ABBREVIATED NOTICE OF RESOURCE AREA DELINEATION

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

Stafford Street Substation
408 Stafford Street
Leicester, Massachusetts

Submitted to:

Leicester Conservation Commission
Leicester Town Hall
3 Washburn Square
Leicester, Massachusetts 01524

Filed by:

Kellie M. Doherty
New England Power Company
40 Sylvan Road
Waltham, Massachusetts 02451

Prepared by:

TRC Companies
650 Suffolk Street
Lowell, Massachusetts 01854

March 2020

650 Suffolk St., Suite 200
Lowell, MA 01854

T 978.970.5600
TRCcompanies.com

March12, 2020

Town of Leicester Conservation Commission
Leicester Town Hall
3 Washburn Square
Leicester, MA 01524

RE: Stafford Street Substation
408 Stafford Street, Leicester, MA
Abbreviated Notice of Resource Area Delineation (ANRAD)

Dear Commissioners:

TRC Companies (TRC) is writing on behalf of the New England Power Company to file an ANRAD for the parcel at 408 Stafford Street, Leicester, MA (Site) (Figure 1 in Attachment B). The Site consists of an approximately 45-acre parcel (listed by the Leicester tax assessor as Map 34 Parcel # A3).

TRC conducted a wetland and waterbody delineation survey on October 15, 16, and 18, and November 13, 2019. This survey resulted in an overall delineation of 5 wetlands and 5 streams, as well as two additional drainage features, and one off-site wetland with buffer zone within the Site. The total linear feet of wetland edge and other resource areas delineated during the wetland and waterbody survey effort for the Site, the focus of this ANRAD filing, are summarized in the following table:

Resource Area	Delineated Length (linear feet)
Bordering Vegetated Wetland	4,750
Isolated Vegetated Wetland	776
Bank	421

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 (March 2020)

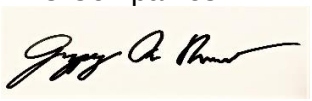
Attachment B also includes the following figures:

Figure 1 – Project Location (January 2020)
Figure 2 – Wetland Delineation (January 2020)

We very much appreciate your review of this information. If you should have any questions, please do not hesitate to contact me at 978-656-3608 or via email at grusso@trccompanies.com.

Sincerely,

TRC Companies



Gregory A. Russo
Ecologist/Wetland Scientist

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

Leicester
City/Town

A. General Information

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

408 Stafford Street
a. Street Address

Leicester
b. City/Town

01524
c. Zip Code

Latitude and Longitude:

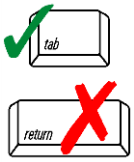
42.47575
d. Latitude

-72.42678
e. Longitude

Map 34
f. Assessors Map/Plat Number

Parcel 3 (or A3)
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:

Kellie M.
a. First Name

Doherty
b. Last Name

New England Power Company
c. Organization

40 Sylvan Rd.
d. Mailing Address

Waltham
e. City/Town

MA
f. State

02451
g. Zip Code

781-907-3683
h. Phone Number

i. Fax Number

kellie.doherty@nationalgrid.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):

Gregory A.
a. Contact Person First Name

Russo
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

978-656-3608
h. Phone Number

i. Fax Number

grusso@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
a. Total Fee Paid

$987.50
b. State Fee Paid

$1012.50
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

Leicester
City/Town

B. Area(s) Delineated

1. Bordering Vegetated Wetland (BVW) — 4,750 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
Bank	421
c. Resource Area	d. Linear Feet Delineated
Isolated Vegetated Wetland	776

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

Leicester
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:

1187453	01/23/2020
2. Municipal Check Number	3. Check date
1187461	01/23/2020
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

Leicester
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.

Kellie Doherty
1. Signature of Applicant

Digitally signed by Kellie Doherty
Date: 2020.03.24 10:51:08 -04'00'
2. Date

3. Signature of Property Owner (if different)

4. Date
3/24/2020

5. Signature of Representative (if any)

6. Date

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.)

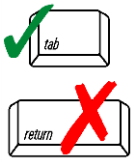
The original and copies must be sent simultaneously. Failure by the applicant to send copies in a timely manner may result in dismissal of the Notice of Intent.

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:

408 Stafford Street	Leicester
a. Street Address	b. City/Town
$2000	
c. Fee amount	d. Check number

2. Applicant:

Kellie M.	Doherty	New England Power Company
a. First Name	b. Last Name	
40 Sylvan Road		
d. Mailing Address		
Waltham	MA	01854
e. City/Town	f. State	g. Zip Code
781-907-3683		
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.

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	4,750 a. feet of BVW	$9,500 x $2.00 =	$2,000 (maximum fee) b. Fee for BVW

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

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	1,197 a. linear feet	$2,394 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

Stafford Street Substation Project

Stafford Street Leicester, Massachusetts

Prepared By:

TRC
Wannalancit Mills
650 Suffolk Street
Lowell, Massachusetts 01854

Wetland and Waterbody Delineation Report

March 2020

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TABLES

APPENDICES

1.0 Introduction

This report presents the results of a wetland and waterbody delineation conducted on October 15, 16, 18, and November 13, 2019 by TRC Companies, Inc. (TRC) off Stafford Street in the Town of Leicester, Worcester County, Massachusetts (Parcel). The survey included approximately 45 acres of the 45-acre parcel listed by the Leicester Tax Assessor as Map 34, Parcel 3. New England Power Company d/b/a National Grid is proposing to construct a new electrical substation at the Site. The wetland and waterbody delineation was completed to support the design of the new substation so resource areas can be avoided to the maximum extent possible.

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

This report documents wetlands, streams, and other aquatic resources (ponds, lakes, impoundments, etc.) in the Parcel, 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 Parcel location map (Figure 1) and a map of the resources delineated by TRC (Figure 2). Appendix B includes representative photographs of the Parcel, Appendix C includes wetland determination data forms, and Appendix D contains the Natural Resources Conservation Service (NRCS) Soil Report. Appendix E contains the U.S. Geological Survey (USGS) StreamStats Report.

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 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 Leicester Conservation Commission

The Leicester Conservation Commission (LCC) administers a local wetlands bylaw and regulations in addition to the WPA. The LCC has jurisdiction over any freshwater wetland, marsh, wet meadow, bog, swamp, vernal pool, spring, bank, reservoir, lake, pond of any size, beaches, dunes, estuaries, lands under water bodies, intermittent streams, brooks, creeks, and land within 100 feet of any of these areas. The LCC also has jurisdiction over perennial rivers, streams, brooks, creeks, and land within 200 feet of these areas known as riverfront area. The LCC also has jurisdiction over land subject to flooding or inundation by groundwater or surface water, and lands subject to flooding. These resource areas are all protected whether or not they border surface waters.

The LCC also implements a 25 foot "No Disturb Zone" (also considered a "No Build Zone") around all protected resource areas.

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 Worcester South and Leicester 7.5 Minute Quadrangles (USGS 2018);
- The FEMA Flood Insurance Rate Map (FIRM) Panel 2501280010A (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;
- Recent aerial orthoimagery.

[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.

- Massachusetts Natural Heritage and Endangered Species Program (NHESP) Certified and Potential Vernal Pools.

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

3.1 Hydrology

The Parcel is undulating with many hills and valleys throughout. The Parcel generally drains northward and eastward via three valleys to off-site wetlands and tributaries.

3.1.1 Floodplains

Flood hazard areas identified on the FEMA's 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 25027C0801E (effective date July 4, 2011) the Parcel is located within a Zone X area of minimal flood disturbance zone.

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 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 are three wetlands on site: one isolated in the central section, and two along the northern border of the site, each extending off site to the north.

3.3 Mapped Soils

The NRCS's Web Soil Survey identifies four soil map units within the Parcel. 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). 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
73A	Whitman fine sandy loam, 0 to 3 percent slopes, extremely stony	99	Very poorly drained	D	Not prime farmland
420B	Canton fine sandy loam, 3 to 8 percent slopes	1	Well drained	B	All areas are prime farmland
422B	Canton fine sandy loam, 0 to 8 percent slopes, extremely stony	4	Well drained	B	Not prime farmland
422C	Canton fine sandy loam, 8 to 15 percent slopes, extremely stony	0	Well drained	B	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 73A has an HSR of 99 percent, map unit 422B has an HSR of 4 percent, map unit 420B has an HSR of 1 percent, and map unit 422C has an HSR of 0 percent. For map unit 73A, the hydric components within the map unit are Whitman, extremely stony; Ridgebury, extremely stony; Scarboro; and Swansea. For map units 420B and 422B, the hydric component within the map units are Swansea.

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 73A is rated as very poorly drained. Map units 420B, 422B, and 422C are rated as well 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, three map units (73A, 422B and 422C) are classified as "not prime farmland", and one map unit (420B) is classified as "all areas are prime farmland."

3.3.4 Hydrologic Soil Groups

Soils are assigned to a 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 73A, is in HSG D. Map units 420B, 422B, and 422D are in HSG B.

4.0 Wetland and Stream Delineation Methodology

In addition to the desktop review described in Section 3.0, TRC biologists performed field investigations within the Parcel to identify wetlands, waterbodies, and other surface waters on October 15, 16, 18 and November 13, 2019.

4.1 Non-wetland Aquatic Resource Methodology

Streams and other non-wetland aquatic features within the Parcel were identified by the presence of an 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 five 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 with 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 with 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).

No formal vernal pool surveys were conducted. Areas that appeared to show potential for meeting vernal pool classification were noted, photographed, and mapped as potential vernal pools

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 Parcel. 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) (USDA NRCS, 2006) was referenced to determine the hydric soil indicators that apply to the Site. Per the MLRA Handbook, the Parcel is within Major Land Resource Area (MLRA) 144A (New England and Eastern New York Upland, Southern Part) of Land Resource Region (LRR) R (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 most the Parcel. The dominant vegetation in the uplands consists of red maple (*Acer rubrum*), northern red oak (*Quercus rubra*), sugar maple (*Acer saccharum*), shag-bark hickory (*Carya ovata*), pignut hickory (*Carya glabra*), striped maple (*Acer pensylvanicum*), winged sumac (*Rhus copallinum*), mountain-laurel (*Kalmia latifolia*), American witch-hazel (*Hamamelis virginiana*), glossy false buckthorn (*Frangula alnus*), Allegheny blackberry (*Rubus allegheniensis*), common red raspberry (*Rubus idaeus*), northern spicebush (*Lindera benzoin*), marginal wood fern (*Dryopteris marginalis*), American hog-peanut (*Amphicarpaea bracteate*), wrinkle-leaf goldenrod (*Solidago rugosa*), evergreen woodfern (*Dryopteris intermedia*), northern bracken fern (*Pteridium aquilinum*), princess-pine (*Dendrolycopodium obscurum*), and annual ragweed (*Ambrosia artemisiifolia*). The terrain of the Parcel is undulating throughout generally sloping to the north or northeast. The soils observed throughout upland portions of the Parcel were generally classified as silt loam or sandy loam.

5.2 Delineated Wetlands and Waterbodies

TRC identified five wetlands and seven waterbodies within the Parcel during the October and November 2019 resource delineation efforts (Figure 2 in Appendix A). One offsite wetland (W-GR-5) appears on Figure 2 because the buffer zone associated with this resource area extends on to the Parcel. 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 W-GR-1 is a palustrine forested (PFO) wetland draining into intermittent stream S-GR-1. This wetland is in the eastern portion of the Parcel and drains off site to the east via stream S-GR-1. The dominant vegetation included yellow birch (*Betula alleghaniensis*), red maple (*Acer rubrum*), northern spicebush (*Lindera benzoin*), poison ivy (*Toxicondendron radicans*), and cinnamon fern (*Osmundastrum cinnamomeum*). Indicators of wetland hydrology included saturation, sparsely vegetated concave surface, moss trim lines, geomorphic position, shallow aquitard, microtopographic relief, and the FAC-neutral test. Soils were composed of a thick layer of dark silt loam with a restrictive layer of rock eight inches below the surface. This soil meets Hydric Soil Indicator A1 as described in *Field Indicators of Hydric Soils in the United States, Version 8.2* (Field Indicators) (USDA NRCS, 2018). ***This wetland is MassDEP/LCC jurisdictional and it also falls under USACE jurisdiction, as it is likely connected to other WOUS.***

Wetland W-GR-2 is a palustrine forested (PFO) wetland associated with intermittent stream S-GR-4. The wetland is in the central portion of the Parcel and extends off site to the East. The dominant vegetation included red maple, highbush blueberry (*Vaccinium corymbosum*), northern spicebush, royal fern (*Osmunda spectabilis*), and shallow sedge (*Carex lurida*). Indicators of wetland hydrology included saturation, sparsely vegetated concave surface, water-stained leaves, moss trim lines, microtopographic relief, and the FAC-neutral test. Soils were composed of a thick layer of organic matter and dark silt. This soil meets Hydric Soil Indicator A1 as described in *Field Indicators of Hydric Soils in the United States, Version 8.2* (Field Indicators) (USDA NRCS, 2018). A potential vernal pool was noted within this wetland. A follow up survey will need to be conducted in spring to determine whether it is an actual vernal pool or not. ***This wetland is MassDEP/LCC jurisdictional and it also falls under USACE jurisdiction, as it is likely connected to other WOUS.***

Wetland W-GR-3 is both a palustrine scrub-shrub (PSS) and palustrine forested (PFO) wetland associated with intermittent stream S-GR-2. The wetland is in the western portion of the Parcel and extends offsite to the West. The dominant vegetation included red maple, green ash (*Fraxinus pennsylvanica*), northern spicebush, purple meadow-rue (*Thalictrum dasycarpum*), evergreen woodfern (*Dryopteris intermedia*), maleberry (*Lyonia ligustrina*), and arrow-leaf tearthumb (*Persicaria sagittate*). Indicators of wetland hydrology included saturation, sparsely vegetated concave surface, drainage patterns, moss trim lines, microtopographic relief, and the FAC-neutral test. Soils were composed of a layer of organic matter and dark silty clay. This soil meets Hydric Soil Indicator A3 as described in *Field Indicators of Hydric Soils in the United States, Version 8.2* (Field Indicators) (USDA NRCS, 2018). ***This wetland is MassDEP/LCC jurisdictional and it also falls under USACE jurisdiction, as it is likely connected to other WOUS.***

Wetland W-GR-4 is both an isolated palustrine scrub-shrub (PSS) wetland and palustrine forested (PFO) wetland associated with non-jurisdictional drainage D-GR-3. The wetland is in the southeastern portion of the Parcel and is completely contained on site. The dominant vegetation included (*Spiraea latifolia*), maleberry, poison ivy, and bristly dewberry (*Rubus hispidus*). Indicators of wetland hydrology included saturation, water-stained leaves, moss trim lines, microtopographic relief, and the FAC-neutral test. Soils were composed of a layer of dark mucky silt loam and a layer of gravelly clay loam, separated by a few inches of sand. This soil meets hydric soil indicator F3 as described in the Field Indicators (USDA NRCS, 2018). ***This wetland is not MassDEP jurisdictional as it does not border a waterbody and is does not have a basin that is large enough or deep enough to meet the definition of Isolated Land Subject to Flooding based on field review. This wetland is unlikely to be USACE jurisdiction, as it does not have a clear connection to other WOUS. However, it is LCC jurisdictional since the LCC regulates both bordering and isolated wetlands under the Leicester Wetlands Protection Bylaw.***

