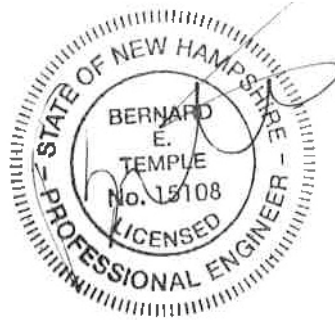


DRAINAGE REPORT

SITE PLAN 2A TACTICAL, LLC

Tax Map 251 Lots 63
99 Tolend Road
Barrington NH 03825

July 12, 2021
September 10, 2021



Prepared For:

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Site Plan
2A Tactical, LLC
Map 251 Lot 63
Barrington NH

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Site Plan
2A Tactical, LLC
Map 251 Lot 63
Barrington NH

Introduction

This proposed project is located on Map 251, Lot 63 of the Barrington NH tax maps. The project consists of the construction of a 6000 square foot retail building as well as a 3500 square foot trailer storage pad with associated access, parking, utilities and other site improvements. Drainage from the developed area will be routed both open and closed drainage to one infiltration pond located at the back of the site. The site will be provided with onsite septic and water.

Existing Conditions

This parcel is 8.5 acres with approximately 700 feet of frontage on NH Rout 125 as well as frontage on Bumford Road which is a Class VI town road. It is located in the commercial district of Barrington. The site is moderately sloping with all of the site draining from West to East before entering a large wetland complex on the Easterly side of the property. The NRCS web soils maps indicate that the majority of the soils are classified as a Hinckley Loamy Sand (HaB and HaC). This soil complex is a moderately well drained hydrological class "A" soil. The pre-developed analysis shows the site divided into one subcatchment drainage area as can be seen on the pre-development drainage area plan. Subcatchment 1 discharges off the easterly corner of the property at Bumford road.

Proposed development

As noted above the project consists of the construction of a 6000 square foot retail building as well as a 3500 square foot trailer storage pad with associated access, parking, utilities and other site improvements. The site has been designed with both open and closed drainage with all of the drainage and roof top ending up in one infiltration basin located on the easterly side of the proposed parking area. The access road and parking area drainage will be directed to three deep sump catch basins for sediment removal and then into a sediment forebay located in the pond prior to entering the infiltration pond. There is no change proposed to the existing drainage patterns. Because of the favorable soil conditions, the infiltration pond has been designed to infiltrate and treat the water quality volume and retain peak stormwater flows per local regulations. Onsite soils as noted above are Hinckley Loamy Sand HaB. This soil complex is a well-drained class "A" soil. The infiltration rate for the soil as shown SSSNNE special publication No. 5 Ksat values for NH soils is 6 inches per hour, this rate is then used at 50% or 3 inches per

Site Plan
2A Tactical, LLC
Map 251 Lot 63
Barrington NH

hour for design purposes. The drainage system is designed to mitigate any increase in stormwater runoff as a result from the site development per local regulations.

Design methodology

The drainage analysis in this study was completed using HydroCad Version 10.1, a stormwater modeling program utilizing TR-20 and TR-55 methodology. This program performs both the hydrologic computations for determination of runoff flows, and the hydraulic calculations for pipe, ditch, and pond design. Calculations were performed for 2,10,25 and 50-year return frequency storms in accordance with Town regulations. Rainfall information is provided from the most recent Extreme Precipitation Tables provided from the Northeast Regional Climate Center. The following design parameters were used:

Rainfall distribution: Type III
AMC: 2
Extreme Precipitation Estimates
2-year storm rainfall: 3.08 inches
10-year storm rainfall: 4.65 inches
25-year storm rainfall: 5.88 inches
50-year storm rainfall: 7.03 inches

Design analysis

The drainage improvements designed for the proposed project have been designed to conform to Municipal requirements. The proposed underground drainage system is designed to mitigate peak runoff rates such that post-development flows are equal to or less than pre-development flows. The design analysis therefore includes outputs for the 2,10,25 and 50-year event.

The drainage calculations are included in the appendix of this report. Peak runoff rates of the pre-development and post-development runoff rates are summarized in the following table:

| Storm event / Sub-basin | Pre-development (cfs) | Phase 1 Post-development (cfs) |
|--------------------------------|------------------------------|---------------------------------------|
| <u>Event</u> | 1L | 1L |
| <u>2-yr</u> | 1.18 | 1.18 |

Site Plan
2A Tactical, LLC
Map 251 Lot 63
Barrington NH

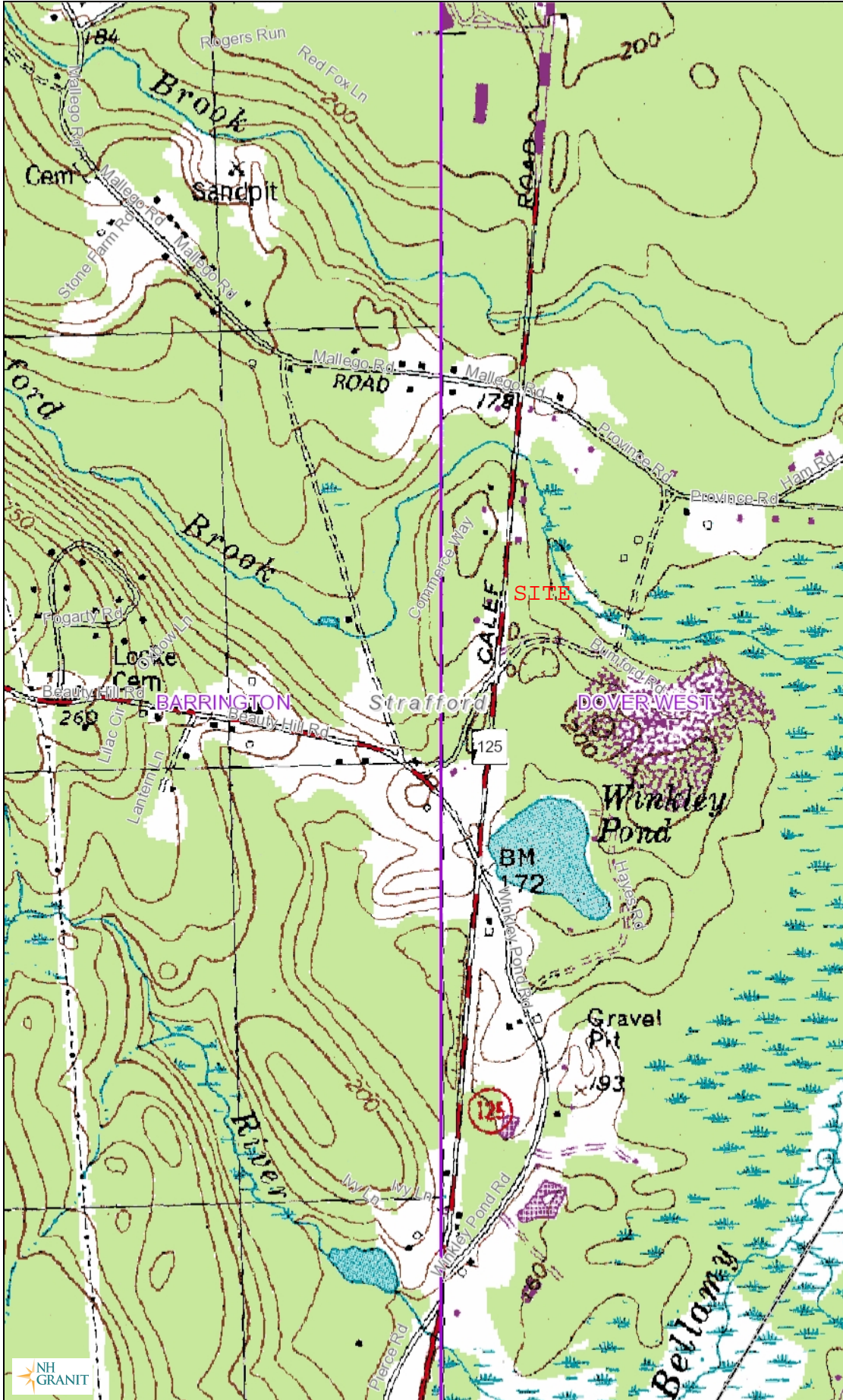
| | | |
|-----------------------|-------------|-------------|
| 10-yr | 3.06 | 3.06 |
| <u>25-year</u> | 4.74 | 4.74 |
| 50-year | 6.40 | 6.40 |

The calculations show that there is no increase in peak runoff rates for the storm events analyzed. Therefore, there will be no effect on downstream drainage patterns.

Site Plan
2A Tactical, LLC
Map 251 Lot 63
Barrington NH

USGS

Map by NH GRANIT



Legend

- 7.5-Minute
- State
- County
- City/Town

Map Scale

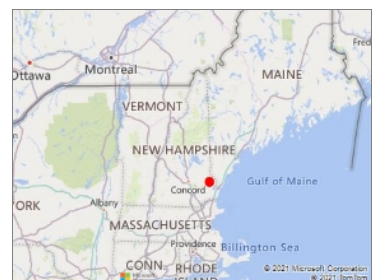
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Map Generated: 7/12/2021

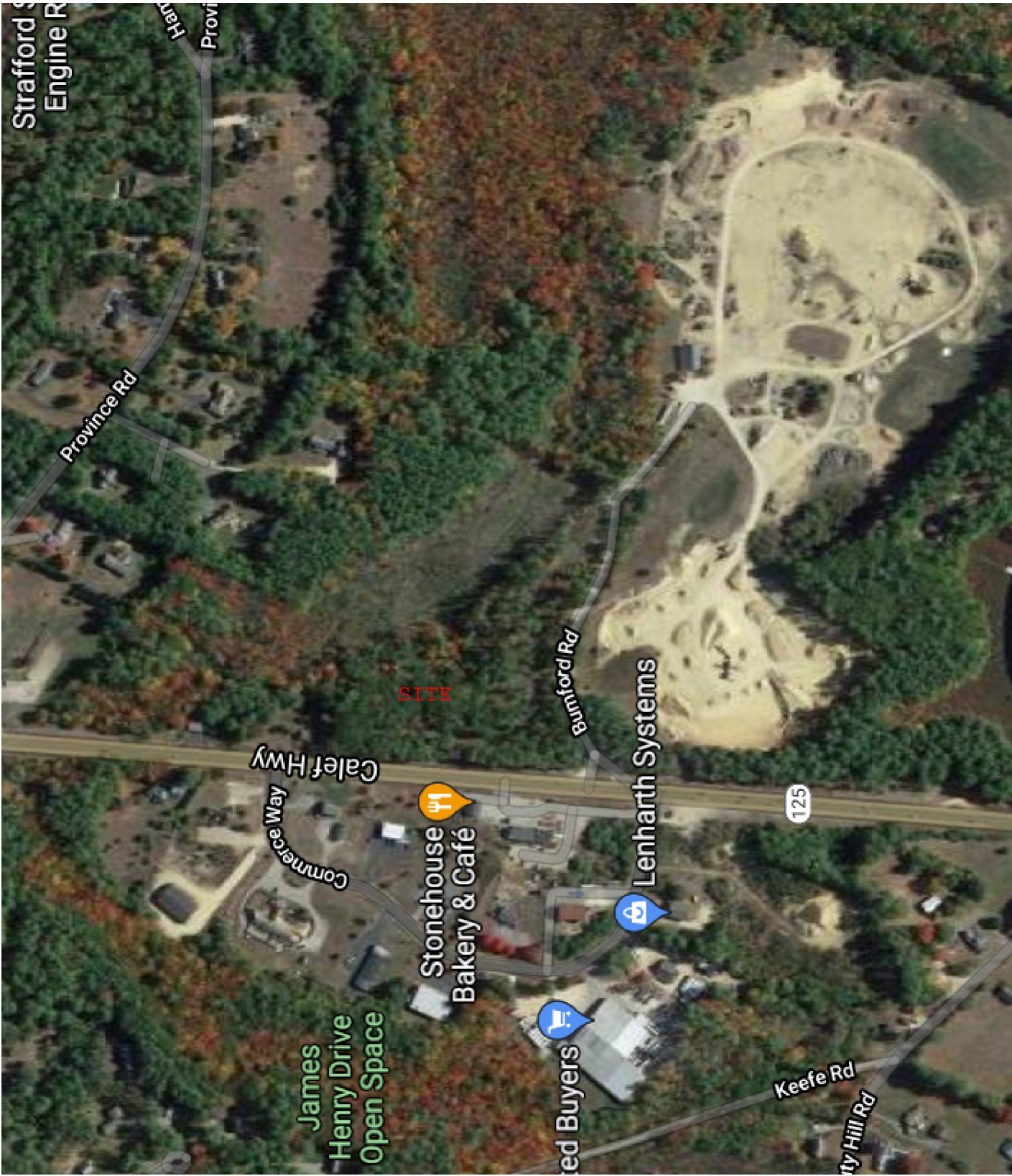


Notes



Site Plan
2A Tactical, LLC
Map 251 Lot 63
Barrington NH

AERIAL PHOTO



Site Plan
2A Tactical, LLC
Map 251 Lot 63
Barrington NH

WEBB 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 Strafford County, New Hampshire



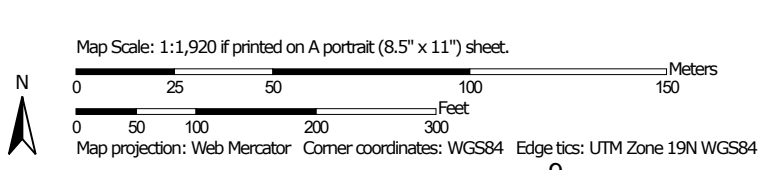
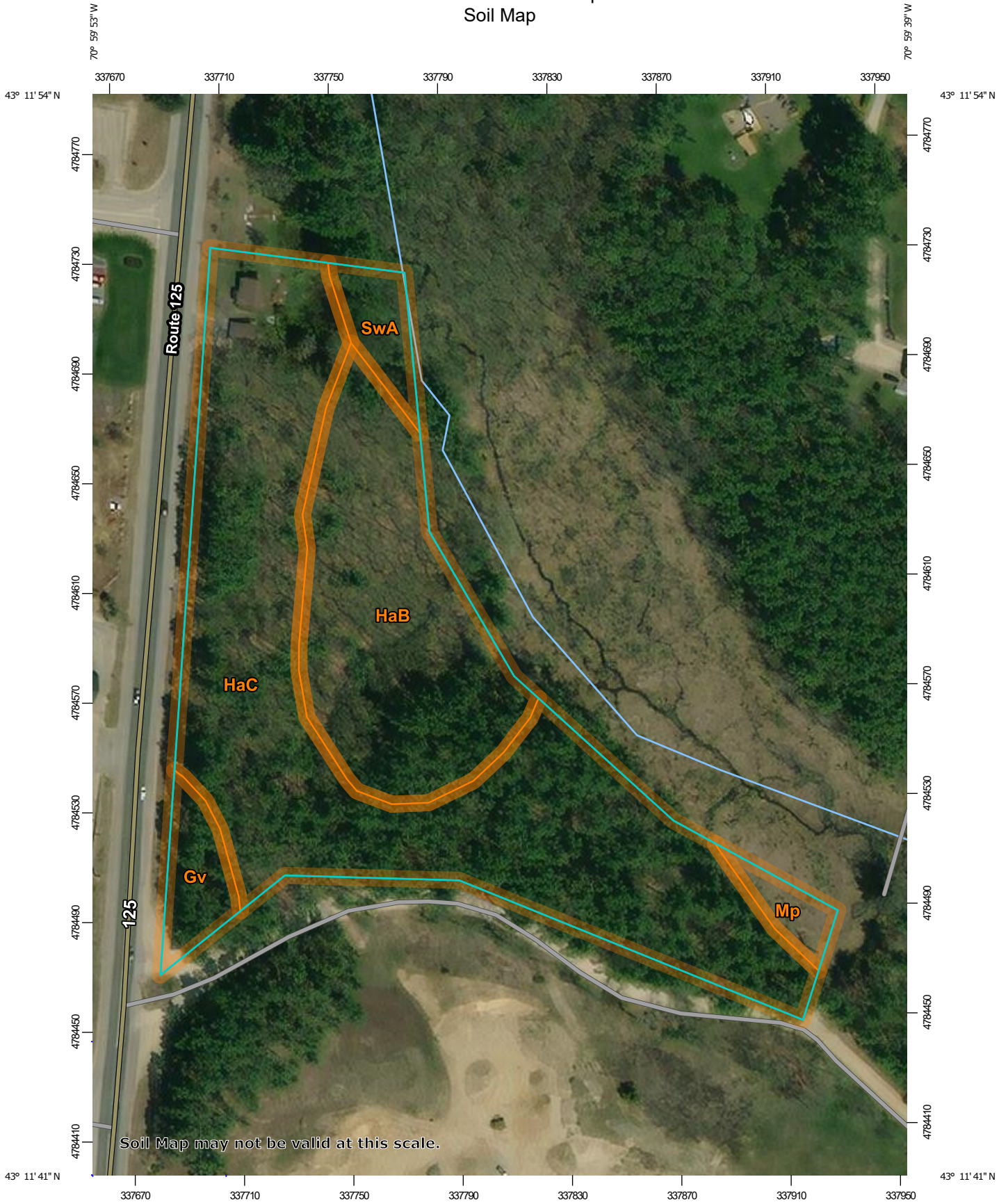
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Soil Map


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 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 1:20,000.

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

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

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

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

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

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

Soil Survey Area: Strafford County, New Hampshire
 Survey Area Data: Version 20, May 29, 2020

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

Date(s) aerial images were photographed: Dec 31, 2009—Sep 9, 2017

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 |
|------------------------------------|---|--------------|----------------|
| Gv | Gravel and borrow pits | 0.3 | 4.2% |
| HaB | Hinckley loamy sand, 3 to 8 percent slopes | 2.1 | 28.0% |
| HaC | Hinckley loamy sand, 8 to 15 percent slopes | 4.6 | 62.2% |
| Mp | Freetown and Swansea mucky peats, 0 to 2 percent slopes | 0.2 | 2.2% |
| SwA | Swanton fine sandy loam, 0 to 3 percent slopes | 0.3 | 3.5% |
| Totals for Area of Interest | | 7.4 | 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.

