May 23, 2017

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

Re: **Notice of Intent**
Proposed Solar Photovoltaic Project
Stafford Street, Leicester, MA

To the Conservation Commission:

On behalf of Ameresco, Inc. (Ameresco), AMEC Massachusetts, Inc. (AMEC) submits this Notice of Intent (NOI) application package for a proposed 1,359 kilowatt (kW) ground-mounted solar photovoltaic (PV) installation (the Project) off Stafford Street in Leicester (the Project Site). **WPA Form 3** is contained in **Attachment A**. Supporting documents are also attached.

This NOI is being submitted in accordance with the Massachusetts Wetlands Protection Act (WPA) (MGL c. 131 s. 40), its implementing regulations (310 CMR 10.00), and the Town of Leicester Wetlands Protection Bylaw and Regulations. AMEC has determined that filing of this NOI is necessary because portions of the proposed solar array will be located within Buffer Zone to wetland resource areas. The Project will cause no direct impacts to wetlands, and no impacts within the Leicester 25-foot "No Disturb" zone. Construction-period erosion and sediment controls will be employed to prevent sedimentation to jurisdictional areas.

This letter provides a description of the Project, nearby wetland resource areas, and proposed work within Buffer Zones. **Figure 1 in Attachment B** shows the Project location on a USGS topographic quadrangle map.

Project Description

The Project will be constructed on portions of a 45-acre parcel identified as Assessor's map and parcel number 34 A3 0, on the north side of Stafford Street near the town boundary with Worcester and Auburn. The parcel is bisected northwest-southeast by an overhead electric transmission corridor. The parcel and electric transmission corridor are owned by New England Power Company (NEP) d/b/a National Grid. The Project Site is presently predominantly forested. Topography is rolling and slopes down toward the east. Vegetated wetlands and intermittent streams are described below. **Photographs** are contained in **Attachment C**.

The Project is a Large-Scale Ground-Mounted Solar Energy System (as defined in the Town of Leicester Solar Bylaw Amendment). The Project will consist of the construction of 5,753 solar PV modules on approximately 205,642 sq. ft. (4.7 acres) of land as well as 11,923 sq. ft. (0.3 acres) of land for access and the electrical interconnection. **Site Plan Drawings** are provided in **Attachment D**.

Access for construction and maintenance will be from a gravel driveway leading from Stafford Street and passing south of an existing solar energy project on the same parcel immediately southwest of the electric transmission corridor. Temporary staging areas for construction equipment and materials for the solar PV installation will be located on existing cleared areas

Amec Massachusetts, Inc.
Environment & Infrastructure, Inc.
271 Mill Road, 3rd Floor
Chelmsford, MA 01824
+1 978-692-9090
amecfw.com

adjacent to the existing solar array. A perimeter security fence will be located a minimum of 25 feet from wetlands and streams, and the array will be set a minimum of 40 feet from wetlands and streams.

The sequence of construction activities will be as follows: establishment of limits of work and placement of perimeter erosion controls marking limits of work; clearing of trees and preparation of the access road from the southwest; tree clearing in the solar array areas; construction of the solar array, appurtenant equipment such as transformer(s), electrical interconnection, and security fence; seeding of all disturbed areas except the access road with an erosion control grass seed mix.

Resource Areas and Jurisdiction

As described above, the site is a forested parcel with rolling topography and an overall slight slope down toward the east toward Kettle Brook approximately one-half mile east of the site. Soils are generally poorly drained and extremely stony. Hydrologically restrictive materials apparently have caused wetlands to form in valleys and saddles. AMEC identified several Bordering Vegetated Wetlands (BVW) and intermittent streams on and near the site. BVWs were delineated in accordance with the Massachusetts Department of Environmental Protection Handbook on Delineating Bordering Vegetated Wetlands under the Massachusetts Wetlands Protection Act. Three wetlands and two intermittent streams whose buffers will be intersected by the project are described herein. **BVW Delineation Field Data Forms** are contained in **Attachment E**.

Intermittent Stream A is a broad, rocky surface that shows evidence of water flow by drainage patterns in the leaf litter. The intermittent stream begins at a BVW under the electric transmission lines, enters the forest canopy, and ends at a BVW identified as Wetland 3. Several braided paths lead downslope to Wetland 3. Photo 1 shows Intermittent Stream A.

Wetland 3 is a palustrine forested wetland (PFO) formed in a level area at the base of a trough trending southwest to northeast. Vegetation is dominated by red maple and winterberry. Soils were mucky and extremely stony. Drainage patterns, water-stained leaves, and surface water (several inches) were observed at the time of delineation in March 2017. No evidence of vernal-pool breeding amphibians was observed during multiple site visits in March and April.

In the western corner of the site Wetland 4 is a palustrine scrub-shrub (PSS) wetland within a broad saddle that drains off a plateau toward the north and the east. Wetland 4 transitions to a PFO beneath the forest canopy northeast of the transmission corridor, and drains generally to the north. Vegetation in the PSS part of the wetland is dominated by speckled alder, brambles (rubus species), and unidentified grasses. In the PFO portion vegetation includes red maple, yellow birch, and highbush blueberry.

A small Intermittent Stream C drains from Wetland 4 down toward the east. Intermittent Stream C is similar to Intermittent Stream A with braided channels formed in the leaf litter and between exposed rocks.

Intermittent Stream C drains into a large PFO wetland, Wetland 5, which itself drains offsite to the east. Wetland 5 is forested except at its center, where dense shrubs contribute to the plant community. Vegetation is dominated by red maple, winterberry, and speckled alder. Soils were

mucky and extremely stony. Surface water to a depth of several inches was observed at the time of delineation in March 2017. No evidence of vernal-pool breeding amphibians was observed during multiple site visits in March and April.

Approximately 89,300 square feet of Buffer Zone to Wetland 4, Intermittent Stream C, and Wetland 5 on the north side of the project will be impacted by the project. Similarly, approximately 36,300 square feet of Buffer Zone of Intermittent Stream A and Wetland 3 will be impacted on the south side of the proposed solar array. The project will not impact the 25-foot No-Disturb Zone closest to the wetlands. A perimeter erosion control line will be placed at the 25-foot line prior to construction, forming the limit of work, and there will be no clearing or work beyond that line. Impacts between 25 feet and 100 feet from wetland boundaries will be in the form of tree clearing, erection of a chain-link security fence, and solar panel construction.

No other jurisdictional resource areas are located near the Project. No perennial streams, vernal pools, Bordering Land Subject to Flooding, or other resources were observed on or near the site.

Compliance with WPA and Leicester Wetlands Protection Bylaw and Regulations

Massachusetts WPA

The Massachusetts WPA states in 10.02.b, "Any activity other than minor activities identified in 310 CMR 10.02(2)(b)2. proposed or undertaken within 100 feet of an area specified in 310 CMR 10.02(1)(a) (hereinafter called the Buffer Zone) which, in the judgment of the issuing authority, will alter an Area Subject to Protection under M.G.L. c. 131, § 40 is subject to regulation under M.G.L. c. 131, § 40 and requires the filing of a Notice of Intent." The work area is limited to the Buffer Zone. The work does not qualify as a *minor activity* identified in 310 CMR 10.02(2)(b)2*;* and therefore requires the filing of a Notice of Intent. No permanent change in topography will be caused by the Project. The project proposes no direct impacts to wetland resources. No other wetland resource areas or Buffer Zones will be affected by the work.

Leicester Wetlands By-Law

This application is submitted for concurrent review and permitting under the Leicester Wetlands Protection Bylaw and Regulations. The Project proposes no alterations within the 25-foot No Disturb Zone established by the Leicester bylaw and regulations.

Supporting Information

Massachusetts Endangered Species Act Review

According to the Natural Heritage and Endangered Species Program (NHESP) 2008 Priority and Estimated Habitat maps for state-listed protected species, the Project site is not located within any mapped Priority or Estimated Habitats.

Massachusetts Stormwater Standards

The Project is not exempt from the MassDEP Stormwater Management Standards because it is not a single family house, small residential subdivision, or emergency road repair. The required

Stormwater Report and Stormwater Checklist are attached to this letter, as specified by WPA Form 3, and are contained in **Attachment F**. The Stormwater Report was also prepared to meet the requirements of the Leicester Stormwater Regulations.

Other Permits

AMEC has submitted a combined application for Site Plan Review and application for a Special Permit to the Town of Leicester Planning Board.

Filing Requirements

Information required by the Massachusetts and Leicester regulations is contained herein, including as described below.

1. Two (2) copies of a complete NOI application with supporting documents:
   a. Completed MassDEP WPA Form 3 (Attachment A)
   b. NOI Wetland Fee Transmittal Form (Attachment A)
   c. 8 1/2 x 11 inch USGS map or other locus map sufficient to show the location of the affected area. (Attachment B)
   d. A detailed written description of work to be performed, to include a description of existing conditions, proposed conditions, wetland delineation information, stormwater information, construction sequencing, and how project will contribute to the protection of the interest of the Wetlands Protection Act. (this letter)
   e. Optional: photographs to help describe the proposed project and wetland impacts (Attachment C)

2. Five (5) sets of plans: 3 full-size (24” x 36”) and 2 half-size (11”x 17” or similar). In all cases, plans shall be of adequate size, scale, and detail to clearly and accurately describe the site, property boundaries, resource area boundaries, extent of the proposed work and potential impacts on resource areas. (Attachment D)

3. Certified Abutters List (abutters to the abutters within 300 feet of the property line of the land where the activity is proposed, including any in another municipality or across a body of water) (**Attachment G**).

4. Electronic submission of all application materials and plans in .pdf format or other electronic format specified by the Commission. (accompanying this submittal)

5. Filing Fees (MassDEP fee, plus local fees described in Section V.B. of the Regulations). (accompanying this submittal)

We respectfully request the Town of Leicester Conservation Commission consider the information in this Notice of Intent and issue an Order of Conditions permitting the Project as proposed.

May 23, 2017

Should you have any questions regarding this application, please contact us at (978) 392-5307; rob.bukowski@amecfw.com or (978) 392-5370; ryan.hale@amecfw.com.

Thank you.

Sincerely,

AMEC Massachusetts, Inc.

Robert J. Bukowski, P.E.
Project Manager

Ryan Hale, PWS
Permitting Specialist

Attachments

Copy: Ameresco, Inc.

Attachment A

WPA Form 3

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 3 – Notice of Intent

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

Provided by MassDEP:

MassDEP File Number

Document Transaction Number

Leicester
City/Town

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

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

A. General Information

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

0 Stafford Street — a. Street Address
Leicester — b. City/Town
01611 — c. Zip Code

Latitude and Longitude:
42d 13' 42.70" — d. Latitude
71d 52' 02.05" — e. Longitude

34 A3 0 — f. Assessors Map/Plat Number
0 — g. Parcel /Lot Number

2. Applicant:

Peter — a. First Name
Esselstyn — b. Last Name
Ameresco, Inc. — c. Organization
111 Speen Street — d. Street Address
Framingham — e. City/Town
MA — f. State
01701 — g. Zip Code
508-498-3083 — h. Phone Number
i. Fax Number
pesselstyn@ameresco.com — j. Email Address

3. Property owner (required if different from applicant): ☐ Check if more than one owner

Tyler — a. First Name
Krupa — b. Last Name
New England Power Company d/b/a National Grid — c. Organization
40 Sylvan Road — d. Street Address
Waltham — e. City/Town
MA — f. State
02451 — g. Zip Code
781-907-3906 — h. Phone Number
i. Fax Number
Tyler.Krupa@nationalgrid.com — j. Email address

4. Representative (if any):

Ryan — a. First Name
Hale — b. Last Name
Amec Massachusetts, Inc. — c. Company
271 Mill Road — d. Street Address
Chelmsford — e. City/Town
MA — f. State
01824 — g. Zip Code
978-392-5370 — h. Phone Number
i. Fax Number
ryan.hale@amecfw.com — j. Email address

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

500.00 — a. Total Fee Paid
237.50 — b. State Fee Paid
262.50 — c. City/Town Fee Paid

A. General Information (continued)

6. General Project Description:

Construction of a 1,361 kW ground-mounted solar energy project with portions in buffer zone.

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

1. ☐ Single Family Home
2. ☐ Residential Subdivision
3. ☐ Commercial/Industrial
4. ☐ Dock/Pier
5. ☒ Utilities
6. ☐ Coastal engineering Structure
7. ☐ Agriculture (e.g., cranberries, forestry)
8. ☐ Transportation
9. ☐ Other

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

1. ☒ Yes ☐ No

If yes, describe which limited project applies to this project. (See 310 CMR 10.24 and 10.53 for a complete list and description of limited project types)

310 CMR 10.53(3)t. Construction of a new access roadway… renewable energy project.

2. Limited Project Type

If the proposed activity is eligible to be treated as an Ecological Restoration Limited Project (310 CMR10.24(8), 310 CMR 10.53(4)), complete and attach Appendix A: Ecological Restoration Limited Project Checklist and Signed Certification.

8. Property recorded at the Registry of Deeds for:

a. County
b. Certificate # (if registered land)
c. Book
d. Page Number

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

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

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

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

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

Resource Area	Size of Proposed Alteration	Proposed Replacement (if any)
a. ☐ Bank	1. linear feet	2. linear feet
b. ☐ Bordering Vegetated Wetland	1. square feet	2. square feet
c. ☐ Land Under Waterbodies and Waterways	1. square feet 3. cubic yards dredged	2. square feet

Resource Area	Size of Proposed Alteration	Proposed Replacement (if any)
d. ☐ Bordering Land Subject to Flooding	1. square feet 3. cubic feet of flood storage lost	2. square feet 4. cubic feet replaced
e. ☐ Isolated Land Subject to Flooding	1. square feet 2. cubic feet of flood storage lost	3. cubic feet replaced

f. ☐ Riverfront Area

1. Name of Waterway (if available) - **specify coastal or inland**

2. Width of Riverfront Area (check one):

☐ 25 ft. - Designated Densely Developed Areas only

☐ 100 ft. - New agricultural projects only

☐ 200 ft. - All other projects

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

4. Proposed alteration of the Riverfront Area:

a. total square feet _____ b. square feet within 100 ft. _____ c. square feet between 100 ft. and 200 ft. _____

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

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

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

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

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

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

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

Resource Area	Size of Proposed Alteration	Proposed Replacement (if any)
a. ☐ Designated Port Areas	Indicate size under Land Under the Ocean, below	
b. ☐ Land Under the Ocean	1. square feet 2. cubic yards dredged	
c. ☐ Barrier Beach	Indicate size under Coastal Beaches and/or Coastal Dunes below	
d. ☐ Coastal Beaches	1. square feet	2. cubic yards beach nourishment
e. ☐ Coastal Dunes	1. square feet	2. cubic yards dune nourishment

Resource Area	Size of Proposed Alteration	Proposed Replacement (if any)
f. ☐ Coastal Banks	1. linear feet	
g. ☐ Rocky Intertidal Shores	1. square feet	
h. ☐ Salt Marshes	1. square feet	2. sq ft restoration, rehab., creation
i. ☐ Land Under Salt Ponds	1. square feet 2. cubic yards dredged	
j. ☐ Land Containing Shellfish	1. square feet	
k. ☐ Fish Runs	Indicate size under Coastal Banks, inland Bank, Land Under the Ocean, and/or inland Land Under Waterbodies and Waterways, above 1. cubic yards dredged	
l. ☐ Land Subject to Coastal Storm Flowage	1. square feet	

4. ☐ Restoration/Enhancement
If the project is for the purpose of restoring or enhancing a wetland resource area in addition to the square footage that has been entered in Section B.2.b or B.3.h above, please enter the additional amount here.

a. square feet of BVW | b. square feet of Salt Marsh

5. ☐ Project Involves Stream Crossings

a. number of new stream crossings | b. number of replacement stream crossings

C. Other Applicable Standards and Requirements

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

Streamlined Massachusetts Endangered Species Act/Wetlands Protection Act Review

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

   a. ☐ Yes ☒ No

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

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

   2008
   b. Date of map

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

   c. Submit Supplemental Information for Endangered Species Review*

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

         (a) within wetland Resource Area _____ percentage/acreage

         (b) outside Resource Area _____ percentage/acreage

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

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

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

   (b) ☐ Photographs representative of the site

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

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

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

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

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

(d) ☐ Vegetation cover type map of site

(e) ☐ Project plans showing Priority & Estimated Habitat boundaries

(f) OR Check One of the Following

1. ☐ Project is exempt from MESA review.
Attach applicant letter indicating which MESA exemption applies. (See 321 CMR 10.14, http://www.mass.gov/dfwele/dfw/nhesp/regulatory_review/mesa/mesa_exemptions.htm; the NOI must still be sent to NHESP if the project is within estimated habitat pursuant to 310 CMR 10.37 and 10.59.)

2. ☐ Separate MESA review ongoing.
a. NHESP Tracking # _____ b. Date submitted to NHESP _____

3. ☐ Separate MESA review completed.
Include copy of NHESP "no Take" determination or valid Conservation & Management Permit with approved plan.

3. For coastal projects only, is any portion of the proposed project located below the mean high water line or in a fish run?

a. ☐ Not applicable – project is in inland resource area only b. ☐ Yes ☐ No

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

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

Division of Marine Fisheries -
Southeast Marine Fisheries Station
Attn: Environmental Reviewer
1213 Purchase Street – 3rd Floor
New Bedford, MA 02740-6694
Email: DMF.EnvReview-South@state.ma.us

North Shore - Hull to New Hampshire border:

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

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

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

4. Is any portion of the proposed project within an Area of Critical Environmental Concern (ACEC)?

a. ☐ Yes ☒ No If yes, provide name of ACEC (see instructions to WPA Form 3 or MassDEP Website for ACEC locations). **Note:** electronic filers click on Website.

b. ACEC

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

5. Is any portion of the proposed project within an area designated as an Outstanding Resource Water (ORW) as designated in the Massachusetts Surface Water Quality Standards, 314 CMR 4.00?

a. ☐ Yes ☒ No

6. Is any portion of the site subject to a Wetlands Restriction Order under the Inland Wetlands Restriction Act (M.G.L. c. 131, § 40A) or the Coastal Wetlands Restriction Act (M.G.L. c. 130, § 105)?

a. ☐ Yes ☒ No

7. Is this project subject to provisions of the MassDEP Stormwater Management Standards?

a. ☒ Yes. Attach a copy of the Stormwater Report as required by the Stormwater Management Standards per 310 CMR 10.05(6)(k)-(q) and check if:

1. ☐ Applying for Low Impact Development (LID) site design credits (as described in Stormwater Management Handbook Vol. 2, Chapter 3)

2. ☐ A portion of the site constitutes redevelopment

3. ☐ Proprietary BMPs are included in the Stormwater Management System.

b. ☐ No. Check why the project is exempt:

1. ☐ Single-family house

2. ☐ Emergency road repair

3. ☐ Small Residential Subdivision (less than or equal to 4 single-family houses or less than or equal to 4 units in multi-family housing project) with no discharge to Critical Areas.

D. Additional Information

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

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

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

1. ☒ USGS or other map of the area (along with a narrative description, if necessary) containing sufficient information for the Conservation Commission and the Department to locate the site. (Electronic filers may omit this item.)

2. ☒ Plans identifying the location of proposed activities (including activities proposed to serve as a Bordering Vegetated Wetland [BVW] replication area or other mitigating measure) relative to the boundaries of each affected resource area.

D. Additional Information (cont'd)

3. ☒ Identify the method for BVW and other resource area boundary delineations (MassDEP BVW Field Data Form(s), Determination of Applicability, Order of Resource Area Delineation, etc.), and attach documentation of the methodology.

4. ☒ List the titles and dates for all plans and other materials submitted with this NOI.

a. Plan Title

b. Prepared By

c. Signed and Stamped by

d. Final Revision Date

e. Scale

f. Additional Plan or Document Title

g. Date

5. ☐ If there is more than one property owner, please attach a list of these property owners not listed on this form.

6. ☐ Attach proof of mailing for Natural Heritage and Endangered Species Program, if needed.

7. ☐ Attach proof of mailing for Massachusetts Division of Marine Fisheries, if needed.

8. ☒ Attach NOI Wetland Fee Transmittal Form

9. ☒ Attach Stormwater Report, if needed.

E. Fees

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

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

700938
2. Municipal Check Number

5/22/2017
3. Check date

700721
4. State Check Number

5/22/2017
5. Check date

Amec Foster Wheeler Environment & Infrastructure, Inc.

7. Payor name on check: Last Name

F. Signatures and Submittal Requirements

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

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

Peter Kesselty — 1. Signature of Applicant — 2. Date: 5/22/17

3. Signature of Property Owner (if different) — 4. Date: 5/22/17

5. Signature of Representative (if any) — 6. Date

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

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

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

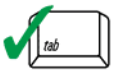
The original and copies must be sent simultaneously. Failure by the applicant to send copies in a timely manner may result in dismissal of the Notice of Intent.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

NOI Wetland Fee Transmittal Form

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

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



A. Applicant Information

1. Location of Project:

0 Stafford Street	Leicestesr
a. Street Address	b. City/Town
c. Check number	d. Fee amount

2. Applicant Mailing Address:

Peter	Esselstyn	
a. First Name	b. Last Name	
Ameresco, Inc.		
c. Organization		
111 Speen Street		
d. Mailing Address		
Framingham	MA	01701
e. City/Town	f. State	g. Zip Code
508-498-3083		pesselstyn@ameresco.com
h. Phone Number	i. Fax Number	j. Email Address

3. Property Owner (if different):

Tyler	Krupa	
a. First Name	b. Last Name	
New England Power Company d/b/a National Grid		
c. Organization		
40 Sylvan Road		
d. Mailing Address		
Waltham	MA	02451
e. City/Town	f. State	g. Zip Code
781-907-3906		Tyler.Krupa@nationalgrid.com
h. Phone Number	i. Fax Number	j. Email Address

B. Fees

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

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

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

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

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

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

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

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

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

NOI Wetland Fee Transmittal Form

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

B. Fees (continued)

Step 1/Type of Activity	Step 2/Number of Activities	Step 3/Individual Activity Fee	Step 4/Subtotal Activity Fee
Electric Generating Facility	1	500	500

Step 5/Total Project Fee: 500

Step 6/Fee Payments:

Total Project Fee:	500 (a. Total Fee from Step 5)
State share of filing Fee:	237.50 (b. 1/2 Total Fee **less $**12.50)
City/Town share of filling Fee:	262.50 (c. 1/2 Total Fee **plus** $12.50)

C. Submittal Requirements

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

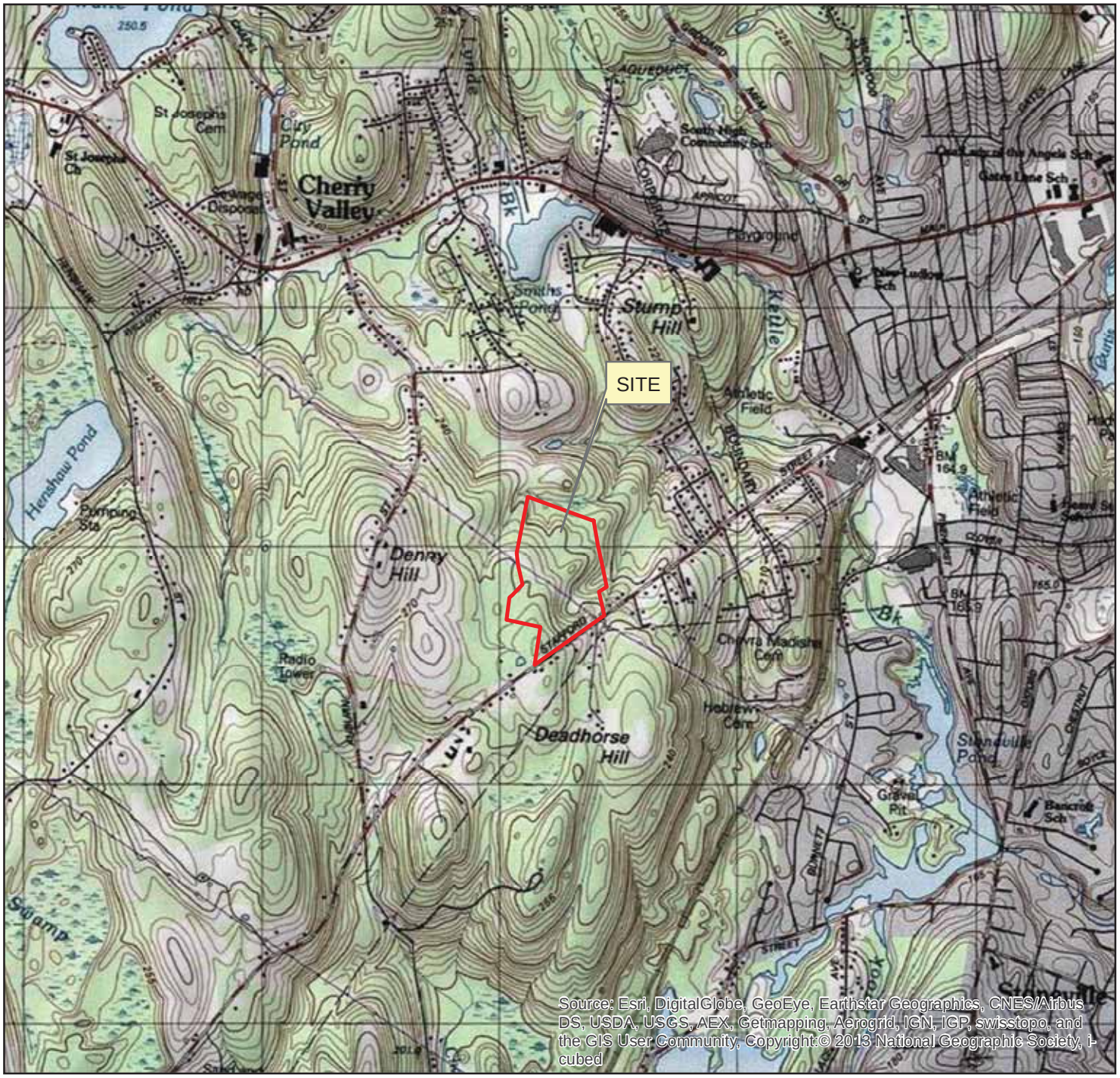
Department of Environmental Protection
Box 4062
Boston, MA 02211

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

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

Attachment B

Site Locus



Location of Site

SITE LOCATION MAP

Ameresco, Inc.
Proposed Photovoltaic
Solar Project

0 Stafford St
Leicester, Massachusetts

Notes & Sources

0 1,000 2,000
Feet

amec foster wheeler

AMEC Massachusetts, Inc.
271 Mill Road
Chelmsford, MA 01824
(978) 692-9090

FIGURE
1

H:\Ameresco\Leicester_MA\Task1\MXD\Site Location Map.mxd May 22, 2017 DWN: elizabeth.flanary CHKD: AKN

Attachment C

Photos

PHOTO 1:

Intermittent Stream A
View toward East

PHOTO 2:

Wetland 3
View toward East

PHOTO 3:

Wetland 4 PSS section

PHOTO 4:

Wetland 4 PFO section

PHOTO 5:

Intermittent Stream C

PHOTO 6:

Wetland 5

Attachment D

Site Plans

TOWN OF LEICESTER

1,360.8 KW DC SOLAR PV DEVELOPMENT
STAFFORD STREET
LEICESTER, MASSACHUSETTS
MAY, 2017
ISSUED FOR LOCAL PERMITTING/NOT FOR CONSTRUCTION

LOCUS MAP
NOT TO SCALE

AERIAL IMAGE
SCALE: 1" = 1000'

DRAWING INDEX

SHEET NUMBER	DRAWING TITLE	DRAWING NUMBER
	COVER SHEET	
1	EXISTING CONDITIONS PLAN	V-101
2	PROPOSED SITE PLAN	C-101
3	CONSTRUCTION, EROSION AND SEDIMENTATION CONTROL DETAILS	C-501

