

FULLER ENGINEERING & LAND SURVEYING, LLC

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Information prepared for:

WESTERN GROUP, LLC

#245 Route 32

Montville, CT

&

Town of Montville

Department of Public Works / Engineering Department

Project Name: Wilton's Way Proposed Residential Development



ENGINEERING REPORT

Documentation

Dated: January 25, 2022

Revised: March 8, 2022

Revised February 10, 2026 (Site Plan Modification)

FULLER ENGINEERING & LAND SURVEYING, LLC
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OWNER/APPLICANT: WESTERN GROUP, LLC
PROJECT LOCATION: WILTONS WAY #245 Route 32,
Montville, Connecticut

DRAINAGE STUDY

SITE PLAN MODIFICATION NARRATIVE

The purpose of this application is for a Site Plan Modification for Phases 2, 3, and 4. The first six (6) units of Phase 1 of the approved site plan has been completed and approved for a certificate of occupancy. The upper stormwater infiltration system has been installed and connected to the lower-level spreader system via temporary piping.

Changes from the original approved application:

- 1. As-built Survey has been added.*
- 2. Phase 1 As-built conditions have been added to the proposed drawings*
- 3. Pad elevations have been raised to reflect as-built conditions*
- 4. Sanitary sewer system is now gravity instead of pump.*

Conditions that remain the same:

- 1. Pavement extents*
- 2. Phase 2 subsurface drainage system*
- 3. Unit and parking counts*
- 4. Phase 2, 3, & 4 Planting and Lighting*

INTRODUCTION

The purpose of this study is to outline the storm water analysis for the proposed development at #245 Norwich-New London Road Town of Montville, Route 32 Uncasville, CT. The storm water management plan is based on a hydrologic analysis of pre-development and post-development conditions using a Type III-24 Hour, for 25 –year frequency storms. The peak flow rate and the increase in runoff for up to the 50-year storm frequency is being compared in this study. The hydrological analysis is conducted within the area of the property as bounded by the property lines shown on the plan only.

Western Group, LLC is proposing to construct four (4) multi-level residential condominium buildings, new driveways and miscellaneous landscaping at 245 Norwich-New London Road,

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Route 32 Montville, CT. The proposed development is located on the east side of State Route 32 travelling northbound. Refer to the plan titled “Wilton’s Way” 22 Unit Condominium Development dated January 4, 2022, Revised February 10, 2026 prepared for Western Group, LLC prepared by Fuller Engineering & Land Surveying, LLC for the extent of the proposed development.

The proposed development will increase the amount of impervious area on the site, and will therefore increase the runoff rain water leaving the site. The analysis did not consider back-to-back storms.

PRE-DEVELOPMENT CONDITIONS

The site considered in this study is the entire area of the property which is located in the C-1 District, which is a Commercial Zone, although the proposed development will be strictly residential use. The total area (79,607 s.f.) (1.828 acre) currently is composed of mainly pervious surfaces with little impervious land surface.

The runoff from this area sheet flows towards the East at the low point on the property (considered as POC "A") (outfall 1L in Hydrocad). The peak flow towards POC "A" for a Type III-24 Hour, for 25 –year frequency storms is 4.76 cfs.

PROPOSED POST-DEVELOPMENT CONDITIONS

The proposed developments on said parcel with area of (79,607 s.f.) will be four (4) multi story residential condominium buildings, common drive and independent driveway/parking and miscellaneous landscaping. The proposed development will increase the impervious surface by 42,965 s.f. within the watershed encompassing POC "A". Stormwater runoff from the proposed building and basement driveway will be directed to the inlet structure which is connected to 60 units 4' x 8' x 4' Concrete Galleys in 2 groups, first set of 28 embedded in 58' x 18.6' x 5.17' gravel bed, and a second set of 32 embedded in 66' x 18.6' x 5.17' gravel bed to help treat water quality and attenuate the storm water runoff going to the control structure at the back of the retaining wall before discharging to 12" RCP to the 40' long ADS-N12 15"Ø slotted pipe encased in 42' x 3.5' x 3.17' gravel bed Level Spreader moving towards POC "A" (outfall 1L in Hydrocad). Storm water runoff from the driveways and common drive will sheet flow into common drive catch basin distributing the stormwater along the edge of the common drive in a storm sewer system. Roof drains will be directly connected underground to the concrete galley system. The overflow of the concrete galley system will be directed to a control structure which will discharge the water into a energy dissipating level spreader. The peak flow towards POC "A" for a Type III-24 Hour, for 25 –year frequency storm, post development is 4.52 cfs. which is less than the pre development conditions.

DESIGN METHODOLOGY

The site consists of a Hydrological Soil Group (HSG) rating C (refer to Appendix B) which is used in the analysis. The following CN values are used; (a) 98 for impervious surfaces; (b) 81 for HSG C, 30% imp. 1/3 acre residential; (c) 65 for HSG C, 50-75% grass cover, good condition.

HydroCAD Version 10.0 was utilized to evaluate the runoff volume and peak discharge rates of the pre and post-development conditions. The design storm frequencies considered are the 2-year, 5-year, 10-year, 25-year, and 50-year storm frequencies. They were used in the analysis with the following 24-hour rainfall total; 2-year, 3.46 inches; 5-year, 4.36 in.; 10-year, 5.12 inches; 25-year, 6.15 inches; and 50-year, 6.93 inches. The peak flow towards POC “A” at the wooded border is less than the pre-development runoff peak flows as shown in Table 1.

TABLE 1 – Peak Flows in cfs/Volume in C.F.

STORM EVENT	LINK/POC	FLOW/VOLUME	EXISTING	PROPOSED	Δ	Δ (%)
2 Year Storm	LINK 1 (A)	q (ft ³ /s)	1.61	0.18	-1.43	-88.8
		v (ft ³)	7613	1187	-6426	-84.4
5 Year Storm	LINK 1 (A)	q (ft ³ /s)	2.6	0.84	-1.76	-67.7
		v (ft ³)	11831	2936	-8895	-75.2
10 Year Storm	LINK 1 (A)	q (ft ³ /s)	3.49	1.72	-1.77	-50.7
		v (ft ³)	15694	6274	-9420	-60.0
25 Year Storm	LINK 1 (A)	q (ft ³ /s)	4.76	4.52	-0.24	-5.0
		v (ft ³)	21240	11149	-10091	-47.5
50 Year Storm	LINK 1 (A)	q (ft ³ /s)	5.75	6.17	0.42	7.3
		v (ft ³)	25616	15101	-10515	-41.0

Based on the tabulated results above, the peak flows and the run off volume of the post-development condition are less than the pre-development conditions.

SOIL EROSION AND SEDIMENTATION CONTROL

For temporary condition or during construction a silt fence shall be provided along the

property lines. Anti-tracking aprons shall be provided at all access routes from the site to the public road. A temporary diversion berm with stone check dams @ 50 ft o.c. shall be maintained and relocated as required during construction. All planting areas shall be protected with slope stabilization measures.

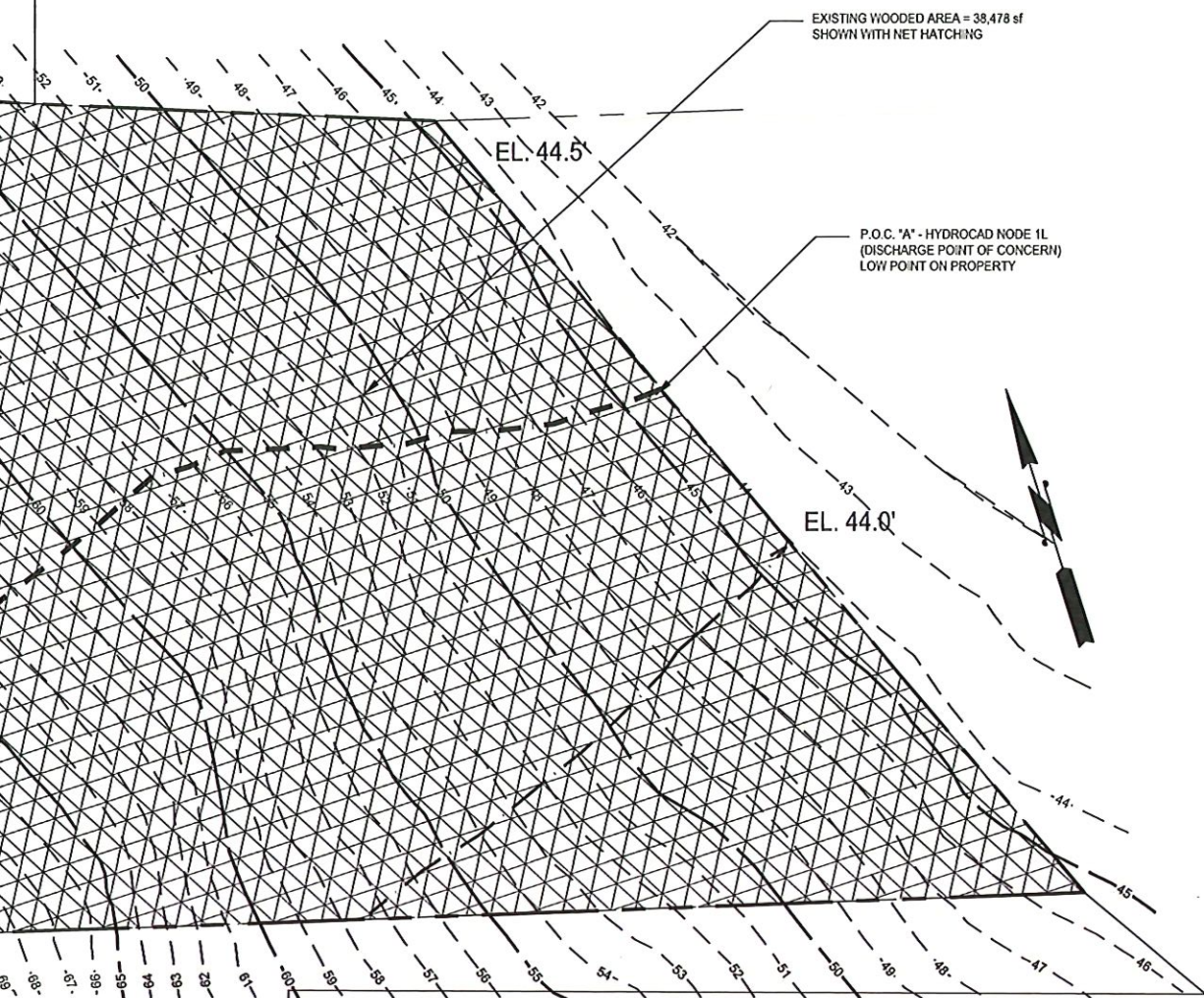
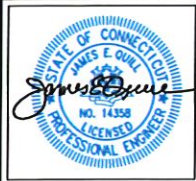
For permanent condition, all embankments, after being stabilized, shall be sodded. Newly planted areas shall be covered with straw or erosion control blankets.

CONCLUSION

The proposed development will increase the impervious coverage on the site thus increase the volume and peak flow rate of runoff generated during a storm event. However, to address the water quality volume and peak flow issues, a subsurface detention/retention system will be installed to treat and attenuate the storm water runoff. The proposed development will not increase the peak flow rate to the POC for up to the 25-year frequency storm.

Since the proposed development incorporates pre-treatment and attenuation of runoff to the maximum extent practical, if the proposed development is constructed as depicted on the proposed development plans, then there will be no adverse impacts to adjoining properties and/or street drainage.

EXHIBITS "A" AND "B"
WATERSHED MAPS
FOR
EXISTING & PROPOSED CONDITIONS



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WILTON'S WAY
22 UNIT CONDOMINIUM DEVELOPMENT
 245 NORWICH-NEW LONDON ROAD (RT 32)
 MONTVILLE, CONNECTICUT
 PREPARED FOR
WESTERN GROUP, LLC

PRE DEVEL Type III 24-hr 25-YEAR Rainfall=6.15"
 Prepared by Fuller Engineering & Land Surveying, LLC Printed 3/15/2022
 HydroCAD® 10.00 s/n 02123 © 2011 HydroCAD Software Solutions LLC

Summary for Subcatchment 1S: #245 Route 32

Runoff = 4.76 cfs @ 12.26 hrs, Volume= 21,240 cf, Depth > 3.20"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-YEAR Rainfall=6.15"

Area (sf)	CN	Description
1,661	98	Roofs, HSG B
22	98	Unconnected pavement, HSG B
580	98	Unconnected roofs, HSG D
38,478	76	Woods/grass comb., Fair, HSG C
38,866	69	50-75% Grass cover, Fair, HSG B
79,607	73	Weighted Average
77,344		97.16% Pervious Area
2,263		2.84% Impervious Area
602		26.60% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	477	0.0677	0.96		Lag/CN Method, Overland Flow
10.3	100	0.1160	0.16		Sheet Flow, Thru the Woods
					Woods: Light underbrush n= 0.400 P2= 3.40"
18.6	577				Total

Job Number:
FE22-1700

Job Start Date:
1/4/22

Conditions of Approval	01/09/23
Conditions of Approval Revised	01/13/23
Handicap Unit	09/12/23
San Sewer/Water	03/14/24
Eversource Easement	08/05/24
Eversource Comments	09/24/24
Staplan Modification	02/19/26

Drawn By: D.R.R. Checked By: J.E.Q.

