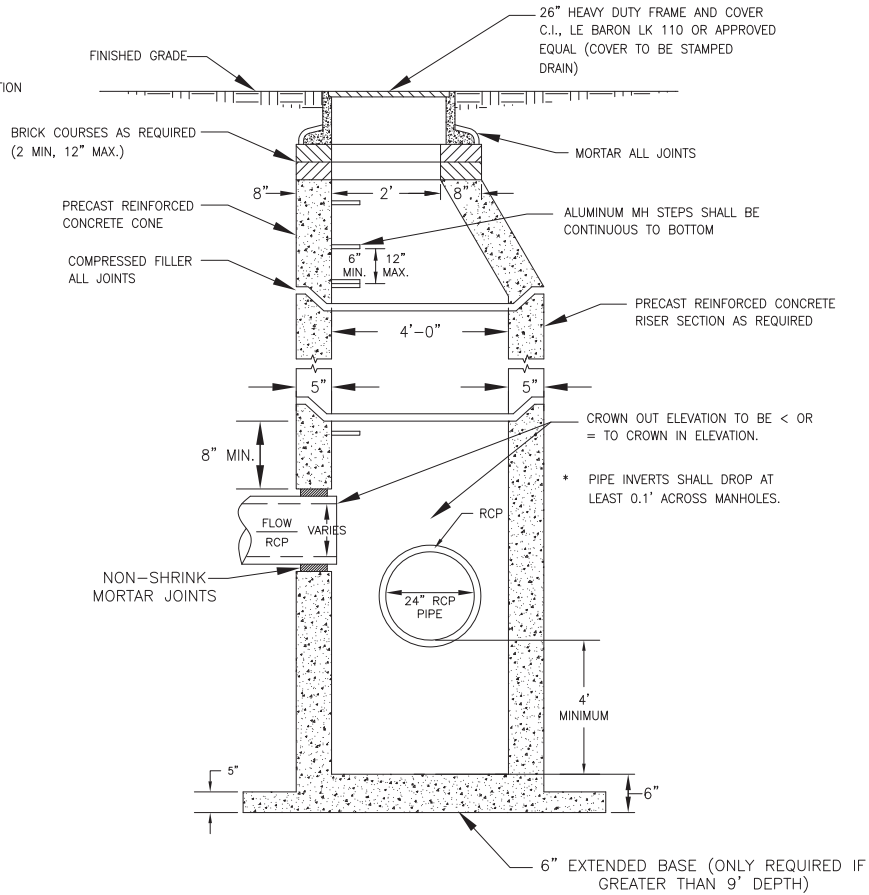
NOTES: WEEPING AT 90", CLEAN SAND IN "C" LAYER



NOT TO SCALE



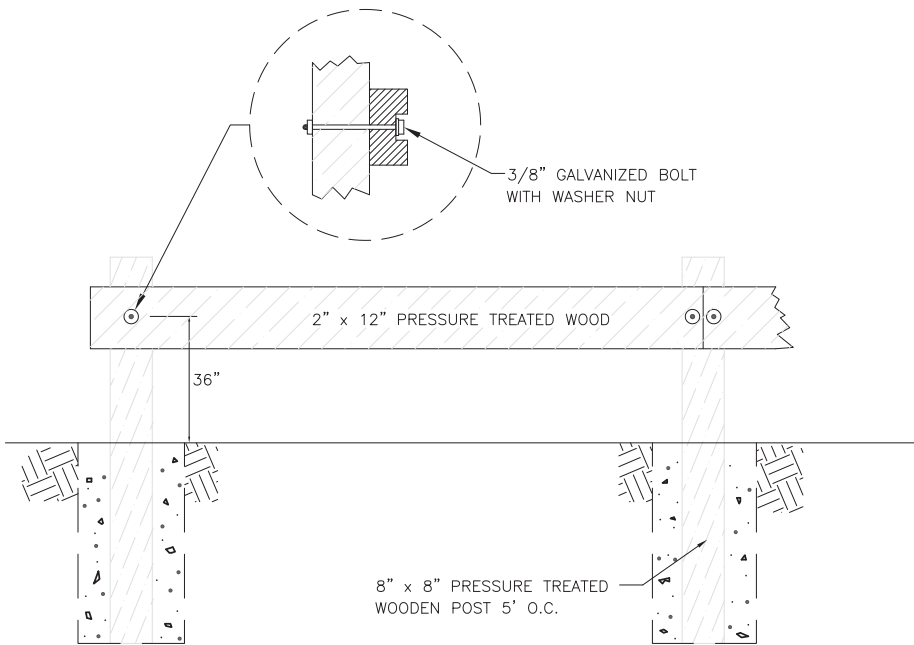
NOT TO SCALE



NOT TO SCALE

NOTES:

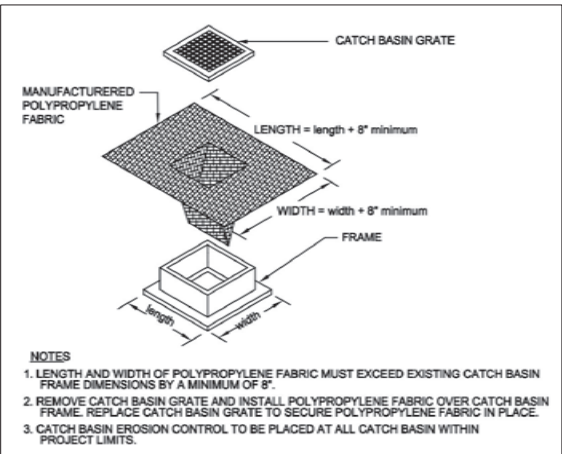
1. DRAINMANHOLE TO BE UTILIZED AT THE HIGHWAY GARAGE. SEE PLAN FOR INVERT AND LOCATION DETAILS.



NOT TO SCALE

NOTES:

1. REFLECTORS TO BE PLACED ON WOODEN GUARDRAIL EVERY 20' ON CENTER.



NOT TO SCALE



Stantec Consulting Services Inc.  
400 Crown Colony Drive  
Quincy Massachusetts 02169 U.S.A.  
Tel. 617.786.7960  
Fax. 617.786.7962  
[www.stantec.com](http://www.stantec.com)

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## Consultants

### Legend

## Notes

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AUTHORIZATION IS OBTAINED FROM  
THE ENGINEER.

[illegible]

File Name: SPENCER-319 GRANT	WAS	MSB	WAS	18.08.01
	Dwn.	Chkd.	Dsgn.	YY.MM.DD

Permit-Seal



Client/Project

THE TOWN OF SPENCER  
319 STORMWATER GRANT

DETAIL SHEET 2

Title

Project No. 195150496	Scale	
Drawing No.	Sheet	Revision



## **Attachment 6**

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### Conservation Documents

- Order of Conditions
- MESA Approved Documentation





Bk: 60565 Pg: 366

Page: 1 of 18 06/18/2019 12:34 PM WD



Massachusetts Department of Environmental Protection  
Bureau of Resource Protection - Wetlands  
**WPA Form 5 – Order of Conditions**  
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:  
293-0937  
MassDEP File #

eDEP Transaction #  
Spencer  
City/Town

## A. General Information

**Please note:**  
this form has  
been modified  
with added  
space to  
accommodate  
the Registry  
of Deeds  
Requirements

**Important:**  
When filling  
out forms on  
the  
computer,  
use only the  
tab key to  
move your  
cursor - do  
not use the  
return key.



1. From: SPENCER STORMWATER PERMIT  
Conservation Commission

2. This issuance is for  
(check one): a. ☒ Order of Conditions b. ☐ Amended Order of Conditions

3. To: Applicant:

Eben Butler  
a. First Name b. Last Name  
Town of Spencer Highway Department  
c. Organization  
3 Old Meadow Road  
d. Mailing Address  
Spencer MA 01562  
e. City/Town f. State g. Zip Code

4. Property Owner (if different from applicant):

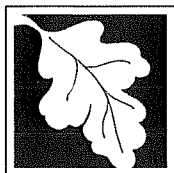
a. First Name b. Last Name  
  
c. Organization  
  
d. Mailing Address  
    
e. City/Town f. State g. Zip Code

5. Project Location:

Smithville-3 Old Meadow-7 Meadow Roads Spencer  
a. Street Address b. City/Town  
U21-U23-U11 58/ 2-1/ 8  
c. Assessors Map/Plat Number d. Parcel/Lot Number

Latitude and Longitude, if known: d m s d m s  
d. Latitude e. Longitude

18



Massachusetts Department of Environmental Protection  
Bureau of Resource Protection - Wetlands  
**WPA Form 5 – Order of Conditions**  
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:  
293-0937

MassDEP File #

eDEP Transaction #

Spencer

City/Town

**A. General Information (cont.)**

6. Property recorded at the Registry of Deeds for (attach additional information if more than one parcel):  
Worcester

a. County

12032, 53157

b. Certificate Number (if registered land)

316, 183

c. Book

d. Page

7. Dates: 8/1/18  
a. Date Notice of Intent Filed b. Date Public Hearing Closed c. Date of Issuance

8. Final Approved Plans and Other Documents (attach additional plan or document references as needed):

Town of Spencer Stormwater Improvement

a. Plan Title

Mark Bartlett

Mark Bartlett

b. Prepared By

c. Signed and Stamped by

8/1/18

1"=20' / 1"=20' / 1"=30

d. Final Revision Date

e. Scale

Operation & Maintenance Plan

8/20/18

f. Additional Plan or Document Title

g. Date

**B. Findings**

1. Findings pursuant to the Massachusetts Wetlands Protection Act:

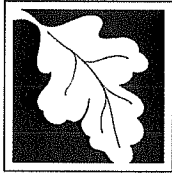
Following the review of the above-referenced Notice of Intent and based on the information provided in this application and presented at the public hearing, this Commission finds that the areas in which work is proposed is significant to the following interests of the Wetlands Protection Act (the Act). Check all that apply:

- a. ☒ Public Water Supply b. ☐ Land Containing Shellfish c. ☒ Prevention of Pollution  
d. ☒ Private Water Supply e. ☒ Fisheries f. ☒ Protection of Wildlife Habitat  
g. ☒ Groundwater Supply h. ☒ Storm Damage Prevention i. ☒ Flood Control

2. This Commission hereby finds the project, as proposed, is: (check one of the following boxes)

**Approved** subject to:

- a. ☒ the following conditions which are necessary in accordance with the performance standards set forth in the wetlands regulations. This Commission orders that all work shall be performed in accordance with the Notice of Intent referenced above, the following General Conditions, and any other special conditions attached to this Order. To the extent that the following conditions modify or differ from the plans, specifications, or other proposals submitted with the Notice of Intent, these conditions shall control.



Massachusetts Department of Environmental Protection  
Bureau of Resource Protection - Wetlands  
**WPA Form 5 – Order of Conditions**  
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:  
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MassDEP File #

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Spencer  
City/Town

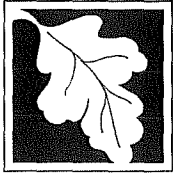
## B. Findings (cont.)

Denied because:

- b. ☐ the proposed work cannot be conditioned to meet the performance standards set forth in the wetland regulations. Therefore, work on this project may not go forward unless and until a new Notice of Intent is submitted which provides measures which are adequate to protect the interests of the Act, and a final Order of Conditions is issued. **A description of the performance standards which the proposed work cannot meet is attached to this Order.**
- c. ☐ the information submitted by the applicant is not sufficient to describe the site, the work, or the effect of the work on the interests identified in the Wetlands Protection Act. Therefore, work on this project may not go forward unless and until a revised Notice of Intent is submitted which provides sufficient information and includes measures which are adequate to protect the Act's interests, and a final Order of Conditions is issued. **A description of the specific information which is lacking and why it is necessary is attached to this Order as per 310 CMR 10.05(6)(c).**
3. ☐ Buffer Zone Impacts: Shortest distance between limit of project disturbance and the wetland resource area specified in 310 CMR 10.02(1)(a)                      a. linear feet

**Inland Resource Area Impacts:** Check all that apply below. (For Approvals Only)

Resource Area	Proposed Alteration	Permitted Alteration	Proposed Replacement	Permitted Replacement
4. <input type="checkbox"/> Bank	<u>                    </u> a. linear feet	<u>                    </u> b. linear feet	<u>                    </u> c. linear feet	<u>                    </u> d. linear feet
5. <input type="checkbox"/> Bordering Vegetated Wetland	<u>                    </u> a. square feet	<u>                    </u> b. square feet	<u>                    </u> c. square feet	<u>                    </u> d. square feet
6. <input type="checkbox"/> Land Under Waterbodies and Waterways	<u>                    </u> a. square feet	<u>                    </u> b. square feet	<u>                    </u> c. square feet	<u>                    </u> d. square feet
7. <input checked="" type="checkbox"/> Bordering Land Subject to Flooding	<u>                    </u> e. c/y dredged 20,440 <u>                    </u> a. square feet	<u>                    </u> f. c/y dredged 20,444 <u>                    </u> b. square feet	<u>                    </u> 20,440 <u>                    </u> c. square feet	<u>                    </u> 20,440 <u>                    </u> d. square feet
Cubic Feet Flood Storage	<u>                    </u> e. cubic feet	<u>                    </u> f. cubic feet	<u>                    </u> g. cubic feet	<u>                    </u> h. cubic feet
8. <input type="checkbox"/> Isolated Land Subject to Flooding	<u>                    </u> a. square feet	<u>                    </u> b. square feet		
Cubic Feet Flood Storage	<u>                    </u> c. cubic feet 19,721	<u>                    </u> d. cubic feet 19,721	<u>                    </u> e. cubic feet	<u>                    </u> f. cubic feet
9. <input checked="" type="checkbox"/> Riverfront Area	<u>                    </u> a. total sq. feet 0	<u>                    </u> b. total sq. feet		
Sq ft within 100 ft	<u>                    </u> c. square feet	<u>                    </u> d. square feet	<u>                    </u> e. square feet	<u>                    </u> f. square feet
Sq ft between 100-200 ft	<u>                    </u> 19,721 <u>                    </u> g. square feet	<u>                    </u> 19,721 <u>                    </u> h. square feet	<u>                    </u> 19,721 <u>                    </u> i. square feet	<u>                    </u> 19,721 <u>                    </u> j. square feet



Massachusetts Department of Environmental Protection  
Bureau of Resource Protection - Wetlands

**WPA Form 5 – Order of Conditions**

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:  
293-0937  
MassDEP File #

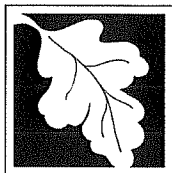
eDEP Transaction #

Spencer  
City/Town

**B. Findings (cont.)**

**Coastal Resource Area Impacts:** Check all that apply below. (For Approvals Only)

	Proposed Alteration	Permitted Alteration	Proposed Replacement	Permitted Replacement
10. <input type="checkbox"/> Designated Port Areas	Indicate size under Land Under the Ocean, below			
11. <input type="checkbox"/> Land Under the Ocean	<u>                    </u> a. square feet	<u>                    </u> b. square feet		
	<u>                    </u> c. c/y dredged	<u>                    </u> d. c/y dredged		
12. <input type="checkbox"/> Barrier Beaches	Indicate size under Coastal Beaches and/or Coastal Dunes below			
13. <input type="checkbox"/> Coastal Beaches	<u>                    </u> a. square feet	<u>                    </u> b. square feet	<u>                    </u> c. nourishment cu yd	<u>                    </u> d. nourishment cu yd
14. <input type="checkbox"/> Coastal Dunes	<u>                    </u> a. square feet	<u>                    </u> b. square feet	<u>                    </u> c. nourishment cu yd	<u>                    </u> d. nourishment cu yd
15. <input type="checkbox"/> Coastal Banks	<u>                    </u> a. linear feet	<u>                    </u> b. linear feet		
16. <input type="checkbox"/> Rocky Intertidal Shores	<u>                    </u> a. square feet	<u>                    </u> b. square feet		
17. <input type="checkbox"/> Salt Marshes	<u>                    </u> a. square feet	<u>                    </u> b. square feet	<u>                    </u> c. square feet	<u>                    </u> d. square feet
18. <input type="checkbox"/> Land Under Salt Ponds	<u>                    </u> a. square feet	<u>                    </u> b. square feet		
	<u>                    </u> c. c/y dredged	<u>                    </u> d. c/y dredged		
19. <input type="checkbox"/> Land Containing Shellfish	<u>                    </u> a. square feet	<u>                    </u> b. square feet	<u>                    </u> c. square feet	<u>                    </u> d. square feet
20. <input type="checkbox"/> Fish Runs	Indicate size under Coastal Banks, Inland Bank, Land Under the Ocean, and/or inland Land Under Waterbodies and Waterways, above			
	<u>                    </u> a. c/y dredged	<u>                    </u> b. c/y dredged		
21. <input type="checkbox"/> Land Subject to Coastal Storm Flowage	<u>                    </u> a. square feet	<u>                    </u> b. square feet		



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Bureau of Resource Protection - Wetlands  
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Provided by MassDEP:  
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City/Town

## B. Findings (cont.)

\* #22. If the project is for the purpose of restoring or enhancing a wetland resource area in addition to the square footage that has been entered in Section B.5.c (BVW) or B.17.c (Salt Marsh) above, please enter the additional amount here.

