

Rhode Island Wetland Delineation Report

Report Date:	April 29, 2024		
Project Name:	Coventry High School Sewer Extension		
Site Location:	40 Reservoir Rd, Approximately 1,700 ft of Reservoir Road, and Approximately 2,000 ft of Tiogue Ave, Coventry, RI		
Prepared For:	Town of Coventry 1670 Flat River Road Coventry, RI 02816		
Date(s) of Investigation:	April 1, 2024		
Weather:	44°F, Cloudy	Rainfall (last 24 hours):	0 in

Soil Conditions:

- Dry
 Moist
 Wet
 Frozen (____ in.)
 Snow cover (____ in.)

Jurisdictional Areas¹:

- | | |
|--|--|
| <input checked="" type="checkbox"/> Freshwater Wetlands
<input checked="" type="checkbox"/> Buffers
<input checked="" type="checkbox"/> Floodplains

<input checked="" type="checkbox"/> Areas Subject to Storm Flowage

<input checked="" type="checkbox"/> Areas Subject to Flooding | <input checked="" type="checkbox"/> Contiguous Areas that extend outward:
<input checked="" type="checkbox"/> 200' from the edge of a river/stream
<input type="checkbox"/> 200' from the edge of a drinking water supply reservoir
<input checked="" type="checkbox"/> 100' from the edge of all other freshwater wetlands |
|--|--|

Method of Flag Series Mapping:

- Site sketch
 Aerial photograph
 GPS (sub-meter) located

**Table 1
Summary of Wetland Delineation Flag Series**

Flag Series	Flag Number	Description	Location
A D	A100 → A106 D400 → D405	Upstream banks of the Mishnock River delineated by the Ordinary High Water Mark.	South of Tiogue Ave
B	B200 → B227	Forested Swamp	South of Tiogue Ave
C	C300 → C307	Forested Swamp, Area Subject to Flooding	South of Tiogue Ave
E F	E500 → E507 F600 → F607	Downstream banks of the Mishnock River delineated by the Ordinary High Water Mark.	North of Tiogue Ave
G	G700 → G702	Marsh, Area Subject to Flooding	North of Tiogue Ave
H	H800 → H813	Forested Swamp	North of Tiogue Ave
I	I900 → I905	Forested Swamp	North of Tiogue Ave

¹ Pursuant to R.I. Gen. Laws § 2-1-20(9) and 250-RICR-150-15-3 §3.4(A)(39), effective July 15, 2022.

Inland resource areas were delineated in accordance with applicable local, state, and federal statutes, as detailed within this Wetland Delineation Report. This delineation does not constitute an official wetland boundary until such time as it is accepted and approved by local, state, or federal regulatory agencies.

The wetland delineation was conducted by:



Kristin Connell
Wetland Scientist, Qualified Soil Scientist

Figures:

- 1 Wetland Delineation Sketch
- 2 FEMA Map (FIRMette Panel 44003C0112H; effective 10/2/2015)
- 3 RIDEM Environmental Resource Map
- 4 RIDEM Freshwater Wetlands Buffer Regions
- 5 RIDEM Surface Water Buffer Zone Designations
- 6 National Wetland Inventory Map

Attachments:

- A Site Photographs
- B Rhode Island Department of Environmental Management Wetland Edge Delineation Forms
- C NRCS Hydric Rating by Map Unit
- D Explanation of the Terms Used in Wetlands/Watercourses Functions and Values Assessments

1 Methodology

1.1 Regulatory Context

Freshwater wetlands are regulated in the State of Rhode Island by the Rhode Island General Laws Section 2-1-18 to 2-1-27; the Freshwater Wetlands Act and the Rules and Regulations Governing the Administration and Enforcement of the Freshwater Wetlands Act (effective July 1, 2022). **Freshwater wetlands** includes, but are not limited to, those areas that are inundated or saturated by surface or groundwater at a frequency and duration to support, and that under normal circumstances do support a prevalence of vegetation adapted for life in saturated soil conditions. Freshwater wetlands includes, but is not limited to: marshes, swamps, bogs, emergent and submergent plant communities, and for the purposes of this chapter, rivers, streams, ponds, and vernal pools. **Jurisdictional Areas** regulated by Rhode Island's Department of Environmental Management (RIDEM) include: Freshwater wetlands, buffers, floodplains, areas subject to storm flowage, areas subject to flooding, and contiguous areas that extend outward: (A) two hundred feet from the edge of a river or stream; (B) two hundred feet from the edge of a drinking water supply reservoir; and (C) one hundred feet from the edge of all other freshwater wetlands. In accordance with Section 3.9.3(D) of the Rules and Regulations Governing the Administration and Enforcement of the Freshwater Wetlands Act, any delineation or identification of freshwater wetlands completed by a person other than the RI DEM shall be valid only after review and written verification by the RIDEM. Activities occurring within Jurisdictional Areas are regulated by RIDEM and will require a Freshwater Wetlands General Permit or Freshwater Wetlands Permit from RIDEM. Activities will also be subject to approval by the U.S. Army Corps of Engineers (USACE), New England District.

The wetland delineation was conducted in conformance with local, state, and federal regulations and guidelines including:

- Section 3.21: Specific Criteria for Identifying Freshwater Wetlands and Floodplain Edges in the *Rules and Regulations Governing the Administration and Enforcement of the Freshwater Wetlands Act (effective July 1, 2022)*.
- *Corps of Engineers Wetlands Delineation Manual*, Technical Report Y-87-1 (January 1987)
- *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region* (January 2012)
- *Field Indicators for Identifying Hydric Soils in New England in New England* (Version 4, April 2019)

The 1972 amendments to the Clean Water Act established federal jurisdiction over “navigable waters,” defined in the Act as “waters of the United States” (WOTUS), CWA Section 502(7). The U.S. Environmental Protection Agency and the USACE have defined WOTUS in regulations 40 CFR 120.2(a) and 33 CFR 328.3(a). The lateral limits of federally jurisdictional **non-tidal WOTUS in the absence of adjacent wetlands** are defined by the Ordinary High Water Mark (OHWM). The OHWM “means that line on the shore established by the fluctuations of water and indicated by physical characteristics such as clear, natural line impressed on the bank, shelving, changes in the character or soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.” Federally jurisdictional **wetlands** have a continuous surface water connection to waters identified in 33 CFR 328.3(a)(1), 33 CFR 328.3(a)(2), or 33 CFR 328.3(a)(3) and are “those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.”

When present, federal wetlands were delineated in accordance with the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region* (Version 2.0, January 2012). When present, federal non-tidal watercourses in the absence of wetlands were delineated in accordance with the US Army Corps of Engineers *National Ordinary High Water Mark Field Delineation Manual for Rivers and Streams* (Interim Version, November 2022). Activities occurring within wetlands and waters within the State of Rhode Island are also subject to approval by the US Army Corps of Engineers (USACE), New England District.

During the April 1, 2024 delineation, the Fuss & O'Neill wetland and soil scientist reviewed the Site Location, observed vegetation and soils, and verified the presence or absence of wetlands. Where Freshwater Wetlands

were observed, boundaries were delineated and information regarding vegetation, soils, and hydrology was collected. Each flag location was named based on an alpha-numeric nomenclature.

Fuss & O'Neill also conducted a desktop review of available online resources prior to performing the wetland delineation including:

- Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRMette)
- Local Mapping – Town of Coventry RI GIS Map (<https://next.axisgis.com/CoventryRI/>)
- National Wetlands Inventory Wetlands Mapper
- Natural Resources Conservation Service Hydric Rating by Map Unit
- RIDEM Environmental Resource mapping
- RIDEM Freshwater Wetlands Buffer Regions
- RIDEM RI Drinking Water Supply
- RIDEM Surface Water Buffer Zone Designations
- RI Geographic Information System: Natural Heritage Areas (2023)

2 Results and Findings

2.1 Summary of Site

The entirety of the proposed gravity sewer pipe route and approximately 75 feet from existing roadways was evaluated for the presence of Freshwater Wetlands. The pipe route is anticipated to be installed within the existing roadways and will extend west from an existing manhole near 1100 Tiogue Ave to the intersection of Tiogue Ave and Reservoir Rd. The pipe route will then extend north from the intersection to Coventry High School (40 Reservoir Rd), within the existing roadway until it enters the Coventry High School property. Four (4) forested swamps, one (1) marsh, and the banks of the Mishnock River were delineated along Tiogue Ave (*Figure 1*). One (1) Area subject to storm flowage (Forested Swamp C) and three (3) Areas subject to Flooding (Forested Swamp C, Marsh G, and upstream river left of Mishnock River/Forested Swamp B) were located at the western-most and eastern-most extents of the pipe route along Tiogue Ave. A review of FEMA mapping also shows floodplain areas bordering Mishnock River which crosses below Tiogue Ave at the eastern-most extent of the pipe route (*Figure 2*). No Freshwater Wetlands or Jurisdictional Areas were identified along Reservoir Rd within the project area.

