



June 14, 2022

Ref: 42893.00

Mr. Eric Virkler
Director of Commercial Solar
Earthlight Technologies
192 West Road
Ellington, Connecticut 06029

Re: Wetland and Watercourse Delineation Report
Proposed ± 3 MW-AC Solar Project
Property ID Nos. 017/009; 018/013; and Portion of No. 018/011
1 Hamilton Road, Windsor Locks, Connecticut 06096

Dear Mr. Virkler,

At your request, Vanasse Hangen Brustlin, Inc. (VHB) completed an on-site investigation to delineate the limits of inland wetlands and watercourses on a portion of the Collins Aerospace facility property at 1 Hamilton Road, Windsor Locks, Connecticut (**Figure 1**). The limit of investigation and the delineation are depicted on **Figure 2** with recent aerial imagery as the background (Herein referred to as, 'Project Area'). The delineation, and this report, are specific to the approximately 50 acre Project Area within the ± 267 -acre property. The delineation was conducted pursuant to the Connecticut Inland Wetlands and Watercourse Act. This report includes descriptions of site conditions, photographic documentation of the site conditions (**Appendix A**), and a map displaying the inland wetlands delineated within the Study Area.

BACKGROUND AND DUE DILIGENCE

Before visiting the Project Area, VHB performed a desktop review to evaluate existing conditions. Sources reviewed included the U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) Web Soil Survey, and CTECO Map Viewer (<http://cteco.uconn.edu/viewers/index.htm>) to view the U.S. Fish and Wildlife Service's National Wetlands Inventory (NWI) and the Connecticut Department of Energy and Environmental Protection (CTDEEP) wetlands data sets. Federal Emergency Management Agency's (FEMA) Flood Insurance Rate Maps (FIRM) were also evaluated.

The ± 50 acre Project site is accessed from Hamilton Road in the Town of Windsor Locks. The Project site contains a parking lot, an overhead electric transmission line, a groundwater treatment

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facility, and other ancillary structures accessed by unimproved roads, forest, old fields, former lagoons, and several security fence lines.

The southern limits of the Project Area abut the state highway layout for the interchange Bradley Airport Connector for approximately 0.5 miles. This interchange was constructed in a fill section that rises 20 to 30 feet above the elevation of the Project Site. Before the interchange was constructed, a segment of Rainbow Brook downstream of Hamilton Pond (west of the Project site) was channelized, mostly within the CTDOT layout and lined with concrete slabs. This channelization eliminated evidence of alluvial soils along the deeply incised segment of Rainbow Brook on and adjacent to the Project Area (Wetland 2). Rainbow Brook is conveyed through a culvert under Route 20. Rainbow Brook enters the Farmington River east of Rainbow Reservoir and west of Stevens Paper Mill Pond.

An unnamed and perhaps intermittent tributary to Rainbow Brook drains wetlands (Wetland 1) in the eastern part of the Project Area. Flow from this unnamed watercourse is conveyed south under CT Route 20 through a separate culvert. The tributary joins Rainbow Brook off-site, south of CT Route 20.

Topography, Surfaces Waters, and Soils

Most of the existing Collins Aerospace Facility was constructed on a near-level Pleistocene Farmington River Terrace (CT ECO accessed 4/9/2022) perched high above the current river valley. This terrace is cut by drainage valleys which slope south towards the Farmington River. These drainages are steep-sided and slope east or west to the bottom where the stream channel flows south. Elevations range from 163 feet above NAVD 1988 at the parking lot to 100 feet NAVD 88 along the brook in the southeasternmost part of the Project site.

As shown in **Figure 3**, the NRCS Web Soil Survey identified nine soil map units within the Project Area. Wetlands consisting of soils that are poorly, very poorly drained, or alluvial in origin were intensively mapped within the Project Area to identify the limits of inland wetlands. Typical soil descriptions can be found in **Appendix B**.

In addition to these map units from the soil survey, soils similar to the moderately well drained Pootatuck series and poorly drained Rippowam series were observed in Wetland 1. These soils are alluvial and regulated as inland wetlands.



TABLE 1: NRCS Soils Mapped Onsite:

Map Unit Symbol	NRCS Soil Map Unit	Landform	Drainage Class
13	Walpole sandy loam, 0 to 3 percent slopes	Low-lying positions in outwash terraces and plains	Poorly drained
15	Scarboro muck, 0 to 3 percent slopes	Low-lying positions in outwash terraces or plains	Very poorly drained
23A	Sudbury sandy loam, 0 to 5 percent slopes	Outwash plains	Moderately well drained
36A	Windsor loamy sand, 0 to 3 percent slopes	Sandy outwash or eolian deposits	Excessively drained
36B	Windsor loamy sand, 3 to 8 percent slopes	Sandy outwash or eolian deposits	Excessively drained
38E	Hinckley loamy sand, 15 to 45 percent slopes	Eskers, kames, outwash deltas, terraces or plains	Excessively drained
306	Udorthents-Urban land complex	Human Altered Sites	Variable
307	Urban land	Human Altered Sites	N/A
308	Udorthents, smoothed	Human Altered Site	Variable

Wetlands and Floodplains

As shown in **Figure 4**, the CTDEEP wetland dataset and the NWI identified wetlands onsite. There were no wetlands at the center or northern parts of the site. Rainbow Brook in the southwestern portion of the Project site is confined within a steep-sided constructed channel with a concrete liner. The mapped NWI wetland classifications consist of:

TABLE 2: NWI Wetland Types Mapped Onsite:

Cowardin 1979 Code	NWI Wetland Type	Onsite Location
PFO1E	Palustrine forested broad-leaved deciduous	Eastern Wetland 1
PSS1E	Palustrine scrub shrub broad-leaved deciduous	Small southeastern corner of Wetland 1
R4UB	Riverine intermittent unconsolidated bottom	Watercourses

As shown in **Figure 5**, the Federal Emergency Management Agency (FEMA) does not identify a floodplain within the Study Area.



