ABBREVIATED NOTICE OF RESOURCE AREA DELINEATION

Filing Under the Massachusetts Wetlands Protection Act
M.G.L. Chapter 131, Section 40 and the Town of Shutesbury Wetland Bylaw

Pratt Corner Road (Parcel ID ZW-6)
Shutesbury, Massachusetts

Submitted to:

Shutesbury Conservation Commission
Shutesbury Town Hall
1 Cooleyville Road
Shutesbury, Massachusetts 01072

Filed by:

W.D. Cowls, Inc.
P.O. Box 9677
North Amherst, Massachusetts 01059

Prepared by:

TRC Companies
650 Suffolk Street
Lowell, Massachusetts 01854

December 2019

650 Suffolk St., Suite 200
Lowell, MA 01854

T 978.970.5600
TRCcompanies.com

December 27, 2019

Town of Shutesbury Conservation Commission
Shutesbury Town Hall
1 Cooleyville Road
Shutesbury, MA 01072

RE: Pratt Corner Road (Parcel ID ZW-6)
Abbreviated Notice of Resource Area Delineation (ANRAD)

Dear Commissioners:

TRC Companies (TRC) is writing on behalf of W.D. Cowls, Inc. to file an ANRAD for a parcel off Pratt Corner Road, Shutesbury, MA (Site) (Figure 1 in Attachment B). The Site is approximately 40 acres of a 389-acre parcel (listed by the Shutesbury tax assessor as Parcel ID ZW-6).

TRC conducted a wetland and waterbody delineation survey on October 22 and 23, 2019. This survey resulted in an overall delineation of four wetlands and seven streams. The total linear feet of wetland edge and other resource areas delineated during the wetland and waterbody survey effort for the Site off Pratt Corner Road, the focus of this ANRAD filing, are summarized in the following table:

Resource Area	Delineated Length (linear feet)
Bordering Vegetated Wetland	1,041
Isolated Vegetated Wetland	317
Bank	5,276

Please refer to Attachment B for survey methodology, delineated wetland descriptions, US Army Corps of Engineers Wetland Determination forms, site photographs, and figures showing the resource areas.

To assist your review, we have provided the following attachments:

1. Attachment A – Abbreviated Notice of Resource Area Delineation Form & Wetland Fee Transmittal Form
2. Attachment B – Wetland and Waterbody Delineation Report
3. Attachment C – Abutter Information (Certified Abutter List, Abutter Notification & Affidavit of Service)
4. Attachment D – Figure 1: Delineated Resources Map (November 2019)

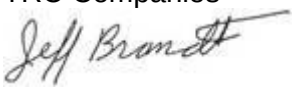
Attachment B also includes the following figures:

Figure 1 – Project Location (November 2019)
Figure 2 – Wetland Delineation (November 2019)

We very much appreciate your review of this information. If you should have any questions, please do not hesitate to contact me at 978-656-3662 or via email at JBrandt@TRCcompanies.com.

Sincerely,

TRC Companies



Jeff Brandt
Senior Project Manager

ATTACHMENT A
Abbreviated Notice of Resource Area Delineation Form & Wetland Fee Transmittal Form

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 4A – Abbreviated Notice of Resource Area Delineation

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

Provided by MassDEP:

MassDEP File Number

Document Transaction Number

Shutesbury
City/Town

A. General Information

1. Project Location (**Note:** electronic filers will click on button for GIS locator):

Pratt Corner Road
a. Street Address

Shutesbury
b. City/Town

01072
c. Zip Code

Latitude and Longitude:

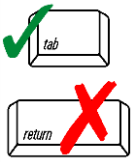
42.43095
d. Latitude

-72.46717
e. Longitude

Map ZW
f. Assessors Map/Plat Number

Lot 6
g. Parcel /Lot Number

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



2. Applicant:

a. First Name

b. Last Name

W.D. Cowls, Inc.
c. Organization

P.O. Box 9677
d. Mailing Address

North Amherst
e. City/Town

MA
f. State

01059
g. Zip Code

336-314-1702
h. Phone Number

i. Fax Number

eturner@ariespowersystems.com
j. Email Address

3. Property owner (if different from applicant):

☐ Check if more than one owner (attach additional sheet with names and contact information)

a. First Name

b. Last Name

c. Organization

d. Mailing Address

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

e. City/Town

f. State

g. Zip Code

h. Phone Number

i. Fax Number

j. Email Address

4. Representative (if any):

Jeff
a. Contact Person First Name

Brandt
b. Contact Person Last Name

TRC
c. Organization

650 Suffolk Street
d. Mailing Address

Lowell
e. City/Town

MA
f. State

01854
g. Zip Code

978-656-3662
h. Phone Number

i. Fax Number

JBrandt@TRCcompanies.com
j. Email Address

Fees will be calculated for online users.

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

$2,000.00
a. Total Fee Paid

$987.50
b. State Fee Paid

$1,012.50
c. City/Town Fee Paid

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 4A – Abbreviated Notice of Resource Area Delineation

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

Provided by MassDEP:

MassDEP File Number

Document Transaction Number

Shutesbury
City/Town

B. Area(s) Delineated

1. Bordering Vegetated Wetland (BVW) — 1,041 Linear Feet of Boundary Delineated

2. Check all methods used to delineate the Bordering Vegetated Wetland (BVW) boundary:

   a. ☐ MassDEP BVW Field Data Form (attached)

   b. ☒ Other Methods for Determining the BVW boundary (attach documentation):

      1. ☒ 50% or more wetland indicator plants
      2. ☐ Saturated/inundated conditions exist
      3. ☐ Groundwater indicators
      4. ☒ Direct observation
      5. ☒ Hydric soil indicators
      6. ☐ Credible evidence of conditions prior to disturbance

3. Indicate any other resource area boundaries that are delineated:

a. Resource Area	b. Linear Feet Delineated
Isolated Vegetated Wetland	317
Bank and Bank/Mean Annual High Water Line	5,276

c. Resource Area	d. Linear Feet Delineated

C. Additional Information

Applicants must include the following plans with this Abbreviated Notice of Resource Area Delineation. 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. ☒ ANRAD (Delineation Plans only)
2. ☒ 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.)
3. ☒ Plans identifying the boundaries of the Bordering Vegetated Wetlands (BVW) (and/or other resource areas, if applicable).
4. ☒ List the titles and final revision dates for all plans and other materials submitted with this Abbreviated Notice of Resource Area Delineation.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 4A – Abbreviated Notice of Resource Area Delineation

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

Provided by MassDEP:

MassDEP File Number

Document Transaction Number

Shutesbury
City/Town

D. Fees

The fees for work proposed under each Abbreviated Notice of Resource Area Delineation must be calculated and submitted to the Conservation Commission and the Department (see Instructions and Wetland Fee Transmittal Form).

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 the attached Wetland Fee Transmittal Form) to confirm fee payment:

1182641	11/19/2019
2. Municipal Check Number	3. Check date
1182630	11/19/2019
4. State Check Number	5. Check date
TRC	
6. Payor name on check: First Name	7. Payor name on check: Last Name

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 4A – Abbreviated Notice of Resource Area Delineation

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

Provided by MassDEP:

MassDEP File Number

Document Transaction Number

Shutesbury
City/Town

E. Signatures

I certify under the penalties of perjury that the foregoing Abbreviated Notice of Resource Area Delineation 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 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.

I hereby grant permission, to the Agent or member of the Conservation Commission and the Department of Environmental Protection, to enter and inspect the area subject to this Notice at reasonable hours to evaluate the wetland resource boundaries subject to this Notice, and to require the submittal of any data deemed necessary by the Conservation Commission or Department for that evaluation.

I acknowledge that failure to comply with these certification requirements is grounds for the Conservation Commission or the Department to take enforcement action.

1. Signature of Applicant — 2. Date: 12/17/2019

3. Signature of Property Owner (if different) — 4. Date

Jeff Bronstein

5. Signature of Representative (if any) — 6. Date: 12/18/2019

For Conservation Commission:
Two copies of the completed Abbreviated Notice of Resource Area Delineation (Form 4A), including supporting plans and documents; two copies of the ANRAD Wetland Fee Transmittal Form; and the city/town fee payment must be sent to the Conservation Commission by certified mail or hand delivery.

For MassDEP:
One copy of the completed Abbreviated Notice of Resource Area Delineation (Form 4A), including supporting plans and documents; one copy of the ANRAD Wetland Fee Transmittal Form; and a copy of the state fee payment must be sent to the MassDEP Regional Office (see Instructions) by certified mail or hand delivery. (E-filers may submit these electronically.)

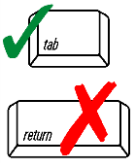
The original and copies must be sent simultaneously. Failure by the applicant to send copies in a timely manner may result in dismissal of the Notice of Intent.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

ANRAD 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:

Pratt Corner Road (Parcel ID: ZW-6)	Shutesbury
a. Street Address	b. City/Town
$987.50	1182630
c. Fee amount	d. Check number

2. Applicant:

		W.D. Cowls, Inc.
a. First Name	b. Last Name	c. Company

P.O. Box 9677
d. Mailing Address

North Amherst	MA	01059
e. City/Town	f. State	g. Zip Code

336-314-1702
h. Phone Number

3. Property Owner (if different):

a. First Name	b. Last Name	c. Company

d. Mailing Address

e. City/Town	f. State	g. Zip Code

h. Phone Number

B. Fees

The fee is calculated as follows for each Resource Area Delineation included in the ANRAD (check applicable project type). The maximum fee for each ANRAD, regardless of the number of Resource Area Delineations, is $200 activities associated with a single-family house and $2,000 for any other activity.

☐ **Online users:** check box if fee exempt.

Bordering Vegetated Wetland Delineation Fee:

1. ☐	single family house project	a. feet of BVW	x $2.00 =	b. Fee for BVW
2. ☒	all other projects	1,041 a. feet of BVW	$2,082 x $2.00 =	$2,000 (maximum fee) b. Fee for BVW

Other Resource Area (e.g., bank, riverfront area, etc.):

3. ☐	single family house project	a. linear feet	x $2.00 =	b. Fee
4. ☒	all other projects	5,593 a. linear feet	$11,186 x $2.00 =	$0 (maximum fee) b. Fee

Total Fee for all Resource Areas:	$2,000 Fee
State share of filing fee:	$987.50 5. 1/2 of total fee **less** $12.50
City/Town share of filing fee:	$1,012.50 6. 1/2 of total fee **plus** $12.50

C. Submittal Requirements

a.) Send a copy of this form, with a check or money order for the state share of the fee, payable to the Commonwealth of Massachusetts, to:

Department of Environmental Protection
Box 4062
Boston, MA 02211

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

c.) **To DEP Regional Office**: Send one copy of the Abbreviated Notice of Resource Area Delineation (and any additional documentation required as part of a Simplified Review Buffer Zone Project); a **copy** of this form; and a **copy** of the state fee payment. (E-filers of Notices of Intent may submit these electronically.)

ATTACHMENT B
Wetland and Waterbody Delineation Report

Pratt Corner Road West Solar Project

Pratt Corner Road Shutesbury, Massachusetts

Wetland and Waterbody Delineation Report

November 2019

Prepared By:

TRC
Wannalancit Mills
650 Suffolk Street
Lowell, Massachusetts 01854

TABLE OF CONTENTS

TABLES

APPENDICES

1.0 Introduction

This report presents the results of a wetland and waterbody delineation conducted on October 22 and 23, 2019 by TRC Companies, Inc. (TRC) off Pratt Corner Road in the Town of Shutesbury, Franklin County, Massachusetts (Site). The survey included 40 acres of the 389-acre parcel listed by the Shutesbury Tax Assessor as Parcel ID ZW-6.

The survey for wetlands and streams focused on the entire Site as well as adjacent parcels, when accessible, within 200 feet.

This report documents wetlands, streams, and other aquatic resources (ponds, lakes, impoundments, etc.) at the Site regardless of assumed jurisdictional status and addresses the implementation of local and state regulated buffer areas. To the extent practicable, the delineated resources were investigated to determine drainage patterns and a physical nexus to Waters of the United States (WOUS).

Appendix A provides a Site location map (Figure 1) and a map of the resources delineated by TRC (Figure 2). Appendix B includes representative photographs of the Site, Appendix C includes wetland determination data forms, Appendix D contains the Natural Resources Conservation Service (NRCS) Soil Report, and a U. S. Geological Survey (USGS) StreamStats report is included in Appendix E.

2.0 Regulatory Authority

2.1 United States Army Corps of Engineers

In accordance with Section 404 of the Clean Water Act (CWA), the United States Army Corps of Engineers (USACE) asserts jurisdiction over WOUS, defined as wetlands, streams, and other aquatic resources under the regulatory authority per Title 33 Code of Federal Regulations (CFR) Part 328, and the United States Environmental Protection Agency (EPA) per Title 40 CFR Part 230.3(s). Wetlands are defined as “those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions” (EPA, 2019).

The USACE will assert jurisdiction over the following waters:

- Traditional navigable waters;
- Wetlands adjacent to traditional navigable waters;
- Non-navigable tributaries of traditional navigable waters that are relatively permanent where the tributaries typically flow year-round or have continuous flow at least seasonally (e.g., typically three months); and
- Wetlands that directly abut such tributaries.

The USACE will decide jurisdiction over the following waters based on analysis to determine whether they have significant nexus with a traditional navigable water:

- Non-navigable tributaries that are not relatively permanent;
- Wetlands adjacent to non-navigable tributaries that are not relatively permanent; and
- Wetlands adjacent to, but that do not directly abut, a relatively permanent non-navigable tributary.

The USACE generally will not assert jurisdiction over the following features:

- Swales or erosional features (e.g., gullies, small washes characterized by low volume, infrequent, or short duration flow); and
- Ditches (including roadside ditches) excavated wholly in and draining only uplands, and that do not carry a relatively permanent flow of water.

The USACE will apply the significant nexus standard as follows:

- A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by all wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of downstream traditional navigable waters; and
- Significant nexus includes consideration of hydrologic and ecologic factors.

The USACE also regulates navigable waters under Section 10 of the Rivers and Harbor Act (33 U.S.C. 401 et seq.), which requires that a permit must be issued by the USACE to construct any structure in or over any navigable WOUS, as well as any proposed action (such as excavation/dredging or deposition of materials) that would alter or disturb these waters. If the proposed structure or activity affects the course, location, condition, or capacity of the navigable water, even if the proposed activity is outside the boundaries of the stream in associated wetlands, a Section 10 permit from the USACE is required.

2.2 Massachusetts Department of Environmental Protection

The Massachusetts Wetlands Protection Act (WPA) (Section 40 of Chapter 131 of the General Laws of Massachusetts and regulated under 310 Code of Massachusetts Regulations [CMR] section 10.00) defines multiple coastal (310 CMR 10.25-10.37) and inland resource areas (310 CMR 10.54-10.59) and gives the Massachusetts Department of Environmental Protection (MassDEP) jurisdiction over these resource areas. In most cases, the WPA also gives MassDEP jurisdiction over buffer zone extending 100 feet from the edge of the resource area. In addition to MassDEP, local municipalities' Conservation Commissions are responsible for administering the WPA and any local wetlands ordinance or bylaw.

The WPA defines two types of Land Subject to Flooding (310 CMR 10.57): isolated and bordering. Isolated Land Subject to Flooding (ILSF) is defined as "an isolated depression or a closed basin which serves as a ponding area for run-off or high ground water which has risen above the ground surface." Bordering Land Subject to Flooding (BLSF) is defined as "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 water bodies; where a bordering vegetated wetland occurs, it extends from said wetland." The boundary of BLSF is further defined as "the estimated maximum lateral extent of flood water which will theoretically result from the statistical 100-year frequency storm" as shown on the most recently available flood profile data prepared for the community by the National Flood Insurance Program (NFIP), currently administered by the Federal Emergency Management Agency (FEMA), successor to the U.S. Department of Housing and Urban Development). Under the WPA, ILSF and BLSF do not have associated buffer zones.

The WPA defines Bordering Vegetated Wetland (BVW) under 310 CMR 10.55 as any freshwater wetland which borders on creeks, rivers, stream ponds or lakes. Under the WPA, a 100-foot buffer zone is associated with BVWs. Isolated wetlands (IWs) are not connected to a waterway or waterbody and, therefore, are not regulated under the WPA and do not have an associated buffer zone under the WPA. IWs may have an associated buffer zone or similar zone associated with them under the local ordinance or bylaw. In some cases, IWs may qualify as ILSF and, in those instances, are regulated under the WPA.

The WPA defines Bank (310 CMR 10.54) as the portion of the land surface which normally abuts and confines a waterbody, occurring between a waterbody and a BVW and adjacent floodplain, or between a waterbody and an upland. Under the WPA, a 100-foot buffer zone is associated with Banks.

The WPA defines Riverfront Area (310 CMR 10.58) as the 200-foot area of land measured horizontally from a river's Mean Annual High Water (MAHW) line. The section defines a river as any stream that is perennial and includes, but is not limited to, streams shown as perennial on current U. S. Geological Survey (USGS) maps or that have a watershed size greater than or equal to one square mile. Riverfront Area is not associated with intermittent streams as they do not flow throughout the year. Under the WPA, Riverfront Area does not have an associated buffer zone.

A Notice of Intent filing is required from the MassDEP for any disturbance, including the removal of vegetation or alteration to a Banks, BVW, ILSF, BLSF, Riverfront Area, or buffer zone.

2.3 Town of Shutesbury Conservation Commission

The Shutesbury Conservation Commission (SCC) administers a local wetlands bylaw and regulations in addition to the WPA. The SCC has jurisdiction over any freshwater wetland, marsh, wet meadow, bog, swamp, isolated wetland, lake, pond, river, and stream (surface or subsurface) and land within 100 feet of any of these areas. The SCC also has jurisdiction over land under waterbodies and land subject to flooding or inundation by groundwater, surface water, storm flowage, or within a 100-year flood plain.

3.0 Project Site Characteristics

TRC reviewed publicly available literature and materials used for the investigation, survey, and report preparation, including:

- MassGIS OLIVER[1], the National Hydrography Dataset;
- The Shutesbury, Massachusetts 7.5 Minute Quadrangle (USGS 2018);
- The FEMA Flood Insurance Rate Map (FIRM) Panel 2501280015A (effective date June 18, 1980);
- The U.S. Fish and Wildlife Service (USFWS), National Wetlands Inventory (NWI);
- The U.S. Department of Agriculture (USDA), NRCS Web Soil Survey;
- The NRCS Soil Data Access (SDA) Hydric Soils List for Massachusetts; and
- Recent aerial orthoimagery.

The following sections summarize TRC's review of each of these resources.

3.1 Hydrology

The Site has relatively hilly and undulating topography throughout. The Site generally drains southwestward towards Atkins Reservoir via on-Site and off-Site streams and wetlands.

[1] The MassDEP Wetlands Conservancy Program uses aerial photography and photo interpretation to delineate and map wetland boundaries. These boundaries are available via the Massachusetts Office of Geographic Information (MassGIS) online mapping tool, OLIVER. Desktop review consisted of utilizing MassGIS OLIVER to gather a general understanding of existing conditions and potential regulated resource areas.

3.1.1 Floodplains

Flood hazard areas identified on the FEMA's Flood Insurance Rate Maps (FIRMs) are identified as Special Flood Hazard Areas (SFHAs). SFHAs are defined as the area that will be inundated by the flood event having a 1-percent chance of being equaled or exceeded in any given year. The 1-percent annual chance flood is also referred to as the base flood or 100-year flood. FEMA uses a variety of labels for SFHAs:

Zone A	Zone A99	Zone AR/A
Zone AO	Zone AR	Zone V
Zone AH	Zone AR/AE	Zone VE, and
Zones A1-A30	Zone AR/AO	Zones V1-V30
Zone AE	Zone AR/A1-A30	

Moderate flood hazard areas, labeled Zone B or Zone X (shaded on FEMA mapping) are also shown on the FIRM, and are the areas between the limits of the base flood and the 0.2-percent-annual-chance (or 500-year) flood. The areas of minimal flood hazard, which are the areas outside the SFHA and higher than the elevation of the 0.2-percent-annual-chance flood, are labeled Zone C or Zone X (unshaded on FEMA mapping).

According to the FEMA FIRM 2501280015A (effective date June 18, 1980) the Site is located within a Zone C area of minimal flood disturbance zone. Base flood elevations and flood hazard factors are not available for this area.

3.2 Federal and State Mapped Wetlands and Streams

The USFWS is the principal federal agency tasked with providing information to the public on the status and trends of wetlands on a national scale. The USFWS National Wetlands Inventory (NWI) is a publicly available resource that provides detailed information on the abundance, characteristics, and distribution of nationwide wetlands (where mapped). NWI mapping data is offered to promote the understanding, conservation, and restoration of wetlands. The online MassGIS OLIVER mapping tool was accessed to determine the extent of state-mapped aquatic resources.

According to TRC's review of NWI and MassGIS OLIVER mapping, there is one wetland that just enters the edge of the Site along the western border. The MassDEP data layers show one perennial stream that flows on the eastern portion of the Site.

