

**FULLER ENGINEERING & LAND SURVEYING, LLC**

525 John Street • Second Floor  
Bridgeport, CT 06604  
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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

*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

### 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 two multi-level residential condominium buildings, basements, new driveways and miscellaneous landscaping at 245 Norwich-New London Road, 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 3/8/2022 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.*

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### **PROPOSED POST-DEVELOPMENT CONDITIONS**

The proposed developments on said parcel with area of (79,607 s.f.) will be two (2) 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 <sup>3</sup> /s)	1.61	0.18	-1.43	-88.8
		v (ft <sup>3</sup> )	7613	1187	-6426	-84.4
5 Year Storm	LINK 1 (A)	q (ft <sup>3</sup> /s)	2.6	0.84	-1.76	-67.7
		v (ft <sup>3</sup> )	11831	2936	-8895	-75.2
10 Year Storm	LINK 1 (A)	q (ft <sup>3</sup> /s)	3.49	1.72	-1.77	-50.7
		v (ft <sup>3</sup> )	15694	6274	-9420	-60.0
25 Year Storm	LINK 1 (A)	q (ft <sup>3</sup> /s)	4.76	4.52	-0.24	-5.0
		v (ft <sup>3</sup> )	21240	11149	-10091	-47.5
50 Year Storm	LINK 1 (A)	q (ft <sup>3</sup> /s)	5.75	6.17	0.42	7.3
		v (ft <sup>3</sup> )	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.*

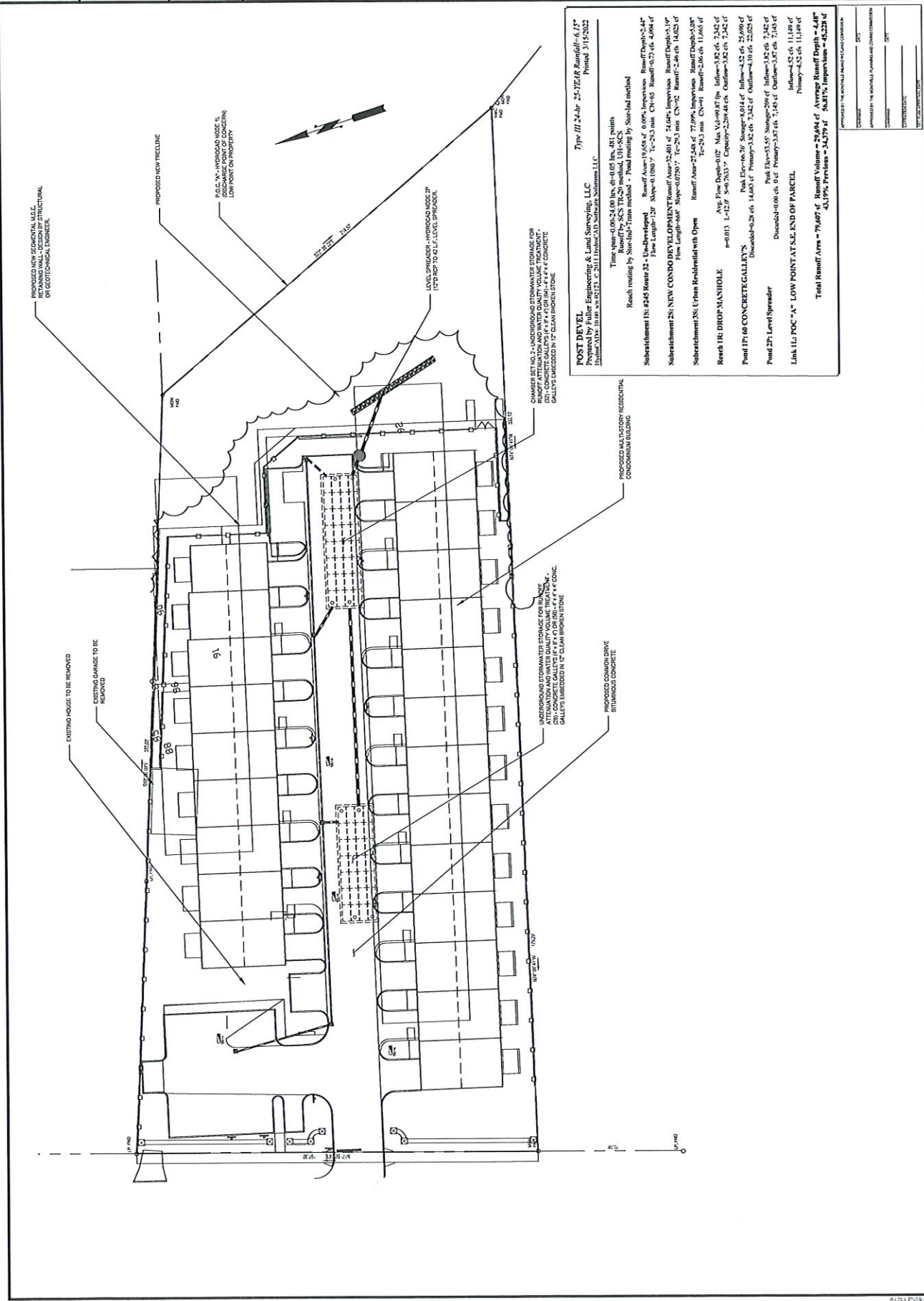
**CONCLUSION**

*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**





**POST DEVELOP**  
 Prepared by Faller Engineering & Land Surveying, LLC  
 Date: 03/15/2022  
 Project: 22 UNIT CONDOMINIUM DEVELOPMENT  
 265 MONTAILE CONNOR COURT  
 MONTAILE, CONNECTICUT 06258  
 WESTERN GROUP, LLC

Time Spent: 0.00-24.00 hrs. @ 0.05 hrs./81 points  
 Runoff by SCS TR-20 method, UR-SCS  
 Flow Length: 120' Slope: 0.0007' 1"=20.3' min. CV=65 Runoff: 0.75 cfs, 4.064 of  
 Subcatchment 1N: #245 Route 32 - Un-Developed Runoff Area=19.668 of 0.00% Impervious Runoff Depth=2.44'  
 Subcatchment 2S: NEW CONDO DEVELOPMENT Runoff Area=32.401 of 74.04% Impervious Runoff Depth=5.19'  
 Subcatchment 3N: 1 Urban Residential w/b Open Runoff Area=27.548 of 77.09% Impervious Runoff Depth=2.08'  
 Runoff: 0.013 1"=12.0' 5-4=70.33' 1"=20.3' min. CV=65 Runoff: 3.82 cfs, 7.342 of  
 Pond 1R: DROP MANHOLE Avg. Flow Depth=0.02' Max. Vol=99.97 flr. Inflow=3.82 cfs, 7.342 of  
 Pond 1T: 60 CONCRETE GALLIES Peak Flow=66.70 Sump=8.044 of Inflow=4.42 cfs, 25.690 of  
 Pond 2P: Level Spreader Discharge=6.28 cfs, 14.463 of Primary=3.82 cfs, 7.342 of Outflow=4.19 cfs, 25.025 of  
 Link 1L: POC "A" LOW POINT AT S.E. END OF PARCEL Discharge=6.28 cfs, 14.463 of Inflow=4.42 cfs, 7.342 of  
 Link 1L: POC "X" LOW POINT AT S.E. END OF PARCEL Discharge=6.28 cfs, 14.463 of Inflow=4.42 cfs, 7.342 of  
 Total Runoff Area = 79.607 of Runoff Volume = 29.944 of Average Runoff Depth = 4.48'  
 4.119% Impervious = 54,279 sq ft 50.81% Impervious = 45,228 sq ft