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

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

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

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

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

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

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

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

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

Strafford County, New Hampshire

Gv—Gravel and borrow pits

Map Unit Setting

National map unit symbol: 9d7c
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

Gravel and borrow pits: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Gravel And Borrow Pits

Typical profile

H1 - 0 to 6 inches: extremely gravelly sand
H2 - 6 to 60 inches: extremely gravelly sand

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: Unranked

HaB—Hinckley loamy sand, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2svm8
Elevation: 0 to 1,430 feet
Mean annual precipitation: 36 to 53 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Hinckley

Setting

Landform: Outwash deltas, outwash plains, eskers, moraines, kame terraces, kames, outwash terraces
Landform position (two-dimensional): Summit, shoulder, backslope, footslope
Landform position (three-dimensional): Nose slope, side slope, base slope, crest, riser, tread
Down-slope shape: Linear, convex, concave
Across-slope shape: Convex, linear, concave

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

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
A - 1 to 8 inches: loamy sand
Bw1 - 8 to 11 inches: gravelly loamy sand
Bw2 - 11 to 16 inches: gravelly loamy sand
BC - 16 to 19 inches: very gravelly loamy sand
C - 19 to 65 inches: very gravelly sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water capacity: Very low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: A
Ecological site: F144AY022MA - Dry Outwash
Hydric soil rating: No

Minor Components

Windsor

Percent of map unit: 8 percent
Landform: Outwash deltas, kame terraces, outwash plains, kames, eskers, moraines, outwash terraces
Landform position (two-dimensional): Summit, shoulder, backslope, footslope
Landform position (three-dimensional): Nose slope, side slope, base slope, crest, riser, tread
Down-slope shape: Linear, convex, concave
Across-slope shape: Convex, linear, concave
Hydric soil rating: No

Sudbury

Percent of map unit: 5 percent
Landform: Kame terraces, outwash plains, moraines, outwash terraces, outwash deltas
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Side slope, base slope, head slope, tread
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Hydric soil rating: No

Agawam

Percent of map unit: 2 percent

Custom Soil Resource Report

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

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

Landform position (three-dimensional): Nose slope, side slope, base slope, crest, riser, tread

Down-slope shape: Linear, convex, concave

Across-slope shape: Convex, linear, concave

Hydric soil rating: No

HaC—Hinckley loamy sand, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2svm9

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

Hinckley and similar soils: 85 percent

Minor components: 15 percent

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

Description of Hinckley

Setting

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

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

Landform position (three-dimensional): Nose slope, side slope, crest, head slope, riser

Down-slope shape: Convex, concave, linear

Across-slope shape: Concave, linear, convex

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

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material

A - 1 to 8 inches: loamy sand

Bw1 - 8 to 11 inches: gravelly loamy sand

Bw2 - 11 to 16 inches: gravelly loamy sand

BC - 16 to 19 inches: very gravelly loamy sand

C - 19 to 65 inches: very gravelly sand

Properties and qualities

Slope: 8 to 15 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Excessively drained

Runoff class: Very low

Custom Soil Resource Report

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

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

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

Available water capacity: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4e

Hydrologic Soil Group: A

Ecological site: F144AY022MA - Dry Outwash

Hydric soil rating: No

Minor Components

Sudbury

Percent of map unit: 5 percent

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

Landform position (two-dimensional): Backslope, footslope

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

Down-slope shape: Concave, linear

Across-slope shape: Concave, linear

Hydric soil rating: No

Merrimac

Percent of map unit: 5 percent

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

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

Landform position (three-dimensional): Side slope, head slope, nose slope, crest, riser

Down-slope shape: Convex

Across-slope shape: Convex

Hydric soil rating: No

Windsor

Percent of map unit: 5 percent

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

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

Landform position (three-dimensional): Nose slope, side slope, crest, head slope, riser

Down-slope shape: Convex, concave, linear

Across-slope shape: Concave, linear, convex

Hydric soil rating: No

Mp—Freetown and Swansea mucky peats, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2w68w
Elevation: 10 to 940 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

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

Description of Freetown

Setting

Landform: Depressions, swamps, bogs, marshes, kettles
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Moderately decomposed organic material

Typical profile

Oe1 - 0 to 2 inches: mucky peat
Oe2 - 2 to 79 inches: mucky peat

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: None
Frequency of ponding: Frequent
Available water capacity: Very high (about 20.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: B/D
Ecological site: F144AY043MA - Acidic Organic Wetlands
Hydric soil rating: Yes

Description of Swansea

Setting

Landform: Marshes, kettles, swamps, bogs, depressions

Down-slope shape: Concave

Across-slope shape: Concave

Parent material: Moderately decomposed organic material over sandy and gravelly glaciofluvial deposits

Typical profile

Oe1 - 0 to 12 inches: mucky peat

Oe2 - 12 to 25 inches: mucky peat

Cg - 25 to 79 inches: 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 6 inches

Frequency of flooding: None

Frequency of ponding: Frequent

Available water capacity: High (about 11.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8

Hydrologic Soil Group: B/D

Ecological site: F144AY043MA - Acidic Organic Wetlands

Hydric soil rating: Yes

Minor Components

Natchaug

Percent of map unit: 10 percent

Landform: Depressions, depressions, depressions

Down-slope shape: Concave

Across-slope shape: Concave

Hydric soil rating: Yes

Scarboro

Percent of map unit: 4 percent

Landform: Drainageways, outwash terraces, depressions, outwash deltas

Landform position (three-dimensional): Tread

Down-slope shape: Concave

Across-slope shape: Concave

Hydric soil rating: Yes

Whitman

Percent of map unit: 4 percent

Landform: Hills, depressions

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Base slope

Down-slope shape: Concave

Across-slope shape: Concave

Custom Soil Resource Report

Hydric soil rating: Yes

Maybid

Percent of map unit: 2 percent

Landform: Marine terraces

Landform position (three-dimensional): Tread

Down-slope shape: Concave

Across-slope shape: Concave

Hydric soil rating: Yes

SwA—Swanton fine sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 9d90

Elevation: 0 to 260 feet

Mean annual precipitation: 36 to 71 inches

Mean annual air temperature: 39 to 55 degrees F

Frost-free period: 140 to 240 days

Farmland classification: Farmland of local importance

Map Unit Composition

Swanton and similar soils: 85 percent

Minor components: 15 percent

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

Description of Swanton

Setting

Landform: Marine terraces

Typical profile

H1 - 0 to 19 inches: fine sandy loam

H2 - 19 to 26 inches: sandy loam

H3 - 26 to 41 inches: silty clay

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Poorly drained

Runoff class: Medium

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 0 to 12 inches

Frequency of flooding: None

Frequency of ponding: None

Available water capacity: Low (about 6.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4w

Custom Soil Resource Report

Hydrologic Soil Group: C/D
Hydric soil rating: Yes

Minor Components

Not named wet

Percent of map unit: 10 percent
Landform: Marine terraces
Hydric soil rating: Yes

Scantic

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

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.

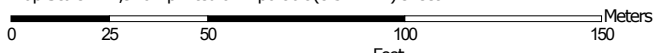
Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over 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: 1:1,920 if printed on A portrait (8.5" x 11") sheet.











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

MAP LEGEND









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

Soils





Soil 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


Water Features

-  Streams and Canals





Transportation

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

Background

-  Aerial Photography

Soils

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

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Strafford County, New Hampshire
 Survey Area Data: Version 20, May 29, 2020

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

Date(s) aerial images were photographed: Dec 31, 2009—Sep 9, 2017

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 |
|------------------------------------|---|--------|--------------|----------------|
| Gv | Gravel and borrow pits | | 0.3 | 4.2% |
| HaB | Hinckley loamy sand, 3 to 8 percent slopes | A | 2.1 | 28.0% |
| HaC | Hinckley loamy sand, 8 to 15 percent slopes | A | 4.6 | 62.2% |
| Mp | Freetown and Swansea mucky peats, 0 to 2 percent slopes | B/D | 0.2 | 2.2% |
| SwA | Swanton fine sandy loam, 0 to 3 percent slopes | C/D | 0.3 | 3.5% |
| Totals for Area of Interest | | | 7.4 | 100.0% |

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Site Plan
2A Tactical, LLC
Map 251 Lot 63
Barrington NH

EXTREME PRECIPITATION TABLE

Extreme Precipitation Tables

Northeast Regional Climate Center

Data represents point estimates calculated from partial duration series. All precipitation amounts are displayed in inches.

| | |
|------------------|---------------------------------|
| Smoothing | Yes |
| State | New Hampshire |
| Location | |
| Longitude | 70.996 degrees West |
| Latitude | 43.196 degrees North |
| Elevation | 0 feet |
| Date/Time | Mon, 28 Jun 2021 13:39:05 -0400 |

Extreme Precipitation Estimates

| | 5min | 10min | 15min | 30min | 60min | 120min | | 1hr | 2hr | 3hr | 6hr | 12hr | 24hr | 48hr | | 1day | 2day | 4day | 7day | 10day | |
|--------------|------|-------|-------|-------|-------|--------|--------------|------|------|------|------|------|-------|-------|--------------|-------|-------|-------|-------|-------|--------------|
| 1yr | 0.26 | 0.40 | 0.50 | 0.65 | 0.81 | 1.03 | 1yr | 0.70 | 0.98 | 1.20 | 1.53 | 1.98 | 2.57 | 2.81 | 1yr | 2.27 | 2.70 | 3.11 | 3.83 | 4.41 | 1yr |
| 2yr | 0.32 | 0.49 | 0.61 | 0.80 | 1.01 | 1.28 | 2yr | 0.87 | 1.16 | 1.49 | 1.89 | 2.41 | 3.08 | 3.43 | 2yr | 2.73 | 3.30 | 3.80 | 4.52 | 5.15 | 2yr |
| 5yr | 0.37 | 0.57 | 0.72 | 0.96 | 1.23 | 1.57 | 5yr | 1.06 | 1.44 | 1.84 | 2.36 | 3.03 | 3.90 | 4.39 | 5yr | 3.45 | 4.22 | 4.83 | 5.70 | 6.45 | 5yr |
| 10yr | 0.40 | 0.63 | 0.80 | 1.09 | 1.42 | 1.84 | 10yr | 1.22 | 1.69 | 2.17 | 2.80 | 3.61 | 4.65 | 5.29 | 10yr | 4.12 | 5.08 | 5.81 | 6.80 | 7.66 | 10yr |
| 25yr | 0.46 | 0.74 | 0.94 | 1.30 | 1.72 | 2.27 | 25yr | 1.49 | 2.08 | 2.69 | 3.50 | 4.54 | 5.88 | 6.77 | 25yr | 5.20 | 6.51 | 7.41 | 8.59 | 9.60 | 25yr |
| 50yr | 0.52 | 0.83 | 1.06 | 1.49 | 2.00 | 2.66 | 50yr | 1.73 | 2.45 | 3.17 | 4.15 | 5.41 | 7.03 | 8.17 | 50yr | 6.22 | 7.86 | 8.91 | 10.25 | 11.41 | 50yr |
| 100yr | 0.58 | 0.94 | 1.21 | 1.71 | 2.33 | 3.12 | 100yr | 2.01 | 2.88 | 3.74 | 4.92 | 6.44 | 8.40 | 9.87 | 100yr | 7.43 | 9.49 | 10.71 | 12.25 | 13.55 | 100yr |
| 200yr | 0.64 | 1.05 | 1.36 | 1.96 | 2.71 | 3.67 | 200yr | 2.34 | 3.39 | 4.42 | 5.85 | 7.68 | 10.04 | 11.91 | 200yr | 8.89 | 11.45 | 12.89 | 14.63 | 16.11 | 200yr |
| 500yr | 0.76 | 1.25 | 1.63 | 2.37 | 3.32 | 4.54 | 500yr | 2.86 | 4.21 | 5.49 | 7.32 | 9.69 | 12.73 | 15.29 | 500yr | 11.27 | 14.70 | 16.47 | 18.53 | 20.27 | 500yr |

Lower Confidence Limits

| | 5min | 10min | 15min | 30min | 60min | 120min | | 1hr | 2hr | 3hr | 6hr | 12hr | 24hr | 48hr | | 1day | 2day | 4day | 7day | 10day | |
|--------------|------|-------|-------|-------|-------|--------|--------------|------|------|------|------|------|------|-------|--------------|------|-------|-------|-------|-------|--------------|
| 1yr | 0.24 | 0.36 | 0.45 | 0.60 | 0.74 | 0.90 | 1yr | 0.64 | 0.88 | 0.91 | 1.25 | 1.52 | 1.95 | 2.49 | 1yr | 1.72 | 2.39 | 2.92 | 3.29 | 3.96 | 1yr |
| 2yr | 0.31 | 0.49 | 0.60 | 0.81 | 1.00 | 1.18 | 2yr | 0.86 | 1.15 | 1.36 | 1.82 | 2.34 | 2.99 | 3.33 | 2yr | 2.65 | 3.20 | 3.69 | 4.41 | 5.03 | 2yr |
| 5yr | 0.35 | 0.54 | 0.67 | 0.92 | 1.16 | 1.40 | 5yr | 1.01 | 1.37 | 1.61 | 2.14 | 2.77 | 3.61 | 4.04 | 5yr | 3.20 | 3.89 | 4.49 | 5.35 | 6.02 | 5yr |
| 10yr | 0.38 | 0.59 | 0.73 | 1.02 | 1.32 | 1.60 | 10yr | 1.14 | 1.56 | 1.81 | 2.44 | 3.13 | 4.14 | 4.68 | 10yr | 3.66 | 4.50 | 5.21 | 6.19 | 6.89 | 10yr |
| 25yr | 0.44 | 0.67 | 0.83 | 1.19 | 1.56 | 1.91 | 25yr | 1.35 | 1.87 | 2.12 | 2.84 | 3.64 | 4.94 | 5.66 | 25yr | 4.37 | 5.44 | 6.35 | 7.51 | 8.30 | 25yr |
| 50yr | 0.49 | 0.74 | 0.92 | 1.33 | 1.78 | 2.19 | 50yr | 1.54 | 2.14 | 2.37 | 3.21 | 4.09 | 5.65 | 6.52 | 50yr | 5.00 | 6.27 | 7.38 | 8.68 | 9.58 | 50yr |
| 100yr | 0.55 | 0.82 | 1.03 | 1.49 | 2.04 | 2.52 | 100yr | 1.76 | 2.46 | 2.67 | 3.60 | 4.57 | 6.44 | 7.51 | 100yr | 5.70 | 7.23 | 8.58 | 10.04 | 10.96 | 100yr |
| 200yr | 0.61 | 0.91 | 1.16 | 1.68 | 2.34 | 2.89 | 200yr | 2.02 | 2.82 | 2.99 | 4.05 | 5.10 | 7.34 | 8.88 | 200yr | 6.50 | 8.54 | 9.98 | 11.61 | 12.57 | 200yr |
| 500yr | 0.71 | 1.06 | 1.36 | 1.98 | 2.82 | 3.49 | 500yr | 2.43 | 3.41 | 3.49 | 4.72 | 5.94 | 8.68 | 10.77 | 500yr | 7.68 | 10.35 | 12.21 | 14.08 | 14.99 | 500yr |

Upper Confidence Limits

| | 5min | 10min | 15min | 30min | 60min | 120min | | 1hr | 2hr | 3hr | 6hr | 12hr | 24hr | 48hr | | 1day | 2day | 4day | 7day | 10day | |
|--------------|------|-------|-------|-------|-------|--------|--------------|------|------|------|------|-------|-------|-------|--------------|-------|-------|-------|-------|-------|--------------|
| 1yr | 0.28 | 0.43 | 0.53 | 0.71 | 0.87 | 1.07 | 1yr | 0.75 | 1.05 | 1.23 | 1.73 | 2.19 | 2.77 | 3.02 | 1yr | 2.45 | 2.91 | 3.34 | 4.12 | 4.73 | 1yr |
| 2yr | 0.33 | 0.50 | 0.62 | 0.84 | 1.03 | 1.24 | 2yr | 0.89 | 1.21 | 1.46 | 1.94 | 2.50 | 3.19 | 3.54 | 2yr | 2.83 | 3.41 | 3.92 | 4.65 | 5.30 | 2yr |
| 5yr | 0.39 | 0.60 | 0.75 | 1.02 | 1.30 | 1.57 | 5yr | 1.13 | 1.54 | 1.84 | 2.47 | 3.16 | 4.18 | 4.72 | 5yr | 3.70 | 4.54 | 5.19 | 6.06 | 6.86 | 5yr |
| 10yr | 0.45 | 0.70 | 0.87 | 1.21 | 1.56 | 1.90 | 10yr | 1.35 | 1.86 | 2.21 | 3.01 | 3.80 | 5.17 | 5.88 | 10yr | 4.57 | 5.65 | 6.43 | 7.41 | 8.34 | 10yr |
| 25yr | 0.55 | 0.84 | 1.05 | 1.49 | 1.97 | 2.44 | 25yr | 1.70 | 2.39 | 2.84 | 3.90 | 4.87 | 6.84 | 7.87 | 25yr | 6.05 | 7.57 | 8.52 | 9.75 | 10.76 | 25yr |
| 50yr | 0.64 | 0.97 | 1.21 | 1.74 | 2.34 | 2.94 | 50yr | 2.02 | 2.88 | 3.44 | 4.75 | 5.89 | 8.46 | 9.83 | 50yr | 7.49 | 9.45 | 10.57 | 11.96 | 13.15 | 50yr |
| 100yr | 0.74 | 1.12 | 1.41 | 2.03 | 2.79 | 3.55 | 100yr | 2.41 | 3.47 | 4.17 | 5.80 | 7.14 | 10.47 | 12.29 | 100yr | 9.27 | 11.81 | 13.10 | 14.69 | 16.06 | 100yr |
| 200yr | 0.86 | 1.30 | 1.64 | 2.38 | 3.32 | 4.29 | 200yr | 2.86 | 4.20 | 5.07 | 7.07 | 8.65 | 13.01 | 15.09 | 200yr | 11.51 | 14.51 | 16.22 | 18.03 | 19.64 | 200yr |
| 500yr | 1.05 | 1.57 | 2.01 | 2.93 | 4.16 | 5.49 | 500yr | 3.59 | 5.37 | 6.53 | 9.23 | 11.15 | 17.37 | 20.22 | 500yr | 15.37 | 19.44 | 21.54 | 23.69 | 25.65 | 500yr |