All Freshwater Wetlands delineated are jurisdictional under the State of Rhode Island's Department of Environmental Management.

Refer to *Section 2.2* below for further descriptions of the delineated Freshwater Wetlands and their associated Buffers and Contiguous Areas. Refer to *Table 2* for a summary of the Freshwater Wetlands delineated and their potential jurisdictional status.

Table 2.
Summary of Water Resource Features

Resource Feature	Flag Series	Description	Potential Jurisdictional Status *
Mishnock River (Upstream)	A100 → A106 D400 → D405	Upstream banks of the Mishnock River (flows north) delineated by the Ordinary High Water Mark.	<ul style="list-style-type: none"> • RIDEM considers Mishnock River a jurisdictional Freshwater Wetland River. • Mishnock River would be considered a federally jurisdictional WOTUS.

Resource Feature	Flag Series	Description	Potential Jurisdictional Status *
Wetland B200	B200 → B227	Forested wetland area south of Tiogue Ave with pockets of standing water.	<ul style="list-style-type: none"> • Under the Freshwater regulations, RIDEM would consider B200 as a forested swamp. • B200 is likely federally jurisdictional due to its surface water connection with Mishnock River.
Wetland C300	C300 → C307	Forested swamp wetland and Area subject to flooding (ASF) from an Area subject to storm flowage (ASSF).	<ul style="list-style-type: none"> • Under the Freshwater regulations, RIDEM would consider C300 as a forested swamp and ASF. • C300 is likely federally jurisdictional due to its surface water connection with Mishnock River as mapped by RIDEM.
Mishnock River (Downstream)	E500 → E507 F600 → F607	Downstream banks of the Mishnock River (flows north) delineated by the Ordinary High Water Mark.	<ul style="list-style-type: none"> • RIDEM considers Mishnock River a jurisdictional Freshwater Wetland River. • Mishnock River would be considered a federally jurisdictional WOTUS.
Wetland G700	G700 → G702	Marsh area hydraulically connected to the Mishnock River containing standing water and emergent plants. Area subject to flooding (ASF) from Mishnock River.	<ul style="list-style-type: none"> • Under the Freshwater regulations, RIDEM would consider G700 as a marsh and ASF. • G700 is likely federally jurisdictional due to its surface water connection with Mishnock River.
Wetland H800	H800 → H813	Observed to be forested swamp area with standing water and water stained leaves. Note that RIDEM maps this area as scrub shrub wetland.	<ul style="list-style-type: none"> • Under the Freshwater regulations, RIDEM would consider H800 as a forested swamp. • H800 may have historically had direct surface water connection to Mishnock River. However, at this time is likely not federally jurisdictional due to a lack of continuous surface water connection to a WOTUS.

Resource Feature	Flag Series	Description	Potential Jurisdictional Status *
Forested Swamp Wetland I	1900 → 1905	Hydraulically isolated forested swamp wetland with standing water.	<ul style="list-style-type: none"> Under the Freshwater regulations, RIDEM would consider 1900 as a forested swamp. 1900 is likely not federally jurisdictional due to a lack of continuous surface water connection to a WOTUS.

* Potential jurisdictional status for onsite features is based on our professional experience and our understanding of current regulatory definitions and guidance. It is important to note this assessment is not an agency-approved determination of jurisdictional status of onsite water resources. The USACE and RIDEM should be consulted to obtain concurrence on the jurisdictional status of Freshwater Wetlands on site. See *Methodology* section for further description of regulatory context.

2.2 Freshwater Wetlands

“Freshwater wetlands” includes, but is not limited to, those areas that are inundated or saturated by surface or groundwater at a frequency and duration to support, and that under normal circumstances do support a prevalence of vegetation adapted for life in saturated soil conditions. Freshwater wetlands includes, but is not limited to: marshes, swamps, bogs, emergent, and submergent plant communities, and for the purposes of this chapter, rivers, streams, ponds, and vernal pools.

2.2.1 Swamps

“Swamp” means a place, wholly or partly within the state, where ground water is near or at the surface of the ground for a significant part of the growing season or runoff water from surface drainage collects frequently and/or where a vegetational community is made up of a significant portion of one or more of, but not limited to nor necessarily including all of, the following: red maple (*Acer rubum*), elm (*Ulmus americana*), black spruce (*Picea mariana*), white cedar (*Chamaecyparis thyoides*), ashes (*Fraxinus*), poison sumac (*Rhus vernix*), larch (*Larix laricina*), spice bush (*Lindera benzoin*), alders (*Alnus*), skunk cabbage (*Symplocarpus foetidus*), hellebore (*Veratrum viride*), hemlock (*Thuja canadensis*), sphagnums (*Sphagnum*), azaleas (*Rhododendron*), black alder (*Ilex verticillata*), coast pepperbush (*Clethra alnifolia*), marsh marigold (*Caltha palustris*), blueberries (*Vaccinium*), buttonbush (*Cephalanthus occidentalis*), willow (*Salicaceae*), water willow (*Decodon verticillatus*), tupelo (*Nyssa sylvatica*), laurels (*Kalmia*), swamp white oak (*Quercus bicolor*), or species indicative of marsh.

Wetland B200 would be defined as a Forested Swamp under the RI Freshwater Wetland Act. Common vegetation identified within the wetland and adjacent to the project area includes [common name (*scientific name*), wetland indicator status]: false glossy buckthorn (*Frangula alnus*), FAC; sedge species (*Carex spp.*); green briar (*Smilax rotundifolia*), FAC; multiflora rose (*Rosa multiflora*), FACU; and sweet pepperbush (*Clethra alnifolia*), FAC. Located at the toe of a slope, standing water and saturated soils at the surface were present within the wetland. Although out of scope for this delineation, RIDEM Environmental Resource mapping depicts Wetland B200 within River Protection Region 2 and as part of a larger wetland complex (Mishnock Swamp) extending south and greater than 10 acres (*Figure 3 and 4*). Therefore, a 75-foot jurisdictional buffer zone and 100-ft contiguous area would be associated with this Forested Swamp.

Wetland C300 would be defined as a Forested Swamp under the RI Freshwater Wetland Act. Common vegetation identified within the wetland and adjacent to the project area includes [common name (*scientific name*), wetland indicator status]: white pine (*Pinus strobus*), FACU; red maple (*Acer rubrum*), FAC; Eastern white oak (*Quercus bicolor*), FACW; green briar (*Smilax rotundifolia*), FAC; and Japanese barberry (*Berberis thunbergia*), FACU. Saturated soils at the surface and groundwater at 6 inches were present within the wetland. Additionally, two stormwater channels originating from Reservoir Rd and Tiogue Ave discharge into this wetland. Although out of scope for this delineation, RIDEM Environmental Resource mapping depicts Wetland C300 within River Protection Region 2 and as part of a larger wetland complex (Mishnock Swamp) extending south and greater than 10 acres (*Figure 3 and 4*). It is likely C300 is connected to Wetland B200. Therefore, a 75-foot jurisdictional buffer zone and 100-ft contiguous area would be associated with this Forested Swamp.

Wetland H800 would be defined as a Forested Swamp under the RI Freshwater Wetland Act. Common vegetation identified within the wetland includes [common name (*scientific name*), wetland indicator status]: white pine (*Pinus strobus*), FACU; red maple (*Acer rubrum*), FAC; green briar (*Smilax rotundifolia*), FAC; sweet pepperbush (*Clethra alnifolia*), FAC; and grapevines (*Vitis spp.*). Standing water, saturated soils at the surface and water-stained leaves were present within the wetland. Although out of scope for this delineation, RIDEM Environmental Resource mapping depicts Wetland H800 within River Protection Region 2 and as part of a larger wetland complex extending north between 1 and 10 acres (*Figure 3 and 4*). Therefore, a 50-foot jurisdictional buffer zone and 100-ft contiguous area would be associated with this Forested Swamp.

