Stormwater Management Report

Habitat For Humanity Residential Development

8, 9, and 11 Colby Drive, Ledyard CT

Prepared For:

Town of Ledyard
741 Colonel Ledyard Highway
Ledyard, CT 06339

Prepared By:

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Issued:

December 2024
Revised March 2025
Revised September 2025

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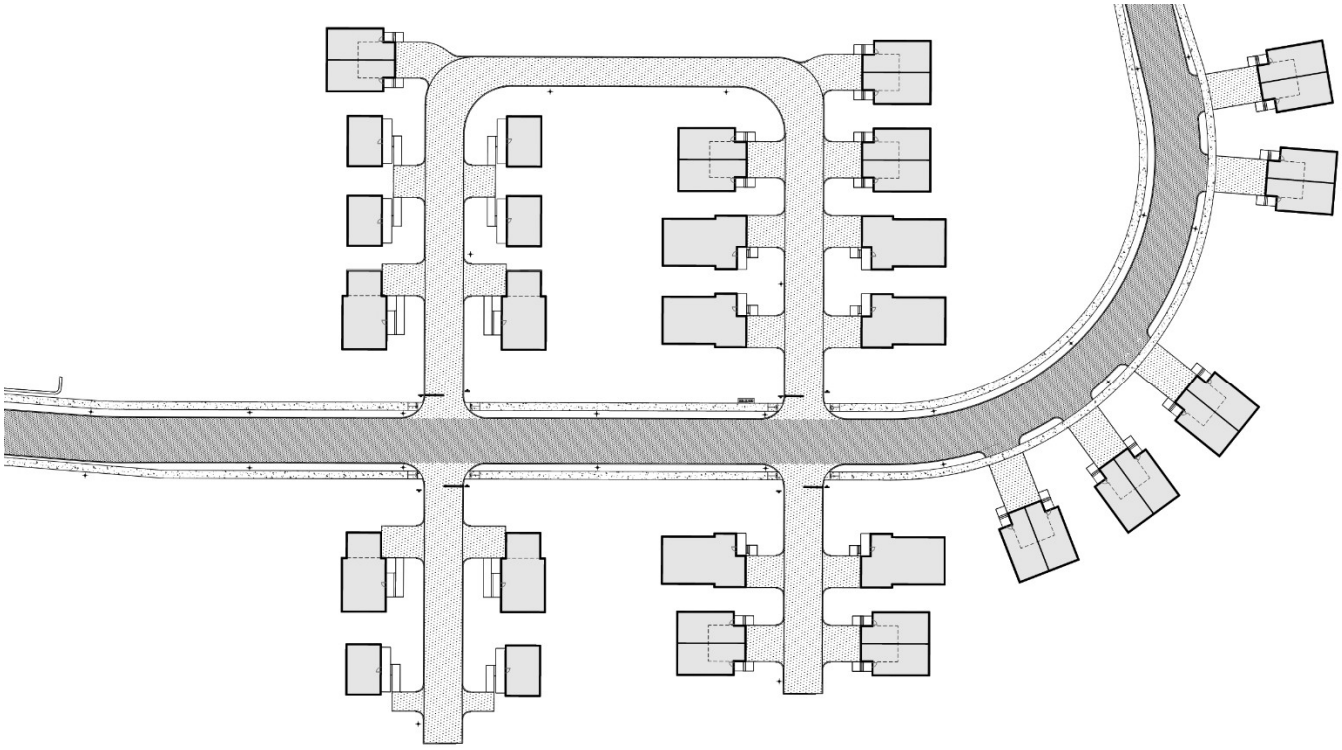

PROPOSED RESIDENTIAL DEVELOPMENT

(Schematic Layout)

8, 9, and 11 Colby Drive

Ledyard, CT 06339

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1 INTRODUCTION

1.1 General Information

The subject parcels addressed 8, 9, and 11 Colby Drive, Ledyard, CT consist of approximately 15.71 acres and are located at the end of Colby drive, where it curves and extends down to Colonel Ledyard Highway. It is situated in the MFDD (Multi Family Development District) Zone and the subject parcels are denoted as and owned by:

- 8 Colby Drive – Book 560 / Page 433 G - Habitat for Humanity of Eastern CT Inc.
- 9 Colby Drive – Book 560 / Page 436 G - Habitat for Humanity of Eastern CT Inc.
- 11 Colby Drive – Book 560 / Page 436 G - Habitat for Humanity of Eastern CT Inc.
- Colby Drive Roadbed – Book 560 / Page 442 – Habitat for Humanity of Eastern CT Inc.

The project proposes the development of the existing parcels along with a full roadway construction to town standards. The proposed development will consist of twenty-seven (27) housing structures and the following site features:

- New Bituminous Pavement and Curbing
- New Concrete Walks
- Utilities and Storm Drainage system. (including detention)
- Revised Site Landscaping
- Single and Multi-Family Residential Buildings

The existing site is comprised of approximately 15.7 acres that is predominately wooded. This site has been the subject of multiple, various, applications over the past 40 – 50 years, all of which included the completion of a town road extending from the Colby Drive cul-de-sac through the site and connecting to Colonel Ledyard Highway. The natural low spot of the site is the northwestern portion, which is comprised of a large wetlands system. Based on discussions with town staff, it is our understanding that this wetlands system was utilized to provide stormwater management in the 1980s through the following construction:

- Construction of an earthen berm along the northern boundary line created a defined volume.
- A concrete outlet control structure, with a large RCP outlet pipe was placed to regulate flow out of the pond.
- The RCP pipe discharges to the property to the north (16 Highview Terrace). A stream has formed at this outlet pipe, and it runs south to north through the property. It appears a drainage easement was designed as part of a previous plan set, but the easement may have never been formalized and filed on the town land records.

This stormwater management system was designed to manage flow from the Colby Drive cul-de-sac development, as well as a previously approved development for the subject property (8, 9 and 11 Colby

Drive, and the Colby Drive Roadbed). The flows from the subject property were assumed to be generated by a 28' wide paved road extension (between the cul-de-sac and Colonel Ledyard Highway) and several commercial buildings. Therefore, the increased flows that truly need to be accounted for, for the proposed development, would only be the increased imperviousness from the previously approved commercial development and the proposed multi-family residential development.

However, the detention basin was never formally accepted by the Town. Therefore, in coordination with the Town staff, the proposed stormwater management has been designed with the following assumptions:

- The "existing" conditions consist of the current conditions (selectively cleared ROW and gravel drive) and NOT a 28' wide paved roadway with several commercial buildings. This resulted in the existing peak flows, as generated by the hydrologic model, being significantly lower than could perhaps take credit for. This forced us to design the proposed conditions to a much higher level of detention than would've otherwise been required.
- The Basin was surveyed and the topography was compared to the design plan from the 1990's. The comparison indicates the elevations and shape of the detention basin under current conditions is substantially in conformance with the original design in the 1980s. The Basin and structures were inspected and the facilities appear to be functioning as intended. We are providing several maintenance items in Section 2.3 of the report, which are to be expected after approximately 50 years, but the facility appears to be working as designed. Also, we have no knowledge of any complaints of flooding directly downstream of this basin.
- A new stormwater management system upgradient of the new paved road extension has been designed to manage and regulate all increased flows associated with the proposed development. This methodology has been designed to be very conservative, specifically to provide the Town with a level of comfort that the entirety of stormwater management will treat and regulate peak stormwater flow beyond that required by the applicable regulations. The proposed design assumes that the discharge point of our development is the existing detention basin on the northern portion of the property. peak flows are reducing from our site, to this basin, under proposed conditions for all the required design storms.

The proposed development includes an additional detention/infiltration basin and French drain to meet the 2024 CT DEEP Stormwater Quality Manual requirements for water quality and provide zero increase in runoff rate. Previously installed structures and pipes will be used if feasible after inspection and verification of suitability,

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Site Location Map

The project was designed utilizing the Town of Ledyard Zoning Regulations, the 2002 Connecticut Department of Transportation (ConnDOT) Drainage Manual, the latest Connecticut Guidelines for Soil Erosion and Sediment Control, and the latest Connecticut Department of Energy and Environmental Protection (CT DEEP) Water Quality Manual.

1.2 Project Summary

This project proposes to:

- Construct a new roadway for the town of Ledyard
- Construct multiple private driveways
- Construct multiple housing units
- Provide adequate site drainage and water quality.
- Provide ADA accessibility
- Construct utility connections to the buildings and site.

The project will disturb approximately 9.20 acres between the subject parcels and the ROW.

1.3 Existing Site Conditions

1.3.1 Topography

The project site slopes generally from south to north, with flow being directed to wetlands/existing detention basin northeast of the site. The proposed extension of Colby Drive is located within the previously approved right-of-way in approximately the same location. A portion of the drainage was previously constructed and will be inspected and reused to the extent possible. Elevations (NAVD 88) range from approximately 318 ft at the southern property border to 218 located at the northeaster property corner.

1.3.2 Soils

NRCS soils mapping indicates 4 soil types located within the project limits; defined as:

- 47C – Woodbridge Fine Sandy Loam – Hydrologic Soil Group C
- 84B – Paxton Montauk Fine Sandy Loam – Hydrologic Soil Group C
- 85B – Paxton Montauk Fine Sandy Loam – Hydrologic Soil Group C
- 86B – Paxton Montauk Fine Sandy Loam – Hydrologic Soil Group C

Exploratory borings and test pits were completed onsite on October 24, 2024 and November 5, 2024 supervised by Down to Earth Consulting LLC. Groundwater was found to be 5-10.5 ft below the existing grade at ±257 and ±254 (NAVD 88). Infiltration testing was performed using the Falling Head Test. And revealed the pond location can infiltrate at a rate of 0.21in/hr, and a rate of 0.94in/hr at the location of the proposed French Drain.

The locations of Boring and Infiltration tests and results are included in Appendix G.

1.3.3 On-site and Adjacent Waterbody Information

There are wetlands adjacent to this project site. All flow from this site under existing conditions, both sheet flow and concentrated pipe flow, discharges to wetlands. This site is not located within an aquifer protection area, per Ledyard, CT Map (June 2024)

1.3.4 Additional Site Considerations

- The existing stormwater management area has some organic overgrowth (phragmites, and down trees/root balls, etc.).
- The existing RCP discharge pipe into and out of the pond is not equipped with rip rap outlet control.
- The detention pond outlet control is comprised of a concrete block structure with a metal grate on the side (to prevent clogging of the low-flow orifice) and on top (to prevent clogging of the overflow spillway). Although the structure is structurally sound, the metal contains rust and the block mortar is slightly deteriorating in some locations.
- The site is currently undeveloped, except for the roughed in roadway, detention basin and catch basins which were installed for the previously approved roadway.
- A majority of existing soils have limiting exfiltration characteristics.
- The site is not located within a Natural Diversity Database Area, per Ledyard, CT Map, (June 2024)

2 HYDROLOGY

2.1 Methodology

The analysis to determine peak flows generated from the site was prepared using TR-55 procedures for calculating peak rates of runoff resulting from precipitation events and procedures for developing runoff hydrographs. HydroCAD software was utilized to perform hydrologic computations. Rainfall Frequency Estimates for precipitation frequency, based on National Oceanic and Atmospheric Administration (NOAA) data from Colby Drive, Ledyard, CT, were utilized to generate the flows. The following 24-hour, precipitation estimates were utilized:

2-Year	3.46 inches
10-Year	5.11 inches
25-Year	6.15 inches
50-Year	6.92 inches
100-Year	7.74 inches

Design Storm Type: NOAA, 24-hour Type D

Project Type: New Construction

2.2 Existing Conditions

2.2.1 Watershed Boundaries and Design Points.

Drainage from the existing site is contained within one (1) watershed for analysis.

- **Watershed E1 (To Wetlands):** This watershed consists of the entirety of the existing site. There is a previously graded, but unconstructed roadway designed directly through the middle of the site. The roadway was analyzed as constructed, along with the water which comes down the hill from outside the property onto the site. The majority of the existing site is a heavily wooded area, with some impervious cover. All flow from this watershed discharges through the existing detention pond to the wetlands or directly to the wetlands located northeast of the project site.

  Existing Watershed Data (Existing Cover Characteristics, Existing Watershed Area Map, and Hydrologic Computations) have been included in Appendix A.

2.3 Proposed Conditions

2.3.1 Watershed Boundaries and Design Points

This project proposes to provide stormwater management in the form of a detention pond. Peak flow reduction is achieved using an outlet control structure to control stormwater discharge from the pond. The elevation of the bottom orifice and pond size have been calculated to meet the water quality requirement for the entire site. Drainage from the proposed site consists of two (2) subwatersheds for analysis.

- **Watershed 1:** This watershed has been further divided into subwatersheds for further analysis
  - **Watershed P1-1 (Direct to Wetlands):** This watershed consists of the area along the Eastern and northern borders on the downslope of the roadway, including a portion of the roadway, and a minor section of the slope from the pond. There is impervious cover from thirteen (13) Single and multi-family residential buildings, two (2) private drives and a portion of the proposed Colby Drive extension. There is proposed grass around all areas in this watershed which have been designed to be disturbed and regraded.
  - **Watershed P1-2 (To Detention Pond):** The majority of Colby Drive is within this watershed. Along with Colby Drive, there is a proposed private drive loop, fourteen (14)

proposed residential buildings and, pavement from offsite which sheet flows downhill from the west, to make up the proposed impervious cover of this watershed. The proposed detention pond and all disturbed areas around the proposed residential buildings make up the grass cover for this watershed. There is woodland offsite to the west and south which remains undisturbed and remains the same condition as existing.

Proposed Watershed Data (Proposed Cover Characteristics, Proposed Watershed Area Map, and Hydrologic Computations) have been included in Appendix B.

2.3.2 Existing Detention Basin Renovations

Based upon our site walk, following are the proposed renovations to the existing stormwater detention basin:

- Selectively remove the phragmite stand, as well as downed trees, stump and associated root balls in the area adjacent the pond inlet pipe.
- Place rip rap outlet control at the end of the existing RCP discharging into and out of the detention pond. The rip rap has been sized per ConnDOT criteria and the computations are shown in Appendix H.
- Remove the rust off the outlet control structure metal grates and remove the moss off the concrete block portion of the structure.
- Parge the interior portion of the concrete block structure to address the slight deterioration of existing mortar.

2.4 Compliance with Performance Criteria

2.4.1 Compliance with Local Criteria

This project has been designed per the Town of Ledyard's Stormwater Management Regulations.

2.4.2 Compliance with Connecticut Stormwater Quality Manual

2.4.2.1 Standard 1 – Runoff Volume Reduction

The method of analysis for this stormwater management system is providing site specific peak runoff volume reduction for the 2, 10, 25, 50, or 100-year Type NOAA, 24-hr Type D storm.

Low impact development practices have been implemented throughout this stormwater management design utilizing a series of treatment practices to remove temporarily suspended solids from the discharge location. Under existing conditions there are multiple catch basins and double catch basins,

none of which receive significant flow as they have been set to the proposed elevation of the previously approved roadway and grading has only been performed to subgrade.

For the proposed detention pond, infiltration testing revealed an infiltration rate of 0.21in/hr. For the proposed French drain, infiltration testing revealed an infiltration rate of 0.94 in/hr. The French Drain has been modeled as a narrow but long infiltration basin to accommodate offsite flow.

Water quality volume calculations are provided in Appendix D.

Peak Flow Comparison

Peak flows at the off-site analysis point are as follows:

Proposed Watershed Hydrologic Characteristics Colby Drive Ledyard, CT Project # 0725-500010.00			
Comparison of Existing to Proposed Peak Flow Rate			
Watershed	**Storm Event (NOAA Type D)**	**Existing Flow (cfs)**	**Proposed Flow (cfs)**
To Wetlands	**2-year**	14.98	7.83
	10-year	30.78	25.98
	25-year	41.66	41.15
	50-year	49.91	45.72
	100-year	58.82	50.73

Conclusion, total site peak flows will be reduced under proposed conditions for all design storms.

2.4.2.2 Standard 2 – Stormwater Runoff Quantity Control

See Peak Flow Comparison above.

3 HYDRAULICS

The intent of the hydraulic analysis is to ensure that proposed on-site drainage facilities are designed to accommodate and safely convey runoff produced up to and including the 25-year storm event.

3.1 Compliance with Performance Criteria

The site has been designed with a series of structural drainage facilities, including twenty-two (22) catch basins, four (4) double catch basins, eight (8) concrete area drains, one (1) dry well, one (1) French Drain, two (2) manholes, one (1) detention pond, four (4) flared end structures, one (1) outlet control structure and one (1) emergency overflow. This drainage system has been designed to remove stormwater from driving surfaces and divert it to the proposed detention pond, or directly to the wetlands.

3.1.1 Compliance with Local Criteria

The proposed storm sewer system has been designed in compliance with Town of Ledyard Drainage Regulations.

3.1.2 Compliance with State Criteria

The proposed storm sewer system has been designed in compliance with the State of Connecticut's drainage regulations per the 2002 ConnDOT Drainage Manual. (as amended)

Computations for the hydraulic analysis can be viewed in Appendix C.

4 WATER QUALITY

4.1 Methodology

The project has been designed to address both short-term and long-term stormwater quality. Short term (during construction) water quality has been provided in the form of erosion control measures and long-term (post construction) water quality has been provided through the use of primary and secondary treatment practices. Erosion control has been designed per the latest Connecticut Erosion Control Guidelines and long-term stormwater quality has been designed per the latest CT DEEP Stormwater Quality Manual.

4.2 Compliance with Performance Criteria

4.2.1 Compliance with Local Criteria

The proposed stormwater management system is designed to provide water quality volume for the entirety of the proposed development and treat the 1.3" storm as required by the 2024 CT DEEP Stormwater Quality Manual.

4.2.2 Compliance with Connecticut Stormwater Quality Manual

4.2.2.1 Standard 1 – Pollutant Reduction

Long Term Stormwater Quality

The project was designed with guidance from the latest Connecticut Stormwater Quality Manual.

The site was designed to divert all surface stormwater to the proposed detention basin, where floatables, debris and other pollutants will be filtered out of the water prior to discharge to the onsite wetlands. The detention pond is designed to provide 100% of the required water quality volume.

Computations for Water Quality can be viewed in Appendix D.

5 SOIL EROSION AND SEDIMENT CONTROL

5.1 Methodology

The proposed soil erosion and sediment controls have been designed in accordance with local regulations, the Connecticut Guidelines for Soil Erosion and Sediment Control, and the requirements of the CTDEEP General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities, as applicable. The proposed design considers the specific site characteristics of the site and anticipated construction activities. See the plan set for location and design of proposed short term soil erosion and sediment control measures to be used throughout construction.

Short Term Erosion Control

The proposed erosion and sedimentation controls consider the specific characteristics of the site and the anticipated construction activities. They have been designed in accordance with the latest CT DEEP Guidelines for Soil Erosion and Sediment Control.

Construction Entrances

Construction entrances will be utilized to remove sediment from construction vehicle tires and prevent it from being tracked onto adjoining paved roadway areas.

Erosion Control Barriers

Prior to any construction activity, hay bales, silt fence, or combination hay bale/silt fence barriers will be placed at the downgradient limits of construction and adjacent to the wetlands. Throughout construction, additional barriers will be installed as necessary at the toe of slopes equal to or in excess of 15 feet. These barriers will be inspected once every seven calendar days

and within 24 hours after every rainfall generating a discharge and replaced as necessary. Collected silt will be removed when one-half the barrier height is reached.

Temporary Seeding

Temporary Seeding will be utilized on portions where the phasing and sequencing require an initial disturbance followed by an extended period of inactivity that is greater than 30 days but less than 1 year. Temporary seeding will be conducted within 7 days after the suspension of grading work in disturbed areas where the suspension of work is expected to be more than 30 days but less than 1 year.

Soil Stabilization- Mulches

Structural (non-living) soil stabilization will be utilized to protect the soil surface on a temporary basis without the intention of promoting plant growth. When grading of the disturbed area will be suspended for a period of 30 or more consecutive days, but less than 5 months, disturbed areas will be stabilized within 7 days of the suspension of grading through the use of mulch, non-bituminous tackifiers, erosion control netting, or other approved materials appropriate for use as a temporary soil protector. For surfaces that are not to be reworked within 5 months but will be reworked within 1 year, use temporary seeding, seeding-type mulch (hay, straw, or cellulose fiber) or when slopes are less than 3:1, wood chips, bark chips or shredded bark.

Temporary Filter Inserts

Temporary Filter Inserts will be placed in each existing catch basin and yard drains prior to the start of construction, and in each new catch basin or yard drain during construction. These devices will be removed upon final site stabilization. Filter inserts will be inspected once every seven (7) calendar days and within 24 hours after every rainfall generating a discharge. Replacement of the inserts will be as often as necessary to maintain function of the drainage structure and prevent excessive ponding due to clogged fabric. Ripped or otherwise damaged inserts will be replaced immediately.

Stockpile Management

The topsoil stockpiles which will be idle for at least 30 days will be stabilized with temporary seed and mulch no later than 7 days from the last use. Small stockpiles may be covered with impervious tarps or erosion control matting in lieu of seeding and mulching.

A geotextile silt fence or hay bale barrier will be installed around the stockpile area approximately 10 feet from the proposed toe of the slope.

6 OPERATION AND MAINTENANCE

6.1 Inspection Frequency and Criteria

Maintenance and operation will be provided as follows.

During Construction

- **Dust Control:** Moisten disturbed soil areas with water periodically, or use a non-asphaltic soil tacifier to minimize dust.
- **Temporary Soil Protection:** Inspect seeded areas weekly and within 24 hours after a storm generating a discharge.
- **Catch Basin Filter Inserts:** Inspect the fabric at least once a week and within 24 hours after the end of a storm generating a discharge. Check the fabric for structural soundness (i.e. tears), proper anchoring/alignment within the grate and ability to drain runoff (i.e. percent of clogging by sediment). Remove the sediment every week, or sooner if ponding is excessive. Each time the sediment is removed, replace the section of fabric removed with a new section. Do not remove the sediment and reuse the same section of fabric.
- **Hay Bale/ Silt Fence Barrier:** Inspect the barrier at least once a week and within 24 hours after the end of a storm generating a discharge. For dewatering operations, inspect frequently before, during and after pumping operations. Remove the sediment deposits when the depth reaches one half the barrier's height. Repair or replace a barrier within 24 hours of observed failure. Maintain the barrier until the contributing disturbed area is stabilized.
- **Construction Entrance/Exit Pad:** Maintain the pad in a condition that will prevent tracking and washing of sediment onto paved surfaces. Place additional clean gravel on top of gravel that has become silted, or remove the silted gravel and replace the gravel to the depth removed with clean gravel, as conditions warrant. Remove immediately all sediment spilled, dropped, washed or tracked onto paved surfaces. Roads adjacent to the construction site shall be cleaned at the end of each day by hand sweeping or sweeper truck.
- **Existing Catch Basins and Sumps:** Inspect the filter baskets as specified above. After final removal of the filter baskets at the end of construction, clean the sump of all silt and debris.
- **New Catch Basins and Sumps:** As new catch basins are constructed, a sediment trap shall be installed in the unit and a sediment barrier installed around the grate. Inspect the

trap and barrier weekly and within 24 hours after a storm generating a discharge. After stabilization of the drainage area entering the catch basin, remove the trap and barrier and clean the basin sump of all silt and debris.

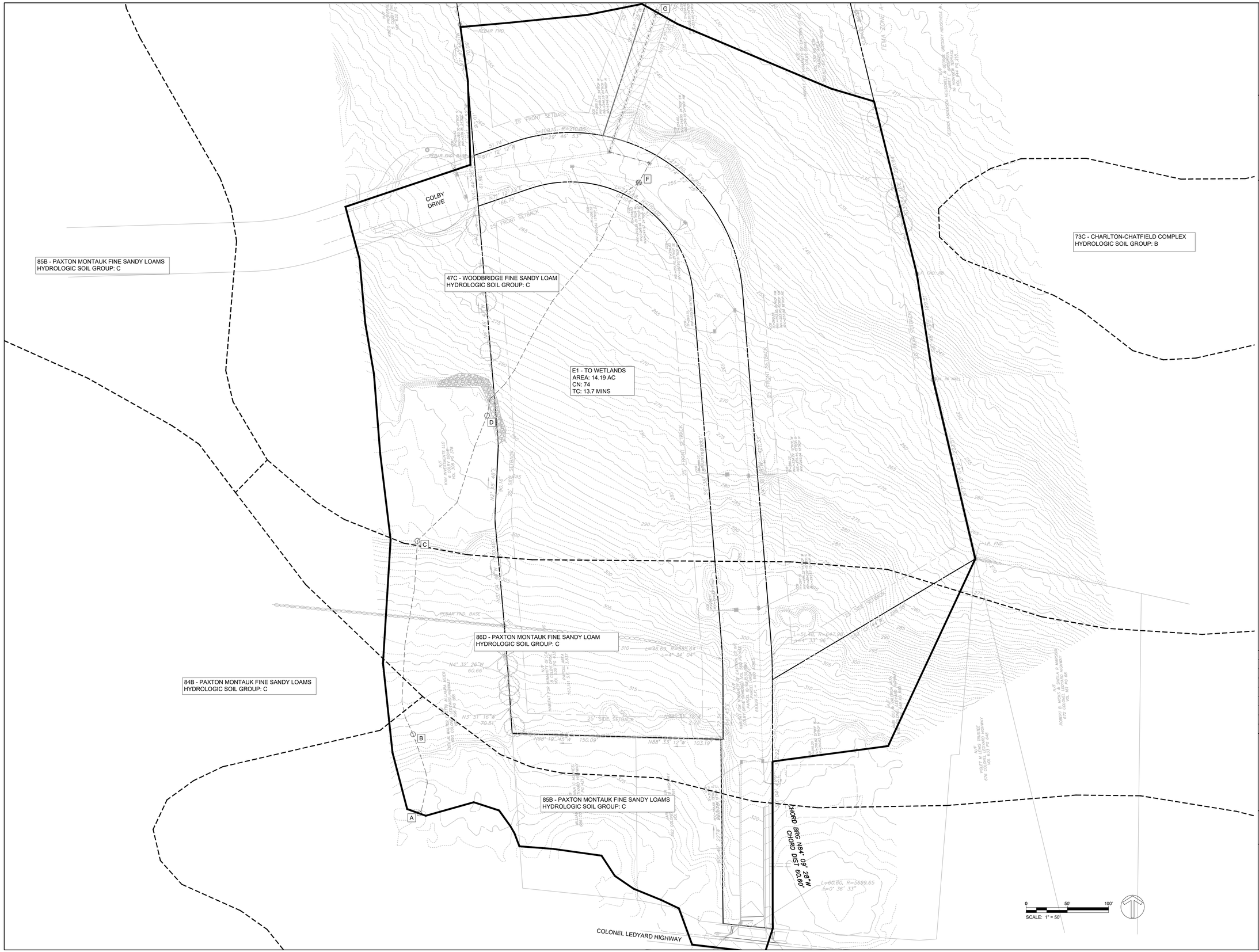
- **Temporary Stockpiles:** Inspect temporary stockpiles at the end of each workday to ensure that tarps are in place and secured. Temporary stockpiles that are expected to be inactive for more than 30 days should be temporarily seeded (see above).

After Construction

- **Driveway Sweeping:** At least twice a year, with the first occurring as soon as possible after snowmelt and the second not less than 90 days following the first.
- **Catch Basins and Sumps:** Maintenance includes removal of trash from the grate and the sump, as well as sediment from the sump. They shall be inspected semi-annually and cleaned when the sump is one half full of sediment. One of the inspections shall be after the snow and ice removal season is over, and prior to the spring rainfall events. If the sumps is filled more than half-filled with sediment at the semi-annual inspections, they shall be inspected quarterly.
- **Landscaped Areas:** Inspect semi-annually for erosion or dying vegetation. Repair and stabilize any bare or eroded areas and replace vegetation as soon as possible.
- **Detention Pond:** Inspect several times during the first few months to ensure that grass cover is established. Inspect the basin semi-annually and after major rain events for the first year, then annually after the first year. Trash should be removed as accumulated. Sediment building up should be removed when it's depth is greater than four (4) inches. Grass should be reseeded if the side slope or bottom exhibit erosion. Grass should be mowed once per month (depending on species) and should be cut to leave at least two (2) inches of height. Mowing should not occur when the ground is soft, to avoid rutting.
- **French Drain:** Inspect for sediment and debris build up on top of stone trench annually, if degradation of function is noticed and overflow flow is not contained within the drain, inspect pipe manually using a snake or camera equipment.

APPENDIX A

Existing Watershed Data



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Prepared for:

Habitat for Humanity® of Eastern Connecticut

HABITAT FOR HUMANITY MULTI-FAMILY RESIDENTIAL AFFORDABLE HOUSING DEVELOPMENT PER C.G.S. §8-30g, LOTS 8, 9 & 11

LEDYARD, CT

COLBY DRIVE

DATE:	REVISION:
09/02/2025	PER CITY STAFF COMMENTS

PROJECT NO.: 0725 500010.00
SCALE: 1" = 50'
DATE: 12/20/2024
DRAWN BY: CLM
CHECKED BY: WGW

EXISTING WATERSHED AREA MAP

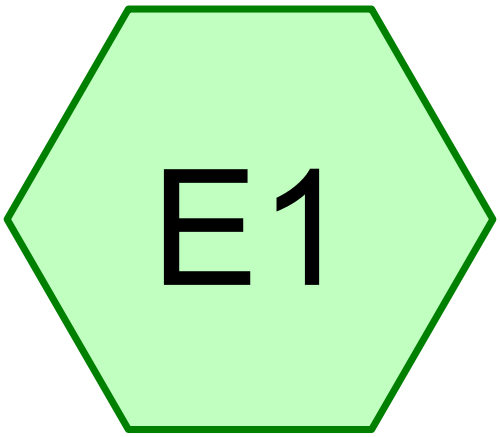
DRAWING NO.:

EWAM

Existing Watershed Cover Characteristics
Colby Drive Ledyard, CT
Project # 0725-500010.00

Watershed	Description	Total Area (AC)	Woods	Gravel	Impervious	CN	Tc (min)
			C	C			
			Good	W - ROW			
			70	89	98		
E1	**To Wetlands**	14.19	11.81	1.55	0.83	74	13.7

* 1.38 acres of gravel accounts for previously approved impervious surface discharge into existing detention basin



To Wetlands

Subcat Reach Pond Link

Routing Diagram for 0725-500010.00 EWAM
Prepared by Alfred Benesch & Company, Printed 8/29/2025

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-year	NOAA10 24-hr	D	Default	24.00	1	3.46	2
2	10-year	NOAA 24-hr	D	Default	24.00	1	5.11	2
3	25-year	NOAA 24-hr	D	Default	24.00	1	6.15	2
4	50-year	NOAA 24-hr	D	Default	24.00	1	6.92	2
5	100-year	NOAA 24-hr	D	Default	24.00	1	7.74	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.550	89	Gravel roads, HSG C (E1)
0.830	98	Paved parking, HSG C (E1)
11.810	70	Woods, Good, HSG C (E1)
14.190	**74**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
14.190	HSG C	E1
0.000	HSG D	
0.000	Other	
14.190		**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	1.550	0.000	0.000	1.550	Gravel roads	E1
0.000	0.000	0.830	0.000	0.000	0.830	Paved parking	E1
0.000	0.000	11.810	0.000	0.000	11.810	Woods, Good	E1
0.000	**0.000**	**14.190**	**0.000**	**0.000**	**14.190**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)	Node Name
1	E1	0.00	0.00	257.0	0.0730	0.011	0.0	24.0	0.0	

Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E1: To Wetlands Runoff Area=14.190 ac 5.85% Impervious Runoff Depth=1.21"
Flow Length=1,118' Tc=13.7 min CN=74 Runoff=14.98 cfs 1.434 af

Total Runoff Area = 14.190 ac Runoff Volume = 1.434 af Average Runoff Depth = 1.21"
94.15% Pervious = 13.360 ac 5.85% Impervious = 0.830 ac

Summary for Subcatchment E1: To Wetlands

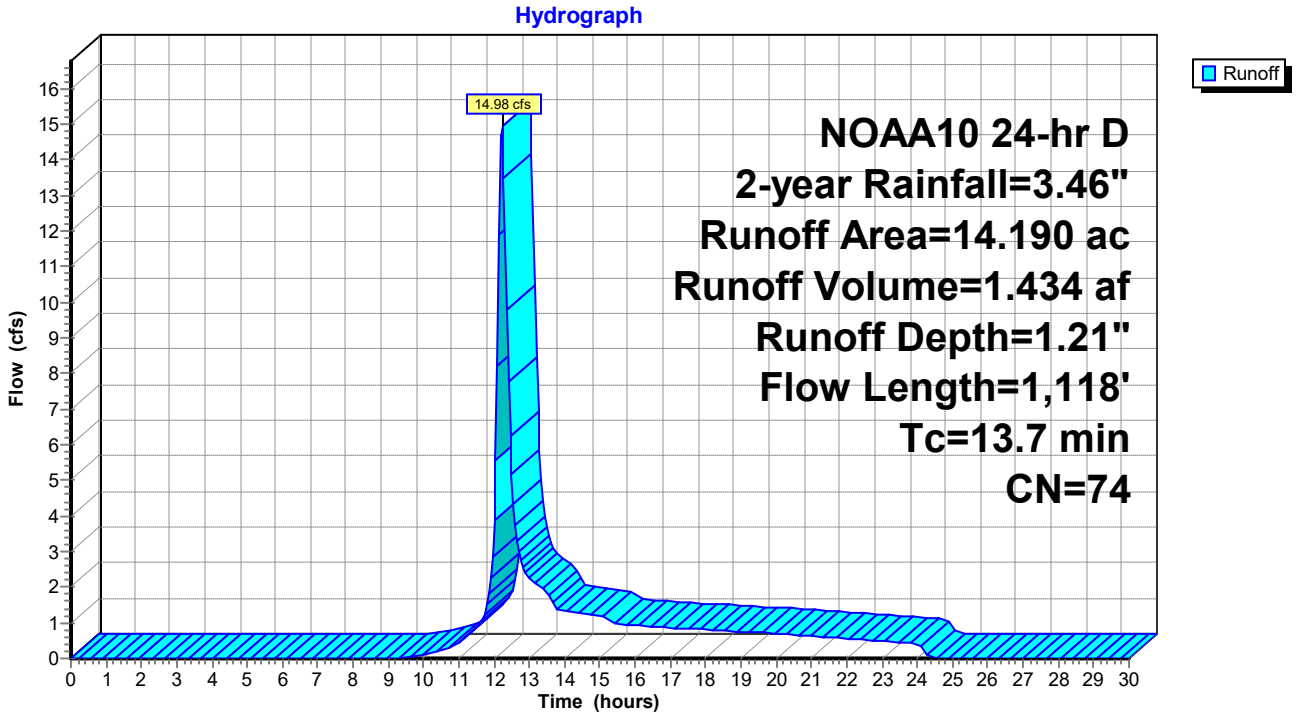
Runoff = 14.98 cfs @ 12.22 hrs, Volume= 1.434 af, Depth= 1.21"
Routed to nonexistent node TS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
NOAA10 24-hr D 2-year Rainfall=3.46"

Area (ac)	CN	Description
11.810	70	Woods, Good, HSG C
0.830	98	Paved parking, HSG C
1.550	89	Gravel roads, HSG C
14.190	74	Weighted Average
13.360		94.15% Pervious Area
0.830		5.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	100	0.1000	0.15		**Sheet Flow, Woods** Woods: Light underbrush n= 0.400 P2= 3.46"
0.8	239	0.0920	4.88		**Shallow Concentrated Flow, Woods** Unpaved Kv= 16.1 fps
0.8	179	0.0330	3.69		**Shallow Concentrated Flow, Impervious** Paved Kv= 20.3 fps
1.1	343	0.1100	5.34		**Shallow Concentrated Flow, Woods** Unpaved Kv= 16.1 fps
0.2	257	0.0730	22.99	72.24	**Pipe Channel, pipe** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.011 Concrete pipe, straight & clean
13.7	1,118	Total			

Subcatchment E1: To Wetlands



Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E1: To Wetlands Runoff Area=14.190 ac 5.85% Impervious Runoff Depth=2.45"
Flow Length=1,118' Tc=13.7 min CN=74 Runoff=30.78 cfs 2.900 af

Total Runoff Area = 14.190 ac Runoff Volume = 2.900 af Average Runoff Depth = 2.45"
94.15% Pervious = 13.360 ac 5.85% Impervious = 0.830 ac