Sheet Title:
DRAINAGE AREA MAP - EXISTING CONDITIONS

APPROVED BY THE MONTVILLE INLAND WETLAND COMMISSION
 CHAIRMAN _____ DATE _____

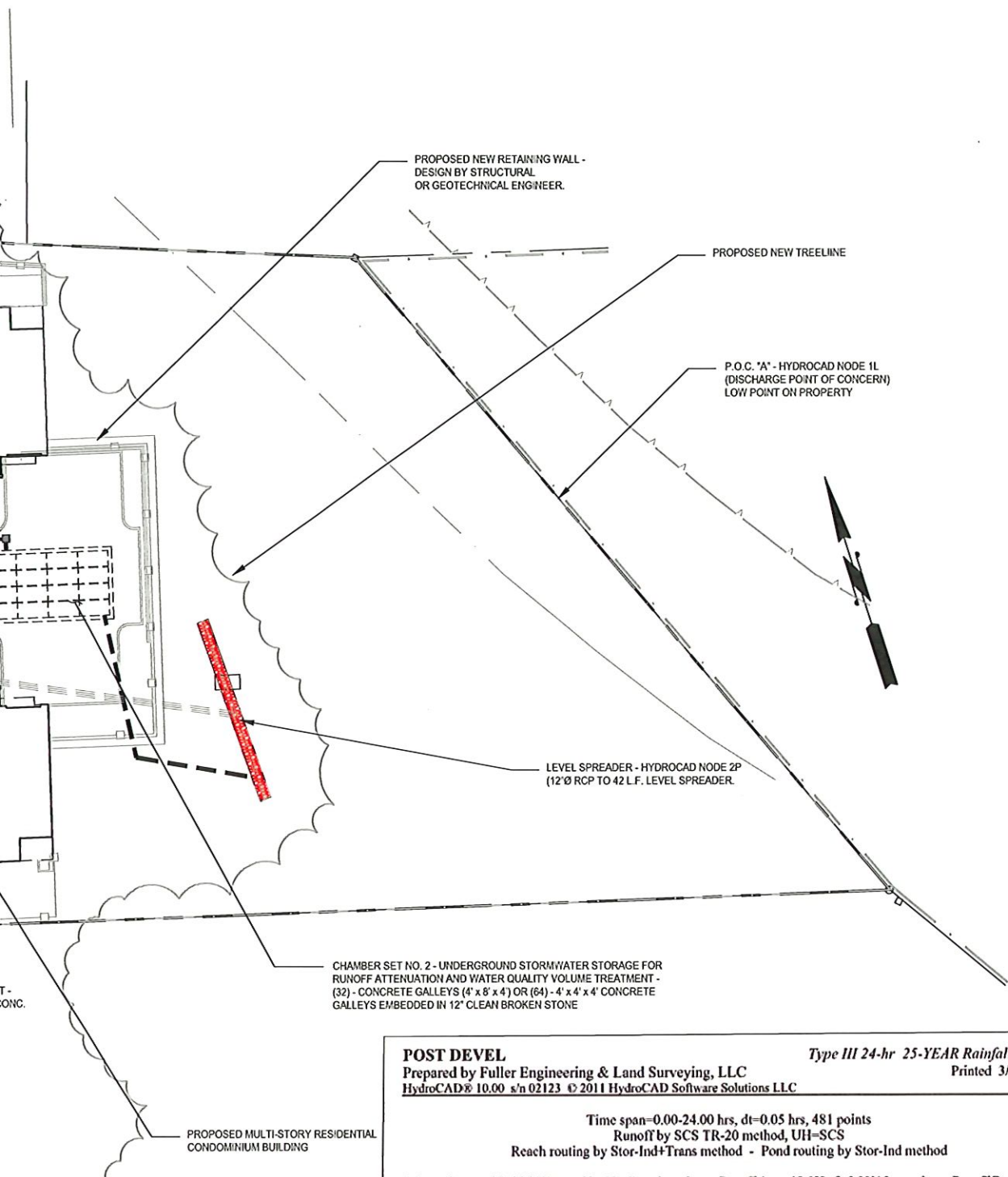
Scale:
1" = 20'



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WILTON'S WAY
22 UNIT CONDOMINIUM DEVELOPMENT
 245 NORWICH-NEW LONDON ROAD (RT 32)
 MONTVILLE, CONNECTICUT
 PREPARED FOR
WESTERN GROUP, LLC



POST DEVEL		<i>Type III 24-hr 25-YEAR Rainfall= 6.15"</i>	
Prepared by Fuller Engineering & Land Surveying, LLC		Printed 3/15/2022	
HydroCAD® 10.00 s/n 02123 © 2011 HydroCAD Software Solutions LLC			
Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points			
Runoff by SCS TR-20 method, UH=SCS			
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method			
Subcatchment 1S: #245 Route 32 - Un-Developed		Runoff Area=19,658 sf 0.00% Impervious Runoff Depth>2.44"	
Flow Length=120' Slope=0.1080 1/100'		Tc=29.3 min CN=65 Runoff=0.73 cfs 4,004 cf	
Subcatchment 2S: NEW CONDO DEVELOPMENT		Runoff Area=32,401 sf 74.04% Impervious Runoff Depth>5.19"	
Flow Length=668' Slope=0.0750 1/133'		Tc=29.3 min CN=92 Runoff=2.46 cfs 14,025 cf	
Subcatchment 3S: Urban Residential wth Open		Runoff Area=27,548 sf 77.09% Impervious Runoff Depth>5.08"	
Tc=29.3 min CN=91		Runoff=2.06 cfs 11,665 cf	
Reach 1R: DROP MANHOLE		Avg. Flow Depth=0.02' Max Vel=99.87 fps Inflow=3.82 cfs 7,342 cf	
n=0.013 L=12.0' S=0.7633 1/133'		Capacity=2,269.48 cfs Outflow=3.82 cfs 7,342 cf	
Pond 1P: 60 CONCRETE GALLEY'S		Peak Elev=66.76' Storage=8,014 cf Inflow=4.52 cfs 25,690 cf	
Discarded=0.28 cfs 14,683 cf Primary=3.82 cfs 7,342 cf		Outflow=4.10 cfs 22,025 cf	
Pond 2P: Level Spreader		Peak Elev=53.55' Storage=209 cf Inflow=3.82 cfs 7,342 cf	
Discarded=0.00 cfs 0 cf Primary=3.87 cfs 7,145 cf		Outflow=3.87 cfs 7,145 cf	
Link 1L: POC "A" LOW POINT AT S.E. END OF PARCEL		Inflow=4.52 cfs 11,149 cf	
		Primary=4.52 cfs 11,149 cf	
Total Runoff Area = 79,607 sf Runoff Volume = 29,694 cf Average Runoff Depth = 4.48"			
43.19% Pervious = 34,379 sf 56.81% Impervious = 45,228 sf			

Job Number:
FE22-1700

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Conditions of Approval	01/09/23
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Handicap Unit	09/12/23
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Staplan Modification	02/10/26

Drawn By: D.R.R. Checked By: J.E.Q.

Sheet Title:
DRAINAGE AREA MAP - PROPOSED CONDITIONS

APPROVED BY THE MONTVILLE INLAND WETLAND COMMISSION
 CHAIRMAN _____ DATE _____

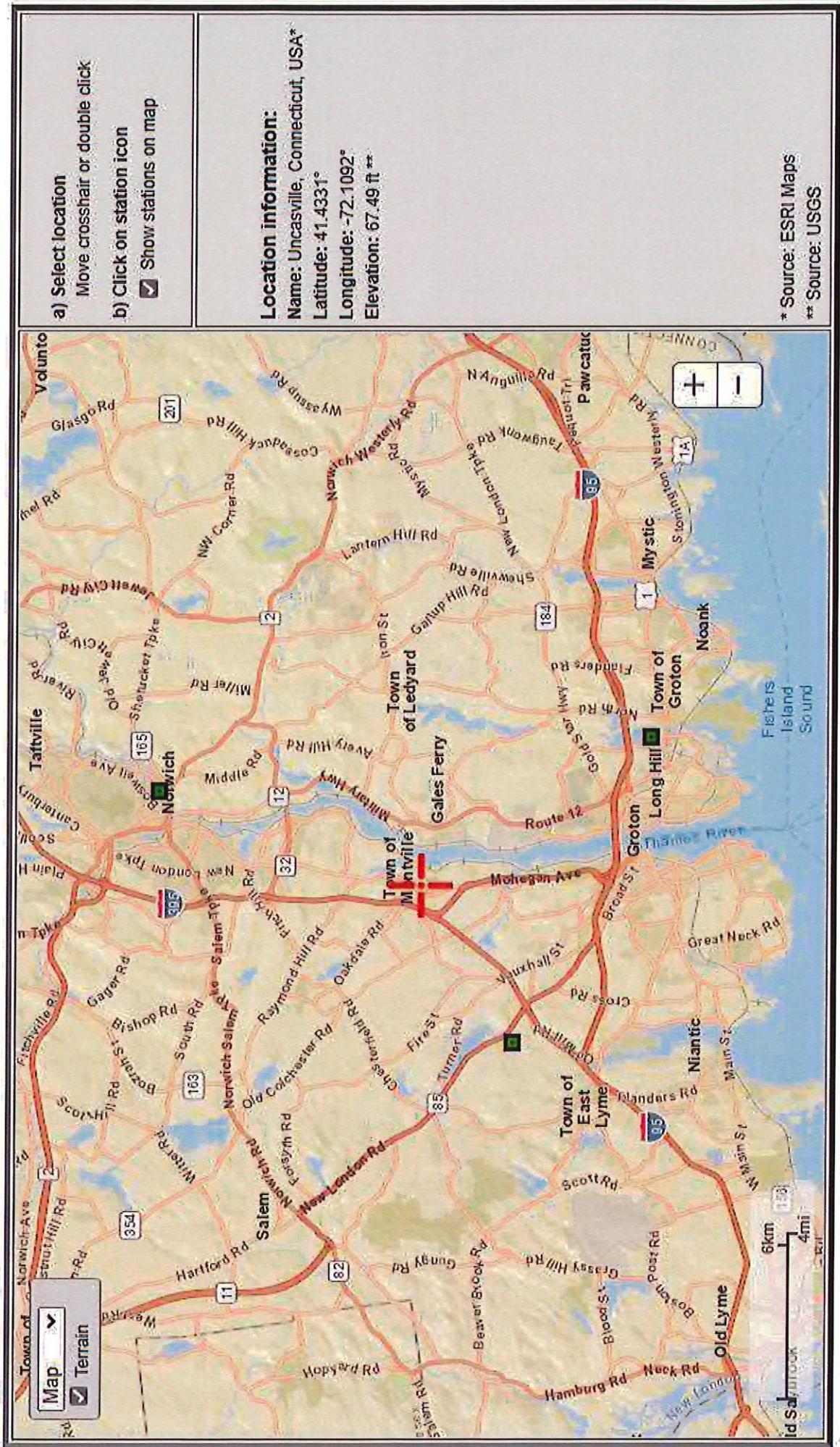
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1" = 20'

APPENDIX "A"

**MONTVILLE PRECIPITATION FREQUENCY (PF)
RAINFALL DATA**

NOAA ATLAS 14 POINT PRECIPITATION FREQUENCY ESTIMATES: CT

#245 Norwich New London Road (CT State RTE. 32) Montville, CT





POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sandra Pavlovic, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Orlan Wilhite

NOAA, National Weather Service, Silver Spring, Maryland

[PF_tabular](#) | [PF_graphical](#) | [Maps & aerials](#)