Wetland I900 would be defined as a Forested Swamp under the RI Freshwater Wetland Act. Common vegetation identified within the wetland includes [common name (*scientific name*), wetland indicator status]: red maple (*Acer rubrum*) and an unidentified sapling species. Standing water and saturated soils at the surface were present within the wetland. This delineated wetland is within River Protection Region 2 and smaller than an acre and therefore, a 25-foot jurisdictional buffer zone and 100-ft contiguous area would be associated with this Scrub-shrub Swamp (*Figure 4*).

2.2.2 Marshes

“Marsh” means a place wholly or partly within the state where a vegetational community exists in standing or running water during the growing season and/or is made up of one or more of, but not limited to nor necessarily including all of, the following plants or groups of plants: hydrophytic reeds (Phragmites), grasses (Cramineae), mannagrasses (Glyceria), cutgrasses (Leersia), pickerelwoods (Pontederiaceae), sedges (Cyperaceae), rushes (Juncaceae), cattails (Typha), water plantains (Alismataceae), bur-reeds (Sparganiaceae), pondweeds (Zosteraceae), frog’s bits (Hydrocharitaceae), arums (Araceae), duckweeds (Lemmaceae), water lilies (Nymphaeaceae), water-milfoils (Haloragaceae), water-starworts (Callitricheae), bladder-worts (Utricularia), pipeworts (Eriocaulon), sweet gale (Myrica gale), and buttonbush (Cephalanthus occidentalis).

Wetland G700 would be defined as a Freshwater Marsh under the RI Freshwater Wetland Act. Common vegetation identified within the wetland includes [common name (*scientific name*), wetland indicator status]: sedge species (*Carex spp.*); skunk cabbage (*Symplocarpus foetidus*), OBL; and red maple (*Acre rubrum*), FAC. Standing water, bare ground, and a 10-inch layer of organic muck were present within the wetland. Although out of scope for this delineation, RIDEM Environmental Resource mapping depicts Wetland G700 extending north and bordering the Mishnock River (*Figure 3*). A 100-foot jurisdictional buffer zone and contiguous area would be associated with this marsh.

2.2.3 Rivers

“River” means a body of water designated as a perennial stream by the United States Department of Interior geologic survey (USGS) on 7.5 minute series topographic maps.

The Mishnock River is designated as a perennial stream by the USGS and is located within the South Branch Pawtuxet River Sub-Basin with a drainage area of approximately 10,645 acres. The Mishnock River within the Project Location flows north and crosses below Tiogue Ave, spanning approximately 15-30 feet in width. Upstream banks were delineated by Flag Series A100 and D400 and downstream banks by Flag Series E500 and F600. Banks A100, E500, and F600 were defined by steep topography and large rocks/boulders. Bank D400 was defined by a gradual slope adjacent to delineated wetlands. Flags were hung based on the Ordinary High Water Mark and observed physical characteristics in the field.

According to RIDEM’s Surface Water Buffer Zone Designations (*Figure 3*), the Mishnock River has a 150-foot buffer zone width due to its designation as a cold water fishery and a 200-ft contiguous area. The buffer zone within the Project Location is comprised of Tiogue Ave, marsh areas, forested swamp areas, residential and commercial buildings, and upland forest.

2.3 Floodplains

“Floodplain” means that land area adjacent to a river or stream or other body of flowing water which is, on the average, likely to be covered with flood waters resulting from a one-hundred (100) year frequency storm. A “one-hundred (100) year frequency storm” is one that is to be expected to be equaled or exceeded once in one hundred (100) years; or may be said to have a one percent (1%) probability of being equaled or exceeded in any given year.

Floodplains on site were determined based on FEMA mapping (*Figure 2*). FEMA Flood Insurance Rate Map (FIRM) Panel 44003C0112H (effective 10/1/2015) depicts floodplain within 75 ft of Tiogue Ave at the Mishnock River (Regulatory Floodway) crossing. FEMA’s limit of study occurs approximately 55 feet south of the road edge. Floodplain likely extends further than depicted on mapping. Additionally, the regulatory floodway north of Tiogue Ave likely follows Flag Series E500 and F600. Further investigation may be needed to determine the proper extent and floodplain elevations on site.

2.4 Areas subject to storm flowage and flooding

“Area subject to flooding” shall include, but not be limited to, low-lying areas that collect, hold, or meter out storm and flood waters from any of the following: rivers, streams, intermittent streams, or areas subject to storm flowage.

“Area subject to storm flowage” includes drainage swales and channels that lead into, out of, pass through, or connect other freshwater wetlands or coastal wetlands, and that carry flows resulting from storm events, but may remain relatively dry at other times.

One Area subject to storm flowage was identified at the southwestern-most extent of the project area. Two outlets from Reservoir Rd discharge stormwater south into Wetland C, following a well-defined stormwater channel with a sandy bottom.

Three Areas subject to flooding were identified:

1. Forested Swamp C receives flood waters from the Area subject to storm flowage mentioned above. See *Section 2.2.1* for a further description of the area.
2. Marsh G collects storm and flood waters from Mishnock River.
3. The upstream area river left of the Mishnock River is a low-lying area that transitions into wetland B200 and would receive flood waters from the river.

3 Summary of Wetland Function & Values Assessment

Function & values assessments were conducted in the field of the Freshwater Wetlands delineated at the Site. The assessments are largely based on the procedure outlined in the U.S. Army Corps of Engineers “Highway Methodology Work Book: Supplement. Wetland Functions and Values: A Descriptive Approach” (1999, NAEPP-360-1-30a). This methodology is descriptive and does not rely upon semi-quantitative numerical models to identify principal functions and values. In addition, other assessment methods were considered (e.g. Wisc. DNR, 1992, “Rapid Assessment Methodology for Evaluating Wetland functions and Values.” and Ammann, et al., 1996, “Method for the Evaluation of Inland Wetlands in Connecticut.”) as well as professional experience.

Table 3, below, provides a summary of the assessments of wetlands and watercourses conducted at the Site. Resource areas with similar Functions and Values (e.g., forested wetlands, watercourses) are assessed jointly. The 8 terms used to identify the Functions and Values are described in the attachment, *Explanation of the Terms Used in Wetlands/Watercourses Functions and Values*.

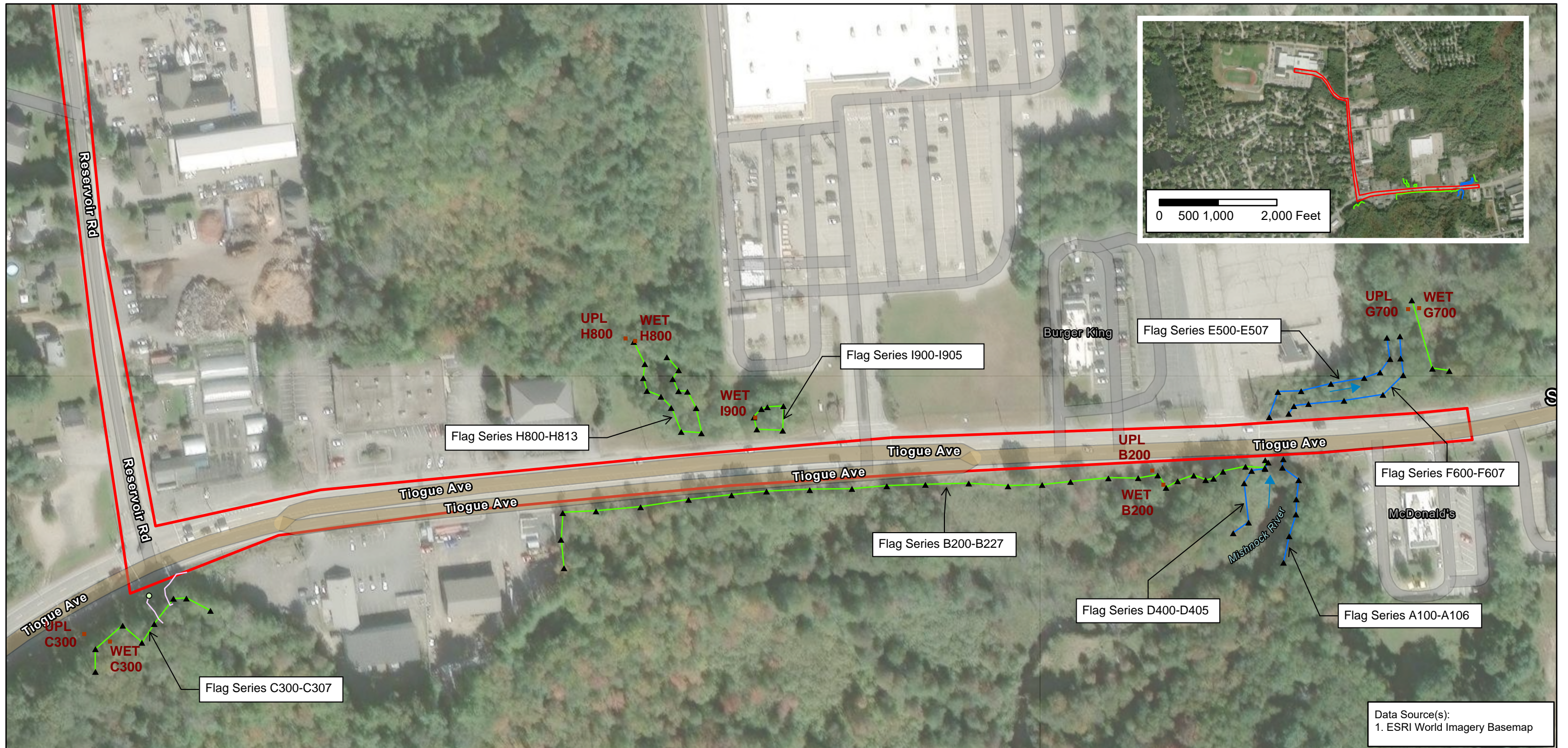
Table 3: Summary of Wetland/Watercourse Functions and Values