22. ☐ Restoration/Enhancement \*:

a. square feet of BVW

b. square feet of salt marsh

23. ☐ Stream Crossing(s):

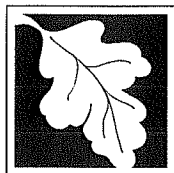
a. number of new stream crossings

b. number of replacement stream crossings

## C. General Conditions Under Massachusetts Wetlands Protection Act

The following conditions are only applicable to Approved projects.

1. Failure to comply with all conditions stated herein, and with all related statutes and other regulatory measures, shall be deemed cause to revoke or modify this Order.
2. The Order does not grant any property rights or any exclusive privileges; it does not authorize any injury to private property or invasion of private rights.
3. This Order does not relieve the permittee or any other person of the necessity of complying with all other applicable federal, state, or local statutes, ordinances, bylaws, or regulations.
4. The work authorized hereunder shall be completed within three years from the date of this Order unless either of the following apply:
  - a. The work is a maintenance dredging project as provided for in the Act; or
  - b. The time for completion has been extended to a specified date more than three years, but less than five years, from the date of issuance. If this Order is intended to be valid for more than three years, the extension date and the special circumstances warranting the extended time period are set forth as a special condition in this Order.
  - c. If the work is for a Test Project, this Order of Conditions shall be valid for no more than one year.
5. This Order may be extended by the issuing authority for one or more periods of up to three years each upon application to the issuing authority at least 30 days prior to the expiration date of the Order. An Order of Conditions for a Test Project may be extended for one additional year only upon written application by the applicant, subject to the provisions of 310 CMR 10.05(11)(f).
6. If this Order constitutes an Amended Order of Conditions, this Amended Order of Conditions does not extend the issuance date of the original Final Order of Conditions and the Order will expire on 8/23/21 unless extended in writing by the Department.
7. Any fill used in connection with this project shall be clean fill. Any fill shall contain no trash, refuse, rubbish, or debris, including but not limited to lumber, bricks, plaster, wire, lath, paper, cardboard, pipe, tires, ashes, refrigerators, motor vehicles, or parts of any of the foregoing.



Massachusetts Department of Environmental Protection  
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MassDEP File #

eDEP Transaction #

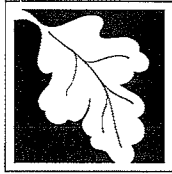
Spencer

City/Town

**C. General Conditions Under Massachusetts Wetlands Protection Act**

8. This Order is not final until all administrative appeal periods from this Order have elapsed, or if such an appeal has been taken, until all proceedings before the Department have been completed.
9. No work shall be undertaken until the Order has become final and then has been recorded in the Registry of Deeds or the Land Court for the district in which the land is located, within the chain of title of the affected property. In the case of recorded land, the Final Order shall also be noted in the Registry's Grantor Index under the name of the owner of the land upon which the proposed work is to be done. In the case of the registered land, the Final Order shall also be noted on the Land Court Certificate of Title of the owner of the land upon which the proposed work is done. The recording information shall be submitted to the Conservation Commission on the form at the end of this Order, which form must be stamped by the Registry of Deeds, prior to the commencement of work.
10. A sign shall be displayed at the site not less than two square feet or more than three square feet in size bearing the words,  

"Massachusetts Department of Environmental Protection" [or, "MassDEP"]  
"File Number            293-0937            "
11. Where the Department of Environmental Protection is requested to issue a Superseding Order, the Conservation Commission shall be a party to all agency proceedings and hearings before MassDEP.
12. Upon completion of the work described herein, the applicant shall submit a Request for Certificate of Compliance (WPA Form 8A) to the Conservation Commission.
13. The work shall conform to the plans and special conditions referenced in this order.
14. Any change to the plans identified in Condition #13 above shall require the applicant to inquire of the Conservation Commission in writing whether the change is significant enough to require the filing of a new Notice of Intent.
15. The Agent or members of the Conservation Commission and the Department of Environmental Protection shall have the right to enter and inspect the area subject to this Order at reasonable hours to evaluate compliance with the conditions stated in this Order, and may require the submittal of any data deemed necessary by the Conservation Commission or Department for that evaluation.
16. This Order of Conditions shall apply to any successor in interest or successor in control of the property subject to this Order and to any contractor or other person performing work conditioned by this Order.



Massachusetts Department of Environmental Protection  
Bureau of Resource Protection - Wetlands  
**WPA Form 5 – Order of Conditions**  
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

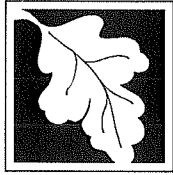
Provided by MassDEP:  
293-0937  
MassDEP File #  
eDEP Transaction #  
Spencer  
City/Town

**C. General Conditions Under Massachusetts Wetlands Protection Act (cont.)**

17. Prior to the start of work, and if the project involves work adjacent to a Bordering Vegetated Wetland, the boundary of the wetland in the vicinity of the proposed work area shall be marked by wooden stakes or flagging. Once in place, the wetland boundary markers shall be maintained until a Certificate of Compliance has been issued by the Conservation Commission.
18. All sedimentation barriers shall be maintained in good repair until all disturbed areas have been fully stabilized with vegetation or other means. At no time shall sediments be deposited in a wetland or water body. During construction, the applicant or his/her designee shall inspect the erosion controls on a daily basis and shall remove accumulated sediments as needed. The applicant shall immediately control any erosion problems that occur at the site and shall also immediately notify the Conservation Commission, which reserves the right to require additional erosion and/or damage prevention controls it may deem necessary. Sedimentation barriers shall serve as the limit of work unless another limit of work line has been approved by this Order.
19. The work associated with this Order (the "Project")
  - (1) ☒ is subject to the Massachusetts Stormwater Standards
  - (2) ☐ is NOT subject to the Massachusetts Stormwater Standards

**If the work is subject to the Stormwater Standards, then the project is subject to the following conditions:**

- a) All work, including site preparation, land disturbance, construction and redevelopment, shall be implemented in accordance with the construction period pollution prevention and erosion and sedimentation control plan and, if applicable, the Stormwater Pollution Prevention Plan required by the National Pollution Discharge Elimination System Construction General Permit as required by Stormwater Condition 8. Construction period erosion, sedimentation and pollution control measures and best management practices (BMPs) shall remain in place until the site is fully stabilized.
- b) No stormwater runoff may be discharged to the post-construction stormwater BMPs unless and until a Registered Professional Engineer provides a Certification that:
  - i. all construction period BMPs have been removed or will be removed by a date certain specified in the Certification. For any construction period BMPs intended to be converted to post construction operation for stormwater attenuation, recharge, and/or treatment, the conversion is allowed by the MassDEP Stormwater Handbook BMP specifications and that the BMP has been properly cleaned or prepared for post construction operation, including removal of all construction period sediment trapped in inlet and outlet control structures;
  - ii. as-built final construction BMP plans are included, signed and stamped by a Registered Professional Engineer, certifying the site is fully stabilized;
  - iii. any illicit discharges to the stormwater management system have been removed, as per the requirements of Stormwater Standard 10;



**Massachusetts Department of Environmental Protection**  
**Bureau of Resource Protection - Wetlands**  
**WPA Form 5 – Order of Conditions**  
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:  
293-0937  
MassDEP File #

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Spencer  
City/Town

**C. General Conditions Under Massachusetts Wetlands Protection Act (cont.)**

iv. all post-construction stormwater BMPs are installed in accordance with the plans (including all planting plans) approved by the issuing authority, and have been inspected to ensure that they are not damaged and that they are in proper working condition;

v. any vegetation associated with post-construction BMPs is suitably established to withstand erosion.

c) The landowner is responsible for BMP maintenance until the issuing authority is notified that another party has legally assumed responsibility for BMP maintenance. Prior to requesting a Certificate of Compliance, or Partial Certificate of Compliance, the responsible party (defined in General Condition 18(e)) shall execute and submit to the issuing authority an Operation and Maintenance Compliance Statement ("O&M Statement") for the Stormwater BMPs identifying the party responsible for implementing the stormwater BMP Operation and Maintenance Plan ("O&M Plan") and certifying the following:

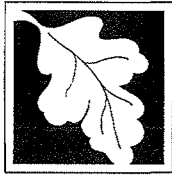
i.) the O&M Plan is complete and will be implemented upon receipt of the Certificate of Compliance, and

ii.) the future responsible parties shall be notified in writing of their ongoing legal responsibility to operate and maintain the stormwater management BMPs and implement the Stormwater Pollution Prevention Plan.

d) Post-construction pollution prevention and source control shall be implemented in accordance with the long-term pollution prevention plan section of the approved Stormwater Report and, if applicable, the Stormwater Pollution Prevention Plan required by the National Pollution Discharge Elimination System Multi-Sector General Permit.

e) Unless and until another party accepts responsibility, the landowner, or owner of any drainage easement, assumes responsibility for maintaining each BMP. To overcome this presumption, the landowner of the property must submit to the issuing authority a legally binding agreement of record, acceptable to the issuing authority, evidencing that another entity has accepted responsibility for maintaining the BMP, and that the proposed responsible party shall be treated as a permittee for purposes of implementing the requirements of Conditions 18(f) through 18(k) with respect to that BMP. Any failure of the proposed responsible party to implement the requirements of Conditions 18(f) through 18(k) with respect to that BMP shall be a violation of the Order of Conditions or Certificate of Compliance. In the case of stormwater BMPs that are serving more than one lot, the legally binding agreement shall also identify the lots that will be serviced by the stormwater BMPs. A plan and easement deed that grants the responsible party access to perform the required operation and maintenance must be submitted along with the legally binding agreement.

f) The responsible party shall operate and maintain all stormwater BMPs in accordance with the design plans, the O&M Plan, and the requirements of the Massachusetts Stormwater Handbook.



Massachusetts Department of Environmental Protection  
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**C. General Conditions Under Massachusetts Wetlands Protection Act (cont.)**

- g) The responsible party shall:
1. Maintain an operation and maintenance log for the last three (3) consecutive calendar years of inspections, repairs, maintenance and/or replacement of the stormwater management system or any part thereof, and disposal (for disposal the log shall indicate the type of material and the disposal location);
  2. Make the maintenance log available to MassDEP and the Conservation Commission ("Commission") upon request; and
  3. Allow members and agents of the MassDEP and the Commission to enter and inspect the site to evaluate and ensure that the responsible party is in compliance with the requirements for each BMP established in the O&M Plan approved by the issuing authority.
- h) All sediment or other contaminants removed from stormwater BMPs shall be disposed of in accordance with all applicable federal, state, and local laws and regulations.
- i) Illicit discharges to the stormwater management system as defined in 310 CMR 10.04 are prohibited.
- j) The stormwater management system approved in the Order of Conditions shall not be changed without the prior written approval of the issuing authority.
- k) Areas designated as qualifying pervious areas for the purpose of the Low Impact Site Design Credit (as defined in the MassDEP Stormwater Handbook, Volume 3, Chapter 1, Low Impact Development Site Design Credits) shall not be altered without the prior written approval of the issuing authority.
- l) Access for maintenance, repair, and/or replacement of BMPs shall not be withheld. Any fencing constructed around stormwater BMPs shall include access gates and shall be at least six inches above grade to allow for wildlife passage.

Special Conditions (if you need more space for additional conditions, please attach a text document):

**See Page 10B.**

20. For Test Projects subject to 310 CMR 10.05(11), the applicant shall also implement the monitoring plan and the restoration plan submitted with the Notice of Intent. If the conservation commission or Department determines that the Test Project threatens the public health, safety or the environment, the applicant shall implement the removal plan submitted with the Notice of Intent or modify the project as directed by the conservation commission or the Department.

**Order of Conditions**

Address: Smithville Road, 3 Old Meadow Road &amp; 7 Meadow Road

Date: 8/22/18

Page 10B

DEP #293-0937

**SPECIAL CONDITIONS:**

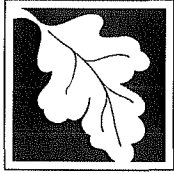
1. Catch basins must be protected with silt sacks as shown on the approved plans.
2. In order to prevent woody vegetation from becoming established in the grass swales, all surfaces in the grass swales (bottoms and side slopes) must be mowed to no higher than 4 inches at least twice per year, by Nov. 1. This Order shall not expire with the Order of Conditions.
3. At least five business days prior to the commencement of construction, the applicant shall request by telephone a pre-construction meeting to be coordinated by the Office of Development & Inspectional Services and to be attended by the applicant or the applicant's representative, the person or supervisor responsible for the work, and the Conservation Commission or its Agent. The phone number to call to schedule this meeting is (508) 885-7500 ext. 180. The applicant shall submit an Anticipated Schedule of Construction at said meeting. The applicant shall provide the name(s) and telephone number(s) of all persons responsible for compliance with this Order. Included at this meeting shall be a review of this Order and all required pre-construction conditions. At the pre-construction meeting, the contractor must sign and date the certification at the bottom of the page in the Order of Conditions, attesting that he has read and understood all the conditions in this Order, both the Special Orders and the General Conditions imposed by state regulations.

I Certify that I have read and understood the conditions above.

Signature \_\_\_\_\_

Date \_\_\_\_\_

***Failure to comply with these orders or the Town of Spencer Wetland By-Law may be deemed reason to modify or revoke this Order of Conditions.***



Massachusetts Department of Environmental Protection  
Bureau of Resource Protection - Wetlands  
**WPA Form 5 – Order of Conditions**  
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

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City/Town

## D. Findings Under Municipal Wetlands Bylaw or Ordinance

1. Is a municipal wetlands bylaw or ordinance applicable? ☒ Yes ☐ No
2. The Spencer hereby finds (check one that applies):  
Conservation Commission
- a. ☐ that the proposed work cannot be conditioned to meet the standards set forth in a municipal ordinance or bylaw, specifically:  
Spencer Wetlands Protection Bylaw 16.1  
1. Municipal Ordinance or Bylaw 2. Citation

Therefore, work on this project may not go forward unless and until a revised Notice of Intent is submitted which provides measures which are adequate to meet these standards, and a final Order of Conditions is issued.

