STORMWATER MANAGEMENT REPORT

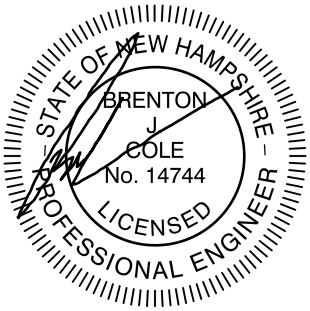
GRANITE ENGINEERING

civil engineering ● land planning ● municipal services

GORDON SERVICES - KEENE

Keene: Map 215; Lots 7 & 8
Sullivan: Map 5; Lots 46 & 46-1
57 Route 9
Keene & Sullivan, New Hampshire
January 22, 2025
Revised: May 8, 2025

PREPARED FOR:
G2 HOLDINGS, LLC
250 NORTH STREET
JAFFREY, NH 03452



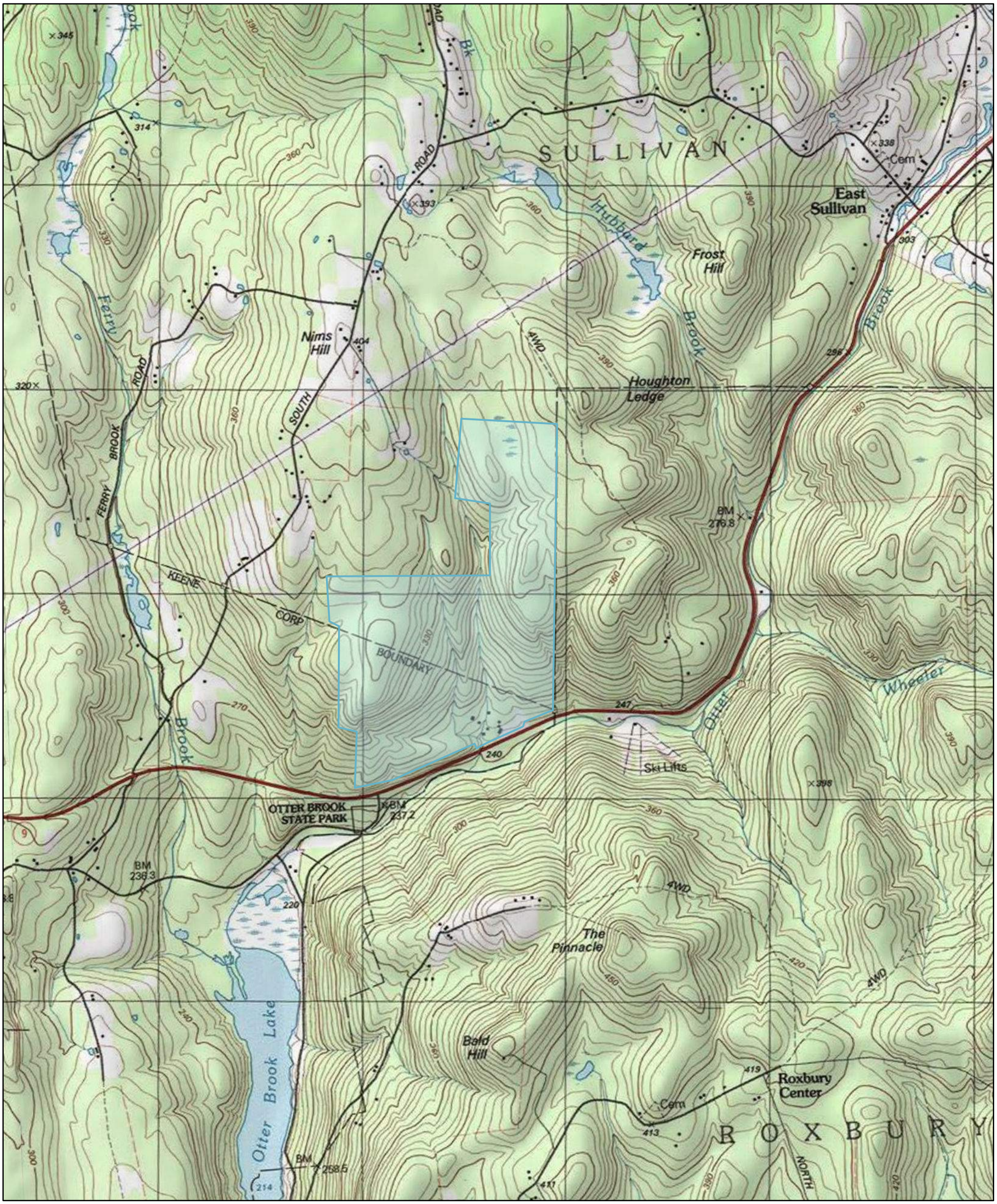
PREPARED BY:
GRANITE ENGINEERING, LLC
150 DOW STREET, TOWER 2, SUITE 421
MANCHESTER, NH 03101
603.518.8030