Summary for Subcatchment E1: To Wetlands

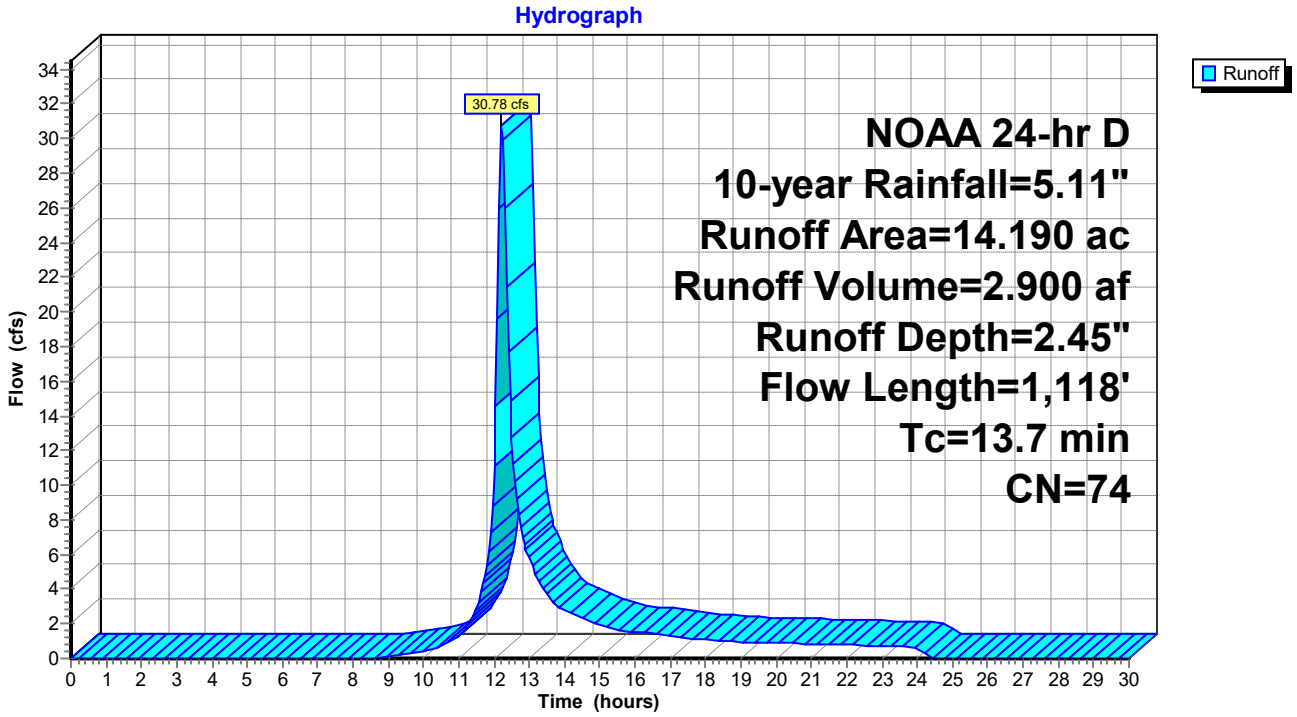
Runoff = 30.78 cfs @ 12.22 hrs, Volume= 2.900 af, Depth= 2.45"
Routed to nonexistent node TS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 10-year Rainfall=5.11"

Area (ac)	CN	Description
11.810	70	Woods, Good, HSG C
0.830	98	Paved parking, HSG C
1.550	89	Gravel roads, HSG C
14.190	74	Weighted Average
13.360		94.15% Pervious Area
0.830		5.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	100	0.1000	0.15		**Sheet Flow, Woods** Woods: Light underbrush n= 0.400 P2= 3.46"
0.8	239	0.0920	4.88		**Shallow Concentrated Flow, Woods** Unpaved Kv= 16.1 fps
0.8	179	0.0330	3.69		**Shallow Concentrated Flow, Impervious** Paved Kv= 20.3 fps
1.1	343	0.1100	5.34		**Shallow Concentrated Flow, Woods** Unpaved Kv= 16.1 fps
0.2	257	0.0730	22.99	72.24	**Pipe Channel, pipe** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.011 Concrete pipe, straight & clean
13.7	1,118	Total			

Subcatchment E1: To Wetlands



Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E1: To Wetlands Runoff Area=14.190 ac 5.85% Impervious Runoff Depth=3.31"
Flow Length=1,118' Tc=13.7 min CN=74 Runoff=41.66 cfs 3.916 af

Total Runoff Area = 14.190 ac Runoff Volume = 3.916 af Average Runoff Depth = 3.31"
94.15% Pervious = 13.360 ac 5.85% Impervious = 0.830 ac

Summary for Subcatchment E1: To Wetlands

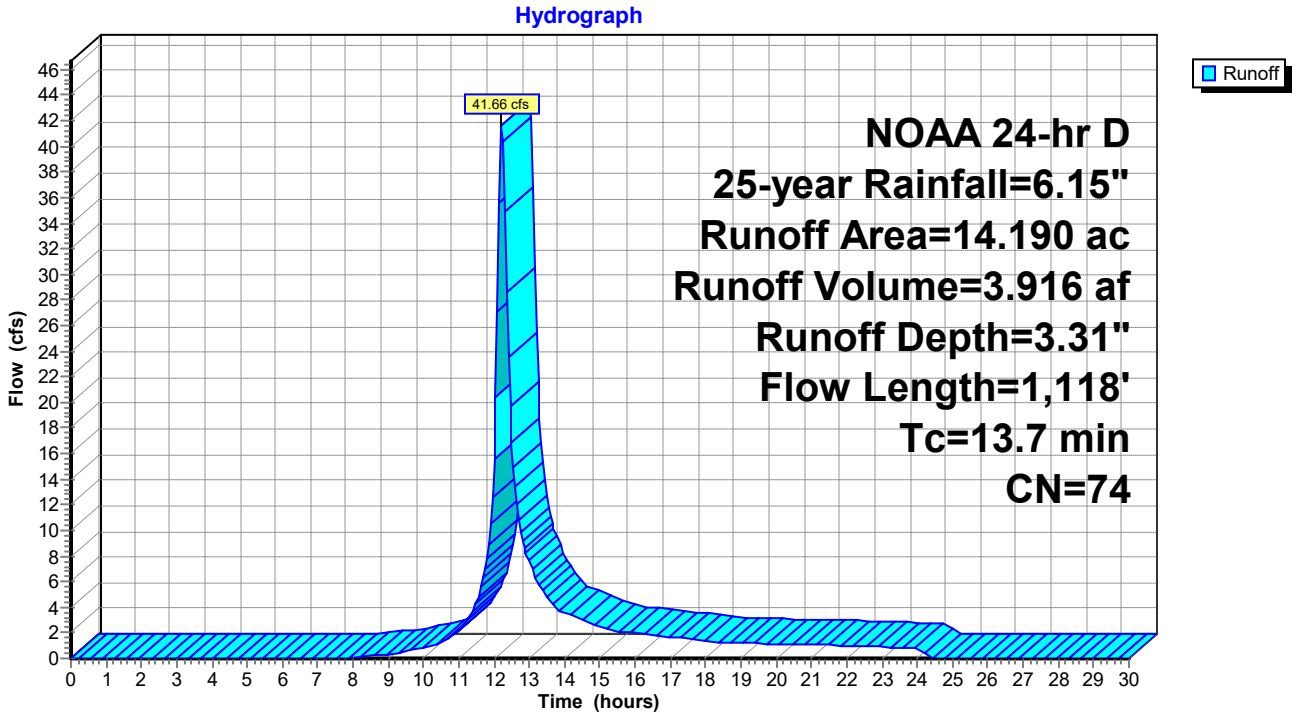
Runoff = 41.66 cfs @ 12.22 hrs, Volume= 3.916 af, Depth= 3.31"
Routed to nonexistent node TS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 25-year Rainfall=6.15"

Area (ac)	CN	Description
11.810	70	Woods, Good, HSG C
0.830	98	Paved parking, HSG C
1.550	89	Gravel roads, HSG C
14.190	74	Weighted Average
13.360		94.15% Pervious Area
0.830		5.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	100	0.1000	0.15		**Sheet Flow, Woods** Woods: Light underbrush n= 0.400 P2= 3.46"
0.8	239	0.0920	4.88		**Shallow Concentrated Flow, Woods** Unpaved Kv= 16.1 fps
0.8	179	0.0330	3.69		**Shallow Concentrated Flow, Impervious** Paved Kv= 20.3 fps
1.1	343	0.1100	5.34		**Shallow Concentrated Flow, Woods** Unpaved Kv= 16.1 fps
0.2	257	0.0730	22.99	72.24	**Pipe Channel, pipe** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.011 Concrete pipe, straight & clean
13.7	1,118	Total			

Subcatchment E1: To Wetlands



Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E1: To Wetlands Runoff Area=14.190 ac 5.85% Impervious Runoff Depth=3.97"
Flow Length=1,118' Tc=13.7 min CN=74 Runoff=49.91 cfs 4.697 af

Total Runoff Area = 14.190 ac Runoff Volume = 4.697 af Average Runoff Depth = 3.97"
94.15% Pervious = 13.360 ac 5.85% Impervious = 0.830 ac

Summary for Subcatchment E1: To Wetlands

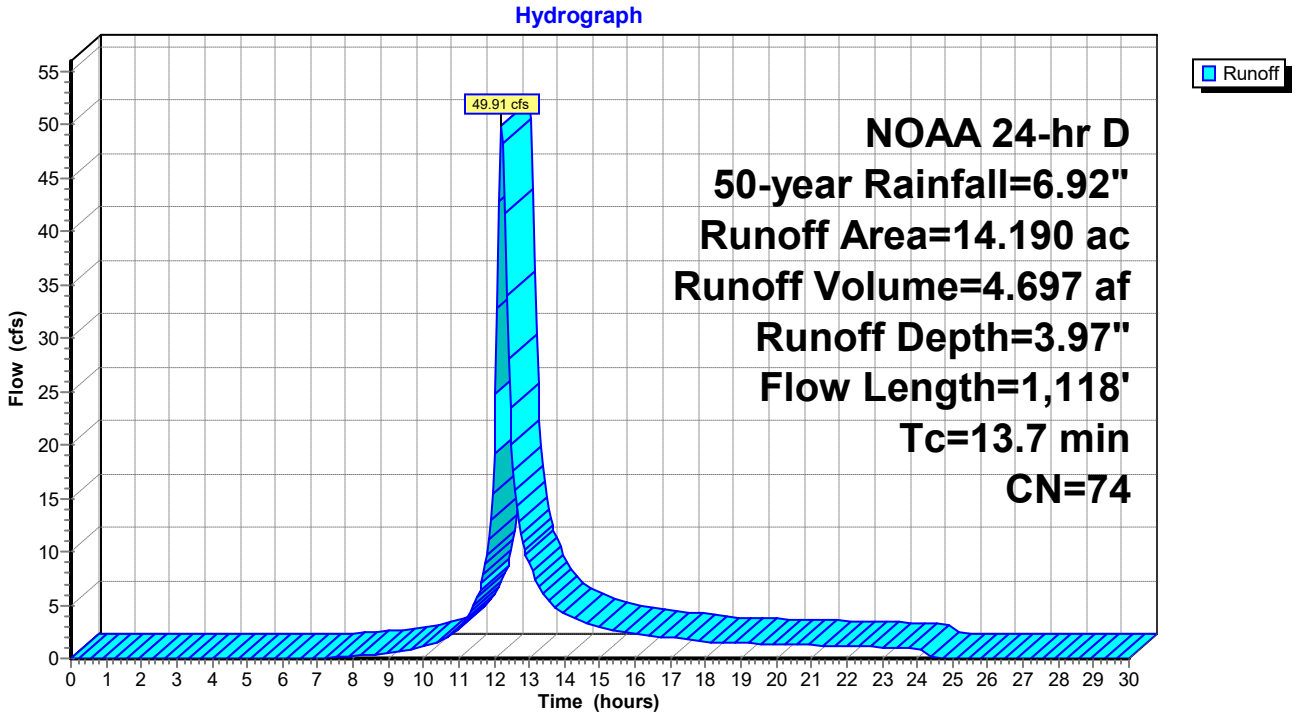
Runoff = 49.91 cfs @ 12.22 hrs, Volume= 4.697 af, Depth= 3.97"
Routed to nonexistent node TS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 50-year Rainfall=6.92"

Area (ac)	CN	Description
11.810	70	Woods, Good, HSG C
0.830	98	Paved parking, HSG C
1.550	89	Gravel roads, HSG C
14.190	74	Weighted Average
13.360		94.15% Pervious Area
0.830		5.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	100	0.1000	0.15		**Sheet Flow, Woods** Woods: Light underbrush n= 0.400 P2= 3.46"
0.8	239	0.0920	4.88		**Shallow Concentrated Flow, Woods** Unpaved Kv= 16.1 fps
0.8	179	0.0330	3.69		**Shallow Concentrated Flow, Impervious** Paved Kv= 20.3 fps
1.1	343	0.1100	5.34		**Shallow Concentrated Flow, Woods** Unpaved Kv= 16.1 fps
0.2	257	0.0730	22.99	72.24	**Pipe Channel, pipe** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.011 Concrete pipe, straight & clean
13.7	1,118	Total			

Subcatchment E1: To Wetlands



Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E1: To Wetlands Runoff Area=14.190 ac 5.85% Impervious Runoff Depth=4.69"
Flow Length=1,118' Tc=13.7 min CN=74 Runoff=58.82 cfs 5.550 af

Total Runoff Area = 14.190 ac Runoff Volume = 5.550 af Average Runoff Depth = 4.69"
94.15% Pervious = 13.360 ac 5.85% Impervious = 0.830 ac

Summary for Subcatchment E1: To Wetlands

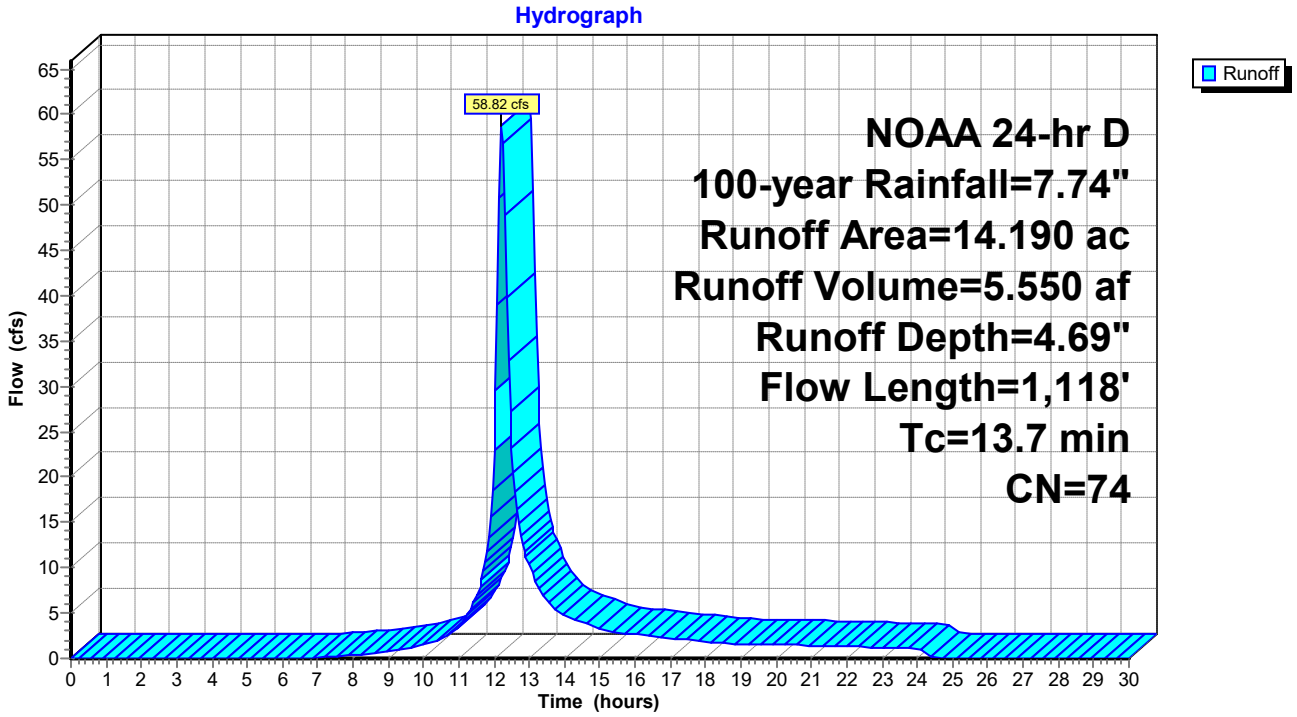
Runoff = 58.82 cfs @ 12.22 hrs, Volume= 5.550 af, Depth= 4.69"
Routed to nonexistent node TS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 100-year Rainfall=7.74"

Area (ac)	CN	Description
11.810	70	Woods, Good, HSG C
0.830	98	Paved parking, HSG C
1.550	89	Gravel roads, HSG C
14.190	74	Weighted Average
13.360		94.15% Pervious Area
0.830		5.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	100	0.1000	0.15		**Sheet Flow, Woods** Woods: Light underbrush n= 0.400 P2= 3.46"
0.8	239	0.0920	4.88		**Shallow Concentrated Flow, Woods** Unpaved Kv= 16.1 fps
0.8	179	0.0330	3.69		**Shallow Concentrated Flow, Impervious** Paved Kv= 20.3 fps
1.1	343	0.1100	5.34		**Shallow Concentrated Flow, Woods** Unpaved Kv= 16.1 fps
0.2	257	0.0730	22.99	72.24	**Pipe Channel, pipe** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.011 Concrete pipe, straight & clean
13.7	1,118	Total			

Subcatchment E1: To Wetlands



APPENDIX B

Proposed Watershed Data

Prepared by:

benesch

Alfred Benesch & Company
200 Glastonbury Boulevard, Suite 201
Glastonbury, Connecticut 06033
860-633-8341

Prepared for:

Habitat for Humanity®
of Eastern Connecticut

HABITAT FOR HUMANITY MULTI-FAMILY RESIDENTIAL AFFORDABLE HOUSING DEVELOPMENT PER C.G.S. §8-30g, LOTS 8, 9 & 11

LEDYARD, CT

COLBY DRIVE

DATE:	REVISION:
09/02/2025	PER CITY STAFF COMMENTS

PROJECT NO.: 0725 500010.00
SCALE: 1" = 50'
DATE: 12/20/2024

DRAWN BY: CLM
CHECKED BY: WGW

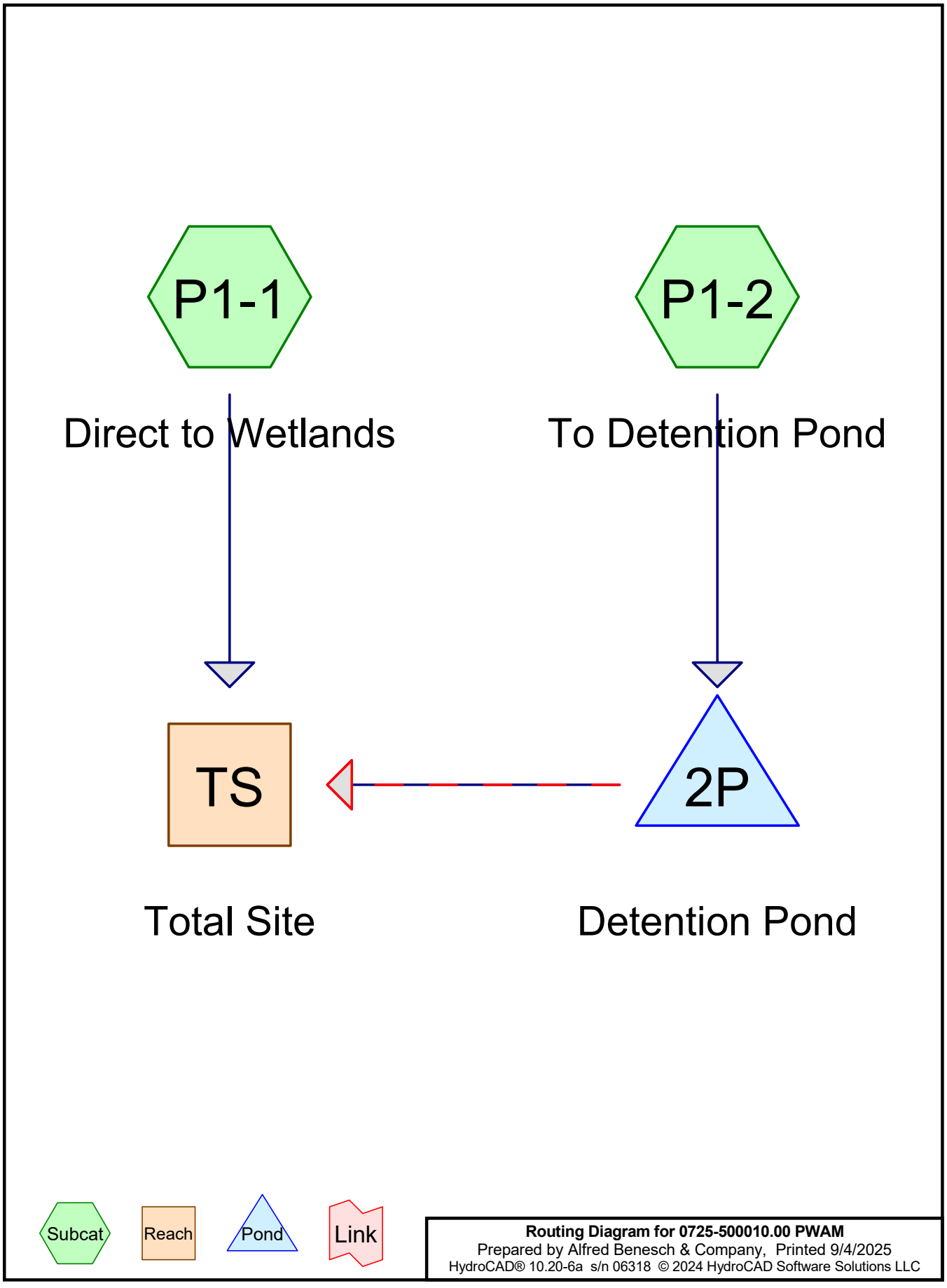
PROPOSED WATERSHED AREA MAP

DRAWING NO.:

PWAM

Proposed Watershed Cover Characteristics
Colby Drive Ledyard, CT
Project # 0725-500010.00

Watershed	Description	Total Area (AC)	Woods	Grass	Impervious	CN	Tc (min)
			C	C			
			Good	good			
			70	74	98		
P1-1	**Direct to Wetlands**	6.04	2.68	2.15	1.22	77	12.1
P1-2	**To Detention Pond**	8.15	3.24	2.49	2.42	80	13.3
TS	**Total Site**	14.19	5.92	4.64	3.63	79	



Routing Diagram for 0725-500010.00 PWAM
Prepared by Alfred Benesch & Company, Printed 9/4/2025

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-year	NOAA 24-hr	D	Default	24.00	1	3.46	2
2	10-year	NOAA 24-hr	D	Default	24.00	1	5.11	2
3	25-year	NOAA 24-hr	D	Default	24.00	1	6.15	2
4	50-year	NOAA 24-hr	D	Default	24.00	1	6.92	2
5	100-year	NOAA 24-hr	D	Default	24.00	1	7.74	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
4.640	74	>75% Grass cover, Good, HSG C (P1-1, P1-2)
3.640	98	Paved parking, HSG C (P1-1, P1-2)
5.920	70	Woods, Good, HSG C (P1-1, P1-2)
14.200	**78**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
14.200	HSG C	P1-1, P1-2
0.000	HSG D	
0.000	Other	
14.200		**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	4.640	0.000	0.000	4.640	>75% Grass cover, Good	P1-1, P1-2
0.000	0.000	3.640	0.000	0.000	3.640	Paved parking	P1-1, P1-2
0.000	0.000	5.920	0.000	0.000	5.920	Woods, Good	P1-1, P1-2
0.000	**0.000**	**14.200**	**0.000**	**0.000**	**14.200**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)	Node Name
1	P1-2	0.00	0.00	250.0	0.0600	0.011	0.0	15.0	0.0	
2	P1-2	0.00	0.00	106.0	0.0058	0.011	0.0	24.0	0.0	
3	2P	254.60	252.50	74.0	0.0284	0.011	0.0	24.0	0.0	

Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P1-1: Direct to Wetlands Runoff Area=6.050 ac 20.17% Impervious Runoff Depth=1.40"
Flow Length=409' Tc=12.1 min CN=77 Runoff=7.83 cfs 0.706 af

Subcatchment P1-2: To Detention Pond Runoff Area=8.150 ac 29.69% Impervious Runoff Depth=1.60"
Flow Length=966' Tc=13.3 min CN=80 Runoff=11.70 cfs 1.090 af

Reach TS: Total Site Inflow=7.83 cfs 1.301 af
Outflow=7.83 cfs 1.301 af

Pond 2P: Detention Pond Peak Elev=256.91' Storage=22,022 cf Inflow=11.70 cfs 1.090 af
Discarded=0.05 cfs 0.070 af Primary=2.51 cfs 0.595 af Secondary=0.00 cfs 0.000 af Outflow=2.56 cfs 0.664 af

Total Runoff Area = 14.200 ac Runoff Volume = 1.796 af Average Runoff Depth = 1.52"
74.37% Pervious = 10.560 ac 25.63% Impervious = 3.640 ac

Summary for Subcatchment P1-1: Direct to Wetlands

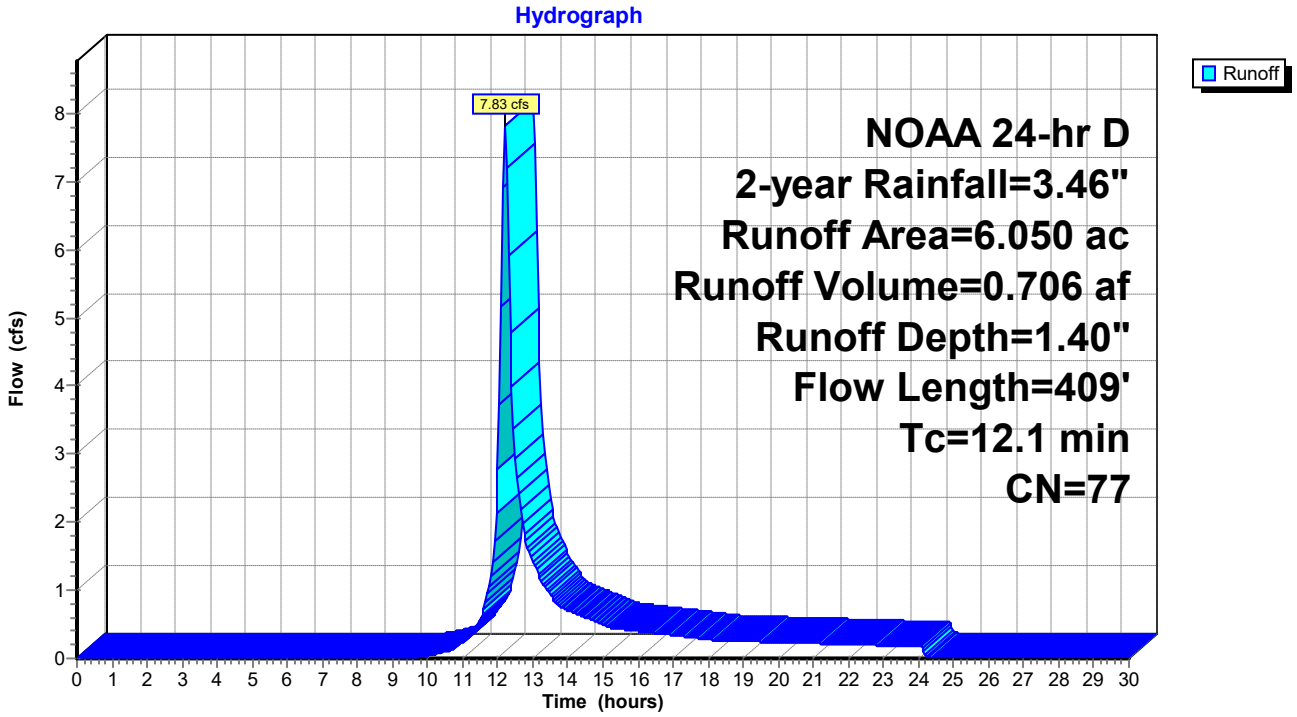
Runoff = 7.83 cfs @ 12.20 hrs, Volume= 0.706 af, Depth= 1.40"
Routed to Reach TS : Total Site

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 2-year Rainfall=3.46"

Area (ac)	CN	Description
2.680	70	Woods, Good, HSG C
2.150	74	>75% Grass cover, Good, HSG C
1.220	98	Paved parking, HSG C
6.050	77	Weighted Average
4.830		79.83% Pervious Area
1.220		20.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	100	0.0900	0.15		**Sheet Flow, woods** Woods: Light underbrush n= 0.400 P2= 3.46"
0.1	46	0.1520	6.28		**Shallow Concentrated Flow, Woods** Unpaved Kv= 16.1 fps
0.2	89	0.1900	7.02		**Shallow Concentrated Flow, woods** Unpaved Kv= 16.1 fps
0.5	174	0.1290	5.78		**Shallow Concentrated Flow, Woods** Unpaved Kv= 16.1 fps
12.1	409	Total			

Subcatchment P1-1: Direct to Wetlands



Summary for Subcatchment P1-2: To Detention Pond

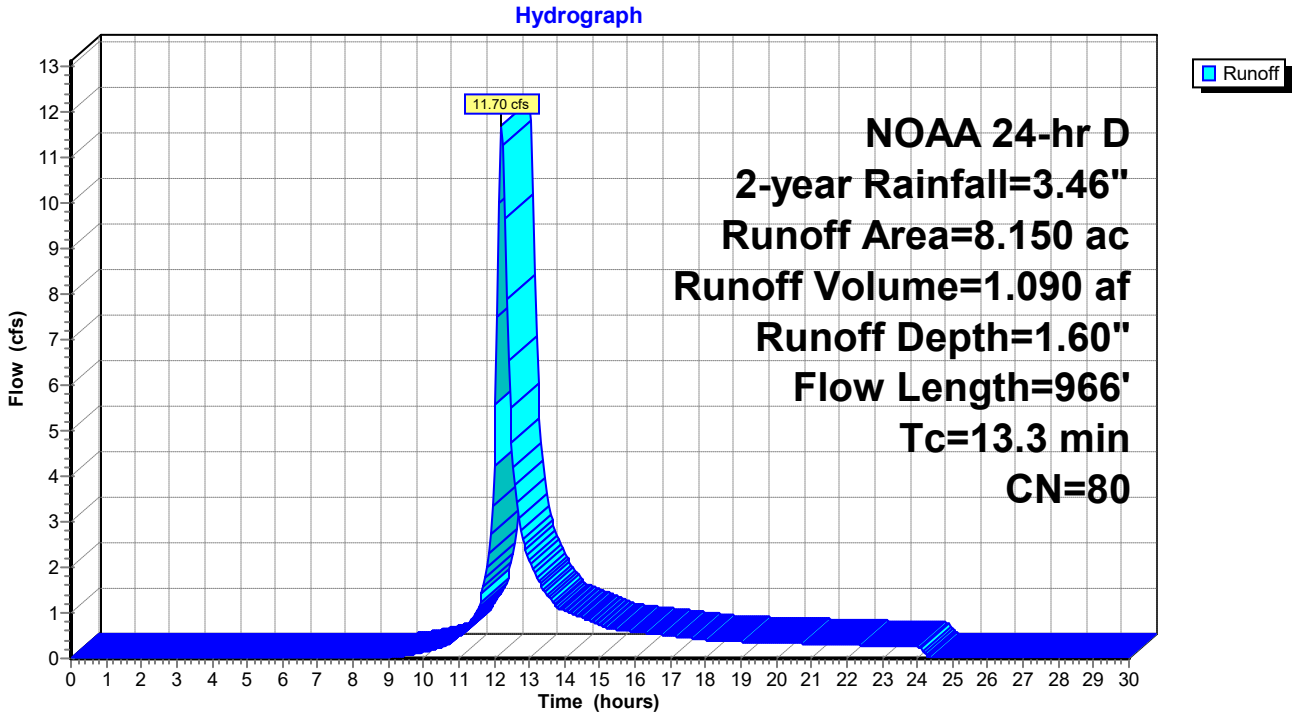
Runoff = 11.70 cfs @ 12.22 hrs, Volume= 1.090 af, Depth= 1.60"
Routed to Pond 2P : Detention Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 2-year Rainfall=3.46"

Area (ac)	CN	Description
3.240	70	Woods, Good, HSG C
2.490	74	>75% Grass cover, Good, HSG C
2.420	98	Paved parking, HSG C
8.150	80	Weighted Average
5.730		70.31% Pervious Area
2.420		29.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	100	0.1000	0.15		**Sheet Flow, Woods** Woods: Light underbrush n= 0.400 P2= 3.46"
0.8	239	0.0920	4.88		**Shallow Concentrated Flow, Woods** Unpaved Kv= 16.1 fps
0.8	179	0.0330	3.69		**Shallow Concentrated Flow, Impervious** Paved Kv= 20.3 fps
0.1	48	0.2520	8.08		**Shallow Concentrated Flow, Woods** Unpaved Kv= 16.1 fps
0.2	44	0.0400	3.22		**Shallow Concentrated Flow, Grass** Unpaved Kv= 16.1 fps
0.3	250	0.0600	15.24	18.70	**Pipe Channel, pipe to detention pond** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.011 Concrete pipe, straight & clean
0.3	106	0.0058	6.48	20.36	**Pipe Channel, pipe to detention pond** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.011 Concrete pipe, straight & clean
13.3	966	Total			

Subcatchment P1-2: To Detention Pond



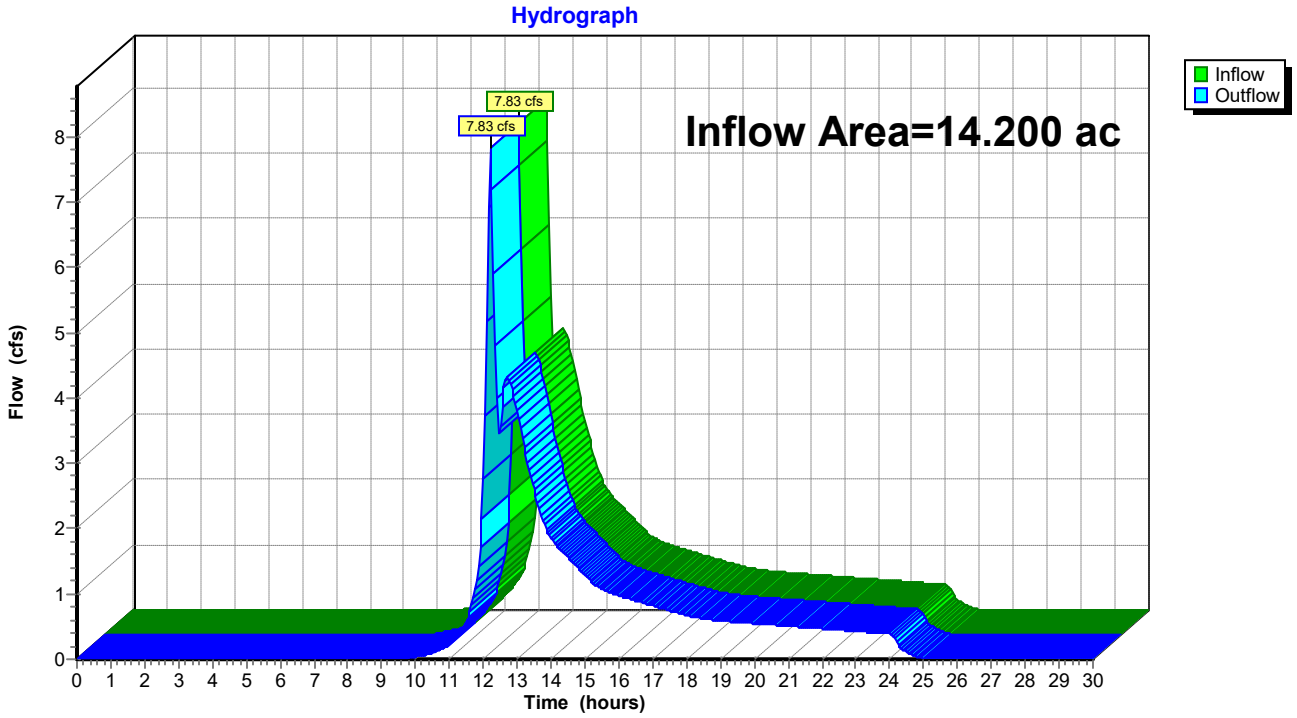
Summary for Reach TS: Total Site

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 14.200 ac, 25.63% Impervious, Inflow Depth = 1.10" for 2-year event
Inflow = 7.83 cfs @ 12.20 hrs, Volume= 1.301 af
Outflow = 7.83 cfs @ 12.20 hrs, Volume= 1.301 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Reach TS: Total Site



Summary for Pond 2P: Detention Pond

Inflow Area = 8.150 ac, 29.69% Impervious, Inflow Depth = 1.60" for 2-year event
Inflow = 11.70 cfs @ 12.22 hrs, Volume= 1.090 af
Outflow = 2.56 cfs @ 12.83 hrs, Volume= 0.664 af, Atten= 78%, Lag= 36.6 min
Discarded = 0.05 cfs @ 12.83 hrs, Volume= 0.070 af
Primary = 2.51 cfs @ 12.83 hrs, Volume= 0.595 af
Routed to Reach TS : Total Site
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach TS : Total Site

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 256.91' @ 12.83 hrs Surf.Area= 6,899 sf Storage= 22,022 cf

Plug-Flow detention time= 257.8 min calculated for 0.664 af (61% of inflow)
Center-of-Mass det. time= 136.6 min (993.0 - 856.4)

Volume	Invert	Avail.Storage	Storage Description
#1	250.00'	49,076 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
250.00	624	0	0
251.00	1,125	875	875
252.00	1,687	1,406	2,281
253.00	2,459	2,073	4,354
254.00	3,344	2,902	7,255
255.00	4,361	3,853	11,108
256.00	5,885	5,123	16,231
257.00	7,004	6,445	22,675
258.00	8,170	7,587	30,262
259.00	9,393	8,782	39,044
260.00	10,672	10,033	49,076