- b. ☐ that the following additional conditions are necessary to comply with a municipal ordinance or bylaw:
1. Municipal Ordinance or Bylaw 2. Citation
3. The Commission orders that all work shall be performed in accordance with the following conditions and with the Notice of Intent referenced above. To the extent that the following conditions modify or differ from the plans, specifications, or other proposals submitted with the Notice of Intent, the conditions shall control.
- The special conditions relating to municipal ordinance or bylaw are as follows (if you need more space for additional conditions, attach a text document):  
See Page 10A

**Order of Conditions**

Address: Smithville Rd/3 Old Meadow Rd/7 Meadow Rd

Date: August 20, 2018

Page 10A

DEP #293-0937

**STANDARD CONDITIONS:**

1. No work shall commence on proposed project until such time as this Order of Conditions has been recorded at the Worcester County Registry of Deeds and a certified copy of the recording is received by the Spencer Conservation Commission. Violation of this condition will result in an Enforcement Order.
2. Prior to any work commencing on the site, the applicant shall display the DEP file number for this Order on a sign with minimum dimensions of two feet by two feet at a location clearly visible from the street. The sign shall remain in place and visible until a Certificate of Compliance is issued for the activity.
3. Erosion controls as specified by the Commission must be installed as indicated on the approved plan. These erosion controls must be inspected and approved by a representative of the Conservation Commission before other work may start. The applicant or contractor must notify the Conservation Commission for an inspection of the protection measures before any other site work commences.
4. Before work begins, the applicant shall furnish a copy of the Order of Conditions to the contractor. The Contractor must read all the conditions in this Order, both on this page and the General Conditions imposed by state regulations found on pages 5 and 6 of the Order, and sign and date the certification at the bottom of the page attesting that he has read and understood them. If the contractor wishes clarification before signing the certification he/she must contact the Conservation Commission or its agent. Both the property owner and the contractor are responsible for compliance with this Order.
5. A copy of this Order of Conditions and the approved plan(s) cited on Page 2 of the Order must be kept on site during all construction and available to the Commission at site visits.
6. The applicant shall contact the Spencer Conservation Commission five (5) business days prior to starting work for inspection of sediment controls and/or boom.
7. A member of the Conservation Commission or its agent may enter and inspect the property and the activity that are the subjects of this Order at all reasonable times, with or without probable cause or prior notice, and until a Certificate of Compliance is issued, for the limited purpose of evaluating compliance with this Order (and Town Bylaw and Bylaw Regulations).
8. This Order authorizes only the activity described on the approved plan(s) and approved documents referenced in this Order. If any change is made in the above-described plan(s), the applicant shall inquire from this Commission or its agent, prior to implementing the change in the field, whether the change is significant enough to require the filing of a new Notice of Intent. Any errors in the plans or information submitted by the applicant shall be considered changes and the above procedures shall be followed.
9. When work is about to begin, the applicant shall furnish a copy of this Order of Conditions to the Contractor and shall notify the Conservation Agent by phone, fax or email.
10. A copy of these orders, the approved plan(s), and must be kept on site during all construction and be available to the Commission or its agent during site visits.
11. The control devices shall be the limit of disturbance.
12. The control devices shall be maintained and remain in place until the Commission authorizes removal.

13. Oil absorbent pads (spill kit) must be kept on site whenever hydraulic equipment is on site. OR An oil absorbent boom must be in place at the water line whenever hydraulic equipment is within 40 feet of the water. In freezing conditions the boom shall be at the landward edge of the ice.
14. No fuel, oil, or other pollutants shall be stored in any resource area or the buffer zone thereto.
15. This Order of Conditions shall apply to any successor in interest or successor in control.
16. Members and agents of the Spencer Conservation Commission shall have the right to enter and inspect the premises to evaluate compliance with these conditions and to require submittal of any data deemed necessary by the Commission for that evaluation.
17. The site engineer or contractor shall have a copy of this Order of Conditions at the site and available for inspection during all phases of construction.
18. All equipment and facilities shall be continually operated and maintained so as to comply with these conditions and the Wetland Protection Act.
19. No equipment is to enter the wetlands at any time during site preparation, construction of roadways, storm water management system, utilities and buildings, or at any other phase of the project, and no materials are to be placed in the wetland during construction.
20. Any change in the plans submitted to the Spencer Conservation Commission shall require the applicant to file a request to amend the Order of Conditions or to inquire of the Commission in writing whether the change is substantial enough to require a new filing.
21. The applicant shall call the Conservation Commission's agent one week prior to the commencement of work for an erosion/sediment control inspection.
22. Upon completion of work, the applicant shall submit "as-built" plans for the project certified by the architect, engineer, or other appropriate official specifying how the completed work differs from that shown in the plans originally reviewed by the Spencer Conservation Commission.

#### **SEDIMENT AND EROSION CONTROLS**

23. Accepted and usual methods for controlling sedimentation and erosion (e.g. silt fences, hay bale dikes, etc.) shall be used during all phases of construction to prevent erosion and sedimentation into wetlands and surface waters. Hay bales are to be staked in place. Erosion control devices shall be installed in accordance with practices set forth by the United States Department of Agriculture (U.S.D.A.) Natural Resources Conservation Service (N.R.C.S.).
24. No clearing of vegetation, excavation, grading or other site preparation activities may commence within 100 feet of wetland resource areas until erosion controls are in place and the Spencer Conservation Commission has inspected the erosion control devices and certified, in writing, that proper installation of the devices occurred. Erosion control devices shall be placed as necessary up-gradient of all wetland resource areas. The Spencer Conservation Commission shall be notified by telephone once erosion control devices are in place, and a member or agent of the Commission will conduct a site inspection within seven (7) days of notification and certify in writing that erosion control devices have been placed in accordance with these conditions.
25. The work shall be designed and constructed so that there will be no erosion and sedimentation into wetlands and surface waters during construction or after completion of the project.

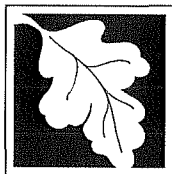
26. Erosion control devices shall be inspected regularly. Any entrapped silt or other materials shall be removed to an area outside of the 100-foot buffer zone. Hay bales and other devices shall be replaced as necessary.
27. Erosion control devices shall remain in place until all disturbed surfaces have been stabilized with final vegetative cover and written certification has been received from the Spencer Conservation Commission.
28. If soils are to be disturbed for longer than two months, a temporary cover of rye or other grass should be established, following U.S.D.A.N.R.C.S. procedures, to prevent erosion and sedimentation. Once final grading is completed, loaming and seeding of final cover should be completed promptly. Vegetative cover, either temporary or permanent, shall be established prior to winter. If the season is not appropriate for plant growth, exposed surfaces shall be stabilized with jute netting, staked mulches, or other U.S.D.A.N.R.C.S. methods. In such cases, additional erosion controls may be necessary to ensure that any eroded materials will not enter wetlands and water bodies.
29. The Spencer Conservation Commission reserves the right to require additional erosion control and storm damage prevention measures in the future if it should become necessary.
30. The project engineer shall report any problems with erosion control during construction immediately to the Spencer Conservation Commission.

I Certify that I have read and understood the conditions above.

Signature \_\_\_\_\_

Date \_\_\_\_\_

*Failure to comply with these orders or the Town of Spencer Wetland By-Law may be deemed reason to modify or revoke this Order of Conditions.*



Massachusetts Department of Environmental Protection  
Bureau of Resource Protection - Wetlands  
**WPA Form 5 – Order of Conditions**  
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:  
293-0937  
MassDEP File #

eDEP Transaction #  
Spencer  
City/Town

## E. Signatures

This Order is valid for three years, unless otherwise specified as a special condition pursuant to General Conditions #4, from the date of issuance.

Please indicate the number of members who will sign this form.

This Order must be signed by a majority of the Conservation Commission.

The Order must be mailed by certified mail (return receipt requested) or hand delivered to the applicant. A copy also must be mailed or hand delivered at the same time to the appropriate Department of Environmental Protection Regional Office, if not filing electronically, and the property owner, if different from applicant.

8-23-18

1. Date of Issuance

4

2. Number of Signers

Signatures:

*Charles Bellemere*  
*Mary McLaughlin*  
*Chris R.*

*Margaret Emen*

☐ by hand delivery on

☒ by certified mail, return receipt requested, on

8-23-18

Date

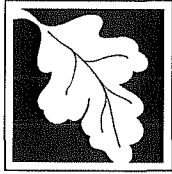
Date

## F. Appeals

The applicant, the owner, any person aggrieved by this Order, any owner of land abutting the land subject to this Order, or any ten residents of the city or town in which such land is located, are hereby notified of their right to request the appropriate MassDEP Regional Office to issue a Superseding Order of Conditions. The request must be made by certified mail or hand delivery to the Department, with the appropriate filing fee and a completed Request for Departmental Action Fee Transmittal Form, as provided in 310 CMR 10.03(7) within ten business days from the date of issuance of this Order. A copy of the request shall at the same time be sent by certified mail or hand delivery to the Conservation Commission and to the applicant, if he/she is not the appellant.

Any appellants seeking to appeal the Department's Superseding Order associated with this appeal will be required to demonstrate prior participation in the review of this project. Previous participation in the permit proceeding means the submission of written information to the Conservation Commission prior to the close of the public hearing, requesting a Superseding Order, or providing written information to the Department prior to issuance of a Superseding Order.

The request shall state clearly and concisely the objections to the Order which is being appealed and how the Order does not contribute to the protection of the interests identified in the Massachusetts Wetlands Protection Act (M.G.L. c. 131, § 40), and is inconsistent with the wetlands regulations (310 CMR 10.00). To the extent that the Order is based on a municipal ordinance or bylaw, and not on the Massachusetts Wetlands Protection Act or regulations, the Department has no appellate jurisdiction.



Massachusetts Department of Environmental Protection  
Bureau of Resource Protection - Wetlands  
**WPA Form 5 – Order of Conditions**  
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:  
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MassDEP File #

eDEP Transaction #  
Spencer  
City/Town

## G. Recording Information

Prior to commencement of work, this Order of Conditions must be recorded in the Registry of Deeds or the Land Court for the district in which the land is located, within the chain of title of the affected property. In the case of recorded land, the Final Order shall also be noted in the Registry's Grantor Index under the name of the owner of the land subject to the Order. In the case of registered land, this Order shall also be noted on the Land Court Certificate of Title of the owner of the land subject to the Order of Conditions. The recording information on this page shall be submitted to the Conservation Commission listed below.

Conservation Commission

Detach on dotted line, have stamped by the Registry of Deeds and submit to the Conservation Commission.

To:

Conservation Commission

Please be advised that the Order of Conditions for the Project at:

Project Location

MassDEP File Number

Has been recorded at the Registry of Deeds of:

County

Book

Page

for:

Property Owner

and has been noted in the chain of title of the affected property in:

Book

Page

In accordance with the Order of Conditions issued on:

Date

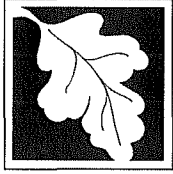
If recorded land, the instrument number identifying this transaction is:

Instrument Number

If registered land, the document number identifying this transaction is:

Document Number

Signature of Applicant



Massachusetts Department of Environmental Protection  
Bureau of Resource Protection - Wetlands

DEP File Number: \_\_\_\_\_

**Request for Departmental Action Fee  
Transmittal Form**

Provided by DEP

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

**A. Request Information**

1. Location of Project

a. Street Address \_\_\_\_\_

b. City/Town, Zip \_\_\_\_\_

c. Check number \_\_\_\_\_

d. Fee amount \_\_\_\_\_

2. Person or party making request (if appropriate, name the citizen group's representative):

Name \_\_\_\_\_

Mailing Address \_\_\_\_\_

City/Town \_\_\_\_\_

State \_\_\_\_\_

Zip Code \_\_\_\_\_

Phone Number \_\_\_\_\_

Fax Number (if applicable) \_\_\_\_\_

3. Applicant (as shown on Determination of Applicability (Form 2), Order of Resource Area Delineation (Form 4B), Order of Conditions (Form 5), Restoration Order of Conditions (Form 5A), or Notice of Non-Significance (Form 6)):

Name \_\_\_\_\_

Mailing Address \_\_\_\_\_

City/Town \_\_\_\_\_

State \_\_\_\_\_

Zip Code \_\_\_\_\_

Phone Number \_\_\_\_\_

Fax Number (if applicable) \_\_\_\_\_

4. DEP File Number: \_\_\_\_\_

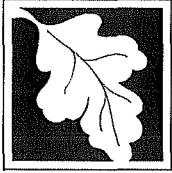
**Important:**  
When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



**B. Instructions**

1. When the Departmental action request is for (check one):

- ☐ Superseding Order of Conditions – Fee: \$120.00 (single family house projects) or \$245 (all other projects)
- ☐ Superseding Determination of Applicability – Fee: \$120
- ☐ Superseding Order of Resource Area Delineation – Fee: \$120



Massachusetts Department of Environmental Protection  
Bureau of Resource Protection - Wetlands  
**Request for Departmental Action Fee  
Transmittal Form**

DEP File Number:

Provided by DEP

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

**B. Instructions (cont.)**

Send this form and check or money order, payable to the *Commonwealth of Massachusetts*, to:

Department of Environmental Protection  
Box 4062  
Boston, MA 02211

2. On a separate sheet attached to this form, state clearly and concisely the objections to the Determination or Order which is being appealed. To the extent that the Determination or Order is based on a municipal bylaw, and not on the Massachusetts Wetlands Protection Act or regulations, the Department has no appellate jurisdiction.
3. Send a **copy** of this form and a **copy** of the check or money order with the Request for a Superseding Determination or Order by certified mail or hand delivery to the appropriate DEP Regional Office (see <http://www.mass.gov/eea/agencies/massdep/about/contacts/>).
4. A copy of the request shall at the same time be sent by certified mail or hand delivery to the Conservation Commission and to the applicant, if he/she is not the appellant.

**From:** Margaret Washburn  
**To:** [Billy Krukowski](#)  
**Cc:** [Eben Butler](#); [Bartlett, Mark](#)  
**Subject:** Order of Conditions  
**Date:** Tuesday, October 02, 2018 12:15:35 PM  
**Attachments:** [10A.pdf](#)  
[Page 10B Smithville Rd. - 3 Old Meadow Rd. - 7 Meadow Rd. Page.pdf](#)  
[Smithville Road-3 Old Meadow Road-7 Meadow Road - Copy \(2\).pdf](#)

---

Hi Billy,

Eben has the signed original of this document. He is supposed to give it to you.

It needs to be recorded at the Registry of Deeds in Worcester **before any of the work can begin.** They need to attach it to the deeds for all 3 parcels where work will be done. We need you to give us proof of recording for each lot by submitting a copy of the cover sheet with the bar code they put on when they record it.

The other things that must be done before any work can begin: Post the DEP number (293-0937) on signs visible from the road at all 3 sites. The signs should be 1 foot x 2 feet, durable metal or wood. Install sediment controls as shown on the approved plans and call this office at 508-885-7500 ext. 180 for an inspection of the sediment controls. Only after all of these things have been done, can work begin.

Margaret Washburn, M.S., R.P.S.S.  
Wetland Soil Specialist  
Office of Development and Inspectional Services  
Memorial Town Hall  
Spencer, MA 01562  
Phone (508) 885-7500 extension 123  
Fax (508) 885-7519  
Hours: Mondays: 9:00 a.m. – 3:30 p.m.  
Tuesdays: 9:00 a.m. – 3:30 p.m.  
First and third Wednesdays: 9:00 a.m. to 3:30 p.m.  
Second and fourth Wednesdays 2:30 p.m. to 9:00 p.m.