GE Project No. 23-0201-1

TABLE OF CONTENTS

1. USGS MAP

USGS Map



1/22/2025, 10:01:12 AM

1:24,000

0 0.2 0.4 0.8 mi

0 0.33 0.65 1.3 km

2. PROJECT NARRATIVE

I. INTRODUCTION

A. Project Description

The subject properties propose the expansion of an existing gravel and earth removal operation for G2 Holdings, LLC. The properties are located at 57 Route 9 in Keene and Sullivan, New Hampshire. The majority of the site is located within the Keene R (Rural) Zoning District. A proposed gravel road will be constructed to access various points on the site. Stormwater runoff will be managed through a series of sediment basins that connect to an existing infiltration pond.

B. Existing Site Conditions

Keene Tax Map 215 Lot 7 is approximately 78.4 acres in area. Keene Tax Map 215 Lot 8 is approximately 23.1 acres in area. Sullivan Tax Map 5 Lot 46 is approximately 169.0 acres in area. Tax map 5 Lot 46-1 is approximately 28.1 acres in area. The total area of all four subject properties is therefore 298.6 acres in area. The property is currently developed with a gravel removal operation. There are wetlands on the properties to the north and east. There is an existing, previously permitted, stormwater basin located to the south of the property, closest to Route 9.

According to the Site Specific Soil Survey, the predominant onsite soil types are Sunapee, Tunbridge Lyman Rock Outcrop, and Lyman.

Please refer to sections three (3) and eight (8) of this stormwater report for project specific NRCS soils and SSSS report information.

II. STORM DRAINAGE ANALYSIS & DESIGN

A. Methodology

The purpose of this analysis was to determine if the proposed sediment ponds could capture, detain, and release the stormwater flows through small, controlled, outlet pipes to both the existing infiltration area located currently on-site, as well as the proposed infiltration area to be completed during the final phase of the project (Period 8).

In accordance with generally accepted engineering practice, the 2-year, 10-year, 25-year, 50-year and 100-year frequency storm has been used in the various aspects of analysis and design of stormwater management considerations for the subject site. Stormwater-treatment provisions and all drainage facilities have been designed to be fully functional during a 50-year return frequency storm.

In appreciation of the benefits and limitations related to each of the various methods available to design professionals for estimating peak stormwater discharge rates for use in analysis and design, the TR-20 computer model was used. Values for Time of Concentration used in the analysis were estimated using the methodology contained within USDA-S.C.S. publication Urban Hydrology for Small Watersheds Technical Release No. 55 (TR 55).

All proposed stormwater inlet structures were designed to remain under inlet control throughout a design storm of the return frequency noted. Outlet protection for each discharging culvert was designed in accordance with the methodology for the "best management practice", in accordance with a publication entitled New Hampshire Stormwater Manual Volume 2: Post-Construction Best Management Practices Selection and Design. In addition, this publication served as the primary reference for the numerous temporary and permanent erosion control methods incorporated into the design of this project.