INLAND WETLAND AND WATERCOURSE DELINEATION METHODOLOGY

VHB delineated wetlands within the Project Area on Monday, March 28 and Tuesday, March 29, 2022. Between March 24 and 25 1.16 inches of rainfall occurred over the two day period. Temperatures were below freezing during both field days, however soils were generally frost-free.

Wetlands subject to regulation under Section 404 of the Clean Water Act by the U.S. Army Corps of Engineers (USACE) were identified onsite following criteria provided in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region*. These criteria include the dominance of hydrophytic vegetation, hydric soils, and evidence of wetland hydrology.

The Connecticut Inland Wetlands and Watercourses Act (§22a-38 CGS) identifies wetlands as soils that are poorly or very poorly drained, or alluvial and/or floodplain soils. The Act also defines the term watercourses very broadly to mean rivers, streams, brooks, waterways, lakes, ponds, marshes, swamps, bogs, and all other bodies of water, natural or artificial, vernal or intermittent, public or private. Intermittent watercourses are identified by a defined permanent channel and bank and the occurrence of two or more of the following characteristics:

- Evidence of scouring or deposits of recent alluvium or detritus;
- The presence of standing or flowing water for a duration longer than a particular storm incident; and,
- The presence of hydrophytic vegetation.

FIELD VERIFIED WETLAND AND WATERCOURSE DESCRIPTIONS

As shown in **Figure 6**, two wetland areas were partially delineated either within the Project site or immediately adjacent to the Project site within the highway layout for CT Route 20. These wetlands are associated with onsite watercourses including Rainbow Brook and an unnamed tributary which may be intermittent.

TABLE 3: Wetland Area Delineated Onsite:

Wetland Area ID	Wetland and Watercourse Type	Onsite Location
WF1a	Palustrine forested, intermittent stream	Northeastern portion of Project Area
WF1b	Riverine, intermittent stream	Crossed by an inspection road
WF1c	Palustrine forested	Southeast portion of Project Area
WF2	Riverine forested	Western side of Project Aite

Wetland 1

Wetland 1 is a palustrine forested wetland associated with an unnamed headwater tributary to Rainbow Brook. This wetland is crossed by an unimproved inspection road with a culvert but was flagged as a single wetland. Soils observed in the northern part of this wetland include very poorly drained including soils belonging to the Scarboro and Timakwa series. As one progresses southward down stream along Wetland 1 the soils transition to poorly drained and some profiles reflect an alluvial origin. These soils are very similar to the Rippowam series and there are small



inclusions of the Pootatuck series on higher portions of the the alluvial terrace. Refer to the **Project Area Photograph Log** for documentation of these wetlands (**Appendix A**).

Wetland 1 was delineated by flags 1-100 to 1-124 south of the culvert and 1-200 to 1-225 north of the culvert.

Wetland 2

Wetland 2 follows the constructed channel that now confined Rainbow Brook, much of which is inside of the highway layout for CT Route 20. Much of this resource area consists of a concrete line watercourse, but some of the scoured banks and infilled channels do support vegetated wetland below the cut embankment created to reroute the streamcourse into a constructed channel. Wetland 2 was delineated by flags 2-100 to 2-140. This delineated edge is on state property after flag 2-125.

Vegetation

Table 4 provides a list of dominant plant species found within each wetland. The plant associations in Wetland 1 were similar in the northern and southern lobes. As mentioned above, wetland Wetland 2 is primarily the Rainbow Brook watercourse confined to an excavated lined channel. The limited plant association in Wetland 2 included similar species to Wetland 1.



TABLE 4: Wetland Plant Species Onsite

Trees and Saplings				
Scientific	Common	Indicator	Upland	Wetland
<i>Acer rubrum</i>	Red Maple	FAC	X	X
<i>Quercus alba</i>	White oak	FACW	-	X
<i>Pinus strobus</i>	White pine	FACU	X	-
<i>Pinus rigida</i>	Pitch pine	FACU	X	-
Shrubs / Herbaceous Plants				
Scientific	Common	Indicator	Upland	Wetland
<i>Ilex verticillata</i>	Winterberry	FACW	-	X
<i>Vaccinium corymbosum</i>	Highbush blueberry	FACW	-	X
<i>Lindera benzoin</i>	Spicebush	FACW	-	X
<i>Rosa multiflora</i>	Multiflora rose	FACU	X	X
<i>Onoclea sensibilis</i>	Sensitive Fern	FACW	-	X
<i>Symplocarpus foetidus</i>	Skunk cabbage	OBL	-	X
<i>Osmundastrum cinnamomeum</i>	Cinnamon fern	FACW	-	X
<i>Rubus hispidus</i>	Bristly dewberry	FACW	-	X
<i>Poa sp.</i>	Grass	FAC	X	X
<i>Toxicodendron radicans</i>	Poison ivy	FAC	X	X
<i>Boehmeria cylindrica</i>	False nettle	OBL	-	X
<i>Athyrium filix-femina</i>	Lady fern	FAC	X	X

Soils

Wetlands identified within the Study Area consist of moderately well drained, poorly and very poorly drained soils formed in alluvium or outwash deposits. Most of the area delineated as Connecticut Inland Wetland would also meet Federal criteria.¹ Some of the upper alluvial fringes of Wetland 1 may not meet federal criteria, but the difference between the two lines would not be significant unless work were proposed within wetland. These wetland areas are subject to the IWW Regulations and USACE jurisdiction under Section 404. Jurisdiction under the IWW Regulations extends further west from Wetland 1 to include moderately well drained soils formed in recent alluvium.

Uplands

Uplands north and of Rainbow Brook and east and west of its unnamed tributary support a mixed broad-leaved deciduous and evergreen coniferous forest. Open areas on droughtly sandy soils

¹ : United States Department of Agriculture, Natural Resources Conservation Service. 2018. Field Indicators of Hydric Soils in the United States, Version 8.2. L.M. Vasilas, G.W. Hurt, and J.F. Berkowitz (eds.). USDA, NRCS, in cooperation with the National Technical Committee for Hydric Soils.



support warm season grasses such as little bluestem (*Schyzachrium scoparium*) and poverty grass (*Danthonia spicata*), and forbs such as roundhead bushclover (*Lespedizia capitata*), braken fern (*Pteridium aquilinum*) or pinweed (*Lechea* sp.). Trees noted in the canopy are listed in Table 5 below. In the dry woodlands the forest floor is typically open and covered in forest litter. Occasional patches of Pennsylvania sedge (*Carex pensylvanica*) or lowbush blueberry (*Vaccinium angustifolium*) are scattered throughout.

