DRAINAGE REPORT

Proposed Restaurant at 3 Dover Road

Durham, New Hampshire

Prepared for:

Tropic Star Development, LLC
321 D Lafayette Road
Hampton, NH 03842

Prepared by:

TEC, Inc.
169 Ocean Boulevard
PO Box 249
Hampton, NH 03842

February 19, 2025

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Narrative

Introduction

Tropic Star Development, LLC, "the Applicant", is proposing to construct a restaurant at 3 Dover Road in the Courthouse Zoning District. The project is identified on the Town of Durham's Assessors Map as Map 108, Lot 38. The project proposes to redevelop the lot. The area within the limit of work, herein referred to as "the Site", occupies 10,881 SF, equaling approximately 0.25 acre of land. The project is situated between the Holiday Inn Express (westerly bound), the residences located at 4 Main Street (northerly bound), Route 108 (Dover Road) (Southernly bound), and the Mobil Gas Station (easterly bound). The project is defined on the *Project Location Map* (Figure 1).

The Applicant is proposing to redevelop the Site by constructing a 1-story restaurant with an approximate total footprint of 1,520 +/- square feet. The Site will also contain associated off-street parking, landscaping, utility and stormwater management infrastructure. The project will require review and approval from the Town of Durham Planning Board.

This drainage study was performed in order to assess the potential impacts of the proposed improvements and to provide measures to mitigate any impacts of the project. Currently, the Site consists of existing pavement and concrete, an existing building and wooded areas. Runoff from the Site either infiltrates into the ground, sheet flows to the drainage system along Route 108. The Project will provide a stormwater management system incorporating traditional and Low Impact Design (LID) Best Management Practices (BMP) elements. This analysis has been prepared to verify that the project will not have an adverse effect on the stormwater conditions both on-site and off-site.

The Stormwater Management Plan has been prepared to meet the design criteria identified in the New Hampshire Stormwater Manual and addresses water quality, groundwater recharge, site coverage, channel protection, and peak runoff control.

Existing Conditions

The existing Site is 0.25 acre and is comprised of wooded areas, grassed areas, concrete and asphalt areas, and an existing building. Stormwater runoff primarily enters the drainage system along Route 108, and infiltrates into the ground. The topography of the Site is gently sloping with grades generally ranging from 4-5%. The Site slopes down from an elevation of 41 in the western portion of the lot to elevation 36 in the eastern portion of the lot. There are no major hills or depressed areas on the Site.

The Site is comprised of Buxton silt loam complex, hydrologic soil group C/D, which is considered to be a moderately well drained soil. Refer to Appendix B to review the Geotechnical Data, depicting the various soils present at and around the Site.

According to the FEMA Flood Insurance Rate Maps (FIRM), map number 33017C0318E, dated September 30, 2015, the site lies entirely outside of the 100-year floodplain in an area of minimal flood hazard (Zone X). Refer to the attached FIRM Figure at the end of this section (Figure 2).

Proposed Conditions

The development will consist of a 1-story restaurant with an approximate total footprint of 1,520 +/- square feet with associated parking, landscaping, and utility and stormwater management infrastructure. The proposed stormwater management system has been designed in accordance with the New Hampshire Stormwater Manual and includes traditional and LID BMPs.

The proposed conditions features one treatment train for peak rate attenuation, water quality treatment, and TSS removal. The treatment train consists of a Contech CDS 2015-4C water quality unit and deep-sump and hooded catch basins. The Water Quality Unit has an outlet control structure which outlets to Design-Point 1. The design parameters set forth in the New Hampshire Stormwater Manual have been met as described in the Regulatory Compliance section below.

Methodology

The Stormwater Management Plan, which will be implemented as part of this project, will provide adequate collection, management, and treatment of the stormwater runoff. Existing and proposed hydrologic conditions were analyzed using HydroCAD, an SCS TR-20 based program, to calculate existing and proposed peak discharge rates. This method takes into account existing and proposed pervious and impervious areas including soil types and hydrologic classifications. The rainfall data utilized was the extreme precipitation values from the Northeast Regional Climate Center. The 2-, 10-, 25-, and 50-year, 24-hour storm frequencies were used in the analysis in accordance with the NHDES and Town of Durham requirements.

The “Regulatory Compliance” portion of this report addresses the Town of Durham and New Hampshire Department of Environmental Services (NHDES) requirements concerning peak runoff control, groundwater recharge, water quality, and channel protection.

Pre-Development Runoff

In the Site’s current condition, there is one existing subcatchment areas which are conveyed to one design points. The *Pre-Development Drainage Areas* are depicted in Figure D-1 of this report. This figure presents the delineation of the existing subcatchment areas and the design points.

Existing Subcatchment Area 1 (EX-1) is comprised of 3,460 SF of pervious area consisting of grassed areas and wooded areas, and 7,421 SF of impervious area consisting of paved roadway, concrete surfaces, gravel, and a roof. Runoff from EX-1 sheet flows to the southern side of the Site, Design Point 1 (DP-1). The time of concentration for EX-1 has been calculated to be approximately 6.0 minutes.

Post-Development Runoff

The proposed stormwater management system is designed to mitigate the effects of the proposed development by reducing the peak rates of runoff as compared to the existing conditions. In the proposed conditions analysis, the same design points identified and analyzed under the existing conditions were analyzed. The post-development subcatchment areas are identified in Figure D-2, *Post Development Drainage Areas.*

Proposed Subcatchment Area 1 (PR-1) is comprised of 2,385 SF of pervious landscaped areas and 8,496 SF of impervious pavement, concrete, and roofs. Stormwater from PR-1 is collected via roof drains or sheet flows south to deep-sump and hooded catch basins, then is directed to a water quality unit before outletting into the closed drainage system on Dover Road (DP-1). The minimum time of concentration of 6 minutes has been utilized for PR-1.

Regulatory Compliance

The proposed project does not require the filing of any permits identified in Chapter 4 of the New Hampshire Stormwater Manual and is therefore exempt from an NHDES Antidegradation Review. The following calculations have been provided to show conformance with New Hampshire BMP design criteria (DC) and industry best practices for drainage design. BMP Maintenance shall be completed as described in the Operation & Maintenance Plan (Appendix F).

DC-1 Water Quality Volume (WQV)

A proposed BMP will capture and treat the WQV associated with all proposed impervious surfaces. The respective WQV the BMP have been calculated to determine the appropriate size of each BMP. The proposed BMP exceeds the WQV standard.

WQV = (P)(Rv)(A)
P = 1 inch
Rv = the unitless runoff coefficient, Rv = 0.05 + 0.9(I)
I = percent impervious cover draining to the structure, in decimal form
A = total site area draining to the structure

Water Quality Unit
Rv = 0.05 + 0.9(0.7799) = 0.75191
WQV = (1”)(0.75191)(10,881 SF)[1 FT / 12”] = 682 CF

The volume of runoff filtered through the water quality unit, including the storage above the filter, is 699 CF exceeding the required WQV.

DC-2 Water Quality Flow (WQF)

The proposed hydrodynamic separator is sized based on the WQF, as opposed to the WQV. The hydrodynamic separator is sized to accommodate the WQF.

Water Quality Unit:
CN = 98
Tc = 0.1 hours
S = (1000/CN) – 10 = (1000/98) – 10 = 0.2
Ia = 0.2S = (0.2)(0.64) = 0.046

Durham is within a Type III NRCS Rainfall Distribution, and the unit peak discharge as determined by Exhibit 4-III is 650 CFS/mile^2/in.

WQF = (q_u)(WQV)
=(650 CFS/mile^2/in)(699 CF)[(1 mile^2/640 AC)(1 AC/43,560 SF)(12”/1 FT)]
= 0.196 CFS

The Water Quality Unit accommodates up to a 0.7 CFS inlet velocity, exceeding the calculated WQF.

Contech CDS Hydrodynamic Separator:
The proposed water quality unit has been sized utilizing the water quality flow as the design flow rate. The WQV and WQF have been calculated using the same method(s) as seen above and are summarized in Table 1 below. Hydrodynamic separator sizing for 80% TSS removal is provided in Appendix C.

Table 1 (Contech CDS Hydrodynamic Separator Summary)

WQU	Drainage Area	CN	Tc (hr)	S	Ia	q_u	WQV (cf)	Design Flow (WQF in cfs)	Model	TSS Removal (%)
WQU-5	PR-1	94	0.10	0.2	0.046	650	699	0.196	CDS2015-4-C	89.4%

DC-3 Effective Impervious Cover (EIC) & Undisturbed Cover (UDC)

The existing and proposed amount of effective impervious cover (EIC) and the proposed undisturbed cover (UDC) within the limit of work are as seen below:

Table 2 (EIC & UDC)

	Exist (%)	Prop (%)
EIC	68%	78%
UDC	0%	0%

The existing EIC on the Site is 68%. The existing impervious contains the building roof, concrete sidewalk, asphalt parking area and a gravel parking/turnaround area that all directly drain to a storm drain network. The proposed EIC

consists of the building roof, the concrete sidewalks, and the asphalt parking areas that are directed through a storm drain to catch basins, and then directed to a water quality unit connected to the Town of Durham's closed drainage system along Route 108.

The existing site has previously been developed and has 0% UDC. The site will be cleared and graded within the limit of work as seen in Figure D-2, resulting in 0% proposed UDC.

Because the project does not meet the "1065 Rule", the simple method was utilized to calculate pre- and post-development total suspended solids (TSS). BMP pollutant removal efficiencies were determined from Appendix B of the NHDES Stormwater Manual Volume 2. See Appendix D for the Treatment Train Pollutant Removal Computation. Please note, the Site does not discharge runoff directly to a waterbody and the project is exempt from NHDES Antidegradation Review.

One BMP treatment train treats runoff from impervious surface in accordance with the Town of Durham Site and Subdivision Regulations. The treatment Train, consists of a Contech Hydrodynamic Separator providing a TSS removal rate of 89.4%. See Appendix D for a table showing BMP pollutant removal capacity.

DC-4 Peak Runoff Control

The project proposes to maintain peak runoff rates for the 2-, 10-, 25-, and 100-Year 24-hour storm events, in accordance with state and local regulations. The peak runoff rates were calculated using HydroCAD, a TR-20 program. The HydroCAD Reports are attached as Appendix A and are summarized below in Table 5.

Table 3 (Peak Flow Summary)

	2-Year Storm		**10-Year Storm**		**25-Year Storm**		**100-Year Storm**	
Design Point	**Exist (cfs)**	**Prop (cfs)**	**Exist (cfs)**	**Prop (cfs)**	**Exist (cfs)**	**Prop (cfs)**	**Exist (cfs)**	**Prop (cfs)**
	2-Year		10-Year		25-Year		50-Year	
DP-1	0.63	0.63	1.00	1.00	1.28	1.28	1.87	1.87

Conclusion

The proposed site development is designed in accordance with all rules and regulations of the Town of Durham, revitalizes an underdeveloped site along Route 108, encouraging economic development. The proposed development ameliorates stormwater conditions by reducing peak runoff rates, providing water quality treatment, and will provide erosion and sediment control during construction activities.

Figure 1 – Project Location Map
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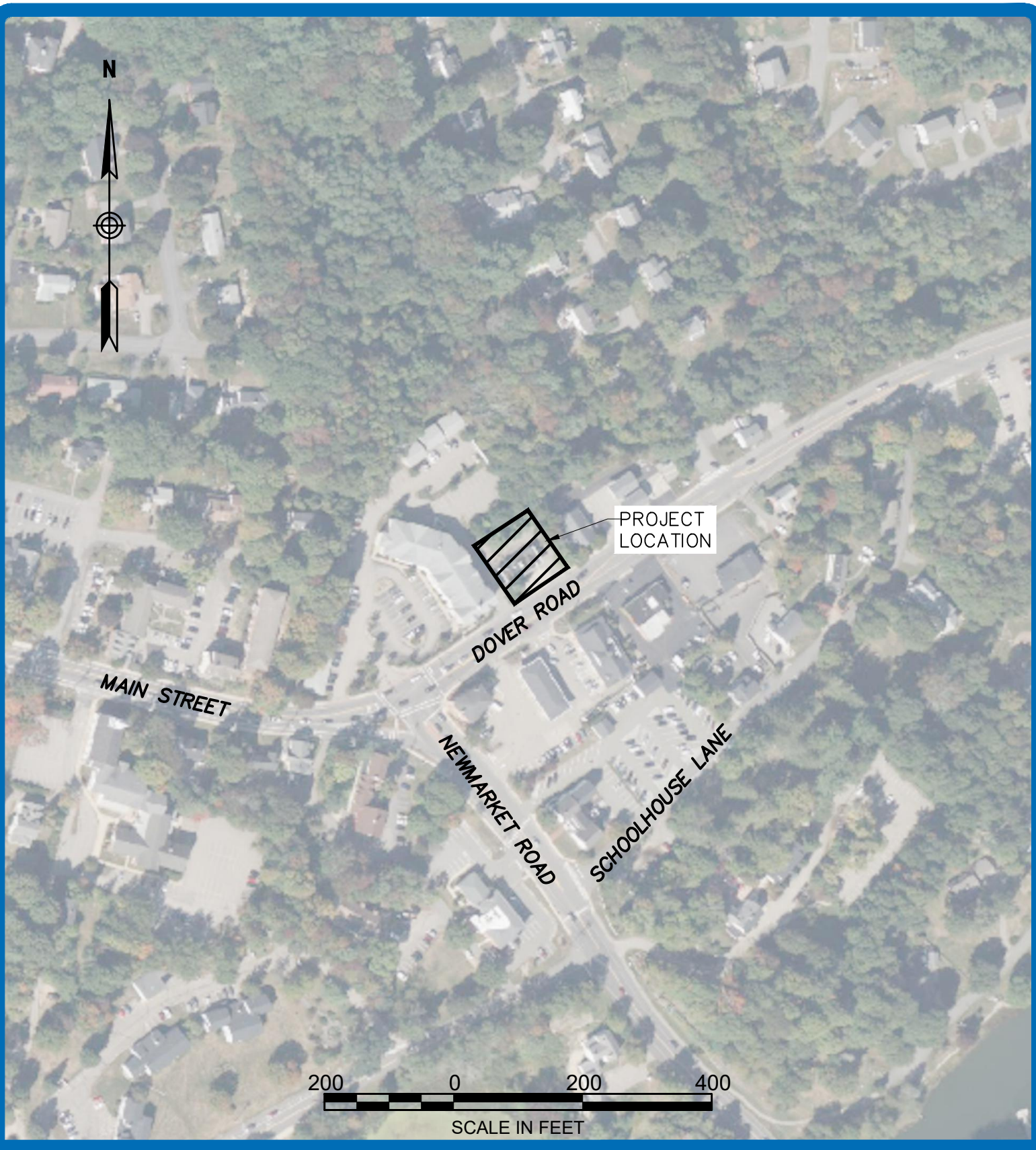

TEC
The Engineering Corp

Project Location Map
3 Dover Road
Durham, New Hampshire

February 19, 2025

Figure 2 – FEMA FIRM
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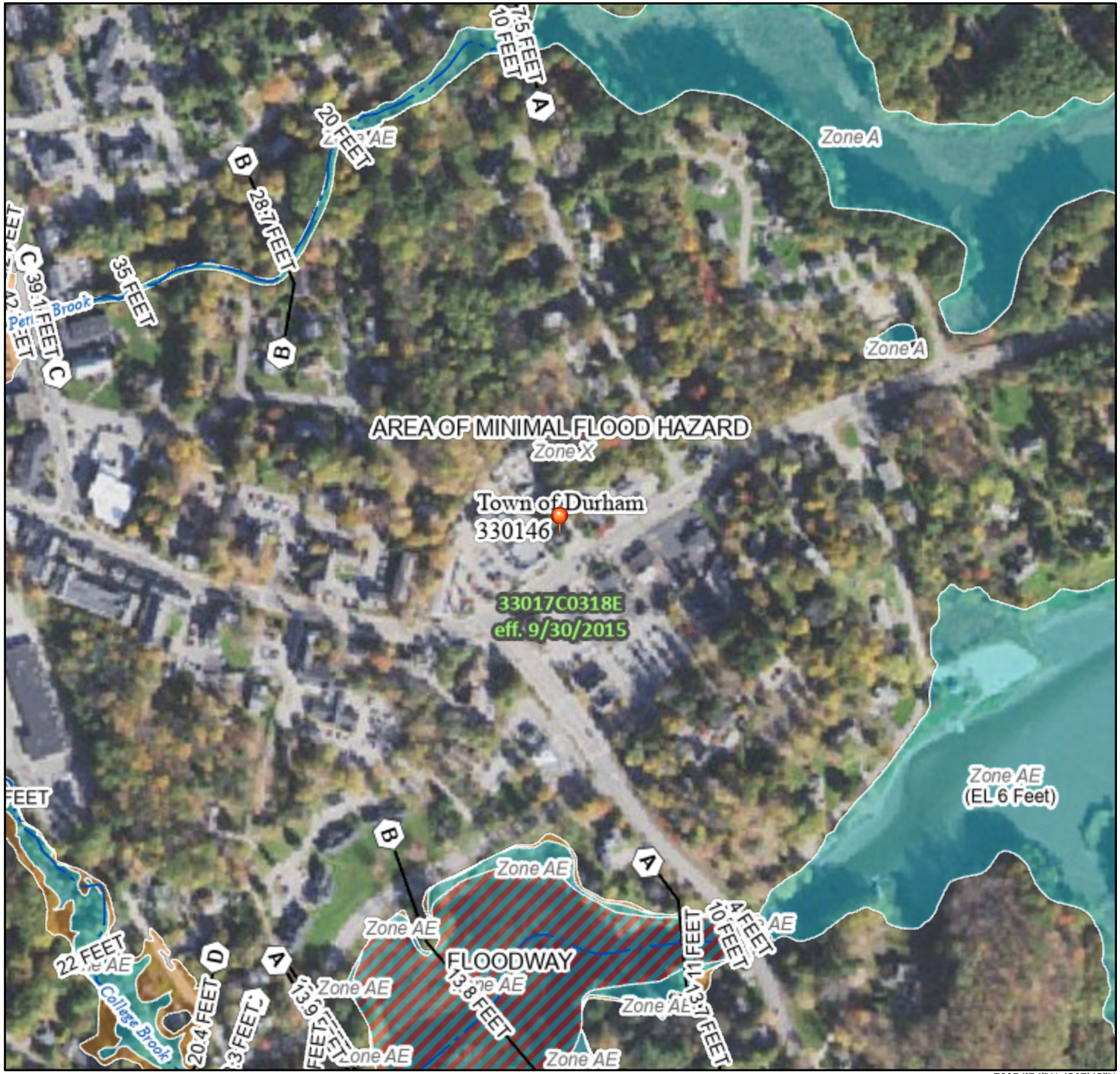
National Flood Hazard Layer FIRMette

FEMA

70°55'31"W 43°8'14"N



70°54'54"W 43°7'48"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Basemap Imagery Source: USGS National Map 2023

Legend

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

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

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

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

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 10/28/2024 at 3:55 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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