PF tabular

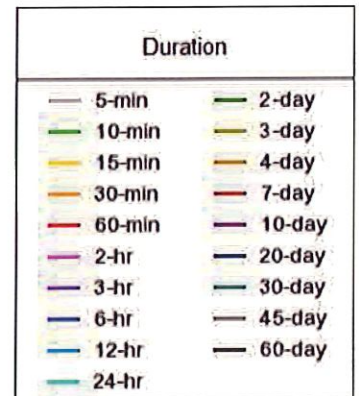
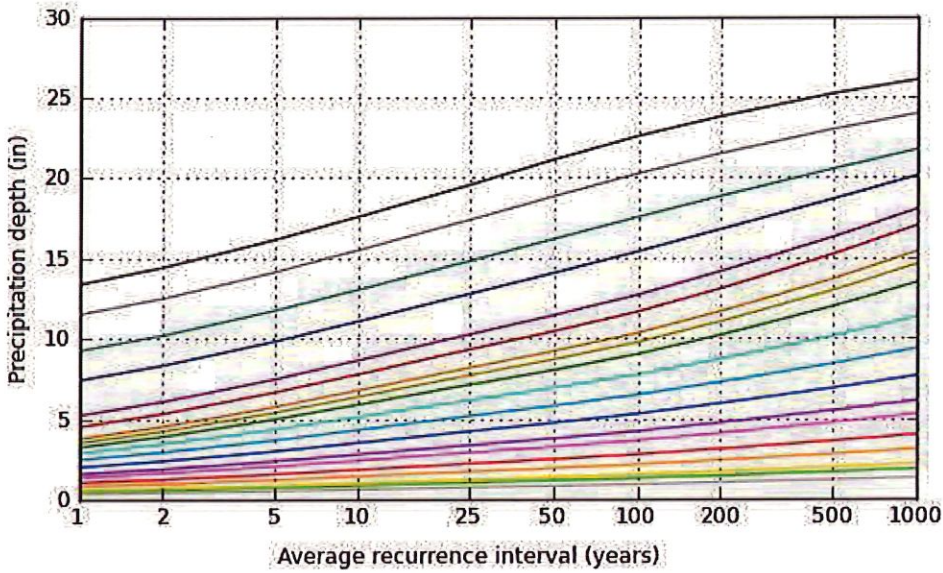
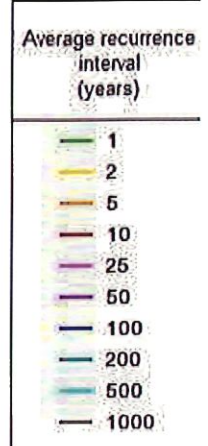
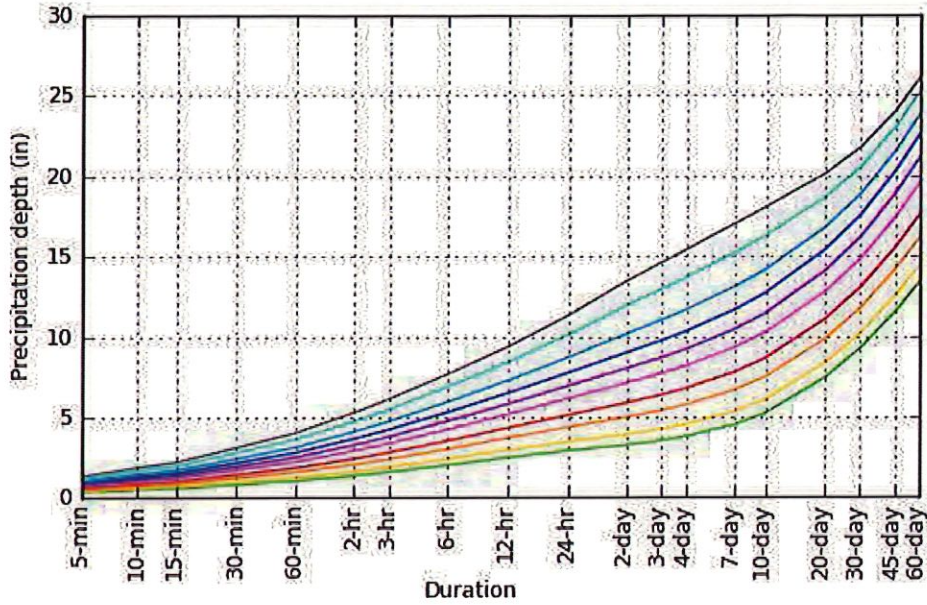
PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.340 (0.266-0.427)	0.406 (0.317-0.510)	0.514 (0.400-0.648)	0.604 (0.467-0.763)	0.727 (0.545-0.952)	0.820 (0.601-1.09)	0.918 (0.654-1.26)	1.03 (0.693-1.43)	1.19 (0.770-1.70)	1.32 (0.835-1.91)
10-min	0.482 (0.377-0.605)	0.576 (0.449-0.723)	0.729 (0.567-0.918)	0.856 (0.662-1.08)	1.03 (0.772-1.35)	1.16 (0.853-1.55)	1.30 (0.926-1.78)	1.46 (0.982-2.02)	1.68 (1.09-2.40)	1.87 (1.18-2.71)
15-min	0.567 (0.443-0.712)	0.677 (0.529-0.851)	0.857 (0.667-1.08)	1.01 (0.779-1.27)	1.21 (0.908-1.59)	1.37 (1.00-1.82)	1.53 (1.09-2.10)	1.71 (1.16-2.38)	1.98 (1.28-2.83)	2.20 (1.39-3.19)
30-min	0.803 (0.627-1.01)	0.958 (0.747-1.20)	1.21 (0.942-1.53)	1.42 (1.10-1.80)	1.71 (1.28-2.24)	1.93 (1.41-2.57)	2.16 (1.54-2.96)	2.42 (1.63-3.36)	2.79 (1.81-3.99)	3.10 (1.96-4.50)
60-min	1.04 (0.811-1.30)	1.24 (0.966-1.56)	1.57 (1.22-1.97)	1.84 (1.42-2.32)	2.21 (1.66-2.89)	2.49 (1.83-3.32)	2.79 (1.99-3.82)	3.12 (2.10-4.34)	3.61 (2.34-5.15)	4.01 (2.53-5.81)
2-hr	1.36 (1.08-1.70)	1.63 (1.28-2.03)	2.05 (1.61-2.57)	2.41 (1.88-3.02)	2.90 (2.19-3.77)	3.26 (2.41-4.31)	3.65 (2.62-4.97)	4.10 (2.78-5.65)	4.75 (3.09-6.72)	5.28 (3.36-7.59)
3-hr	1.58 (1.25-1.96)	1.89 (1.49-2.34)	2.38 (1.88-2.96)	2.79 (2.19-3.48)	3.35 (2.54-4.34)	3.78 (2.81-4.97)	4.22 (3.05-5.73)	4.74 (3.22-6.50)	5.49 (3.59-7.74)	6.12 (3.90-8.75)
6-hr	2.01 (1.60-2.47)	2.39 (1.90-2.94)	3.00 (2.39-3.70)	3.51 (2.78-4.35)	4.22 (3.22-5.41)	4.75 (3.55-6.19)	5.30 (3.85-7.13)	5.95 (4.07-8.08)	6.89 (4.52-9.61)	7.67 (4.91-10.9)
12-hr	2.48 (2.00-3.02)	2.94 (2.36-3.59)	3.69 (2.96-4.52)	4.31 (3.44-5.30)	5.17 (3.98-6.58)	5.81 (4.38-7.52)	6.49 (4.74-8.65)	7.28 (5.00-9.80)	8.42 (5.55-11.6)	9.37 (6.02-13.2)
24-hr	2.90 (2.36-3.51)	3.46 (2.80-4.18)	4.36 (3.53-5.30)	5.12 (4.11-6.24)	6.15 (4.77-7.77)	6.93 (5.26-8.89)	7.75 (5.71-10.3)	8.71 (6.02-11.6)	10.1 (6.71-13.9)	11.3 (7.31-15.7)
2-day	3.25 (2.66-3.89)	3.91 (3.20-4.69)	4.99 (4.06-6.00)	5.88 (4.77-7.11)	7.12 (5.57-8.92)	8.03 (6.15-10.3)	9.02 (6.71-11.9)	10.2 (7.09-13.5)	12.0 (7.97-16.3)	13.5 (8.75-18.6)
3-day	3.52 (2.90-4.20)	4.23 (3.48-5.06)	5.40 (4.43-6.47)	6.37 (5.19-7.66)	7.70 (6.06-9.62)	8.69 (6.69-11.0)	9.76 (7.29-12.8)	11.0 (7.70-14.5)	13.0 (8.66-17.5)	14.6 (9.51-20.0)
4-day	3.78 (3.12-4.50)	4.53 (3.74-5.39)	5.75 (4.73-6.87)	6.77 (5.53-8.12)	8.17 (6.45-10.2)	9.21 (7.11-11.7)	10.3 (7.73-13.5)	11.7 (8.15-15.3)	13.7 (9.16-18.4)	15.4 (10.0-21.0)
7-day	4.50 (3.75-5.33)	5.32 (4.43-6.30)	6.66 (5.52-7.90)	7.77 (6.40-9.26)	9.30 (7.38-11.5)	10.4 (8.10-13.1)	11.7 (8.75-15.1)	13.1 (9.20-17.0)	15.2 (10.2-20.3)	17.0 (11.1-23.1)
10-day	5.22 (4.37-6.15)	6.08 (5.08-7.16)	7.48 (6.22-8.83)	8.64 (7.14-10.2)	10.2 (8.16-12.5)	11.4 (8.90-14.2)	12.7 (9.55-16.3)	14.2 (9.99-18.4)	16.3 (11.0-21.6)	18.0 (11.8-24.3)
20-day	7.42 (6.26-8.66)	8.33 (7.03-9.74)	9.83 (8.25-11.5)	11.1 (9.23-13.0)	12.8 (10.2-15.4)	14.1 (11.0-17.2)	15.4 (11.5-19.3)	16.8 (11.9-21.5)	18.7 (12.7-24.6)	20.1 (13.3-26.9)
30-day	9.25 (7.85-10.7)	10.2 (8.65-11.9)	11.8 (9.92-13.7)	13.0 (10.9-15.3)	14.8 (11.9-17.7)	16.2 (12.7-19.6)	17.5 (13.1-21.7)	18.9 (13.5-24.0)	20.5 (14.0-26.8)	21.7 (14.4-28.9)
45-day	11.5 (9.82-13.3)	12.5 (10.7-14.5)	14.1 (12.0-16.4)	15.5 (13.1-18.0)	17.4 (14.0-20.7)	18.9 (14.8-22.7)	20.3 (15.2-24.8)	21.5 (15.4-27.2)	23.0 (15.7-29.9)	24.0 (15.9-31.7)
60-day	13.4 (11.5-15.4)	14.4 (12.3-16.6)	16.2 (13.8-18.7)	17.6 (14.9-20.4)	19.6 (15.8-23.1)	21.1 (16.6-25.3)	22.6 (16.9-27.5)	23.8 (17.1-30.0)	25.2 (17.3-32.6)	26.1 (17.4-34.3)

¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS). Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values. Please refer to NOAA Atlas 14 document for more information.

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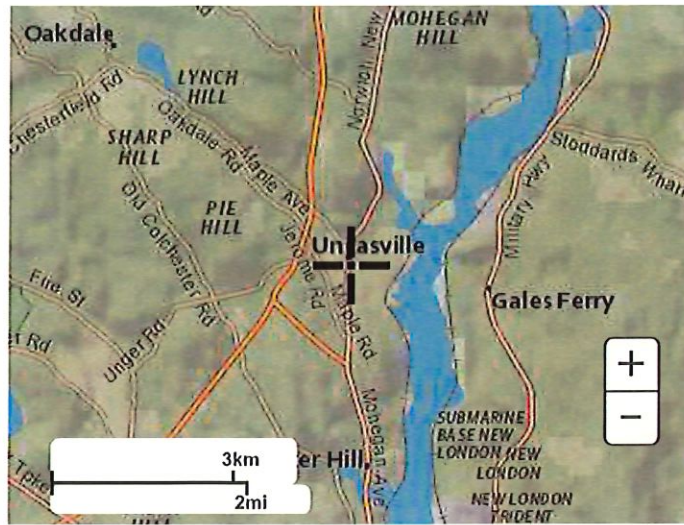
PF graphical

PDS-based depth-duration-frequency (DDF) curves
 Latitude: 41.4331°, Longitude: -72.1092°