Table 5 –Upland Vegetation provides a summary of species identified.

TABLE 5: Upland Plant Species

Trees and Saplings				
Scientific	Common	Indicator	Upland	Wetland
<i>Quercus rubra</i>	Northern red oak	FACU	X	-
<i>Fagus grandifolia</i>	American beech	FACU	X	-
<i>Quercus velutina</i>	Black oak	UPL	X	-
<i>Quercus coccinea</i>	Scarlet oak	UPL	X	-
<i>Pinus rigida</i>	Pitch pine	FACU	X	-
<i>Pinus strobus</i>	White pine	FACU	X	-
<i>Populus tremula</i>	Trembling Aspen	FACU	X	-
Shrubs / Herbaceous Plants				
Scientific	Common	Indicator	Upland	Wetland
<i>Gaylussacia baccata</i>	Black huckleberry	FACU	X	-
<i>Vaccinium angustifolia</i>	Lowbush blueberry	FACU	X	-
<i>Carex pensylvanica</i>	Pennsylvania sedge	UPL	X	-
<i>Celastrus orbiculatus</i>	Asiatic bittersweet	UPL	X	-
<i>Lechea</i> sp	Pinweed species	UPL	X	-



CONCLUSION

In summary, a VHB soil scientist delineated two areas of inland wetland and watercourses within the Project Area. These Connecticut inland wetlands on site consist of broad-leaved deciduous palustrine forested wetland.

Please contact me at 401.457.2066 if you have any questions or require additional assistance.

Sincerely,
Vanasse Hangen Brustlin, Inc.

A handwritten signature in blue ink, appearing to read "Jeff Peterson".

Jeffrey C. Peterson, CPSS, PWS, CPESC, ENV SP
Senior Soil and Wetland Scientist
jpeterson@vhb.com

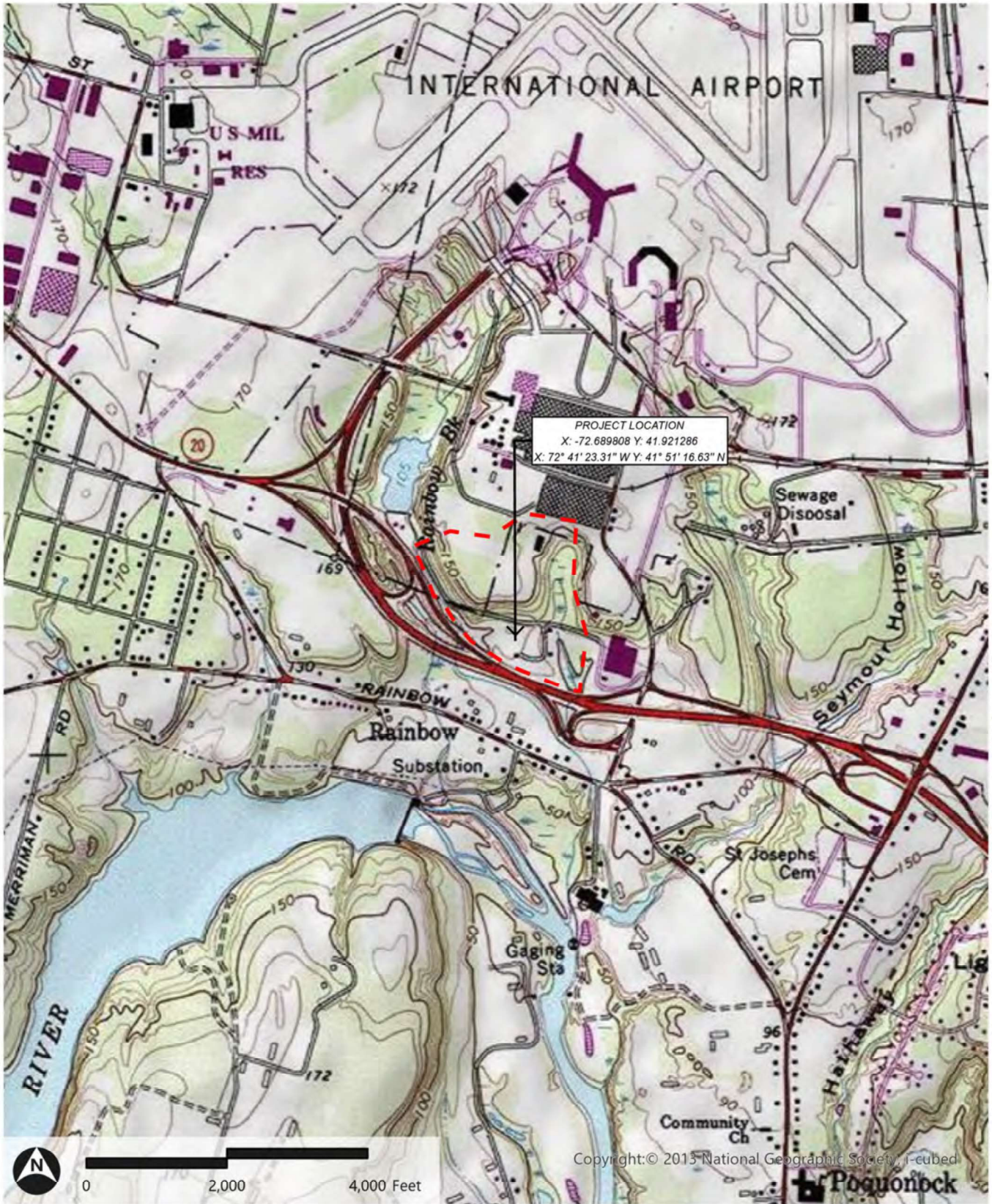
Figures:

- Figure 1 – USGS Site Location Map
- Figure 2 – Site Topography Map
- Figure 3 – NRCS Soils Map
- Figure 4 – NWI and State Wetland Map
- Figure 5 – FEMA Floodplain Map
- Figure 6 – Delineated Wetlands Map

Appendices:

- Appendix A – Project Area Photographic Log
- Appendix B – Web Soil Survey Custom Soil Report

Figure 1: USGS Site Location Map
Collins Aerospace Solar | Windsor Locks, CT



Path: \\vhb.com\gis\proj\Wetherfield\42993.000\Project\CT Solar.aprx (kfrench, 6/14/2022)

Source: USGS

Figure 2: Aerial

Collins Aerospace Solar | Windsor Locks, CT

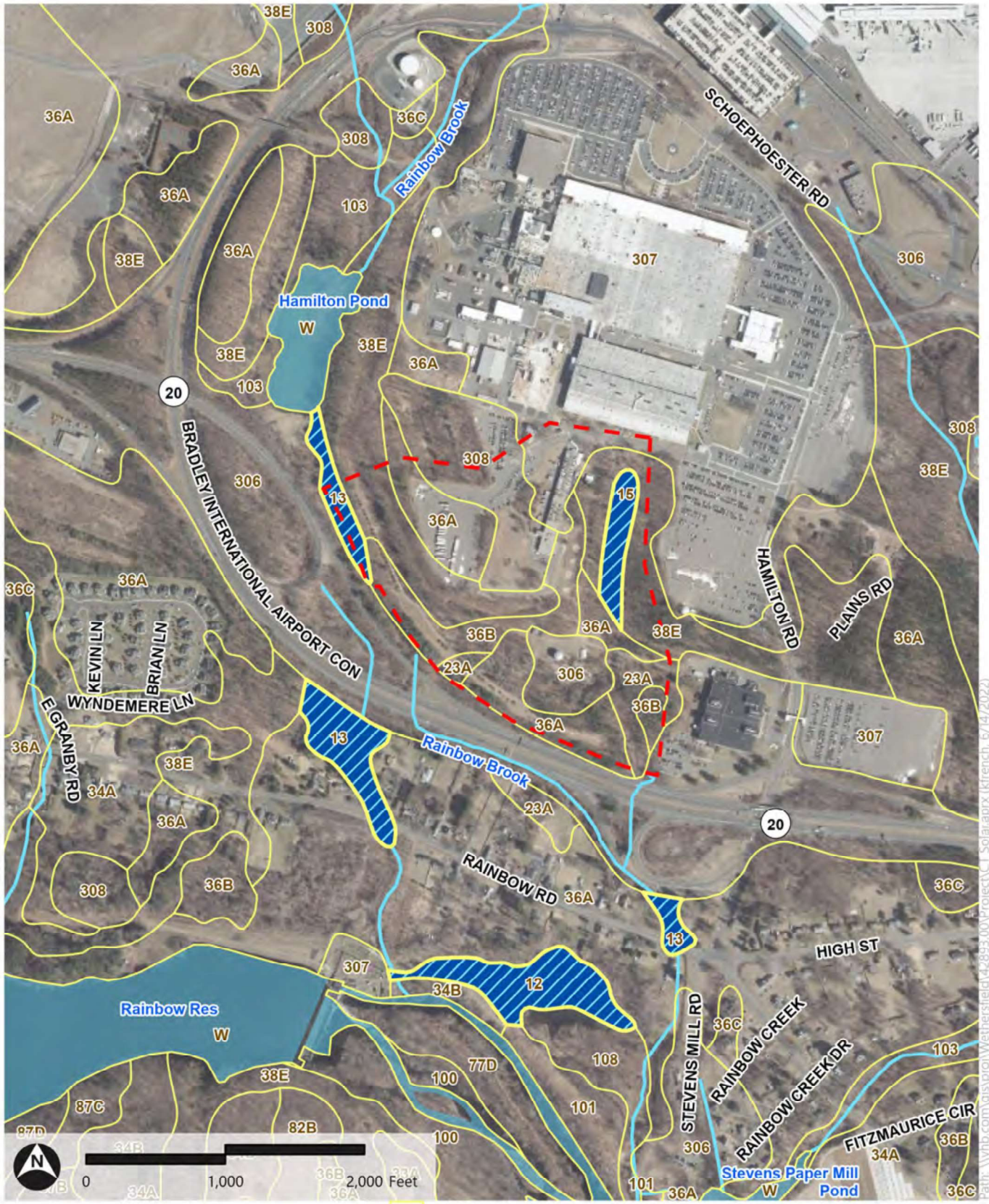


- Proposed Project Area
- Streams
- 10' Contours
- Waterbodies

Source: CTDEEP

Figure 3: NRCS Soils

Collins Aerospace Solar | Windsor Locks, CT



- - - Proposed Project Area
- NRCS Soils
- Streams
- Waterbodies
- Floodplain Soils
- Poorly Drained/Very Poorly Drained Soils

Source: CTDEEP, NRCS

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Figure 4: NWI and State Wetlands Map
 Collins Aerospace Solar | Windsor Locks, CT



- - - Proposed Project Area
- CTDEEP Wetlands
- NWI Wetlands
- Streams
- Waterbodies

Source: CTDEEP

Path: \\vhb.com\gis\proj\Wethersfield\42893.00\Project\CT Solar.aprx (ktrench, 6/14/2022)

Figure 5: FEMA Floodplain Map
 Collins Aerospace Solar | Windsor Locks, CT



- - - Proposed Project Area
- Waterbodies
- Streams
- ▨ FEMA 100-Year Floodplain

Source: CTDEEP

Path: \\vhb.com\gis\proj\Wethersfield\42893.00\Project\CT Solar.aprx (ktrench, 6/14/2022)

Figure 6: Field Delineated Wetlands Map
 Collins Aerospace Solar | Windsor Locks, CT