Figure 3 – NRCS Soil Map
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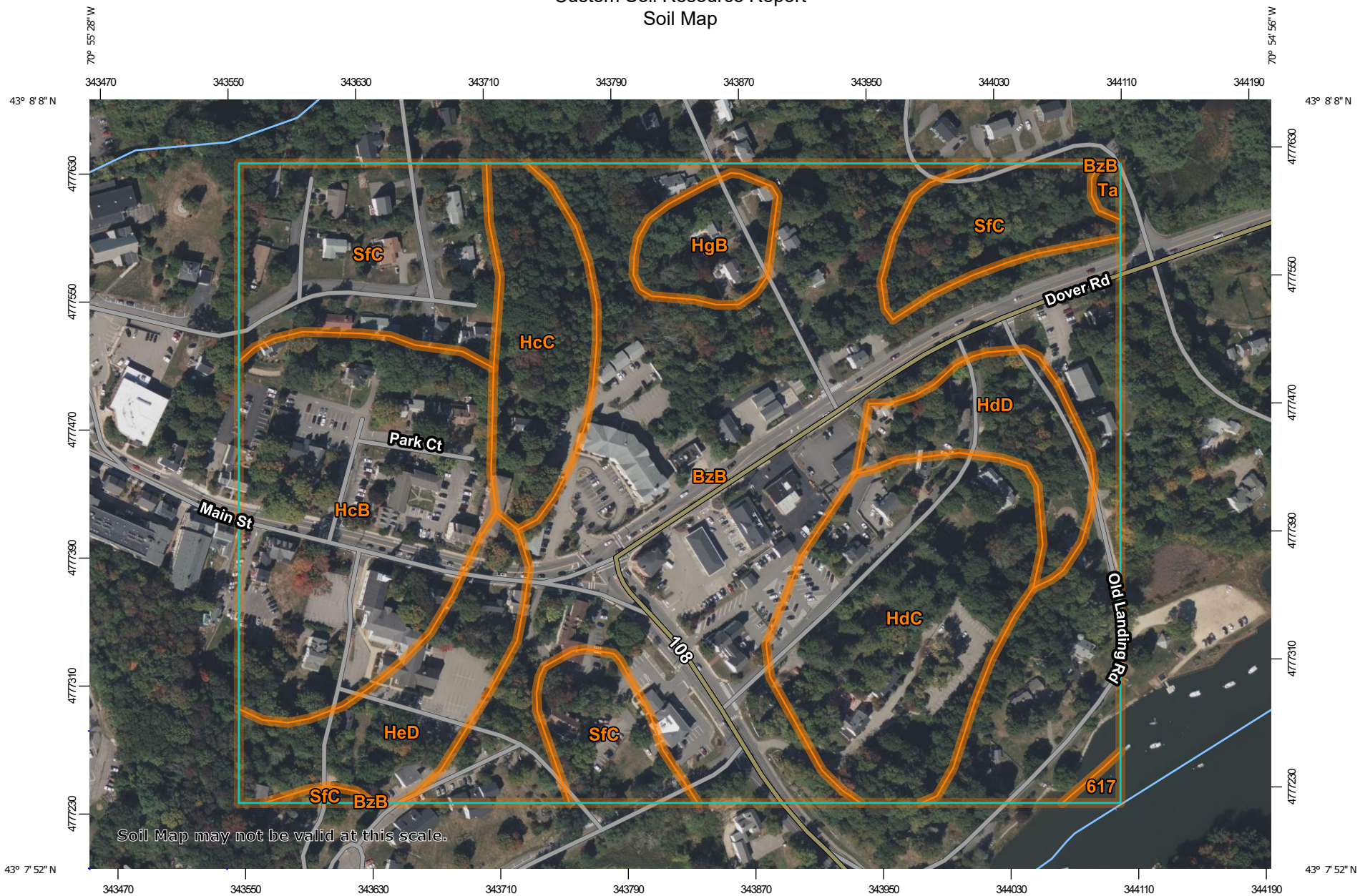
Custom Soil Resource Report
Soil Map



Map Scale: 1:3,390 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Survey Areas
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

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: Strafford County, New Hampshire
Survey Area Data: Version 25, Sep 3, 2024

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

Date(s) aerial images were photographed: Jun 19, 2020—Sep 20, 2020

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.

Figure D-1 Pre-Development Drainage Areas
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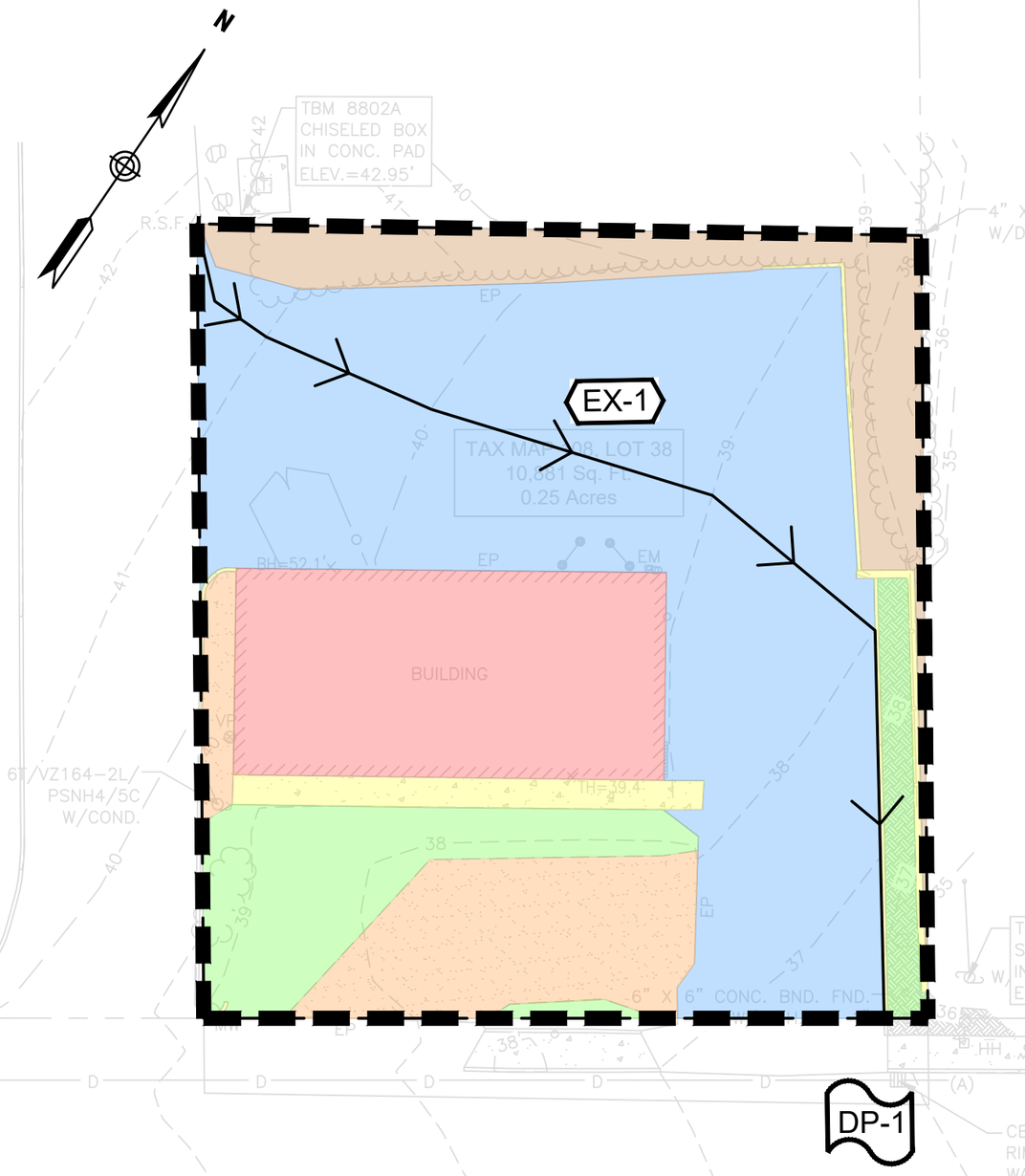
LOCUS MAP
SCALE : 1" = 500'



EXISTING LOT COVERAGE TABLE

GRASSED AREAS	1,235 SF (11.4%)
WOODED AREAS	1,104 SF (10.1%)
PAVEMENT	5,321 SF (48.9%)
CONCRETE & STONE	399 SF (3.7%)
BUILDINGS	1,701 SF (15.6%)
GRAVEL	1,121 SF (10.3%)
TOTAL	10,881 SF

LEGEND

- SUBCATCHMENT
- DESIGN POINT
- SUBCATCHMENT BOUNDARY
- TC PATH

NOTE: ALL SOIL ON SITE IS BUXTON SILT LOAM WITH 3-8% SLOPES, HYDROLOGIC SOIL GROUP C/D.

20 0 20 40
SCALE IN FEET

DOVER ROAD (ROUTE 108)

The Engineering Corp

Pre-Development Drainage Areas
3 Dover Road
Durham, New Hampshire
February 19, 2025

Figure D-2 Post-Development Drainage Areas
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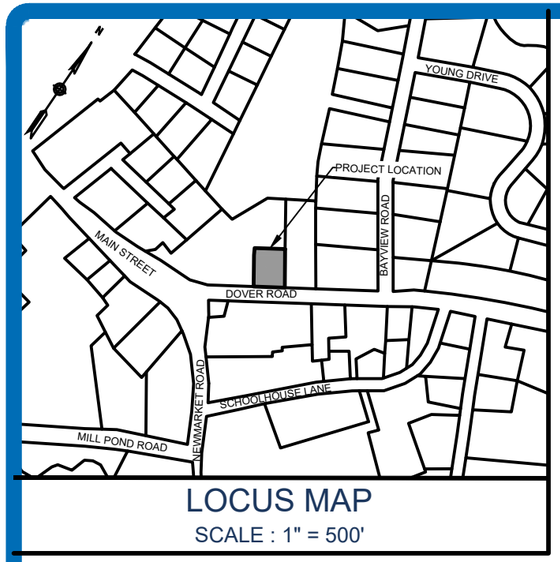


LOCUS MAP
SCALE : 1" = 500'

PROPOSED LOT COVERAGE TABLE	
GRASSED AREAS	2,385 SF (21.9%)
PAVEMENT	6,655 SF (61.2%)
CONCRETE & STONE	313 SF (2.9%)
BUILDINGS	1,527 SF (14.0%)
TOTAL	10,881 SF

LEGEND

- SUBCATCHMENT
- DESIGN POINT
- SUBCATCHMENT BOUNDARY
- TC PATH

TAX MAP 108, LOT 39
GIBBS OIL COMPANY LTD
6 KIMBALL LANE
LYNNFIELD, MA 01940
S.C.R.D. BOOK 2096, PAGE 0087

NOTE: ALL SOIL ON SITE IS BUXTON SILT LOAM WITH 3-8% SLOPES, HYDROLOGIC SOIL GROUP C/D.

20 0 20 40
SCALE IN FEET

DOVER ROAD (ROUTE 108)

TEC
The Engineering Corp

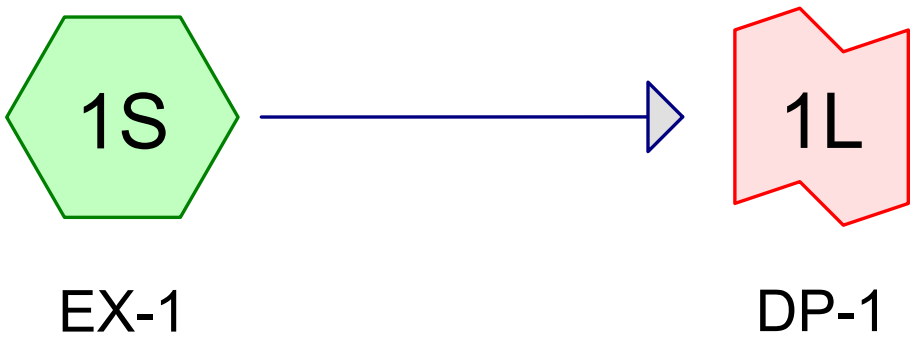
Post-Development Drainage Areas
3 Dover Road
Durham, New Hampshire
February 19, 2025

2

Appendix

A

Hydrologic Calculations



Subcat Reach Pond Link

Routing Diagram for T1573_PRE
Prepared by TEC, Inc, Printed 2/14/2025

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-Inch	NRCC 24-hr	D	Default	24.00	1	1.00	2
2	2-Year	NRCC 24-hr	D	Default	24.00	1	3.14	2
3	10-Year	NRCC 24-hr	D	Default	24.00	1	4.75	2
4	25-Year	NRCC 24-hr	D	Default	24.00	1	6.02	2
5	100-Year	NRCC 24-hr	D	Default	24.00	1	8.63	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.028	86	<50% Grass cover, Poor, HSG C (1S)
0.009	98	Concrete & Stone, HSG C (1S)
0.026	96	Gravel surface, HSG C (1S)
0.122	98	Paved parking, HSG C (1S)
0.039	98	Roofs, HSG C (1S)
0.025	77	Woods, Poor, HSG C (1S)
0.250	**94**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.250	HSG C	1S
0.000	HSG D	
0.000	Other	
0.250		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.028	0.000	0.000	0.028	<50% Grass cover, Poor	1S
0.000	0.000	0.009	0.000	0.000	0.009	Concrete & Stone	1S
0.000	0.000	0.026	0.000	0.000	0.026	Gravel surface	1S
0.000	0.000	0.122	0.000	0.000	0.122	Paved parking	1S
0.000	0.000	0.039	0.000	0.000	0.039	Roofs	1S
0.000	0.000	0.025	0.000	0.000	0.025	Woods, Poor	1S
0.000	**0.000**	**0.250**	**0.000**	**0.000**	**0.250**	**TOTAL AREA**	

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: EX-1 Runoff Area=10,881 sf 68.20% Impervious Runoff Depth=0.50"
Tc=6.0 min CN=94 Runoff=0.14 cfs 0.010 af

Link 1L: DP-1 Inflow=0.14 cfs 0.010 af
Primary=0.14 cfs 0.010 af

Total Runoff Area = 0.250 ac Runoff Volume = 0.010 af Average Runoff Depth = 0.50"
31.80% Pervious = 0.079 ac 68.20% Impervious = 0.170 ac

Summary for Subcatchment 1S: EX-1

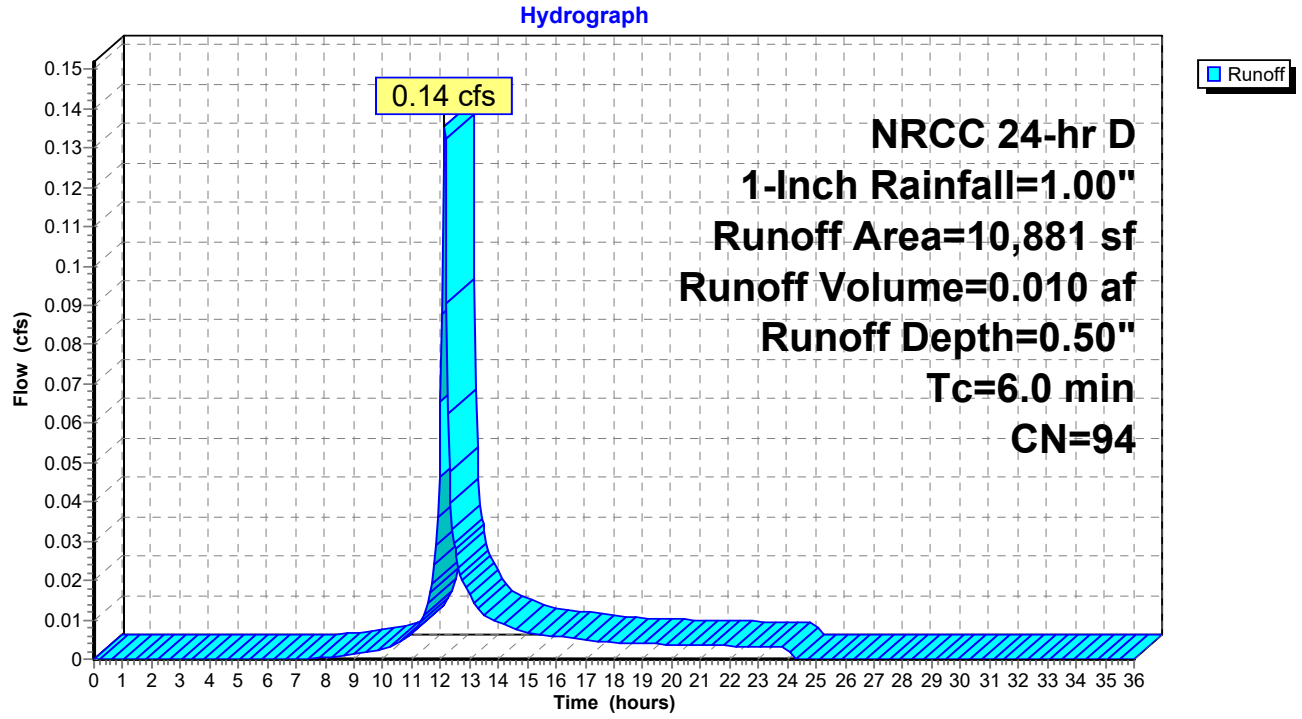
Runoff = 0.14 cfs @ 12.13 hrs, Volume= 0.010 af, Depth= 0.50"
Routed to Link 1L : DP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 1-Inch Rainfall=1.00"

	Area (sf)	CN	Description
	1,235	86	<50% Grass cover, Poor, HSG C
	1,104	77	Woods, Poor, HSG C
	5,321	98	Paved parking, HSG C
*	399	98	Concrete & Stone, HSG C
	1,701	98	Roofs, HSG C
	1,121	96	Gravel surface, HSG C
	10,881	94	Weighted Average
	3,460		31.80% Pervious Area
	7,421		68.20% Impervious Area

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

Subcatchment 1S: EX-1

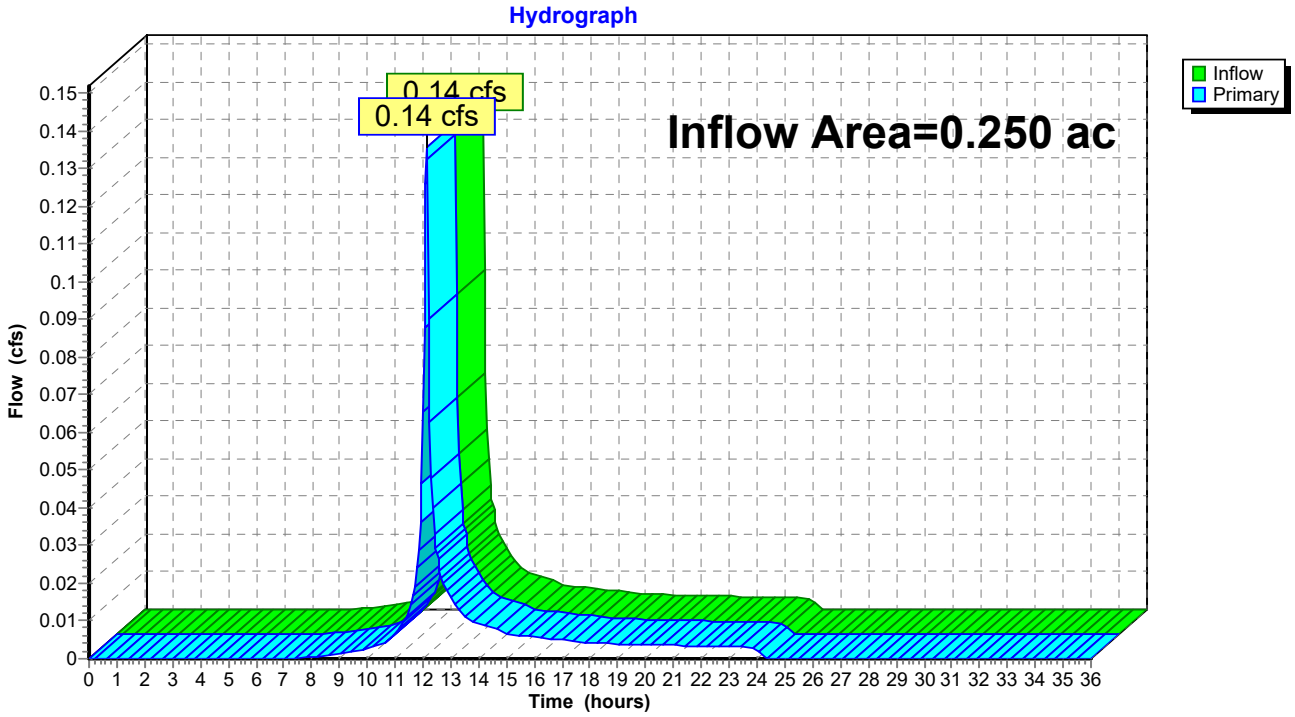


Summary for Link 1L: DP-1

Inflow Area = 0.250 ac, 68.20% Impervious, Inflow Depth = 0.50" for 1-Inch event
Inflow = 0.14 cfs @ 12.13 hrs, Volume= 0.010 af
Primary = 0.14 cfs @ 12.13 hrs, Volume= 0.010 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Link 1L: DP-1



Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: EX-1 Runoff Area=10,881 sf 68.20% Impervious Runoff Depth=2.49"
Tc=6.0 min CN=94 Runoff=0.63 cfs 0.052 af

Link 1L: DP-1 Inflow=0.63 cfs 0.052 af
Primary=0.63 cfs 0.052 af

Total Runoff Area = 0.250 ac Runoff Volume = 0.052 af Average Runoff Depth = 2.49"
31.80% Pervious = 0.079 ac 68.20% Impervious = 0.170 ac

Summary for Subcatchment 1S: EX-1

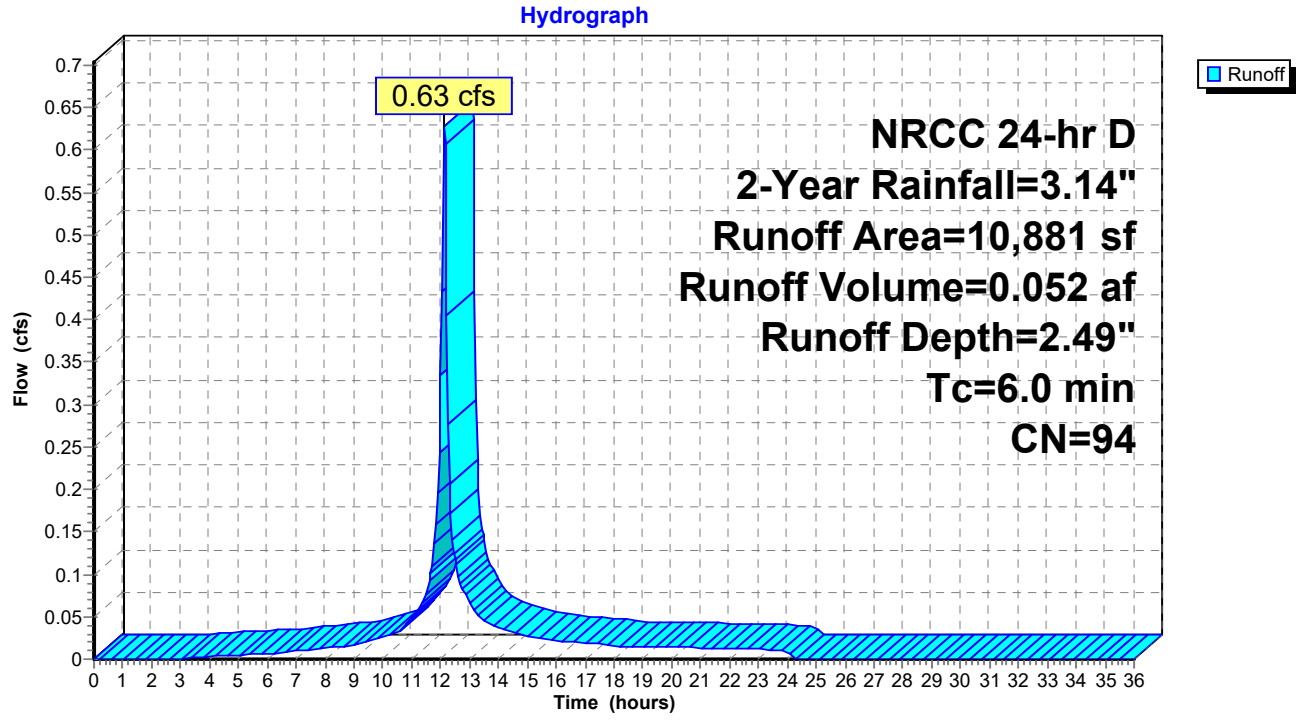
Runoff = 0.63 cfs @ 12.13 hrs, Volume= 0.052 af, Depth= 2.49"
Routed to Link 1L : DP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2-Year Rainfall=3.14"

	Area (sf)	CN	Description
	1,235	86	<50% Grass cover, Poor, HSG C
	1,104	77	Woods, Poor, HSG C
	5,321	98	Paved parking, HSG C
*	399	98	Concrete & Stone, HSG C
	1,701	98	Roofs, HSG C
	1,121	96	Gravel surface, HSG C
	10,881	94	Weighted Average
	3,460		31.80% Pervious Area
	7,421		68.20% Impervious Area

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

Subcatchment 1S: EX-1

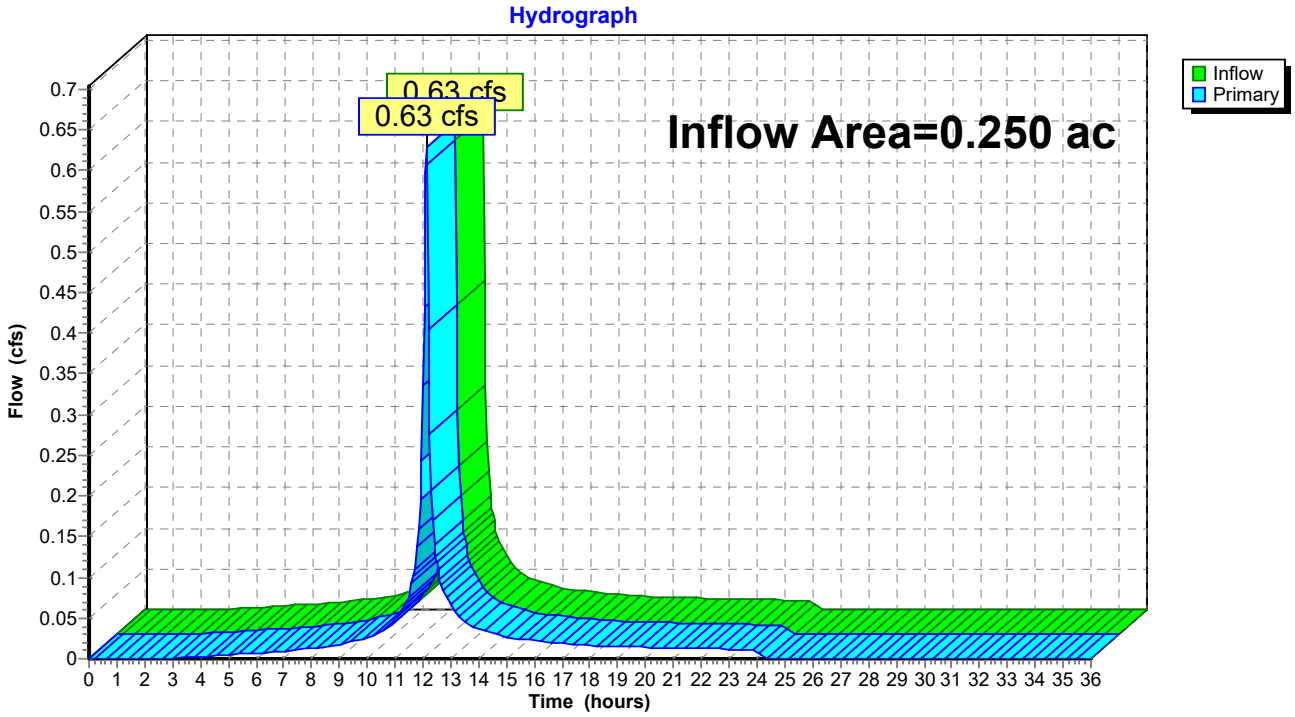


Summary for Link 1L: DP-1

Inflow Area = 0.250 ac, 68.20% Impervious, Inflow Depth = 2.49" for 2-Year event
Inflow = 0.63 cfs @ 12.13 hrs, Volume= 0.052 af
Primary = 0.63 cfs @ 12.13 hrs, Volume= 0.052 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Link 1L: DP-1



Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: EX-1 Runoff Area=10,881 sf 68.20% Impervious Runoff Depth=4.06"
Tc=6.0 min CN=94 Runoff=1.00 cfs 0.085 af

Link 1L: DP-1 Inflow=1.00 cfs 0.085 af
Primary=1.00 cfs 0.085 af

Total Runoff Area = 0.250 ac Runoff Volume = 0.085 af Average Runoff Depth = 4.06"
31.80% Pervious = 0.079 ac 68.20% Impervious = 0.170 ac

Summary for Subcatchment 1S: EX-1

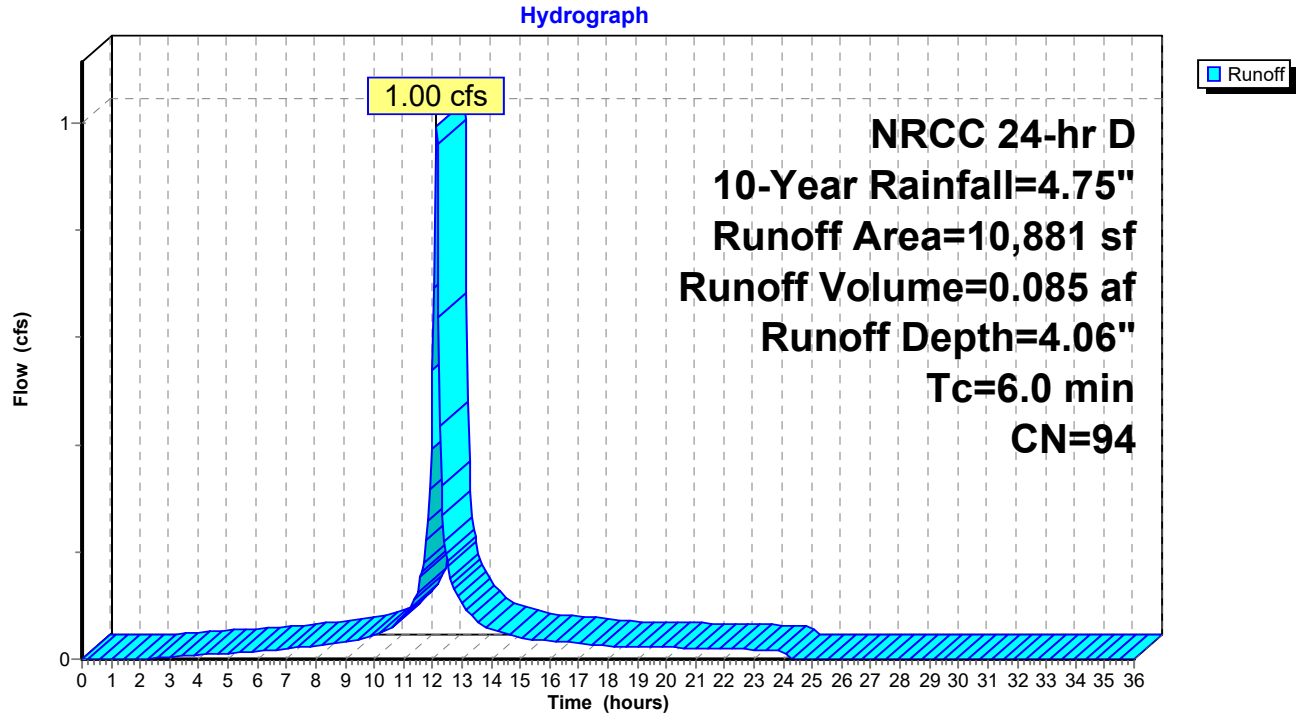
Runoff = 1.00 cfs @ 12.13 hrs, Volume= 0.085 af, Depth= 4.06"
Routed to Link 1L : DP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10-Year Rainfall=4.75"

	Area (sf)	CN	Description
	1,235	86	<50% Grass cover, Poor, HSG C
	1,104	77	Woods, Poor, HSG C
	5,321	98	Paved parking, HSG C
*	399	98	Concrete & Stone, HSG C
	1,701	98	Roofs, HSG C
	1,121	96	Gravel surface, HSG C
	10,881	94	Weighted Average
	3,460		31.80% Pervious Area
	7,421		68.20% Impervious Area

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

Subcatchment 1S: EX-1

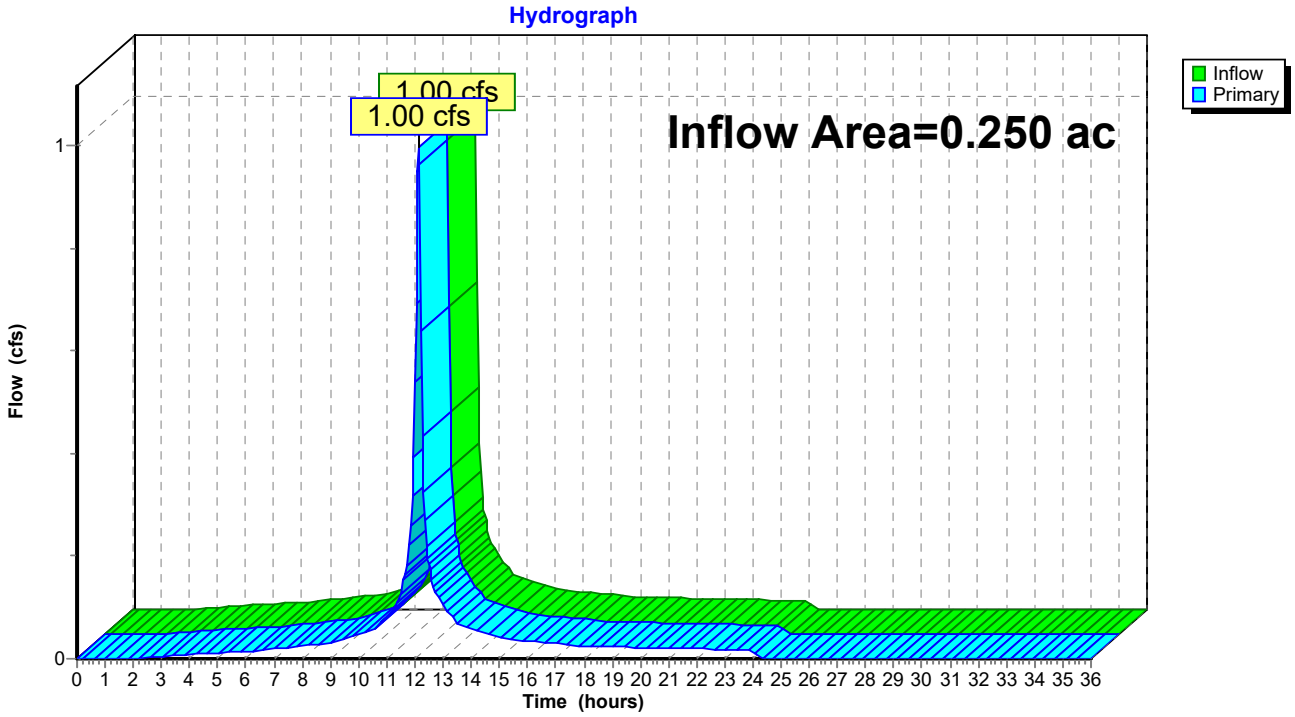


Summary for Link 1L: DP-1

Inflow Area = 0.250 ac, 68.20% Impervious, Inflow Depth = 4.06" for 10-Year event
Inflow = 1.00 cfs @ 12.13 hrs, Volume= 0.085 af
Primary = 1.00 cfs @ 12.13 hrs, Volume= 0.085 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Link 1L: DP-1



Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: EX-1 Runoff Area=10,881 sf 68.20% Impervious Runoff Depth=5.32"
Tc=6.0 min CN=94 Runoff=1.28 cfs 0.111 af

Link 1L: DP-1 Inflow=1.28 cfs 0.111 af
Primary=1.28 cfs 0.111 af

Total Runoff Area = 0.250 ac Runoff Volume = 0.111 af Average Runoff Depth = 5.32"
31.80% Pervious = 0.079 ac 68.20% Impervious = 0.170 ac

Summary for Subcatchment 1S: EX-1

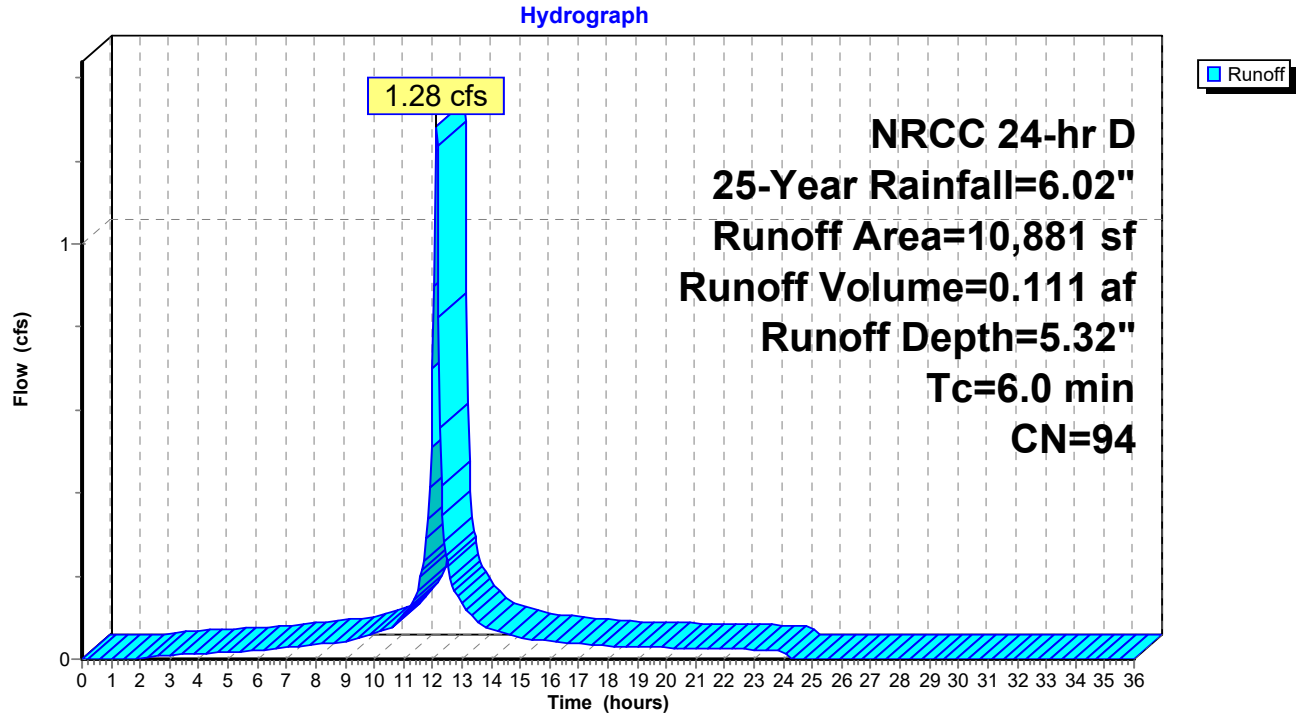
Runoff = 1.28 cfs @ 12.13 hrs, Volume= 0.111 af, Depth= 5.32"
Routed to Link 1L : DP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 25-Year Rainfall=6.02"