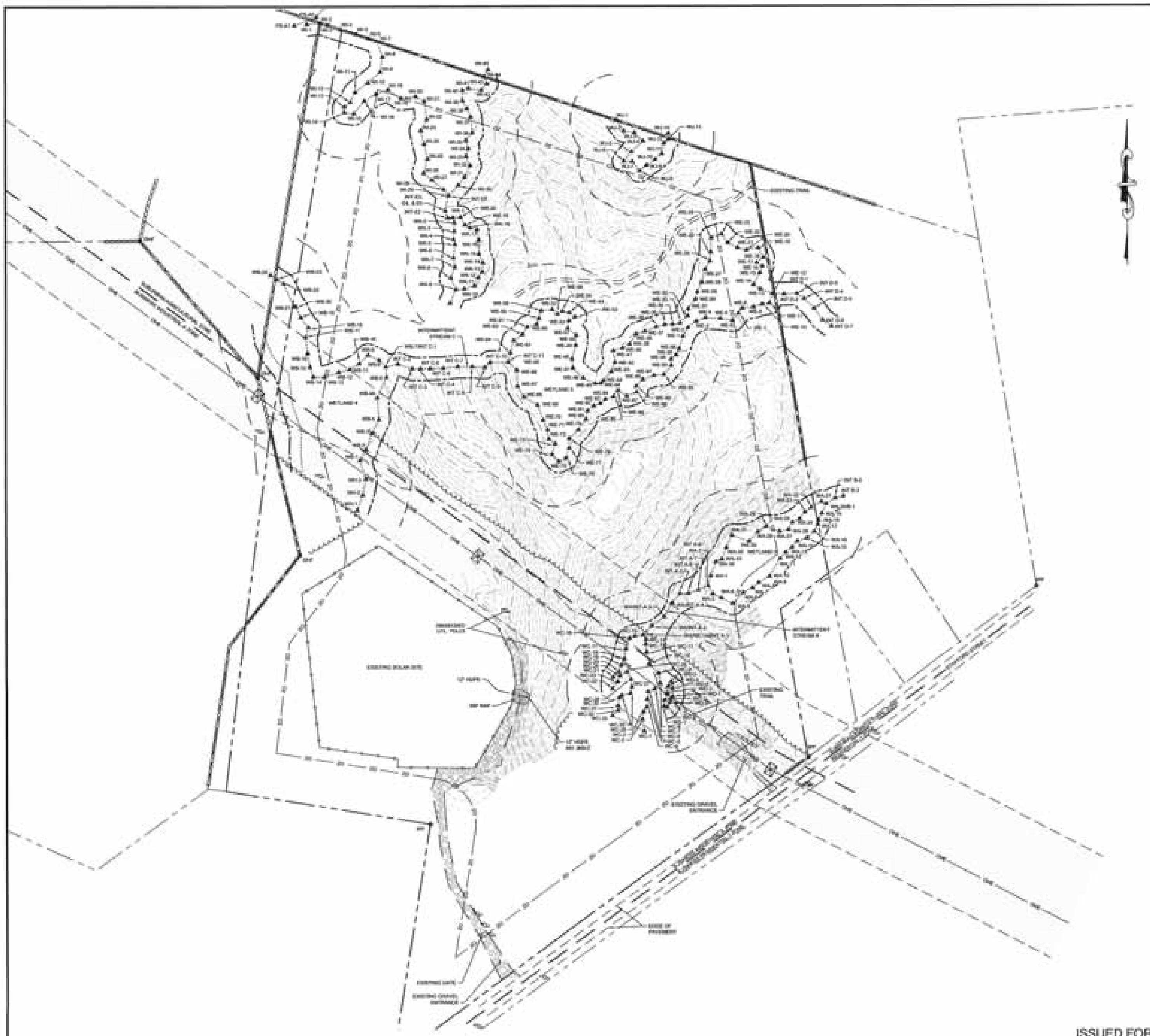
DEVELOPED BY

AMERESCO, INC.
AMERESCO
Green + Clean + Sustainable
111 SPEEN STREET
FRAMINGHAM, MA 01701

PREPARED BY

amec foster wheeler

AMEC MASSACHUSETTS, INC.
271 MILL ROAD
CHELMSFORD, MASSACHUSETTS 01824



GENERAL NOTES:

PLAN REFERENCES:

LEGEND:

MAJOR CONTOUR
MINOR CONTOUR
PROPERTY LINE
WETLAND LINE
TRAIL
FENCE
STONEWALL
TREE LINE
OVERHEAD ELECTRIC LINE
UTILITY POLE
TRANSMISSION LINE TOWER
DRILL HOLE FOUND
SURVEY MONUMENT FOUND

amec foster wheeler

NATIONAL GRID SOLAR PHASE III
1,360.8 KW SOLAR PV ARRAY
LEICESTER, MASSACHUSETTS

EXISTING CONDITIONS PLAN

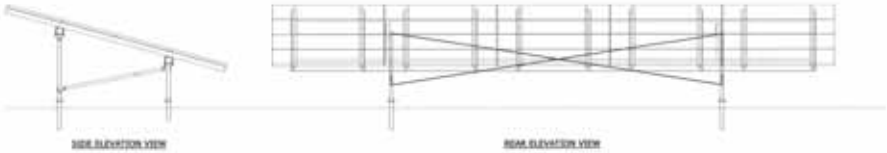
AMERESCO, INC.
111 SPEEN STREET
FRAMINGHAM, MA 01701

AMERESCO
Green • Clean • Sustainable

V-101

1 OF 3

ISSUED FOR LOCAL PERMITTING/NOT FOR CONSTRUCTION

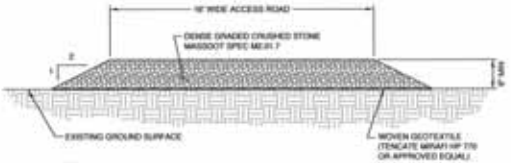


NOTE:

1. DESIGN FOR FOUNDATIONS, RACKING, GROUND SCREWS, AND MODULES BY OTHERS. DETAILS SHOWN FOR ILLUSTRATION PURPOSES ONLY.

SOLAR PV ARRAY - GROUND SCREW FOUNDATION (1)

NOT TO SCALE

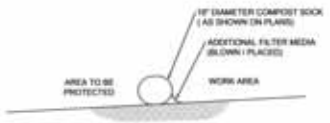


NOTES:

1. ACCESS ROAD TO BE CONSTRUCTED OF A MINIMUM 6" OF DENSE GRADED CRUSHED STONE.
2. WOVEN GEOTEXTILE TO BE PLACED BETWEEN THE GROUND SURFACE AND THE CRUSHED STONE.
3. CRUSHED STONE SHALL BE COMPACTED TO A MINIMUM 95% OF MAXIMUM DRY DENSITY (MODIFIED PROCTOR - ASTM D 1557) AND ACHIEVE A FIRM AND NON YIELDING CONDITION.

ACCESS ROAD (2)

NOT TO SCALE



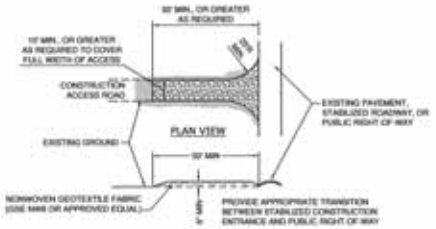
SECTION VIEW

NOTES

1. COMPOST SOCK TO BE FILTREXX SOXX OR APPROVED EQUAL.
2. FILTER MEDIA FILL TO MEET MANUFACTURER'S REQUIREMENTS.
3. STAKE COMPOST SOCKS IN PLACE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
4. UPON COMPLETION, COMPOST MATERIAL TO BE DISPERSED AND SPREAD ON SITE WHERE DIRECTED BY ENGINEER. FILTREXX FABRIC TO BE REMOVED.

SEDIMENT BARRIER - COMPOST SOCK (3)

NOT TO SCALE



SECTION VIEW

NOTES:

1. STONE TO BE 1"-3" STONE, RECLAIMED STONE, OR RECYCLED CONCRETE EQUIVALENT.
2. LENGTH - AS REQUIRED, BUT NOT LESS THAN 50 FT.
3. THICKNESS - NOT LESS THAN SIX (6) INCHES.
4. WIDTH - TEN (10) FT. MIN, BUT NOT LESS THAN THE FULL TRAVELED WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS.
5. FILTER CLOTH - SHALL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING OF STONE.
6. SURFACE WATER - ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCE SHALL BE PIPED ACROSS OR BENEATH THE ENTRANCE.
7. MAINTENANCE - THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY.
8. WASHING - WHEELS SHALL BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLIC RIGHTS-OF-WAY. IF WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.
9. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED AFTER EACH RAIN.

STABILIZED CONSTRUCTION ENTRANCE (4)

NOT TO SCALE

ISSUED FOR LOCAL PERMITTING/NOT FOR CONSTRUCTION

amec foster wheeler

NO.	ISSUED/BY	ISSUED FOR LOCAL PERMITTING/NOT FOR CONSTRUCTION	APPROVED
1	04/03/2017	REVISED SOLAR PV ARRAY LAYOUT	RJB / APV
0	12/16/2016	ISSUED FOR LOCAL PERMITTING/NOT FOR CONSTRUCTION	APV / RJB
NO.	DATE	ISSUE / REVISION DESCRIPTION	DESIGNED BY

PROJECT: NATIONAL GRID SOLAR PHASE III
1,360.8 KW SOLAR PV ARRAY
LEICESTER, MASSACHUSETTS

TITLE: CONSTRUCTION, EROSION AND SEDIMENTATION CONTROL DETAILS

CLIENT: AMERESCO, INC.
111 SPEEN STREET
FRAMINGHAM, MA 01701

AMERESCO
Greater | Closer | Sustainable

SEAL:

5/2/17

DESIGNED BY: APV	DRAWN BY: HCD
CHECKED BY: RAA	SCALE: AS SHOWN
PROJECT NUMBER: 3620113261	
DRAWING NUMBER: C-501	
SHEET NUMBER: 3 OF 3	

Attachment E

Wetland Data Forms

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

Plot: W-3 wet plot at flag WA-6

Location: National Grid, Parcel 0, Stafford St., Leicester MA Applicant: Ameresco Prepared by: S. Herzog Date: 8 March 2017

Check all that apply:
- Vegetation alone presumed adequate to delineation BVW boundary: complete Section I
- x Vegetation and other indicators of hydrology used to delineate BVW boundary: complete Sections I and II
- Method other than dominance test (additional information attached)

Section I. Vegetation

A. Sample Layer and Plant Species		A. Percent Cover	B. Percent Dominance	C. Dominant Plant	D. Indicator Category
Trees:	Red maple (*Acer rubrum*)	38	0.49	Yes	FAC
	Yellow birch (*Betula alleghaniensis*)	20	0.26	Yes	FAC
	White ash (*Fraxinus americana*)	20	0.26	Yes	FACU
Shrubs:	Red maple (*Acer rubrum*)	20	0.50	Yes	FACW
	Arrowwood (*Viburnum recognitum*)	20	0.50	Yes	FACW

Herbs: None observed

Vines: None

Asterisks mark wetland indicator plants: species listed in the Wetlands Protection Act; plants in the genus Sphagnum; plants listed as FAC, FAC, FACW, or OBL; or plants with physiological or morphological adaptations as noted.

Vegetation conclusion by dominance test: wetland - 4 dominant hydrophytes; 1 dominant non-hydrophyte

Section II. Indicators of Hydrology

Hydric Soil Interpretation

1. Soil Survey

Is there a published soil survey for this site? Yes

Downloaded from NRCS Web Soil Survey

Survey area data version 9, Sep 15, 2016

Soil type mapped: Canton fine sandy loam 8-15% slopes, extremely stony

Hydric soil inclusions: none reported

Are field observations consistent with soil survey? No

Remarks: soils observed are not well-drained, slopes vary to 15% or >

2. Soil Description

Horizon	Depth	Matrix color	Texture	Mottles color
O	0-2"	7.5YR 3/3 var	SL with leaf litter	none
A	2-8"R	7.5YR 2.5/2	FSL	none

Refusal on rock 8"

Moist, saturated at 6"

Other Indicators:

Site inundated: X

Depth to free water in observation hole:

Depth to soil saturation: 6"

Water marks:

Drift lines:

Sediment deposits:

Drainge patterns in BVW: X

Oxidized rhizospheres:

Water-stained leaves: X

Other:

Vegetation and Hydrology Conclusions

Number of wetland indicator plants > number of non-indicator plants: X

Hydric soil present: X

Other indicators of hydrology: X

Sample location is in a BVW: Yes

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

Plot: W-3 upland plot at flag WA-6

Location: National Grid, Parcel 0, Stafford St., Leicester MA Applicant: Ameresco Prepared by: S. Herzog Date: 8 March 2017

Check all that apply:
- Vegetation alone presumed adequate to delineation BVW boundary: complete Section I
- x Vegetation and other indicators of hydrology used to delineate BVW boundary: complete Sections I and II
- Method other than dominance test (additional information attached)

Section I. Vegetation

A. Sample Layer and Plant Species		A. Percent Cover	B. Percent Dominance	C. Dominant Plant	D. Indicator Category
Trees:	Red oak (*Quercus rubra*)	38	0.56	Yes	FACU
	American beech (*Fagus grandifolia*)	20	0.29	Yes	FACU
	Yellow birch (*Betula alleghaniensis*)	10	0.15	No	FACW
Shrubs:	American beech (*Fagus grandifolia*)	20	1.00	Yes	FACU

Herbs: None observed

Vines: None

Asterisks mark wetland indicator plants: species listed in the Wetlands Protection Act; plants in the genus Sphagnum; plants listed as FAC, FAC, FACW, or OBL; or plants with physiological or morphological adaptations as noted.

Vegetation conclusion by dominance test: 3 dominant non-wetland; 0 dominant wetland species

Section II. Indicators of Hydrology

Hydric Soil Interpretation

1. Soil Survey

Is there a published soil survey for this site? Yes

Downloaded from NRCS Web Soil Survey

Survey area data version 9, Sep 15, 2016

Soil type mapped: Canton fine sandy loam 8-15% slopes, extremely stony

Hydric soil inclusions: none reported

Are field observations consistent with soil survey? No

Remarks: soils observed are not well-drained, slopes vary to 15% or >

2. Soil Description

Horizon	Depth	Matrix color	Texture	Mottles color
O	0-2"	7.5YR 3/3 var	SL with leaf litter	none
A	2-8"R	7.5YR 2.5/2	FSL	none
Refusal on rock				

Other Indicators:

Site inundated:

Depth to free water in observation hole:

Depth to soil saturation:

Water marks:

Drift lines:

Sediment deposits:

Drainge patterns in BVW:

Oxidized rhizospheres:

Water-stained leaves:

Other:

Vegetation and Hydrology Conclusions

Number of wetland indicator plants > number of non-indicator plants:

Hydric soil present:

Other indicators of hydrology:

Sample location is in a BVW: No

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

Plot: W-4 wet plot at flag WB-10

Location: National Grid, Parcel 0, Stafford St., Leicester MA Applicant: Ameresco Prepared by: S. Herzog Date: 8 March 2017

Check all that apply:
- Vegetation alone presumed adequate to delineation BVW boundary: complete Section I
- x Vegetation and other indicators of hydrology used to delineate BVW boundary: complete Sections I and II
- Method other than dominance test (additional information attached)

Section I. Vegetation

A. Sample Layer and Plant Species		A. Percent Cover	B. Percent Dominance	C. Dominant Plant	D. Indicator Category
Trees:	None				
Shrubs:	Speckled Alder (*Alnus incana*)	63	0.57	Yes	FACW
	Red osier dogwood (*Cornus alba*)	38	0.34	Yes	FACW
	Blackberry sp. (*Rubus sp.*)	10	0.09	No	FACU
Herbs:	None observed				
Vines:	Grape sp.	10	0.10	No	FACU

Asterisks mark wetland indicator plants: species listed in the Wetlands Protection Act; plants in the genus Sphagnum; plants listed as FAC, FAC, FACW, or OBL; or plants with physiological or morphological adaptations as noted.

Vegetation conclusion by dominance test: wetland - 2 dominant hydrophytes; no dominant non-hydrophytes

Section II. Indicators of Hydrology

Hydric Soil Interpretation

1. Soil Survey

Is there a published soil survey for this site? Yes

Downloaded from NRCS Web Soil Survey

Survey area data version 9, Sep 15, 2016

Soil type mapped: Canton fine sandy loam 8-15% slopes, extremely stony

Hydric soil inclusions: none reported

Are field observations consistent with soil survey? No

Remarks: soils observed are not well-drained, slopes vary to 15% or >

2. Soil Description

Horizon	Depth	Matrix color	Texture	Mottles color
A	0-14"	7.5YR 3/1 v dk gr	FSiltLoam	none
A	14-20"	7.5YR 2.5/1 black	FSiltLoam	none
Refusal on rock 8"				
Saturated at 10"				

Other Indicators:

Site inundated:

Depth to free water in observation hole:

Depth to soil saturation: 10"

Water marks:

Drift lines:

Sediment deposits:

Drainge patterns in BVW: X

Oxidized rhizospheres:

Water-stained leaves: X

Other:

Vegetation and Hydrology Conclusions

Number of wetland indicator plants > number of non-indicator plants: X

Hydric soil present: X

Other indicators of hydrology: X

Sample location is in a BVW: Yes

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

Plot: W-4 upland plot at flag WB-10

Location: National Grid, Parcel 0, Stafford St., Leicester MA Applicant: Ameresco Prepared by: S. Herzog Date: 8 March 2017

Check all that apply:
- Vegetation alone presumed adequate to delineation BVW boundary: complete Section I
- x Vegetation and other indicators of hydrology used to delineate BVW boundary: complete Sections I and II
- Method other than dominance test (additional information attached)

Section I. Vegetation

A. Sample Layer and Plant Species		A. Percent Cover	B. Percent Dominance	C. Dominant Plant	D. Indicator Category
Trees:	None				
Shrubs:	Blackberry sp. (*Rubus sp.*)	63	0.76	Yes	FACU
	Staghorn sumac (*Rhus typhina*)	20	0.24	No	-
Herbs:	Unidentified grass	85	1.00	Yes	-
Vines:	None				

Asterisks mark wetland indicator plants: species listed in the Wetlands Protection Act; plants in the genus Sphagnum; plants listed as FAC, FAC, FACW, or OBL; or plants with physiological or morphological adaptations as noted.

Vegetation conclusion by dominance test: No dominant wetland species

Section II. Indicators of Hydrology

Hydric Soil Interpretation

1. Soil Survey

Is there a published soil survey for this site? Yes

Downloaded from NRCS Web Soil Survey

Survey area data version 9, Sep 15, 2016

Soil type mapped: Canton fine sandy loam 8-15% slopes, extremely stony

Hydric soil inclusions: none reported

Are field observations consistent with soil survey? No

Remarks: soils observed are not well-drained, slopes vary to 15% or >

2. Soil Description

Horizon	Depth	Matrix color	Texture	Mottles color
A	0-10"	7.5YR 4/4 brown	FSL	none
B	10"-18"	7.5YR 4/6 strong br	FSL	none
Refusal on rock 18"				

Other Indicators:

Site inundated:

Depth to free water in observation hole:

Depth to soil saturation:

Water marks:

Drift lines:

Sediment deposits:

Drainge patterns in BVW:

Oxidized rhizospheres:

Water-stained leaves:

Other:

Vegetation and Hydrology Conclusions

Number of wetland indicator plants > number of non-indicator plants:

Hydric soil present:

Other indicators of hydrology:

Sample location is in a BVW: No

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

Plot: W-5 wet plot at flag WE-8

Location: National Grid, Parcel 0, Stafford St., Leicester MA Applicant: Ameresco Prepared by: S. Herzog Date: 8 March 2017

Check all that apply:
- Vegetation alone presumed adequate to delineation BVW boundary: complete Section I
- x Vegetation and other indicators of hydrology used to delineate BVW boundary: complete Sections I and II
- Method other than dominance test (additional information attached)

Section I. Vegetation

	A. Sample Layer and Plant Species	A. Percent Cover	B. Percent Dominance	C. Dominant Plant	D. Indicator Category
Trees:	Red maple (*Acer rubrum*)	63	0.86	Yes	FAC
	White ash (*Fraxinus americana*)	10	0.14	No	FACU
Shrubs:	Red maple (*Acer rubrum*)	63	0.55	Yes	FACW
	Yellow birch (*Betula allegheniensis*)	38	0.33	Yes	FACW
	Winterberry (*Ilex verticillata*)	10	0.09	No	FACU
	Mountain laurel (*Kalmia latifolia*)	3	0.03	No	FACU
Herbs:	Canada mayflower (*Maianthemum canadense*)	10	0.63	Yes	FAC
	False Solomon's seal (*Maianthemum racemosum*)	3	0.19	No	FACU
	White pine seedlings (*Pinus strobus*)	3	0.19	No	FACU
Vines:	Grape sp.	10	0.10	No	FACU

Asterisks mark wetland indicator plants: species listed in the Wetlands Protection Act; plants in the genus Sphagnum; plants listed as FAC, FAC, FACW, or OBL; or plants with physiological or morphological adaptations as noted.

Vegetation conclusion by dominance test: wetland - 4 dominant hydrophytes; no dominant non-hydrophytes

Section II. Indicators of Hydrology

Hydric Soil Interpretation

1. Soil Survey

Is there a published soil survey for this site? Yes

Downloaded from NRCS Web Soil Survey

Survey area data version 9, Sep 15, 2016

Soil type mapped: Canton fine sandy loam 8-15% slopes, extremely stony

Hydric soil inclusions: none reported

Are field observations consistent with soil survey? No

Remarks: soils observed are not well-drained, slopes vary to 15% or >

2. Soil Description

Horizon	Depth	Matrix color	Texture	Mottles color
A	0-5"	7.5YR 2.5/1 black	FSiltLoam	none

Refusal on rock 5"

Other Indicators:

Site inundated: X

Depth to free water in observation hole:

Depth to soil saturation:

Water marks:

Drift lines:

Sediment deposits:

Drainge patterns in BVW: X

Oxidized rhizospheres:

Water-stained leaves: X

Other:

Vegetation and Hydrology Conclusions

Number of wetland indicator plants > number of non-indicator plants: X

Hydric soil present: X

Other indicators of hydrology: X

Sample location is in a BVW: Yes

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

Plot: W-5 upland plot at flag WE-8

Location: National Grid, Parcel 0, Stafford St., Leicester MA Applicant: Ameresco Prepared by: S. Herzog Date: 8 March 2017

Check all that apply:
- Vegetation alone presumed adequate to delineation BVW boundary: complete Section I
- x Vegetation and other indicators of hydrology used to delineate BVW boundary: complete Sections I and II
- Method other than dominance test (additional information attached)

Section I. Vegetation

A. Sample Layer and Plant Species		A. Percent Cover	B. Percent Dominance	C. Dominant Plant	D. Indicator Category
Trees:	Red oak (*Quercus rubra*)	38	0.46	Yes	FACU
	Black birch (*Betula nigra*)	38	0.46	Yes	FACU
	Yellow birch (*Betula allegheniensis*)	3	0.04	No	FAC
	Red maple (*Acer rubrum*)	3	0.04	No	FAC
Shrubs:	Black birch (*Betula nigra*)	38	0.54	Yes	FACU
	Black cherry (*Prunus serotina*)	10	0.14	No	FACU
	Red maple (*Acer rubrum*)	10	0.14	No	FAC
	Mountain laurel (*Kalmia latifolia*)	10	0.14	No	FACU
	Yellow birch (*Betula allegheniensis*)	3	0.04	No	FAC
Herbs:	Canada mayflower (*Maianthemum canadense*)	10	1.00	Yes	FACU
Vines:	None				

Asterisks mark wetland indicator plants: species listed in the Wetlands Protection Act; plants in the genus Sphagnum; plants listed as FAC, FAC, FACW, or OBL; or plants with physiological or morphological adaptations as noted.

Vegetation conclusion by dominance test: Four dominant upland species, No dominant wetland species

Section II. Indicators of Hydrology

Hydric Soil Interpretation

1. Soil Survey

Is there a published soil survey for this site? Yes

Downloaded from NRCS Web Soil Survey

Survey area data version 9, Sep 15, 2016

Soil type mapped: Canton fine sandy loam 8-15% slopes, extremely stony

Hydric soil inclusions: none reported

Are field observations consistent with soil survey? No

Remarks: soils observed are not well-drained, slopes vary to 15% or >

2. Soil Description

Horizon	Depth	Matrix color	Texture	Mottles color
A	0-1.5"	2.5YR 3/3	FSL	none
A_2	1.5-6"	10YR 3/4	FSL	none
B	6-9"R	10YR 4/6	FSL	none

Refusal on rock 9"

Other Indicators:

Site inundated:

Depth to free water in observation hole:

Depth to soil saturation:

Water marks:

Drift lines:

Sediment deposits:

Drainge patterns in BVW:

Oxidized rhizospheres:

Water-stained leaves:

Other:

Vegetation and Hydrology Conclusions

Number of wetland indicator plants > number of non-indicator plants:

Hydric soil present:

Other indicators of hydrology:

Sample location is in a BVW: No

Attachment F

Stormwater Report

Stormwater Report
Proposed Photovoltaic Solar Project

Stafford Street
Leicester, Massachusetts

Prepared for:

Ameresco, Inc.
111 Speen Street
Framingham, MA 01701

Prepared by:

AMEC Massachusetts, Inc.

271 Mill Rd, 3rd Floor
Chelmsford, MA 01824

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Project number: 3652170091.0300.0002

Stormwater Report

- **MassDEP Stormwater Report Summary**
- **MassDEP Checklist**
- **Stormwater Modeling Report and Summary Table**
- **Rainfall Data**
- **Drainage Maps**
- **Stormwater Calculations**
- **NRCS Soil Report**

271 Mill Road
Chelmsford, Massachusetts
amecfw.com

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION

STORMWATER REPORT

Stormwater Management Summary for
Leicester, MA Solar PV Array

Standard 1: No New Untreated Discharges

The Massachusetts Stormwater Handbook requires that the project demonstrate that there are no new untreated discharges and that new discharges will not cause erosion or scour to downstream wetlands.

The proposed solar array installation work consists of a concrete equipment pad and ground screw foundation poles installed on the existing ground surface. A permanent gravel road extension is proposed for access to portions of the site. Discharges from access roads are addressed under Standard 8. The Project will not result in any permanent changes to the existing drainage patterns or hydrology; therefore, there will be no new stormwater conveyances or discharges.

Standard 2: Peak Rate Attenuation

Standard 2 requires that peak rates of flow be attenuated for the proposed development condition.

This Project will create minimal impervious area. The only new impervious area consists of the ground screw foundation poles installed on the existing ground surface to support the racks and a concrete equipment pad. The access road will be gravel. All other impacted areas will be restored to vegetated ground cover. This Project does not involve any change to existing grades. Attenuation on-site within the large wetlands results in no increase in off-site peak flow or volume.

Standard 3: Stormwater Recharge

Standard 3 requires that the infiltration into the ground under post-development conditions is at least as much as the infiltration volume under pre-development conditions.

There will be approximately 6.7 acres of tree clearing for the project. Following tree clearing, the existing ground surface will be restored with grass. The existing stumps and root systems will remain for the majority of the Site except where impeding the ground screw installation. The overall hydrologic conditions, including infiltration into existing rocky soils, are anticipated to remain largely unchanged.

Standard 4: Water Quality

Standard 4 requires that all stormwater management systems be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS). The Massachusetts Stormwater Handbook states that this standard is met when:

a. Suitable practices for source control and pollution prevention are identified in a long-term pollution prevention plan, and thereafter are implemented and maintained;
b. Structural stormwater best management practices (BMPs) are sized to capture the required water quality volume as determined in accordance with the Massachusetts Stormwater Handbook; and
c. Pretreatment is provided in accordance with the Massachusetts Stormwater Handbook.