***Please be advised that all email messages and any attachments sent to and from this email account are subject to the Public Records Law, M.G.L. c. 66, Section 10, unless qualified as an exemption.***

**From:** Paulson, David (FWE)  
**To:** [Bartlett, Mark](#)  
**Cc:** [Cheeseman, Melany \(FWE\)](#); [Margaret Washburn \(mwashburn@spencerma.gov\)](#); [Stanley, Wade](#); [Schmitz, Judith \(DEP\)](#)  
**Subject:** RE: Stormwater improvements, Meadow Rd. NHESP 18-37966.  
**Date:** Wednesday, August 22, 2018 1:37:44 PM

---

Mark,

Thank you for the update. The Division approves the protocols and details of the protection plan.

All the best,

Dave

---

**From:** Bartlett, Mark [mailto:Mark.Bartlett@stantec.com]  
**Sent:** Wednesday, August 22, 2018 11:40 AM  
**To:** Paulson, David (FWE)  
**Cc:** Cheeseman, Melany (FWE); Margaret Washburn (mwashburn@spencerma.gov); Stanley, Wade; Schmitz, Judith (DEP)  
**Subject:** RE: Stormwater improvements, Meadow Rd. NHESP 18-37966.

Good Morning David –

Thank you for your prompt feedback on the plan submitted to you yesterday.

Attached is a revised version of the turtle protection plan, with today's date.

Please note the 3<sup>rd</sup> paragraph on the 2<sup>nd</sup> page, which now incorporates the items that you've requested.

Please contact us if you have any other questions.

Best regards,

Mark

**Mark Bartlett** P.E.  
Senior Associate

Direct: 508 591-4331  
Mobile: 508 941-2190  
Fax: 617 786-7962  
[Mark.Bartlett@stantec.com](mailto:Mark.Bartlett@stantec.com)

Stantec  
400 Crown Colony Drive Suite 200  
Quincy MA 02169-0982 US

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**From:** Paulson, David (FWE) <david.paulson@state.ma.us>  
**Sent:** Wednesday, August 22, 2018 10:00 AM  
**To:** Bartlett, Mark <Mark.Bartlett@stantec.com>  
**Cc:** Cheeseman, Melany (FWE) <melany.cheeseman@state.ma.us>; Margaret Washburn (mwashburn@spencerma.gov) <mwashburn@spencerma.gov>; Stanley, Wade

<Wade.Stanley@stantec.com>

**Subject:** RE: Stormwater improvements, Meadow Rd. NHESP 18-37966.

Mark,

Overall the plan looks good. Please also include contractor/construction education into plan. As noted, a collection permit is required and the Division must approve the biologist.

All the best,

Dave

---

**From:** Bartlett, Mark [<mailto:Mark.Bartlett@stantec.com>]

**Sent:** Tuesday, August 21, 2018 3:46 PM

**To:** Paulson, David (FWE)

**Cc:** Cheeseman, Melany (FWE); Margaret Washburn ([mwashburn@spencerma.gov](mailto:mwashburn@spencerma.gov)); Stanley, Wade

**Subject:** FW: Stormwater improvements, Meadow Rd. NHESP 18-37966.

Hello David –

Per Melany's suggestion, as you reviewed the Spencer stormwater project:

Please see the attached Letter\_Wood Turtle Protection plan. She indicated that you will also have access to the project plans, to which this letter/plan refers.

As the Town of Spencer is hoping to close out their NOI hearing tomorrow night, any assistance you can provide in processing and communicating on this to Margaret Washburn (email cc above) would be very much appreciated.

Thank you, and please call me if you have any questions.

Mark

**Mark Bartlett** P.E.

Senior Associate

Direct: 508 591-4331

Mobile: 508 941-2190

Fax: 617 786-7962

[Mark.Bartlett@stantec.com](mailto:Mark.Bartlett@stantec.com)

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400 Crown Colony Drive Suite 200

Quincy MA 02169-0982 US

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**From:** Bartlett, Mark

**Sent:** Tuesday, August 21, 2018 3:34 PM

**To:** Cheeseman, Melany (FWE) <[melany.cheeseman@state.ma.us](mailto:melany.cheeseman@state.ma.us)>

**Cc:** Stanley, Wade <[Wade.Stanley@stantec.com](mailto:Wade.Stanley@stantec.com)>; CERO\_NOI (DEP) <[ceronoi@state.ma.us](mailto:ceronoi@state.ma.us)>; 'Margaret Washburn' <[mwashburn@spencerma.gov](mailto:mwashburn@spencerma.gov)>; Eben Butler <[ebutler@spencerma.gov](mailto:ebutler@spencerma.gov)>

**Subject:** RE: Stormwater improvements, Meadow Rd. NHESP 18-37966.

Hello Melany –

Please see the attached Letter Wood Turtle Protection Plan that is sent in response to the August 9<sup>th</sup> request from Fisheries & Wildlife.

I will call you to discuss.

Thank you

Mark

**Mark Bartlett** P.E.  
Senior Associate

Direct: 508 591-4331

Mobile: 508 941-2190

Fax: 617 786-7962

[Mark.Bartlett@stantec.com](mailto:Mark.Bartlett@stantec.com)

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**From:** Margaret Washburn <[mwashburn@spencerma.gov](mailto:mwashburn@spencerma.gov)>

**Sent:** Tuesday, August 21, 2018 11:09 AM

**To:** Cheeseman, Melany (FWE) <[melany.cheeseman@state.ma.us](mailto:melany.cheeseman@state.ma.us)>; Eben Butler  
<[ebutler@spencerma.gov](mailto:ebutler@spencerma.gov)>

**Cc:** Stanley, Wade <[Wade.Stanley@stantec.com](mailto:Wade.Stanley@stantec.com)>; CERO\_NOI (DEP) <[cero\\_noi@state.ma.us](mailto:cero_noi@state.ma.us)>;  
Bartlett, Mark <[Mark.Bartlett@stantec.com](mailto:Mark.Bartlett@stantec.com)>

**Subject:** RE: Stormwater improvements, Meadow Rd. NHESP 18-37966.

Dear Melany,

This public hearing opens tomorrow.

Will we have additional comments from NHESP reviewing any supplemental information the applicant may have provided to you in time for the 8/22 hearing, please?

**From:** Cheeseman, Melany (FWE) [[mailto:melany.cheeseman@state.ma.us](mailto:mailto:melany.cheeseman@state.ma.us)]

**Sent:** Thursday, August 09, 2018 12:14 PM

**To:** Eben Butler <[ebutler@spencerma.gov](mailto:ebutler@spencerma.gov)>; Margaret Washburn <[mwashburn@spencerma.gov](mailto:mwashburn@spencerma.gov)>

**Cc:** [wade.stanley@stantec.com](mailto:wade.stanley@stantec.com); CERO\_NOI (DEP) <[cero\\_noi@state.ma.us](mailto:cero_noi@state.ma.us)>

**Subject:** Stormwater improvements, Meadow Rd. NHESP 18-37966.

Good afternoon,

Please find attached the Division's comments on the submitted NOI/MESA filing. Let me know if you have any questions.

Thank you,

**Melany Cheeseman**

Endangered Species Review Assistant

Natural Heritage & Endangered Species Program

Massachusetts Division of Fisheries & Wildlife

1 Rabbit Hill Road, Westborough, MA 01581

ph: 508.389.6357 | fax: 508.389.7890

[melany.cheeseman@state.ma.us](mailto:melany.cheeseman@state.ma.us) | [www.mass.gov/nhesp](http://www.mass.gov/nhesp)



Stantec Consulting Services Inc.  
400 Crown Colony Drive Suite 200, Quincy MA 02169-0982

August 22, 2018  
File: 195150496

**Attention: Melany Cheeseman, Endangered Species Review Assistant**

Massachusetts Division of Fisheries and Wildlife  
1 Rabbit Hill Road  
Westborough, MA 01581

by email to: [melany.cheeseman@state.ma.us](mailto:melany.cheeseman@state.ma.us)

Dear Ms. Cheeseman,

**Reference: Stormwater BMP improvements Project at Smithville Road, 3 Old Meadow Road, and  
7 Meadow Road, Spencer, MA - NHESP Tracking No.: 18-37966**

**Introduction**

Presented below is a proposed Wood Turtle Protection Plan for the above noted project. Attached are the Project Plans<sup>1</sup> that serve to supplement this protection plan.

The proposed project consists of constructing stormwater improvement best management practices (BMPs), including rain gardens, preceded in some cases by deep sump catch basins and or sediment forebays and grass swales. Three specific areas of construction will be involved as listed above, and as illustrated in the attached Project Plans. All three BMP locations are located in the Town of Spencer, east of the Sevenmile River and its bordering wetland and flood plain. The project was approved by the Natural Heritage and Endangered Species Program in a conditional letter issued August 9, 2018. This Turtle Protection Plan has been prepared to ensure that protections are in place to protect the Wood Turtle as required by the conditional letter. The goal is to conduct this work in late summer this year, or shortly thereafter into the fall, and ending before cold weather sets in. As such, this turtle protection plan assumes that most of the project work will be conducted during the active season for Wood Turtles. The work is expected to take one week, more or less, at each location. The equipment consisting of an excavator or rubber tire backhoe and dump truck will enter the work area at the start of work, and excess material will be loaded into the truck for off-site disposal and equipment will leave once the work is completed. Excavated soils that may be re-used during construction of the rain garden or swale at each location will be temporarily stockpiled in areas away from the wetland, as noted on the plans.

The following detailed turtle protection plan will be adhered to, to protect the state-listed species and any other species encountered.

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<sup>1</sup> "Spencer 319 Grant Stormwater BMP Project" (7 sheets), project number 195150496, dated August 1, 2018

August 22, 2018

Melany Cheeseman, Endangered Species Review Assistant

Page 2 of 4

**Reference:** Stormwater BMP improvements Project at Smithville Road, 3 Old Meadow Road, and 7 Meadow Road, Spencer, MA - NHESP  
Tracking No.: 18-37966

## **Wood Turtle (*Glyptemys insculpta*) Protection Plan**

### **Overall Approach**

Work will proceed and be completed one site at a time, starting with Site 1 (plan sheet 3 of 7), then proceeding to Sites 2 and 3 (plan sheets 4 of 7 and 5 of 7) respectively. Install silt fence with straw wattle barriers (see detail on sheet 6 of 7) at specific portions of each site (and maintain throughout) and conduct sweeps within the project site as detailed below. The barriers will be installed in the project areas to the limits shown on sheets 3, 4 and 5 of 7. Additional specific measures are discussed below:

Prior to the commencement of any construction activity during the active season (April 15 to October 15), temporary turtle barriers must be installed along the limit of Work as depicted on the attached Plans and pre-construction turtle surveys must be conducted between April 15 – October 15 (of any year), in accordance with the following turtle protection plan unless otherwise approved in writing by the NHESP.

In addition, prior to commencement of the site work, the following three actions shall be taken:

- (1) A "collection permit" shall be obtained from the MA Division of Fisheries & Wildlife;
- (2) A project biologist shall be pre-approved by the MA Division of Fisheries & Wildlife; and
- (3) The Town of Spencer will schedule a pre-construction "contractor / construction education meeting". Attending this meeting will be the Town's project supervisor, the Town's Conservation Agent, the Town's on-call contractor, an engineer from Stantec, and the biologist (from LEC Environmental, subconsultant to Stantec).

### **Temporary Turtle Barriers/Erosion Control**

1. Installation of the barrier must be conducted using methods that result in a minimum of disturbance (i.e., hand-dug, "2-man" trencher or auger). It is not appropriate to clear large access paths prior to sweeps for turtles. No clearing may occur outside the limit of work approved by the NHESP.
2. The barrier must be composed of at least 2½ feet of vertical barrier above ground and an additional 4-6 inches buried below ground.
3. The face of the material must be relatively smooth. Materials commonly used are staked at 6 to 10-foot intervals and include tightly woven geotextile, aluminum flashing, or other such materials stapled or tacked to stakes. Loosely woven geotextile fabrics, hay/straw bales, wattles or tubular materials are not generally sufficient.

August 22, 2018

Melany Cheeseman, Endangered Species Review Assistant

Page 3 of 4

**Reference:** Stormwater BMP improvements Project at Smithville Road, 3 Old Meadow Road, and 7 Meadow Road, Spencer, MA - NHESP Tracking No.: 18-37966

4. The bottom of the silt fencing must be carefully buried in a 4 to 6-inch deep trench. The trench must be backfilled and compacted. If it is not possible to dig a trench, then the bottom of the barrier must be affixed to the surface.
5. The barrier shall not have gaps (not necessary or required for vehicle passage at any site)
6. Although straw wattles are to be used with silt fencing, they shall be installed on the work-side (upstream side) of the silt fence to avoid turtles using the wattles to climb on to breach the barrier.
7. Once installed, the barrier shall be taut between the stakes.

#### **Pre-Construction Turtle Survey**

1. The NHESP must pre-approve the candidate wildlife biologist before work begins. The ability to locate and identify state-listed turtles requires significant experience with the Wood Turtle. The resume/curriculum vitae of the candidate biologist, demonstrating extensive experience locating the Wood Turtle, shall be sent to the NHESP for written pre-approval. At this time, the Town anticipates that a representative from the firm of LEC Environmental will be identified for this purpose.
2. The NHESP-approved biologist must obtain a Scientific Collection Permit prior to conducting turtle searches. Any state-listed vertebrate species - including but not limited to the Wood Turtle - encountered during these searches shall be released in suitable habitat near, but outside of, the limit of Work. All state-listed species encountered shall be reported to the NHESP through a Rare Animal Observation Report within 10 days of the observation.
3. Prior to any searches, the NHESP-approved wildlife biologist(s) shall inspect the barriers and facilitate any repairs/alterations necessary to ensure the integrity of the barrier.
4. Searches must occur within the proposed Limit of Work, and a sweep of the work area shall be conducted immediately prior to equipment accessing the work site. Searches must equal a total of at least 4 to 6 hours per acre of search effort.
5. Within 10 days of the completion of searches by the qualified biologist, the biologist shall submit a report to the NHESP indicating the date(s) of the pre-Work search, the number of hours searched (per date), weather conditions, and condition of all turtle barriers. Rare Animal Observation Report will also be submitted to NHESP if necessary.

August 22, 2018

Melany Cheeseman, Endangered Species Review Assistant

Page 4 of 4

**Reference:** Stormwater BMP improvements Project at Smithville Road, 3 Old Meadow Road, and 7 Meadow Road, Spencer, MA - NHESP  
Tracking No.: 18-37966

### **Turtle Sweeps & Reporting to NHESP**

Searches of the work area must occur immediately before any heavy machinery enters the work zone or any soil or vegetation alteration commences. Searches must be conducted by an NHESP-approved biologist.

1. The biologist shall inspect the barrier and facilitate any repairs/alternations necessary to ensure the integrity of the barrier.
2. Searches must include looking along both sides of the barrier, and along any access paths within the work area as may be traveled by heavy machinery.
3. Any state-listed vertebrate species encountered during these searches shall be released by the biologist in appropriate habitat on site, but outside of, the construction areas.

**Reporting Requirements** - Within 10 days of the completion of searches by the biologist, a report must be submitted to the NHESP indicating: the dates of each pre-work search clearly stating the name of the individual(s) conducting work at each search period; the number of hours searched per date; presence or absence of turtles; information on any turtles found, whether state-listed or not; and the condition of the barrier and any repairs.