	Area (sf)	CN	Description
	1,235	86	<50% Grass cover, Poor, HSG C
	1,104	77	Woods, Poor, HSG C
	5,321	98	Paved parking, HSG C
*	399	98	Concrete & Stone, HSG C
	1,701	98	Roofs, HSG C
	1,121	96	Gravel surface, HSG C
	10,881	94	Weighted Average
	3,460		31.80% Pervious Area
	7,421		68.20% Impervious Area

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

Subcatchment 1S: EX-1

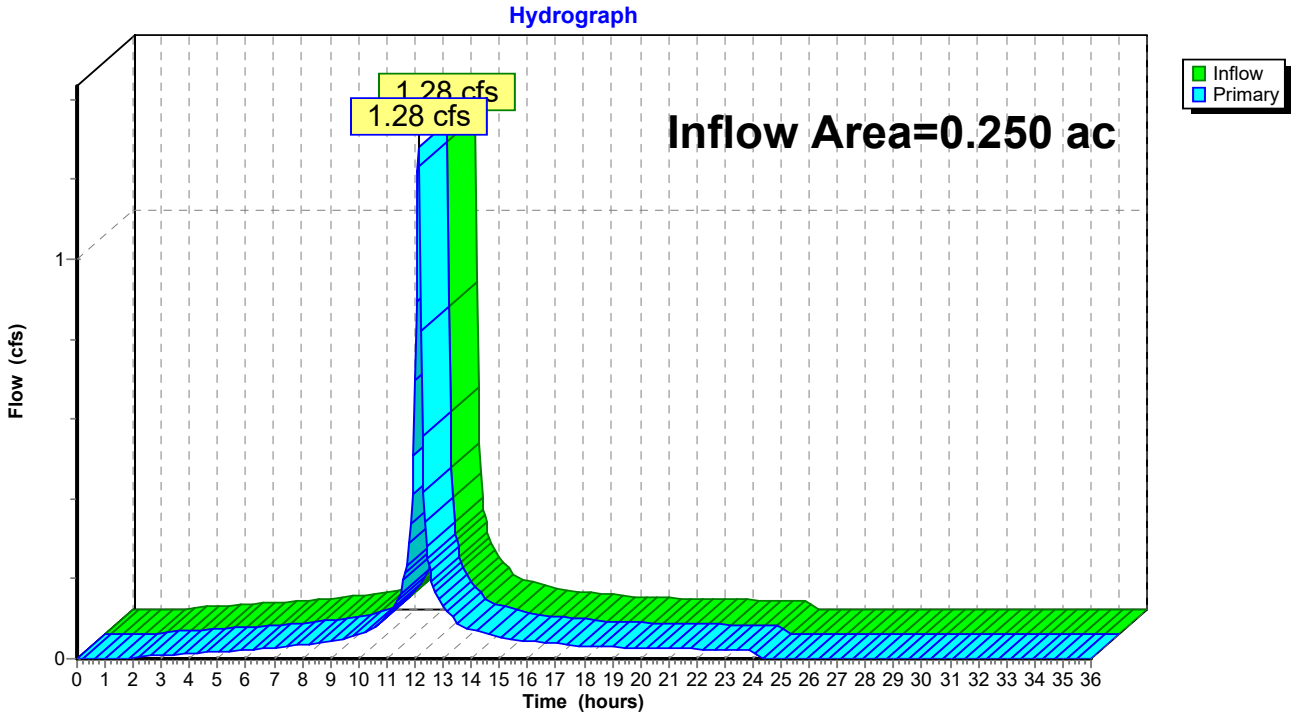


Summary for Link 1L: DP-1

Inflow Area = 0.250 ac, 68.20% Impervious, Inflow Depth = 5.32" for 25-Year event
Inflow = 1.28 cfs @ 12.13 hrs, Volume= 0.111 af
Primary = 1.28 cfs @ 12.13 hrs, Volume= 0.111 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Link 1L: DP-1



Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: EX-1 Runoff Area=10,881 sf 68.20% Impervious Runoff Depth=7.91"
Tc=6.0 min CN=94 Runoff=1.87 cfs 0.165 af

Link 1L: DP-1 Inflow=1.87 cfs 0.165 af
Primary=1.87 cfs 0.165 af

Total Runoff Area = 0.250 ac Runoff Volume = 0.165 af Average Runoff Depth = 7.91"
31.80% Pervious = 0.079 ac 68.20% Impervious = 0.170 ac

Summary for Subcatchment 1S: EX-1

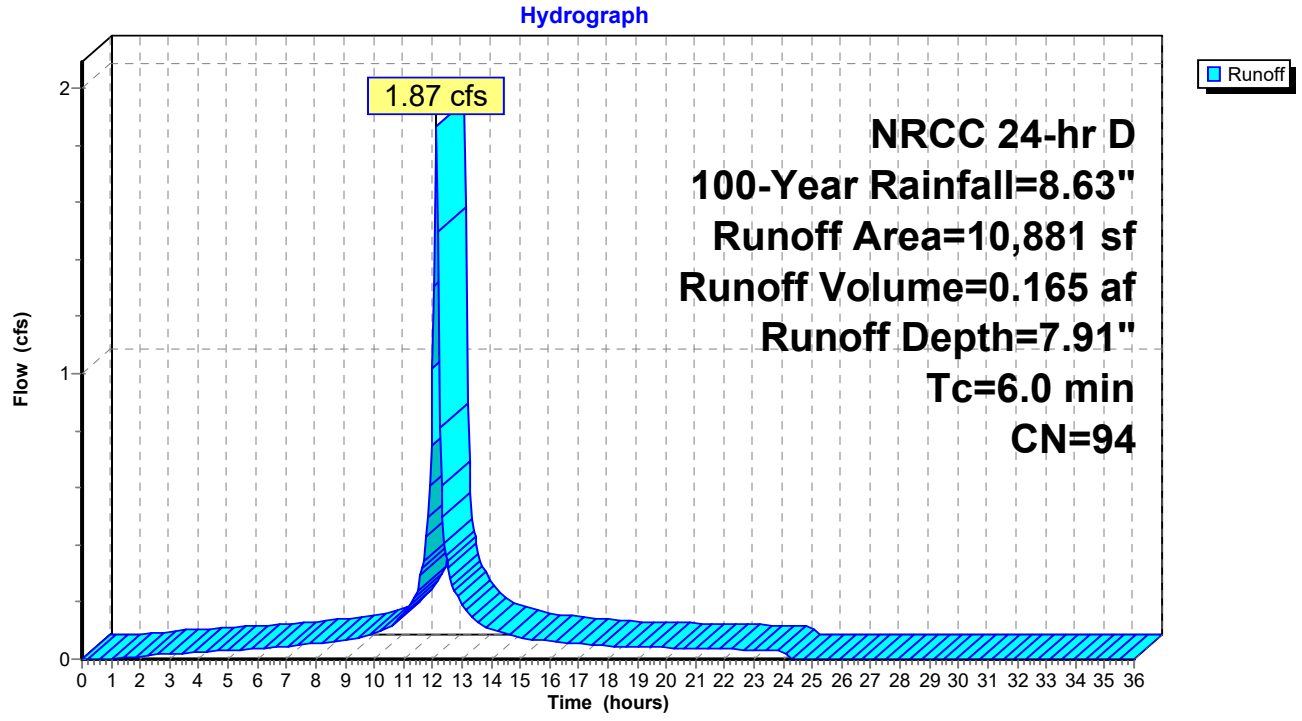
Runoff = 1.87 cfs @ 12.13 hrs, Volume= 0.165 af, Depth= 7.91"
Routed to Link 1L : DP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100-Year Rainfall=8.63"

	Area (sf)	CN	Description
	1,235	86	<50% Grass cover, Poor, HSG C
	1,104	77	Woods, Poor, HSG C
	5,321	98	Paved parking, HSG C
*	399	98	Concrete & Stone, HSG C
	1,701	98	Roofs, HSG C
	1,121	96	Gravel surface, HSG C
	10,881	94	Weighted Average
	3,460		31.80% Pervious Area
	7,421		68.20% Impervious Area

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

Subcatchment 1S: EX-1

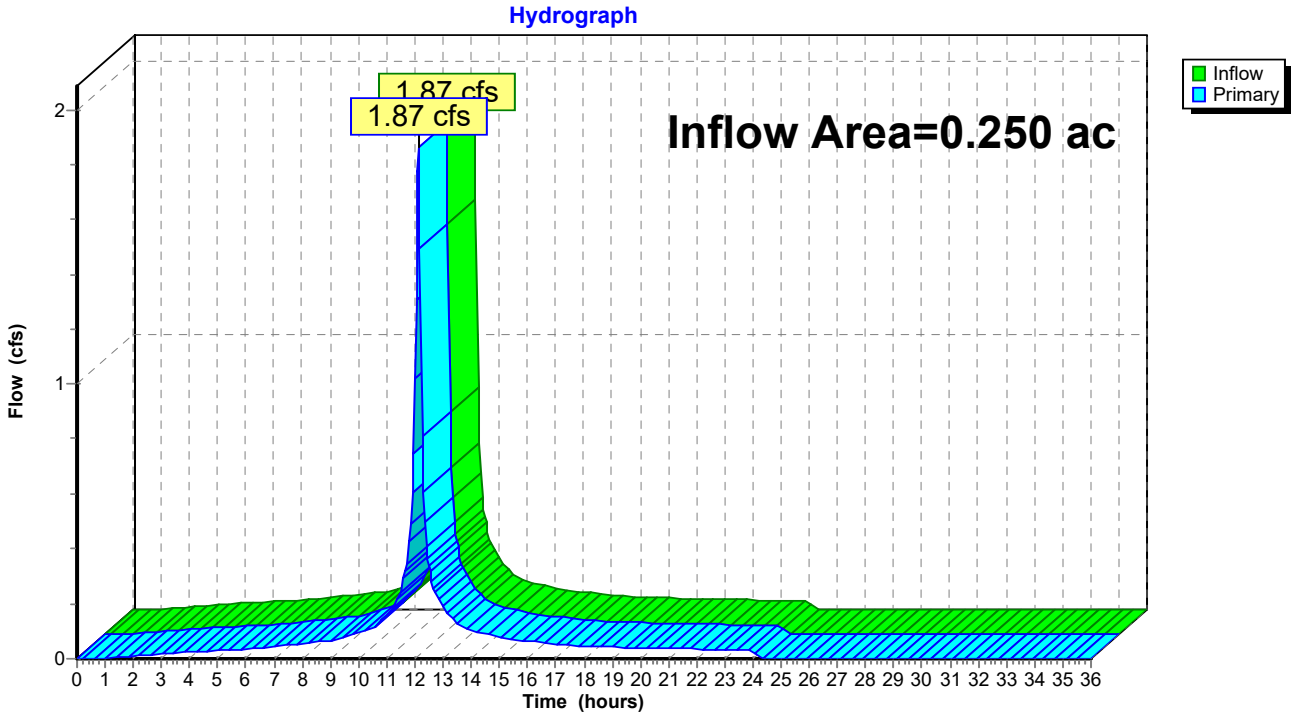


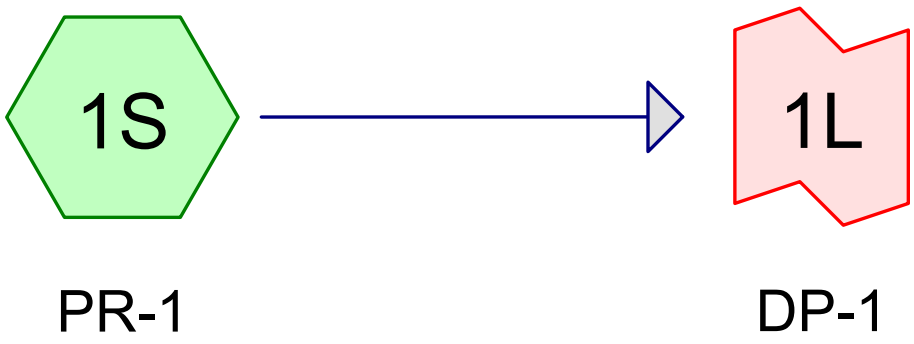
Summary for Link 1L: DP-1

Inflow Area = 0.250 ac, 68.20% Impervious, Inflow Depth = 7.91" for 100-Year event
Inflow = 1.87 cfs @ 12.13 hrs, Volume= 0.165 af
Primary = 1.87 cfs @ 12.13 hrs, Volume= 0.165 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Link 1L: DP-1





Subcat Reach Pond Link

Routing Diagram for T1573_POST
Prepared by TEC, Inc, Printed 2/14/2025

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-Inch	NRCC 24-hr	D	Default	24.00	1	1.00	2
2	2-Year	NRCC 24-hr	D	Default	24.00	1	3.14	2
3	10-Year	NRCC 24-hr	D	Default	24.00	1	4.75	2
4	25-Year	NRCC 24-hr	D	Default	24.00	1	6.02	2
5	100-Year	NRCC 24-hr	D	Default	24.00	1	8.63	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.055	79	50-75% Grass cover, Fair, HSG C (1S)
0.007	98	Concrete & Stone, HSG C (1S)
0.153	98	Paved parking, HSG C (1S)
0.035	98	Roofs, HSG C (1S)
0.250	**94**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.250	HSG C	1S
0.000	HSG D	
0.000	Other	
0.250		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.055	0.000	0.000	0.055	50-75% Grass cover, Fair	1S
0.000	0.000	0.007	0.000	0.000	0.007	Concrete & Stone	1S
0.000	0.000	0.153	0.000	0.000	0.153	Paved parking	1S
0.000	0.000	0.035	0.000	0.000	0.035	Roofs	1S
0.000	**0.000**	**0.250**	**0.000**	**0.000**	**0.250**	**TOTAL AREA**	

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: PR-1 Runoff Area=10,881 sf 77.99% Impervious Runoff Depth=0.50"
Tc=6.0 min CN=94 Runoff=0.14 cfs 0.010 af

Link 1L: DP-1 Inflow=0.14 cfs 0.010 af
Primary=0.14 cfs 0.010 af

Total Runoff Area = 0.250 ac Runoff Volume = 0.010 af Average Runoff Depth = 0.50"
22.01% Pervious = 0.055 ac 77.99% Impervious = 0.195 ac

Summary for Subcatchment 1S: PR-1

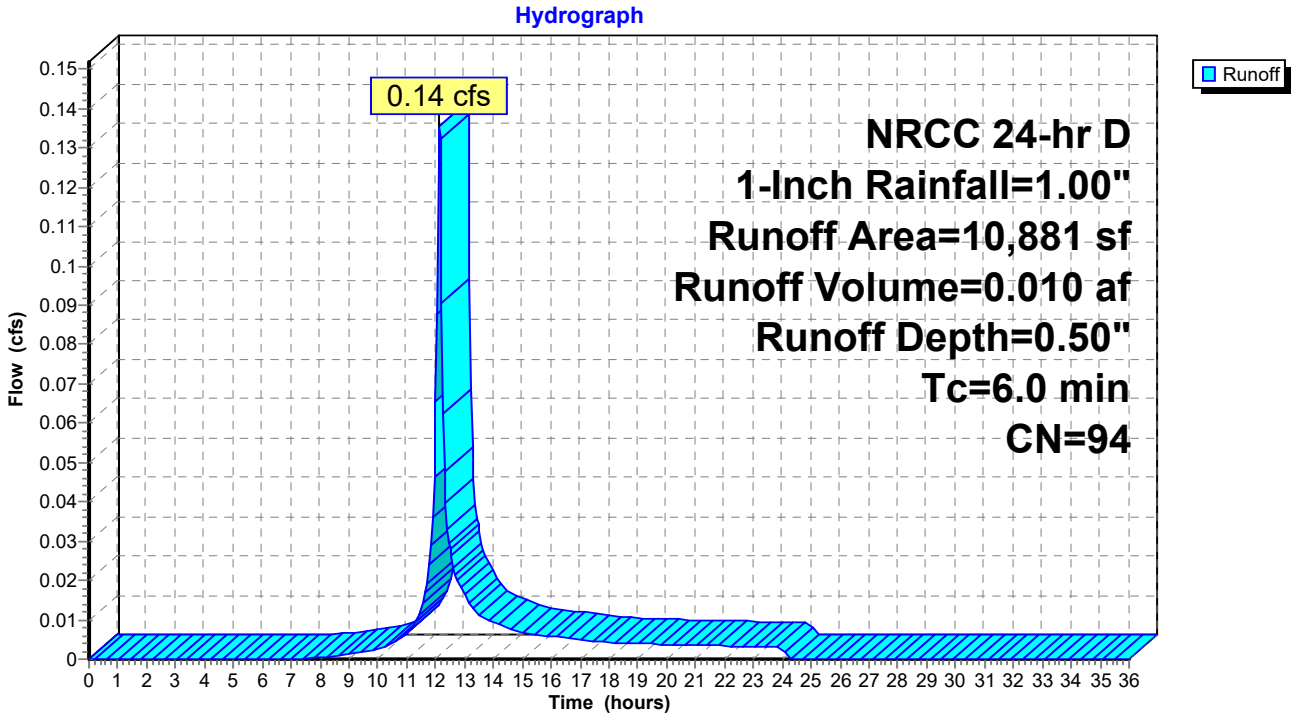
Runoff = 0.14 cfs @ 12.13 hrs, Volume= 0.010 af, Depth= 0.50"
Routed to Link 1L : DP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 1-Inch Rainfall=1.00"

	Area (sf)	CN	Description
	2,395	79	50-75% Grass cover, Fair, HSG C
	6,655	98	Paved parking, HSG C
*	304	98	Concrete & Stone, HSG C
	1,527	98	Roofs, HSG C
	10,881	94	Weighted Average
	2,395		22.01% Pervious Area
	8,486		77.99% Impervious Area