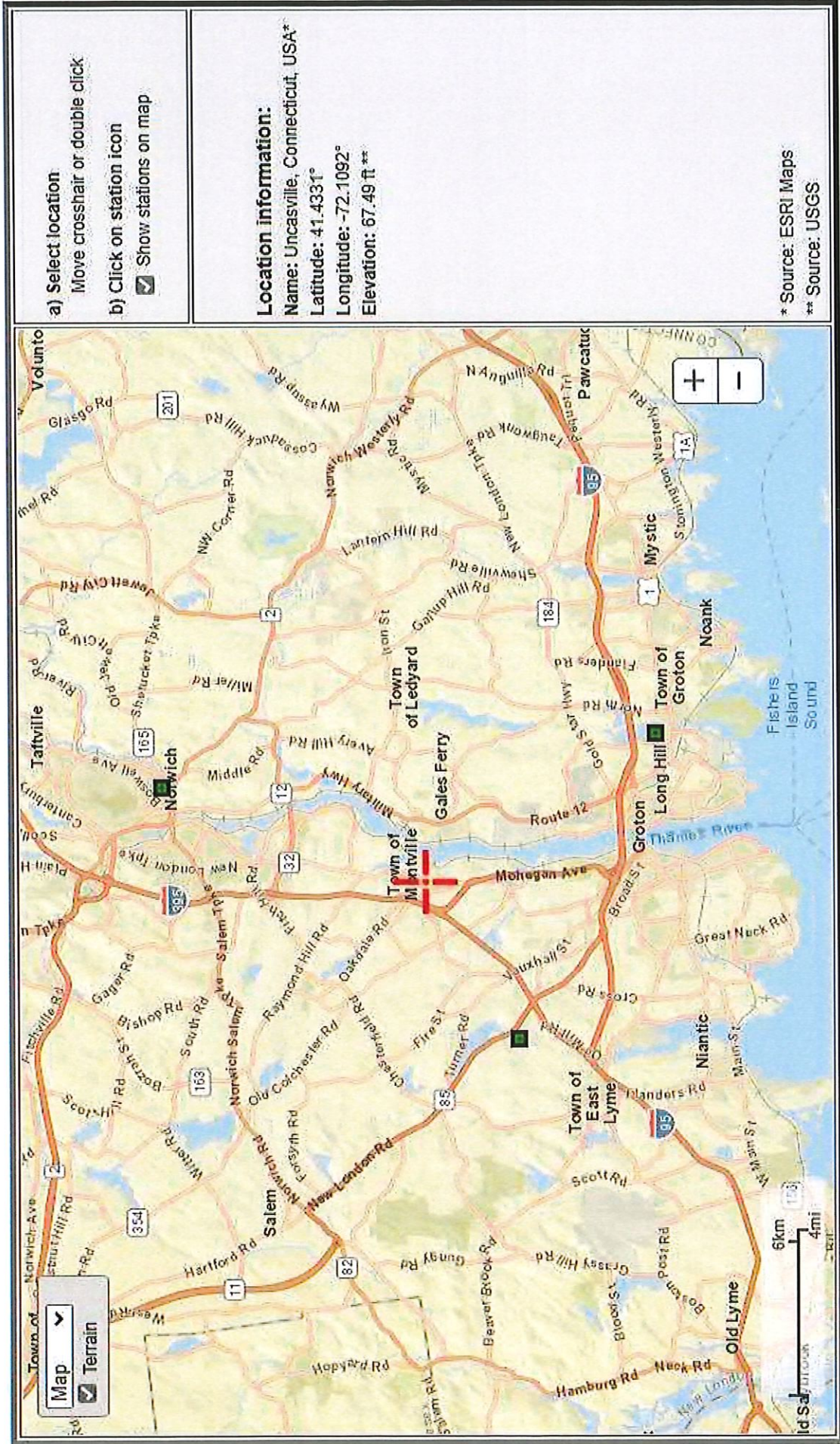
**APPENDIX "A"**

**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







NOAA Atlas 14, Volume 10, Version 3  
 Location name: Uncasville, Connecticut, USA\*  
 Latitude: 41.4331°, Longitude: -72.1092°  
 Elevation: 67.49 ft\*\*  
 \* source: ESRI Maps  
 \*\* source: USGS



**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**

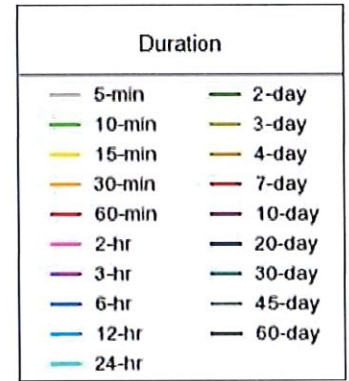
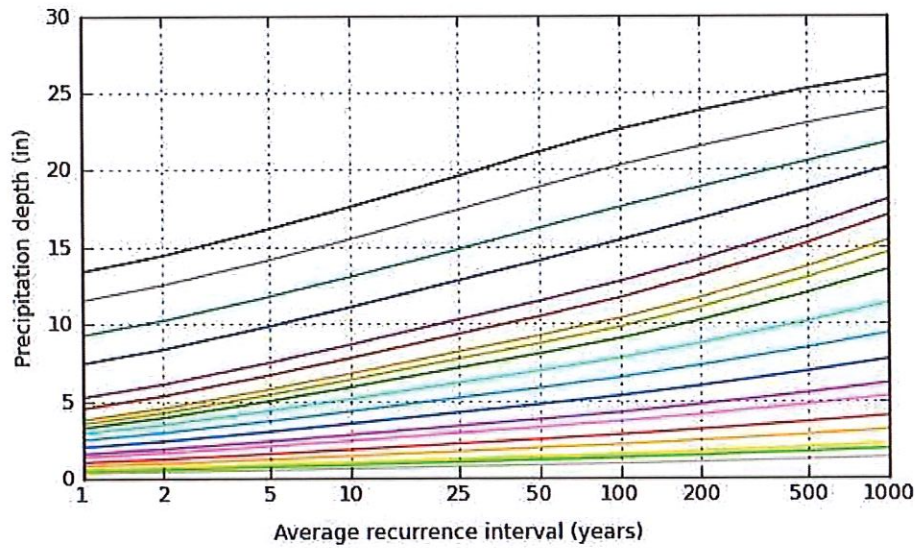
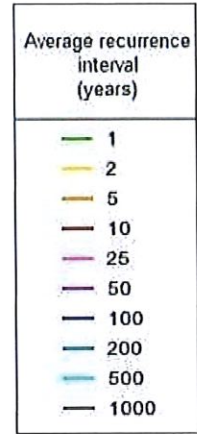
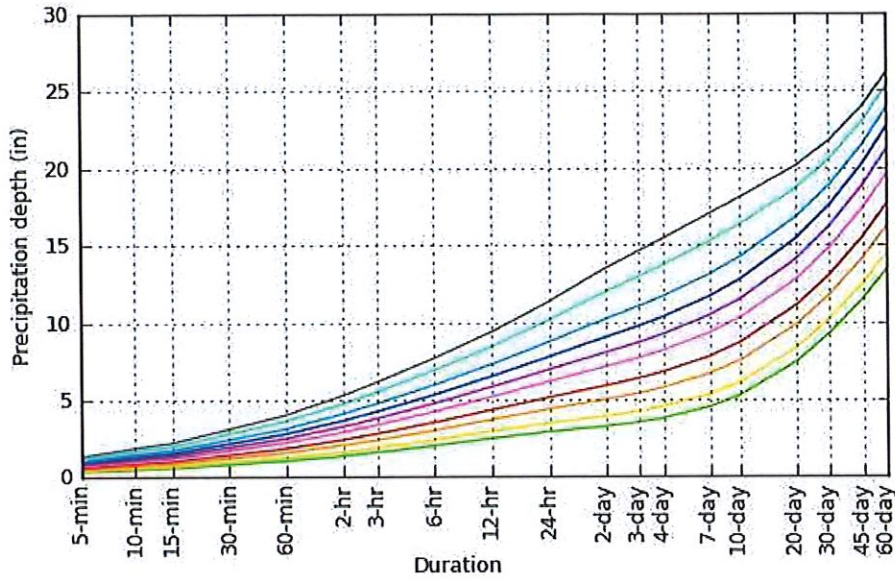
<b>PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)<sup>1</sup></b>										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.340 (0.266-0.427)	0.406 (0.317-0.510)	0.514 (0.400-0.648)	0.604 (0.467-0.763)	0.727 (0.545-0.952)	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)