3.3 Mapped Soils

The NRCS's Web Soil Survey identifies six soil map units within the Site. Map units can represent a type of soil, a combination of soils, or miscellaneous land cover types (e.g., water, rock outcrop, developed impervious surface, etc.). Map units are usually named for the predominant soil series or land types within the map unit. A summary of soil characteristics for soils mapped at the Site are included in Table 1, below. The following sections provide details about hydric ratings, drainage class, prime farmland, and hydrologic soil groups (HSGs). Details about soil map unit descriptions are provided in the NRCS Soil Report included as Appendix D.

Table 1: Mapped Soils

Symbol	Soil Name	Hydric Rating (%)	Drainage Class	Hydrologic Soil Group	Farmland Classification
71B	Ridgebury fine sandy loam, 3 to 8 percent slopes, extremely stony	88	Poorly drained	D	Not Prime Farmland
109B	Chatfield-Hollis complex, 3 to 8 percent slopes, rocky	2	Chatfield, rocky: Well drained Hollis, rocky: Somewhat excessively drained	Chatfield, rocky: B Hollis, rocky: D	Not Prime Farmland
109C	Chatfield-Hollis complex, 8 to 15 percent slopes, rocky	2	Chatfield, very stony: Well drained Hollis, very stony: Somewhat excessively drained	Chatfield, very stony: B Hollis, very stony: D	Not Prime Farmland
316B	Scituate fine sandy loam, 3 to 8 percent slopes, very stony	10	Moderately well drained	C/D	Farmland of Statewide Importance
441C	Gloucester sandy loam, 8 to 15 percent slopes, very stony	1	Somewhat excessively drained	C	Farmland of Statewide Importance
441D	Gloucester sandy loam, 15 to 25 percent slopes, very stony	0	Somewhat excessively drained	C	Not Prime Farmland

3.3.1 Hydric Rating

The *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory, 1987) (1987 Manual) defines a hydric soil as "…a soil that in its undrained condition, is saturated, flooded or ponded long enough during the growing season to develop anaerobic conditions that favor the growth and regeneration of hydrophytic vegetation."

Due to limitations imposed by the small scale of the soil survey mapping, it is not uncommon to identify wetlands within areas not mapped as hydric soil while areas mapped as hydric often do not support wetlands. This concept is emphasized by the NRCS:

> *Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.*

Hydric Soil Rating (HSR) indicates the percentage of a map unit that meets the criteria for hydric soils.

Map unit 71B has an HSR of 88 percent, map units 109B and 109C have an HSR of 2 percent, map unit 316B has an HSR of 10 percent, map unit 441C has an HSR of 1 percent, and map unit 441D has an HSR of 0 percent. For map unit 71B, the hydric components within the map unit are Ridgebury, extremely stony and Whitman, extremely stony. For map unit 109B, the hydric components within the map unit are Ridgebury, very stony and Swansea. For map unit 109C, the hydric component within the map unit is

Leicester, very stony. For map unit 316B, the hydric component within the map unit is Ridgebury, very stony. For map unit 441C, the hydric component within the map unit is Ridgebury, very stony.

3.3.2 Natural Drainage Class

Natural drainage class refers to the frequency and duration of wet periods under conditions similar to those under which the soil developed. Anthropogenic alteration of the water regime, either through drainage or irrigation, is not a consideration unless the alterations have significantly changed the morphology of the soil.

Map unit 71 B is rated as poorly drained. For map unit 109B, the Chatfield, rocky component is rated as well drained and the Hollis, rocky component is rated as somewhat excessively drained. For map unit 109C, the Chatfield, very stony component is rated as well drained and the Hollis, very stony component is rated as somewhat excessively drained. Map unit 316B is rated as moderately well drained. Map units 441C and 441D are rated as somewhat excessively drained.

3.3.3 Prime Farmland

Prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and is available for these uses (the land could be cropland, pastureland, rangeland, forestland, or other land, but not urban built-up land or water). Land used for a specific high-value food or fiber crop is classified as “unique farmland.” Generally, additional “farmlands of statewide importance” include those that are nearly prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods. In some local areas, there is concern for certain additional farmlands, even though these lands are not identified as having national or statewide importance. These farmlands are identified as being of “local importance” through ordinances adopted by local government. The NRCS State Conservationist reviews and certifies lists of farmland of state and local importance. These lists, along with state and locally established Land Evaluation and Site Assessment (LESA) systems where applicable, are used by federal agencies to review and evaluate activities that may impact farmland. As defined in 7 CFR Part 657, important farmland encompasses prime and unique farmland, as well as farmland of statewide and local importance.

According to the NRCS, map units 71B, 109B, 109C, and 441D are classified as “not prime farmland” and map units 316B and 441C are classified as “farmland of statewide importance.”

3.3.4 Hydrologic Soil Groups

Soils are assigned to an HSG based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

> Group A: Soils have a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.
>
> Group B: Soils have a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C: Soils have a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D: Soils have a very slow infiltration rate (high runoff potential) when thoroughly wet. Soils consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition in Group D are assigned to dual classes.

Map unit 71B is in HSG D. For map unit 109B, the Chatfield, rocky component is in HSG B while the Hollis, rocky component is in HSG D. For map unit 109C, the Chatfield, very stony component is in HSG B while the Hollis, very stony component is in HSG D. Map unit 316B is in dual HSG C/D. Map units 441C and 441D are in HSG C.

4.0 Wetland and Stream Delineation Methodology

In addition to the desktop review described in Section 3.0, TRC biologists performed field investigations at the Site to identify wetlands, waterbodies, and other surface waters on October 22 and 23, 2019.

4.1 Non-wetland Aquatic Resource Methodology

Streams and other non-wetland aquatic features within the Site were identified by the presence of an ordinary high water mark (OHWM), which is the line established by the fluctuations of water (33 CFR 328.3). The OHWM line is indicated by physical characteristics, which can include: a clear, natural line impressed on the bank; shelving; changes in the character of soil; destruction of terrestrial vegetation; the presence of litter and debris; or other characteristics of the surrounding areas. For streams three feet or more in width, each stream bank was delineated with blue flagging. For smaller streams, the stream centerline is delineated with notes for the width. Flags were located with a handheld global positioning system (GPS) unit and the data post-processed to achieve sub-meter accuracy.

4.2 Wetland Delineation Methodologies

The delineation of wetlands was conducted in accordance with criteria set forth in the 1987 Manual, the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (Version 2.0)* (USACE, 2012) (Supplement), and the *Delineating Bordering Vegetated Wetlands Under the Massachusetts Wetlands Protection Act- A Handbook* (MassDEP, 1995) (the MassDEP Handbook).

The three-parameter approach to identify and delineate wetlands presented in the 1987 Manual and the Supplement requires that, except for atypical and disturbed situations, wetlands possess hydrophytic vegetation, hydric soils, and wetland hydrology. A two-parameter approach that considers only vegetation and hydrology indicators is presented in the MassDEP Handbook. Per the MassDEP Handbook, hydric soil is included as evidence of wetland hydrology.

Wetland boundary flags were located with a handheld GPS unit and the data were post-processed to achieve sub-meter accuracy. Delineated resources were classified in accordance with the system

presented in *The Classification of Wetlands and Deepwater Habitats of the United States, Second Edition* (Federal Geographic Data Committee, 2013).

4.2.1 Hydrophytic Vegetation Methodologies

Hydrophytic vegetation is defined in the 1987 Manual as:

> …the sum total of macrophytic plant life that occurs in areas where the frequency and duration of inundation or soil saturation produce permanently or periodically saturated soils of sufficient duration to exert a controlling influence on the plant species present.

Plants are categorized according to their occurrence in wetlands. Scientific names and wetland indicator statuses for vegetation are those listed in *The National Wetland Plant List: 2016 Wetland Ratings* (NWPL) (Lichvar et al., 2016). The indicator statuses specific to the "Northcentral and Northeast Region" as defined by the USACE apply to the Site. For upland species that are not listed on the NWPL, the Integrated Taxonomic Information System was referenced for currently accepted scientific names. The official short definitions for wetland indicator statuses are as follows:

- Obligate Wetland (OBL): Almost always occur in wetlands;
- Facultative Wetland (FACW): Usually occur in wetlands, but may occur in non-wetlands;
- Facultative (FAC): Occur in wetlands and non-wetlands (50/50 mix);
- Facultative Upland (FACU): Usually occur in non-wetlands, but may occur in wetlands; and
- Upland (UPL): Almost never occur in wetlands.

Plants that are not found in a region, but are found in an adjacent region, take on the indicator status of that adjacent region for dominance calculations. Plants that are included on the NWPL, but not within the Site region or an adjacent region, are not included in dominance calculations. Plants that are not found in wetlands in any region are considered "UPL" for dominance calculations.

Vegetation community sampling was accomplished using the methodologies outlined in the 2012 Supplement. The "50/20 rule" was applied to determine whether a species was dominant in its stratum. In using the 50/20 rule, the plants that comprise each stratum are ranked from highest to lowest in percent cover. The species that cumulatively equal or exceed 50 percent of the total percent cover for each stratum are dominant species, and any additional species that individually provides 20 percent or more percent cover is also considered dominant species of its respective strata.

A hydrophytic vegetation community is present when: 1) all of the dominant species are FACW and/or OBL (Rapid Test for Hydrophytic Vegetation); 2) greater than 50 percent of the dominant species' (as determined by the 50/20 rule) indicator statuses are FAC, FACW, or OBL (Dominance Test); and/or 3) when the calculated Prevalence Index is equal to or less than 3.0. When applying the Prevalence Index, all plants are assigned a numeric value based on indicator status (OBL = 1, FACW = 2, FAC = 3, FACU = 4, and UPL = 5) and their abundance (absolute percent cover) is used to calculate the prevalence index.

Cover types are also assigned to each wetland and waterbody in accordance with the system presented in *The Classification of Wetlands and Deepwater Habitats of the United States, Second Edition* (Federal Geographic Data Committee, 2013).

4.2.2 Hydric Soil Methodologies

Hydric soil indicators described in *Field Indicators for Identifying Hydric Soils in New England, Version 4* (New England Hydric Soils Technical Committee, 2017) and in *Field Indicators of Hydric Soils in the United States, Version 8.2* (NRCS, 2018) were used to determine the presence of characteristic soil morphologies resulting from prolonged saturation and/or inundation. Soil color was described using standard color notations provided on Munsell® soil color charts (X-Rite, Inc., 2015). Soil texture was determined using the methods described by Thien (1979). Soil test pits were dug using a spade shovel to a depth of approximately 20 inches or more (if needed).

Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin (MLRA Handbook) (NRCS, 2006) was referenced to determine the hydric soil indicators that apply to the Site. Per the MLRA Handbook, the Site is within Major Land Resource Area (MLRA) 144A (New England and Eastern New York Upland, Southern Part) of Land Resource Region (Northeastern Forage and Forest Region). Hydric soil indicators that do not apply to this MLRA were not considered on the wetland determination data forms.

The presence or absence of hydric soils was determined through examination of samples extracted with a hand shovel or hand auger from the upper horizons of the soil profile. Soils were examined to depths of approximately 18 to 20 inches, unless restrictive layers such as hard pan, rock, densely packed fill materials, etc. were encountered at shallower depths.

4.2.3 Wetland Hydrology Methodologies

Per the 1987 Manual:

> *The term "wetland hydrology" encompasses all hydrologic characteristics of areas that are periodically inundated or have soils saturated to the surface at some time during the growing season. Areas with evident characteristics of wetland hydrology are those where the presence of water has an overriding influence on characteristics of vegetation and soils due to anaerobic and reducing conditions, respectively. Such characteristics are usually present in areas that are inundated or have soils that are saturated to the surface for sufficient duration to develop hydric soils and support vegetation typically adapted for life in periodically anaerobic soil conditions. Hydrology is often the least exact of the parameters, and indicators of wetland hydrology are sometimes difficult to find in the field. However, it is essential to establish that a wetland area is periodically inundated or has saturated soils during the growing season.* (Environmental Laboratory, 1987)

Wetland hydrology indicators are grouped into 18 primary and 11 secondary indicators presented in the Supplement. The USACE considers wetland hydrology to be present when at least one primary indicator or two secondary indicators are identified.

5.0 Results

5.1 Upland Areas

The upland areas consist of successional forests throughout the Site. The dominant vegetation in the uplands consists of eastern hemlock (*Tsuga canadensis*), red oak (*Quercus rubra*), white pine (*Pinus strobus*), American witch-hazel (*Hamamelis virginiana*), mountain-laurel (*Kalmia latifolia*), American wintergreen (*Pyrola americana*), partridge berry (*Mitchella ripens*), and princess pine (*Dendrolycopodium*

obscurum). The terrain of the Site is relatively hilly and undulating. The soils observed throughout upland portions of the Site were generally classified as silt loam or sandy loam.

5.2 Delineated Wetlands and Waterbodies

TRC identified four wetlands and seven waterbodies within the Site during the September 2019 resource delineation effort (Figure 2 in Appendix A). Delineated areas are described in the following sections and summarized at the end of this section in Table 2. Refer to the photographs in Appendix B and the wetland determination data forms in Appendix C for further details about each delineated area.

5.2.1 Delineated Wetlands

Wetland W1 is a Palustrine Forested (PFO) wetland associated with streams S2 and S3, and it is located along the western edge of the Site. The dominant vegetation within this wetland included yellow birch (*Betula alleghaniensis*), cinnamon fern (*Osmundastrum cinnamomeum*), and maleberry (*Lyonia ligustrina*). Indicators of wetland hydrology within this wetland included saturation at the soil surface, water-stained leaves, drainage patterns, moss trim lines, and microtopographic relief. Soils within wetland W1 were comprised of a thick layer of dark silt loam on top of clay loam. This soil meets Hydric Soil Indicator F3 as described in *Field Indicators of Hydric Soils in the United States, Version 8.2* (Field Indicators) (USDA NRCS, 2018). ***This wetland is MassDEP jurisdictional as a BVW to streams S2 and S3, falls under USACE jurisdiction, as it is likely connected to other WOUS, and is SCC jurisdictional as a freshwater wetland.***

Wetland W2 is a Palustrine Emergent (PEM) wetland associated with stream S2, and it is located on the western edge of the Site and extends off-Site. A certified vernal pool is located within wetland W2. The dominant vegetation within this wetland included broadleaf meadowsweet (*Spiraea latifolia*), shallow sedge (*Carex lurida*), and bristly dewberry (*Rubus hispidus*). Indicators of wetland hydrology within this wetland included saturation at the soil surface and microtopographic relief. Soils within wetland W2 were comprised of a thick layer of dark silt loam. This soil meets Hydric Soil Indicator F3 as described in *Field Indicators of Hydric Soils in the United States, Version 8.2* (Field Indicators) (USDA NRCS, 2018). ***This wetland is MassDEP jurisdictional as a BVW to stream S2, falls under USACE jurisdiction, as it is likely connected to other WOUS, and is SCC jurisdictional as a freshwater wetland.***

Wetland W3 is a PFO wetland associated with stream S3, and it is located near the western edge of the Site. The dominant vegetation within this wetland included red maple (*Acer rubrum*), American elm (*Ulmus americana*), and smooth arrow-wood (*Viburnum recognitum*). Indicators of wetland hydrology within this wetland included saturation at the soil surface, sparsely vegetated concave surface, water-stained leaves, moss trim lines, and microtopographic relief. Soils within wetland W3 were comprised of a thick layer of dark silt loam on top of silt loam on top of clay loam. This soil meets Hydric Soil Indicator A11 as described in *Field Indicators of Hydric Soils in the United States, Version 8.2* (Field Indicators) (USDA NRCS, 2018). ***This wetland is MassDEP jurisdictional as a BVW to stream S3, falls under USACE jurisdiction, as it is likely connected to other WOUS, and is SCC jurisdictional as a freshwater wetland.***

Wetland W4 is an isolated Palustrine Scrub-shrub (PSS) wetland located in the center of the Site. The dominant vegetation within this wetland included *A. rubrum* and *B. alleghaniensis*. Indicators of wetland hydrology within this wetland included saturation at the soil surface, water-stained leaves, moss trim lines, and microtopographic relief. Soils within wetland W4 were comprised of a thick layer of dark silt loam on top of a layer of sandy loam with redoximorphic concentrations in the matrix. This soil meets Hydric Soil

Indicator F3 as described in *Field Indicators of Hydric Soils in the United States, Version 8.2* (Field Indicators) (USDA NRCS, 2018). ***This wetland is SCC jurisdictional as an isolated wetland.***

5.2.2 Delineated Waterbodies

Stream S1 is an intermittent stream (R4, NWI Classification) that flows southeastward from along the southwest edge of the Site and continues off-Site past the southern boundary. The streambed was comprised of cobble and gravel. TRC observed an average width of approximately 3 feet and a water depth of approximately 0 inches. Stream S1 has defined banks such that the OHWM and the banks are coincident. The centerline of the stream was delineated.

The USGS does not map stream S1, and the USGS StreamStats analysis in Appendix E shows that it has a watershed that is less than 0.5 square miles prior to converging with stream S6. Therefore, this stream is considered intermittent. ***This stream is MassDEP jurisdictional, falls under USACE jurisdiction, as it is likely connected to other WOUS, and is SCC jurisdictional as a stream.***

Stream S2 is an intermittent stream (R4, NWI Classification) that flows southeastward from wetland W2 and into a culvert along the western edge of the Site. The streambed was comprised of cobble and gravel. TRC observed an average width of approximately 3 feet and a water depth of approximately 0 inches. Stream S2 has defined banks that are coincident with the OHWM. The centerline of the stream was delineated.

The USGS and MassDEP do not map stream S2, and the stream is not digitized for USGS StreamStats. Based on the available topography, the watershed is less than 0.5 square miles. Therefore, this stream is considered intermittent. ***This stream is MassDEP jurisdictional, falls under USACE jurisdiction, as it is likely connected to other WOUS, and is SCC jurisdictional as a stream.***

Stream S3 is an intermittent stream (R4, NWI Classification) that flows southwestward from wetland W3 and into wetland W1. The streambed was comprised of cobble and gravel. TRC observed an average width of approximately 3 feet and a water depth of approximately 0 inches. Stream S3 has defined banks that are coincident with the OHWM. The centerline of the stream was delineated.

The USGS and MassDEP do not map stream S3, and the stream is not digitized for USGS StreamStats. Based on the available topography, the watershed is less than 0.5 square miles. Therefore, this stream is considered intermittent. ***This stream is MassDEP jurisdictional, falls under USACE jurisdiction, as it is likely connected to other WOUS, and is SCC jurisdictional as a stream.***

Stream S4 is an intermittent stream (R4, NWI Classification) that enters the Site along the eastern boundary and flows westward until it converges with stream S5. The streambed was comprised of cobble and gravel. TRC observed an average width of approximately 4 feet and a water depth of approximately 6 inches. Stream S4 has defined banks that are coincident with the OHWM. The MAHW line was delineated on each side of the stream.

While the USGS maps stream S4 as perennial, the USGS StreamStats analysis in Appendix E shows that it has a watershed that is less than 0.5 square miles and has a predicted flow rate of less than 0.01 cubic feet per second at the 99% flow duration. Therefore, this stream is considered intermittent. ***This stream is MassDEP jurisdictional, falls under USACE jurisdiction, as it is likely connected to other WOUS, and is SCC jurisdictional as a stream.***

Stream S5 is Nurse Brook, an intermittent stream (R4, NWI Classification) and a perennial stream (R3, NWI Classification) that enters the Site along the northeastern boundary and flows southward and off-Site

along the southeastern boundary. The stream proceeds to parallel the eastern boundary of the Site. The streambed was comprised of cobble and gravel. TRC observed an average width of approximately 6 feet and a water depth of approximately 8 inches. Stream S5 has defined banks such that the banks and the OHMW/MAHW line are coincident. The OHWM/MAHW line was delineated on each side of the stream.

The USGS maps stream S5 as perennial and the USGS StreamStats analysis in Attachment E shows that, south of the convergence with stream S4, it has a watershed of at least 0.5 square miles and has a predicted flow rate greater than 0.01 cubic feet per second at the 99% flow duration. Therefore, south of the convergence with stream S4, this stream qualifies as perennial under 310 CMR 10.58(2)(a)(1)(a) and has an associated 200-foot Riverfront Area measured horizontally from the MAHW line. North of the convergence with stream S4, stream S5 is considered intermittent. ***This stream is MassDEP jurisdictional, falls under USACE jurisdiction, as it is likely connected to other WOUS, and is SCC jurisdictional as a river.***

Stream S6 is an intermittent stream (R4, NWI Classification) located in the central southern portion of the Site that flows southwestward and off-Site past the southern edge of the Site. The streambed was comprised of cobble and gravel. TRC observed an average width of approximately 3 feet and a water depth of approximately 0 inches. Stream S6 has defined banks, and the OHWM line is approximately one foot wider than the MAHW line on both sides of the stream. The centerline of the stream was delineated.