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

Subcatchment 1S: PR-1

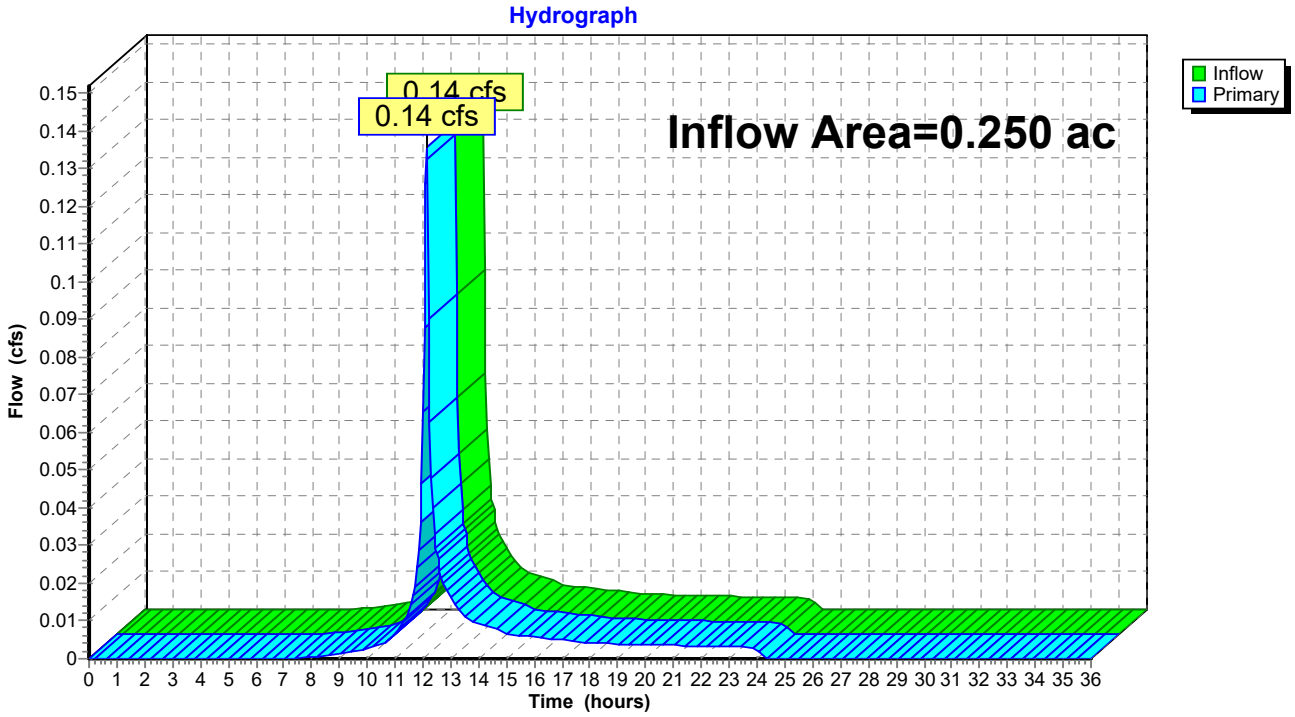


Summary for Link 1L: DP-1

Inflow Area = 0.250 ac, 77.99% Impervious, Inflow Depth = 0.50" for 1-Inch event
Inflow = 0.14 cfs @ 12.13 hrs, Volume= 0.010 af
Primary = 0.14 cfs @ 12.13 hrs, Volume= 0.010 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Link 1L: DP-1



Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: PR-1 Runoff Area=10,881 sf 77.99% Impervious Runoff Depth=2.49"
Tc=6.0 min CN=94 Runoff=0.63 cfs 0.052 af

Link 1L: DP-1 Inflow=0.63 cfs 0.052 af
Primary=0.63 cfs 0.052 af

Total Runoff Area = 0.250 ac Runoff Volume = 0.052 af Average Runoff Depth = 2.49"
22.01% Pervious = 0.055 ac 77.99% Impervious = 0.195 ac

Summary for Subcatchment 1S: PR-1

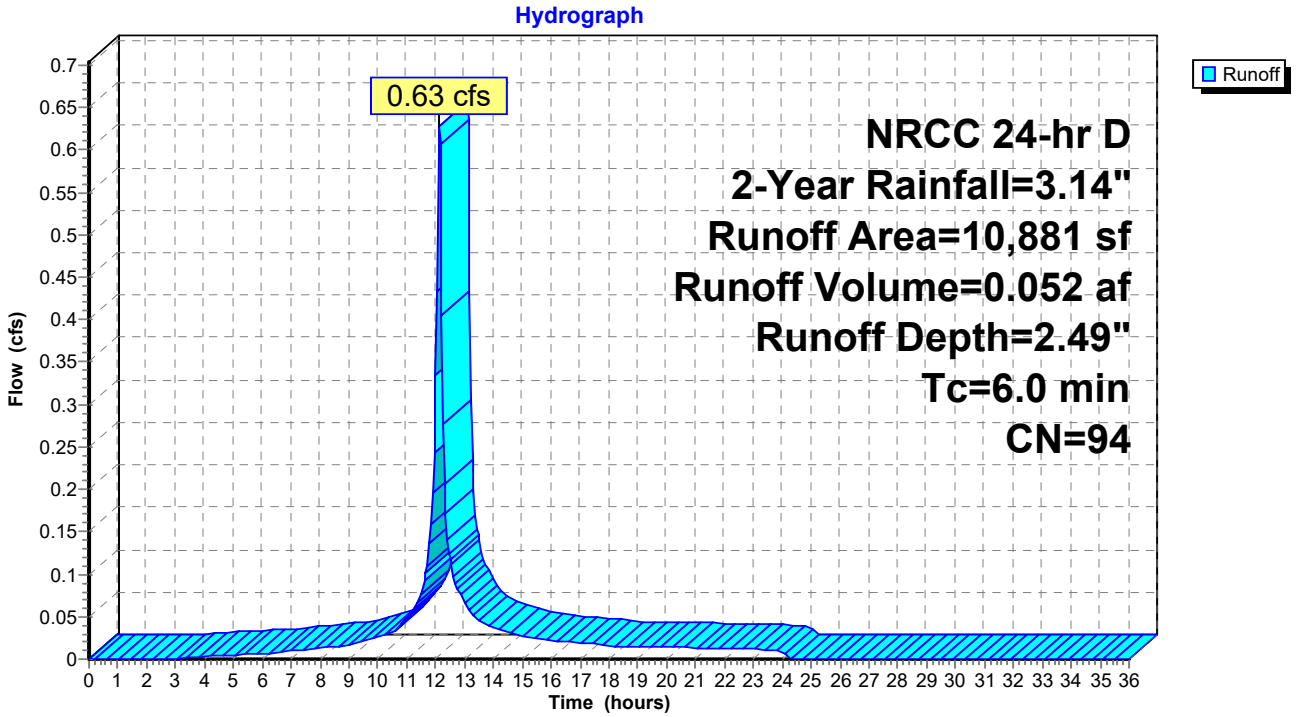
Runoff = 0.63 cfs @ 12.13 hrs, Volume= 0.052 af, Depth= 2.49"
Routed to Link 1L : DP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2-Year Rainfall=3.14"

	Area (sf)	CN	Description
	2,395	79	50-75% Grass cover, Fair, HSG C
	6,655	98	Paved parking, HSG C
*	304	98	Concrete & Stone, HSG C
	1,527	98	Roofs, HSG C
	10,881	94	Weighted Average
	2,395		22.01% Pervious Area
	8,486		77.99% Impervious Area

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

Subcatchment 1S: PR-1

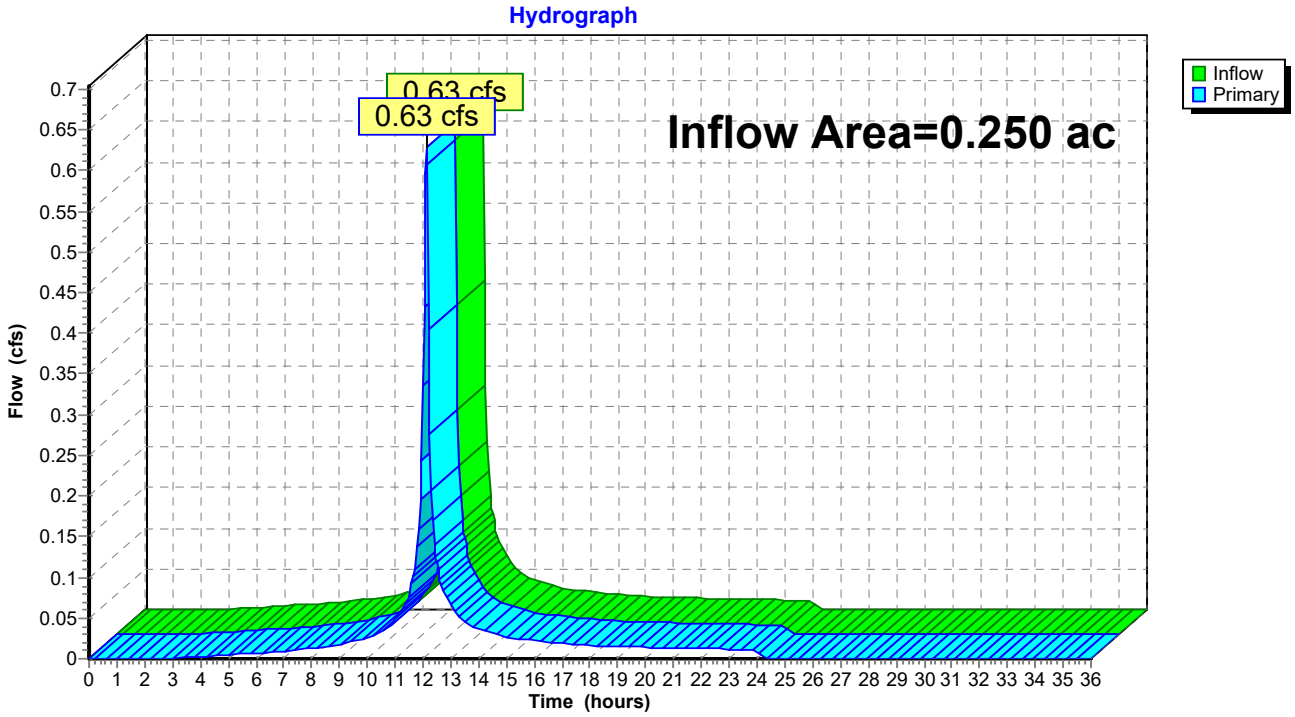


Summary for Link 1L: DP-1

Inflow Area = 0.250 ac, 77.99% Impervious, Inflow Depth = 2.49" for 2-Year event
Inflow = 0.63 cfs @ 12.13 hrs, Volume= 0.052 af
Primary = 0.63 cfs @ 12.13 hrs, Volume= 0.052 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Link 1L: DP-1



Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: PR-1 Runoff Area=10,881 sf 77.99% Impervious Runoff Depth=4.06"
Tc=6.0 min CN=94 Runoff=1.00 cfs 0.085 af

Link 1L: DP-1 Inflow=1.00 cfs 0.085 af
Primary=1.00 cfs 0.085 af

Total Runoff Area = 0.250 ac Runoff Volume = 0.085 af Average Runoff Depth = 4.06"
22.01% Pervious = 0.055 ac 77.99% Impervious = 0.195 ac

Summary for Subcatchment 1S: PR-1

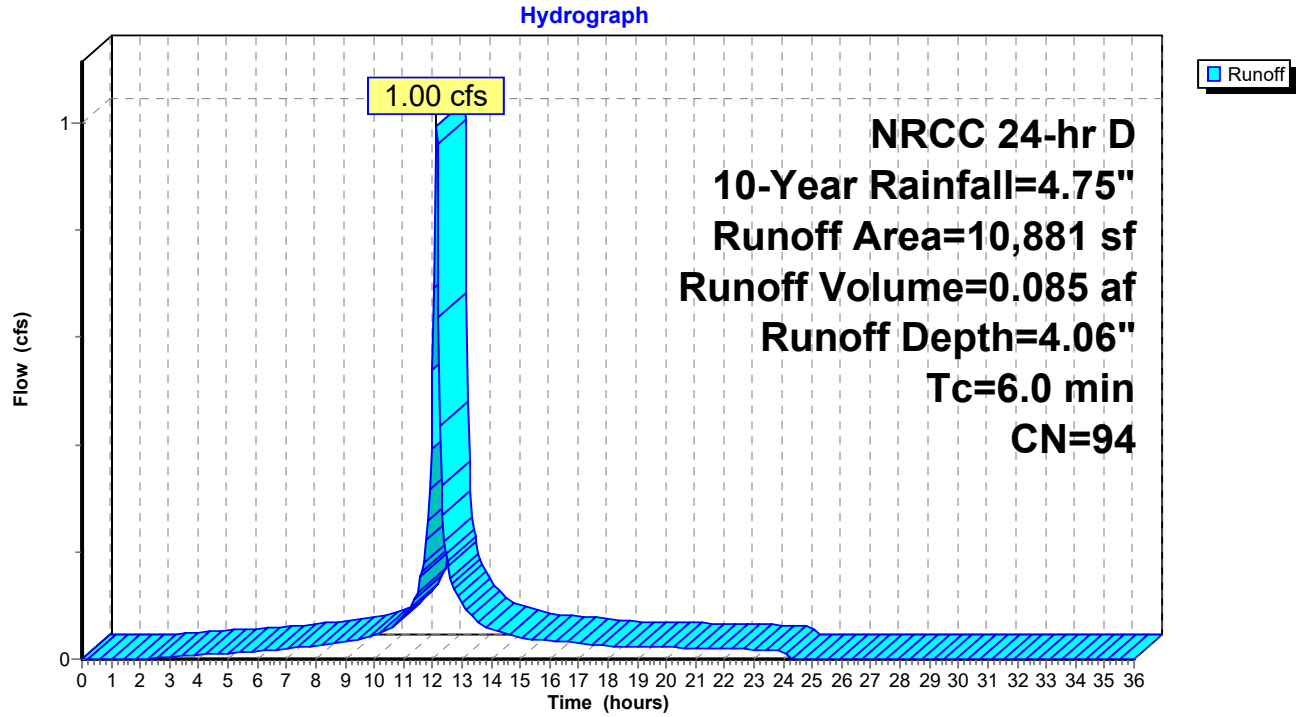
Runoff = 1.00 cfs @ 12.13 hrs, Volume= 0.085 af, Depth= 4.06"
Routed to Link 1L : DP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10-Year Rainfall=4.75"

	Area (sf)	CN	Description
	2,395	79	50-75% Grass cover, Fair, HSG C
	6,655	98	Paved parking, HSG C
*	304	98	Concrete & Stone, HSG C
	1,527	98	Roofs, HSG C
	10,881	94	Weighted Average
	2,395		22.01% Pervious Area
	8,486		77.99% Impervious Area

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

Subcatchment 1S: PR-1

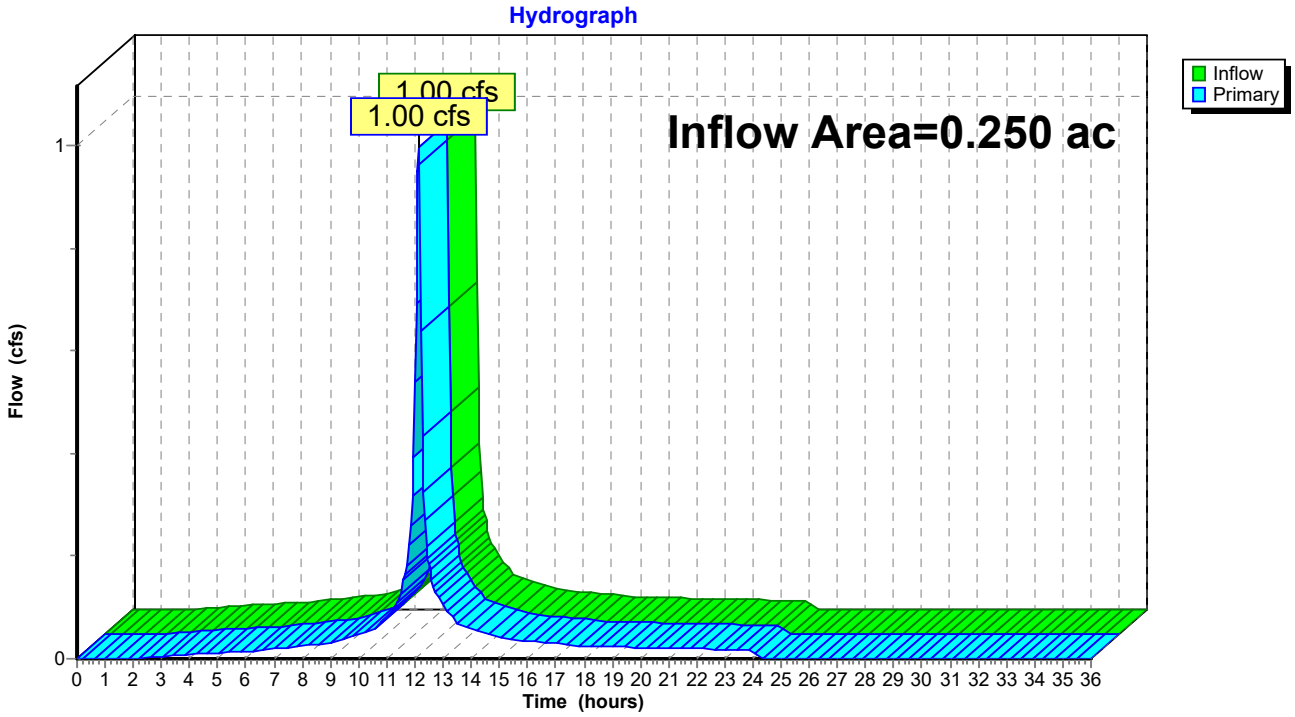


Summary for Link 1L: DP-1

Inflow Area = 0.250 ac, 77.99% Impervious, Inflow Depth = 4.06" for 10-Year event
Inflow = 1.00 cfs @ 12.13 hrs, Volume= 0.085 af
Primary = 1.00 cfs @ 12.13 hrs, Volume= 0.085 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Link 1L: DP-1



Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: PR-1 Runoff Area=10,881 sf 77.99% Impervious Runoff Depth=5.32"
Tc=6.0 min CN=94 Runoff=1.28 cfs 0.111 af

Link 1L: DP-1 Inflow=1.28 cfs 0.111 af
Primary=1.28 cfs 0.111 af

Total Runoff Area = 0.250 ac Runoff Volume = 0.111 af Average Runoff Depth = 5.32"
22.01% Pervious = 0.055 ac 77.99% Impervious = 0.195 ac

Summary for Subcatchment 1S: PR-1

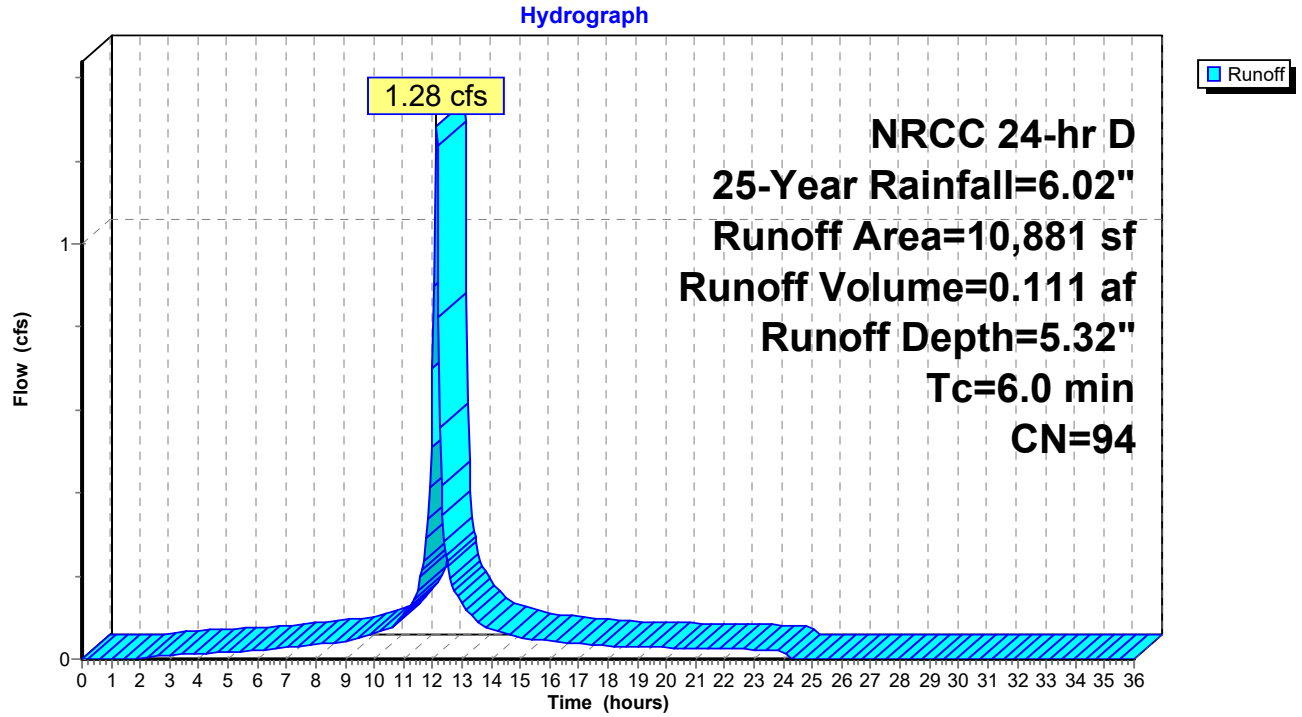
Runoff = 1.28 cfs @ 12.13 hrs, Volume= 0.111 af, Depth= 5.32"
Routed to Link 1L : DP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 25-Year Rainfall=6.02"