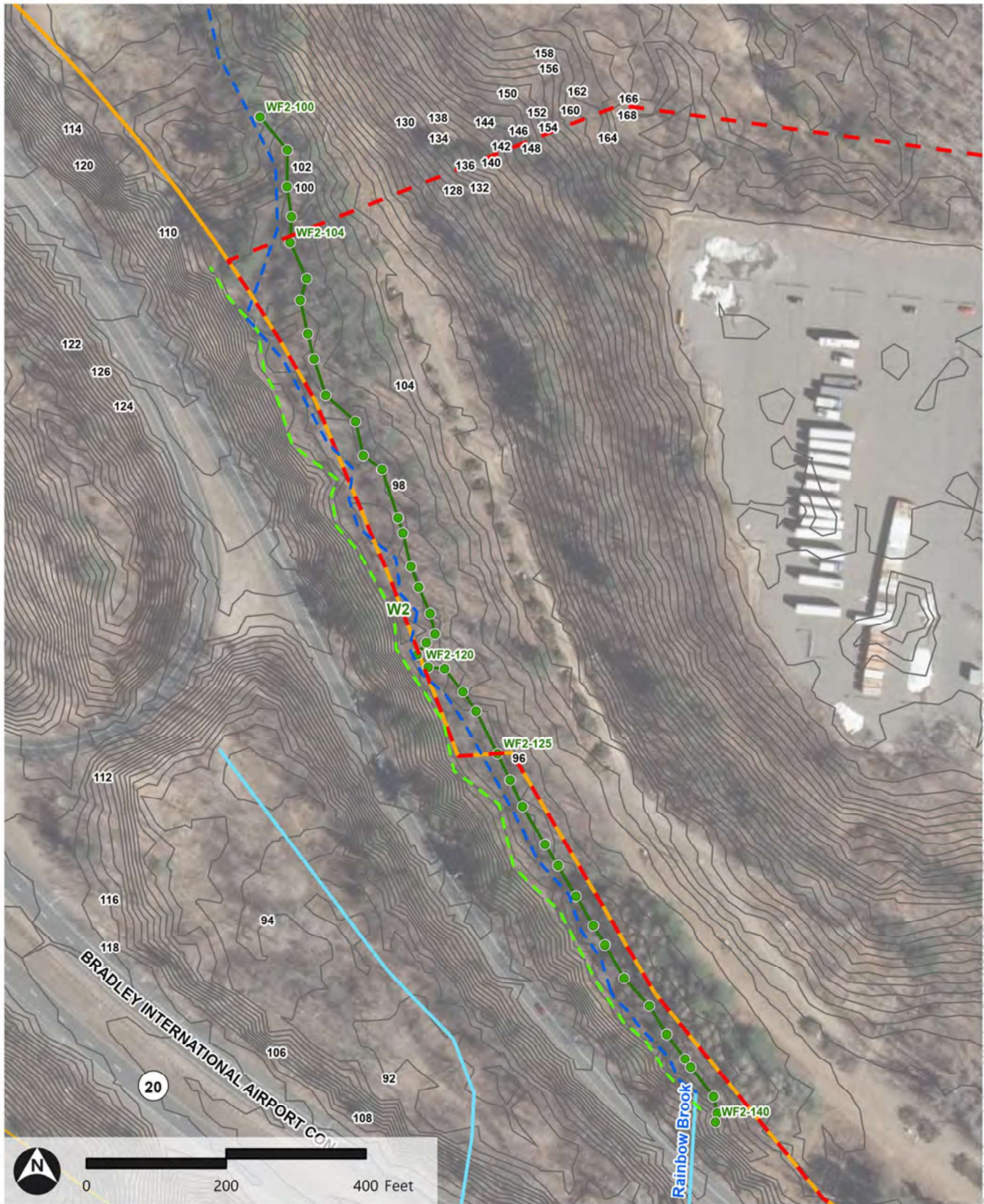


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Source: CTDEEP, VHB

Figure 6: Wetland 2

Collins Aerospace Solar | Windsor Locks, CT

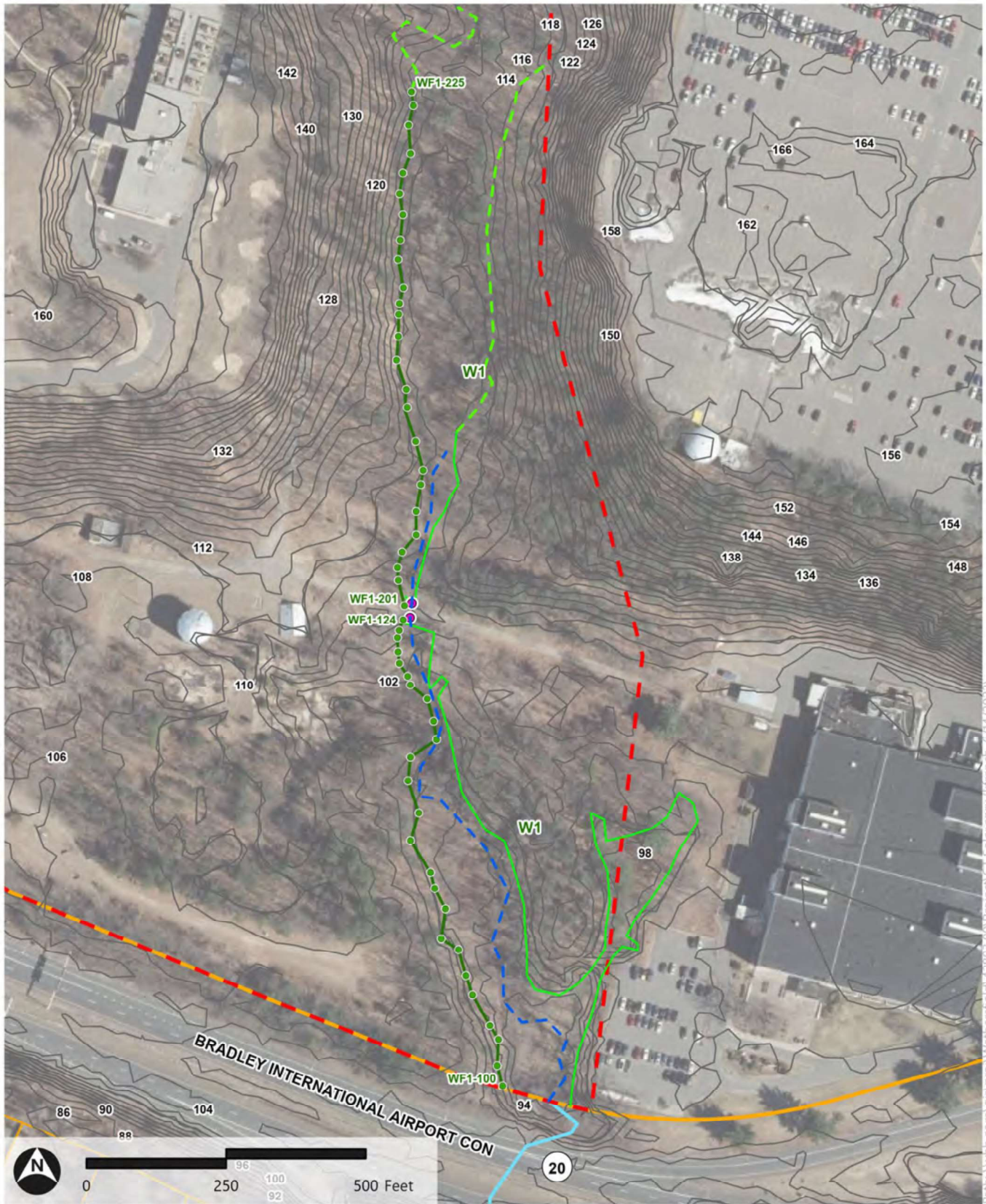


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- VHB Wetland Flags
- Proposed Project Area
- - - Estimated Wetland Edge (Off Site)
- Streams
- - - Approximate Stream Centerline
- Delineated Wetland Boundary Outline
- 2' Contours
- Parcel Boundary

Figure 6: Wetland 1

Collins Aerospace Solar | Windsor Locks, CT



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- VHB Wetland Flags
- Culvert
- Proposed Project Area
- Streams
- Approximate Stream Centerline
- Delineated Wetland Boundary Outline
- Estimated Wetland Edge
- Wetland Edge Delineated by Others
- 2' Contours
- Parcel Boundary

Appendix A Project Area Photographic Log



No. 1 - Photo of Wetland 1c taken at flag 104, facing north



No. 2 - Photo of Wetland 1c taken at flag 115, facing south with Bradley Connector in the background.



No. 3 - Photo of Wetland 1b taken at flag 118, facing north. This section of stream is high gradient and well incised.



No. 4 - Photo of Wetland 1a taken at flag 223, facing north.



No. 5 - Photo of Wetland 2 taken at flag 100, facing southeast. A segment of Rainbow Brook was relocated to construct the Bradley Connector.



No. 6 - Photo of Wetland 2 taken at flag 119, facing northwest.



No. 7 - Photo of Wetland 2 taken at flag 127, facing south.



No. 8 - Photo of Wetland 2 taken at flag 140, facing northwest.

Appendix B Soil Report

Custom Soil Resource Report for State of Connecticut

Project Area Collins Aerospace



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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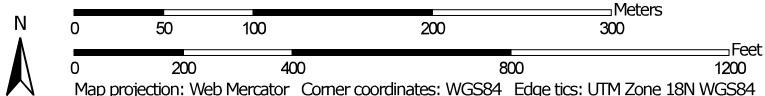
Soil Map

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