All design and analysis calculations performed using the referenced methodologies are attached to this report. The minimum time of concentrations used for the analysis is 6 minutes. These calculations document each catchment area, a breakdown of surface type, time of concentration, rainfall intensity, peak discharge volume, Manning's "n" value, peak velocity, and other descriptive design data for each watershed and pipe segment evaluated. In addition, the "Post Development Drainage Area Plans" graphically define and illustrate the extent of each watershed or catchment area investigated.

B. Post-Development Drainage Conditions

In order to evaluate the impact of the proposed development, two (2) Point of Analysis (POA) was analyzed to demonstrate that the peak rates of runoff would not increase from the site improvements.

The first POA, Link A, is located in the wetlands adjacent to Route 9 and directly south of the proposed project area. Within the wetlands, there is an 18" culvert directing runoff to the southern side of Route 9. This culvert has been shown on DOT Reference plans.

The second POA, Link B, is located in the wetlands directly to the east of the project area. Within the wetlands, there is an box culvert directing runoff to the southern side of Route 9.

Pre-development peak rates of discharge are identified in Table 2. Further explanation of the post-condition hydrology will show a net decrease to the point of analysis.

For a more visual description of the information presented in this section, please refer to the attached “Pre-Development Drainage Areas Plan” attached in the appendix of this report.

The analysis for the development of the site is broken into two segments, Interim and Final. “Interim Development” is in reference to the development of the site from Period 1 through Period 7. Once Period 7 is completed, the project will proceed with Period 8. In this Period, there is an additional excavation in the area of Period 1. For the construction of Period 8, this is viewed as the “Final Development”.

Stormwater from within the project area is managed by multiple sediment basins/detention ponds around each work area. These detention ponds are represented in the HydroCAD model and are denoted as SF 5, SF6, and SF7. The intent of the grading of the pit areas, as well as the haul roads, was to keep the stormwater self-contained, with no runoff during a 50-year, 24-hour storm event.

The detention basins mentioned above are designed to without and slowly discharge stormwater runoff to the infiltration basins near the lower portion of the project. During the project, in Period 1, the Infiltration Basin SF1 will be constructed to handle the runoff from the project site and infiltrate into the soil. Once Period 7 is completed, the project will move forward with Period 8. In this Period, Infiltration Basin SF8 will be constructed and will observe the runoff that originally was directed to SF1.

The proposed infiltration area was designed to use exfiltration though the native soils as its only means of outlet. Infiltration rates for the infiltration ponds were calculated by the default method as set forth in Env-Wq 1054.14. The practice is located in an area identified in the Soil Series Survey as Berkshire, Fine Sandy Loam Soils. Using Ksat values for New Hampshire Soils, Soil Scientists of Northern New England, Special Publications No. 5, September 2009, the lowest value associated with Berkshire soils is 0.6 inches per hour. Using a safety factor of 2, the infiltration rate utilized in the drainage analysis is 0.3 inches per hour.

Test pit data performed by TF Moran were used to determine the floor elevation of the pond, keeping it above the estimated seasonal high-water table.

The results of the drainage analysis determined that the stormwater was infiltrated in its entirety during a 50-year, 24-hour storm event. The self-contained 50-year storm event for both the Interim and Final Development of the project. This was done through capturing stormwater in large

sediment basins with small, controlled outlet devices to release stormwater in a controlled manner and by directing stormwater to the infiltration area.

During the 100-yr, 24-hour storm event, both the Interim and Final Development of the project provide a decrease in peak flow rate that discharge to the two points of analysis.

For a more visual description of the information presented in this section, please refer to the attached "Post-Development Drainage Areas Plan" attached in the appendix of this report.