The USGS does not map stream S6, and the stream is not digitized for USGS StreamStats. It is mapped by MassDEP as intermittent. Based on the available topography, the watershed is less than 0.5 square miles. Therefore, this stream is considered intermittent. ***This stream is MassDEP jurisdictional, falls under USACE jurisdiction, as it is likely connected to other WOUS, and is SCC jurisdictional as a stream.***

Stream S7 is an intermittent stream (R4, NWI Classification) located in the center of the Site that flows southward. The streambed was comprised of organic matter. TRC observed an average width of approximately 2 feet and a water depth of approximately 0 inches. Stream S7 has defined banks, and the OHWM line is approximately 0.5 feet wider than the MAHW line on both sides of the stream. The centerline of the stream was delineated.

The USGS and MassDEP do not map stream S7, and the stream is not digitized for USGS StreamStats. Based on the available topography, the watershed is less than 0.5 square miles. Therefore, this stream is considered intermittent. ***This stream is MassDEP jurisdictional, falls under USACE jurisdiction, as it is likely connected to other WOUS, and is SCC jurisdictional as a stream.***

Table 2. Delineated Wetlands and Waterbodies

Wetland Field Designation	Field Designated NWI Classification [1]	Assumed Jurisdictional Status	Assumed Buffer/ Setback Requirements
W1	PFO	USACE/MassDEP/Local	100-ft buffer zone
W2	PEM	USACE/MassDEP/Local	100-ft buffer zone
W3	PFO	USACE/MassDEP/Local	100-ft buffer zone
W4	PSS	Local	100-ft buffer zone
S1	R4	USACE/MassDEP/Local	100-ft buffer zone
S2	R4	USACE/MassDEP/Local	100-ft buffer zone
S3	R4	USACE/MassDEP/Local	100-ft buffer zone
S4	R4	USACE/MassDEP/Local	100-ft buffer zone

Table 2. Delineated Wetlands and Waterbodies

Wetland Field Designation	Field Designated NWI Classification [1]	Assumed Jurisdictional Status	Assumed Buffer/ Setback Requirements
S5 (north)	R4	USACE/MassDEP/Local	100-ft buffer zone
S5 (south)	R3	USACE/MassDEP/Local	200-ft Riverfront Area
S6	R4	USACE/MassDEP/Local	100-ft buffer zone
S7	R4	USACE/MassDEP/Local	100-ft buffer zone

[1] *The Classification of Wetlands and Deepwater Habitats of the United States, Second Edition* (Federal Geographic Data Committee, 2013). Categories include: Palustrine Forested (PFO), Palustrine Scrub-Shrub (PSS), Palustrine Emergent (PEM), Riverine Perennial (R3), and Riverine Intermittent (R4).

6.0 Conclusions

It is TRC's opinion that three of the delineated wetlands, W1, W2, and W3, are BVW regulated by MassDEP and the SCC and are also likely be under USACE jurisdiction. There are no buffers or setbacks associated with USACE-regulated wetlands. However, there is a 100-foot buffer zone associated with MassDEP and SCC-regulated wetlands. As an isolated wetland, it is TRC's opinion that delineated wetland W4 is not regulated by MassDEP or within USACE jurisdiction. However, wetland W4 is regulated by the SCC and has an associated 100-foot buffer zone.

Perennial stream S5 (south portion) and intermittent streams S1, S2, S3, S4, S5 (north portion), S6, and S7 are USACE jurisdictional, as they are hydrologically connected to WOUS. These streams are also regulated by the MassDEP, as they flow within, into, or out of a MassDEP-regulated wetland resource area. These streams are also regulated by the SCC and its local bylaw as the SCC has jurisdiction over all rivers and streams in Shutesbury.

Final determination of jurisdictional status for on-Site wetlands must be made by the agencies.

7.0 References

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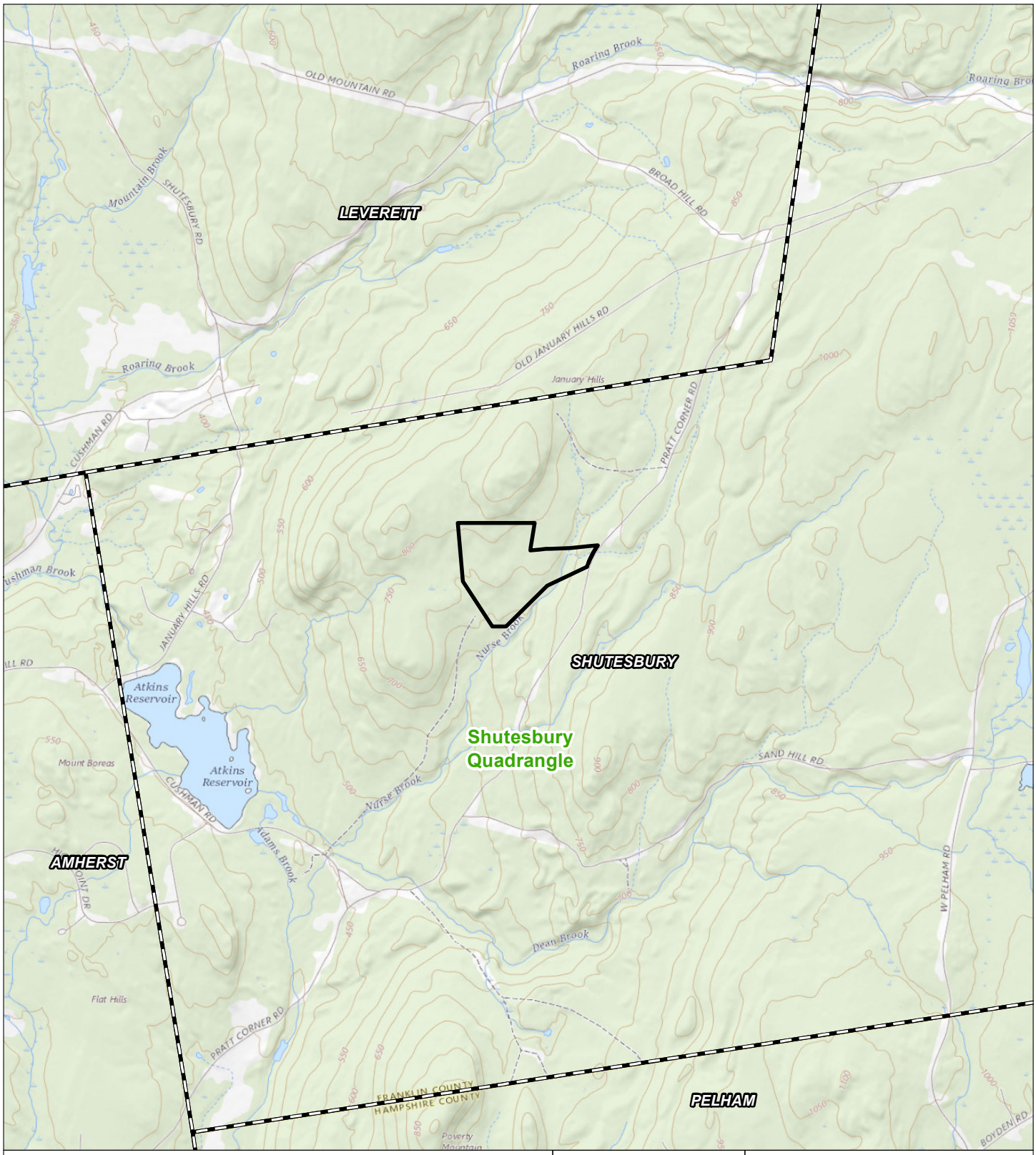
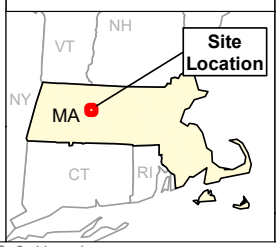
Appendix A: Figures



Project Area
USGS 24k Quadrangle
Town Boundary

N

0 1,000 2,000
Feet



Data Sources: Meridian Associates, MassGIS, Esri
Bae Map: USGS The National Map, "USGSTopo"

TRC
Wannalancit Mills
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Lowell, MA 01854
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PROJECT LOCATION

PRATT CORNER ROAD WEST PROJECT

SHUTESBURY, MA

FIGURE 1	NOVEMBER 2019

S:\1-PROJECTS\AMP\365708_Amherst Phase 1\5-MXD\Wetland Delineation\Fig 1 PrattCornerWest_USGS_8x11.mxd

W - UPL

W-GR-4
W -4 PSS
W -4 UPL

W-GR-3
W -3 PFO
W -3 UPL

W -2 PEM
W-GR-2
W -2 UPL

S-GR-3
W -1 UPL
W-GR-1
W -1 PFO
S-GR-2

S-GR-7
S-GR-5
S-GR-4
S-GR-5
S-GR-5
S-GR-1
S-GR-6

Pratt Corner Rd

Project Area
Culvert
USACE Plot
Stream Plot
Delineated Perennial Stream
Delineated Intermittent Stream Area
Delineated Perennial Stream Area
Wetland Boundary Line
Delineated Wetland
100-ft Wetland Buffer
200-ft Riverfront Area

0 100 200
Feet

N

VT NH NY MA CT RI Site Location

Data: TRC, 2019
Base Map: Esri & Contributors, "World Imagery"

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WETLAND DELINEATION

PRATT CORNER ROAD WEST PROJECT

SHUTESBURY, MA

FIGURE 2 | NOVEMBER 2019

S:\1-PROJECTS\AMP\365708_Amherst Phase 1\5-MXD\Wetland Delineation\Fig 2 PrattCorner_West_DelResults_11x17P_20191114.mxd

Appendix B: Photographs

PRATT CORNER ROAD WEST PROJECT

PRATT CORNER ROAD, SHUTESBURY, MASSACHUSETTS

Photograph: 1 Date: 10/22/2019 Direction: Southeast Description: Conditions observed at stream S1 looking downstream.	
Photograph: 2 Date: 10/22/2019 Direction: Northwest Description: Conditions observed at stream S2 looking upstream.	

PRATT CORNER ROAD WEST PROJECT

PRATT CORNER ROAD, SHUTESBURY, MASSACHUSETTS

Photograph: 3 Date: 10/22/2019 Direction: South Description: Conditions observed at stream S3 looking downstream.	
Photograph: 4 Date: 10/22/2019 Direction: West Description: Conditions observed at stream S4 looking downstream.	

PRATT CORNER ROAD WEST PROJECT

PRATT CORNER ROAD, SHUTESBURY, MASSACHUSETTS

Photograph: 5 Date: 10/22/2019 Direction: Northeast Description: Conditions observed at stream S5 looking upstream.	
Photograph: 6 Date: 10/22/2019 Direction: Southwest Description: Conditions observed at stream S6 looking upstream.	

PRATT CORNER ROAD WEST PROJECT

PRATT CORNER ROAD, SHUTESBURY, MASSACHUSETTS

Photograph: 7 Date: 10/23/2019 Direction: South Description: Conditions observed at stream S7 looking upstream.	
Photograph: 8 Date: 10/22/2019 Direction: South Description: Typical conditions observed in northern uplands portion of the Site at data point UPL-1.	

PRATT CORNER ROAD WEST PROJECT

PRATT CORNER ROAD, SHUTESBURY, MASSACHUSETTS

Photograph: 9 Date: 10/22/2019 Direction: Northeast Description: Typical conditions observed in northeastern portion of wetland W1 at data point W1-PFO.	
Photograph: 10 Date: 10/22/2019 Direction: West Description: Conditions observed at wetland W2 data point W2-PEM.	

PRATT CORNER ROAD WEST PROJECT

PRATT CORNER ROAD, SHUTESBURY, MASSACHUSETTS

Photograph: 11 Date: 10/22/2019 Direction: South Description: Conditions observed at wetland W3 data point W3-PFO.	
Photograph: 12 Date: 10/22/2019 Direction: North Description: Conditions observed at wetland W4 data point W4-PFO.	

Appendix C: Wetland Determination Data Forms

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Pratt Corner Road West Project City/County: Franklin County Sampling Date: 10/22/2019

Applicant/Owner: State: MA Sampling Point: UPL-1

Investigator(s): G. Russo, M. Boscow Section, Township, Range: Shutesbury

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): None

Slope (%): 8-15 Lat: 42.43111028 Long: -72.46678523 Datum: NAD 83

Soil Map Unit Name: Chatfield-Hollis complex, 8 to 15 percent slopes, rocky NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID: ____

Remarks: (Explain alternative procedures here or in a separate report.)

Hydrophytic vegetation, hydric soil, and wetland hydrology are not present in this area. Area is not a wetland.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Wetland hydrology is not present in this area.

VEGETATION – Use scientific names of plants.

Sampling Point: UPL-1

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Tsuga canadensis	90	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
	90	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size: 5)			
1. Pyrola americana	20	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	20	= Total Cover	

Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
	0	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50.00% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	20	x 3 =	60
FACU species	90	x 4 =	360
UPL species	0	x 5 =	0
Column Totals:	110 (A)		360 (B)

Prevalence Index = B/A = 3.82

Hydrophytic Vegetation Indicators:

___ Rapid Test for Hydrophytic Vegetation

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** _____ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

Hydrophytic vegetation is not present in this area.

SOIL

Sampling Point: UPL-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-1	10YR 5/2	100					Silt loam	
1-20	10YR 5/6	100					Silt loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** X

Remarks:

Hydric soil is not present in this area.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Pratt Corner Road West Project City/County: Franklin County Sampling Date: 10/22/2019

Applicant/Owner: _____ State: MA Sampling Point: W1PFO

Investigator(s): G. Russo, M. Boscow Section, Township, Range: Shutesbury

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): Convave

Slope (%): 8-15 Lat: 42.42941186 Long: -72.46901191 Datum: NAD 83

Soil Map Unit Name: Chatfield-Hollis complex, 8 to 15 percent slopes, rocky NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No _____	**Is the Sampled Area within a Wetland?** Yes X No _____
Hydric Soil Present?	Yes X	No _____	If yes, optional Wetland Site ID: _____
Wetland Hydrology Present?	Yes X	No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

Hydrophytic vegetation, hydric soil, and wetland hydrology are present in this area. Area is a wetland.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- X Drainage Patterns (B10)
- X Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No X	Depth (inches): _____
Water Table Present?	Yes _____	No X	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes X	No _____	Depth (inches): 0

Wetland Hydrology Present? Yes X No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Wetland hydrology is present in this area.

VEGETATION – Use scientific names of plants.

Sampling Point: W1-PFO

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Betula alleghaniensis	60	Yes	FAC
2. Acer rubrum	15	No	FAC
3. Fraxinus pennsylvanica	5	No	FACW
4.			
5.			
6.			
7.			
	80	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15)			
1. Lyonia ligustrina	15	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	15	= Total Cover	

Herb Stratum (Plot size: 5)			
1. Osmundastrum cinnamomeum	15	Yes	FACW
2. Coptis trifolia	5	Yes	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	20	= Total Cover	

Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
	0	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	40	x 2 =	80
FAC species	75	x 3 =	225
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	115 (A)		305 (B)

Prevalence Index = B/A = 2.65

Hydrophytic Vegetation Indicators:

__ Rapid Test for Hydrophytic Vegetation

X Dominance Test is >50%

X Prevalence Index is ≤3.0[1]

__ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** _____

Remarks: (Include photo numbers here or on a separate sheet.)

Hydrophytic vegetation is present in this area.

SOIL

Sampling Point: W1-PFO

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-7	10YR 2/1	100					Silt loam	Mucky
7-10	10YR 5/1	95	10YR 4/6	5	Conc	Matrix	Clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: Rock

Depth (inches): 10

Hydric Soil Present? Yes X No ___

Remarks:

Hydric soil is present in this area.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Pratt Corner Road West Project City/County: Franklin County Sampling Date: 10/22/2019

Applicant/Owner: State: MA Sampling Point: W1UPL

Investigator(s): G. Russo, M. Boscow Section, Township, Range: Shutesbury

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): None

Slope (%): 8-15 Lat: 42.42946642 Long: -72.46893440 Datum: NAD 83

Soil Map Unit Name: Chatfield-Hollis complex, 8 to 15 percent slopes, rocky NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No X	**Is the Sampled Area within a Wetland?** Yes _____ No X
Hydric Soil Present?	Yes _____	No X	
Wetland Hydrology Present?	Yes _____	No X	If yes, optional Wetland Site ID: _____

Remarks: (Explain alternative procedures here or in a separate report.)

Hydrophytic vegetation, hydric soil, and wetland hydrology are not present in this area. Area is not a wetland.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No X	Depth (inches): _____
Water Table Present?	Yes _____	No X	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No X	Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Wetland hydrology is not present in this area.

VEGETATION – Use scientific names of plants.

Sampling Point: W1-UPL

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Tsuga canadensis	40	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
	40	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15)			
1. Hamamelis virginiana	10	Yes	FACU
2. Kalmia latifolia	5	Yes	FACU
3.			
4.			
5.			
6.			
7.			
	15	= Total Cover	

Herb Stratum (Plot size: 5)			
1. Mitchella repens	70	Yes	FACU
2. Quercus rubra	5	No	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	75	= Total Cover	

Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
	0	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	5	x 2 =	10
FAC species	0	x 3 =	0
FACU species	125	x 4 =	500
UPL species	0	x 5 =	0
Column Totals:	130 (A)		510 (B)

Prevalence Index = B/A = 3.92

Hydrophytic Vegetation Indicators:

___ Rapid Test for Hydrophytic Vegetation

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

Hydrophytic vegetation is not present in this area.

SOIL

Sampling Point: W1-UPL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 2/2	100					Silt loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: Rock

Depth (inches): 6

Hydric Soil Present? Yes _____ No X

Remarks:

Hydric soil is not present in this area.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Pratt Corner Road West Project City/County: Franklin County Sampling Date: 10/22/2019

Applicant/Owner: State: MA Sampling Point: W2PEM

Investigator(s): G. Russo, M. Boscow Section, Township, Range: Shutesbury

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave

Slope (%): 8-15 Lat: 42.42972881 Long: -72.46959103 Datum: NAD 83

Soil Map Unit Name: Chatfield-Hollis complex, 8 to 15 percent slopes, rocky NWI classification: PSS1E

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No _____	**Is the Sampled Area within a Wetland?** Yes X No _____
Hydric Soil Present?	Yes X	No _____	If yes, optional Wetland Site ID: _____
Wetland Hydrology Present?	Yes X	No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

Hydrophytic vegetation, hydric soil, and wetland hydrology are present in this area. Area is a wetland.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- X Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No X	Depth (inches): _____
Water Table Present?	Yes _____	No X	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes X	No _____	Depth (inches): 0

Wetland Hydrology Present? Yes X No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Wetland hydrology is present in this area. Area has a vernal pool.

VEGETATION – Use scientific names of plants.

Sampling Point: W2-PEM

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1. Spiraea latifolia	20	Yes	FACW
2. Ilex verticillata	20	Yes	FACW
3. Kalmia latifolia	20	Yes	FACU
4. Lyonia ligustrina	10	No	FACW
5.			
6.			
7.			
	70 = Total Cover		
Herb Stratum (Plot size: 5)			
1. Carex lurida	65	Yes	OBL
2. Rubus hispidus	50	Yes	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	115 = Total Cover		
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
	0 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 80.00% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	65	x 1 =	65
FACW species	100	x 2 =	200
FAC species	0	x 3 =	0
FACU species	20	x 4 =	80
UPL species	0	x 5 =	0
Column Totals:	185 (A)		345 (B)

Prevalence Index = B/A = 1.86

Hydrophytic Vegetation Indicators:

- ___ Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- X Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

Hydrophytic vegetation is present in this area.

SOIL

Sampling Point: W2-PEM

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 2/1	100					Silt loam	w/ organic

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- X Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: Rock

Depth (inches): 8

Hydric Soil Present? Yes X No ___

Remarks:

Hydric soil is present in this area.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Pratt Corner Road West Project City/County: Franklin County Sampling Date: 10/22/2019

Applicant/Owner: _____ State: MA Sampling Point: W2UPL

Investigator(s): G. Russo, M. Boscow Section, Township, Range: Shutesbury

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): None

Slope (%): 8-15 Lat: 42.42965770 Long: -72.46933235 Datum: NAD 83

Soil Map Unit Name: Chatfield-Hollis complex, 8 to 15 percent slopes, rocky NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No X	**Is the Sampled Area within a Wetland?** Yes _____ No X
Hydric Soil Present?	Yes _____	No X	If yes, optional Wetland Site ID: _____
Wetland Hydrology Present?	Yes _____	No X	

Remarks: (Explain alternative procedures here or in a separate report.)

Hydrophytic vegetation, hydric soil, and wetland hydrology are not present in this area. Area is not a wetland.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No X	Depth (inches): _____
Water Table Present?	Yes _____	No X	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No X	Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Wetland hydrology is not present in this area.

VEGETATION – Use scientific names of plants.