<sup>1</sup> 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°

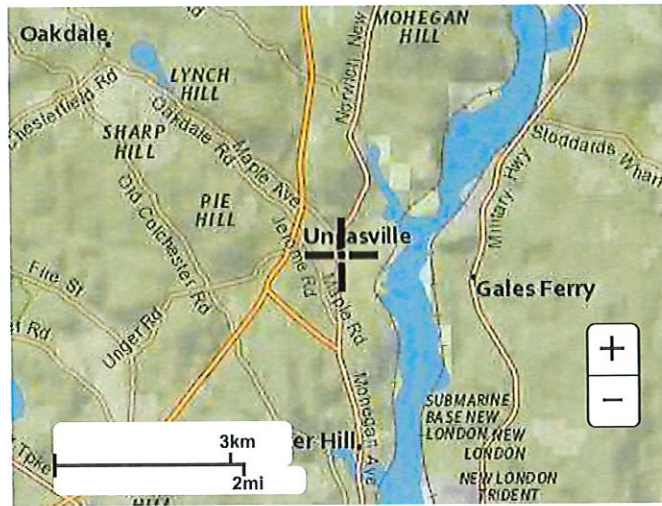


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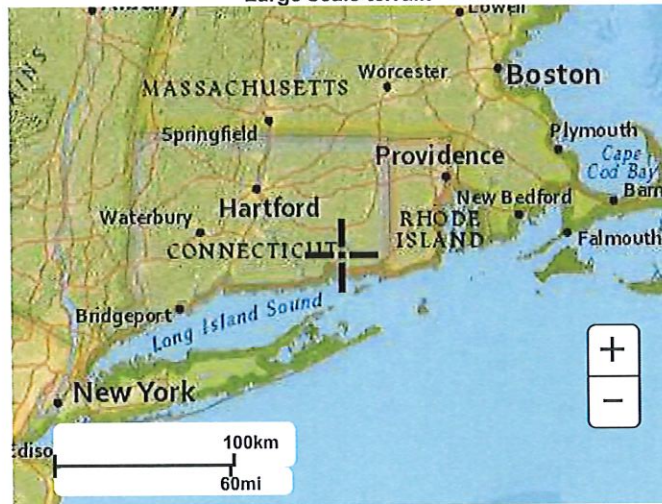
**Maps & aerials**

Small scale terrain





Large scale terrain



Large scale map



Large scale aerial



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

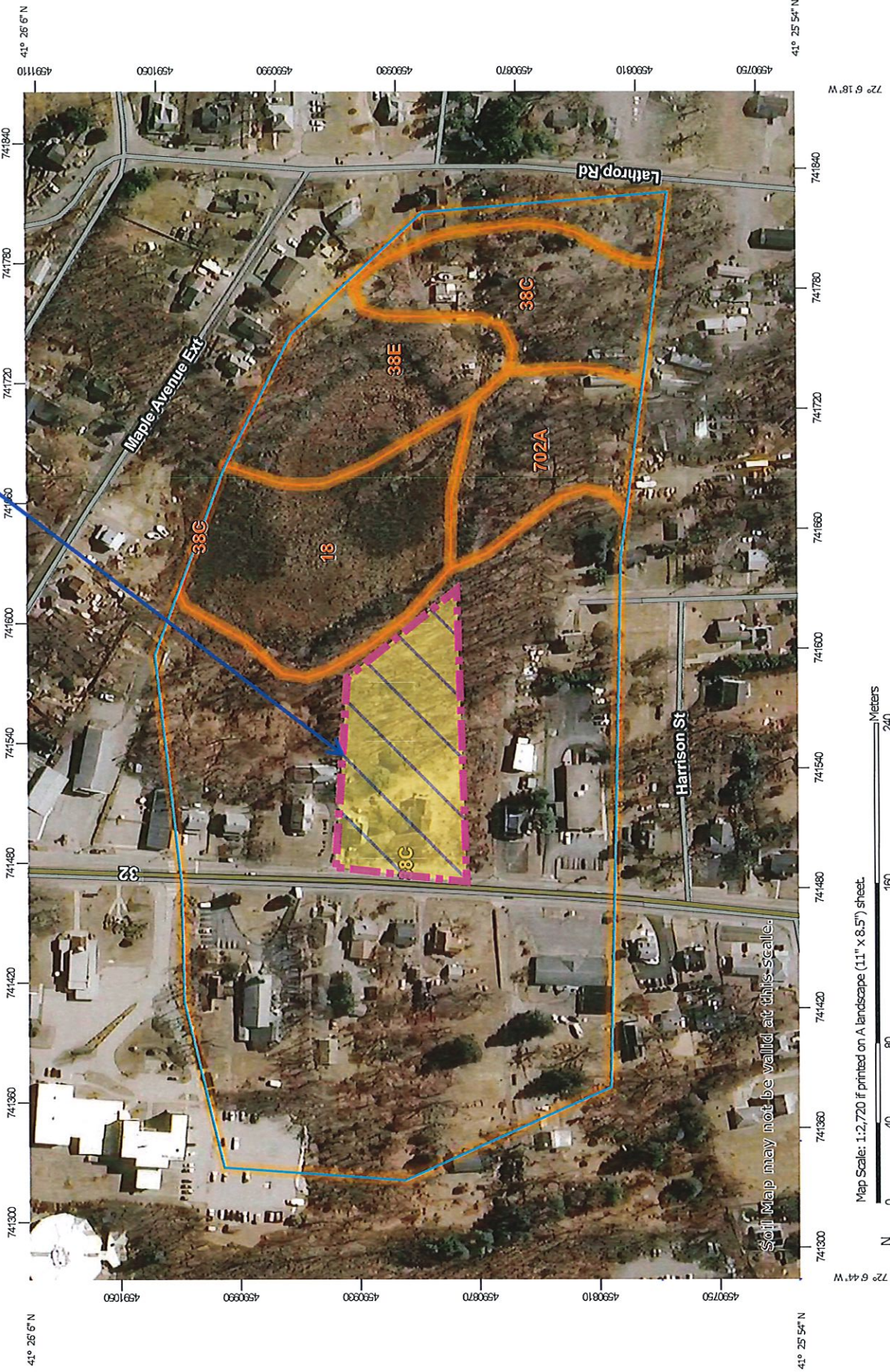
[Disclaimer](#)

**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)



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





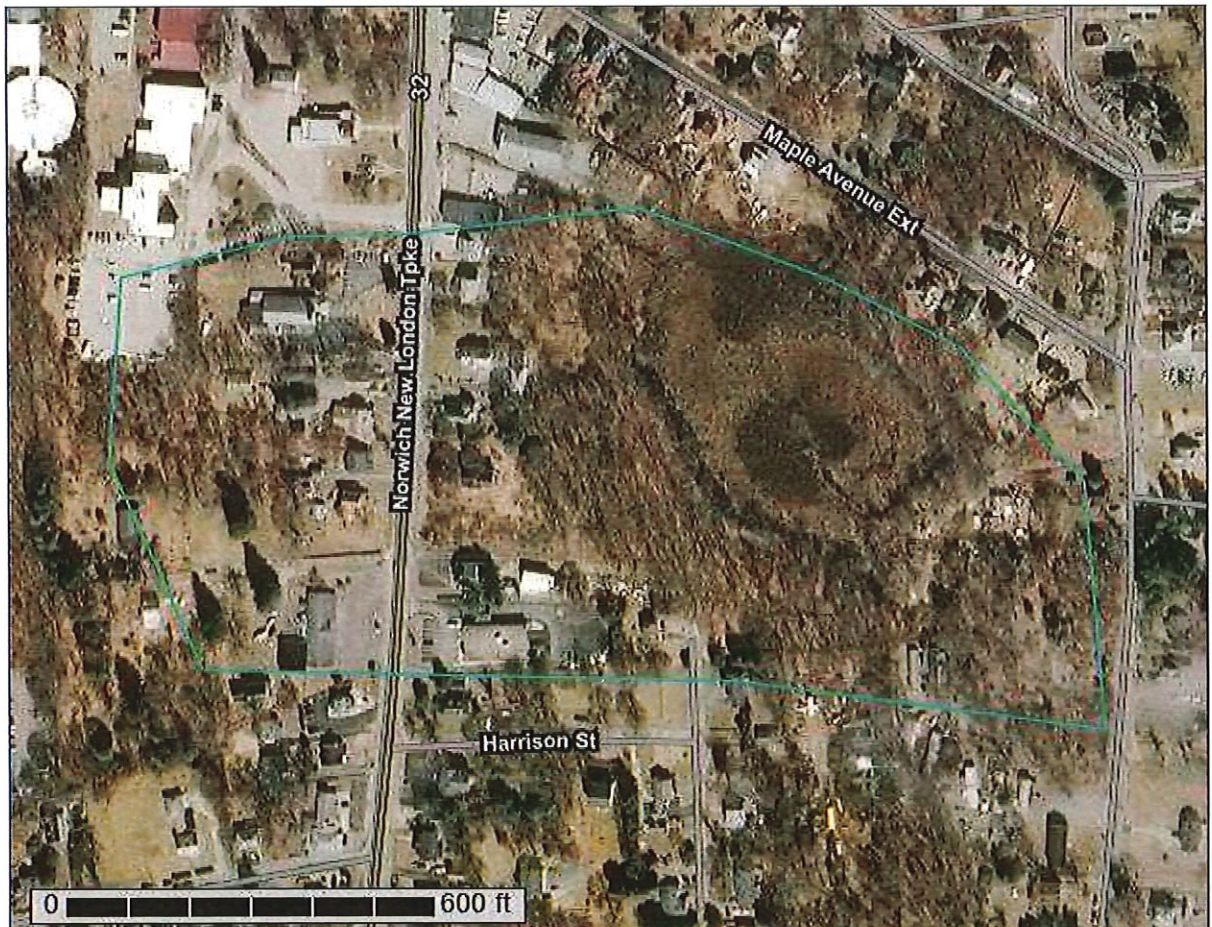
United States  
Department of  
Agriculture

**NRCS**

Natural  
Resources  
Conservation  
Service

A product of the National  
Cooperative Soil Survey,  
a joint effort of the United  
States Department of  
Agriculture and other  
Federal agencies, State  
agencies including the  
Agricultural Experiment  
Stations, and local  
participants

# Custom Soil Resource Report for State of Connecticut





# 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](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

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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

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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.