Custom Soil Resource Report Soil Map






































Map Scale: 1:4,220 if printed on A portrait (8.5" x 11") sheet.



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

MAP LEGEND

- Area of Interest (AOI)**
 -  Area of Interest (AOI)
- Soils**
 -  Soil Map Unit Polygons
 -  Soil Map Unit Lines
 -  Soil Map Unit Points
- Special Point Features**
 -  Blowout
 -  Borrow Pit
 -  Clay Spot
 -  Closed Depression
 -  Gravel Pit
 -  Gravelly Spot
 -  Landfill
 -  Lava Flow
 -  Marsh or swamp
 -  Mine or Quarry
 -  Miscellaneous Water
 -  Perennial Water
 -  Rock Outcrop
 -  Saline Spot
 -  Sandy Spot
 -  Severely Eroded Spot
 -  Sinkhole
 -  Slide or Slip
 -  Sodic Spot
- Water Features**
 -  Streams and Canals
- Transportation**
 -  Rails
 -  Interstate Highways
 -  US Routes
 -  Major Roads
 -  Local Roads
- Background**
 -  Aerial Photography
- Other**
 -  Spoil Area
 -  Stony Spot
 -  Very Stony Spot
 -  Wet Spot
 -  Other
 -  Special Line Features

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: State of Connecticut
 Survey Area Data: Version 21, Sep 7, 2021

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

Date(s) aerial images were photographed: Aug 24, 2019—Oct 24, 2019

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
13	Walpole sandy loam, 0 to 3 percent slopes	0.8	1.7%
15	Scarboro muck, 0 to 3 percent slopes	2.2	4.5%
23A	Sudbury sandy loam, 0 to 5 percent slopes	2.8	5.7%
36A	Windsor loamy sand, 0 to 3 percent slopes	11.1	22.9%
36B	Windsor loamy sand, 3 to 8 percent slopes	6.7	13.8%
38E	Hinckley loamy sand, 15 to 45 percent slopes	11.9	24.7%
306	Udorthents-Urban land complex	4.0	8.2%
307	Urban land	3.1	6.5%
308	Udorthents, smoothed	5.8	11.9%
Totals for Area of Interest		48.3	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

Custom Soil Resource Report

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.