Regards,

**Stantec Consulting Services Inc.**



**Mark S. Bartlett** P.E.  
Senior Associate

Phone: (508) 591-4331

Fax: (617) 786-7962

Mark.Bartlett@stantec.com

Attachment: Project Plans

- c. Eben Butler, Town of Spencer Office of Utilities & Facilities (ebutler@spencerma.gov)  
Margaret Washburn, Spencer Conservation Agent (mwashburn@spencerma.gov)  
David Paulson, MA Division of Fisheries & Wildlife (david.paulson@state.ma.us)  
Judith Schmitz, MassDEP/CERO (Judith.Schmitz@state.ma.us)  
Brian Madden, LEC Environmental (bmadden@lecenvironmental.com)



## **Attachment 7**

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EPA BMP Pollutant Load Reduction Worksheets



# Powder Mill Park (Smithville Road) Sediment Forebay

5/13/2019

## URBAN RUNOFF BMP POLLUTANT LOAD REDUCTION WORKSHEET (BASED ON LAND USE RUNOFF LOADING RATE)

Please fill in the gray areas below.

Notes:  
The methodology and efficiency values used in this worksheet were developed by the Illinois Environmental Protection Agency.

Please Select a Best Management Practice:

- |  |  |  |
|--|--|--|
| <input type="checkbox"/> Vegetated Filter Strips<br><input type="checkbox"/> Grass Swales<br><input type="checkbox"/> Infiltration Device<br><input type="checkbox"/> Extended Wet Detention<br><input type="checkbox"/> Wetland Detention<br><input type="checkbox"/> Dry Detention<br><input checked="" type="checkbox"/> Settling Basin | <input type="checkbox"/> Sand Filters<br><input type="checkbox"/> WQ Inlets<br><input type="checkbox"/> Weekly Street Sweeping<br><input type="checkbox"/> Infiltration Basin<br><input type="checkbox"/> Infiltration Trench<br><input type="checkbox"/> Porous Pavement<br><input type="checkbox"/> Concrete Grid Pavement | <input type="checkbox"/> Sand Filter/Infiltration Basin<br><input type="checkbox"/> WQ Inlet w/ Sand Filter<br><input type="checkbox"/> Oil/Grit Separator<br><input type="checkbox"/> Wet Pond<br><input type="checkbox"/> Green Roof |
|--|--|--|

Green Roof:  
The green roof is such a way that it generated would quality of runoff from the land use of the roof is on, i.e. commercial, institutional, residential, etc. the entire loading eliminated.

Please enter landuse of contributing/drainage area in acres:

	Sewered	Unsewered
Commercial		
Industrial		
Institutional		
Transportation	1.27	
Multi-Family		
Residential		
Agriculture		
Vacant		
Open Space		

Note: Sewered and Unsewered refer to storm sewers.

Please enter landuse specific pollutant loading rate (lbs/ac/yr)

☒ Default ☐ User Defined

### DEFAULT AVERAGE POLLUTANT LOADS BY LAND USE (Lbs/Ac./Yr.) 1

	Commercial	Industrial	Institutional	Transportation	Multi-Family	Residential	Agriculture	Vacant	Open Space
BOD (Sewered)	85	50	52	50	52	22		2	1
BOD (Unsewered)	75	40	31	30	42	11	3	0.9	0.4
COD (Sewered)	589	260	320	881	320	140		64	46
COD (Unsewered)	520	230	190	518	260	71	28	26	15
TSS (Sewered)	1180	1240	1320	2260	1320	309		100	61
TSS (Unsewered)	1040	1080	790	1330	1050	154	153	40	20
LEAD (Sewered)	1.03	1.58	0.37	2.67	0.37	0.23		0.03	0.02
LEAD (Unsewered)	0.90	1.39	0.22	1.57	0.29	0.12	0.00	0.01	0.01
COPPER (Sewered)	0.2	0.21	0.1	0.56	0.1	0.048		0.01	0.01
COPPER (Unsewered)	0.18	0.18	0.061	0.33	0.081	0.024	0.0044	0.004	0.002
ZINC (Sewered)	1.6	1.3	0.57	3.2	0.57	0.9		0.1	0.08
ZINC (Unsewered)	1.4	1.2	0.34	1.9	0.46	0.45	0.069	0.06	0.03
TDS (Sewered)	2830	1290	623	6060	623	436		1210	724
TDS (Unsewered)	2500	1130	374	3565	498	218	89.2	483	241
TN (Sewered)	21	14	11	13	11	6		1	1
TN (Unsewered)	18	12	6.5	7.7	8.6	3.1	2.4	0.5	0.2
TKN (Sewered)	6.9	4	6.4	18	6.4	3.2		2.2	1.3
TKN (Unsewered)	6.1	4	3.8	11	5.1	1.6	0.91	0.88	0.44
DP (Sewered)	0.69	0.86	0.61	0.2	0.61	0.26		0.1	0.08
DP (Unsewered)	0.61	0.75	0.36	0.1	0.48	0.13	0.08	0.05	0.03
TP (Sewered)	1.3	1.5	1.4	1.8	1.4	0.81		0.22	0.39
TP (Unsewered)	1.2	1.3	0.8	1.1	1.1	0.4	0.18	0.088	0.13
CADMIUM (sewered)	0.008	0.025	0.0037	0.021	0.0037	0.002		0.0003	0.0002
CADMIUM (Unsewered)	0.0071	0.022	0.0022	0.012	0.003	0.001	0.0002	0.0001	0.0001

1. Unit Area Pollutant Load Estimates for Lake County, Illinois Lake Michigan Watersheds." NIPC. August 1993.

### Estimated Load and Load Reductions

	Load before BMP (lbs/yr)	Load after BMP (lbs/yr)	Load Reduction (lbs/yr)
BOD	64	28	36
COD	1,119	U	U
TSS	2,870	531	2,339
LEAD	3	U	U
COPPER	1	U	U
ZINC	4	U	U
TDS	7,696	U	U
TN	17	U	U
TKN	23	U	U
DP	0	U	U
TP	2	1	1
CADMIUM	0	U	U

U = Removal Efficiency for the particular BMP and constituent unavailable.

# Powder Mill Park (Smithville Road) Raingarden

8/14/2019

## URBAN RUNOFF BMP POLLUTANT LOAD REDUCTION WORKSHEET (BASED ON LAND USE RUNOFF LOADING RATE)

Please fill in the gray areas below.

Notes:  
The methodology and efficiency values used in this worksheet were developed by the Illinois Environmental Protection Agency.

Please Select a Best Management Practice:

- |   |  |  |
|---|--|--|
| <input type="checkbox"/> Vegetated Filter Strips<br><input type="checkbox"/> Grass Swales<br><input type="checkbox"/> Infiltration Device<br><input type="checkbox"/> Extended Wet Detention<br><input type="checkbox"/> Wetland Detention<br><input type="checkbox"/> Dry Detention<br><input type="checkbox"/> Settling Basin | <input type="checkbox"/> Sand Filters<br><input type="checkbox"/> WQ Inlets<br><input type="checkbox"/> Weekly Street Sweeping<br><input type="checkbox"/> Infiltration Basin<br><input type="checkbox"/> Infiltration Trench<br><input type="checkbox"/> Porous Pavement<br><input type="checkbox"/> Concrete Grid Pavement | <input type="checkbox"/> Sand Filter/Infiltration Basin<br><input type="checkbox"/> WQ Inlet w/ Sand Filter<br><input type="checkbox"/> Oil/Grit Separator<br><input type="checkbox"/> Wet Pond<br><input type="checkbox"/> Green Roof |
|---|--|--|

Green Roof:  
The green roof is such a way that it generated would quality of runoff from the land use of the roof is on, i.e. commercial, institutional, residential, etc. the entire loading eliminated.

Please enter landuse of contributing/drainage area in acres:

	Sewered	Unsewered
Commercial		
Industrial		
Institutional		
Transportation	1.27	
Multi-Family		
Residential		
Agriculture		
Vacant		
Open Space		

Note: Sewered and Unsewered refer to storm sewers.

Please enter landuse specific pollutant loading rate (lbs/ac/yr)

☒ Default ☐ User Defined

### DEFAULT AVERAGE POLLUTANT LOADS BY LAND USE (Lbs/Ac./Yr.) 1

	Commercial	Industrial	Institutional	Transportation	Multi-Family	Residential	Agriculture	Vacant	Open Space
BOD (Sewered)	85	50	52	50	52	22		2	1
BOD (Unsewered)	75	40	31	30	42	11	3	0.9	0.4
COD (Sewered)	589	260	320	881	320	140		64	46
COD (Unsewered)	520	230	190	518	260	71	28	26	15
TSS (Sewered)	1180	1240	1320	2260	1320	309		100	61
TSS (Unsewered)	1040	1080	790	1330	1050	154	153	40	20
LEAD (Sewered)	1.03	1.58	0.37	2.67	0.37	0.23		0.03	0.02
LEAD (Unsewered)	0.90	1.39	0.22	1.57	0.29	0.12	0.00	0.01	0.01
COPPER (Sewered)	0.2	0.21	0.1	0.56	0.1	0.048		0.01	0.01
COPPER (Unsewered)	0.18	0.18	0.061	0.33	0.081	0.024	0.0044	0.004	0.002
ZINC (Sewered)	1.6	1.3	0.57	3.2	0.57	0.9		0.1	0.08
ZINC (Unsewered)	1.4	1.2	0.34	1.9	0.46	0.45	0.069	0.06	0.03
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TN (Unsewered)	18	12	6.5	7.7	8.6	3.1	2.4	0.5	0.2
TKN (Sewered)	6.9	4	6.4	18	6.4	3.2		2.2	1.3
TKN (Unsewered)	6.1	4	3.8	11	5.1	1.6	0.91	0.88	0.44
DP (Sewered)	0.69	0.86	0.61	0.2	0.61	0.26		0.1	0.08
DP (Unsewered)	0.61	0.75	0.36	0.1	0.48	0.13	0.08	0.05	0.03
TP (Sewered)	1.3	1.5	1.4	1.8	1.4	0.81		0.22	0.39
TP (Unsewered)	1.2	1.3	0.8	1.1	1.1	0.4	0.18	0.088	0.13
CADMIUM (sewered)	0.008	0.025	0.0037	0.021	0.0037	0.002		0.0003	0.0002
CADMIUM (Unsewered)	0.0071	0.022	0.0022	0.012	0.003	0.001	0.0002	0.0001	0.0001

1. Unit Area Pollutant Load Estimates for Lake County, Illinois Lake Michigan Watersheds." NIPC. August 1993.

### Estimated Load and Load Reductions

	Load before BMP (lbs/yr)	Load after BMP (lbs/yr)	Load Reduction (lbs/yr)
BOD	28	U	U
COD	1,119	392	727
TSS	531	133	398
LEAD	3	1	2
COPPER	1	U	U
ZINC	4	1	3
TDS	7,696	U	U
TN	17	7	10
TKN	23	U	U
DP	0	U	U
TP	1	0	1
CADMIUM	0	U	U

U = Removal Efficiency for the particular BMP and constituent unavailable.

# Water Department (3 Old Meadow Road) Sediment Forebay

8/1/2019

## URBAN RUNOFF BMP POLLUTANT LOAD REDUCTION WORKSHEET (BASED ON LAND USE RUNOFF LOADING RATE)

Please fill in the **gray** areas below.

Notes:  
The methodology and efficiency values used in this worksheet were developed by the Illinois Environmental Protection Agency.

Please Select a Best Management Practice:

- |   |   |   |
|---|---|---|
| <input type="radio"/> Vegetated Filter Strips<br><input type="radio"/> Grass Swales<br><input type="radio"/> Infiltration Device<br><input type="radio"/> Extended Wet Detention<br><input type="radio"/> Wetland Detention<br><input type="radio"/> Dry Detention<br><input checked="" type="radio"/> Settling Basin | <input type="radio"/> Sand Filters<br><input type="radio"/> WQ Inlets<br><input type="radio"/> Weekly Street Sweeping<br><input type="radio"/> Infiltration Basin<br><input type="radio"/> Infiltration Trench<br><input type="radio"/> Porous Pavement<br><input type="radio"/> Concrete Grid Pavement | <input type="radio"/> Sand Filter/Infiltration Basin<br><input type="radio"/> WQ Inlet w/ Sand Filter<br><input type="radio"/> Oil/Grit Separator<br><input type="radio"/> Wet Pond<br><input type="radio"/> Green Roof |
|---|---|---|

**Green Roof:**  
The green roof is such a way that it generated would quality of runoff from the land use of the roof is on, i.e. commercial, institutional, residential, etc. the entire loading eliminated.

Please enter landuse of contributing/drainage area in acres:

	Sewered	Unsewered
Commercial		
Industrial		
Institutional		
Transportation	1.1	
Multi-Family		
Residential		
Agriculture		
Vacant		
Open Space		

Note: Sewered and Unsewered refer to storm sewers.

Please enter landuse specific pollutant loading rate (lbs/ac/yr)

☒ Default ☐ User Defined

### DEFAULT AVERAGE POLLUTANT LOADS BY LAND USE (Lbs/Ac./Yr.) 1

	Commercial	Industrial	Institutional	Transportation	Multi-Family	Residential	Agriculture	Vacant	Open Space
BOD (Sewered)	85	50	52	50	52	22		2	1
BOD (Unsewered)	75	40	31	30	42	11	3	0.9	0.4
COD (Sewered)	589	260	320	881	320	140		64	46
COD (Unsewered)	520	230	190	518	260	71	28	26	15
TSS (Sewered)	1180	1240	1320	2260	1320	309		100	61
TSS (Unsewered)	1040	1080	790	1330	1050	154	153	40	20
LEAD (Sewered)	1.03	1.58	0.37	2.67	0.37	0.23		0.03	0.02
LEAD (Unsewered)	0.90	1.39	0.22	1.57	0.29	0.12	0.00	0.01	0.01
COPPER (Sewered)	0.2	0.21	0.1	0.56	0.1	0.048		0.01	0.01
COPPER (Unsewered)	0.18	0.18	0.061	0.33	0.081	0.024	0.0044	0.004	0.002
ZINC (Sewered)	1.6	1.3	0.57	3.2	0.57	0.9		0.1	0.08
ZINC (Unsewered)	1.4	1.2	0.34	1.9	0.46	0.45	0.069	0.06	0.03
TDS (Sewered)	2830	1290	623	6060	623	436		1210	724
TDS (Unsewered)	2500	1130	374	3565	498	218	89.2	483	241
TN (Sewered)	21	14	11	13	11	6		1	1
TN (Unsewered)	18	12	6.5	7.7	8.6	3.1	2.4	0.5	0.2
TKN (Sewered)	6.9	4	6.4	18	6.4	3.2		2.2	1.3
TKN (Unsewered)	6.1	4	3.8	11	5.1	1.6	0.91	0.88	0.44
DP (Sewered)	0.69	0.86	0.61	0.2	0.61	0.26		0.1	0.08
DP (Unsewered)	0.61	0.75	0.36	0.1	0.48	0.13	0.08	0.05	0.03
TP (Sewered)	1.3	1.5	1.4	1.8	1.4	0.81		0.22	0.39
TP (Unsewered)	1.2	1.3	0.8	1.1	1.1	0.4	0.18	0.088	0.13
CADMIUM (sewered)	0.008	0.025	0.0037	0.021	0.0037	0.002		0.0003	0.0002
CADMIUM (Unsewered)	0.0071	0.022	0.0022	0.012	0.003	0.001	0.0002	0.0001	0.0001

1. Unit Area Pollutant Load Estimates for Lake County, Illinois Lake Michigan Watersheds." NIPC. August 1993.

### Estimated Load and Load Reductions

	Load before BMP (lbs/yr)	Load after BMP (lbs/yr)	Load Reduction (lbs/yr)
BOD	55	24	31
COD	969	U	U
TSS	2,486	460	2,026
LEAD	3	U	U
COPPER	1	U	U
ZINC	4	U	U
TDS	6,666	U	U
TN	14	U	U
TKN	20	U	U
DP	0	U	U
TP	2	1	1
CADMIUM	0	U	U

U = Removal Efficiency for the particular BMP and constituent unavailable.