Wetland W-DJH-1 a palustrine forested (PFO) wetland associated with non-jurisdictional drainage D-DJH-1 and intermittent stream S-DJH-2. The wetland is in the north-central portion of the Parcel and extends off site to the north. The dominant vegetation within this wetland included red maple, common winterberry (*Ilex certicillata*), northern spicebush, highbush blueberry, and sensitive fern (*Onoclea sensibilis*). Indicators of wetland hydrology included water-stained leaves, drainage patterns, geomorphic position, microtopographic relief, and the FAC-neutral test. Soils were composed of a layer of dark muck restricted at six inches by shallow rock. This soil meets Hydric Soil Indicators A1 as described in the Field Indicators (USDA NRCS, 2018). A potential vernal pool was noted within this wetland. A follow up survey will need to be conducted in spring to determine whether it is an actual vernal pool or not. ***This wetland is MassDEP/LCC jurisdictional and it also falls under USACE jurisdiction, as it is likely connected to other WOUS.***

5.2.2 Delineated Waterbodies

Stream S-GR-1 is an intermittent stream (R4) that flows out of wetland W-GR-1 off site northeastward from the eastern side of the Parcel. The streambed was comprised of cobbles. TRC observed an average width of approximately 4 feet and no flow at the time of the survey. Stream S-GR-1 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 S-GR-1 nor is it digitized in the USGS StreamStats analysis ***This stream is MassDEP/LCC jurisdictional and falls under USACE jurisdiction, as it is likely connected to other WOUS.***

Stream S-GR-2 is an intermittent stream (R4) that flows out of wetland W-GR-3 to its terminus near the center of the Parcel. The streambed was comprised of cobbles. TRC observed an average width of approximately 3 feet and no flow at the time of the survey. Stream S-GR-2 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 S-GR-2 nor is it digitized in the USGS StreamStats analysis ***This stream is MassDEP/LCC jurisdictional and falls under USACE jurisdiction, as it is likely connected to other WOUS.***

Stream S-GR-4 is an intermittent stream (R4) that flows through narrow sections of wetland W-GR-2 ultimately dissipating within the wetland. The streambed was comprised of cobbles. TRC observed an average width of approximately 3 feet and a water depth of approximately 2 inches. Stream S-GR-4 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 S-GR-4 nor is it digitized in the USGS StreamStats analysis ***This stream is MassDEP/LCC jurisdictional and falls under USACE jurisdiction, as it is likely connected to other WOUS.***

Stream S-DJH-2 is an intermittent stream (R4) that flows out of wetland W-DJH-1 to the east. The streambed was comprised of cobbles. TRC observed an average width of approximately 4 feet and no flow at the time of the survey. Stream S-DJH-2 has defined banks such that the OHWM and the banks are coincident. The centerline of the stream was delineated. This stream is located just outside the limits of the Parcel but its buffer zone overlaps the Parcel.

The USGS does not map stream S-DJH-2 nor is it digitized in the USGS StreamStats analysis ***This stream is MassDEP/LCC jurisdictional and falls under USACE jurisdiction, as it is likely connected to other WOUS.***

Drainage D-DJH-1 is a non-jurisdictional drainage feature (NJD) that flows through into wetland W-DJH-1 from surrounding uplands. The streambed was comprised of cobbles and leaf litter. TRC observed an average width of approximately 4 feet and no flow at the time of the survey. NJD D-DJH-1 has defined banks such that the OHWM and the banks are coincident. The centerline was delineated.

The USGS does not map NJD D-DJH-1 nor is it digitized in the USGS StreamStats analysis. The definition of a stream in the WPA regulations at 310 CMR 10.04 states that "such a body of water which does not flow throughout the year (i.e. which is intermittent) is a stream except for that portion upgradient of all bogs, swamps, wet meadows and marshes. ***Since ephemeral drainage D-DJH-1 does not flow out of a wetland, this stream is not MassDEP jurisdictional. However, it may fall under USACE jurisdiction and TRC assumes it is jurisdictional under the Leicester Wetlands Protection Bylaw.***

Drainage D-GR-3 is a non-jurisdictional drainage feature (NJD) that flows out of uplands next to wetland W-GR-4 but does not connect to the wetland or any other waterbody. The streambed was comprised of cobbles and leaf litter. TRC observed an average width of approximately 5 feet and no flow at the time of the survey. NJD D-GR-3 has defined banks such that the OHWM and the banks are coincident. The centerline was delineated.

The USGS does not map NJD D-GR-3 nor is it digitized in the USGS StreamStats analysis. ***Since this drainage does not flow out of a wetland, it is not MassDEP jurisdictional and does not fall under USACE jurisdiction. We assume it is jurisdictional under the Leicester Wetlands Protection Bylaw.***

Table 2. Delineated Wetlands and Waterbodies

Wetland Field Designation	Field Designated NWI Classification [1]	Assumed Jurisdictional Status	Assumed Buffer/ Setback Requirements
W-GR-1	PFO	USACE/MassDEP/Local	100-ft buffer zone 25-ft No Disturbance Zone
W-GR-2	PFO	USACE/MassDEP/Local	100-ft buffer zone 25-ft No Disturbance Zone
W-GR-3	PFO/PSS	USACE/MassDEP/Local	100-ft buffer zone 25-ft No Disturbance Zone
W-GR-4	PFO/PSS	Local	100-ft buffer zone 25-ft No Disturbance Zone
W-DJH-1	PFO	USACE/MassDEP/Local	100-ft buffer zone 25-ft No Disturbance Zone
S-GR-1	R4	USACE/MassDEP/Local	100-ft buffer zone 25-ft No Disturbance Zone
S-GR-2	R4	USACE/MassDEP/Local	100-ft buffer zone 25-ft No Disturbance Zone
S-GR-3	R4	USACE/MassDEP/Local	100-ft buffer zone 25-ft No Disturbance Zone
S-GR-4	R4	USACE/MassDEP/Local	100-ft buffer zone 25-ft No Disturbance Zone
S-DJH-2	R4	USACE/MassDEP/Local	100-ft buffer zone 25-ft No Disturbance Zone

Table 2. Delineated Wetlands and Waterbodies

Wetland Field Designation	Field Designated NWI Classification [1]	Assumed Jurisdictional Status	Assumed Buffer/ Setback Requirements
D-DJH-1	N/A	Local	100-ft buffer zone 25-ft No Disturbance Zone
D-GR-3	N/A	Local	100-ft buffer zone 25-ft No Disturbance 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 Shrub-Scrub (PSS), Riverine Intermittent (R4), and Ephemeral Stream (R6).

6.0 Conclusions

It is TRC's opinion that delineated wetlands W-GR-1, W-GR-2, W-GR-3, and W-DJH-1 are BVWs regulated by MassDEP and are also likely regulated under USACE jurisdiction. Wetland W-GR-4, is regulated under the Leicester Wetlands Protection Bylaw only. There are no buffers or setbacks associated with USACE-regulated wetlands. However, there is a 100-foot buffer zone associated with MassDEP and LCC-regulated wetlands as well as a 25-foot "No Disturbance Zone" around all LCC-regulated wetlands.

R4 streams S-GR-1, S-GR-2, S-GR-3, and S-DJH-1 are USACE jurisdictional, as they are hydrologically connected to WOUS. These streams are also regulated by the MassDEP/LCC, as they flow within, into, or out of a MassDEP-regulated wetland resource area. TRC assumes the two ephemeral drainages at the site (D-DJH-1 and D-GR-3) are only regulated by the LCC.

Final determination of jurisdictional status for on-site wetlands and waterbodies must be made by regulatory agencies.

7.0 References

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Appendix A: Figures

File Location: S:\1-PROJECTS\NATIONAL_GRID\327103_NPCC Phase 4\6-MXD\Stafford_ANRAD\Fig 1_NGRID_StaffordSt_SubStation_SiteLoc_20200115.mxd
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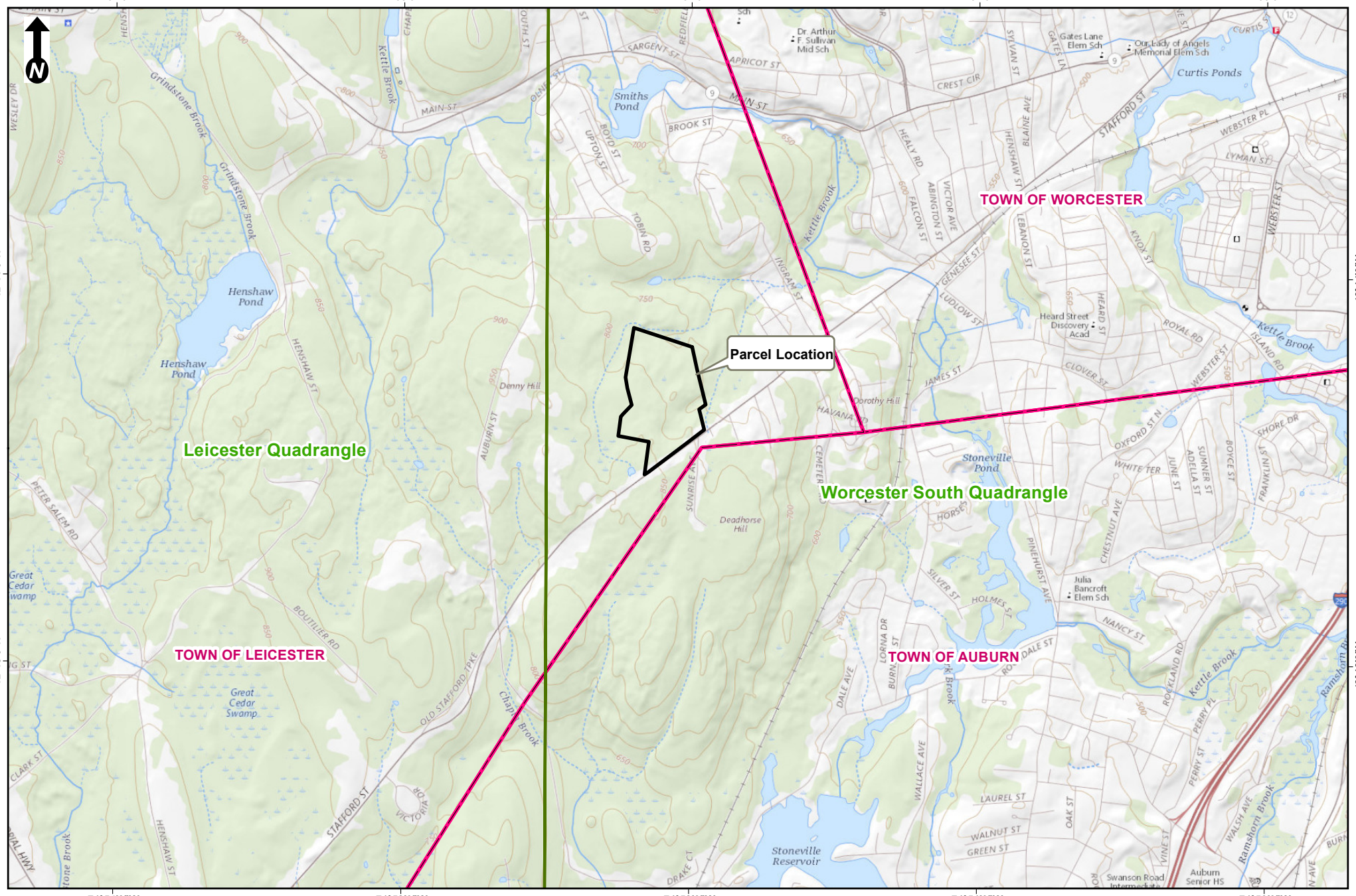

Scale:
1 inch = 2,000 feet
0 1,000 2,000
Feet
(Page Size 8.5 x 11)

STAFFORD STREET SUBSTATION

Figure 1
USGS Parcel Location Map
Town of Leicester, MA

Source: TRC, 2013 National Geographic Society, i-cubed, "USGSTopo" Base Map

nationalgrid
TRC

THIS DOCUMENT IS INTENDED FOR GENERAL PLANNING & INFORMATION PURPOSES ONLY. ALL MEASUREMENTS & LOCATIONS ARE APPROXIMATE.