Sampling Point: W2-UPL

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Tsuga canadensis	60	Yes	FACU
2. Quercus rubra	50	Yes	FACU
3.			
4.			
5.			
6.			
7.			
	110	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15)			
1. Kalmia latifolia	60	Yes	FACU
2. Hamamelis virginiana	30	Yes	FACU
3.			
4.			
5.			
6.			
7.			
	90	= Total Cover	

Herb Stratum (Plot size: 5)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	0	= Total Cover	

Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
	0	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	200	x 4 =	800
UPL species	0	x 5 =	0
Column Totals:	200 (A)		800 (B)

Prevalence Index = B/A = 4.00

Hydrophytic Vegetation Indicators:

___ Rapid Test for Hydrophytic Vegetation

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** _____ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

Hydrophytic vegetation is not present in the area.

SOIL

Sampling Point: W2-UPL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-8	10YR 4/2	100					Sdy loam	Sandy loam

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: Rock

Depth (inches): 8

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

Hydric soil is not present in this area.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Pratt Corner Road West Project City/County: Franklin County Sampling Date: 10/22/2019

Applicant/Owner: State: MA Sampling Point: W3PFO

Investigator(s): G. Russo, M. Boscow Section, Township, Range: Shutesbury

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): None

Slope (%): 8-15 Lat: 42.43003084 Long: -72.46899651 Datum: NAD 83

Soil Map Unit Name: Chatfield-Hollis complex, 8 to 15 percent slopes, rocky NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	If yes, optional Wetland Site ID: ____
Wetland Hydrology Present?	Yes X	No ____	

Remarks: (Explain alternative procedures here or in a separate report.)

Hydrophytic vegetation, hydric soil, and wetland hydrology are present in this area. Area is a wetland.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- X Sparsely Vegetated Concave Surface (B8)
- X Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- X Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches): 0

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Wetland hydrology is present in this area.

VEGETATION – Use scientific names of plants.

Sampling Point: W3-PFO

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer rubrum	25	Yes	FAC
2. Ulmus americana	20	Yes	FACW
3. Tsuga canadensis	15	Yes	FACU
4.			
5.			
6.			
7.			
	60	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15)			
1. Viburnum recognitum	30	Yes	FAC
2. Kalmia latifolia	5	No	FACU
3. Lyonia ligustruna	5	No	FACW
4.			
5.			
6.			
7.			
	40	= Total Cover	

Herb Stratum (Plot size: 5)			
1. Osmundastrum cinnamomeum	10	Yes	FACW
2. Rubus hispidus	5	Yes	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	15	= Total Cover	

Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
	0	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 83.33% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	40	x 2 =	80
FAC species	55	x 3 =	165
FACU species	20	x 4 =	80
UPL species	0	x 5 =	0
Column Totals:	115 (A)		325 (B)

Prevalence Index = B/A = 2.83

Hydrophytic Vegetation Indicators:

- ___ Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- X Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

Hydrophytic vegetation is present in this area.

SOIL

Sampling Point: W3-PFO

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-10	10YR 2/1	100					Silt loam	
10-15	10YR 6/1	100					Clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- X Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: Rock

Depth (inches): 15

Hydric Soil Present? **Yes** X **No** ___

Remarks:

Hydric soil is present in this area.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Pratt Corner Road West Project City/County: Franklin County Sampling Date: 10/22/2019

Applicant/Owner: State: MA Sampling Point: W3UPL

Investigator(s): Greg Russo Section, Township, Range: Shutesbury

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): None

Slope (%): 8-15 Lat: 42.43000238 Long: -72.46916810 Datum: NAD 83

Soil Map Unit Name: Chatfield-Hollis complex, 8 to 15 percent slopes, rocky NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID: ____

Remarks: (Explain alternative procedures here or in a separate report.)

Hydrophytic vegetation, hydric soil, and wetland hydrology are not present in this area. Area is not a wetland.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Wetland hydrology is not present in this area.

VEGETATION – Use scientific names of plants.

Sampling Point: W3-UPL

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Tsuga canadensis	55	Yes	FACU
2. Hamamelis virginiana	20	Yes	FACU
3. Quercus rubra	15	No	FACU
4.			
5.			
6.			
7.			
	95	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15)			
1. Kalmia latifolia	30	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
	30	= Total Cover	

Herb Stratum (Plot size: 5)			
1. Dendrolycopodium obscurum	10	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	10	= Total Cover	

Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
	0	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	135	x 4 =	520
UPL species	0	x 5 =	0
Column Totals:	135 (A)		520 (B)

Prevalence Index = B/A = 4.00

Hydrophytic Vegetation Indicators:

___ Rapid Test for Hydrophytic Vegetation

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks: (Include photo numbers here or on a separate sheet.)

Hydrophytic vegetation is not present in this area.

SOIL

Sampling Point: W3-UPL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-1	10YR 5/3	100					Silt loam	
1-8	10YR 5/4	100					Silt loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: Rock

Depth (inches): 8

Hydric Soil Present? **Yes** _____ **No** X

Remarks:

Hydric soil is not present in this area.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Pratt Corner Road West Project City/County: Franklin County Sampling Date: 10/22/2019

Applicant/Owner: _____ State: MA Sampling Point: W4PSS

Investigator(s): G. Russo, M. Boscow Section, Township, Range: Shutesbury

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Hillslope

Slope (%): 3-8 Lat: 42.43012295 Long: -72.46738220 Datum: NAD 83

Soil Map Unit Name: Chatfield-Hollis complex, 8 to 15 percent slopes, rocky NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No _____	**Is the Sampled Area within a Wetland?** Yes X No _____
Hydric Soil Present?	Yes X	No _____	If yes, optional Wetland Site ID: _____
Wetland Hydrology Present?	Yes X	No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

Hydrophytic vegetation, hydric soil, and wetland hydrology are present in this area. Area is a wetland.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- X Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No X	Depth (inches): _____
Water Table Present?	Yes _____	No X	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes X	No _____	Depth (inches): 0

Wetland Hydrology Present? Yes X No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Wetland hydrology is present in this area.

VEGETATION – Use scientific names of plants.

Sampling Point: W4-PSS

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	60 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1. Acer rubrum	30	Yes	FAC
2. Betula alleghaniensis	30	Yes	FAC
3.			
4.			
5.			
6.			
7.			
	60 = Total Cover		
Herb Stratum (Plot size: 5)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	0 = Total Cover		
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
	0 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	60	x 3 =	180
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	60 (A)		180 (B)

Prevalence Index = B/A = 3.00

Hydrophytic Vegetation Indicators:

- ___ Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- X Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

Hydrophytic vegetation is present in this area.

SOIL

Sampling Point: W4-PSS

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-8	10YR 2/1	100					Silt loam	
8-12	10YR 6/1	100					Sdy loam	Sandy loam

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- X Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: Rock

Depth (inches): 12

Hydric Soil Present? Yes X No ___

Remarks:

Hydric soil is present in this area.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Pratt Corner Road West Project City/County: Franklin County Sampling Date: 10/22/2019

Applicant/Owner: State: MA Sampling Point: W4UPL

Investigator(s): G. Russo, M. Boscow Section, Township, Range: Shutesbury

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): None

Slope (%): 3-8 Lat: 42.42998997 Long: -72.46720131 Datum: NAD 83

Soil Map Unit Name: Chatfield-Hollis complex, 3 to 8 percent slopes, rocky NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID: ____

Remarks: (Explain alternative procedures here or in a separate report.)

Hydrophytic vegetation, hydric soil, and wetland hydrology are not present in this area. Area is not a wetland.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Wetland hydrology is not present in this area.

VEGETATION – Use scientific names of plants.

Sampling Point: W4-UPL

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1. Quercus rubra	75	Yes	FACU
2. Tsuga canadensis	60	Yes	FACU
3. Kalmia latifolia	10	No	FACU
4.			
5.			
6.			
7.			
	145 = Total Cover		
Herb Stratum (Plot size: 5)			
1. Pinus strobus	10	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	10 = Total Cover		
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
	0 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	155	x 4 =	620
UPL species	0	x 5 =	0
Column Totals:	155 (A)		620 (B)

Prevalence Index = B/A = 4.0

Hydrophytic Vegetation Indicators:

___ Rapid Test for Hydrophytic Vegetation

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes _____ No X

Remarks: (Include photo numbers here or on a separate sheet.)

Hydrophytic vegetation is not present in this area.

SOIL

Sampling Point: W4-UPL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-20	10YR 5/6	100					Silt loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** X

Remarks:

Hydric soil is not present in this area.

Appendix D: NRCS Soil Report

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Franklin County, Massachusetts

October 31, 2019

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

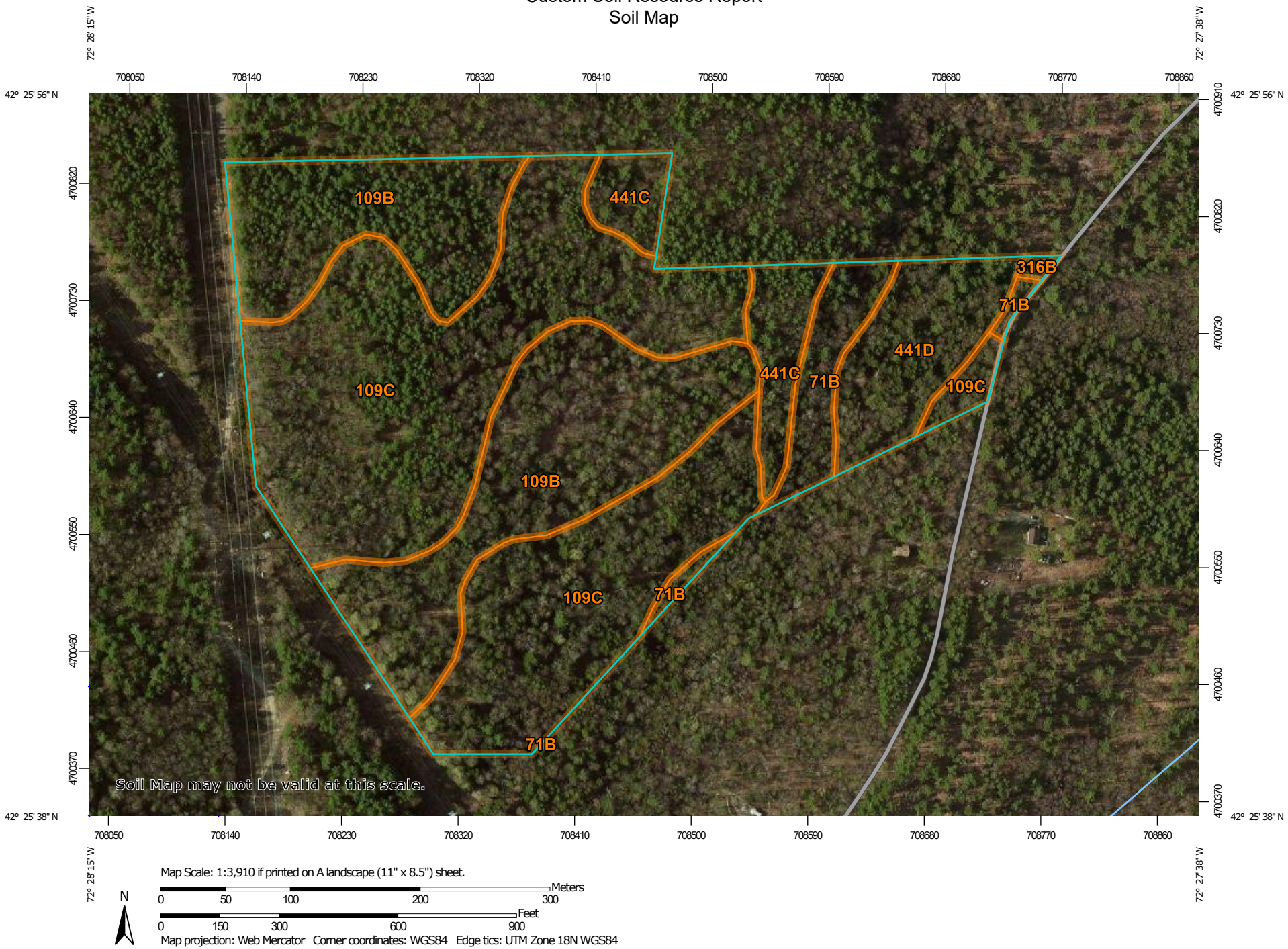
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



Map Scale: 1:3,910 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 50 100 200 300

Feet
0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Franklin County, Massachusetts
Survey Area Data: Version 14, Sep 12, 2019

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Sep 29, 2013—Oct 16, 2016

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
71B	Ridgebury fine sandy loam, 3 to 8 percent slopes, extremely stony	2.1	4.8%
109B	Chatfield-Hollis complex, 3 to 8 percent slopes, rocky	13.4	31.1%
109C	Chatfield-Hollis complex, 8 to 15 percent slopes, rocky	21.6	50.4%
316B	Scituate fine sandy loam, 3 to 8 percent slopes, very stony	0.1	0.3%
441C	Gloucester sandy loam, 8 to 15 percent slopes, very stony	2.5	5.8%
441D	Gloucester sandy loam, 15 to 25 percent slopes, very stony	3.3	7.7%
Totals for Area of Interest		**43.0**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not

mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Franklin County, Massachusetts

71B—Ridgebury fine sandy loam, 3 to 8 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2w69c
Elevation: 0 to 1,290 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Ridgebury, extremely stony, and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ridgebury, Extremely Stony

Setting

Landform: Depressions, drainageways, hills, ground moraines, drumlins
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope, head slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
A - 1 to 6 inches: fine sandy loam
Bw - 6 to 10 inches: sandy loam
Bg - 10 to 19 inches: gravelly sandy loam
Cd - 19 to 66 inches: gravelly sandy loam

Properties and qualities

Slope: 3 to 8 percent
Percent of area covered with surface fragments: 9.0 percent
Depth to restrictive feature: 15 to 35 inches to densic material
Natural drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water storage in profile: Low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Hydric soil rating: Yes

Minor Components

Woodbridge, extremely stony
Percent of map unit: 10 percent
Landform: Drumlins, hills, ground moraines
Landform position (two-dimensional): Footslope, summit, backslope
Landform position (three-dimensional): Crest, side slope
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Whitman, extremely stony
Percent of map unit: 8 percent
Landform: Depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Paxton, extremely stony
Percent of map unit: 2 percent
Landform: Drumlins, hills, ground moraines
Landform position (two-dimensional): Shoulder, summit, backslope
Landform position (three-dimensional): Crest, side slope
Down-slope shape: Linear, convex
Across-slope shape: Convex, linear
Hydric soil rating: No

109B—Chatfield-Hollis complex, 3 to 8 percent slopes, rocky

Map Unit Setting
National map unit symbol: 1hv7s
Elevation: 180 to 1,070 feet
Mean annual precipitation: 38 to 52 inches
Mean annual air temperature: 35 to 58 degrees F
Frost-free period: 127 to 178 days
Farmland classification: Not prime farmland

Map Unit Composition
Chatfield, rocky, and similar soils: 55 percent
Hollis, rocky, and similar soils: 25 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Chatfield, Rocky

Setting
Landform: Ground moraines
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex

Across-slope shape: Linear
Parent material: Loamy supraglacial till derived from gneiss and/or schist

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
A - 1 to 4 inches: fine sandy loam
Bw1 - 4 to 9 inches: gravelly fine sandy loam
Bw2 - 9 to 19 inches: cobbly fine sandy loam
BC - 19 to 30 inches: sandy loam
C1 - 30 to 34 inches: gravelly sandy loam
C2 - 34 to 37 inches: gravelly sandy loam
R - 37 to 65 inches: bedrock

Properties and qualities

Slope: 3 to 8 percent
Percent of area covered with surface fragments: 2.1 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 5.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B
Hydric soil rating: No

Description of Hollis, Rocky

Setting

Landform: Upland slopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Loamy supraglacial till derived from gneiss and/or schist

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
Oa - 1 to 3 inches: highly decomposed plant material
A - 3 to 4 inches: fine sandy loam
Bw - 4 to 15 inches: cobbly fine sandy loam
R - 15 to 65 inches: bedrock

Properties and qualities

Slope: 3 to 8 percent
Percent of area covered with surface fragments: 2.1 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Natural drainage class: Somewhat excessively drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 0.60 in/hr)

Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 2.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Paxton, very stony

Percent of map unit: 4 percent
Landform: Drumlins, ground moraines
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Montauk, very stony

Percent of map unit: 4 percent
Landform: Drumlins, ground moraines
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Canton, rocky

Percent of map unit: 4 percent
Landform: Hillslopes, valley sides, ground moraines
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Charlton, rocky

Percent of map unit: 4 percent
Landform: Valley sides on moraines, toes on moraines
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Ridgebury, very stony

Percent of map unit: 1 percent
Landform: Depressions on ground moraines, depressions on drumlins
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear, convex
Hydric soil rating: Yes

Rock outcrop
Percent of map unit: 1 percent
Hydric soil rating: Unranked

Newfields, very stony
Percent of map unit: 1 percent
Landform: Depressions on ground moraines, swales on ground moraines
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

Swansea
Percent of map unit: 1 percent
Landform: Outwash plains, outwash terraces, ground moraines
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

109C—Chatfield-Hollis complex, 8 to 15 percent slopes, rocky

Map Unit Setting
National map unit symbol: 2w69l
Elevation: 110 to 1,320 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition
Chatfield, very stony, and similar soils: 55 percent
Hollis, very stony, and similar soils: 30 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Chatfield, Very Stony

Setting
Landform: Ridges, hills
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Crest, side slope, nose slope
Down-slope shape: Convex
Across-slope shape: Linear, convex
Parent material: Coarse-loamy melt-out till derived from granite, gneiss, and/or schist

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 2 inches: fine sandy loam
Bw - 2 to 30 inches: gravelly fine sandy loam
2R - 30 to 40 inches: bedrock

Properties and qualities

Slope: 8 to 15 percent
Percent of area covered with surface fragments: 1.6 percent
Depth to restrictive feature: 20 to 41 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water storage in profile: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B
Hydric soil rating: No

Description of Hollis, Very Stony

Setting

Landform: Ridges, hills
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Nose slope, crest, side slope
Down-slope shape: Convex
Across-slope shape: Linear, convex
Parent material: Coarse-loamy melt-out till derived from granite, gneiss, and/or schist

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
A - 2 to 7 inches: gravelly fine sandy loam
Bw - 7 to 16 inches: gravelly fine sandy loam
2R - 16 to 26 inches: bedrock

Properties and qualities

Slope: 8 to 15 percent
Percent of area covered with surface fragments: 1.6 percent
Depth to restrictive feature: 8 to 23 inches to lithic bedrock
Natural drainage class: Somewhat excessively drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water storage in profile: Very low (about 2.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Charlton, very stony

Percent of map unit: 8 percent
Landform: Ridges, hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear, convex
Across-slope shape: Convex
Hydric soil rating: No

Paxton, very stony

Percent of map unit: 4 percent
Landform: Drumlins, hills, ground moraines
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Hydric soil rating: No

Leicester, very stony

Percent of map unit: 2 percent
Landform: Depressions, drainageways, hills, ground moraines
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear, concave
Across-slope shape: Concave
Hydric soil rating: Yes

Rock outcrop

Percent of map unit: 1 percent
Landform: Ridges, hills
Hydric soil rating: No

316B—Scituate fine sandy loam, 3 to 8 percent slopes, very stony

Map Unit Setting

National map unit symbol: 9c7w
Elevation: 330 to 1,060 feet
Mean annual precipitation: 38 to 50 inches
Mean annual air temperature: 35 to 58 degrees F
Frost-free period: 127 to 178 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Scituate, very stony, and similar soils: 65 percent
Minor components: 35 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Scituate, Very Stony

Setting

Landform: Moraines, drumlins
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex, linear
Parent material: Friable loamy supraglacial till derived from gneiss over firm sandy lodgment till derived from gneiss

Typical profile

Oa - 0 to 2 inches: highly decomposed plant material
A - 2 to 4 inches: fine sandy loam
Ap - 4 to 8 inches: fine sandy loam
Bw1 - 8 to 18 inches: stony fine sandy loam
Bw2 - 18 to 20 inches: stony fine sandy loam
Bw3 - 20 to 27 inches: sandy loam
BC - 27 to 31 inches: sandy loam
2Cd1 - 31 to 55 inches: gravelly loamy fine sand
2Cd2 - 55 to 65 inches: loamy fine sand

Properties and qualities

Slope: 3 to 8 percent
Percent of area covered with surface fragments: 2.1 percent
Depth to restrictive feature: 20 to 36 inches to densic material
Natural drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 15 to 31 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: C/D
Hydric soil rating: No

Minor Components

Woodbridge, very stony

Percent of map unit: 10 percent
Landform: Moraines, drumlins
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Ridgebury, very stony

Percent of map unit: 10 percent
Landform: Depressions on ground moraines, depressions on drumlins
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear, convex
Hydric soil rating: Yes

Montauk, very stony

Percent of map unit: 10 percent
Landform: Drumlins, ground moraines
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Newfields, very stony