Although tree clearing is proposed, the majority of existing stumps and root systems will remain and will be restored with grass, which will provide stormwater treatment.

Long term pollution prevention plan

Since no post-construction stormwater BMPs are proposed and there will be no storage of pollutants on the site, a long term pollution prevention plan is not required.

Water quality treatment volume

The only added impervious area is from the ground screw foundation poles and the concrete equipment pad.

These impervious areas will be managed as disconnected impervious area and will not be directed to a single (or series of) BMPs designed to handle the water quality volume.

TSS Removal Computations
Since permanent, post-construction BMPs are not proposed due to the nearly identical runoff rates from pre- to post-development, TSS removal computations have not been performed.

Standard 5: Land Uses with Higher Potential Pollutant Loads
The installation of the solar array is not considered a Land Use with Higher Potential Pollutant Loads (LUHPPL).

Standard 6: Critical Areas
A Critical Areas Map is enclosed, which indicates there are no critical areas on or near the Site. The Project does not discharge stormwater within the Zone A or Interim Wellhead Protection Area of a public water supply, nor does it discharge near or to a Public Water Supply Watershed.

Standard 7: Redevelopments
The Project is a new development. Certain standards are not fully met and an explanation of why these standards are not met is contained in the Stormwater Report.

Standard 8: Construction Period Pollution Prevention and Erosion & Sedimentation Control
Construction period pollution prevention and erosion and sedimentation control measures must be implemented at the site to control construction related impacts during construction and land disturbance activities. An erosion and sedimentation control plan and a Stormwater Pollution Prevention Plan (SWPPP) will be prepared prior to the start of construction. The SWPPP will be prepared following the US EPA's guidelines as this project will require coverage under the NPDES Construction General Permit due to land disturbance greater than one acre. Construction period BMPs will be employed before construction of the access road extensions and before the installation of the arrays to prevent erosion of exposed soils and retain sediment on-site.

Restoration activities are detailed on the construction plans, and include revegetating areas in accordance with the *Massachusetts Guidelines for Erosion and Sedimentation Control for Urban and Suburban Areas, 2003*. Erosion and sedimentation controls will remain in place during restoration activities, and shall not be removed until upgradient areas have been stabilized.

Standard 9: Operation and Maintenance Plan
According to the Massachusetts Stormwater Handbook, the goal of an Operation and Maintenance (O&M) plan is not only to protect resources on-site or nearby, but also to protect resources in the region that may be affected by the post-development activities at the site. The proposed work will not create any permanent changes to the Project area and will not alter the existing hydrology; therefore, an O&M plan is not required. However, routine O&M inspections will occur as part of the solar PV array operation. Part of these O&M inspections will include observation of any stormwater issues at the site.

Standard 10: Prohibition of Illicit Discharges
Standard 10 of the Massachusetts Stormwater Handbook prohibits illicit discharges to stormwater management systems. As stated in the handbook, "The stormwater management system is the system for conveying, treating, and infiltrating stormwater on-site, including stormwater best management practices and any pipes intended to transport stormwater to the groundwater, a surface water, or municipal separate storm sewer system. Illicit discharges to the stormwater management system are discharges that are not entirely comprised of stormwater."

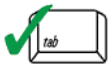
Proponents of projects within wetlands jurisdiction must demonstrate compliance with this requirement by submitting to the issuing authority an Illicit Discharge Compliance Statement verifying that no illicit discharges exist on the site, and by including in the pollution prevention plan measures to prevent illicit discharges to the stormwater management system. Illicit discharges are not applicable to this Project and an Illicit Discharge Compliance Statement is not required.

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

Checklist for Stormwater Report

A. Introduction

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



A Stormwater Report must be submitted with the Notice of Intent permit application to document compliance with the Stormwater Management Standards. The following checklist is NOT a substitute for the Stormwater Report (which should provide more substantive and detailed information) but is offered here as a tool to help the applicant organize their Stormwater Management documentation for their Report and for the reviewer to assess this information in a consistent format. As noted in the Checklist, the Stormwater Report must contain the engineering computations and supporting information set forth in Volume 3 of the Massachusetts Stormwater Handbook. The Stormwater Report must be prepared and certified by a Registered Professional Engineer (RPE) licensed in the Commonwealth.

The Stormwater Report must include:

- The Stormwater Checklist completed and stamped by a Registered Professional Engineer (see page 2) that certifies that the Stormwater Report contains all required submittals.[1] This Checklist is to be used as the cover for the completed Stormwater Report.
- Applicant/Project Name
- Project Address
- Name of Firm and Registered Professional Engineer that prepared the Report
- Long-Term Pollution Prevention Plan required by Standards 4-6
- Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan required by Standard 8[2]
- Operation and Maintenance Plan required by Standard 9

In addition to all plans and supporting information, the Stormwater Report must include a brief narrative describing stormwater management practices, including environmentally sensitive site design and LID techniques, along with a diagram depicting runoff through the proposed BMP treatment train. Plans are required to show existing and proposed conditions, identify all wetland resource areas, NRCS soil types, critical areas, Land Uses with Higher Potential Pollutant Loads (LUHPPL), and any areas on the site where infiltration rate is greater than 2.4 inches per hour. The Plans shall identify the drainage areas for both existing and proposed conditions at a scale that enables verification of supporting calculations.

As noted in the Checklist, the Stormwater Management Report shall document compliance with each of the Stormwater Management Standards as provided in the Massachusetts Stormwater Handbook. The soils evaluation and calculations shall be done using the methodologies set forth in Volume 3 of the Massachusetts Stormwater Handbook.

To ensure that the Stormwater Report is complete, applicants are required to fill in the Stormwater Report Checklist by checking the box to indicate that the specified information has been included in the Stormwater Report. If any of the information specified in the checklist has not been submitted, the applicant must provide an explanation. The completed Stormwater Report Checklist and Certification must be submitted with the Stormwater Report.

[1] The Stormwater Report may also include the Illicit Discharge Compliance Statement required by Standard 10. If not included in the Stormwater Report, the Illicit Discharge Compliance Statement must be submitted prior to the discharge of stormwater runoff to the post-construction best management practices.

[2] For some complex projects, it may not be possible to include the Construction Period Erosion and Sedimentation Control Plan in the Stormwater Report. In that event, the issuing authority has the discretion to issue an Order of Conditions that approves the project and includes a condition requiring the proponent to submit the Construction Period Erosion and Sedimentation Control Plan before commencing any land disturbance activity on the site.

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

Checklist for Stormwater Report

B. Stormwater Checklist and Certification

The following checklist is intended to serve as a guide for applicants as to the elements that ordinarily need to be addressed in a complete Stormwater Report. The checklist is also intended to provide conservation commissions and other reviewing authorities with a summary of the components necessary for a comprehensive Stormwater Report that addresses the ten Stormwater Standards.

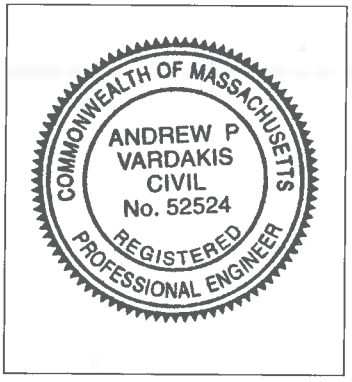
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the item is not applicable (N.A.) and provide the reasons for that determination.

A complete checklist must include the Certification set forth below signed by the Registered Professional Engineer who prepared the Stormwater Report.

Registered Professional Engineer's Certification

I have reviewed the Stormwater Report, including the soil evaluation, computations, Long-term Pollution Prevention Plan, the Construction Period Erosion and Sedimentation Control Plan (if included), the Long-term Post-Construction Operation and Maintenance Plan, the Illicit Discharge Compliance Statement (if included) and the plans showing the stormwater management system, and have determined that they have been prepared in accordance with the requirements of the Stormwater Management Standards as further elaborated by the Massachusetts Stormwater Handbook. I have also determined that the information presented in the Stormwater Checklist is accurate and that the information presented in the Stormwater Report accurately reflects conditions at the site as of the date of this permit application.

Registered Professional Engineer Block and Signature



A. P. Vardakis 5/23/17

Signature and Date

Checklist

Project Type: Is the application for new development, redevelopment, or a mix of new and redevelopment?

☒ New development

☐ Redevelopment

☐ Mix of New Development and Redevelopment

Checklist for Stormwater Report

Checklist (continued)

LID Measures: Stormwater Standards require LID measures to be considered. Document what environmentally sensitive design and LID Techniques were considered during the planning and design of the project:

- ☐ No disturbance to any Wetland Resource Areas
- ☐ Site Design Practices (e.g. clustered development, reduced frontage setbacks)
- ☐ Reduced Impervious Area (Redevelopment Only)
- ☐ Minimizing disturbance to existing trees and shrubs
- ☐ LID Site Design Credit Requested:
  - ☐ Credit 1
  - ☐ Credit 2
  - ☐ Credit 3
- ☐ Use of "country drainage" versus curb and gutter conveyance and pipe
- ☐ Bioretention Cells (includes Rain Gardens)
- ☐ Constructed Stormwater Wetlands (includes Gravel Wetlands designs)
- ☐ Treebox Filter
- ☐ Water Quality Swale
- ☒ Grass Channel
- ☐ Green Roof
- ☒ Other (describe): Vegetated ground cover

Standard 1: No New Untreated Discharges

- ☒ No new untreated discharges
- ☐ Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth
- ☐ Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included.

Checklist for Stormwater Report

Checklist (continued)

Standard 2: Peak Rate Attenuation

☐ Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.

☐ Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm.

☒ Calculations provided to show that post-development peak discharge rates do not exceed pre-development rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24-hour storm.

Standard 3: Recharge (See Stormwater Report)

☐ Soil Analysis provided.

☐ Required Recharge Volume calculation provided.

☐ Required Recharge volume reduced through use of the LID site Design Credits.

☐ Sizing the infiltration, BMPs is based on the following method: Check the method used.

☐ Static ☐ Simple Dynamic ☐ Dynamic Field[1]

☐ Runoff from all impervious areas at the site discharging to the infiltration BMP.

☐ Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.

☐ Recharge BMPs have been sized to infiltrate the Required Recharge Volume.

☐ Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason:

- ☐ Site is comprised solely of C and D soils and/or bedrock at the land surface
- ☐ M.G.L. c. 21E sites pursuant to 310 CMR 40.0000
- ☐ Solid Waste Landfill pursuant to 310 CMR 19.000
- ☐ Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.

☐ Calculations showing that the infiltration BMPs will drain in 72 hours are provided.

☐ Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

[1] 80% TSS removal is required prior to discharge to infiltration BMP if Dynamic Field method is used.

Checklist for Stormwater Report

Checklist (continued)

Standard 3: Recharge (continued)

☐ The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.

☐ Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

Standard 4: Water Quality (See Stormwater Report)

The Long-Term Pollution Prevention Plan typically includes the following:

- Good housekeeping practices;
- Provisions for storing materials and waste products inside or under cover;
- Vehicle washing controls;
- Requirements for routine inspections and maintenance of stormwater BMPs;
- Spill prevention and response plans;
- Provisions for maintenance of lawns, gardens, and other landscaped areas;
- Requirements for storage and use of fertilizers, herbicides, and pesticides;
- Pet waste management provisions;
- Provisions for operation and management of septic systems;
- Provisions for solid waste management;
- Snow disposal and plowing plans relative to Wetland Resource Areas;
- Winter Road Salt and/or Sand Use and Storage restrictions;
- Street sweeping schedules;
- Provisions for prevention of illicit discharges to the stormwater management system;
- Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL;
- Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;
- List of Emergency contacts for implementing Long-Term Pollution Prevention Plan.

☐ A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent.

☐ Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge:

- ☐ is within the Zone II or Interim Wellhead Protection Area
- ☐ is near or to other critical areas
- ☐ is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)
- ☐ involves runoff from land uses with higher potential pollutant loads.

☐ The Required Water Quality Volume is reduced through use of the LID site Design Credits.

☐ Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if applicable, the 44% TSS removal pretreatment requirement, are provided.

Checklist for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued)

☐ The BMP is sized (and calculations provided) based on:

- ☐ The ½" or 1" Water Quality Volume or
- ☐ The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.

☐ The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the propriety BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.

☐ A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.

Standard 5: Land Uses With Higher Potential Pollutant Loads (LUHPPLs)

☐ The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report.

☐ The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted ***prior to*** the discharge of stormwater to the post-construction stormwater BMPs.

☒ The NPDES Multi-Sector General Permit does ***not*** cover the land use.

☐ LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan.

☐ All exposure has been eliminated.

☐ All exposure has ***not*** been eliminated and all BMPs selected are on MassDEP LUHPPL list.

☐ The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.

Standard 6: Critical Areas (See Stormwater Report)

☐ The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.

☐ Critical areas and BMPs are identified in the Stormwater Report.

Checklist for Stormwater Report

Checklist (continued)

Standard 7: Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable

☐ The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a:

- ☐ Limited Project
- ☐ Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.
- ☐ Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area
- ☐ Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
- ☐ Bike Path and/or Foot Path
- ☐ Redevelopment Project
- ☐ Redevelopment portion of mix of new and redevelopment.

☒ Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.

☐ The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control

A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan must include the following information:

- Narrative;
- Construction Period Operation and Maintenance Plan;
- Names of Persons or Entity Responsible for Plan Compliance;
- Construction Period Pollution Prevention Measures;
- Erosion and Sedimentation Control Plan Drawings;
- Detail drawings and specifications for erosion control BMPs, including sizing calculations;
- Vegetation Planning;
- Site Development Plan;
- Construction Sequencing Plan;
- Sequencing of Erosion and Sedimentation Controls;
- Operation and Maintenance of Erosion and Sedimentation Controls;
- Inspection Schedule;
- Maintenance Schedule;
- Inspection and Maintenance Log Form.

☐ A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.

Checklist for Stormwater Report

Checklist (continued)

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control (continued)

☐ The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has ***not*** been included in the Stormwater Report but will be submitted ***before*** land disturbance begins.

☐ The project is ***not*** covered by a NPDES Construction General Permit.

☐ The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report.

☒ The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted BEFORE land disturbance begins.

Standard 9: Operation and Maintenance Plan (See Stormwater Report)

☐ The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:

- ☐ Name of the stormwater management system owners;
- ☐ Party responsible for operation and maintenance;
- ☐ Schedule for implementation of routine and non-routine maintenance tasks;
- ☐ Plan showing the location of all stormwater BMPs maintenance access areas;
- ☐ Description and delineation of public safety features;
- ☐ Estimated operation and maintenance budget; and
- ☐ Operation and Maintenance Log Form.

☐ The responsible party is ***not*** the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:

- ☐ A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;
- ☐ A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.

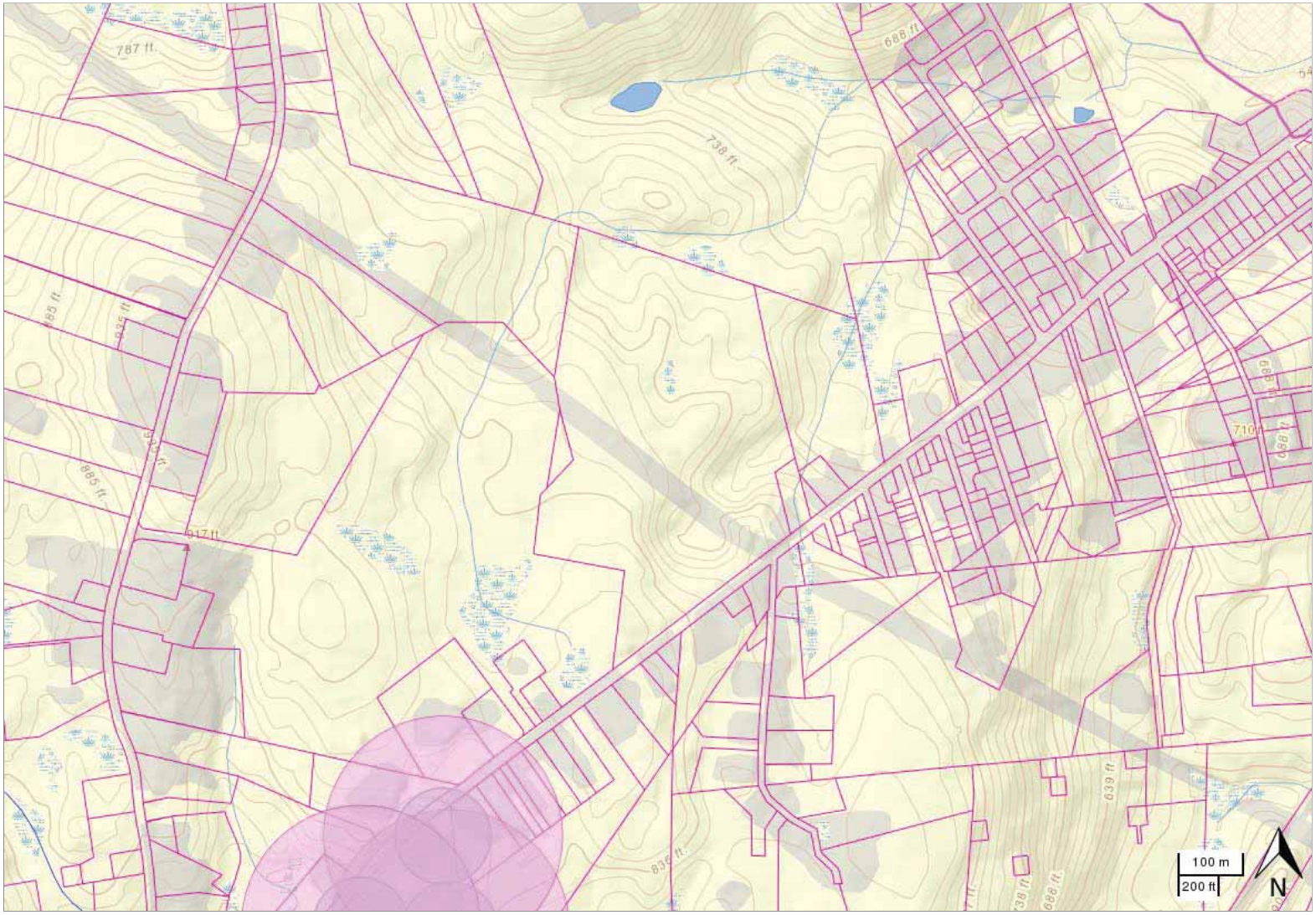
Standard 10: Prohibition of Illicit Discharges (See Stormwater Report)

☐ The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;

☐ An Illicit Discharge Compliance Statement is attached;

☐ NO Illicit Discharge Compliance Statement is attached but will be submitted ***prior to*** the discharge of any stormwater to post-construction BMPs.

Critical Areas Map - National Grid, Stafford Street, Leicester MA



Zone A

DFW Coldwater Fisheries Resources

Shellfish Growing Areas

- APPROVED
- CONDITIONALLY APPROVED
- RESTRICTED
- CONDITIONALLY RESTRICTED
- PROHIBITED

NHESP Certified Vernal Pools

Zone Is

IWPAs

Outstanding Resource Waters

- PUBLIC WATER SUPPLY CONTRIBUTOR
- ORW FOR ACEC
- ORW FOR BOTH WATER SUPPLY AND OTHER

Zone IIs

Areas of Critical Environmental Concern
ACECs

Tax Parcels

MassGIS Statewide Basemap
MassGIS Topographic Features Basemap

amec foster wheeler

STORMWATER REPORT

Stormwater Modeling

The stormwater runoff pattern for the Leicester site will not be altered for this Project. The site is an existing wooded area where tree clearing and minimal site grading is proposed. Surface drainage from the site is conveyed over the existing wooded areas from west to east to two on-site wetlands to the north and south. The titles of Wetland 5 (north) and Wetland 3 (south) have been retained in this stormwater report to coincide with the existing wetlands delineation.

Runoff calculations were performed for the Soil Conservation Service (SCS) Type III 2- and 10-year, 24-hour storm events. The documented rainfall was estimated from the Northeast Regional Climate Center (NRCC) Extreme Precipitation Tables to be 3.24 and 4.86 inches for the 2- and 10-year storm events, respectively.

The existing and proposed condition peak-design flows were assessed using the National Resources Conservation Service (NRCS) Technical Release 55 (TR-55) methodology. Autodesk® Storm and Sanitary Analysis 2015 stormwater modeling software was used. The software program is included in the AutoCAD Civil 3D package that utilizes the TR-55 methodology. It is a comprehensive hydrodynamic modeling program which analyzes and designs site hydrology, surface drainage systems, and storm drains. It can manage a variety of flow situations such as overland flow, drainage swales, ponds, and piping systems.

The existing conditions topography is from a field survey performed by AMEC in March 2017. This topography was used to develop the stormwater model. There were two scenarios evaluated: the Existing Condition (pre-PV array development) and the Proposed Condition (post-PV array development). The detailed stormwater model, NRCS Soil Report, and the NRCC precipitation table for Leicester, MA are enclosed.

The primary impact of the solar PV array on the stormwater runoff rate and volume is a result of the ground screw foundation poles of the rack assembly and tree clearing to eliminate shading of the array. There will be a total of 156 panel rack assemblies. Each of these rack assemblies require four ground screw posts to anchor them to the ground (624 total ground screws). The ground screw diameter used for this project is 4 inches.

In addition to the ground screws, there will be a concrete equipment pad for the required electrical connection of the solar array. The equipment pad size used in this stormwater analysis is 28.5 feet wide by 48 feet long.

There will be approximately 6.7 acres of tree clearing for the project. Following tree clearing, the existing ground surface will be restored with grass. The existing stumps and root systems will remain for the majority of the Site except where impeding the ground screw installation. A proposed gravel access road will extend from the existing gravel area adjacent to the existing solar site located to the south of the proposed project. The proposed gravel access road is approximately 16 feet wide and 760 feet long and includes upgrading the existing gravel area east of the existing solar site. With the exception of the ground screws, concrete equipment pad, and gravel access road, all disturbed areas will be restored with vegetated ground cover.

The impervious cover associated with the proposed ground screws and equipment pad accounts for approximately 0.3% of the affected drainage sub-basin area (see summary table enclosed). Also represented in the summary table are the existing and proposed conditions for peak runoff rate and volume for the 2- and 10-year 24-hour storm events.

The peak flow rates and total runoff volume to the existing wetlands increase slightly under the proposed condition; however, further attenuation on-site within the large wetlands results in no increase in off-site peak flow or volume. As a result, the model shows that there is no change in off-site conditions.

Stormwater Erosion Control Plan

A Stormwater Erosion Control Plan will be implemented prior to and during construction. This plan will address all potential avenues and pathways for erosion during construction and operation. This section briefly describes what the erosion control plan will encompass.

The primary construction activities that the plan will address will include: the cutting of trees in the existing wooded areas; the addition of gravel fill material for the proposed gravel road construction; the movement of heavy machinery; and re-vegetation of disturbed areas (if required). Vegetative cover outside of the limit of disturbance is to remain. If the vegetative cover outside the intended work area is damaged or disturbed during construction, it will be repaired to re-establish vegetation. Erosion control measures will be installed at the perimeter of the work to prevent sediment from leaving the site. Material stockpiles, if required, will be maintained in one or more central locations. Perimeter erosion control will placed around all stockpiles and will consist of sediment barriers sufficient enough to contain sediment.

Disturbance of the existing ground surface and access road by equipment is another possible source of erosion during construction. Rutting or exposed soil will require repair and attempts to mitigate future rutting at the same location will be made. Avoiding site work on-site during periods of heavy precipitation or when the cover soils are saturated and soft should mitigate many of the issues related to equipment use on-site.

The lower edge of each panel array, or the “drip edge,” has been identified as a potential source of ongoing erosion. This is not likely to be an issue due to the relatively short drip distance and the proposed vegetative cover. If erosion along the drip edge becomes an issue it will be mitigated as part of ongoing maintenance at the landfill, likely with a gravel splash strip or erosion control blanket.

LEICESTER, MA - SOLAR PV DEVELOPMENT

Ground Screw Area 0.09 sf Equipment Pad Area 1368 sf

Condition	Sub-basin		Ground Screws		Gravel	Woods	Brush	Grass
	Sub-basin	Total Area (acres)	# Screws	Total Ground Screw Area (acre)[1]	Total Gravel Area (acre)	Woods Area (acre)	Brush Area (acre)	Grass Area (acre)
EXISTING	A	5.36			0.00	3.71	1.65	0.00
	B	6.05			0.29	3.03	2.73	0.00
TOTAL		**11.41**			**0.29**	**6.74**	**4.38**	**0.00**
PROPOSED	A	5.36	296	0.032	0.06	0.00	1.65	3.62
	B	6.05	328	0.001	0.35	0.00	2.73	2.97
TOTAL		**11.41**	**624**	**0.033**	**0.42**	**0.00**	**4.38**	**6.58**

624 **Total ground screws**

0.3% **Increase in impervious area due to ground screws and equipment pad.**

1. Ground screw area includes concrete equipment pad.

ON-SITE SUMMARY		FLOW			VOLUME		
Sub-basin	24-hour Storm Event	Existing Condition Peak Flow (cfs)	Proposed Condition Peak Flow (cfs)	**Difference in Peak Flow (cfs)**	Existing Condition Runoff Volume (ac-in)	Proposed Condition Runoff Volume (ac-in)	**Difference in Runoff Volume (ac-in)**
Sub-basin A	2	0.36	0.64	**0.28**	1.09	1.48	**0.39**
	10	3.01	4.11	**1.10**	4.23	5.03	**0.80**
Sub-basin B	2	0.46	0.67	**0.21**	1.30	1.60	**0.30**
	10	3.70	4.61	**0.91**	4.92	5.54	**0.62**

OFF-SITE SUMMARY		FLOW		
Outfall	24-hour Storm Event	Existing Condition Peak Flow (cfs)	Proposed Condition Peak Flow (cfs)	**Difference in Peak Flow (cfs)**
Outlet A	2	0.00	0.00	**0.00**
	10	0.00	0.00	**0.00**
Outlet B	2	0.00	0.00	**0.00**
	10	0.00	0.00	**0.00**

Extreme Precipitation Tables

Northeast Regional Climate Center

Data represents point estimates calculated from partial duration series. All precipitation amounts are displayed in inches.

