



WETLANDS DELINEATION REPORT

Date: July 16, 2019

Project No.: 42519.00

Prepared For: Clean Focus Renewables, Inc

Site Location: Lantern Hill Road, Stonington, CT

Site Map: Wetland Delineation GIS Figure, dated July 18, 2019

Inspection Dates: June 18, 24, 26, 27, 2019

Field Conditions: Weather: Sunny to Partly Cloudy General Soil Moisture: moist to dry
Snow Depth: 0 inches Frost Depth: 0 inches

Type of Wetlands Identified and Delineated:

Connecticut Inland Wetlands and Watercourses



Tidal Wetlands



U.S. Army Corps of Engineers

Local Regulated Upland Review Areas: Wetlands: 100 feet Watercourses: 100 feet

Field Numbering Sequence of Wetlands Boundary: Connecticut - WF 1-100 to 1-236, WF 1-200 to 1-218, WF 2-100 to 2-139, WF 3-100 to 3-110, WF 4-100 to 4-104 [as depicted on attached inland wetland delineation plan]

The classification systems of the National Cooperative Soil Survey, the U.S. Department of Agriculture, Natural Resources Conservation Service, County Soil Survey Identification Legend, and the Connecticut Department of Energy and Environmental Protection were used in this investigation.

All established wetlands boundary lines are subject to change until officially adopted by local, state, or federal regulatory agencies.

The wetlands delineation was conducted and reviewed by:

Jeffrey Peterson
Certified Professional Soil Scientist

Enclosures

1 Cedar Street

Suite 400

Providence, RI 02903

P 401.272.8100

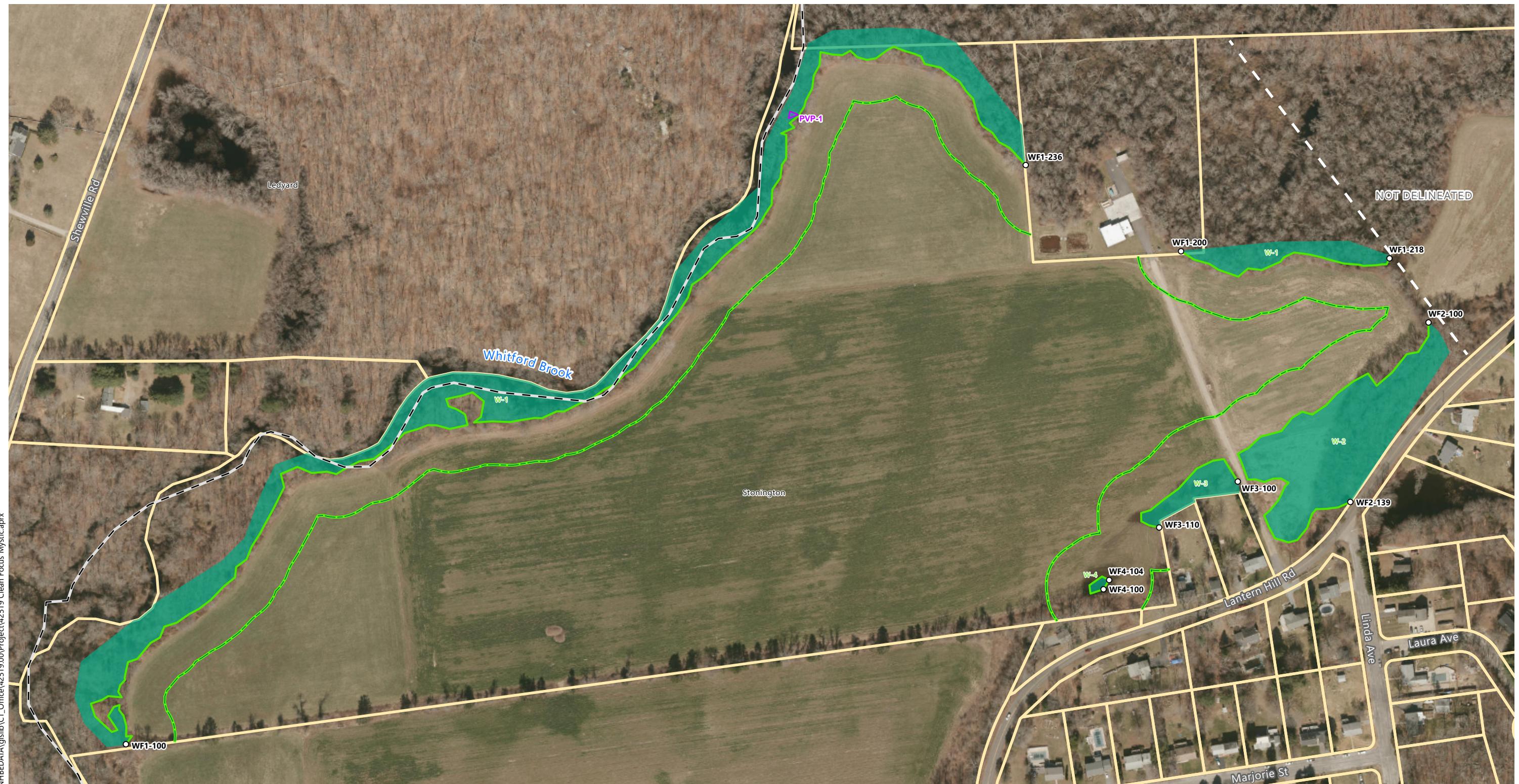
F 401.277.8400

Engineers | Scientists | Planners | Designers



Attachments

- › Wetland Delineation Map
- › Wetland Delineation Field Forms
- › NRCS Soil Reports and Soil Maps



Parcel Boundary Delineated Potential Vernal Pool Edge

Town Boundary Delineated Wetland Edge

100' Wetland Buffer

Wetland Area

Potential Vernal Pool

229 Lantern Hill Road

Stonington, Connecticut

Inland Wetland Delineation Plan

Source: VHB, CTDEEP, ArcGIS Online

Wetland Delineation Field Form

Project Address:	Lantern Hill Road, Stonington, CT	Project Number:	42519.00
Inspection Date:	6/18/19 to 6/27/19	Inspector:	Jeffrey Peterson, CPSS
Wetland I.D.:	Wetland 1		

Field Conditions:	Weather: Sunny, 80s, humid	Snow Depth: 0 inches
	General Soil Moisture: moist	Frost Depth: 0 inches
Type of Wetland Delineation:	Connecticut <input checked="" type="checkbox"/>	
	ACOE <input type="checkbox"/>	
	Tidal <input type="checkbox"/>	
Field Numbering Sequence: WF 1-100 to 1-236, 1-200 to 1-218.		

WETLAND HYDROLOGY:

NONTIDAL

Intermittently Flooded <input checked="" type="checkbox"/>	Artificially Flooded <input type="checkbox"/>	Permanently Flooded <input type="checkbox"/>
Semipermanently Flooded <input type="checkbox"/>	Seasonally Flooded <input checked="" type="checkbox"/>	Temporarily Flooded <input type="checkbox"/>
Permanently Saturated <input type="checkbox"/>	Seasonally Saturated – seepage <input type="checkbox"/>	Seasonally Saturated - perched <input type="checkbox"/>

Comments: Surficial geology is primarily outwash and Holocene alluvium. There are steep escarpments along some segments of Whitford Brook where streambank stabilization measures were installed to protect farmland.