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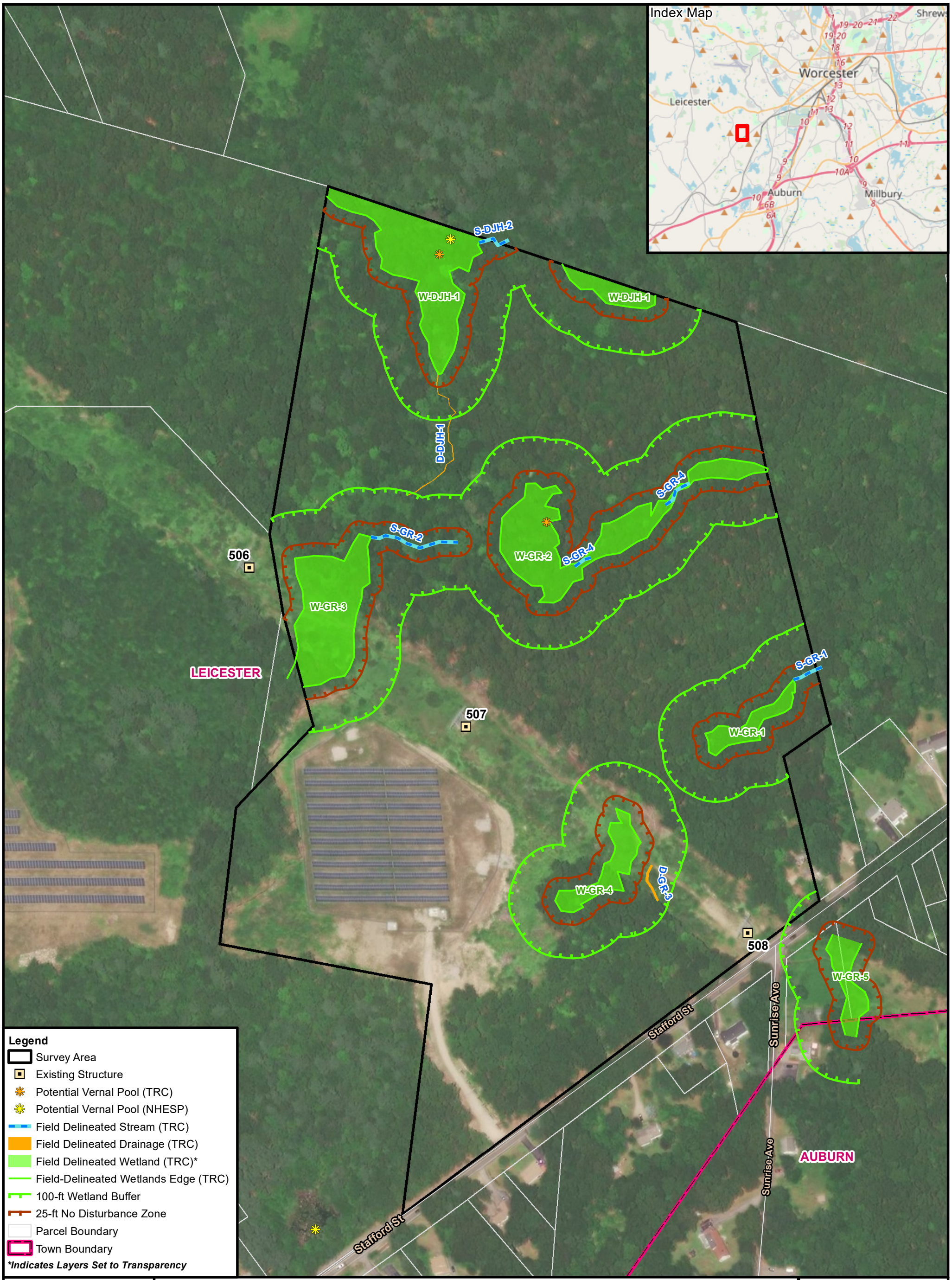


Legend

- Survey Area
- Existing Structure
- Potential Vernal Pool (TRC)
- Potential Vernal Pool (NHESP)
- Field Delineated Stream (TRC)
- Field Delineated Drainage (TRC)
- Field Delineated Wetland (TRC)*
- Field-Delineated Wetlands Edge (TRC)
- 100-ft Wetland Buffer
- 25-ft No Disturbance Zone
- Parcel Boundary
- Town Boundary

Indicates Layers Set to Transparency

N

1 inch = 200 feet
0 100 200
Feet

STAFFORD STREET SUBSTATION

Figure 2
Wetland Delineation Results

Town of Leicester, MA
January, 2020

TRC, MassGIS, NationalGrid, Esri & Contributors - "World Imagery"

nationalgrid
TRC

Appendix B: Photographs

NATIONAL GRID

STAFFORD STREET SUBSTATION, LEICESTER, MASSACUSETTS

Photograph: 1 Date: 10/15/2019 Direction: Unknown Description: Conditions observed at ephemeral drainage D-DJH-S1.	
Photograph: 2 Date: 10/15/2019 Direction: West Description: Conditions observed at intermittent stream S-DJH-S2 looking upstream.	

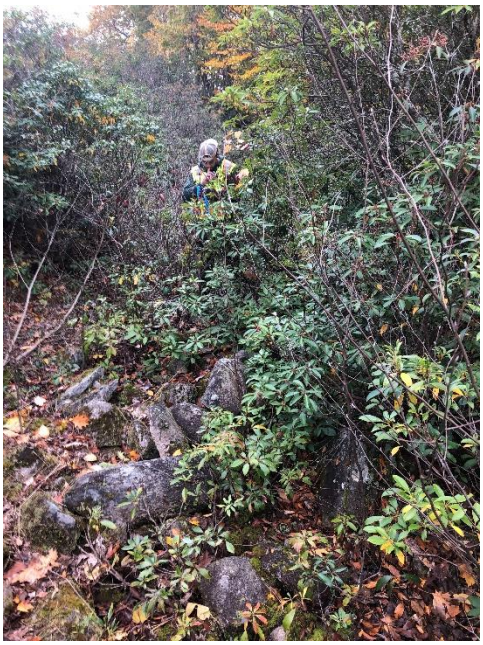
NATIONAL GRID

STAFFORD STREET SUBSTATION, LEICESTER, MASSACUSETTS

Photograph: 3 Date: 10/16/2019 Direction: East Description: Conditions observed at ephemeral stream S-GR-S1 looking upstream.	
Photograph: 4 Date: 10/16/2019 Direction: East Description: Conditions observed at ephemeral stream S-GR-S2 looking downstream.	

NATIONAL GRID

STAFFORD STREET SUBSTATION, LEICESTER, MASSACUSETTS

Photograph: 5 Date: 10/18/2019 Direction: South Description: Conditions observed at ephemeral drainage D-GR-S3 looking upstream.	
Photograph: 6 Date: 11/13/2019 Direction: Southwest Description: Conditions observed at intermittent stream S-GR-S4 looking upstream.	

NATIONAL GRID

STAFFORD STREET SUBSTATION, LEICESTER, MASSACUSETTS

Photograph: 7 Date: 10/16/2019 Direction: South Description: Conditions observed at upland data point GR-W1-UPL.	
Photograph: 8 Date: 10/22/2019 Direction: South Description: Typical conditions observed at wetland data point GR-W1-PFO .	

NATIONAL GRID

STAFFORD STREET SUBSTATION, LEICESTER, MASSACUSETTS

Photograph: 9 Date: 10/16/2019 Direction: West Description: Typical conditions observed at upland data point GR-W2-UPL.	
Photograph: 10 Date: 10/16/2019 Direction: South Description: Conditions observed at wetland W2 data point GR-W2-PFO.	

NATIONAL GRID

STAFFORD STREET SUBSTATION, LEICESTER, MASSACUSETTS

Photograph: 11 Date: 10/16/2019 Direction: North Description: Typical conditions observed at upland data point GR-W3-UPL1.	
Photograph: 12 Date: 10/16/2019 Direction: South Description: Conditions observed at wetland W3 data point GR-W3-PSS.	

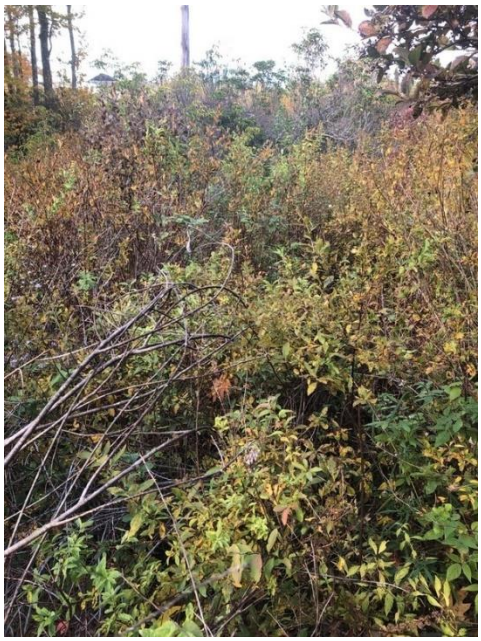
NATIONAL GRID

STAFFORD STREET SUBSTATION, LEICESTER, MASSACUSETTS

Photograph: 13 Date: 10/16/2019 Direction: South Description: Typical conditions observed at upland data point GR-W3-UPL2.	
Photograph: 14 Date: 10/16/2019 Direction: East Description: Conditions observed at wetland W3 data point GR-W3-PFO.	

NATIONAL GRID

STAFFORD STREET SUBSTATION, LEICESTER, MASSACUSETTS

Photograph: 15 Date: 10/16/2019 Direction: North Description: Typical conditions observed at upland data point GR-W4-UPL.	
Photograph: 16 Date: 10/16/2019 Direction: West Description: Conditions observed at wetland W4 data point GR-W4-PSS.	

NATIONAL GRID

STAFFORD STREET SUBSTATION, LEICESTER, MASSACUSETTS

Photograph: 17 Date: 10/15/2019 Direction: North Description: Typical conditions observed at upland data point DJH-W1-UPL.	
Photograph: 18 Date: 10/15/2019 Direction: West Description: Conditions observed at wetland W1 data point DJH-W1-PFO.	

Appendix C: Wetland Determination Data Forms

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Stafford St. Substation **City/County:** Cherry Valley, Worcester **Sampling Date:** 2019-Oct-16
Applicant/Owner: NGRID **State:** MA **SamplingPoint:** GR-W1-PFO
Investigator(s): Greg Russo, Matt Boscow, Russo **Section,Township,Range:** Leicester
Landform (hillslope, terrace, etc.): Valley **Local relief (concave, convex, none):** Concave **Slope (%):** 2-5
Subregion (LRR or MLRA): LRR R **Lat:** 42.2278173734 **Long:** -71.8669553754 **Datum:** WGS84
Soil Map Unit Name: Canton fine sandy loam, 8 to 15 percent slopes, extremely stony **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 _✓_ No ____		
Hydric Soil Present?	Yes _✓_ No ____	**Is the Sampled Area within a Wetland?**	**Yes _✓_ No ____**
Wetland Hydrology Present?	Yes _✓_ No ____	**If yes, optional Wetland Site ID:**	GR-W1

Remarks: (Explain alternative procedures here or in a separate report)
Covertype is PFO. Area is wetland, all three wetland parameters are present..

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

Wetland Hydrology Present? Yes _✓_ No ____

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

Remarks:
The criterion for wetland hydrology is met.

VEGETATION -- Use scientific names of plants.

Sampling Point: GR-W1-PFO

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Acer rubrum*	40	Yes	FAC
2. *Betula alleghaniensis*	20	Yes	FAC
3.			
4.			
5.			
6.			
7.			
	60	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft)			
1. *Lindera benzoin*	30	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	30	= Total Cover	
Herb Stratum (Plot size: 5 ft)			
1. *Toxicodendron radicans*	25	Yes	FAC
2. *Osmundastrum cinnamomeum*	10	Yes	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	35	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft)			
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:	5	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	100	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply By:	
OBL species	0	x 1 =	0
FACW species	40	x 2 =	80
FAC species	85	x 3 =	255
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals	125	(A)	335 (B)
Prevalence Index = B/A =	2.7		

Hydrophytic Vegetation Indicators:

____ 1- Rapid Test for Hydrophytic Vegetation

_✓_ 2 - Dominance Test is >50%

_✓_ 3 - Prevalence Index is ≤ 3.0[1]

____ 4 - 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 or equal to 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 ____

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

A positive indication of hydrophytic vegetation was observed (>50% of dominant species indexed as OBL, FACW, or FAC)..

SOIL

Sampling Point: GR-W1-PFO

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 - 8	10YR 2/1	100					Org matter Silt Loam	

[1]Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked 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 (F21)
- ___ 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 ____

Remarks:

A positive indication of hydric soil was observed..

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Stafford St. Substation **City/County:** Cherry Valley, Worcester **Sampling Date:** 2019-Oct-16
Applicant/Owner: NGRID **State:** MA **SamplingPoint:** GR-W1-UPL
Investigator(s): Greg Russo, Matt Boscow, Russo **Section,Township,Range:** Leicester
Landform (hillslope, terrace, etc.): Hillslope **Local relief (concave, convex, none):** Undulating **Slope (%):** 5-10
Subregion (LRR or MLRA): LRR R **Lat:** 42.227650364 **Long:** -71.8666996435 **Datum:** WGS84
Soil Map Unit Name: Canton fine sandy loam, 0 to 8 percent slopes, extremely stony **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 ____ No ✓		
Hydric Soil Present?	Yes ____ No ✓	**Is the Sampled Area within a Wetland?**	**Yes ____ No ✓**
Wetland Hydrology Present?	Yes ____ No ✓	**If yes, optional Wetland Site ID:**	

Remarks: (Explain alternative procedures here or in a separate report)
Covertype is UPL. Area is upland, not all three wetland parameters are present..

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 ✓	Depth (inches):	
Water Table Present?	Yes ____ No ✓	Depth (inches):	**Wetland Hydrology Present?** Yes ____ No ✓
Saturation Present? (includes capillary fringe)	Yes ____ No ✓	Depth (inches):	

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

Remarks:
The criterion for wetland hydrology is not met.

VEGETATION -- Use scientific names of plants.

Sampling Point: GR-W1-UPL

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Acer rubrum*	40	Yes	FAC
2. *Quercus rubra*	35	Yes	FACU
3. *Betula alleghaniensis*	15	No	FAC
4. *Fagus grandifolia*	5	No	FACU
5.			
6.			
7.			
	95	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft)			
1. *Kalmia latifolia*	40	Yes	FACU
2. *Hamamelis virginiana*	20	Yes	FACU
3.			
4.			
5.			
6.			
7.			
	60	= Total Cover	
Herb Stratum (Plot size: 5 ft)			
1. *Dryopteris marginalis*	10	Yes	FACU
2. *Acer pensylvanicum*	5	Yes	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	15	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft)			
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: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 16.7 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply By:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	55	x 3 =	165
FACU species	115	x 4 =	460
UPL species	0	x 5 =	0
Column Totals	170	(A)	625 (B)

Prevalence Index = B/A = 3.7

Hydrophytic Vegetation Indicators:

_____ 1- Rapid Test for Hydrophytic Vegetation

_____ 2 - Dominance Test is > 50%

_____ 3 - Prevalence Index is ≤ 3.0[1]

_____ 4 - 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 or equal to 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 ✓

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

No positive indication of hydrophytic vegetation was observed (≥50% of dominant species indexed as FAC− or drier)..

SOIL

Sampling Point: GR-W1-UPL

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 - 20	10YR 6/8	100					Silt Loam	

[1]Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked 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 (F21)
___ 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: None

Depth (inches):

Hydric Soil Present? Yes ____ No ✓

Remarks:

No positive indication of hydric soils was observed..

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Stafford St. Substation **City/County:** Cherry Valley, Worcester **Sampling Date:** 2019-Oct-16
Applicant/Owner: NGRID **State:** MA **SamplingPoint:** GR-W2-PFO
Investigator(s): Greg Russo, Matt Boscow, Russo **Section,Township,Range:** Leicester
Landform (hillslope, terrace, etc.): Depression **Local relief (concave, convex, none):** Concave **Slope (%):** 2-5
Subregion (LRR or MLRA): LRR R **Lat:** 42.2290363117 **Long:** -71.8682658021 **Datum:** WGS84
Soil Map Unit Name: Canton fine sandy loam, 8 to 15 percent slopes, extremely stony **NWI classification:** PEM
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 ✓ No ____		
Hydric Soil Present?	Yes ✓ No ____	**Is the Sampled Area within a Wetland?**	**Yes ✓ No ____**
Wetland Hydrology Present?	Yes ✓ No ____	**If yes, optional Wetland Site ID:**	GR-W2

Remarks: (Explain alternative procedures here or in a separate report)
Covertype is PFO. Area is wetland, all three wetland parameters are present..

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

Wetland Hydrology Present? Yes ✓ No ____

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

Remarks:
The criterion for wetland hydrology is met.

VEGETATION -- Use scientific names of plants.