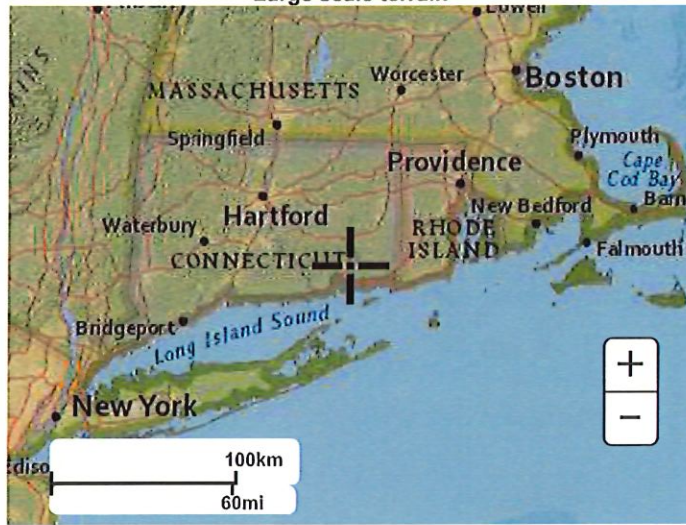


Maps & aerials

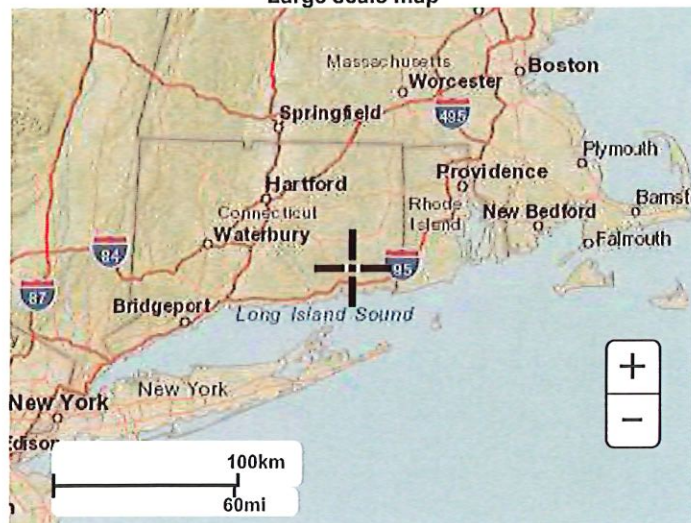
Small scale terrain



Large scale terrain



Large scale map



Large scale aerial



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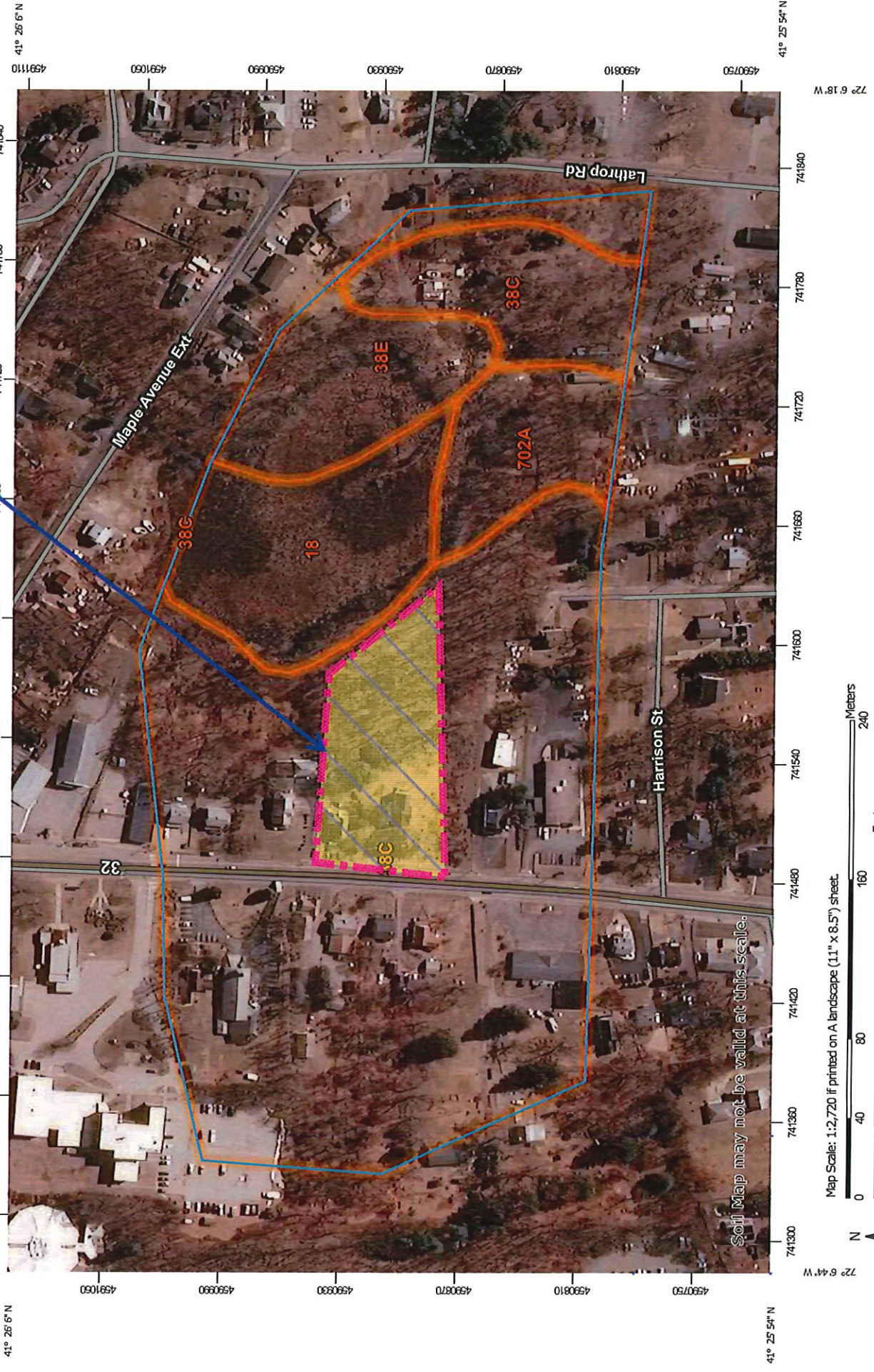
[US Department of Commerce](#)
[National Oceanic and Atmospheric Administration](#)
[National Weather Service](#)
[National Water Center](#)
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

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APPENDIX "B"
NRCS SOIL MAP AND
HYDROLOGIC SOIL
GROUP RATINGS

PROJECT PARCEL SHOWN
HIGHLIGHTED
LOCATION IS APPROX. ONLY

Soil Map—State of Connecticut
(Vicinity Around #245 Route 32)

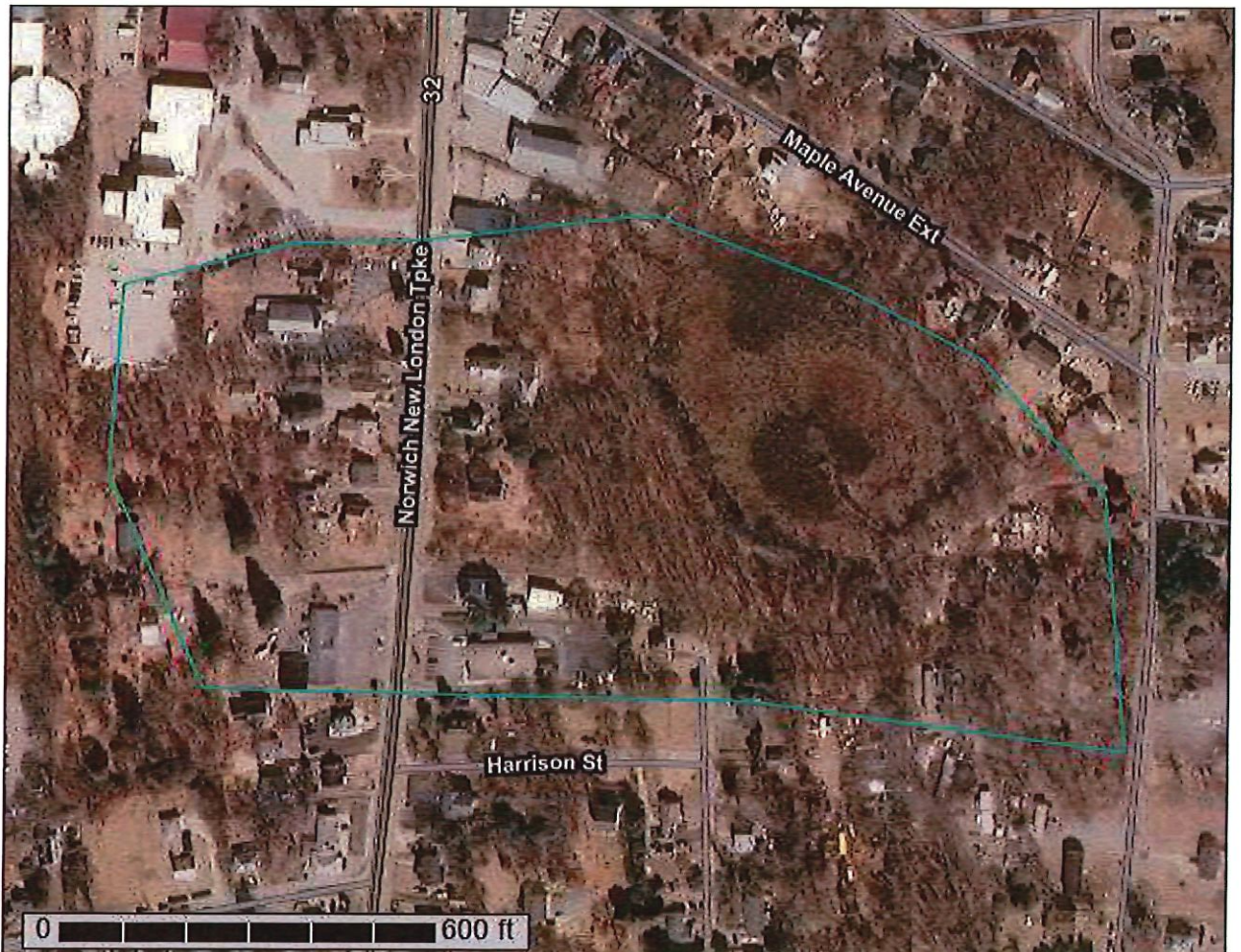


Soil Map may not be valid at this scale.

Map Scale: 1:2,720 if printed on A landscape (11" x 8.5") sheet.



Custom Soil Resource Report for State of Connecticut



Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

Custom Soil Resource Report

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

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

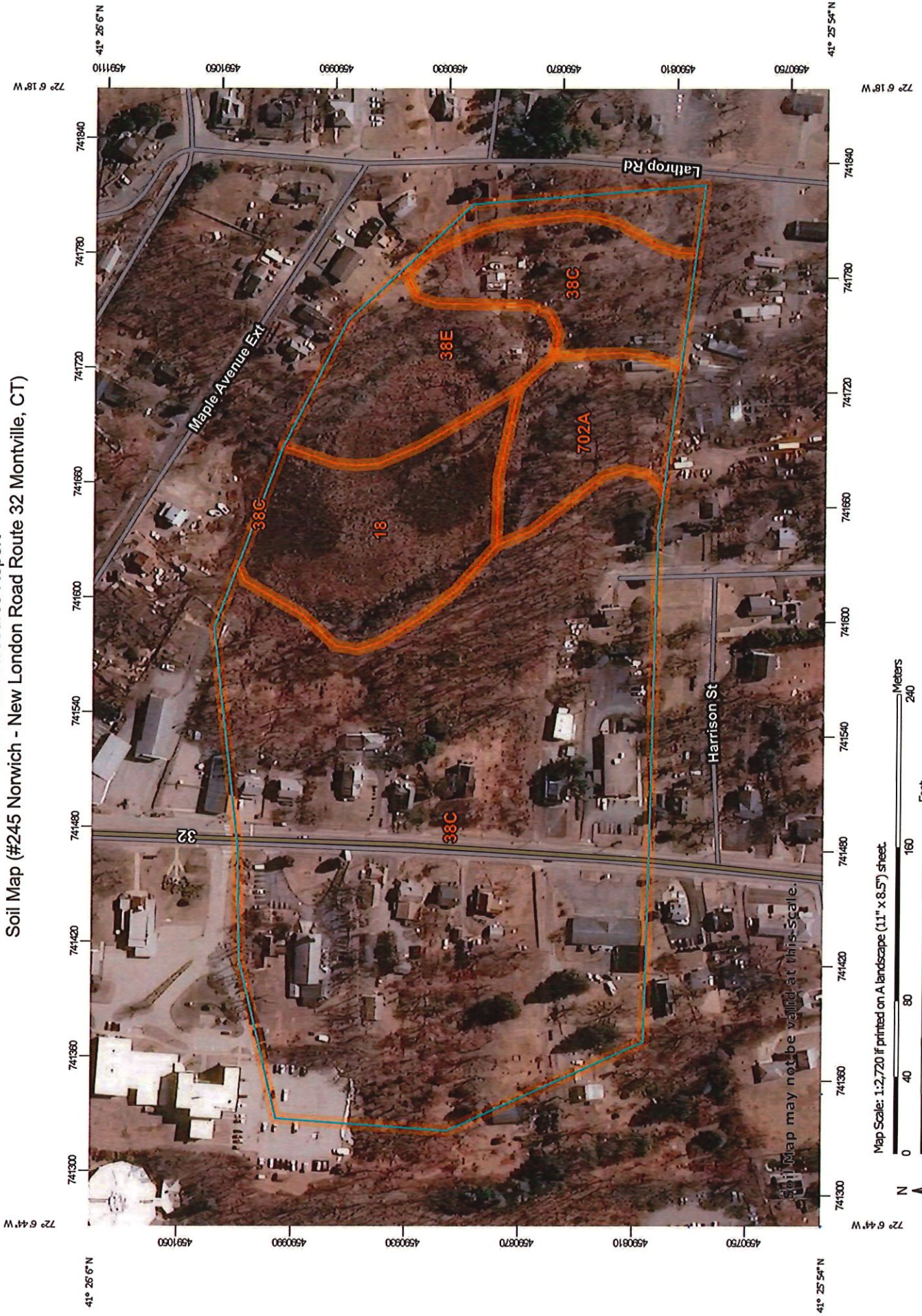
Custom Soil Resource Report

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

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

Custom Soil Resource Report
Soil Map (#245 Norwich - New London Road Route 32 Montville, CT)



Map Scale: 1:2,720 if printed on A landscape (11" x 8.5") sheet.
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

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

MAP INFORMATION

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

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

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

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

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

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

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

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

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

Date(s) aerial images were photographed: 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 (#245 Norwich - New London Road Route 32 Montville, CT)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
18	Catden and Freetown soils, 0 to 2 percent slopes	2.8	11.7%
38C	Hinckley loamy sand, 3 to 15 percent slopes	17.0	70.7%
38E	Hinckley loamy sand, 15 to 45 percent slopes	2.7	11.1%
702A	Tisbury silt loam, 0 to 3 percent slopes	1.6	6.5%
Totals for Area of Interest		24.0	100.0%

Map Unit Descriptions (#245 Norwich - New London Road Route 32 Montville, CT)

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

Custom Soil Resource Report

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: 45 percent
Freetown and similar soils: 35 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Catden

Setting

Landform: Depressions, kettles, marshes, swamps, depressions, bogs, fens, 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
Surface area covered with cobbles, stones or boulders: 0.0 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: NoneRare
Frequency of ponding: Frequent
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 26.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: B/D
Ecological site: F144AY042NY - Semi-Rich Organic Wetlands
Hydric soil rating: Yes