TIDAL

Subtidal <input type="checkbox"/>	Regularly Flooded <input type="checkbox"/>	Irregularly Flooded <input type="checkbox"/>
Irregularly Flooded <input type="checkbox"/>		
Comments: N/A		

WETLAND TYPE:

SYSTEM:

Estuarine <input type="checkbox"/>	Riverine <input checked="" type="checkbox"/>	Palustrine <input checked="" type="checkbox"/>
Lacustrine <input type="checkbox"/>	Marine <input type="checkbox"/>	
Comments: Narrow to broad riverine/floodplain corridor along Whitford Brook		

CLASS:

Emergent <input type="checkbox"/>	Scrub-shrub <input type="checkbox"/>	Forested <input checked="" type="checkbox"/>
Open Water <input checked="" type="checkbox"/>	Disturbed <input type="checkbox"/>	Wet Meadow <input type="checkbox"/>
Comments: Shallow open water associated with brook.		

WATERCOURSE TYPE:

Perennial <input checked="" type="checkbox"/>	Intermittent <input type="checkbox"/>	Tidal <input type="checkbox"/>
Comments:		

SPECIAL AQUATIC HABITAT:

Vernal Pool <input checked="" type="checkbox"/>	Other <input type="checkbox"/>
Comments: One potential vernal pool identified in backwater position in floodplain.	

Wetland Delineation Field Form (Cont.)

MAPPED SOILS:

SOIL SERIES (Map Unit Symbol)	WET	UP	NRCS MAPPED	FIELD IDD/ CONFIRMED
Catden and Freetown soils, 0 to 2 percent slope (18)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Sudbury sandy loam, 0 to 5 percent slope (23A)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Hinckley loamy sand, 3 to 15 percent slopes (38C)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Rippowam fine sandy loam (103)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Tisbury silt loam 0 to 3 percent slopes (702A)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Haven silt loam 3 to 8 percent slope (703B)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Raypol silt loam (12)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Pootatuck fine sandy loam (102) moderately well drained alluvial soil	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

DOMINANT WETLAND PLANTS:

Red maple (<i>Acer rubrum</i>)	Sensitive fern (<i>Onoclea sensibilis</i>)
American elm (<i>Ulmus americana</i>)	Jewelweed (<i>Impatiens capensis</i>)
	Cinnamon fern (<i>Osmundastrum cinnamomeum</i>)
Highbush blueberry (<i>Vaccinium corymbosum</i>)	Poison ivy (<i>Toxicodendron radicans</i>)
Winterberry (<i>Ilex verticillata</i>)	
Spicebush (<i>Lindera benzoin</i>)	Fox grape (<i>Vitis labrusca</i>)
Multiflora rose (<i>Rosa multiflora</i>)	Oriental bittersweet (<i>Celastrus orbiculatus</i>)

DOMINANT UPLAND PLANTS:

Red maple (<i>Acer rubrum</i>)	Poison ivy (<i>Toxicodendron radicans</i>)
Red Oak (<i>Quercus rubra</i>)	Fox grape (<i>Vitis labrusca</i>)
	Oriental bittersweet (<i>Celastrus orbiculatus</i>)
Multiflora rose (<i>Rosa multiflora</i>)	
Morrow's honeysuckle (<i>Lonicera morrowii</i>)	

WETLAND NARRATIVE:

Whitford Brook flows west along the northern limits of the parcel. The delineation is broken at an out-parcel managed by the Aquarian Water Company as a public water supply source towards the eastern end of the study area. The eastern limits of the investigation ended at a culvert that conveys flow from a tributary stream beneath the eastern field limits. The wetland edge is variously formed between the contact of floodplain with an upland terrace or a steep, riprap-armored terrace escarpment installed to protect farmland. When examining soils in the open agricultural field, we determined that the polygon mapped as Tisbury silt loam has large areas of gravelly and cobble inclusions and the Haven silt loam unit is larger than mapped. Wetland 1 also included gravelly and cobble phases of a soil similar to the Walpole series as well as alluvial soil belong to the Rippowam and Pootatuck series. Much of the stone in the riparian wetland likely was cast from the agricultural fields over many years of management.

The transition between the tilled agricultural soils and forested floodplain consisted of a nearly impenetrable shrub thicket with multiflora rose (*Rosa multiflora*) and honeysuckle (*Lonicera morrowii*) entangle by fox grape (*Vitis labrusca*) and bittersweet (*Celastrus orbiculatus*). The floodplain is generally dominated by red maple (*Acer rubrum*), but oaks (*Quercus spp.*) are also present on moderately well drained alluvial soils.

Wetland Delineation Field Form

Project Address:	Lantern Hill Road, Stonington, CT	Project Number:	42519.00
Inspection Date:	6/18/19 to 6/27/19	Inspector:	Jeffrey Peterson, CPSS
Wetland I.D.:	Wetland 2		

Field Conditions:	Weather: 80s, partly cloudy humid	Snow Depth: 0 inches
	General Soil Moisture: moist	Frost Depth: 0 inches
Type of Wetland Delineation:	Connecticut <input checked="" type="checkbox"/>	
	ACOE <input type="checkbox"/>	
	Tidal <input type="checkbox"/>	
Field Numbering Sequence: WF 2-100 to 2-139		

WETLAND HYDROLOGY:

NONTIDAL

Intermittently Flooded <input checked="" type="checkbox"/>	Artificially Flooded <input type="checkbox"/>	Permanently Flooded <input type="checkbox"/>
Semipermanently Flooded <input type="checkbox"/>	Seasonally Flooded <input checked="" type="checkbox"/>	Temporarily Flooded <input type="checkbox"/>
Permanently Saturated <input type="checkbox"/>	Seasonally Saturated – seepage <input type="checkbox"/>	Seasonally Saturated - perched <input type="checkbox"/>
Comments: Delineation included partially buried poorly and very poorly drained soils. Wetland 2 is tributary to Wetland 1 through a culvert at the eastern end of the Study Area.		

TIDAL

Subtidal <input type="checkbox"/>	Regularly Flooded <input type="checkbox"/>	Irregularly Flooded <input type="checkbox"/>
Irregularly Flooded <input type="checkbox"/>		
Comments: N/A		

WETLAND TYPE:

SYSTEM:

Estuarine <input type="checkbox"/>	Riverine <input checked="" type="checkbox"/>	Palustrine <input checked="" type="checkbox"/>
Lacustrine <input type="checkbox"/>	Marine <input type="checkbox"/>	
Comments:		

CLASS:

Emergent <input type="checkbox"/>	Scrub-shrub <input checked="" type="checkbox"/>	Forested <input checked="" type="checkbox"/>
Open Water <input type="checkbox"/>	Disturbed <input type="checkbox"/>	Wet Meadow <input checked="" type="checkbox"/>
Comments:		

WATERCOURSE TYPE:

Perennial <input checked="" type="checkbox"/>	Intermittent <input type="checkbox"/>	Tidal <input type="checkbox"/>
Comments:		

SPECIAL AQUATIC HABITAT:

Vernal Pool <input type="checkbox"/>	Other <input type="checkbox"/>
Comments: NA	

Wetland Delineation Field Form (Cont.)