Sampling Point: GR-W2-PFO

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Acer rubrum*	50	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	50	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft)			
1. *Vaccinium corymbosum*	40	Yes	FACW
2. *Lindera benzoin*	20	Yes	FACW
3.			
4.			
5.			
6.			
7.			
	60	= Total Cover	
Herb Stratum (Plot size: 5 ft)			
1. *Osmunda spectabilis*	15	Yes	OBL
2. *Carex lurida*	5	Yes	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	20	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft)			
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:	5	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	100	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply By:	
OBL species	20	x 1 =	20
FACW species	60	x 2 =	120
FAC species	50	x 3 =	150
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals	130 (A)		290 (B)
Prevalence Index = B/A =	2.2		

Hydrophytic Vegetation Indicators:

____ 1- Rapid Test for Hydrophytic Vegetation

_✓_ 2 - Dominance Test is >50%

_✓_ 3 - Prevalence Index is ≤ 3.0[1]

____ 4 - 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 or equal to 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 ____

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

A positive indication of hydrophytic vegetation was observed (>50% of dominant species indexed as OBL, FACW, or FAC)..

SOIL

Sampling Point: GR-W2-PFO

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 - 20	10YR 2/2	100					Org matter Silt Loam	

[1]Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked 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 (F21)
- ___ 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: None

Depth (inches):

Hydric Soil Present? Yes ✓ No ____

Remarks:

A positive indication of hydric soil was observed..

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Stafford St. Substation **City/County:** Cherry Valley, Worcester **Sampling Date:** 2019-Oct-16
Applicant/Owner: NGRID **State:** MA **SamplingPoint:** GR-W2-UPL
Investigator(s): Greg Russo, Matt Boscow **Section,Township,Range:** Leicester
Landform (hillslope, terrace, etc.): Hillslope **Local relief (concave, convex, none):** Convex **Slope (%):** 5-10
Subregion (LRR or MLRA): LRR R **Lat:** 42.2292373516 **Long:** -71.8683931232 **Datum:** WGS84
Soil Map Unit Name: Canton fine sandy loam, 8 to 15 percent slopes, extremely stony **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 ✓ No ____		
Hydric Soil Present?	Yes ____ No ✓	**Is the Sampled Area within a Wetland?**	**Yes ____ No ✓**
Wetland Hydrology Present?	Yes ____ No ✓	**If yes, optional Wetland Site ID:**	

Remarks: (Explain alternative procedures here or in a separate report)
Covertype is UPL. Area is upland, not all three wetland parameters are present..

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 ✓	Depth (inches):	
Water Table Present?	Yes ____ No ✓	Depth (inches):	**Wetland Hydrology Present?** Yes ____ No ✓
Saturation Present? (includes capillary fringe)	Yes ____ No ✓	Depth (inches):	

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

Remarks:
The criterion for wetland hydrology is not met.

VEGETATION -- Use scientific names of plants.

Sampling Point: GR-W2-UPL

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Acer saccharum*	40	Yes	FACU
2. *Acer rubrum*	30	Yes	FAC
3. *Carya glabra*	15	No	FACU
4.			
5.			
6.			
7.			
	85	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft)			
1. *Lindera benzoin*	25	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	25	= Total Cover	

Herb Stratum (Plot size: 5 ft)			
1. *Amphicarpaea bracteata*	60	Yes	FAC
2. *Osmundastrum cinnamomeum*	10	No	FACW
3. *Parathelypteris noveboracensis*	5	No	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	75	= Total Cover	

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

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 75 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply By:	
OBL species	0	x 1 =	0
FACW species	35	x 2 =	70
FAC species	95	x 3 =	285
FACU species	55	x 4 =	220
UPL species	0	x 5 =	0
Column Totals	185 (A)		575 (B)

Prevalence Index = B/A = 3.1

Hydrophytic Vegetation Indicators:

____ 1- Rapid Test for Hydrophytic Vegetation

_✓_ 2 - Dominance Test is >50%

____ 3 - Prevalence Index is ≤ 3.0[1]

____ 4 - 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 or equal to 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 ____

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

The hydrophytic vegetation criterion has been met. However, due to the absence of wetland hydrology and/or hydric soils, this data point is within a non-wetland.

SOIL

Sampling Point: GR-W2-UPL

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 - 10	10YR 3/3	100					Silt Loam	

[1]Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked 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 (F21)
___ 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 ____ No ✓

Remarks:

No positive indication of hydric soils was observed..

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Stafford St. Substation **City/County:** Cherry Valley, Worcester **Sampling Date:** 2019-Oct-16
Applicant/Owner: NGRID **State:** MA **SamplingPoint:** GR-W3-PFO
Investigator(s): Greg Russo, Matt Boscow, Russo **Section,Township,Range:** Leicester
Landform (hillslope, terrace, etc.): Depression **Local relief (concave, convex, none):** Concave **Slope (%):** 5-10
Subregion (LRR or MLRA): LRR R **Lat:** 42.2289590724 **Long:** -71.869829027 **Datum:** WGS84
Soil Map Unit Name: Canton fine sandy loam, 0 to 8 percent slopes, extremely stony **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 _✓_ No ____		
Hydric Soil Present?	Yes _✓_ No ____	**Is the Sampled Area within a Wetland?**	**Yes _✓_ No ____**
Wetland Hydrology Present?	Yes _✓_ No ____	**If yes, optional Wetland Site ID:**	GR-W3

Remarks: (Explain alternative procedures here or in a separate report)
Covertype is PFO. Area is wetland, all three wetland parameters are present..

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

Wetland Hydrology Present? Yes _✓_ No ____

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

Remarks:
The criterion for wetland hydrology is met.

VEGETATION -- Use scientific names of plants.

Sampling Point: GR-W3-PFO

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Acer rubrum*	50	Yes	FAC
2. *Fraxinus pennsylvanica*	20	Yes	FACW
3.			
4.			
5.			
6.			
7.			
	70	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft)			
1. *Lindera benzoin*	15	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	15	= Total Cover	
Herb Stratum (Plot size: 5 ft)			
1. *Thalictrum dasycarpum*	50	Yes	FACW
2. *Dryopteris intermedia*	25	Yes	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	75	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft)			
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:	5	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	100	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply By:	
OBL species	0	x 1 =	0
FACW species	85	x 2 =	170
FAC species	75	x 3 =	225
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals	160	(A)	395 (B)

Prevalence Index = B/A = 2.5

Hydrophytic Vegetation Indicators:

____ 1- Rapid Test for Hydrophytic Vegetation

_✓_ 2 - Dominance Test is >50%

_✓_ 3 - Prevalence Index is ≤ 3.0[1]

____ 4 - 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 or equal to 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 ____

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

A positive indication of hydrophytic vegetation was observed (>50% of dominant species indexed as OBL, FACW, or FAC)..

SOIL

Sampling Point: GR-W3-PFO

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 - 8	10YR 2/1	100					Org matter Silty Clay Loam	

[1]Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked 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 (F21)
___ 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 ____

Remarks:

A positive indication of hydric soil was observed..

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Stafford St. Substation **City/County:** Cherry Valley, Worcester **Sampling Date:** 2019-Oct-16
Applicant/Owner: NGRID **State:** MA **SamplingPoint:** GR-W3-PSS
Investigator(s): Greg Russo, Matt Boscow, Russo **Section,Township,Range:** Leicester
Landform (hillslope, terrace, etc.): Depression **Local relief (concave, convex, none):** Concave **Slope (%):** 2-5
Subregion (LRR or MLRA): LRR R **Lat:** 42.2282387736 **Long:** -71.8701679912 **Datum:** WGS84
Soil Map Unit Name: Canton fine sandy loam, 0 to 8 percent slopes, extremely stony **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 _✓_ No ____		
Hydric Soil Present?	Yes _✓_ No ____	**Is the Sampled Area within a Wetland?**	**Yes _✓_ No ____**
Wetland Hydrology Present?	Yes _✓_ No ____	**If yes, optional Wetland Site ID:**	GR-W3

Remarks: (Explain alternative procedures here or in a separate report)
Covertype is PSS. Area is wetland, all three wetland parameters are present..

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

Wetland Hydrology Present? Yes _✓_ No ____

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

Remarks:
The criterion for wetland hydrology is met.

VEGETATION -- Use scientific names of plants.

Sampling Point: GR-W3-PSS

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft)			
1. *Lyonia ligustrina*	60	Yes	FACW
2. *Lindera benzoin*	30	Yes	FACW
3.			
4.			
5.			
6.			
7.			
	90	= Total Cover	
Herb Stratum (Plot size: 5 ft)			
1. *Persicaria sagittata*	70	Yes	OBL
2. *Eupatorium perfoliatum*	25	No	FACW
3. *Impatiens capensis*	25	No	FACW
4. *Onoclea sensibilis*	10	No	FACW
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	130	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft)			
1.			
2.			
3.			
4.			
	0	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	3	(A)
Total Number of Dominant Species Across All Strata:	3	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	100	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply By:	
OBL species	70	x 1 =	70
FACW species	150	x 2 =	300
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals	220	(A)	370 (B)
Prevalence Index = B/A =	1.7		

Hydrophytic Vegetation Indicators:

✓ 1- Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

✓ 3 - Prevalence Index is ≤ 3.0[1]

____ 4 - 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 or equal to 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 ____

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

A positive indication of hydrophytic vegetation was observed (>50% of dominant species indexed as OBL, FACW, or FAC)..

SOIL

Sampling Point: GR-W3-PSS

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 - 10	10YR 2/1	100					Org matter Silty Clay Loam	

[1]Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked 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 (F21)
- ___ 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 _✓_ No ____

Remarks:

A positive indication of hydric soil was observed..

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Stafford St. Substation **City/County:** Cherry Valley, Worcester **Sampling Date:** 2019-Oct-16
Applicant/Owner: NGRID **State:** MA **SamplingPoint:** GR-W3-UPL1
Investigator(s): Greg Russo, Matt Boscow, Russo **Section,Township,Range:** Leicester
Landform (hillslope, terrace, etc.): Hillslope **Local relief (concave, convex, none):** Convex **Slope (%):** 5-10
Subregion (LRR or MLRA): LRR R **Lat:** 42.22827008 **Long:** -71.8703143392 **Datum:** WGS84
Soil Map Unit Name: Canton fine sandy loam, 0 to 8 percent slopes, extremely stony **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 ____ No ✓		
Hydric Soil Present?	Yes ____ No ✓	**Is the Sampled Area within a Wetland?**	**Yes ____ No ✓**
Wetland Hydrology Present?	Yes ____ No ✓	**If yes, optional Wetland Site ID:**	

Remarks: (Explain alternative procedures here or in a separate report)
Covertype is UPL. Area is upland, not all three wetland parameters are present..

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 ✓	Depth (inches):	
Water Table Present?	Yes ____ No ✓	Depth (inches):	**Wetland Hydrology Present?** Yes ____ No ✓
Saturation Present? (includes capillary fringe)	Yes ____ No ✓	Depth (inches):	

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

Remarks:
The criterion for wetland hydrology is not met.

VEGETATION -- Use scientific names of plants.

Sampling Point: GR-W3-UPL1

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Quercus rubra*	50	Yes	FACU
2. *Acer saccharum*	20	Yes	FACU
3.			
4.			
5.			
6.			
7.			
	70	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft)			
1. *Kalmia latifolia*	25	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
	25	= Total Cover	
Herb Stratum (Plot size: 5 ft)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	0	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft)			
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** (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	95	x 4 =	380
UPL species	0	x 5 =	0
Column Totals	95	(A)	380 (B)

Prevalence Index = B/A = 4

Hydrophytic Vegetation Indicators:

_____ 1- Rapid Test for Hydrophytic Vegetation

_____ 2 - Dominance Test is > 50%

_____ 3 - Prevalence Index is ≤ 3.0[1]

_____ 4 - 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 or equal to 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 ✓

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

No positive indication of hydrophytic vegetation was observed (≥50% of dominant species indexed as FAC− or drier)..

SOIL

Sampling Point: GR-W3-UPL1

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 - 20	10YR 4/4	100					Silt Loam	

[1]Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked 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 (F21)
___ 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: None

Depth (inches):

Hydric Soil Present? Yes ____ No ✓

Remarks:

No positive indication of hydric soils was observed..

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Stafford St. Substation **City/County:** Cherry Valley, Worcester **Sampling Date:** 2019-Oct-16
Applicant/Owner: NGRID **State:** MA **SamplingPoint:** GR-W3-UPL2
Investigator(s): Greg Russo, Matt Boscow, Russo **Section,Township,Range:** Leicester
Landform (hillslope, terrace, etc.): Hillslope **Local relief (concave, convex, none):** None **Slope (%):** 2-5
Subregion (LRR or MLRA): LRR R **Lat:** 42.2289142292 **Long:** -71.8698379957 **Datum:** WGS84
Soil Map Unit Name: Canton fine sandy loam, 0 to 8 percent slopes, extremely stony **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 ____ No ✓		
Hydric Soil Present?	Yes ____ No ✓	**Is the Sampled Area within a Wetland?**	**Yes ____ No ✓**
Wetland Hydrology Present?	Yes ____ No ✓	**If yes, optional Wetland Site ID:**	

Remarks: (Explain alternative procedures here or in a separate report)
Covertype is UPL. Area is upland, not all three wetland parameters are present..

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 ✓	Depth (inches):	
Water Table Present?	Yes ____ No ✓	Depth (inches):	**Wetland Hydrology Present?** Yes ____ No ✓
Saturation Present? (includes capillary fringe)	Yes ____ No ✓	Depth (inches):	

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

Remarks:
The criterion for wetland hydrology is not met.

VEGETATION -- Use scientific names of plants.

Sampling Point: GR-W3-UPL2

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Acer rubrum*	50	Yes	FAC
2. *Carya glabra*	15	Yes	FACU
3. *Fraxinus pennsylvanica*	10	No	FACW
4.			
5.			
6.			
7.			
	75	= Total Cover	

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

Herb Stratum (Plot size: 5 ft)			
1. *Dryopteris marginalis*	70	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	70	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft)			
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: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33.3 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply By:	
OBL species	0	x 1 =	0
FACW species	10	x 2 =	20
FAC species	50	x 3 =	150
FACU species	85	x 4 =	340
UPL species	0	x 5 =	0
Column Totals	145	(A)	510 (B)

Prevalence Index = B/A = 3.5

Hydrophytic Vegetation Indicators:

_____ 1- Rapid Test for Hydrophytic Vegetation

_____ 2 - Dominance Test is > 50%

_____ 3 - Prevalence Index is ≤ 3.0[1]

_____ 4 - 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 or equal to 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 ✓

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

No positive indication of hydrophytic vegetation was observed (≥50% of dominant species indexed as FAC− or drier)..