Smoothing	Yes
State	Massachusetts
Location	
Longitude	71.884 degrees West
Latitude	42.212 degrees North
Elevation	0 feet
Date/Time	Mon, 22 May 2017 17:32:53 -0400

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.28	0.42	0.53	0.69	0.86	1.09	1yr	0.75	1.07	1.27	1.61	2.06	2.64	2.91	1yr	2.34	2.79	3.19	3.87	4.48	1yr
2yr	0.35	0.53	0.66	0.88	1.10	1.39	2yr	0.95	1.27	1.61	2.03	2.56	3.24	3.50	2yr	2.86	3.37	3.87	4.59	5.22	2yr
5yr	0.41	0.63	0.80	1.07	1.36	1.74	5yr	1.18	1.57	2.03	2.56	3.23	4.08	4.46	5yr	3.61	4.29	4.91	5.75	6.47	5yr
10yr	0.46	0.72	0.91	1.24	1.61	2.07	10yr	1.39	1.85	2.42	3.07	3.86	4.86	5.36	10yr	4.30	5.15	5.88	6.82	7.61	10yr
25yr	0.54	0.86	1.09	1.50	1.99	2.59	25yr	1.72	2.29	3.04	3.87	4.89	6.14	6.84	25yr	5.43	6.58	7.46	8.56	9.43	25yr
50yr	0.60	0.97	1.24	1.74	2.35	3.09	50yr	2.03	2.70	3.64	4.64	5.85	7.33	8.24	50yr	6.49	7.92	8.94	10.17	11.11	50yr
100yr	0.69	1.12	1.44	2.03	2.77	3.66	100yr	2.39	3.17	4.33	5.53	6.99	8.76	9.93	100yr	7.75	9.55	10.72	12.08	13.08	100yr
200yr	0.78	1.27	1.65	2.36	3.27	4.35	200yr	2.82	3.74	5.16	6.62	8.36	10.46	11.98	200yr	9.26	11.52	12.85	14.36	15.40	200yr
500yr	0.93	1.53	2.00	2.90	4.07	5.47	500yr	3.51	4.65	6.51	8.37	10.59	13.26	15.38	500yr	11.73	14.79	16.35	18.06	19.13	500yr

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.21	0.32	0.39	0.53	0.65	0.99	1yr	0.56	0.97	1.09	1.46	1.83	2.27	2.50	1yr	2.01	2.40	2.70	3.27	4.13	1yr
2yr	0.34	0.52	0.64	0.87	1.08	1.25	2yr	0.93	1.23	1.44	1.89	2.43	3.14	3.39	2yr	2.78	3.26	3.75	4.44	5.04	2yr
5yr	0.38	0.59	0.74	1.01	1.28	1.49	5yr	1.11	1.46	1.70	2.23	2.85	3.81	4.15	5yr	3.37	3.99	4.56	5.29	5.94	5yr
10yr	0.42	0.65	0.81	1.13	1.45	1.70	10yr	1.26	1.66	1.93	2.51	3.20	4.40	4.84	10yr	3.90	4.65	5.27	6.05	6.70	10yr
25yr	0.48	0.74	0.92	1.31	1.72	2.02	25yr	1.49	1.97	2.28	2.96	3.74	5.35	5.94	25yr	4.74	5.71	6.40	7.25	7.87	25yr
50yr	0.53	0.81	1.01	1.45	1.96	2.29	50yr	1.69	2.24	2.60	3.35	4.21	6.22	6.96	50yr	5.51	6.69	7.43	8.32	8.90	50yr
100yr	0.59	0.89	1.12	1.62	2.22	2.61	100yr	1.92	2.55	2.96	3.79	4.74	7.25	8.18	100yr	6.41	7.87	8.65	9.57	10.06	100yr
200yr	0.65	0.99	1.25	1.81	2.52	2.98	200yr	2.18	2.92	3.37	4.31	5.35	8.45	9.67	200yr	7.48	9.30	10.09	11.00	11.38	200yr
500yr	0.78	1.16	1.49	2.17	3.08	3.56	500yr	2.66	3.48	4.02	5.13	6.29	10.37	12.11	500yr	9.17	11.64	12.41	13.30	13.37	500yr

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.31	0.48	0.58	0.78	0.96	1.18	1yr	0.83	1.15	1.36	1.77	2.33	2.89	3.15	1yr	2.56	3.03	3.47	4.17	4.81	1yr
2yr	0.36	0.56	0.69	0.94	1.15	1.34	2yr	1.00	1.31	1.53	2.01	2.59	3.34	3.64	2yr	2.96	3.50	4.02	4.77	5.44	2yr
5yr	0.43	0.67	0.83	1.14	1.45	1.72	5yr	1.25	1.69	1.99	2.56	3.23	4.38	4.81	5yr	3.87	4.62	5.28	6.24	7.05	5yr
10yr	0.50	0.77	0.96	1.34	1.73	2.09	10yr	1.49	2.05	2.41	3.09	3.85	5.36	5.93	10yr	4.74	5.70	6.49	7.65	8.56	10yr
25yr	0.62	0.95	1.18	1.68	2.21	2.70	25yr	1.91	2.64	3.12	3.94	4.86	7.01	7.84	25yr	6.20	7.54	8.53	10.00	11.12	25yr
50yr	0.73	1.11	1.38	1.98	2.67	3.28	50yr	2.30	3.21	3.81	4.74	5.78	8.59	9.68	50yr	7.60	9.30	10.49	12.27	13.56	50yr
100yr	0.86	1.30	1.62	2.34	3.22	3.98	100yr	2.77	3.89	4.63	5.72	6.90	10.52	11.94	100yr	9.31	11.49	12.89	15.01	16.53	100yr
200yr	1.01	1.52	1.92	2.78	3.88	4.84	200yr	3.35	4.73	5.64	6.87	8.22	12.90	14.75	200yr	11.41	14.18	15.81	18.38	20.17	200yr
500yr	1.29	1.92	2.48	3.60	5.11	6.26	500yr	4.41	6.12	7.31	8.78	10.36	16.85	19.44	500yr	14.91	18.70	20.71	24.00	26.21	500yr

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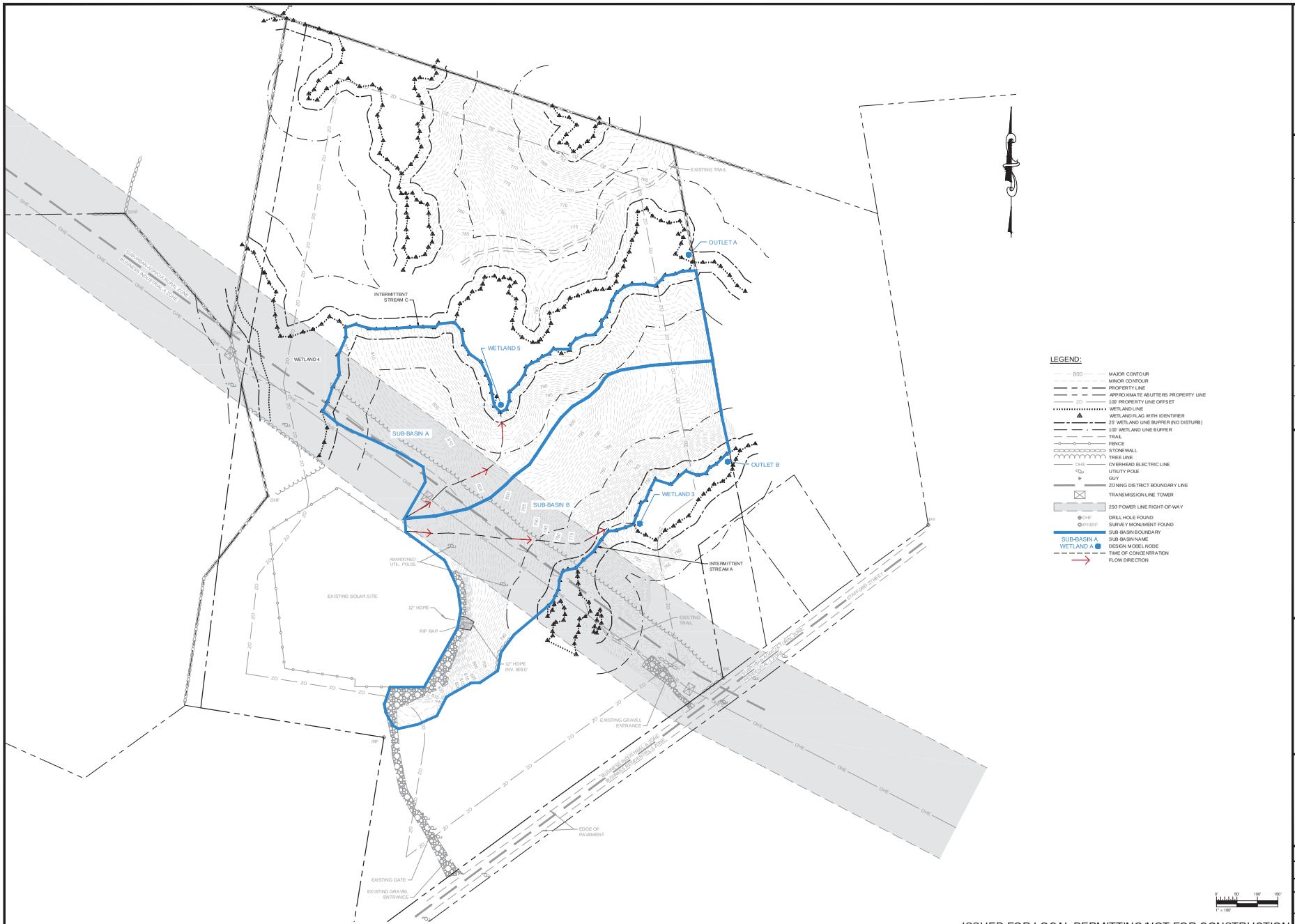
Northeast Regional Climate Center



ISSUED FOR LOCAL PERMITTING/NOT FOR CONSTRUCTION

amec foster wheeler
AMEC MASSACHUSETTS, INC.
271 MILL ROAD
CHELMSFORD MASSACHUSETTS 01824
TELEPHONE: (978) 692-9090
FAX: (978) 692-9033
WEB: WWW.AMECFW.COM

REVISION	DATE	ISSUE / REVISION DESCRIPTION	ISSUED BY	APPROVED
0	05/25/2017	ISSUED FOR LOCAL PERMITTING/NOT FOR CONSTRUCTION	DAA	APV

PROJECT: NATIONAL GRID SOLAR PHASE III
1,360.8 KW SOLAR PV ARRAY
LEICESTER, MASSACHUSETTS

TITLE: STORMWATER EXISTING CONDITIONS SITE PLAN

CLIENT: AMERESCO, INC.
111 SPEEN STREET
FRAMINGHAM, MA 01701

AMERESCO Green • Clean • Sustainable

SEAL:

DESIGNED BY: APV	DRAWN BY: DED
CHECKED BY: DAA	SCALE: AS SHOWN

PROJECT NUMBER: 3652170091

DRAWING NUMBER: SW-101

SHEET NUMBER: 1 OF 2

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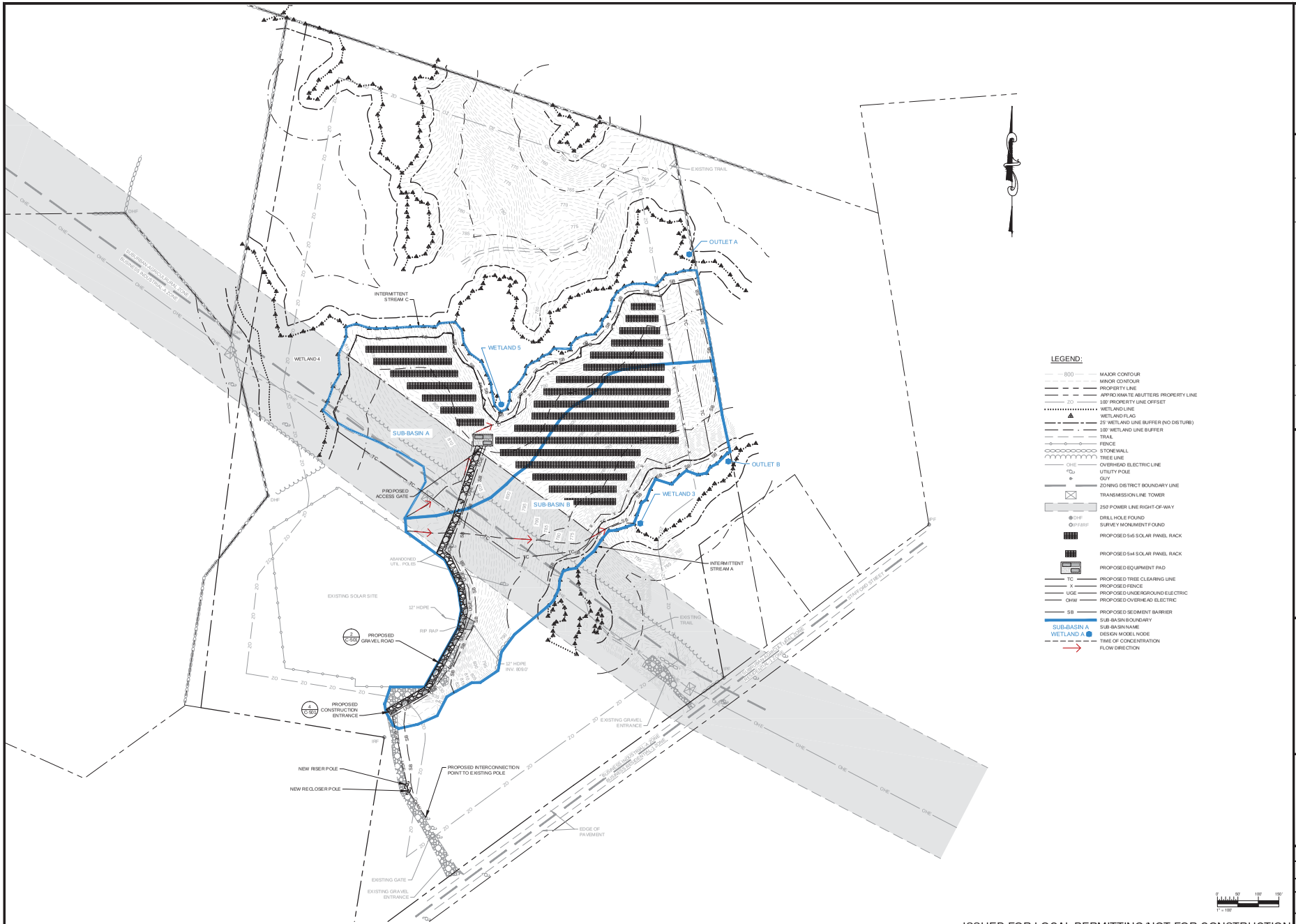

ISSUED FOR LOCAL PERMITTING/NOT FOR CONSTRUCTION

amec foster wheeler
AMEC MASSACHUSETTS, INC.
271 MILL ROAD
CHELMSFORD MASSACHUSETTS 01824
TELEPHONE: (978) 692-9090
FAX: (978) 692-9033
WEB: WWW.AMECFW.COM

#	DATE	DESCRIPTION	BY	APP
0	05/23/2017	ISSUED FOR LOCAL PERMITTING/NOT FOR CONSTRUCTION	DAA	APV

PROJECT: NATIONAL GRID SOLAR PHASE III
1,360.8 KW SOLAR PV ARRAY
LEICESTER, MASSACHUSETTS

TITLE: STORMWATER PROPOSED CONDITIONS SITE PLAN

CLIENT: AMERESCO, INC.
111 SPEEN STREET
FRAMINGHAM, MA 01701

AMERESCO Green • Clean • Sustainable

SEAL:

DESIGNED BY: APV	DRAWN BY: DED
CHECKED BY: DAA	SCALE: AS SHOWN

PROJECT NUMBER: 3652170091

DRAWING NUMBER: SW-102

SHEET NUMBER: 2 OF 2

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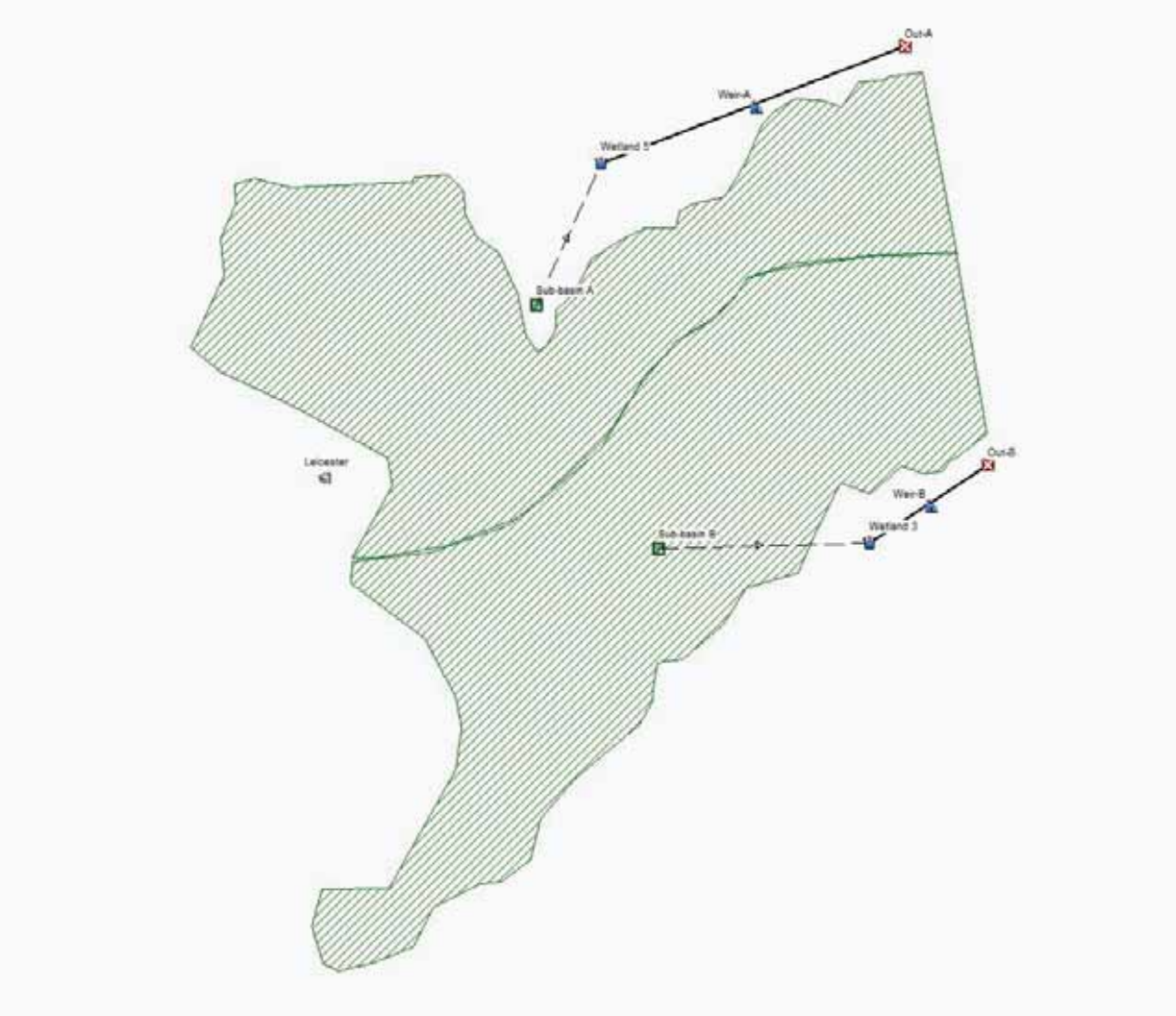

Out-A
Wet-A
Wetland 1
Sub-basin A
Leicester
Out-B
Wet-B
Wetland 3
Sub-basin B

Project Description

File Name ..... Leicester Stormwater Model-Pre.SPF
Description .....
Leicester, MA Solar

Stormwater Report

Project Options

Flow Units ..... CFS
Elevation Type ..... Elevation
Hydrology Method ..... SCS TR-55
Time of Concentration (TOC) Method ..... SCS TR-55
Link Routing Method ..... Kinematic Wave
Enable Overflow Ponding at Nodes ..... YES
Skip Steady State Analysis Time Periods ... YES

Analysis Options

Start Analysis On	May 22, 2017	00:00:00
End Analysis On	May 23, 2017	00:00:00
Start Reporting On	May 22, 2017	00:00:00
Antecedent Dry Days	0	days
Runoff (Dry Weather) Time Step	0 01:00:00	days hh:mm:ss
Runoff (Wet Weather) Time Step	0 00:05:00	days hh:mm:ss
Reporting Time Step	0 00:05:00	days hh:mm:ss
Routing Time Step	30	seconds

Number of Elements

	Qty
Rain Gages	1
Subbasins.....	2
Nodes.....	4
Junctions	0
Outfalls	2
Flow Diversions	0
Inlets	0
Storage Nodes	2
Links.....	2
Channels	0
Pipes	0
Pumps	0
Orifices	0
Weirs	2
Outlets	0
Pollutants	0
Land Uses	0

Rainfall Details

SN	Rain Gage ID	Data Source	Data Source ID	Rainfall Type	Rain Units	State	County	Return Period (years)	Rainfall Depth (inches)	Rainfall Distribution
1	Leicester	Time Series	2-year	Cumulative	inches	Massachusetts	Worcester	2	3.24	SCS Type III 24-hr

Subbasin Summary

SN	Subbasin ID	Area (ac)	Weighted Curve Number	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
1	Sub-basin A	5.36	52.85	3.24	0.20	1.09	0.36	0 00:10:34
2	Sub-basin B	6.05	53.28	3.24	0.22	1.30	0.46	0 00:09:22

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft^2)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	Out-A	Outfall	761.00					0.00	761.00					
2	Out-B	Outfall	741.00					0.00	741.00					
3	Wetland 3	Storage Node	748.00	754.00	748.00		20178.00	0.46	748.23				0.00	0.00
4	Wetland 5	Storage Node	784.00	790.00	784.00		72180.00	0.36	784.05				0.00	0.00

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length (ft)	Inlet Invert Elevation (ft)	Outlet Invert Elevation (ft)	Average Slope (%)	Diameter or Height (in)	Manning's Roughness	Peak Flow (cfs)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged (min)	Reported Condition
1	Weir-A	Weir	Wetland 5	Out-A		784.00	761.00				0.00							
2	Weir-B	Weir	Wetland 3	Out-B		748.00	741.00				0.00							

Subbasin Hydrology

Subbasin : Sub-basin A

Input Data

Area (ac) 5.36
Weighted Curve Number 52.85
Rain Gage ID ..... Leicester

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Gravel roads	0.00	B	85.00
Woods, Good	3.71	B	55.00
Brush, Good	1.65	B	48.00
Meadow, non-grazed	0.00	B	58.00
Composite Area & Weighted CN	5.36		52.85

Time of Concentration

TOC Method : SCS TR-55

Sheet Flow Equation :

Tc = (0.007 * ((n * Lf)^0.8)) / ((P^0.5) * (Sf^0.4))

Where :

Tc = Time of Concentration (hr)
n = Manning's roughness
Lf = Flow Length (ft)
P = 2 yr, 24 hr Rainfall (inches)
Sf = Slope (ft/ft)

Shallow Concentrated Flow Equation :

V = 16.1345 * (Sf^0.5) (unpaved surface)
V = 20.3282 * (Sf^0.5) (paved surface)
V = 15.0 * (Sf^0.5) (grassed waterway surface)
V = 10.0 * (Sf^0.5) (nearly bare & untilled surface)
V = 9.0 * (Sf^0.5) (cultivated straight rows surface)
V = 7.0 * (Sf^0.5) (short grass pasture surface)
V = 5.0 * (Sf^0.5) (woodland surface)
V = 2.5 * (Sf^0.5) (forest w/heavy litter surface)
Tc = (Lf / V) / (3600 sec/hr)

Where:

Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)

Channel Flow Equation :

V = (1.49 * (R^(2/3)) * (Sf^0.5)) / n
R = Aq / Wp
Tc = (Lf / V) / (3600 sec/hr)

Where :

Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
R = Hydraulic Radius (ft)
Aq = Flow Area (ft^2)
Wp = Wetted Perimeter (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)
n = Manning's roughness

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	.4	0.00	0.00
Flow Length (ft) :	100	0.00	0.00
Slope (%) :	4	0.00	0.00
2 yr, 24 hr Rainfall (in) :	3.24	0.00	0.00
Velocity (ft/sec) :	0.10	0.00	0.00
Computed Flow Time (min) :	16.17	0.00	0.00

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	60	228	0.00
Slope (%) :	11	12	0.00
Surface Type :	Woodland	Forest	Unpaved
Velocity (ft/sec) :	1.66	0.87	0.00
Computed Flow Time (min) :	0.60	4.37	0.00

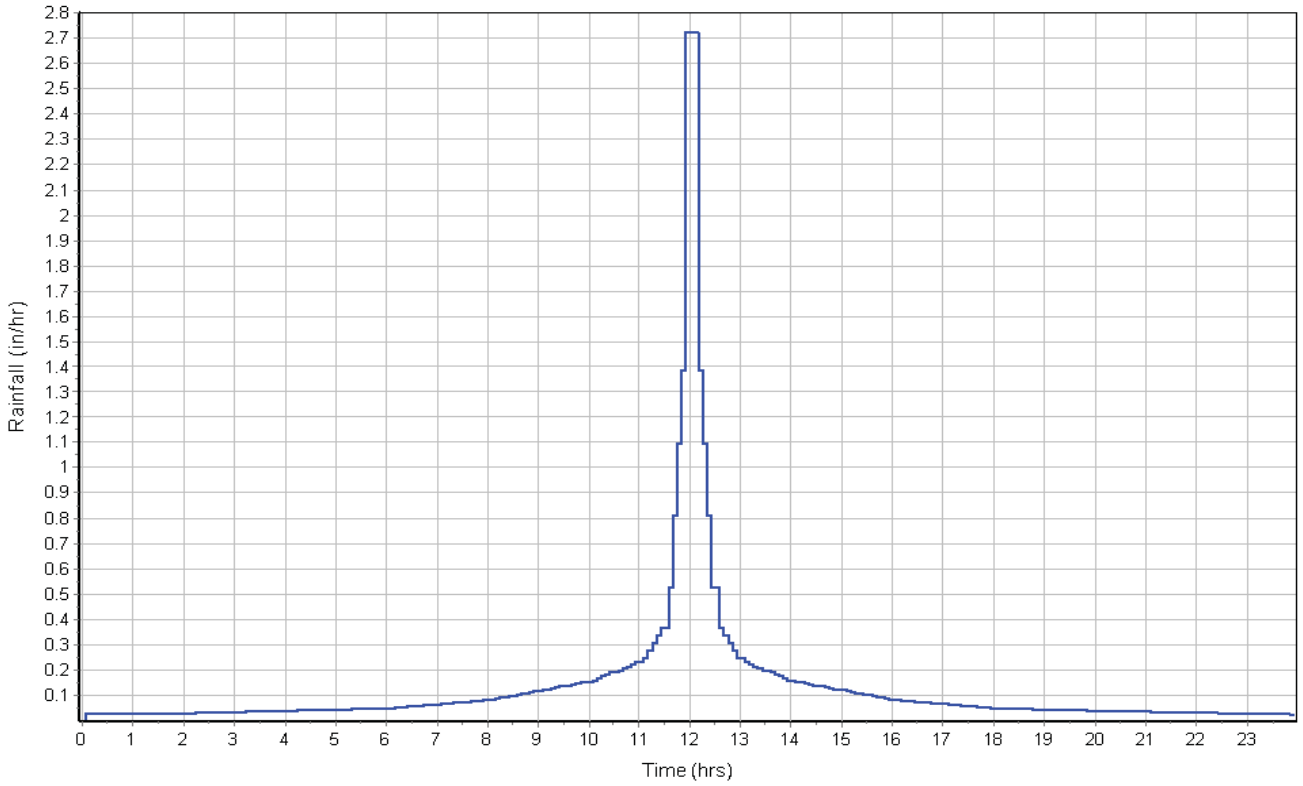
Total TOC (min) 10.57

Subbasin Runoff Results

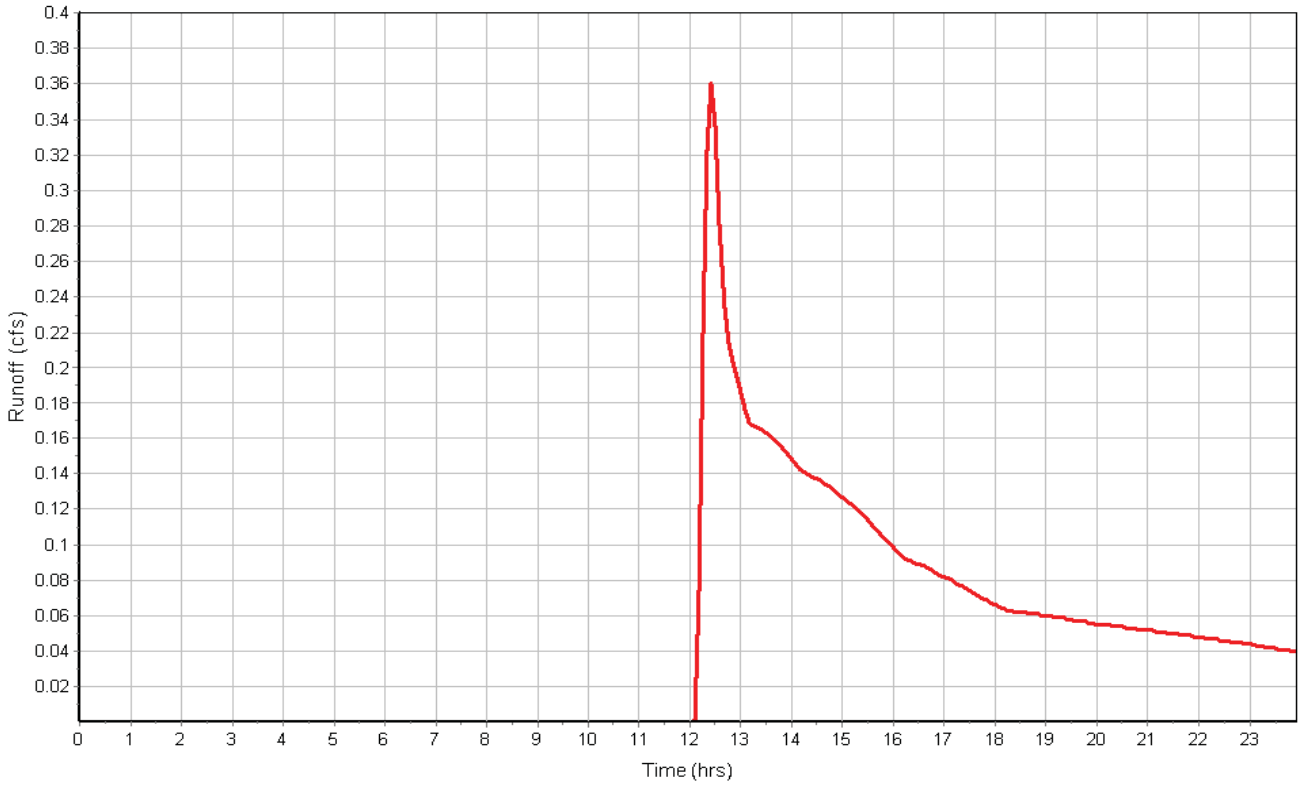
Total Rainfall (in)	3.24
Total Runoff (in)	0.20
Peak Runoff (cfs)	0.36
Weighted Curve Number	52.85
Time of Concentration (days hh:mm:ss)	0 00:10:34