State of Connecticut

13—Walpole sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2svkl

Elevation: 0 to 1,020 feet

Mean annual precipitation: 36 to 71 inches

Mean annual air temperature: 39 to 55 degrees F

Frost-free period: 140 to 250 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Walpole and similar soils: 80 percent

Minor components: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Walpole

Setting

Landform: Depressions, outwash plains, outwash terraces, depressions, deltas

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Tread, dip, talf

Down-slope shape: Concave

Across-slope shape: Concave

Parent material: Sandy glaciofluvial deposits derived from igneous, metamorphic and sedimentary rock

Typical profile

Oe - 0 to 1 inches: mucky peat

A - 1 to 7 inches: sandy loam

Bg - 7 to 21 inches: sandy loam

BC - 21 to 25 inches: gravelly sandy loam

C - 25 to 65 inches: very gravelly sand

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Poorly drained

Runoff class: Very high

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 4 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)

Available water supply, 0 to 60 inches: Moderate (about 6.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4w

Hydrologic Soil Group: B/D

Ecological site: F144AY028MA - Wet Outwash

Hydric soil rating: Yes

Minor Components

Sudbury

Percent of map unit: 10 percent
Landform: Outwash plains, deltas, terraces
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Scarboro

Percent of map unit: 10 percent
Landform: Outwash plains, deltas, outwash terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

15—Scarboro muck, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2svkt
Elevation: 0 to 1,350 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

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

Description of Scarboro

Setting

Landform: Drainageways, depressions, outwash deltas, outwash terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope, tread, dip
Down-slope shape: Concave
Across-slope shape: Linear, concave
Parent material: Sandy glaciofluvial deposits derived from schist and/or gneiss and/or granite

Typical profile

Oa - 0 to 8 inches: muck
A - 8 to 14 inches: mucky fine sandy loam
Cg1 - 14 to 22 inches: sand

Custom Soil Resource Report

Cg2 - 22 to 65 inches: gravelly sand

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Very poorly drained

Runoff class: Negligible

*Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(1.42 to 14.17 in/hr)*

Depth to water table: About 0 to 2 inches

Frequency of flooding: None

Frequency of ponding: Frequent

Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)

Available water supply, 0 to 60 inches: Moderate (about 6.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 5w

Hydrologic Soil Group: A/D

Ecological site: F144AY031MA - Very Wet Outwash

Hydric soil rating: Yes

Minor Components

Timakwa

Percent of map unit: 10 percent

Landform: Swamps

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Base slope, tread, dip

Down-slope shape: Concave, linear

Across-slope shape: Concave, linear

Hydric soil rating: Yes

Walpole

Percent of map unit: 8 percent

Landform: Deltas, depressions, outwash plains, depressions, outwash terraces

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Tread, tal, dip

Down-slope shape: Concave

Across-slope shape: Concave

Hydric soil rating: Yes

Deerfield

Percent of map unit: 2 percent

Landform: Terraces, outwash plains

Landform position (three-dimensional): Tread, dip

Down-slope shape: Linear

Across-slope shape: Concave

Hydric soil rating: No

23A—Sudbury sandy loam, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 9lkv
Elevation: 0 to 1,200 feet
Mean annual precipitation: 43 to 54 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days
Farmland classification: All areas are prime farmland

Map Unit Composition

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

Description of Sudbury

Setting

Landform: Terraces, outwash plains
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Sandy and gravelly glaciofluvial deposits derived from granite and/or schist and/or gneiss

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
A - 1 to 5 inches: sandy loam
Bw1 - 5 to 17 inches: gravelly sandy loam
Bw2 - 17 to 25 inches: sandy loam
2C - 25 to 60 inches: stratified gravel to sand

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: About 18 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B
Ecological site: F144AY027MA - Moist Sandy Outwash
Hydric soil rating: No

Minor Components

Agawam

Percent of map unit: 5 percent
Landform: Terraces, outwash plains
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Merrimac

Percent of map unit: 5 percent
Landform: Terraces, outwash plains, kames
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Ninigret

Percent of map unit: 5 percent
Landform: Terraces, outwash plains
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

Tisbury

Percent of map unit: 3 percent
Landform: Terraces, outwash plains
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Walpole

Percent of map unit: 2 percent
Landform: Drainageways on terraces, depressions on terraces
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

36A—Windsor loamy sand, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2svkg
Elevation: 0 to 990 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

Windsor, loamy sand, and similar soils: 85 percent
Minor components: 15 percent

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Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Windsor, Loamy Sand

Setting

Landform: Outwash plains, outwash terraces, deltas, dunes

Landform position (three-dimensional): Tread, riser

Down-slope shape: Linear, convex

Across-slope shape: Linear, convex

Parent material: Loose sandy glaciofluvial deposits derived from granite and/or loose sandy glaciofluvial deposits derived from schist and/or loose sandy glaciofluvial deposits derived from gneiss

Typical profile

O - 0 to 1 inches: moderately decomposed plant material

A - 1 to 3 inches: loamy sand

Bw - 3 to 25 inches: loamy sand

C - 25 to 65 inches: sand

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Excessively drained

Runoff class: 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

Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)

Available water supply, 0 to 60 inches: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2s

Hydrologic Soil Group: A

Ecological site: F144AY022MA - Dry Outwash

Hydric soil rating: No

Minor Components

Deerfield, loamy sand

Percent of map unit: 10 percent

Landform: Deltas, terraces, outwash plains

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Tread, tal

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

Hinckley, loamy sand

Percent of map unit: 5 percent

Landform: Deltas, kames, eskers, outwash plains

Landform position (two-dimensional): Summit, shoulder, backslope

Landform position (three-dimensional): Head slope, nose slope, side slope, crest, rise

Down-slope shape: Convex

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Across-slope shape: Convex, linear
Hydric soil rating: No

36B—Windsor loamy sand, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2svkf
Elevation: 0 to 1,210 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

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

Description of Windsor, Loamy Sand

Setting

Landform: Dunes, outwash plains, deltas, outwash terraces
Landform position (three-dimensional): Tread, riser
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Parent material: Loose sandy glaciofluvial deposits derived from granite and/or loose sandy glaciofluvial deposits derived from schist and/or loose sandy glaciofluvial deposits derived from gneiss

Typical profile

O - 0 to 1 inches: moderately decomposed plant material
A - 1 to 3 inches: loamy sand
Bw - 3 to 25 inches: loamy sand
C - 25 to 65 inches: sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: 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
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s