SOIL

Sampling Point: GR-W3-UPL2

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 - 8	10YR 2/2	100					Silt Loam	

[1]Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked 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 (F21)
___ 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 ✓

Remarks:

No positive indication of hydric soils was observed..

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Stafford St. Substation **City/County:** Cherry Valley, Worcester **Sampling Date:** 2019-Oct-18
Applicant/Owner: NGRID **State:** MA **SamplingPoint:** GR-W4-PSS
Investigator(s): Greg Russo, Matt Boscow, Russo **Section,Township,Range:** Leicester
Landform (hillslope, terrace, etc.): Depression **Local relief (concave, convex, none):** Concave **Slope (%):** 2-5
Subregion (LRR or MLRA): LRR R **Lat:** 42.2270809813 **Long:** -71.8675241713 **Datum:** WGS84
Soil Map Unit Name: Canton fine sandy loam, 0 to 8 percent slopes, extremely stony **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 _✓_ No ____		
Hydric Soil Present?	Yes _✓_ No ____	**Is the Sampled Area within a Wetland?**	**Yes _✓_ No ____**
Wetland Hydrology Present?	Yes _✓_ No ____	**If yes, optional Wetland Site ID:**	GR-W4

Remarks: (Explain alternative procedures here or in a separate report)
Covertype is PSS. Area is wetland, all three wetland parameters are present..

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

Wetland Hydrology Present? Yes _✓_ No ____

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

Remarks:
The criterion for wetland hydrology is met.

VEGETATION -- Use scientific names of plants.

Sampling Point: GR-W4-PSS

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft)			
1. *Spiraea latifolia*	70	Yes	FACW
2. *Lyonia ligustrina*	25	Yes	FACW
3. *Alnus incana*	5	No	FACW
4.			
5.			
6.			
7.			
	100	= Total Cover	
Herb Stratum (Plot size: 5 ft)			
1. *Toxicodendron radicans*	60	Yes	FAC
2. *Rubus hispidus*	50	Yes	FACW
3. *Solidago rugosa*	5	No	FAC
4. *Onoclea sensibilis*	5	No	FACW
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	120	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft)			
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	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply By:	
OBL species	0	x 1 =	0
FACW species	155	x 2 =	310
FAC species	65	x 3 =	195
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals	220	(A)	505 (B)

Prevalence Index = B/A = 2.3

Hydrophytic Vegetation Indicators:

____ 1- Rapid Test for Hydrophytic Vegetation

_✓_ 2 - Dominance Test is >50%

_✓_ 3 - Prevalence Index is ≤ 3.0[1]

____ 4 - 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 or equal to 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 ____

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

A positive indication of hydrophytic vegetation was observed (>50% of dominant species indexed as OBL, FACW, or FAC)..

SOIL

Sampling Point: GR-W4-PSS

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 - 3	10YR 2/1	100					Mucky Silt Loam	
3 - 6	10YR 4/1	100					Sand	Very coarse
6 - 20	10YR 5/1	80	7.5YR 4/6	20	C	M	Gravelly Clay Loam	

[1]Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked 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 (F21)
___ 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: None

Depth (inches):

Hydric Soil Present? Yes _✓_ No ____

Remarks:

A positive indication of hydric soil was observed..

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Stafford St. Substation **City/County:** Cherry Valley, Worcester **Sampling Date:** 2019-Oct-18
Applicant/Owner: NGRID **State:** MA **SamplingPoint:** GR-W4-UPL
Investigator(s): Greg Russo, Matt Boscow, Russo **Section,Township,Range:** Leicester
Landform (hillslope, terrace, etc.): Hillslope **Local relief (concave, convex, none):** None **Slope (%):** 5-10
Subregion (LRR or MLRA): LRR R **Lat:** 42.2270678217 **Long:** -71.8673402724 **Datum:** WGS84
Soil Map Unit Name: Canton fine sandy loam, 0 to 8 percent slopes, extremely stony **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 ____ No ✓		
Hydric Soil Present?	Yes ____ No ✓	**Is the Sampled Area within a Wetland?**	**Yes ____ No ✓**
Wetland Hydrology Present?	Yes ____ No ✓	**If yes, optional Wetland Site ID:**	

Remarks: (Explain alternative procedures here or in a separate report)
Covertype is UPL. Area is upland, not all three wetland parameters are present..

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 ✓	Depth (inches):	
Water Table Present?	Yes ____ No ✓	Depth (inches):	**Wetland Hydrology Present?** Yes ____ No ✓
Saturation Present? (includes capillary fringe)	Yes ____ No ✓	Depth (inches):	

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

Remarks:
The criterion for wetland hydrology is met.

VEGETATION -- Use scientific names of plants.

Sampling Point: GR-W4-UPL

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft)			
1. *Kalmia latifolia*	50	Yes	FACU
2. *Lyonia ligustrina*	10	No	FACW
3. *Rubus allegheniensis*	10	No	FACU
4.			
5.			
6.			
7.			
	70	= Total Cover	
Herb Stratum (Plot size: 5 ft)			
1. *Solidago rugosa*	10	Yes	FAC
2. *Dryopteris intermedia*	5	Yes	FAC
3. *Pteridium aquilinum*	5	Yes	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	20	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft)			
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: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply By:	
OBL species	0	x 1 =	0
FACW species	10	x 2 =	20
FAC species	15	x 3 =	45
FACU species	65	x 4 =	260
UPL species	0	x 5 =	0
Column Totals	90	(A)	325 (B)

Prevalence Index = B/A = 3.6

Hydrophytic Vegetation Indicators:

_____ 1- Rapid Test for Hydrophytic Vegetation

_____ 2 - Dominance Test is > 50%

_____ 3 - Prevalence Index is ≤ 3.0[1]

_____ 4 - 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 or equal to 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 ✓

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

No positive indication of hydrophytic vegetation was observed (≥50% of dominant species indexed as FAC− or drier)..

SOIL

Sampling Point: GR-W4-UPL

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 - 2	10YR 4/3	100					Silt Loam	
2 - 16	10YR 5/8	100					Silt Loam	

[1]Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked 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 (F21)
___ 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): 16

Hydric Soil Present? Yes ____ No ✓

Remarks:

No positive indication of hydric soils was observed..

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Stafford St. Substation **City/County:** Leicester, Worcester County **Sampling Date:** 2019-Oct-15
Applicant/Owner: NGRID **State:** Massachusetts **Sampling Point:** DJH-W1-PFO
Investigator(s): Dan Herzlinger, Matt Boscow **Section, Township, Range:**
Landform (hillslope, terrace, etc.): Back slope **Local relief (concave, convex, none):** Concave **Slope (%):** 1-10
Subregion (LRR or MLRA): **Lat:** 42.2306005 **Long:** -71.8693431 **Datum:** WGS84
Soil Map Unit Name: **NWI classification:**
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 _✓_ No ____		
Hydric Soil Present?	Yes _✓_ No ____	**Is the Sampled Area within a Wetland?**	**Yes _✓_ No ____**
Wetland Hydrology Present?	Yes _✓_ No ____	**If yes, optional Wetland Site ID:**	W-DJH-01

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

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 _✓_	Depth (inches):	
Water Table Present?	Yes ____ No _✓_	Depth (inches):	**Wetland Hydrology Present?** Yes _✓_ No ____
Saturation Present? (includes capillary fringe)	Yes ____ No _✓_	Depth (inches):	

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

Remarks:

VEGETATION -- Use scientific names of plants.

Sampling Point: DJH-W1-PFO

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Acer rubrum*	80	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	80	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft)			
1. *Ilex verticillata*	40	Yes	FACW
2. *Lindera benzoin*	30	Yes	FACW
3. *Vaccinium corymbosum*	30	Yes	FACW
4.			
5.			
6.			
7.			
	100	= Total Cover	
Herb Stratum (Plot size: 5 ft)			
1. *Onoclea sensibilis*	20	Yes	FACW
2. *Ilex verticillata*	20	Yes	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	40	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft)			
1.			
2.			
3.			
4.			
	0	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	6	(A)
Total Number of Dominant Species Across All Strata:	6	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	100	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply By:	
OBL species	0	x 1 =	0
FACW species	140	x 2 =	280
FAC species	80	x 3 =	240
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals	220 (A)		520 (B)
Prevalence Index = B/A =	2.4		

Hydrophytic Vegetation Indicators:

____ 1- Rapid Test for Hydrophytic Vegetation

_✓_ 2 - Dominance Test is >50%

_✓_ 3 - Prevalence Index is ≤ 3.0[1]

____ 4 - 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 or equal to 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 ____

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

SOIL

Sampling Point: DJH-W1-PFO

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 - 6	10YR 2/1	100					Org matter Muck	

[1]Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked 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 (F21)
- ___ 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: Shallow rock

Depth (inches): 6

Hydric Soil Present? Yes ✓ No ____

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Stafford St. Substation **City/County:** Leicester, Worcester County **Sampling Date:** 2019-Oct-15
Applicant/Owner: NGRID **State:** Massachusetts **Sampling Point:** DJH-W1-UPL
Investigator(s): Dan Herzlinger, Matt Boscow **Section, Township, Range:**
Landform (hillslope, terrace, etc.): Back slope **Local relief (concave, convex, none):** Convex **Slope (%):** 1-10
Subregion (LRR or MLRA): **Lat:** 42.2306769 **Long:** -71.8691202 **Datum:** WGS84
Soil Map Unit Name: **NWI classification:**
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 ____ No ✓		
Hydric Soil Present?	Yes ____ No ✓	**Is the Sampled Area within a Wetland?**	**Yes ____ No ✓**
Wetland Hydrology Present?	Yes ____ No ✓	**If yes, optional Wetland Site ID:**	

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

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 ✓	Depth (inches):	
Water Table Present?	Yes ____ No ✓	Depth (inches):	**Wetland Hydrology Present?** Yes ____ No ✓
Saturation Present? (includes capillary fringe)	Yes ____ No ✓	Depth (inches):	

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

Remarks:

VEGETATION -- Use scientific names of plants.

Sampling Point: DJH-W1-UPL

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Acer rubrum*	40	Yes	FAC
2. *Carya ovata*	30	Yes	FACU
3. *Quercus rubra*	20	Yes	FACU
4. *Hamamelis virginiana*	10	No	FACU
5.			
6.			
7.			
	100	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft)			
1. *Hamamelis virginiana*	70	Yes	FACU
2. *Kalmia latifolia*	40	Yes	FACU
3.			
4.			
5.			
6.			
7.			
	110	= Total Cover	
Herb Stratum (Plot size: 5 ft)			
1. *Kalmia latifolia*	30	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	30	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft)			
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: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 16.7 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply By:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	40	x 3 =	120
FACU species	200	x 4 =	800
UPL species	0	x 5 =	0
Column Totals	240	(A)	920 (B)

Prevalence Index = B/A = 3.8

Hydrophytic Vegetation Indicators:

____ 1- Rapid Test for Hydrophytic Vegetation

____ 2 - Dominance Test is > 50%

____ 3 - Prevalence Index is ≤ 3.0[1]

____ 4 - 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 or equal to 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 ✓

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

SOIL

Sampling Point: DJH-W1-UPL

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 - 3	10YR 2/1	100		0			Silt Loam	
3 - 12	10YR 3/4	100					Sandy Loam	

[1]Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked 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 (F21)
___ 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: None

Depth (inches):

Hydric Soil Present? Yes ____ No ✓

Remarks:

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 Worcester County, Massachusetts, Southern Part

Stafford St Substation

January 10, 2020

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.

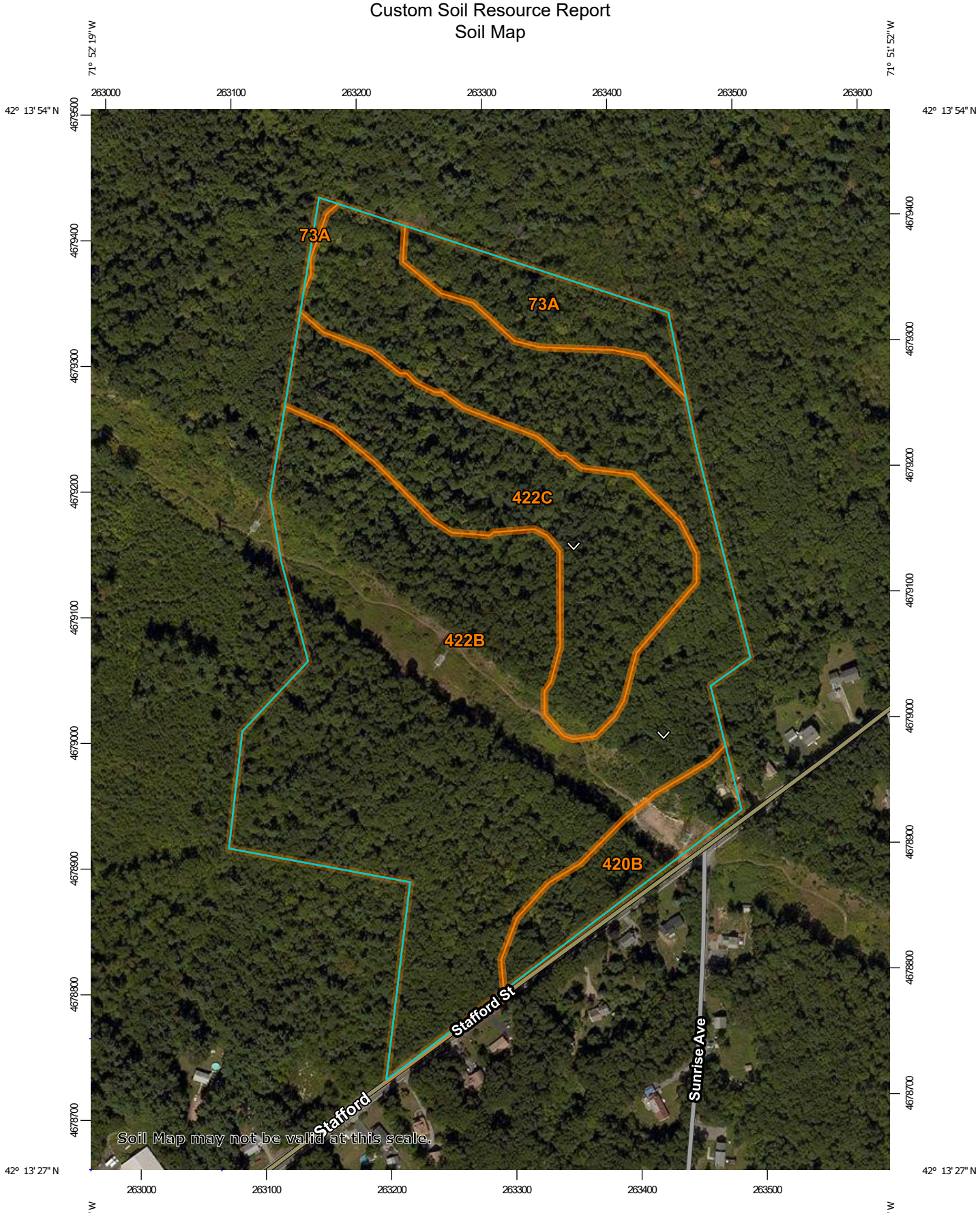
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

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: 1:4,110 if printed on A portrait (8.5" x 11") 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 19N 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 1:25,000.