Site Plan
2A Tactical, LLC
Map 251 Lot 63
Barrington NH

BMP Worksheets



INFILTRATION PRACTICE CRITERIA (Env-Wq 1508.06)

Type/Node Name: **POND 1 INFILTRATION 9-10-21**

Enter the type of infiltration practice (e.g., basin, trench) and the node name in the drainage analysis, if applicable.

| | | |
|----------------|--|------------------------|
| Y | Have you reviewed Env-Wq 1508.06(a) to ensure that infiltration is allowed? | ← yes |
| 2.85 ac | A = Area draining to the practice | |
| 1.81 ac | A _I = Impervious area draining to the practice | |
| 0.64 decimal | I = Percent impervious area draining to the practice, in decimal form | |
| 0.62 unitless | R _v = Runoff coefficient = 0.05 + (0.9 x I) | |
| 1.77 ac-in | WQV = 1" x R _v x A | |
| 6,431 cf | WQV conversion (ac-in x 43,560 sf/ac x 1ft/12") | |
| 1,608 cf | 25% x WQV (check calc for sediment forebay volume) | |
| FOREBAY | Method of pretreatment? (not required for clean or roof runoff) | |
| 1,650 cf | V _{SED} = Sediment forebay volume, if used for pretreatment | ≥ 25%WQV |
| 6,543 cf | V = Volume ¹ (attach a stage-storage table) | ≥ WQV |
| 1,881 sf | A _{SA} = Surface area of the bottom of the pond | |
| 3.00 iph | K _{satDESIGN} = Design infiltration rate ² | |
| 13.7 hours | T _{DRAIN} = Drain time = V / (A _{SA} * I _{DESIGN}) | < 72-hrs |
| 169.00 feet | E _{BTM} = Elevation of the bottom of the basin | |
| 166.00 feet | E _{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit) | |
| feet | E _{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit) | |
| 3.00 feet | D _{SHWT} = Separation from SHWT | ≥ *³ |
| 169.0 feet | D _{ROCK} = Separation from bedrock | ≥ *³ |
| ft | D _{amend} = Depth of amended soil, if applicable due high infiltration rate | ≥ 24" |
| ft | D _T = Depth of trench, if trench proposed | 4 - 10 ft |
| Yes/No | If a trench or underground system is proposed, has observation well been provided? | ← yes |
| Y | If a trench is proposed, does material meet Env-Wq 1508.06(k)(2) requirements. ⁴ | ← yes |
| Y | If a basin is proposed, Is the perimeter curvilinear, and basin floor flat? | ← yes |
| 3.0 :1 | If a basin is proposed, pond side slopes. | ≥3:1 |
| 170.82 ft | Peak elevation of the 10-year storm event (infiltration can be used in analysis) | |
| 171.40 ft | Peak elevation of the 50-year storm event (infiltration can be used in analysis) | |
| 172.40 ft | Elevation of the top of the practice (if a basin, this is the elevation of the berm) | |
| YES | 10 peak elevation ≤ Elevation of the top of the trench? ⁵ | ← yes |
| YES | If a basin is proposed, 50-year peak elevation ≤ Elevation of berm? | ← yes |

1. Volume below the lowest invert of the outlet structure and excludes forebay volume
2. K_{satDESIGN} includes a factor of safety. See Env-Wq 1504.14 for requirements for determining the infiltr. rate
3. 1' separation if treatment not required; 4' for treatment in GPAs & WSIPAs; & 3' in all other areas.
4. Clean, washed well graded diameter of 1.5 to 3 inches above the in-situ soil.
5. If 50-year peak elevation exceeds top of trench, the overflow must be routed in HydroCAD as secondary discharge.

Designer's Notes: _____

POST

Prepared by HP

HydroCAD® 10.10-4a s/n 11004 © 2020 HydroCAD Software Solutions LLC

Type III 24-hr 10YR Rainfall=4.65"

Printed 9/10/2021

Page 1

Summary for Pond 5P: DETENTION POND

Inflow Area = 124,181 sf, 41.44% Impervious, Inflow Depth > 1.24" for 10YR event
 Inflow = 4.07 cfs @ 12.10 hrs, Volume= 12,862 cf
 Outflow = 0.33 cfs @ 14.00 hrs, Volume= 10,126 cf, Atten= 92%, Lag= 114.2 min
 Discarded = 0.33 cfs @ 14.00 hrs, Volume= 10,126 cf
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 170.55' @ 14.00 hrs Surf.Area= 4,765 sf Storage= 5,732 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 114.7 min (919.6 - 804.9)

| Volume | Invert | Avail.Storage | Storage Description |
|------------------|-------------------|------------------------|--|
| #1 | 169.00' | 13,845 cf | Custom Stage Data (Prismatic) Listed below (Recalc) |
| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
| 169.00 | 2,440 | 0 | 0 |
| 170.00 | 4,150 | 3,295 | 3,295 |
| 172.00 | 6,400 | 10,550 | 13,845 |

| Device | Routing | Invert | Outlet Devices |
|--------|-----------|---------|---|
| #1 | Primary | 167.00' | 18.0" Round Culvert L= 40.0' Ke= 0.500 Inlet / Outlet Invert= 167.00' / 164.00' S= 0.0750 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf |
| #2 | Discarded | 169.00' | 3.000 in/hr Exfiltration over Surface area |
| #3 | Device 1 | 171.25' | 32.0" W x 42.0" H Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads |
| #4 | Device 1 | 170.70' | 16.0" W x 6.0" H Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads |

Discarded OutFlow Max=0.33 cfs @ 14.00 hrs HW=170.55' (Free Discharge)
 ↑ **2=Exfiltration** (Exfiltration Controls 0.33 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=169.00' TW=164.00' (Dynamic Tailwater)
 ↑ **1=Culvert** (Passes 0.00 cfs of 9.51 cfs potential flow)
 ↑ **3=Orifice/Grate** (Controls 0.00 cfs)
 ↑ **4=Orifice/Grate** (Controls 0.00 cfs)

POST

Prepared by HP

HydroCAD® 10.10-4a s/n 11004 © 2020 HydroCAD Software Solutions LLC

Type III 24-hr 10YR Rainfall=4.65"

Printed 9/10/2021

Page 2

Stage-Area-Storage for Pond 5P: DETENTION POND

| Elevation (feet) | Surface (sq-ft) | Storage (cubic-feet) | Elevation (feet) | Surface (sq-ft) | Storage (cubic-feet) |
|---------------------|--------------------|-------------------------|---------------------|--------------------|-------------------------|
| 169.00 | 2,440 | 0 | 174.40 | 6,400 | 13,845 |
| 169.10 | 2,611 | 253 | 174.50 | 6,400 | 13,845 |
| 169.20 | 2,782 | 522 | 174.60 | 6,400 | 13,845 |
| 169.30 | 2,953 | 809 | 174.70 | 6,400 | 13,845 |
| 169.40 | 3,124 | 1,113 | | | |
| 169.50 | 3,295 | 1,434 | | | |
| 169.60 | 3,466 | 1,772 | | | |
| 169.70 | 3,637 | 2,127 | | | |
| 169.80 | 3,808 | 2,499 | | | |
| 169.90 | 3,979 | 2,889 | | | |
| 170.00 | 4,150 | 3,295 | | | |
| 170.10 | 4,262 | 3,716 | | | |
| 170.20 | 4,375 | 4,147 | | | |
| 170.30 | 4,488 | 4,591 | | | |
| 170.40 | 4,600 | 5,045 | | | |
| 170.50 | 4,713 | 5,511 | | | |
| 170.60 | 4,825 | 5,987 | | | |
| 170.70 | 4,937 | 6,476 | | | |
| 170.80 | 5,050 | 6,975 | | | |
| 170.90 | 5,163 | 7,486 | | | |
| 171.00 | 5,275 | 8,008 | | | |
| 171.10 | 5,387 | 8,541 | | | |
| 171.20 | 5,500 | 9,085 | | | |
| 171.30 | 5,613 | 9,641 | | | |
| 171.40 | 5,725 | 10,208 | | | |
| 171.50 | 5,838 | 10,786 | | | |
| 171.60 | 5,950 | 11,375 | | | |
| 171.70 | 6,062 | 11,976 | | | |
| 171.80 | 6,175 | 12,588 | | | |
| 171.90 | 6,288 | 13,211 | | | |
| 172.00 | 6,400 | 13,845 | | | |
| 172.10 | 6,400 | 13,845 | | | |
| 172.20 | 6,400 | 13,845 | | | |
| 172.30 | 6,400 | 13,845 | | | |
| 172.40 | 6,400 | 13,845 | | | |
| 172.50 | 6,400 | 13,845 | | | |
| 172.60 | 6,400 | 13,845 | | | |
| 172.70 | 6,400 | 13,845 | | | |
| 172.80 | 6,400 | 13,845 | | | |
| 172.90 | 6,400 | 13,845 | | | |
| 173.00 | 6,400 | 13,845 | | | |
| 173.10 | 6,400 | 13,845 | | | |
| 173.20 | 6,400 | 13,845 | | | |
| 173.30 | 6,400 | 13,845 | | | |
| 173.40 | 6,400 | 13,845 | | | |
| 173.50 | 6,400 | 13,845 | | | |
| 173.60 | 6,400 | 13,845 | | | |
| 173.70 | 6,400 | 13,845 | | | |
| 173.80 | 6,400 | 13,845 | | | |
| 173.90 | 6,400 | 13,845 | | | |
| 174.00 | 6,400 | 13,845 | | | |
| 174.10 | 6,400 | 13,845 | | | |
| 174.20 | 6,400 | 13,845 | | | |
| 174.30 | 6,400 | 13,845 | | | |

Infiltration Feasibility Report

TAX MAP 251 LOT 63
2A TACTICAL, LLC
ROUTE 125 & BUMFORD ROAD
BARRINGTON NH

Prepared for:

Steven & Pamela Lenzi
TRS Rev. Trust
304 Young Road
Barrington NH 03825

Prepared By:

Bernie Temple, P.E.
Po Box 7,
Gilmanton I W, NH 03837
Phone: 603-630-1008

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I. Location of the practice

II. Existing topography at the location of the practice

III. Test pit or boring locations

IV. Seasonal high water table (SHWT) and bedrock elevations

**V. Summary of [Default, Field Testing, or Lab Testing] data used to determine the
Infiltration rate**

Infiltration Pond

I. Location of the practice

The Infiltration area is a porous paved area and is located in the back of the proposed parking lot on the East side of the project. This system is identified as infiltration pond node 5p. The pond uses infiltration for treatment of the stormwater as well as providing the required GRV recharge per state regulations.

II. Existing topography at the location of the practice

The topography located at the practice is moderately sloping wooded area. Soils at the location are mapped as HaC Hinkley-Sandy Loam.

III. Test pit or boring locations

Two test pits were performed at the area of the proposed pond area test pit 2 and test pit 3. For design purposes the average of both pits was use or 2' to SHWT.

IV. Seasonal high water table (SHWT) and bedrock elevations

(See attached data sheet)

Pond 5p

Infiltration Basin

Bottom of Pond Elevation= 169

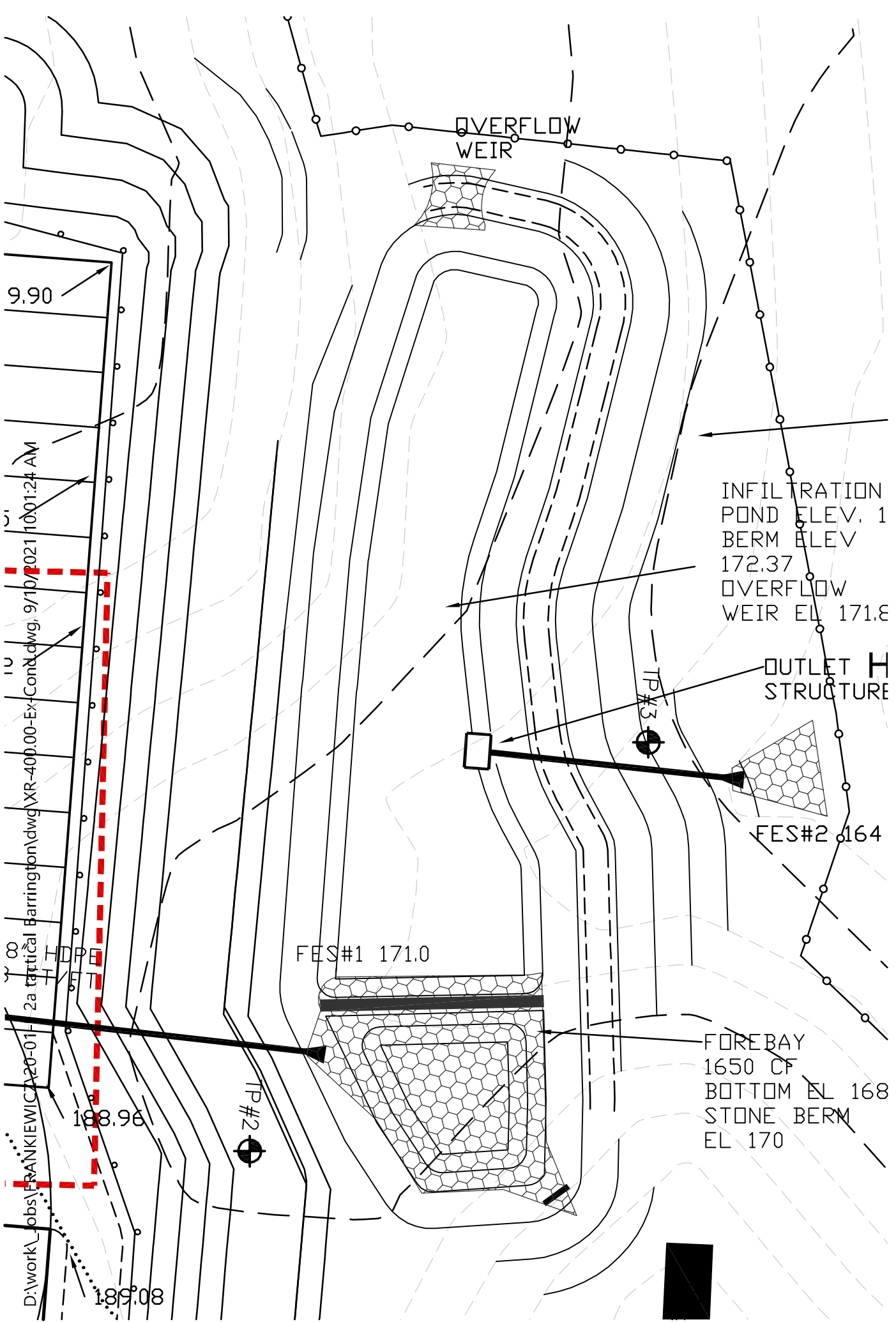
Existing Elevation Average 168

SHWT 166

See test pit. 2 and 3

V. Summary of [Default, Field Testing, or Lab Testing] data used to determine the infiltration rate

Infiltration rate is based on 50% of the SSNNE for the soil complex or 6 inch per hour @50%= 3 inch per hour. This infiltration is used for the required GRV and treatment.



OVERFLOW WEIR

9.90

10/10/2021 10:01:24 AM

9/10/2021 10:01:24 AM

HP

HP

188.96

189.08

D:\work\jobs\FRANKIEWICZ\20-01-2a tactical Barrington\dwg\XR-400.00-Ex-Cond.dwg, 9/10/2021 10:01:24 AM

INFILTRATION POND ELEV. 1
BERM ELEV 172.37
OVERFLOW WEIR EL 171.8

OUTLET H STRUCTURE

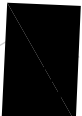
FES#2 164

FES#1 171.0

FOREBAY
1650 CF
BOTTOM EL 168
STONE BERM
EL 170

IP#2

IP#3



Site Plan
2A Tactical, LLC
Map 251 Lot 63
Barrington NH

Test Pit Data

**Tax Map 251 Lot 63
Bumford Road & Rte. 4
Barrington, NH**

Test Pit #1

Date: 8-13-21

0-6" Topsoil
10YR 3/3 – Dark Brown

6-38" Gravelly Sand
Granular/Friable
7.5 YR 5/6 – Strong Brown

38-72" Loamy Sand
Granular, Firm in Place
7.5 YR 5/8 – Strong Brown

ESHWT = 38"

Roots to 38"

No water Observed

No ledge Observed

Boulders 6"-

Parent Soils: HaC-Hinckley-sandy loam, excessively drained, NHDES group 1 (per WEBSOILS)
Perc: 2-4 min./inch

**Tax Map 251 Lot 63
Bumford Road & Rte. 4
Barrington, NH**

Test Pit #2

Date: 8-13-21

0-6" Topsoil
10YR 3/3 – Dark Brown

6-32" Gravelly Sand
Granular/Friable
7.5 YR 5/6 – Strong Brown

32-60" Loamy Sand
Granular, Firm in Place
2.5 YR= 5/6 – Light Olive Brown

ESHWT = 32"

Roots to 32"

No water Observed

No ledge Observed

Parent Soils: HaB-Hinckley-sandy loam, excessively drained, NHDES group 1 (per WEBSOILS)

Perc: 2-4 min./inch

Tax Map 251 Lot 63
Bumford Road & Rte. 4
Barrington, NH

Tax Map 251 Lot 63
Bumford Road & Rte. 4
Barrington, NH

Test Pit #3
Date: 8-13-21

0-6" Topsoil
10YR 3/3 – Dark Brown

6-16" Gravelly Sand
Granular/Friable
7.5 YR 5/6 – Strong Brown

16-48" Loamy sand
Granular, Firm in Place
2.5 YR 5/6 – Light Olive Brown

ESHWT = 16"
Roots to 16"
No water Observed
No ledge Observed

Parent Soils: HaB-Hinckley-sandy loam, excessively drained, NHDES group 1 (per WEBSOILS)
Perc: 2-4 min./inch