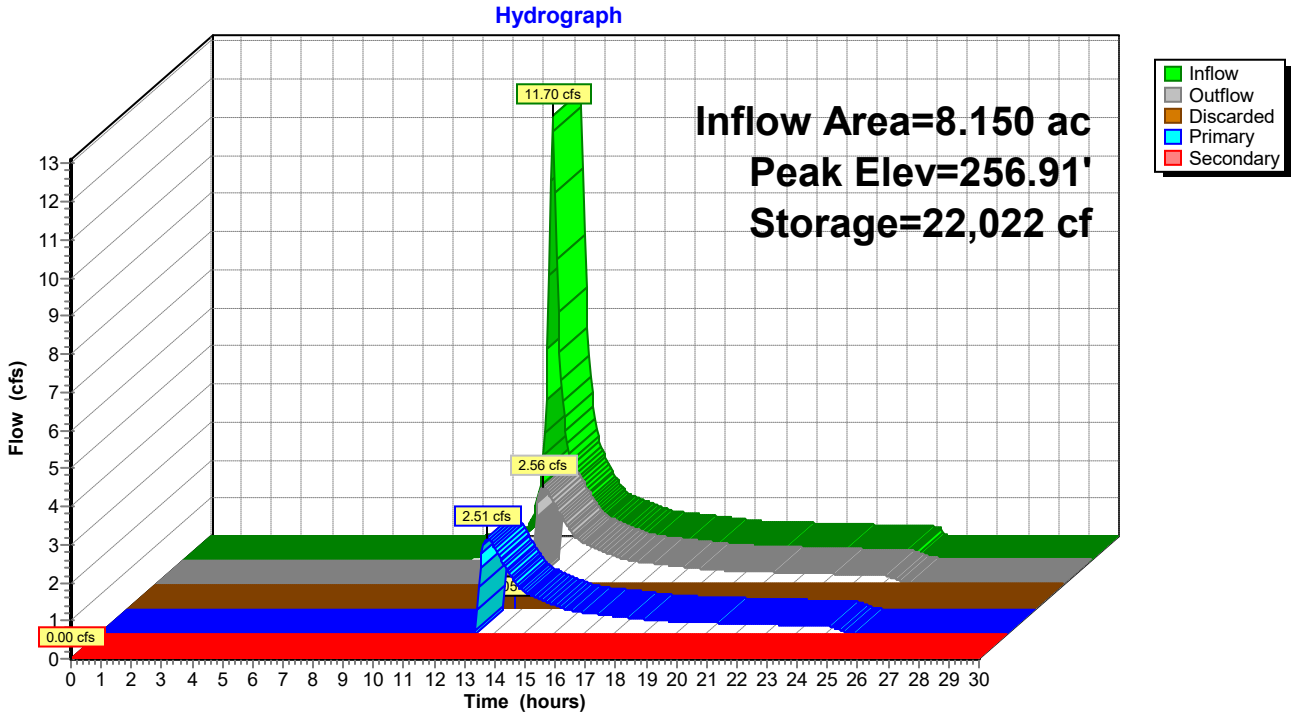
Device	Routing	Invert	Outlet Devices
#1	Primary	254.60'	**24.0" Round 74' - 24" HDPE @ 2.84% Culvert** L= 74.0' RCP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 254.60' / 252.50' S= 0.0284 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf
#2	Device 1	256.50'	**36.0" W x 10.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	257.60'	**40.0" x 33.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#4	Discarded	250.00'	**0.210 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 245.00'
#5	Secondary	259.09'	**20.8" W x 32.8" H Vert. Emergency Overflow** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.05 cfs @ 12.83 hrs HW=256.91' (Free Discharge)
└**4=Exfiltration** (Controls 0.05 cfs)

Primary OutFlow Max=2.49 cfs @ 12.83 hrs HW=256.91' (Free Discharge)
└**1=74' - 24" HDPE @ 2.84% Culvert** (Passes 2.49 cfs of 15.25 cfs potential flow)
  └**2=Orifice/Grate** (Orifice Controls 2.49 cfs @ 2.04 fps)
  └**3=Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=250.00' (Free Discharge)
└**5=Emergency Overflow** (Controls 0.00 cfs)

Pond 2P: Detention Pond



Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P1-1: Direct to Wetlands Runoff Area=6.050 ac 20.17% Impervious Runoff Depth=2.72"
Flow Length=409' Tc=12.1 min CN=77 Runoff=15.36 cfs 1.369 af

Subcatchment P1-2: To Detention Pond Runoff Area=8.150 ac 29.69% Impervious Runoff Depth=2.99"
Flow Length=966' Tc=13.3 min CN=80 Runoff=21.83 cfs 2.030 af

Reach TS: Total Site Inflow=25.98 cfs 2.898 af
Outflow=25.98 cfs 2.898 af

Pond 2P: Detention Pond Peak Elev=257.82' Storage=28,794 cf Inflow=21.83 cfs 2.030 af
Discarded=0.06 cfs 0.074 af Primary=15.40 cfs 1.530 af Secondary=0.00 cfs 0.000 af Outflow=15.46 cfs 1.603 af

Total Runoff Area = 14.200 ac Runoff Volume = 3.399 af Average Runoff Depth = 2.87"
74.37% Pervious = 10.560 ac 25.63% Impervious = 3.640 ac

Summary for Subcatchment P1-1: Direct to Wetlands

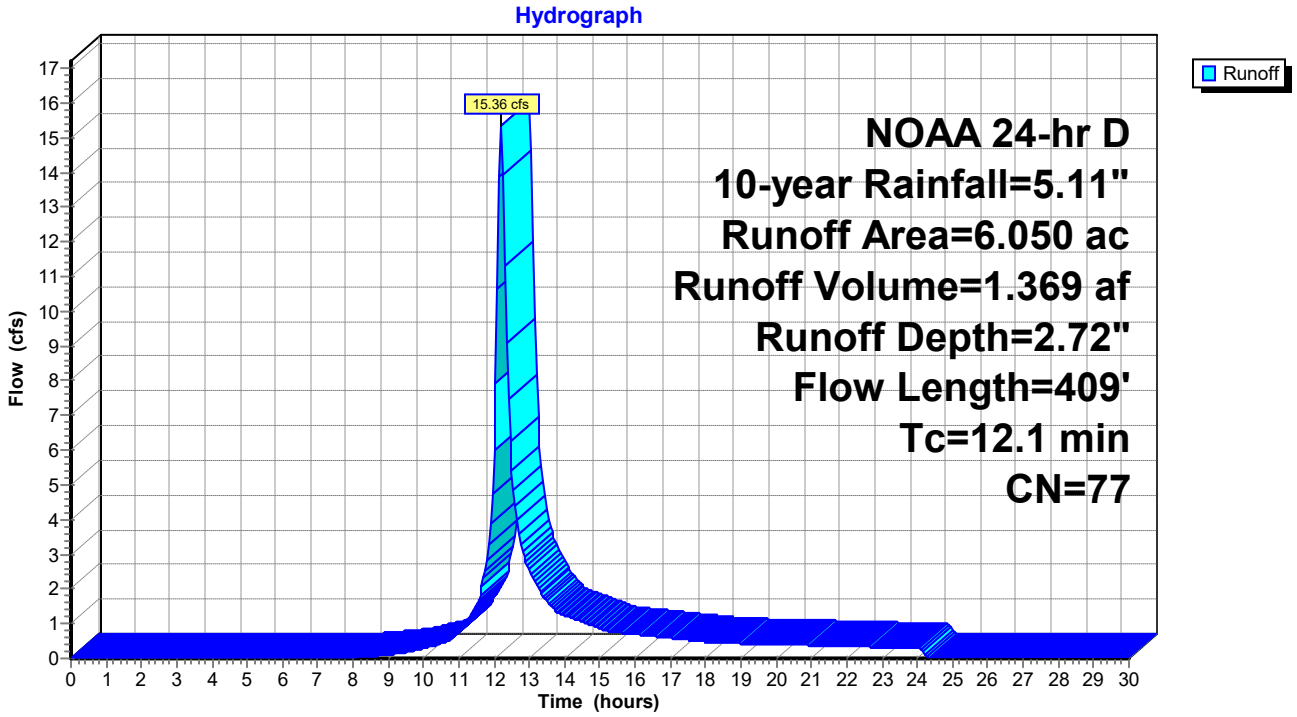
Runoff = 15.36 cfs @ 12.20 hrs, Volume= 1.369 af, Depth= 2.72"
Routed to Reach TS : Total Site

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 10-year Rainfall=5.11"

Area (ac)	CN	Description
2.680	70	Woods, Good, HSG C
2.150	74	>75% Grass cover, Good, HSG C
1.220	98	Paved parking, HSG C
6.050	77	Weighted Average
4.830		79.83% Pervious Area
1.220		20.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	100	0.0900	0.15		**Sheet Flow, woods** Woods: Light underbrush n= 0.400 P2= 3.46"
0.1	46	0.1520	6.28		**Shallow Concentrated Flow, Woods** Unpaved Kv= 16.1 fps
0.2	89	0.1900	7.02		**Shallow Concentrated Flow, woods** Unpaved Kv= 16.1 fps
0.5	174	0.1290	5.78		**Shallow Concentrated Flow, Woods** Unpaved Kv= 16.1 fps
12.1	409	Total			

Subcatchment P1-1: Direct to Wetlands



Summary for Subcatchment P1-2: To Detention Pond

[47] Hint: Peak is 117% of capacity of segment #6
[47] Hint: Peak is 107% of capacity of segment #7

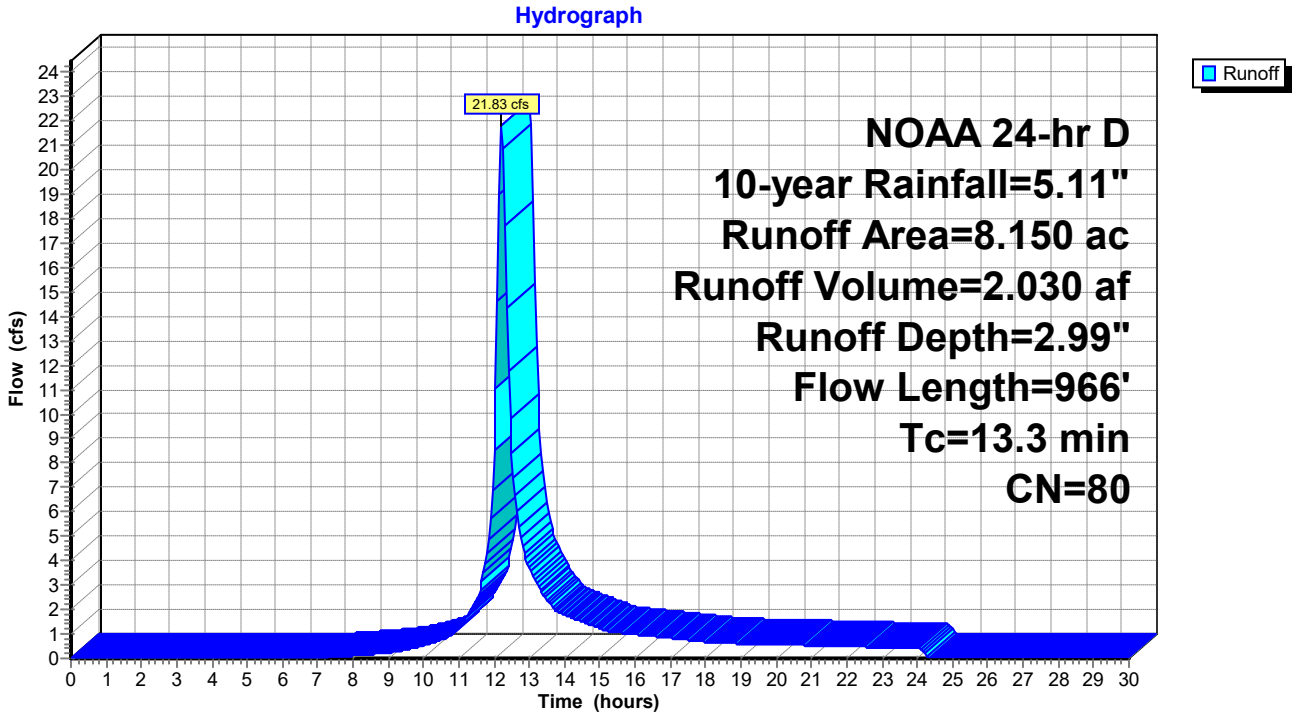
Runoff = 21.83 cfs @ 12.21 hrs, Volume= 2.030 af, Depth= 2.99"
Routed to Pond 2P : Detention Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 10-year Rainfall=5.11"

Area (ac)	CN	Description
3.240	70	Woods, Good, HSG C
2.490	74	>75% Grass cover, Good, HSG C
2.420	98	Paved parking, HSG C
8.150	80	Weighted Average
5.730		70.31% Pervious Area
2.420		29.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	100	0.1000	0.15		**Sheet Flow, Woods** Woods: Light underbrush n= 0.400 P2= 3.46"
0.8	239	0.0920	4.88		**Shallow Concentrated Flow, Woods** Unpaved Kv= 16.1 fps
0.8	179	0.0330	3.69		**Shallow Concentrated Flow, Impervious** Paved Kv= 20.3 fps
0.1	48	0.2520	8.08		**Shallow Concentrated Flow, Woods** Unpaved Kv= 16.1 fps
0.2	44	0.0400	3.22		**Shallow Concentrated Flow, Grass** Unpaved Kv= 16.1 fps
0.3	250	0.0600	15.24	18.70	**Pipe Channel, pipe to detention pond** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.011 Concrete pipe, straight & clean
0.3	106	0.0058	6.48	20.36	**Pipe Channel, pipe to detention pond** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.011 Concrete pipe, straight & clean
13.3	966	Total			

Subcatchment P1-2: To Detention Pond



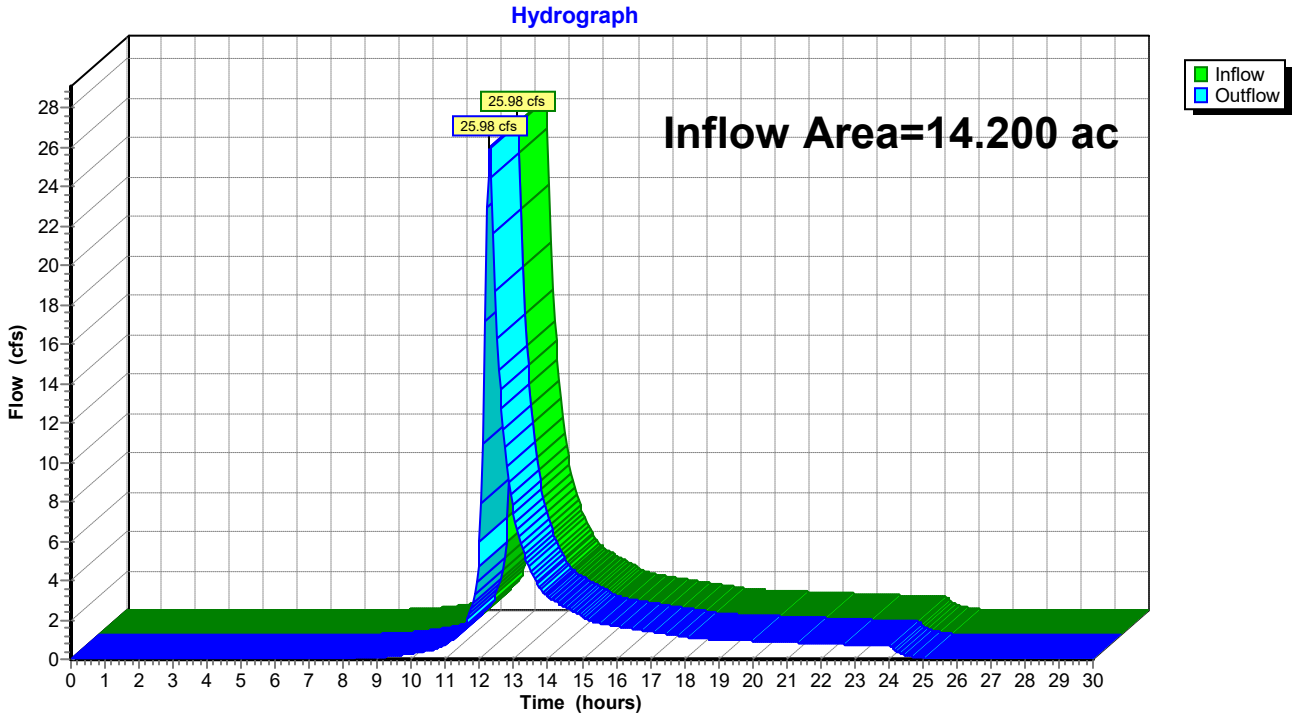
Summary for Reach TS: Total Site

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 14.200 ac, 25.63% Impervious, Inflow Depth = 2.45" for 10-year event
Inflow = 25.98 cfs @ 12.30 hrs, Volume= 2.898 af
Outflow = 25.98 cfs @ 12.30 hrs, Volume= 2.898 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Reach TS: Total Site



Summary for Pond 2P: Detention Pond

Inflow Area = 8.150 ac, 29.69% Impervious, Inflow Depth = 2.99" for 10-year event
Inflow = 21.83 cfs @ 12.21 hrs, Volume= 2.030 af
Outflow = 15.46 cfs @ 12.34 hrs, Volume= 1.603 af, Atten= 29%, Lag= 7.8 min
Discarded = 0.06 cfs @ 12.34 hrs, Volume= 0.074 af
Primary = 15.40 cfs @ 12.34 hrs, Volume= 1.530 af
Routed to Reach TS : Total Site
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach TS : Total Site

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 257.82' @ 12.34 hrs Surf.Area= 7,958 sf Storage= 28,794 cf

Plug-Flow detention time= 157.0 min calculated for 1.603 af (79% of inflow)
Center-of-Mass det. time= 70.7 min (907.2 - 836.6)

Volume	Invert	Avail.Storage	Storage Description
#1	250.00'	49,076 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
250.00	624	0	0
251.00	1,125	875	875
252.00	1,687	1,406	2,281
253.00	2,459	2,073	4,354
254.00	3,344	2,902	7,255
255.00	4,361	3,853	11,108
256.00	5,885	5,123	16,231
257.00	7,004	6,445	22,675
258.00	8,170	7,587	30,262
259.00	9,393	8,782	39,044
260.00	10,672	10,033	49,076

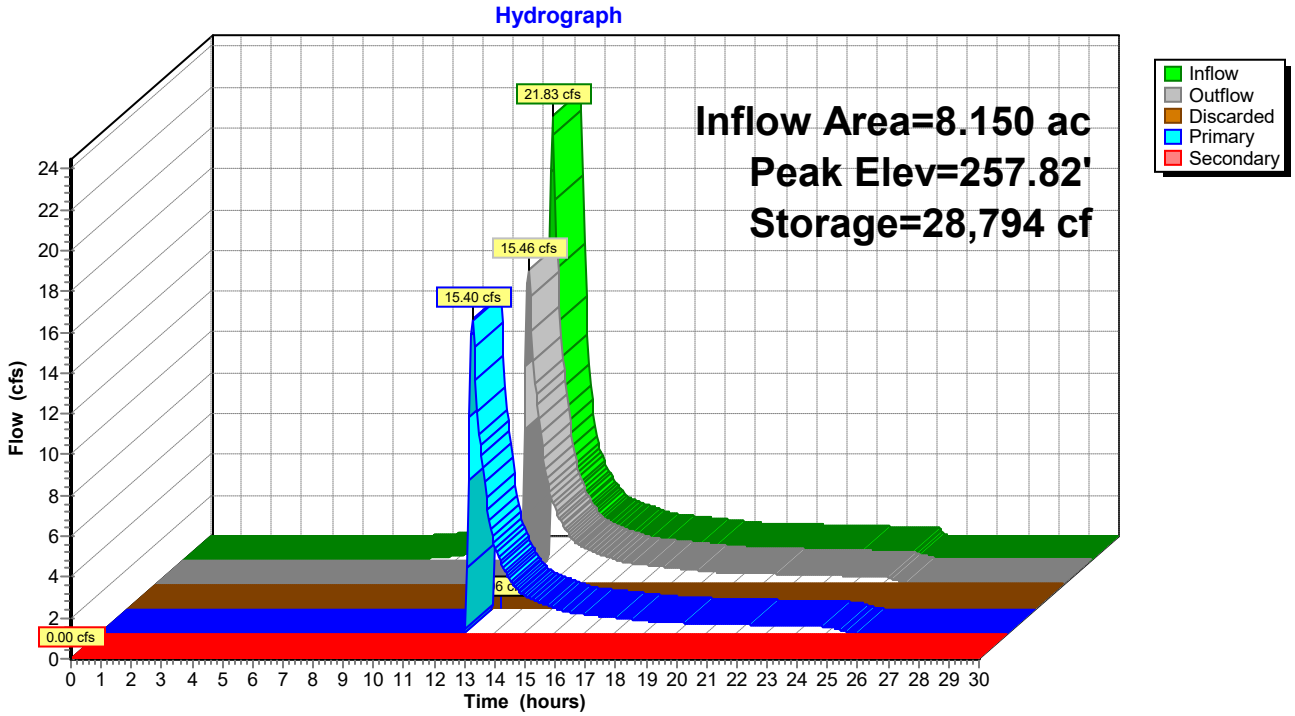
Device	Routing	Invert	Outlet Devices
#1	Primary	254.60'	**24.0" Round 74' - 24" HDPE @ 2.84% Culvert** L= 74.0' RCP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 254.60' / 252.50' S= 0.0284 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf
#2	Device 1	256.50'	**36.0" W x 10.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	257.60'	**40.0" x 33.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#4	Discarded	250.00'	**0.210 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 245.00'
#5	Secondary	259.09'	**20.8" W x 32.8" H Vert. Emergency Overflow** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.06 cfs @ 12.34 hrs HW=257.81' (Free Discharge)
└**4=Exfiltration** (Controls 0.06 cfs)

Primary OutFlow Max=15.24 cfs @ 12.34 hrs HW=257.81' (Free Discharge)
└**1=74' - 24" HDPE @ 2.84% Culvert** (Passes 15.24 cfs of 19.86 cfs potential flow)
  └**2=Orifice/Grate** (Orifice Controls 11.30 cfs @ 4.52 fps)
  └**3=Grate** (Weir Controls 3.95 cfs @ 1.51 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=250.00' (Free Discharge)
└**5=Emergency Overflow** (Controls 0.00 cfs)

Pond 2P: Detention Pond



Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P1-1: Direct to Wetlands Runoff Area=6.050 ac 20.17% Impervious Runoff Depth=3.61"
Flow Length=409' Tc=12.1 min CN=77 Runoff=20.37 cfs 1.820 af

Subcatchment P1-2: To Detention Pond Runoff Area=8.150 ac 29.69% Impervious Runoff Depth=3.92"
Flow Length=966' Tc=13.3 min CN=80 Runoff=28.44 cfs 2.660 af

Reach TS: Total Site Inflow=41.15 cfs 3.977 af
Outflow=41.15 cfs 3.977 af

Pond 2P: Detention Pond Peak Elev=258.19' Storage=31,873 cf Inflow=28.44 cfs 2.660 af
Discarded=0.06 cfs 0.077 af Primary=21.50 cfs 2.157 af Secondary=0.00 cfs 0.000 af Outflow=21.56 cfs 2.233 af

Total Runoff Area = 14.200 ac Runoff Volume = 4.480 af Average Runoff Depth = 3.79"
74.37% Pervious = 10.560 ac 25.63% Impervious = 3.640 ac

Summary for Subcatchment P1-1: Direct to Wetlands

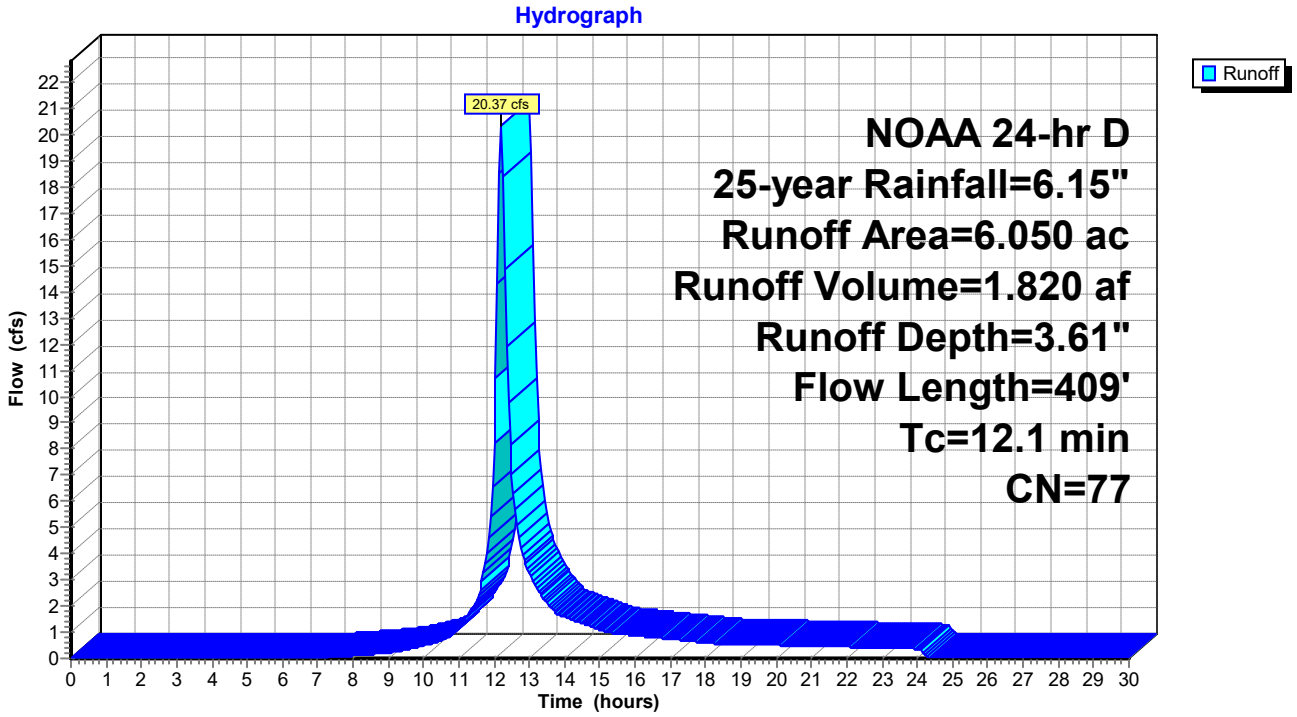
Runoff = 20.37 cfs @ 12.20 hrs, Volume= 1.820 af, Depth= 3.61"
Routed to Reach TS : Total Site

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 25-year Rainfall=6.15"

Area (ac)	CN	Description
2.680	70	Woods, Good, HSG C
2.150	74	>75% Grass cover, Good, HSG C
1.220	98	Paved parking, HSG C
6.050	77	Weighted Average
4.830		79.83% Pervious Area
1.220		20.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	100	0.0900	0.15		**Sheet Flow, woods** Woods: Light underbrush n= 0.400 P2= 3.46"
0.1	46	0.1520	6.28		**Shallow Concentrated Flow, Woods** Unpaved Kv= 16.1 fps
0.2	89	0.1900	7.02		**Shallow Concentrated Flow, woods** Unpaved Kv= 16.1 fps
0.5	174	0.1290	5.78		**Shallow Concentrated Flow, Woods** Unpaved Kv= 16.1 fps
12.1	409	Total			

Subcatchment P1-1: Direct to Wetlands



Summary for Subcatchment P1-2: To Detention Pond

[47] Hint: Peak is 152% of capacity of segment #6
[47] Hint: Peak is 140% of capacity of segment #7

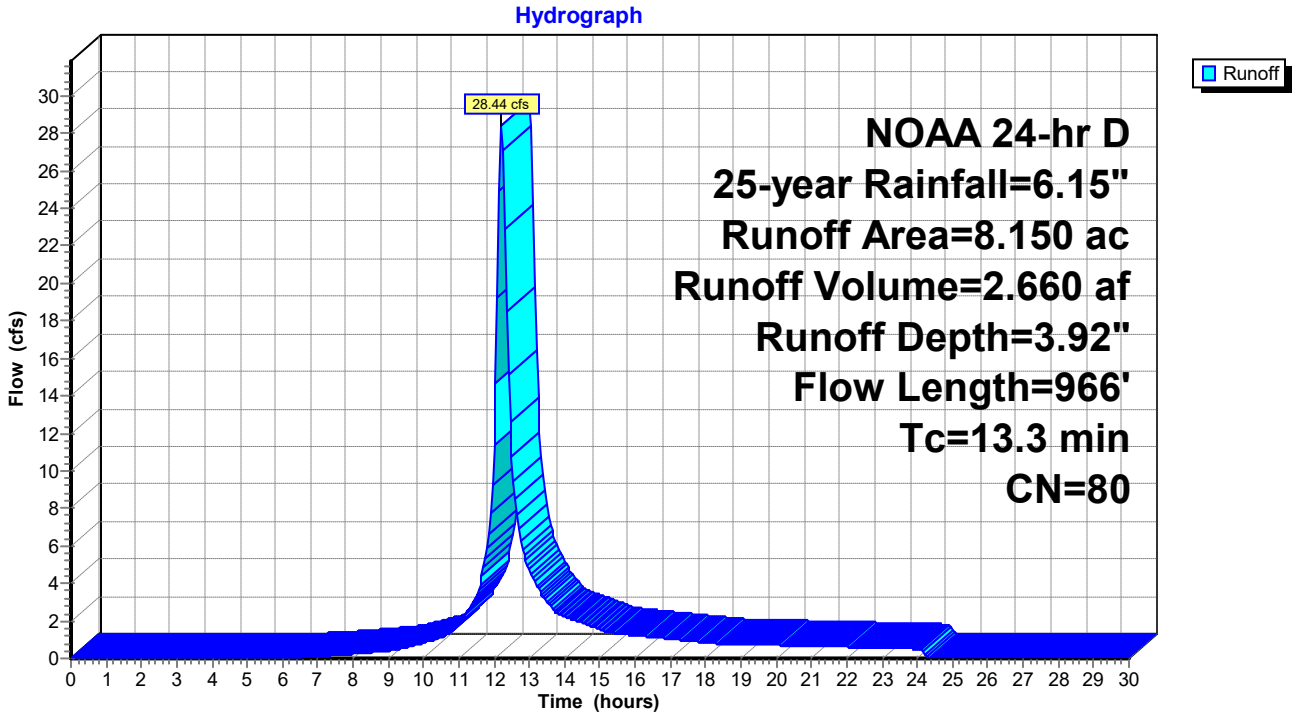
Runoff = 28.44 cfs @ 12.21 hrs, Volume= 2.660 af, Depth= 3.92"
Routed to Pond 2P : Detention Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 25-year Rainfall=6.15"

Area (ac)	CN	Description
3.240	70	Woods, Good, HSG C
2.490	74	>75% Grass cover, Good, HSG C
2.420	98	Paved parking, HSG C
8.150	80	Weighted Average
5.730		70.31% Pervious Area
2.420		29.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	100	0.1000	0.15		**Sheet Flow, Woods** Woods: Light underbrush n= 0.400 P2= 3.46"
0.8	239	0.0920	4.88		**Shallow Concentrated Flow, Woods** Unpaved Kv= 16.1 fps
0.8	179	0.0330	3.69		**Shallow Concentrated Flow, Impervious** Paved Kv= 20.3 fps
0.1	48	0.2520	8.08		**Shallow Concentrated Flow, Woods** Unpaved Kv= 16.1 fps
0.2	44	0.0400	3.22		**Shallow Concentrated Flow, Grass** Unpaved Kv= 16.1 fps
0.3	250	0.0600	15.24	18.70	**Pipe Channel, pipe to detention pond** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.011 Concrete pipe, straight & clean
0.3	106	0.0058	6.48	20.36	**Pipe Channel, pipe to detention pond** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.011 Concrete pipe, straight & clean
13.3	966	Total			

Subcatchment P1-2: To Detention Pond



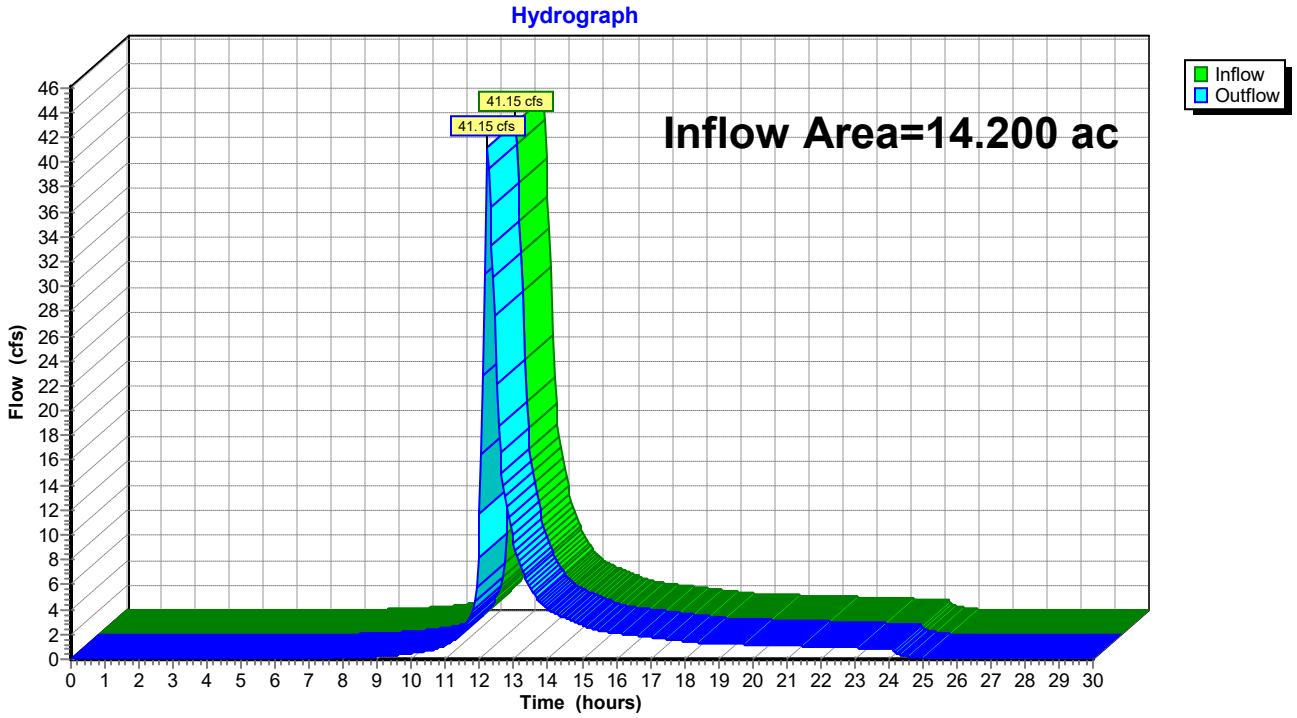
Summary for Reach TS: Total Site

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 14.200 ac, 25.63% Impervious, Inflow Depth = 3.36" for 25-year event
Inflow = 41.15 cfs @ 12.22 hrs, Volume= 3.977 af
Outflow = 41.15 cfs @ 12.22 hrs, Volume= 3.977 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Reach TS: Total Site



Summary for Pond 2P: Detention Pond

Inflow Area = 8.150 ac, 29.69% Impervious, Inflow Depth = 3.92" for 25-year event
Inflow = 28.44 cfs @ 12.21 hrs, Volume= 2.660 af
Outflow = 21.56 cfs @ 12.32 hrs, Volume= 2.233 af, Atten= 24%, Lag= 6.3 min
Discarded = 0.06 cfs @ 12.32 hrs, Volume= 0.077 af
Primary = 21.50 cfs @ 12.32 hrs, Volume= 2.157 af
Routed to Reach TS : Total Site
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach TS : Total Site

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 258.19' @ 12.32 hrs Surf.Area= 8,408 sf Storage= 31,873 cf

Plug-Flow detention time= 130.6 min calculated for 2.233 af (84% of inflow)
Center-of-Mass det. time= 58.3 min (886.3 - 828.0)

Volume	Invert	Avail.Storage	Storage Description
#1	250.00'	49,076 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
250.00	624	0	0
251.00	1,125	875	875
252.00	1,687	1,406	2,281
253.00	2,459	2,073	4,354
254.00	3,344	2,902	7,255
255.00	4,361	3,853	11,108
256.00	5,885	5,123	16,231
257.00	7,004	6,445	22,675
258.00	8,170	7,587	30,262
259.00	9,393	8,782	39,044
260.00	10,672	10,033	49,076

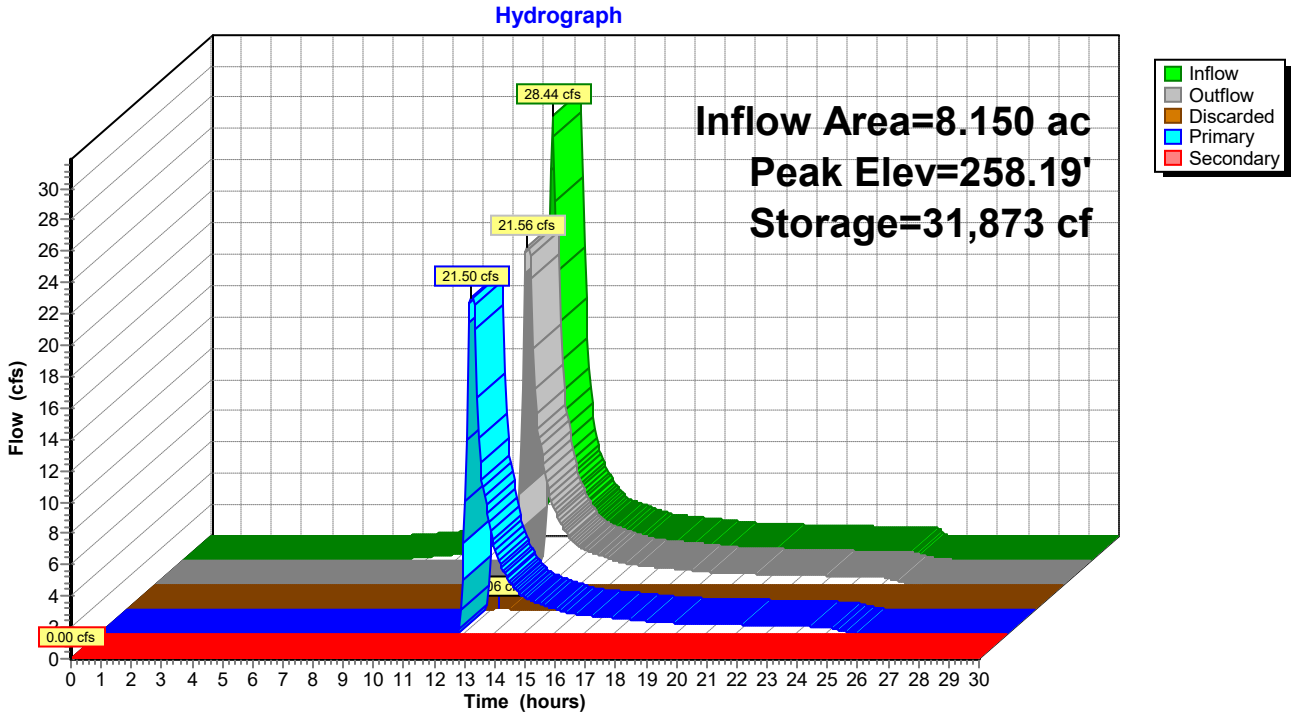
Device	Routing	Invert	Outlet Devices
#1	Primary	254.60'	**24.0" Round 74' - 24" HDPE @ 2.84% Culvert** L= 74.0' RCP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 254.60' / 252.50' S= 0.0284 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf
#2	Device 1	256.50'	**36.0" W x 10.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	257.60'	**40.0" x 33.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#4	Discarded	250.00'	**0.210 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 245.00'
#5	Secondary	259.09'	**20.8" W x 32.8" H Vert. Emergency Overflow** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.06 cfs @ 12.32 hrs HW=258.18' (Free Discharge)
└**4=Exfiltration** (Controls 0.06 cfs)