Percent of map unit: 5 percent
Landform: Depressions on ground moraines, swales on ground moraines
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

441C—Gloucester sandy loam, 8 to 15 percent slopes, very stony

Map Unit Setting

National map unit symbol: 9c7p
Elevation: 380 to 1,040 feet
Mean annual precipitation: 38 to 50 inches
Mean annual air temperature: 35 to 58 degrees F
Frost-free period: 127 to 178 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Gloucester, very stony, and similar soils: 87 percent
Minor components: 13 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Gloucester, Very Stony

Setting

Landform: Moraines, upland slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex

Parent material: Sandy and gravelly supraglacial till derived from gneiss

Typical profile

Oa - 0 to 2 inches: highly decomposed plant material
A - 2 to 6 inches: sandy loam
Bw1 - 6 to 15 inches: gravelly sandy loam
Bw2 - 15 to 29 inches: very gravelly loamy coarse sand
C - 29 to 65 inches: very gravelly loamy coarse sand

Properties and qualities

Slope: 8 to 15 percent
Percent of area covered with surface fragments: 2.1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 2.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Canton, very stony

Percent of map unit: 5 percent
Landform: Valley sides, hillslopes, ground moraines
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Montauk, very stony

Percent of map unit: 5 percent
Landform: Drumlins, ground moraines
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Newfields, very stony

Percent of map unit: 2 percent
Landform: Depressions on ground moraines, swales on ground moraines
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

Ridgebury, very stony

Percent of map unit: 1 percent
Landform: Depressions on ground moraines, depressions on drumlins
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear, convex
Hydric soil rating: Yes

441D—Gloucester sandy loam, 15 to 25 percent slopes, very stony

Map Unit Setting

National map unit symbol: 9c7q
Elevation: 360 to 1,040 feet
Mean annual precipitation: 38 to 50 inches
Mean annual air temperature: 35 to 58 degrees F
Frost-free period: 127 to 178 days
Farmland classification: Not prime farmland

Map Unit Composition

Gloucester, very stony, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Gloucester, Very Stony

Setting

Landform: Moraines, upland slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Sandy and gravelly supraglacial till derived from gneiss

Typical profile

Oa - 0 to 2 inches: highly decomposed plant material
A - 2 to 6 inches: sandy loam
Bw1 - 6 to 15 inches: gravelly sandy loam
Bw2 - 15 to 29 inches: very gravelly loamy coarse sand
C - 29 to 65 inches: very gravelly loamy coarse sand

Properties and qualities

Slope: 15 to 25 percent
Percent of area covered with surface fragments: 2.1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches

Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 2.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Canton, very stony

Percent of map unit: 5 percent
Landform: Valley sides, hillslopes, ground moraines
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Montauk, very stony

Percent of map unit: 5 percent
Landform: Drumlins, ground moraines
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

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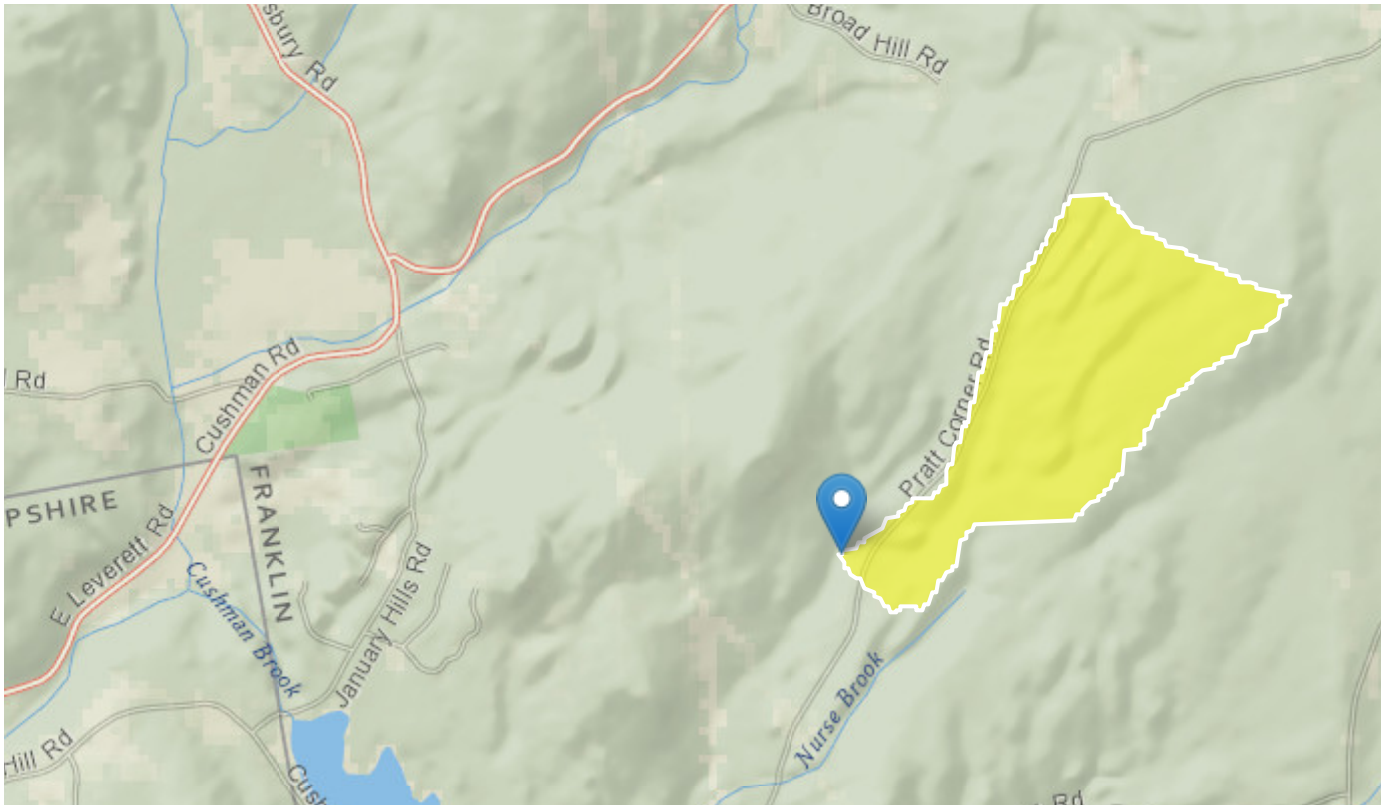
Appendix E: USGS StreamStats Report

StreamStats Report (Stream S4)

Region ID: MA
Workspace ID: MA20191113202859184000
Clicked Point (Latitude, Longitude): 42.43077, -72.46367
Time: 2019-11-13 15:29:14 -0500



Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	0.33	square miles
ELEV	Mean Basin Elevation	934	feet
LC06STOR	Percentage of water bodies and wetlands determined from the NLCD 2006	0	percent
DRFTPERSTR	Area of stratified drift per unit of stream length	0	square mile per mile
MAREGION	Region of Massachusetts 0 for Eastern 1 for Western	1	dimensionless

Parameter Code	Parameter Description	Value	Unit
BSLDEM250	Mean basin slope computed from 1:250K DEM	5.647	percent
ACRSDFT	Area underlain by stratified drift	0	square miles
BSLDEM10M	Mean basin slope computed from 10 m DEM	8.794	percent
CENTROIDX	Basin centroid horizontal (x) location in state plane coordinates	121512.4	meters
CENTROIDY	Basin centroid vertical (y) location in state plane units	909941.4	meters
CRSDFT	Percentage of area of coarse-grained stratified drift	0	percent
FOREST	Percentage of area covered by forest	100	percent
LAKEAREA	Percentage of Lakes and Ponds	0	percent
LC11DEV	Percentage of developed (urban) land from NLCD 2011 classes 21-24	3.83	percent
LC11IMP	Average percentage of impervious area determined from NLCD 2011 impervious dataset	0.0925	percent
MAXTEMPC	Mean annual maximum air temperature over basin area, in degrees Centigrade	13.5	feet per mi
OUTLETX	Basin outlet horizontal (x) location in state plane coordinates	120705	feet
OUTLETY	Basin outlet vertical (y) location in state plane coordinates	909365	feet
PCTSNDGRV	Percentage of land surface underlain by sand and gravel deposits	0	percent
PRECPRIS00	Basin average mean annual precipitation for 1971 to 2000 from PRISM	49	inches
STRMTOT	total length of all mapped streams (1:24,000-scale) in the basin	0.81	miles
WETLAND	Percentage of Wetlands	1.28	percent

Peak-Flow Statistics Parameters[Peak Statewide 2016 5156]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.33	square miles	0.16	512
ELEV	Mean Basin Elevation	934	feet	80.6	1948
LC06STOR	Percent Storage from NLCD2006	0	percent	0	32.3

Peak-Flow Statistics Flow Report[Peak Statewide 2016 5156]

PII: Prediction Interval-Lower, PIu: Prediction Interval-Upper, SEp: Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	PII	PIu	SEp
2 Year Peak Flood	25.9	ft^3/s	12.8	52.3	42.3
5 Year Peak Flood	45	ft^3/s	21.9	92.5	43.4
10 Year Peak Flood	61.2	ft^3/s	29	129	44.7
25 Year Peak Flood	85.6	ft^3/s	39.1	187	47.1
50 Year Peak Flood	106	ft^3/s	46.9	241	49.4
100 Year Peak Flood	129	ft^3/s	55.1	303	51.8
200 Year Peak Flood	155	ft^3/s	63.8	375	54.1
500 Year Peak Flood	192	ft^3/s	86.3	428	57.6

Peak-Flow Statistics Citations

Zarriello, P.J.,2017, Magnitude of flood flows at selected annual exceedance probabilities for streams in Massachusetts: U.S. Geological Survey Scientific Investigations Report 2016–5156, 99 p. (https://dx.doi.org/10.3133/sir20165156)

Flow-Duration Statistics Parameters[Statewide Low Flow WRIR00 4135]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.33	square miles	1.61	149
DRFTPERSTR	Stratified Drift per Stream Length	0	square mile per mile	0	1.29
MAREGION	Massachusetts Region	1	dimensionless	0	1

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
BSLDEM250	Mean Basin Slope from 250K DEM	5.647	percent	0.32	24.6

Flow-Duration Statistics Disclaimers[Statewide Low Flow WRIR00 4135]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Flow-Duration Statistics Flow Report[Statewide Low Flow WRIR00 4135]

Statistic	Value	Unit
50 Percent Duration	0.308	ft^3/s
60 Percent Duration	0.179	ft^3/s
70 Percent Duration	0.108	ft^3/s
75 Percent Duration	0.0818	ft^3/s
80 Percent Duration	0.0617	ft^3/s
85 Percent Duration	0.0444	ft^3/s
90 Percent Duration	0.0295	ft^3/s
95 Percent Duration	0.0169	ft^3/s
98 Percent Duration	0.0111	ft^3/s
99 Percent Duration	0.00761	ft^3/s

Flow-Duration Statistics Citations

Ries, K.G., III,2000, Methods for estimating low-flow statistics for Massachusetts streams: U.S. Geological Survey Water Resources Investigations Report 00-4135, 81 p. (http://pubs.usgs.gov/wri/wri004135/)

Low-Flow Statistics Parameters[Statewide Low Flow WRIR00 4135]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.33	square miles	1.61	149
BSLDEM250	Mean Basin Slope from 250K DEM	5.647	percent	0.32	24.6

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRFTPERSTR	Stratified Drift per Stream Length	0	square mile per mile	0	1.29
MAREGION	Massachusetts Region	1	dimensionless	0	1

Low-Flow Statistics Disclaimers[Statewide Low Flow WRIR00 4135]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Low-Flow Statistics Flow Report[Statewide Low Flow WRIR00 4135]

Statistic	Value	Unit
7 Day 2 Year Low Flow	0.0174	ft^3/s
7 Day 10 Year Low Flow	0.0064	ft^3/s

Low-Flow Statistics Citations

Ries, K.G., III,2000, Methods for estimating low-flow statistics for Massachusetts streams: U.S. Geological Survey Water Resources Investigations Report 00-4135, 81 p. (http://pubs.usgs.gov/wri/wri004135/)

August Flow-Duration Statistics Parameters[Statewide Low Flow WRIR00 4135]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.33	square miles	1.61	149
BSLDEM250	Mean Basin Slope from 250K DEM	5.647	percent	0.32	24.6
DRFTPERSTR	Stratified Drift per Stream Length	0	square mile per mile	0	1.29
MAREGION	Massachusetts Region	1	dimensionless	0	1

August Flow-Duration Statistics Disclaimers[Statewide Low Flow WRIR00 4135]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

August Flow-Duration Statistics Flow Report[Statewide Low Flow WRIR00 4135]

Statistic	Value	Unit
August 50 Percent Duration	0.0478	ft^3/s

August Flow-Duration Statistics Citations

Ries, K.G., III,2000, Methods for estimating low-flow statistics for Massachusetts streams: U.S. Geological Survey Water Resources Investigations Report 00-4135, 81 p. (http://pubs.usgs.gov/wri/wri004135/)

Bankfull Statistics Parameters[Bankfull Statewide SIR2013 5155]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.33	square miles	0.6	329
BSLDEM10M	Mean Basin Slope from 10m DEM	8.794	percent	2.2	23.9

Bankfull Statistics Disclaimers[Bankfull Statewide SIR2013 5155]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Bankfull Statistics Flow Report[Bankfull Statewide SIR2013 5155]

Statistic	Value	Unit
Bankfull Width	10.1	ft
Bankfull Depth	0.71	ft
Bankfull Area	7.06	ft^2
Bankfull Streamflow	18.9	ft^3/s

Bankfull Statistics Citations

Bent, G.C., and Waite, A.M.,2013, Equations for estimating bankfull channel geometry and discharge for streams in Massachusetts: U.S. Geological Survey Scientific Investigations Report 2013–5155, 62 p., (http://pubs.usgs.gov/sir/2013/5155/)

Probability Statistics Parameters[Perennial Flow Probability]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.33	square miles	0.01	1.99
PCTSNDGRV	Percent Underlain By Sand And Gravel	0	percent	0	100
FOREST	Percent Forest	100	percent	0	100
MAREGION	Massachusetts Region	1	dimensionless	0	1

Probability Statistics Flow Report[Perennial Flow Probability]

PIl: Prediction Interval-Lower, PIu: Prediction Interval-Upper, SEp: Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	PC
Probability Stream Flowing Perennially	0.533	dim	71

Probability Statistics Citations

Bent, G.C., and Steeves, P.A.,2006, A revised logistic regression equation and an automated procedure for mapping the probability of a stream flowing perennially in Massachusetts: U.S. Geological Survey Scientific Investigations Report 2006–5031, 107 p. (http://pubs.usgs.gov/sir/2006/5031/pdfs/SIR_2006-5031rev.pdf)

Application Version: 4.3.8

StreamStats Report (Stream S5 north of convergence with stream S4)

Region ID: MA
Workspace ID: MA20191113202408455000
Clicked Point (Latitude, Longitude): 42.43090, -72.46380
Time: 2019-11-13 15:24:24 -0500

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	0.17	square miles
ELEV	Mean Basin Elevation	822	feet
LC06STOR	Percentage of water bodies and wetlands determined from the NLCD 2006	6.52	percent
DRFTPERSTR	Area of stratified drift per unit of stream length	0	square mile per mile
MAREGION	Region of Massachusetts 0 for Eastern 1 for Western	1	dimensionless

Parameter Code	Parameter Description	Value	Unit
BSLDEM250	Mean basin slope computed from 1:250K DEM	6.18	percent
BSLDEM10M	Mean basin slope computed from 10 m DEM	9.473	percent
PCTSNDGRV	Percentage of land surface underlain by sand and gravel deposits	0	percent
FOREST	Percentage of area covered by forest	99.26	percent
ACRSDFT	Area underlain by stratified drift	0	square miles
CENTROIDX	Basin centroid horizontal (x) location in state plane coordinates	120833.9	meters
CENTROIDY	Basin centroid vertical (y) location in state plane units	909820.4	meters
CRSDFT	Percentage of area of coarse-grained stratified drift	0	percent
LAKEAREA	Percentage of Lakes and Ponds	0	percent
LC11DEV	Percentage of developed (urban) land from NLCD 2011 classes 21-24	2.89	percent
LC11IMP	Average percentage of impervious area determined from NLCD 2011 impervious dataset	0.11	percent
MAXTEMPC	Mean annual maximum air temperature over basin area, in degrees Centigrade	13.7	feet per mi
OUTLETX	Basin outlet horizontal (x) location in state plane coordinates	120695	feet
OUTLETY	Basin outlet vertical (y) location in state plane coordinates	909375	feet
PRECPRIS00	Basin average mean annual precipitation for 1971 to 2000 from PRISM	48.5	inches
STRMTOT	total length of all mapped streams (1:24,000-scale) in the basin	0.9	miles
WETLAND	Percentage of Wetlands	3.35	percent

Peak-Flow Statistics Parameters[Peak Statewide 2016 5156]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.17	square miles	0.16	512
ELEV	Mean Basin Elevation	822	feet	80.6	1948
LC06STOR	Percent Storage from NLCD2006	6.52	percent	0	32.3

Peak-Flow Statistics Flow Report[Peak Statewide 2016 5156]

PII: Prediction Interval-Lower, PIu: Prediction Interval-Upper, SEp: Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	PII	PIu	SEp
2 Year Peak Flood	12.2	ft^3/s	6.07	24.7	42.3
5 Year Peak Flood	21.4	ft^3/s	10.4	43.9	43.4
10 Year Peak Flood	29.2	ft^3/s	13.8	61.4	44.7
25 Year Peak Flood	40.8	ft^3/s	18.6	89.3	47.1
50 Year Peak Flood	50.7	ft^3/s	22.4	115	49.4
100 Year Peak Flood	61.6	ft^3/s	26.3	144	51.8
200 Year Peak Flood	73.6	ft^3/s	30.4	178	54.1
500 Year Peak Flood	91.3	ft^3/s	40.6	205	57.6

Peak-Flow Statistics Citations

Zarriello, P.J.,2017, Magnitude of flood flows at selected annual exceedance probabilities for streams in Massachusetts: U.S. Geological Survey Scientific Investigations Report 2016–5156, 99 p. (https://dx.doi.org/10.3133/sir20165156)

Flow-Duration Statistics Parameters[Statewide Low Flow WRIR00 4135]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.17	square miles	1.61	149
DRFTPERSTR	Stratified Drift per Stream Length	0	square mile per mile	0	1.29
MAREGION	Massachusetts Region	1	dimensionless	0	1

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
BSLDEM250	Mean Basin Slope from 250K DEM	6.18	percent	0.32	24.6

Flow-Duration Statistics Disclaimers[Statewide Low Flow WRIR00 4135]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Flow-Duration Statistics Flow Report[Statewide Low Flow WRIR00 4135]

Statistic	Value	Unit
50 Percent Duration	0.157	ft^3/s
60 Percent Duration	0.0894	ft^3/s
70 Percent Duration	0.0529	ft^3/s
75 Percent Duration	0.04	ft^3/s
80 Percent Duration	0.0311	ft^3/s
85 Percent Duration	0.0222	ft^3/s
90 Percent Duration	0.0149	ft^3/s
95 Percent Duration	0.00839	ft^3/s
98 Percent Duration	0.00547	ft^3/s
99 Percent Duration	0.00366	ft^3/s

Flow-Duration Statistics Citations

Ries, K.G., III,2000, Methods for estimating low-flow statistics for Massachusetts streams: U.S. Geological Survey Water Resources Investigations Report 00-4135, 81 p. (http://pubs.usgs.gov/wri/wri004135/)

Low-Flow Statistics Parameters[Statewide Low Flow WRIR00 4135]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.17	square miles	1.61	149
BSLDEM250	Mean Basin Slope from 250K DEM	6.18	percent	0.32	24.6

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRFTPERSTR	Stratified Drift per Stream Length	0	square mile per mile	0	1.29
MAREGION	Massachusetts Region	1	dimensionless	0	1

Low-Flow Statistics Disclaimers[Statewide Low Flow WRIR00 4135]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Low-Flow Statistics Flow Report[Statewide Low Flow WRIR00 4135]

Statistic	Value	Unit
7 Day 2 Year Low Flow	0.00841	ft^3/s
7 Day 10 Year Low Flow	0.00309	ft^3/s

Low-Flow Statistics Citations

Ries, K.G., III,2000, Methods for estimating low-flow statistics for Massachusetts streams: U.S. Geological Survey Water Resources Investigations Report 00-4135, 81 p. (http://pubs.usgs.gov/wri/wri004135/)

August Flow-Duration Statistics Parameters[Statewide Low Flow WRIR00 4135]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.17	square miles	1.61	149
BSLDEM250	Mean Basin Slope from 250K DEM	6.18	percent	0.32	24.6
DRFTPERSTR	Stratified Drift per Stream Length	0	square mile per mile	0	1.29
MAREGION	Massachusetts Region	1	dimensionless	0	1

August Flow-Duration Statistics Disclaimers[Statewide Low Flow WRIR00 4135]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