# Water Department (3 Old Meadow Road) Rain Garden

8/1/2019

## URBAN RUNOFF BMP POLLUTANT LOAD REDUCTION WORKSHEET (BASED ON LAND USE RUNOFF LOADING RATE)

Please fill in the **gray** areas below.

Notes:  
The methodology and efficiency values used in this worksheet were developed by the Illinois Environmental Protection Agency.

Please Select a Best Management Practice:

- |   |   |  |
|---|---|--|
| <input type="radio"/> Vegetated Filter Strips | <input type="radio"/> Sand Filters                  | <input type="radio"/> Sand Filter/Infiltration Basin |
| <input type="radio"/> Grass Swales            | <input type="radio"/> WQ Inlets                     | <input type="radio"/> WQ Inlet w/ Sand Filter        |
| <input type="radio"/> Infiltration Device     | <input type="radio"/> Weekly Street Sweeping        | <input type="radio"/> Oil/Grit Separator             |
| <input type="radio"/> Extended Wet Detention  | <input checked="" type="radio"/> Infiltration Basin | <input type="radio"/> Wet Pond                       |
| <input type="radio"/> Wetland Detention       | <input type="radio"/> Infiltration Trench           | <input type="radio"/> Green Roof                     |
| <input type="radio"/> Dry Detention           | <input type="radio"/> Porous Pavement               |  |
| <input type="radio"/> Settling Basin          | <input type="radio"/> Concrete Grid Pavement        |  |

**Green Roof:**  
The green roof is such a way that it generated would quality of runoff from the land use of the roof is on, i.e. commercial, institutional, residential, etc. the entire loading eliminated.

Please enter landuse of contributing/drainage area in acres:

	Sewered	Unsewered
Commercial		
Industrial		
Institutional		
Transportation	1.1	
Multi-Family		
Residential		
Agriculture		
Vacant		
Open Space		

Note: Sewered and Unsewered refer to storm sewers.

Please enter landuse specific pollutant loading rate (lbs/ac/yr)

☒ Default ☐ User Defined

### DEFAULT AVERAGE POLLUTANT LOADS BY LAND USE (Lbs/Ac./Yr.) 1

	Commercial	Industrial	Institutional	Transportation	Multi-Family	Residential	Agriculture	Vacant	Open Space
BOD (Sewered)	85	50	52	50	52	22		2	1
BOD (Unsewered)	75	40	31	30	42	11	3	0.9	0.4
COD (Sewered)	589	260	320	881	320	140		64	46
COD (Unsewered)	520	230	190	518	260	71	28	26	15
TSS (Sewered)	1180	1240	1320	2260	1320	309		100	61
TSS (Unsewered)	1040	1080	790	1330	1050	154	153	40	20
LEAD (Sewered)	1.03	1.58	0.37	2.67	0.37	0.23		0.03	0.02
LEAD (Unsewered)	0.90	1.39	0.22	1.57	0.29	0.12	0.00	0.01	0.01
COPPER (Sewered)	0.2	0.21	0.1	0.56	0.1	0.048		0.01	0.01
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ZINC (Sewered)	1.6	1.3	0.57	3.2	0.57	0.9		0.1	0.08
ZINC (Unsewered)	1.4	1.2	0.34	1.9	0.46	0.45	0.069	0.06	0.03
TDS (Sewered)	2830	1290	623	6060	623	436		1210	724
TDS (Unsewered)	2500	1130	374	3565	498	218	89.2	483	241
TN (Sewered)	21	14	11	13	11	6		1	1
TN (Unsewered)	18	12	6.5	7.7	8.6	3.1	2.4	0.5	0.2
TKN (Sewered)	6.9	4	6.4	18	6.4	3.2		2.2	1.3
TKN (Unsewered)	6.1	4	3.8	11	5.1	1.6	0.91	0.88	0.44
DP (Sewered)	0.69	0.86	0.61	0.2	0.61	0.26		0.1	0.08
DP (Unsewered)	0.61	0.75	0.36	0.1	0.48	0.13	0.08	0.05	0.03
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TP (Unsewered)	1.2	1.3	0.8	1.1	1.1	0.4	0.18	0.088	0.13
CADMIUM (sewered)	0.008	0.025	0.0037	0.021	0.0037	0.002		0.0003	0.0002
CADMIUM (Unsewered)	0.0071	0.022	0.0022	0.012	0.003	0.001	0.0002	0.0001	0.0001

1. Unit Area Pollutant Load Estimates for Lake County, Illinois Lake Michigan Watersheds." NIPC. August 1993.

### Estimated Load and Load Reductions

	Load before BMP (lbs/yr)	Load after BMP (lbs/yr)	Load Reduction (lbs/yr)
BOD	24	U	U
COD	969	339	630
TSS	460	115	345
LEAD	3	1	2
COPPER	1	U	U
ZINC	4	1	2
TDS	6,666	U	U
TN	14	6	9
TKN	20	U	U
DP	0	U	U
TP	1	0	1
CADMIUM	0	U	U

U = Removal Efficiency for the particular BMP and constituent unavailable.

# Highway Department (7 Meadow Road) Stilling Basin

8/1/2019

## URBAN RUNOFF BMP POLLUTANT LOAD REDUCTION WORKSHEET (BASED ON LAND USE RUNOFF LOADING RATE)

Please fill in the **gray** areas below.

Notes:  
The methodology and efficiency values used in this worksheet were developed by the Illinois Environmental Protection Agency.

Please Select a Best Management Practice:

- |   |  |  |
|---|--|--|
| <input type="radio"/> Vegetated Filter Strips   | <input type="radio"/> Sand Filters           | <input type="radio"/> Sand Filter/Infiltration Basin |
| <input type="radio"/> Grass Swales              | <input type="radio"/> WQ Inlets              | <input type="radio"/> WQ Inlet w/ Sand Filter        |
| <input type="radio"/> Infiltration Device       | <input type="radio"/> Weekly Street Sweeping | <input type="radio"/> Oil/Grit Separator             |
| <input type="radio"/> Extended Wet Detention    | <input type="radio"/> Infiltration Basin     | <input type="radio"/> Wet Pond                       |
| <input type="radio"/> Wetland Detention         | <input type="radio"/> Infiltration Trench    | <input type="radio"/> Green Roof                     |
| <input type="radio"/> Dry Detention             | <input type="radio"/> Porous Pavement        |  |
| <input checked="" type="radio"/> Settling Basin | <input type="radio"/> Concrete Grid Pavement |  |

**Green Roof:**  
The green roof is such a way that it generated would quality of runoff from the land use of the roof is on, i.e. commercial, institutional, residential, etc. the entire loading eliminated.

Please enter landuse of contributing/drainage area in acres:

	Sewered	Unsewered
Commercial		
Industrial		
Institutional		
Transportation	14.1	
Multi-Family		
Residential		
Agriculture		
Vacant		
Open Space		

Note: Sewered and Unsewered refer to storm sewers.

Please enter landuse specific pollutant loading rate (lbs/ac/yr)

☒ Default ☐ User Defined

### DEFAULT AVERAGE POLLUTANT LOADS BY LAND USE (Lbs/Ac./Yr.) 1

	Commercial	Industrial	Institutional	Transportation	Multi-Family	Residential	Agriculture	Vacant	Open Space
BOD (Sewered)	85	50	52	50	52	22		2	1
BOD (Unsewered)	75	40	31	30	42	11	3	0.9	0.4
COD (Sewered)	589	260	320	881	320	140		64	46
COD (Unsewered)	520	230	190	518	260	71	28	26	15
TSS (Sewered)	1180	1240	1320	2260	1320	309		100	61
TSS (Unsewered)	1040	1080	790	1330	1050	154	153	40	20
LEAD (Sewered)	1.03	1.58	0.37	2.67	0.37	0.23		0.03	0.02
LEAD (Unsewered)	0.90	1.39	0.22	1.57	0.29	0.12	0.00	0.01	0.01
COPPER (Sewered)	0.2	0.21	0.1	0.56	0.1	0.048		0.01	0.01
COPPER (Unsewered)	0.18	0.18	0.061	0.33	0.081	0.024	0.0044	0.004	0.002
ZINC (Sewered)	1.6	1.3	0.57	3.2	0.57	0.9		0.1	0.08
ZINC (Unsewered)	1.4	1.2	0.34	1.9	0.46	0.45	0.069	0.06	0.03
TDS (Sewered)	2830	1290	623	6060	623	436		1210	724
TDS (Unsewered)	2500	1130	374	3565	498	218	89.2	483	241
TN (Sewered)	21	14	11	13	11	6		1	1
TN (Unsewered)	18	12	6.5	7.7	8.6	3.1	2.4	0.5	0.2
TKN (Sewered)	6.9	4	6.4	18	6.4	3.2		2.2	1.3
TKN (Unsewered)	6.1	4	3.8	11	5.1	1.6	0.91	0.88	0.44
DP (Sewered)	0.69	0.86	0.61	0.2	0.61	0.26		0.1	0.08
DP (Unsewered)	0.61	0.75	0.36	0.1	0.48	0.13	0.08	0.05	0.03
TP (Sewered)	1.3	1.5	1.4	1.8	1.4	0.81		0.22	0.39
TP (Unsewered)	1.2	1.3	0.8	1.1	1.1	0.4	0.18	0.088	0.13
CADMIUM (sewered)	0.008	0.025	0.0037	0.021	0.0037	0.002		0.0003	0.0002
CADMIUM (Unsewered)	0.0071	0.022	0.0022	0.012	0.003	0.001	0.0002	0.0001	0.0001

1. Unit Area Pollutant Load Estimates for Lake County, Illinois Lake Michigan Watersheds.\* NIPC. August 1993.

### Estimated Load and Load Reductions

	Load before BMP (lbs/yr)	Load after BMP (lbs/yr)	Load Reduction (lbs/yr)
BOD	705	310	395
COD	12,422	U	U
TSS	31,866	5,895	25,971
LEAD	38	U	U
COPPER	8	U	U
ZINC	45	U	U
TDS	85,446	U	U
TN	183	U	U
TKN	254	U	U
DP	3	U	U
TP	25	12	13
CADMIUM	0	U	U

U = Removal Efficiency for the particular BMP and constituent unavailable.

# Highway Department (7 Meadow Road) Grass Swale

8/1/2019

## URBAN RUNOFF BMP POLLUTANT LOAD REDUCTION WORKSHEET (BASED ON LAND USE RUNOFF LOADING RATE)

Please fill in the **gray** areas below.

Notes:  
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Please Select a Best Management Practice:

- |   |  |  |
|---|--|--|
| <input type="radio"/> Vegetated Filter Strips | <input type="radio"/> Sand Filters           | <input type="radio"/> Sand Filter/Infiltration Basin |
| <input checked="" type="radio"/> Grass Swales | <input type="radio"/> WQ Inlets              | <input type="radio"/> WQ Inlet w/ Sand Filter        |
| <input type="radio"/> Infiltration Device     | <input type="radio"/> Weekly Street Sweeping | <input type="radio"/> Oil/Grit Separator             |
| <input type="radio"/> Extended Wet Detention  | <input type="radio"/> Infiltration Basin     | <input type="radio"/> Wet Pond                       |
| <input type="radio"/> Wetland Detention       | <input type="radio"/> Infiltration Trench    | <input type="radio"/> Green Roof                     |
| <input type="radio"/> Dry Detention           | <input type="radio"/> Porous Pavement        |  |
| <input type="radio"/> Settling Basin          | <input type="radio"/> Concrete Grid Pavement |  |

**Green Roof:**  
The green roof is such a way that it generated would quality of runoff from the land use of the roof is on, i.e. commercial, institutional, residential, etc. the entire loading eliminated.

Please enter landuse of contributing/drainage area in acres:

	Sewered	Unsewered
Commercial		
Industrial		
Institutional		
Transportation	14.1	
Multi-Family		
Residential		
Agriculture		
Vacant		
Open Space		

Note: Sewered and Unsewered refer to storm sewers.

Please enter landuse specific pollutant loading rate (lbs/ac/yr)

☒ Default ☐ User Defined

### DEFAULT AVERAGE POLLUTANT LOADS BY LAND USE (Lbs/Ac./Yr.) 1

	Commercial	Industrial	Institutional	Transportation	Multi-Family	Residential	Agriculture	Vacant	Open Space
BOD (Sewered)	85	50	52	50	52	22		2	1
BOD (Unsewered)	75	40	31	30	42	11	3	0.9	0.4
COD (Sewered)	589	260	320	881	320	140		64	46
COD (Unsewered)	520	230	190	518	260	71	28	26	15
TSS (Sewered)	1180	1240	1320	2260	1320	309		100	61
TSS (Unsewered)	1040	1080	790	1330	1050	154	153	40	20
LEAD (Sewered)	1.03	1.58	0.37	2.67	0.37	0.23		0.03	0.02
LEAD (Unsewered)	0.90	1.39	0.22	1.57	0.29	0.12	0.00	0.01	0.01
COPPER (Sewered)	0.2	0.21	0.1	0.56	0.1	0.048		0.01	0.01
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ZINC (Sewered)	1.6	1.3	0.57	3.2	0.57	0.9		0.1	0.08
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TDS (Sewered)	2830	1290	623	6060	623	436		1210	724
TDS (Unsewered)	2500	1130	374	3565	498	218	89.2	483	241
TN (Sewered)	21	14	11	13	11	6		1	1
TN (Unsewered)	18	12	6.5	7.7	8.6	3.1	2.4	0.5	0.2
TKN (Sewered)	6.9	4	6.4	18	6.4	3.2		2.2	1.3
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DP (Sewered)	0.69	0.86	0.61	0.2	0.61	0.26		0.1	0.08
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1. Unit Area Pollutant Load Estimates for Lake County, Illinois Lake Michigan Watersheds." NIPC. August 1993.

### Estimated Load and Load Reductions

	Load before BMP (lbs/yr)	Load after BMP (lbs/yr)	Load Reduction (lbs/yr)
BOD	310	217	93
COD	12,422	9,317	3,106
TSS	5,895	2,063	3,832
LEAD	38	11	27
COPPER	8	4	4
ZINC	45	18	27
TDS	85,446	U	U
TN	183	165	18
TKN	254	U	U
DP	3	U	U
TP	12	9	3
CADMIUM	0	0	0

U = Removal Efficiency for the particular BMP and constituent unavailable.

# Highway Department (7 Meadow Road) Rain Garden

8/1/2019

## URBAN RUNOFF BMP POLLUTANT LOAD REDUCTION WORKSHEET (BASED ON LAND USE RUNOFF LOADING RATE)

Please fill in the **gray** areas below.

Notes:  
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Please Select a Best Management Practice:

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|---|---|--|
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| <input type="radio"/> Extended Wet Detention  | <input checked="" type="radio"/> Infiltration Basin | <input type="radio"/> Wet Pond                       |
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Vacant		
Open Space		

Note: Sewered and Unsewered refer to storm sewers.