Custom Soil Resource Report

Description of Freetown

Setting

Landform: Depressions, marshes, depressions, bogs, swamps, kettles

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

Surface area covered with cobbles, stones or boulders: 0.0 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Very poorly drained

Runoff class: Negligible

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

Depth to water table: About 0 to 6 inches

Frequency of flooding: NoneRare

Frequency of ponding: Frequent

Available water supply, 0 to 60 inches: Very high (about 26.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 5w

Hydrologic Soil Group: B/D

Ecological site: F144AY043MA - Acidic Organic Wetlands

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: Drainageways, depressions

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

Custom Soil Resource Report

Hydric soil rating: Yes

Scarboro

Percent of map unit: 2 percent

Landform: Depressions, drainageways, outwash deltas, outwash terraces

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

Down-slope shape: Concave

Across-slope shape: Concave, linear

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: Outwash deltas, outwash terraces, moraines, eskers, kames, outwash plains, kame terraces

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

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

Down-slope shape: Concave, convex, linear

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

Custom Soil Resource Report

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
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: F144AY022MA - Dry Outwash
Hydric soil rating: No

Minor Components

Merrimac

Percent of map unit: 5 percent
Landform: Kames, outwash plains, outwash terraces, moraines, eskers
Landform position (two-dimensional): Summit, shoulder, backslope, footslope, toeslope
Landform position (three-dimensional): Head slope, nose slope, side slope, crest, riser, tread
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Windsor

Percent of map unit: 5 percent
Landform: Moraines, eskers, kames, outwash deltas, outwash terraces, outwash plains, kame terraces
Landform position (two-dimensional): Summit, shoulder, backslope, footslope, toeslope
Landform position (three-dimensional): Head slope, nose slope, side slope, crest, riser, tread
Down-slope shape: Concave, convex, linear
Across-slope shape: Convex, linear, concave
Hydric soil rating: No

Agawam

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

Sudbury

Percent of map unit: 2 percent

Custom Soil Resource Report

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

Landform position (two-dimensional): Backslope, footslope

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

Down-slope shape: Concave, linear

Across-slope shape: Concave, linear

Hydric soil rating: No

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

Map Unit Setting

National map unit symbol: 2svmj

Elevation: 0 to 1,280 feet

Mean annual precipitation: 36 to 71 inches

Mean annual air temperature: 39 to 55 degrees F

Frost-free period: 140 to 240 days

Farmland classification: Not prime farmland

Map Unit Composition

Hinckley and similar soils: 85 percent

Minor components: 15 percent

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

Description of Hinckley

Setting

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

Landform position (two-dimensional): Backslope

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

Down-slope shape: Concave, convex, linear

Across-slope shape: Convex, linear, concave

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

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material

A - 1 to 8 inches: loamy sand

Bw1 - 8 to 11 inches: gravelly loamy sand

Bw2 - 11 to 16 inches: gravelly loamy sand

BC - 16 to 19 inches: very gravelly loamy sand

C - 19 to 65 inches: very gravelly sand

Properties and qualities

Slope: 15 to 45 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Excessively drained

Runoff class: Low

Custom Soil Resource Report

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

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

Available water supply, 0 to 60 inches: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7e

Hydrologic Soil Group: A

Ecological site: F144AY022MA - Dry Outwash

Hydric soil rating: No

Minor Components

Windsor

Percent of map unit: 5 percent

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

Landform position (two-dimensional): Backslope

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

Down-slope shape: Concave, convex, linear

Across-slope shape: Convex, linear, concave

Hydric soil rating: No

Merrimac

Percent of map unit: 5 percent

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

Landform position (two-dimensional): Backslope

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

Down-slope shape: Convex

Across-slope shape: Convex

Hydric soil rating: No

Agawam

Percent of map unit: 3 percent

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

Landform position (two-dimensional): Backslope

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

Down-slope shape: Concave, convex, linear

Across-slope shape: Convex, linear, concave

Hydric soil rating: No

Sudbury

Percent of map unit: 2 percent

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

Landform position (two-dimensional): Backslope, footslope

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

Down-slope shape: Concave, linear

Across-slope shape: Linear, concave

Hydric soil rating: No

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: Outwash terraces, deltas, outwash plains, valley trains
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
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
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C

Custom Soil Resource Report

Ecological site: F144AY026CT - Moist Silty Outwash

Hydric soil rating: No

Minor Components

Merrimac

Percent of map unit: 5 percent

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

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

Agawam

Percent of map unit: 5 percent

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

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

Landform position (two-dimensional): Footslope, toeslope

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

Down-slope shape: Convex, linear

Across-slope shape: Convex, concave

Hydric soil rating: No

Raypol

Percent of map unit: 2 percent

Landform: Drainageways, depressions

Down-slope shape: Concave

Across-slope shape: Concave

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

APPENDIX "C"
RETENTION SYSTEM STRUCTURE
RATING TABLE'S

POST DEVEL

Prepared by Fuller Engineering & Land Surveying, LLC
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Type III 24-hr 100-YEAR Rainfall= 7.75"

Printed 3/15/2022

Stage-Area-Storage for Pond 1P: 60 CONCRETE GALLEY'S

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
57.33	2,574	0	60.51	2,574	5,527
57.39	2,574	62	60.57	2,574	5,639
57.45	2,574	124	60.63	2,574	5,750
57.51	2,574	185	60.69	2,574	5,861
57.57	2,574	247	60.75	2,574	5,973
57.63	2,574	309	60.81	2,574	6,084
57.69	2,574	371	60.87	2,574	6,195
57.75	2,574	432	60.93	2,574	6,306
57.81	2,574	494	60.99	2,574	6,417
57.87	2,574	588	61.05	2,574	6,528
57.93	2,574	697	61.11	2,574	6,639
57.99	2,574	806	61.17	2,574	6,750
58.05	2,574	916	61.23	2,574	6,861
58.11	2,574	1,029	61.29	2,574	6,972
58.17	2,574	1,142	61.35	2,574	7,082
58.23	2,574	1,255	61.41	2,574	7,193
58.29	2,574	1,369	61.47	2,574	7,212
58.35	2,574	1,482	61.53	2,574	7,232
58.41	2,574	1,595	61.59	2,574	7,251
58.47	2,574	1,708	61.65	2,574	7,270
58.53	2,574	1,822	61.71	2,574	7,289
58.59	2,574	1,935	61.77	2,574	7,309
58.65	2,574	2,048	61.83	2,574	7,328
58.71	2,574	2,161	61.89	2,574	7,390
58.77	2,574	2,274	61.95	2,574	7,452
58.83	2,574	2,387	62.01	2,574	7,513
58.89	2,574	2,500	62.07	2,574	7,575
58.95	2,574	2,612	62.13	2,574	7,637
59.01	2,574	2,725	62.19	2,574	7,699
59.07	2,574	2,838	62.25	2,574	7,761
59.13	2,574	2,950	62.31	2,574	7,822
59.19	2,574	3,063	62.37	2,574	7,884
59.25	2,574	3,176	62.43	2,574	7,946
59.31	2,574	3,288	62.49	2,574	8,008
59.37	2,574	3,400	62.55	2,574	8,014
59.43	2,574	3,513	62.61	2,574	8,014
59.49	2,574	3,625	62.67	2,574	8,014
59.55	2,574	3,738	62.73	2,574	8,014
59.61	2,574	3,850	62.79	2,574	8,014
59.67	2,574	3,962	62.85	2,574	8,014
59.73	2,574	4,074	62.91	2,574	8,014
59.79	2,574	4,186	62.97	2,574	8,014
59.85	2,574	4,298	63.03	2,574	8,014
59.91	2,574	4,410	63.09	2,574	8,014
59.97	2,574	4,522	63.15	2,574	8,014
60.03	2,574	4,634	63.21	2,574	8,014
60.09	2,574	4,746	63.27	2,574	8,014
60.15	2,574	4,858	63.33	2,574	8,014
60.21	2,574	4,969	63.39	2,574	8,014
60.27	2,574	5,081	63.45	2,574	8,014
60.33	2,574	5,193	63.51	2,574	8,014
60.39	2,574	5,304	63.57	2,574	8,014
60.45	2,574	5,416	63.63	2,574	8,014



POST DEVEL

Type III 24-hr 100-YEAR Rainfall= 7.75"

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Stage-Area-Storage for Pond 1P: 60 CONCRETE GALLEY'S (continued)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
63.69	2,574	8,014	66.87	2,574	8,014
63.75	2,574	8,014	66.93	2,574	8,014
63.81	2,574	8,014	66.99	2,574	8,014
63.87	2,574	8,014	67.05	2,574	8,014
63.93	2,574	8,014	67.11	2,574	8,014
63.99	2,574	8,014	67.17	2,574	8,014
64.05	2,574	8,014	67.23	2,574	8,014
64.11	2,574	8,014	67.29	2,574	8,014
64.17	2,574	8,014	67.35	2,574	8,014
64.23	2,574	8,014	67.41	2,574	8,014
64.29	2,574	8,014	67.47	2,574	8,014
64.35	2,574	8,014	67.53	2,574	8,014
64.41	2,574	8,014	67.59	2,574	8,014
64.47	2,574	8,014	67.65	2,574	8,014
64.53	2,574	8,014	67.71	2,574	8,014
64.59	2,574	8,014	67.77	2,574	8,014
64.65	2,574	8,014	67.83	2,574	8,014
64.71	2,574	8,014	67.89	2,574	8,014
64.77	2,574	8,014	67.95	2,574	8,014
64.83	2,574	8,014	68.01	2,574	8,014
64.89	2,574	8,014	68.07	2,574	8,014
64.95	2,574	8,014	68.13	2,574	8,014
65.01	2,574	8,014	68.19	2,574	8,014
65.07	2,574	8,014	68.25	2,574	8,014
65.13	2,574	8,014	68.31	2,574	8,014
65.19	2,574	8,014	68.37	2,574	8,014
65.25	2,574	8,014	68.43	2,574	8,014
65.31	2,574	8,014	68.49	2,574	8,014
65.37	2,574	8,014	68.55	2,574	8,014
65.43	2,574	8,014	68.61	2,574	8,014
65.49	2,574	8,014	68.67	2,574	8,014
65.55	2,574	8,014	68.73	2,574	8,014
65.61	2,574	8,014	68.79	2,574	8,014
65.67	2,574	8,014	68.85	2,574	8,014
65.73	2,574	8,014	68.91	2,574	8,014
65.79	2,574	8,014	68.97	2,574	8,014
65.85	2,574	8,014	69.03	2,574	8,014
65.91	2,574	8,014	69.09	2,574	8,014
65.97	2,574	8,014	69.15	2,574	8,014
66.03	2,574	8,014	69.21	2,574	8,014
66.09	2,574	8,014	69.27	2,574	8,014
66.15	2,574	8,014	69.33	2,574	8,014
66.21	2,574	8,014	69.39	2,574	8,014
66.27	2,574	8,014	69.45	2,574	8,014
66.33	2,574	8,014	69.51	2,574	8,014
66.39	2,574	8,014	69.57	2,574	8,014
66.45	2,574	8,014	69.63	2,574	8,014
66.51	2,574	8,014	69.69	2,574	8,014
66.57	2,574	8,014	69.75	2,574	8,014
66.63	2,574	8,014	69.81	2,574	8,014
66.69	2,574	8,014	69.87	2,574	8,014
66.75	2,574	8,014	69.93	2,574	8,014
66.81	2,574	8,014	69.99	2,574	8,014

POST DEVEL

Type III 24-hr 100-YEAR Rainfall= 7.75"

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Stage-Area-Storage for Pond 1P: 60 CONCRETE GALLEY'S (continued)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
70.05	2,574	8,014	73.23	2,574	8,014
70.11	2,574	8,014	73.29	2,574	8,014
70.17	2,574	8,014	73.35	2,574	8,014
70.23	2,574	8,014	73.41	2,574	8,014
70.29	2,574	8,014	73.47	2,574	8,014
70.35	2,574	8,014	73.53	2,574	8,014
70.41	2,574	8,014	73.59	2,574	8,014
70.47	2,574	8,014	73.65	2,574	8,014
70.53	2,574	8,014	73.71	2,574	8,014
70.59	2,574	8,014	73.77	2,574	8,014
70.65	2,574	8,014	73.83	2,574	8,014
70.71	2,574	8,014	73.89	2,574	8,014
70.77	2,574	8,014	73.95	2,574	8,014
70.83	2,574	8,014	74.01	2,574	8,014
70.89	2,574	8,014	74.07	2,574	8,014
70.95	2,574	8,014	74.13	2,574	8,014
71.01	2,574	8,014	74.19	2,574	8,014
71.07	2,574	8,014	74.25	2,574	8,014
71.13	2,574	8,014	74.31	2,574	8,014
71.19	2,574	8,014	74.37	2,574	8,014
71.25	2,574	8,014	74.43	2,574	8,014
71.31	2,574	8,014	74.49	2,574	8,014
71.37	2,574	8,014	74.55	2,574	8,014
71.43	2,574	8,014	74.61	2,574	8,014
71.49	2,574	8,014	74.67	2,574	8,014
71.55	2,574	8,014	74.73	2,574	8,014
71.61	2,574	8,014	74.79	2,574	8,014
71.67	2,574	8,014	74.85	2,574	8,014
71.73	2,574	8,014	74.91	2,574	8,014
71.79	2,574	8,014	74.97	2,574	8,014
71.85	2,574	8,014	75.03	2,574	8,014
71.91	2,574	8,014	75.09	2,574	8,014
71.97	2,574	8,014	75.15	2,574	8,014
72.03	2,574	8,014	75.21	2,574	8,014
72.09	2,574	8,014	75.27	2,574	8,014
72.15	2,574	8,014	75.33	2,574	8,014
72.21	2,574	8,014	75.39	2,574	8,014
72.27	2,574	8,014	75.45	2,574	8,014
72.33	2,574	8,014	75.51	2,574	8,014
72.39	2,574	8,014	75.57	2,574	8,014
72.45	2,574	8,014	75.63	2,574	8,014
72.51	2,574	8,014	75.69	2,574	8,014
72.57	2,574	8,014	75.75	2,574	8,014
72.63	2,574	8,014	75.81	2,574	8,014
72.69	2,574	8,014	75.87	2,574	8,014
72.75	2,574	8,014	75.93	2,574	8,014
72.81	2,574	8,014	75.99	2,574	8,014
72.87	2,574	8,014	76.05	2,574	8,014
72.93	2,574	8,014	76.11	2,574	8,014
72.99	2,574	8,014	76.17	2,574	8,014
73.05	2,574	8,014	76.23	2,574	8,014
73.11	2,574	8,014	76.29	2,574	8,014
73.17	2,574	8,014	76.35	2,574	8,014