Primary OutFlow Max=21.46 cfs @ 12.32 hrs HW=258.18' (Free Discharge)
└**1=74' - 24" HDPE @ 2.84% Culvert** (Inlet Controls 21.46 cfs @ 6.83 fps)
└**2=Orifice/Grate** (Passes < 13.49 cfs potential flow)
└**3=Grate** (Passes < 17.76 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=250.00' (Free Discharge)
└**5=Emergency Overflow** (Controls 0.00 cfs)

Pond 2P: Detention Pond



Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P1-1: Direct to Wetlands Runoff Area=6.050 ac 20.17% Impervious Runoff Depth=4.29"
Flow Length=409' Tc=12.1 min CN=77 Runoff=24.13 cfs 2.165 af

Subcatchment P1-2: To Detention Pond Runoff Area=8.150 ac 29.69% Impervious Runoff Depth=4.62"
Flow Length=966' Tc=13.3 min CN=80 Runoff=33.38 cfs 3.138 af

Reach TS: Total Site Inflow=45.72 cfs 4.797 af
Outflow=45.72 cfs 4.797 af

Pond 2P: Detention Pond Peak Elev=258.57' Storage=35,115 cf Inflow=33.38 cfs 3.138 af
Discarded=0.07 cfs 0.079 af Primary=23.00 cfs 2.632 af Secondary=0.00 cfs 0.000 af Outflow=23.07 cfs 2.711 af

Total Runoff Area = 14.200 ac Runoff Volume = 5.303 af Average Runoff Depth = 4.48"
74.37% Pervious = 10.560 ac 25.63% Impervious = 3.640 ac

Summary for Subcatchment P1-1: Direct to Wetlands

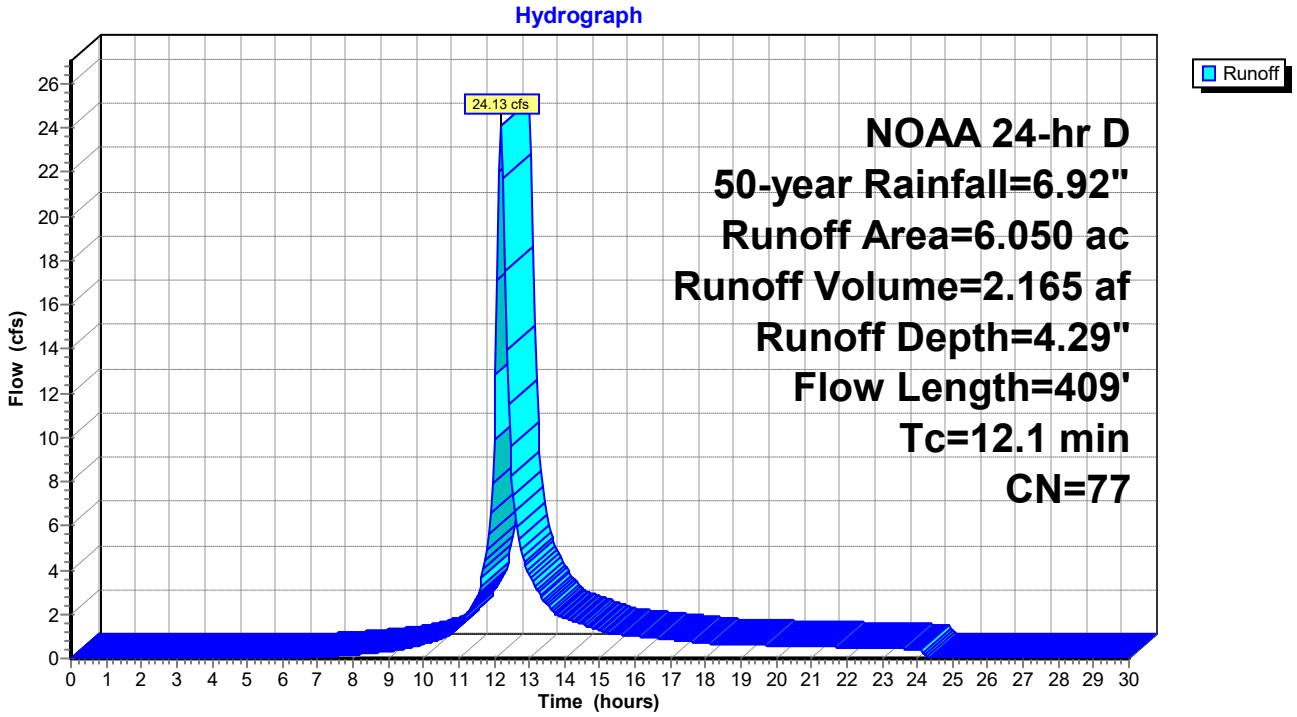
Runoff = 24.13 cfs @ 12.20 hrs, Volume= 2.165 af, Depth= 4.29"
Routed to Reach TS : Total Site

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 50-year Rainfall=6.92"

Area (ac)	CN	Description
2.680	70	Woods, Good, HSG C
2.150	74	>75% Grass cover, Good, HSG C
1.220	98	Paved parking, HSG C
6.050	77	Weighted Average
4.830		79.83% Pervious Area
1.220		20.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	100	0.0900	0.15		**Sheet Flow, woods** Woods: Light underbrush n= 0.400 P2= 3.46"
0.1	46	0.1520	6.28		**Shallow Concentrated Flow, Woods** Unpaved Kv= 16.1 fps
0.2	89	0.1900	7.02		**Shallow Concentrated Flow, woods** Unpaved Kv= 16.1 fps
0.5	174	0.1290	5.78		**Shallow Concentrated Flow, Woods** Unpaved Kv= 16.1 fps
12.1	409	Total			

Subcatchment P1-1: Direct to Wetlands



Summary for Subcatchment P1-2: To Detention Pond

[47] Hint: Peak is 178% of capacity of segment #6
[47] Hint: Peak is 164% of capacity of segment #7

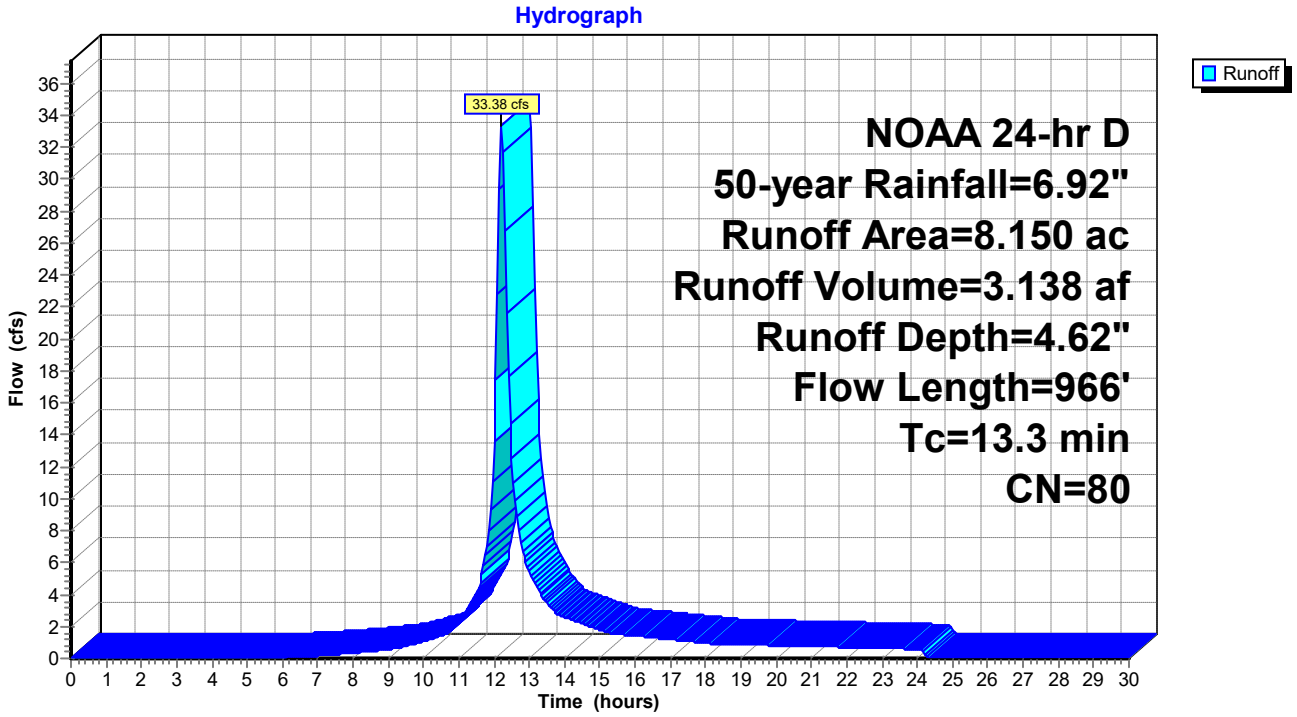
Runoff = 33.38 cfs @ 12.21 hrs, Volume= 3.138 af, Depth= 4.62"
Routed to Pond 2P : Detention Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 50-year Rainfall=6.92"

Area (ac)	CN	Description
3.240	70	Woods, Good, HSG C
2.490	74	>75% Grass cover, Good, HSG C
2.420	98	Paved parking, HSG C
8.150	80	Weighted Average
5.730		70.31% Pervious Area
2.420		29.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	100	0.1000	0.15		**Sheet Flow, Woods** Woods: Light underbrush n= 0.400 P2= 3.46"
0.8	239	0.0920	4.88		**Shallow Concentrated Flow, Woods** Unpaved Kv= 16.1 fps
0.8	179	0.0330	3.69		**Shallow Concentrated Flow, Impervious** Paved Kv= 20.3 fps
0.1	48	0.2520	8.08		**Shallow Concentrated Flow, Woods** Unpaved Kv= 16.1 fps
0.2	44	0.0400	3.22		**Shallow Concentrated Flow, Grass** Unpaved Kv= 16.1 fps
0.3	250	0.0600	15.24	18.70	**Pipe Channel, pipe to detention pond** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.011 Concrete pipe, straight & clean
0.3	106	0.0058	6.48	20.36	**Pipe Channel, pipe to detention pond** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.011 Concrete pipe, straight & clean
13.3	966	Total			

Subcatchment P1-2: To Detention Pond



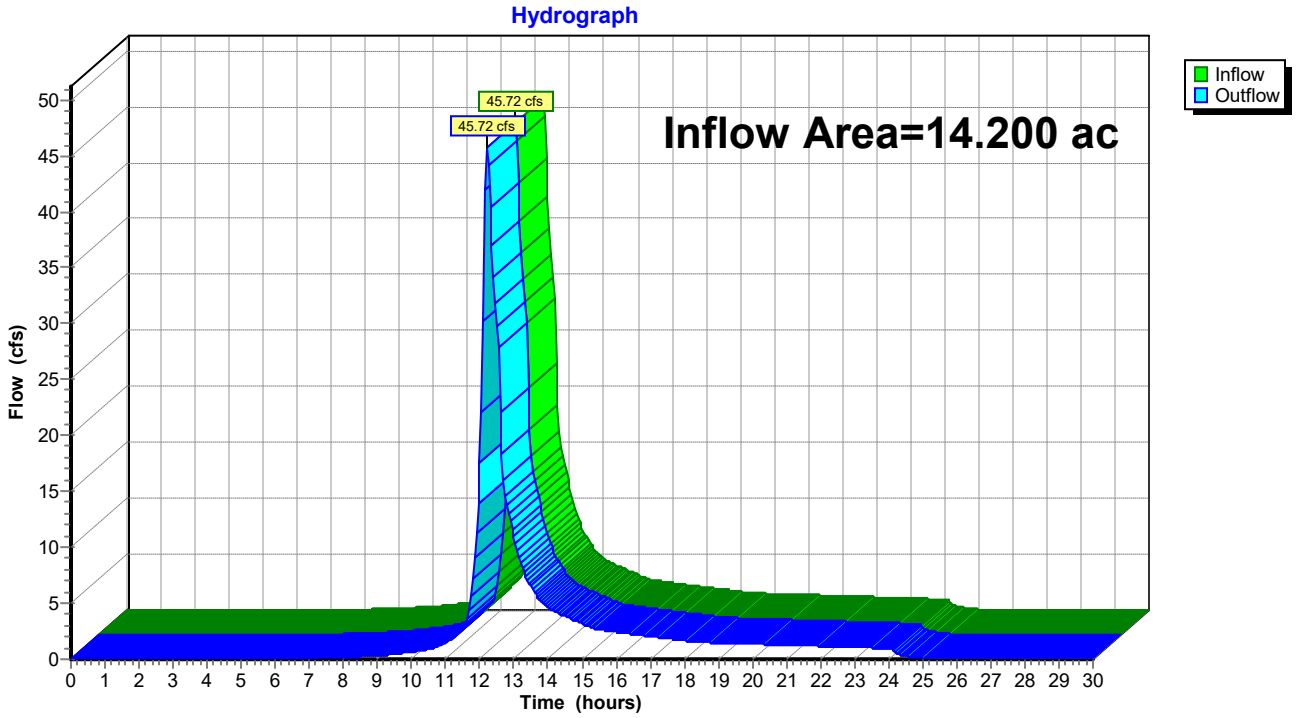
Summary for Reach TS: Total Site

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 14.200 ac, 25.63% Impervious, Inflow Depth = 4.05" for 50-year event
Inflow = 45.72 cfs @ 12.21 hrs, Volume= 4.797 af
Outflow = 45.72 cfs @ 12.21 hrs, Volume= 4.797 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Reach TS: Total Site



Summary for Pond 2P: Detention Pond

Inflow Area = 8.150 ac, 29.69% Impervious, Inflow Depth = 4.62" for 50-year event
Inflow = 33.38 cfs @ 12.21 hrs, Volume= 3.138 af
Outflow = 23.07 cfs @ 12.34 hrs, Volume= 2.711 af, Atten= 31%, Lag= 7.6 min
Discarded = 0.07 cfs @ 12.34 hrs, Volume= 0.079 af
Primary = 23.00 cfs @ 12.34 hrs, Volume= 2.632 af
Routed to Reach TS : Total Site
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach TS : Total Site

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 258.57' @ 12.34 hrs Surf.Area= 8,867 sf Storage= 35,115 cf

Plug-Flow detention time= 116.8 min calculated for 2.707 af (86% of inflow)
Center-of-Mass det. time= 53.4 min (876.1 - 822.8)

Volume	Invert	Avail.Storage	Storage Description
#1	250.00'	49,076 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
250.00	624	0	0
251.00	1,125	875	875
252.00	1,687	1,406	2,281
253.00	2,459	2,073	4,354
254.00	3,344	2,902	7,255
255.00	4,361	3,853	11,108
256.00	5,885	5,123	16,231
257.00	7,004	6,445	22,675
258.00	8,170	7,587	30,262
259.00	9,393	8,782	39,044
260.00	10,672	10,033	49,076

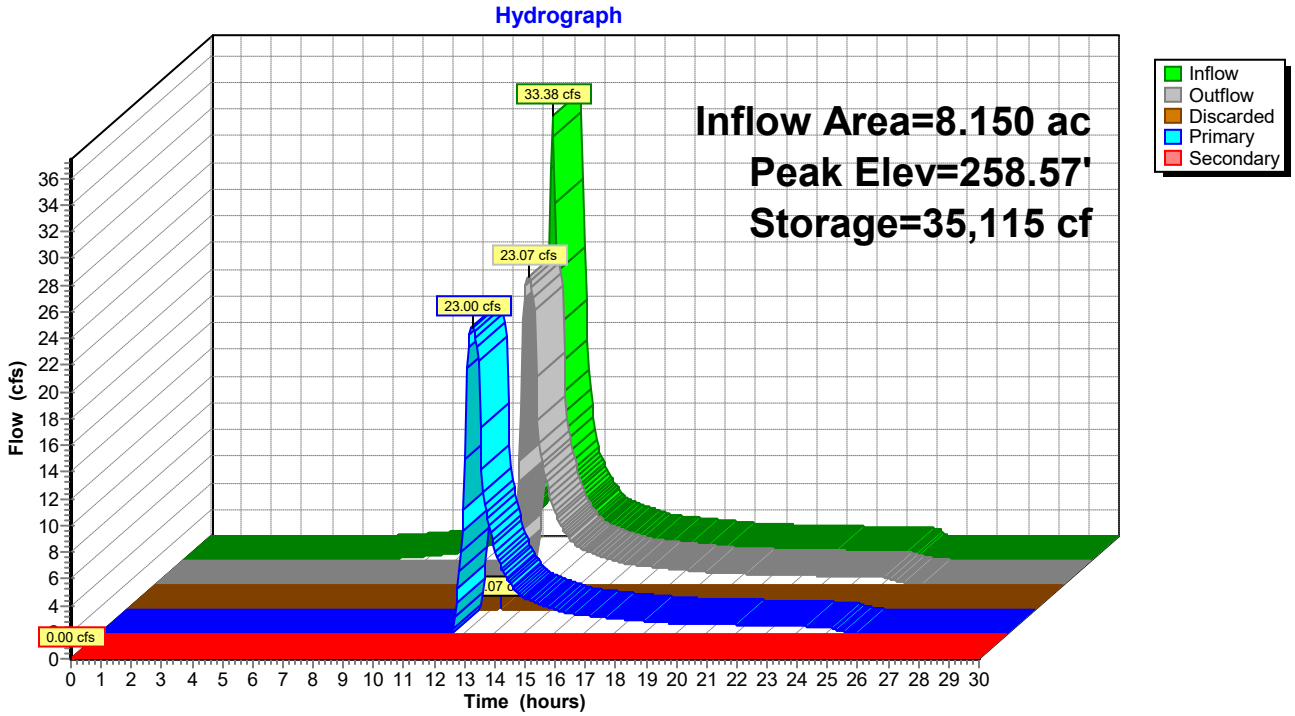
Device	Routing	Invert	Outlet Devices
#1	Primary	254.60'	**24.0" Round 74' - 24" HDPE @ 2.84% Culvert** L= 74.0' RCP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 254.60' / 252.50' S= 0.0284 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf
#2	Device 1	256.50'	**36.0" W x 10.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	257.60'	**40.0" x 33.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#4	Discarded	250.00'	**0.210 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 245.00'
#5	Secondary	259.09'	**20.8" W x 32.8" H Vert. Emergency Overflow** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.07 cfs @ 12.34 hrs HW=258.56' (Free Discharge)
└**4=Exfiltration** (Controls 0.07 cfs)

Primary OutFlow Max=22.97 cfs @ 12.34 hrs HW=258.56' (Free Discharge)
└**1=74' - 24" HDPE @ 2.84% Culvert** (Inlet Controls 22.97 cfs @ 7.31 fps)
  └**2=Orifice/Grate** (Passes < 15.40 cfs potential flow)
  └**3=Grate** (Passes < 37.51 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=250.00' (Free Discharge)
└**5=Emergency Overflow** (Controls 0.00 cfs)

Pond 2P: Detention Pond



Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P1-1: Direct to Wetlands Runoff Area=6.050 ac 20.17% Impervious Runoff Depth=5.04"
Flow Length=409' Tc=12.1 min CN=77 Runoff=28.17 cfs 2.539 af

Subcatchment P1-2: To Detention Pond Runoff Area=8.150 ac 29.69% Impervious Runoff Depth=5.38"
Flow Length=966' Tc=13.3 min CN=80 Runoff=38.65 cfs 3.655 af

Reach TS: Total Site Inflow=50.73 cfs 5.686 af
Outflow=50.73 cfs 5.686 af

Pond 2P: Detention Pond Peak Elev=258.99' Storage=38,927 cf Inflow=38.65 cfs 3.655 af
Discarded=0.07 cfs 0.081 af Primary=24.57 cfs 3.147 af Secondary=0.00 cfs 0.000 af Outflow=24.64 cfs 3.228 af

Total Runoff Area = 14.200 ac Runoff Volume = 6.194 af Average Runoff Depth = 5.23"
74.37% Pervious = 10.560 ac 25.63% Impervious = 3.640 ac

Summary for Subcatchment P1-1: Direct to Wetlands

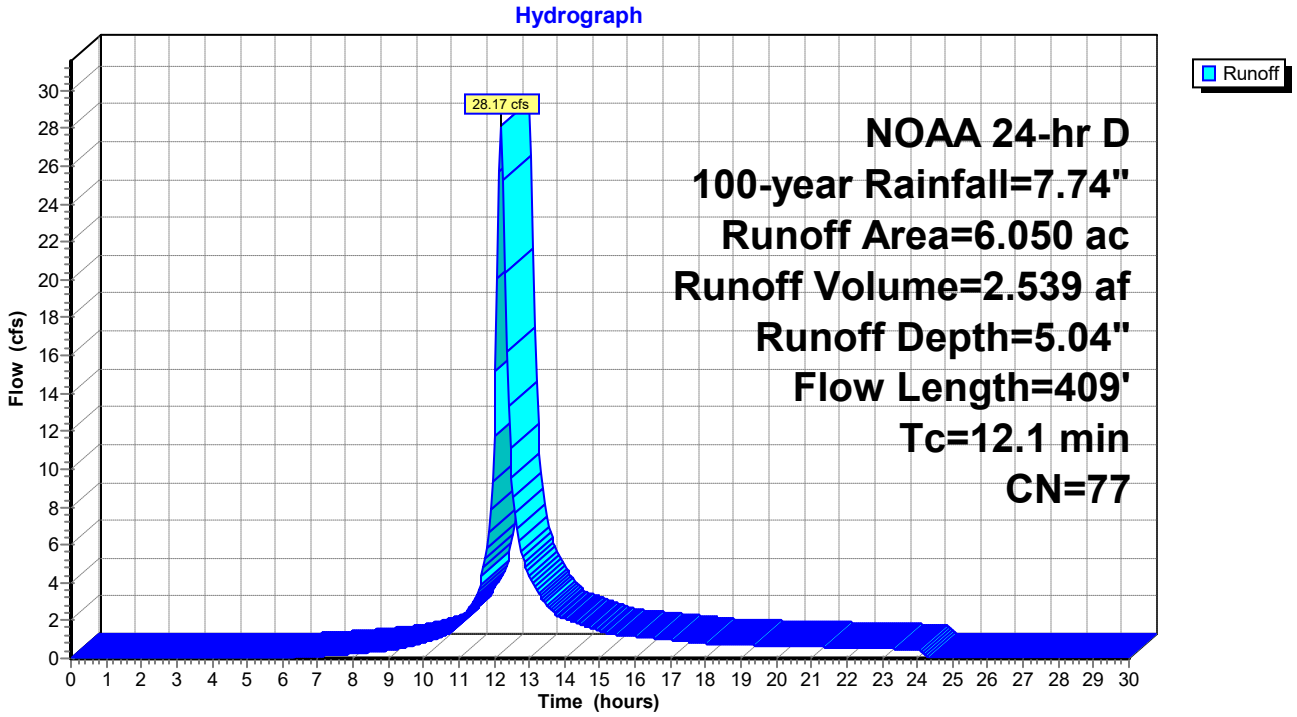
Runoff = 28.17 cfs @ 12.20 hrs, Volume= 2.539 af, Depth= 5.04"
Routed to Reach TS : Total Site

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 100-year Rainfall=7.74"

Area (ac)	CN	Description
2.680	70	Woods, Good, HSG C
2.150	74	>75% Grass cover, Good, HSG C
1.220	98	Paved parking, HSG C
6.050	77	Weighted Average
4.830		79.83% Pervious Area
1.220		20.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	100	0.0900	0.15		**Sheet Flow, woods** Woods: Light underbrush n= 0.400 P2= 3.46"
0.1	46	0.1520	6.28		**Shallow Concentrated Flow, Woods** Unpaved Kv= 16.1 fps
0.2	89	0.1900	7.02		**Shallow Concentrated Flow, woods** Unpaved Kv= 16.1 fps
0.5	174	0.1290	5.78		**Shallow Concentrated Flow, Woods** Unpaved Kv= 16.1 fps
12.1	409	Total			

Subcatchment P1-1: Direct to Wetlands



Summary for Subcatchment P1-2: To Detention Pond

[47] Hint: Peak is 207% of capacity of segment #6
[47] Hint: Peak is 190% of capacity of segment #7

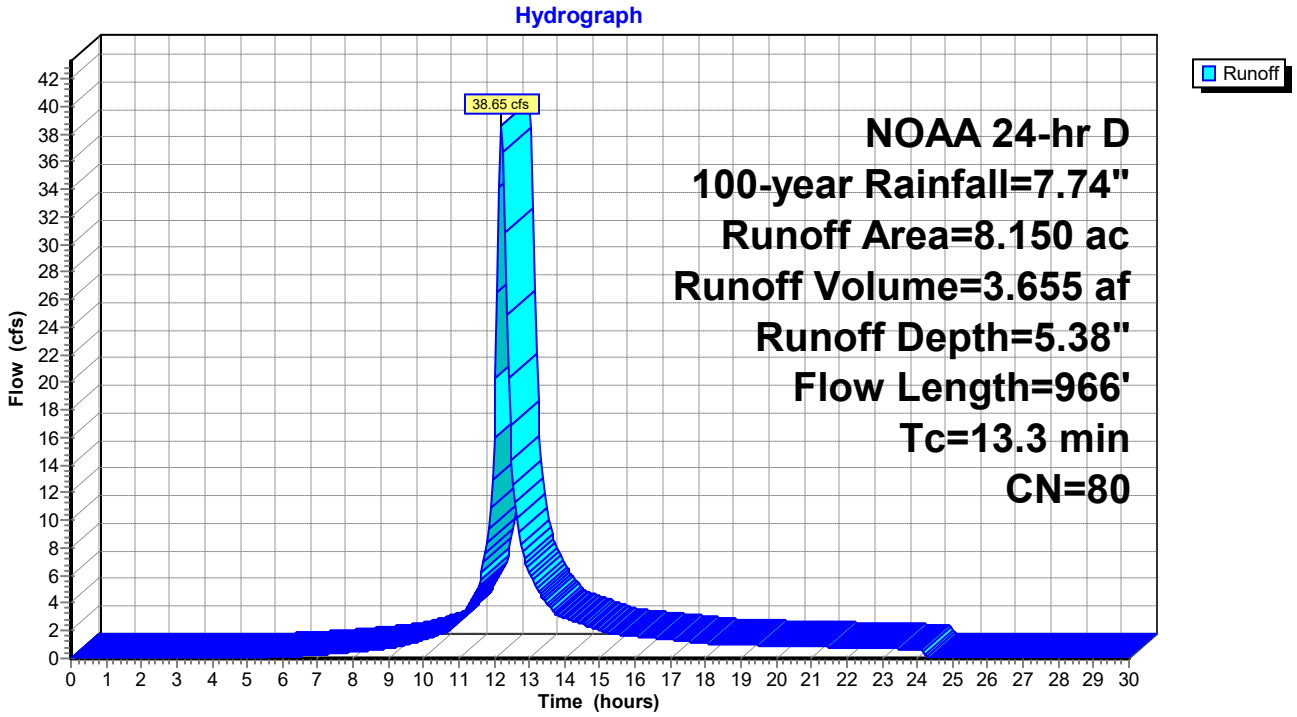
Runoff = 38.65 cfs @ 12.21 hrs, Volume= 3.655 af, Depth= 5.38"
Routed to Pond 2P : Detention Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 100-year Rainfall=7.74"

Area (ac)	CN	Description
3.240	70	Woods, Good, HSG C
2.490	74	>75% Grass cover, Good, HSG C
2.420	98	Paved parking, HSG C
8.150	80	Weighted Average
5.730		70.31% Pervious Area
2.420		29.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	100	0.1000	0.15		**Sheet Flow, Woods** Woods: Light underbrush n= 0.400 P2= 3.46"
0.8	239	0.0920	4.88		**Shallow Concentrated Flow, Woods** Unpaved Kv= 16.1 fps
0.8	179	0.0330	3.69		**Shallow Concentrated Flow, Impervious** Paved Kv= 20.3 fps
0.1	48	0.2520	8.08		**Shallow Concentrated Flow, Woods** Unpaved Kv= 16.1 fps
0.2	44	0.0400	3.22		**Shallow Concentrated Flow, Grass** Unpaved Kv= 16.1 fps
0.3	250	0.0600	15.24	18.70	**Pipe Channel, pipe to detention pond** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.011 Concrete pipe, straight & clean
0.3	106	0.0058	6.48	20.36	**Pipe Channel, pipe to detention pond** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.011 Concrete pipe, straight & clean
13.3	966	Total			

Subcatchment P1-2: To Detention Pond



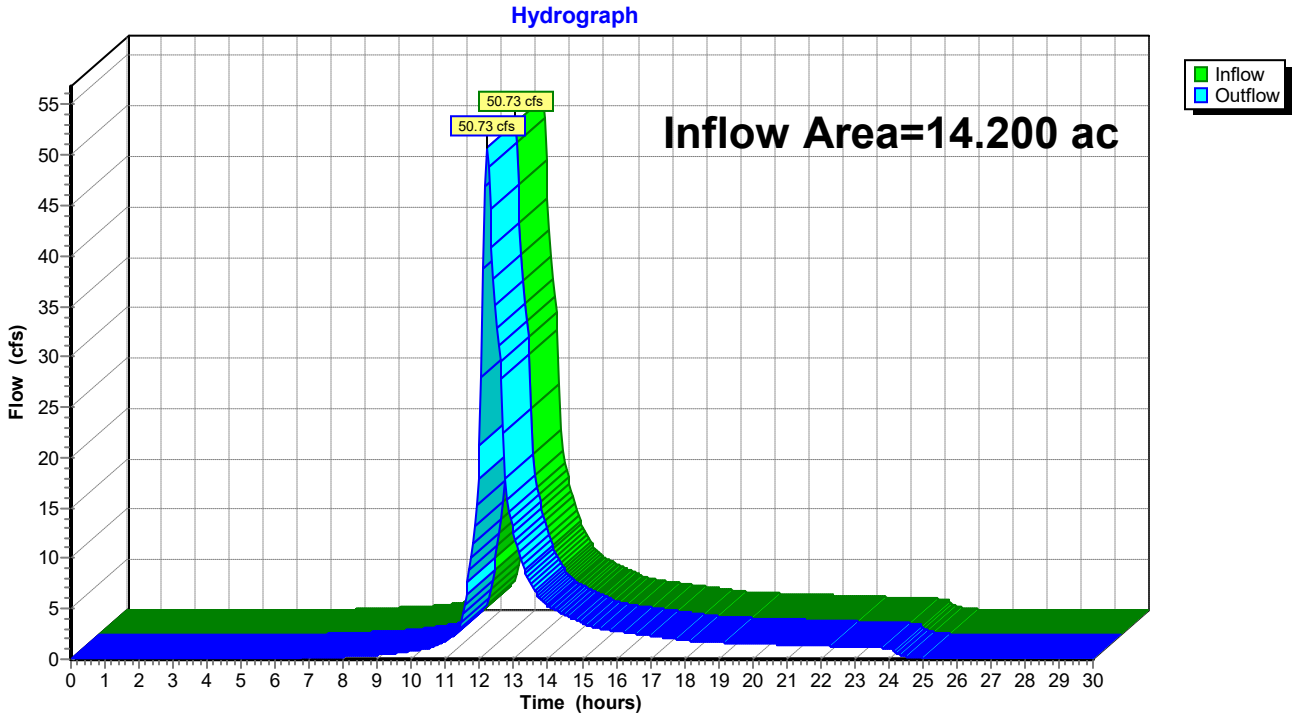
Summary for Reach TS: Total Site

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 14.200 ac, 25.63% Impervious, Inflow Depth = 4.81" for 100-year event
Inflow = 50.73 cfs @ 12.21 hrs, Volume= 5.686 af
Outflow = 50.73 cfs @ 12.21 hrs, Volume= 5.686 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Reach TS: Total Site



Summary for Pond 2P: Detention Pond

Inflow Area = 8.150 ac, 29.69% Impervious, Inflow Depth = 5.38" for 100-year event
Inflow = 38.65 cfs @ 12.21 hrs, Volume= 3.655 af
Outflow = 24.64 cfs @ 12.36 hrs, Volume= 3.228 af, Atten= 36%, Lag= 8.8 min
Discarded = 0.07 cfs @ 12.36 hrs, Volume= 0.081 af
Primary = 24.57 cfs @ 12.36 hrs, Volume= 3.147 af
Routed to Reach TS : Total Site
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach TS : Total Site

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 258.99' @ 12.36 hrs Surf.Area= 9,378 sf Storage= 38,927 cf

Plug-Flow detention time= 106.7 min calculated for 3.222 af (88% of inflow)
Center-of-Mass det. time= 49.9 min (867.9 - 818.0)

Volume	Invert	Avail.Storage	Storage Description
#1	250.00'	49,076 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
250.00	624	0	0
251.00	1,125	875	875
252.00	1,687	1,406	2,281
253.00	2,459	2,073	4,354
254.00	3,344	2,902	7,255
255.00	4,361	3,853	11,108
256.00	5,885	5,123	16,231
257.00	7,004	6,445	22,675
258.00	8,170	7,587	30,262
259.00	9,393	8,782	39,044
260.00	10,672	10,033	49,076

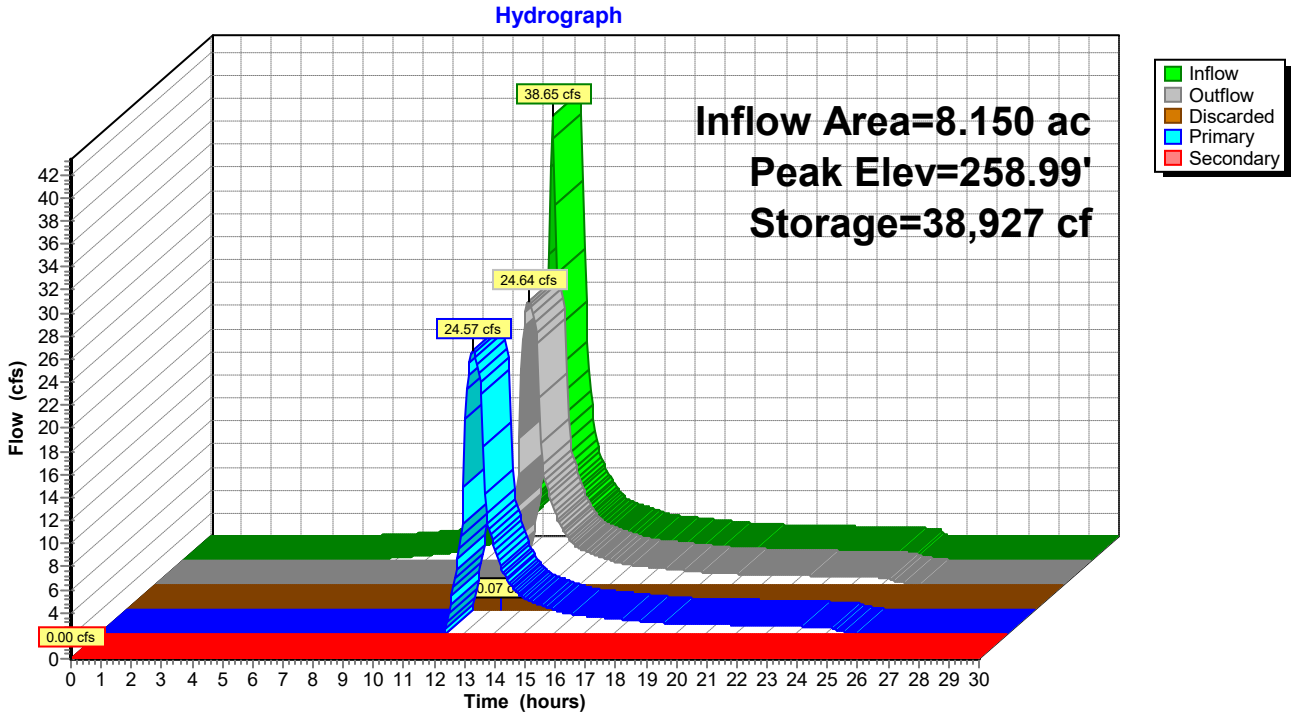
Device	Routing	Invert	Outlet Devices
#1	Primary	254.60'	**24.0" Round 74' - 24" HDPE @ 2.84% Culvert** L= 74.0' RCP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 254.60' / 252.50' S= 0.0284 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf
#2	Device 1	256.50'	**36.0" W x 10.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	257.60'	**40.0" x 33.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#4	Discarded	250.00'	**0.210 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 245.00'
#5	Secondary	259.09'	**20.8" W x 32.8" H Vert. Emergency Overflow** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.07 cfs @ 12.36 hrs HW=258.98' (Free Discharge)
└**4=Exfiltration** (Controls 0.07 cfs)