Subbasin : Sub-basin A

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : Sub-basin B

Input Data

Area (ac) 6.05
Weighted Curve Number 53.28
Rain Gage ID ..... Leicester

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Gravel roads	0.29	B	85.00
Woods, Good	3.03	B	55.00
Brush, Good	2.73	B	48.00
Meadow, non-grazed	0.00	B	58.00
Composite Area & Weighted CN	6.05		53.28

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	.4	0.00	0.00
Flow Length (ft) :	100	0.00	0.00
Slope (%) :	7	0.00	0.00
2 yr, 24 hr Rainfall (in) :	3.24	0.00	0.00
Velocity (ft/sec) :	0.13	0.00	0.00
Computed Flow Time (min) :	12.93	0.00	0.00

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	213	236	0.00
Slope (%) :	14.5	16	0.00
Surface Type :	Woodland	Forest	Unpaved
Velocity (ft/sec) :	1.90	1.00	0.00
Computed Flow Time (min) :	1.87	3.93	0.00

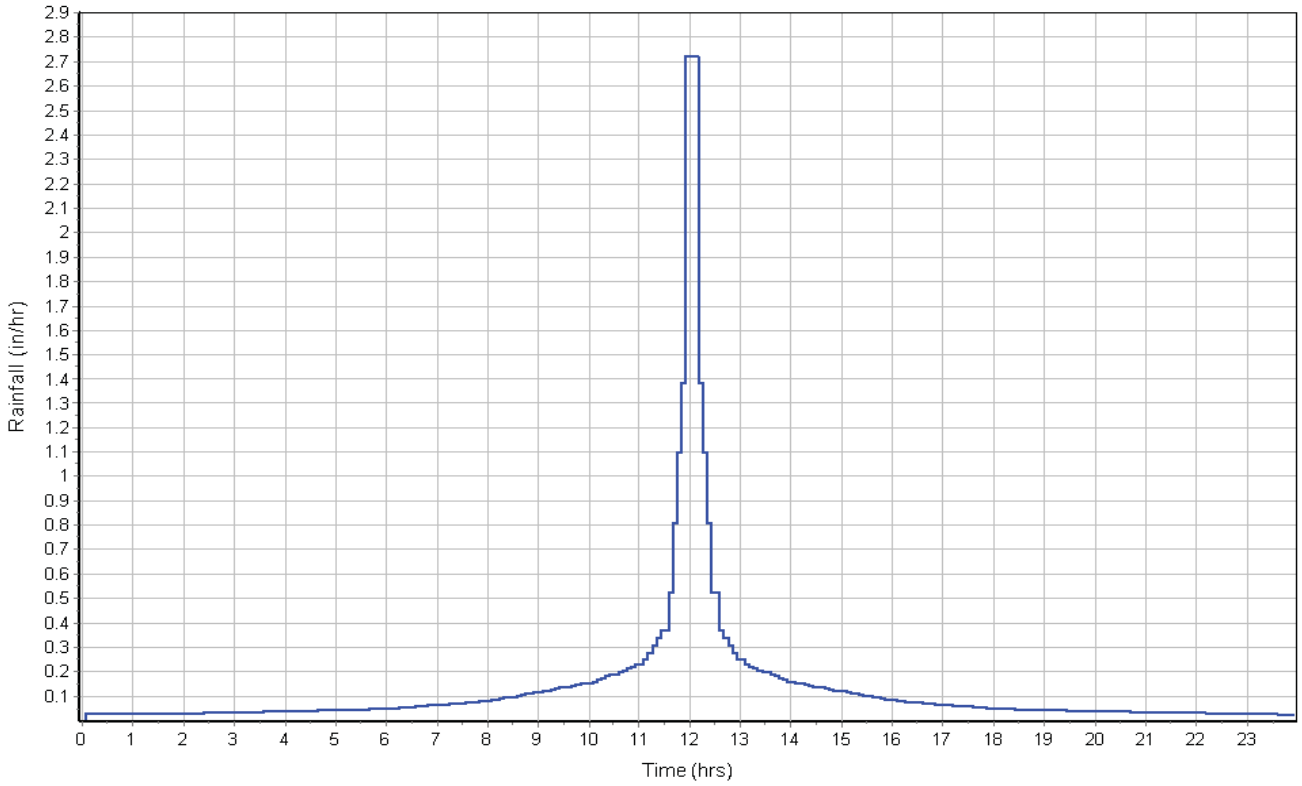
Total TOC (min) 9.37

Subbasin Runoff Results

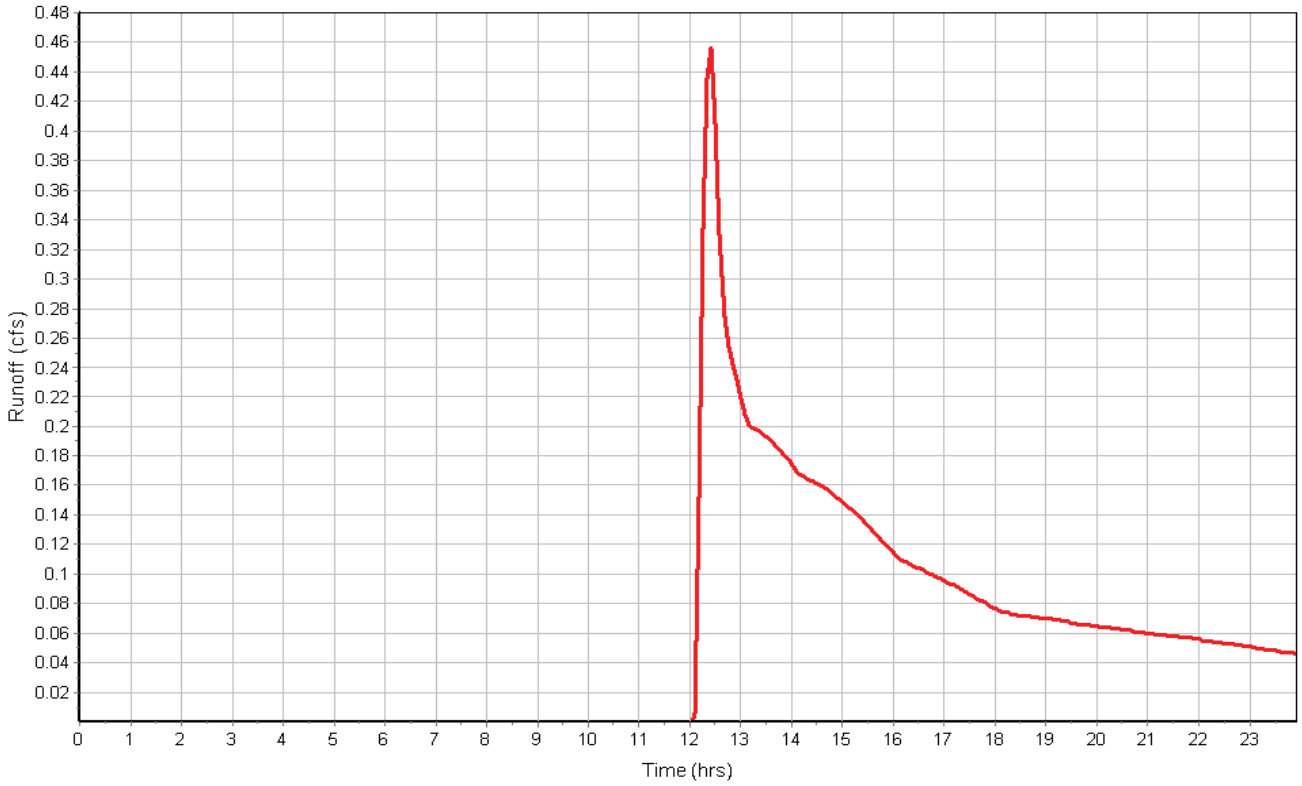
Total Rainfall (in) 3.24
Total Runoff (in) 0.22
Peak Runoff (cfs) 0.46
Weighted Curve Number 53.28
Time of Concentration (days hh:mm:ss) 0 00:09:22

Subbasin : Sub-basin B

Rainfall Intensity Graph



Runoff Hydrograph



Storage Nodes

Storage Node : Wetland 3

Input Data

Invert Elevation (ft) 748.00
Max (Rim) Elevation (ft) 754.00
Max (Rim) Offset (ft) 6.00
Initial Water Elevation (ft) 748.00
Initial Water Depth (ft) 0.00
Ponded Area (ft²) 20178.00
Evaporation Loss 0.00

Outflow Weirs

SN	Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1	Weir-B	Rectangular	No	754.00	6.00	100.00	1.00	3.33

Output Summary Results

Peak Inflow (cfs) 0.46
Peak Lateral Inflow (cfs) 0.46
Peak Outflow (cfs) 0.00
Peak Exfiltration Flow Rate (cfm) 0.00
Max HGL Elevation Attained (ft) 748.23
Max HGL Depth Attained (ft) 0.23
Average HGL Elevation Attained (ft) 748.08
Average HGL Depth Attained (ft) 0.08
Time of Max HGL Occurrence (days hh:mm) 1 00:00
Total Exfiltration Volume (1000-ft³) 0.000
Total Flooded Volume (ac-in) 0
Total Time Flooded (min) 0
Total Retention Time (sec) 0.00

Storage Node : Wetland 5

Input Data

Invert Elevation (ft) 784.00
Max (Rim) Elevation (ft) 790.00
Max (Rim) Offset (ft) 6.00
Initial Water Elevation (ft) 784.00
Initial Water Depth (ft) 0.00
Ponded Area (ft²) 72180.00
Evaporation Loss 0.00

Outflow Weirs

SN	Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1	Weir-A	Rectangular	No	790.00	6.00	100.00	1.00	3.33

Output Summary Results

Peak Inflow (cfs) 0.36
Peak Lateral Inflow (cfs) 0.36
Peak Outflow (cfs) 0.00
Peak Exfiltration Flow Rate (cfm) 0.00
Max HGL Elevation Attained (ft) 784.05
Max HGL Depth Attained (ft) 0.05
Average HGL Elevation Attained (ft) 784.02
Average HGL Depth Attained (ft) 0.02
Time of Max HGL Occurrence (days hh:mm) 1 00:00
Total Exfiltration Volume (1000-ft³) 0.000
Total Flooded Volume (ac-in) 0
Total Time Flooded (min) 0
Total Retention Time (sec) 0.00

Project Description

File Name	Leicester Stormwater Model-Pre.SPF
Description	
	Leicester, MA Solar
	Stormwater Report

Project Options

Flow Units	CFS
Elevation Type	Elevation
Hydrology Method	SCS TR-55
Time of Concentration (TOC) Method	SCS TR-55
Link Routing Method	Kinematic Wave
Enable Overflow Ponding at Nodes	YES
Skip Steady State Analysis Time Periods	YES

Analysis Options

Start Analysis On	May 22, 2017	00:00:00
End Analysis On	May 23, 2017	00:00:00
Start Reporting On	May 22, 2017	00:00:00
Antecedent Dry Days	0	days
Runoff (Dry Weather) Time Step	0 01:00:00	days hh:mm:ss
Runoff (Wet Weather) Time Step	0 00:05:00	days hh:mm:ss
Reporting Time Step	0 00:05:00	days hh:mm:ss
Routing Time Step	30	seconds

Number of Elements

	Qty
Rain Gages	1
Subbasins	2
Nodes	4
Junctions	0
Outfalls	2
Flow Diversions	0
Inlets	0
Storage Nodes	2
Links	2
Channels	0
Pipes	0
Pumps	0
Orifices	0
Weirs	2
Outlets	0
Pollutants	0
Land Uses	0

Rainfall Details

SN	Rain Gage ID	Data Source	Data Source ID	Rainfall Type	Rain Units	State	County	Return Period (years)	Rainfall Depth (inches)	Rainfall Distribution
1	Leicester	Time Series	10-year	Cumulative	inches	Massachusetts	Worcester	10	4.86	SCS Type III 24-hr

Subbasin Summary

SN	Subbasin ID	Area (ac)	Weighted Curve Number	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
1	Sub-basin A	5.36	52.85	4.86	0.79	4.23	3.01	0 00:10:34
2	Sub-basin B	6.05	53.28	4.86	0.81	4.92	3.70	0 00:09:22

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft^2)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	Out-A	Outfall	761.00					0.00	761.00					
2	Out-B	Outfall	741.00					0.00	741.00					
3	Wetland 3	Storage Node	748.00	754.00	748.00		20178.00	3.70	748.88				0.00	0.00
4	Wetland 5	Storage Node	784.00	790.00	784.00		72180.00	2.99	784.21				0.00	0.00

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length (ft)	Inlet Invert Elevation (ft)	Outlet Invert Elevation (ft)	Average Slope (%)	Diameter or Height (in)	Manning's Roughness	Peak Flow (cfs)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged (min)	Reported Condition
1	Weir-A	Weir	Wetland 5	Out-A		784.00	761.00				0.00							
2	Weir-B	Weir	Wetland 3	Out-B		748.00	741.00				0.00							

Subbasin Hydrology

Subbasin : Sub-basin A

Input Data

Area (ac) 5.36
Weighted Curve Number 52.85
Rain Gage ID ..... Leicester

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Gravel roads	0.00	B	85.00
Woods, Good	3.71	B	55.00
Brush, Good	1.65	B	48.00
Meadow, non-grazed	0.00	B	58.00
Composite Area & Weighted CN	5.36		52.85

Time of Concentration

TOC Method : SCS TR-55

Sheet Flow Equation :

Tc = (0.007 * ((n * Lf)^0.8)) / ((P^0.5) * (Sf^0.4))

Where :

Tc = Time of Concentration (hr)
n = Manning's roughness
Lf = Flow Length (ft)
P = 2 yr, 24 hr Rainfall (inches)
Sf = Slope (ft/ft)

Shallow Concentrated Flow Equation :

V = 16.1345 * (Sf^0.5) (unpaved surface)
V = 20.3282 * (Sf^0.5) (paved surface)
V = 15.0 * (Sf^0.5) (grassed waterway surface)
V = 10.0 * (Sf^0.5) (nearly bare & untilled surface)
V = 9.0 * (Sf^0.5) (cultivated straight rows surface)
V = 7.0 * (Sf^0.5) (short grass pasture surface)
V = 5.0 * (Sf^0.5) (woodland surface)
V = 2.5 * (Sf^0.5) (forest w/heavy litter surface)
Tc = (Lf / V) / (3600 sec/hr)

Where:

Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)

Channel Flow Equation :

V = (1.49 * (R^(2/3)) * (Sf^0.5)) / n
R = Aq / Wp
Tc = (Lf / V) / (3600 sec/hr)

Where :

Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
R = Hydraulic Radius (ft)
Aq = Flow Area (ft^2)
Wp = Wetted Perimeter (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)
n = Manning's roughness

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	.4	0.00	0.00
Flow Length (ft) :	100	0.00	0.00
Slope (%) :	4	0.00	0.00
2 yr, 24 hr Rainfall (in) :	3.24	0.00	0.00
Velocity (ft/sec) :	0.10	0.00	0.00
Computed Flow Time (min) :	16.17	0.00	0.00

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	60	228	0.00
Slope (%) :	11	12	0.00
Surface Type :	Woodland	Forest	Unpaved
Velocity (ft/sec) :	1.66	0.87	0.00
Computed Flow Time (min) :	0.60	4.37	0.00

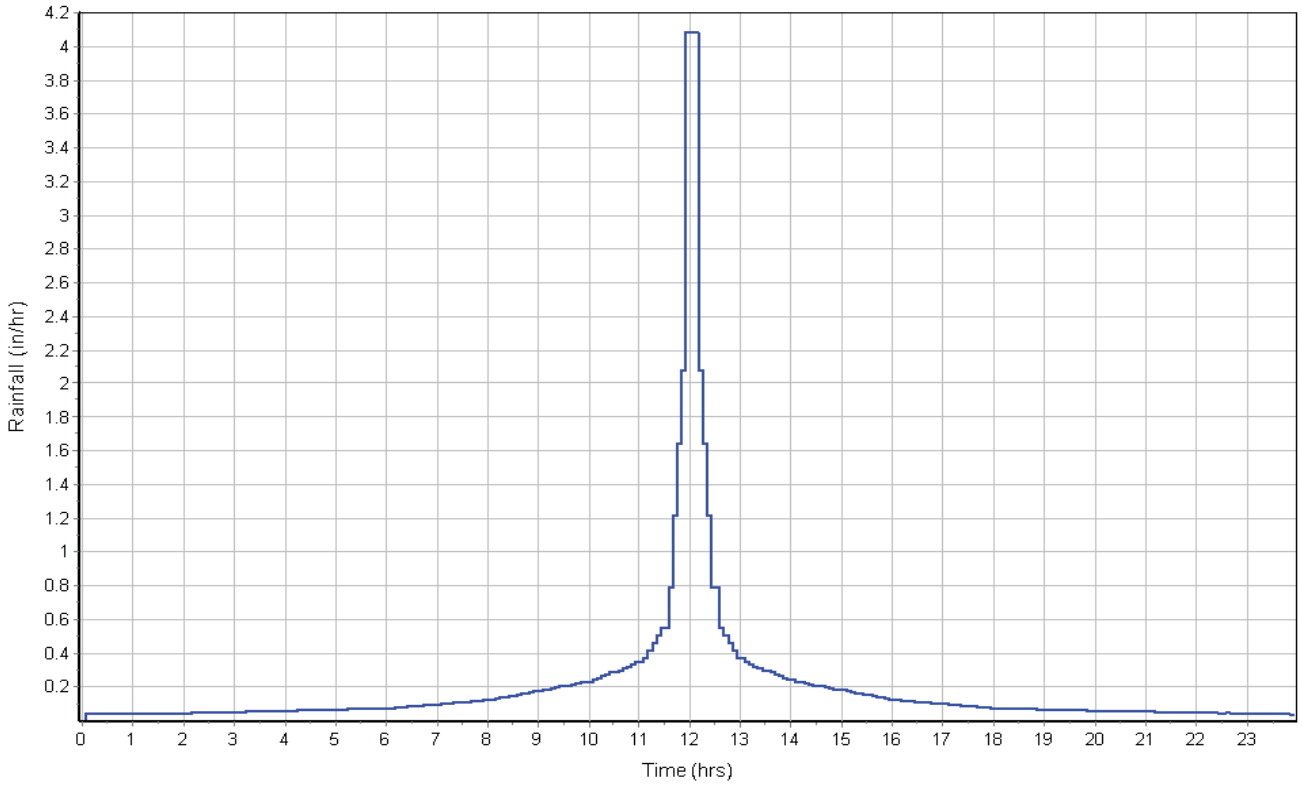
Total TOC (min) 10.57

Subbasin Runoff Results

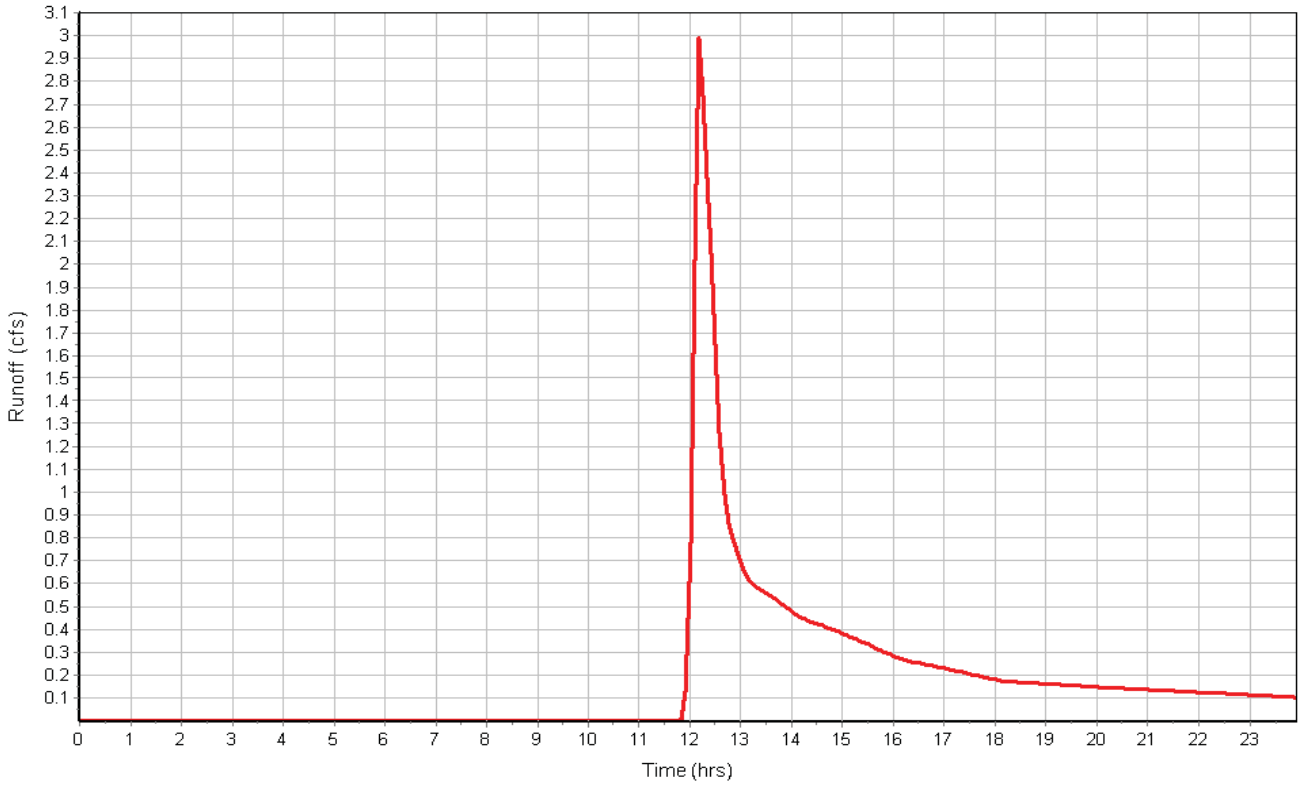
Total Rainfall (in)	4.86
Total Runoff (in)	0.79
Peak Runoff (cfs)	3.01
Weighted Curve Number	52.85
Time of Concentration (days hh:mm:ss)	0 00:10:34

Subbasin : Sub-basin A

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : Sub-basin B

Input Data

Area (ac) 6.05
Weighted Curve Number 53.28
Rain Gage ID ..... Leicester

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Gravel roads	0.29	B	85.00
Woods, Good	3.03	B	55.00
Brush, Good	2.73	B	48.00
Meadow, non-grazed	0.00	B	58.00
Composite Area & Weighted CN	6.05		53.28

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	.4	0.00	0.00
Flow Length (ft) :	100	0.00	0.00
Slope (%) :	7	0.00	0.00
2 yr, 24 hr Rainfall (in) :	3.24	0.00	0.00
Velocity (ft/sec) :	0.13	0.00	0.00
Computed Flow Time (min) :	12.93	0.00	0.00

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	213	236	0.00
Slope (%) :	14.5	16	0.00
Surface Type :	Woodland	Forest	Unpaved
Velocity (ft/sec) :	1.90	1.00	0.00
Computed Flow Time (min) :	1.87	3.93	0.00