Wetland/ Watercourse delineated at the Site		Mishnock River	B200	C300	G700	H800	I900
FUNCTIONS & VALUES	Groundwater Recharge/Discharge	S	P	P	P	S	S
	Floodflow Alteration and Protection	-	P	P	P	-	-
	Fish & Shellfish Habitat	P	-	-	-	-	-
	Sediment/Toxicant/ Nutrient Retention	-	P	P	P	S	S
	Production Export	S	P	S	P	S	S
	Wildlife Habitat	P	P	P	P	P	P
	Educational/Scientific/ Recreation Value	-	-	-	-	-	-
	Uniqueness/Heritage*	-	-	-	-	-	-

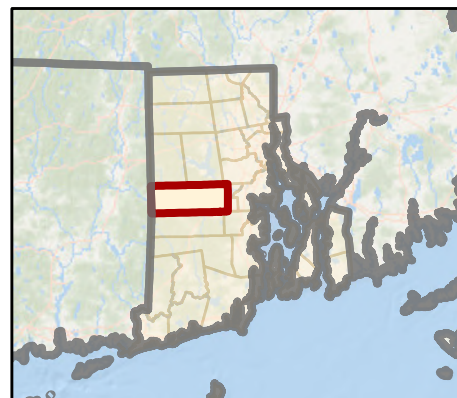
“P” = Principal Function or Value; “S” = Secondary Function or Value; “-” = assessed, no P or S assigned.

Note: The site *may* contain endangered, threatened, and/or special concern species, as it is located within a Natural Heritage Area, mapped by the University of Rhode Island Environmental Data Center and RIGIS. While RIGIS maps show the approximate locations of endangered, threatened, and special concern species, this mapping does not confirm their presence or absence at the Site. State and Federal species list should be reviewed, and best management practices should be adhered to.

Figures



Data Source(s):
1. ESRI World Imagery Basemap



- Approximate Project Area
- ▲ Delineation Flag
- Sample Plot
- Approximate Ordinary High Water Flag Line
- Approximate Wetland Flag Line
- Culvert
- ASSF

The wetlands depicted in this sketch were identified and delineated in the field by Kristin Connell, Wetland Scientist (Fuss & O'Neill) and Qualified Soils Scientist on April 1, 2024.

0 38 75 150 Feet



Wetland Delineation Sketch Map

Coventry High School Sewer Extension

Coventry

Rhode Island

FUSS & O'NEILL
146 Hartford Road
Manchester, CT 06040
860.646.2469 | www.fando.com

Figure 1

Disclaimer: This map is not the product of a Professional Land Survey. It was created by Fuss & O'Neill, Inc. for general reference, informational, planning and guidance use, and is not a legally authoritative source as to location of natural or manmade features. Proper interpretation of this map may require the assistance of appropriate professional services. Fuss & O'Neill, Inc. makes no warranty, express or implied, related to the spatial accuracy, reliability, completeness, or currentness of this map. Note: Delineation flags were collected by GPS within 1 meter accuracy.

National Flood Hazard Layer FIRMMette



71°35'35"W 41°41'9"N



Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

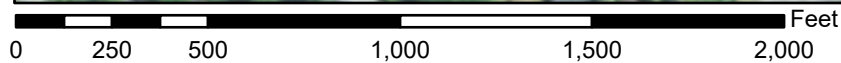
SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) <i>Zone A, V, A99</i>
		With BFE or Depth <i>Zone AE, AO, AH, VE, AR</i>
		Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD		0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile <i>Zone X</i>
		Future Conditions 1% Annual Chance Flood Hazard <i>Zone X</i>
		Area with Reduced Flood Risk due to Levee. See Notes. <i>Zone X</i>
		Area with Flood Risk due to Levee <i>Zone D</i>
OTHER AREAS		NO SCREEN Area of Minimal Flood Hazard <i>Zone X</i>
		Effective LOMRs
GENERAL STRUCTURES		Area of Undetermined Flood Hazard <i>Zone D</i>
		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall
OTHER FEATURES		Cross Sections with 1% Annual Chance Water Surface Elevation
		Coastal Transect
		Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary
		Coastal Transect Baseline
MAP PANELS		Digital Data Available
		No Digital Data Available
		Unmapped
		The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.



This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on **5/29/2024 at 8:25 AM** and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.



1:6,000

71°34'57"W 41°40'42"N

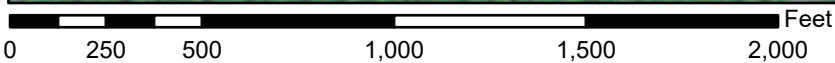
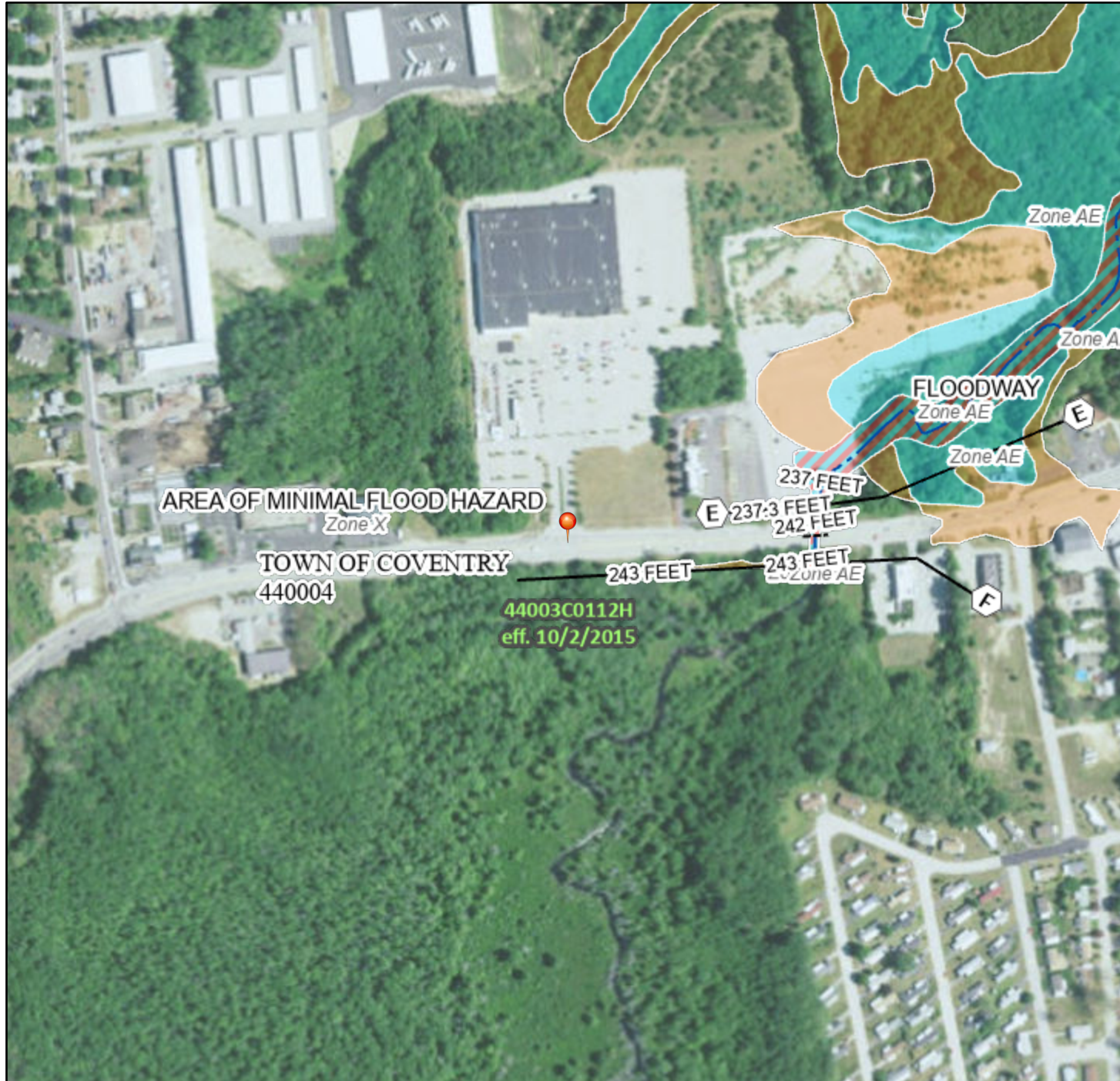
Basemap Imagery Source: USGS National Map 2023