August Flow-Duration Statistics Flow Report[Statewide Low Flow WRIR00 4135]

Statistic	Value	Unit
August 50 Percent Duration	0.0237	ft^3/s

August Flow-Duration Statistics Citations

Ries, K.G., III,2000, Methods for estimating low-flow statistics for Massachusetts streams: U.S. Geological Survey Water Resources Investigations Report 00-4135, 81 p. (http://pubs.usgs.gov/wri/wri004135/)

Bankfull Statistics Parameters[Bankfull Statewide SIR2013 5155]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.17	square miles	0.6	329
BSLDEM10M	Mean Basin Slope from 10m DEM	9.473	percent	2.2	23.9

Bankfull Statistics Disclaimers[Bankfull Statewide SIR2013 5155]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Bankfull Statistics Flow Report[Bankfull Statewide SIR2013 5155]

Statistic	Value	Unit
Bankfull Width	7.87	ft
Bankfull Depth	0.593	ft
Bankfull Area	4.59	ft^2
Bankfull Streamflow	12.1	ft^3/s

Bankfull Statistics Citations

Bent, G.C., and Waite, A.M.,2013, Equations for estimating bankfull channel geometry and discharge for streams in Massachusetts: U.S. Geological Survey Scientific Investigations Report 2013–5155, 62 p., (http://pubs.usgs.gov/sir/2013/5155/)

Probability Statistics Parameters[Perennial Flow Probability]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.17	square miles	0.01	1.99
PCTSNDGRV	Percent Underlain By Sand And Gravel	0	percent	0	100
FOREST	Percent Forest	99.26	percent	0	100
MAREGION	Massachusetts Region	1	dimensionless	0	1

Probability Statistics Flow Report[Perennial Flow Probability]

PIl: Prediction Interval-Lower, PIu: Prediction Interval-Upper, SEp: Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	PC
Probability Stream Flowing Perennially	0.376	dim	71

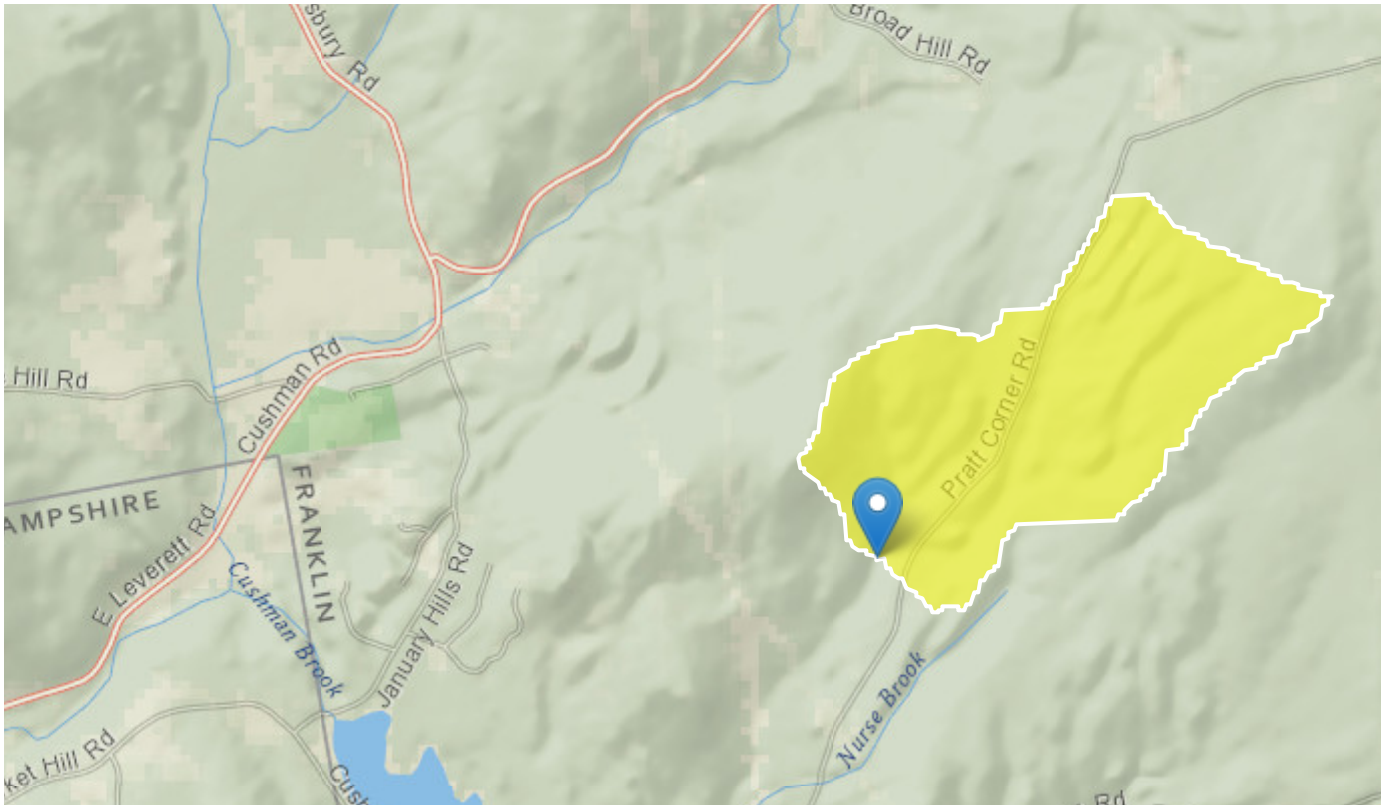
Probability Statistics Citations

Bent, G.C., and Steeves, P.A.,2006, A revised logistic regression equation and an automated procedure for mapping the probability of a stream flowing perennially in Massachusetts: U.S. Geological Survey Scientific Investigations Report 2006–5031, 107 p. (http://pubs.usgs.gov/sir/2006/5031/pdfs/SIR_2006-5031rev.pdf)

Application Version: 4.3.8

StreamStats Report (Stream S5 south of convergence with stream S4)

Region ID: MA
Workspace ID: MA20191113203201471000
Clicked Point (Latitude, Longitude): 42.43066, -72.46389
Time: 2019-11-13 15:32:17 -0500



Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	0.5	square miles
ELEV	Mean Basin Elevation	896	feet
LC06STOR	Percentage of water bodies and wetlands determined from the NLCD 2006	2.18	percent
DRFTPERSTR	Area of stratified drift per unit of stream length	0	square mile per mile
MAREGION	Region of Massachusetts 0 for Eastern 1 for Western	1	dimensionless

Parameter Code	Parameter Description	Value	Unit
BSLDEM250	Mean basin slope computed from 1:250K DEM	5.832	percent
ACRSDFT	Area underlain by stratified drift	0	square miles
BSLDEM10M	Mean basin slope computed from 10 m DEM	9.019	percent
CENTROIDX	Basin centroid horizontal (x) location in state plane coordinates	121282.7	meters
CENTROIDY	Basin centroid vertical (y) location in state plane units	909899.3	meters
CRSDFT	Percentage of area of coarse-grained stratified drift	0	percent
FOREST	Percentage of area covered by forest	99.75	percent
LAKEAREA	Percentage of Lakes and Ponds	0	percent
LC11DEV	Percentage of developed (urban) land from NLCD 2011 classes 21-24	3.5	percent
LC11IMP	Average percentage of impervious area determined from NLCD 2011 impervious dataset	0.0973	percent
MAXTEMPC	Mean annual maximum air temperature over basin area, in degrees Centigrade	13.5	feet per mi
OUTLETX	Basin outlet horizontal (x) location in state plane coordinates	120685	feet
OUTLETY	Basin outlet vertical (y) location in state plane coordinates	909355	feet
PCTSNDGRV	Percentage of land surface underlain by sand and gravel deposits	0	percent
PRECPRIS00	Basin average mean annual precipitation for 1971 to 2000 from PRISM	48.8	inches
STRMTOT	total length of all mapped streams (1:24,000-scale) in the basin	1.73	miles
WETLAND	Percentage of Wetlands	1.97	percent

Peak-Flow Statistics Parameters[Peak Statewide 2016 5156]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.5	square miles	0.16	512
ELEV	Mean Basin Elevation	896	feet	80.6	1948
LC06STOR	Percent Storage from NLCD2006	2.18	percent	0	32.3

Peak-Flow Statistics Flow Report[Peak Statewide 2016 5156]

PII: Prediction Interval-Lower, PIu: Prediction Interval-Upper, SEp: Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	PII	PIu	SEp
2 Year Peak Flood	33.6	ft^3/s	16.7	67.4	42.3
5 Year Peak Flood	58.1	ft^3/s	28.5	118	43.4
10 Year Peak Flood	78.6	ft^3/s	37.5	165	44.7
25 Year Peak Flood	109	ft^3/s	50.3	238	47.1
50 Year Peak Flood	136	ft^3/s	60.3	305	49.4
100 Year Peak Flood	164	ft^3/s	70.7	383	51.8
200 Year Peak Flood	196	ft^3/s	81.7	472	54.1
500 Year Peak Flood	243	ft^3/s	107	550	57.6

Peak-Flow Statistics Citations

Zarriello, P.J.,2017, Magnitude of flood flows at selected annual exceedance probabilities for streams in Massachusetts: U.S. Geological Survey Scientific Investigations Report 2016–5156, 99 p. (https://dx.doi.org/10.3133/sir20165156)

Flow-Duration Statistics Parameters[Statewide Low Flow WRIR00 4135]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.5	square miles	1.61	149
DRFTPERSTR	Stratified Drift per Stream Length	0	square mile per mile	0	1.29
MAREGION	Massachusetts Region	1	dimensionless	0	1

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
BSLDEM250	Mean Basin Slope from 250K DEM	5.832	percent	0.32	24.6

Flow-Duration Statistics Disclaimers[Statewide Low Flow WRIR00 4135]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Flow-Duration Statistics Flow Report[Statewide Low Flow WRIR00 4135]

Statistic	Value	Unit
50 Percent Duration	0.471	ft^3/s
60 Percent Duration	0.278	ft^3/s
70 Percent Duration	0.168	ft^3/s
75 Percent Duration	0.128	ft^3/s
80 Percent Duration	0.0964	ft^3/s
85 Percent Duration	0.0701	ft^3/s
90 Percent Duration	0.0468	ft^3/s
95 Percent Duration	0.0273	ft^3/s
98 Percent Duration	0.0181	ft^3/s
99 Percent Duration	0.0125	ft^3/s

Flow-Duration Statistics Citations

Ries, K.G., III,2000, Methods for estimating low-flow statistics for Massachusetts streams: U.S. Geological Survey Water Resources Investigations Report 00-4135, 81 p. (http://pubs.usgs.gov/wri/wri004135/)

Low-Flow Statistics Parameters[Statewide Low Flow WRIR00 4135]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.5	square miles	1.61	149
BSLDEM250	Mean Basin Slope from 250K DEM	5.832	percent	0.32	24.6

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRFTPERSTR	Stratified Drift per Stream Length	0	square mile per mile	0	1.29
MAREGION	Massachusetts Region	1	dimensionless	0	1

Low-Flow Statistics Disclaimers[Statewide Low Flow WRIR00 4135]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Low-Flow Statistics Flow Report[Statewide Low Flow WRIR00 4135]

Statistic	Value	Unit
7 Day 2 Year Low Flow	0.028	ft^3/s
7 Day 10 Year Low Flow	0.0106	ft^3/s

Low-Flow Statistics Citations

Ries, K.G., III,2000, Methods for estimating low-flow statistics for Massachusetts streams: U.S. Geological Survey Water Resources Investigations Report 00-4135, 81 p. (http://pubs.usgs.gov/wri/wri004135/)

August Flow-Duration Statistics Parameters[Statewide Low Flow WRIR00 4135]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.5	square miles	1.61	149
BSLDEM250	Mean Basin Slope from 250K DEM	5.832	percent	0.32	24.6
DRFTPERSTR	Stratified Drift per Stream Length	0	square mile per mile	0	1.29
MAREGION	Massachusetts Region	1	dimensionless	0	1

August Flow-Duration Statistics Disclaimers[Statewide Low Flow WRIR00 4135]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

August Flow-Duration Statistics Flow Report[Statewide Low Flow WRIR00 4135]

Statistic	Value	Unit
August 50 Percent Duration	0.0753	ft^3/s

August Flow-Duration Statistics Citations

Ries, K.G., III,2000, Methods for estimating low-flow statistics for Massachusetts streams: U.S. Geological Survey Water Resources Investigations Report 00-4135, 81 p. (http://pubs.usgs.gov/wri/wri004135/)

Bankfull Statistics Parameters[Bankfull Statewide SIR2013 5155]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.5	square miles	0.6	329
BSLDEM10M	Mean Basin Slope from 10m DEM	9.019	percent	2.2	23.9

Bankfull Statistics Disclaimers[Bankfull Statewide SIR2013 5155]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Bankfull Statistics Flow Report[Bankfull Statewide SIR2013 5155]

Statistic	Value	Unit
Bankfull Width	11.9	ft
Bankfull Depth	0.803	ft
Bankfull Area	9.45	ft^2
Bankfull Streamflow	26.4	ft^3/s

Bankfull Statistics Citations

Bent, G.C., and Waite, A.M.,2013, Equations for estimating bankfull channel geometry and discharge for streams in Massachusetts: U.S. Geological Survey Scientific Investigations Report 2013–5155, 62 p., (http://pubs.usgs.gov/sir/2013/5155/)

Probability Statistics Parameters[Perennial Flow Probability]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.5	square miles	0.01	1.99
PCTSNDGRV	Percent Underlain By Sand And Gravel	0	percent	0	100
FOREST	Percent Forest	99.75	percent	0	100
MAREGION	Massachusetts Region	1	dimensionless	0	1

Probability Statistics Flow Report[Perennial Flow Probability]

PIl: Prediction Interval-Lower, PIu: Prediction Interval-Upper, SEp: Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	PC
Probability Stream Flowing Perennially	0.634	dim	71

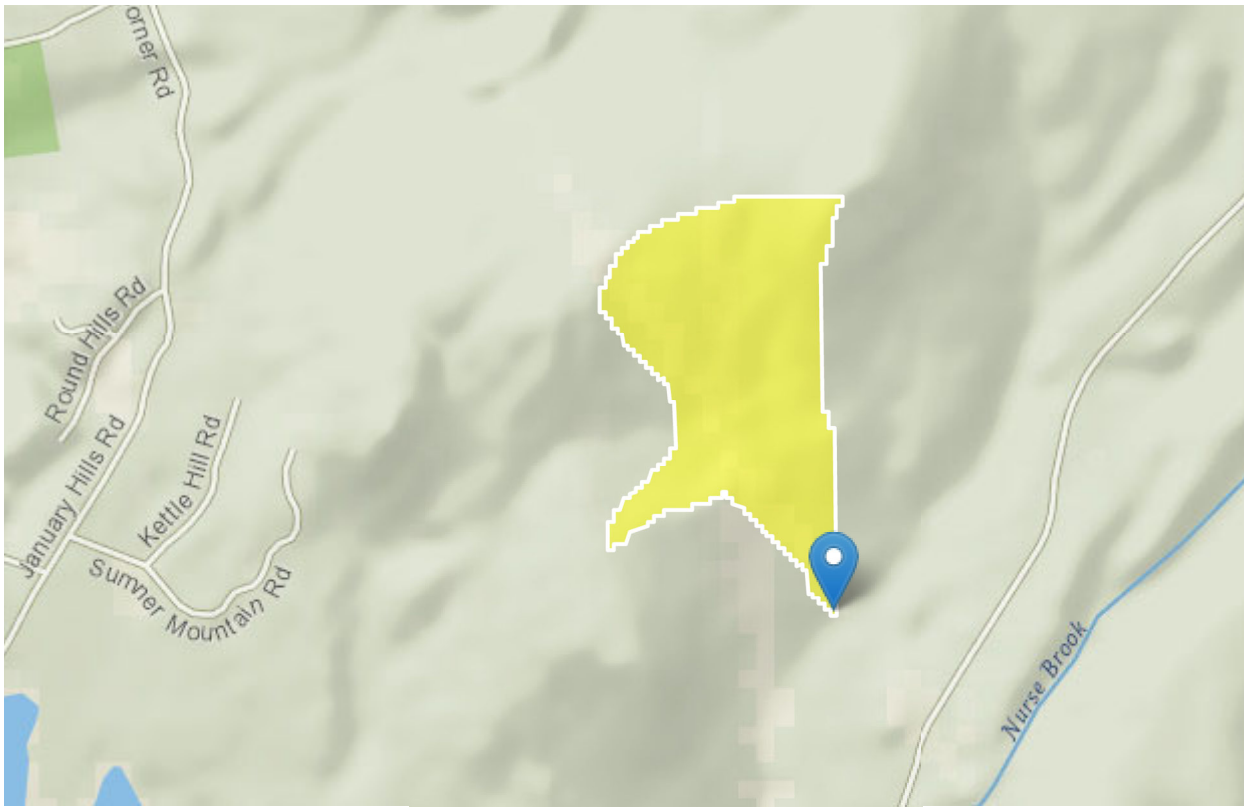
Probability Statistics Citations

Bent, G.C., and Steeves, P.A.,2006, A revised logistic regression equation and an automated procedure for mapping the probability of a stream flowing perennially in Massachusetts: U.S. Geological Survey Scientific Investigations Report 2006–5031, 107 p. (http://pubs.usgs.gov/sir/2006/5031/pdfs/SIR_2006-5031rev.pdf)

Application Version: 4.3.8

Pratt East S1, S2, S3 StreamStats Report

Region ID: MA
Workspace ID: MA20191108223434548000
Clicked Point (Latitude, Longitude): 42.42714, -72.46772
Time: 2019-11-08 17:34:52 -0500



Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	0.0752	square miles
ELEV	Mean Basin Elevation	787	feet
LC06STOR	Percentage of water bodies and wetlands determined from the NLCD 2006	4.21	percent

Parameter Code	Parameter Description	Value	Unit
DRFTPERSTR	Area of stratified drift per unit of stream length	-100000	square mile per mile
MAREGION	Region of Massachusetts 0 for Eastern 1 for Western	1	dimensionless
BSLDEM250	Mean basin slope computed from 1:250K DEM	7.503	percent
BSLDEM10M	Mean basin slope computed from 10 m DEM	9.128	percent
PCTSNDGRV	Percentage of land surface underlain by sand and gravel deposits	0	percent
FOREST	Percentage of area covered by forest	82.75	percent
ACRSDFT	Area underlain by stratified drift	0	square miles
CENTROIDX	Basin centroid horizontal (x) location in state plane coordinates	120201.2	meters
CENTROIDY	Basin centroid vertical (y) location in state plane units	909397.1	meters
CRSDFT	Percentage of area of coarse-grained stratified drift	0	percent
LAKEAREA	Percentage of Lakes and Ponds	0	percent
LC11DEV	Percentage of developed (urban) land from NLCD 2011 classes 21-24	0	percent
LC11IMP	Average percentage of impervious area determined from NLCD 2011 impervious dataset	0	percent
MAXTEMPC	Mean annual maximum air temperature over basin area, in degrees Centigrade	13.7	feet per mi
OUTLETX	Basin outlet horizontal (x) location in state plane coordinates	120365	feet
OUTLETY	Basin outlet vertical (y) location in state plane coordinates	908965	feet

Parameter Code	Parameter Description	Value	Unit
PRECPRIS00	Basin average mean annual precipitation for 1971 to 2000 from PRISM	48.1	inches
STRMTOT	total length of all mapped streams (1:24,000-scale) in the basin	0	miles
WETLAND	Percentage of Wetlands	3.39	percent

Peak-Flow Statistics Parameters[Peak Statewide 2016 5156]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.0752	square miles	0.16	512
ELEV	Mean Basin Elevation	787	feet	80.6	1948
LC06STOR	Percent Storage from NLCD2006	4.21	percent	0	32.3

Peak-Flow Statistics Disclaimers[Peak Statewide 2016 5156]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Peak-Flow Statistics Flow Report[Peak Statewide 2016 5156]

Statistic	Value	Unit
2 Year Peak Flood	6.67	ft^3/s
5 Year Peak Flood	11.8	ft^3/s
10 Year Peak Flood	16.1	ft^3/s
25 Year Peak Flood	22.6	ft^3/s
50 Year Peak Flood	28.2	ft^3/s
100 Year Peak Flood	34.3	ft^3/s
200 Year Peak Flood	41.1	ft^3/s

Statistic	Value	Unit
500 Year Peak Flood	51.1	ft^3/s

Peak-Flow Statistics Citations

Zarriello, P.J.,2017, Magnitude of flood flows at selected annual exceedance probabilities for streams in Massachusetts: U.S. Geological Survey Scientific Investigations Report 2016–5156, 99 p. (https://dx.doi.org/10.3133/sir20165156)

Flow-Duration Statistics Parameters[Statewide Low Flow WRIR00 4135]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.0752	square miles	1.61	149
DRFTPERSTR	Stratified Drift per Stream Length	-100000	square mile per mile	0	1.29
MAREGION	Massachusetts Region	1	dimensionless	0	1
BSLDEM250	Mean Basin Slope from 250K DEM	7.503	percent	0.32	24.6