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: Worcester County, Massachusetts, Southern Part
Survey Area Data: Version 12, 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 12, 2014—Sep 28, 2014

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND

MAP INFORMATION

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
73A	Whitman fine sandy loam, 0 to 3 percent slopes, extremely stony	2.7	5.9%
420B	Canton fine sandy loam, 3 to 8 percent slopes	2.7	5.8%
422B	Canton fine sandy loam, 0 to 8 percent slopes, extremely stony	31.9	69.2%
422C	Canton fine sandy loam, 8 to 15 percent slopes, extremely stony	8.8	19.1%
Totals for Area of Interest		**46.0**	**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.

Worcester County, Massachusetts, Southern Part

73A—Whitman fine sandy loam, 0 to 3 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2w695
Elevation: 0 to 1,580 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

Whitman, extremely stony, and similar soils: 81 percent
Minor components: 19 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Whitman, Extremely Stony

Setting

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

Typical profile

Oi - 0 to 1 inches: peat
A - 1 to 10 inches: fine sandy loam
Bg - 10 to 17 inches: gravelly fine sandy loam
Cdg - 17 to 61 inches: fine sandy loam

Properties and qualities

Slope: 0 to 3 percent
Percent of area covered with surface fragments: 9.0 percent
Depth to restrictive feature: 7 to 38 inches to densic material
Natural drainage class: Very poorly drained
Runoff class: Negligible
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: Frequent
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

Ridgebury, extremely stony

Percent of map unit: 10 percent
Landform: Drainageways, hills, ground moraines, drumlins, depressions
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope, head slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Scarboro

Percent of map unit: 5 percent
Landform: Outwash deltas, depressions, drainageways, outwash terraces
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Swansea

Percent of map unit: 3 percent
Landform: Marshes, swamps, bogs
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Woodbridge, extremely stony

Percent of map unit: 1 percent
Landform: Drumlins, ground moraines, hills
Landform position (two-dimensional): Backslope, footslope, summit
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

420B—Canton fine sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2w81b
Elevation: 0 to 1,180 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: All areas are prime farmland

Map Unit Composition

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

Description of Canton

Setting

Landform: Hills, ridges, moraines
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Side slope, crest, nose slope
Down-slope shape: Linear, convex
Across-slope shape: Convex
Parent material: Coarse-loamy over sandy melt-out till derived from gneiss, granite, and/or schist

Typical profile

Ap - 0 to 7 inches: fine sandy loam
Bw1 - 7 to 15 inches: fine sandy loam
Bw2 - 15 to 26 inches: gravelly fine sandy loam
2C - 26 to 65 inches: gravelly loamy sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 19 to 39 inches to strongly contrasting textural stratification
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 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 2.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Scituate

Percent of map unit: 10 percent
Landform: Ground moraines, drumlins, hills
Landform position (two-dimensional): Backslope, footslope, summit
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Linear, convex
Across-slope shape: Convex
Hydric soil rating: No

Montauk

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

Charlton

Percent of map unit: 4 percent
Landform: Ground moraines, ridges, hills
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Linear, convex
Across-slope shape: Convex
Hydric soil rating: No

Swansea

Percent of map unit: 1 percent
Landform: Kettles, bogs, depressions, marshes, swamps
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

422B—Canton fine sandy loam, 0 to 8 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2w818
Elevation: 0 to 1,180 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 145 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Canton, Extremely Stony

Setting

Landform: Hills, moraines, ridges
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope, crest, nose slope
Down-slope shape: Linear, convex
Across-slope shape: Convex
Parent material: Coarse-loamy over sandy melt-out till derived from gneiss, granite, and/or schist

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
A - 2 to 5 inches: fine sandy loam
Bw1 - 5 to 16 inches: fine sandy loam
Bw2 - 16 to 22 inches: gravelly fine sandy loam
2C - 22 to 67 inches: gravelly loamy sand

Properties and qualities

Slope: 0 to 8 percent
Percent of area covered with surface fragments: 9.0 percent
Depth to restrictive feature: 19 to 39 inches to strongly contrasting textural stratification
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 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 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Scituate, extremely stony

Percent of map unit: 6 percent
Landform: Ground moraines, hills, drumlins
Landform position (two-dimensional): Footslope, backslope, summit
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Linear, convex
Across-slope shape: Convex
Hydric soil rating: No

Charlton, extremely stony

Percent of map unit: 6 percent
Landform: Ground moraines, ridges, hills
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Linear, convex
Across-slope shape: Convex
Hydric soil rating: No

Swansea

Percent of map unit: 4 percent
Landform: Marshes, swamps, kettles, bogs, depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Montauk, extremely stony

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

422C—Canton fine sandy loam, 8 to 15 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2w815
Elevation: 0 to 1,310 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 145 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Canton, Extremely Stony

Setting

Landform: Hills, moraines, ridges
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope, crest, nose slope
Down-slope shape: Linear, convex
Across-slope shape: Convex
Parent material: Coarse-loamy over sandy melt-out till derived from gneiss, granite, and/or schist

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
A - 2 to 5 inches: fine sandy loam
Bw1 - 5 to 16 inches: fine sandy loam
Bw2 - 16 to 22 inches: gravelly fine sandy loam
2C - 22 to 67 inches: gravelly loamy sand

Properties and qualities

Slope: 8 to 15 percent
Percent of area covered with surface fragments: 9.0 percent
Depth to restrictive feature: 19 to 39 inches to strongly contrasting textural stratification
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 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 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Scituate, extremely stony
Percent of map unit: 6 percent
Landform: Ground moraines, drumlins, hills
Landform position (two-dimensional): Footslope, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear, convex
Across-slope shape: Convex
Hydric soil rating: No

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

Montauk, extremely stony
Percent of map unit: 5 percent
Landform: Ground moraines, recessionial moraines, hills, drumlins
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear, convex
Across-slope shape: Convex
Hydric soil rating: No

Hollis, extremely stony
Percent of map unit: 4 percent
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
Hydric soil rating: No

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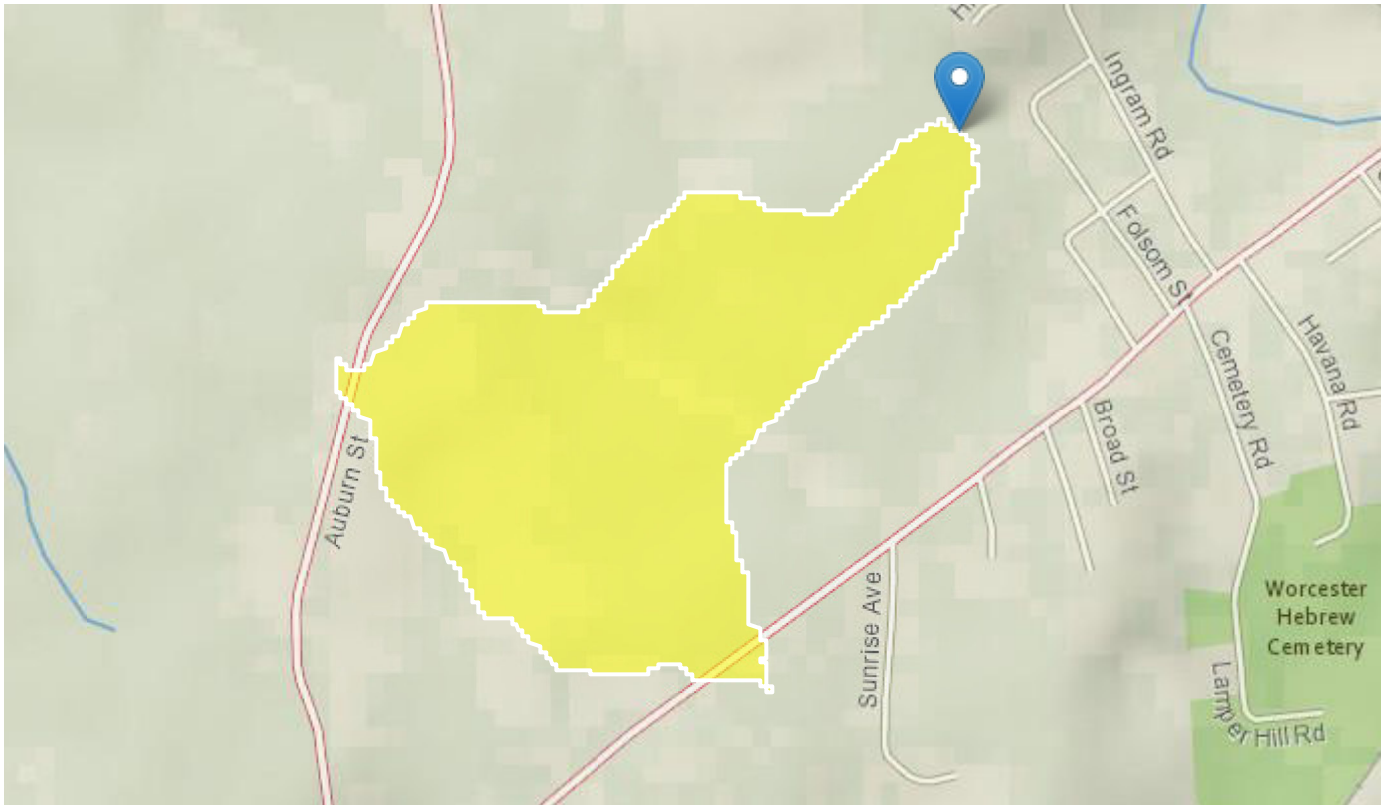
Appendix E: USGS StreamStats Report

Stafford Street Sub StreamStats Report

Region ID: MA
Workspace ID: MA20200115172321674000
Clicked Point (Latitude, Longitude): 42.23293, -71.86483
Time: 2020-01-15 12:23:38 -0500



Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	0.2	square miles
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	0	dimensionless
BSLDEM250	Mean basin slope computed from 1:250K DEM	4.221	percent
PCTSNDGRV	Percentage of land surface underlain by sand and gravel deposits	0	percent

Parameter Code	Parameter Description	Value	Unit
FOREST	Percentage of area covered by forest	68.17	percent
BSLDEM10M	Mean basin slope computed from 10 m DEM	7.552	percent
ELEV	Mean Basin Elevation	834	feet
LC06STOR	Percentage of water bodies and wetlands determined from the NLCD 2006	2.22	percent
ACRSDFT	Area underlain by stratified drift	0	square miles
CENTROIDX	Basin centroid horizontal (x) location in state plane coordinates	169324.7	meters
CENTROIDY	Basin centroid vertical (y) location in state plane units	886514	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	2.7	percent
LC11IMP	Average percentage of impervious area determined from NLCD 2011 impervious dataset	0.62	percent
MAXTEMPC	Mean annual maximum air temperature over basin area, in degrees Centigrade	13.9	feet per mi
OUTLETX	Basin outlet horizontal (x) location in state plane coordinates	169885	feet
OUTLETY	Basin outlet vertical (y) location in state plane coordinates	887005	feet
PRECPRIS00	Basin average mean annual precipitation for 1971 to 2000 from PRISM	48.6	inches
STRMTOT	total length of all mapped streams (1:24,000-scale) in the basin	0.9	miles
WETLAND	Percentage of Wetlands	4.69	percent

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

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.2	square miles	1.61	149
DRFTPERSTR	Stratified Drift per Stream Length	0	square mile per mile	0	1.29
MAREGION	Massachusetts Region	0	dimensionless	0	1
BSLDEM250	Mean Basin Slope from 250K DEM	4.221	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	0.185	ft^3/s
60 Percent Duration	0.106	ft^3/s
70 Percent Duration	0.0477	ft^3/s
75 Percent Duration	0.0331	ft^3/s
80 Percent Duration	0.0246	ft^3/s
85 Percent Duration	0.0166	ft^3/s
90 Percent Duration	0.0106	ft^3/s
95 Percent Duration	0.00546	ft^3/s
98 Percent Duration	0.00318	ft^3/s
99 Percent Duration	0.00209	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	0.2	square miles	1.61	149
BSLDEM250	Mean Basin Slope from 250K DEM	4.221	percent	0.32	24.6
DRFTPERSTR	Stratified Drift per Stream Length	0	square mile per mile	0	1.29
MAREGION	Massachusetts Region	0	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	0.00576	ft^3/s
7 Day 10 Year Low Flow	0.00169	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	0.2	square miles	1.61	149
BSLDEM250	Mean Basin Slope from 250K DEM	4.221	percent	0.32	24.6
DRFTPERSTR	Stratified Drift per Stream Length	0	square mile per mile	0	1.29
MAREGION	Massachusetts Region	0	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	0.017	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/)

Probability Statistics Parameters[Perennial Flow Probability]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.2	square miles	0.01	1.99
PCTSNDGRV	Percent Underlain By Sand And Gravel	0	percent	0	100
FOREST	Percent Forest	68.17	percent	0	100
MAREGION	Massachusetts Region	0	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	0.408	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)

Bankfull Statistics Parameters[Bankfull Statewide SIR2013 5155]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.2	square miles	0.6	329
BSLDEM10M	Mean Basin Slope from 10m DEM	7.552	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	8.07	ft
Bankfull Depth	0.602	ft
Bankfull Area	4.78	ft^2
Bankfull Streamflow	11.5	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/)

Peak-Flow Statistics Parameters[Peak Statewide 2016 5156]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.2	square miles	0.16	512
ELEV	Mean Basin Elevation	834	feet	80.6	1948
LC06STOR	Percent Storage from NLCD2006	2.22	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	PIl	PIu	SEp
2 Year Peak Flood	15.7	ft^3/s	7.78	31.6	42.3
5 Year Peak Flood	27.4	ft^3/s	13.4	56.1	43.4
10 Year Peak Flood	37.2	ft^3/s	17.7	78.3	44.7
25 Year Peak Flood	52.1	ft^3/s	23.8	114	47.1
50 Year Peak Flood	64.7	ft^3/s	28.6	147	49.4
100 Year Peak Flood	78.6	ft^3/s	33.6	184	51.8
200 Year Peak Flood	94	ft^3/s	38.8	227	54.1
500 Year Peak Flood	117	ft^3/s	45.8	297	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)

Application Version: 4.3.11

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

Seth Woolard

From: ccosgrove=town.auburn.ma.us@mg.unibank.net on behalf of ccosgrove@town.auburn.ma.us
Sent: Tuesday, January 14, 2020 4:33 PM
To: gossur@comcast.net
Subject: Request for Abutters List - Your payment has been confirmed!