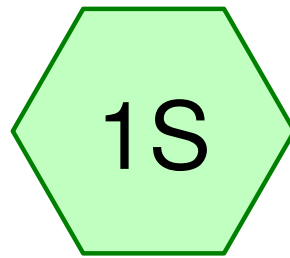
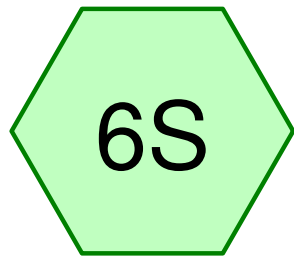
Site Plan
2A Tactical, LLC
Map 251 Lot 63
Barrington NH

Rip-rap apron calculations

Site Plan
2A Tactical, LLC
Map 251 Lot 63
Barrington NH

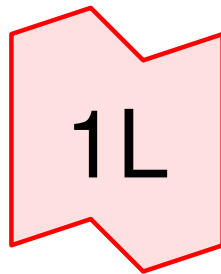
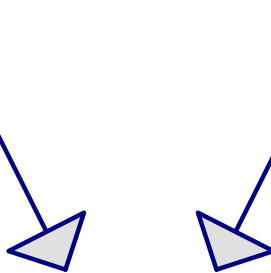
Pre-Drainage analysis output

Pre-development 2,10, 25, 50-year

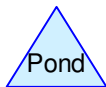
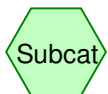


C SOIL

TO WET



DESIGN NODE



PRE

Area Listing (all nodes)

| Area (sq-ft) | CN | Description (subcatchment-numbers) |
|-----------------|-----------|---------------------------------------|
| 31,196 | 39 | >75% Grass cover, Good, HSG A (1S) |
| 10,997 | 98 | Paved parking, HSG A (1S) |
| 297,762 | 30 | Woods, Good, HSG A (1S) |
| 66,595 | 70 | Woods, Good, HSG C (6S) |
| 406,550 | 39 | TOTAL AREA |

Soil Listing (all nodes)

| Area (sq-ft) | Soil Group | Subcatchment Numbers |
|-----------------|---------------|-------------------------|
| 339,955 | HSG A | 1S |
| 0 | HSG B | |
| 66,595 | HSG C | 6S |
| 0 | HSG D | |
| 0 | Other | |
| 406,550 | | TOTAL AREA |

PRE

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Type III 24-hr 2YR Rainfall=3.08"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: TO WET

Runoff Area=339,955 sf 3.23% Impervious Runoff Depth=0.00"
Flow Length=979' Tc=30.1 min CN=33 Runoff=0.00 cfs 0 cf

Subcatchment 6S: C SOIL

Runoff Area=66,595 sf 0.00% Impervious Runoff Depth>0.68"
Tc=6.0 min CN=70 Runoff=1.18 cfs 3,795 cf

Link 1L: DESIGN NODE

Inflow=1.18 cfs 3,795 cf
Primary=1.18 cfs 3,795 cf

Total Runoff Area = 406,550 sf Runoff Volume = 3,795 cf Average Runoff Depth = 0.11"
97.30% Pervious = 395,553 sf 2.70% Impervious = 10,997 sf

Summary for Subcatchment 1S: TO WET

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0 cf, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2YR Rainfall=3.08"

| Area (sf) | CN | Description |
|-----------|----|-------------------------------|
| 10,997 | 98 | Paved parking, HSG A |
| 31,196 | 39 | >75% Grass cover, Good, HSG A |
| 297,762 | 30 | Woods, Good, HSG A |
| 339,955 | 33 | Weighted Average |
| 328,958 | | 96.77% Pervious Area |
| 10,997 | | 3.23% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|--|
| 0.3 | 14 | 0.0200 | 0.91 | | Sheet Flow, Smooth surfaces n= 0.011 P2= 3.08" |
| 2.2 | 15 | 0.0200 | 0.11 | | Sheet Flow, Grass: Short n= 0.150 P2= 3.08" |
| 12.6 | 50 | 0.0200 | 0.07 | | Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.08" |
| 15.0 | 900 | 0.0400 | 1.00 | | Shallow Concentrated Flow, Woodland Kv= 5.0 fps |
| 30.1 | 979 | Total | | | |

Summary for Subcatchment 6S: C SOIL

Runoff = 1.18 cfs @ 12.11 hrs, Volume= 3,795 cf, Depth> 0.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2YR Rainfall=3.08"

| Area (sf) | CN | Description |
|-----------|----|-----------------------|
| 66,595 | 70 | Woods, Good, HSG C |
| 66,595 | | 100.00% Pervious Area |

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

Summary for Link 1L: DESIGN NODE

Inflow Area = 406,550 sf, 2.70% Impervious, Inflow Depth > 0.11" for 2YR event
 Inflow = 1.18 cfs @ 12.11 hrs, Volume= 3,795 cf
 Primary = 1.18 cfs @ 12.11 hrs, Volume= 3,795 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

PRE

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Type III 24-hr 10YR Rainfall=4.65"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: TO WET

Runoff Area=339,955 sf 3.23% Impervious Runoff Depth>0.01"
Flow Length=979' Tc=30.1 min CN=33 Runoff=0.02 cfs 180 cf

Subcatchment 6S: C SOIL

Runoff Area=66,595 sf 0.00% Impervious Runoff Depth>1.64"
Tc=6.0 min CN=70 Runoff=3.06 cfs 9,077 cf

Link 1L: DESIGN NODE

Inflow=3.06 cfs 9,257 cf
Primary=3.06 cfs 9,257 cf

Total Runoff Area = 406,550 sf Runoff Volume = 9,257 cf Average Runoff Depth = 0.27"
97.30% Pervious = 395,553 sf 2.70% Impervious = 10,997 sf

Summary for Subcatchment 1S: TO WET

Runoff = 0.02 cfs @ 20.00 hrs, Volume= 180 cf, Depth> 0.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10YR Rainfall=4.65"

| Area (sf) | CN | Description |
|-----------|----|-------------------------------|
| 10,997 | 98 | Paved parking, HSG A |
| 31,196 | 39 | >75% Grass cover, Good, HSG A |
| 297,762 | 30 | Woods, Good, HSG A |
| 339,955 | 33 | Weighted Average |
| 328,958 | | 96.77% Pervious Area |
| 10,997 | | 3.23% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|--|
| 0.3 | 14 | 0.0200 | 0.91 | | Sheet Flow, Smooth surfaces n= 0.011 P2= 3.08" |
| 2.2 | 15 | 0.0200 | 0.11 | | Sheet Flow, Grass: Short n= 0.150 P2= 3.08" |
| 12.6 | 50 | 0.0200 | 0.07 | | Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.08" |
| 15.0 | 900 | 0.0400 | 1.00 | | Shallow Concentrated Flow, Woodland Kv= 5.0 fps |
| 30.1 | 979 | Total | | | |

Summary for Subcatchment 6S: C SOIL

Runoff = 3.06 cfs @ 12.10 hrs, Volume= 9,077 cf, Depth> 1.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10YR Rainfall=4.65"

| Area (sf) | CN | Description |
|-----------|----|-----------------------|
| 66,595 | 70 | Woods, Good, HSG C |
| 66,595 | | 100.00% Pervious Area |

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

Summary for Link 1L: DESIGN NODE

Inflow Area = 406,550 sf, 2.70% Impervious, Inflow Depth > 0.27" for 10YR event
 Inflow = 3.06 cfs @ 12.10 hrs, Volume= 9,257 cf
 Primary = 3.06 cfs @ 12.10 hrs, Volume= 9,257 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

PRE

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Type III 24-hr 25YR Rainfall=5.88"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: TO WET

Runoff Area=339,955 sf 3.23% Impervious Runoff Depth>0.11"
Flow Length=979' Tc=30.1 min CN=33 Runoff=0.16 cfs 3,045 cf

Subcatchment 6S: C SOIL

Runoff Area=66,595 sf 0.00% Impervious Runoff Depth>2.51"
Tc=6.0 min CN=70 Runoff=4.74 cfs 13,921 cf

Link 1L: DESIGN NODE

Inflow=4.74 cfs 16,966 cf
Primary=4.74 cfs 16,966 cf

Total Runoff Area = 406,550 sf Runoff Volume = 16,966 cf Average Runoff Depth = 0.50"
97.30% Pervious = 395,553 sf 2.70% Impervious = 10,997 sf

Summary for Subcatchment 1S: TO WET

Runoff = 0.16 cfs @ 15.01 hrs, Volume= 3,045 cf, Depth> 0.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YR Rainfall=5.88"

| Area (sf) | CN | Description |
|-----------|----|-------------------------------|
| 10,997 | 98 | Paved parking, HSG A |
| 31,196 | 39 | >75% Grass cover, Good, HSG A |
| 297,762 | 30 | Woods, Good, HSG A |
| 339,955 | 33 | Weighted Average |
| 328,958 | | 96.77% Pervious Area |
| 10,997 | | 3.23% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|--|
| 0.3 | 14 | 0.0200 | 0.91 | | Sheet Flow, Smooth surfaces n= 0.011 P2= 3.08" |
| 2.2 | 15 | 0.0200 | 0.11 | | Sheet Flow, Grass: Short n= 0.150 P2= 3.08" |
| 12.6 | 50 | 0.0200 | 0.07 | | Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.08" |
| 15.0 | 900 | 0.0400 | 1.00 | | Shallow Concentrated Flow, Woodland Kv= 5.0 fps |
| 30.1 | 979 | Total | | | |

Summary for Subcatchment 6S: C SOIL

Runoff = 4.74 cfs @ 12.10 hrs, Volume= 13,921 cf, Depth> 2.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YR Rainfall=5.88"

| Area (sf) | CN | Description |
|-----------|----|-----------------------|
| 66,595 | 70 | Woods, Good, HSG C |
| 66,595 | | 100.00% Pervious Area |

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

Summary for Link 1L: DESIGN NODE

Inflow Area = 406,550 sf, 2.70% Impervious, Inflow Depth > 0.50" for 25YR event
Inflow = 4.74 cfs @ 12.10 hrs, Volume= 16,966 cf
Primary = 4.74 cfs @ 12.10 hrs, Volume= 16,966 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

PRE

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Type III 24-hr 50 YR Rainfall=7.03"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: TO WET

Runoff Area=339,955 sf 3.23% Impervious Runoff Depth>0.30"
Flow Length=979' Tc=30.1 min CN=33 Runoff=0.60 cfs 8,518 cf

Subcatchment 6S: C SOIL

Runoff Area=66,595 sf 0.00% Impervious Runoff Depth>3.39"
Tc=6.0 min CN=70 Runoff=6.40 cfs 18,803 cf

Link 1L: DESIGN NODE

Inflow=6.40 cfs 27,321 cf
Primary=6.40 cfs 27,321 cf

Total Runoff Area = 406,550 sf Runoff Volume = 27,321 cf Average Runoff Depth = 0.81"
97.30% Pervious = 395,553 sf 2.70% Impervious = 10,997 sf

Summary for Subcatchment 1S: TO WET

Runoff = 0.60 cfs @ 12.81 hrs, Volume= 8,518 cf, Depth> 0.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 YR Rainfall=7.03"

| Area (sf) | CN | Description |
|-----------|----|-------------------------------|
| 10,997 | 98 | Paved parking, HSG A |
| 31,196 | 39 | >75% Grass cover, Good, HSG A |
| 297,762 | 30 | Woods, Good, HSG A |
| 339,955 | 33 | Weighted Average |
| 328,958 | | 96.77% Pervious Area |
| 10,997 | | 3.23% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|--|
| 0.3 | 14 | 0.0200 | 0.91 | | Sheet Flow, Smooth surfaces n= 0.011 P2= 3.08" |
| 2.2 | 15 | 0.0200 | 0.11 | | Sheet Flow, Grass: Short n= 0.150 P2= 3.08" |
| 12.6 | 50 | 0.0200 | 0.07 | | Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.08" |
| 15.0 | 900 | 0.0400 | 1.00 | | Shallow Concentrated Flow, Woodland Kv= 5.0 fps |
| 30.1 | 979 | Total | | | |

Summary for Subcatchment 6S: C SOIL

Runoff = 6.40 cfs @ 12.09 hrs, Volume= 18,803 cf, Depth> 3.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 YR Rainfall=7.03"

| Area (sf) | CN | Description |
|-----------|----|-----------------------|
| 66,595 | 70 | Woods, Good, HSG C |
| 66,595 | | 100.00% Pervious Area |

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

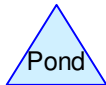
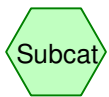
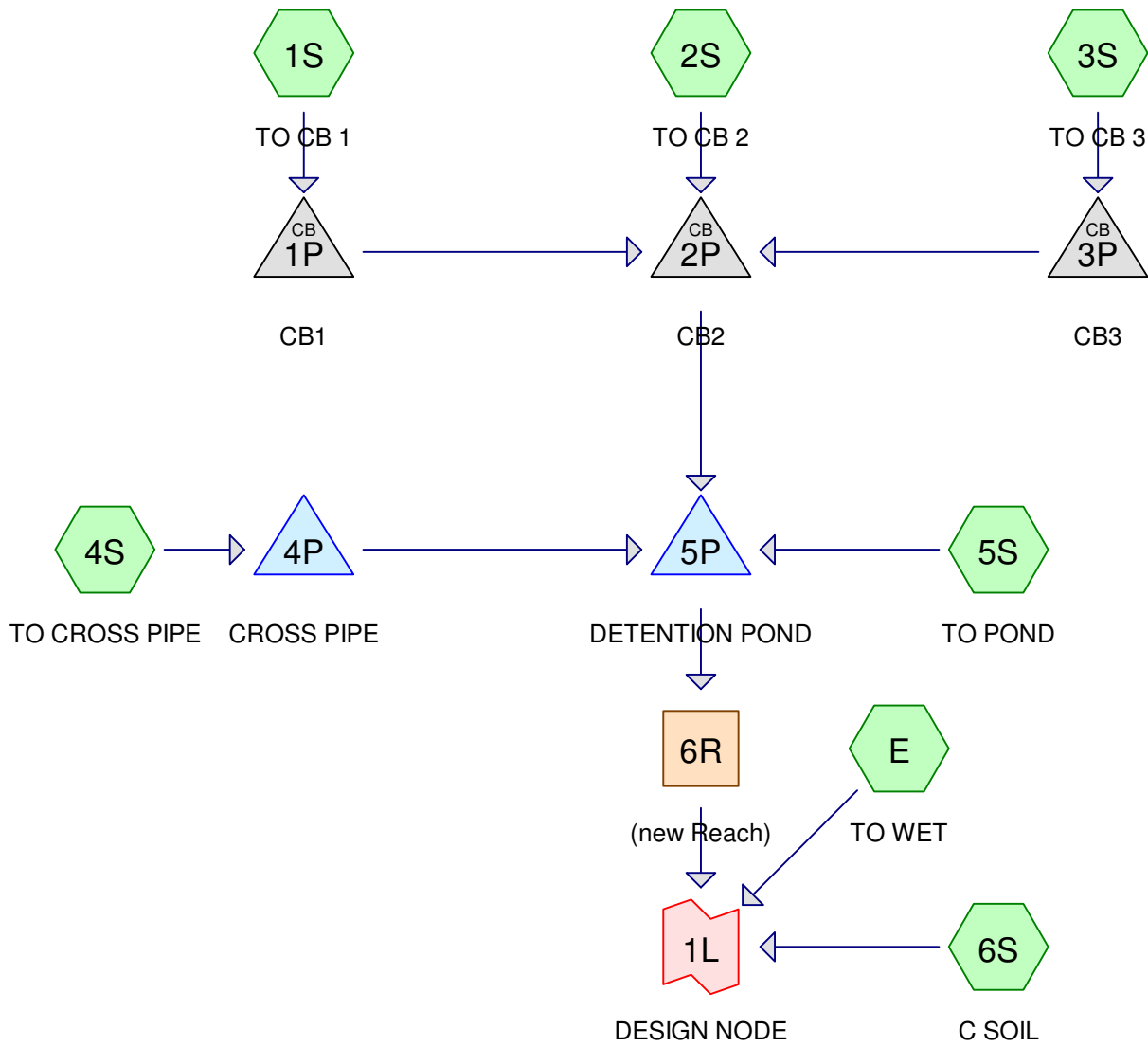
Summary for Link 1L: DESIGN NODE

Inflow Area = 406,550 sf, 2.70% Impervious, Inflow Depth > 0.81" for 50 YR event
Inflow = 6.40 cfs @ 12.09 hrs, Volume= 27,321 cf
Primary = 6.40 cfs @ 12.09 hrs, Volume= 27,321 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Site Plan
2A Tactical, LLC
Map 251 Lot 63
Barrington NH

**Post-Drainage analysis output
Post development 2,10, 25, 50-year**



POST

Area Listing (all nodes)

| Area (sq-ft) | CN | Description (subcatchment-numbers) |
|-----------------|-----------|---|
| 68,019 | 39 | >75% Grass cover, Good, HSG A (1S, 2S, 3S, 4S, 5S, E) |
| 43,518 | 98 | Paved parking, HSG A (1S, 2S, 3S, 4S, 5S, E) |
| 9,575 | 98 | Roofs, HSG A (5S) |
| 218,767 | 30 | Woods, Good, HSG A (1S, 4S, E) |
| 66,595 | 70 | Woods, Good, HSG C (6S) |
| 406,474 | 47 | TOTAL AREA |

POST

Soil Listing (all nodes)

| Area (sq-ft) | Soil Group | Subcatchment Numbers |
|-----------------|---------------|-------------------------|
| 339,879 | HSG A | 1S, 2S, 3S, 4S, 5S, E |
| 0 | HSG B | |
| 66,595 | HSG C | 6S |
| 0 | HSG D | |
| 0 | Other | |
| 406,474 | | TOTAL AREA |