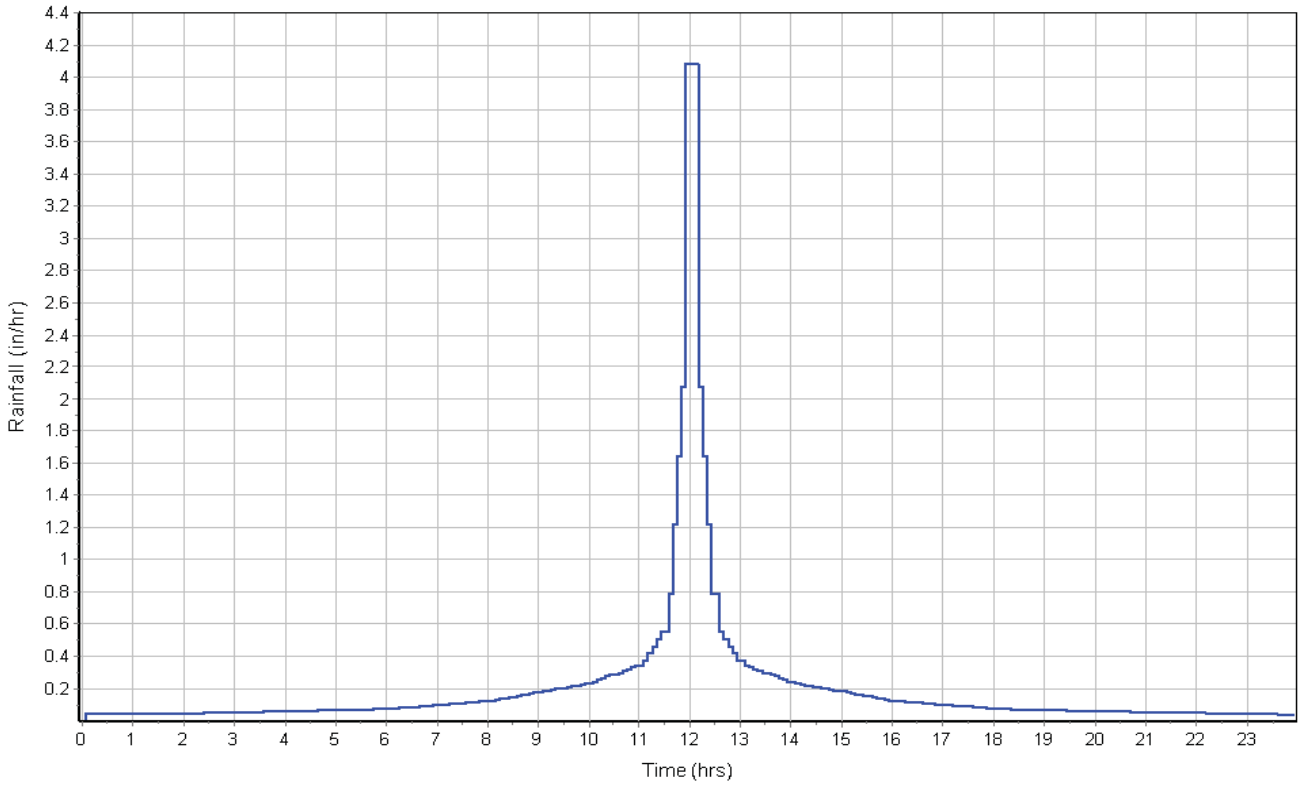
Total TOC (min) 9.37

Subbasin Runoff Results

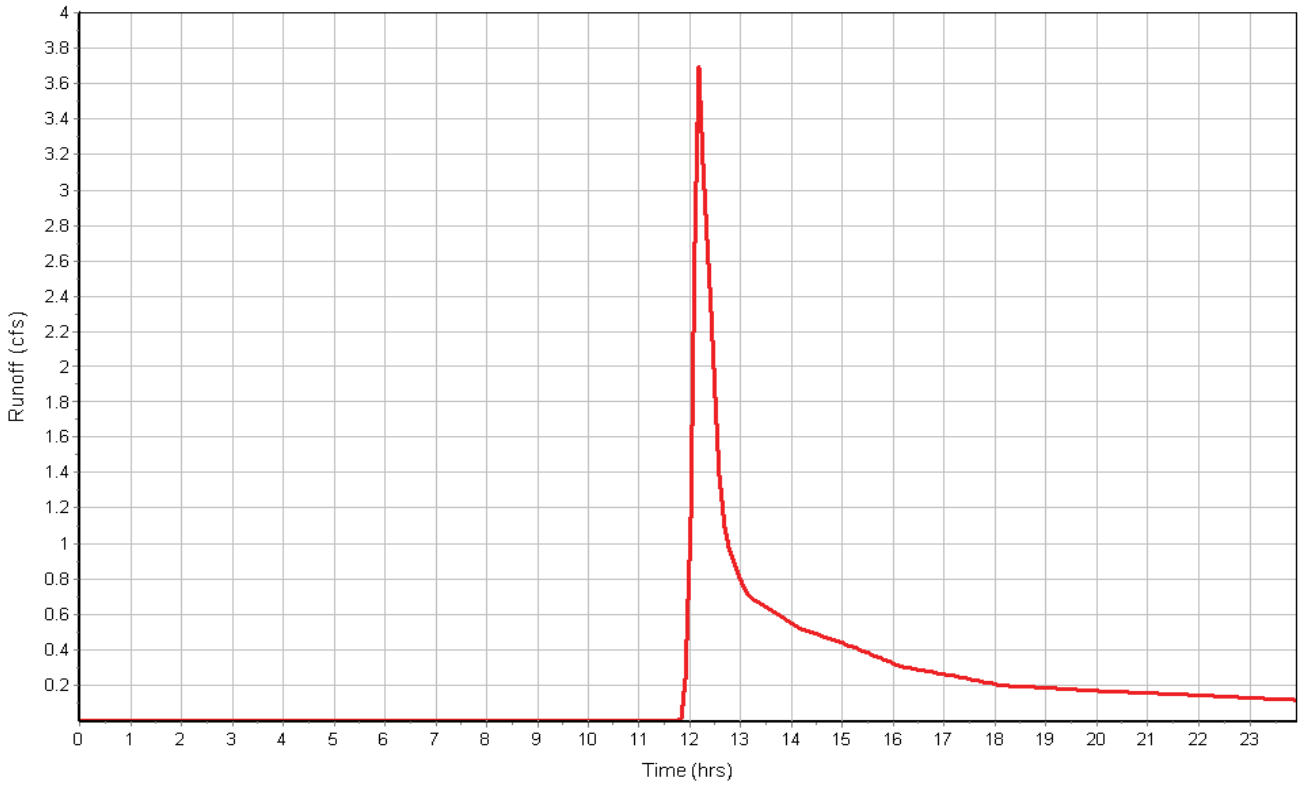
Total Rainfall (in) 4.86
Total Runoff (in) 0.81
Peak Runoff (cfs) 3.70
Weighted Curve Number 53.28
Time of Concentration (days hh:mm:ss) 0 00:09:22

Subbasin : Sub-basin B

Rainfall Intensity Graph



Runoff Hydrograph



Storage Nodes

Storage Node : Wetland 3

Input Data

Invert Elevation (ft) 748.00
Max (Rim) Elevation (ft) 754.00
Max (Rim) Offset (ft) 6.00
Initial Water Elevation (ft) 748.00
Initial Water Depth (ft) 0.00
Ponded Area (ft²) 20178.00
Evaporation Loss 0.00

Outflow Weirs

SN	Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1	Weir-B	Rectangular	No	754.00	6.00	100.00	1.00	3.33

Output Summary Results

Peak Inflow (cfs) 3.70
Peak Lateral Inflow (cfs) 3.70
Peak Outflow (cfs) 0.00
Peak Exfiltration Flow Rate (cfm) 0.00
Max HGL Elevation Attained (ft) 748.88
Max HGL Depth Attained (ft) 0.88
Average HGL Elevation Attained (ft) 748.33
Average HGL Depth Attained (ft) 0.33
Time of Max HGL Occurrence (days hh:mm) 1 00:00
Total Exfiltration Volume (1000-ft³) 0.000
Total Flooded Volume (ac-in) 0
Total Time Flooded (min) 0
Total Retention Time (sec) 0.00

Storage Node : Wetland 5

Input Data

Invert Elevation (ft) 784.00
Max (Rim) Elevation (ft) 790.00
Max (Rim) Offset (ft) 6.00
Initial Water Elevation (ft) 784.00
Initial Water Depth (ft) 0.00
Ponded Area (ft²) 72180.00
Evaporation Loss 0.00

Outflow Weirs

SN	Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1	Weir-A	Rectangular	No	790.00	6.00	100.00	1.00	3.33

Output Summary Results

Peak Inflow (cfs) 2.99
Peak Lateral Inflow (cfs) 2.99
Peak Outflow (cfs) 0.00
Peak Exfiltration Flow Rate (cfm) 0.00
Max HGL Elevation Attained (ft) 784.21
Max HGL Depth Attained (ft) 0.21
Average HGL Elevation Attained (ft) 784.08
Average HGL Depth Attained (ft) 0.08
Time of Max HGL Occurrence (days hh:mm) 1 00:00
Total Exfiltration Volume (1000-ft³) 0.000
Total Flooded Volume (ac-in) 0
Total Time Flooded (min) 0
Total Retention Time (sec) 0.00

Project Description

File Name	Leicester Stormwater Model-Post.SPF
Description	
	Leicester, MA Solar
	Stormwater Report

Project Options

Flow Units	CFS
Elevation Type	Elevation
Hydrology Method	SCS TR-55
Time of Concentration (TOC) Method	SCS TR-55
Link Routing Method	Kinematic Wave
Enable Overflow Ponding at Nodes	YES
Skip Steady State Analysis Time Periods	YES

Analysis Options

Start Analysis On	May 22, 2017	00:00:00
End Analysis On	May 23, 2017	00:00:00
Start Reporting On	May 22, 2017	00:00:00
Antecedent Dry Days	0	days
Runoff (Dry Weather) Time Step	0 01:00:00	days hh:mm:ss
Runoff (Wet Weather) Time Step	0 00:05:00	days hh:mm:ss
Reporting Time Step	0 00:05:00	days hh:mm:ss
Routing Time Step	30	seconds

Number of Elements

	Qty
Rain Gages	1
Subbasins	2
Nodes	4
Junctions	0
Outfalls	2
Flow Diversions	0
Inlets	0
Storage Nodes	2
Links	2
Channels	0
Pipes	0
Pumps	0
Orifices	0
Weirs	2
Outlets	0
Pollutants	0
Land Uses	0

Rainfall Details

SN	Rain Gage ID	Data Source	Data Source ID	Rainfall Type	Rain Units	State	County	Return Period (years)	Rainfall Depth (inches)	Rainfall Distribution
1	Leicester	Time Series	2-year	Cumulative	inches	Massachusetts	Worcester	2	3.24	SCS Type III 24-hr

Subbasin Summary

SN	Subbasin ID	Area (ac)	Weighted Curve Number	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
1	Sub-basin A	5.36	55.47	3.24	0.28	1.48	0.64	0 00:09:06
2	Sub-basin B	6.05	55.06	3.24	0.27	1.60	0.67	0 00:08:06

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft^2)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	Out-A	Outfall	761.00					0.00	761.00					
2	Out-B	Outfall	741.00					0.00	741.00					
3	Wetland 3	Storage Node	748.00	754.00	748.00		20178.00	0.67	748.29				0.00	0.00
4	Wetland 5	Storage Node	784.00	790.00	784.00		72180.00	0.64	784.07				0.00	0.00

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope	Diameter or Height	Manning's Roughness	Peak Flow	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Reported Condition
					(ft)	(ft)	(ft)	(%)	(in)		(cfs)	(cfs)		(ft/sec)	(ft)		(min)	
1	Weir-A	Weir	Wetland 5	Out-A		784.00	761.00				0.00							
2	Weir-B	Weir	Wetland 3	Out-B		748.00	741.00				0.00							

Subbasin Hydrology

Subbasin : Sub-basin A

Input Data

Area (ac) 5.36
Weighted Curve Number 55.47
Rain Gage ID ..... Leicester

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Gravel roads	0.06	B	85.00
Woods, Good	0.00	B	55.00
Brush, Good	1.65	B	48.00
Meadow, non-grazed	3.62	B	58.00
Ground Screws	0.03	B	98.00
Composite Area & Weighted CN	5.36		55.47

Time of Concentration

TOC Method : SCS TR-55

Sheet Flow Equation :

Tc = (0.007 * ((n * Lf)^0.8)) / ((P^0.5) * (Sf^0.4))

Where :

Tc = Time of Concentration (hr)
n = Manning's roughness
Lf = Flow Length (ft)
P = 2 yr, 24 hr Rainfall (inches)
Sf = Slope (ft/ft)

Shallow Concentrated Flow Equation :

V = 16.1345 * (Sf^0.5) (unpaved surface)
V = 20.3282 * (Sf^0.5) (paved surface)
V = 15.0 * (Sf^0.5) (grassed waterway surface)
V = 10.0 * (Sf^0.5) (nearly bare & untilled surface)
V = 9.0 * (Sf^0.5) (cultivated straight rows surface)
V = 7.0 * (Sf^0.5) (short grass pasture surface)
V = 5.0 * (Sf^0.5) (woodland surface)
V = 2.5 * (Sf^0.5) (forest w/heavy litter surface)
Tc = (Lf / V) / (3600 sec/hr)

Where:

Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)

Channel Flow Equation :

V = (1.49 * (R^(2/3)) * (Sf^0.5)) / n
R = Aq / Wp
Tc = (Lf / V) / (3600 sec/hr)

Where :

Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
R = Hydraulic Radius (ft)
Aq = Flow Area (ft²)
Wp = Wetted Perimeter (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)
n = Manning's roughness

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	.4	0.00	0.00
Flow Length (ft) :	100	0.00	0.00
Slope (%) :	4	0.00	0.00
2 yr, 24 hr Rainfall (in) :	3.24	0.00	0.00
Velocity (ft/sec) :	0.10	0.00	0.00
Computed Flow Time (min) :	16.17	0.00	0.00

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	60	214	0.00
Slope (%) :	11	12.5	0.00
Surface Type :	Woodland	Grass pasture	Unpaved
Velocity (ft/sec) :	1.66	2.47	0.00
Computed Flow Time (min) :	0.60	1.44	0.00

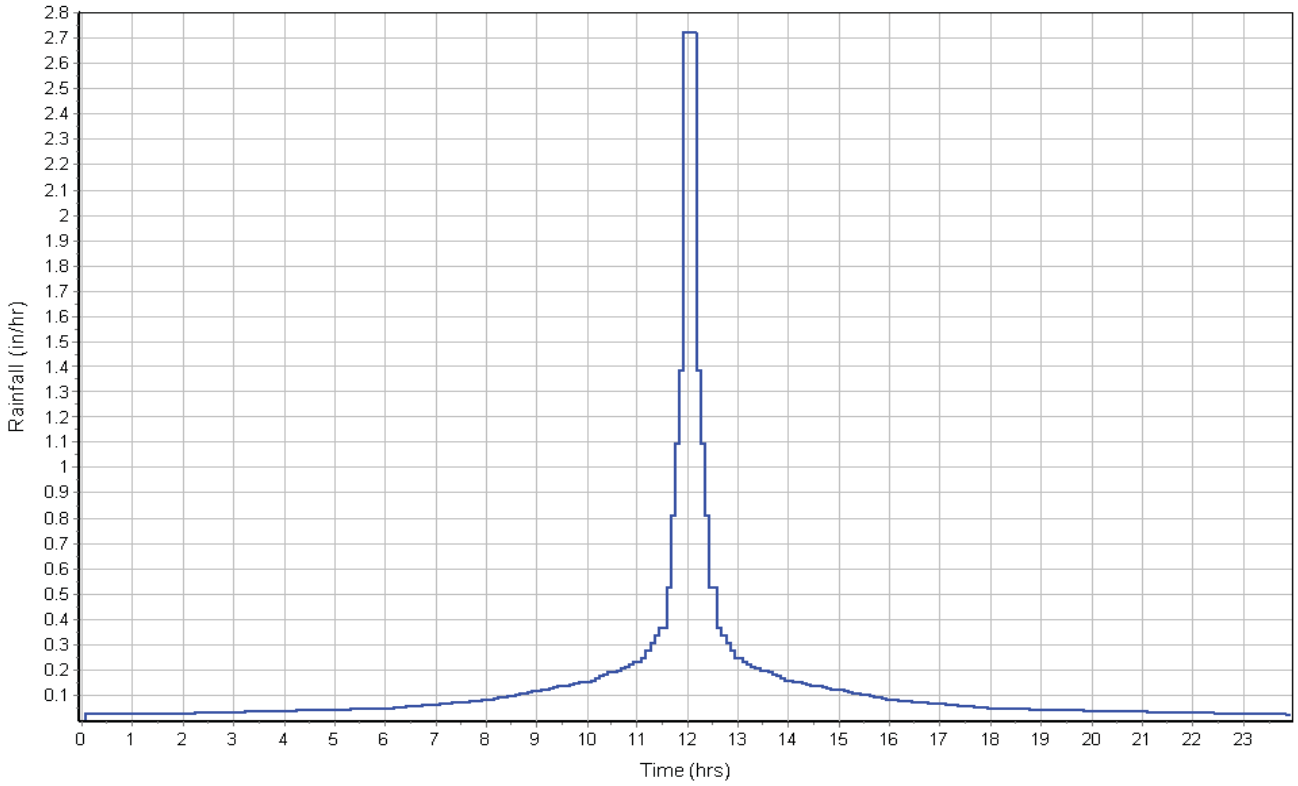
Total TOC (min) 9.11

Subbasin Runoff Results

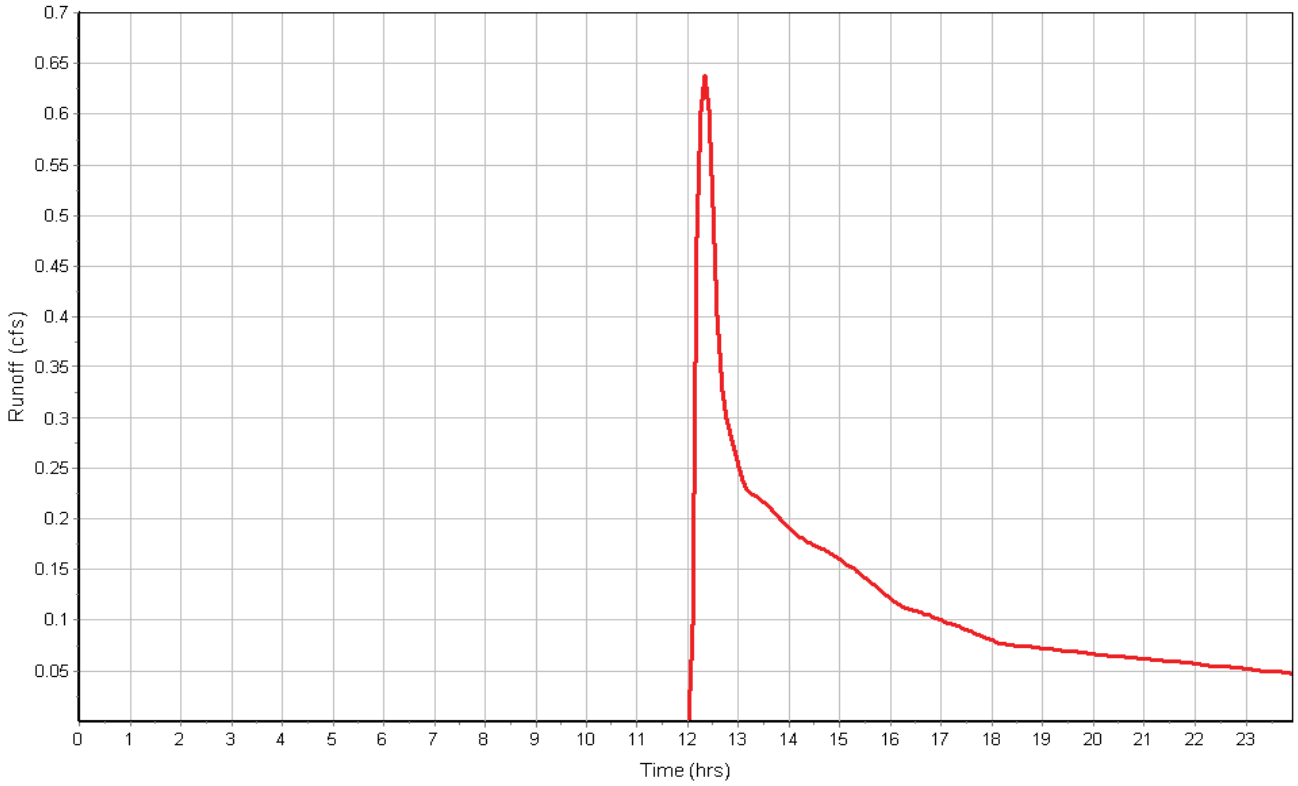
Total Rainfall (in)	3.24
Total Runoff (in)	0.28
Peak Runoff (cfs)	0.64
Weighted Curve Number	55.47
Time of Concentration (days hh:mm:ss)	0 00:09:07

Subbasin : Sub-basin A

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : Sub-basin B

Input Data

Area (ac) 6.05
Weighted Curve Number 55.06
Rain Gage ID ..... Leicester

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Gravel roads	0.35	B	85.00
Woods, Good	0.00	B	55.00
Brush, Good	2.73	B	48.00
Meadow, non-grazed	2.97	B	58.00
Ground Screws	0.00	B	98.00
Composite Area & Weighted CN	6.05		55.06

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	.4	0.00	0.00
Flow Length (ft) :	100	0.00	0.00
Slope (%) :	7	0.00	0.00
2 yr, 24 hr Rainfall (in) :	3.24	0.00	0.00
Velocity (ft/sec) :	0.13	0.00	0.00
Computed Flow Time (min) :	12.93	0.00	0.00

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	213	236	0.00
Slope (%) :	14.5	16	0.00
Surface Type :	Woodland	Grass pasture	Unpaved
Velocity (ft/sec) :	1.90	2.80	0.00
Computed Flow Time (min) :	1.87	1.40	0.00

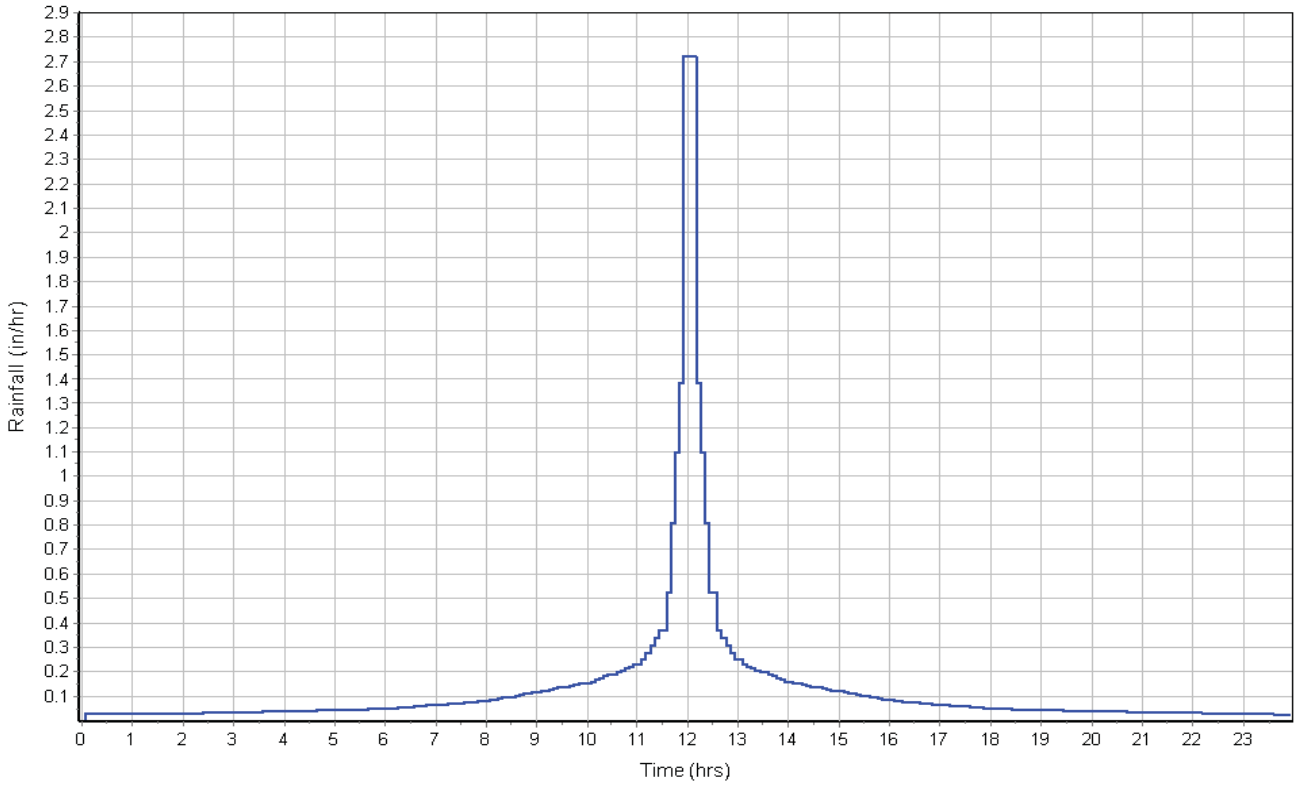
Total TOC (min) 8.10

Subbasin Runoff Results

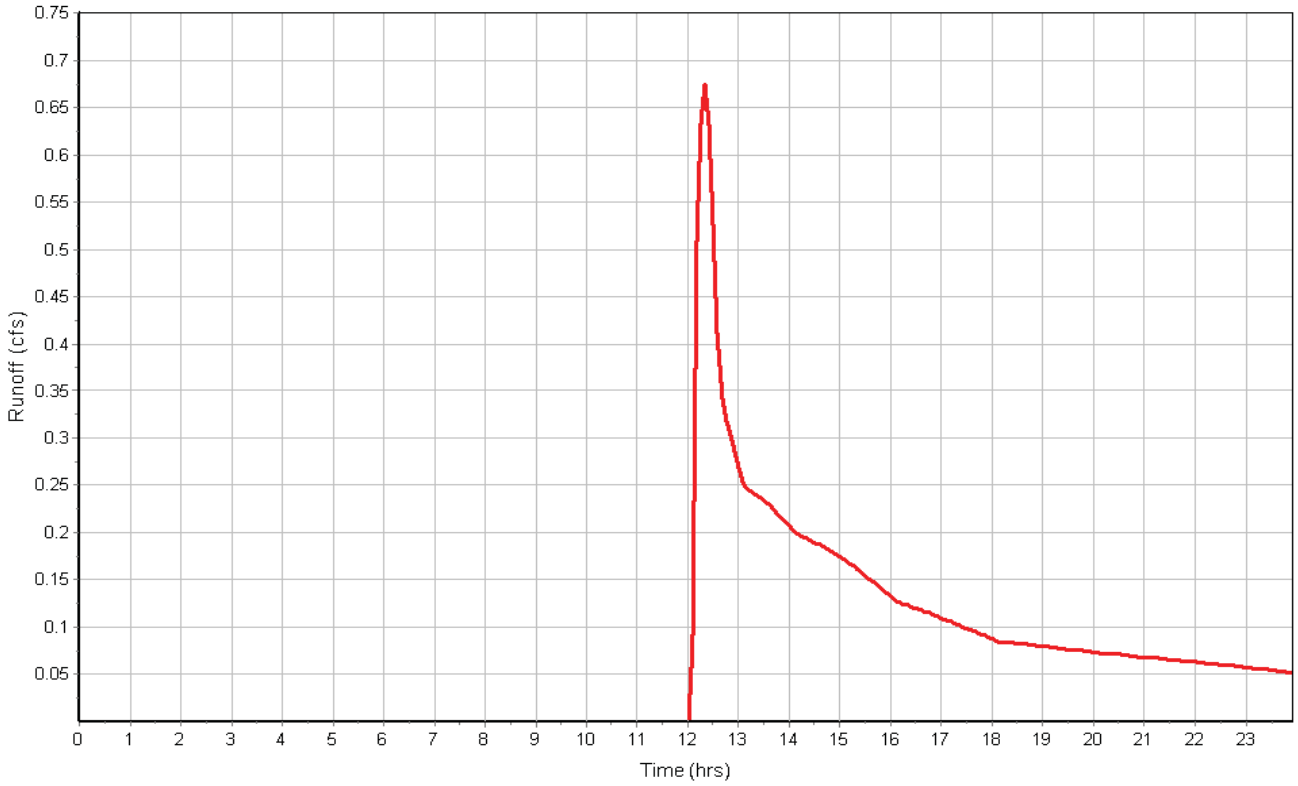
Total Rainfall (in) 3.24
Total Runoff (in) 0.27
Peak Runoff (cfs) 0.67
Weighted Curve Number 55.06
Time of Concentration (days hh:mm:ss) 0 00:08:06

Subbasin : Sub-basin B

Rainfall Intensity Graph



Runoff Hydrograph



Storage Nodes

Storage Node : Wetland 3

Input Data

Invert Elevation (ft) 748.00
Max (Rim) Elevation (ft) 754.00
Max (Rim) Offset (ft) 6.00
Initial Water Elevation (ft) 748.00
Initial Water Depth (ft) 0.00
Ponded Area (ft²) 20178.00
Evaporation Loss 0.00

Outflow Weirs

SN	Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1	Weir-B	Rectangular	No	754.00	6.00	100.00	1.00	3.33