Your Confirmation number is 2020011437761
Date of Confirmation: 1/14/2020

NOTE: When paying by ACH (Checking) it will take two business days for the payment to be debited from your bank account. Your account number is not verified until this payment is presented to your bank. They have the right to return this payment if unable to process this transaction against your account.

Your request for payment(s) of $12.50 has been received and is subject to approval by your financial institution.

Account Information

Name: Gregory A. Russo
Address: 11 Adella Street
City: Auburn
State: MA
Zip: 01501
Email: gossur@comcast.net

Payment Information

Payment Type: Credit Card
Payer Name: Gregory A. Russo
Card Number: **********2000

Transaction Information

Town of Auburn Assessor's Department
Request for Abutters List
Request Type: Standard 100 to 300 Feet $10.00
Contact Person: Gregory Russo
Contact Address: 650 Suffolk Street
Contact Phone Number: 978-6563608
Email Address: grusso@trccompanies.com
Name of Board: Conservation Commission
Purpose: ANRAD
Location of Property: 408 Stafford Street, Map 34-A3-0, Deed Ref. 2328/512 (Leicester)
Owner of Property: New England Power Co.
Preferred Method of Delivery: Electronic
Notes: The property is actually in Leicester but is close enough to the town line that it has abutters in Auburn.

Quantity: 1
Amount: $10.00
Fee: $2.50
Payment Type: Credit Card

Total: $12.50

Town of Auburn, Massachusetts

Julie A. Jacobson
Town Manager

Cynthia Cosgrove
Chief Assessor

January 15, 2020

Conservation Commission
List of "Parties in Interest"

A "Party in Interest" is defined as any person, whose property line touches the petitioner's property, including property directly opposite on public or Private Street or way, and owners of land within 100 feet of the property line as they appear on the most recent tax maps and list in the Town of Auburn.

Map: 2 Parcel: 3

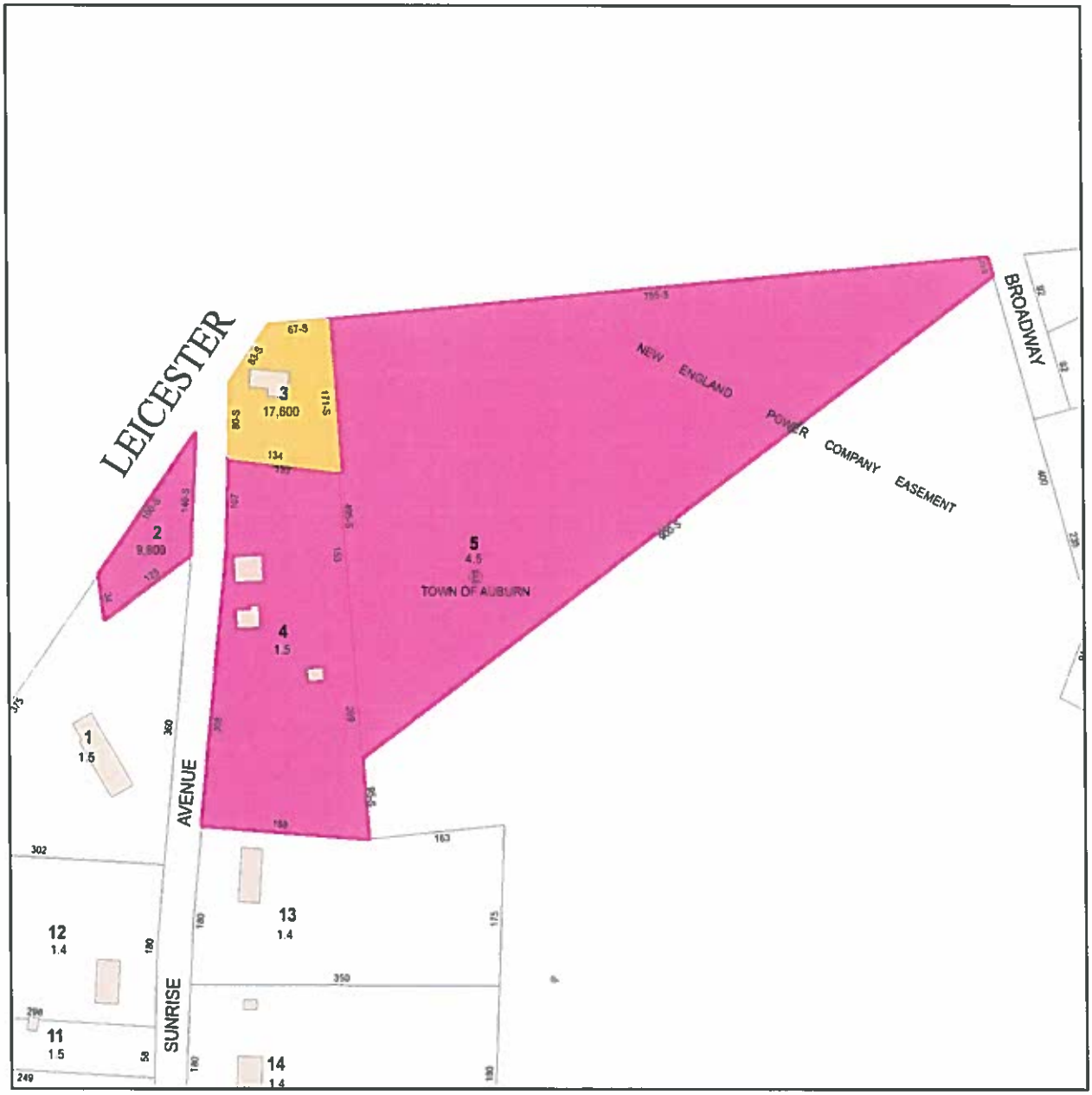
Location: 3 SUNRISE AVE AUBURN MA

Assessed to: RONALD AND KATHLEEN LAFLAMME PO BOX 276 ROCHDALE MA 01542

Signature: _____ Date: 1-5-2020

104 Central Street
Auburn, MA 01501
Telephone: (508) 832-7708
Fax: (508) 832-5328
Email: ccosgrove@town.auburn.ma.us
Web site: www.auburnguide.com

3 SUNRISE AVE AUBURN MA



CONSERVATION

N
W E
S

2/ 2/ / /
OSOWSKA KRYSTYNA
172 PERRY AVE
WORCESTER , MA 01610

2/ 3/ / /
LAFLAMME RONALD W
LAFLAMME KATHLEEN
P O BOX 276
ROCHDALE , MA 01542-0276

2/ 4/ / /
BOROWY QUINN
5 SUNRISE AVE
AUBURN , MA 01501

2/ 5/ / /
AUBURN TOWN OF
104 CENTRAL ST
AUBURN , MA 01501

Abutters List

ParcelID	Location	Owner	Co-Owner	Mailing Address	City	State	Zip
33 A5 0	221 AUBURN ST	PETKIEWICZ JOSEPH P	MILLETTE MARIE	221 AUBURN ST	CHERRY VALLEY	MA	01611
33 A6 0	100 A TOBIN RD	CHARPENTIER JOSEPH P		PO BOX 60453	WORCESTER	MA	01606
34 A1.3 0	466 STAFFORD ST	MARTIROS MICHAEL J		12 SHELTER RIDGE RD	LEICESTER	MA	01524
34 A4 0	402 STAFFORD ST	MCCUE NANCY M		402 STAFFORD ST	CHERRY VALLEY	MA	01611
34 A5 0	398 STAFFORD ST	OCEAN POINT INVESTMENTS LLC		398 STAFFORD STREET	CHERRY VALLEY	MA	01611
34 A6 0	392 STAFFORD ST	CHARPENTIER JOSEPH		392 STAFFORD ST	CHERRY VALLEY	MA	01611
34 A7 0	386 STAFFORD ST	TUISKULA WAYNE A	TUISKULA AMY B	386 STAFFORD STREET	CHERRY VALLEY	MA	01611
34 B10 0	451 STAFFORD ST	LOLA GARY R	LOLA TARA L	451 STAFFORD ST	CHERRY VALLEY	MA	01611
34 B11 0	447 STAFFORD ST	REPEKTA DEBORAH S	REPEKTA MICHAEL	447 STAFFORD ST	CHERRY VALLEY	MA	01611
34 B12 0	441 STAFFORD ST	DUSSAULT LAWRENCE M	MANTHA BARRY J	441 STAFFORD STREET	CHERRY VALLEY	MA	01611-3308
34 B13 0	439 STAFFORD ST	KELLEY CHRISTINE E		439 STAFFORD ST	CHERRY VALLEY	MA	01611
34 B14 0	425 STAFFORD ST	FOLEY BRUCE M	FOLEY ELIZABETH M	425 STAFFORD ST	CHERRY VALLEY	MA	01611
34 B9 0	STAFFORD ST	STAFFORDSHIRE PROPERTIES LL		83 KEYSTONE DR	LEOMINSTER	MA	01453
34B A1 0	417 STAFFORD ST	GITAU DAVIES M	LABOSSIERE ASHLEIGH A	417 STAFFORD STREET	CHERRY VALLEY	MA	01611
34B A2 0	415 STAFFORD ST	OSOWSKA KRYSTYNA		172 PERRY AVE	WORCESTER	MA	01610
34B B1 0	STAFFORD ST	LAFLAMME RONALD W	LAFLAMME KATHLEEN	PO BOX 276	ROCHDALE	MA	01542-0276
34B B10 0	STAFFORD ST	DRAZEK JOHN P		PO BOX 49	REHOBOTH	MA	02769
34B B3 0	STAFFORD ST	AGARWAL SATYENDRA K	AGARWAL BRAHM K	11928 B DARNESTOWN ROA	N POTOMAC	MD	20878
34B B4 0	STAFFORD ST	TOWN OF LEICESTER	TOWN HALL	3 WASHBURN SQUARE	LEICESTER	MA	01524
34B B5 0	STAFFORD ST	ARELLO ROBERT	ARELLO PHILIP	94 WACHUSETT ST	HOLDEN	MA	01520

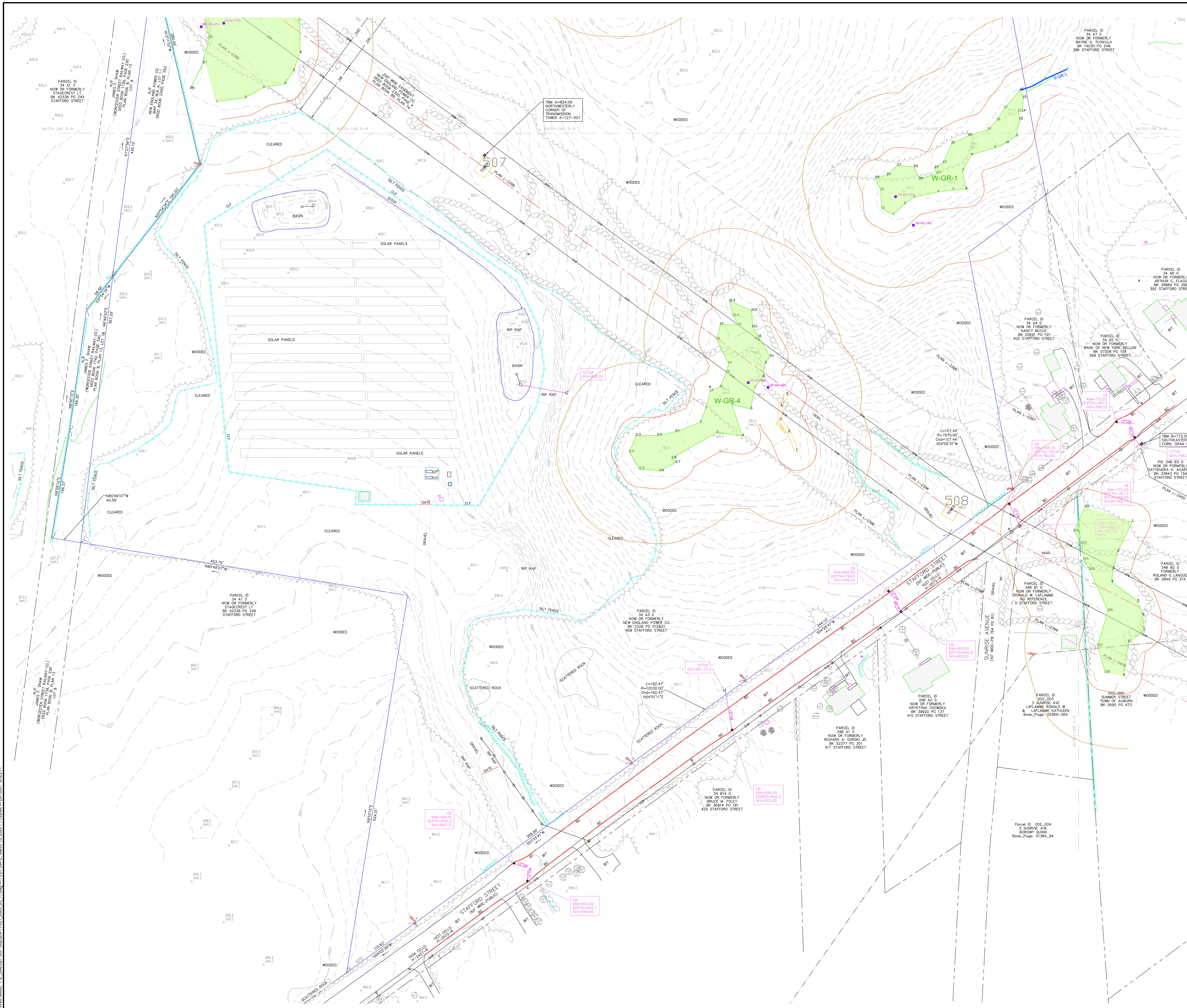
End of Report

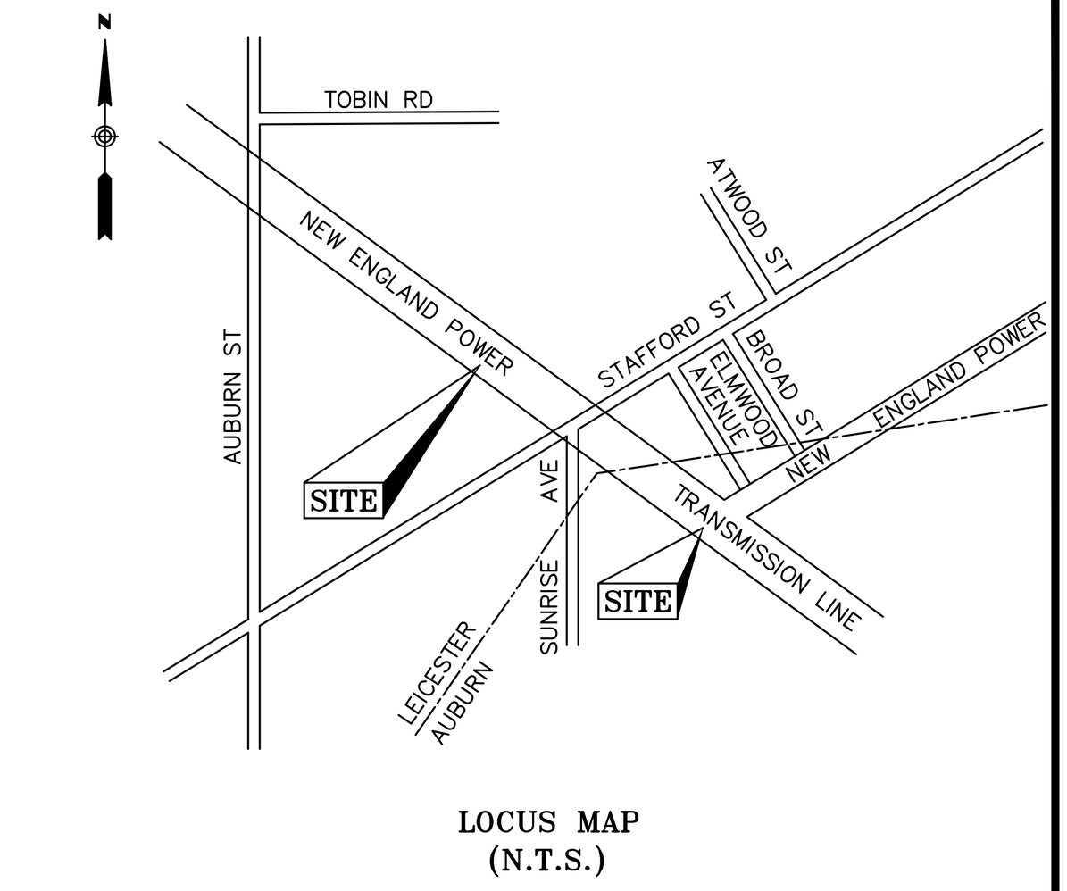
PLEASE NOTE: Abutters in the Town of Auburn