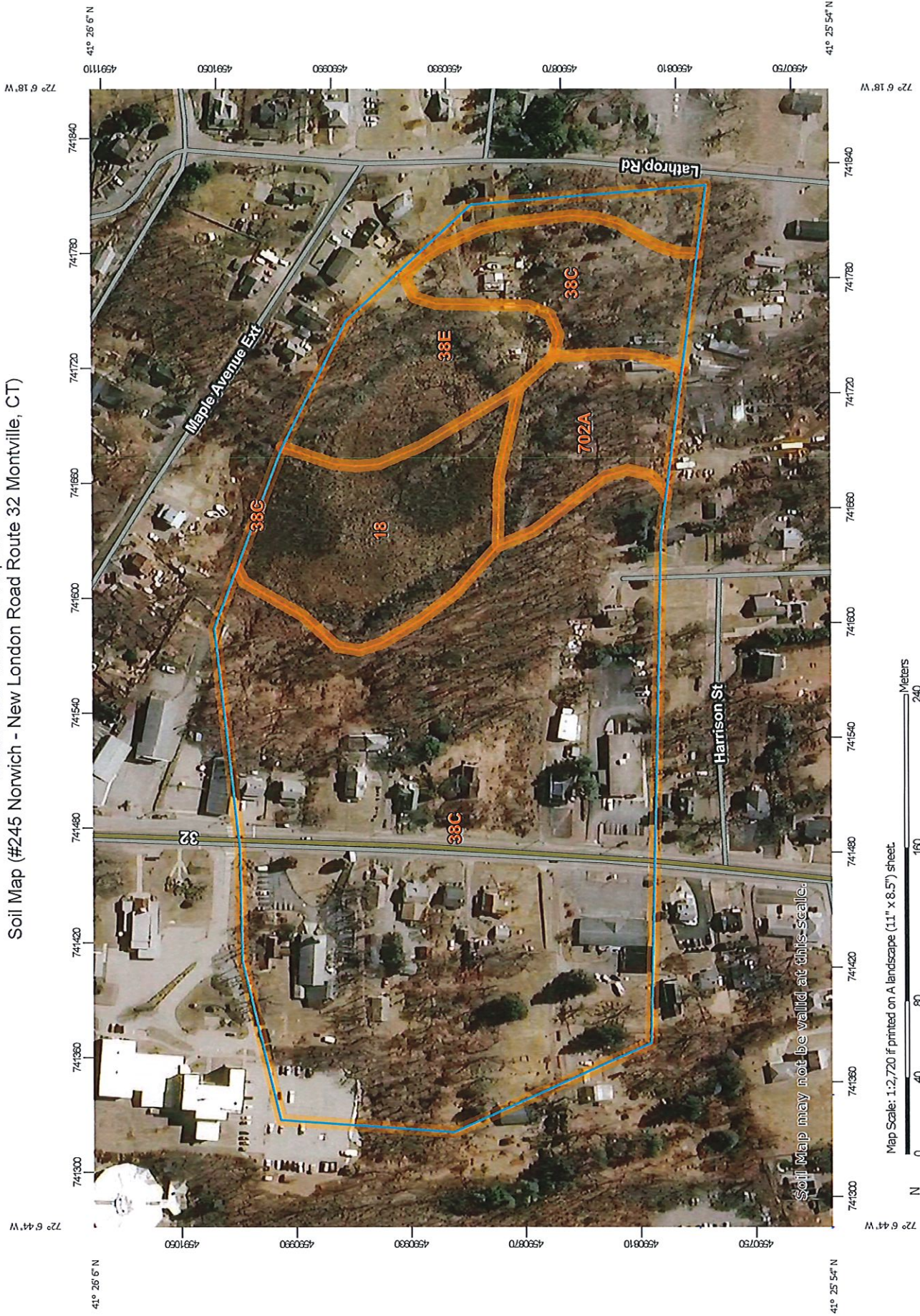
# Soil Map

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

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



## MAP 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 LEGEND

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

## 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%
<b>Totals for Area of Interest</b>		<b>24.0</b>	<b>100.0%</b>

## 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

## Custom Soil Resource Report

*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



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**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**

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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

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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



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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)**

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
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

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

Water Quality Volume Calc  
 Connecticut Stormwater Quality Manual Methodology

Completed By: SDU

Drainage Area: SITE

Checked By:

### Step 1: Calculate Water Quality Volume, (WQv)

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

Where:

R =  $R_{vi} \times \%I + R_{vT} \times \%T + R_{vF} \times \%F$   
 $R_{vi}$  = Runoff Coefficient for Impervious Cover (SEE MANUAL TABLE 5.5)  
 $\%I$  = Percent of Site in Impervious Cover (Fraction)  
 $R_{vT}$  = Runoff Coefficient for Lawn  
 $\%T$  = Percent of Site in Lawn (Fraction)  
 $R_{vF}$  = 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)	$R_{vi}$	$\%I$	$R_{vT}$	$\%T$	$R_{vF}$	$\%F$	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

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

Runoff Volume Reduction Calc  
 Connecticut Stormwater Quality Manual Methodology

Completed By: SDU

Drainage Site  
 Area:

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 <sub>post</sub> (2yr)	V <sub>pre</sub> (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 "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

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

Runoff Volume Reduction Calc  
 Connecticut Stormwater Quality Manual Methodology

Completed By: SDU

Drainage Site  
 Area:

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 <sub>post</sub> (2yr)	V <sub>pre</sub> (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

Pg. 1 of 2

A BMP <sup>1</sup>	B TSS Removal Rate <sup>1</sup>	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

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

**Total TSS Removal =**

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

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

93%

# TSS Removal Calculation Worksheet

Location: 32 CONCRETE GALLEYS

A BMP <sup>1</sup>	B TSS Removal Rate <sup>1</sup>	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

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

99%

**Total TSS Removal =**

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.

**TH-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

**TH-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

**TH-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

**TH-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**

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**PRE DEVEL**

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**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)
<b>79,607</b>	<b>73</b>	<b>TOTAL AREA</b>

**PRE DEVEL**

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**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	
<b>79,607</b>		<b>TOTAL AREA</b>

**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	<b>TOTAL AREA</b>	

**PRE DEVEL**

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#245 Route 32 Montville, CT  
Type III 24-hr 25-YEAR Rainfall=6.15"

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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**

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**

Prepared by Fuller Engineering & Land Surveying, LLC  
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#245 Route 32 Montville, CT  
 Type III 24-hr 25-YEAR Rainfall=6.15"

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**Summary for Subcatchment 1S: #245 Route 32**