POST**Pipe Listing (all nodes)**

| Line# | Node Number | In-Invert (feet) | Out-Invert (feet) | Length (feet) | Slope (ft/ft) | n | Diam/Width (inches) | Height (inches) | Inside-Fill (inches) |
|-------|----------------|---------------------|----------------------|------------------|------------------|-------|------------------------|--------------------|-------------------------|
| 1 | 1P | 181.00 | 180.49 | 51.0 | 0.0100 | 0.013 | 15.0 | 0.0 | 0.0 |
| 2 | 2P | 175.00 | 171.00 | 105.0 | 0.0381 | 0.013 | 18.0 | 0.0 | 0.0 |
| 3 | 3P | 184.00 | 182.50 | 97.0 | 0.0155 | 0.013 | 15.0 | 0.0 | 0.0 |
| 4 | 4P | 176.50 | 176.00 | 45.0 | 0.0111 | 0.013 | 15.0 | 0.0 | 0.0 |
| 5 | 5P | 167.00 | 164.00 | 40.0 | 0.0750 | 0.013 | 18.0 | 0.0 | 0.0 |

POST

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Type III 24-hr 2YR Rainfall=3.08"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

| | |
|---------------------------------------|--|
| Subcatchment 1S: TO CB 1 | Runoff Area=56,421 sf 41.81% Impervious Runoff Depth>0.38" Tc=6.0 min CN=62 Runoff=0.40 cfs 1,770 cf |
| Subcatchment 2S: TO CB 2 | Runoff Area=11,234 sf 87.33% Impervious Runoff Depth>2.02" Tc=6.0 min CN=91 Runoff=0.63 cfs 1,891 cf |
| Subcatchment 3S: TO CB 3 | Runoff Area=6,237 sf 81.59% Impervious Runoff Depth>1.69" Tc=6.0 min CN=87 Runoff=0.30 cfs 879 cf |
| Subcatchment 4S: TO CROSS PIPE | Runoff Area=20,668 sf 7.06% Impervious Runoff Depth=0.00" Tc=6.0 min CN=37 Runoff=0.00 cfs 0 cf |
| Subcatchment 5S: TO POND | Runoff Area=29,621 sf 38.86% Impervious Runoff Depth>0.38" Tc=6.0 min CN=62 Runoff=0.21 cfs 929 cf |
| Subcatchment 6S: C SOIL | Runoff Area=66,595 sf 0.00% Impervious Runoff Depth>0.68" Tc=6.0 min CN=70 Runoff=1.18 cfs 3,795 cf |
| Subcatchment E: TO WET | Runoff Area=215,698 sf 0.76% Impervious Runoff Depth=0.00" Flow Length=979' Tc=30.1 min CN=31 Runoff=0.00 cfs 0 cf |
| Reach 6R: (new Reach) | Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0 cf n=0.050 L=600.0' S=0.0100 '/ Capacity=28.97 cfs Outflow=0.00 cfs 0 cf |
| Pond 1P: CB1 | Peak Elev=181.30' Inflow=0.40 cfs 1,770 cf 15.0" Round Culvert n=0.013 L=51.0' S=0.0100 '/ Outflow=0.40 cfs 1,770 cf |
| Pond 2P: CB2 | Peak Elev=175.51' Inflow=1.31 cfs 4,540 cf 18.0" Round Culvert n=0.013 L=105.0' S=0.0381 '/ Outflow=1.31 cfs 4,540 cf |
| Pond 3P: CB3 | Peak Elev=184.25' Inflow=0.30 cfs 879 cf 15.0" Round Culvert n=0.013 L=97.0' S=0.0155 '/ Outflow=0.30 cfs 879 cf |
| Pond 4P: CROSS PIPE | Peak Elev=176.50' Storage=0 cf Inflow=0.00 cfs 0 cf 15.0" Round Culvert n=0.013 L=45.0' S=0.0111 '/ Outflow=0.00 cfs 0 cf |
| Pond 5P: DETENTION POND | Peak Elev=169.56' Storage=1,626 cf Inflow=1.52 cfs 5,470 cf Discarded=0.24 cfs 5,468 cf Primary=0.00 cfs 0 cf Outflow=0.24 cfs 5,468 cf |
| Link 1L: DESIGN NODE | Inflow=1.18 cfs 3,795 cf Primary=1.18 cfs 3,795 cf |

Total Runoff Area = 406,474 sf Runoff Volume = 9,265 cf Average Runoff Depth = 0.27"
86.94% Pervious = 353,381 sf 13.06% Impervious = 53,093 sf

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Type III 24-hr 2YR Rainfall=3.08"

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Summary for Subcatchment 1S: TO CB 1

Runoff = 0.40 cfs @ 12.13 hrs, Volume= 1,770 cf, Depth> 0.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR Rainfall=3.08"

| Area (sf) | CN | Description |
|-----------|----|-------------------------------|
| 9,363 | 98 | Paved parking, HSG A |
| 11,529 | 39 | >75% Grass cover, Good, HSG A |
| 14,226 | 98 | Paved parking, HSG A |
| 8,380 | 39 | >75% Grass cover, Good, HSG A |
| 12,923 | 30 | Woods, Good, HSG A |
| 56,421 | 62 | Weighted Average |
| 32,832 | | 58.19% Pervious Area |
| 23,589 | | 41.81% Impervious Area |

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

Summary for Subcatchment 2S: TO CB 2

Runoff = 0.63 cfs @ 12.09 hrs, Volume= 1,891 cf, Depth> 2.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR Rainfall=3.08"

| Area (sf) | CN | Description |
|-----------|----|-------------------------------|
| 9,811 | 98 | Paved parking, HSG A |
| 1,423 | 39 | >75% Grass cover, Good, HSG A |
| 11,234 | 91 | Weighted Average |
| 1,423 | | 12.67% Pervious Area |
| 9,811 | | 87.33% Impervious Area |

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

Summary for Subcatchment 3S: TO CB 3

Runoff = 0.30 cfs @ 12.09 hrs, Volume= 879 cf, Depth> 1.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR Rainfall=3.08"

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Type III 24-hr 2YR Rainfall=3.08"

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| Area (sf) | CN | Description |
|-----------|----|-------------------------------|
| 5,089 | 98 | Paved parking, HSG A |
| 1,148 | 39 | >75% Grass cover, Good, HSG A |
| 6,237 | 87 | Weighted Average |
| 1,148 | | 18.41% Pervious Area |
| 5,089 | | 81.59% Impervious Area |

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

Summary for Subcatchment 4S: TO CROSS PIPE

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0 cf, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR Rainfall=3.08"

| Area (sf) | CN | Description |
|-----------|----|-------------------------------|
| 1,460 | 98 | Paved parking, HSG A |
| 4,463 | 39 | >75% Grass cover, Good, HSG A |
| 14,745 | 30 | Woods, Good, HSG A |
| 20,668 | 37 | Weighted Average |
| 19,208 | | 92.94% Pervious Area |
| 1,460 | | 7.06% Impervious Area |

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

Summary for Subcatchment 5S: TO POND

Runoff = 0.21 cfs @ 12.13 hrs, Volume= 929 cf, Depth> 0.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR Rainfall=3.08"

| Area (sf) | CN | Description |
|-----------|----|-------------------------------|
| 6,000 | 98 | Roofs, HSG A |
| 3,575 | 98 | Roofs, HSG A |
| 1,935 | 98 | Paved parking, HSG A |
| 18,111 | 39 | >75% Grass cover, Good, HSG A |
| 29,621 | 62 | Weighted Average |
| 18,111 | | 61.14% Pervious Area |
| 11,510 | | 38.86% Impervious Area |

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Type III 24-hr 2YR Rainfall=3.08"

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

Summary for Subcatchment 6S: C SOIL

Runoff = 1.18 cfs @ 12.11 hrs, Volume= 3,795 cf, Depth> 0.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR Rainfall=3.08"

| Area (sf) | CN | Description |
|-----------|----|-----------------------|
| 66,595 | 70 | Woods, Good, HSG C |
| 66,595 | | 100.00% Pervious Area |

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

Summary for Subcatchment E: TO WET

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0 cf, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR Rainfall=3.08"

| Area (sf) | CN | Description |
|-----------|----|-------------------------------|
| 1,634 | 98 | Paved parking, HSG A |
| 4,498 | 39 | >75% Grass cover, Good, HSG A |
| 191,099 | 30 | Woods, Good, HSG A |
| 12,911 | 39 | >75% Grass cover, Good, HSG A |
| 5,556 | 39 | >75% Grass cover, Good, HSG A |
| 215,698 | 31 | Weighted Average |
| 214,064 | | 99.24% Pervious Area |
| 1,634 | | 0.76% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|-------------|------------------|------------------|----------------------|-------------------|--|
| 0.3 | 14 | 0.0200 | 0.91 | | Sheet Flow, Smooth surfaces n= 0.011 P2= 3.08" |
| 2.2 | 15 | 0.0200 | 0.11 | | Sheet Flow, Grass: Short n= 0.150 P2= 3.08" |
| 12.6 | 50 | 0.0200 | 0.07 | | Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.08" |
| 15.0 | 900 | 0.0400 | 1.00 | | Shallow Concentrated Flow, Woodland Kv= 5.0 fps |
| 30.1 | 979 | Total | | | |

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Type III 24-hr 2YR Rainfall=3.08"

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Summary for Reach 6R: (new Reach)

Inflow Area = 124,181 sf, 41.44% Impervious, Inflow Depth = 0.00" for 2YR event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0 cf
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 5.00 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 0.50' Flow Area= 18.8 sf, Capacity= 28.97 cfs

25.00' x 0.50' deep channel, n= 0.050
Side Slope Z-value= 25.0 ' / ' Top Width= 50.00'
Length= 600.0' Slope= 0.0100 ' / '
Inlet Invert= 164.00', Outlet Invert= 158.00'



Summary for Pond 1P: CB1

Inflow Area = 56,421 sf, 41.81% Impervious, Inflow Depth > 0.38" for 2YR event
Inflow = 0.40 cfs @ 12.13 hrs, Volume= 1,770 cf
Outflow = 0.40 cfs @ 12.13 hrs, Volume= 1,770 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.40 cfs @ 12.13 hrs, Volume= 1,770 cf

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 181.30' @ 12.13 hrs

| Device | Routing | Invert | Outlet Devices |
|--------|---------|---------|---|
| #1 | Primary | 181.00' | 15.0" Round Culvert L= 51.0' Ke= 0.500 Inlet / Outlet Invert= 181.00' / 180.49' S= 0.0100 ' / ' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf |

Primary OutFlow Max=0.39 cfs @ 12.13 hrs HW=181.29' TW=175.49' (Dynamic Tailwater)
↑ **1=Culvert** (Barrel Controls 0.39 cfs @ 2.69 fps)

Summary for Pond 2P: CB2

Inflow Area = 73,892 sf, 52.09% Impervious, Inflow Depth > 0.74" for 2YR event
Inflow = 1.31 cfs @ 12.10 hrs, Volume= 4,540 cf
Outflow = 1.31 cfs @ 12.10 hrs, Volume= 4,540 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.31 cfs @ 12.10 hrs, Volume= 4,540 cf

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Type III 24-hr 2YR Rainfall=3.08"

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Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 175.51' @ 12.10 hrs

| Device | Routing | Invert | Outlet Devices |
|--------|---------|---------|--|
| #1 | Primary | 175.00' | 18.0" Round Culvert L= 105.0' Ke= 0.500 Inlet / Outlet Invert= 175.00' / 171.00' S= 0.0381 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf |

Primary OutFlow Max=1.30 cfs @ 12.10 hrs HW=175.51' TW=169.20' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 1.30 cfs @ 2.44 fps)

Summary for Pond 3P: CB3

Inflow Area = 6,237 sf, 81.59% Impervious, Inflow Depth > 1.69" for 2YR event
Inflow = 0.30 cfs @ 12.09 hrs, Volume= 879 cf
Outflow = 0.30 cfs @ 12.09 hrs, Volume= 879 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.30 cfs @ 12.09 hrs, Volume= 879 cf

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 184.25' @ 12.09 hrs

| Device | Routing | Invert | Outlet Devices |
|--------|---------|---------|---|
| #1 | Primary | 184.00' | 15.0" Round Culvert L= 97.0' Ke= 0.500 Inlet / Outlet Invert= 184.00' / 182.50' S= 0.0155 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf |

Primary OutFlow Max=0.29 cfs @ 12.09 hrs HW=184.25' TW=175.51' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 0.29 cfs @ 1.69 fps)

Summary for Pond 4P: CROSS PIPE

Inflow Area = 20,668 sf, 7.06% Impervious, Inflow Depth = 0.00" for 2YR event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0 cf
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 176.50' @ 5.00 hrs Surf.Area= 50 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no inflow)

| Volume | Invert | Avail.Storage | Storage Description |
|---------------------|----------------------|---------------------------|--|
| #1 | 176.50' | 2,338 cf | Custom Stage Data (Prismatic) Listed below (Recalc) |
| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
| 176.50 | 50 | 0 | 0 |
| 178.00 | 400 | 338 | 338 |
| 180.00 | 1,600 | 2,000 | 2,338 |

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Type III 24-hr 2YR Rainfall=3.08"

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| Device | Routing | Invert | Outlet Devices |
|--------|---------|---------|---|
| #1 | Primary | 176.50' | 15.0" Round Culvert L= 45.0' Ke= 0.500 Inlet / Outlet Invert= 176.50' / 176.00' S= 0.0111 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf |

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=176.50' TW=169.00' (Dynamic Tailwater)
↑**1=Culvert** (Controls 0.00 cfs)

Summary for Pond 5P: DETENTION POND

Inflow Area = 124,181 sf, 41.44% Impervious, Inflow Depth > 0.53" for 2YR event
 Inflow = 1.52 cfs @ 12.11 hrs, Volume= 5,470 cf
 Outflow = 0.24 cfs @ 12.95 hrs, Volume= 5,468 cf, Atten= 84%, Lag= 50.7 min
 Discarded = 0.24 cfs @ 12.95 hrs, Volume= 5,468 cf
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 169.56' @ 12.95 hrs Surf.Area= 3,393 sf Storage= 1,626 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 63.4 min (879.4 - 816.0)

| Volume | Invert | Avail.Storage | Storage Description |
|--------|---------|---------------|--|
| #1 | 169.00' | 13,845 cf | Custom Stage Data (Prismatic) Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|------------------|-------------------|------------------------|------------------------|
| 169.00 | 2,440 | 0 | 0 |
| 170.00 | 4,150 | 3,295 | 3,295 |
| 172.00 | 6,400 | 10,550 | 13,845 |

| Device | Routing | Invert | Outlet Devices |
|--------|-----------|---------|---|
| #1 | Primary | 167.00' | 18.0" Round Culvert L= 40.0' Ke= 0.500 Inlet / Outlet Invert= 167.00' / 164.00' S= 0.0750 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf |
| #2 | Discarded | 169.00' | 3.00 in/hr Exfiltration over Surface area |
| #3 | Device 1 | 171.25' | 32.0" W x 42.0" H Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads |
| #4 | Device 1 | 170.70' | 16.0" W x 6.0" H Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads |

Discarded OutFlow Max=0.24 cfs @ 12.95 hrs HW=169.56' (Free Discharge)
↑**2=Exfiltration** (Exfiltration Controls 0.24 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=169.00' TW=164.00' (Dynamic Tailwater)
↑**1=Culvert** (Passes 0.00 cfs of 9.51 cfs potential flow)
 ↑**3=Orifice/Grate** (Controls 0.00 cfs)
 ↑**4=Orifice/Grate** (Controls 0.00 cfs)

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Type III 24-hr 2YR Rainfall=3.08"

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Summary for Link 1L: DESIGN NODE

Inflow Area = 406,474 sf, 13.06% Impervious, Inflow Depth > 0.11" for 2YR event
Inflow = 1.18 cfs @ 12.11 hrs, Volume= 3,795 cf
Primary = 1.18 cfs @ 12.11 hrs, Volume= 3,795 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

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Type III 24-hr 10YR Rainfall=4.65"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

| | |
|---------------------------------------|---|
| Subcatchment 1S: TO CB 1 | Runoff Area=56,421 sf 41.81% Impervious Runoff Depth>1.11" Tc=6.0 min CN=62 Runoff=1.65 cfs 5,215 cf |
| Subcatchment 2S: TO CB 2 | Runoff Area=11,234 sf 87.33% Impervious Runoff Depth>3.44" Tc=6.0 min CN=91 Runoff=1.04 cfs 3,223 cf |
| Subcatchment 3S: TO CB 3 | Runoff Area=6,237 sf 81.59% Impervious Runoff Depth>3.05" Tc=6.0 min CN=87 Runoff=0.52 cfs 1,585 cf |
| Subcatchment 4S: TO CROSS PIPE | Runoff Area=20,668 sf 7.06% Impervious Runoff Depth>0.06" Tc=6.0 min CN=37 Runoff=0.01 cfs 103 cf |
| Subcatchment 5S: TO POND | Runoff Area=29,621 sf 38.86% Impervious Runoff Depth>1.11" Tc=6.0 min CN=62 Runoff=0.87 cfs 2,738 cf |
| Subcatchment 6S: C SOIL | Runoff Area=66,595 sf 0.00% Impervious Runoff Depth>1.64" Tc=6.0 min CN=70 Runoff=3.06 cfs 9,077 cf |
| Subcatchment E: TO WET | Runoff Area=215,698 sf 0.76% Impervious Runoff Depth=0.00" Flow Length=979' Tc=30.1 min CN=31 Runoff=0.00 cfs 0 cf |
| Reach 6R: (new Reach) | Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0 cf n=0.050 L=600.0' S=0.0100 '/ Capacity=28.97 cfs Outflow=0.00 cfs 0 cf |
| Pond 1P: CB1 | Peak Elev=181.64' Inflow=1.65 cfs 5,215 cf 15.0" Round Culvert n=0.013 L=51.0' S=0.0100 '/ Outflow=1.65 cfs 5,215 cf |
| Pond 2P: CB2 | Peak Elev=175.84' Inflow=3.20 cfs 10,022 cf 18.0" Round Culvert n=0.013 L=105.0' S=0.0381 '/ Outflow=3.20 cfs 10,022 cf |
| Pond 3P: CB3 | Peak Elev=184.34' Inflow=0.52 cfs 1,585 cf 15.0" Round Culvert n=0.013 L=97.0' S=0.0155 '/ Outflow=0.52 cfs 1,585 cf |
| Pond 4P: CROSS PIPE | Peak Elev=176.54' Storage=2 cf Inflow=0.01 cfs 103 cf 15.0" Round Culvert n=0.013 L=45.0' S=0.0111 '/ Outflow=0.01 cfs 102 cf |
| Pond 5P: DETENTION POND | Peak Elev=170.55' Storage=5,732 cf Inflow=4.07 cfs 12,862 cf Discarded=0.33 cfs 10,126 cf Primary=0.00 cfs 0 cf Outflow=0.33 cfs 10,126 cf |
| Link 1L: DESIGN NODE | Inflow=3.06 cfs 9,077 cf Primary=3.06 cfs 9,077 cf |