	Area (sf)	CN	Description
	2,395	79	50-75% Grass cover, Fair, HSG C
	6,655	98	Paved parking, HSG C
*	304	98	Concrete & Stone, HSG C
	1,527	98	Roofs, HSG C
	10,881	94	Weighted Average
	2,395		22.01% Pervious Area
	8,486		77.99% Impervious Area

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

Subcatchment 1S: PR-1

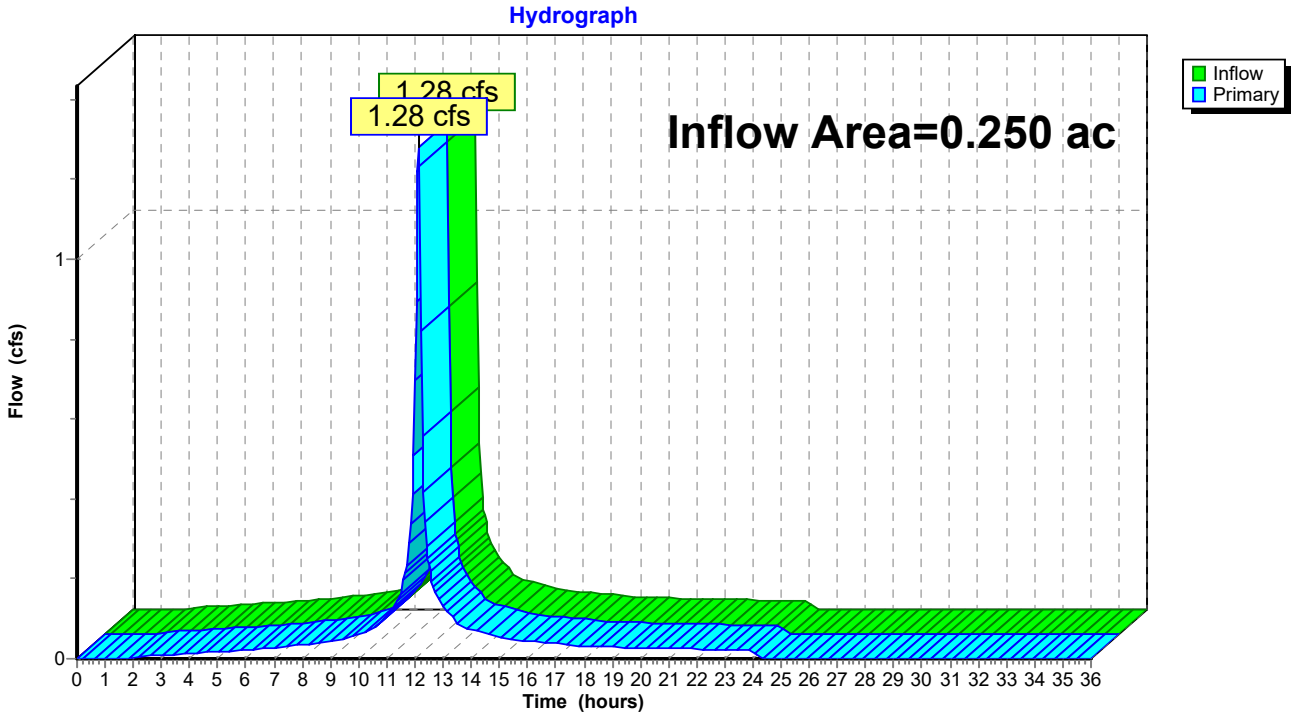


Summary for Link 1L: DP-1

Inflow Area = 0.250 ac, 77.99% Impervious, Inflow Depth = 5.32" for 25-Year event
Inflow = 1.28 cfs @ 12.13 hrs, Volume= 0.111 af
Primary = 1.28 cfs @ 12.13 hrs, Volume= 0.111 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Link 1L: DP-1



Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: PR-1 Runoff Area=10,881 sf 77.99% Impervious Runoff Depth=7.91"
Tc=6.0 min CN=94 Runoff=1.87 cfs 0.165 af

Link 1L: DP-1 Inflow=1.87 cfs 0.165 af
Primary=1.87 cfs 0.165 af

Total Runoff Area = 0.250 ac Runoff Volume = 0.165 af Average Runoff Depth = 7.91"
22.01% Pervious = 0.055 ac 77.99% Impervious = 0.195 ac

Summary for Subcatchment 1S: PR-1

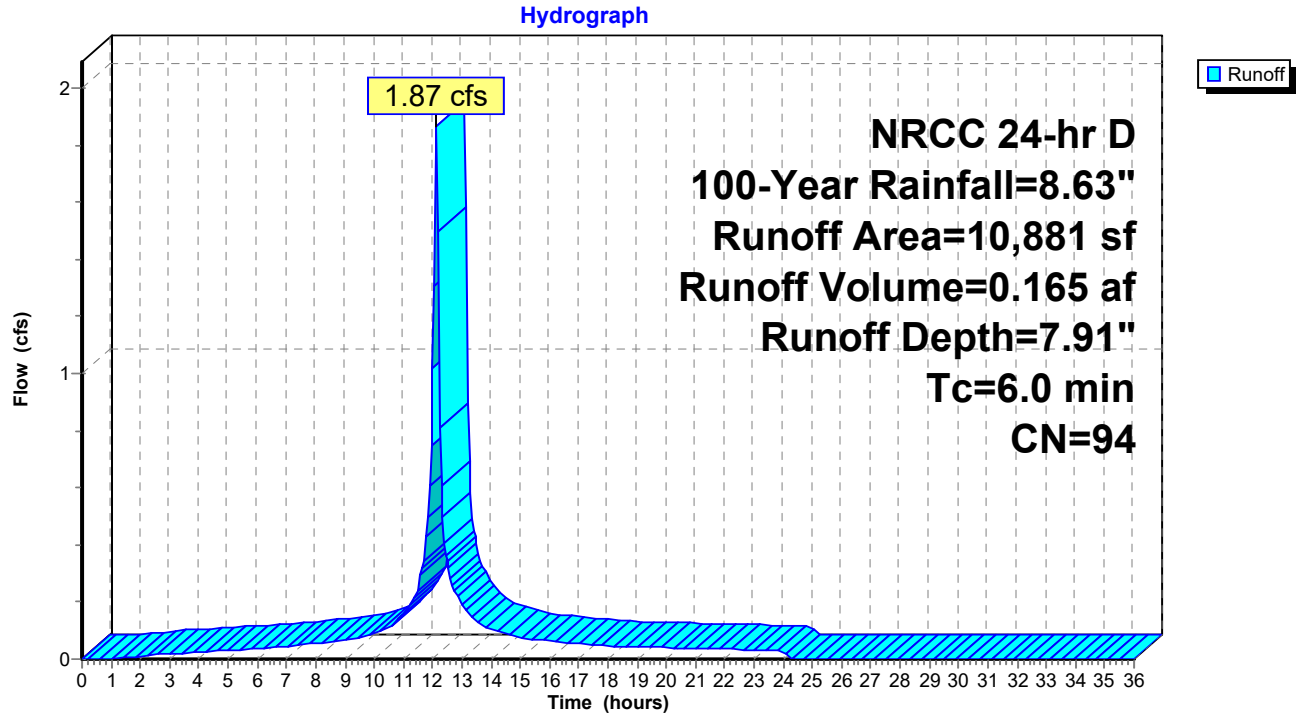
Runoff = 1.87 cfs @ 12.13 hrs, Volume= 0.165 af, Depth= 7.91"
Routed to Link 1L : DP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100-Year Rainfall=8.63"

	Area (sf)	CN	Description
	2,395	79	50-75% Grass cover, Fair, HSG C
	6,655	98	Paved parking, HSG C
*	304	98	Concrete & Stone, HSG C
	1,527	98	Roofs, HSG C
	10,881	94	Weighted Average
	2,395		22.01% Pervious Area
	8,486		77.99% Impervious Area

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

Subcatchment 1S: PR-1

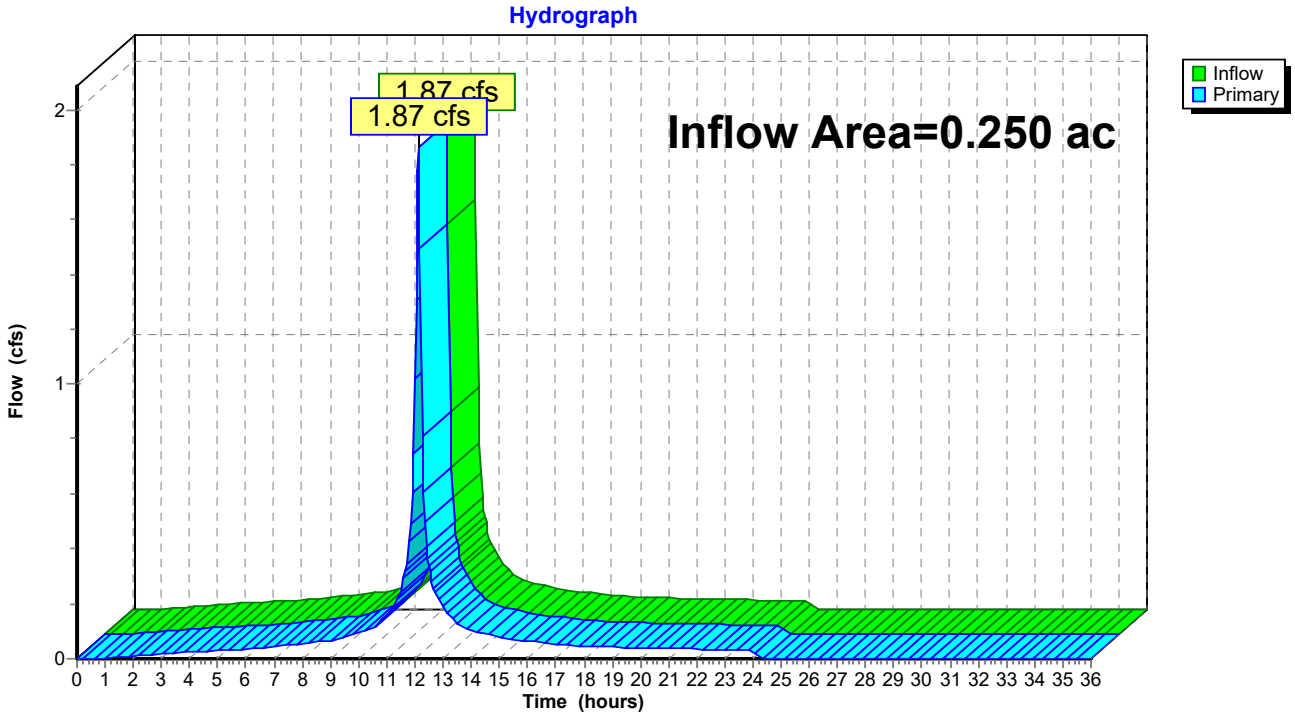


Summary for Link 1L: DP-1

Inflow Area = 0.250 ac, 77.99% Impervious, Inflow Depth = 7.91" for 100-Year event
Inflow = 1.87 cfs @ 12.13 hrs, Volume= 0.165 af
Primary = 1.87 cfs @ 12.13 hrs, Volume= 0.165 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Link 1L: DP-1



B

Geotechnical Data

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 Strafford County, New Hampshire

October 28, 2024

Preface

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

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

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

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

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

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

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Contents

How Soil Surveys Are Made

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

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

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

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

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

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.

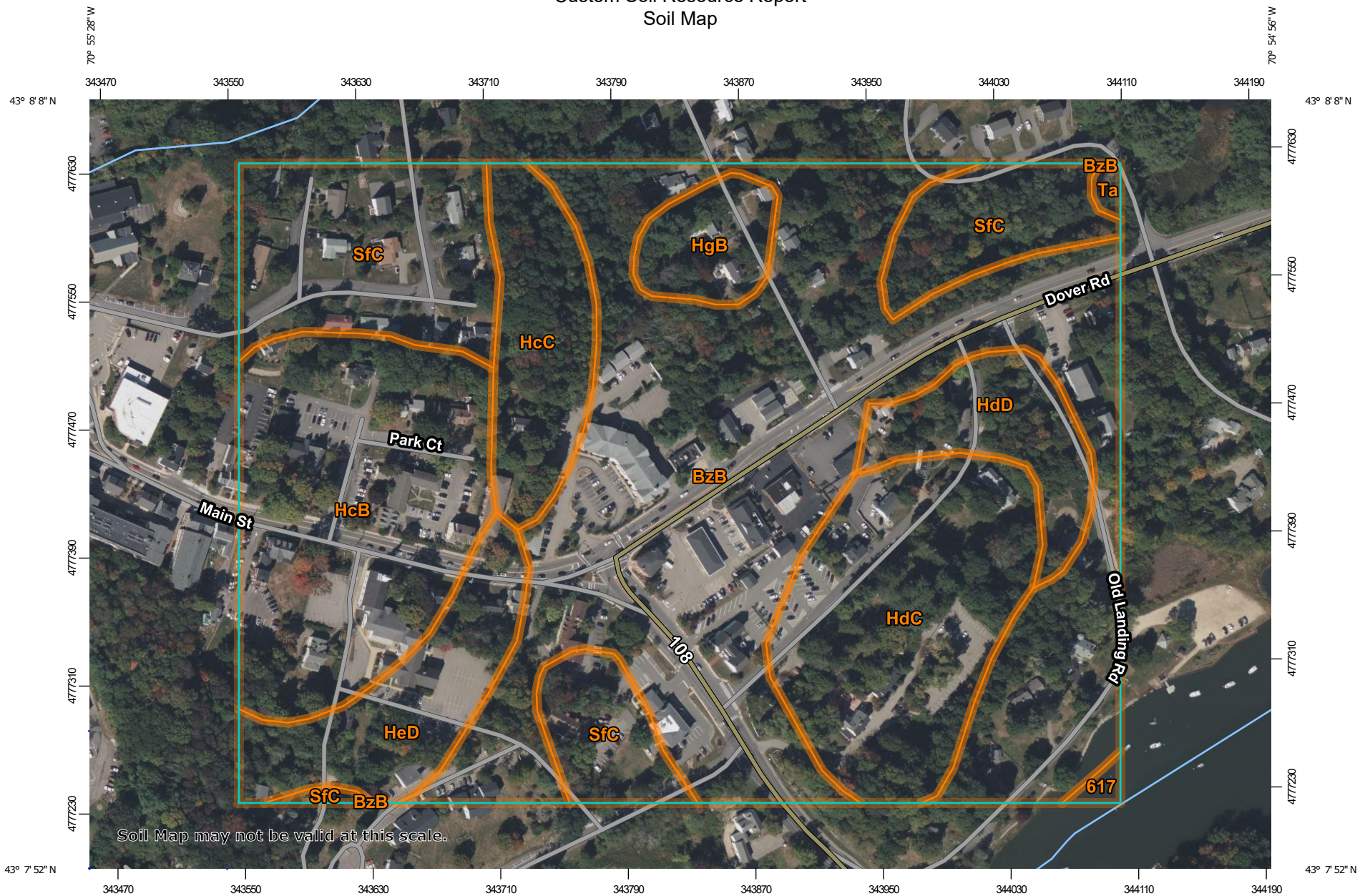
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

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

Soil Map

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

Custom Soil Resource Report
Soil Map



Map Scale: 1:3,390 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Survey Areas
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

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: Strafford County, New Hampshire
Survey Area Data: Version 25, Sep 3, 2024

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

Date(s) aerial images were photographed: Jun 19, 2020—Sep 20, 2020

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
617	Pishagqua silt loam, 0 to 1 meter water depth	0.1	0.3%
BzB	Buxton silt loam, 3 to 8 percent slopes	22.0	40.1%
HcB	Hollis-Charlton fine sandy loams, 3 to 8 percent slopes	8.0	14.6%
HcC	Hollis-Charlton fine sandy loams, 8 to 15 percent slopes	2.9	5.4%
HdC	Hollis-Charlton very rocky fine sandy loams, 8 to 15 percent slopes	6.6	12.0%
HdD	Hollis-Charlton very rocky fine sandy loams, 15 to 25 percent slopes	2.3	4.2%
HeD	Hollis-Charlton extremely rocky fine sandy loams, 8 to 25 percent slopes	3.2	5.9%
HgB	Hollis-Gloucester very rocky fine sandy loams, 3 to 8 percent slopes	1.4	2.5%
SfC	Suffield silt loam, 8 to 15 percent slopes	8.1	14.9%
Ta	Tidal marsh	0.1	0.2%
Totals for Area of Interest		**54.8**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called

noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can

be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Strafford County, New Hampshire

617—Pishagqua silt loam, 0 to 1 meter water depth

Map Unit Setting

National map unit symbol: 2zvg2
Elevation: 0 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 195 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Pishagqua, 0 to 1 meter water depth, and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pishagqua, 0 To 1 Meter Water Depth

Setting

Landform: Bay bottoms
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Very fluid fine-silty marine deposits

Typical profile

Ase - 0 to 6 inches: silt loam
Cse1 - 6 to 43 inches: silty clay loam
Cse2 - 43 to 63 inches: silt loam
Cse3 - 63 to 79 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Subaqueous
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 inches
Frequency of flooding: Very frequent
Frequency of ponding: None
Calcium carbonate, maximum content: 6 percent
Maximum salinity: Very slightly saline to strongly saline (2.0 to 47.0 mmhos/cm)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D
Ecological site: R144AY048RI - Subaqueous Haline Low Energy Basins
Hydric soil rating: Yes

Minor Components

Billington, 0 to 1 meter water depth

Percent of map unit: 5 percent

Landform: Lagoon bottoms, coves (water)
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R144AY048RI - Subaqueous Haline Low Energy Basins
Hydric soil rating: Yes

Great bay, 0 to 1 meter water depth
Percent of map unit: 5 percent
Landform: Coves (water)
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R144AY048RI - Subaqueous Haline Low Energy Basins
Hydric soil rating: Yes