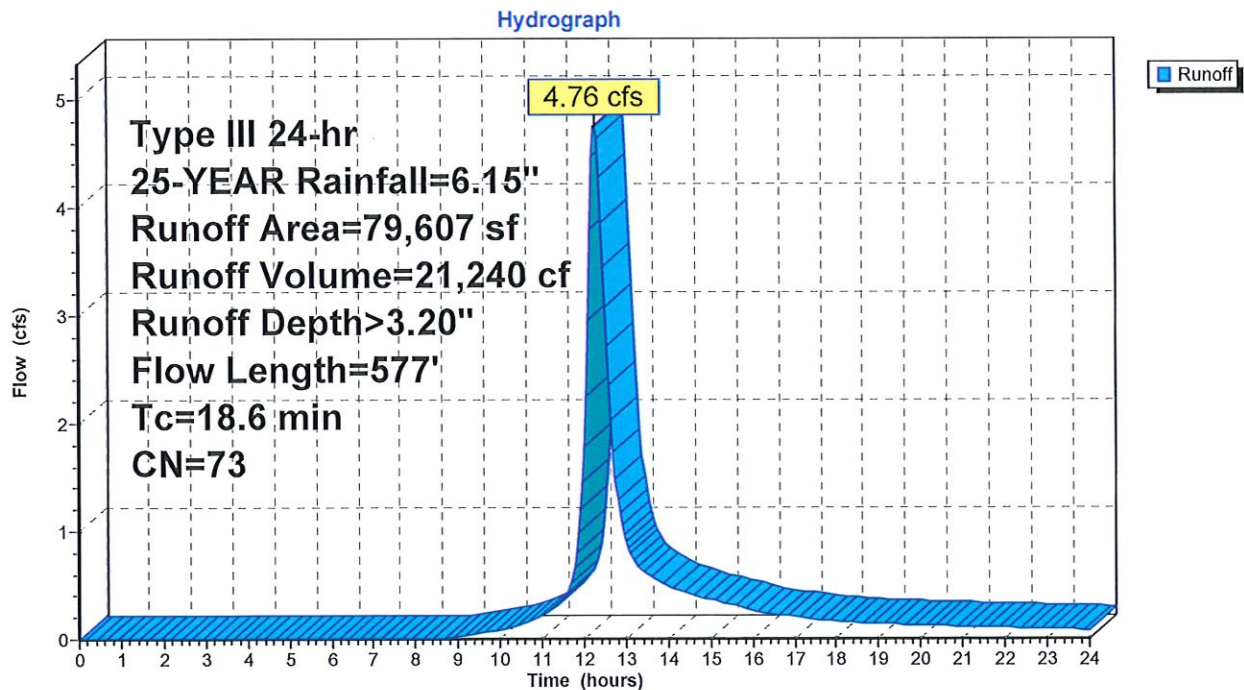
Runoff = 4.76 cfs @ 12.26 hrs, Volume= 21,240 cf, Depth> 3.20"

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**





**PRE DEVEL**

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#245 Route 32 Montville, CT  
Type III 24-hr 25-YEAR Rainfall=6.15"

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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**

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#245 Route 32 Montville, CT  
Type III 24-hr 25-YEAR Rainfall=6.15"

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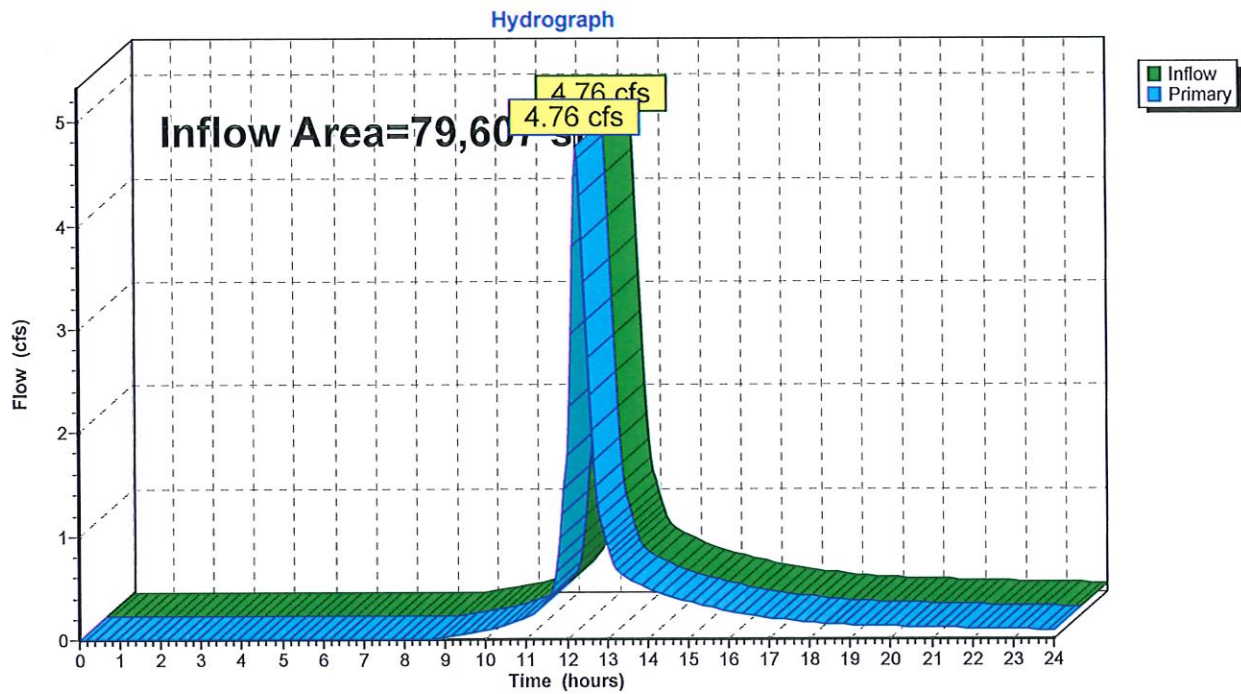
Page 8

**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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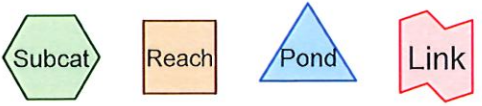
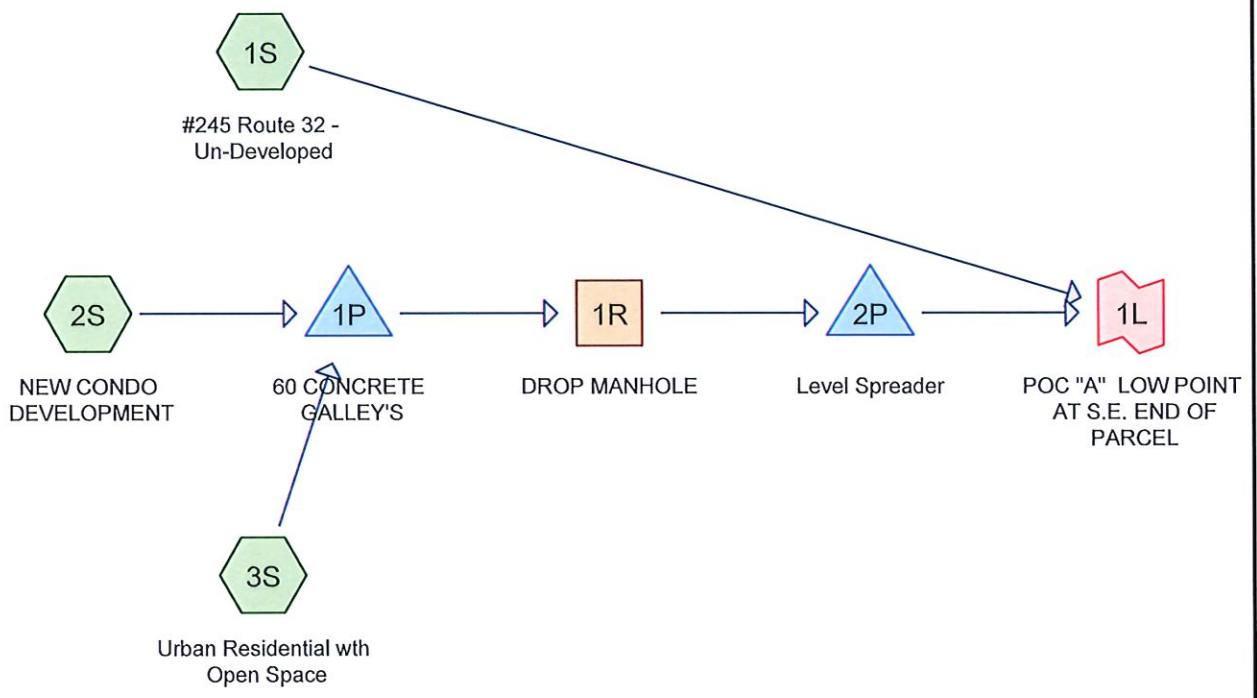
Page 9

**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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**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)
<b>79,607</b>	<b>85</b>	<b>TOTAL AREA</b>

**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	
<b>79,607</b>		<b>TOTAL AREA</b>

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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
<b>0</b>	<b>26,695</b>	<b>52,912</b>	<b>0</b>	<b>0</b>	<b>79,607</b>	<b>TOTAL AREA</b>	

**POST DEVEL**

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#245 Route 32 Montville, CT  
Type III 24-hr 25-YEAR Rainfall=6.15"

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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**

**POST DEVEL**

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#245 Route 32 Montville, CT  
 Type III 24-hr 25-YEAR Rainfall=6.15"

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**Summary for Subcatchment 1S: #245 Route 32 - Un-Developed**