MAPPED SOILS:

SOIL SERIES (Map Unit Symbol)	WET	UP	NRCS MAPPED	FIELD IDD/ CONFIRMED
Tisbury silt loam 0 to 3 percent slopes (702A)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Sudbury sandy loam, 0 to 5 percent slope (23A)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Raypol silt loam (12)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Scarboro muck, 0 to 3 percent slopes (15)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

DOMINANT WETLAND PLANTS:

Red maple (<i>Acer rubrum</i>)	Skunk cabbage (<i>Symplocarpus foetidus</i>)
American elm (<i>Ulmus americana</i>)	Cinnamon fern (<i>Osmunda cinnamomeum</i>)
	Sensitive fern (<i>Onoclea sensibilis</i>)
Spicebush (<i>Lindera benzoin</i>)	Poison ivy (<i>Toxicodendron radicans</i>)
Winterberry (<i>Ilex verticillata</i>)	Reed canary-grass (<i>Phalaris arundinacea</i>)
Highbush blueberry (<i>Vaccinium corymbosum</i>)	
Multiflora rose (<i>Rosa multiflora</i>)	

DOMINANT UPLAND PLANTS:

Red maple (<i>Acer rubrum</i>)	Poison ivy (<i>Toxicodendron radicans</i>)
Red Oak (<i>Quercus rubra</i>)	Fox grape (<i>Vitis labrusca</i>)
	Oriental bittersweet (<i>Celastrus orbiculatus</i>)
Multiflora rose (<i>Rosa multiflora</i>)	Hay-scented fern (<i>Dennstaedtia punctilobula</i>)
Morrow's honeysuckle (<i>Lonicera morrowii</i>)	Orchard grass (<i>Dactylis glomerata</i>)
Staghorn sumac (<i>Rhus typhina</i>)	
Blackberry (<i>Rubus allegheniensis</i>)	

WETLAND NARRATIVE:

This wetland was omitted by the cooperative soil survey. It enters the subject property as a stream under Lantern Hill Road. The wetland includes a forested block along the stream, a meadow dominated almost entirely by reed canary-grass (*Phalaris arundinacea*), and shrubland. Wetland soils include the poorly drained Raypole series and very poorly drained soils similar to the Scarboro series. The access road into the site crosses this wetland and separates Wetland 3 from Wetland 2.

Wetland Delineation Field Form

Project Address:	Lantern Hill Road, Stonington, CT	Project Number:	42519.00
Inspection Date:	6/18/19 to 6/27/19	Inspector:	Jeffrey Peterson, CPSS
Wetland I.D.:	Wetland 3		

Field Conditions:	Weather: Clear 80s, partly cloudy, humid	Snow Depth: 0 inches
	General Soil Moisture: moist	Frost Depth: 0 inches
Type of Wetland Delineation:	Connecticut <input checked="" type="checkbox"/>	
	ACOE <input type="checkbox"/>	
	Tidal <input type="checkbox"/>	
Field Numbering Sequence: WF 3-100 to 3-110		

WETLAND HYDROLOGY:

NONTIDAL

Intermittently Flooded <input type="checkbox"/>	Artificially Flooded <input type="checkbox"/>	Permanently Flooded <input type="checkbox"/>
Semipermanently Flooded <input type="checkbox"/>	Seasonally Flooded <input type="checkbox"/>	Temporarily Flooded <input type="checkbox"/>
Permanently Saturated <input type="checkbox"/>	Seasonally Saturated – seepage <input checked="" type="checkbox"/>	Seasonally Saturated - perched <input type="checkbox"/>
Comments: Farmed wetland.		

TIDAL

Subtidal <input type="checkbox"/>	Regularly Flooded <input type="checkbox"/>	Irregularly Flooded <input type="checkbox"/>
Irregularly Flooded <input type="checkbox"/>		
Comments: N/A		

WETLAND TYPE:

SYSTEM:

Estuarine <input type="checkbox"/>	Riverine <input type="checkbox"/>	Palustrine <input checked="" type="checkbox"/>
Lacustrine <input type="checkbox"/>	Marine <input type="checkbox"/>	
Comments: Depressional wetland ponds surface water over compacted soils		

CLASS:

Emergent <input checked="" type="checkbox"/>	Scrub-shrub <input type="checkbox"/>	Forested <input type="checkbox"/>
Open Water <input type="checkbox"/>	Disturbed <input type="checkbox"/>	Wet Meadow <input type="checkbox"/>
Comments: Corn field. Corn failed in wet depression		

WATERCOURSE TYPE:

Perennial	Intermittent <input type="checkbox"/>	Tidal <input type="checkbox"/>
Comments: NA		

SPECIAL AQUATIC HABITAT:

Vernal Pool <input type="checkbox"/>	Other <input type="checkbox"/>
Comments: NA	

Wetland Delineation Field Form (Cont.)

MAPPED SOILS:

SOIL SERIES (Map Unit Symbol)	WET	UP	NRCS MAPPED	FIELD IDD/ CONFIRMED
Raypol silt loam (12)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Tisbury silt loam 0 to 3 percent slopes (702A)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Sudbury sandy loam, 0 to 5 percent slope (23A)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

DOMINANT WETLAND PLANTS:

Soft rush (<i>Juncus effusus</i>)	
Spike rush (<i>Eleocharis</i> sp.)	

DOMINANT UPLAND PLANTS:

Field corn (<i>Zea mays</i>)	
Crabgrass (<i>Digitaria</i> sp.)	

WETLAND NARRATIVE:

This farmed wetland was plowed and seeded in corn which largely failed due to wetness. Wetland soils are gravelly and similar to the Raypole or Walpole series. A stone drain conveys water under the Aquarion access drive. The investigator did not find evidence of tile or other types of artificial drainage.

Wetland Delineation Field Form

Project Address:	Lantern Hill Road, Stonington, CT	Project Number:	42519.00
Inspection Date:	6/18/19 to 6/27/19	Inspector:	Jeffrey Peterson, CPSS
Wetland I.D.:	Wetland 4		

Field Conditions:	Weather: Partly cloudy, 80s, humid	Snow Depth: 0 inches
	General Soil Moisture: moist	Frost Depth: 0 inches
Type of Wetland Delineation:	Connecticut <input checked="" type="checkbox"/>	
	ACOE <input type="checkbox"/>	
	Tidal <input type="checkbox"/>	
Field Numbering Sequence: WF 4-100 to 4-104		

WETLAND HYDROLOGY:

NONTIDAL

Intermittently Flooded <input type="checkbox"/>	Artificially Flooded <input type="checkbox"/>	Permanently Flooded <input type="checkbox"/>
Semipermanently Flooded <input type="checkbox"/>	Seasonally Flooded <input type="checkbox"/>	Temporarily Flooded <input type="checkbox"/>
Permanently Saturated <input type="checkbox"/>	Seasonally Saturated – seepage <input type="checkbox"/>	Seasonally Saturated - perched <input checked="" type="checkbox"/>
Comments: Ponded depression in till agricultural field.		

TIDAL

Subtidal <input type="checkbox"/>	Regularly Flooded <input type="checkbox"/>	Irregularly Flooded <input type="checkbox"/>
Irregularly Flooded <input type="checkbox"/>		
Comments: N/A		

WETLAND TYPE:

SYSTEM:

Estuarine <input type="checkbox"/>	Riverine <input type="checkbox"/>	Palustrine <input checked="" type="checkbox"/>
Lacustrine <input type="checkbox"/>	Marine <input type="checkbox"/>	
Comments:		

CLASS:

Emergent <input checked="" type="checkbox"/>	Scrub-shrub <input type="checkbox"/>	Forested <input type="checkbox"/>
Open Water <input type="checkbox"/>	Disturbed <input checked="" type="checkbox"/>	Wet Meadow <input type="checkbox"/>
Comments: plowed and seeded in corn		

WATERCOURSE TYPE:

Perennial	Intermittent <input type="checkbox"/>	Tidal <input type="checkbox"/>
Comments: NA		

SPECIAL AQUATIC HABITAT:

Vernal Pool <input type="checkbox"/>	Other <input type="checkbox"/>
Comments:	

Wetland Delineation Field Form (Cont.)