Total Runoff Area = 406,474 sf Runoff Volume = 21,940 cf Average Runoff Depth = 0.65"
86.94% Pervious = 353,381 sf 13.06% Impervious = 53,093 sf

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Type III 24-hr 10YR Rainfall=4.65"

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Summary for Subcatchment 1S: TO CB 1

Runoff = 1.65 cfs @ 12.10 hrs, Volume= 5,215 cf, Depth> 1.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR Rainfall=4.65"

| Area (sf) | CN | Description |
|-----------|----|-------------------------------|
| 9,363 | 98 | Paved parking, HSG A |
| 11,529 | 39 | >75% Grass cover, Good, HSG A |
| 14,226 | 98 | Paved parking, HSG A |
| 8,380 | 39 | >75% Grass cover, Good, HSG A |
| 12,923 | 30 | Woods, Good, HSG A |
| 56,421 | 62 | Weighted Average |
| 32,832 | | 58.19% Pervious Area |
| 23,589 | | 41.81% Impervious Area |

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

Summary for Subcatchment 2S: TO CB 2

Runoff = 1.04 cfs @ 12.09 hrs, Volume= 3,223 cf, Depth> 3.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR Rainfall=4.65"

| Area (sf) | CN | Description |
|-----------|----|-------------------------------|
| 9,811 | 98 | Paved parking, HSG A |
| 1,423 | 39 | >75% Grass cover, Good, HSG A |
| 11,234 | 91 | Weighted Average |
| 1,423 | | 12.67% Pervious Area |
| 9,811 | | 87.33% Impervious Area |

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

Summary for Subcatchment 3S: TO CB 3

Runoff = 0.52 cfs @ 12.09 hrs, Volume= 1,585 cf, Depth> 3.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR Rainfall=4.65"

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Type III 24-hr 10YR Rainfall=4.65"

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| Area (sf) | CN | Description |
|-----------|----|-------------------------------|
| 5,089 | 98 | Paved parking, HSG A |
| 1,148 | 39 | >75% Grass cover, Good, HSG A |
| 6,237 | 87 | Weighted Average |
| 1,148 | | 18.41% Pervious Area |
| 5,089 | | 81.59% Impervious Area |

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

Summary for Subcatchment 4S: TO CROSS PIPE

Runoff = 0.01 cfs @ 15.04 hrs, Volume= 103 cf, Depth> 0.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR Rainfall=4.65"

| Area (sf) | CN | Description |
|-----------|----|-------------------------------|
| 1,460 | 98 | Paved parking, HSG A |
| 4,463 | 39 | >75% Grass cover, Good, HSG A |
| 14,745 | 30 | Woods, Good, HSG A |
| 20,668 | 37 | Weighted Average |
| 19,208 | | 92.94% Pervious Area |
| 1,460 | | 7.06% Impervious Area |

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

Summary for Subcatchment 5S: TO POND

Runoff = 0.87 cfs @ 12.10 hrs, Volume= 2,738 cf, Depth> 1.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR Rainfall=4.65"

| Area (sf) | CN | Description |
|-----------|----|-------------------------------|
| 6,000 | 98 | Roofs, HSG A |
| 3,575 | 98 | Roofs, HSG A |
| 1,935 | 98 | Paved parking, HSG A |
| 18,111 | 39 | >75% Grass cover, Good, HSG A |
| 29,621 | 62 | Weighted Average |
| 18,111 | | 61.14% Pervious Area |
| 11,510 | | 38.86% Impervious Area |

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Type III 24-hr 10YR Rainfall=4.65"

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

Summary for Subcatchment 6S: C SOIL

Runoff = 3.06 cfs @ 12.10 hrs, Volume= 9,077 cf, Depth> 1.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR Rainfall=4.65"

| Area (sf) | CN | Description |
|-----------|----|-----------------------|
| 66,595 | 70 | Woods, Good, HSG C |
| 66,595 | | 100.00% Pervious Area |

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

Summary for Subcatchment E: TO WET

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0 cf, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR Rainfall=4.65"

| Area (sf) | CN | Description |
|-----------|----|-------------------------------|
| 1,634 | 98 | Paved parking, HSG A |
| 4,498 | 39 | >75% Grass cover, Good, HSG A |
| 191,099 | 30 | Woods, Good, HSG A |
| 12,911 | 39 | >75% Grass cover, Good, HSG A |
| 5,556 | 39 | >75% Grass cover, Good, HSG A |
| 215,698 | 31 | Weighted Average |
| 214,064 | | 99.24% Pervious Area |
| 1,634 | | 0.76% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|--|
| 0.3 | 14 | 0.0200 | 0.91 | | Sheet Flow, Smooth surfaces n= 0.011 P2= 3.08" |
| 2.2 | 15 | 0.0200 | 0.11 | | Sheet Flow, Grass: Short n= 0.150 P2= 3.08" |
| 12.6 | 50 | 0.0200 | 0.07 | | Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.08" |
| 15.0 | 900 | 0.0400 | 1.00 | | Shallow Concentrated Flow, Woodland Kv= 5.0 fps |
| 30.1 | 979 | Total | | | |

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Type III 24-hr 10YR Rainfall=4.65"

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Summary for Reach 6R: (new Reach)

Inflow Area = 124,181 sf, 41.44% Impervious, Inflow Depth = 0.00" for 10YR event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0 cf
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 5.00 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 0.50' Flow Area= 18.8 sf, Capacity= 28.97 cfs

25.00' x 0.50' deep channel, n= 0.050
Side Slope Z-value= 25.0 ' / ' Top Width= 50.00'
Length= 600.0' Slope= 0.0100 ' / '
Inlet Invert= 164.00', Outlet Invert= 158.00'



Summary for Pond 1P: CB1

Inflow Area = 56,421 sf, 41.81% Impervious, Inflow Depth > 1.11" for 10YR event
Inflow = 1.65 cfs @ 12.10 hrs, Volume= 5,215 cf
Outflow = 1.65 cfs @ 12.10 hrs, Volume= 5,215 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.65 cfs @ 12.10 hrs, Volume= 5,215 cf

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 181.64' @ 12.10 hrs

| Device | Routing | Invert | Outlet Devices |
|--------|---------|---------|---|
| #1 | Primary | 181.00' | 15.0" Round Culvert L= 51.0' Ke= 0.500 Inlet / Outlet Invert= 181.00' / 180.49' S= 0.0100 ' / ' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf |

Primary OutFlow Max=1.64 cfs @ 12.10 hrs HW=181.64' TW=175.84' (Dynamic Tailwater)
↑ **1=Culvert** (Barrel Controls 1.64 cfs @ 3.78 fps)

Summary for Pond 2P: CB2

Inflow Area = 73,892 sf, 52.09% Impervious, Inflow Depth > 1.63" for 10YR event
Inflow = 3.20 cfs @ 12.10 hrs, Volume= 10,022 cf
Outflow = 3.20 cfs @ 12.10 hrs, Volume= 10,022 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.20 cfs @ 12.10 hrs, Volume= 10,022 cf

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Type III 24-hr 10YR Rainfall=4.65"

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Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 175.84' @ 12.10 hrs

| Device | Routing | Invert | Outlet Devices |
|--------|---------|---------|--|
| #1 | Primary | 175.00' | 18.0" Round Culvert L= 105.0' Ke= 0.500 Inlet / Outlet Invert= 175.00' / 171.00' S= 0.0381 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf |

Primary OutFlow Max=3.18 cfs @ 12.10 hrs HW=175.84' TW=169.69' (Dynamic Tailwater)↑**1=Culvert** (Inlet Controls 3.18 cfs @ 3.12 fps)**Summary for Pond 3P: CB3**

Inflow Area = 6,237 sf, 81.59% Impervious, Inflow Depth > 3.05" for 10YR event
 Inflow = 0.52 cfs @ 12.09 hrs, Volume= 1,585 cf
 Outflow = 0.52 cfs @ 12.09 hrs, Volume= 1,585 cf, Atten= 0%, Lag= 0.0 min
 Primary = 0.52 cfs @ 12.09 hrs, Volume= 1,585 cf

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 184.34' @ 12.09 hrs

| Device | Routing | Invert | Outlet Devices |
|--------|---------|---------|---|
| #1 | Primary | 184.00' | 15.0" Round Culvert L= 97.0' Ke= 0.500 Inlet / Outlet Invert= 184.00' / 182.50' S= 0.0155 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf |

Primary OutFlow Max=0.51 cfs @ 12.09 hrs HW=184.33' TW=175.83' (Dynamic Tailwater)↑**1=Culvert** (Inlet Controls 0.51 cfs @ 1.96 fps)**Summary for Pond 4P: CROSS PIPE**

Inflow Area = 20,668 sf, 7.06% Impervious, Inflow Depth > 0.06" for 10YR event
 Inflow = 0.01 cfs @ 15.04 hrs, Volume= 103 cf
 Outflow = 0.01 cfs @ 15.09 hrs, Volume= 102 cf, Atten= 0%, Lag= 3.2 min
 Primary = 0.01 cfs @ 15.09 hrs, Volume= 102 cf

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 176.54' @ 15.09 hrs Surf.Area= 58 sf Storage= 2 cf

Plug-Flow detention time= 6.9 min calculated for 102 cf (99% of inflow)

Center-of-Mass det. time= 3.7 min (986.5 - 982.9)

| Volume | Invert | Avail.Storage | Storage Description |
|---------------------|----------------------|---------------------------|--|
| #1 | 176.50' | 2,338 cf | Custom Stage Data (Prismatic) Listed below (Recalc) |
| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
| 176.50 | 50 | 0 | 0 |
| 178.00 | 400 | 338 | 338 |
| 180.00 | 1,600 | 2,000 | 2,338 |

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Type III 24-hr 10YR Rainfall=4.65"

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| Device | Routing | Invert | Outlet Devices |
|--------|---------|---------|---|
| #1 | Primary | 176.50' | 15.0" Round Culvert L= 45.0' Ke= 0.500 Inlet / Outlet Invert= 176.50' / 176.00' S= 0.0111 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf |

Primary OutFlow Max=0.01 cfs @ 15.09 hrs HW=176.54' TW=170.51' (Dynamic Tailwater)
↑**1=Culvert** (Barrel Controls 0.01 cfs @ 0.81 fps)

Summary for Pond 5P: DETENTION POND

Inflow Area = 124,181 sf, 41.44% Impervious, Inflow Depth > 1.24" for 10YR event
 Inflow = 4.07 cfs @ 12.10 hrs, Volume= 12,862 cf
 Outflow = 0.33 cfs @ 14.00 hrs, Volume= 10,126 cf, Atten= 92%, Lag= 114.2 min
 Discarded = 0.33 cfs @ 14.00 hrs, Volume= 10,126 cf
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 170.55' @ 14.00 hrs Surf.Area= 4,765 sf Storage= 5,732 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 114.7 min (919.6 - 804.9)

| Volume | Invert | Avail.Storage | Storage Description |
|--------|---------|---------------|--|
| #1 | 169.00' | 13,845 cf | Custom Stage Data (Prismatic) Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|------------------|-------------------|------------------------|------------------------|
| 169.00 | 2,440 | 0 | 0 |
| 170.00 | 4,150 | 3,295 | 3,295 |
| 172.00 | 6,400 | 10,550 | 13,845 |

| Device | Routing | Invert | Outlet Devices |
|--------|-----------|---------|---|
| #1 | Primary | 167.00' | 18.0" Round Culvert L= 40.0' Ke= 0.500 Inlet / Outlet Invert= 167.00' / 164.00' S= 0.0750 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf |
| #2 | Discarded | 169.00' | 3.00 in/hr Exfiltration over Surface area |
| #3 | Device 1 | 171.25' | 32.0" W x 42.0" H Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads |
| #4 | Device 1 | 170.70' | 16.0" W x 6.0" H Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads |

Discarded OutFlow Max=0.33 cfs @ 14.00 hrs HW=170.55' (Free Discharge)
↑**2=Exfiltration** (Exfiltration Controls 0.33 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=169.00' TW=164.00' (Dynamic Tailwater)
↑**1=Culvert** (Passes 0.00 cfs of 9.51 cfs potential flow)
 ↑**3=Orifice/Grate** (Controls 0.00 cfs)
 ↑**4=Orifice/Grate** (Controls 0.00 cfs)

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Type III 24-hr 10YR Rainfall=4.65"

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Summary for Link 1L: DESIGN NODE

Inflow Area = 406,474 sf, 13.06% Impervious, Inflow Depth > 0.27" for 10YR event
Inflow = 3.06 cfs @ 12.10 hrs, Volume= 9,077 cf
Primary = 3.06 cfs @ 12.10 hrs, Volume= 9,077 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

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Type III 24-hr 25YR Rainfall=5.88"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

| | |
|---------------------------------------|---|
| Subcatchment 1S: TO CB 1 | Runoff Area=56,421 sf 41.81% Impervious Runoff Depth>1.84" Tc=6.0 min CN=62 Runoff=2.87 cfs 8,633 cf |
| Subcatchment 2S: TO CB 2 | Runoff Area=11,234 sf 87.33% Impervious Runoff Depth>4.57" Tc=6.0 min CN=91 Runoff=1.35 cfs 4,281 cf |
| Subcatchment 3S: TO CB 3 | Runoff Area=6,237 sf 81.59% Impervious Runoff Depth>4.16" Tc=6.0 min CN=87 Runoff=0.70 cfs 2,160 cf |
| Subcatchment 4S: TO CROSS PIPE | Runoff Area=20,668 sf 7.06% Impervious Runoff Depth>0.26" Tc=6.0 min CN=37 Runoff=0.04 cfs 440 cf |
| Subcatchment 5S: TO POND | Runoff Area=29,621 sf 38.86% Impervious Runoff Depth>1.84" Tc=6.0 min CN=62 Runoff=1.51 cfs 4,532 cf |
| Subcatchment 6S: C SOIL | Runoff Area=66,595 sf 0.00% Impervious Runoff Depth>2.51" Tc=6.0 min CN=70 Runoff=4.74 cfs 13,921 cf |
| Subcatchment E: TO WET | Runoff Area=215,698 sf 0.76% Impervious Runoff Depth>0.06" Flow Length=979' Tc=30.1 min CN=31 Runoff=0.05 cfs 1,000 cf |
| Reach 6R: (new Reach) | Avg. Flow Depth=0.05' Max Vel=0.42 fps Inflow=0.80 cfs 4,038 cf n=0.050 L=600.0' S=0.0100 '/' Capacity=28.97 cfs Outflow=0.60 cfs 4,017 cf |
| Pond 1P: CB1 | Peak Elev=181.90' Inflow=2.87 cfs 8,633 cf 15.0" Round Culvert n=0.013 L=51.0' S=0.0100 '/' Outflow=2.87 cfs 8,633 cf |
| Pond 2P: CB2 | Peak Elev=176.09' Inflow=4.92 cfs 15,075 cf 18.0" Round Culvert n=0.013 L=105.0' S=0.0381 '/' Outflow=4.92 cfs 15,075 cf |
| Pond 3P: CB3 | Peak Elev=184.39' Inflow=0.70 cfs 2,160 cf 15.0" Round Culvert n=0.013 L=97.0' S=0.0155 '/' Outflow=0.70 cfs 2,160 cf |
| Pond 4P: CROSS PIPE | Peak Elev=176.60' Storage=6 cf Inflow=0.04 cfs 440 cf 15.0" Round Culvert n=0.013 L=45.0' S=0.0111 '/' Outflow=0.04 cfs 437 cf |
| Pond 5P: DETENTION POND | Peak Elev=171.03' Storage=8,149 cf Inflow=6.43 cfs 20,045 cf Discarded=0.37 cfs 11,456 cf Primary=0.80 cfs 4,038 cf Outflow=1.17 cfs 15,493 cf |
| Link 1L: DESIGN NODE | Inflow=4.74 cfs 18,939 cf Primary=4.74 cfs 18,939 cf |

Total Runoff Area = 406,474 sf Runoff Volume = 34,968 cf Average Runoff Depth = 1.03"
86.94% Pervious = 353,381 sf 13.06% Impervious = 53,093 sf

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Type III 24-hr 25YR Rainfall=5.88"

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Summary for Subcatchment 1S: TO CB 1

Runoff = 2.87 cfs @ 12.10 hrs, Volume= 8,633 cf, Depth> 1.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YR Rainfall=5.88"

| Area (sf) | CN | Description |
|-----------|----|-------------------------------|
| 9,363 | 98 | Paved parking, HSG A |
| 11,529 | 39 | >75% Grass cover, Good, HSG A |
| 14,226 | 98 | Paved parking, HSG A |
| 8,380 | 39 | >75% Grass cover, Good, HSG A |
| 12,923 | 30 | Woods, Good, HSG A |
| 56,421 | 62 | Weighted Average |
| 32,832 | | 58.19% Pervious Area |
| 23,589 | | 41.81% Impervious Area |

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

Summary for Subcatchment 2S: TO CB 2

Runoff = 1.35 cfs @ 12.09 hrs, Volume= 4,281 cf, Depth> 4.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YR Rainfall=5.88"

| Area (sf) | CN | Description |
|-----------|----|-------------------------------|
| 9,811 | 98 | Paved parking, HSG A |
| 1,423 | 39 | >75% Grass cover, Good, HSG A |
| 11,234 | 91 | Weighted Average |
| 1,423 | | 12.67% Pervious Area |
| 9,811 | | 87.33% Impervious Area |

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

Summary for Subcatchment 3S: TO CB 3

Runoff = 0.70 cfs @ 12.09 hrs, Volume= 2,160 cf, Depth> 4.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YR Rainfall=5.88"