Please enter landuse specific pollutant loading rate (lbs/ac/yr)

☒ Default ☐ User Defined

### DEFAULT AVERAGE POLLUTANT LOADS BY LAND USE (Lbs/Ac./Yr.) 1

	Commercial	Industrial	Institutional	Transportation	Multi-Family	Residential	Agriculture	Vacant	Open Space
BOD (Sewered)	85	50	52	50	52	22		2	1
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COD (Sewered)	589	260	320	881	320	140		64	46
COD (Unsewered)	520	230	190	518	260	71	28	26	15
TSS (Sewered)	1180	1240	1320	2260	1320	309		100	61
TSS (Unsewered)	1040	1080	790	1330	1050	154	153	40	20
LEAD (Sewered)	1.03	1.58	0.37	2.67	0.37	0.23		0.03	0.02
LEAD (Unsewered)	0.90	1.39	0.22	1.57	0.29	0.12	0.00	0.01	0.01
COPPER (Sewered)	0.2	0.21	0.1	0.56	0.1	0.048		0.01	0.01
COPPER (Unsewered)	0.18	0.18	0.061	0.33	0.081	0.024	0.0044	0.004	0.002
ZINC (Sewered)	1.6	1.3	0.57	3.2	0.57	0.9		0.1	0.08
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DP (Unsewered)	0.61	0.75	0.36	0.1	0.48	0.13	0.08	0.05	0.03
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TP (Unsewered)	1.2	1.3	0.8	1.1	1.1	0.4	0.18	0.088	0.13
CADMIUM (sewered)	0.008	0.025	0.0037	0.021	0.0037	0.002		0.0003	0.0002
CADMIUM (Unsewered)	0.0071	0.022	0.0022	0.012	0.003	0.001	0.0002	0.0001	0.0001

1. Unit Area Pollutant Load Estimates for Lake County, Illinois Lake Michigan Watersheds." NIPC. August 1993.

### Estimated Load and Load Reductions

	Load before BMP (lbs/yr)	Load after BMP (lbs/yr)	Load Reduction (lbs/yr)
BOD	217	U	U
COD	9,317	3,261	6,056
TSS	2,063	516	1,547
LEAD	11	4	7
COPPER	4	U	U
ZINC	18	6	12
TDS	85,446	U	U
TN	165	66	99
TKN	254	U	U
DP	3	U	U
TP	9	3	6
CADMIUM	0	U	U

U = Removal Efficiency for the particular BMP and constituent unavailable.

## Bacteria (Fecal Coliform) Reduction Worksheet <sup>(1)</sup>

BMP Location	Area (acres)	Percent Impervious <sup>(2)</sup>
7 Meadow Road (Highway Department)	14.1	77
Smithville Road (Powder Mill Park)	1.27	70
3 Old Meadow Road (Water Department)	1.1	60

Created By W.A.S.  
 Checked By M.S.B.  
 Issued 6/30/2019

<sup>(1)</sup> The methodology used to calculate loadings reduction is from the New York State Stormwater Management Design Manual (2008), which in turn refers to the Simple Method (Schueler, 1987)

<sup>(2)</sup> Percentage of Impervious Areas was calculated by the project engineering team using GIS data from the Massachusetts Database and Aerial Photography

### Runoff Coefficient

$$R_v = 0.05 + 0.9 \cdot I_a$$

Where:  
 $I_a$  = Impervious Fraction

Site	$I_a$	$R_v$
7 Meadow Road (Highway Department)	0.77	0.743
Smithville Road (Powder Mill Park)	0.7	0.68
3 Old Meadow Road (Water Department)	0.6	0.59

### Annual Runoff (inches)

$$R = P \cdot P_j \cdot R_v$$

Where:  
 $R$  = Annual Runoff  
 $P$  = Annual Rainfall (inches) <sup>(3)</sup>  
 $P_j$  = Fraction of annual rainfall events which produce Runoff (0.9)  
 $R_v$  = Runoff Coefficient

Site	$R_v$	$P_j$	$P$	$R$
7 Meadow Road (Highway Department)	0.743	0.9	48	32.10
Smithville Road (Powder Mill Park)	0.68	0.9	48	29.38
3 Old Meadow Road (Water Department)	0.59	0.9	48	25.49

<sup>(3)</sup> from U.S. Climate Data Website for Worcester County

### Bacteria Loading (F. Coli)

$$L = 103 \cdot R \cdot C \cdot A$$

Where:  
 $L$  = Annual Load (Billion Colonies)  
 $R$  = Annual Runoff (inches)  
 $C$  = Bacteria Concentration (1,000/ml) 1.5 x 1,000/ml (typical, from New York State Stormwater Management Design Manual)  
 $A$  = Area (acres)  
 103 = Unit Conversion Factor

Site	$R$	$C$ (1,000/ml)	$A$	$L$ (Billion Colonies)
7 Meadow Road (Highway Department)	32.10	1.50	14.10	69,923
Smithville Road (Powder Mill Park)	29.38	1.50	1.27	5,764
3 Old Meadow Road (Water Department)	25.49	1.50	1.10	4,332

### Bacteria Reduction (Per Year) For Rain Gardens

$$\text{Reduction}^{(4)} = 0.76 \cdot L$$

Site	$L$	Reduction (Billion Colonies)
7 Meadow Road (Highway Department)	69,923	53,141
Smithville Road (Powder Mill Park)	5,764	4,381
3 Old Meadow Road (Water Department)	4,332	3,292

<sup>(4)</sup> 76% reduction of was selected as the most conservative reduction value after reviewing "Final Report International Stormwater BMP Database 2016 Summary Statistics" (Water Environment & Reuse Foundation, 2016), specifically considering Table 2-3 (for Bioretention), and Table 2-4 (for Wetland Basin/Retention Pond).

## 2.2 Bacteria

Fecal indicator bacteria data summaries are provided for enterococcus, *Escherichia coli* (*E. coli*), and fecal coliform. Performance data remain limited for EPA's currently recommended fecal indicator bacteria, enterococcus and *E. coli*.

### 2.2.1 Enterococcus

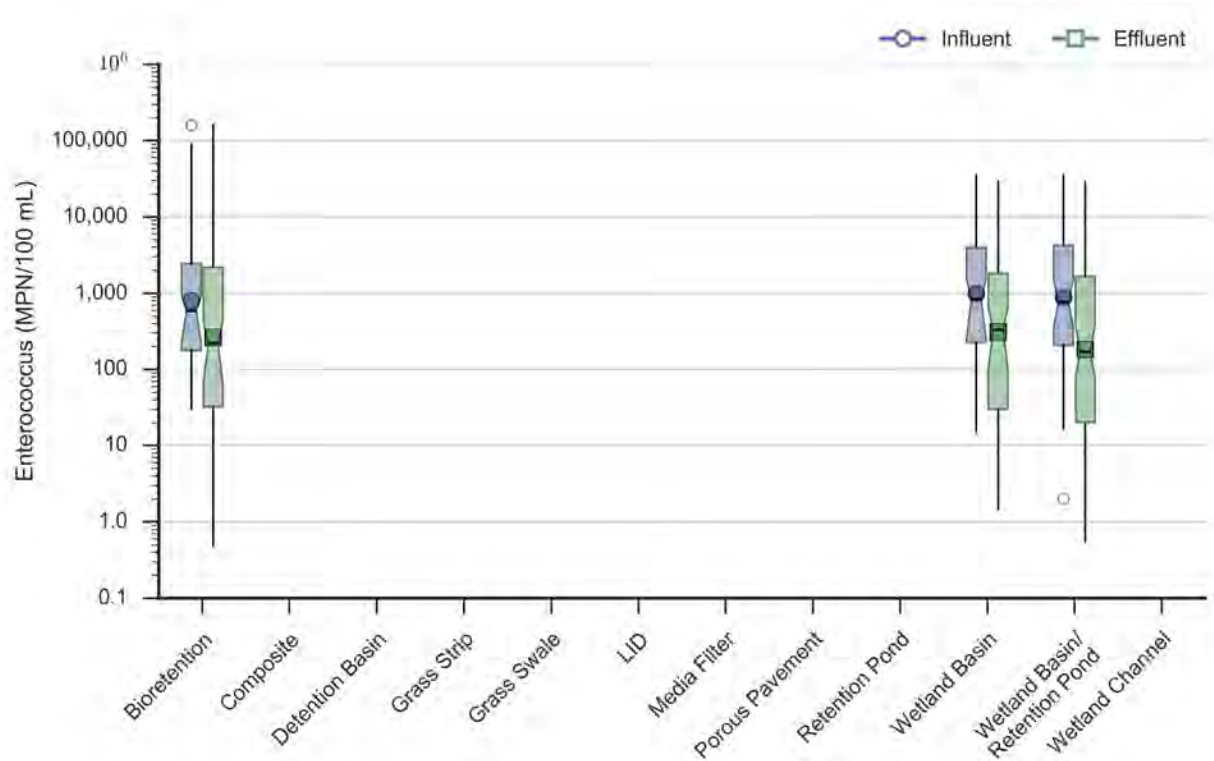


Figure 2-2. Box plots of influent/effluent enterococcus concentrations.

Table 2-2. Influent/Effluent Summary Statistics for Enterococcus (MPN/100 mL)

BMP Category	BMPs		EMCs		25th		Median			75th	
	In	Out	In	Out	In	Out	In	Out	Difference	In	Out
Bioretention	3	3	48	49	180	32	590 (220, 920)	220 (58, 440)	◇◆◆	2,400	2,200
Wetland Basin	4	4	53	53	230	30	840 (250, 1,500)	330 (100, 630)	◇◆◆	4,000	1,800
Wetland Basin/ Retention Pond	6	6	86	86	210	20	780 (350, 1,500)	170 (80, 390)	◇◆◆	4,300	1,700

## 2.2.2 E. coli

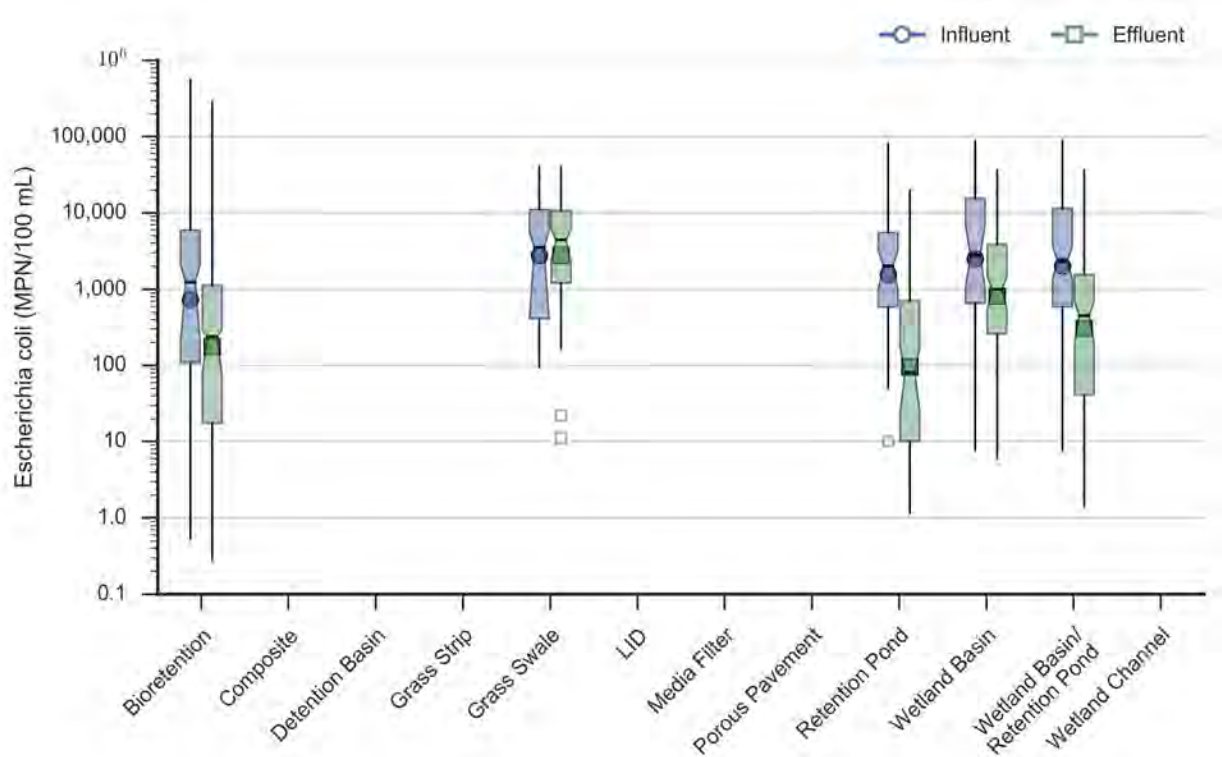


Figure 2-3. Box plots of influent/effluent *E. coli* concentrations.

Table 2-3. Influent/Effluent Summary Statistics for *E. coli* (MPN/100 mL)

BMP Category	BMPs		EMCs		25th		Median			75th	
	In	Out	In	Out	In	Out	In	Out	Difference	In	Out
Bioretention	7	7	97	96	110	18	1,200 (200, 2,100)	240 (77, 280)	◆◆◆	5,900	1,100
Grass Swale	5	6	39	46	410	1,200	3,500 (410, 5,600)	4,400 (2,600, 5,900)	◇◇◇	11,000	11,000
Retention Pond	4	4	69	65	580	10	2,000 (990, 3,100)	80 (24, 170)	◆◆◆	5,500	700
Wetland Basin	6	6	77	76	650	260	2,800 (870, 6,900)	1,000 (550, 1,500)	◇◆◆	15,000	3,800
Wetland Basin/ Retention Pond	10	10	146	141	580	41	2,300 (1,400, 3,500)	450 (200, 700)	◆◆◆	11,000	1,600

## 2.2.3 Fecal Coliform

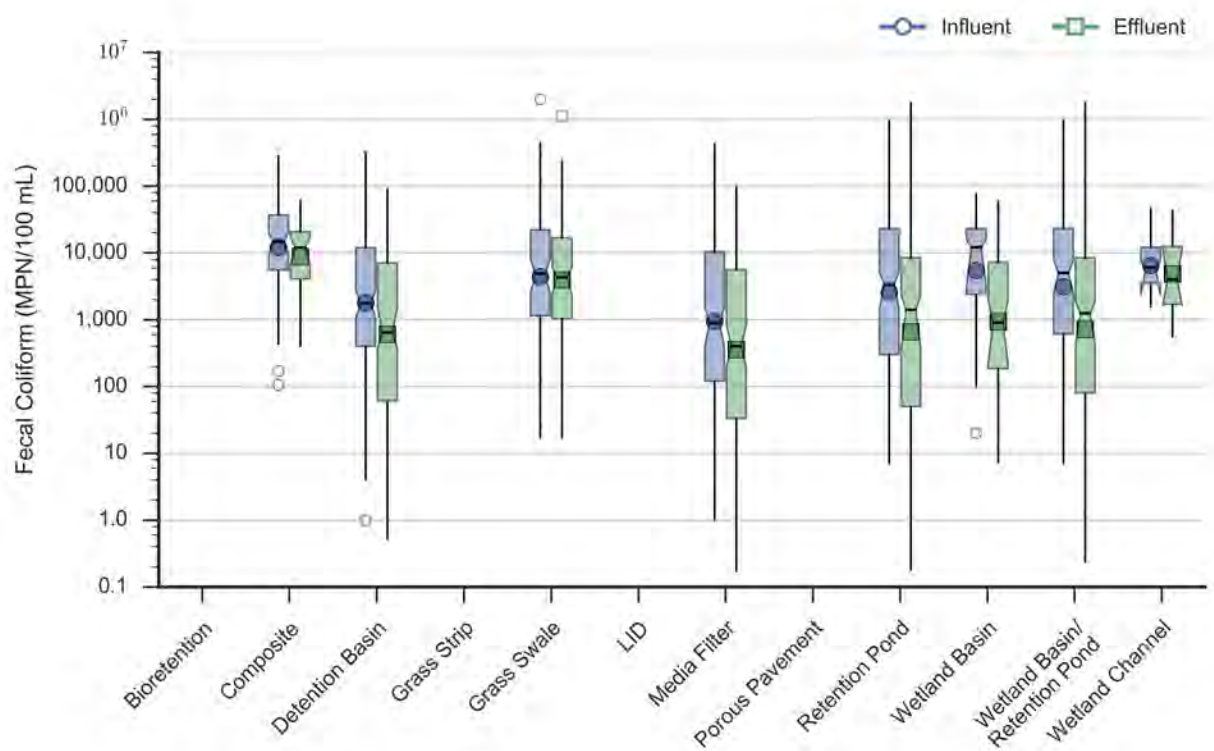


Figure 2-4. Box plots of influent/effluent fecal coliform concentrations.