Output Summary Results

Peak Inflow (cfs) 0.67
Peak Lateral Inflow (cfs) 0.67
Peak Outflow (cfs) 0.00
Peak Exfiltration Flow Rate (cfm) 0.00
Max HGL Elevation Attained (ft) 748.29
Max HGL Depth Attained (ft) 0.29
Average HGL Elevation Attained (ft) 748.10
Average HGL Depth Attained (ft) 0.1
Time of Max HGL Occurrence (days hh:mm) 1 00:00
Total Exfiltration Volume (1000-ft³) 0.000
Total Flooded Volume (ac-in) 0
Total Time Flooded (min) 0
Total Retention Time (sec) 0.00

Storage Node : Wetland 5

Input Data

Invert Elevation (ft) 784.00
Max (Rim) Elevation (ft) 790.00
Max (Rim) Offset (ft) 6.00
Initial Water Elevation (ft) 784.00
Initial Water Depth (ft) 0.00
Ponded Area (ft²) 72180.00
Evaporation Loss 0.00

Outflow Weirs

SN	Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1	Weir-A	Rectangular	No	790.00	6.00	100.00	1.00	3.33

Output Summary Results

Peak Inflow (cfs) 0.64
Peak Lateral Inflow (cfs) 0.64
Peak Outflow (cfs) 0.00
Peak Exfiltration Flow Rate (cfm) 0.00
Max HGL Elevation Attained (ft) 784.07
Max HGL Depth Attained (ft) 0.07
Average HGL Elevation Attained (ft) 784.03
Average HGL Depth Attained (ft) 0.03
Time of Max HGL Occurrence (days hh:mm) 1 00:00
Total Exfiltration Volume (1000-ft³) 0.000
Total Flooded Volume (ac-in) 0
Total Time Flooded (min) 0
Total Retention Time (sec) 0.00

Project Description

File Name ..... Leicester Stormwater Model-Post.SPF
Description .....
Leicester, MA Solar

Stormwater Report

Project Options

Flow Units ..... CFS
Elevation Type ..... Elevation
Hydrology Method ..... SCS TR-55
Time of Concentration (TOC) Method ..... SCS TR-55
Link Routing Method ..... Kinematic Wave
Enable Overflow Ponding at Nodes ..... YES
Skip Steady State Analysis Time Periods ... YES

Analysis Options

Start Analysis On	May 22, 2017	00:00:00
End Analysis On	May 23, 2017	00:00:00
Start Reporting On	May 22, 2017	00:00:00
Antecedent Dry Days	0	days
Runoff (Dry Weather) Time Step	0 01:00:00	days hh:mm:ss
Runoff (Wet Weather) Time Step	0 00:05:00	days hh:mm:ss
Reporting Time Step	0 00:05:00	days hh:mm:ss
Routing Time Step	30	seconds

Number of Elements

	Qty
Rain Gages	1
Subbasins.....	2
Nodes.....	4
Junctions	0
Outfalls	2
Flow Diversions	0
Inlets	0
Storage Nodes	2
Links.....	2
Channels	0
Pipes	0
Pumps	0
Orifices	0
Weirs	2
Outlets	0
Pollutants	0
Land Uses	0

Rainfall Details

SN	Rain Gage ID	Data Source	Data Source ID	Rainfall Type	Rain Units	State	County	Return Period (years)	Rainfall Depth (inches)	Rainfall Distribution
1	Leicester	Time Series	10-year	Cumulative	inches	Massachusetts	Worcester	10	4.86	SCS Type III 24-hr

Subbasin Summary

SN	Subbasin ID	Area (ac)	Weighted Curve Number	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
1	Sub-basin A	5.36	55.47	4.86	0.94	5.03	4.11	0 00:09:06
2	Sub-basin B	6.05	55.06	4.86	0.92	5.54	4.61	0 00:08:06

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft^2)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	Out-A	Outfall	761.00					0.00	761.00					
2	Out-B	Outfall	741.00					0.00	741.00					
3	Wetland 3	Storage Node	748.00	754.00	748.00		20178.00	4.51	748.99				0.00	0.00
4	Wetland 5	Storage Node	784.00	790.00	784.00		72180.00	4.09	784.25				0.00	0.00

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length (ft)	Inlet Invert Elevation (ft)	Outlet Invert Elevation (ft)	Average Slope (%)	Diameter or Height (in)	Manning's Roughness	Peak Flow (cfs)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged (min)	Reported Condition
1	Weir-A	Weir	Wetland 5	Out-A		784.00	761.00				0.00							
2	Weir-B	Weir	Wetland 3	Out-B		748.00	741.00				0.00							

Subbasin Hydrology

Subbasin : Sub-basin A

Input Data

Area (ac) 5.36
Weighted Curve Number 55.47
Rain Gage ID ..... Leicester

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Gravel roads	0.06	B	85.00
Woods, Good	0.00	B	55.00
Brush, Good	1.65	B	48.00
Meadow, non-grazed	3.62	B	58.00
Ground Screws	0.03	B	98.00
Composite Area & Weighted CN	5.36		55.47

Time of Concentration

TOC Method : SCS TR-55

Sheet Flow Equation :

Tc = (0.007 * ((n * Lf)^0.8)) / ((P^0.5) * (Sf^0.4))

Where :

Tc = Time of Concentration (hr)
n = Manning's roughness
Lf = Flow Length (ft)
P = 2 yr, 24 hr Rainfall (inches)
Sf = Slope (ft/ft)

Shallow Concentrated Flow Equation :

V = 16.1345 * (Sf^0.5) (unpaved surface)
V = 20.3282 * (Sf^0.5) (paved surface)
V = 15.0 * (Sf^0.5) (grassed waterway surface)
V = 10.0 * (Sf^0.5) (nearly bare & untilled surface)
V = 9.0 * (Sf^0.5) (cultivated straight rows surface)
V = 7.0 * (Sf^0.5) (short grass pasture surface)
V = 5.0 * (Sf^0.5) (woodland surface)
V = 2.5 * (Sf^0.5) (forest w/heavy litter surface)
Tc = (Lf / V) / (3600 sec/hr)

Where:

Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)

Channel Flow Equation :

V = (1.49 * (R^(2/3)) * (Sf^0.5)) / n
R = Aq / Wp
Tc = (Lf / V) / (3600 sec/hr)

Where :

Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
R = Hydraulic Radius (ft)
Aq = Flow Area (ft²)
Wp = Wetted Perimeter (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)
n = Manning's roughness

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	.4	0.00	0.00
Flow Length (ft) :	100	0.00	0.00
Slope (%) :	4	0.00	0.00
2 yr, 24 hr Rainfall (in) :	3.24	0.00	0.00
Velocity (ft/sec) :	0.10	0.00	0.00
Computed Flow Time (min) :	16.17	0.00	0.00

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	60	214	0.00
Slope (%) :	11	12.5	0.00
Surface Type :	Woodland	Grass pasture	Unpaved
Velocity (ft/sec) :	1.66	2.47	0.00
Computed Flow Time (min) :	0.60	1.44	0.00

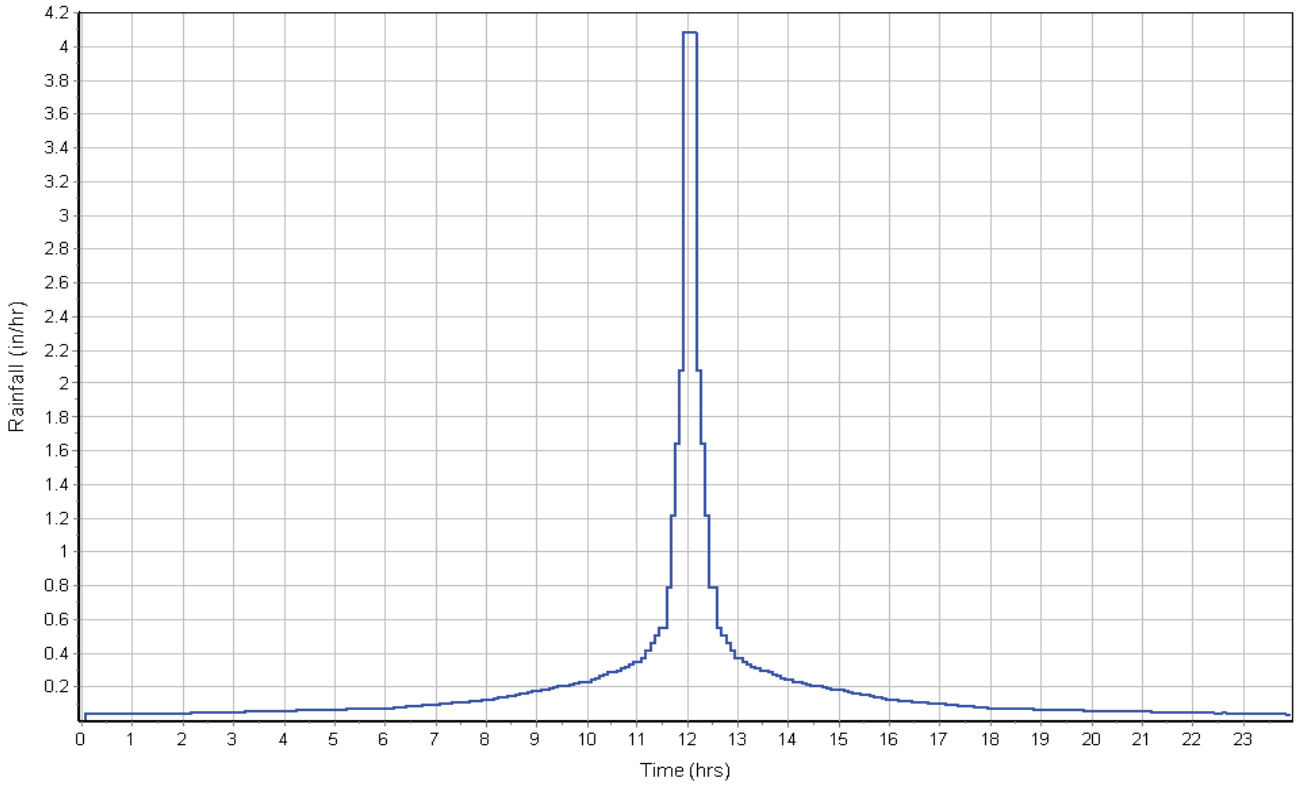
Total TOC (min) 9.11

Subbasin Runoff Results

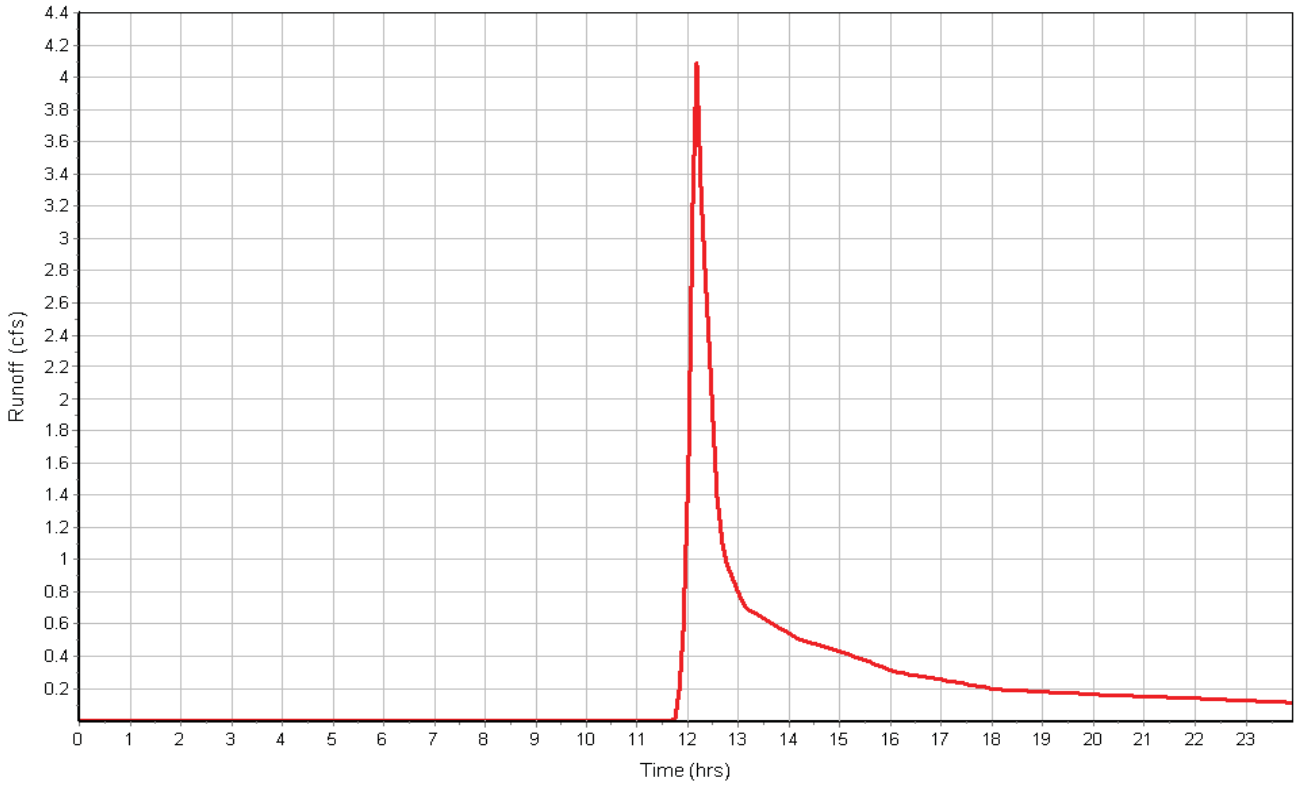
Total Rainfall (in)	4.86
Total Runoff (in)	0.94
Peak Runoff (cfs)	4.11
Weighted Curve Number	55.47
Time of Concentration (days hh:mm:ss)	0 00:09:07

Subbasin : Sub-basin A

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : Sub-basin B

Input Data

Area (ac) 6.05
Weighted Curve Number 55.06
Rain Gage ID ..... Leicester

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Gravel roads	0.35	B	85.00
Woods, Good	0.00	B	55.00
Brush, Good	2.73	B	48.00
Meadow, non-grazed	2.97	B	58.00
Ground Screws	0.00	B	98.00
Composite Area & Weighted CN	6.05		55.06

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	.4	0.00	0.00
Flow Length (ft) :	100	0.00	0.00
Slope (%) :	7	0.00	0.00
2 yr, 24 hr Rainfall (in) :	3.24	0.00	0.00
Velocity (ft/sec) :	0.13	0.00	0.00
Computed Flow Time (min) :	12.93	0.00	0.00

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	213	236	0.00
Slope (%) :	14.5	16	0.00
Surface Type :	Woodland	Grass pasture	Unpaved
Velocity (ft/sec) :	1.90	2.80	0.00
Computed Flow Time (min) :	1.87	1.40	0.00

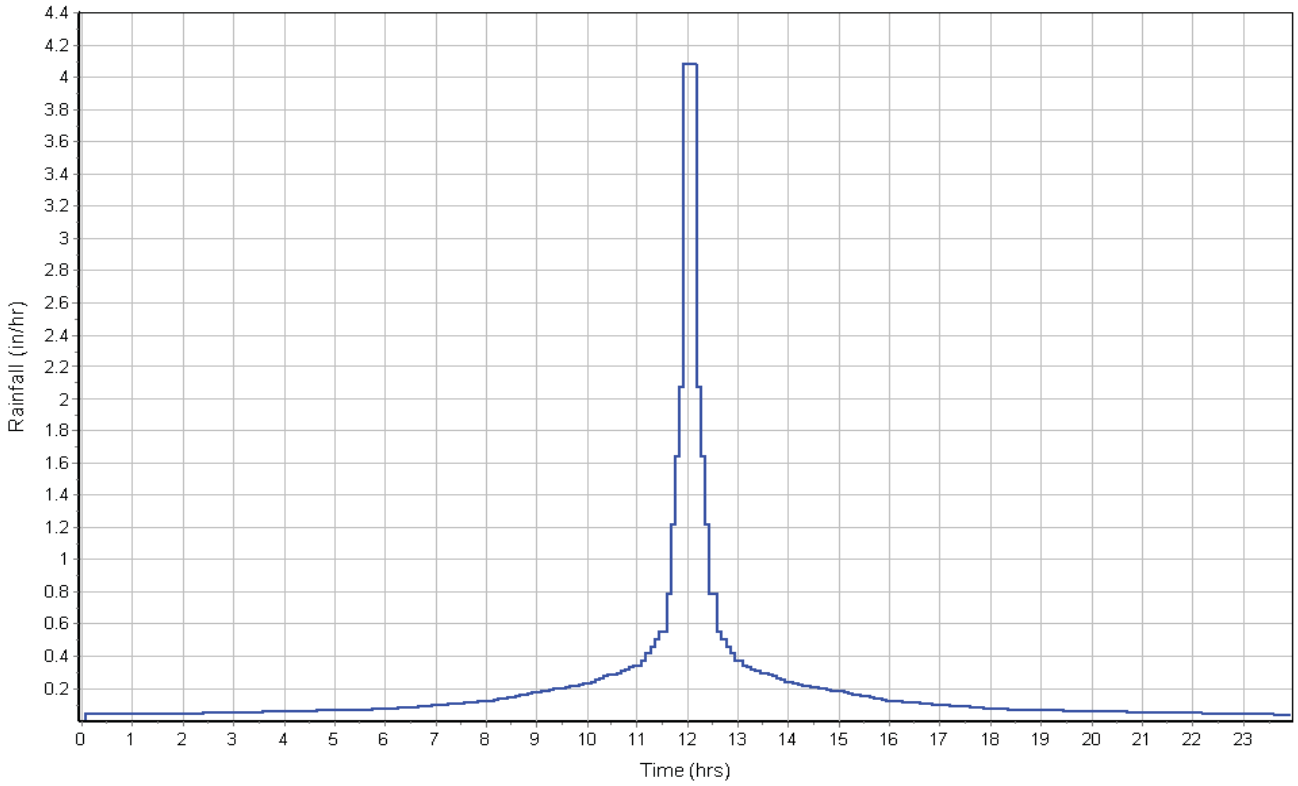
Total TOC (min) 8.10

Subbasin Runoff Results

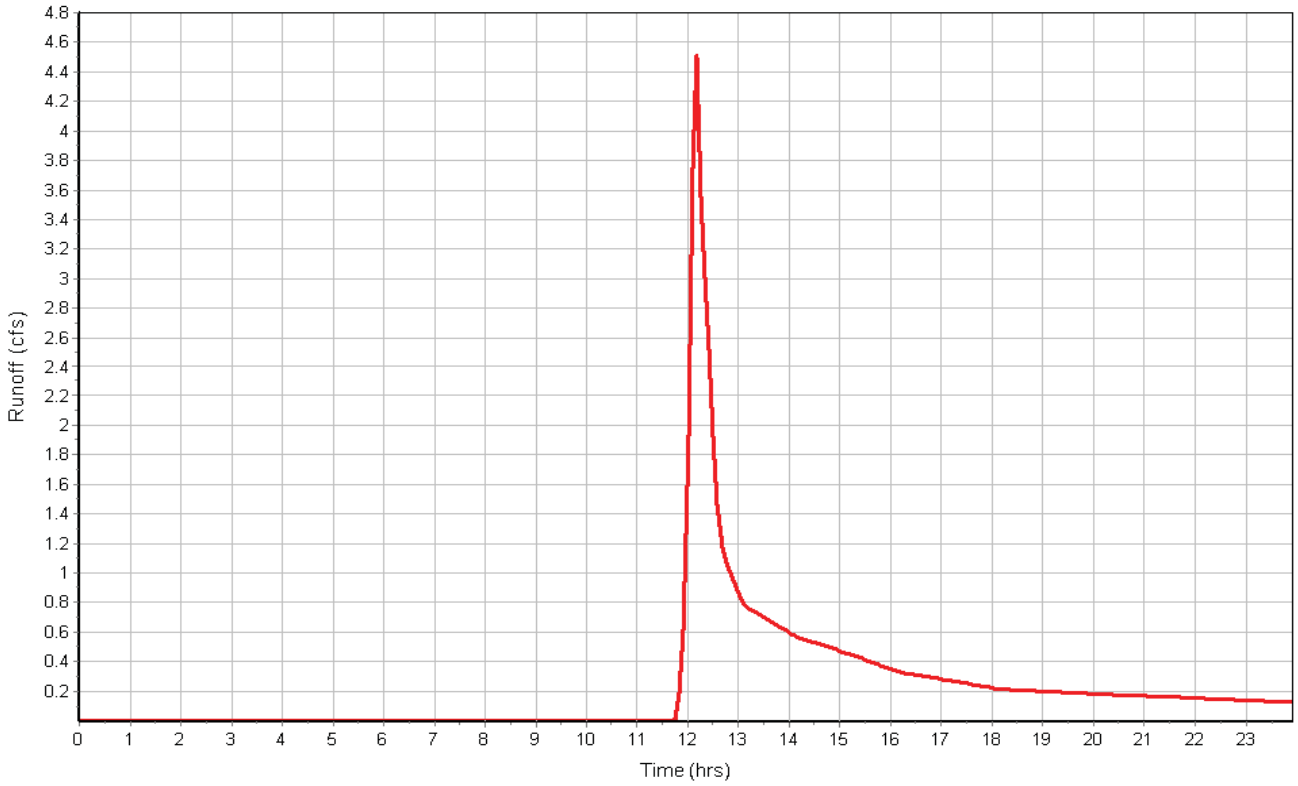
Total Rainfall (in) 4.86
Total Runoff (in) 0.92
Peak Runoff (cfs) 4.61
Weighted Curve Number 55.06
Time of Concentration (days hh:mm:ss) 0 00:08:06

Subbasin : Sub-basin B

Rainfall Intensity Graph



Runoff Hydrograph



Storage Nodes

Storage Node : Wetland 3

Input Data

Invert Elevation (ft) 748.00
Max (Rim) Elevation (ft) 754.00
Max (Rim) Offset (ft) 6.00
Initial Water Elevation (ft) 748.00
Initial Water Depth (ft) 0.00
Ponded Area (ft²) 20178.00
Evaporation Loss 0.00

Outflow Weirs

SN	Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1	Weir-B	Rectangular	No	754.00	6.00	100.00	1.00	3.33

Output Summary Results

Peak Inflow (cfs) 4.51
Peak Lateral Inflow (cfs) 4.51
Peak Outflow (cfs) 0.00
Peak Exfiltration Flow Rate (cfm) 0.00
Max HGL Elevation Attained (ft) 748.99
Max HGL Depth Attained (ft) 0.99
Average HGL Elevation Attained (ft) 748.37
Average HGL Depth Attained (ft) 0.37
Time of Max HGL Occurrence (days hh:mm) 1 00:00
Total Exfiltration Volume (1000-ft³) 0.000
Total Flooded Volume (ac-in) 0
Total Time Flooded (min) 0
Total Retention Time (sec) 0.00

Storage Node : Wetland 5

Input Data

Invert Elevation (ft) 784.00
Max (Rim) Elevation (ft) 790.00
Max (Rim) Offset (ft) 6.00
Initial Water Elevation (ft) 784.00
Initial Water Depth (ft) 0.00
Ponded Area (ft²) 72180.00
Evaporation Loss 0.00

Outflow Weirs

SN	Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1	Weir-A	Rectangular	No	790.00	6.00	100.00	1.00	3.33

Output Summary Results

Peak Inflow (cfs) 4.09
Peak Lateral Inflow (cfs) 4.09
Peak Outflow (cfs) 0.00
Peak Exfiltration Flow Rate (cfm) 0.00
Max HGL Elevation Attained (ft) 784.25
Max HGL Depth Attained (ft) 0.25
Average HGL Elevation Attained (ft) 784.09
Average HGL Depth Attained (ft) 0.09
Time of Max HGL Occurrence (days hh:mm) 1 00:00
Total Exfiltration Volume (1000-ft³) 0.000
Total Flooded Volume (ac-in) 0
Total Time Flooded (min) 0
Total Retention Time (sec) 0.00

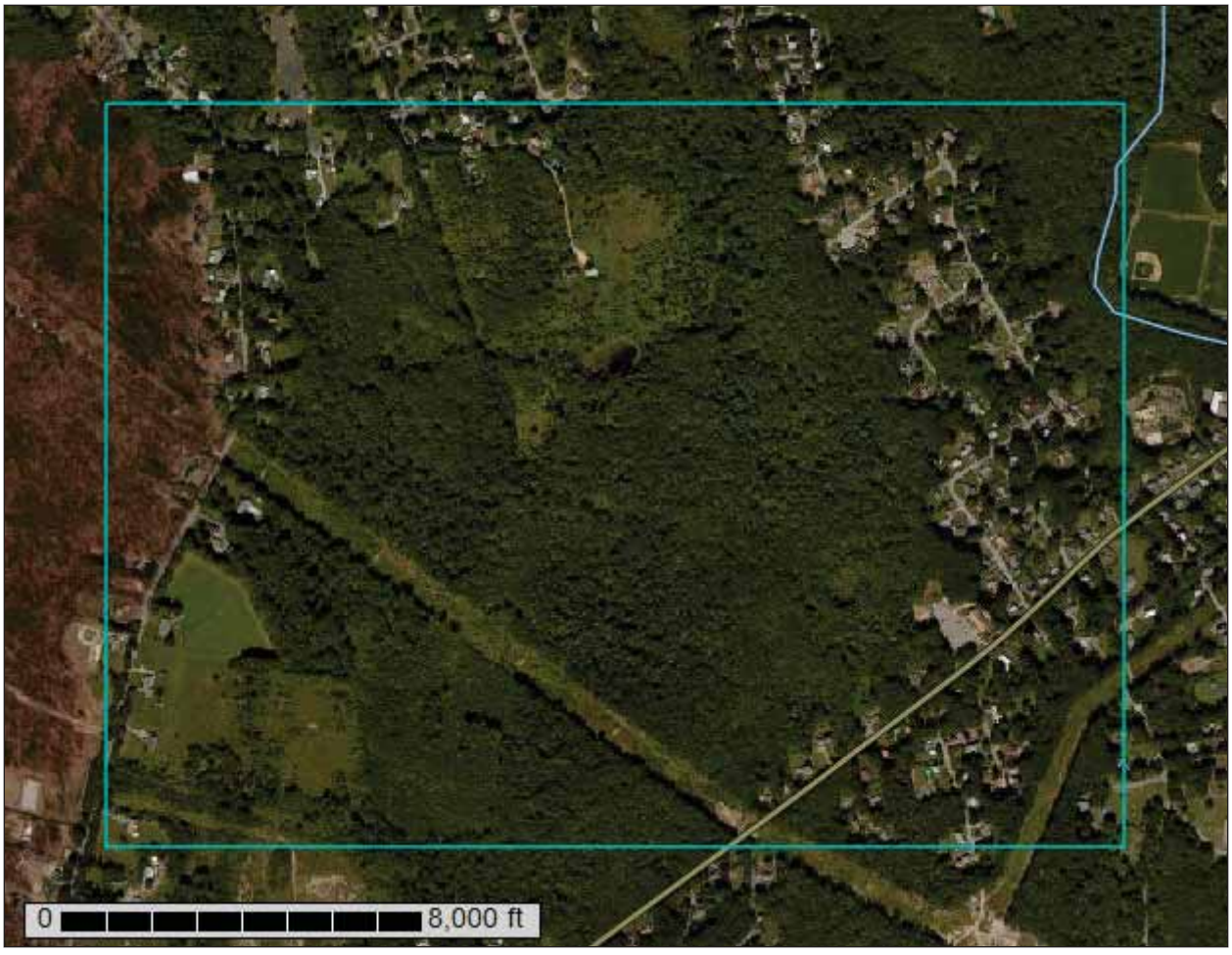
United States Department of Agriculture

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, Northeastern Part; and Worcester County, Massachusetts, Southern Part

Stafford St, Leicester, MA



May 22, 2017

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: 1:9,680 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 100 200 400 600

Feet: 0 450 900 1800 2700

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 scales ranging from 1:20,000 to 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, Northeastern Part
Survey Area Data: Version 11, Sep 14, 2016

Soil Survey Area: Worcester County, Massachusetts, Southern Part
Survey Area Data: Version 9, Sep 15, 2016

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil

MAP LEGEND

MAP INFORMATION

properties, and interpretations that do not completely agree across soil survey area boundaries.