Figure 2A

National Flood Hazard Layer FIRMMette



71°35'18"W 41°40'58"N



1:6,000

71°34'40"W 41°40'31"N

Basemap Imagery Source: USGS National Map 2023

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) Zone A, V, A99
		With BFE or Depth Zone AE, AO, AH, VE, AR
		Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD		0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
		Future Conditions 1% Annual Chance Flood Hazard Zone X
		Area with Reduced Flood Risk due to Levee. See Notes. Zone X
		Area with Flood Risk due to Levee Zone D
OTHER AREAS		NO SCREEN Area of Minimal Flood Hazard Zone X
		Effective LOMRs
		Area of Undetermined Flood Hazard Zone D
GENERAL STRUCTURES		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall
OTHER FEATURES		20.2 Cross Sections with 1% Annual Chance
		17.5 Water Surface Elevation
		Coastal Transect
		Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary
		Coastal Transect Baseline
		Profile Baseline
		Hydrographic Feature
MAP PANELS		Digital Data Available
		No Digital Data Available
		Unmapped



The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

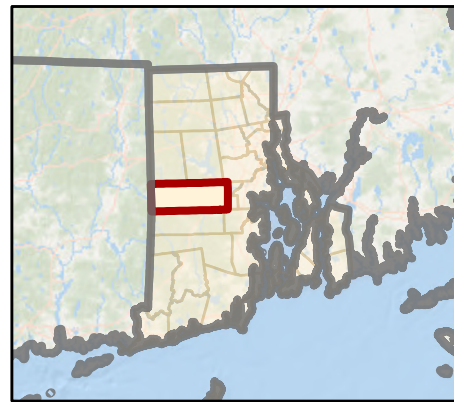
The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on **5/29/2024 at 8:24 AM** and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

Figure 2B



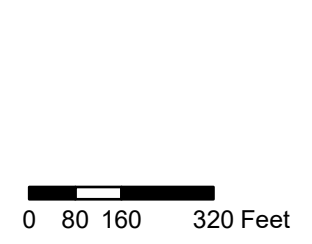
Data Source(s):
 1. ESRI World Imagery Basemap
 2. RIDEM Freshwater Rivers and Streams (1:5000), 2016
 3. RIDEM Natural Heritage Areas, 2023
 4. RIDEM Wetland Types, 1993



- Approximate Project Area
- RIDEM Freshwater Rivers and Streams
- Natural Heritage Areas

- RIDEM Wetland Types**
- Emergent Wetland: Marsh/Wet Meadow
 - Forested Wetland: Coniferous
 - Forested Wetland: Deciduous

- Palustrine Open Water
- Scrub-Shrub Swamp
- Scrub-Shrub Wetland: Shrub Fen or Upland



Environmental Resources Map
 Coventry High School Sewer Extension

Coventry Rhode Island

FUSS & O'NEILL
 146 Hartford Road
 Manchester, CT 06040
 860.646.2469 | www.fando.com

Figure 3

Disclaimer: This map is not the product of a Professional Land Survey. It was created by Fuss & O'Neil, Inc. for general reference, informational, planning and guidance use, and is not a legally authoritative source as to location of natural or manmade features. Proper interpretation of this map may require the assistance of appropriate professional services. Fuss & O'Neil, Inc. makes no warranty, express or implied, related to the spatial accuracy, reliability, completeness, or currentness of this map.

Coventry High School Sewer Extension
Coventry, RI

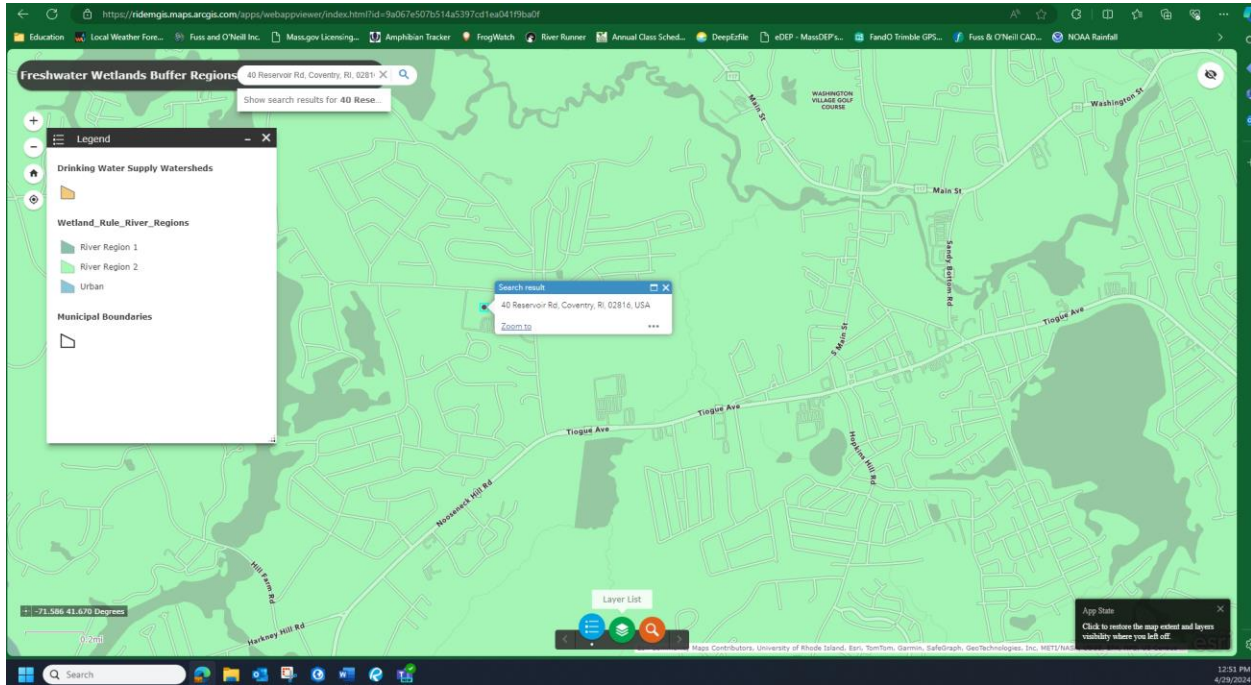


Figure 4
RIDEM Freshwater Wetlands Buffer Regions, accessed April 29, 2024.