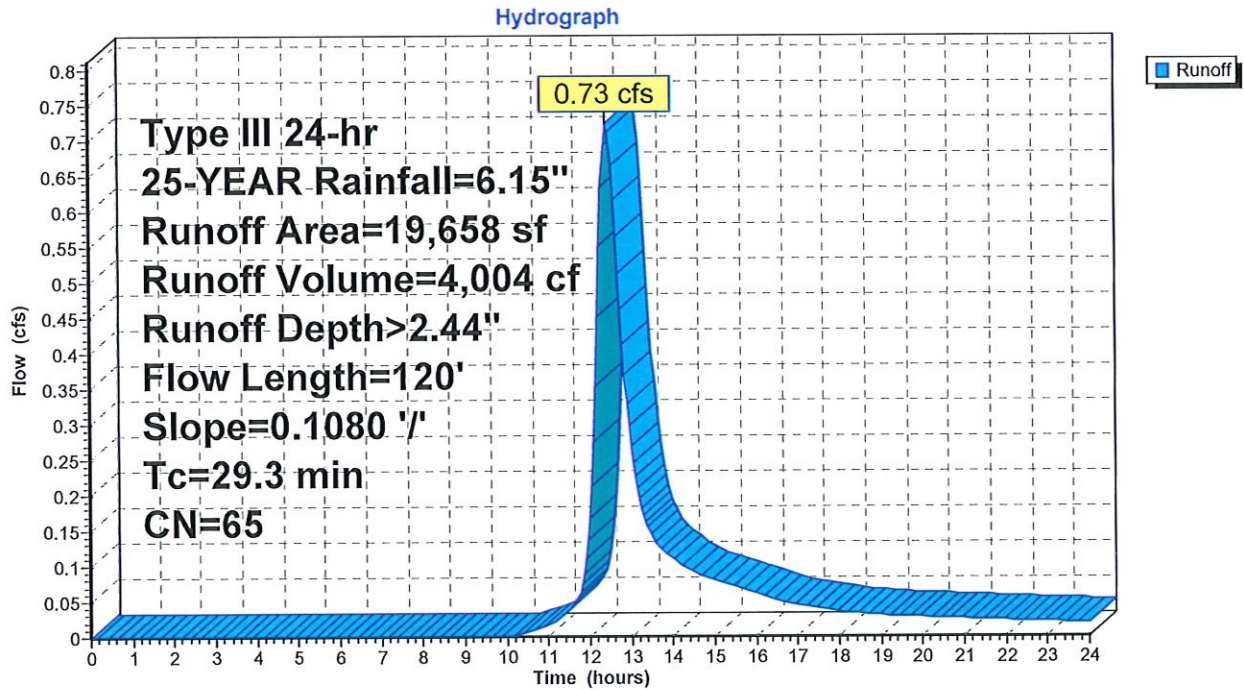
Runoff = 0.73 cfs @ 12.43 hrs, Volume= 4,004 cf, Depth> 2.44"

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
19,658	65	Brush, Good, HSG C
19,658		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	120	0.1080	0.74		Lag/CN Method, Overland Flow
26.6					Direct Entry, HydroStatic Seepage from Wall
29.3	120	Total			

**Subcatchment 1S: #245 Route 32 - Un-Developed**



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#245 Route 32 Montville, CT  
Type III 24-hr 25-YEAR Rainfall=6.15"

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**Hydrograph for Subcatchment 1S: #245 Route 32 - Un-Developed**

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	1.40	0.27
0.25	0.02	0.00	0.00	13.25	4.72	1.47	0.18
0.50	0.03	0.00	0.00	13.50	4.82	1.53	0.14
0.75	0.05	0.00	0.00	13.75	4.91	1.59	0.12
1.00	0.06	0.00	0.00	14.00	4.99	1.65	0.11
1.25	0.08	0.00	0.00	14.25	5.06	1.69	0.10
1.50	0.09	0.00	0.00	14.50	5.13	1.74	0.09
1.75	0.11	0.00	0.00	14.75	5.19	1.78	0.09
2.00	0.12	0.00	0.00	15.00	5.25	1.82	0.08
2.25	0.14	0.00	0.00	15.25	5.31	1.86	0.08
2.50	0.15	0.00	0.00	15.50	5.36	1.90	0.07
2.75	0.17	0.00	0.00	15.75	5.41	1.93	0.07
3.00	0.19	0.00	0.00	16.00	5.45	1.96	0.06
3.25	0.21	0.00	0.00	16.25	5.49	1.99	0.06
3.50	0.23	0.00	0.00	16.50	5.53	2.01	0.05
3.75	0.24	0.00	0.00	16.75	5.56	2.04	0.05
4.00	0.26	0.00	0.00	17.00	5.59	2.06	0.05
4.25	0.28	0.00	0.00	17.25	5.62	2.08	0.04
4.50	0.31	0.00	0.00	17.50	5.65	2.10	0.04
4.75	0.33	0.00	0.00	17.75	5.68	2.12	0.04
5.00	0.35	0.00	0.00	18.00	5.71	2.14	0.04
5.25	0.37	0.00	0.00	18.25	5.73	2.16	0.03
5.50	0.39	0.00	0.00	18.50	5.76	2.17	0.03
5.75	0.42	0.00	0.00	18.75	5.78	2.19	0.03
6.00	0.44	0.00	0.00	19.00	5.80	2.21	0.03
6.25	0.47	0.00	0.00	19.25	5.82	2.22	0.03
6.50	0.50	0.00	0.00	19.50	5.84	2.24	0.03
6.75	0.53	0.00	0.00	19.75	5.87	2.25	0.03
7.00	0.56	0.00	0.00	20.00	5.89	2.27	0.03
7.25	0.59	0.00	0.00	20.25	5.91	2.28	0.03
7.50	0.62	0.00	0.00	20.50	5.92	2.30	0.03
7.75	0.66	0.00	0.00	20.75	5.94	2.31	0.03
8.00	0.70	0.00	0.00	21.00	5.96	2.32	0.03
8.25	0.74	0.00	0.00	21.25	5.98	2.34	0.02
8.50	0.79	0.00	0.00	21.50	6.00	2.35	0.02
8.75	0.84	0.00	0.00	21.75	6.01	2.36	0.02
9.00	0.90	0.00	0.00	22.00	6.03	2.37	0.02
9.25	0.96	0.00	0.00	22.25	6.05	2.39	0.02
9.50	1.02	0.00	0.00	22.50	6.06	2.40	0.02
9.75	1.09	0.00	0.00	22.75	6.08	2.41	0.02
10.00	1.16	0.00	0.00	23.00	6.09	2.42	0.02
10.25	1.24	0.00	0.00	23.25	6.11	2.43	0.02
10.50	1.33	0.01	0.01	23.50	6.12	2.44	0.02
10.75	1.43	0.02	0.01	23.75	6.14	2.45	0.02
11.00	1.54	0.04	0.02	24.00	6.15	2.46	0.02
11.25	1.67	0.06	0.02				
11.50	1.83	0.09	0.04				
11.75	2.18	0.19	0.06				
12.00	3.07	0.54	0.17				
12.25	3.97	1.01	0.55				
12.50	4.32	1.22	0.70				
12.75	4.48	1.32	0.46				



**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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**Summary for Subcatchment 2S: NEW CONDO DEVELOPMENT**

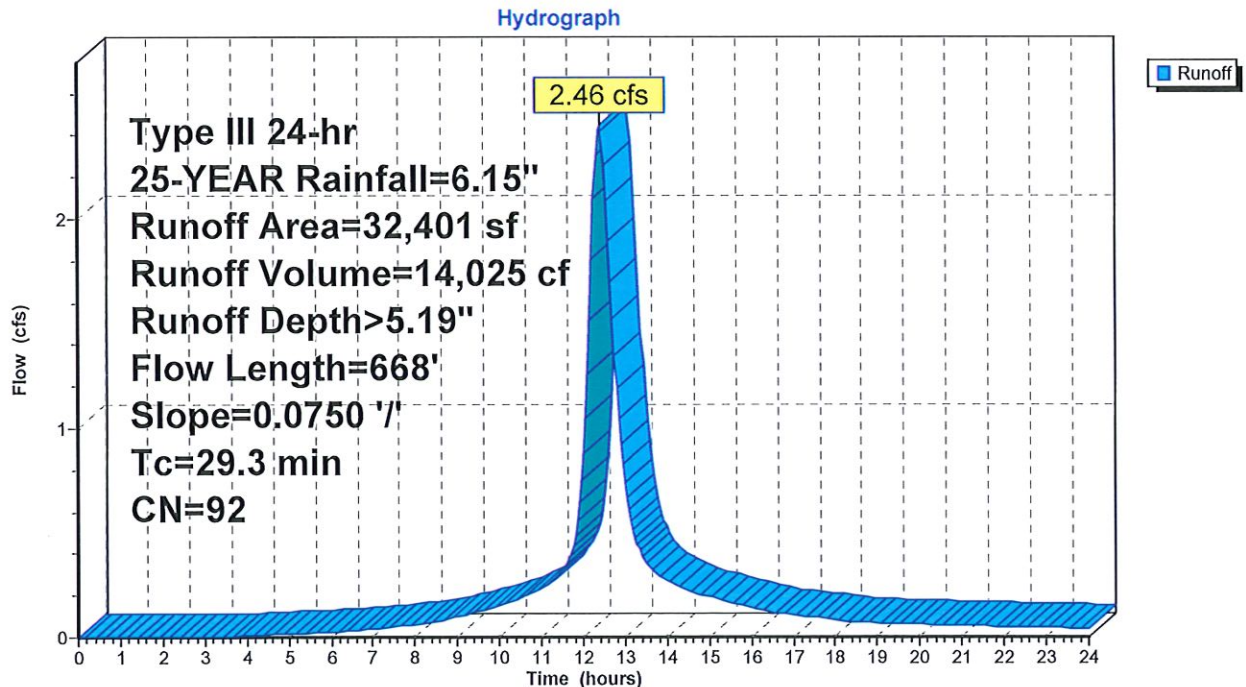
Runoff = 2.46 cfs @ 12.39 hrs, Volume= 14,025 cf, Depth> 5.19"