Primary OutFlow Max=24.54 cfs @ 12.36 hrs HW=258.98' (Free Discharge)
└**1=74' - 24" HDPE @ 2.84% Culvert** (Inlet Controls 24.54 cfs @ 7.81 fps)
  └**2=Orifice/Grate** (Passes < 17.27 cfs potential flow)
  └**3=Grate** (Passes < 51.88 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=250.00' (Free Discharge)
└**5=Emergency Overflow** (Controls 0.00 cfs)

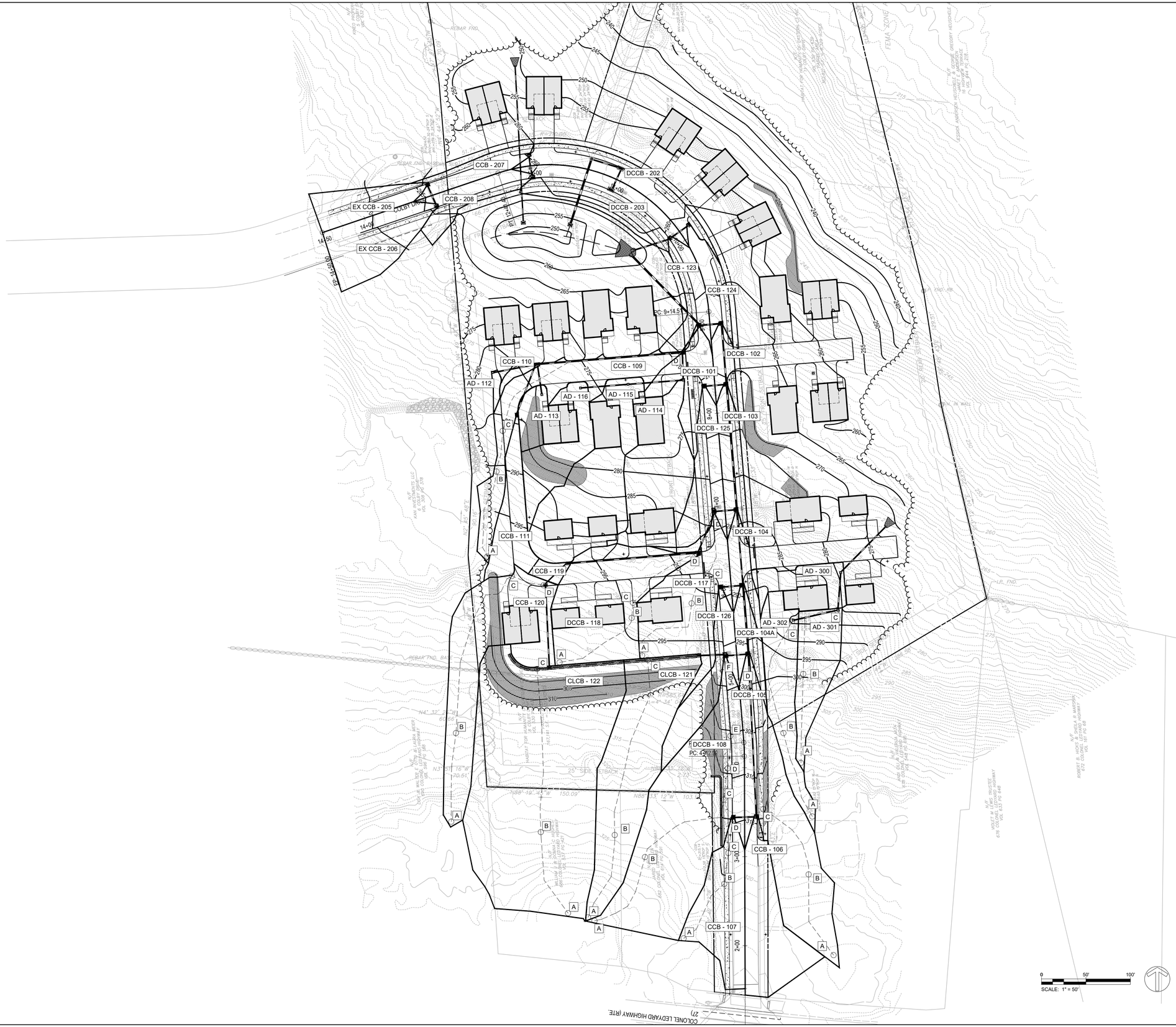
Pond 2P: Detention Pond



APPENDIX C

Hydraulic Analysis

benesch



Prepared by:

benesch

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Glastonbury, Connecticut 06033
860-633-8341

Prepared for:

Habitat for Humanity® of Eastern Connecticut

HABITAT FOR HUMANITY MULTI-FAMILY RESIDENTIAL AFFORDABLE HOUSING DEVELOPMENT PER C.G.S. §8-30g, LOTS 8, 9 & 11

LEDYARD, CT

COLBY DRIVE

DATE:	REVISION:
09/02/2025	PER CITY STAFF COMMENTS

PROJECT NO.: 0725 500010.00
SCALE: 1" = 50'
DATE: 12/20/2024

DRAWN BY: CLM
CHECKED BY: WGW

CATCHMENT AREA MAP

DRAWING NO.:

CAM

Drainage Analysis for Proposed Conditions
Ledyard Housing Development
Ledyard, CT

Job Number: 0725-500010.00

Drainage Areas

BASIN	TOTAL (SF)	TOTAL (AC)	IMPERV. (SF)	IMPERV. (AC)	PERVIOUS (SF)	PERVIOUS (AC)	C-Value	Tc (Min.)
DCCB-101	5,163	**0.12**	2571	0.06	2,592	0.06	**0.60**	**5.0**
DCCB-102	1,743	**0.04**	1592	0.04	151	0.00	**0.85**	**5.0**
DCCB-103	3,501	**0.08**	2,874	0.07	627	0.01	**0.79**	**5.0**
DCCB-104	2,276	**0.05**	1,786	0.04	490	0.01	**0.77**	**5.0**
DCCB-104A	2,328	**0.05**	1,538	0.04	790	0.02	**0.70**	**5.0**
DCCB-105	15,343	**0.35**	3,498	0.08	11,845	0.27	**0.44**	**15.1**
CCB-106	8,566	**0.20**	3,946	0.09	4,620	0.11	**0.58**	**5.0**
CCB-107	7,731	**0.18**	3,332	0.08	4,398	0.10	**0.56**	**8.8**
DCCB-108	23,427	**0.54**	3,430	0.08	19,996	0.46	**0.39**	**13.0**
CCB-109	8,811	**0.20**	6,121	0.14	2,690	0.06	**0.72**	**13.3**
CCB-110	491	**0.01**	491	0.01	0	0.00	**0.90**	**5.0**
CCB-111	4,897	**0.11**	3,042	0.07	1,855	0.04	**0.67**	**5.0**
AD-112	315	**0.01**	0	0.00	315	0.01	**0.30**	**5.0**
AD-113	3,560	**0.08**	1754.06	0.04	1,805	0.04	**0.60**	**5.0**
AD-114	10,063	**0.23**	3019.5	0.07	7,044	0.16	**0.48**	**5.0**
AD-115	13,616	**0.31**	3979.81	0.09	9,636	0.22	**0.48**	**5.0**
AD-116	5,167	**0.12**	0	0.00	5,167	0.12	**0.30**	**5.0**
DCCB-117	10,815	**0.25**	4189.04	0.10	6,626	0.15	**0.53**	**6.4**
DCCB-118	13,632	**0.31**	6424.95	0.15	7,207	0.17	**0.58**	**7.6**
CCB-119	798	**0.02**	798	0.02	0	0.00	**0.90**	**5.0**
CCB-120	15,689	**0.36**	2860.33	0.07	12,828	0.29	**0.41**	**11.0**
CLCB-121	16,351	**0.38**	0	0.00	16,351	0.38	**0.30**	**11.9**
CLCB-122	41,176	**0.95**	0	0.00	41,176	0.95	**0.30**	**11.8**
CCB-123	3,276	**0.08**	2107.39	0.05	1,168	0.03	**0.69**	**5.0**
CCB-124	2,658	**0.06**	2291.92	0.05	366	0.01	**0.82**	**5.0**
DCCB-125	6,289	**0.14**	3301.43	0.08	2,987	0.07	**0.61**	**5.0**
DCCB-126	4,825	**0.11**	1588.98	0.04	3,236	0.07	**0.50**	**5.0**
DCCB - 202	5,375	**0.12**	4,682	0.11	693	0.02	**0.82**	**5.0**
DCCB - 203	7,026	**0.16**	3,823	0.09	3,203	0.07	**0.63**	**5.0**
EX CCB - 205	3,933	**0.09**	2,319	0.05	1,614	0.04	**0.65**	**5.0**
EX CCB-206	6,668	**0.15**	2,380	0.05	4,288	0.10	**0.51**	**5.0**
CCB - 207	2,795	**0.06**	2,518	0.06	277	0.01	**0.84**	**5.0**
CCB-208	3,412	**0.08**	2,183	0.05	1,229	0.03	**0.68**	**5.0**
AD-300	4,439	**0.10**	2013	0.05	2,426	0.06	**0.57**	**5.0**
AD-301	5,695	**0.13**	0	0.00	5,695	0.13	**0.30**	**9.4**

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	106.000	0.12	5.31	0.60	0.07	2.48	5.0	19.8	4.5	11.04	59.26	4.59	24	5.85	256.00	262.20	259.22	263.39	258.00	266.69	DCCB - 101
2	1	23.000	0.04	4.12	0.85	0.03	1.82	5.0	16.5	5.0	9.09	11.38	6.66	18	1.00	262.80	263.03	263.81	264.19	266.69	266.63	DCCB - 102
3	2	64.000	0.08	4.08	0.79	0.06	1.79	5.0	16.3	5.0	8.99	27.28	6.42	18	5.75	263.13	266.81	264.19	267.97	266.63	270.41	DCCB - 103
4	3	137.000	0.05	3.86	0.77	0.04	1.64	5.0	15.8	5.1	8.39	34.03	6.11	18	8.95	266.91	279.17	267.97	280.29	270.41	283.02	DCCB - 104
5	4	81.000	0.05	1.81	0.70	0.04	0.79	5.0	15.4	5.2	4.07	19.98	6.61	15	8.16	279.77	286.38	280.29	287.20	283.02	289.88	DCCB - 104A
6	5	73.000	0.35	1.65	0.44	0.15	0.70	15.1	15.1	5.2	3.64	11.05	5.69	12	8.21	286.48	292.47	287.20	293.28	289.88	296.09	DCCB - 105
7	6	179.000	0.20	0.38	0.58	0.12	0.22	5.0	9.4	6.8	1.47	22.05	3.58	15	9.93	292.84	310.62	293.28	311.10	296.09	314.37	CCB - 106
8	7	22.000	0.18	0.18	0.56	0.10	0.10	8.8	8.8	7.0	0.71	19.27	3.10	15	7.59	310.82	312.49	311.10	312.82	314.37	314.37	CCB - 107
9	6	23.000	0.54	0.92	0.39	0.21	0.32	13.0	13.0	5.7	1.85	7.00	3.10	15	1.00	292.57	292.80	293.28	293.34	296.09	296.04	DCCB - 108
10	1	32.000	0.20	1.07	0.72	0.14	0.58	13.3	19.6	4.5	2.60	19.55	7.56	15	7.81	263.44	265.94	263.75	266.59	266.69	269.29	CCB - 109
11	10	159.000	0.01	0.21	0.90	0.01	0.14	5.0	17.0	4.9	0.68	16.64	2.02	15	5.66	266.04	275.04	266.59	275.36	269.29	278.41	CCB - 110
12	11	59.000	0.11	0.11	0.67	0.07	0.07	5.0	5.0	9.1	0.67	19.74	3.95	15	7.97	275.16	279.86	275.36	280.18	278.41	284.11	CCB - 111
13	11	48.000	0.01	0.01	0.90	0.01	0.01	5.0	5.0	9.1	0.08	18.45	1.09	15	6.96	275.16	278.50	275.36	278.61	278.41	281.75	AD - 112
14	11	31.000	0.08	0.08	0.60	0.05	0.05	5.0	5.0	9.1	0.44	7.00	2.68	15	1.00	275.14	275.45	275.36	275.71	278.41	278.70	AD - 113
15	10	28.000	0.23	0.66	0.48	0.11	0.30	5.0	8.9	7.0	2.06	14.54	3.88	15	4.32	266.04	267.25	266.59	267.82	269.29	270.60	AD - 114
16	15	60.000	0.31	0.43	0.48	0.15	0.18	5.0	8.2	7.3	1.35	15.27	3.24	15	4.77	267.35	270.21	267.82	270.67	270.60	273.56	AD - 115
17	16	51.000	0.12	0.12	0.30	0.04	0.04	5.0	5.0	9.1	0.33	17.36	1.68	15	6.16	270.31	273.45	270.67	273.67	273.56	276.70	AD - 116
18	4	23.000	0.36	2.00	0.52	0.19	0.82	6.4	14.5	5.4	4.39	7.00	4.88	15	1.00	279.42	279.65	280.29	280.50	283.02	283.00	DCCB - 117
19	18	45.000	0.31	1.64	0.58	0.18	0.63	7.6	14.2	5.4	3.42	23.25	4.47	15	11.04	279.75	284.72	280.50	285.47	283.00	288.07	DCCB - 118
20	19	143.000	0.02	1.33	0.90	0.02	0.45	5.0	13.1	5.7	2.56	16.99	4.02	15	5.90	284.82	293.25	285.47	293.89	288.07	296.60	CCB - 119
21	20	32.000	0.36	1.31	0.41	0.15	0.43	11.0	12.9	5.7	2.48	8.57	4.45	15	1.50	293.35	293.83	293.89	294.46	296.60	297.18	CCB - 120
22	9	26.000	0.38	0.38	0.30	0.11	0.11	11.9	11.9	6.0	0.68	7.00	2.24	15	1.00	292.90	293.16	293.34	293.48	296.04	296.59	CLCB - 121

Project File: storm - 100.stm

Number of lines: 24

Run Date: 9/3/2025

NOTES:Intensity = 44.54 / (Inlet time + 3.90) ^ 0.73; Return period =Yrs. 25 ; c = cir e = ellip b = box

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
23	21	90.000	0.95	0.95	0.30	0.29	0.29	11.8	11.8	6.0	1.72	7.07	3.51	15	1.02	293.93	294.85	294.46	295.37	297.18	297.90	CCB - 122
24	3	20.000	0.14	0.14	0.61	0.09	0.09	5.0	5.0	9.1	0.78	7.00	1.80	15	1.00	267.02	267.22	267.97	267.56	270.41	270.47	DCCB - 125

Project File: storm - 100.stm

Number of lines: 24

Run Date: 9/3/2025

NOTES:Intensity = 44.54 / (Inlet time + 3.90) ^ 0.73; Return period =Yrs. 25 ; c = cir e = ellip b = box

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	217.000	0.00	0.66	0.00	0.00	0.44	0.0	13.0	5.7	17.23	77.52	6.85	24	10.01	224.49	246.21	225.98	247.70	228.70	257.85	MH-201
2	1	28.000	0.12	0.28	0.82	0.10	0.20	5.0	5.5	8.7	1.74	24.50	3.86	24	1.00	253.40	253.68	253.76	254.14	257.85	257.25	DCCB - 202
3	2	22.000	0.16	0.16	0.63	0.10	0.10	5.0	5.0	9.1	0.92	7.00	3.06	15	1.00	253.78	254.00	254.14	254.38	257.25	257.25	DCCB-203
4	1	69.000	0.00	0.38	0.00	0.00	0.24	0.0	11.2	6.2	1.49	58.92	5.52	24	5.78	249.22	253.21	249.44	253.63	257.85	260.14	MH - 204
5	4	113.000	0.09	0.24	0.65	0.06	0.14	5.0	6.3	8.3	1.11	58.95	2.59	24	5.79	253.21	259.75	253.63	260.11	260.14	265.95	EX CCB - 205
6	5	43.000	0.15	0.15	0.51	0.08	0.08	5.0	5.0	9.1	0.70	6.66	3.12	15	0.91	260.30	260.69	260.57	261.02	265.95	265.90	EX CCB - 206
7	4	10.000	0.06	0.06	0.84	0.05	0.05	5.0	5.0	9.1	0.46	0.00	2.83	15	1.00	256.55	256.65	256.77	256.91	260.14	259.90	CCB - 207
8	4	7.000	0.08	0.08	0.68	0.05	0.05	5.0	5.0	9.1	0.49	0.00	2.89	15	1.00	256.56	256.63	256.79	256.90	260.14	259.88	CCB - 208
9	1	74.000	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	14.72	0.00	9.62	24	3.42	254.47	257.00	255.25	258.38	257.85	257.90	OCS - 1

Project File: storm - 200.stm

Number of lines: 9

Run Date: 9/4/2025

NOTES:Intensity = 44.54 / (Inlet time + 3.90) ^ 0.73; Return period =Yrs. 25 ; c = cir e = ellip b = box

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	69.000	0.10	0.39	0.57	0.06	0.14	5.0	16.1	5.0	0.71	16.09	2.75	15	5.29	272.50	276.15	272.83	276.48	273.75	279.50	AD-300
2	1	40.000	0.13	0.29	0.30	0.04	0.09	9.4	14.5	5.2	0.46	7.82	2.69	15	1.25	276.25	276.75	276.48	277.01	279.50	280.10	AD-301
3	2	49.000	0.16	0.16	0.30	0.05	0.05	11.1	11.1	6.1	0.29	0.00	2.63	15	9.39	276.85	281.45	277.01	281.66	280.10	284.70	AD-302

Project File: storm - 300.stm | Number of lines: 3 | Run Date: 8/29/2025

NOTES:Intensity = 38.62 / (Inlet time + 3.60) ^ 0.69; Return period =Yrs. 25 ; c = cir e = ellip b = box

APPENDIX D

Water Quality Volume

benesch

Water Quality Volume Computations
8, 9, 11 Colby Drive, Ledyard, CT
Project # 0725-500010.00

Designation	Description	Total Area (ac)	Total Impervious Area (ac)	Impervious Coverage, I (%)	Volumetric Runoff Coefficient (R)	WQV (ac-ft, apply 1.3")	Required WQV (cf)	Provided WQV (cf)
					R = 0.05 + 0.009*(I)	WQV = (1.3")*(R)*(A)/12		
1	Total Site	14.19	3.63	25.59	0.28	0.431	18,774	19,888
2	Flow to Pond	8.15	2.42	29.65	0.32	0.280	12,183	19,888

APPENDIX E

NOAA Rainfall Data

NOAA Atlas 14, Volume 10, Version 3
Location name: Ledyard, Connecticut, USA*
Latitude: 41.4421°, Longitude: -72.0096°
Elevation: 269 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

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

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.341** (0.264-0.437)	**0.408** (0.315-0.523)	**0.517** (0.399-0.665)	**0.607** (0.466-0.783)	**0.732** (0.545-0.975)	**0.826** (0.602-1.12)	**0.925** (0.656-1.28)	**1.04** (0.697-1.45)	**1.20** (0.776-1.72)	**1.33** (0.842-1.94)
10-min	**0.483** (0.374-0.619)	**0.577** (0.447-0.741)	**0.732** (0.565-0.942)	**0.861** (0.660-1.11)	**1.04** (0.772-1.38)	**1.17** (0.854-1.58)	**1.31** (0.930-1.82)	**1.47** (0.987-2.06)	**1.70** (1.10-2.43)	**1.88** (1.19-2.74)
15-min	**0.568** (0.440-0.728)	**0.679** (0.526-0.872)	**0.861** (0.664-1.11)	**1.01** (0.777-1.31)	**1.22** (0.908-1.62)	**1.38** (1.00-1.86)	**1.54** (1.09-2.14)	**1.73** (1.16-2.42)	**2.00** (1.29-2.86)	**2.22** (1.40-3.23)
30-min	**0.801** (0.621-1.03)	**0.957** (0.741-1.23)	**1.21** (0.936-1.56)	**1.42** (1.09-1.84)	**1.72** (1.28-2.28)	**1.94** (1.41-2.62)	**2.17** (1.54-3.01)	**2.43** (1.63-3.40)	**2.81** (1.82-4.03)	**3.12** (1.97-4.54)
60-min	**1.03** (0.801-1.33)	**1.24** (0.956-1.58)	**1.56** (1.21-2.01)	**1.84** (1.41-2.37)	**2.21** (1.65-2.95)	**2.50** (1.82-3.37)	**2.79** (1.98-3.88)	**3.13** (2.10-4.39)	**3.62** (2.34-5.19)	**4.02** (2.54-5.85)
2-hr	**1.36** (1.06-1.73)	**1.62** (1.27-2.06)	**2.05** (1.60-2.62)	**2.41** (1.86-3.08)	**2.90** (2.18-3.83)	**3.27** (2.40-4.39)	**3.66** (2.62-5.04)	**4.10** (2.78-5.71)	**4.75** (3.09-6.76)	**5.28** (3.35-7.62)
3-hr	**1.58** (1.24-1.99)	**1.88** (1.48-2.38)	**2.38** (1.86-3.02)	**2.79** (2.17-3.56)	**3.36** (2.53-4.42)	**3.79** (2.80-5.05)	**4.24** (3.04-5.81)	**4.75** (3.22-6.57)	**5.49** (3.58-7.78)	**6.10** (3.89-8.78)
6-hr	**2.00** (1.59-2.51)	**2.38** (1.89-2.99)	**3.00** (2.37-3.77)	**3.52** (2.76-4.44)	**4.23** (3.21-5.50)	**4.76** (3.54-6.29)	**5.32** (3.84-7.23)	**5.96** (4.07-8.18)	**6.89** (4.52-9.69)	**7.65** (4.90-10.9)
12-hr	**2.48** (1.98-3.08)	**2.94** (2.34-3.65)	**3.69** (2.94-4.60)	**4.32** (3.41-5.40)	**5.18** (3.96-6.69)	**5.82** (4.36-7.64)	**6.51** (4.73-8.78)	**7.29** (5.00-9.93)	**8.42** (5.56-11.8)	**9.37** (6.03-13.3)
24-hr	**2.90** (2.34-3.57)	**3.46** (2.78-4.26)	**4.36** (3.50-5.38)	**5.11** (4.08-6.34)	**6.15** (4.74-7.88)	**6.92** (5.23-9.02)	**7.74** (5.68-10.4)	**8.70** (6.01-11.8)	**10.1** (6.70-14.0)	**11.3** (7.30-15.9)
2-day	**3.24** (2.64-3.96)	**3.90** (3.17-4.76)	**4.97** (4.03-6.08)	**5.86** (4.72-7.20)	**7.09** (5.52-9.02)	**8.00** (6.10-10.4)	**8.98** (6.65-12.0)	**10.1** (7.04-13.6)	**11.9** (7.91-16.3)	**13.3** (8.67-18.6)
3-day	**3.52** (2.88-4.26)	**4.22** (3.45-5.12)	**5.38** (4.38-6.54)	**6.34** (5.13-7.74)	**7.66** (5.99-9.70)	**8.64** (6.62-11.1)	**9.70** (7.21-12.9)	**10.9** (7.63-14.6)	**12.8** (8.57-17.6)	**14.4** (9.39-20.0)
4-day	**3.77** (3.10-4.56)	**4.51** (3.70-5.46)	**5.72** (4.68-6.94)	**6.73** (5.46-8.19)	**8.11** (6.37-10.2)	**9.14** (7.02-11.7)	**10.2** (7.64-13.6)	**11.6** (8.07-15.4)	**13.5** (9.05-18.4)	**15.2** (9.90-21.0)
7-day	**4.49** (3.71-5.38)	**5.30** (4.38-6.36)	**6.62** (5.45-7.96)	**7.72** (6.31-9.32)	**9.22** (7.28-11.5)	**10.4** (7.99-13.2)	**11.6** (8.64-15.1)	**12.9** (9.09-17.1)	**15.0** (10.1-20.4)	**16.7** (11.0-23.0)
10-day	**5.20** (4.32-6.21)	**6.05** (5.02-7.22)	**7.43** (6.14-8.90)	**8.58** (7.05-10.3)	**10.2** (8.05-12.6)	**11.3** (8.78-14.3)	**12.6** (9.43-16.4)	**14.0** (9.88-18.4)	**16.1** (10.8-21.7)	**17.8** (11.7-24.3)
20-day	**7.39** (6.20-8.73)	**8.29** (6.95-9.81)	**9.78** (8.16-11.6)	**11.0** (9.12-13.1)	**12.7** (10.1-15.5)	**14.0** (10.9-17.4)	**15.3** (11.4-19.5)	**16.7** (11.8-21.7)	**18.5** (12.6-24.7)	**19.9** (13.1-27.0)
30-day	**9.20** (7.76-10.8)	**10.2** (8.55-11.9)	**11.7** (9.82-13.8)	**13.0** (10.8-15.4)	**14.8** (11.8-17.9)	**16.1** (12.6-19.9)	**17.5** (13.1-22.0)	**18.8** (13.4-24.3)	**20.4** (13.9-27.2)	**21.6** (14.3-29.2)
45-day	**11.4** (9.71-13.4)	**12.5** (10.6-14.6)	**14.1** (11.9-16.5)	**15.5** (13.0-18.2)	**17.4** (14.0-20.9)	**18.9** (14.7-23.0)	**20.3** (15.1-25.2)	**21.5** (15.4-27.7)	**23.0** (15.7-30.4)	**23.9** (15.9-32.2)
60-day	**13.3** (11.3-15.5)	**14.4** (12.2-16.8)	**16.1** (13.7-18.8)	**17.6** (14.8-20.6)	**19.6** (15.8-23.4)	**21.2** (16.6-25.7)	**22.6** (16.9-28.0)	**23.9** (17.2-30.6)	**25.3** (17.4-33.3)	**26.1** (17.4-35.0)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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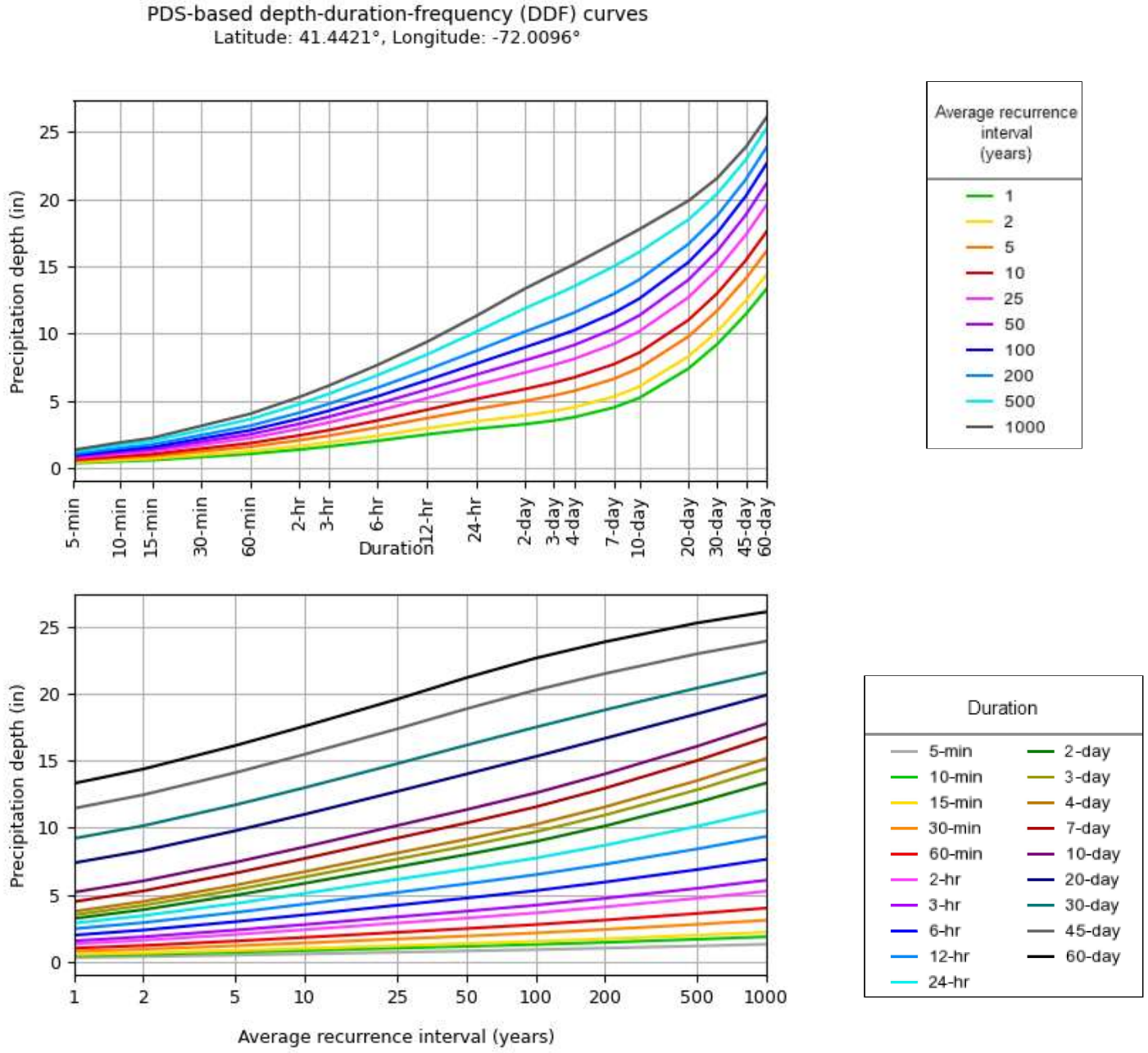
PF graphical



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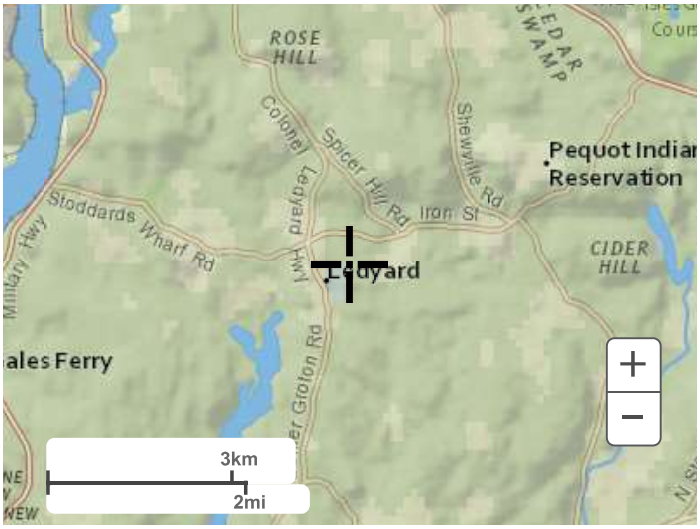
Maps & aerials

Small scale terrain



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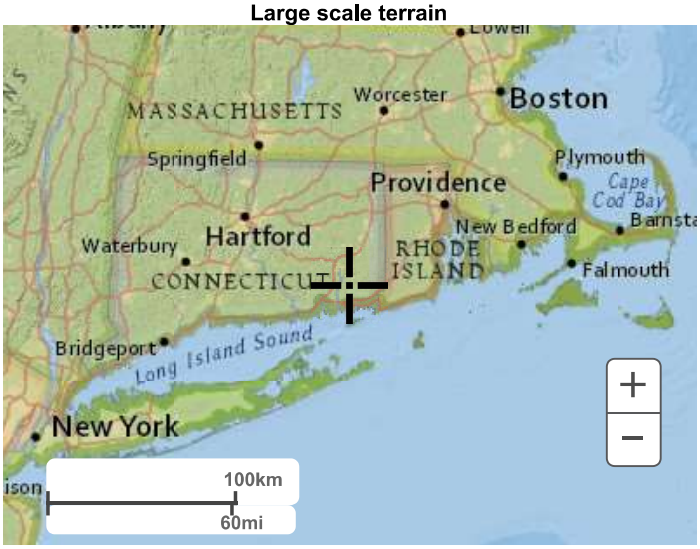

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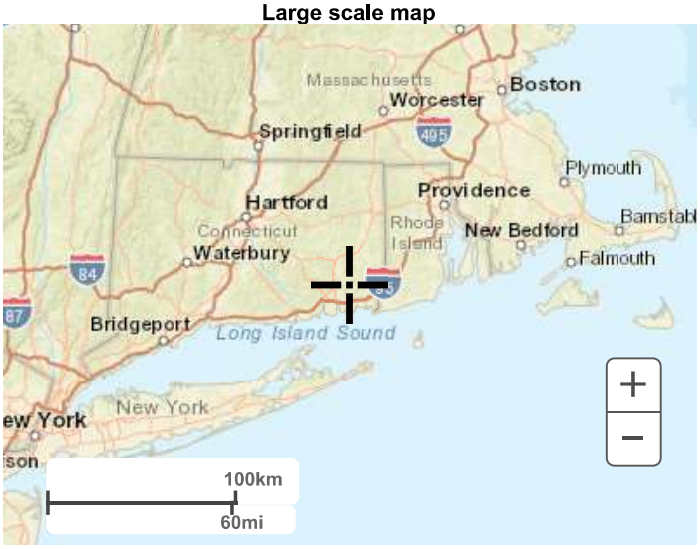

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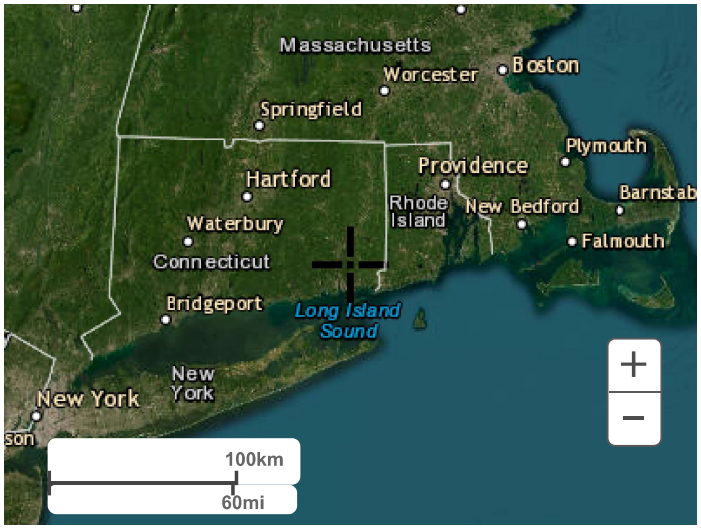

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US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

NOAA Atlas 14, Volume 10, Version 3
Location name: Ledyard, Connecticut, USA*
Latitude: 41.4421°, Longitude: -72.0096°
Elevation: 269 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