MAPPED SOILS:

SOIL SERIES (Map Unit Symbol)	WET	UP	NRCS MAPPED	FIELD IDD/ CONFIRMED
Canton and Charlton fine sandy loams, 8 to 15 percent slopes, very stony (61C)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Raypol silt loam (12)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Tisbury silt loam 0 to 3 percent slopes (702A)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

DOMINANT WETLAND PLANTS:

Exposed soil (recently tilled)	

WETLAND NARRATIVE:

This soil was puddled from plowing during periods of excessive soil moisture. The delineated depression included soils with morphologies that meet the morphologic criteria of Aquepts that are poorly drained and others that would be considered somewhat poorly drained.



United States
Department of
Agriculture

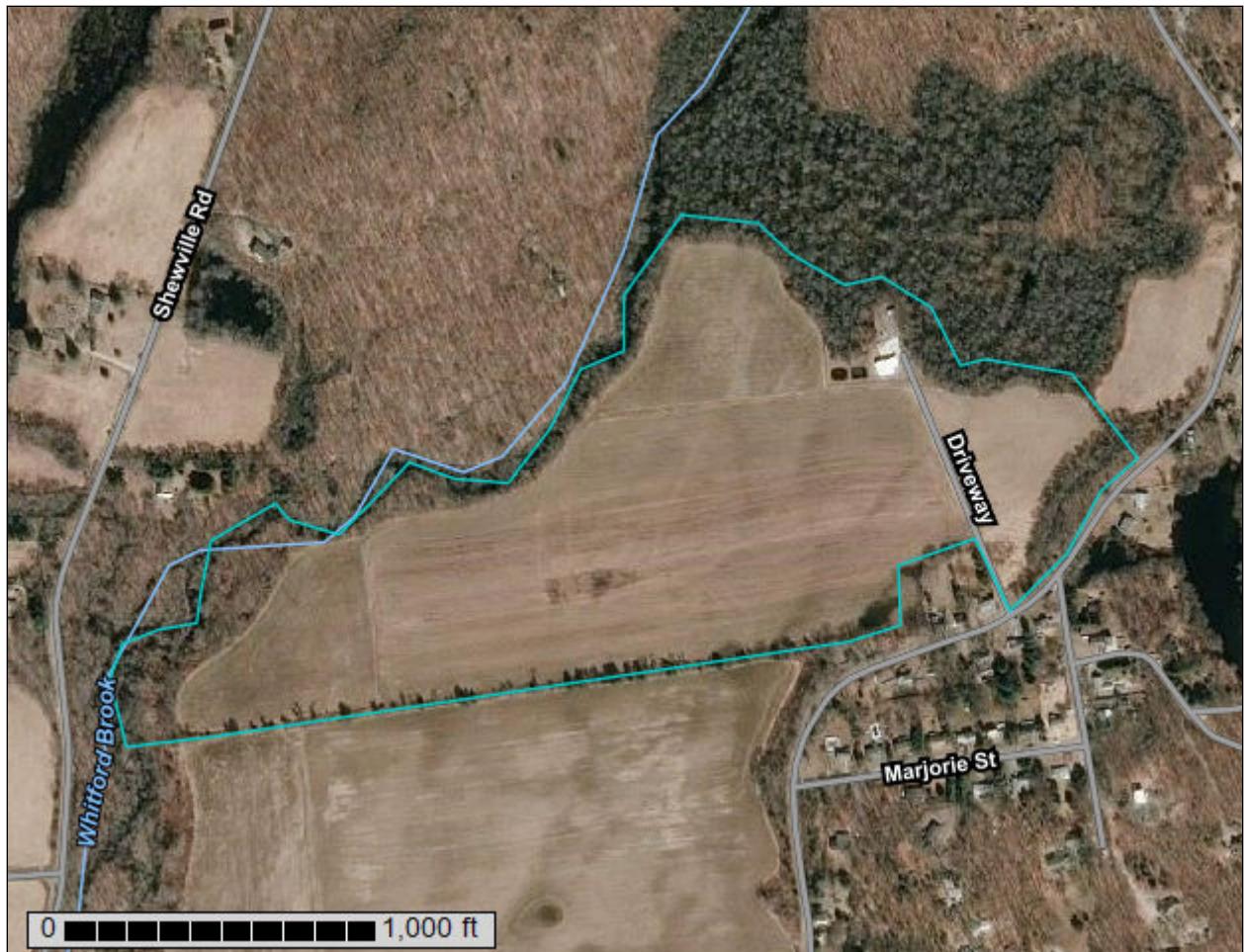


Natural
Resources
Conservation
Service

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 State of Connecticut

Clear Focus Solar Site, Lantern Hill Road, Stonington, CT



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.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

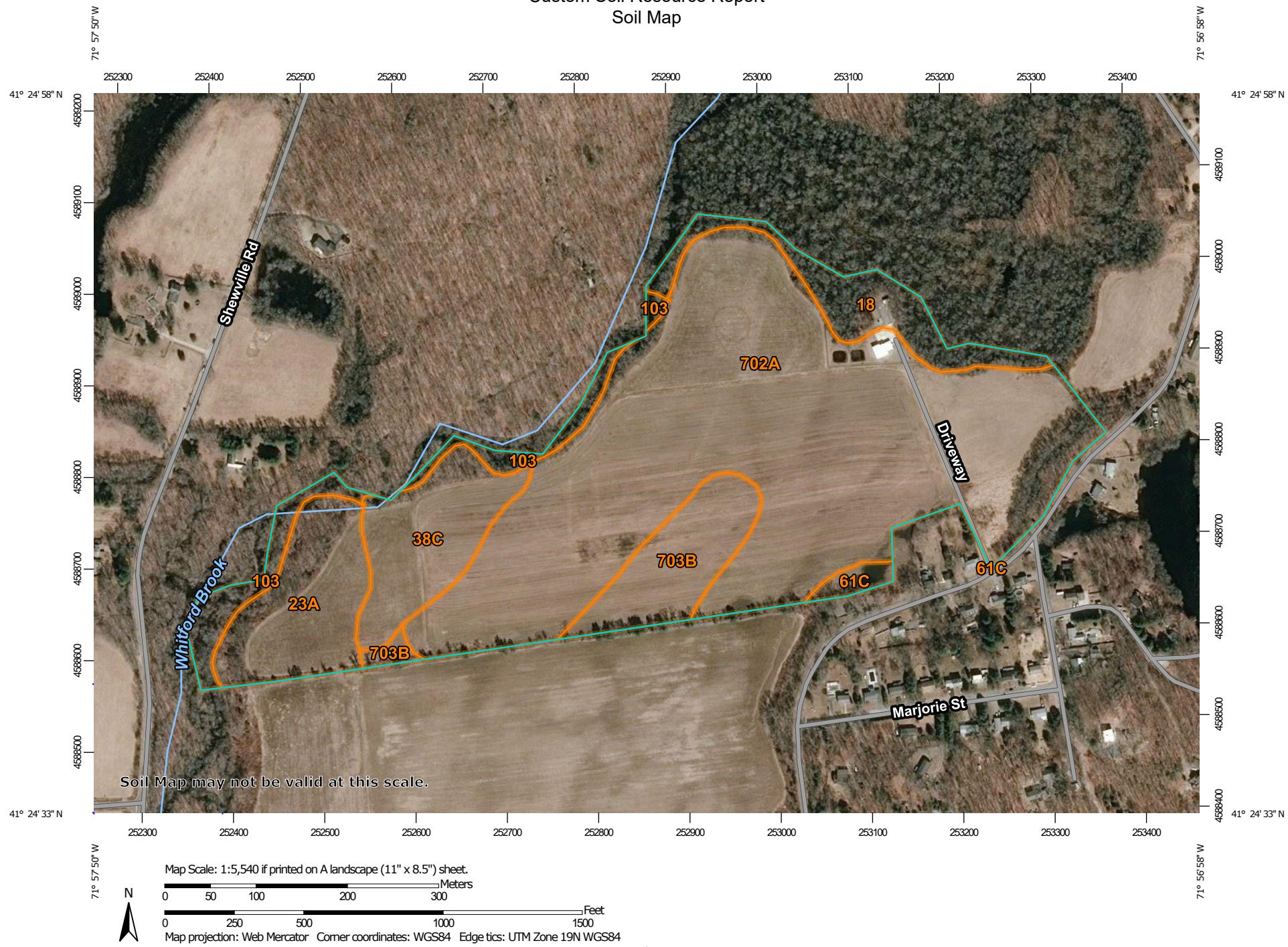
Preface.....	2
Soil Map.....	5
Soil Map.....	6
Legend.....	7
Map Unit Legend.....	8
Map Unit Descriptions.....	8
State of Connecticut.....	10
18—Catden and Freetown soils, 0 to 2 percent slopes.....	10
23A—Sudbury sandy loam, 0 to 5 percent slopes.....	12
38C—Hinckley loamy sand, 3 to 15 percent slopes.....	13
61C—Canton and Charlton fine sandy loams, 8 to 15 percent slopes, very stony.....	15
103—Rippowam fine sandy loam.....	18
702A—Tisbury silt loam, 0 to 3 percent slopes.....	19
703B—Haven silt loam, 3 to 8 percent slopes.....	21
References.....	24