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
20,385	98	Roofs, HSG B
12,016	81	1/3 acre lots, 30% imp, HSG C
32,401	92	Weighted Average
8,411		25.96% Pervious Area
23,990		74.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.5					<b>Direct Entry, DIRECT</b>
0.6	456		12.69		<b>Lake or Reservoir, DETENTION</b> Mean Depth= 5.00'
10.2	212	0.0750	0.35		<b>Sheet Flow, OverLand Flow</b> Grass: Short n= 0.150 P2= 3.40"
29.3	668	Total			

**Subcatchment 2S: NEW CONDO DEVELOPMENT**



**POST DEVEL**

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**Hydrograph for Subcatchment 2S: NEW CONDO DEVELOPMENT**

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	3.71	0.74
0.25	0.02	0.00	0.00	13.25	4.72	3.82	0.48
0.50	0.03	0.00	0.00	13.50	4.82	3.91	0.36
0.75	0.05	0.00	0.00	13.75	4.91	4.00	0.30
1.00	0.06	0.00	0.00	14.00	4.99	4.08	0.27
1.25	0.08	0.00	0.00	14.25	5.06	4.15	0.24
1.50	0.09	0.00	0.00	14.50	5.13	4.22	0.22
1.75	0.11	0.00	0.00	14.75	5.19	4.28	0.21
2.00	0.12	0.00	0.00	15.00	5.25	4.34	0.19
2.25	0.14	0.00	0.00	15.25	5.31	4.39	0.18
2.50	0.15	0.00	0.00	15.50	5.36	4.44	0.17
2.75	0.17	0.00	0.00	15.75	5.41	4.49	0.15
3.00	0.19	0.00	0.00	16.00	5.45	4.53	0.14
3.25	0.21	0.00	0.00	16.25	5.49	4.57	0.13
3.50	0.23	0.00	0.00	16.50	5.53	4.60	0.12
3.75	0.24	0.01	0.00	16.75	5.56	4.64	0.11
4.00	0.26	0.01	0.01	17.00	5.59	4.67	0.11
4.25	0.28	0.01	0.01	17.25	5.62	4.70	0.10
4.50	0.31	0.02	0.01	17.50	5.65	4.73	0.09
4.75	0.33	0.02	0.01	17.75	5.68	4.76	0.09
5.00	0.35	0.03	0.02	18.00	5.71	4.78	0.08
5.25	0.37	0.04	0.02	18.25	5.73	4.81	0.08
5.50	0.39	0.04	0.02	18.50	5.76	4.83	0.07
5.75	0.42	0.05	0.02	18.75	5.78	4.85	0.07
6.00	0.44	0.06	0.03	19.00	5.80	4.87	0.07
6.25	0.47	0.07	0.03	19.25	5.82	4.90	0.07
6.50	0.50	0.09	0.03	19.50	5.84	4.92	0.07
6.75	0.53	0.10	0.04	19.75	5.87	4.94	0.06
7.00	0.56	0.12	0.04	20.00	5.89	4.96	0.06
7.25	0.59	0.13	0.05	20.25	5.91	4.98	0.06
7.50	0.62	0.15	0.05	20.50	5.92	5.00	0.06
7.75	0.66	0.18	0.06	20.75	5.94	5.01	0.06
8.00	0.70	0.20	0.06	21.00	5.96	5.03	0.06
8.25	0.74	0.23	0.07	21.25	5.98	5.05	0.05
8.50	0.79	0.26	0.08	21.50	6.00	5.07	0.05
8.75	0.84	0.29	0.09	21.75	6.01	5.08	0.05
9.00	0.90	0.33	0.10	22.00	6.03	5.10	0.05
9.25	0.96	0.37	0.11	22.25	6.05	5.12	0.05
9.50	1.02	0.42	0.12	22.50	6.06	5.13	0.05
9.75	1.09	0.47	0.14	22.75	6.08	5.15	0.05
10.00	1.16	0.53	0.15	23.00	6.09	5.16	0.05
10.25	1.24	0.59	0.17	23.25	6.11	5.18	0.04
10.50	1.33	0.66	0.18	23.50	6.12	5.19	0.04
10.75	1.43	0.74	0.21	23.75	6.14	5.20	0.04
11.00	1.54	0.83	0.24	24.00	6.15	5.22	0.04
11.25	1.67	0.94	0.27				
11.50	1.83	1.09	0.32				
11.75	2.18	1.40	0.44				
12.00	3.07	2.23	0.88				
12.25	3.97	3.08	2.09				
12.50	4.32	3.42	2.26				
12.75	4.48	3.59	1.35				

**POST DEVEL**

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 Type III 24-hr 25-YEAR Rainfall=6.15"

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**Summary for Subcatchment 3S: Urban Residential wth Open Space**

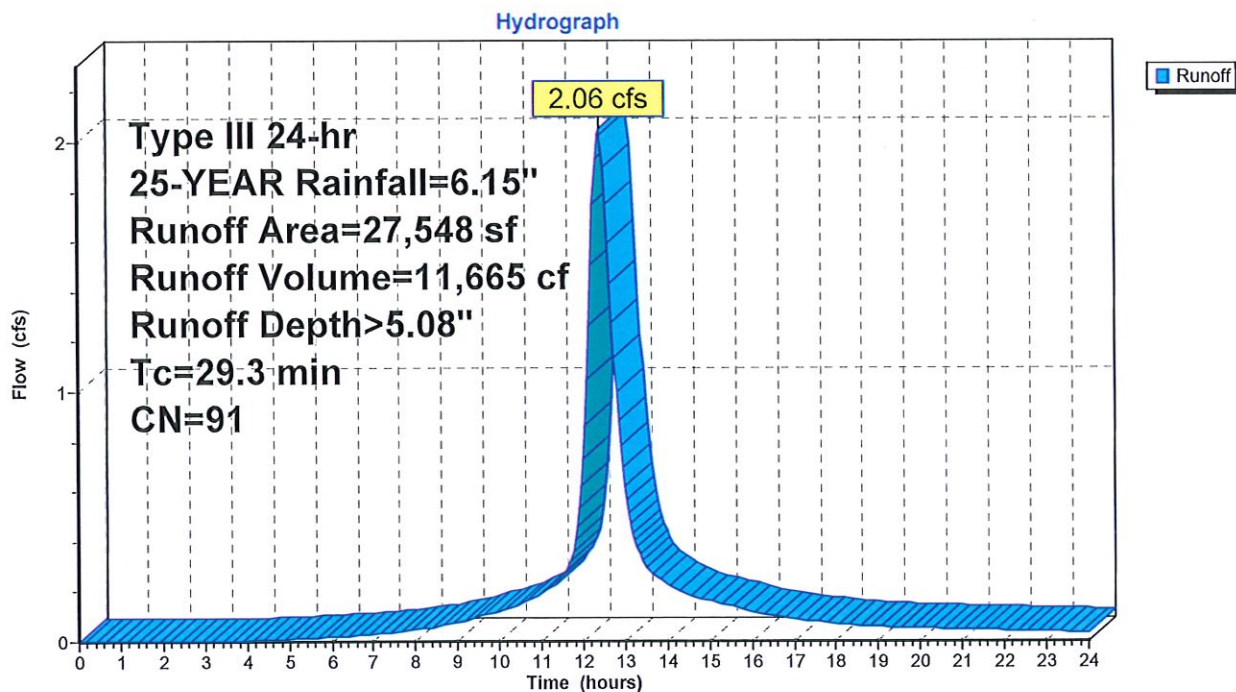
Runoff = 2.06 cfs @ 12.39 hrs, Volume= 11,665 cf, Depth> 5.08"