Above is a certified list of abutters and abutters to abutters within 300 feet of subject.
Subject property: 408 Stafford Street, Assessors Map 34-A3-0, Deed Ref. 2328/512
Subject owner: New England Power Co.
John Prescott, Principal Assessor

Prepared by: Kathleen Asquith, Assistant

ATTACHMENT D
Figure 1: Delineated Resources Map (March 2020)





NOTES

1. THE INTENT OF THIS PLAN IS TO SHOW THE LAND AND EASEMENTS OWNED BY THE NEW ENGLAND POWER COMPANY.

2. TOPOGRAPHY AND PHOTOGRAMMETRY SHOWN ON THIS PLAN WERE COMPILED FROM AERIAL PHOTOS DATED APRIL 17TH, 2017.

3. PROPERTY BOUNDARY AND WETLAND FLAG LOCATIONS SHOWN ON THIS PLAN WERE PREPARED FROM AN ACTUAL ON THE GROUND FIELD SURVEY CONDUCTED BY WSP BETWEEN JANUARY 9TH, 2015 AND JANUARY 26TH, 2020.

4. THE HORIZONTAL DATUM SHOWN HEREON IS BASED UPON THE MASSACHUSETTS STATE PLANE COORDINATE SYSTEM, MAINLAND ZONE, NORTH AMERICAN DATUM OF 1983.

5. THE VERTICAL DATUM SHOWN HEREON REFERENCES THE NORTH AMERICAN VERTICAL DATUM OF 1988.

6. WETLANDS WERE DELINEATED AND FLAGGED BY TRC ENVIRONMENTAL IN NOVEMBER 2019. SOME OF THE FLAGS ARE NO LONGER THERE.

LEGEND

CBDH CONCRETE BOUND WITH DRILL HOLE
CB CONCRETE BOUND
DHF DRILL HOLE FOUND
IPF IRON PIPE FOUND
UTILITY POLE
UTILITY POLE WITH LIGHT
POST
863.2 SPOT ELEVATION
DECIDUOUS TREE
CONIFER TREE
SHRUB
DI DROP INLET ELEVATION
INV PIPE INVERT ELEVATION
NPV NO PIPED VISIBLE

TEMP. BENCHMARK
LANDSCAPE BOULDER
WATER WELL
CATCH BASIN
CATCH BASIN DROP INLET
CULVERT
LIGHT POLE
BC BITUMINOUS CURBING
BIT BITUMINOUS PAVEMENT
CB CATCH BASIN
CLF CHAIN LINK FENCE
CM CORREGATED METAL PIPE
CNO COULD NOT OPEN

25-FT NO DISTURBANCE ZONE
FIELD DELINEATED WETLAND EDGE (TRC)
25-FT NO DISTURBANCE ZONE
100-FT WETLAND BUFFER
FIELD DELINEATED STREAM (TRC) AREA AND FLAG
FIELD DELINEATED DRAIN AREA (TRC)
33 WETLAND FLAG
USACE PLOT (TRC)
POTENTIAL VERNAL POOL
ABUTTERS LOT LINE
PROPERTY LINE
EASEMENT
TOWN LINE
BASELINE OF RIGHT OF WAY
OHW OVERHEAD WIRES
STONE WALL
TREE LINE
852 INTERMEDIATE CONTOURS
850 INDEX CONTOURS

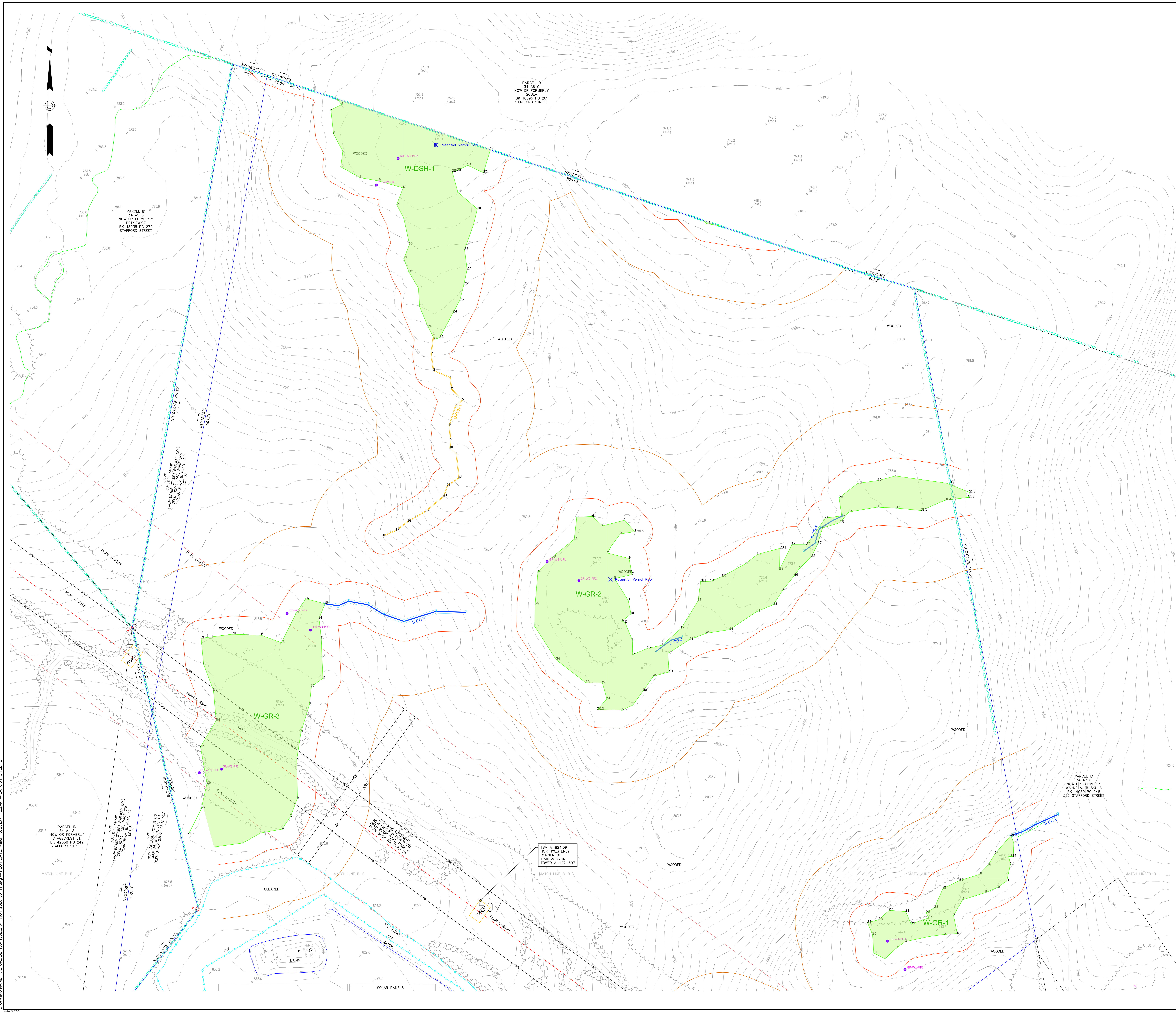
GRAPHIC SCALE

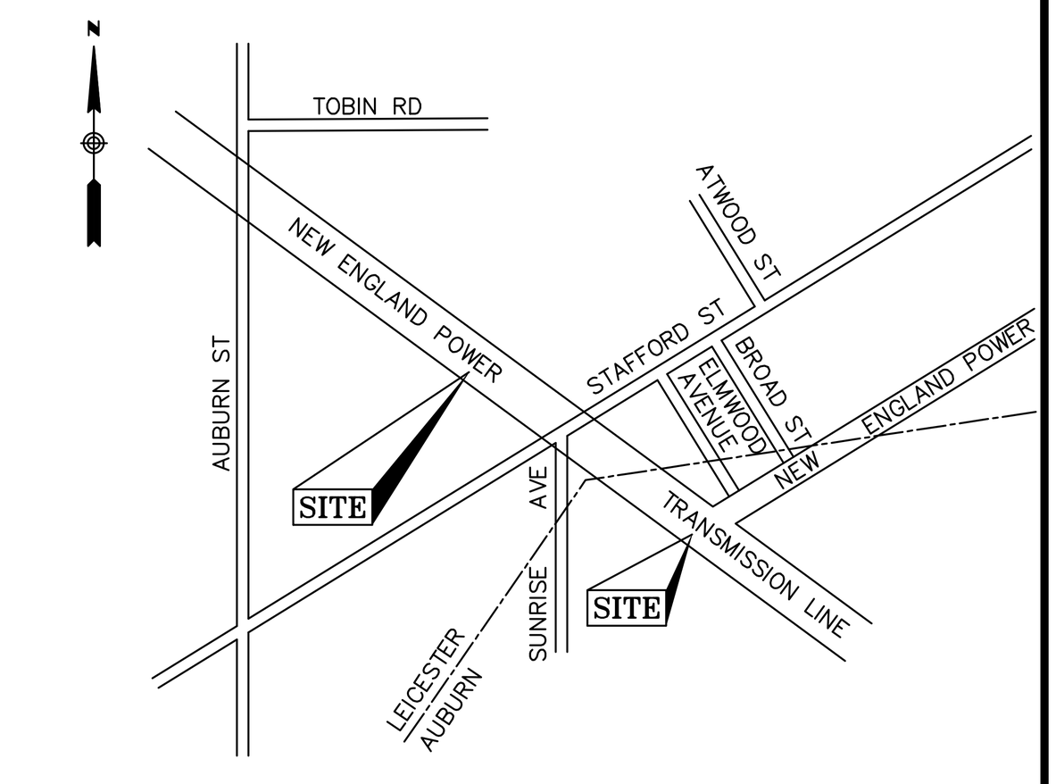
40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.

NOTE:
1) BASE MAP WAS DEVELOPED FROM A PLAN ENTITLED " EXISTING CONDITIONS PLAN" DATED FEBRUARY 7, 2020, SCALE 1"=40-FT SHEET 3 OF 3. PREPARED FOR NATIONAL GRID, PREPARED BY WSP USA INC. OF WORCESTER, MA

PROJECT: STAFFORD STREET LEICESTER & AUBURN, MA	
TITLE: WETLANDS DELINEATION PLAN	
DRAWN BY: MAN	PROJ. NO.: 327103
CHECKED BY: GR	SHEET 1
APPROVED BY: DH	
DATE: MARCH 2020	
TRC	650 Suffolk Street Suite 200 Lowell, MA 01854 Phone: 978.970.5600
FILE NO.: 190252N-1TRC1_2020_03_11.dwg	





LOCUS MAP (N.T.S.)

NOTES

1. THE INTENT OF THIS PLAN IS TO SHOW THE LAND AND EASEMENTS OWNED BY THE NEW ENGLAND POWER COMPANY.

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LEGEND

CBDH CONCRETE BOUND WITH DRILL HOLE
CB CONCRETE BOUND
DHF DRILL HOLE FOUND
IPF IRON PIPE FOUND
UTILITY POLE
UTILITY POLE WITH LIGHT
POST
SPOT ELEVATION
DECIDUOUS TREE
CONIFER TREE
SHRUB
DI DROP INLET ELEVATION
INV PIPE INVERT ELEVATION
NPV NO PIPED VISIBLE
TEMP. BENCHMARK
LANDSCAPE BOULDER
WATER WELL
CATCH BASIN
CATCH BASIN DROP INLET
CULVERT
LIGHT POLE
BC BITUMINOUS CURBING
BIT BITUMINOUS PAVEMENT
CB CATCH BASIN
CLF CHAIN LINK FENCE
CM CORRUGATED METAL PIPE
CNO COULD NOT OPEN

25-FT NO DISTURBANCE ZONE
FIELD DELINEATED WETLAND EDGE (TRC)
25-FT NO DISTURBANCE ZONE
100-FT WETLAND BUFFER
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ABUTTERS LOT LINE
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STONE WALL
TREE LINE
INTERMEDIATE CONTOURS
INDEX CONTOURS

GRAPHIC SCALE

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(IN FEET)
1 inch = 40 ft.

NOTE:
1) BASE MAP WAS DEVELOPED FROM A PLAN ENTITLED " EXISTING CONDITIONS PLAN" DATED FEBRUARY 7, 2020, SCALE 1"=40-FT SHEET 3 OF 3. PREPARED FOR NATIONAL GRID, PREPARED BY WSP USA INC. OF WORCESTER, MA

PROJECT: STAFFORD STREET LEICESTER & AUBURN, MA	
TITLE: WETLANDS DELINEATION PLAN	
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CHECKED BY: GR	SHEET 2
APPROVED BY: DH	
DATE: MARCH 2020	

TRC
650 Suffolk Street
Suite 200
Lowell, MA 01854
Phone: 978.970.5600

FILE NO.: 190252N-1TRC1_2020_03_11.dwg