POST DEVEL

Type III 24-hr 100-YEAR Rainfall= 7.75"

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Stage-Area-Storage for Pond 1P: 60 CONCRETE GALLEY'S (continued)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
76.41	2,574	8,014	79.59	2,574	8,014
76.47	2,574	8,014	79.65	2,574	8,014
76.53	2,574	8,014	79.71	2,574	8,014
76.59	2,574	8,014	79.77	2,574	8,014
76.65	2,574	8,014	79.83	2,574	8,014
76.71	2,574	8,014	79.89	2,574	8,014
76.77	2,574	8,014	79.95	2,574	8,014
76.83	2,574	8,014	80.01	2,574	8,014
76.89	2,574	8,014	80.07	2,574	8,014
76.95	2,574	8,014	80.13	2,574	8,014
77.01	2,574	8,014	80.19	2,574	8,014
77.07	2,574	8,014	80.25	2,574	8,014
77.13	2,574	8,014	80.31	2,574	8,014
77.19	2,574	8,014	80.37	2,574	8,014
77.25	2,574	8,014	80.43	2,574	8,014
77.31	2,574	8,014	80.49	2,574	8,014
77.37	2,574	8,014	80.55	2,574	8,014
77.43	2,574	8,014	80.61	2,574	8,014
77.49	2,574	8,014	80.67	2,574	8,014
77.55	2,574	8,014	80.73	2,574	8,014
77.61	2,574	8,014	80.79	2,574	8,014
77.67	2,574	8,014	80.85	2,574	8,014
77.73	2,574	8,014	80.91	2,574	8,014
77.79	2,574	8,014	80.97	2,574	8,014
77.85	2,574	8,014	81.03	2,574	8,014
77.91	2,574	8,014	81.09	2,574	8,014
77.97	2,574	8,014	81.15	2,574	8,014
78.03	2,574	8,014	81.21	2,574	8,014
78.09	2,574	8,014	81.27	2,574	8,014
78.15	2,574	8,014	81.33	2,574	8,014
78.21	2,574	8,014	81.39	2,574	8,014
78.27	2,574	8,014	81.45	2,574	8,014
78.33	2,574	8,014	81.51	2,574	8,014
78.39	2,574	8,014	81.57	2,574	8,014
78.45	2,574	8,014	81.63	2,574	8,014
78.51	2,574	8,014	81.69	2,574	8,014
78.57	2,574	8,014	81.75	2,574	8,014
78.63	2,574	8,014	81.81	2,574	8,014
78.69	2,574	8,014	81.87	2,574	8,014
78.75	2,574	8,014	81.93	2,574	8,014
78.81	2,574	8,014	81.99	2,574	8,014
78.87	2,574	8,014	82.05	2,574	8,014
78.93	2,574	8,014	82.11	2,574	8,014
78.99	2,574	8,014	82.17	2,574	8,014
79.05	2,574	8,014	82.23	2,574	8,014
79.11	2,574	8,014	82.29	2,574	8,014
79.17	2,574	8,014	82.35	2,574	8,014
79.23	2,574	8,014	82.41	2,574	8,014
79.29	2,574	8,014	82.47	2,574	8,014
79.35	2,574	8,014	82.53	2,574	8,014
79.41	2,574	8,014	82.59	2,574	8,014
79.47	2,574	8,014	82.65	2,574	8,014
79.53	2,574	8,014	82.71	2,574	8,014

POST DEVEL

Type III 24-hr 100-YEAR Rainfall=7.75"

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Stage-Area-Storage for Pond 1P: 60 CONCRETE GALLEY'S (continued)

<u>Elevation (feet)</u>	<u>Surface (sq-ft)</u>	<u>Storage (cubic-feet)</u>
82.77	2,574	8,014
82.83	2,574	8,014
82.89	2,574	8,014
82.95	2,574	8,014
83.01	2,574	8,014
83.07	2,574	8,014
83.13	2,574	8,014
83.19	2,574	8,014
83.25	2,574	8,014
83.31	2,574	8,014
83.37	2,574	8,014

APPENDIX "D"

WATER QUALITY VOLUME CALCULATION

Fuller Engineering & Land Surveying, LLC

525 John Street • Second Floor
 Bridgeport, CT 06604
 (203) 333-9465 (203) 336-1769 FAX

Project: #245 Norwich New London Rd. CT Route 32
 MONTVILLE, CT

Water Quality Volume Calc
 Connecticut Stormwater Quality Manual Methodology

Date: 1/24/22
Revised: 3/8/22

Completed By: SDU
Checked By:

Drainage Area: SITE

Step 1: Calculate Water Quality Volume, (WQv)

$$WQv = (1" \times R \times A) / 12$$

Where:

- R = $RvI \times \%I + RvT \times \%T + RvF \times \%F$
- RvI = Runoff Coefficient for Impervious Cover (SEE MANUAL TABLE 5.5)
- %I = Percent of Site in Impervious Cover (Fraction)
- RvT = Runoff Coefficient for Lawn
- %T = Percent of Site in Lawn (Fraction)
- RvF = Runoff Coefficient for Forest Cover
- %F = Percent of Site in Forest (Fraction)
- A = Tributary Drainage Area (Acre)
- WQv = Required Water Quality Volume
- P = 2 Year Frequency Storm (3.4)

Design Parameters									Water Quality Volume
P (in)	A (SF)	RvI	%I	RvT	%T	RvF	%F	R	(Cu. Ft.)
1.0	79,607.00	0.95	0.40	0.08	0.35	0.05	0.247	0.41584	2758.65

Volume Required to Store On-Site for Cleaning: 2,759 CU. FT.

Inundated Volume provided by the subsurface systems is > 7,000 Cu. Ft.

Vol. provided by the subsurface sys. with inv. set at 61.50' (60 count) = 7,222 Cu. Ft.

Therefore the WQV is Satisfied

APPENDIX "E"

**RUNOFF VOLUME REDUCTION
CALCULATION**

Fuller Engineering & Land Surveying, LLC

525 John Street • Second Floor
 Bridgeport, CT 06604
 (203) 333-9465 (203) 336-1769 FAX

**Project: #245 Norwich New London Rd. CT Route 32
 MONTVILLE, CT**

**Runoff Volume Reduction Calc
 Connecticut Stormwater Quality Manual Methodology**

**Date: 1/22/22
 Revised: 3/8/22**

**Completed By: SDU
 Checked By:**

**Drainage Site
 Area:**

Step 2: Calculate Runoff Volume Reduction, (RRV)

$$RRV = V_{\text{post}} (2\text{yr}) - V_{\text{pre}} (2\text{yr})$$

Where: $V_{\text{post}} (2\text{yr})$ = Total Runoff Volume of Post-Construction Site Condition (2 yr, 24 hour storm)
 $V_{\text{pre}} (2\text{yr})$ = Total Runoff Volume of Pre-Construction Site Condition (2 yr, 24 hour storm)

Design Parameters		Runoff Reduction Volume (Cu. Ft.)
$V_{\text{post}} (2\text{yr})$	$V_{\text{pre}} (2\text{yr})$	
10259.00	7613.00	2646.00

Runoff will be infiltrated in proposed underground retention system.

$$V_{\text{pre}} (2\text{yr}) = \text{Total Runoff Volume of Pre-Construction Site Condition (2 yr, 24 hour storm)} = 7,613.0 \text{ CF}$$

$$V_{\text{post}} (2\text{yr}) = \text{Total Runoff Volume of Post-Construction Site Condition (2 yr, 24 hour storm)(No BMP)} = 10,259.0 \text{ CF}$$

$$RRV = V_{\text{post}} (2\text{yr}) - V_{\text{pre}} (2\text{yr}) = 2,646.0 \text{ CF}$$

$$RSV = \text{Proposed Retention Storage Volume} * (\text{Total Allowable for system}) = 8.010 \text{ CF}$$

* Refer to Appendix "C" for Retention Storage Volume Calculations.

$$V_{\text{post_BMP}} = \text{Total Runoff Volume of Post-Construction with BMP's (2 yr, 24 hour storm)}$$

$$V_{\text{post_BMP}} = V_{\text{post}} (2\text{yr}) - RSV = 10,259 - 8,010 = 2,249 \text{ CF}$$

$$V_{\text{post_BMP}} < V_{\text{pre}} (2\text{yr}) \quad \text{Therefore the Runoff Volume Reduction Standard is met.}$$

APPENDIX "F"
**GROUND WATER RECHARGE VOLUME
CALCULATION**

Fuller Engineering & Land Surveying, LLC

525 John Street • Second Floor
 Bridgeport, CT 06604
 (203) 333-9465 (203) 336-1769 FAX

Project: #245 Norwich New London Rd. CT Route 32
 MONTVILLE, CT

Runoff Volume Reduction Calc
 Connecticut Stormwater Quality Manual Methodology

Date: 1/22/22
Revised: 3/8/22

Drainage Site
Area:

Completed By: SDU
Checked By:

Step 2: Calculate Runoff Volume Reduction, (RRV)

$$RRV = V_{post} (2yr) - V_{pre} (2yr)$$

Where: $V_{post} (2yr)$ = Total Runoff Volume of Post-Construction Site Condition (2 yr, 24 hour storm)
 $V_{pre} (2yr)$ = Total Runoff Volume of Pre-Construction Site Condition (2 yr, 24 hour storm)

Design Parameters		Runoff Reduction Volume (Cu. Ft.)
$V_{post} (2yr)$	$V_{pre} (2yr)$	
10259.00	7613.00	2646.00

Runoff will be infiltrated in proposed underground retention system.

$$V_{pre} (2yr) = \text{Total Runoff Volume of Pre-Construction Site Condition (2 yr, 24 hour storm)} = 7,613.0 \text{ CF}$$

$$V_{post} (2yr) = \text{Total Runoff Volume of Post-Construction Site Condition (2 yr, 24 hour storm)(No BMP)} = 10,259.0 \text{ CF}$$

$$RRV = V_{post} (2yr) - V_{pre} (2yr) = 2,646.0 \text{ CF}$$

$$RSV = \text{Proposed Retention Storage Volume * (Total Allowable for system)} = 8.010 \text{ CF}$$

* Refer to Appendix "C" for Retention Storage Volume Calculations.

$$V_{post_BMP} = \text{Total Runoff Volume of Post-Construction with BMP's (2 yr, 24 hour storm)}$$

$$V_{post_BMP} = V_{post} (2yr) - RSV = 10,259 - 8,010 = 2,249 \text{ CF}$$

$$V_{post_BMP} < V_{pre} (2yr) \quad \text{Therefore the Runoff Volume Reduction Standard is met.}$$

APPENDIX "G"

**TSS (TOTAL SUSPENDED SOLIDS)
REMOVAL CALCULATION**

TSS Removal Calculation Worksheet

Location: 28 CONCRETE GALLEYS

A BMP ¹	B TSS Removal Rate ¹	C Starting TSS Load*	D Amount Removed (B*C)	E Remaining Load (C-D)
DEEP SUMP CATCH BASIN	25%	1.00	0.25	0.75
SUBSURFACE STRUCTURE	90%	0.75	0.68	0.08
		0.08	0.00	0.08
		0.08	0.00	0.08
		0.08	0.00	0.08

Total TSS Removal = 93%

Separate Form Needs to be
 Completed for Each Outlet or
 BMP Train

Project: 245 ROUTE 32
 Prepared By: SDU
 Date: 1/24/2022

*Equals remaining load from previous BMP (E) which enters the BMP

TSS Removal Calculation Worksheet

Location: 32 CONCRETE GALLEYS

A BMP ¹	B TSS Removal Rate ¹	C Starting TSS Load*	D Amount Removed (B*C)	E Remaining Load (C-D)
SUBSURFACE STRUCTURE	90%	0.08	0.07	0.01
DEEP SUMP CATCH BASIN	25%	0.01	0.00	0.01
		0.01	0.00	0.01
		0.01	0.00	0.01
		0.01	0.00	0.01

Total TSS Removal = 99%

Separate Form Needs to be
Completed for Each Outlet or
BMP Train

Project: 245 ROUTE 32
 Prepared By: SDU
 Date: 1/24/2022

*Equals remaining load from previous BMP (E) which enters the BMP

APPENDIX "H"
INFILTRATION SYSTEM DRAWDOWN
CALCULATION

FULLER ENGINEERING & LAND SURVEYING, LLC

525 John Street • Second Floor
Bridgeport, CT 06604
(203) 333-9465 (203) 336-1769 FAX

DRAWDOWN CALCULATIONS:

Pg. 1 of 2

245 NORWICH-NEW LONDON ROAD
STATE ROUTE 32
MONTVILLE, CT

(60) - 4' x 8' x 4' High CONCRETE GALLEY DETENTION/RETENTION SYSTEM

The storage capacity of this retention system is 7,222 cf.
Refer to Appendix "C" for a structure rating table of the system.

$$\text{Time} = \frac{DV}{K \times A}$$

SOIL CONDUCTIVITY

RATE = 20 MIN PER IN
3 IN PER HR

SAFETY FACTOR OF 2

RATE = 1.5 IN PER HR

DV =	DESIGN VOLUME	7,222 cf
K =	INFILTRATION RATE	1.5 in/hr (rate based on Soil Class)
A =	BOTTOM AREA	907.68 sf surface area x porosity of stone (122 x 18.6 x 0.4)

$$\text{Time} = \frac{7222}{(1.5) \times (907.7) \times (1/12)}$$

Time = 63.7 hrs

The proposed Concrete Galley System volume will drawdown within 72 Hours.