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.

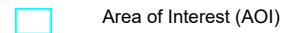
Custom Soil Resource Report

Soil Map



MAP 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



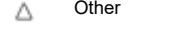
Stony Spot

Very Stony Spot



Very Stony Spot

Wet Spot



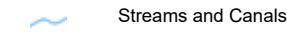
Wet Spot

Other



Special Line Features

Water Features



Streams and Canals

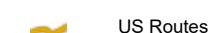
Transportation



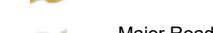
Rails



Interstate Highways



US Routes



Major Roads



Local Roads

Background



Aerial Photography

MAP INFORMATION

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

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

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

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

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: State of Connecticut

Survey Area Data: Version 18, Dec 6, 2018

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

Date(s) aerial images were photographed: Mar 20, 2019—Mar 27, 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
18	Catden and Freetown soils, 0 to 2 percent slopes	3.7	6.0%
23A	Sudbury sandy loam, 0 to 5 percent slopes	5.6	9.1%
38C	Hinckley loamy sand, 3 to 15 percent slopes	5.2	8.4%
61C	Canton and Charlton fine sandy loams, 8 to 15 percent slopes, very stony	0.6	0.9%
103	Rippowam fine sandy loam	3.0	4.8%
702A	Tisbury silt loam, 0 to 3 percent slopes	39.2	63.3%
703B	Haven silt loam, 3 to 8 percent slopes	4.6	7.4%
Totals for Area of Interest		61.9	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.

State of Connecticut

18—Catden and Freetown soils, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2t2r2

Elevation: 0 to 1,390 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

Catden and similar soils: 40 percent

Freetown and similar soils: 40 percent

Minor components: 20 percent

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

Description of Catden

Setting

Landform: Swamps, marshes, kettles, depressions, depressions, fens, bogs, depressions

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

Down-slope shape: Concave

Across-slope shape: Concave

Parent material: Highly decomposed herbaceous organic material and/or highly decomposed woody organic material

Typical profile

Oa1 - 0 to 2 inches: muck

Oa2 - 2 to 79 inches: muck

Properties and qualities

Slope: 0 to 2 percent

Percent of area covered with surface fragments: 0.0 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

Salinity, maximum in profile: Nonsaline (0.0 to 1.9 mmhos/cm)

Available water storage in profile: Very high (about 26.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 5w

Hydrologic Soil Group: B/D

Hydric soil rating: Yes

Description of Freetown

Setting

Landform: Kettles, swamps, bogs, depressions, marshes, depressions
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Highly decomposed organic material

Typical profile

Oe - 0 to 2 inches: mucky peat
Oa - 2 to 79 inches: muck

Properties and qualities

Slope: 0 to 2 percent
Percent of area covered with surface fragments: 0.0 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 26.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: B/D
Hydric soil rating: Yes

Minor Components

Natchaug

Percent of map unit: 7 percent
Landform: Depressions, depressions, depressions
Landform position (three-dimensional): Base slope, tread
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Whitman

Percent of map unit: 6 percent
Landform: Depressions, drainageways
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Timakwa

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

Scarboro

Percent of map unit: 2 percent
Landform: Outwash terraces, outwash deltas, drainageways, depressions
Landform position (three-dimensional): Base slope, tread, dip
Down-slope shape: Concave
Across-slope shape: Concave, linear
Hydric soil rating: Yes

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
Natural 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 storage in profile: Low (about 4.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2w

Hydrologic Soil Group: B

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

38C—Hinckley loamy sand, 3 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2svmb

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: Farmland of statewide importance

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: Kame terraces, outwash plains, kames, eskers, moraines, outwash terraces, outwash deltas

Landform position (two-dimensional): Foothslope, toeslope, shoulder, backslope, summit

Landform position (three-dimensional): Nose slope, side slope, crest, head slope, riser, tread

Down-slope shape: Linear, convex, concave

Across-slope shape: Convex, linear, concave

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: 3 to 15 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: 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

Salinity, maximum in profile: Nonsaline (0.0 to 1.9 mmhos/cm)

Available water storage in profile: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4e

Hydrologic Soil Group: A

Hydric soil rating: No

Minor Components

Merrimac

Percent of map unit: 5 percent

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

Landform position (two-dimensional): Shoulder, toeslope, backslope, footslope, summit

Landform position (three-dimensional): Side slope, head slope, nose slope, crest, riser, tread
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Windsor

Percent of map unit: 5 percent
Landform: Kame terraces, outwash plains, outwash terraces, outwash deltas, kames, eskers, moraines
Landform position (two-dimensional): Footslope, shoulder, backslope, toeslope, summit
Landform position (three-dimensional): Nose slope, side slope, crest, head slope, riser, tread
Down-slope shape: Linear, convex, concave
Across-slope shape: Convex, linear, concave
Hydric soil rating: No

Agawam

Percent of map unit: 3 percent
Landform: Kame terraces, outwash plains, kames, eskers, moraines, outwash terraces, outwash deltas
Landform position (two-dimensional): Summit, toeslope, shoulder, backslope, footslope
Landform position (three-dimensional): Nose slope, side slope, crest, head slope, tread, riser
Down-slope shape: Linear, convex, concave
Across-slope shape: Convex, linear, concave
Hydric soil rating: No

Sudbury

Percent of map unit: 2 percent
Landform: Outwash terraces, kame terraces, outwash plains, moraines, outwash deltas
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

61C—Canton and Charlton fine sandy loams, 8 to 15 percent slopes, very stony

Map Unit Setting

National map unit symbol: 2w820
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

Canton, very stony, and similar soils: 50 percent

Charlton, very stony, and similar soils: 35 percent

Minor components: 15 percent

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

Description of Canton, Very Stony

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

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: 1.6 percent

Depth to restrictive feature: 19 to 39 inches to strongly contrasting textural stratification

Natural drainage class: Well drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Salinity, maximum in profile: Nonsaline (0.0 to 1.9 mmhos/cm)

Available water storage in profile: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6s