Flow-Duration Statistics Flow Report[Statewide Low Flow WRIR00 4135]

Statistic	Value	Unit

Flow-Duration Statistics Citations

Low-Flow Statistics Parameters[Statewide Low Flow WRIR00 4135]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.0752	square miles	1.61	149
BSLDEM250	Mean Basin Slope from 250K DEM	7.503	percent	0.32	24.6

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRFTPERSTR	Stratified Drift per Stream Length	-100000	square mile per mile	0	1.29
MAREGION	Massachusetts Region	1	dimensionless	0	1

Low-Flow Statistics Flow Report[Statewide Low Flow WRIR00 4135]

Statistic	Value	Unit

Low-Flow Statistics Citations

August Flow-Duration Statistics Parameters[Statewide Low Flow WRIR00 4135]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.0752	square miles	1.61	149
BSLDEM250	Mean Basin Slope from 250K DEM	7.503	percent	0.32	24.6
DRFTPERSTR	Stratified Drift per Stream Length	-100000	square mile per mile	0	1.29
MAREGION	Massachusetts Region	1	dimensionless	0	1

August Flow-Duration Statistics Flow Report[Statewide Low Flow WRIR00 4135]

Statistic	Value	Unit

August Flow-Duration Statistics Citations

Bankfull Statistics Parameters[Bankfull Statewide SIR2013 5155]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.0752	square miles	0.6	329
BSLDEM10M	Mean Basin Slope from 10m DEM	9.128	percent	2.2	23.9

Bankfull Statistics Disclaimers[Bankfull Statewide SIR2013 5155]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Bankfull Statistics Flow Report[Bankfull Statewide SIR2013 5155]

Statistic	Value	Unit
Bankfull Width	5.67	ft
Bankfull Depth	0.466	ft
Bankfull Area	2.6	ft^2
Bankfull Streamflow	6.37	ft^3/s

Bankfull Statistics Citations

Bent, G.C., and Waite, A.M.,2013, Equations for estimating bankfull channel geometry and discharge for streams in Massachusetts: U.S. Geological Survey Scientific Investigations Report 2013–5155, 62 p., (http://pubs.usgs.gov/sir/2013/5155/)

Probability Statistics Parameters[Perennial Flow Probability]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.0752	square miles	0.01	1.99
PCTSNDGRV	Percent Underlain By Sand And Gravel	0	percent	0	100
FOREST	Percent Forest	82.75	percent	0	100
MAREGION	Massachusetts Region	1	dimensionless	0	1

Probability Statistics Flow Report[Perennial Flow Probability]

PII: Prediction Interval-Lower, PIu: Prediction Interval-Upper, SEp: Standard Error of Prediction, SE: Standard Error (other -- see report)

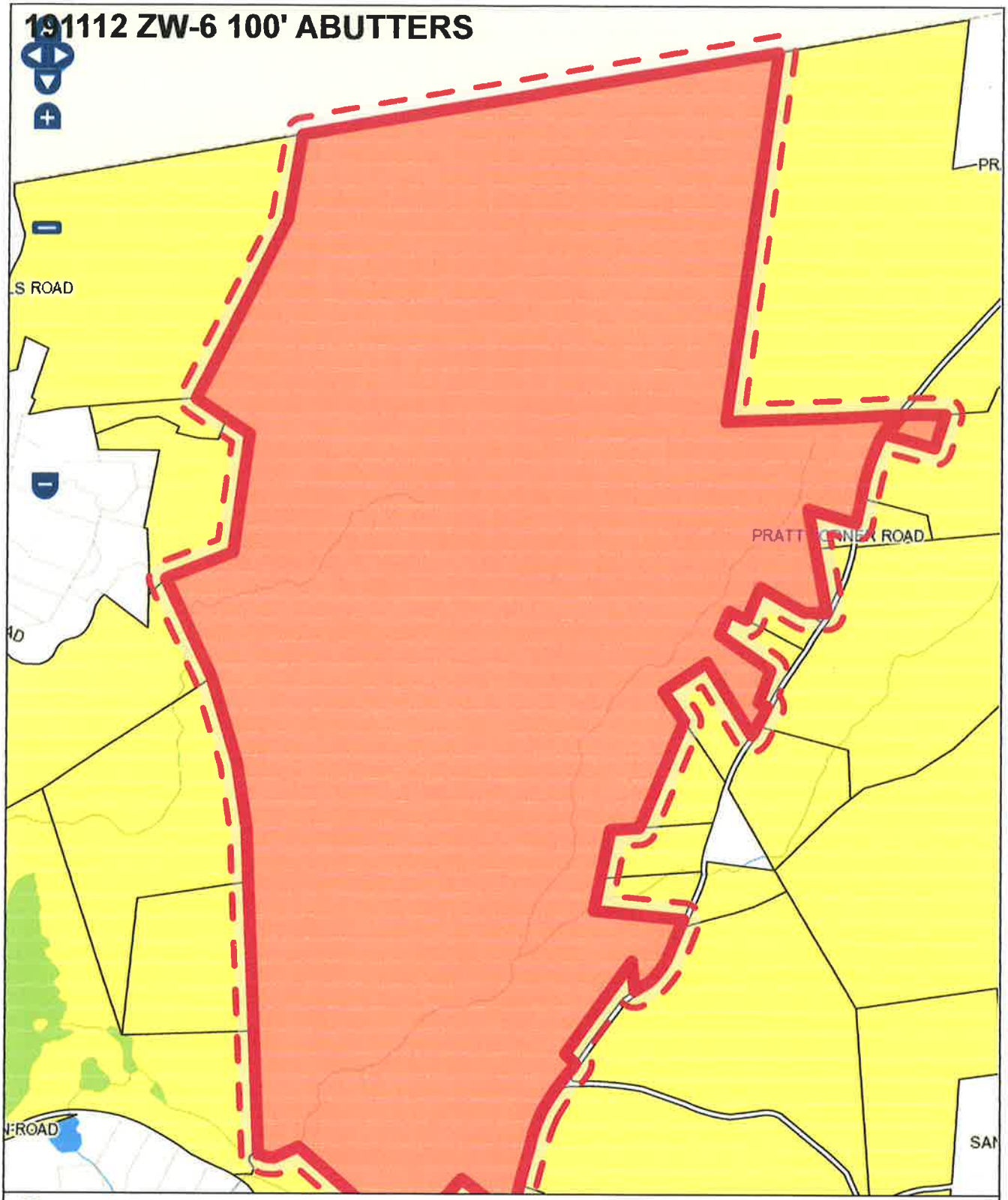
Statistic	Value	Unit	PC
Probability Stream Flowing Perennially	0.283	dim	71

Probability Statistics Citations

Bent, G.C., and Steeves, P.A.,2006, A revised logistic regression equation and an automated procedure for mapping the probability of a stream flowing perennially in Massachusetts: U.S. Geological Survey Scientific Investigations Report 2006 –5031, 107 p. (http://pubs.usgs.gov/sir/2006/5031/pdfs/SIR_2006-5031rev.pdf)

Application Version: 4.3.8

ATTACHMENT C
Abutter Information
(Certified Abutter List, Abutter Notification & Affidavit of Service)



TOWN OF SHUTESBURY OFFICIAL 100' ABUTTERS LIST FOR PRATT CORNER RD PARCEL ZW-6

MAP	LOT	OWNER	CO-OWNER	MAILING ADDRESS	TOWN	ST	ZIP	LOCATION
ZW	6	W D COWLS INC		P O BOX 9677	NORTH AMHERST	MA	01059	PRATT CORNER RD
T	1	WESTERN MASS ELECTRIC CO.	PROPERTY TAX DEPT.	PO BOX 270	HARTFORD	CT	06141	SAND HILL RD
T	165	CHUDZIK STEVEN P	BARSCHENSKI COLLEEN	422 PRATT CORNER RD	AMHERST	MA	01002	422 PRATT CORNER RD
T	170	POSEVER, MICHAEL M.	DEMETZ, ANNE-MARIE	528 PRATT CORNER RD	AMHERST	MA	01002	528 PRATT CORNER RD
T	126	PRATT CORNER REALTY TRUST	GULA, STEPHEN R. & DIANE M., TRUSTEES	480 PRATT CORNER RD	AMHERST	MA	01002	480 PRATT CORNER RD
U	7	TOWN OF SHUTESBURY		P O BOX 276	SHUTESBURY	MA	01072	PRATT CORNER RD
U	8	TOWN OF AMHERST		4 BOLTWOOD AVENUE	AMHERST	MA	01002	PRATT CORNER RD
U	25	WESTERN MASS ELECTRIC CO.	PROPERTY TAX DEPT	PO BOX 270	HARTFORD	CT	06141	PRATT CORNER RD
W	1	TOWN OF AMHERST		4 BOLTWOOD AVENUE	AMHERST	MA	01002	CUSHMAN RD
W	2	TOWN OF AMHERST		4 BOLTWOOD AVENUE	AMHERST	MA	01002	CUSHMAN RD
W	4	ADAMS ELIZABETH		623 PRATT CORNER RD	AMHERST	MA	01002	623 PRATT CORNER RD
W	9	TOWN OF AMHERST		4 BOLTWOOD AVENUE	AMHERST	MA	01002	CUSHMAN RD
W	10	TOWN OF AMHERST		4 BOLTWOOD AVENUE	AMHERST	MA	01002	CUSHMAN RD
W	15	ANTONINO, JOAN & DIMARE, CHARLES		P O BOX 9333	AMHERST	MA	01004	SUMNER MOUNTAIN RD
W	49	WESTERN MASS ELECTRIC CO	PROPERTY TAX DEPT	PO BOX 270	HARTFORD	CT	01641	PRATT CORNER RD
W	52	SEIDMAN EARL	SEIDMAN LINDA L	511 PRATT CORNER RD	AMHERST	MA	01002	511 PRATT CORNER RD
W	54	NEW ENGLAND POWER COMPANY	PROPERTY TAX DEPARTMENT	40 SYLVAN RD	WALTHAM	MA	02451	PRATT CORNER RD
W	76	HARLOW JEANNE L		461 PRATT CORNER RD	AMHERST	MA	01002	461 PRATT CORNER RD
W	80	REEBEL RUTH E (TRSTEE RER TRST)		525 PRATT CORNER RD	AMHERST	MA	01002	525 PRATT CORNER RD
W	81	WOLF, STEVEN C.	WOLF, MICHELE M.	505 PRATT CORNER RD	AMHERST	MA	01002	505 PRATT CORNER RD
W	93	SORLI STEVEN W		425 PRATT CORNER RD	AMHERST	MA	01002	425 PRATT CORNER RD
W	94	W D COWLS INC		P O BOX 9677	NORTH AMHERST	MA	01059	PRATT CORNER RD
W	112	MUTEN BURLEIGH N.		45 KETTLE HILL RD	AMHERST	MA	01002	SUMNER MOUNTAIN RD
W	113	LIPTON BRUCE & STERN ELAINE J.	C/O RATHBUN JOHN	170 PRATT CORNER RD	LEVERETT	MA	01054	PRATT CORNER RD
ZG	2	W D COWLS INC		P O BOX 9677	NORTH AMHERST	MA	01059	PRATT CORNER RD
ZT	3	TOWN OF AMHERST	ATKINS RESERVOIR	4 BOLTWOOD AVENUE	AMHERST	MA	01002	SAND HILL RD
ZW	6	W D COWLS INC		P O BOX 9677	NORTH AMHERST	MA	01059	PRATT CORNER RD
ZW	16	CONWAY DOLORES M	CONWAY BRIAN T	7 POMEROY STREET	EASTHAMPTON	MA	01027	18 JANUARY HILLS RD
ZW	108	TOWN OF AMHERST		4 BOLTWOOD AVENUE	AMHERST	MA	01002	SUMNER MOUNTAIN RD

FOR: JAMES RYNES, STAFF SCIENTIST

TRC

978.656.3664

Leslie Bracebridge, Assessors Clerk
for
Kevin Rudden, Administratve Assessor
11/13/2019

Parcel ID: W-15
ANTONINO, JOAN & DIMARE, CHARLES
P O BOX 3333
AMHERST MA 01004

Parcel ID: W-4
ADAMS ELIZABETH
623 PRATT CORNER ROAD
AMHERST MA 01002

Parcel ID: W-54, U-25
NEW ENGLAND POWER COMPANY
PROPERTY TAX DEPARTMENT
40 SYLVAN RD
WALTHAM MA 02451

Parcel ID: W-80
REEBEL RUTH E (TRSTEE RER TRST)
525 PRATT CORNER RD
AMHERST MA 01002

Parcel ID: W-112
MUTEN BURLEIGH N.
45 KETTLE HILL RD
AMHERST MA 01002

Parcel ID: T-170
POSEVER, MICHAEL M.
DEMETZ, ANNE-MARIE
528 PRATT CORNER RD
AMHERST MA 01002

Parcel ID: W-1, W-2, W-9, W-10, U-6, ZW-108, ZT-3
TOWN OF AMHERST
4 BOLTWOOD AVENUE
AMHERST MA 01002

Parcel ID: T-1, U-25, W-49
WESTERN MASS ELECTRIC CO. (NSTAR)
PROPERTY TAX DEPT.
PO BOX 270
HARTFORD CT 06141

Parcel ID: T-126
PRATT CORNER REALTY TRUST
C/O GULA, STEPHEN R.& DIANE M., TRUSTEES
480 PRATT CORNER RD
AMHERST MA 01002

Parcel ID: W-113
LIPTON BRUCE & STERN ELAINE J.
C/O RATHBUN JOHN
170 PRATT CORNER RD
LEVERETT MA 01054

Parcel ID: T-165
CHUDZIK STEVEN P
BARSCHENSKI COLLEEN
422 PRATT CORNER RD
AMHERST MA 01002

Parcel ID: ZW-16
CONWAY DOLORES M
CONWAY BRIAN T
7 POMEROY STREET
EASTHAMPTON MA 01027

Parcel ID: U-7
TOWN OF SHUTESBURY
1 COOLEYVILLE ROAD
P O BOX 276
SHUTESBURY MA 01072

Parcel ID: W-52
SEIDMAN EARL
SEIDMAN LINDA L
511 PRATT CORNER ROAD
AMHERST MA 01002

Parcel ID: ZG-2, W-94, ZW-6
W D COWLS INC
P O BOX 9677
NORTH AMHERST MA 01059

Parcel ID: W-93
SORLI STEVEN W
425 PRATT CORNER ROAD
AMHERST MA 01002

Parcel ID: W-76
HARLOW JEANNE L
461 PRATT CORNER ROAD
AMHERST MA 01002

Parcel ID: W-81
WOLF, STEVEN C.
WOLF, MICHELE M.
505 PRATT CORNER RD
AMHERST MA 01002

Town of Leverett 100-ft Abutter List

ABUTTERS LIST COMPILED FOR SUBMITTED MAP AND PARCELS (ATTACHED)

OWNER & MAILING ADDRESS	PROPERTY LOCATION	MAP & PARCEL
W D Cowls Inc. P.O. Box 9677 North Amherst, MA 01059	Pratt Corner Road	8-156
Heston C. & Anna Maria Scheffey Elizabeth W. Scheffey 36 Broad Hill Road Leverett, MA 01054	Pratt Corner Road	8-152
Elizabeth W. Scheffey 36 Broad Hill Road Leverett, MA 01054	Pratt Corner Road	8-42
Rattlesnake Gutter Trust P.O. Box 195 Leverett, MA 01054	Shutesbury Road	8-40
Richard W. Ferro and Hillary H. Wilbur-Ferro Alfred Clayton Wilbur and Barbara Gravin Wilbur 11 Amherst Road Leverett, MA 01054	350 Shutesbury Road	8-39

Linda

NOV 12 2019

Notification to Abutters
Under the Massachusetts Wetlands Protection Act

In accordance with the second paragraph of Massachusetts General Laws Chapter 131, Section 40, you are hereby notified of the following:

A. The name of the applicant is: W.D. Cowls, Inc.

B. The applicant has filed an Abbreviated Notice of Resource Area Delineation (ANRAD) with the Conservation Commission for the Town of Shutesbury seeking permission to remove, fill, dredge, or alter an area subject to protection under the Wetlands Protection Act (General Laws Chapter 131, Section 40).

C. The address of the lot where the activity is proposed is: Pratt Corner Road, Shutesbury, MA (Parcel ID: ZW-6)

Project Description: Review of delineated wetland resources.

D. Copies of the ANRAD may be examined at the Shutesbury Conservation Commission Office at 1 Cooleyville Road, Shutesbury, MA 01072 between the hours of 10:00 am and 12:00 pm on Tuesday and Thursday. Call the Conservation Commission Office at 413-259-3792 for an appointment to review the ANRAD.

E. Copies of the ANRAD may be obtained from the Applicant's Representative, TRC Companies (650 Suffolk Street, Lowell, MA 01854), by calling this telephone number: 978-656-3662 between the hours of 8:30 am and 5 pm on the following days of the week: Monday through Friday.

F. Information regarding the date, time, and place of the public hearing may be obtained from the applicant or the Shutesbury Conservation Commission by calling this number 413-259-3792 between the hours of 10:00 am and 12:00 pm on the following days of the week: Tuesday and Thursday.

Note: Notice of the public hearing, including its date, time, and place, will be published at least 5 days in advance in the Greenfield Recorder or the Hampshire Daily Gazette.

Note: Notice of the public hearing, including its date, time, and place, will be posted in the Town Hall no less than forty-eight (48) hours in advance.

Note: You may also contact the nearest Department of Environmental Protection (DEP) Regional Office for more information about this application or the Wetlands Protection Act. To contact DEP, call 413-784-1100.

AFFIDAVIT OF SERVICE

I, Jeff Brandt , hereby certify under the pains and penalties of perjury that on December 27, 2019 I gave notification to abutters in compliance with the Shutesbury Wetlands Protection Bylaw and regulations as well as the second paragraph of the Massachusetts General Laws, Chapter 131, Section 40 and the DEP Guide to Abutter Notification in connection with the following matter:

> An Abbreviated Notice of Resource Area Delineation application was filed under the Massachusetts Wetlands Protection Act by AMP Solar Development with the Shutesbury Conservation Commission on December 27, 2019 for the property located off Pratt Corner Road, Shutesbury, Massachusetts (Assessor's ID ZW-6).

The form of the notification, and a list of the abutters to whom it was given and their addresses, are attached to this Affidavit of Service.