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

Date(s) aerial images were photographed: Apr 8, 2011—Sep 28, 2014

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

Map Unit Legend

Worcester County, Massachusetts, Northeastern Part (MA613)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
71A	Ridgebury fine sandy loam, 0 to 3 percent slopes, extremely stony	4.0	0.9%
102C	Chatfield-Hollis-Rock outcrop complex, 0 to 15 percent slopes	0.2	0.0%
254A	Merrimac fine sandy loam, 0 to 3 percent slopes	0.1	0.0%
420B	Canton fine sandy loam, 3 to 8 percent slopes	0.9	0.2%
422C	Canton fine sandy loam, 8 to 15 percent slopes, extremely stony	2.2	0.5%
422D	Canton fine sandy loam, 15 to 35 percent slopes, extremely stony	4.2	0.9%
Subtotals for Soil Survey Area		**11.5**	**2.6%**
Totals for Area of Interest		**445.5**	**100.0%**

Worcester County, Massachusetts, Southern Part (MA615)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
1	Water	0.5	0.1%
51A	Swansea muck, 0 to 1 percent slopes	1.0	0.2%
71A	Ridgebury fine sandy loam, 0 to 3 percent slopes, extremely stony	5.6	1.3%
71B	Ridgebury fine sandy loam, 3 to 8 percent slopes, extremely stony	15.0	3.4%
73A	Whitman fine sandy loam, 0 to 3 percent slopes, extremely stony	22.9	5.1%
102C	Chatfield-Hollis-Rock outcrop complex, 0 to 15 percent slopes	9.7	2.2%
305B	Paxton fine sandy loam, 3 to 8 percent slopes	34.9	7.8%
305C	Paxton fine sandy loam, 8 to 15 percent slopes	22.7	5.1%
307C	Paxton fine sandy loam, 8 to 15 percent slopes, extremely stony	3.3	0.7%

Worcester County, Massachusetts, Southern Part (MA615)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
307E	Paxton fine sandy loam, 15 to 35 percent slopes, extremely stony	24.6	5.5%
420B	Canton fine sandy loam, 3 to 8 percent slopes	100.3	22.5%
420C	Canton fine sandy loam, 8 to 15 percent slopes	20.6	4.6%
422B	Canton fine sandy loam, 0 to 8 percent slopes, extremely stony	131.7	29.6%
422C	Canton fine sandy loam, 8 to 15 percent slopes, extremely stony	39.6	8.9%
422E	Canton fine sandy loam, 15 to 35 percent slopes, extremely stony	1.5	0.3%
Subtotals for Soil Survey Area		**434.0**	**97.4%**
Totals for Area of Interest		**445.5**	**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, Northeastern Part

71A—Ridgebury fine sandy loam, 0 to 3 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2w69b
Elevation: 0 to 1,480 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Ridgebury, extremely stony, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ridgebury, Extremely Stony

Setting

Landform: Depressions, ground moraines, drumlins, drainageways, hills
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Head slope, 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

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

Properties and qualities

Slope: 0 to 3 percent
Percent of area covered with surface fragments: 9.0 percent
Depth to restrictive feature: 15 to 35 inches to densic material
Natural drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Low (about 3.0 inches)

Interpretive groups

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

Minor Components

Woodbridge, extremely stony
Percent of map unit: 7 percent
Landform: Ground moraines, drumlins, hills
Landform position (two-dimensional): Footslope, summit
Landform position (three-dimensional): Crest, base slope
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Whitman, extremely stony
Percent of map unit: 7 percent
Landform: Depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Paxton, extremely stony
Percent of map unit: 1 percent
Landform: Ground moraines, drumlins, hills
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Linear, convex
Across-slope shape: Convex, linear
Hydric soil rating: No

102C—Chatfield-Hollis-Rock outcrop complex, 0 to 15 percent slopes

Map Unit Setting
National map unit symbol: 2w69g
Elevation: 0 to 1,540 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition
Chatfield, extremely stony, and similar soils: 39 percent
Hollis, extremely stony, and similar soils: 26 percent
Rock outcrop: 17 percent
Minor components: 18 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Chatfield, Extremely Stony

Setting
Landform: Ridges, hills
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Crest, side slope, nose slope

Down-slope shape: Convex
Across-slope shape: Linear, convex
Parent material: Coarse-loamy melt-out till derived from granite, gneiss, and/or schist

Typical profile

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

Properties and qualities

Slope: 0 to 15 percent
Percent of area covered with surface fragments: 9.0 percent
Depth to restrictive feature: 20 to 41 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Low (about 4.3 inches)

Interpretive groups

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

Description of Hollis, Extremely Stony

Setting

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

Typical profile

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

Properties and qualities

Slope: 0 to 15 percent
Percent of area covered with surface fragments: 9.0 percent
Depth to restrictive feature: 8 to 23 inches to lithic bedrock
Natural drainage class: Somewhat excessively drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)

Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Very low (about 2.7 inches)

Interpretive groups

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

Description of Rock Outcrop

Setting

Parent material: Igneous and metamorphic rock

Properties and qualities

Slope: 0 to 15 percent
Depth to restrictive feature: 0 inches to lithic bedrock
Runoff class: Very high

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Charlton, extremely stony

Percent of map unit: 12 percent
Landform: Ridges, hills
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Crest, side slope
Down-slope shape: Linear, convex
Across-slope shape: Convex
Hydric soil rating: No

Sutton, extremely stony

Percent of map unit: 3 percent
Landform: Ground moraines, hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Paxton, extremely stony

Percent of map unit: 2 percent
Landform: Ground moraines, drumlins, hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Hydric soil rating: No

Leicester, extremely stony

Percent of map unit: 1 percent
Landform: Depressions, ground moraines, drainageways, hills
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear, concave
Across-slope shape: Concave
Hydric soil rating: Yes

254A—Merrimac fine sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2tyqr
Elevation: 0 to 1,100 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

Merrimac and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Merrimac

Setting

Landform: Outwash plains, kames, eskers, outwash terraces, moraines
Landform position (two-dimensional): Backslope, footslope, shoulder, summit
Landform position (three-dimensional): Side slope, crest, riser, tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy glaciofluvial deposits derived from granite, schist, and gneiss over sandy and gravelly glaciofluvial deposits derived from granite, schist, and gneiss

Typical profile

Ap - 0 to 10 inches: fine sandy loam
Bw1 - 10 to 22 inches: fine sandy loam
Bw2 - 22 to 26 inches: stratified gravel to gravelly loamy sand
2C - 26 to 65 inches: stratified gravel to very gravelly sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Runoff class: Very low

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline (0.0 to 1.4 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 1.0
Available water storage in profile: Low (about 4.6 inches)

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

Minor Components

Sudbury
Percent of map unit: 5 percent
Landform: Deltas, outwash plains, terraces
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Hinckley
Percent of map unit: 5 percent
Landform: Deltas, outwash plains, kames, eskers
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Nose slope, side slope, crest, head slope, rise
Down-slope shape: Convex
Across-slope shape: Convex, linear
Hydric soil rating: No

Agawam
Percent of map unit: 3 percent
Landform: Kames, eskers, outwash terraces, moraines, outwash plains, stream terraces
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Windsor
Percent of map unit: 2 percent
Landform: Deltas, dunes, outwash plains, outwash terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Riser, tread
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex
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: Ridges, hills, moraines
Landform position (two-dimensional): Backslope, summit, shoulder
Landform position (three-dimensional): Side slope, crest, nose slope
Down-slope shape: Convex, linear
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: Ground moraines, drumlins, hills, moraines
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Crest, side slope
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: Depressions, bogs, marshes, kettles, swamps
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

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: Ridges, hills, moraines
Landform position (two-dimensional): Summit, backslope, shoulder
Landform position (three-dimensional): Side slope, crest, nose slope
Down-slope shape: Convex, linear
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 to very slightly saline (0.0 to 2.0 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

Montauk, extremely stony

Percent of map unit: 5 percent
Landform: Ground moraines, drumlins, recessionial moraines, hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope

Down-slope shape: Linear, convex
Across-slope shape: Convex
Hydric soil rating: No

Charlton, extremely stony

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

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

422D—Canton fine sandy loam, 15 to 35 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2w81j
Elevation: 0 to 1,340 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: Ridges, hills, moraines
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Side slope, crest, nose slope
Down-slope shape: Convex, linear
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: 15 to 35 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: Medium
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 to very slightly saline (0.0 to 2.0 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

Montauk, extremely stony

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

Charlton, extremely stony

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

Hollis, extremely stony

Percent of map unit: 4 percent
Landform: Ridges, hills
Landform position (two-dimensional): Shoulder, backslope, summit
Landform position (three-dimensional): Crest, side slope, nose slope
Down-slope shape: Convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Scituate, extremely stony

Percent of map unit: 4 percent

Landform: Ground moraines, drumlins, hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear, convex
Across-slope shape: Convex
Hydric soil rating: No

Worcester County, Massachusetts, Southern Part

1—Water

Map Unit Setting

National map unit symbol: 9bgp
Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 145 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Water

Setting

Landform: Lakes

51A—Swansea muck, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2trl2
Elevation: 0 to 1,140 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: Farmland of unique importance

Map Unit Composition

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

Description of Swansea

Setting

Landform: Bogs, swamps
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Highly decomposed organic material over loose sandy and gravelly glaciofluvial deposits

Typical profile

Oa1 - 0 to 24 inches: muck
Oa2 - 24 to 34 inches: muck
Cg - 34 to 79 inches: coarse sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Very poorly drained
Runoff class: Negligible
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: About 0 to 6 inches
Frequency of flooding: Rare
Frequency of ponding: Frequent
Available water storage in profile: Very high (about 16.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8w
Hydrologic Soil Group: B/D
Hydric soil rating: Yes

Minor Components

Freetown

Percent of map unit: 10 percent
Landform: Bogs, swamps
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Whitman

Percent of map unit: 5 percent
Landform: Depressions, drainageways
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Scarboro

Percent of map unit: 5 percent
Landform: Depressions, drainageways
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope, tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

71A—Ridgebury fine sandy loam, 0 to 3 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2w69b

Elevation: 0 to 1,480 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Ridgebury, extremely stony, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ridgebury, Extremely Stony

Setting

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

Typical profile

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

Properties and qualities

Slope: 0 to 3 percent
Percent of area covered with surface fragments: 9.0 percent
Depth to restrictive feature: 15 to 35 inches to densic material
Natural drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Low (about 3.0 inches)

Interpretive groups

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

Minor Components

Woodbridge, extremely stony

Percent of map unit: 7 percent
Landform: Drumlins, ground moraines, hills
Landform position (two-dimensional): Footslope, summit
Landform position (three-dimensional): Crest, base slope

Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Whitman, extremely stony

Percent of map unit: 7 percent
Landform: Depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Paxton, extremely stony

Percent of map unit: 1 percent
Landform: Drumlins, ground moraines, hills
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Crest
Down-slope shape: Linear, convex
Across-slope shape: Convex, linear
Hydric soil rating: No

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

Map Unit Setting

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

Map Unit Composition

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

Description of Ridgebury, Extremely Stony

Setting

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

Typical profile

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

Cd - 19 to 66 inches: gravelly sandy loam

Properties and qualities

Slope: 3 to 8 percent
Percent of area covered with surface fragments: 9.0 percent
Depth to restrictive feature: 15 to 35 inches to densic material
Natural drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Low (about 3.0 inches)

Interpretive groups

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

Minor Components

Woodbridge, extremely stony

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

Whitman, extremely stony

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

Paxton, extremely stony

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

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: Depressions, drumlins, ground moraines, drainageways, hills
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 to very slightly saline (0.0 to 2.0 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: Depressions, drumlins, ground moraines, drainageways, hills
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: Depressions, outwash terraces, drainageways, outwash deltas
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: Bogs, marshes, swamps
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

102C—Chatfield-Hollis-Rock outcrop complex, 0 to 15 percent slopes

Map Unit Setting
National map unit symbol: 2w69g
Elevation: 0 to 1,540 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition
Chatfield, extremely stony, and similar soils: 39 percent
Hollis, extremely stony, and similar soils: 26 percent

Rock outcrop: 17 percent
Minor components: 18 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Chatfield, Extremely Stony

Setting

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

Typical profile

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

Properties and qualities

Slope: 0 to 15 percent
Percent of area covered with surface fragments: 9.0 percent
Depth to restrictive feature: 20 to 41 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Low (about 4.3 inches)

Interpretive groups

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

Description of Hollis, Extremely Stony

Setting

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

Typical profile

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

2R - 16 to 26 inches: bedrock

Properties and qualities

Slope: 0 to 15 percent
Percent of area covered with surface fragments: 9.0 percent
Depth to restrictive feature: 8 to 23 inches to lithic bedrock
Natural drainage class: Somewhat excessively drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Very low (about 2.7 inches)

Interpretive groups

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

Description of Rock Outcrop

Setting

Parent material: Igneous and metamorphic rock

Properties and qualities

Slope: 0 to 15 percent
Depth to restrictive feature: 0 inches to lithic bedrock
Runoff class: Very high

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Charlton, extremely stony

Percent of map unit: 12 percent
Landform: Ridges, hills
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Crest, side slope
Down-slope shape: Linear, convex
Across-slope shape: Convex
Hydric soil rating: No

Sutton, extremely stony

Percent of map unit: 3 percent
Landform: Ground moraines, hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Paxton, extremely stony

Percent of map unit: 2 percent
Landform: Drumlins, ground moraines, hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Hydric soil rating: No

Leicester, extremely stony

Percent of map unit: 1 percent
Landform: Depressions, ground moraines, drainageways, hills
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear, concave
Across-slope shape: Concave
Hydric soil rating: Yes

305B—Paxton fine sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2t2qp
Elevation: 0 to 1,570 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

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

Description of Paxton

Setting

Landform: Drumlins, ground moraines, hills
Landform position (two-dimensional): Backslope, summit, shoulder
Landform position (three-dimensional): Side slope, crest, nose slope
Down-slope shape: Linear, convex
Across-slope shape: Convex
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Ap - 0 to 8 inches: fine sandy loam
Bw1 - 8 to 15 inches: fine sandy loam

Bw2 - 15 to 26 inches: fine sandy loam
Cd - 26 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 18 to 39 inches to densic material
Natural drainage class: Well drained
Runoff class: Medium
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 18 to 37 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Low (about 3.1 inches)

Interpretive groups

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

Minor Components

Woodbridge

Percent of map unit: 9 percent
Landform: Drumlins, ground moraines, hills
Landform position (two-dimensional): Backslope, footslope, summit
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Ridgebury

Percent of map unit: 6 percent
Landform: Depressions, ground moraines, drainageways, hills
Landform position (two-dimensional): Toeslope, backslope, footslope
Landform position (three-dimensional): Base slope, head slope, dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Charlton

Percent of map unit: 5 percent
Landform: Hills
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

305C—Paxton fine sandy loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2w66y
Elevation: 0 to 1,320 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Paxton and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Paxton

Setting

Landform: Drumlins, ground moraines, hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear, convex
Across-slope shape: Convex
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Ap - 0 to 8 inches: fine sandy loam
Bw1 - 8 to 15 inches: fine sandy loam
Bw2 - 15 to 26 inches: fine sandy loam
Cd - 26 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 20 to 39 inches to densic material
Natural drainage class: Well drained
Runoff class: Medium
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 18 to 37 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Low (about 4.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C

Hydric soil rating: No

Minor Components

Charlton

Percent of map unit: 7 percent
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Woodbridge

Percent of map unit: 6 percent
Landform: Drumlins, ground moraines, hills
Landform position (two-dimensional): Backslope, footslope, summit
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Ridgebury

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

307C—Paxton fine sandy loam, 8 to 15 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2w676
Elevation: 0 to 1,490 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

Paxton, extremely stony, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Paxton, Extremely Stony

Setting

Landform: Drumlins, ground moraines, hills
Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope
Down-slope shape: Linear, convex
Across-slope shape: Convex, linear
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Oe - 0 to 2 inches: moderately decomposed plant material
A - 2 to 10 inches: fine sandy loam
Bw1 - 10 to 17 inches: fine sandy loam
Bw2 - 17 to 28 inches: fine sandy loam
Cd - 28 to 67 inches: gravelly fine sandy loam

Properties and qualities

Slope: 8 to 15 percent
Percent of area covered with surface fragments: 9.0 percent
Depth to restrictive feature: 20 to 43 inches to densic material
Natural drainage class: Well drained
Runoff class: Medium
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 18 to 37 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Low (about 4.7 inches)

Interpretive groups

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

Minor Components

Charlton, extremely stony

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

Woodbridge, extremely stony

Percent of map unit: 6 percent
Landform: Drumlins, ground moraines, hills
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Ridgebury, extremely stony

Percent of map unit: 1 percent
Landform: Depressions, drumlins, ground moraines, drainageways, hills

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

307E—Paxton fine sandy loam, 15 to 35 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2w67m
Elevation: 310 to 1,130 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

Paxton, extremely stony, and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Paxton, Extremely Stony

Setting

Landform: Drumlins, ground moraines, hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear, convex
Across-slope shape: Convex, linear
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Oe - 0 to 2 inches: moderately decomposed plant material
A - 2 to 10 inches: fine sandy loam
Bw1 - 10 to 17 inches: fine sandy loam
Bw2 - 17 to 28 inches: fine sandy loam
Cd - 28 to 67 inches: gravelly fine sandy loam

Properties and qualities

Slope: 15 to 35 percent
Percent of area covered with surface fragments: 9.0 percent
Depth to restrictive feature: 20 to 43 inches to densic material
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 18 to 37 inches
Frequency of flooding: None
Frequency of ponding: None

Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Low (about 4.7 inches)

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

Minor Components

Charlton, extremely stony
Percent of map unit: 20 percent
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

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

Ridgebury, extremely stony
Percent of map unit: 1 percent
Landform: Depressions, drumlins, ground moraines, drainageways, hills
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

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: Ridges, hills, moraines
Landform position (two-dimensional): Backslope, summit, shoulder
Landform position (three-dimensional): Side slope, crest, nose slope
Down-slope shape: Convex, linear
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: Drumlins, ground moraines, hills
Landform position (two-dimensional): Footslope, backslope, summit
Landform position (three-dimensional): Crest, side slope
Down-slope shape: Linear, convex
Across-slope shape: Convex
Hydric soil rating: No

Montauk

Percent of map unit: 5 percent
Landform: Drumlins, ground moraines, hills, 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: Bogs, depressions, kettles, marshes, swamps
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

420C—Canton fine sandy loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2w817
Elevation: 0 to 1,330 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: Farmland of statewide importance

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: Ridges, hills, moraines
Landform position (two-dimensional): Backslope, summit, shoulder
Landform position (three-dimensional): Side slope, crest, nose slope
Down-slope shape: Convex, linear
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: 8 to 15 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): 3e
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Montauk

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

Scituate

Percent of map unit: 6 percent
Landform: Drumlins, ground moraines, hills
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear, convex
Across-slope shape: Convex
Hydric soil rating: No

Newfields

Percent of map unit: 4 percent
Landform: Ground moraines, hills, moraines
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

Charlton

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

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: Ridges, hills, moraines
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope, crest, nose slope
Down-slope shape: Convex, linear
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 to very slightly saline (0.0 to 2.0 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: Drumlins, ground moraines, hills
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

Montauk, extremely stony

Percent of map unit: 4 percent
Landform: Drumlins, ground moraines, recessionial moraines, hills
Landform position (two-dimensional): Backslope, summit, shoulder
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: Bogs, depressions, kettles, marshes, swamps
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

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: Ridges, hills, moraines
Landform position (two-dimensional): Summit, backslope, shoulder
Landform position (three-dimensional): Side slope, crest, nose slope
Down-slope shape: Convex, linear
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 to very slightly saline (0.0 to 2.0 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: Drumlins, ground moraines, 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

Montauk, extremely stony

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

Charlton, extremely stony

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

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

422E—Canton fine sandy loam, 15 to 35 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2w81j
Elevation: 0 to 1,340 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: Ridges, hills, moraines
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Side slope, crest, nose slope
Down-slope shape: Convex, linear
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: 15 to 35 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: Medium
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 to very slightly saline (0.0 to 2.0 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

Montauk, extremely stony

Percent of map unit: 6 percent
Landform: Drumlins, ground moraines, recessionial moraines, hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear, convex
Across-slope shape: Convex
Hydric soil rating: No

Charlton, extremely stony

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

Hollis, extremely stony

Percent of map unit: 4 percent
Landform: Ridges, hills
Landform position (two-dimensional): Shoulder, backslope, summit
Landform position (three-dimensional): Crest, side slope, nose slope

Down-slope shape: Convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Scituate, extremely stony

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

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Attachment G

Abutters List

Town of Auburn, Massachusetts

Julie A. Jacobson
Town Manager

Cynthia Cosgrove
Chief Assessor

May 9, 2017

Planning Board
List of Abutters

The following attachment is a list of Abutters to the property identified. An abutter 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 300 feet of the property line as they appear on the most recent tax maps and list in the Town Of Auburn.

These are the Auburn, Ma abutters to the parcel located at the address below as determined by the assessor's office from information submitted by the applicant.

Map: 34 Parcel: 3 LEICESTER, MA

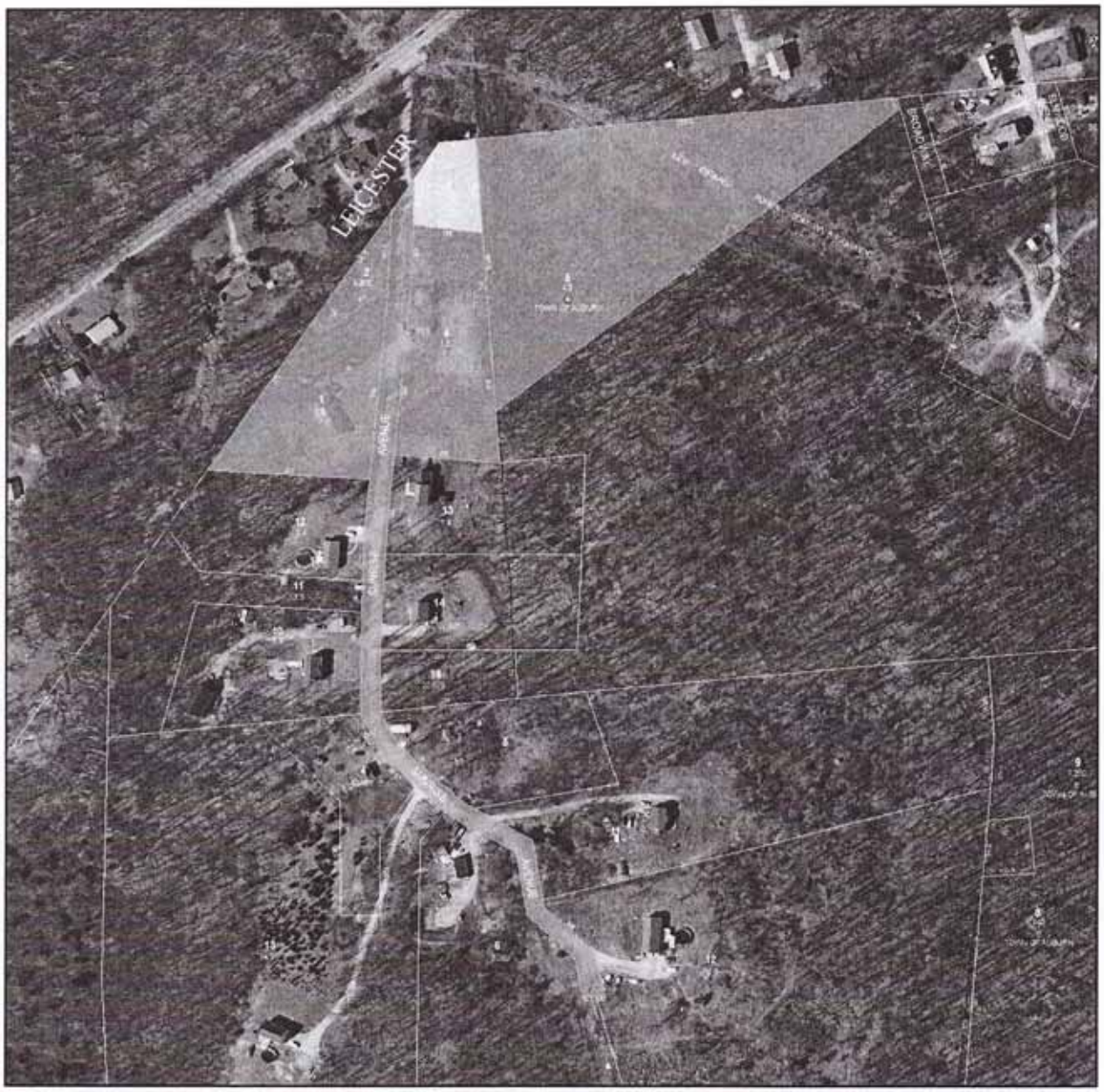
Location: 0 Stafford Street, Leicester, MA

Assessed to:

Signature: _____ Date: 5/9/17

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

0 Stafford Street Leicester, MA



Planning Department

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

2/ 1/ / /
HUYGHUE WINTHROP III
6 SUNRISE AVE
AUBURN, MA 01501

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

Abutters Report

Abutters

ACCOUNT NUMBER	OWNER NAME	LOCATION
0000087	HUYGHUE WINTHROP III	6 SUNRISE AVE
0000088	OSOWSKA KRYSTYNA	4 SUNRISE AVE
0000089	LAFLAMME RONALD W	3 SUNRISE AVE
0000090	BOROWY QUINN	5 SUNRISE AVE
0000091	AUBURN TOWN OF	SUMMER ST

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 TOBIN RD	SCOLA KERRY		25 BARNES AVENUE	WORCESTER	MA	01605
33B C7 0	30 TOBIN RD	BERGIN FRANCIS A		30 TOBIN RD	CHERRY VALLEY	MA	01611
34 A1.1 0	STAFFORD ST	NEW ENGLAND POWER CO	ATTN: PROPERTY TAX DEP	40 SYLVAN ROAD	WALTHAM	MA	02451
34 A1.2 0	464 STAFFORD ST	HOEKSTRA MARY E		464 STAFFORD STREET	CHERRY VALLEY	MA	01611
34 A1.3 0	466 STAFFORD ST	MARTIROS MICHAEL J		12 SHELTER RIDGE RD	LEICESTER	MA	01524
34 A2 0	462 STAFFORD ST	MARENGO JOHN	MARENGO JEAN A	462 STAFFORD ST	CHERRY VALLEY	MA	01611
34 A4 0	402 STAFFORD ST	MCCUE NANCY M		402 STAFFORD ST	CHERRY VALLEY	MA	01611
34 A5 0	398 STAFFORD ST	WILSON EARL G	WILSON JACQUELINE J	24 DOLGE COURT	CHARLTON	MA	01507
34 A6 0	392 STAFFORD ST	FLAGG ARTHUR C	FLAGG BARBARA A	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	MELVIN ROBIN C		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	AUDETTE IRENE A		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	SOUTHWEST HOLDINGS LTD	C/O ROBERT W RICHARD	SUITE 255	NAPLES	FL	34119-3956
34B A1 0	417 STAFFORD ST	GORSKI RICHARD A JR	GORSKI LESLEY E	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 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

End of Report

PLEASTE 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: Stafford Street, Assessors Map 34-A3-0, Deed Ref. N/A
Subject owner(s): New England Power Co.

John Prescott, Principal Assessor

Prepared by: Kathleen Asquith, Assistant