Wequetequock, 0 to 1 meter water depth
Percent of map unit: 5 percent
Landform: Coves (water), mainland coves
Landform position (three-dimensional): Dip
Down-slope shape: Concave, linear
Across-slope shape: Concave
Ecological site: R144AY048RI - Subaqueous Haline Low Energy Basins
Hydric soil rating: Yes

Marshneck, 0 to 1 meter water depth
Percent of map unit: 5 percent
Landform: Shoals, coves (water)
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear, concave
Ecological site: R144AY049RI - Subaqueous Haline Slopes
Hydric soil rating: Yes

BzB—Buxton silt loam, 3 to 8 percent slopes

Map Unit Setting
National map unit symbol: 9d6p
Elevation: 0 to 260 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: All areas are prime farmland

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

Description of Buxton

Setting

Parent material: Glaciomarine

Typical profile

H1 - 0 to 10 inches: silt loam
H2 - 10 to 28 inches: silty clay loam
H3 - 28 to 43 inches: silty clay

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 12 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C/D
Ecological site: F145XY006CT - Semi-Rich Moist Lake Plain
Hydric soil rating: No

Minor Components

Elmwood

Percent of map unit: 10 percent
Hydric soil rating: No

Not named

Percent of map unit: 5 percent
Hydric soil rating: No

HcB—Hollis-Charlton fine sandy loams, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9d7j
Elevation: 0 to 1,020 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 120 to 240 days
Farmland classification: Farmland of local importance

Map Unit Composition

Hollis and similar soils: 55 percent

Charlton and similar soils: 35 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hollis

Setting
Parent material: Till

Typical profile
H1 - 0 to 14 inches: fine sandy loam
H2 - 14 to 18 inches: bedrock

Properties and qualities
Slope: 3 to 8 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.3 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D
Ecological site: F144AY033MA - Shallow Dry Till Uplands
Hydric soil rating: No

Description of Charlton

Setting
Parent material: Till

Typical profile
H1 - 0 to 13 inches: fine sandy loam
H2 - 13 to 36 inches: fine sandy loam
H3 - 36 to 40 inches: gravelly loamy sand

Properties and qualities
Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.2 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: A

Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Minor Components

Not named
Percent of map unit: 5 percent
Hydric soil rating: No

Buxton
Percent of map unit: 5 percent
Hydric soil rating: No

HcC—Hollis-Charlton fine sandy loams, 8 to 15 percent slopes

Map Unit Setting
National map unit symbol: 9d7k
Elevation: 0 to 1,080 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 120 to 240 days
Farmland classification: Farmland of local importance

Map Unit Composition
Hollis and similar soils: 55 percent
Charlton and similar soils: 35 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hollis

Setting
Parent material: Till

Typical profile
H1 - 0 to 14 inches: fine sandy loam
H2 - 14 to 18 inches: bedrock

Properties and qualities
Slope: 8 to 15 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D
Ecological site: F144AY033MA - Shallow Dry Till Uplands
Hydric soil rating: No

Description of Charlton

Setting

Parent material: Till

Typical profile

H1 - 0 to 13 inches: fine sandy loam
H2 - 13 to 36 inches: fine sandy loam
H3 - 36 to 40 inches: gravelly loamy sand

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: A
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Minor Components

Not named

Percent of map unit: 5 percent
Hydric soil rating: No

Buxton

Percent of map unit: 5 percent
Hydric soil rating: No

HdC—Hollis-Charlton very rocky fine sandy loams, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 9d7n
Elevation: 0 to 1,200 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 120 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Hollis and similar soils: 40 percent
Charlton and similar soils: 30 percent
Minor components: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hollis

Setting

Parent material: Till

Typical profile

H1 - 0 to 14 inches: very stony fine sandy loam
H2 - 14 to 18 inches: bedrock

Properties and qualities

Slope: 8 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: D
Ecological site: F144AY033MA - Shallow Dry Till Uplands
Hydric soil rating: No

Description of Charlton

Setting

Parent material: Till

Typical profile

H1 - 0 to 13 inches: very stony fine sandy loam
H2 - 13 to 36 inches: fine sandy loam
H3 - 36 to 40 inches: gravelly loamy sand

Properties and qualities

Slope: 8 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Minor Components

Rock outcrop

Percent of map unit: 10 percent
Hydric soil rating: No

Not named

Percent of map unit: 10 percent
Hydric soil rating: No

Woodbridge

Percent of map unit: 5 percent
Hydric soil rating: No

Sutton

Percent of map unit: 5 percent
Hydric soil rating: No

HdD—Hollis-Charlton very rocky fine sandy loams, 15 to 25 percent slopes

Map Unit Setting

National map unit symbol: 9d7p
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: 120 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Hollis and similar soils: 40 percent
Charlton and similar soils: 30 percent
Minor components: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hollis

Setting

Parent material: Till

Typical profile

H1 - 0 to 14 inches: very stony fine sandy loam
H2 - 14 to 18 inches: bedrock

Properties and qualities

Slope: 15 to 25 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: D
Ecological site: F144AY033MA - Shallow Dry Till Uplands
Hydric soil rating: No

Description of Charlton

Setting

Parent material: Till

Typical profile

H1 - 0 to 13 inches: very stony fine sandy loam
H2 - 13 to 36 inches: fine sandy loam
H3 - 36 to 40 inches: gravelly loamy sand

Properties and qualities

Slope: 15 to 25 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Minor Components

Not named

Percent of map unit: 20 percent
Hydric soil rating: No

Rock outcrop

Percent of map unit: 10 percent
Hydric soil rating: No

HeD—Hollis-Charlton extremely rocky fine sandy loams, 8 to 25 percent slopes

Map Unit Setting

National map unit symbol: 9d7q
Elevation: 0 to 1,180 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 120 to 240 days

Farmland classification: Not prime farmland

Map Unit Composition

Hollis and similar soils: 30 percent
Charlton and similar soils: 25 percent
Minor components: 45 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hollis

Setting

Parent material: Till

Typical profile

H1 - 0 to 14 inches: extremely stony fine sandy loam
H2 - 14 to 18 inches: bedrock

Properties and qualities

Slope: 8 to 25 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: D
Ecological site: F144AY033MA - Shallow Dry Till Uplands
Hydric soil rating: No

Description of Charlton

Setting

Parent material: Till

Typical profile

H1 - 0 to 13 inches: extremely stony fine sandy loam
H2 - 13 to 36 inches: fine sandy loam
H3 - 36 to 40 inches: gravelly loamy sand

Properties and qualities

Slope: 8 to 25 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

Available water supply, 0 to 60 inches: Low (about 5.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Minor Components

Rock outcrop

Percent of map unit: 25 percent
Hydric soil rating: No

Not named

Percent of map unit: 10 percent
Hydric soil rating: No

Sutton

Percent of map unit: 5 percent
Hydric soil rating: No

Leicester

Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

HgB—Hollis-Gloucester very rocky fine sandy loams, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9d7v
Elevation: 30 to 1,120 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

Hollis and similar soils: 50 percent
Gloucester and similar soils: 30 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hollis

Setting

Parent material: Till

Typical profile

H1 - 0 to 14 inches: very stony fine sandy loam
H2 - 14 to 18 inches: bedrock

Properties and qualities

Slope: 3 to 8 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: D
Ecological site: F144AY033MA - Shallow Dry Till Uplands
Hydric soil rating: No

Description of Gloucester

Setting

Parent material: Till

Typical profile

H1 - 0 to 14 inches: very stony fine sandy loam
H2 - 14 to 28 inches: very gravelly loamy sand
H3 - 28 to 40 inches: very gravelly coarse sand

Properties and qualities

Slope: 3 to 8 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Ecological site: F144AY032NH - Dry Till Uplands
Hydric soil rating: No

Minor Components

Rock outcrop
Percent of map unit: 10 percent
Hydric soil rating: No

Not named
Percent of map unit: 5 percent
Hydric soil rating: No

Acton
Percent of map unit: 3 percent
Hydric soil rating: No

Leicester
Percent of map unit: 2 percent
Landform: Depressions
Hydric soil rating: Yes

SfC—Suffield silt loam, 8 to 15 percent slopes

Map Unit Setting
National map unit symbol: 9d8v
Elevation: 0 to 250 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
Suffield and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Suffield

Typical profile
H1 - 0 to 19 inches: silt loam
H2 - 19 to 28 inches: silt loam
H3 - 28 to 41 inches: silty clay

Properties and qualities
Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None

Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: F144AY017NH - Well Drained Lake Plain
Hydric soil rating: No

Minor Components

Not named

Percent of map unit: 9 percent
Hydric soil rating: No

Buxton

Percent of map unit: 5 percent
Hydric soil rating: No

Rock outcrop

Percent of map unit: 1 percent
Hydric soil rating: No

Ta—Tidal marsh

Map Unit Setting

National map unit symbol: 9d92
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

Tidal marsh: 98 percent
Minor components: 2 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Tidal Marsh

Setting

Landform: Marshes

Typical profile

H1 - 0 to 12 inches: peat
H2 - 12 to 46 inches: mucky peat
H3 - 46 to 50 inches: silt loam
H4 - 50 to 60 inches: loamy sand

Properties and qualities

Slope: 0 to 1 percent
Drainage class: Very poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (0.60 to 20.00 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: Frequent
Frequency of ponding: Frequent
Maximum salinity: Very slightly saline to strongly saline (2.0 to 32.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 14.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8w
Hydric soil rating: Yes

Minor Components

Rock outcrop

Percent of map unit: 2 percent
Hydric soil rating: No

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C

Hydrodynamic Separator Sizing

CDS ESTIMATED NET ANNUAL SOLIDS LOAD REDUCTION
BASED ON THE RATIONAL RAINFALL METHOD

TROPIC STAR - DURHAM
DURHAM, NH

Area	**0.20 ac**	Unit Site Designation	**WQU**
Weighted C	**0.9**	Rainfall Station #	**104**
t_c	**6 min**		
CDS Model	**2015-4**	CDS Treatment Capacity	**0.7 cfs**

Rainfall Intensity[1] (in/hr)	Percent Rainfall Volume[1]	Cumulative Rainfall Volume	Total Flowrate (cfs)	Treated Flowrate (cfs)	Incremental Removal (%)
0.02	13.0%	13.0%	0.00	0.00	12.6
0.04	12.2%	25.2%	0.01	0.01	11.8
0.06	11.2%	36.4%	0.01	0.01	10.8
0.08	10.0%	46.4%	0.01	0.01	9.6
0.10	8.2%	54.6%	0.02	0.02	7.9
0.12	5.8%	60.4%	0.02	0.02	5.6
0.14	6.5%	66.9%	0.03	0.03	6.2
0.16	4.6%	71.5%	0.03	0.03	4.4
0.18	3.7%	75.2%	0.03	0.03	3.5
0.20	3.3%	78.5%	0.04	0.04	3.2
0.25	6.7%	85.2%	0.05	0.05	6.3
0.30	3.7%	88.9%	0.05	0.05	3.5
0.35	2.4%	91.3%	0.06	0.06	2.3
0.40	1.8%	93.1%	0.07	0.07	1.7
0.45	1.9%	95.0%	0.08	0.08	1.8
0.50	1.1%	96.1%	0.09	0.09	1.0
0.75	2.6%	98.7%	0.14	0.14	2.3
1.00	0.9%	99.6%	0.18	0.18	0.8
1.50	0.4%	100.0%	0.27	0.27	0.3
2.00	0.0%	100.0%	0.36	0.36	0.0
0.00	0.0%	100.0%	0.00	0.00	0.0
					95.8
				Removal Efficiency Adjustment[2] =	6.5%
				Predicted % Annual Rainfall Treated =	93.5%
				Predicted Net Annual Load Removal Efficiency =	**89.4%**

1 - Based on 10 years of hourly precipitation data from NCDC 1683, Concord WSO Airport, Merrimack County, NH
2 - Reduction due to use of 60-minute data for a site that has a time of concentration less than 30-minutes.

CONTECH®
ENGINEERED SOLUTIONS

CDS®
Hydrodynamic Separator

The experts you need to solve your stormwater management challenges

Contech is the leader in stormwater management solutions, helping engineers, contractors and owners with infrastructure and land development projects throughout North America.

With our responsive team of stormwater experts, local regulatory expertise and flexible solutions, Contech is the trusted partner you can count on for stormwater management solutions.

Your Contech Team

STORMWATER CONSULTANT

It's my job to recommend the best solution to meet permitting requirements.

STORMWATER DESIGN ENGINEER

I work with consultants to design the best approved solution to meet your project's needs.

REGULATORY MANAGER

I understand the local stormwater regulations and what solutions will be approved.

SALES ENGINEER

I make sure our solutions meet the needs of the contractor during construction.

Contech is your partner in stormwater management solutions

Unique screening technology for stormwater runoff – CDS®

The CDS hydrodynamic separator uses swirl concentration and continuous deflective separation to screen, separate and trap trash, debris, sediment, and hydrocarbons from stormwater runoff.

At the heart of the CDS system is a unique screening technology used to capture and retain trash and debris. The screen face is louvered so that it is smooth in the downstream direction. The effect created is called "Continuous Deflective Separation." The power of the incoming flow is harnessed to continually shear debris off the screen and to direct trash and sediment toward the center of the separation cylinder. This results in a screen that is self-cleaning and provides 100% removal of floatables and neutrally buoyant material debris 4.7 mm or larger, without blinding.

CDS is used to meet trash Total Maximum Daily Load (TMDL) requirements, for stormwater quality control, inlet and outlet pollution control, and as pretreatment for filtration, detention/infiltration, bioretention, rainwater harvesting systems, and a variety of green infrastructure practices.

CDS® Features and Benefits

FEATURE	BENEFIT
Captures and retains 100% of floatables and neutrally buoyant debris 4.7mm or larger	Superior pollutant removal
Self-cleaning screen	Ease of maintenance
Isolated storage sump eliminates scour potential	Excellent pollutant retention
Internal bypass	Eliminates the need for additional structures
Multiple pipe inlets and 90-180º angles	Design flexibility
Clear access to sump and stored pollutants	Fast, easy maintenance

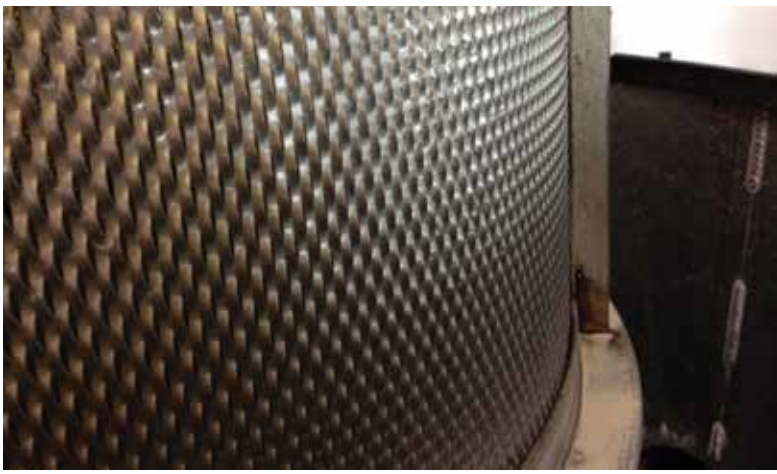
APPLICATION TIPS

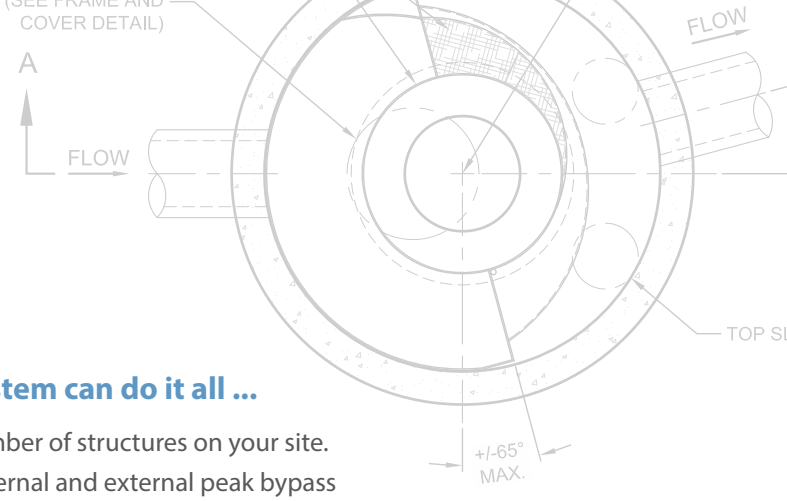
- Because of its internal peak bypass weirs, CDS systems can provide cost savings by eliminating the need for additional structures.
- Pretreating detention, infiltration, and green infrastructure practices with CDS can protect downstream structures and provide for easy maintenance.
- The CDS an ideal solution for retrofit applications due to its compact footprint and configuration flexibility.

The CDS® Screen

A fundamentally different approach to trash control ...

Traditional approaches to trash control typically involve "direct screening" that can easily become clogged, as trash is pinned to the screen as water passes through. Clogged screens can lead to flooding as water backs up. The design of the CDS screen is fundamentally different. Flow is introduced to the screen face which is louvered so that it is smooth in the downstream direction. The effect created is called "Continuous Deflective Separation." The power of the incoming flow is harnessed to continually shear debris off the screen and to direct trash and sediment toward the center of the separation cylinder.

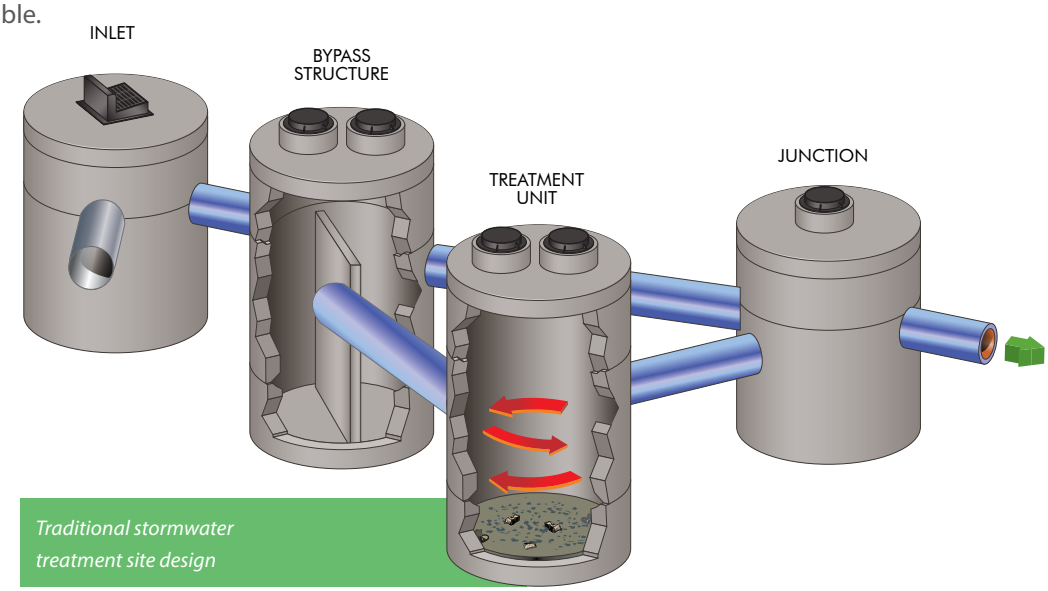




CDS® Design Configuration

Why use traditional stormwater design when ONE system can do it all ...