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

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches/hour)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	4.09 (3.17-5.24)	4.90 (3.78-6.28)	6.20 (4.79-7.98)	7.28 (5.59-9.40)	8.78 (6.54-11.7)	9.91 (7.22-13.4)	11.1 (7.87-15.4)	12.4 (8.36-17.4)	14.4 (9.31-20.6)	16.0 (10.1-23.2)
10-min	2.90 (2.24-3.71)	3.46 (2.68-4.45)	4.39 (3.39-5.65)	5.17 (3.96-6.67)	6.23 (4.63-8.29)	7.03 (5.12-9.49)	7.86 (5.58-10.9)	8.81 (5.92-12.3)	10.2 (6.59-14.6)	11.3 (7.16-16.5)
15-min	2.27 (1.76-2.91)	2.72 (2.10-3.49)	3.44 (2.66-4.43)	4.05 (3.11-5.22)	4.88 (3.63-6.50)	5.51 (4.02-7.44)	6.17 (4.38-8.56)	6.91 (4.65-9.68)	7.98 (5.17-11.5)	8.87 (5.61-12.9)
30-min	1.60 (1.24-2.05)	1.91 (1.48-2.46)	2.43 (1.87-3.12)	2.85 (2.19-3.68)	3.43 (2.55-4.57)	3.87 (2.82-5.23)	4.33 (3.08-6.01)	4.86 (3.27-6.81)	5.61 (3.64-8.06)	6.24 (3.95-9.07)
60-min	1.03 (0.801-1.33)	1.24 (0.956-1.58)	1.56 (1.21-2.01)	1.84 (1.41-2.37)	2.21 (1.65-2.95)	2.50 (1.82-3.37)	2.79 (1.98-3.88)	3.13 (2.10-4.39)	3.62 (2.34-5.19)	4.02 (2.54-5.85)
2-hr	0.679 (0.531-0.863)	0.811 (0.633-1.03)	1.03 (0.798-1.31)	1.20 (0.932-1.54)	1.45 (1.09-1.92)	1.64 (1.20-2.19)	1.83 (1.31-2.52)	2.05 (1.39-2.85)	2.37 (1.54-3.38)	2.64 (1.68-3.81)
3-hr	0.525 (0.412-0.664)	0.626 (0.491-0.792)	0.792 (0.619-1.00)	0.930 (0.722-1.18)	1.12 (0.842-1.47)	1.26 (0.931-1.68)	1.41 (1.01-1.93)	1.58 (1.07-2.19)	1.83 (1.19-2.59)	2.03 (1.30-2.92)
6-hr	0.334 (0.265-0.419)	0.397 (0.314-0.498)	0.501 (0.395-0.630)	0.587 (0.460-0.741)	0.705 (0.535-0.919)	0.794 (0.590-1.05)	0.888 (0.641-1.21)	0.994 (0.679-1.37)	1.15 (0.754-1.62)	1.28 (0.818-1.82)
12-hr	0.205 (0.164-0.255)	0.243 (0.194-0.303)	0.306 (0.243-0.381)	0.358 (0.283-0.448)	0.429 (0.328-0.555)	0.483 (0.362-0.634)	0.539 (0.392-0.728)	0.604 (0.415-0.824)	0.699 (0.461-0.976)	0.777 (0.500-1.10)
24-hr	0.120 (0.097-0.148)	0.143 (0.115-0.177)	0.181 (0.145-0.224)	0.213 (0.169-0.264)	0.256 (0.197-0.328)	0.288 (0.217-0.375)	0.322 (0.236-0.432)	0.362 (0.250-0.490)	0.421 (0.279-0.584)	0.470 (0.304-0.661)
2-day	0.067 (0.054-0.082)	0.081 (0.066-0.099)	0.103 (0.083-0.126)	0.122 (0.098-0.149)	0.147 (0.114-0.187)	0.166 (0.127-0.215)	0.187 (0.138-0.249)	0.211 (0.146-0.283)	0.247 (0.164-0.340)	0.278 (0.180-0.388)
3-day	0.048 (0.039-0.059)	0.058 (0.047-0.071)	0.074 (0.060-0.090)	0.088 (0.071-0.107)	0.106 (0.083-0.134)	0.120 (0.091-0.154)	0.134 (0.100-0.178)	0.152 (0.105-0.203)	0.178 (0.119-0.243)	0.200 (0.130-0.278)
4-day	0.039 (0.032-0.047)	0.047 (0.038-0.056)	0.059 (0.048-0.072)	0.070 (0.056-0.085)	0.084 (0.066-0.106)	0.095 (0.073-0.122)	0.106 (0.079-0.141)	0.120 (0.084-0.160)	0.140 (0.094-0.192)	0.157 (0.103-0.218)
7-day	0.026 (0.022-0.032)	0.031 (0.026-0.037)	0.039 (0.032-0.047)	0.045 (0.037-0.055)	0.054 (0.043-0.068)	0.061 (0.047-0.078)	0.068 (0.051-0.090)	0.077 (0.054-0.101)	0.089 (0.060-0.121)	0.099 (0.065-0.137)
10-day	0.021 (0.018-0.025)	0.025 (0.020-0.030)	0.030 (0.025-0.037)	0.035 (0.029-0.042)	0.042 (0.033-0.052)	0.047 (0.036-0.059)	0.052 (0.039-0.068)	0.058 (0.041-0.076)	0.066 (0.045-0.090)	0.074 (0.048-0.101)
20-day	0.015 (0.012-0.018)	0.017 (0.014-0.020)	0.020 (0.016-0.024)	0.022 (0.019-0.027)	0.026 (0.021-0.032)	0.029 (0.022-0.036)	0.031 (0.023-0.040)	0.034 (0.024-0.045)	0.038 (0.026-0.051)	0.041 (0.027-0.056)
30-day	0.012 (0.010-0.015)	0.014 (0.011-0.016)	0.016 (0.013-0.019)	0.018 (0.015-0.021)	0.020 (0.016-0.024)	0.022 (0.017-0.027)	0.024 (0.018-0.030)	0.026 (0.018-0.033)	0.028 (0.019-0.037)	0.029 (0.019-0.040)
45-day	0.010 (0.008-0.012)	0.011 (0.009-0.013)	0.013 (0.011-0.015)	0.014 (0.012-0.016)	0.016 (0.012-0.019)	0.017 (0.013-0.021)	0.018 (0.014-0.023)	0.019 (0.014-0.025)	0.021 (0.014-0.028)	0.022 (0.014-0.029)
60-day	0.009 (0.007-0.010)	0.009 (0.008-0.011)	0.011 (0.009-0.013)	0.012 (0.010-0.014)	0.013 (0.010-0.016)	0.014 (0.011-0.017)	0.015 (0.011-0.019)	0.016 (0.011-0.021)	0.017 (0.012-0.023)	0.018 (0.012-0.024)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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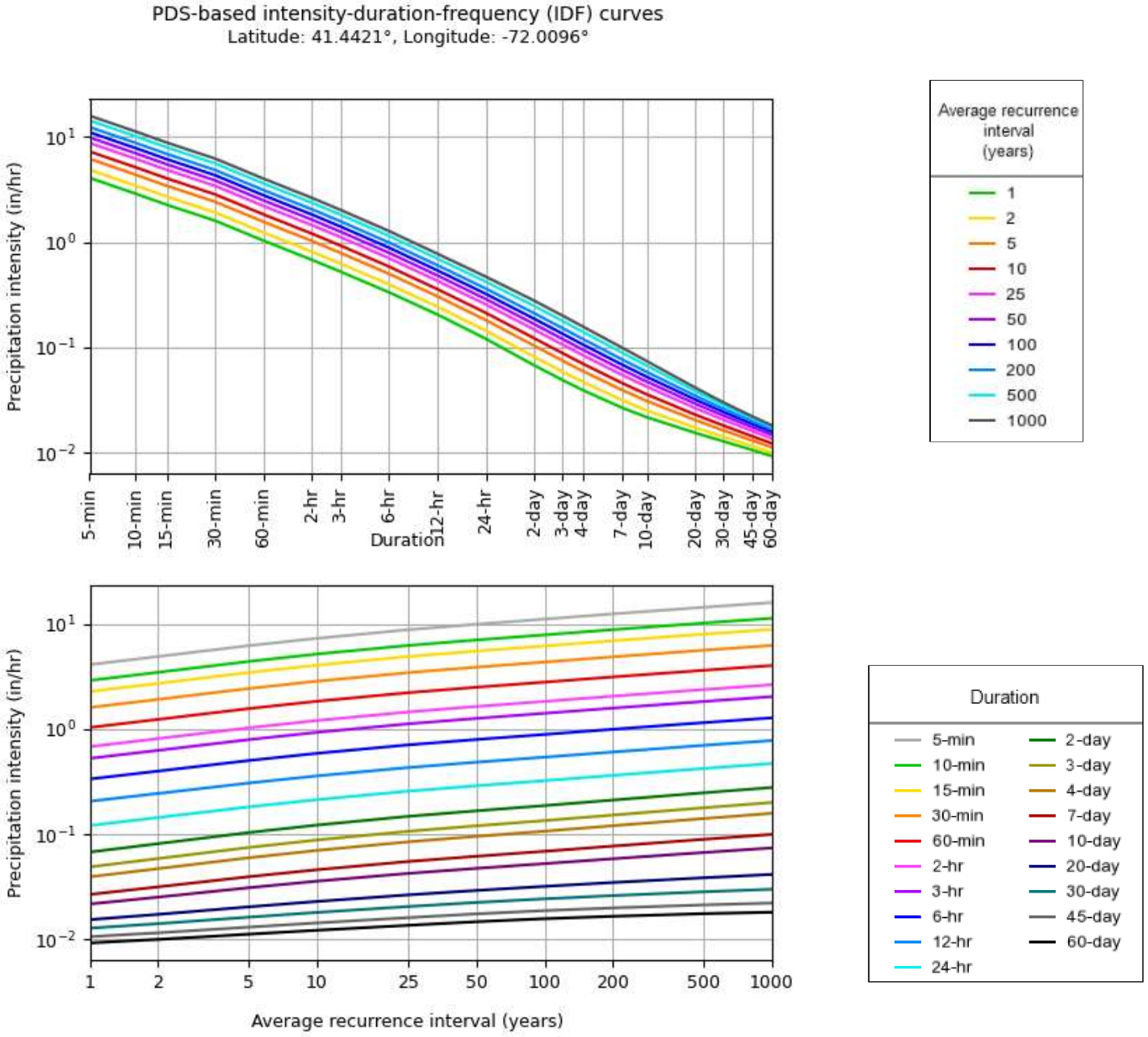
PF graphical



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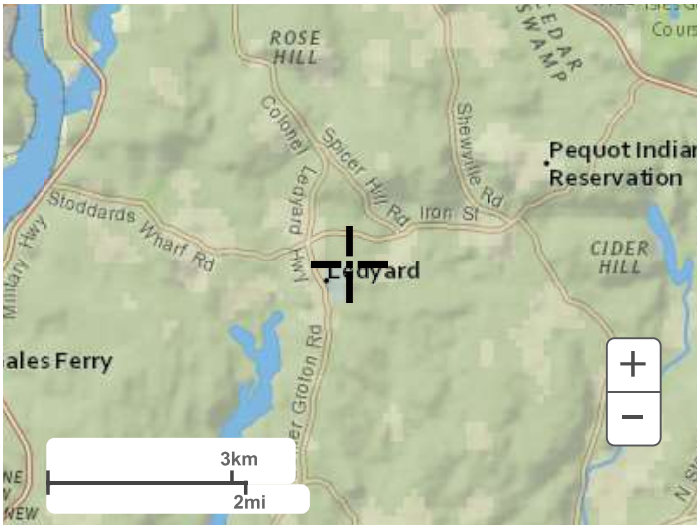
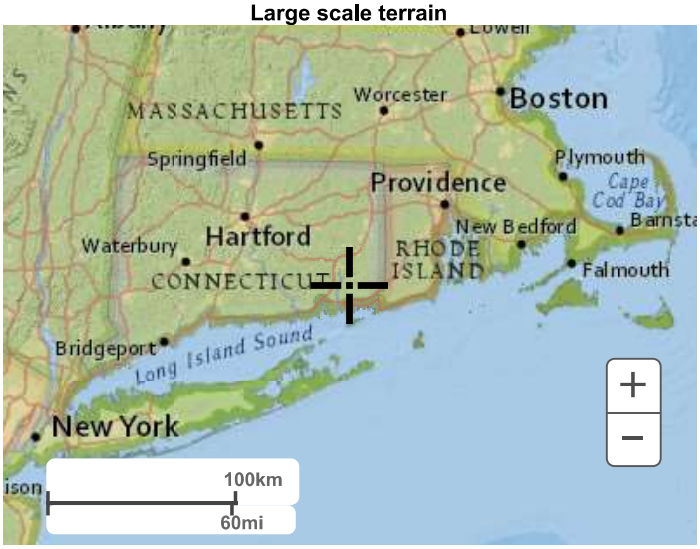
Maps & aerials

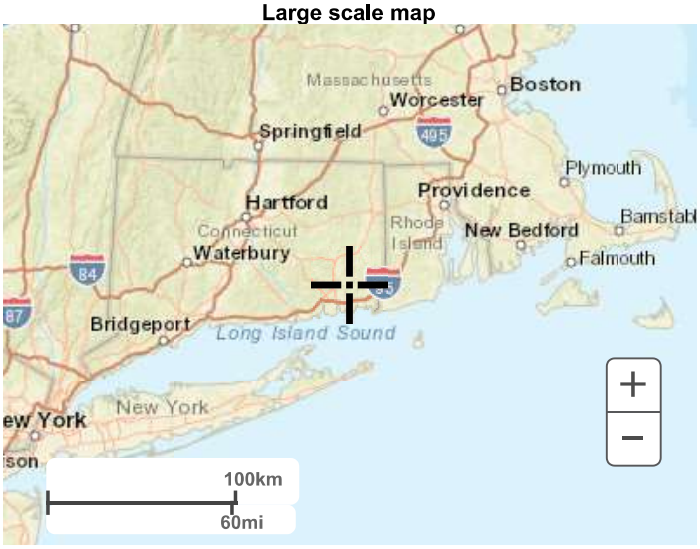
Small scale terrain



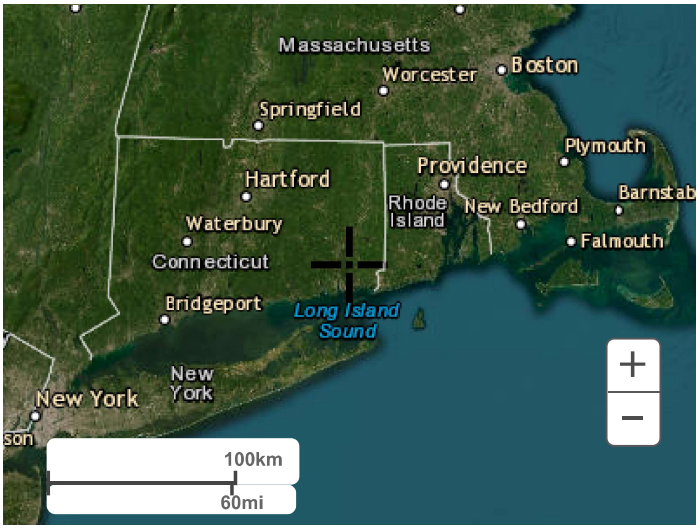
Large scale terrain



Large scale map



Large scale aerial



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

APPENDIX F

NRCS Soil Survey

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

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

Custom Soil Resource Report for State of Connecticut, Eastern Part

August 2, 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: 1:8,640 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 100 200 400 600

Feet: 0 400 800 1600 2400

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

MAP LEGEND

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

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

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- 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 1:12,000.

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

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

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

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

Soil Survey Area: State of Connecticut, Eastern Part
Survey Area Data: Version 1, Sep 15, 2023

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

Date(s) aerial images were photographed: Jun 14, 2022—Oct 6, 2022

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
3	Ridgebury, Leicester, and Whitman soils, 0 to 8 percent slopes, extremely stony	22.7	7.3%
17	Timakwa and Natchaug soils, 0 to 2 percent slopes	1.7	0.5%
18	Catden and Freetown soils, 0 to 2 percent slopes	1.9	0.6%
29B	Agawam fine sandy loam, 3 to 8 percent slopes	0.3	0.1%
45A	Woodbridge fine sandy loam, 0 to 3 percent slopes	0.1	0.0%
45B	Woodbridge fine sandy loam, 3 to 8 percent slopes	14.5	4.6%
46B	Woodbridge fine sandy loam, 0 to 8 percent slopes, very stony	31.3	10.0%
47C	Woodbridge fine sandy loam, 3 to 15 percent slopes, extremely stony	40.0	12.8%
50B	Sutton fine sandy loam, 3 to 8 percent slopes	0.1	0.0%
51B	Sutton fine sandy loam, 0 to 8 percent slopes, very stony	34.3	11.0%
61B	Canton and Charlton fine sandy loams, 0 to 8 percent slopes, very stony	2.9	0.9%
61C	Canton and Charlton fine sandy loams, 8 to 15 percent slopes, very stony	0.1	0.0%
62C	Canton and Charlton fine sandy loams, 3 to 15 percent slopes, extremely stony	0.1	0.0%
62D	Canton and Charlton fine sandy loams, 15 to 35 percent slopes, extremely stony	19.4	6.2%
73C	Charlton-Chatfield complex, 0 to 15 percent slopes, very rocky	49.8	15.9%
75C	Hollis-Chatfield-Rock outcrop complex, 3 to 15 percent slopes	9.0	2.9%
84B	Paxton and Montauk fine sandy loams, 3 to 8 percent slopes	14.1	4.5%
85B	Paxton and Montauk fine sandy loams, 3 to 8 percent slopes, very stony	23.0	7.3%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
86D	Paxton and Montauk fine sandy loams, 15 to 35 percent slopes, extremely stony	14.0	4.5%
103	Rippowam fine sandy loam	11.8	3.8%
702A	Tisbury silt loam, 0 to 3 percent slopes	21.7	6.9%
Totals for Area of Interest		**312.8**	**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.

State of Connecticut, Eastern Part

3—Ridgebury, Leicester, and Whitman soils, 0 to 8 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2t2qt
Elevation: 0 to 1,480 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

Ridgebury, extremely stony, and similar soils: 40 percent
Leicester, extremely stony, and similar soils: 35 percent
Whitman, extremely stony, and similar soils: 17 percent
Minor components: 8 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ridgebury, Extremely Stony

Setting

Landform: Drumlins, ground moraines, hills, drainageways, depressions
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope, head slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
A - 1 to 6 inches: fine sandy loam
Bw - 6 to 10 inches: sandy loam
Bg - 10 to 19 inches: gravelly sandy loam
Cd - 19 to 66 inches: gravelly sandy loam

Properties and qualities

Slope: 0 to 8 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 15 to 35 inches to densic material
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: D
Ecological site: F144AY009CT - Wet Till Depressions
Hydric soil rating: Yes

Description of Leicester, Extremely Stony

Setting

Landform: Ground moraines, hills, drainageways, depressions
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Concave
Parent material: Coarse-loamy melt-out till derived from gneiss, granite, and/or schist

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
A - 1 to 7 inches: fine sandy loam
Bg - 7 to 18 inches: fine sandy loam
BC - 18 to 24 inches: fine sandy loam
C1 - 24 to 39 inches: gravelly fine sandy loam
C2 - 39 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 0 to 8 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 9.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B/D
Ecological site: F144AY009CT - Wet Till Depressions
Hydric soil rating: Yes

Description of Whitman, Extremely Stony

Setting

Landform: Drumlins, ground moraines, hills, drainageways, depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Oi - 0 to 1 inches: peat

A - 1 to 10 inches: fine sandy loam
Bg - 10 to 17 inches: gravelly fine sandy loam
Cdg - 17 to 61 inches: fine sandy loam

Properties and qualities

Slope: 0 to 3 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 7 to 38 inches to densic material
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: F144AY009CT - Wet Till Depressions
Hydric soil rating: Yes

Minor Components

Woodbridge, extremely stony

Percent of map unit: 6 percent
Landform: Hills, drumlins, ground moraines
Landform position (two-dimensional): Backslope, footslope, summit
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Swansea

Percent of map unit: 2 percent
Landform: Bogs, swamps
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

17—Timakwa and Natchaug soils, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2t2qx
Elevation: 0 to 1,420 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

Timakwa and similar soils: 45 percent
Natchaug and similar soils: 40 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Timakwa

Setting

Landform: Depressions
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Herbaceous and woody organic material over sandy and gravelly glaciofluvial deposits

Typical profile

Oa1 - 0 to 12 inches: muck
Oa2 - 12 to 37 inches: muck
2Cg1 - 37 to 47 inches: very gravelly loamy coarse sand
2Cg2 - 47 to 60 inches: gravelly loamy very fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: Rare
Frequency of ponding: Frequent
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 14.9 inches)

Interpretive groups

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

Description of Natchaug

Setting

Landform: Depressions, depressions, depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope, tread
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Highly decomposed organic material over loamy glaciofluvial deposits and/or loamy glaciolacustrine deposits and/or loamy till

Typical profile

Oa1 - 0 to 12 inches: muck
Oa2 - 12 to 31 inches: muck
2Cg1 - 31 to 39 inches: silt loam
2Cg2 - 39 to 79 inches: fine sandy loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.01 to 14.17 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: Rare
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 25 percent
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 17.9 inches)

Interpretive groups

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

Minor Components

Whitman

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

Catden

Percent of map unit: 3 percent
Landform: Depressions, depressions, fens, depressions, kettles, marshes, bogs, swamps
Landform position (three-dimensional): Base slope, tread
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Maybid

Percent of map unit: 3 percent
Landform: Drainageways, terraces, depressions
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Scarboro

Percent of map unit: 2 percent

Landform: Drainageways, outwash deltas, depressions, outwash terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope, tread, dip
Down-slope shape: Concave
Across-slope shape: Linear, concave
Hydric soil rating: Yes

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

Map Unit Setting

National map unit symbol: 2t2r2
Elevation: 0 to 1,390 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Catden

Setting

Landform: Depressions, bogs, fens, depressions, depressions, kettles, marshes, swamps
Landform position (three-dimensional): Base slope, tread
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Highly decomposed herbaceous organic material and/or highly decomposed woody organic material

Typical profile

Oa1 - 0 to 2 inches: muck
Oa2 - 2 to 79 inches: muck

Properties and qualities

Slope: 0 to 2 percent
Surface area covered with cobbles, stones or boulders: 0.0 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: Rare
Frequency of ponding: Frequent

Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 26.9 inches)

Interpretive groups

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

Description of Freetown

Setting

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

Typical profile

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

Properties and qualities

Slope: 0 to 2 percent
Surface area covered with cobbles, stones or boulders: 0.0 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: Rare
Frequency of ponding: Frequent
Available water supply, 0 to 60 inches: Very high (about 26.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: B/D
Ecological site: F144AY043MA - Acidic Organic Wetlands
Hydric soil rating: Yes

Minor Components

Natchaug

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

Whitman

Percent of map unit: 6 percent
Landform: Drainageways, depressions
Landform position (three-dimensional): Base slope
Down-slope shape: Concave

Across-slope shape: Concave
Hydric soil rating: Yes

Timakwa

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

Scarboro

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

29B—Agawam fine sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2tyqx
Elevation: 0 to 820 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 250 days
Farmland classification: All areas are prime farmland

Map Unit Composition

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

Description of Agawam

Setting

Landform: Outwash terraces
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Coarse-loamy eolian deposits over sandy and gravelly glaciofluvial deposits derived from gneiss and/or granite and/or schist and/or phyllite

Typical profile

Ap - 0 to 11 inches: fine sandy loam
Bw1 - 11 to 16 inches: fine sandy loam
Bw2 - 16 to 26 inches: fine sandy loam
2C1 - 26 to 45 inches: loamy fine sand

2C2 - 45 to 55 inches: loamy fine sand
2C3 - 55 to 65 inches: loamy sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 15 to 35 inches to strongly contrasting textural stratification
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: B
Ecological site: F145XY008MA - Dry Outwash
Hydric soil rating: No

Minor Components

Merrimac

Percent of map unit: 5 percent
Landform: Outwash terraces
Landform position (three-dimensional): Riser, tread
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: F145XY008MA - Dry Outwash
Hydric soil rating: No

Ninigret

Percent of map unit: 4 percent
Landform: Terraces
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

Walpole

Percent of map unit: 3 percent
Landform: Deltas, depressions, outwash terraces, depressions, outwash plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Hinckley

Percent of map unit: 3 percent
Landform: Eskers
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex

Ecological site: F145XY008MA - Dry Outwash
Hydric soil rating: No

45A—Woodbridge fine sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2w686
Elevation: 0 to 1,420 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

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

Description of Woodbridge

Setting

Landform: Ground moraines, hills, drumlins
Landform position (two-dimensional): Footslope, summit
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Ap - 0 to 7 inches: fine sandy loam
Bw1 - 7 to 18 inches: fine sandy loam
Bw2 - 18 to 30 inches: fine sandy loam
Cd - 30 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 20 to 39 inches to densic material
Drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w

Hydrologic Soil Group: C/D
Ecological site: F144AY037MA - Moist Dense Till Uplands
Hydric soil rating: No

Minor Components

Paxton
Percent of map unit: 7 percent
Landform: Ground moraines, hills, drumlins
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Ridgebury
Percent of map unit: 6 percent
Landform: Depressions, ground moraines, drainageways, drumlins, hills
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope, head slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Sutton
Percent of map unit: 1 percent
Landform: Ground moraines, hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Whitman, extremely stony
Percent of map unit: 1 percent
Landform: Drainageways, depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

45B—Woodbridge fine sandy loam, 3 to 8 percent slopes

Map Unit Setting
National map unit symbol: 2t2ql
Elevation: 0 to 1,470 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

Woodbridge, fine sandy loam, and similar soils: 82 percent
Minor components: 18 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Woodbridge, Fine Sandy Loam

Setting

Landform: Ground moraines, drumlins, hills
Landform position (two-dimensional): Backslope, footslope, summit
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Ap - 0 to 7 inches: fine sandy loam
Bw1 - 7 to 18 inches: fine sandy loam
Bw2 - 18 to 30 inches: fine sandy loam
Cd - 30 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 20 to 39 inches to densic material
Drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C/D
Ecological site: F144AY037MA - Moist Dense Till Uplands
Hydric soil rating: No

Minor Components

Paxton

Percent of map unit: 10 percent
Landform: Drumlins, ground moraines, hills
Landform position (two-dimensional): Backslope, summit, shoulder
Landform position (three-dimensional): Side slope, crest, nose slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Ridgebury

Percent of map unit: 8 percent
Landform: Depressions, ground moraines, hills, drainageways

Landform position (two-dimensional): Toeslope, backslope, footslope
Landform position (three-dimensional): Base slope, head slope, dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

46B—Woodbridge fine sandy loam, 0 to 8 percent slopes, very stony

Map Unit Setting

National map unit symbol: 2t2qr
Elevation: 0 to 1,440 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

Woodbridge, very stony, and similar soils: 82 percent
Minor components: 18 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Woodbridge, Very Stony

Setting

Landform: Ground moraines, hills, drumlins
Landform position (two-dimensional): Backslope, footslope, summit
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Oe - 0 to 2 inches: moderately decomposed plant material
A - 2 to 9 inches: fine sandy loam
Bw1 - 9 to 20 inches: fine sandy loam
Bw2 - 20 to 32 inches: fine sandy loam
Cd - 32 to 67 inches: gravelly fine sandy loam

Properties and qualities

Slope: 0 to 8 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 20 to 43 inches to densic material
Drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 19 to 27 inches
Frequency of flooding: None
Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: C/D
Ecological site: F144AY037MA - Moist Dense Till Uplands
Hydric soil rating: No

Minor Components

Paxton, very stony

Percent of map unit: 10 percent
Landform: Ground moraines, hills, drumlins
Landform position (two-dimensional): Shoulder, backslope, summit
Landform position (three-dimensional): Crest, side slope
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Hydric soil rating: No

Ridgebury, very stony

Percent of map unit: 8 percent
Landform: Depressions, ground moraines, hills, drainageways, drumlins
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Head slope, base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

47C—Woodbridge fine sandy loam, 3 to 15 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2w685
Elevation: 10 to 1,470 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 145 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Woodbridge, extremely stony, and similar soils: 83 percent
Minor components: 17 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Woodbridge, Extremely Stony

Setting

Landform: Ground moraines, hills, drumlins
Landform position (two-dimensional): Backslope, footslope, summit

Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Oe - 0 to 2 inches: moderately decomposed plant material
A - 2 to 9 inches: fine sandy loam
Bw1 - 9 to 20 inches: fine sandy loam
Bw2 - 20 to 32 inches: fine sandy loam
Cd - 32 to 67 inches: gravelly fine sandy loam

Properties and qualities

Slope: 3 to 15 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 20 to 43 inches to densic material
Drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 19 to 27 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C/D
Ecological site: F144AY037MA - Moist Dense Till Uplands
Hydric soil rating: No

Minor Components

Paxton, extremely stony

Percent of map unit: 9 percent
Landform: Ground moraines, hills, drumlins
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Crest, side slope
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Hydric soil rating: No

Ridgebury, extremely stony

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

Sutton, extremely stony

Percent of map unit: 2 percent
Landform: Hills, ground moraines

Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Whitman, extremely stony

Percent of map unit: 1 percent
Landform: Drainageways, depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

50B—Sutton fine sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2w69j
Elevation: 0 to 1,410 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

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

Description of Sutton

Setting

Landform: Ridges, ground moraines, hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Coarse-loamy melt-out till derived from gneiss, granite, and/or schist

Typical profile

Ap - 0 to 5 inches: fine sandy loam
Bw1 - 5 to 17 inches: fine sandy loam
Bw2 - 17 to 25 inches: sandy loam
C1 - 25 to 39 inches: gravelly sandy loam
C2 - 39 to 60 inches: gravelly sandy loam

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 high (0.14 to 14.17 in/hr)
Depth to water table: About 12 to 27 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B/D
Ecological site: F144AY008CT - Moist Till Uplands
Hydric soil rating: No

Minor Components

Charlton

Percent of map unit: 9 percent
Landform: Ridges, ground moraines, hills
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Crest, side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Leicester

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

Woodbridge

Percent of map unit: 5 percent
Landform: Hills, drumlins, ground moraines
Landform position (two-dimensional): Backslope, footslope, summit
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Whitman

Percent of map unit: 1 percent
Landform: Drumlins, ground moraines, hills, drainageways, depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

51B—Sutton fine sandy loam, 0 to 8 percent slopes, very stony

Map Unit Setting

National map unit symbol: 2xfff
Elevation: 0 to 1,410 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

Sutton, very stony, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sutton, Very Stony

Setting

Landform: Ground moraines, hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Coarse-loamy melt-out till derived from gneiss, granite, and/or schist

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
A - 2 to 7 inches: fine sandy loam
Bw1 - 7 to 19 inches: fine sandy loam
Bw2 - 19 to 27 inches: sandy loam
C1 - 27 to 41 inches: gravelly sandy loam
C2 - 41 to 62 inches: gravelly sandy loam

Properties and qualities

Slope: 0 to 8 percent
Surface area covered with cobbles, stones or boulders: 1.6 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 high (0.14 to 14.17 in/hr)
Depth to water table: About 12 to 27 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B/D
Ecological site: F144AY008CT - Moist Till Uplands
Hydric soil rating: No

Minor Components

Charlton, very stony
Percent of map unit: 7 percent
Landform: Ridges, ground moraines, hills
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Crest, side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Canton, very stony
Percent of map unit: 4 percent
Landform: Moraines, hills, ridges
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Leicester, very stony
Percent of map unit: 3 percent
Landform: Depressions, ground moraines, drainageways, hills
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear, concave
Across-slope shape: Concave
Hydric soil rating: Yes

Whitman, very stony
Percent of map unit: 1 percent
Landform: Drumlins, ground moraines, hills, drainageways, depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

61B—Canton and Charlton fine sandy loams, 0 to 8 percent slopes, very stony

Map Unit Setting
National map unit symbol: 2w81v
Elevation: 0 to 1,480 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

Canton, very stony, and similar soils: 50 percent
Charlton, very stony, and similar soils: 35 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Canton, Very Stony

Setting

Landform: Moraines, hills, ridges
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope, crest, nose slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Coarse-loamy over sandy melt-out till derived from gneiss, granite, and/or schist

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
A - 2 to 5 inches: fine sandy loam
Bw1 - 5 to 16 inches: fine sandy loam
Bw2 - 16 to 22 inches: gravelly fine sandy loam
2C - 22 to 67 inches: gravelly loamy sand

Properties and qualities

Slope: 0 to 8 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 19 to 39 inches to strongly contrasting textural stratification
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.4 inches)

Interpretive groups

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

Description of Charlton, Very Stony

Setting

Landform: Ridges, ground moraines, hills
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Convex

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

Typical profile

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

Properties and qualities

Slope: 0 to 8 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): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.7 inches)

Interpretive groups

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

Minor Components

Sutton, very stony

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

Leicester, very stony

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

Chatfield, very stony

Percent of map unit: 5 percent
Landform: Ridges, hills
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Crest, side slope, nose slope
Down-slope shape: Convex
Across-slope shape: Linear, convex

Hydric soil rating: No

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

Map Unit Setting

National map unit symbol: 2w820
Elevation: 0 to 1,540 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Canton, very stony, and similar soils: 50 percent
Charlton, very stony, and similar soils: 35 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Canton, Very Stony

Setting

Landform: Moraines, hills, ridges
Landform position (two-dimensional): Backslope, summit, shoulder
Landform position (three-dimensional): Side slope, crest, nose slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Coarse-loamy over sandy melt-out till derived from gneiss, granite, and/or schist

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
A - 2 to 5 inches: fine sandy loam
Bw1 - 5 to 16 inches: fine sandy loam
Bw2 - 16 to 22 inches: gravelly fine sandy loam
2C - 22 to 67 inches: gravelly loamy sand

Properties and qualities

Slope: 8 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 19 to 39 inches to strongly contrasting textural stratification
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.4 inches)

Interpretive groups

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

Description of Charlton, Very Stony

Setting

Landform: Ridges, ground moraines, hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Coarse-loamy melt-out till derived from granite, gneiss, and/or schist

Typical profile

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

Properties and qualities

Slope: 8 to 15 percent
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): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.7 inches)

Interpretive groups

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

Minor Components

Chatfield, very stony

Percent of map unit: 5 percent
Landform: Ridges, hills
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Crest, side slope, nose slope
Down-slope shape: Convex
Across-slope shape: Linear, convex

Hydric soil rating: No

Sutton, very stony

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

Leicester, very stony

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

62C—Canton and Charlton fine sandy loams, 3 to 15 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2wks7
Elevation: 0 to 1,310 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Canton, extremely stony, and similar soils: 50 percent
Charlton, extremely stony, and similar soils: 35 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Canton, Extremely Stony

Setting

Landform: Moraines, hills, ridges
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Side slope, crest, nose slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Coarse-loamy over sandy melt-out till derived from gneiss, granite, and/or schist

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
A - 2 to 5 inches: fine sandy loam
Bw1 - 5 to 16 inches: fine sandy loam
Bw2 - 16 to 22 inches: gravelly fine sandy loam
2C - 22 to 67 inches: gravelly loamy sand

Properties and qualities

Slope: 3 to 15 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 19 to 39 inches to strongly contrasting textural stratification
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Description of Charlton, Extremely Stony

Setting

Landform: Ridges, ground moraines, hills
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Coarse-loamy melt-out till derived from granite, gneiss, and/or schist

Typical profile

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

Properties and qualities

Slope: 3 to 15 percent
Surface area covered with cobbles, stones or boulders: 9.0 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): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None

Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Minor Components

Leicester, extremely stony

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

Sutton, extremely stony

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

Chatfield, extremely stony

Percent of map unit: 5 percent
Landform: Ridges, hills
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Crest, side slope, nose slope
Down-slope shape: Convex
Across-slope shape: Linear, convex
Hydric soil rating: No

62D—Canton and Charlton fine sandy loams, 15 to 35 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2w81r
Elevation: 0 to 1,640 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 145 to 240 days

Farmland classification: Not prime farmland

Map Unit Composition

Canton, extremely stony, and similar soils: 55 percent
Charlton, extremely stony, and similar soils: 30 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Canton, Extremely Stony

Setting

Landform: Moraines, hills, ridges
Landform position (two-dimensional): Backslope, summit, shoulder
Landform position (three-dimensional): Side slope, nose slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Coarse-loamy over sandy melt-out till derived from gneiss, granite, and/or schist

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
A - 2 to 5 inches: fine sandy loam
Bw1 - 5 to 16 inches: fine sandy loam
Bw2 - 16 to 22 inches: gravelly fine sandy loam
2C - 22 to 67 inches: gravelly loamy sand

Properties and qualities

Slope: 15 to 35 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 19 to 39 inches to strongly contrasting textural stratification
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Description of Charlton, Extremely Stony

Setting

Landform: Ridges, ground moraines, hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex

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

Typical profile

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

Properties and qualities

Slope: 15 to 35 percent
Surface area covered with cobbles, stones or boulders: 9.0 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): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Minor Components

Sutton, extremely stony

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

Chatfield, extremely stony

Percent of map unit: 5 percent
Landform: Ridges, hills
Landform position (two-dimensional): Summit, backslope, shoulder
Landform position (three-dimensional): Crest, side slope, nose slope
Down-slope shape: Convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Hollis, extremely stony

Percent of map unit: 5 percent
Landform: Ridges, hills
Landform position (two-dimensional): Shoulder, backslope, summit
Landform position (three-dimensional): Crest, side slope, nose slope
Down-slope shape: Convex
Across-slope shape: Linear, convex

Hydric soil rating: No

73C—Charlton-Chatfield complex, 0 to 15 percent slopes, very rocky

Map Unit Setting

National map unit symbol: 2w698
Elevation: 0 to 1,550 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

Charlton, very stony, and similar soils: 50 percent
Chatfield, very stony, and similar soils: 30 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Charlton, Very Stony

Setting

Landform: Ridges, hills
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Side slope, crest, nose slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Coarse-loamy melt-out till derived from granite, gneiss, and/or schist

Typical profile

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

Properties and qualities

Slope: 3 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): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.7 inches)

Interpretive groups

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

Description of Chatfield, Very Stony

Setting

Landform: Hills, ridges
Landform position (two-dimensional): Backslope, summit, shoulder
Landform position (three-dimensional): Crest, side slope, nose slope
Down-slope shape: Convex
Across-slope shape: Linear, convex
Parent material: Coarse-loamy melt-out till derived from granite, gneiss, and/or schist

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 2 inches: fine sandy loam
Bw - 2 to 30 inches: gravelly fine sandy loam
2R - 30 to 40 inches: bedrock

Properties and qualities

Slope: 3 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 20 to 41 inches to lithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.3 inches)

Interpretive groups

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

Minor Components

Sutton, very stony

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

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

Hollis, very stony
Percent of map unit: 5 percent
Landform: Hills, ridges
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Crest, side slope, nose slope
Down-slope shape: Convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Leicester, very stony
Percent of map unit: 5 percent
Landform: Drainageways, depressions
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: Yes

75C—Hollis-Chatfield-Rock outcrop complex, 3 to 15 percent slopes

Map Unit Setting
National map unit symbol: 9lqn
Elevation: 0 to 1,200 feet
Mean annual precipitation: 43 to 56 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days
Farmland classification: Not prime farmland

Map Unit Composition
Hollis and similar soils: 35 percent
Chatfield and similar soils: 30 percent
Rock outcrop: 15 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hollis

Setting
Landform: Ridges, hills
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy melt-out till derived from granite and/or schist and/or gneiss

Typical profile
Oa - 0 to 1 inches: highly decomposed plant material
A - 1 to 6 inches: gravelly fine sandy loam

Bw1 - 6 to 9 inches: channery fine sandy loam
Bw2 - 9 to 15 inches: gravelly fine sandy loam
2R - 15 to 80 inches: bedrock

Properties and qualities

Slope: 3 to 15 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 5.95 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 1.8 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 Chatfield

Setting

Landform: Ridges, hills
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Coarse-loamy melt-out till derived from granite and/or schist and/or gneiss

Typical profile

Oa - 0 to 1 inches: highly decomposed plant material
A - 1 to 6 inches: gravelly fine sandy loam
Bw1 - 6 to 15 inches: gravelly fine sandy loam
Bw2 - 15 to 29 inches: gravelly fine sandy loam
2R - 29 to 80 inches: unweathered bedrock

Properties and qualities

Slope: 3 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 5.95 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 3.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B

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

Description of Rock Outcrop

Typical profile
R - 0 to 0 inches: bedrock

Properties and qualities
Slope: 3 to 15 percent
Depth to restrictive feature: 0 inches to lithic bedrock
Runoff class: Very high

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D
Hydric soil rating: Unranked

Minor Components

Charlton
Percent of map unit: 7 percent
Landform: Hills
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Sutton, very stony
Percent of map unit: 5 percent
Landform: Drainageways, depressions
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Leicester
Percent of map unit: 5 percent
Landform: Drainageways, depressions
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: Yes

Brimfield
Percent of map unit: 1 percent
Landform: Ridges, hills
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Unnamed, red parent material
Percent of map unit: 1 percent
Hydric soil rating: No

Unnamed, sandy subsoil
Percent of map unit: 1 percent
Hydric soil rating: No

84B—Paxton and Montauk fine sandy loams, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2t2qn
Elevation: 0 to 1,570 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

Paxton and similar soils: 55 percent
Montauk and similar soils: 30 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Paxton