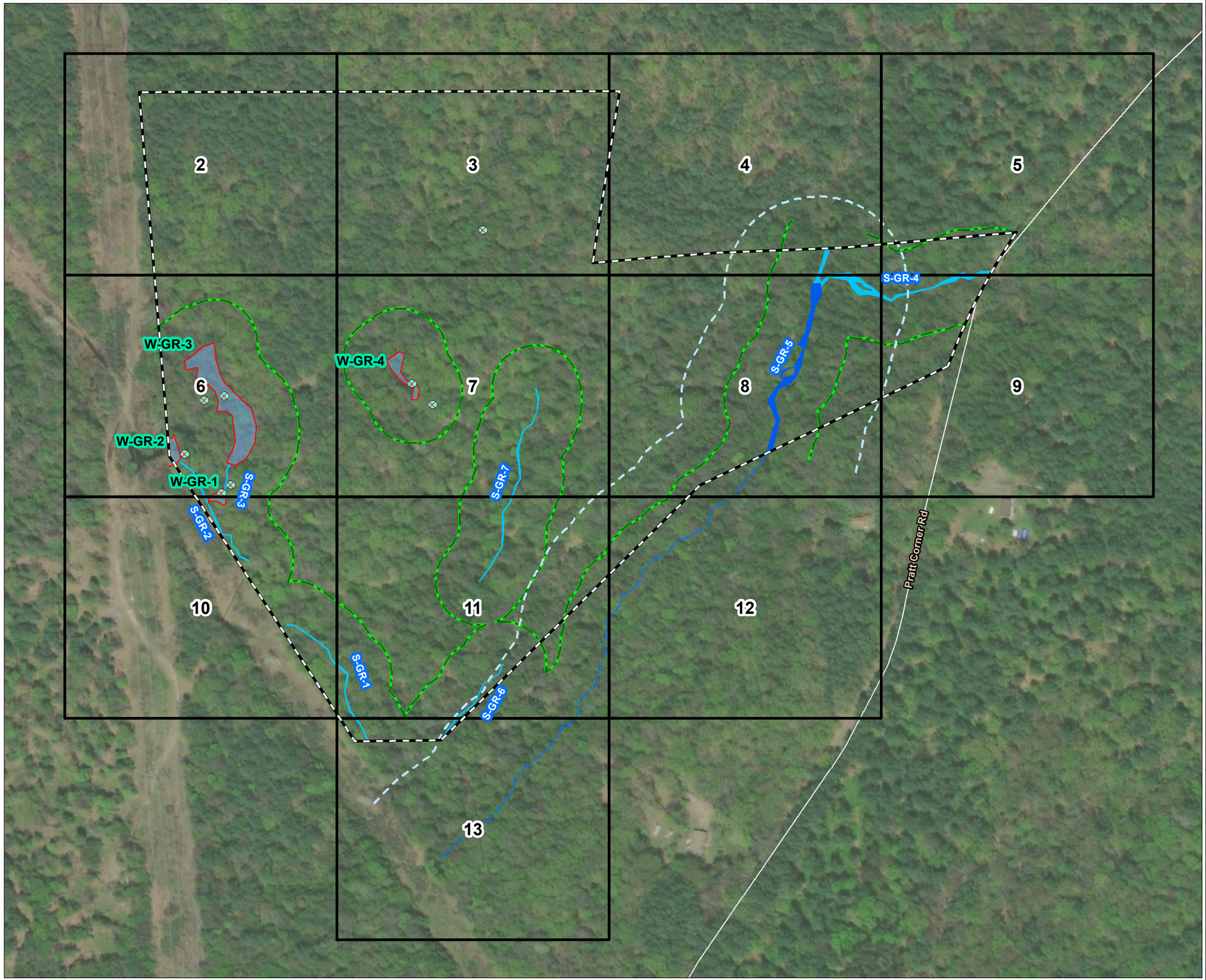
Jeff Brandt

Signature

12/27/2019

Date

ATTACHMENT D
Figure 1: Delineated Resources Map (November 2019)



LEGEND

- PROJECT BOUNDARY
- 1:50' MAP PAGE
- USACE PLOT
- DELINEATED PERENNIAL STREAM
- DELINEATED INTERMITTENT STREAM
- DELINEATED PERENNIAL STREAM
- WETLAND BOUNDARY LINE
- DELINEATED WETLAND
- 100-FT WETLAND BUFFER
- 200-FT RIVERFRONT

NOTES:

1 BASEMAP IMAGERY FROM ESRI/NAIP, "WORLD IMAGERY" WEB BASEMAP SERVICE LAYER, 2017.

2 RESOURCES WERE DELINEATED BY TRC ON 10/22/2019.

N

0 220 440 Feet

1:2,640

PROJECT:

PRATT CORNER ROAD WEST PROJECT
FRANKLIN COUNTY, MASSACHUSETTS

TITLE:

DELINEATED RESOURCES MAP

DRAWN BY:	A. THOMPSON	PROJ NO.:	336892
CHECKED BY:	M. LENNON	**FIGURE 1**	
APPROVED BY:	M. FIRSTENBERG	Page 1 of 14	
DATE:	DECEMBER 2019		

650 SUFFOLK STREET
LOWELL, MA 01854

FILE NO.: Pratt_West_ANRAD_Overview_11x17_201911220.mxd

TRC - GIS

Coordinate System: NAD 1983 StatePlane Massachusetts Mainland FIPS 2001 Feet (Foot US)
Map Rotation: 0

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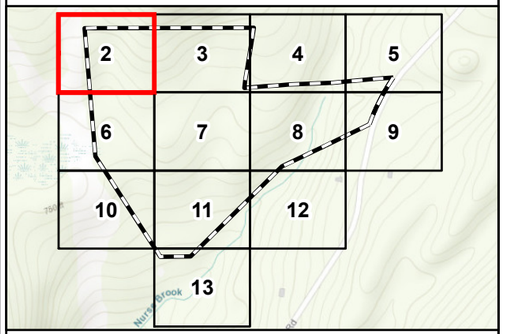
TRC - GIS

Coordinate System: NAD 1983 StatePlane Massachusetts Mainland FIPS 2001 Feet (Foot US)
Map Rotation: 0

Plot Date: 12/20/2019, 20:58:29 PM by SMOTURI -- LAYOUT: ANSI B(11"x17")
Path: S:\1-PROJECTS\AMP\336892_0000_0006_Pratt_West\Pratt_West_ANRAD_Series_11x17_20191220.mxd

PROJECT



NOTES:

1 BASEMAP IMAGERY FROM ESRI/NAIP, "WORLD IMAGERY" WEB BASEMAP SERVICE LAYER, 2017.
2 RESOURCES WERE DELINEATED BY TRC ON 10/22/2019.

N

0 50 100 Feet

1 " = 50 '
1:600

PROJECT:

PRATT CORNER ROAD WEST PROJECT
FRANKLIN COUNTY, MASSACHUSETTS

TITLE:

DELINEATED RESOURCES MAP

DRAWN BY:	A. THOMPSON	PROJ NO.:	336892
CHECKED BY:	M. LENNON	**FIGURE 1**	
APPROVED BY:	M. FIRSTENBERG	Page 2 of 14	
DATE:	DECEMBER 2019		

TRC

650 SUFFOLK STREET
LOWELL, MA 01854

FILE NO.: Pratt_West_ANRAD_Series_11x17_20191220.mxd

TRC - GIS

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Map Rotation: 0

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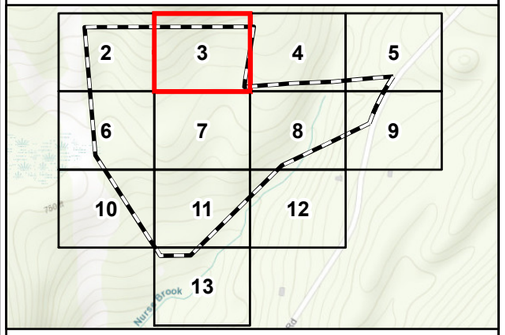
Path: S:\1-PROJECTS\AMP\336892_0000_0006_Pratt_West\Pratt_West_ANRAD_Series_11x17_20191220.mxd

LEGEND

- PROJECT BOUNDARY
- USACE PLOT



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N

0 50 100 Feet

1 " = 50 '
1:600

PROJECT:

PRATT CORNER ROAD WEST PROJECT
FRANKLIN COUNTY, MASSACHUSETTS

TITLE:

DELINEATED RESOURCES MAP

DRAWN BY:	A. THOMPSON	PROJ NO.:	336892
CHECKED BY:	M. LENNON		
APPROVED BY:	M. FIRSTENBERG		
DATE:	DECEMBER 2019		

FIGURE 1
Page 3 of 14

TRC

650 SUFFOLK STREET
LOWELL, MA 01854

FILE NO.: Pratt_West_ANRAD_Series_11x17_20191220.mxd

TRC - GIS

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Map Rotation: 0

Plot Date: 12/20/2019, 20:58:29 PM by SMOTURI -- LAYOUT: ANSI B(11"x17")
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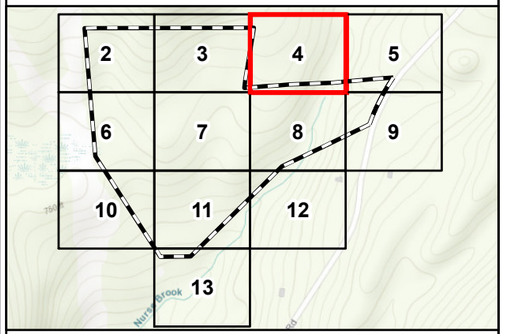
LEGEND

- PROJECT BOUNDARY
- STREAM FLAG
- DELINEATED INTERMITTENT STREAM
- 100-FT WETLAND BUFFER
- 200-FT RIVERFRONT AREA



NOTES:

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N

0 50 100 Feet

1 " = 50 '
1:600

PROJECT:

PRATT CORNER ROAD WEST PROJECT
FRANKLIN COUNTY, MASSACHUSETTS

TITLE:

DELINEATED RESOURCES MAP

DRAWN BY:	A. THOMPSON	PROJ NO.:	336892
CHECKED BY:	M. LENNON		
APPROVED BY:	M. FIRSTENBERG		
DATE:	DECEMBER 2019		

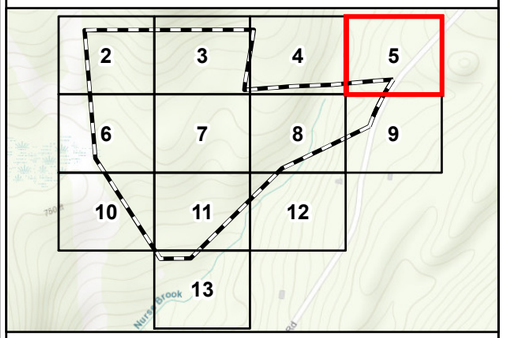
FIGURE 1
Page 4 of 14

TRC
650 SUFFOLK STREET
LOWELL, MA 01854

FILE NO.: Pratt_West_ANRAD_Series_11x17_20191220.mxd

LEGEND

- PROJECT
- CULVERT
- STREAM FLAG
- DELINEATED INTERMITTENT STREAM
- 100-FT WETLAND BUFFER
- 200-FT RIVERFRONT AREA



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N

0 50 100 Feet

1 " = 50 '

1:600

PROJECT:

PRATT CORNER ROAD WEST PROJECT
FRANKLIN COUNTY, MASSACHUSETTS

TITLE:

DELINEATED RESOURCES MAP

DRAWN BY:	A. THOMPSON	PROJ NO.:	336892
CHECKED BY:	M. LENNON		
APPROVED BY:	M. FIRSTENBERG		
DATE:	DECEMBER 2019		

FIGURE 1
Page 5 of 14

TRC

650 SUFFOLK STREET
LOWELL, MA 01854

FILE NO.: Pratt_West_ANRAD_Series_11x17_20191220.mxd

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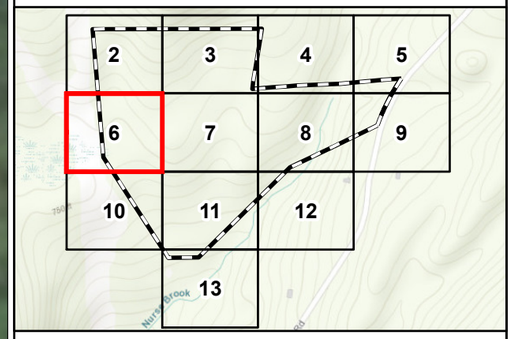
Coordinate System: NAD 1983 StatePlane Massachusetts Mainland FIPS 2001 Feet (Foot US)
Map Rotation: 0

TRC - GIS

PROJECT
WETLAND
STREAM FLAG
USACE PLOT
DELINEATED INTERMITTENT STREAM
DELINEATED
WETLAND BOUNDARY
100-FT WETLAND



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N

0 50 100 Feet

1 " = 50 '

1:600

PROJECT:

PRATT CORNER ROAD WEST PROJECT
FRANKLIN COUNTY, MASSACHUSETTS

TITLE:

DELINEATED RESOURCES MAP

DRAWN BY:	A. THOMPSON	PROJ NO.:	336892
CHECKED BY:	M. LENNON		
APPROVED BY:	M. FIRSTENBERG		
DATE:	DECEMBER 2019		

FIGURE 1
Page 6 of 14

TRC

650 SUFFOLK STREET
LOWELL, MA 01854

FILE NO.: Pratt_West_ANRAD_Series_11x17_20191220.mxd

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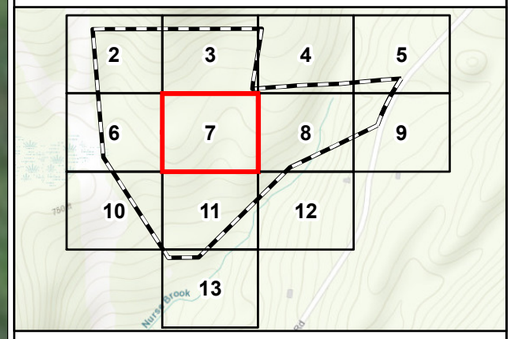
Coordinate System: NAD 1983 StatePlane Massachusetts Mainland FIPS 2001 Feet (Foot US)
Map Rotation: 0

TRC - GIS

LEGEND

- PROJECT
- WETLAND FLAG
- STREAM FLAG
- USACE PLOT
- DELINEATED INTERMITTENT STREAM
- DELINEATED WETLAND
- WETLAND BOUNDARY
- 100-FT WETLAND BUFFER
- 200-FT RIVERFRONT AREA



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N

0 50 100 Feet

1 " = 50 '

1:600

PROJECT:

PRATT CORNER ROAD WEST PROJECT
FRANKLIN COUNTY, MASSACHUSETTS

TITLE:

DELINEATED RESOURCES MAP

DRAWN BY:	A. THOMPSON	PROJ NO.:	336892
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APPROVED BY:	M. FIRSTENBERG		
DATE:	DECEMBER 2019		

FIGURE 1
Page 7 of 14

TRC

650 SUFFOLK STREET
LOWELL, MA 01854

FILE NO.: Pratt_West_ANRAD_Series_11x17_20191220.mxd

TRC - GIS

Coordinate System: NAD 1983 StatePlane Massachusetts Mainland FIPS 2001 Feet (Foot US)
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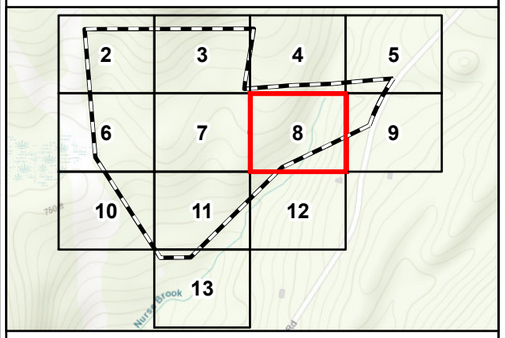
PROJECT
STREAM FLAG
DELINEATED PERENNIAL
DELINEATED INTERMITTENT STREAM
DELINEATED PERENNIAL STREAM
100-FT WETLAND
200-FT RIVERFRONT AREA



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N

0 50 100 Feet
1 " = 50 '
1:600

PROJECT:
PRATT CORNER ROAD WEST PROJECT
FRANKLIN COUNTY, MASSACHUSETTS

TITLE:
DELINEATED RESOURCES MAP

DRAWN BY:	A. THOMPSON	PROJ NO.:	336892
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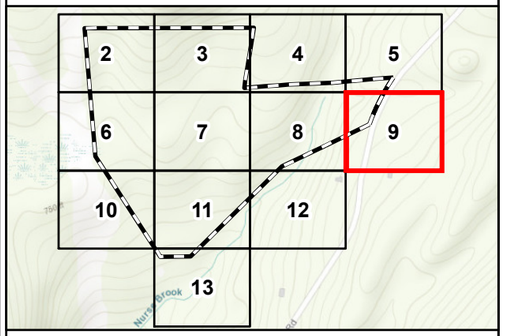
FIGURE 1
Page 8 of 14

TRC
650 SUFFOLK STREET
LOWELL, MA 01854

FILE NO.: Pratt_West_ANRAD_Series_11x17_20191220.mxd

PROJECT
CULVERT
STREAM FLAG
DELINEATED INTERMITTENT STREAM
100-FT WETLAND
200-FT RIVERFRONT AREA



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N
0 50 100 Feet
1 " = 50 '
1:600

PROJECT:
PRATT CORNER ROAD WEST PROJECT
FRANKLIN COUNTY, MASSACHUSETTS

TITLE:
DELINEATED RESOURCES MAP

DRAWN BY:	A. THOMPSON	PROJ NO.:	336892
CHECKED BY:	M. LENNON		
APPROVED BY:	M. FIRSTENBERG		
DATE:	DECEMBER 2019		

FIGURE 1
Page 9 of 14

TRC
650 SUFFOLK STREET
LOWELL, MA 01854

FILE NO.: Pratt_West_ANRAD_Series_11x17_20191220.mxd

Plot Date: 12/20/2019, 20:58:29 PM by SMOTURI -- LAYOUT: ANSI B(11"x17")
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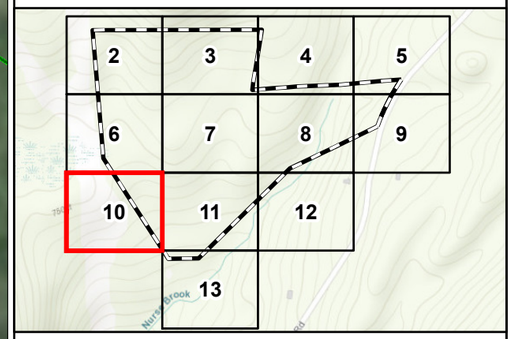
Coordinate System: NAD 1983 StatePlane Massachusetts Mainland FIPS 2001 Feet (Foot US)
Map Rotation: 0

TRC - GIS

PROJECT
CULVERT
WETLAND
STREAM FLAG
DELINEATED INTERMITTENT STREAM
DELINEATED
WETLAND BOUNDARY
100-FT WETLAND



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0 50 100 Feet
1 " = 50 '
1:600
N

PROJECT:
PRATT CORNER ROAD WEST PROJECT
FRANKLIN COUNTY, MASSACHUSETTS

TITLE:
DELINEATED RESOURCES MAP

DRAWN BY:	A. THOMPSON	PROJ NO.:	336892
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FIGURE 1
Page 10 of 14

TRC
650 SUFFOLK STREET
LOWELL, MA 01854

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TRC - GIS

TRC - GIS

Coordinate System: NAD 1983 StatePlane Massachusetts Mainland FIPS 2001 Feet (Foot US)
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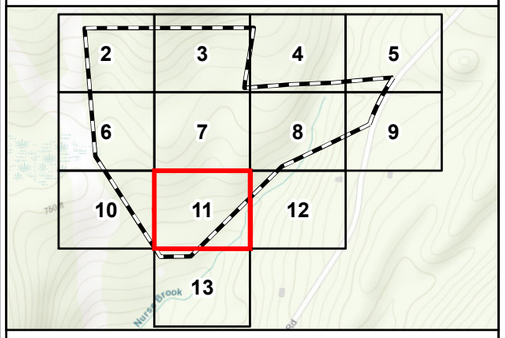
LEGEND

- PROJECT
- STREAM FLAG
- DELINEATED PERENNIAL
- DELINEATED INTERMITTENT STREAM
- 100-FT WETLAND BUFFER
- 200-FT RIVERFRONT AREA



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N

0 50 100 Feet
1 " = 50 '
1:600

PROJECT:

PRATT CORNER ROAD WEST PROJECT
FRANKLIN COUNTY, MASSACHUSETTS

TITLE:

DELINEATED RESOURCES MAP

DRAWN BY:	A. THOMPSON	PROJ NO.:	336892
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DATE:	DECEMBER 2019		

FIGURE 1
Page 11 of 14

TRC
650 SUFFOLK STREET
LOWELL, MA 01854

FILE NO.: Pratt_West_ANRAD_Series_11x17_20191220.mxd

TRC - GIS

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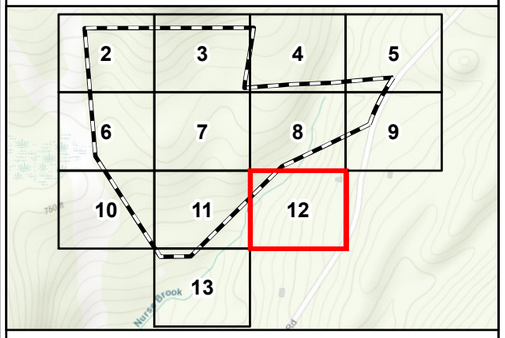
PROJECT
STREAM FLAG
DELINEATED PERENNIAL
100-FT WETLAND



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N

0 50 100 Feet
1 " = 50 '
1:600

PROJECT:
PRATT CORNER ROAD WEST PROJECT
FRANKLIN COUNTY, MASSACHUSETTS

TITLE:
DELINEATED RESOURCES MAP

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DATE:	DECEMBER 2019		

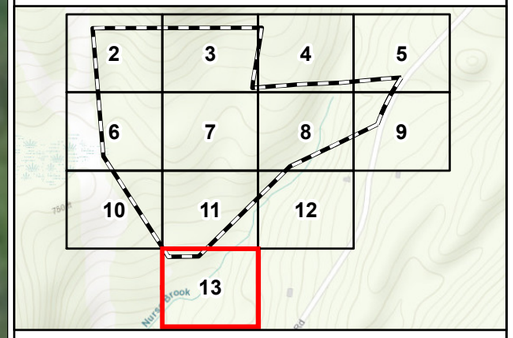
FIGURE 1
Page 12 of 14

TRC
650 SUFFOLK STREET
LOWELL, MA 01854

FILE NO.: Pratt_West_ANRAD_Series_11x17_20191220.mxd

LEGEND

- PROJECT BOUNDARY
- STREAM FLAG
- DELINEATED PERENNIAL STREAM
- DELINEATED INTERMITTENT STREAM
- 200-FT RIVERFRONT AREA



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N

0 50 100 Feet

1 " = 50 '

1:600

PROJECT:

PRATT CORNER ROAD WEST PROJECT
FRANKLIN COUNTY, MASSACHUSETTS

TITLE:

DELINEATED RESOURCES MAP

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DATE:	DECEMBER 2019		

FIGURE 1
Page 13 of 14

TRC
650 SUFFOLK STREET
LOWELL, MA 01854

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TRC - GIS
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