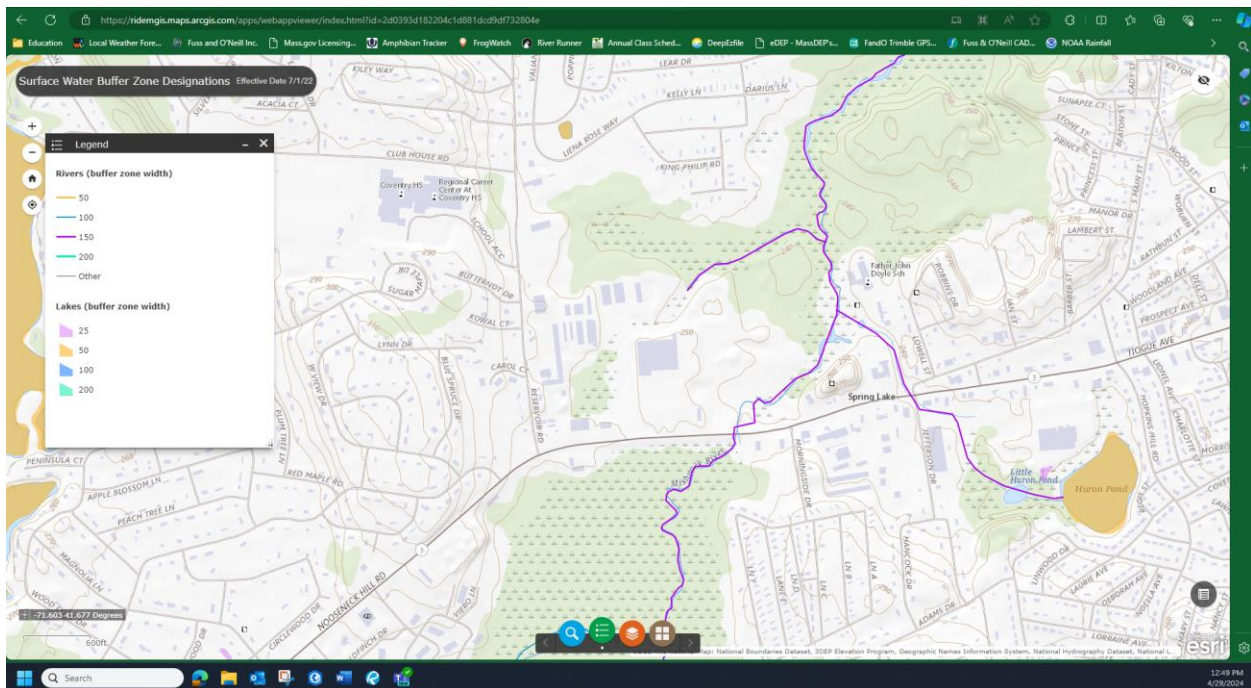


Figure 5
RIDEM Surface Water Buffer Zone Designations, accessed April 29, 2024

Attachment A

Site Photographs



Photo 1. Mishnock River, upstream of crossing with Tiogue Ave. Ordinary High Water delineated by flag series "A100" and "D400", looking west near flag A100.



Photo 2. Mishnock River, upstream of crossing with Tiogue Ave. Ordinary High Water delineated by flag series "A100" and "D400", looking south near flag A100 and D400.



Photo 3. Scrub shrub swamp area delineated by flag series "B200" looking south near wetland flag B205.



Photo 4. Scrub shrub swamp area delineated by flag series "C300" looking south near wetland flag C301.



Photo 5. Mishnock River, downstream of crossing with Tiogue Ave. Ordinary High Water delineated by flag series “E500” and “F600”, looking east near flag E500.



Photo 6. Emergent marsh area delineated by flag series “G700”, looking south near wetland flag G700.



Photo 7. Emergent marsh area delineated by flag series "G700", looking east near wetland flag G700.



Photo 8. Forested swamp area delineated by flag series "H800", looking east near wetland flag H802.

Site Photographs: Coventry High School Sewer Extension
Coventry, RI

Date of field investigation: April 1, 2024

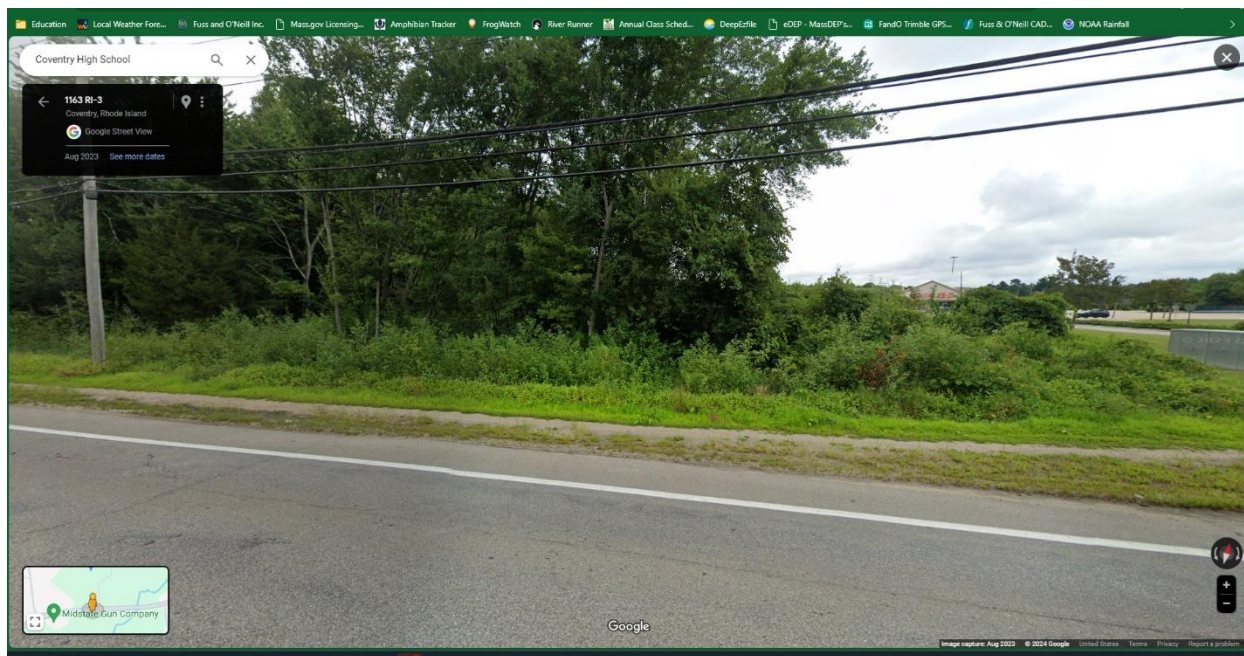


Photo 9. Forested swamp area delineated by flag series "I900". Photo from Google Maps, looking north (August 2023).

Attachment B

RI DEM Wetland Edge Delineation Forms



RHODE ISLAND DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF WATER RESOURCES - Groundwater and Freshwater Wetlands Protection
FRESHWATER WETLANDS PROGRAM
235 Promenade Street, Providence, RI 02908
Telephone: 401-222-6820; Rhode Island Relay: 711
www.dem.ri.gov/wetlands

WETLAND EDGE DELINEATION FORM INSTRUCTIONS

Pursuant to § 3.9.3(E) of the [Rules and Regulations Governing the Administration and Enforcement of the Freshwater Wetlands Act \(Rules\) \[250-RICR-150-15-3\]](#), applicants must complete, and provide to RIDEM, documentation which describes the reasoning used to delineate wetland edges whenever requesting verification of a wetland edge. For this purpose, the applicant must complete the attached Wetland Edge Delineation Forms. These forms (see attached) are not meant to provide quantitative plot data, but rather to provide RIDEM with an outline of the reasoning used to delineate a particular **wetland edge**. While the vegetative community may change abruptly in some circumstances, other plant communities may transition very gradually to upland. In these cases, other hydrologic indicators, such as soil redoximorphic features, often must be considered in determining existing hydrological conditions. Completion of these data forms will provide RIDEM biologists with a clearer understanding of all the factors considered by an applicant or their consultant in delineating the boundary of a given wetland area.

At a minimum, one set of data forms (upland and wetland) must be completed for each wetland on the site. More than one set should be provided wherever changes in vegetative community composition, soil characteristics, topography, or other factor(s) might cause a change in reasoning for determination of the wetland edge. For example, if the edge of wetland "X" is located at the base of a steep slope with a clear vegetative break in one area (Flag Nos 1-27), but within a broad, transitional zone dominated by facultative vegetation in another area (Flag Nos. 28-56), at least two sets of data forms should be filled out for that wetland, since the reasoning behind the delineation (changes in vegetative species, topography and/or soil characteristics) is different in the two areas. If only one set of data forms is provided for a given wetland, it will be assumed that the same reasoning was used for determination of the entire wetland edge and the wetland flagging will be reviewed accordingly.