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Type III 24-hr 25YR Rainfall=5.88"

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| Area (sf) | CN | Description |
|-----------|----|-------------------------------|
| 5,089 | 98 | Paved parking, HSG A |
| 1,148 | 39 | >75% Grass cover, Good, HSG A |
| 6,237 | 87 | Weighted Average |
| 1,148 | | 18.41% Pervious Area |
| 5,089 | | 81.59% Impervious Area |

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

Summary for Subcatchment 4S: TO CROSS PIPE

Runoff = 0.04 cfs @ 12.41 hrs, Volume= 440 cf, Depth> 0.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YR Rainfall=5.88"

| Area (sf) | CN | Description |
|-----------|----|-------------------------------|
| 1,460 | 98 | Paved parking, HSG A |
| 4,463 | 39 | >75% Grass cover, Good, HSG A |
| 14,745 | 30 | Woods, Good, HSG A |
| 20,668 | 37 | Weighted Average |
| 19,208 | | 92.94% Pervious Area |
| 1,460 | | 7.06% Impervious Area |

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

Summary for Subcatchment 5S: TO POND

Runoff = 1.51 cfs @ 12.10 hrs, Volume= 4,532 cf, Depth> 1.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YR Rainfall=5.88"

| Area (sf) | CN | Description |
|-----------|----|-------------------------------|
| 6,000 | 98 | Roofs, HSG A |
| 3,575 | 98 | Roofs, HSG A |
| 1,935 | 98 | Paved parking, HSG A |
| 18,111 | 39 | >75% Grass cover, Good, HSG A |
| 29,621 | 62 | Weighted Average |
| 18,111 | | 61.14% Pervious Area |
| 11,510 | | 38.86% Impervious Area |

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Type III 24-hr 25YR Rainfall=5.88"

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

Summary for Subcatchment 6S: C SOIL

Runoff = 4.74 cfs @ 12.10 hrs, Volume= 13,921 cf, Depth> 2.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YR Rainfall=5.88"

| Area (sf) | CN | Description |
|-----------|----|-----------------------|
| 66,595 | 70 | Woods, Good, HSG C |
| 66,595 | | 100.00% Pervious Area |

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

Summary for Subcatchment E: TO WET

Runoff = 0.05 cfs @ 15.68 hrs, Volume= 1,000 cf, Depth> 0.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YR Rainfall=5.88"

| Area (sf) | CN | Description |
|-----------|----|-------------------------------|
| 1,634 | 98 | Paved parking, HSG A |
| 4,498 | 39 | >75% Grass cover, Good, HSG A |
| 191,099 | 30 | Woods, Good, HSG A |
| 12,911 | 39 | >75% Grass cover, Good, HSG A |
| 5,556 | 39 | >75% Grass cover, Good, HSG A |
| 215,698 | 31 | Weighted Average |
| 214,064 | | 99.24% Pervious Area |
| 1,634 | | 0.76% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|-------------|------------------|------------------|----------------------|-------------------|--|
| 0.3 | 14 | 0.0200 | 0.91 | | Sheet Flow, Smooth surfaces n= 0.011 P2= 3.08" |
| 2.2 | 15 | 0.0200 | 0.11 | | Sheet Flow, Grass: Short n= 0.150 P2= 3.08" |
| 12.6 | 50 | 0.0200 | 0.07 | | Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.08" |
| 15.0 | 900 | 0.0400 | 1.00 | | Shallow Concentrated Flow, Woodland Kv= 5.0 fps |
| 30.1 | 979 | Total | | | |

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Type III 24-hr 25YR Rainfall=5.88"

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Summary for Reach 6R: (new Reach)

Inflow Area = 124,181 sf, 41.44% Impervious, Inflow Depth = 0.39" for 25YR event
Inflow = 0.80 cfs @ 12.60 hrs, Volume= 4,038 cf
Outflow = 0.60 cfs @ 13.04 hrs, Volume= 4,017 cf, Atten= 25%, Lag= 26.3 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.42 fps, Min. Travel Time= 24.1 min
Avg. Velocity = 0.19 fps, Avg. Travel Time= 51.5 min

Peak Storage= 869 cf @ 13.04 hrs
Average Depth at Peak Storage= 0.05', Surface Width= 27.75'
Bank-Full Depth= 0.50' Flow Area= 18.8 sf, Capacity= 28.97 cfs

25.00' x 0.50' deep channel, n= 0.050
Side Slope Z-value= 25.0 ' / ' Top Width= 50.00'
Length= 600.0' Slope= 0.0100 ' / '
Inlet Invert= 164.00', Outlet Invert= 158.00'



Summary for Pond 1P: CB1

Inflow Area = 56,421 sf, 41.81% Impervious, Inflow Depth > 1.84" for 25YR event
Inflow = 2.87 cfs @ 12.10 hrs, Volume= 8,633 cf
Outflow = 2.87 cfs @ 12.10 hrs, Volume= 8,633 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.87 cfs @ 12.10 hrs, Volume= 8,633 cf

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 181.90' @ 12.10 hrs

| Device | Routing | Invert | Outlet Devices |
|--------|---------|---------|---|
| #1 | Primary | 181.00' | 15.0" Round Culvert L= 51.0' Ke= 0.500 Inlet / Outlet Invert= 181.00' / 180.49' S= 0.0100 ' / ' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf |

Primary OutFlow Max=2.87 cfs @ 12.10 hrs HW=181.90' TW=176.09' (Dynamic Tailwater)
↑ **1=Culvert** (Barrel Controls 2.87 cfs @ 4.25 fps)

Summary for Pond 2P: CB2

Inflow Area = 73,892 sf, 52.09% Impervious, Inflow Depth > 2.45" for 25YR event
Inflow = 4.92 cfs @ 12.09 hrs, Volume= 15,075 cf
Outflow = 4.92 cfs @ 12.09 hrs, Volume= 15,075 cf, Atten= 0%, Lag= 0.0 min
Primary = 4.92 cfs @ 12.09 hrs, Volume= 15,075 cf

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Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 176.09' @ 12.09 hrs

| Device | Routing | Invert | Outlet Devices |
|--------|---------|---------|--|
| #1 | Primary | 175.00' | 18.0" Round Culvert L= 105.0' Ke= 0.500 Inlet / Outlet Invert= 175.00' / 171.00' S= 0.0381 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf |

Primary OutFlow Max=4.86 cfs @ 12.09 hrs HW=176.09' TW=170.14' (Dynamic Tailwater)↑**1=Culvert** (Inlet Controls 4.86 cfs @ 3.55 fps)**Summary for Pond 3P: CB3**

Inflow Area = 6,237 sf, 81.59% Impervious, Inflow Depth > 4.16" for 25YR event
 Inflow = 0.70 cfs @ 12.09 hrs, Volume= 2,160 cf
 Outflow = 0.70 cfs @ 12.09 hrs, Volume= 2,160 cf, Atten= 0%, Lag= 0.0 min
 Primary = 0.70 cfs @ 12.09 hrs, Volume= 2,160 cf

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 184.39' @ 12.09 hrs

| Device | Routing | Invert | Outlet Devices |
|--------|---------|---------|---|
| #1 | Primary | 184.00' | 15.0" Round Culvert L= 97.0' Ke= 0.500 Inlet / Outlet Invert= 184.00' / 182.50' S= 0.0155 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf |

Primary OutFlow Max=0.69 cfs @ 12.09 hrs HW=184.39' TW=176.08' (Dynamic Tailwater)↑**1=Culvert** (Inlet Controls 0.69 cfs @ 2.12 fps)**Summary for Pond 4P: CROSS PIPE**

Inflow Area = 20,668 sf, 7.06% Impervious, Inflow Depth > 0.26" for 25YR event
 Inflow = 0.04 cfs @ 12.41 hrs, Volume= 440 cf
 Outflow = 0.04 cfs @ 12.44 hrs, Volume= 437 cf, Atten= 1%, Lag= 1.4 min
 Primary = 0.04 cfs @ 12.44 hrs, Volume= 437 cf

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 176.60' @ 12.44 hrs Surf.Area= 72 sf Storage= 6 cf

Plug-Flow detention time= 3.5 min calculated for 437 cf (99% of inflow)

Center-of-Mass det. time= 2.0 min (911.8 - 909.8)

| Volume | Invert | Avail.Storage | Storage Description |
|---------------------|----------------------|---------------------------|--|
| #1 | 176.50' | 2,338 cf | Custom Stage Data (Prismatic) Listed below (Recalc) |
| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
| 176.50 | 50 | 0 | 0 |
| 178.00 | 400 | 338 | 338 |
| 180.00 | 1,600 | 2,000 | 2,338 |

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| Device | Routing | Invert | Outlet Devices |
|--------|---------|---------|---|
| #1 | Primary | 176.50' | 15.0" Round Culvert L= 45.0' Ke= 0.500 Inlet / Outlet Invert= 176.50' / 176.00' S= 0.0111 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf |

Primary OutFlow Max=0.04 cfs @ 12.44 hrs HW=176.60' TW=170.97' (Dynamic Tailwater)
↑**1=Culvert** (Barrel Controls 0.04 cfs @ 1.51 fps)

Summary for Pond 5P: DETENTION POND

Inflow Area = 124,181 sf, 41.44% Impervious, Inflow Depth > 1.94" for 25YR event
 Inflow = 6.43 cfs @ 12.10 hrs, Volume= 20,045 cf
 Outflow = 1.17 cfs @ 12.60 hrs, Volume= 15,493 cf, Atten= 82%, Lag= 30.5 min
 Discarded = 0.37 cfs @ 12.60 hrs, Volume= 11,456 cf
 Primary = 0.80 cfs @ 12.60 hrs, Volume= 4,038 cf

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 171.03' @ 12.60 hrs Surf.Area= 5,305 sf Storage= 8,149 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 82.1 min (881.3 - 799.2)

| Volume | Invert | Avail.Storage | Storage Description |
|--------|---------|---------------|--|
| #1 | 169.00' | 13,845 cf | Custom Stage Data (Prismatic) Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|------------------|-------------------|------------------------|------------------------|
| 169.00 | 2,440 | 0 | 0 |
| 170.00 | 4,150 | 3,295 | 3,295 |
| 172.00 | 6,400 | 10,550 | 13,845 |

| Device | Routing | Invert | Outlet Devices |
|--------|-----------|---------|---|
| #1 | Primary | 167.00' | 18.0" Round Culvert L= 40.0' Ke= 0.500 Inlet / Outlet Invert= 167.00' / 164.00' S= 0.0750 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf |
| #2 | Discarded | 169.00' | 3.000 in/hr Exfiltration over Surface area |
| #3 | Device 1 | 171.25' | 32.0" W x 42.0" H Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads |
| #4 | Device 1 | 170.70' | 16.0" W x 6.0" H Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads |

Discarded OutFlow Max=0.37 cfs @ 12.60 hrs HW=171.03' (Free Discharge)
↑**2=Exfiltration** (Exfiltration Controls 0.37 cfs)

Primary OutFlow Max=0.80 cfs @ 12.60 hrs HW=171.03' TW=164.03' (Dynamic Tailwater)
↑**1=Culvert** (Passes 0.80 cfs of 15.40 cfs potential flow)
↑**3=Orifice/Grate** (Controls 0.00 cfs)
↑**4=Orifice/Grate** (Orifice Controls 0.80 cfs @ 1.83 fps)

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Summary for Link 1L: DESIGN NODE

Inflow Area = 406,474 sf, 13.06% Impervious, Inflow Depth > 0.56" for 25YR event
Inflow = 4.74 cfs @ 12.10 hrs, Volume= 18,939 cf
Primary = 4.74 cfs @ 12.10 hrs, Volume= 18,939 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

| | |
|---------------------------------------|---|
| Subcatchment 1S: TO CB 1 | Runoff Area=56,421 sf 41.81% Impervious Runoff Depth>2.60" Tc=6.0 min CN=62 Runoff=4.13 cfs 12,216 cf |
| Subcatchment 2S: TO CB 2 | Runoff Area=11,234 sf 87.33% Impervious Runoff Depth>5.63" Tc=6.0 min CN=91 Runoff=1.65 cfs 5,275 cf |
| Subcatchment 3S: TO CB 3 | Runoff Area=6,237 sf 81.59% Impervious Runoff Depth>5.21" Tc=6.0 min CN=87 Runoff=0.87 cfs 2,706 cf |
| Subcatchment 4S: TO CROSS PIPE | Runoff Area=20,668 sf 7.06% Impervious Runoff Depth>0.54" Tc=6.0 min CN=37 Runoff=0.14 cfs 931 cf |
| Subcatchment 5S: TO POND | Runoff Area=29,621 sf 38.86% Impervious Runoff Depth>2.60" Tc=6.0 min CN=62 Runoff=2.17 cfs 6,413 cf |
| Subcatchment 6S: C SOIL | Runoff Area=66,595 sf 0.00% Impervious Runoff Depth>3.39" Tc=6.0 min CN=70 Runoff=6.40 cfs 18,803 cf |
| Subcatchment E: TO WET | Runoff Area=215,698 sf 0.76% Impervious Runoff Depth>0.20" Flow Length=979' Tc=30.1 min CN=31 Runoff=0.19 cfs 3,665 cf |
| Reach 6R: (new Reach) | Avg. Flow Depth=0.11' Max Vel=0.63 fps Inflow=2.40 cfs 10,015 cf n=0.050 L=600.0' S=0.0100 '/' Capacity=28.97 cfs Outflow=1.87 cfs 9,982 cf |
| Pond 1P: CB1 | Peak Elev=182.15' Inflow=4.13 cfs 12,216 cf 15.0" Round Culvert n=0.013 L=51.0' S=0.0100 '/' Outflow=4.13 cfs 12,216 cf |
| Pond 2P: CB2 | Peak Elev=176.35' Inflow=6.64 cfs 20,196 cf 18.0" Round Culvert n=0.013 L=105.0' S=0.0381 '/' Outflow=6.64 cfs 20,196 cf |
| Pond 3P: CB3 | Peak Elev=184.44' Inflow=0.87 cfs 2,706 cf 15.0" Round Culvert n=0.013 L=97.0' S=0.0155 '/' Outflow=0.87 cfs 2,706 cf |
| Pond 4P: CROSS PIPE | Peak Elev=176.67' Storage=12 cf Inflow=0.14 cfs 931 cf 15.0" Round Culvert n=0.013 L=45.0' S=0.0111 '/' Outflow=0.14 cfs 928 cf |
| Pond 5P: DETENTION POND | Peak Elev=171.37' Storage=10,034 cf Inflow=8.85 cfs 27,537 cf Discarded=0.40 cfs 12,181 cf Primary=2.40 cfs 10,015 cf Outflow=2.80 cfs 22,196 cf |
| Link 1L: DESIGN NODE | Inflow=6.40 cfs 32,450 cf Primary=6.40 cfs 32,450 cf |

Total Runoff Area = 406,474 sf Runoff Volume = 50,008 cf Average Runoff Depth = 1.48"
86.94% Pervious = 353,381 sf 13.06% Impervious = 53,093 sf

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Type III 24-hr 50 YR Rainfall=7.03"

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Summary for Subcatchment 1S: TO CB 1

Runoff = 4.13 cfs @ 12.10 hrs, Volume= 12,216 cf, Depth> 2.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type III 24-hr 50 YR Rainfall=7.03"

| Area (sf) | CN | Description |
|-----------|----|-------------------------------|
| 9,363 | 98 | Paved parking, HSG A |
| 11,529 | 39 | >75% Grass cover, Good, HSG A |
| 14,226 | 98 | Paved parking, HSG A |
| 8,380 | 39 | >75% Grass cover, Good, HSG A |
| 12,923 | 30 | Woods, Good, HSG A |
| 56,421 | 62 | Weighted Average |
| 32,832 | | 58.19% Pervious Area |
| 23,589 | | 41.81% Impervious Area |

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

Summary for Subcatchment 2S: TO CB 2

Runoff = 1.65 cfs @ 12.09 hrs, Volume= 5,275 cf, Depth> 5.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type III 24-hr 50 YR Rainfall=7.03"

| Area (sf) | CN | Description |
|-----------|----|-------------------------------|
| 9,811 | 98 | Paved parking, HSG A |
| 1,423 | 39 | >75% Grass cover, Good, HSG A |
| 11,234 | 91 | Weighted Average |
| 1,423 | | 12.67% Pervious Area |
| 9,811 | | 87.33% Impervious Area |

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

Summary for Subcatchment 3S: TO CB 3

Runoff = 0.87 cfs @ 12.09 hrs, Volume= 2,706 cf, Depth> 5.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type III 24-hr 50 YR Rainfall=7.03"

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| Area (sf) | CN | Description |
|-----------|----|-------------------------------|
| 5,089 | 98 | Paved parking, HSG A |
| 1,148 | 39 | >75% Grass cover, Good, HSG A |
| 6,237 | 87 | Weighted Average |
| 1,148 | | 18.41% Pervious Area |
| 5,089 | | 81.59% Impervious Area |

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

Summary for Subcatchment 4S: TO CROSS PIPE

Runoff = 0.14 cfs @ 12.30 hrs, Volume= 931 cf, Depth> 0.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 YR Rainfall=7.03"

| Area (sf) | CN | Description |
|-----------|----|-------------------------------|
| 1,460 | 98 | Paved parking, HSG A |
| 4,463 | 39 | >75% Grass cover, Good, HSG A |
| 14,745 | 30 | Woods, Good, HSG A |
| 20,668 | 37 | Weighted Average |
| 19,208 | | 92.94% Pervious Area |
| 1,460 | | 7.06% Impervious Area |

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

Summary for Subcatchment 5S: TO POND

Runoff = 2.17 cfs @ 12.10 hrs, Volume= 6,413 cf, Depth> 2.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 YR Rainfall=7.03"

| Area (sf) | CN | Description |
|-----------|----|-------------------------------|
| 6,000 | 98 | Roofs, HSG A |
| 3,575 | 98 | Roofs, HSG A |
| 1,935 | 98 | Paved parking, HSG A |
| 18,111 | 39 | >75% Grass cover, Good, HSG A |
| 29,621 | 62 | Weighted Average |
| 18,111 | | 61.14% Pervious Area |
| 11,510 | | 38.86% Impervious Area |