Hydrologic Soil Group: B

Hydric soil rating: No

Description of Charlton, Very Stony

Setting

Landform: Ridges, ground moraines, hills

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope

Down-slope shape: Convex, linear

Across-slope shape: Convex

Parent material: Coarse-loamy melt-out till derived from granite, gneiss, and/or schist

Typical profile

Oe - 0 to 2 inches: moderately decomposed plant material
A - 2 to 4 inches: fine sandy loam
Bw - 4 to 27 inches: gravelly fine sandy loam
C - 27 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 8 to 15 percent
Percent of area covered with surface fragments: 1.6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water storage in profile: Moderate (about 8.7 inches)

Interpretive groups

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

Minor Components

Chatfield, very stony

Percent of map unit: 5 percent
Landform: Hills, ridges
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

Leicester, very stony

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

Sutton, very stony

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

103—Rippowam fine sandy loam

Map Unit Setting

National map unit symbol: 9ljp
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: Farmland of statewide importance

Map Unit Composition

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

Description of Rippowam

Setting

Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Coarse-loamy alluvium

Typical profile

A - 0 to 5 inches: fine sandy loam
Bg1 - 5 to 12 inches: fine sandy loam
Cg2 - 12 to 19 inches: fine sandy loam
Cg3 - 19 to 24 inches: sandy loam
Cg4 - 24 to 27 inches: sandy loam
Cg5 - 27 to 31 inches: loamy sand
Cg6 - 31 to 65 inches: stratified very gravelly coarse sand to loamy fine sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: About 0 to 18 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Available water storage in profile: Low (about 5.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: B/D
Hydric soil rating: Yes

Minor Components

Suncook

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

Occum

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

Pootatuck

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

Lim

Percent of map unit: 3 percent
Landform: Flood plains
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Limerick

Percent of map unit: 2 percent
Landform: Flood plains
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Saco

Percent of map unit: 2 percent
Landform: Flood plains
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

702A—Tisbury silt loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2y07g
Elevation: 0 to 1,260 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

Tisbury and similar soils: 85 percent

Minor components: 15 percent

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

Description of Tisbury

Setting

Landform: Valley trains, outwash plains, deltas, outwash terraces

Landform position (three-dimensional): Tread

Down-slope shape: Concave

Across-slope shape: Concave

Parent material: Coarse-silty eolian deposits over sandy and gravelly glaciofluvial deposits derived from granite, schist, and/or gneiss

Typical profile

Ap - 0 to 8 inches: silt loam

Bw1 - 8 to 18 inches: silt loam

Bw2 - 18 to 26 inches: silt loam

2C - 26 to 65 inches: extremely gravelly sand

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: 24 to 36 inches to strongly contrasting textural stratification

Natural drainage class: Moderately well drained

Runoff class: Very 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: About 18 to 30 inches

Frequency of flooding: None

Frequency of ponding: None

Salinity, maximum in profile: Nonsaline (0.0 to 1.9 mmhos/cm)

Available water storage in profile: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2e

Hydrologic Soil Group: C

Hydric soil rating: No

Minor Components

Merrimac

Percent of map unit: 5 percent

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

Landform position (two-dimensional): Shoulder, summit

Landform position (three-dimensional): Crest, side slope, tread

Down-slope shape: Convex

Across-slope shape: Convex

Hydric soil rating: No

Agawam

Percent of map unit: 5 percent

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

Landform position (two-dimensional): Summit, shoulder

Landform position (three-dimensional): Side slope, crest, tread

Down-slope shape: Convex

Across-slope shape: Convex

Hydric soil rating: No

Ninigret

Percent of map unit: 3 percent

Landform: Outwash terraces, kames, moraines, outwash plains, kame terraces

Landform position (two-dimensional): Footslope, toeslope

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

Down-slope shape: Linear, convex

Across-slope shape: Concave, convex

Hydric soil rating: No

Raypol

Percent of map unit: 2 percent

Landform: Depressions, drainageways

Down-slope shape: Concave

Across-slope shape: Concave

Hydric soil rating: Yes

703B—Haven silt loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2y07I

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

Haven and similar soils: 85 percent

Minor components: 15 percent

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

Description of Haven

Setting

Landform: Outwash terraces, outwash plains

Landform position (three-dimensional): Tread

Down-slope shape: Convex

Across-slope shape: Linear

Parent material: Coarse-loamy eolian deposits over sandy and gravelly glaciofluvial deposits derived from granite and/or schist and/or gneiss

Typical profile

Ap - 0 to 7 inches: silt loam

Bw1 - 7 to 14 inches: silt loam

Bw2 - 14 to 20 inches: silt loam

BC - 20 to 24 inches: fine sandy loam

2C - 24 to 60 inches: stratified very gravelly sand to gravelly fine sand

Properties and qualities

Slope: 3 to 8 percent

Depth to restrictive feature: 18 to 36 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 high to high (0.57 to 1.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Low (about 4.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2e

Hydrologic Soil Group: B

Hydric soil rating: No

Minor Components

Enfield

Percent of map unit: 5 percent

Landform: Outwash plains, outwash terraces

Landform position (three-dimensional): Tread

Down-slope shape: Convex

Across-slope shape: Linear

Hydric soil rating: No

Tisbury

Percent of map unit: 5 percent

Landform: Outwash plains, deltas, valley trains, outwash terraces

Landform position (three-dimensional): Tread

Down-slope shape: Concave

Across-slope shape: Concave

Hydric soil rating: No

Agawam

Percent of map unit: 3 percent

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

Landform position (two-dimensional): Backslope, shoulder, footslope, summit, toeslope

Landform position (three-dimensional): Side slope, crest, head slope, nose slope, tread

Down-slope shape: Convex

Across-slope shape: Convex

Hydric soil rating: No

Raypol

Percent of map unit: 2 percent

Landform: Depressions, drainageways

Down-slope shape: Concave

Across-slope shape: Concave

Custom Soil Resource Report

Hydric soil rating: Yes

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. <http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084>

Custom Soil Resource Report

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf



To: Ms. Bonnie Potocki
Project Developer
Greenskies Clean Energy

Date: June 11, 2021

Project #: 42734.00

Memorandum

From: Christopher Wagner, PWS, Senior
Environmental Scientist
Jeffrey Shamas, CSS, CE, PWS

Re: Vernal Pool Survey, 229 Lantern Hill Road
Stonington, Connecticut

Greenskies Clean Energy is proposing to construct an approximately 2 MW solar photovoltaic (PV) development (the Project) on an approximately 71.2-acre parcel at 229 Lantern Hill Road in Stonington, Connecticut (the Site). As part of the pre-construction environmental due diligence and permitting for the Project, VHB delineated jurisdictional wetlands resource areas on the Site in June 2019. During the delineation, one area that exhibited signs of long-term hydrology was identified as a potential vernal pool. A VHB environmental scientist surveyed the Site for vernal pools in April 2021 and did not observe any vernal pool activity. A summary of site conditions, criteria for identifying vernal pools, and the findings of VHB's survey are presented below.

Site Description

The Site consists primarily of active agricultural fields on parcel, which is situated on the northwest side of Lantern Hill Road. The non-farmed portions of the Site consist of wooded wetlands associated with Whitford Brook, a perennial stream that forms much of the northern and northwestern boundary of the Site. An existing dirt and gravel access road leads northwest into the Site from Lantern Hill Road and accesses a small public water supply facility adjacent to the river on the northern boundary of the Site. The wetlands along Whitford Brook consist primarily of a forested red maple swamp associated with the river. The wetlands have a mostly mature overstory with a moderately dense shrub understory and a thick line of shrubs at the transition between the wetlands and the farm fields. Dominant wetland vegetation includes red maple (*Acer rubrum*), sweet pepperbush (*Clethra alnifolia*), highbush blueberry (*Vaccinium corymbosum*), northern spicebush (*Lindera benzoin*), green brier (*Smilax rotundifolia*), and multiflora rose (*Rosa multiflora*), with some transitional areas containing northern red oak (*Quercus rubra*), American beech (*Fagus grandifolia*), and Canada mayflower (*Maianthemum canadense*). See Figure 1 for an aerial view of the Site and the delineated wetland resources on the Site. See the attached photo log for additional pictures of existing conditions on the Site.