Properly completed forms which support an accurate edge only increase the speed by which RIDEM's verification can be completed. This in turn will get a quicker, less troublesome answer back to the applicant. Substantial inaccuracies can often be attributed to a lack of supporting data used to locate the wetland edge. In turn, these inaccuracies only increase delays and problems with verifying the wetland edge.

All wetland edge delineations are to be accomplished in accordance with § 3.21 of the Rules.

Wetland Edge Delineation Data Form (UPLAND)

Applicant: _____

Wetland No. _____

Project Name: _____

Flag No. Sequence: _____

City/Town: _____

Delineation Date: _____

Vegetation: List the three dominant species in each vegetative strata along with their NWI status:

Tree	Indicator Status	Herbs	Indicator Status

Saplings/Shrubs	Indicator Status	Woody Vines	Indicator Status

List other vegetative species noted which may have affected determination of the wetland edge: _____

Soil: SCS Soil Survey Mapping Unit: _____

On Hydric Soils List? YES NO

Soil Profile (Note wetland flag no. nearest soil test pit): _____

Horizon	Depth	Matrix Color	Mottling Description	Depth to Saturation	Depth to Free Water

Other indicators exhibiting an absence of wetland hydrology (e.g. absence of water marks, lack of redoximorphic features, lack of oxidized rhizospheres, etc.): _____

Landscape position: _____

Altered/atypical situation? (describe): _____

Comments: _____

Wetland Edge Delineation Data Form (WETLAND)

Applicant: _____

Wetland No. _____

Project Name: _____

Flag No. Sequence: _____

City/Town: _____

Delineation Date: _____

Vegetation: List the three dominant species in each vegetative strata along with their NWI status:

Tree	Indicator Status	Herbs	Indicator Status

Saplings/Shrubs	Indicator Status	Woody Vines	Indicator Status

List other vegetative species noted which may have affected determination of the wetland edge: _____

Soil: SCS Soil Survey Mapping Unit: _____

On Hydric Soils List? YES NO

Soil Profile (Note wetland flag no. nearest soil test pit): _____

Horizon	Depth	Matrix Color	Mottling Description	Depth to Saturation	Depth to Free Water

Other indicators exhibiting an absence of wetland hydrology (e.g. water marks, drainage patterns, root rhizospheres, etc.; see § 3.21.1 (D) of the Rules): _____

Landscape position: _____

Altered/atypical situation? (describe): _____

Comments: _____

Wetland Edge Delineation Data Form (UPLAND)

Applicant: _____

Wetland No. _____

Project Name: _____

Flag No. Sequence: _____

City/Town: _____

Delineation Date: _____

Vegetation: List the three dominant species in each vegetative strata along with their NWI status:

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Saplings/Shrubs	Indicator Status	Woody Vines	Indicator Status

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Soil: SCS Soil Survey Mapping Unit: _____

On Hydric Soils List? YES NO

Soil Profile (Note wetland flag no. nearest soil test pit): _____

Horizon	Depth	Matrix Color	Mottling Description	Depth to Saturation	Depth to Free Water

Other indicators exhibiting an absence of wetland hydrology (e.g. absence of water marks, lack of redoximorphic features, lack of oxidized rhizospheres, etc.): _____

Landscape position: _____

Altered/atypical situation? (describe): _____

Comments: _____

Wetland Edge Delineation Data Form (WETLAND)

Applicant: _____

Wetland No. _____

Project Name: _____

Flag No. Sequence: _____

City/Town: _____

Delineation Date: _____

Vegetation: List the three dominant species in each vegetative strata along with their NWI status:

Tree	Indicator Status	Herbs	Indicator Status

Saplings/Shrubs	Indicator Status	Woody Vines	Indicator Status

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Horizon	Depth	Matrix Color	Mottling Description	Depth to Saturation	Depth to Free Water

Other indicators exhibiting an absence of wetland hydrology (e.g. water marks, drainage patterns, root rhizospheres, etc.; see § 3.21.1 (D) of the Rules): _____

Landscape position: _____

Altered/atypical situation? (describe): _____

Comments: _____

Wetland Edge Delineation Data Form (UPLAND)

Applicant: _____

Wetland No. _____

Project Name: _____

Flag No. Sequence: _____

City/Town: _____

Delineation Date: _____

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Saplings/Shrubs	Indicator Status	Woody Vines	Indicator Status

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Soil: SCS Soil Survey Mapping Unit: _____

On Hydric Soils List? YES NO

Soil Profile (Note wetland flag no. nearest soil test pit): _____

Horizon	Depth	Matrix Color	Mottling Description	Depth to Saturation	Depth to Free Water

Other indicators exhibiting an absence of wetland hydrology (e.g. absence of water marks, lack of redoximorphic features, lack of oxidized rhizospheres, etc.): _____

Landscape position: _____

Altered/atypical situation? (describe): _____

Comments: _____

Wetland Edge Delineation Data Form (WETLAND)

Applicant: _____

Wetland No. _____

Project Name: _____

Flag No. Sequence: _____

City/Town: _____

Delineation Date: _____

Vegetation: List the three dominant species in each vegetative strata along with their NWI status:

Tree	Indicator Status	Herbs	Indicator Status

Saplings/Shrubs	Indicator Status	Woody Vines	Indicator Status

List other vegetative species noted which may have affected determination of the wetland edge: _____

Soil: SCS Soil Survey Mapping Unit: _____

On Hydric Soils List? YES NO

Soil Profile (Note wetland flag no. nearest soil test pit): _____

Horizon	Depth	Matrix Color	Mottling Description	Depth to Saturation	Depth to Free Water

Other indicators exhibiting an absence of wetland hydrology (e.g. water marks, drainage patterns, root rhizospheres, etc.; see § 3.21.1 (D) of the Rules): _____

Landscape position: _____

Altered/atypical situation? (describe): _____

Comments: _____

Wetland Edge Delineation Data Form (UPLAND)

Applicant: _____

Wetland No. _____

Project Name: _____

Flag No. Sequence: _____

City/Town: _____

Delineation Date: _____

Vegetation: List the three dominant species in each vegetative strata along with their NWI status:

Tree	Indicator Status	Herbs	Indicator Status

Saplings/Shrubs	Indicator Status	Woody Vines	Indicator Status

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Soil: SCS Soil Survey Mapping Unit: _____

On Hydric Soils List? YES NO

Soil Profile (Note wetland flag no. nearest soil test pit): _____

Horizon	Depth	Matrix Color	Mottling Description	Depth to Saturation	Depth to Free Water

Other indicators exhibiting an absence of wetland hydrology (e.g. absence of water marks, lack of redoximorphic features, lack of oxidized rhizospheres, etc.): _____

Landscape position: _____

Altered/atypical situation? (describe): _____

Comments: _____

Wetland Edge Delineation Data Form (WETLAND)

Applicant: _____

Wetland No. _____

Project Name: _____

Flag No. Sequence: _____

City/Town: _____

Delineation Date: _____

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Soil Profile (Note wetland flag no. nearest soil test pit): _____

Horizon	Depth	Matrix Color	Mottling Description	Depth to Saturation	Depth to Free Water

Other indicators exhibiting an absence of wetland hydrology (e.g. water marks, drainage patterns, root rhizospheres, etc.; see § 3.21.1 (D) of the Rules): _____

Landscape position: _____

Altered/atypical situation? (describe): _____

Comments: _____

Wetland Edge Delineation Data Form (UPLAND)

Applicant: _____

Wetland No. _____

Project Name: _____

Flag No. Sequence: _____

City/Town: _____

Delineation Date: _____

Vegetation: List the three dominant species in each vegetative strata along with their NWI status:

Tree	Indicator Status	Herbs	Indicator Status

Saplings/Shrubs	Indicator Status	Woody Vines	Indicator Status

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Soil: SCS Soil Survey Mapping Unit: _____

On Hydric Soils List? YES NO

Soil Profile (Note wetland flag no. nearest soil test pit): _____

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Other indicators exhibiting an absence of wetland hydrology (e.g. absence of water marks, lack of redoximorphic features, lack of oxidized rhizospheres, etc.): _____

Landscape position: _____

Altered/atypical situation? (describe): _____

Comments: _____

Wetland Edge Delineation Data Form (WETLAND)

Applicant: _____

Wetland No. _____

Project Name: _____

Flag No. Sequence: _____

City/Town: _____

Delineation Date: _____

Vegetation: List the three dominant species in each vegetative strata along with their NWI status:

Tree	Indicator Status	Herbs	Indicator Status

Saplings/Shrubs	Indicator Status	Woody Vines	Indicator Status

List other vegetative species noted which may have affected determination of the wetland edge: _____

Soil: SCS Soil Survey Mapping Unit: _____

On Hydric Soils List? YES NO

Soil Profile (Note wetland flag no. nearest soil test pit): _____

Horizon	Depth	Matrix Color	Mottling Description	Depth to Saturation	Depth to Free Water

Other indicators exhibiting an absence of wetland hydrology (e.g. water marks, drainage patterns, root rhizospheres, etc.; see § 3.21.1 (D) of the Rules): _____

Landscape position: _____

Altered/atypical situation? (describe): _____

Comments: _____

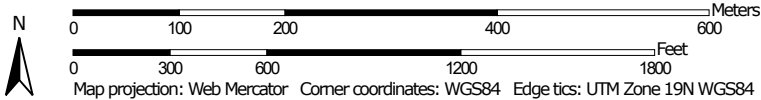
Attachment C

NRCS Hydric Rating by Map Unit

Hydric Rating by Map Unit—State of Rhode Island: Bristol, Kent, Newport, Providence, and Washington Counties
(Coventry Highschool Sewer Extension)




Map Scale: 1:7,130 if printed on A landscape (11" x 8.5") sheet.









MAP LEGEND

Area of Interest (AOI)







 Area of Interest (AOI)

Soils







Soil Rating Polygons

 Hydric (100%)
 Hydric (66 to 99%)
 Hydric (33 to 65%)
 Hydric (1 to 32%)
 Not Hydric (0%)
 Not rated or not available


Soil Rating Lines

 Hydric (100%)
 Hydric (66 to 99%)
 Hydric (33 to 65%)
 Hydric (1 to 32%)
 Not Hydric (0%)
 Not rated or not available






Soil Rating Points

 Hydric (100%)
 Hydric (66 to 99%)
 Hydric (33 to 65%)
 Hydric (1 to 32%)
 Not Hydric (0%)
 Not rated or not available


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.

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 Rhode Island: Bristol, Kent, Newport, Providence, and Washington Counties
 Survey Area Data: Version 23, Sep 8, 2023

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

Date(s) aerial images were photographed: Jun 14, 2022—Jul 1, 2022

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.

Hydric Rating by Map Unit

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
ChB	Canton and Charlton fine sandy loams, 0 to 8 percent slopes, very stony	5	16.3	22.7%
Dc	Deerfield loamy fine sand, 0 to 3 percent slopes	5	1.3	1.8%
FeA	Freetown muck, 0 to 1 percent slopes	100	4.5	6.3%
HkC	Hinckley loamy sand, 8 to 15 percent slopes	0	2.7	3.8%
MmB	Merrimac fine sandy loam, 3 to 8 percent slopes	0	14.9	20.8%
Sb	Scarboro mucky fine sandy loam, 0 to 3 percent slopes	100	4.3	6.0%
SwA	Swansea muck, 0 to 1 percent slopes	100	0.3	0.5%
UD	Udorthents-Urban land complex	0	14.4	20.1%
Ur	Urban land	0	8.7	12.1%
Wa	Walpole sandy loam, 0 to 3 percent slopes	90	3.5	4.9%
WgB	Windsor loamy sand, 3 to 8 percent slopes	0	0.7	0.9%
Totals for Area of Interest			71.5	100.0%

Description

This rating indicates the percentage of map units that meets the criteria for hydric soils. Map units are composed of one or more map unit components or soil types, each of which is rated as hydric soil or not hydric. Map units that are made up dominantly of hydric soils may have small areas of minor nonhydric components in the higher positions on the landform, and map units that are made up dominantly of nonhydric soils may have small areas of minor hydric components in the lower positions on the landform. Each map unit is rated based on its respective components and the percentage of each component within the map unit.

The thematic map is color coded based on the composition of hydric components. The five color classes are separated as 100 percent hydric components, 66 to 99 percent hydric components, 33 to 65 percent hydric components, 1 to 32 percent hydric components, and less than one percent hydric components.

In Web Soil Survey, the Summary by Map Unit table that is displayed below the map pane contains a column named 'Rating'. In this column the percentage of each map unit that is classified as hydric is displayed.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, 1994). Under natural conditions, these soils are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register, 2002). These criteria are used to identify map unit components that normally are associated with wetlands. The criteria used are selected estimated soil properties that are described in "Soil Taxonomy" (Soil Survey Staff, 1999) and "Keys to Soil Taxonomy" (Soil Survey Staff, 2006) and in the "Soil Survey Manual" (Soil Survey Division Staff, 1993).

If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils are specified in "Field Indicators of Hydric Soils in the United States" (Hurt and Vasilas, 2006).

References:

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.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18.

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.

Soil Survey Staff. 2006. Keys to soil taxonomy. 10th edition. U.S. Department of Agriculture, Natural Resources Conservation Service.

Rating Options

Aggregation Method: Percent Present

Aggregation is the process by which a set of component attribute values is reduced to a single value that represents the map unit as a whole.

A map unit is typically composed of one or more "components". A component is either some type of soil or some nonsoil entity, e.g., rock outcrop. For the attribute being aggregated, the first step of the aggregation process is to derive one attribute value for each of a map unit's components. From this set of component attributes, the next step of the aggregation process derives a single value that represents the map unit as a whole. Once a single value for each map unit is derived, a thematic map for soil map units can be rendered. Aggregation must be done because, on any soil map, map units are delineated but components are not.

For each of a map unit's components, a corresponding percent composition is recorded. A percent composition of 60 indicates that the corresponding component typically makes up approximately 60% of the map unit. Percent composition is a critical factor in some, but not all, aggregation methods.

The aggregation method "Percent Present" returns the cumulative percent composition of all components of a map unit for which a certain condition is true. For example, attribute "Hydric Rating by Map Unit" returns the cumulative percent composition of all components of a map unit where the corresponding hydric rating is "Yes". Conditions may be simple or complex. At runtime, the user may be able to specify all, some or none of the conditions in question.

Component Percent Cutoff: None Specified

Components whose percent composition is below the cutoff value will not be considered. If no cutoff value is specified, all components in the database will be considered. The data for some contrasting soils of minor extent may not be in the database, and therefore are not considered.

Tie-break Rule: Lower

The tie-break rule indicates which value should be selected from a set of multiple candidate values, or which value should be selected in the event of a percent composition tie.

Attachment D

Explanation of Terms Used in Wetlands/
Watercourse Functions and Values Assessments

Explanation of Terms Used in Wetlands/Watercourses Function and Values

According to the U.S. Army Corps of Engineers "Highway Methodology Work Book: Supplement. Wetland Functions and Values: A Descriptive Approach" (1999, NAEEP-360-1-30a):

Functions are self-sustaining properties and processes of a wetland. They result from living and non-living components of a specific wetland and describe its ecological significance independent of human valuation. **Values** are benefits that derive from one or more functions and characteristics associated with a wetland. Most wetlands have corresponding societal value that is recognized in federal, state, and/or local legislation to protect these resources.

An assessment of *Primary* or *Secondary* indicates the relative number of satisfied criteria used as "considerations and qualifiers" for a particular function or value.

Terms

Groundwater Recharge & Discharge The capacity or potential for a wetland to interact with groundwater such that water moves from surface water to ground water (Recharge) or from ground water to surface water (Discharge).

Floodflow Alteration The storage of inflowing water from storm or flooding events, resulting in detention and retention of water on the wetland surface.

Fish and Shellfish Habitat (Streams & Rivers) Considers the quality of the aquatic habitat of a perennial watercourse, and its capacity to support finfish.

Sediment/Toxicant/Nutrient Retention The capacity of a wetland to remove dissolved, suspended and floatable material from and prevent the degradation of water quality.

Production Export The capacity to produce wildlife food sources, or to export biomass that sustains downstream ecosystems and local wildlife populations.

Wildlife Habitat The capacity of a wetland to support a diverse and abundant wildlife community typically associated with wetland and wetland edges.

Educational/Scientific/Recreation Value The suitability of a wetland for classroom field trips or scientific research. The ability of watercourses to provide passive or active recreational opportunities such as canoeing, boating, fishing, hunting, and other activities.

Uniqueness/Heritage The degree to which a wetland is considered a unique natural and/or historical resource.