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Type III 24-hr 50 YR Rainfall=7.03"

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

Summary for Subcatchment 6S: C SOIL

Runoff = 6.40 cfs @ 12.09 hrs, Volume= 18,803 cf, Depth> 3.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 YR Rainfall=7.03"

| Area (sf) | CN | Description |
|-----------|----|-----------------------|
| 66,595 | 70 | Woods, Good, HSG C |
| 66,595 | | 100.00% Pervious Area |

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

Summary for Subcatchment E: TO WET

Runoff = 0.19 cfs @ 13.89 hrs, Volume= 3,665 cf, Depth> 0.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 YR Rainfall=7.03"

| Area (sf) | CN | Description |
|-----------|----|-------------------------------|
| 1,634 | 98 | Paved parking, HSG A |
| 4,498 | 39 | >75% Grass cover, Good, HSG A |
| 191,099 | 30 | Woods, Good, HSG A |
| 12,911 | 39 | >75% Grass cover, Good, HSG A |
| 5,556 | 39 | >75% Grass cover, Good, HSG A |
| 215,698 | 31 | Weighted Average |
| 214,064 | | 99.24% Pervious Area |
| 1,634 | | 0.76% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|--|
| 0.3 | 14 | 0.0200 | 0.91 | | Sheet Flow, Smooth surfaces n= 0.011 P2= 3.08" |
| 2.2 | 15 | 0.0200 | 0.11 | | Sheet Flow, Grass: Short n= 0.150 P2= 3.08" |
| 12.6 | 50 | 0.0200 | 0.07 | | Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.08" |
| 15.0 | 900 | 0.0400 | 1.00 | | Shallow Concentrated Flow, Woodland Kv= 5.0 fps |
| 30.1 | 979 | Total | | | |

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Summary for Reach 6R: (new Reach)

Inflow Area = 124,181 sf, 41.44% Impervious, Inflow Depth = 0.97" for 50 YR event
Inflow = 2.40 cfs @ 12.46 hrs, Volume= 10,015 cf
Outflow = 1.87 cfs @ 12.66 hrs, Volume= 9,982 cf, Atten= 22%, Lag= 12.5 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.63 fps, Min. Travel Time= 15.9 min
Avg. Velocity = 0.26 fps, Avg. Travel Time= 37.9 min

Peak Storage= 1,777 cf @ 12.66 hrs
Average Depth at Peak Storage= 0.11' , Surface Width= 30.35'
Bank-Full Depth= 0.50' Flow Area= 18.8 sf, Capacity= 28.97 cfs

25.00' x 0.50' deep channel, n= 0.050
Side Slope Z-value= 25.0 ' / ' Top Width= 50.00'
Length= 600.0' Slope= 0.0100 ' / '
Inlet Invert= 164.00', Outlet Invert= 158.00'



Summary for Pond 1P: CB1

Inflow Area = 56,421 sf, 41.81% Impervious, Inflow Depth > 2.60" for 50 YR event
Inflow = 4.13 cfs @ 12.10 hrs, Volume= 12,216 cf
Outflow = 4.13 cfs @ 12.10 hrs, Volume= 12,216 cf, Atten= 0%, Lag= 0.0 min
Primary = 4.13 cfs @ 12.10 hrs, Volume= 12,216 cf

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 182.15' @ 12.10 hrs

| Device | Routing | Invert | Outlet Devices |
|--------|---------|---------|---|
| #1 | Primary | 181.00' | 15.0" Round Culvert L= 51.0' Ke= 0.500 Inlet / Outlet Invert= 181.00' / 180.49' S= 0.0100 ' / ' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf |

Primary OutFlow Max=4.10 cfs @ 12.10 hrs HW=182.14' TW=176.34' (Dynamic Tailwater)
↑ **1=Culvert** (Barrel Controls 4.10 cfs @ 4.57 fps)

Summary for Pond 2P: CB2

Inflow Area = 73,892 sf, 52.09% Impervious, Inflow Depth > 3.28" for 50 YR event
Inflow = 6.64 cfs @ 12.09 hrs, Volume= 20,196 cf
Outflow = 6.64 cfs @ 12.09 hrs, Volume= 20,196 cf, Atten= 0%, Lag= 0.0 min
Primary = 6.64 cfs @ 12.09 hrs, Volume= 20,196 cf

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Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 176.35' @ 12.09 hrs

| Device | Routing | Invert | Outlet Devices |
|--------|---------|---------|--|
| #1 | Primary | 175.00' | 18.0" Round Culvert L= 105.0' Ke= 0.500 Inlet / Outlet Invert= 175.00' / 171.00' S= 0.0381 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf |

Primary OutFlow Max=6.54 cfs @ 12.09 hrs HW=176.34' TW=170.59' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 6.54 cfs @ 3.93 fps)

Summary for Pond 3P: CB3

Inflow Area = 6,237 sf, 81.59% Impervious, Inflow Depth > 5.21" for 50 YR event
 Inflow = 0.87 cfs @ 12.09 hrs, Volume= 2,706 cf
 Outflow = 0.87 cfs @ 12.09 hrs, Volume= 2,706 cf, Atten= 0%, Lag= 0.0 min
 Primary = 0.87 cfs @ 12.09 hrs, Volume= 2,706 cf

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 184.44' @ 12.09 hrs

| Device | Routing | Invert | Outlet Devices |
|--------|---------|---------|---|
| #1 | Primary | 184.00' | 15.0" Round Culvert L= 97.0' Ke= 0.500 Inlet / Outlet Invert= 184.00' / 182.50' S= 0.0155 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf |

Primary OutFlow Max=0.85 cfs @ 12.09 hrs HW=184.43' TW=176.32' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 0.85 cfs @ 2.24 fps)

Summary for Pond 4P: CROSS PIPE

Inflow Area = 20,668 sf, 7.06% Impervious, Inflow Depth > 0.54" for 50 YR event
 Inflow = 0.14 cfs @ 12.30 hrs, Volume= 931 cf
 Outflow = 0.14 cfs @ 12.31 hrs, Volume= 928 cf, Atten= 0%, Lag= 0.9 min
 Primary = 0.14 cfs @ 12.31 hrs, Volume= 928 cf

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 176.67' @ 12.31 hrs Surf.Area= 89 sf Storage= 12 cf

Plug-Flow detention time= 2.5 min calculated for 925 cf (99% of inflow)
Center-of-Mass det. time= 1.4 min (880.3 - 878.9)

| Volume | Invert | Avail.Storage | Storage Description |
|------------------|-------------------|------------------------|--|
| #1 | 176.50' | 2,338 cf | Custom Stage Data (Prismatic) Listed below (Recalc) |
| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
| 176.50 | 50 | 0 | 0 |
| 178.00 | 400 | 338 | 338 |
| 180.00 | 1,600 | 2,000 | 2,338 |

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| Device | Routing | Invert | Outlet Devices |
|--------|---------|---------|---|
| #1 | Primary | 176.50' | 15.0" Round Culvert L= 45.0' Ke= 0.500 Inlet / Outlet Invert= 176.50' / 176.00' S= 0.0111 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf |

Primary OutFlow Max=0.14 cfs @ 12.31 hrs HW=176.67' TW=171.30' (Dynamic Tailwater)↑**1=Culvert** (Barrel Controls 0.14 cfs @ 2.10 fps)**Summary for Pond 5P: DETENTION POND**

Inflow Area = 124,181 sf, 41.44% Impervious, Inflow Depth > 2.66" for 50 YR event
 Inflow = 8.85 cfs @ 12.10 hrs, Volume= 27,537 cf
 Outflow = 2.80 cfs @ 12.46 hrs, Volume= 22,196 cf, Atten= 68%, Lag= 21.6 min
 Discarded = 0.40 cfs @ 12.46 hrs, Volume= 12,181 cf
 Primary = 2.40 cfs @ 12.46 hrs, Volume= 10,015 cf

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 171.37' @ 12.46 hrs Surf.Area= 5,691 sf Storage= 10,034 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 56.8 min (851.5 - 794.7)

| Volume | Invert | Avail.Storage | Storage Description |
|--------|---------|---------------|--|
| #1 | 169.00' | 13,845 cf | Custom Stage Data (Prismatic) Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 169.00 | 2,440 | 0 | 0 |
| 170.00 | 4,150 | 3,295 | 3,295 |
| 172.00 | 6,400 | 10,550 | 13,845 |

| Device | Routing | Invert | Outlet Devices |
|--------|-----------|---------|---|
| #1 | Primary | 167.00' | 18.0" Round Culvert L= 40.0' Ke= 0.500 Inlet / Outlet Invert= 167.00' / 164.00' S= 0.0750 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf |
| #2 | Discarded | 169.00' | 3.000 in/hr Exfiltration over Surface area |
| #3 | Device 1 | 171.25' | 32.0" W x 42.0" H Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads |
| #4 | Device 1 | 170.70' | 16.0" W x 6.0" H Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads |

Discarded OutFlow Max=0.40 cfs @ 12.46 hrs HW=171.37' (Free Discharge)↑**2=Exfiltration** (Exfiltration Controls 0.40 cfs)**Primary OutFlow** Max=2.40 cfs @ 12.46 hrs HW=171.37' TW=164.09' (Dynamic Tailwater)↑**1=Culvert** (Passes 2.40 cfs of 16.19 cfs potential flow)↑**3=Orifice/Grate** (Orifice Controls 0.35 cfs @ 1.11 fps)↑**4=Orifice/Grate** (Orifice Controls 2.04 cfs @ 3.07 fps)

POST

Prepared by HP

HydroCAD® 10.10-4a s/n 11004 © 2020 HydroCAD Software Solutions LLC

Type III 24-hr 50 YR Rainfall=7.03"

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Summary for Link 1L: DESIGN NODE

Inflow Area = 406,474 sf, 13.06% Impervious, Inflow Depth > 0.96" for 50 YR event
Inflow = 6.40 cfs @ 12.09 hrs, Volume= 32,450 cf
Primary = 6.40 cfs @ 12.09 hrs, Volume= 32,450 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Site Plan
2A Tactical, LLC
Map 251 Lot 63
Barrington NH

Operation and Maintenance Plan

1.0 Intent of this Plan:

The intent of this plan is to insure that all drainage systems designed, constructed, and approved be properly maintained such that there is no detrimental effects, including obstructions, erosion, redirected flow patterns, or any other adverse condition caused by stormwater runoff.

2.0 Plan Coordinator and Responsibilities:

Plan Coordinator contact:
2A Tactical LLC
99 Tolend Road
Barrington NH 03825

The Plan coordinator's duties include the following:

- Implement the Plan with the aid of support personnel;
- Oversee maintenance practices on the site;
- Conduct or provide for inspection and monitoring activities;
- Maintain records of maintenance activities; and
- Identify any deficiencies on the site and make sure they are corrected; and

To aid in the implementation of the plan, all personnel will ensure that all housekeeping and monitoring procedures are implemented and will ensure the integrity of the site drainage facilities.

3.0 Stormwater Management Controls

The following provides a list of recommendations and guidelines for managing the stormwater controls:

Landscaped Areas – Fertilizer Management

Function – Fertilizer management involves controlling the rate, timing and method of fertilizer application so that the nutrients are taken up by the plants thereby reducing the chance of polluting the surface and ground waters. Fertilizer management can be effective in reducing the amounts of phosphorus and nitrogen in runoff from landscaped areas, particularly lawns. Soil tests shall be conducted to determine fertilizer application rates.

Maintenance

- Have the soil tested by your landscaper or local Soil Conservation Service for nutrient requirements and follow the recommendations.
- Do not apply fertilizer to frozen ground.
- Clean up any fertilizer spills.
- Do not allow fertilizer to be broadcast into water bodies.

- When fertilizing a lawn, water thoroughly, but do not create a situation where water runs off the surface of the lawn.

Landscaped Areas – Litter Control

Function – Landscaped areas tend to filter debris and contaminants that may block drainage systems and pollute the surface and ground waters.

Maintenance

- Litter Control and lawn maintenance involves removing litter such as trash, leaves, lawn clippings, pet wastes, oil and chemicals from streets, parking lots, and lawns before materials are transported into surface waters.
- Litter control shall be implemented as part of the grounds maintenance program.

Deep Sump Catch basins & Drainage Pipes

Function – Culverts deep sump catch basin is to convey stormwater away from buildings, walkways, and parking areas and trap sediment within the deep sumps prior to entering the infiltration system.

Deep Sump catch basin

to be inspected after major storms and every 6 months, once after snow-melt and once following leaf -drop, for accumulation of sediment and debris within the sump.

Forebays

shall be inspected after major storms and every 6 months for accumulated sediment and debris. Grass and woody vegetation shall be removed from the forebay annually. Staff gage or other measuring device shall be installed to indicate the depth of the sediment.

Inlet and outlet rip rap swales

to be inspected after major storms and every 6 months for accumulated sediment and debris. Grass and woody vegetation shall be removed from the stone rip rap annually. Sediment shall be removed from the rip rap annually.

Infiltration Basins

Function – These basins are designed to store the water quality volume (WQV) from smaller rainfall events. They also attenuate the peak stormwater runoff from larger events. The sediment forebays preceding each basin are designed to capture sediment before it enters the infiltration basin, and therefore must be periodically inspected and cleared of sediment.

Maintenance

- Periodically mow embankments (one to three times annually)
- Inspect inlet and outlet structures after significant storm events and remove debris

- Annually inspect embankments, inlet/outlet structures and forebay
 - Remove woody vegetation from fill embankments
 - Repair any damaged facilities
 - Repair any erosion;
 - Fill rodent holes
 - Check for invasive species and eradicate if found
- Inspect sediment forebay twice annually and remove accumulated sediment as needed
- Inspect infiltration area twice annually and following a rainfall event exceeding 2.5 inches in a 24 hour period. If the basin is not draining within 72 hours of a rainfall event, then the condition of the basin should be assessed by a qualified professional.

De-icing Chemical Use and Storage

Function – Salt and sand is used for de-icing of walkways, parking lots and drives. Care shall be taken to prevent the over-application of salt for melting ice. Care shall be used with sanding in order to minimize sediment build up in manholes.

Maintenance

- Proper storage of salt is critical. Salt is highly water-soluble. Contamination of wetlands and other sensitive areas can occur when salt is stored in open areas. Salt piles shall be covered at all times if not stored in a shed. Runoff from stockpiles shall be contained to keep the runoff from entering the drainage system.
- When parking lots and walkways are free of snow and ice, they shall be swept clean. Disposal shall be in a solid waste disposal facility.

Grass Lined Conveyance Swales / Infiltration Ditches

Function – These swales promote sedimentation, filtration and infiltration of stormwater runoff.

Maintenance

- Periodically mow embankments (one to three times annually). Do not cut shorter than 4 inches.
- Inspect annually for erosion, sediment accumulation, vegetation loss and invasive species. Remove any accumulated sediment or debris.
- Repair any eroded areas, remove invasive species and dead vegetation, reseed as needed
- Ensure stone ditch if free of debris and sediment

4.0 Safety

Keep safety considerations at the forefront of inspection procedures at all times. Likely hazards should be anticipated and avoided. Never enter a confined space (outlet structure, manhole, etc) without proper training or equipment. A confined space should never be entered without at least one additional person present.

5.0 Inspection and Maintenance Procedures

Visual inspections of all areas of the site will be performed as needed throughout the year, but no less than once in the spring after snow melt-off, once in the fall, and after the end of a storm with rainfall amounts greater than one (1.0) inches. The inspection will be conducted by the Plan coordinator or designated personnel. The inspection will verify that the site drainage as shown on the plan is in good condition, and that there are no erosion problems developing on the slopes or the drainage systems. Any required repairs will be initiated as soon as possible.

6.0 Record Keeping

An Inspection and Maintenance Report will be prepared for each inspection performed throughout the year, but no less than once in the spring after snow melt-off, once in the fall. A copy of the report form to be completed is provided herein. Completed forms will be maintained at the facility, or with the Plan Coordinator.

All record keeping required by this I&M Plan shall be maintained by the responsible parties and made available upon request.

Should ownership of the property be transferred, the new owner(s) shall assume responsibility for this Plan.

Inspection Report

| General Information | |
|---------------------|------------------|
| Facility Name: | 2A Tactical LLC. |
| Location: | Barrington, NH |
| Date of Inspection | |
| Inspector's Name | |

Overall Site Drainage Issues:

| | Source | Adequate? | Maintenance Required? | Corrective Action needed and notes: |
|----|--|--|--|-------------------------------------|
| 1 | Are all slopes stable showing no signs of erosion? | <input type="checkbox"/> Yes <input type="checkbox"/> No | <input type="checkbox"/> Yes <input type="checkbox"/> No | |
| 2 | Are ditches, swales, culverts, inlets, and outlets flowing freely? | <input type="checkbox"/> Yes <input type="checkbox"/> No | <input type="checkbox"/> Yes <input type="checkbox"/> No | |
| 3 | Is there any sediment buildup in ditches, swales, or culverts? | <input type="checkbox"/> Yes <input type="checkbox"/> No | <input type="checkbox"/> Yes <input type="checkbox"/> No | |
| 4 | Are catch basin sumps clean of sediment buildup? | <input type="checkbox"/> Yes <input type="checkbox"/> No | <input type="checkbox"/> Yes <input type="checkbox"/> No | |
| 5 | Are detention basins functioning properly? | <input type="checkbox"/> Yes <input type="checkbox"/> No | <input type="checkbox"/> Yes <input type="checkbox"/> No | |
| 6. | Underground infiltration basins functioning properly? | <input type="checkbox"/> Yes <input type="checkbox"/> No | <input type="checkbox"/> Yes <input type="checkbox"/> No | |
| 7 | Does the site drainage comply with the intent of the I&M Plan | <input type="checkbox"/> Yes <input type="checkbox"/> No | <input type="checkbox"/> Yes <input type="checkbox"/> No | |

Describe any other issues requiring attention not described above:

Inspection & Maintenance Plan
2A Tactical LLC.
Barrington, NH

Site Plan
2A Tactical, LLC
Map 251 Lot 63
Barrington NH

DRAINAGE AREA PLANS