Wetland resource areas on the Site were delineated in June 2019. During the delineation, one area along Whitford Brook was noted as having the potential to support vernal pool habitat. The area is shown on Figure 1 as PVP-1. The area was a small backwater depression adjacent to the river that appeared to hold water for extended periods in a typical spring. The area was assessed in the spring of 2021 to determine its capacity as a vernal pool.

Vernal Pool Identification and Assessment

Although Connecticut's municipal inland wetlands agencies regulate vernal pools, the Connecticut Department of Energy and Environmental Protection (CT DEEP) does not provide a formal definition of vernal pool (CT DEEP 2020). Acknowledging the lack of an official definition for vernal pools in Connecticut, in a technical paper addressing vernal pool considerations for site development, Calhoun and Klemens (2002) note that vernal pools generally occupy less than 2 acres and recommend following guidance provided by Donahue (1996), which includes the following factors:

- a) presence of one or more obligate species,
- b) water for approximately two months during the growing season,
- c) a confined depression that lacks a permanent outlet stream,

100 Great Meadow Road
Suite 200
Wethersfield, CT 06109-2377
P 860.807.4300

- d) no fish, and
- e) dries out in most years.

The Connecticut Association of Wetland Scientist (CAWS) Vernal Pool Monitoring webpage (CAWS 2020) provides the following vernal pool definition:

Vernal pool means a seasonal watercourse in a defined depression or basin, that lacks a fish population and supports or is capable of supporting breeding and development of amphibian or invertebrate species recognized as obligate to such watercourses. These species include spotted salamander, Jefferson salamander complex, marbled salamander, wood frog, and fairy shrimp.

These criteria are similar, although the CAWS does not require that a given pool must dry out in most years. The common and specific names for Connecticut species considered by Calhoun and Klemens (2002) to be obligate biological indicators of vernal pool habitat are listed in Table 1.

Table 1 Obligate Vernal Pool Species

Common Name	Scientific name
Jefferson Salamander	<i>Ambystoma jeffersonianum</i>
Blue-spotted Salamander complex	<i>Ambystoma laterale</i>
Spotted Salamander	<i>Ambystoma maculatum</i>
Marbled Salamander	<i>Ambystoma opacum</i>
Wood Frog	<i>Lithobates sylvaticus</i>
Eastern Spadefoot Toad	<i>Scaphiopus holbrookii</i>
Fairy Shrimp	<i>Eubranchipus spp.</i>

Because vernal pool-breeding amphibians depend on terrestrial habitats as well as aquatic breeding habitats for survival, Calhoun and Klemens (2002) emphasize the importance of considering the surrounding upland areas, up to 750 feet from breeding pools. One hundred feet from the edge of the pool is considered the "vernal pool envelope" and the zone between 100 feet to 750 feet has been termed "critical upland habitat." The authors provide a form to assess the quality of each pool based on biological indicators and surrounding land use. This form, a one-page Vernal Pool Assessment Sheet, is specifically intended to be used for development planning purposes. The purview of Connecticut's municipal inland wetlands agencies encompasses wetland vernal pool habitat and surrounding upland areas.

Survey Findings

VHB surveyed the property for vernal pool indicators on April 26, 2021. To conduct the survey, VHB specifically investigated the depression identified during the 2019 wetland delineation of the Site, since no other areas of vernal pool activity were identified within the wetland areas of the Site and the remainder of the Site consists of agricultural fields. The depression is within the strip of forested wetlands along the river identified as Wetland 1. The area is a small depression immediately adjacent to the river, and measures approximately 20 feet in diameter. The depression holds water to an average depth of 3 to 4 inches for most of its area, with a maximum depth of between 6 and 9 inches. On the day of the survey, water in the depression was cloudy with algae, which also formed a film on the surface.

No vernal pool activity was observed within the depression. No egg masses, egg mass remnants, or juveniles of any obligate vernal pool species were observed. A depression of this size and depth typically does not have the appropriate hydroperiod to support vernal pool activity. The depression has a narrow connection to Whitford Brook, which likely maintains its hydrology for extended periods in the spring. While vernal pool species could therefore theoretically be present in a depression of this size, the connection to the river also may introduce fish into the area during which would depredate any breeding species. The depression is therefore unlikely to provide vernal pool habitat.

Conclusions

In April 2021, VHB assessed an area identified as a potential vernal pool during a wetland delineation in 2019. The area is a small, shallow depression which holds little water. The depression is also connected to Whitford Brook, which may introduce fish into the area during times of high water. In our best professional judgment, the depression does not provide vernal pool habitat. No other potential vernal pools were identified on the Site.

References:

Calhoun, A. J. K. and M. W. Klemens. 2002. Best development practices: Conserving pool-breeding amphibians in residential and commercial developments in the northeastern United States. MCA Technical Paper No. 5, Metropolitan Conservation Alliance, Wildlife Conservation Society, Bronx, New York.

Connecticut Association of Wetland Scientists (CAWS). 2020. Vernal Pool Monitoring webpage: <http://www.ctwetlands.org/vernal-pool-monitoring.html>; last accessed 6/8/21.

Connecticut Department of Energy and Environmental Protection (CT DEEP). 2020. Vernal Pools webpage: <https://portal.ct.gov/DEEP/Water/Wetlands/Vernal-Pools>; last accessed 6/8/21.

Donahue, D. F. 1996. A guide to the identification and protection of vernal pool wetlands in Connecticut. University of Connecticut Cooperative Extension Program.

Klemens, M. W. 1993. Amphibians and reptiles of Connecticut and adjacent regions. State Geological and Natural History

Whitworth, W. R. 1996. Freshwater Fishes of Connecticut. 2nd ed. State Geological and Natural History Survey of Connecticut Bulletin 114, Connecticut Department of Environmental Protection, Hartford, CT.

Figures:

Figure 1 – Site Locus and Wetland Resource Areas

Attachments:

Site Photographs

Figures

- › Figure 1 – Site Locus and Wetland Resource Areas



229 Lantern Hill Road

Stonington, Connecticut

Site Locus and Wetland Resource Areas

Source: VHB, CTDEEP, ArcGIS Online



Parcel Boundary

— Delineated Potential Vernal Pool Edge

Wetland Area

Town Boundary

— Delineated Wetland Edge

Potential Vernal Pool

100' Wetland Buffer

Attachment 1
Site Photographs



Engineers | Scientists | Planners | Designers

Photographic Log

Client Name: Greenskies Clean Energy

Site Location: 229 Lantern Hill Rd., Stonington, CT

Project No: 42734.00

Photo No.: 1

Date: 4/26/21

Location: Access road into Site

View: W

Description:

Agricultural fields that make up the majority of the Site.



Engineers | Scientists | Planners | Designers

Photographic Log

Client Name: Greenskies Clean Energy

Site Location: 229 Lantern Hill Rd., Stonington, CT

Project No: 42734.00

Photo No.: 2

Date: 4/26/21

Location: Access road into Site

View: S

Description:

View of access road leading to Site, with agricultural fields on either side.