Custom Soil Resource Report

Hydrologic Soil Group: A
Ecological site: F144AY022MA - Dry Outwash
Hydric soil rating: No

Minor Components

Hinckley, loamy sand

Percent of map unit: 10 percent
Landform: Deltas, kames, eskers, outwash plains
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Head slope, nose slope, side slope, crest, rise
Down-slope shape: Convex
Across-slope shape: Convex, linear
Hydric soil rating: No

Deerfield, loamy sand

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

38E—Hinckley loamy sand, 15 to 45 percent slopes

Map Unit Setting

National map unit symbol: 2svmj
Elevation: 0 to 1,280 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

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

Description of Hinckley

Setting

Landform: Eskers, kames, outwash deltas, outwash terraces, moraines, outwash plains, kame terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Head slope, nose slope, side slope, crest, riser
Down-slope shape: Concave, convex, linear
Across-slope shape: Convex, linear, concave

Custom Soil Resource Report

Parent material: Sandy and gravelly glaciofluvial deposits derived from gneiss and/or granite and/or schist

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
A - 1 to 8 inches: loamy sand
Bw1 - 8 to 11 inches: gravelly loamy sand
Bw2 - 11 to 16 inches: gravelly loamy sand
BC - 16 to 19 inches: very gravelly loamy sand
C - 19 to 65 inches: very gravelly sand

Properties and qualities

Slope: 15 to 45 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: 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
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Ecological site: F144AY022MA - Dry Outwash
Hydric soil rating: No

Minor Components

Windsor

Percent of map unit: 5 percent
Landform: Eskers, kames, moraines, outwash deltas, outwash terraces, outwash plains, kame terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Head slope, nose slope, side slope, crest, riser
Down-slope shape: Concave, convex, linear
Across-slope shape: Convex, linear, concave
Hydric soil rating: No

Merrimac

Percent of map unit: 5 percent
Landform: Outwash plains, outwash terraces, moraines, eskers, kames
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Head slope, nose slope, side slope, crest, riser
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Agawam

Percent of map unit: 3 percent

Custom Soil Resource Report

Landform: Eskers, kame terraces, outwash deltas, outwash terraces, moraines, kames, outwash plains

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Head slope, nose slope, side slope, crest, riser

Down-slope shape: Concave, convex, linear

Across-slope shape: Convex, linear, concave

Hydric soil rating: No

Sudbury

Percent of map unit: 2 percent

Landform: Kames, eskers, outwash deltas, outwash plains, kame terraces, outwash terraces, moraines

Landform position (two-dimensional): Backslope, footslope

Landform position (three-dimensional): Base slope, tread

Down-slope shape: Concave, linear

Across-slope shape: Linear, concave

Hydric soil rating: No

306—Udorthents-Urban land complex

Map Unit Setting

National map unit symbol: 9lmg

Elevation: 0 to 2,000 feet

Mean annual precipitation: 43 to 56 inches

Mean annual air temperature: 45 to 55 degrees F

Frost-free period: 120 to 185 days

Farmland classification: Not prime farmland

Map Unit Composition

Udorthents and similar soils: 50 percent

Urban land: 35 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents

Setting

Down-slope shape: Convex

Across-slope shape: Linear

Parent material: Drift

Typical profile

A - 0 to 5 inches: loam

C1 - 5 to 21 inches: gravelly loam

C2 - 21 to 80 inches: very gravelly sandy loam

Properties and qualities

Slope: 0 to 25 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

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Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Very low to high (0.00 to 1.98 in/hr)

Depth to water table: About 54 to 72 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Moderate (about 6.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: B

Hydric soil rating: No

Description of Urban Land

Typical profile

H - 0 to 6 inches: material

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8

Hydrologic Soil Group: D

Hydric soil rating: Unranked

Minor Components

Unnamed, undisturbed soils

Percent of map unit: 8 percent

Hydric soil rating: No

Udorthents, wet substratum

Percent of map unit: 5 percent

Down-slope shape: Convex

Across-slope shape: Linear

Hydric soil rating: No

Rock outcrop

Percent of map unit: 2 percent

Hydric soil rating: No

307—Urban land

Map Unit Setting

National map unit symbol: 9Imh

Elevation: 0 to 2,000 feet

Mean annual precipitation: 43 to 56 inches

Mean annual air temperature: 45 to 55 degrees F

Frost-free period: 120 to 185 days

Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 80 percent

Minor components: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Typical profile

H - 0 to 6 inches: material

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8

Hydrologic Soil Group: D

Hydric soil rating: Unranked

Minor Components

Udorthents, wet substratum

Percent of map unit: 10 percent

Down-slope shape: Convex

Across-slope shape: Linear

Hydric soil rating: No

Unnamed, undisturbed soils

Percent of map unit: 10 percent

Hydric soil rating: No

308—Udorthents, smoothed

Map Unit Setting

National map unit symbol: 9lmj

Elevation: 0 to 2,000 feet

Mean annual precipitation: 43 to 56 inches

Mean annual air temperature: 45 to 55 degrees F

Frost-free period: 120 to 185 days

Farmland classification: Not prime farmland

Map Unit Composition

Udorthents and similar soils: 80 percent

Minor components: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents

Setting

Down-slope shape: Convex

Across-slope shape: Linear

Typical profile

A - 0 to 5 inches: loam

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C1 - 5 to 21 inches: gravelly loam

C2 - 21 to 80 inches: very gravelly sandy loam

Properties and qualities

Slope: 0 to 35 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Moderately well drained

Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Very low to high (0.00 to 1.98 in/hr)

Depth to water table: About 24 to 54 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Moderate (about 6.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4e

Hydrologic Soil Group: C

Hydric soil rating: No

Minor Components

Udorthents, wet substratum

Percent of map unit: 7 percent

Hydric soil rating: No

Unnamed, undisturbed soils

Percent of map unit: 7 percent

Hydric soil rating: No

Urban land

Percent of map unit: 5 percent

Hydric soil rating: No

Rock outcrop

Percent of map unit: 1 percent

Hydric soil rating: No

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