Setting

Landform: Ground moraines, drumlins, hills
Landform position (two-dimensional): Backslope, summit, shoulder
Landform position (three-dimensional): Nose slope, side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Ap - 0 to 8 inches: fine sandy loam
Bw1 - 8 to 15 inches: fine sandy loam
Bw2 - 15 to 26 inches: fine sandy loam
Cd - 26 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 18 to 39 inches to densic material
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 18 to 37 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: C
Ecological site: F144AY007CT - Well Drained Dense Till Uplands
Hydric soil rating: No

Description of Montauk

Setting

Landform: Hills, drumlins
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

A - 0 to 4 inches: fine sandy loam
Bw1 - 4 to 14 inches: fine sandy loam
Bw2 - 14 to 25 inches: sandy loam
2Cd1 - 25 to 39 inches: gravelly loamy coarse sand
2Cd2 - 39 to 60 inches: gravelly sandy loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 20 to 38 inches to densic material
Drainage class: Well drained
Runoff class: Low
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: About 24 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: F144AY007CT - Well Drained Dense Till Uplands
Hydric soil rating: No

Minor Components

Woodbridge

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

Ridgebury

Percent of map unit: 5 percent
Landform: Depressions, ground moraines, hills, drainageways
Landform position (two-dimensional): Toeslope, backslope, footslope

Landform position (three-dimensional): Base slope, head slope, dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Charlton

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

85B—Paxton and Montauk fine sandy loams, 3 to 8 percent slopes, very stony

Map Unit Setting

National map unit symbol: 2w679
Elevation: 0 to 1,530 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 145 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Paxton, very stony, and similar soils: 55 percent
Montauk, very stony, and similar soils: 30 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Paxton, Very Stony

Setting

Landform: Hills, ground moraines, drumlins
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Oe - 0 to 2 inches: moderately decomposed plant material
A - 2 to 10 inches: fine sandy loam
Bw1 - 10 to 17 inches: fine sandy loam
Bw2 - 17 to 28 inches: fine sandy loam
Cd - 28 to 67 inches: gravelly fine sandy loam

Properties and qualities

Slope: 3 to 8 percent

Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 20 to 43 inches to densic material
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 18 to 37 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: C
Ecological site: F144AY007CT - Well Drained Dense Till Uplands
Hydric soil rating: No

Description of Montauk, Very Stony

Setting

Landform: Recessionial moraines, ground moraines, hills, drumlins
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Coarse-loamy over sandy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Oe - 0 to 2 inches: moderately decomposed plant material
A - 2 to 6 inches: fine sandy loam
Bw1 - 6 to 28 inches: fine sandy loam
Bw2 - 28 to 36 inches: sandy loam
2Cd - 36 to 74 inches: gravelly loamy sand

Properties and qualities

Slope: 3 to 8 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 20 to 43 inches to densic material
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 1.42 in/hr)
Depth to water table: About 18 to 37 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 5.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: C
Ecological site: F144AY007CT - Well Drained Dense Till Uplands
Hydric soil rating: No

Minor Components

Woodbridge, very stony
Percent of map unit: 8 percent
Landform: Ground moraines, hills, drumlins
Landform position (two-dimensional): Backslope, footslope, summit
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Charlton, very stony
Percent of map unit: 3 percent
Landform: Hills
Landform position (two-dimensional): Shoulder, summit, backslope
Landform position (three-dimensional): Crest, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Ridgebury, very stony
Percent of map unit: 3 percent
Landform: Drumlins, depressions, ground moraines, hills, drainageways
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope, head slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Stockbridge, very stony
Percent of map unit: 1 percent
Landform: Hills
Landform position (two-dimensional): Shoulder, backslope, summit
Landform position (three-dimensional): Crest, side slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

86D—Paxton and Montauk fine sandy loams, 15 to 35 percent slopes, extremely stony

Map Unit Setting
National map unit symbol: 2w67c
Elevation: 0 to 1,400 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 145 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Paxton, extremely stony, and similar soils: 55 percent
Montauk, extremely stony, and similar soils: 30 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Paxton, Extremely Stony

Setting

Landform: Ground moraines, hills, drumlins
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Oe - 0 to 2 inches: moderately decomposed plant material
A - 2 to 10 inches: fine sandy loam
Bw1 - 10 to 17 inches: fine sandy loam
Bw2 - 17 to 28 inches: fine sandy loam
Cd - 28 to 67 inches: gravelly fine sandy loam

Properties and qualities

Slope: 15 to 35 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 20 to 43 inches to densic material
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 18 to 37 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C
Ecological site: F144AY007CT - Well Drained Dense Till Uplands
Hydric soil rating: No

Description of Montauk, Extremely Stony

Setting

Landform: Hills, recessionial moraines, ground moraines, drumlins
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Coarse-loamy over sandy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Oe - 0 to 2 inches: moderately decomposed plant material
A - 2 to 6 inches: fine sandy loam
Bw1 - 6 to 28 inches: fine sandy loam
Bw2 - 28 to 36 inches: sandy loam
2Cd - 36 to 74 inches: gravelly loamy sand

Properties and qualities

Slope: 15 to 35 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 20 to 43 inches to densic material
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 1.42 in/hr)
Depth to water table: About 18 to 37 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 5.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C
Ecological site: F144AY007CT - Well Drained Dense Till Uplands
Hydric soil rating: No

Minor Components

Charlton, extremely stony

Percent of map unit: 6 percent
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Woodbridge, extremely stony

Percent of map unit: 5 percent
Landform: Ground moraines, hills, drumlins
Landform position (two-dimensional): Backslope, footslope, summit
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Ridgebury, extremely stony

Percent of map unit: 3 percent
Landform: Drumlins, depressions, ground moraines, hills, drainageways
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope, head slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Stockbridge, extremely stony

Percent of map unit: 1 percent
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

103—Rippowam fine sandy loam

Map Unit Setting

National map unit symbol: 9ljp
Elevation: 0 to 1,200 feet
Mean annual precipitation: 43 to 54 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

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

Description of Rippowam

Setting

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

Typical profile

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

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: About 0 to 18 inches

Frequency of flooding: Frequent
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: B/D
Ecological site: F144AY014CT - Wet Sandy Low Floodplain
Hydric soil rating: Yes

Minor Components

Occum

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

Suncook

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

Lim

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

Pootatuck

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

Limerick

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

Saco

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

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

Map Unit Setting

National map unit symbol: 2y07g
Elevation: 0 to 1,260 feet
Mean annual precipitation: 43 to 54 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days
Farmland classification: All areas are prime farmland

Map Unit Composition

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

Description of Tisbury

Setting

Landform: Outwash terraces, deltas, outwash plains, valley trains
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Coarse-silty eolian deposits over sandy and gravelly glaciofluvial deposits derived from granite, schist, and/or gneiss

Typical profile

Ap - 0 to 8 inches: silt loam
Bw1 - 8 to 18 inches: silt loam
Bw2 - 18 to 26 inches: silt loam
2C - 26 to 65 inches: extremely gravelly sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 24 to 36 inches to strongly contrasting textural stratification
Drainage class: Moderately well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: About 16 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B/D
Ecological site: F144AY026CT - Moist Silty Outwash

Hydric soil rating: No

Minor Components

Merrimac

Percent of map unit: 5 percent
Landform: Outwash plains, outwash terraces, moraines, eskers, kames
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Side slope, crest, tread
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Agawam

Percent of map unit: 5 percent
Landform: Kame terraces, outwash plains, outwash terraces, moraines, kames
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Side slope, crest, tread
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Ninigret

Percent of map unit: 3 percent
Landform: Kames, outwash terraces, kame terraces, outwash plains, moraines
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope, tread
Down-slope shape: Convex, linear
Across-slope shape: Convex, concave
Hydric soil rating: No

Raypol

Percent of map unit: 2 percent
Landform: Drainageways, depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

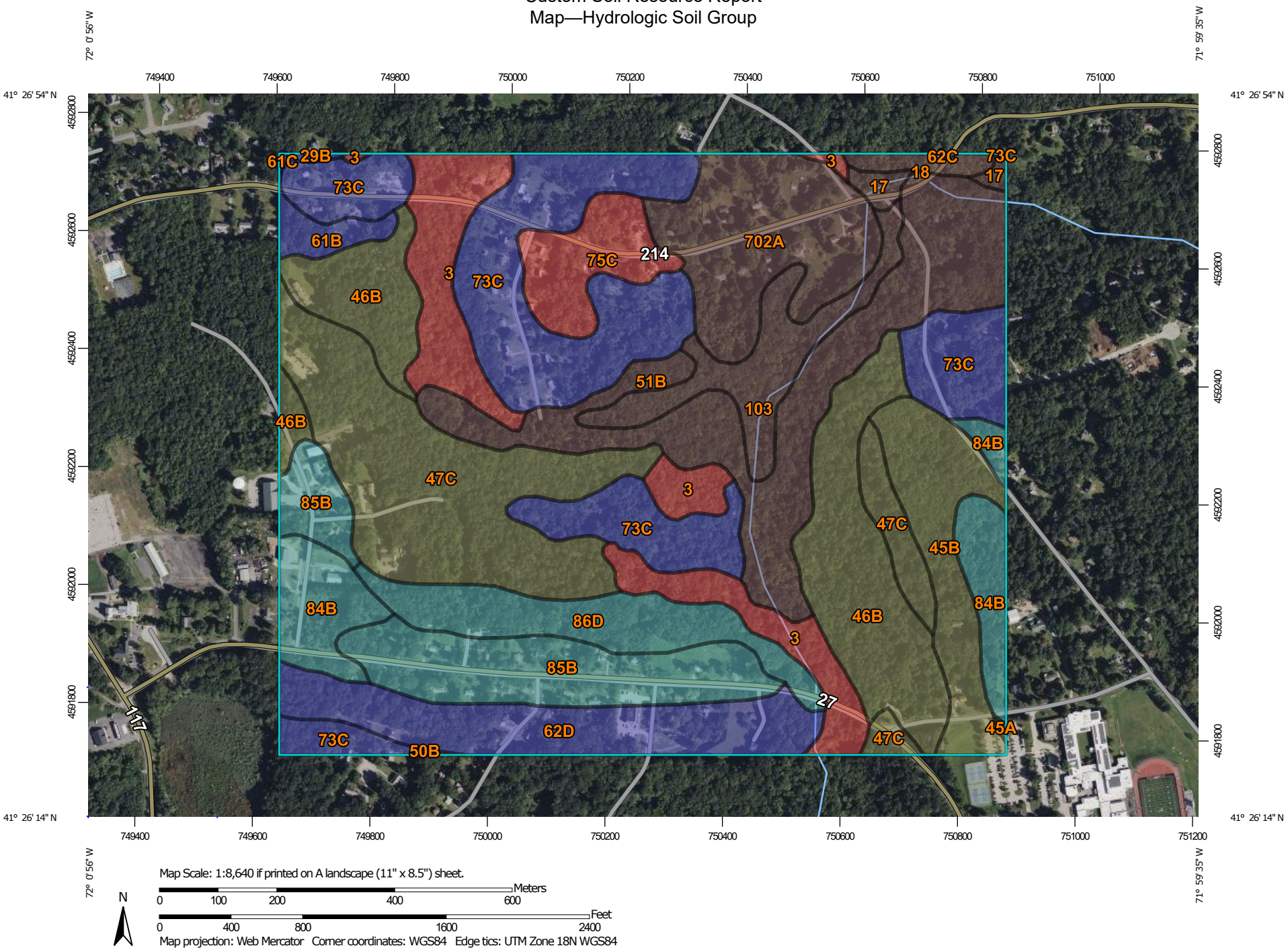
Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Custom Soil Resource Report
Map—Hydrologic Soil Group



Map Scale: 1:8,640 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 100 200 400 600

Feet: 0 400 800 1600 2400

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

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

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

Background

- Aerial Photography

MAP INFORMATION

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

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

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

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

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

Soil Survey Area: State of Connecticut, Eastern Part
Survey Area Data: Version 1, Sep 15, 2023

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

Date(s) aerial images were photographed: Jun 14, 2022—Oct 6, 2022

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

Table—Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
3	Ridgebury, Leicester, and Whitman soils, 0 to 8 percent slopes, extremely stony	D	22.7	7.3%
17	Timakwa and Natchaug soils, 0 to 2 percent slopes	B/D	1.7	0.5%
18	Catden and Freetown soils, 0 to 2 percent slopes	B/D	1.9	0.6%
29B	Agawam fine sandy loam, 3 to 8 percent slopes	B	0.3	0.1%
45A	Woodbridge fine sandy loam, 0 to 3 percent slopes	C/D	0.1	0.0%
45B	Woodbridge fine sandy loam, 3 to 8 percent slopes	C/D	14.5	4.6%
46B	Woodbridge fine sandy loam, 0 to 8 percent slopes, very stony	C/D	31.3	10.0%
47C	Woodbridge fine sandy loam, 3 to 15 percent slopes, extremely stony	C/D	40.0	12.8%
50B	Sutton fine sandy loam, 3 to 8 percent slopes	B/D	0.1	0.0%
51B	Sutton fine sandy loam, 0 to 8 percent slopes, very stony	B/D	34.3	11.0%
61B	Canton and Charlton fine sandy loams, 0 to 8 percent slopes, very stony	B	2.9	0.9%
61C	Canton and Charlton fine sandy loams, 8 to 15 percent slopes, very stony	B	0.1	0.0%
62C	Canton and Charlton fine sandy loams, 3 to 15 percent slopes, extremely stony	B	0.1	0.0%
62D	Canton and Charlton fine sandy loams, 15 to 35 percent slopes, extremely stony	B	19.4	6.2%
73C	Charlton-Chatfield complex, 0 to 15 percent slopes, very rocky	B	49.8	15.9%

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
75C	Hollis-Chatfield-Rock outcrop complex, 3 to 15 percent slopes	D	9.0	2.9%
84B	Paxton and Montauk fine sandy loams, 3 to 8 percent slopes	C	14.1	4.5%
85B	Paxton and Montauk fine sandy loams, 3 to 8 percent slopes, very stony	C	23.0	7.3%
86D	Paxton and Montauk fine sandy loams, 15 to 35 percent slopes, extremely stony	C	14.0	4.5%
103	Rippowam fine sandy loam	B/D	11.8	3.8%
702A	Tisbury silt loam, 0 to 3 percent slopes	B/D	21.7	6.9%
Totals for Area of Interest			**312.8**	**100.0%**

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

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APPENDIX G

Test Pits & Infiltration Results

GRADING LEGEND

- DIRECTION OF SURFACE DRAINAGE FLOW
- PROPOSED INTERMEDIATE CONTOUR (125)
- PROPOSED INDEX CONTOUR (120)
- PROPOSED SPOT ELEVATION (TW 123.45, BW 122.45; 123.45)
- MATCH EXISTING SPOT ELEVATION (123.45 (ME))
- FLUSH CONDITION
- ACCESSIBLE ROUTE
- SOIL BORING LOCATION (B-#)

DRAINAGE AND UTILITIES LEGEND

- STORM DRAINAGE PIPE
- CATCH BASIN
- DRAINAGE MANHOLE
- AREA/YARD DRAIN
- TREATMENT UNIT
- ROOF LEADER (RL)
- SANITARY MANHOLE (S)
- SANITARY SEWER (SAN)
- VENT LINE (VENT)
- CLEANOUT (CO)
- WATER LINE / FIRE LINE (W)
- WATER LINE DOMESTIC (W)
- WATER GATE VALVE
- WATER TAPPING SLEEVE
- WATER METER
- ELECTRIC / COMM. DUCT BANK
- ELECTRIC / COMM. DUCT BANK (E)
- GAS LINE
- GAS METER (G)
- CO_2 SUPPLY
- COMMUNICATION CONDUITS
- EXISTING DRINKING WATER WELL
- EXISTING LEACHING FIELD
- EXISTING SEPTIC TANK

Legend

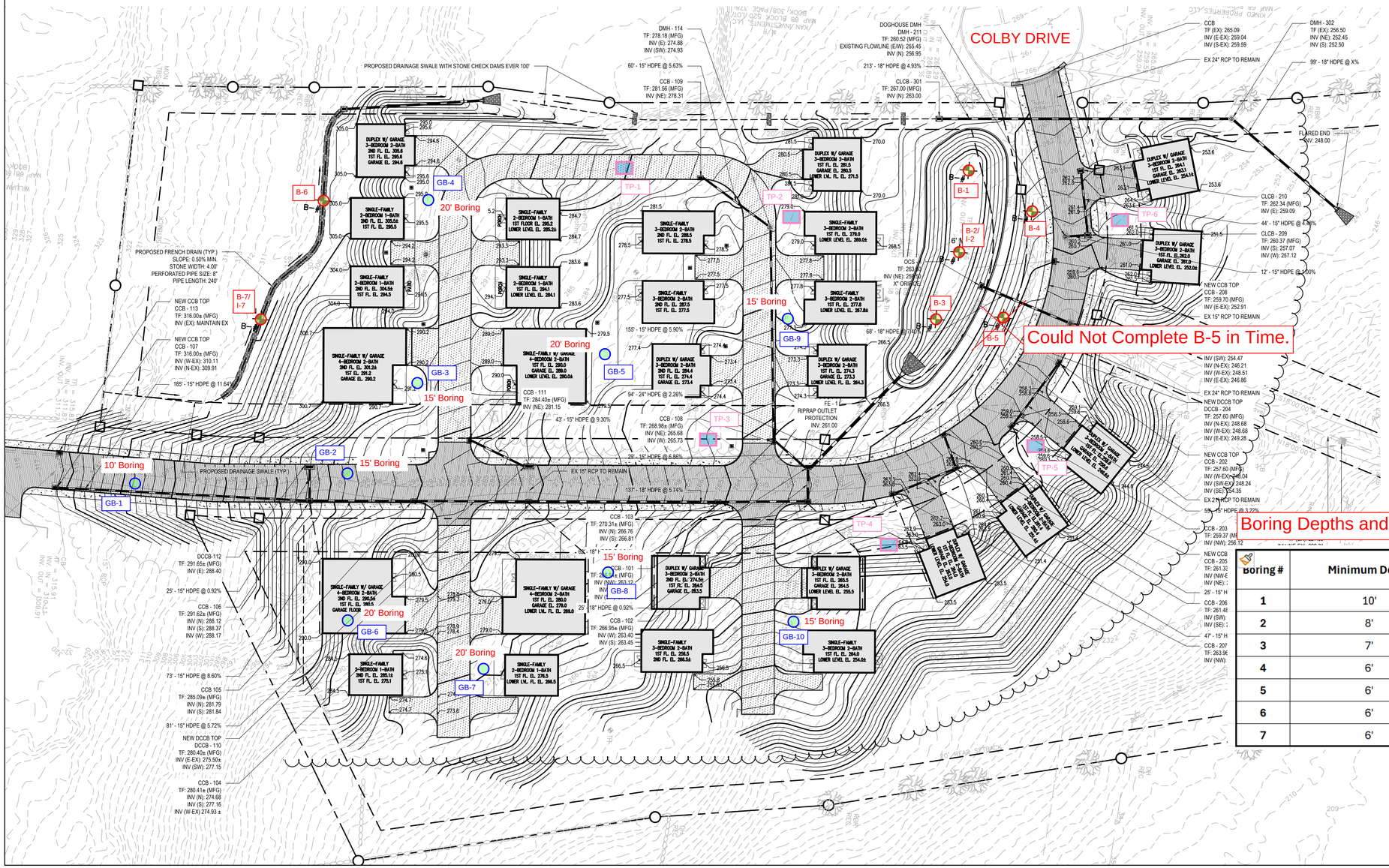
- Stormwater Boring
- Geotech Boring
- Geotech Test Pit

ACCESSIBILITY NOTES

1. SLOPES ALONG THE ACCESSIBLE ROUTE SHALL BE LESS THAN 1:20 (5%) AND THE CROSS SLOPES SHALL NOT EXCEED 1:50 (2%). CHANGES IN LEVELS SHALL NOT BE GREATER THAN ¼ INCH.
2. LANDINGS SHALL NOT HAVE A SLOPE GREATER THAN 1:50 (2%) IN ANY DIRECTION.
3. SLOPES WITHIN THE ACCESSIBLE PARKING SPACE SHALL NOT EXCEED 1:50 (2%) IN ANY DIRECTION.

DRAINAGE NOTES

1. CONTRACTOR SHALL NOTIFY "CALL BEFORE YOU DIG" (1-800-922-4455) AND VERIFY UTILITY MARK-OUT WITH THE OWNER PRIOR TO THE INITIATION OF ANY SITE DISTURBANCE.
2. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR VERIFICATION OF THE LOCATION AND NATURE OF ALL SUBSURFACE UTILITIES AT THE PROJECT WHICH MAY BE AFFECTED BY THE WORK. COORDINATE WITH RESPECTIVE UTILITY OWNERS AND PERFORM VERIFICATION OF TYPE, LOCATION, AND INVERTS AS REQUIRED.
3. THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY AND ALL DISCREPANCIES BETWEEN EXISTING CONDITIONS AND THE CONTRACT DOCUMENTS BEFORE PROCEEDING WITH THAT PORTION OF THE WORK.
4. THE LOCATIONS OF EXISTING SITE FEATURES AS SHOWN HAVE BEEN OBTAINED FROM MAPS, SURVEYS, FIELD INSPECTIONS, AND OTHER AVAILABLE INFORMATION. THEY MUST BE CONSIDERED APPROXIMATE BOTH TO LOCATION, SIZE, AND AS-BUILT CONDITION AND ARE PROVIDED FOR INFORMATIONAL PURPOSES ONLY. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR DETERMINING ACTUAL FIELD CONDITIONS.
5. THE DIMENSIONS SHOWN ON THE PLANS, INCLUDING THE INTENDED DIMENSIONS OF THE WORK, MAY VARY FROM ACTUAL EXISTING CONDITIONS IN THE FIELD. THE CONTRACTOR SHALL TAKE APPROPRIATE MEASUREMENTS TO VERIFY ALL DIMENSIONS SHOWN ON THE DRAWINGS AS WELL AS OTHER DIMENSIONS HE MAY DEEM APPROPRIATE TO FACILITATE THE COMPLETION OF THE WORK. NOTIFY THE ENGINEER OF ANY DISCREPANCIES BETWEEN EXISTING CONDITIONS AND THE CONTRACT DOCUMENTS BEFORE PROCEEDING WITH THAT PORTION OF THE WORK.
6. UNLESS OTHERWISE INDICATED, ALL DISTURBED AREAS SHALL BE RESTORED WITH SIX (6) INCHES OF LOAM, SEEDED, FERTILIZED, AND MULCHED. PROVIDE ADDITIONAL EROSION CONTROLS AS REQUIRED.
7. COMPLY WITH CONNECTICUT BUILDING CODE FOR ALL SITE CONSTRUCTION, INCLUDING HANDICAPPED ACCESSIBILITY.
8. THE CROSS-SLOPE OF ALL SIDEWALKS AND WALKWAYS SHALL BE LESS THAN 1V:50H (2.00%). UNLESS OTHERWISE INDICATED, THE MAXIMUM RUNNING SLOPE OF ALL SIDEWALKS AND WALKWAYS SHALL BE LESS THAN 1V:20H (5%). VERIFY GRADES AND SLOPES PRIOR TO CONCRETE PLACEMENT. REPORT DISCREPANCIES TO THE ENGINEER BEFORE PROCEEDING WITH THE WORK.
10. ENGAGE A CONNECTICUT-LICENSED LAND SURVEYOR TO PERFORM LAND-SURVEYING SERVICES REQUIRED, INCLUDING, BUT NOT LIMITED TO VERIFICATION AND LAYOUT OF BASELINES, PROPOSED IMPROVEMENTS, DIMENSIONS AND ELEVATIONS. REPORT DISCREPANCIES TO THE ENGINEER.
11. PROPOSED GRADES INDICATE DESIGN INTENT. VERIFY ELEVATIONS AND MAKE ADJUSTMENTS TO MEET FIELD CONDITIONS. DO NOT PROCEED WITH ANY ADJUSTMENT OR FIELD MODIFICATION UNTIL APPROVED BY THE ENGINEER.
12. GRADE TRANSITION BETWEEN TOPOGRAPHIC LINES AND SPOT GRADES SHALL BE UNIFORM UNLESS OTHERWISE INDICATED.
13. MAXIMUM LANDSCAPE SLOPES SHALL BE 3(H):1(V) UNLESS OTHERWISE INDICATED.
14. ALL DRAINAGE PIPE SHALL BE HIGH DENSITY POLYETHYLENE PIPE (HDPE), UNLESS OTHERWISE INDICATED. SEE SPECIFICATIONS. ALL PROPOSED DRAINAGE PIPE UNDER ROADWAY WITH LESS THAN TWO (2) FEET OF COVER SHALL BE CLASS V RCP.
15. ALL CATCH BASINS SET AGAINST CURBS SHALL BE CONNDOT TYPE "C" AND THOSE NOT AGAINST CURBING SHALL BE CONNDOT TYPE "C-L".
16. GRADE ELEVATIONS ADJACENT BUILDINGS SHALL BE NO HIGHER THAN 8" BELOW FINISH FLOOR EXCEPT AT BUILDING ENTRANCES.
17. AT THE CONCLUSION OF THE WORK, CONTRACTOR SHALL REMOVE ALL ACCUMULATED SEDIMENT MATERIAL FROM ALL PORTIONS OF THE STORM DRAINAGE SYSTEM



Boring #	Minimum Depth	Approximate Depth of Infiltration Testing
1	10'	~~5-6'~~
2	8'	3-4'
3	7'	~~2-3'~~
4	6'	~~1-2'~~
5	6'	~~1-2'~~
6	6'	2-3'
7	6'	2-3'

0 40 100 160
SCALE: 1" = 40'

Prepared by:
benesch
Alfred Benesch & Company
120 Hebron Avenue, 2nd Floor
Glastonbury, Connecticut 06033
860-633-8341

Prepared for:
Habitat for Humanity® of Eastern Connecticut

HABITAT FOR HUMANITY RESIDENTIAL DEVELOPMENT LOTS 8, 9 & 11

COLBY DRIVE LEDYARD, CT

DATE:	REVISION:

KEY PLAN

0 40' 80'
SCALE: 1" = 40'

PROJECT NO.: 0725 500010.00 DRAWN BY: GSL, NL
SCALE: AS SHOWN CHECKED BY: WGW

BORING LOCATION PLAN

DRAWING NO.:
G1.0

DOWN TO EARTH CONSULTING, LLC
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERING

Test Boring Falling Head Test
Proposed Habitat for Humanity Development
Colby Drive
Ledyard, CT
File No. 0015-046.00

Test Location: I-2
Test Type: Falling Head
Date: 11/5/2024

Driller: J. Casson
Engineer: M. Fekieta
Weather: Sunny, 60s

Ground surface El.: 262.0 (ft.)
Top of Casing El.: 264.5 (ft.)
Bottom of Casing El.: 259.0 (ft.)

Total Casing Length: 5.5 (ft.)

Inside Casing Diameter: 4 (in.)

Hydraulic Conductivity (Kv) = π [D {Ln (h1/h2) }] / 11 (t2-t1)

Elapsed Time (min.)	t2 - t1 (min.)	DTW (in.)	h1 (in.)	h2 (in.)	ln(h1/h2)	Kv (in/min)	Kv (cm/sec)	Kv (in/hr)
4.0	4.0	0.5	66.5	66.0	0.0075	2.2E-03	9.1E-05	1.3E-01
8	4.0	1.3	66.0	65.3	0.0114	3.3E-03	1.4E-04	2.0E-01
12	4.0	2.0	65.3	64.5	0.0116	3.3E-03	1.4E-04	2.0E-01
24	12.0	4.0	64.5	62.5	0.0315	3.0E-03	1.3E-04	1.8E-01
36	12.0	6.0	62.5	60.5	0.0325	3.1E-03	1.3E-04	1.9E-01
58	22.0	10.0	60.5	56.5	0.0684	3.6E-03	1.5E-04	2.1E-01
100	42.0	17.0	56.5	49.5	0.1323	3.6E-03	1.5E-04	2.2E-01
144	44.0	23.0	49.5	43.5	0.1292	3.4E-03	1.4E-04	2.0E-01
171	27.0	27.3	43.5	39.3	0.1028	4.3E-03	1.8E-04	2.6E-01
214	43.0	33.0	39.3	33.5	0.1584	4.2E-03	1.8E-04	2.5E-01
245	31.0	36.5	33.5	30.0	0.1103	4.1E-03	1.7E-04	2.4E-01

Average	3.4E-03	1.5E-04	2.1E-01

DOWN TO EARTH CONSULTING, LLC
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERING

Test Boring Falling Head Test
Proposed Habitat for Humanity Development
Colby Drive
Ledyard, CT
File No. 0015-046.00

Test Location: I-7
Test Type: Falling Head
Date: 11/5/2024

Driller: Jim Casson
Engineer: M. Fekieta
Weather: Sunny 60s

Ground surface El.: 311.0 (ft.)
Top of Casing El.: 313.4 (ft.)
Bottom of Casing El.: 307.9 (ft.)

Total Casing Length: 5.5 (ft.)

Inside Casing Diameter: 4 (in.)

Hydraulic Conductivity (Kv) = π [D {Ln (h1/h2) }] / 11 (t2-t1)

Elapsed Time (min.)	t2 - t1 (min.)	DTW (in.)	h1 (in.)	h2 (in.)	ln(h1/h2)	Kv (in/min)	Kv (cm/sec)	Kv (in/hr)
1.0	1.0	0.5	66.0	65.5	0.0076	8.7E-03	3.7E-04	5.2E-01
2	1.0	1.3	65.5	64.8	0.0115	1.3E-02	5.6E-04	7.9E-01
4	2.0	3.0	64.8	63.0	0.0274	1.6E-02	6.6E-04	9.4E-01
6	2.0	4.5	63.0	61.5	0.0241	1.4E-02	5.8E-04	8.3E-01
10	4.0	7.5	61.5	58.5	0.0500	1.4E-02	6.0E-04	8.6E-01
16	6.0	11.8	58.5	54.3	0.0754	1.4E-02	6.1E-04	8.6E-01
32	16.0	21.8	54.3	44.3	0.2037	1.5E-02	6.2E-04	8.7E-01
45	13.0	29.5	44.3	36.5	0.1925	1.7E-02	7.2E-04	1.0E+00
70	25.0	40.8	36.5	25.3	0.3685	1.7E-02	7.1E-04	1.0E+00
89	19.0	48.0	25.3	18.0	0.3385	2.0E-02	8.6E-04	1.2E+00
105	16.0	53.0	18.0	13.0	0.3254	2.3E-02	9.8E-04	1.4E+00

Average	1.6E-02	6.6E-04	9.4E-01

DOWN TO EARTH CONSULTING, LLC
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERING

PROJECT
PROPOSED HABITAT FOR HUMANITY DEVELOPMENT
COLBY DRIVE
LEDYARD, CONNECTICUT

BORING NO. B-1
SHEET 1 of 1
FILE NO. 0015-046.00
CHKD. BY TJO

Boring Co.	General Borings, Inc.	Boring Location	See Boring Location Plan		
Driller	Jim Casson	Ground Surface El.	264.5'+/-	Datum	Not Available
Logged By	Mateusz Fekieta	Date Start	10/24/2024	Date End	11/5/2024

Hammer Type:	Automatic Hammer
Sampler Size:	1-3/8" I.D. Split Spoon
Type Drill Rig:	Truck Mounted Diedrich D-50
Drilling Method:	3.25-inch I.D. Hollow-Stem Augers

Groundwater Readings (from ground surface)

Date	Time	Depth (ft)	Elev.	Stabilization Time
11/5/24	-	7	-	Moist Sample
11/5/24	-	10.5	254'+/-	End of Boring

DEPTH	Casing Blows (ft)	Type & No.	REC/PEN (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	Core Time (min./ft)	SAMPLE DESCRIPTION	STRATA
1		S-1	15/24	0 to 2	1-2-4-4		Loose, gray-brown, fine to coarse SAND, some Silt, little fine to coarse Gravel, trace (-) Roots	6"+/- Topsoil
2								SUBSOIL
3		S-2	18/24	2 to 4	7-17-28-38		Dense, brown, fine to coarse SAND, some Silt, little fine to coarse Gravel	
4								
5								
6		S-3	20/24	5 to 7	14-32-17-20		Dense, brown, fine to coarse SAND, some Silt, little fine to coarse Gravel	TILL
7								
8		S-4	20/24	7 to 9	29-14-19-25		Dense, brown, fine to coarse SAND, little Silt, little fine to coarse Gravel, moist	
9								
10		S-5	18/18	9 to 10.5	17-29-50/6"		Very dense, gray, fine to coarse SAND, some Silt, little fine to coarse Gravel	
11								
12							END OF EXPLORATION AT 10.5 FEET BELOW GROUND SURFACE	
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SPT N-Values	SPT N-Values	Proportions
0 to 4 - Very Loose	0 to 2 - Very Soft	Trace = 0 to 10%
5 to 10 - Loose	3 to 4 - Soft	Little = 10 to 20%
11 to 30 - Medium Dense	5 to 8 - Medium Stiff	Some = 20 to 35%
31 to 50 - Dense	9 to 15 - Stiff	And = 35 to 50%
Over 50 - Very Dense	16 to 30 - Very Stiff	
	Over 30 - Hard	

SYMBOL KEY

1. S denotes split-barrel sampler.	7. WH denotes weight of hammer
2. ST denotes 3-inch O.D. undisturbed sample.	8. WR denotes weight of rods
3. UO denotes 3-inch Osterberg undisturbed sample.	9. PP denotes Pocket Penetrometer.
4. PEN denotes penetration length of sampler.	10. FVST denotes field vane shear test.
5. REC denotes recovered length of sample.	11. RQD denotes Rock Quality Designation.
6. SPT denotes Standard Penetration Test.	12. C denotes core run number.

FIELD NOTES: 1) Stratification lines represent approximate boundaries between soil types, transitions may be gradual.
2) Water level readings have been made at times and under conditions stated, fluctuations may occur due to other factors.
3) Cobbles and/or boulders were inferred based on observed auger chatter from about 4.5 to 5.5 and 8.5 to 9.5 feet below grade.

DOWN TO EARTH CONSULTING, LLC
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERING

PROJECT
PROPOSED HABITAT FOR HUMANITY DEVELOPMENT
COLBY DRIVE
LEDYARD, CONNECTICUT

BORING NO. B-2
SHEET 1 of 1
FILE NO. 0015-046.00
CHKD. BY TJO

Boring Co.	General Borings, Inc.	Boring Location	See Boring Location Plan		
Driller	Jim Casson	Ground Surface El.	262'+/-	Datum	Not Available
Logged By	Mateusz Fekieta	Date Start	10/24/2024	Date End	10/24/2024

Hammer Type:	Automatic Hammer
Sampler Size:	1-3/8" I.D. Split Spoon
Type Drill Rig:	Truck Mounted Diedrich D-50
Drilling Method:	3.25-inch I.D. Hollow-Stem Augers

Groundwater Readings (from ground surface)

Date	Time	Depth (ft)	Elev.	Stabilization Time
10/24/24	-	5	257'+/-	Perched Water

DEPTH	Casing Blows (ft)	Type & No.	REC/PEN (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	Core Time (min./ft)	SAMPLE DESCRIPTION	STRATA
1								8"+/- Topsoil
2		S-1	0/12	1 to 2	7-10-50/0"		Very dense, No Recovery	SUBSOIL
3		S-2	24/24	2 to 4	4-14-20-18		Dense, brown to gray-brown, fine to coarse SAND, some Silt, little fine to coarse Gravel	
4								
5		S-3	16/24	4 to 6	8-30-46-50		Very dense, Top 6": orange-brown, fine SAND, some Silt, wet; Bottom 10": gray-brown, fine to coarse SAND, some Silt, little fine to coarse Gravel, dry	TILL
6								
7		S-4	18/24	6 to 8	20-15-22-29		Dense, gray, fine to coarse SAND, some Silt, little fine to coarse Gravel, moist	
8								
9							END OF EXPLORATION AT 8 FEET BELOW GROUND SURFACE	
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SPT N-Values	SPT N-Values	Proportions	SYMBOL KEY	
0 to 4 - Very Loose	0 to 2 - Very Soft	Trace = 0 to 10%	1. S denotes split-barrel sampler.	7. WH denotes weight of hammer
5 to 10 - Loose	3 to 4 - Soft	Little = 10 to 20%	2. ST denotes 3-inch O.D. undisturbed sample.	8. WR denotes weight of rods
11 to 30 - Medium Dense	5 to 8 - Medium Stiff	Some = 20 to 35%	3. UO denotes 3-inch Osterberg undisturbed sample.	9. PP denotes Pocket Penetrometer.
31 to 50 - Dense	9 to 15 - Stiff	And = 35 to 50%	4. PEN denotes penetration length of sampler.	10. FVST denotes field vane shear test.
Over 50 - Very Dense	16 to 30 - Very Stiff		5. REC denotes recovered length of sample.	11. RQD denotes Rock Quality Designation.
	Over 30 - Hard		6. SPT denotes Standard Penetration Test.	12. C denotes core run number.

FIELD NOTES: 1) Stratification lines represent approximate boundaries between soil types, transitions may be gradual.
2) Water level readings have been made at times and under conditions stated, fluctuations may occur due to other factors.
3) Cobbles and/or boulders were inferred based on observed auger chatter from about 0 to 4 feet below grade.