The CDS effectively treats stormwater runoff while reducing the number of structures on your site. Inline, offline, grate inlet, and drop inlet configurations available. Internal and external peak bypass options also available.

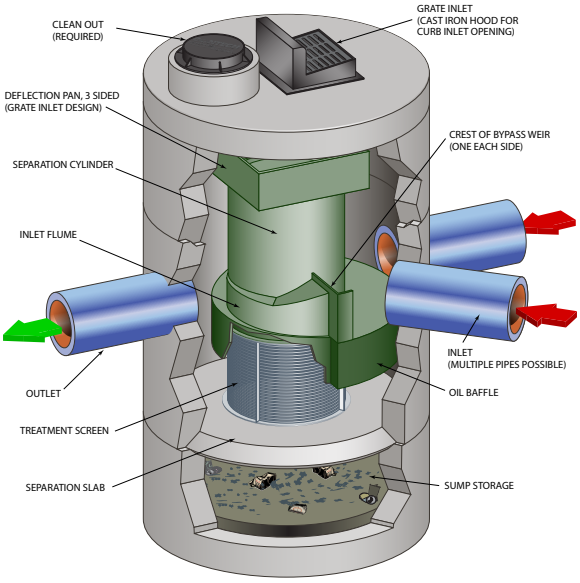


Traditional stormwater treatment site design

A Traditional Stormwater Treatment Site Design would require several structures on your site. With CDS, one system can do it all!

CDS® Advantages

- Grate inlet option available
- Internal bypass weir
- Accepts multiple inlets at a variety of angles
- Advanced hydrodynamic separator
- Captures and retains 100% of floatables and neutrally buoyant debris 4.7 mm or larger
- Indirect screening capability keeps screen from clogging
- Retention of all captured pollutants, even at high flows
- Performance verified by NJCAT, WA Ecology, and ETV Canada



Learn More:
www.ContechES.com/cds

CDS® Applications

CDS is commonly used in the following stormwater applications:

- Stormwater quality control – trash, debris, sediment, and hydrocarbon removal
- Urban retrofit and redevelopment
- Inlet and outlet protection
- Pretreatment for filtration, detention/infiltration, bioretention, rainwater harvesting systems, and Low Impact Development designs

CDS® provides trash control

CDS® pretreats a bioswale

Select CDS® Certifications and Verifications

CDS has been verified by some of the most stringent stormwater technology evaluation organizations in North America, including:

- Washington State Department of Ecology (GULD) - Pretreatment
- Canadian Environmental Technology Verification (ETV)
- California Statewide Trash Amendments Full Capture System Certified*

**The CDS System has been certified by the California State Water Resources Control Board as a Full Capture System provided that it is sized to treat the peak flow rate from the region specific 1-year, 1-hour design storm, or the peak flow capacity of the corresponding storm drain, whichever is less.*

Save time, space and money with CDS

CDS® Maintenance

Select a cost-effective and easy-to-access treatment system ...

Systems vary in their maintenance needs, and the selection of a cost-effective and easy-to-access treatment system can mean a huge difference in maintenance expenses for years to come.

A CDS unit is designed to minimize maintenance and make it as easy and inexpensive as possible to keep our systems working properly.

INSPECTION

Inspection is the key to effective maintenance. Pollutant deposition and transport may vary from year to year and site to site. Semi-annual inspections will help ensure that the system is cleaned out at the appropriate time. Inspections should be performed more frequently where site conditions may cause rapid accumulation of pollutants.

Most CDS® units can easily be cleaned within thirty minutes.

RECOMMENDATIONS FOR CDS MAINTENANCE

The recommended cleanout of solids within the CDS unit's sump should occur at 75% of the sump capacity. Access to the CDS unit is typically achieved through two manhole access covers – one allows inspection and cleanout of the separation chamber and sump, and another allows inspection and cleanout of sediment captured and retained behind the screen. A vacuum truck is recommended for cleanout of the CDS unit and can be easily accomplished in less than 30 minutes for most installations.

Hydrodynamic Separator Selection & Sizing Tool

Quickly prepare designs for estimates and project meetings ...

Part of the Contech Design Center, this free, online tool fully automates the layout process for identifying the proper hydrodynamic separator for your site.

- Multiple sizing methods available.
- Site-specific questions ensure the selected unit will comply with site constraints.
- Multiple treatment options may be available based on regulations and site parameters.
- Follow up reports contain a site-specific design, sizing summary, standard detail, and specification.

Learn More:
www.ContechES.com/designcenter

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Contech® Engineered Solutions provides innovative, cost-effective site solutions to engineers, contractors, and developers on projects across North America. Our portfolio includes bridges, drainage, erosion control, retaining wall, sanitary sewer and stormwater management products.

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D

Water Quality Data

GENERAL CALCULATIONS - WQV and WQF
(optional worksheet)

This worksheet may be useful when designing a BMP **that does not fit into one of the specific worksheets already provided** (i.e. for a technology which is not a stormwater wetland, infiltration practice, etc.)

Water Quality Volume (WQV)

0.25	ac	A = Area draining to the practice
0.20	ac	A_I = Impervious area draining to the practice
0.80	decimal	I = Percent impervious area draining to the practice, in decimal form
0.77	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)
0.19	ac-in	WQV= 1" x Rv x A
699	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")

Water Quality Flow (WQF)

1	inches	P = Amount of rainfall. For WQF in NH, P = 1".
0.77	inches	Q = Water quality depth. Q = WQV/A
98	unitless	CN = Unit peak discharge curve number. CN =1000/(10+5P+10Q–10*[Q^2 + 1.25*Q*P] $^{0.5}$)
0.2	inches	S = Potential maximum retention. S = (1000/CN) - 10
0.046	inches	Ia = Initial abstraction. Ia = 0.2S
6.0	minutes	T_c = Time of Concentration
650.0	cfs/mi^2/in	q_u is the unit peak discharge. Obtain this value from TR-55 exhibits 4-II and 4-III.
0.196	cfs	WQF = q_u x WQV. Conversion: to convert "cfs/mi^2/in * ac-in" to "cfs" multiply by 1mi^2/640ac.

Designer's Notes:

Treatment Train Pollutant Removal Computation for Proposed Site Development

Table 1 (Treatment Train #1)

		Deep-Sump and Hooded Catch Basin	Contech CDS® Hydrodynamic Separator
TSS	BMP % Removal	15%	89.4%
	Cumulative % Removal	15%	91%
TN	BMP % Removal	5%	0%
	Cumulative % Removal	5%	5%
TP	BMP % Removal	5%	0%
	Cumulative % Removal	5%	5%

E

Operation & Maintenance Plan

STORMWATER MANAGEMENT OPERATIONS AND MAINTENANCE PLAN

PROPOSED RESTAURANT AT 3 DOVER ROAD

ASSESSORS MAP 108, LOT 38
3 DOVER ROAD
DURHAM, NEW HAMPSHIRE 03824

Prepared for:

Tropic Star Development, LLC
321 D Lafayette Road
Hampton, NH 03842

Prepared by:

TEC, Inc.
169 Ocean Boulevard
PO Box 249
Hampton, NH 03842

February 19, 2025

Stormwater Management Operation and Maintenance Plan
February 19, 2025

Name of Applicant: **Tropic Star Development, LLC**
Name of Facility: **Proposed Restaurant at 3 Dover Road**
Location: **3 Dover Road, Durham, NH 03824**

A detailed, written log of all scheduled preventative and corrective maintenance performed for the stormwater management measures must be kept on site, including a record of all inspections and copies of maintenance-related work orders.

Attachment 1, "Inspection and Maintenance Check List" shall be maintained as a record of regularly scheduled inspection and maintenance items as outlined below for every year. Maintenance required and actions taken shall be recorded in Attachment 2, Inspection and Maintenance Log". The funding, operation, and maintenance of all stormwater management BMPs shall be provided by Tropic Star Development, LLC, or their appointee.

Maintenance routine and schedule: Routine inspections will be conducted on a monthly basis and thorough investigations will be conducted twice a year. Tasks that are common to all systems include regular removal of accumulated sediments, floatables and debris. Inspections will occur after every major storm event for the first six (6) months after construction. Inspections will be conducted by a Professional Engineer registered in the State of New Hampshire experienced in drainage design.

Annual reports will be prepared detailing the status of the stormwater system and the maintenance performed. A copy of the annual report will be sent to the Town of Durham, if requested.

The owner agrees to comply with a minimum maintenance schedule as follows:

1. **Inspection and cleaning of catch basins**
   Catch basin grates shall be inspected monthly and cleared of debris to maintain inlet capacity. Sumps and inlets shall be cleaned when sediment reaches half of the sump depth and at a minimum two (2) times per year. All sediments shall be properly handled and disposed of in accordance with local, state, and federal guidelines and regulations.

2. **Semi-annual inspection and maintenance of water quality units**
   The water quality units shall be inspected every six months (spring and fall) for the first year to determine oil and sediment accumulation rates. Subsequent inspections will be planned based on the first year's inspection observations, and after any oil or chemical spill. All maintenance including removal and disposal of sediments shall be performed at the time of inspection. All sediments shall be properly handled and disposed of in accordance with local, state, and federal guidelines and regulations.

3. Inspection and cleaning of drainage pipes

Drainage pipes shall be inspected and cleaned of sediment at least every five (5) years or as required to maintain adequate functionality of the stormwater conveyance system. All sediments shall be properly handled and disposed of in accordance with local, state, and federal guidelines and regulations.

4. Grass Landscaping

The grass landscaping and plantings will be inspected after every major storm event for the two (2) months after seeding to ensure functionality. Thereafter, inspections should take place every six (6) months in the spring and fall and after severe storm events. Grass and mulched landscaping showing signs of wear and erosion will be re-loamed/re-seeded or re-mulched as necessary to prevent further erosion.

5. Snow Removal

Snow will be stored within the landscape areas onsite, outside of the wetlands buffer area. Salting and/or sanding will be performed as necessary to promote the public's safety. During large storm events, snow will be trucked offsite.

The Long-Term Pollution Prevention Plan

The Owner agrees to comply with the following Long-Term Pollution Prevention Plan to ensure long-term stormwater quality discharge from the site:

- *Good housekeeping practices:* The project will be maintained by the owner, including snow removal, de-icing, and BMP inspection and maintenance.

- *Provisions for storing materials and waste products inside or under cover*: No materials or waste products will be stored on-site.

- *Vehicle washing controls:* Vehicle washing is not anticipated as a reasonably foreseeable use of the site.

- *Requirements for routine inspections and maintenance of stormwater BMPs:* The owner will be responsible for providing the necessary inspections and maintenance for the stormwater BMPs.

- *Spill prevention and response plans:* There are no proposed uses at the site that would provide an opportunity for a spill of oil or hazardous materials, other than a sudden, catastrophic, vehicle failure. If a vehicle release is the result of an accident, the police and fire department will respond and address any release.

- *Provisions for maintenance of lawns, gardens, and other landscaped areas:* The owner will provide long-term maintenance for the landscaped areas.

- *Requirements for storage and use of fertilizers, herbicides, and pesticides:* At this time there would be no foreseeable need for fertilizers, herbicides, and pesticides.

- *Provisions for solid waste management:* The development will have trash removal service and will store all trash in barrels with closed lids.

- *Provisions for prevention of illicit discharges to the stormwater management system:* Only stormwater is proposed to be conveyed through the stormwater management system. No illicit materials will be permitted. The owner will be responsible for maintaining this system.

- *Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan:* Prior to implementation of the LTPPP, the owner shall provide an on-site meeting with the maintenance personnel to present the contents and requirements of the Stormwater Operation and Maintenance Plan and the LTPPP.

- *List of Emergency contacts for implementing Long-Term Pollution Prevention Plan*:

  Tropic Star Development, LLC
  321 D Lafayette Road
  Hampton, NH 03842

INSPECTION AND MAINTENANCE CHECK LIST –
3 Dover Road, Durham, NH 03824

For Year: _____

	Inspection Item	Inspection Frequency*											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
1	Catch Basins												
2	Water Quality Units	■	■	■		■	■	■	■	■		■	■
3	Drainage Pipes	at least every 5 years											
4	Grass Landscaping	■	■	■		■	■	■	■	■		■	■
	Maintenance Item	Maintenance Frequency*											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
1	Catch Basins		■	■		■	■		■	■		■	■
2	Water Quality Units	■	■	■		■	■	■	■	■		■	■
3	Drainage Pipes	At least every 5 years											
4	Grass Landscaping	■	■	■		■	■	■	■	■		■	■

* Actual time of inspecting and maintaining items may vary. The chart shall be used to indicate the frequency of events. The inspection and maintenance frequency of BMPs during the first year may vary from normal operations and is not reflected in this chart. The above report narrative should be referenced to determine inspection and maintenance requirements for the first year.

** This chart shall be used in conjunction with the attached "Stormwater Management Operations and Maintenance Plan", dated February 19, 2025.

Name of Applicant: Tropic Star Development, LLC

Name of Project: Proposed Restaurant at 3 Dover Road

Location: 3 Dover Road, Durham, NH 03824

Inspection and Maintenance Log

Inspection No.	Date	Inspections Performed	Maintenance Actions Taken
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			

Additional Sheets shall be added as needed

CONTECH®
ENGINEERED SOLUTIONS

CDS® Inspection and Maintenance Guide

CDS TECHNOLOGIES

Maintenance

The CDS system should be inspected at regular intervals and maintained when necessary to ensure optimum performance. The rate at which the system collects pollutants will depend more heavily on site activities than the size of the unit. For example, unstable soils or heavy winter sanding will cause the grit chamber to fill more quickly but regular sweeping of paved surfaces will slow accumulation.

Inspection

Inspection is the key to effective maintenance and is easily performed. Pollutant transport and deposition may vary from year to year and regular inspections will help ensure that the system is cleaned out at the appropriate time. At a minimum, inspections should be performed twice per year (e.g. spring and fall) however more frequent inspections may be necessary in climates where winter sanding operations may lead to rapid accumulations, or in equipment washdown areas. Installations should also be inspected more frequently where excessive amounts of trash are expected.

The visual inspection should ascertain that the system components are in working order and that there are no blockages or obstructions in the inlet and separation screen. The inspection should also quantify the accumulation of hydrocarbons, trash, and sediment in the system. Measuring pollutant accumulation can be done with a calibrated dipstick, tape measure or other measuring instrument. If absorbent material is used for enhanced removal of hydrocarbons, the level of discoloration of the sorbent material should also be identified during inspection. It is useful and often required as part of an operating permit to keep a record of each inspection. A simple form for doing so is provided.

Access to the CDS unit is typically achieved through two manhole access covers. One opening allows for inspection and cleanout of the separation chamber (cylinder and screen) and isolated sump. The other allows for inspection and cleanout of sediment captured and retained outside the screen. For deep units, a single manhole access point would allows both sump cleanout and access outside the screen.

The CDS system should be cleaned when the level of sediment has reached 75% of capacity in the isolated sump or when an appreciable level of hydrocarbons and trash has accumulated. If absorbent material is used, it should be replaced when significant discoloration has occurred. Performance will not be impacted until 100% of the sump capacity is exceeded however it is recommended that the system be cleaned prior to that for easier removal of sediment. The level of sediment is easily determined by measuring from finished grade down to the top of the sediment pile. To avoid underestimating the level of sediment in the chamber, the measuring device must be lowered to the top of the sediment pile carefully. Particles at the top of the pile typically offer less resistance to the end of the rod than consolidated particles toward the bottom of the pile. Once this measurement is recorded, it should be compared to the as-built drawing for the unit to determine weather the height of the sediment pile off the bottom of the sump floor exceeds 75% of the total height of isolated sump.

Cleaning

Cleaning of a CDS systems should be done during dry weather conditions when no flow is entering the system. The use of a vacuum truck is generally the most effective and convenient method of removing pollutants from the system. Simply remove the manhole covers and insert the vacuum hose into the sump. The system should be completely drained down and the sump fully evacuated of sediment. The area outside the screen should also be cleaned out if pollutant build-up exists in this area.

In installations where the risk of petroleum spills is small, liquid contaminants may not accumulate as quickly as sediment. However, the system should be cleaned out immediately in the event of an oil or gasoline spill should be cleaned out immediately. Motor oil and other hydrocarbons that accumulate on a more routine basis should be removed when an appreciable layer has been captured. To remove these pollutants, it may be preferable to use absorbent pads since they are usually less expensive to dispose than the oil/water emulsion that may be created by vacuuming the oily layer. Trash and debris can be netted out to separate it from the other pollutants. The screen should be power washed to ensure it is free of trash and debris.

Manhole covers should be securely seated following cleaning activities to prevent leakage of runoff into the system from above and also to ensure that proper safety precautions have been followed. Confined space entry procedures need to be followed if physical access is required. Disposal of all material removed from the CDS system should be done in accordance with local regulations. In many jurisdictions, disposal of the sediments may be handled in the same manner as the disposal of sediments removed from catch basins or deep sump manholes.

CDS Model	Diameter		Distance from Water Surface to Top of Sediment Pile		Sediment Storage Capacity	
	ft	m	ft	m	y^3	m^3
CDS1515	3	0.9	3.0	0.9	0.5	0.4
CDS2015	4	1.2	3.0	0.9	0.9	0.7
CDS2015	5	1.3	3.0	0.9	1.3	1.0
CDS2020	5	1.3	3.5	1.1	1.3	1.0
CDS2025	5	1.3	4.0	1.2	1.3	1.0
CDS3020	6	1.8	4.0	1.2	2.1	1.6
CDS3025	6	1.8	4.0	1.2	2.1	1.6
CDS3030	6	1.8	4.6	1.4	2.1	1.6
CDS3035	6	1.8	5.0	1.5	2.1	1.6
CDS4030	8	2.4	4.6	1.4	5.6	4.3
CDS4040	8	2.4	5.7	1.7	5.6	4.3
CDS4045	8	2.4	6.2	1.9	5.6	4.3
CDS5640	10	3.0	6.3	1.9	8.7	6.7
CDS5653	10	3.0	7.7	2.3	8.7	6.7
CDS5668	10	3.0	9.3	2.8	8.7	6.7
CDS5678	10	3.0	10.3	3.1	8.7	6.7

Table 1: CDS Maintenance Indicators and Sediment Storage Capacities

Support

- Drawings and specifications are available at www.contechstormwater.com.
- Site-specific design support is available from our engineers.

Contech Engineered Solutions LLC provides site solutions for the civil engineering industry. Contech's portfolio includes bridges, drainage, sanitary sewer, stormwater, earth stabilization and wastewater treament products. For information, visit www.ContechES.com or call 800.338.1122

CONTECH ENGINEERED SOLUTIONS
800.925.5240
www.ContechES.com

CDS Inspection & Maintenance Log

CDS Model: _____ Location: _____

Date	Water depth to sediment[1]	Floatable Layer Thickness[2]	Describe Maintenance Performed	Maintenance Personnel	Comments

1. The water depth to sediment is determined by taking two measurements with a stadia rod: one measurement from the manhole opening to the top of the sediment pile and the other from the manhole opening to the water surface. If the difference between these measurements is less than the values listed in table 1 the system should be cleaned out. **Note: to avoid underestimating the volume of sediment in the chamber, the measuring device must be carefully lowered to the top of the sediment pile.**

2. For optimum performance, the system should be cleaned out when the floating hydrocarbon layer accumulates to an appreciable thickness. In the event of an oil spill, the system should be cleaned immediately.