DRAWDOWN CALCULATION BASED ON THE FOLLOWING:

(Using a conservative Percolation Rate of 20 min./in & Test Pit Data By Others):

TEST HOLE DATA

PERFORMED 9/30/14, BY P. LAFAYETTE, P.E.

IH-1

0-12" TOPSOIL
12-47" TAN FINE-MED. SAND W/SOME SILT
47-130" MED.-COARSE SAND AND STONES

NO MOTTLING, NO WATER, NO LEDGE

IH-2

0-6" TOPSOIL
6-40" TAN FINE-MED. SAND W/SOME SILT
40-128" MED.-COARSE SAND AND STONES

NO MOTTLING, NO WATER, NO LEDGE

IH-3

0-4" TOPSOIL
4-32" ORANGE FINE SAND W/SOME SILT & S
32-125" MED.-COARSE SAND AND STONES

NO MOTTLING, NO WATER, NO LEDGE

IH-2

0-10" TOPSOIL
10-52" ORANGE FINE SAND W/SOME SILT & S
52-136" MED.-COARSE SAND AND STONES

NO MOTTLING, NO WATER, NO LEDGE

NOTE: SOIL TESTING DATA PROVIDED BY OTHERS. DEVELOPMENT SOLUTIONS, LLC
GRADING, DRAINAGE & UTILITY PLAN - COMMERCIAL/RESIDENTIAL COMPLEX
NORWICH-NEW LONDON ROAD (ROUTE 32) MONTVILLE, CONNECTICUT. PREPARED
FOR TOMASHE LLC 19 TULSA COURT MONMOUTH JUNCTION, NJ 08852. DATED
SEPTEMBER 19, 2014, SCALE: 1" = 20', DRAWING NO. DS - 14 - 545.

APPENDIX "J"

**HYDROCAD ANALYSIS 25-Year Storm Frequency
EXISTING CONDITIONS**



#245 Route 32



POC "A" LOW POINT
@ REAR OF PARCEL



Routing Diagram for PRE DEVEL
Prepared by Fuller Engineering & Land Surveying, LLC, Printed 3/15/2022
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PRE DEVEL

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Page 2

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
38,866	69	50-75% Grass cover, Fair, HSG B (1S)
38,478	76	Woods/grass comb., Fair, HSG C (1S)
1,661	98	Roofs, HSG B (1S)
22	98	Unconnected pavement, HSG B (1S)
580	98	Unconnected roofs, HSG D (1S)
79,607	73	TOTAL AREA

PRE DEVEL

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Page 3

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
40,549	HSG B	1S
38,478	HSG C	1S
580	HSG D	1S
0	Other	
79,607		TOTAL AREA

PRE DEVEL

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Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Subcatchment Numbers
0	38,866	0	0	0	38,866	50-75% Grass cover, Fair	1S
0	22	0	0	0	22	Unconnected pavement	1S
0	1,661	0	0	0	1,661	Roofs	1S
0	0	0	580	0	580	Unconnected roofs	1S
0	0	38,478	0	0	38,478	Woods/grass comb., Fair	1S
0	40,549	38,478	580	0	79,607	TOTAL AREA	

PRE DEVEL

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#245 Route 32 Montville, CT
Type III 24-hr 25-YEAR Rainfall=6.15"
Printed 3/15/2022
Page 5

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: #245 Route 32

Runoff Area=79,607 sf 2.84% Impervious Runoff Depth>3.20"
Flow Length=577' Tc=18.6 min CN=73 Runoff=4.76 cfs 21,240 cf

Link 1L: POC "A" LOW POINT @ REAR OF PARCEL

Inflow=4.76 cfs 21,240 cf
Primary=4.76 cfs 21,240 cf

Total Runoff Area = 79,607 sf Runoff Volume = 21,240 cf Average Runoff Depth = 3.20"
97.16% Pervious = 77,344 sf 2.84% Impervious = 2,263 sf

PRE DEVEL

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Summary for Subcatchment 1S: #245 Route 32

Runoff = 4.76 cfs @ 12.26 hrs, Volume= 21,240 cf, Depth> 3.20"

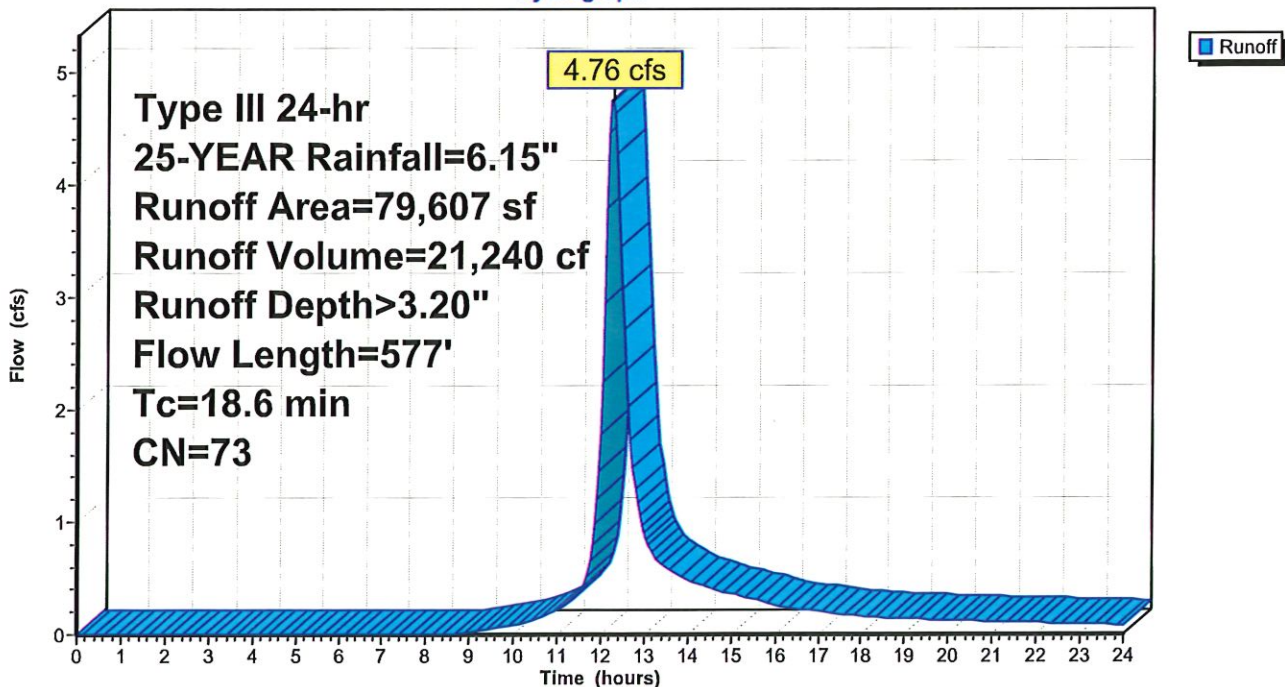
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YEAR Rainfall=6.15"

Area (sf)	CN	Description
1,661	98	Roofs, HSG B
22	98	Unconnected pavement, HSG B
580	98	Unconnected roofs, HSG D
38,478	76	Woods/grass comb., Fair, HSG C
38,866	69	50-75% Grass cover, Fair, HSG B
79,607	73	Weighted Average
77,344		97.16% Pervious Area
2,263		2.84% Impervious Area
602		26.60% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	477	0.0677	0.96		Lag/CN Method, Overland Flow
10.3	100	0.1160	0.16		Sheet Flow, Thru the Woods
					Woods: Light underbrush n= 0.400 P2= 3.40"
18.6	577	Total			

Subcatchment 1S: #245 Route 32

Hydrograph



PRE DEVEL

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Hydrograph for Subcatchment 1S: #245 Route 32

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	13.00	4.61	1.98	0.91
0.25	0.02	0.00	0.00	13.25	4.72	2.06	0.68
0.50	0.03	0.00	0.00	13.50	4.82	2.14	0.60
0.75	0.05	0.00	0.00	13.75	4.91	2.21	0.54
1.00	0.06	0.00	0.00	14.00	4.99	2.27	0.49
1.25	0.08	0.00	0.00	14.25	5.06	2.33	0.45
1.50	0.09	0.00	0.00	14.50	5.13	2.38	0.42
1.75	0.11	0.00	0.00	14.75	5.19	2.43	0.39
2.00	0.12	0.00	0.00	15.00	5.25	2.48	0.37
2.25	0.14	0.00	0.00	15.25	5.31	2.53	0.34
2.50	0.15	0.00	0.00	15.50	5.36	2.57	0.32
2.75	0.17	0.00	0.00	15.75	5.41	2.60	0.29
3.00	0.19	0.00	0.00	16.00	5.45	2.64	0.27
3.25	0.21	0.00	0.00	16.25	5.49	2.67	0.24
3.50	0.23	0.00	0.00	16.50	5.53	2.70	0.23
3.75	0.24	0.00	0.00	16.75	5.56	2.73	0.22
4.00	0.26	0.00	0.00	17.00	5.59	2.75	0.21
4.25	0.28	0.00	0.00	17.25	5.62	2.78	0.20
4.50	0.31	0.00	0.00	17.50	5.65	2.80	0.18
4.75	0.33	0.00	0.00	17.75	5.68	2.83	0.17
5.00	0.35	0.00	0.00	18.00	5.71	2.85	0.16
5.25	0.37	0.00	0.00	18.25	5.73	2.87	0.15
5.50	0.39	0.00	0.00	18.50	5.76	2.89	0.15
5.75	0.42	0.00	0.00	18.75	5.78	2.91	0.14
6.00	0.44	0.00	0.00	19.00	5.80	2.92	0.14
6.25	0.47	0.00	0.00	19.25	5.82	2.94	0.14
6.50	0.50	0.00	0.00	19.50	5.84	2.96	0.13
6.75	0.53	0.00	0.00	19.75	5.87	2.98	0.13
7.00	0.56	0.00	0.00	20.00	5.89	2.99	0.13
7.25	0.59	0.00	0.00	20.25	5.91	3.01	0.12
7.50	0.62	0.00	0.00	20.50	5.92	3.03	0.12
7.75	0.66	0.00	0.00	20.75	5.94	3.04	0.12
8.00	0.70	0.00	0.00	21.00	5.96	3.06	0.11
8.25	0.74	0.00	0.00	21.25	5.98	3.07	0.11
8.50	0.79	0.00	0.00	21.50	6.00	3.09	0.11
8.75	0.84	0.00	0.01	21.75	6.01	3.10	0.11
9.00	0.90	0.01	0.02	22.00	6.03	3.11	0.10
9.25	0.96	0.01	0.03	22.25	6.05	3.13	0.10
9.50	1.02	0.02	0.05	22.50	6.06	3.14	0.10
9.75	1.09	0.03	0.06	22.75	6.08	3.15	0.10
10.00	1.16	0.04	0.08	23.00	6.09	3.17	0.09
10.25	1.24	0.06	0.11	23.25	6.11	3.18	0.09
10.50	1.33	0.08	0.14	23.50	6.12	3.19	0.09
10.75	1.43	0.11	0.17	23.75	6.14	3.20	0.09
11.00	1.54	0.14	0.21	24.00	6.15	3.21	0.08
11.25	1.67	0.19	0.27				
11.50	1.83	0.25	0.38				
11.75	2.18	0.41	0.65				
12.00	3.07	0.90	1.78				
12.25	3.97	1.50	4.75				
12.50	4.32	1.76	3.09				
12.75	4.48	1.88	1.49				