Engineers | Scientists | Planners | Designers

Photographic Log

Client Name: Greenskies Clean Energy

Site Location: 229 Lantern Hill Rd., Stonington, CT

Project No: 42734.00

Photo No.: 3

Date: 4/26/21

Location: Edge of agricultural field at N end of Site

View: SW

Description:

View along edge of managed field. Wooded wetlands begin just inside the treeline.



Engineers | Scientists | Planners | Designers

Photographic Log

Client Name: Greenskies Clean Energy

Site Location: 229 Lantern Hill Rd., Stonington, CT

Project No: 42734.00

Photo No.: 4

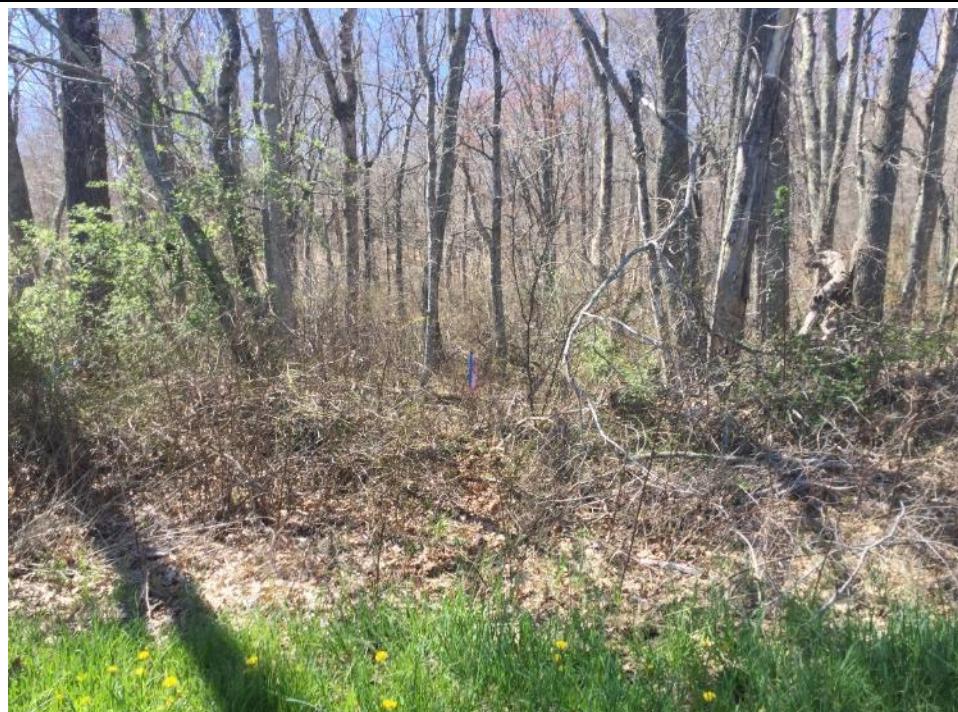
Date: 4/26/21

Location: Edge of agricultural field at N end of Site

View: NW

Description:

View into wooded wetlands. Blue and pink flags denote wetland boundary.





Engineers | Scientists | Planners | Designers

Photographic Log

Client Name: Greenskies Clean Energy

Site Location: 229 Lantern Hill Rd., Stonington, CT

Project No: 42734.00

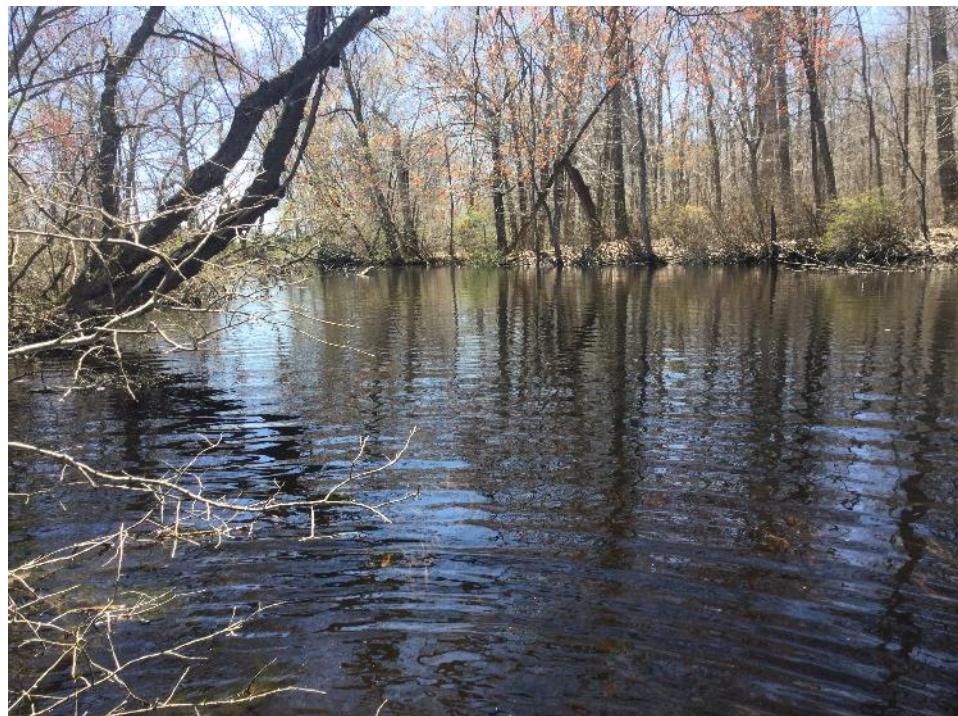
Photo No.: 5 **Date:** 4/26/21

Location: SE side of Whitford Brook

View: S

Description:

View along Whitford Brook.



Engineers | Scientists | Planners | Designers

Photographic Log

Client Name: Greenskies Clean Energy

Site Location: 229 Lantern Hill Rd., Stonington, CT

Project No: 42734.00

Photo No.: 6 **Date:** 4/26/21

Location: SE side of Whitford Brook

View: E

Description:

View toward shore of Whitford Brook.





Engineers | Scientists | Planners | Designers

Photographic Log

Client Name: Greenskies Clean Energy

Site Location: 229 Lantern Hill Rd., Stonington, CT

Project No: 42734.00

Photo No.: 7 **Date:** 4/26/21

Location: PVP depression along Whitford Brook

View: NW

Description:

Depression identified as a potential vernal pool during 2019. The area is a small depression approximately 20 feet in diameter and holds an average of 3-4 inches and a maximum depth of 6-9 inches. Connection to Whitford Brook in background. No vernal pool activity observed



Engineers | Scientists | Planners | Designers

Photographic Log

Client Name: Greenskies Clean Energy

Site Location: 229 Lantern Hill Rd., Stonington, CT

Project No: 42734.00

Photo No.: 8 **Date:** 4/26/21

Location: PVP depression along Whitford Brook

View: NE

Description:

PVP depression with farm field in background.





Engineers | Scientists | Planners | Designers

Photographic Log

Client Name: Greenskies Clean Energy

Site Location: 229 Lantern Hill Rd., Stonington, CT

Project No: 42734.00

Photo No.: 9

Date: 4/26/21

Location: PVP depression along Whitford Brook

View: N

Description:

Large amounts of algae present in depression and on surface.



Engineers | Scientists | Planners | Designers

Photographic Log

Client Name: Greenskies Clean Energy

Site Location: 229 Lantern Hill Rd., Stonington, CT

Project No: 42734.00

Photo No.: 10

Date: 4/26/21

Location: PVP depression along Whitford Brook

View: NW

Description:

Closer view of connection to Whitford Brook, which in periods of high water can introduce fish into the area.