Table 2-4. Influent/Effluent Summary Statistics for Fecal Coliform (MPN/100 mL)

BMP Category	BMPs		EMCs		25th		Median			75th	
	In	Out	In	Out	In	Out	In	Out	Difference	In	Out
Composite	4	4	64	56	5,500	4,100	15,000 (9,500, 19,000)	12,000 (6,800, 17,000)	◇ ◇ ◇	37,000	21,000
Detention Basin	15	15	170	194	400	60	1,800 (1,100, 2,800)	640 (370, 1,500)	◇ ◆ ◆	12,000	7,100
Grass Swale	12	11	91	82	1,100	1,000	4,900 (2,500, 7,000)	4,400 (2,400, 6,200)	◇ ◇ ◇	22,000	17,000
Media Filter	15	15	184	169	120	33	900 (400, 1,500)	400 (200, 800)	◇ ◆ ◆	10,000	5,600
Retention Pond	10	12	121	161	300	50	3,400 (1,500, 5,000)	1,400 (360, 2,300)	◇ ◆ ◆	23,000	8,500
Wetland Basin	5	5	42	39	2,400	180	12,000 (3,200, 15,000)	900 (230, 1,900)	◆ ◆ ◆	23,000	7,200
Wetland Basin/ Retention Pond	15	17	163	200	610	79	5,000 (2,600, 7,300)	1,200 (450, 1,800)	◆ ◆ ◆	23,000	8,500
Wetland Channel	3	3	21	20	3,500	1,700	6,000 (2,300, 7,500)	4,000 (1,600, 11,000)	◇ ◇ ◇	12,000	12,000

## **The Simple Method to Calculate Urban Stormwater Loads**

This appendix presents data and methodologies for using the Simple Method (Schueler, 1987) to estimate pollutant load from a site or drainage area. This appendix is meant for planning purposes only, and should not be used for SMP design.

The Simple Method estimates stormwater runoff pollutant loads for urban areas. The technique requires a modest amount of information, including the subwatershed drainage area and impervious cover, stormwater runoff pollutant concentrations, and annual precipitation. With the Simple Method, the investigator can either break up land use into specific areas, such as residential, commercial, industrial, and roadway and calculate annual pollutant loads for each type of land, or utilize more generalized pollutant values for urban runoff. It is also important to note that these values may vary depending on other variables such as the age of development.

The Simple Method estimates pollutant loads for chemical constituents as a product of annual runoff volume and pollutant concentration, as:

$$L = 0.226 * R * C * A$$

Where: L = Annual load (lbs)  
R = Annual runoff (inches)  
C = Pollutant concentration (mg/l)  
A = Area (acres)  
0.226 = Unit conversion factor

For bacteria, the equation is slightly different, to account for the differences in units. The modified equation for bacteria is:

$$L = 103 * R * C * A$$

Where: L = Annual load (Billion Colonies)  
R = Annual runoff (inches)  
C = Bacteria concentration (1,000/ ml)  
A = Area (acres)  
103 = Unit conversion factor

### A.1 Pollutant Concentrations

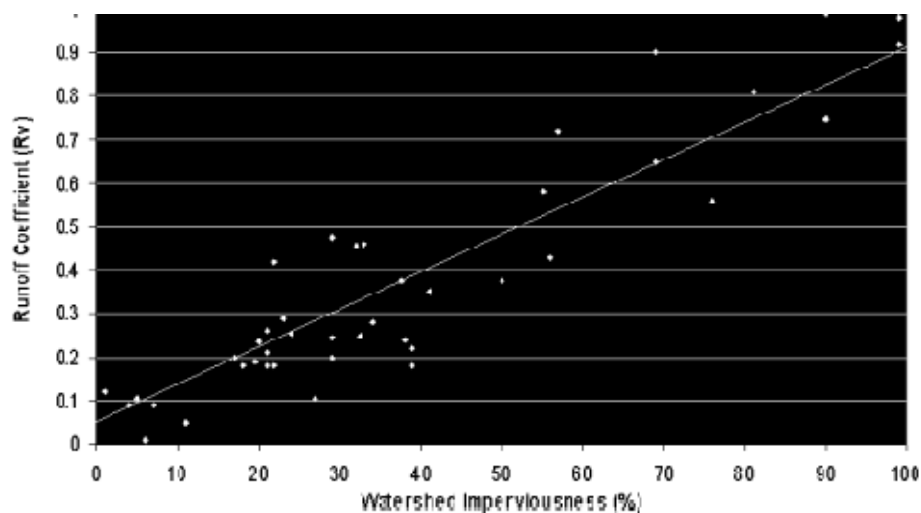
Stormwater pollutant concentrations can be estimated from local or regional data, or from national data sources. Table A.1 presents typical concentration data for pollutants in urban stormwater.

<b>Table A.1 National Median Concentrations for Chemical Constituents in Stormwater</b>		
<b>Constituent</b>	<b>Units</b>	<b>Urban Runoff</b>
TSS	mg/l	54.5 <sup>1</sup>
TP	mg/l	0.26 <sup>1</sup>
TN	mg/l	2.00 <sup>1</sup>
Cu	ug/l	11.1 <sup>1</sup>
Pb	ug/l	50.7 <sup>1</sup>
Zn	ug/l	129 <sup>1</sup>
F Coli	1,000 col/ ml	1.5 <sup>2</sup>
Source:		
1: Pooled NURP/USGS (Smullen and Cave, 1998)		
2: Schueler (1999)		

In addition, some source areas appear to be particularly important for some pollutants. Table A.2 summarizes these data for several key source areas. It is important to note that, because the Simple Method computes runoff based on an impervious area fraction, it cannot be easily used to isolate pervious sources, such as lawns. However, a user can evaluate particular hotspots, such as auto recyclers, separately. In addition, a composite runoff concentration can be developed based on the fraction of lawn, driveway, and roof on a residential site, for example.

<b>Table A.2 Pollutant Concentrations from Source Areas</b>							
<b>Constituent</b>	<b>TSS<sup>1</sup></b>	<b>TP<sup>2</sup></b>	<b>TN<sup>3</sup></b>	<b>F Coli<sup>1</sup></b>	<b>Cu<sup>1</sup></b>	<b>Pb<sup>1</sup></b>	<b>Zn<sup>1</sup></b>
	mg/l	mg/L	mg/l	1,000 col/ ml	ug/l	ug/l	ug/l
Resid Roof	19	0.11	1.5	0.26	20	21	312
Comm Roof	9	0.14	2.1	1.1	7	17	256
Indust Roof	17	-	-	5.8	62	43	1,390
C/R Parking	27	0.15	1.9	1.8	51	28	139
Indust Parking	228	-	-	2.7	34	85	224
Res Street	172	0.55	1.4	37	25	51	173
Comm Street	468	-	-	12	73	170	450
Rural Highway	51	-	22	-	22	80	80
Urban Highway	142	0.32	3.0	-	54	400	329
Lawns	602	2.1	9.1	24	17	17	50
Landscaping	37	-	-	94	94	29	263
Driveway	173	0.56	2.1	17	17	-	107
Gas Station	31	-	-	-	88	80	290
Auto Recycler	335	-	-	-	103	182	520
Heavy Industrial	124	-	-	-	148	290	1600
1: Claytor and Schueler (1996) 2: Average of Steuer et al. (1997),Bannerman (1993) and Waschbusch (2000) 3: Steuer et al. (1997)							

**Figure A.1 Relationship Between Watershed Imperviousness and the Stormwater Runoff Coefficient**



## **A.2 Annual Runoff**

The Simple Method calculates annual runoff as a product of annual runoff volume, and a runoff coefficient (Rv). Runoff volume is calculated as:

$$R = P * P_j * R_v$$

Where:

- R = Annual runoff (inches)
- P = Annual rainfall (inches)
- $P_j$  = Fraction of annual rainfall events that produce runoff (usually 0.9)
- Rv = Runoff coefficient

In the Simple Method, the runoff coefficient is calculated based on impervious cover in the subwatershed. This relationship is shown in Figure A.1. Although there is some scatter in the data, watershed imperviousness does appear to be a reasonable predictor of Rv.

The following equation represents the best fit line the dataset (N=47,  $R^2=0.71$ ).

$$R_v = 0.05 + 0.9I_a$$

Where:  $I_a$  = Impervious fraction

### A.3 Impervious Cover Data

The Simple Method uses different impervious cover values for separate land uses within a subwatershed. Representative impervious cover data, are presented in Table A.3. These numbers are derived from a recent study conducted by the Center for Watershed Protection under a grant from the U.S. Environmental Protection Agency to update impervious cover estimates for a variety of land uses. (Cappiella and Brown, 2001). In addition, some jurisdictions may have detailed impervious cover information if they maintain a detailed land use/land cover GIS database.

<b>Table A.3 Land Use and Impervious Cover Estimates</b>	
<b>Land Use Category</b>	<b>Mean Impervious Cover</b>
Agriculture	<b>2</b>
Open Urban Land*	<b>9</b>
2 Acre Lot Residential	<b>11</b>
1 Acre Lot Residential	<b>14</b>
1/2 Acre Lot Residential	<b>21</b>
1/4Acre Lot Residential	<b>28</b>
1/8 Acre Lot Residential	<b>33</b>
Townhome Residential	<b>41</b>
Multifamily Residential	<b>44</b>
Institutional**	<b>31-38%</b>
Light Industrial	<b>50-56%</b>
Commercial	<b>70-74%</b>
* Open urban land includes developed park land, recreation areas, golf courses, and cemeteries. ** Institutional is defined as places of worship, schools, hospitals, government offices, and police and fire stations	

### A.4 Limitations of the Simple Method

The Simple Method should provide reasonable estimates of changes in pollutant export resulting from urban development activities. However, several caveats should be kept in mind when applying this method.

The Simple Method is most appropriate for assessing and comparing the relative stormflow pollutant load changes of different land use and stormwater management scenarios. The Simple Method provides estimates of storm pollutant export that are probably close to the "true" but unknown value for a development site, catchment, or subwatershed. However, it is very important not to over emphasize the precision of the results obtained. For example, it would be inappropriate to use the Simple Method to evaluate relatively similar development scenarios (e.g., 34.3% versus 36.9% Impervious cover). The simple method provides a general planning estimate of likely storm pollutant export from areas at the scale of a development site, catchment or subwatershed. More sophisticated modeling may be needed to analyze larger and more complex drainages.

In addition, the Simple Method only estimates pollutant loads generated during storm events. It does not consider pollutants associated with baseflow volume. Typically, baseflow is negligible or non-existent at the scale of a single development site, and can be safely neglected, unless wastewater sources such as illicit connections and wastewater treatment plans are significant. However, catchments and subwatersheds do generate baseflow volume. Pollutant loads in baseflow are generally low and can seldom be distinguished from natural background levels (NVPDC, 1980). Consequently, baseflow pollutant loads normally constitute only a small fraction of the total pollutant load delivered from an urban area. Nevertheless, it is important to remember that the load estimates refer only to storm event derived loads and should not be confused with the total pollutant load from an area. This is particularly important when the development density of an area is low. For example, in a large low density residential subwatershed (Imp. Cover < 5%), as much as 75% of the annual runoff volume may occur as baseflow. In such a case, the annual baseflow nutrient load may be equivalent to the annual stormflow nutrient load.

### A.5 SMP Pollutant Removal

The removal efficiencies of various SMP practices also help determine final annual pollutant loads. Table A.4 provides estimates of the average pollutant removal efficiency of the five SMP categories.

Table A.4. Suggested Removal Rates for SMPs					
	TSS	TP	TN	Metals <sup>1</sup>	Bacteria
<b>Wet Ponds</b>	80	50 (51)	35 (33)	60 (62)	70
<b>Stormwater Wetlands</b>	80 <sup>2</sup> (76)	50 (49)	30	40 (42)	80 (78)
<b>Filtering Practices</b>	85 (86)	60 (59)	40 (38)	70 (69)	35 (37)
<b>Infiltration Practices<sup>4</sup></b>	90 <sup>3</sup> (95)	70	50 (51)	90 <sup>3</sup> (99)	90 <sup>4</sup>
<b>Water Quality Swales</b>	85 (84)	40 (39)	50 <sup>5</sup> (84)	70	0 (-25) <sup>6</sup>
<ol style="list-style-type: none"> <li>1. Average of zinc and copper. Only zinc for infiltration</li> <li>2. Many wetland practices in the database were poorly designed, and we consequently adjusted sediment removal upward.</li> <li>3. It is assumed that no practice is greater than 90% efficient.</li> <li>4. Data inferred from sediment removal.</li> <li>5. Actual data is based on only two highly performing practices.</li> <li>6. Assume 0 rather than a negative removal.</li> </ol> <p>Note: Data in parentheses represent median pollutant removal data reported in the <i>National Pollutant Removal Database - Revised Edition</i> (Winer, 2000). These data were adjusted for convenience and to reflect biases in the data.</p>					

These efficiencies represent ideal pollutant removal rates that cannot be achieved at all sites, or at a watershed level. Typically, they need to be “discounted” to account for site constraints, and other factors that reduce practice efficiency. For example, the removal rate should be adjusted to reflect the fraction of runoff captured by a practice on an annual basis (90% if this guidance is followed). For more detail on how to apply these discounts, consult Caraco (2001).

One particularly important consideration is how to account for practices applied in series (e.g., two ponds applied in sequence). If the volume within the practices adds up to the total water quality volume, they are assumed to act as a single practice with that volume. Otherwise, total pollutant removal should be determined by the following equation:

$$R = L [(E_1) + (1 - E_1)E_2 + (1 - ((E_1) + (1 - E_1)E_2))E_3 + \dots]$$

Where:

R = Pollutant Removal (lbs)

L = Annual Load from Simple Method (lbs.)

E<sub>i</sub> = Efficiency of the i<sup>th</sup> practice in a series

Another adjustment can be made to these removals to account for loss of effectiveness and “irreducible concentrations.” Evidence suggests that, at low concentrations, SMPs can no longer remove pollutants.

Table A.5 depicts typical outflow concentrations for various SMPs. Another simplified way to account for this phenomenon is to reduce the efficiency of a second or third practice in a series. For example, the removal efficiency could be cut in half to reflect inability to remove fine particles.

<b>Table A.5. Typical SMP Effluent Concentrations</b>					
	<b>TSS</b>	<b>TP</b>	<b>TN</b>	<b>Cu</b>	<b>Zn</b>
<b>Wet Ponds</b>	17	0.11	1.3	5.0	30
<b>Wetlands</b>	22	0.20	1.7	7.0	31
<b>Filtering Practices</b>	11	0.10	1.12	10	21
<b>Infiltration Practices</b>	17 <sup>2</sup>	0.05 <sup>2</sup>	3.8 <sup>2</sup>	4.8 <sup>2</sup>	39 <sup>2</sup>
<b>Open Channel Practices</b>	14	0.19	1.12	10	53
1. Units for Zn and Cu are micrograms per liter 2. Data based on fewer than five data points					

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