PRE DEVEL

Prepared by Fuller Engineering & Land Surveying, LLC

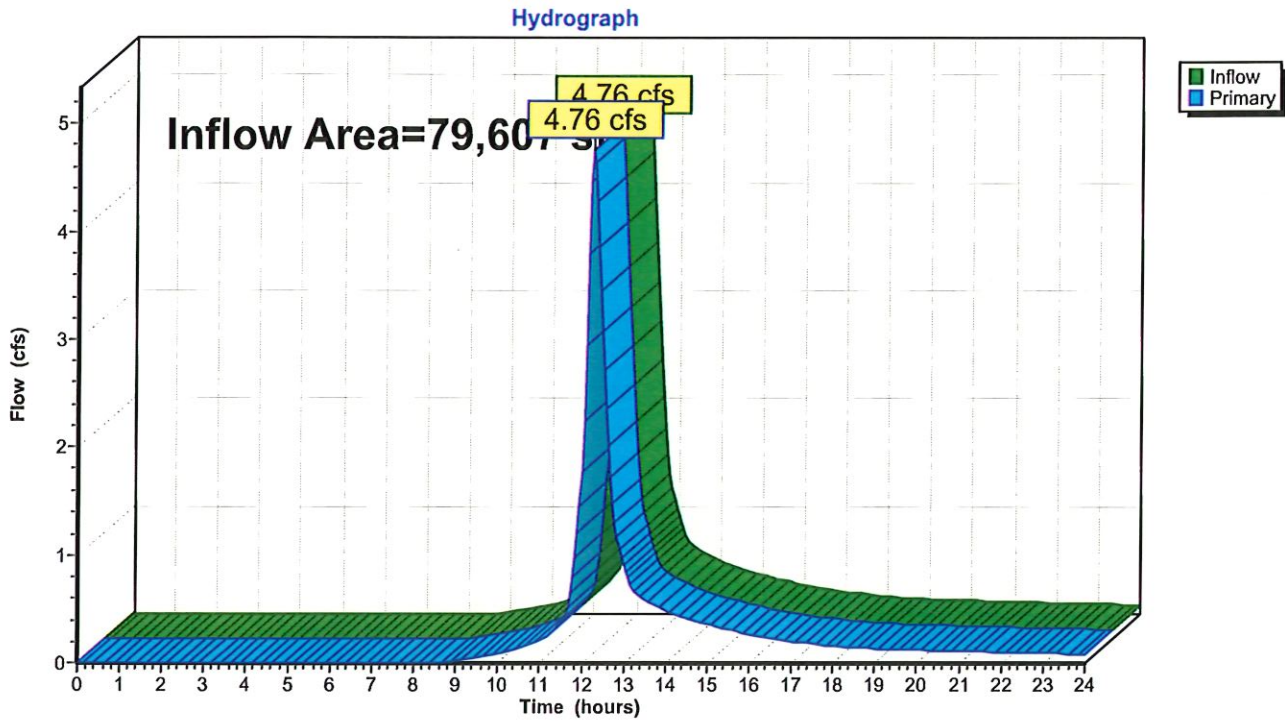
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Summary for Link 1L: POC "A" LOW POINT @ REAR OF PARCEL

Inflow Area = 79,607 sf, 2.84% Impervious, Inflow Depth > 3.20" for 25-YEAR event
Inflow = 4.76 cfs @ 12.26 hrs, Volume= 21,240 cf
Primary = 4.76 cfs @ 12.26 hrs, Volume= 21,240 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 1L: POC "A" LOW POINT @ REAR OF PARCEL



PRE DEVEL

Prepared by Fuller Engineering & Land Surveying, LLC

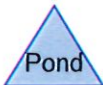
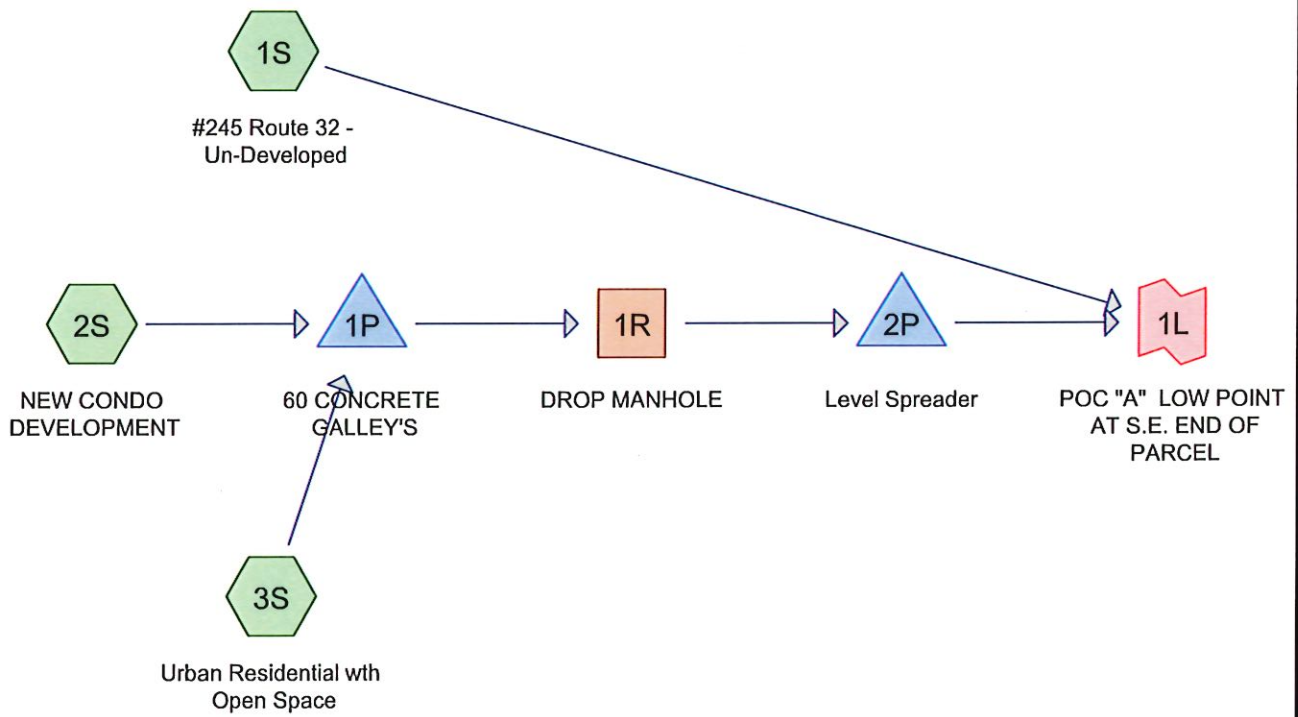
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Hydrograph for Link 1L: POC "A" LOW POINT @ REAR OF PARCEL

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.00	0.00	13.00	0.91	0.00	0.91
0.25	0.00	0.00	0.00	13.25	0.68	0.00	0.68
0.50	0.00	0.00	0.00	13.50	0.60	0.00	0.60
0.75	0.00	0.00	0.00	13.75	0.54	0.00	0.54
1.00	0.00	0.00	0.00	14.00	0.49	0.00	0.49
1.25	0.00	0.00	0.00	14.25	0.45	0.00	0.45
1.50	0.00	0.00	0.00	14.50	0.42	0.00	0.42
1.75	0.00	0.00	0.00	14.75	0.39	0.00	0.39
2.00	0.00	0.00	0.00	15.00	0.37	0.00	0.37
2.25	0.00	0.00	0.00	15.25	0.34	0.00	0.34
2.50	0.00	0.00	0.00	15.50	0.32	0.00	0.32
2.75	0.00	0.00	0.00	15.75	0.29	0.00	0.29
3.00	0.00	0.00	0.00	16.00	0.27	0.00	0.27
3.25	0.00	0.00	0.00	16.25	0.24	0.00	0.24
3.50	0.00	0.00	0.00	16.50	0.23	0.00	0.23
3.75	0.00	0.00	0.00	16.75	0.22	0.00	0.22
4.00	0.00	0.00	0.00	17.00	0.21	0.00	0.21
4.25	0.00	0.00	0.00	17.25	0.20	0.00	0.20
4.50	0.00	0.00	0.00	17.50	0.18	0.00	0.18
4.75	0.00	0.00	0.00	17.75	0.17	0.00	0.17
5.00	0.00	0.00	0.00	18.00	0.16	0.00	0.16
5.25	0.00	0.00	0.00	18.25	0.15	0.00	0.15
5.50	0.00	0.00	0.00	18.50	0.15	0.00	0.15
5.75	0.00	0.00	0.00	18.75	0.14	0.00	0.14
6.00	0.00	0.00	0.00	19.00	0.14	0.00	0.14
6.25	0.00	0.00	0.00	19.25	0.14	0.00	0.14
6.50	0.00	0.00	0.00	19.50	0.13	0.00	0.13
6.75	0.00	0.00	0.00	19.75	0.13	0.00	0.13
7.00	0.00	0.00	0.00	20.00	0.13	0.00	0.13
7.25	0.00	0.00	0.00	20.25	0.12	0.00	0.12
7.50	0.00	0.00	0.00	20.50	0.12	0.00	0.12
7.75	0.00	0.00	0.00	20.75	0.12	0.00	0.12
8.00	0.00	0.00	0.00	21.00	0.11	0.00	0.11
8.25	0.00	0.00	0.00	21.25	0.11	0.00	0.11
8.50	0.00	0.00	0.00	21.50	0.11	0.00	0.11
8.75	0.01	0.00	0.01	21.75	0.11	0.00	0.11
9.00	0.02	0.00	0.02	22.00	0.10	0.00	0.10
9.25	0.03	0.00	0.03	22.25	0.10	0.00	0.10
9.50	0.05	0.00	0.05	22.50	0.10	0.00	0.10
9.75	0.06	0.00	0.06	22.75	0.10	0.00	0.10
10.00	0.08	0.00	0.08	23.00	0.09	0.00	0.09
10.25	0.11	0.00	0.11	23.25	0.09	0.00	0.09
10.50	0.14	0.00	0.14	23.50	0.09	0.00	0.09
10.75	0.17	0.00	0.17	23.75	0.09	0.00	0.09
11.00	0.21	0.00	0.21	24.00	0.08	0.00	0.08
11.25	0.27	0.00	0.27				
11.50	0.38	0.00	0.38				
11.75	0.65	0.00	0.65				
12.00	1.78	0.00	1.78				
12.25	4.75	0.00	4.75				
12.50	3.09	0.00	3.09				
12.75	1.49	0.00	1.49				

APPENDIX "K"

**HYDROCAD ANALYSIS 25-Year Storm Frequency
PROPOSED CONDITIONS**



Routing Diagram for POST DEVEL
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POST DEVEL

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Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
19,658	65	Brush, Good, HSG C (1S)
6,310	69	50-75% Grass cover, Fair, HSG B (3S)
12,016	81	1/3 acre lots, 30% imp, HSG C (2S)
21,238	98	Paved parking, HSG C (3S)
20,385	98	Roofs, HSG B (2S)
79,607	85	TOTAL AREA

POST DEVEL

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Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
26,695	HSG B	2S, 3S
52,912	HSG C	1S, 2S, 3S
0	HSG D	
0	Other	
79,607		TOTAL AREA

POST DEVEL

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Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Subcatchment Numbers
0	6,310	0	0	0	6,310	50-75% Grass cover, Fair	3S
0	0	21,238	0	0	21,238	Paved parking	3S
0	20,385	0	0	0	20,385	Roofs	2S
0	0	12,016	0	0	12,016	1/3 acre lots, 30% imp	2S
0	0	19,658	0	0	19,658	Brush, Good	1S
0	26,695	52,912	0	0	79,607	TOTAL AREA	

POST DEVEL

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#245 Route 32 Montville, CT
Type III 24-hr 25-YEAR Rainfall=6.15"
Printed 3/15/2022
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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: #245 Route 32 - Un-Developed Runoff Area=19,658 sf 0.00% Impervious Runoff Depth>2.44"
Flow Length=120' Slope=0.1080 '/' Tc=29.3 min CN=65 Runoff=0.73 cfs 4,004 cf

Subcatchment 2S: NEW CONDO DEVELOPMENT Runoff Area=32,401 sf 74.04% Impervious Runoff Depth>5.19"
Flow Length=668' Slope=0.0750 '/' Tc=29.3 min CN=92 Runoff=2.46 cfs 14,025 cf

Subcatchment 3S: Urban Residential wth Open Runoff Area=27,548 sf 77.09% Impervious Runoff Depth>5.08"
Tc=29.3 min CN=91 Runoff=2.06 cfs 11,665 cf

Reach 1R: DROP MANHOLE Avg. Flow Depth=0.02' Max Vel=99.87 fps Inflow=3.82 cfs 7,342 cf
n=0.013 L=12.0' S=0.7633 '/' Capacity=2,269.48 cfs Outflow=3.82 cfs 7,342 cf

Pond 1P: 60 CONCRETE GALLEY'S Peak Elev=66.76' Storage=8,014 cf Inflow=4.52 cfs 25,690 cf
Discarded=0.28 cfs 14,683 cf Primary=3.82 cfs 7,342 cf Outflow=4.10 cfs 22,025 cf

Pond 2P: Level Spreader Peak Elev=53.55' Storage=209 cf Inflow=3.82 cfs 7,342 cf
Discarded=0.00 cfs 0 cf Primary=3.87 cfs 7,145 cf Outflow=3.87 cfs 7,145 cf

Link 1L: POC "A" LOW POINT AT S.E. END OF PARCEL Inflow=4.52 cfs 11,149 cf
Primary=4.52 cfs 11,149 cf

Total Runoff Area = 79,607 sf Runoff Volume = 29,694 cf Average Runoff Depth = 4.48"
43.19% Pervious = 34,379 sf 56.81% Impervious = 45,228 sf