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
6,310	69	50-75% Grass cover, Fair, HSG B
21,238	98	Paved parking, HSG C
27,548	91	Weighted Average
6,310		22.91% Pervious Area
21,238		77.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
29.3					Direct Entry, DIRECT

**Subcatchment 3S: Urban Residential wth Open Space**



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Hydrograph for Subcatchment 3S: Urban Residential wth Open Space

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	3.61	0.62
0.25	0.02	0.00	0.00	13.25	4.72	3.71	0.40
0.50	0.03	0.00	0.00	13.50	4.82	3.81	0.30
0.75	0.05	0.00	0.00	13.75	4.91	3.89	0.26
1.00	0.06	0.00	0.00	14.00	4.99	3.97	0.23
1.25	0.08	0.00	0.00	14.25	5.06	4.04	0.21
1.50	0.09	0.00	0.00	14.50	5.13	4.11	0.19
1.75	0.11	0.00	0.00	14.75	5.19	4.17	0.17
2.00	0.12	0.00	0.00	15.00	5.25	4.23	0.16
2.25	0.14	0.00	0.00	15.25	5.31	4.28	0.15
2.50	0.15	0.00	0.00	15.50	5.36	4.33	0.14
2.75	0.17	0.00	0.00	15.75	5.41	4.38	0.13
3.00	0.19	0.00	0.00	16.00	5.45	4.42	0.12
3.25	0.21	0.00	0.00	16.25	5.49	4.46	0.11
3.50	0.23	0.00	0.00	16.50	5.53	4.49	0.10
3.75	0.24	0.00	0.00	16.75	5.56	4.53	0.09
4.00	0.26	0.00	0.00	17.00	5.59	4.56	0.09
4.25	0.28	0.01	0.00	17.25	5.62	4.59	0.08
4.50	0.31	0.01	0.01	17.50	5.65	4.62	0.08
4.75	0.33	0.01	0.01	17.75	5.68	4.65	0.07
5.00	0.35	0.02	0.01	18.00	5.71	4.67	0.07
5.25	0.37	0.03	0.01	18.25	5.73	4.69	0.07
5.50	0.39	0.03	0.01	18.50	5.76	4.72	0.06
5.75	0.42	0.04	0.02	18.75	5.78	4.74	0.06
6.00	0.44	0.05	0.02	19.00	5.80	4.76	0.06
6.25	0.47	0.06	0.02	19.25	5.82	4.78	0.06
6.50	0.50	0.07	0.02	19.50	5.84	4.81	0.06
6.75	0.53	0.08	0.03	19.75	5.87	4.83	0.05
7.00	0.56	0.10	0.03	20.00	5.89	4.85	0.05
7.25	0.59	0.11	0.03	20.25	5.91	4.86	0.05
7.50	0.62	0.13	0.04	20.50	5.92	4.88	0.05
7.75	0.66	0.15	0.04	20.75	5.94	4.90	0.05
8.00	0.70	0.17	0.05	21.00	5.96	4.92	0.05
8.25	0.74	0.19	0.05	21.25	5.98	4.94	0.05
8.50	0.79	0.22	0.06	21.50	6.00	4.95	0.05
8.75	0.84	0.25	0.07	21.75	6.01	4.97	0.04
9.00	0.90	0.29	0.08	22.00	6.03	4.99	0.04
9.25	0.96	0.33	0.09	22.25	6.05	5.00	0.04
9.50	1.02	0.37	0.10	22.50	6.06	5.02	0.04
9.75	1.09	0.42	0.11	22.75	6.08	5.03	0.04
10.00	1.16	0.48	0.12	23.00	6.09	5.05	0.04
10.25	1.24	0.54	0.13	23.25	6.11	5.06	0.04
10.50	1.33	0.61	0.15	23.50	6.12	5.08	0.04
10.75	1.43	0.68	0.17	23.75	6.14	5.09	0.04
11.00	1.54	0.77	0.19	24.00	6.15	5.10	0.03
11.25	1.67	0.88	0.22				
11.50	1.83	1.02	0.26				
11.75	2.18	1.33	0.36				
12.00	3.07	2.14	0.73				
12.25	3.97	2.98	1.75				
12.50	4.32	3.32	1.90				
12.75	4.48	3.48	1.14				

**POST DEVEL**

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#245 Route 32 Montville, CT  
Type III 24-hr 25-YEAR Rainfall=6.15"  
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**Summary for Reach 1R: DROP MANHOLE**

Inflow Area = 59,949 sf, 75.44% Impervious, Inflow Depth = 1.47" for 25-YEAR event  
Inflow = 3.82 cfs @ 12.57 hrs, Volume= 7,342 cf  
Outflow = 3.82 cfs @ 12.57 hrs, Volume= 7,342 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Max. Velocity= 99.87 fps, Min. Travel Time= 0.0 min  
Avg. Velocity = 99.87 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 12.57 hrs  
Average Depth at Peak Storage= 0.02'  
Bank-Full Depth= 12.00' Flow Area= 19.6 sf, Capacity= 2,269.48 cfs

Custom stage-perimeter table, n= 0.013 Concrete pipe, bends & connections  
100 Intermediate values determined by Multi-point interpolation  
Length= 12.0' Slope= 0.7633 1/'  
Inlet Invert= 61.16', Outlet Invert= 52.00'



Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	0.0	0	0.00
6.00	12.6	12.6	151	1,258.35
12.00	19.6	15.7	235	2,269.48



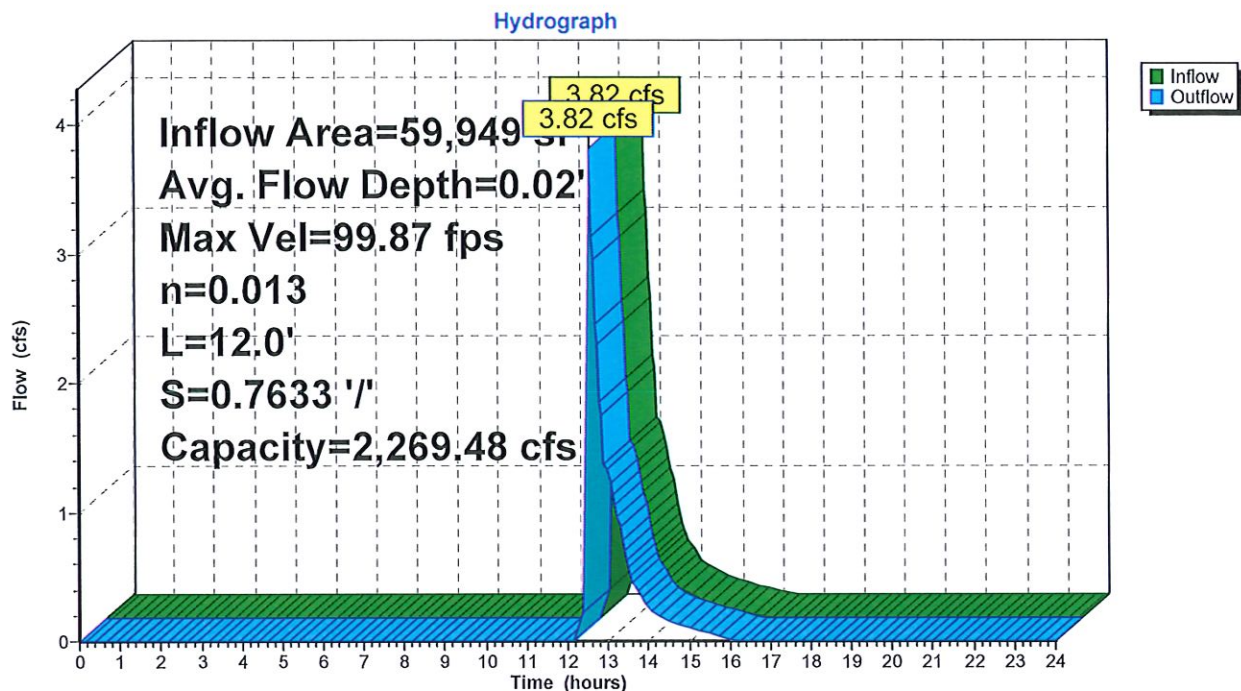
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**Reach 1R: DROP MANHOLE**



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