DOWN TO EARTH CONSULTING, LLC
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERING

PROJECT
PROPOSED HABITAT FOR HUMANITY DEVELOPMENT
COLBY DRIVE
LEDYARD, CONNECTICUT

BORING NO. B-3
SHEET 1 of 1
FILE NO. 0015-046.00
CHKD. BY TJO

Boring Co.	General Borings, Inc.	Boring Location	See Boring Location Plan		
Driller	Jim Casson	Ground Surface El.	261'+/-	Datum	Not Available
Logged By	Mateusz Fekieta	Date Start	11/5/2024	Date End	11/5/2024

Hammer Type:	Automatic Hammer
Sampler Size:	1-3/8" I.D. Split Spoon
Type Drill Rig:	Truck Mounted Diedrich D-50
Drilling Method:	3.25-inch I.D. Hollow-Stem Augers

Groundwater Readings (from ground surface)

Date	Time	Depth (ft)	Elev.	Stabilization Time
11/5/24	-	-	-	Not Encountered

DEPTH	Casing Blows (ft)	SAMPLE INFORMATION Type & No.	REC/PEN (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	Core Time (min./ft)	SAMPLE DESCRIPTION	STRATA
1								9"+/- Topsoil
2		S-1	10/24	1 to 3	2-6-13-21		Medium dense, orange-brown, fine SAND, some Silt	SUBSOIL
3								
4		S-2	2/19	3 to 4.7	22-20-33-50/1"		Very dense, gray, fractured COBBLE fragments	
5								TILL
6		S-3	19/24	5 to 7	19-21-18-16		Dense, gray, fine to coarse SAND, some Silt, little fine to coarse Gravel	
7								
8							END OF EXPLORATION AT 7 FEET BELOW GROUND SURFACE	
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SPT N-Values	SPT N-Values	Proportions	SYMBOL KEY	
0 to 4 - Very Loose	0 to 2 - Very Soft	Trace = 0 to 10%	1. S denotes split-barrel sampler.	7. WH denotes weight of hammer
5 to 10 - Loose	3 to 4 - Soft	Little = 10 to 20%	2. ST denotes 3-inch O.D. undisturbed sample.	8. WR denotes weight of rods
11 to 30 - Medium Dense	5 to 8 - Medium Stiff	Some = 20 to 35%	3. UO denotes 3-inch Osterberg undisturbed sample.	9. PP denotes Pocket Penetrometer.
31 to 50 - Dense	9 to 15 - Stiff	And = 35 to 50%	4. PEN denotes penetration length of sampler.	10. FVST denotes field vane shear test.
Over 50 - Very Dense	16 to 30 - Very Stiff		5. REC denotes recovered length of sample.	11. RQD denotes Rock Quality Designation.
	Over 30 - Hard		6. SPT denotes Standard Penetration Test.	12. C denotes core run number.

FIELD NOTES: 1) Stratification lines represent approximate boundaries between soil types, transitions may be gradual.
2) Water level readings have been made at times and under conditions stated, fluctuations may occur due to other factors.
3) Cobbles and/or boulders were inferred based on observed auger chatter from about 3 to 5 feet below grade.

DOWN TO EARTH CONSULTING, LLC
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERING

PROJECT
PROPOSED HABITAT FOR HUMANITY DEVELOPMENT
COLBY DRIVE
LEDYARD, CONNECTICUT

BORING NO. B-4
SHEET 1 of 1
FILE NO. 0015-046.00
CHKD. BY TJO

Boring Co.	General Borings, Inc.	Boring Location	See Boring Location Plan		
Driller	Jim Casson	Ground Surface El.	261'+/-	Datum	Not Available
Logged By	Mateusz Fekieta	Date Start	11/5/2024	Date End	11/5/2024

Hammer Type:	Automatic Hammer
Sampler Size:	1-3/8" I.D. Split Spoon
Type Drill Rig:	Truck Mounted Diedrich D-50
Drilling Method:	3.25-inch I.D. Hollow-Stem Augers

Groundwater Readings (from ground surface)

Date	Time	Depth (ft)	Elev.	Stabilization Time
11/5/24	-	-	-	Not Encountered

DEPTH	Casing Blows (ft)	SAMPLE INFORMATION Type & No.	REC/PEN (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	Core Time (min./ft)	SAMPLE DESCRIPTION	STRATA
1		S-1	20/24	0 to 2	2-6-5-5		Medium dense, orange-brown, fine SAND, some Silt	9"+/- Topsoil
2								SUBSOIL
3		S-2	20/24	2 to 4	7-13-19-43		Dense, brown to gray, fine to coarse SAND, little fine to coarse Gravel, little Silt	TILL
4								
5		S-3	10/15	4 to 5.3	43-39-50/3"		Very dense, gray, fine to coarse SAND, some Silt, little fine to coarse Gravel	
6							END OF EXPLORATION AT 5.3 FEET BELOW GROUND SURFACE	
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SPT N-Values	SPT N-Values	Proportions	SYMBOL KEY	
0 to 4 - Very Loose	0 to 2 - Very Soft	Trace = 0 to 10%	1. S denotes split-barrel sampler.	7. WH denotes weight of hammer
5 to 10 - Loose	3 to 4 - Soft	Little = 10 to 20%	2. ST denotes 3-inch O.D. undisturbed sample.	8. WR denotes weight of rods
11 to 30 - Medium Dense	5 to 8 - Medium Stiff	Some = 20 to 35%	3. UO denotes 3-inch Osterberg undisturbed sample.	9. PP denotes Pocket Penetrometer.
31 to 50 - Dense	9 to 15 - Stiff	And = 35 to 50%	4. PEN denotes penetration length of sampler.	10. FVST denotes field vane shear test.
Over 50 - Very Dense	16 to 30 - Very Stiff		5. REC denotes recovered length of sample.	11. RQD denotes Rock Quality Designation.
	Over 30 - Hard		6. SPT denotes Standard Penetration Test.	12. C denotes core run number.

FIELD NOTES: 1) Stratification lines represent approximate boundaries between soil types, transitions may be gradual.
2) Water level readings have been made at times and under conditions stated, fluctuations may occur due to other factors.

DOWN TO EARTH CONSULTING, LLC
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERING

PROJECT
PROPOSED HABITAT FOR HUMANITY DEVELOPMENT
COLBY DRIVE
LEDYARD, CONNECTICUT

BORING NO. B-6
SHEET 1 of 1
FILE NO. 0015-046.00
CHKD. BY TJO

Boring Co.	General Borings, Inc.	Boring Location	See Boring Location Plan		
Driller	Jim Casson	Ground Surface El.	308'+/-	Datum	Not Available
Logged By	Mateusz Fekieta	Date Start	11/5/2024	Date End	11/5/2024

Hammer Type:	Automatic Hammer
Sampler Size:	1-3/8" I.D. Split Spoon
Type Drill Rig:	Truck Mounted Diedrich D-50
Drilling Method:	3.25-inch I.D. Hollow-Stem Augers

Groundwater Readings (from ground surface)

Date	Time	Depth (ft)	Elev.	Stabilization Time
11/5/24	-	-	-	Not Encountered

DEPTH	Casing Blows (ft)	SAMPLE INFORMATION Type & No.	REC/PEN (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	Core Time (min./ft)	SAMPLE DESCRIPTION	STRATA
1		S-1	10/24	0 to 2	2-4-13-26		Medium dense, dark brown, fine SAND, some Silt	8"+/- Topsoil
2								SUBSOIL
3		S-2	18/24	2 to 4	6-11-16-18		Medium dense, gray, fine to coarse SAND, little fine to coarse Gravel, little Silt	TILL
4								
5		S-3	18/24	4 to 6	17-20-34-50		Very dense, light gray, fine to coarse SAND, little fine to coarse Gravel, little Silt	
6								
7							END OF EXPLORATION AT 6 FEET BELOW GROUND SURFACE	
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SPT N-Values	SPT N-Values	Proportions
0 to 4 - Very Loose	0 to 2 - Very Soft	Trace = 0 to 10%
5 to 10 - Loose	3 to 4 - Soft	Little = 10 to 20%
11 to 30 - Medium Dense	5 to 8 - Medium Stiff	Some = 20 to 35%
31 to 50 - Dense	9 to 15 - Stiff	And = 35 to 50%
Over 50 - Very Dense	16 to 30 - Very Stiff	
	Over 30 - Hard	

SYMBOL KEY

1. S denotes split-barrel sampler.	7. WH denotes weight of hammer
2. ST denotes 3-inch O.D. undisturbed sample.	8. WR denotes weight of rods
3. UO denotes 3-inch Osterberg undisturbed sample.	9. PP denotes Pocket Penetrometer.
4. PEN denotes penetration length of sampler.	10. FVST denotes field vane shear test.
5. REC denotes recovered length of sample.	11. RQD denotes Rock Quality Designation.
6. SPT denotes Standard Penetration Test.	12. C denotes core run number.

FIELD NOTES: 1) Stratification lines represent approximate boundaries between soil types, transitions may be gradual.
2) Water level readings have been made at times and under conditions stated, fluctuations may occur due to other factors.
3) Cobbles and/or boulders were inferred based on observed auger chatter from about 0 to 5 feet below grade.
4) Multiple auger refusals between 2 to 5 feet below grade on inferred boulders.

DOWN TO EARTH CONSULTING, LLC
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERING

PROJECT
PROPOSED HABITAT FOR HUMANITY DEVELOPMENT
COLBY DRIVE
LEDYARD, CONNECTICUT

BORING NO. B-7
SHEET 1 of 1
FILE NO. 0015-046.00
CHKD. BY TJO

Boring Co.	General Borings, Inc.	Boring Location	See Boring Location Plan		
Driller	Jim Casson	Ground Surface El.	310.5'+/-	Datum	Not Available
Logged By	Mateusz Fekieta	Date Start	11/5/2024	Date End	11/5/2024

Hammer Type:	Automatic Hammer
Sampler Size:	1-3/8" I.D. Split Spoon
Type Drill Rig:	Truck Mounted Diedrich D-50
Drilling Method:	3.25-inch I.D. Hollow-Stem Augers

Groundwater Readings (from ground surface)

Date	Time	Depth (ft)	Elev.	Stabilization Time
11/5/24	-	-	-	Not Encountered

DEPTH	Casing Blows (ft)	SAMPLE INFORMATION Type & No.	REC/PEN (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	Core Time (min./ft)	SAMPLE DESCRIPTION	STRATA
1		S-1	14/24	0 to 2	2-4-3-4		Loose, brown, fine SAND, some Silt, trace (-) Roots	9"+/- Topsoil
2								SUBSOIL
3		S-2	16/24	2 to 4	8-12-16-23		Medium dense, gray, fine to coarse SAND, little fine to coarse Gravel, little Silt	
4								TILL
5		S-3	16/24	4 to 6	20-22-40-56		Very dense, light gray, fine to coarse SAND, little fine to coarse Gravel, little Silt	
6								
7							END OF EXPLORATION AT 6 FEET BELOW GROUND SURFACE	
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SPT N-Values	SPT N-Values	Proportions	SYMBOL KEY	
0 to 4 - Very Loose	0 to 2 - Very Soft	Trace = 0 to 10%	1. S denotes split-barrel sampler.	7. WH denotes weight of hammer
5 to 10 - Loose	3 to 4 - Soft	Little = 10 to 20%	2. ST denotes 3-inch O.D. undisturbed sample.	8. WR denotes weight of rods
11 to 30 - Medium Dense	5 to 8 - Medium Stiff	Some = 20 to 35%	3. UO denotes 3-inch Osterberg undisturbed sample.	9. PP denotes Pocket Penetrometer.
31 to 50 - Dense	9 to 15 - Stiff	And = 35 to 50%	4. PEN denotes penetration length of sampler.	10. FVST denotes field vane shear test.
Over 50 - Very Dense	16 to 30 - Very Stiff		5. REC denotes recovered length of sample.	11. RQD denotes Rock Quality Designation.
	Over 30 - Hard		6. SPT denotes Standard Penetration Test.	12. C denotes core run number.

FIELD NOTES: 1) Stratification lines represent approximate boundaries between soil types, transitions may be gradual.
2) Water level readings have been made at times and under conditions stated, fluctuations may occur due to other factors.
3) Cobbles and/or boulders were inferred based on observed auger chatter from about 0 to 4 feet below grade.

APPENDIX H

Outlet Protection Sizing

benesch

ENGLISH OUTLET PROTECTION

Habitat for Humanity - Ledyard CT - 0725-500010.00

									RIPRAP APRON										SCOUR HOLE							QUANTITIES	
									CHANNEL			Table 11-12 Table 11-13			TYPE C APRON												
System Outlet	Pipe Rise (in)	Pipe Span (in)	Design Year (yr)	Design Q (cfs)	Vel. (ft/s)	TW depth (ft)	Well Defined Channel (Y/N)	TW Cond.	Bottom Width (ft)	Side Slope H:1V	Riprap APRON TYPE	SCOUR HOLE? (Y/N)	La APRON LENGTH	*La Minimum (ft)*	S BED SLOPE	MAX. Shear str. (lb/ft^2)	RIPRAP TYPE	APRON WIDTH 1	APRON WIDTH 2	Type 1 or 2	$Rp^2(Q/Rp^{2.5})^{1.333}$ TW	Stone Size (ft)	Type	F (ft)	C (ft)	B (ft)	Area of Riprap (ft^2)	Volume of Riprap (CUY)
						(1)		(2)			(3)	(4)	(5)	(4)		(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(14)	(14)		
FE - 1-1/1-2	24	24	25	**10.76**	**3.43**	0	No	Min	3	3:01	A	No	13.7	*12*	*	*	Modified	6.00	15.57	N/A	*	*	*	*	*	*	147.4	5.5
FE - 2	12	12	25	**0.00**	**0**	0	No	Min	*	*	A	No	1.0	*10*	*	*	Modified	3.00	10.00	N/A	*	*	*	*	*	*	65.0	2.4
FE - 3	15	15	25	**0.71**	**2.75**	0	No	Min	*	*	A	No	4.5	*10*	*	*	Modified	3.75	10.75	N/A	*	*	*	*	*	*	65.0	2.4
FE - 4/5	36	36	25	**21.44**	**8.61**	0	No	Min	*	*	A	No	15.7	*14*	*	*	Inter.	9.00	19.99	N/A	*	*	*	*	*	*	224.2	12.5

Color Legend:
User Input | Calculated

NOTES:
The following are refernces to the CTDOT Drainage Manual:

(1) For a "free outfall" condition use the normal depth of the pipe as an approximation.
(2) Min = TW<.5(Pipe Rise), Max=TW≥.5(Pipe Rise), * - Does not apply to a well defined channel
(3) Apron type from Section 11.13.5
(4) Scour Houle? : Table 11-12.1 or Table 11-13.1 (Use column (2) to determine which table to use.)
If the velocity in column "F" is > 14fps Then a Scour Hole is required.
(5) Computed La (11.31 or 11.32)
(6) Max. Shear Stress from equation (7.12)
(7) Riprap: Type C Table 7-4
Type A & B Table 11-11
(8)Width 1: Type A & B = 3(Pipe Rise)
Type C = Comps worksheet (W_3)
(9) Width 2: Type A = 3(Pipe Rise)+.7(La)
Type B = 3(Pipe Rise)+.4(La)
Type C = Width 1
(10) Scour Hole Type: Type 1: Depth = .5(Pipe Rise)
Type 2: Depth = Pipe Rise
(see Figure 11-15)
(11) Common part of equation for stone size (d_{50})
(see equations: 11.35 and 11.36)
(12) Stone size (d_{50})
(see equations: 11.35 and 11.36)
(13) Type of Riprap required based on the stone size in (11)
(see Chart on page 11.13-5)
(14) Scour Hole dimensions
(see Figure 11-15)

APPENDIX I

Grading & Drainage Plan

benesch

GRADING LEGEND

- DIRECTION OF SURFACE DRAINAGE FLOW
- PROPOSED INTERMEDIATE CONTOUR
- PROPOSED INDEX CONTOUR
- PROPOSED SPOT ELEVATION (TW 123.45 / BW 122.45)
- MATCH EXISTING SPOT ELEVATION (123.45 (ME))
- FLUSH CONDITION
- ACCESSIBLE ROUTE
- SOIL BORING LOCATION (B-#)

DRAINAGE AND UTILITIES LEGEND

- STORM DRAINAGE PIPE
- CATCH BASIN
- DRAINAGE MANHOLE
- AREA/YARD DRAIN
- TREATMENT UNIT
- ROOF LEADER
- SANITARY MANHOLE
- SANITARY SEWER
- VENT LINE (VENT)
- CLEANOUT
- WATER LINE / FIRE LINE
- WATER LINE DOMESTIC
- WATER GATE VALVE
- WATER TAPPING SLEEVE
- WATER METER
- ELECTRIC / COMM. DUCT BANK
- ELECTRIC / COMM. DUCT BANK
- GAS LINE
- GAS METER
- CO_2 SUPPLY
- COMMUNICATION CONDUITS
- EXISTING DRINKING WATER WELL
- EXISTING LEACHING FIELD
- EXISTING SEPTIC TANK

ACCESSIBILITY NOTES

1. SLOPES ALONG THE ACCESSIBLE ROUTE SHALL BE LESS THAN 1:20 (5%) AND THE CROSS SLOPES SHALL NOT EXCEED 1:50 (2%). CHANGES IN LEVELS SHALL NOT BE GREATER THAN ¼ INCH.
2. LANDINGS SHALL NOT HAVE A SLOPE GREATER THAN 1:50 (2%) IN ANY DIRECTION.
3. SLOPES WITHIN THE ACCESSIBLE PARKING SPACE SHALL NOT EXCEED 1:50 (2%) IN ANY DIRECTION.

DRAINAGE NOTES

1. CONTRACTOR SHALL NOTIFY "CALL BEFORE YOU DIG" (1-800-922-4455) AND VERIFY UTILITY MARK-OUT WITH THE OWNER PRIOR TO THE INITIATION OF ANY SITE DISTURBANCE.
2. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR VERIFICATION OF THE LOCATION AND NATURE OF ALL SUBSURFACE UTILITIES AT THE PROJECT WHICH MAY BE AFFECTED BY THE WORK. COORDINATE WITH RESPECTIVE UTILITY OWNERS AND PERFORM VERIFICATION OF TYPE, LOCATION, AND INVERTS AS REQUIRED.
3. THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY AND ALL DISCREPANCIES BETWEEN EXISTING CONDITIONS AND THE CONTRACT DOCUMENTS BEFORE PROCEEDING WITH THAT PORTION OF THE WORK.
4. THE LOCATIONS OF EXISTING SITE FEATURES AS SHOWN HAVE BEEN OBTAINED FROM MAPS, SURVEYS, FIELD INSPECTIONS, AND OTHER AVAILABLE INFORMATION. THEY MUST BE CONSIDERED APPROXIMATE BOTH TO LOCATION, SIZE, AND AS-BUILT CONDITION AND ARE PROVIDED FOR INFORMATIONAL PURPOSES ONLY. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR DETERMINING ACTUAL FIELD CONDITIONS.
5. THE DIMENSIONS SHOWN ON THE PLANS, INCLUDING THE INTENDED DIMENSIONS OF THE WORK, MAY VARY FROM ACTUAL EXISTING CONDITIONS IN THE FIELD. THE CONTRACTOR SHALL TAKE APPROPRIATE MEASUREMENTS TO VERIFY ALL DIMENSIONS SHOWN ON THE DRAWINGS AS WELL AS OTHER DIMENSIONS HE MAY DEEM APPROPRIATE TO FACILITATE THE COMPLETION OF THE WORK. NOTIFY THE ENGINEER OF ANY DISCREPANCIES BETWEEN EXISTING CONDITIONS AND THE CONTRACT DOCUMENTS BEFORE PROCEEDING WITH THAT PORTION OF THE WORK.
6. UNLESS OTHERWISE INDICATED, ALL DISTURBED AREAS SHALL BE RESTORED WITH SIX (6) INCHES OF LOAM, SEEDED, FERTILIZED, AND MULCHED. PROVIDE ADDITIONAL EROSION CONTROLS AS REQUIRED.
7. COMPLY WITH CONNECTICUT BUILDING CODE FOR ALL SITE CONSTRUCTION, INCLUDING HANDICAPPED ACCESSIBILITY.
8. THE CROSS-SLOPE OF ALL SIDEWALKS AND WALKWAYS SHALL BE LESS THAN 1V:50H (2.00%). UNLESS OTHERWISE INDICATED, THE MAXIMUM RUNNING SLOPE OF ALL SIDEWALKS AND WALKWAYS SHALL BE LESS THAN 1V:20H (5%). VERIFY GRADES AND SLOPES PRIOR TO CONCRETE PLACEMENT. REPORT DISCREPANCIES TO THE ENGINEER BEFORE PROCEEDING WITH THE WORK.
10. ENGAGE A CONNECTICUT-LICENSED LAND SURVEYOR TO PERFORM LAND-SURVEYING SERVICES REQUIRED, INCLUDING, BUT NOT LIMITED TO VERIFICATION AND LAYOUT OF BASELINES, PROPOSED IMPROVEMENTS, DIMENSIONS AND ELEVATIONS. REPORT DISCREPANCIES TO THE ENGINEER.
11. PROPOSED GRADES INDICATE DESIGN INTENT. VERIFY ELEVATIONS AND MAKE ADJUSTMENTS TO MEET FIELD CONDITIONS. DO NOT PROCEED WITH ANY ADJUSTMENT OR FIELD MODIFICATION UNTIL APPROVED BY THE ENGINEER.
12. GRADE TRANSITION BETWEEN TOPOGRAPHIC LINES AND SPOT GRADES SHALL BE UNIFORM UNLESS OTHERWISE INDICATED.
13. MAXIMUM LANDSCAPE SLOPES SHALL BE 3(H):1(V) UNLESS OTHERWISE INDICATED.
14. ALL DRAINAGE PIPE SHALL BE HIGH DENSITY POLYETHYLENE PIPE (HDPE), UNLESS OTHERWISE INDICATED. SEE SPECIFICATIONS. ALL PROPOSED DRAINAGE PIPE UNDER ROADWAY WITH LESS THAN TWO (2) FEET OF COVER SHALL BE CLASS V RCP.
15. ALL CATCH BASINS SET AGAINST CURBS SHALL BE CONNDOT TYPE "C" AND THOSE NOT AGAINST CURBING SHALL BE CONNDOT TYPE "C-L".
16. GRADE ELEVATIONS ADJACENT BUILDINGS SHALL BE NO HIGHER THAN 8" BELOW FINISH FLOOR EXCEPT AT BUILDING ENTRANCES.
17. AT THE CONCLUSION OF THE WORK, CONTRACTOR SHALL REMOVE ALL ACCUMULATED SEDIMENT MATERIAL FROM ALL PORTIONS OF THE STORM DRAINAGE SYSTEM.
18. ANY CHANGES TO THE APPROVED PLAN REQUIRE REVIEW AND APPROVAL BY THE TOWN ENGINEER AND/OR DIRECTOR OF LAND USE & PLANNING.

Prepared by:

benesch

Alfred Benesch & Company
200 Glastonbury Boulevard, Suite 201
Glastonbury, Connecticut 06033
860-633-8341

Prepared for:

Habitat for Humanity® of Eastern Connecticut

HABITAT FOR HUMANITY MULTI-FAMILY RESIDENTIAL AFFORDABLE HOUSING DEVELOPMENT PER C.G.S. §8-30g, LOTS 8, 9 & 11

COLBY DRIVE

LEDYARD, CT

DATE:	REVISION:
09/02/2025	PER CITY STAFF COMMENTS

PROJECT NO.: 0725 500010.00
SCALE: AS SHOWN
DATE: 12/20/2024
DRAWN BY: GSL, TRS
CHECKED BY: WGW

OVERALL GRADING & DRAINAGE PLAN

DRAWING NO.:
C3.0

DRAINAGE AND UTILITIES LEGEND

- STORM DRAINAGE PIPE
- CATCH BASIN
- DRAINAGE MANHOLE
- AREA/YARD DRAIN
- TREATMENT UNIT
- ROOF LEADER
- SANITARY MANHOLE
- SANITARY SEWER
- VENT LINE
- CLEANOUT
- WATER LINE / FIRE LINE
- WATER LINE DOMESTIC
- WATER GATE VALVE
- WATER TAPPING SLEEVE
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- GAS LINE
- GAS METER
- CO_2 SUPPLY
- COMMUNICATION CONDUITS
- EXISTING DRINKING WATER WELL
- EXISTING LEACHING FIELD
- EXISTING SEPTIC TANK

DRAINAGE NOTES

1. CONTRACTOR SHALL NOTIFY "CALL BEFORE YOU DIG" (1-800-922-4455) AND VERIFY UTILITY MARK-OUT WITH THE OWNER PRIOR TO THE INITIATION OF ANY SITE DISTURBANCE.
2. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR VERIFICATION OF THE LOCATION AND NATURE OF ALL SUBSURFACE UTILITIES AT THE PROJECT WHICH MAY BE AFFECTED BY THE WORK. COORDINATE WITH RESPECTIVE UTILITY OWNERS AND PERFORM VERIFICATION OF TYPE, LOCATION, AND INVERTS AS REQUIRED.
3. THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY AND ALL DISCREPANCIES BETWEEN EXISTING CONDITIONS AND THE CONTRACT DOCUMENTS BEFORE PROCEEDING WITH THAT PORTION OF THE WORK.
4. THE LOCATIONS OF EXISTING SITE FEATURES AS SHOWN HAVE BEEN OBTAINED FROM MAPS, SURVEYS, FIELD INSPECTIONS, AND OTHER AVAILABLE INFORMATION. THEY MUST BE CONSIDERED APPROXIMATE BOTH TO LOCATION, SIZE, AND AS-BUILT CONDITION AND ARE PROVIDED FOR INFORMATIONAL PURPOSES ONLY. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR DETERMINING ACTUAL FIELD CONDITIONS.
5. THE DIMENSIONS SHOWN ON THE PLANS, INCLUDING THE INTENDED DIMENSIONS OF THE WORK, MAY VARY FROM ACTUAL EXISTING CONDITIONS IN THE FIELD. THE CONTRACTOR SHALL TAKE APPROPRIATE MEASUREMENTS TO VERIFY ALL DIMENSIONS SHOWN ON THE DRAWINGS AS WELL AS OTHER DIMENSIONS HE MAY DEEM APPROPRIATE TO FACILITATE THE COMPLETION OF THE WORK. NOTIFY THE ENGINEER OF ANY DISCREPANCIES BETWEEN EXISTING CONDITIONS AND THE CONTRACT DOCUMENTS BEFORE PROCEEDING WITH THAT PORTION OF THE WORK.
6. UNLESS OTHERWISE INDICATED, ALL DISTURBED AREAS SHALL BE RESTORED WITH SIX (6) INCHES OF LOAM, SEEDED, FERTILIZED, AND MULCHED. PROVIDE ADDITIONAL EROSION CONTROLS AS REQUIRED.
7. COMPLY WITH CONNECTICUT BUILDING CODE FOR ALL SITE CONSTRUCTION, INCLUDING HANDICAPPED ACCESSIBILITY.
8. THE CROSS-SLOPE OF ALL SIDEWALKS AND WALKWAYS SHALL BE LESS THAN 1V:50H (2.00%). UNLESS OTHERWISE INDICATED, THE MAXIMUM RUNNING SLOPE OF ALL SIDEWALKS AND WALKWAYS SHALL BE LESS THAN 1V:20H (5%). VERIFY GRADES AND SLOPES PRIOR TO CONCRETE PLACEMENT. REPORT DISCREPANCIES TO THE ENGINEER BEFORE PROCEEDING WITH THE WORK.
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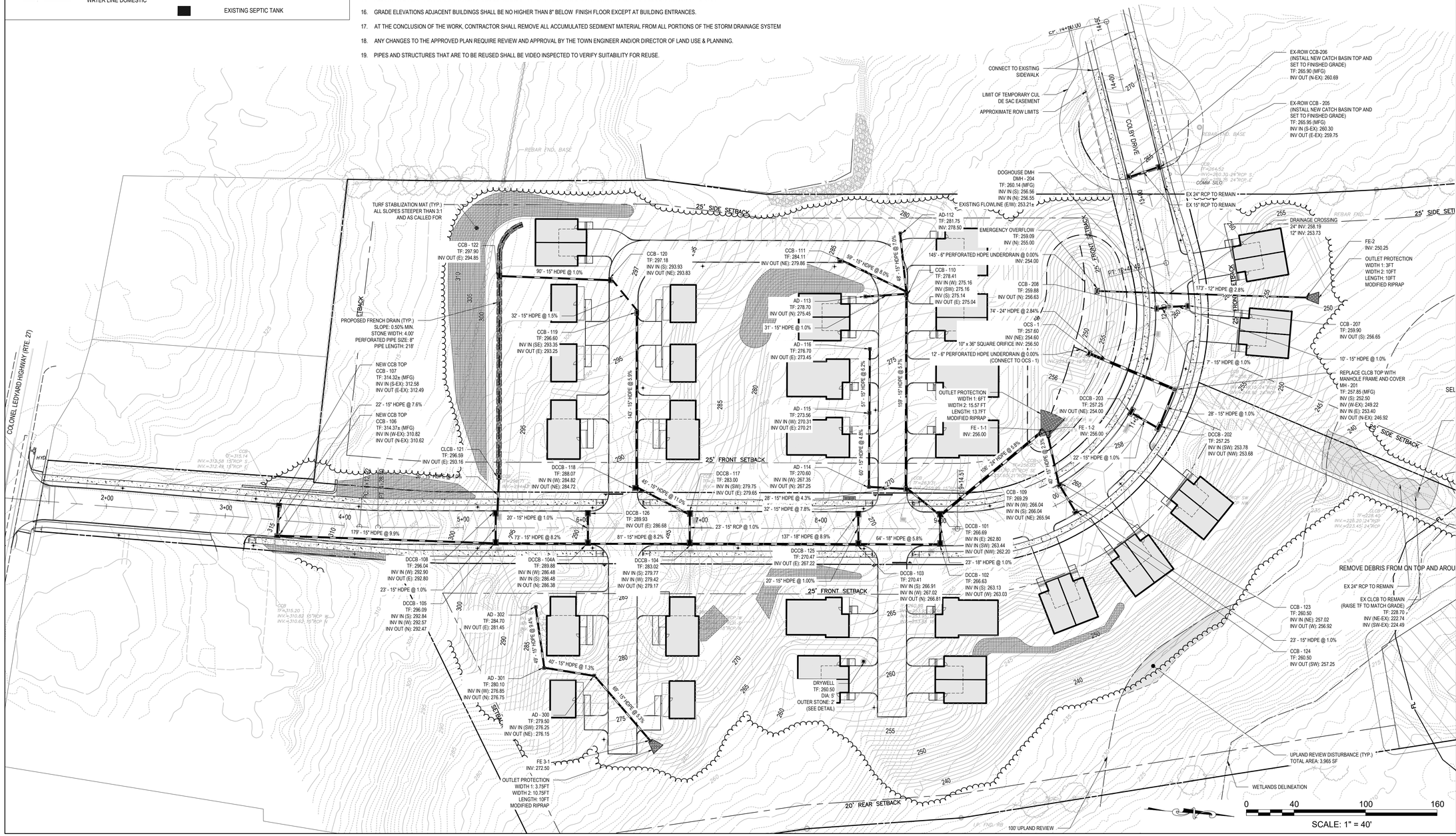
15. ALL CATCH BASINS SET AGAINST CURBS SHALL BE CONNDOT TYPE "C" AND THOSE NOT AGAINST CURBING SHALL BE CONNDOT TYPE "C-L".
16. GRADE ELEVATIONS ADJACENT BUILDINGS SHALL BE NO HIGHER THAN 8" BELOW FINISH FLOOR EXCEPT AT BUILDING ENTRANCES.
17. AT THE CONCLUSION OF THE WORK, CONTRACTOR SHALL REMOVE ALL ACCUMULATED SEDIMENT MATERIAL FROM ALL PORTIONS OF THE STORM DRAINAGE SYSTEM
18. ANY CHANGES TO THE APPROVED PLAN REQUIRE REVIEW AND APPROVAL BY THE TOWN ENGINEER AND/OR DIRECTOR OF LAND USE & PLANNING.
19. PIPES AND STRUCTURES THAT ARE TO BE REUSED SHALL BE VIDEO INSPECTED TO VERIFY SUITABILITY FOR REUSE.



Prepared by:

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860-633-8341

Prepared for:

Habitat for Humanity® of Eastern Connecticut

HABITAT FOR HUMANITY MULTI-FAMILY RESIDENTIAL AFFORDABLE HOUSING DEVELOPMENT PER C.G.S. §8-30g, LOTS 8, 9 & 11

LEDYARD, CT

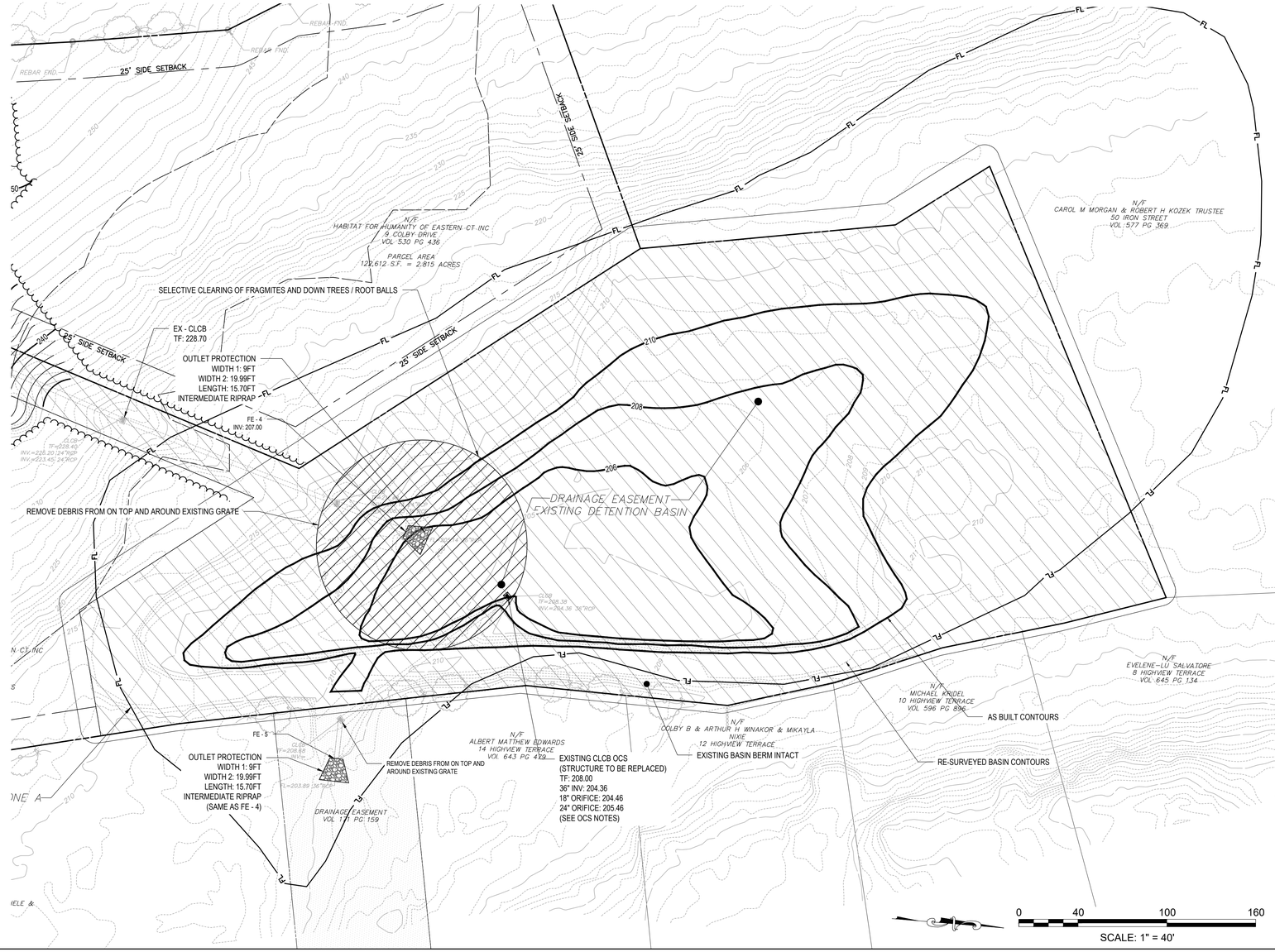
COLBY DRIVE

DATE:	REVISION:
09/02/2025	PER CITY STAFF COMMENTS

PROJECT NO.: 0725 500010.00
SCALE: AS SHOWN
DATE: 12/20/2024
DRAWN BY: GSL, TRS
CHECKED BY: WGW

DRAINAGE PLAN

DRAWING NO.: C3.1



OCS NOTES

- PIPE IS IN ACCEPTABLE CONDITION.
- REPLACE EXISTING STRUCTURE AS CALLED FOR, SEE OCS DETAILS.

BASIN COMPARISON

BASIN PER AS-BUILT SURVEY DATED 12/05/2003

APPROXIMATE VOLUME: 125,465 CUBIC FEET

BASIN PER ADDITIONAL SURVEY PERFORMED OCTOBER 2024

APPROXIMATE VOLUME: 145,0303 CUBIC FEET

SEE HYDROCAD ANALYSIS

Prepared by:

benesch

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Glastonbury, Connecticut 06033
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EXISTING BASIN REHABILITATION PLAN

DRAWING NO.:
C3.2

GRADING LEGEND

- DIRECTION OF SURFACE DRAINAGE FLOW
- PROPOSED INTERMEDIATE CONTOUR (123)
- PROPOSED INDEX CONTOUR (120)
- PROPOSED SPOT ELEVATION (TW 123.45 / BW 122.45; 123.45)
- MATCH EXISTING SPOT ELEVATION (123.45 (ME))
- FLUSH CONDITION
- ACCESSIBLE ROUTE
- SOIL BORING LOCATION (B–#)

ACCESSIBILITY NOTES

1. SLOPES ALONG THE ACCESSIBLE ROUTE SHALL BE LESS THAN 1:20 (5%) AND THE CROSS SLOPES SHALL NOT EXCEED 1:50 (2%). CHANGES IN LEVELS SHALL NOT BE GREATER THAN ¼ INCH.
2. LANDINGS SHALL NOT HAVE A SLOPE GREATER THAN 1:50 (2%) IN ANY DIRECTION.
3. SLOPES WITHIN THE ACCESSIBLE PARKING SPACE SHALL NOT EXCEED 1:50 (2%) IN ANY DIRECTION.

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CHECKED BY: **WGW**

GRADING PLAN

DRAWING NO.: **C3.3**