All of these ponds provide adequate storage to offset the peak rates of runoff for the design storms. The detailed hydrologic and hydraulic relationship of each sub-catchment is described within the HydroCAD stormwater modeling, also contained in the appendix of this report.

The peak stormwater runoff rate for the specific storm frequency is presented and analyzed in the subsequent summary section of this report, for the point of analysis (Table 1).

C. Summary:

TABLE 1: CHANNEL PROTECTION REQUIREMENTS

Site Pre-Development vs. Post-Development (Storm Volume in Acre-Feet)			
Analysis Point	2-Year		
	Pre	Interim	Post
A	**1.011**	0.795	0.795
B	**5.037**	3.902	3.902

TABLE 2: PEAK RUNOFF (ENV-WQ 1507.06)

Site Pre-Development vs. Post-Development (Peak Discharge Rate in cfs)									
Analysis Point	2-Year			10-Year			25-Year		
	Pre	Interim	Post	**Pre**	Interim	Post	**Pre**	Interim	Post
A	**4.07**	3.47	3.47	**11.06**	8.71	8.71	**17.43**	13.39	13.39
B	**19.72**	15.86	15.86	**61.33**	46.94	46.94	**101.14**	76.24	76.24

Site Pre-Development vs. Post-Development (Peak Discharge Rate in cfs)						
Analysis Point	50-Year			100-Year		
	Pre	Interim	Post	**Pre**	Interim	Post
A	**23.78**	17.98	17.98	**31.70**	23.64	23.64
B	**141.45**	105.66	105.66	**192.17**	142.52	142.52

TABLE 3: PEAK STORMWATER POND ELEVATION

Site Post Development (Peak Pond Elevation)				
Description	**50-Year**		**100-Year**	
	Post - Interim	Final	Post - Interim	Final
Stormwater Basin Berm Elevation	874.00	856.00	874.00	856.00
Peak 50-Year Storm Elevation	873.47	853.56	873.64	855.01

III. EROSION & SEDIMENTATION CONTROL PROVISIONS

A. Temporary Erosion Control Measures

Temporary erosion and sediment control measures are indicated on the design plans, construction details, general notes and within the drainage report. Although not integral with this stormwater report, due to the size of the proposed development both temporary and permanent erosion control measures will also be specified within the project's Stormwater Pollution Prevention Plan (SWPPP). All erosion control measures specified are designed to reduce or eliminate potential soil migration and water quality degradation, both during and after the construction period.

The following temporary erosion control measures will be implemented;

- Silt Fence and/or Silt Logs
- Erosion Control Blankets on slopes 3:1 and steeper
- Riprap Aprons & Spillway Stabilization
- Turf Establishment - Hydroseeding with mulch and tackifiers
- Stone Check Dams
- Temporary Sediment Basins

These temporary erosion control measures are also discussed in the projects. Operation and Maintenance plan contained in the appendices of this report.

In addition to the above-listed erosion control measures, references are made throughout the project documents to the New Hampshire Stormwater Manual; Volume 3: Erosion and Sediment Temporary Controls During Construction for additional measures, as necessary.

B. Construction Sequence

A site-specific construction sequence sensitive to limiting soil loss due to erosion and associated water quality degradation was prepared specifically for this project and is shown on the project plans. As pointed out in the erosion control notes, it is important for the contractor to recognize that proper judgment in the implementation of work will be essential if erosion is to be limited and protection of completed work is to be realized. Moreover, any specific changes in sequence and/or field conditions affecting the ability of specific erosion control measures to adequately serve their intended purpose should be reported to this office by the contractor. Furthermore, the contractor is encouraged to supplement specified erosion control measures during the construction period where and when in his/ her best judgment, additional protection is warranted.

C. Permanent Erosion Control Measures

Similar to temporary erosion control measures, all permanent erosion control measures are indicated on the design plans, construction details, general notes, drainage report, SWPPP and O & M project documents.

The following permanent erosion control measures will be implemented;

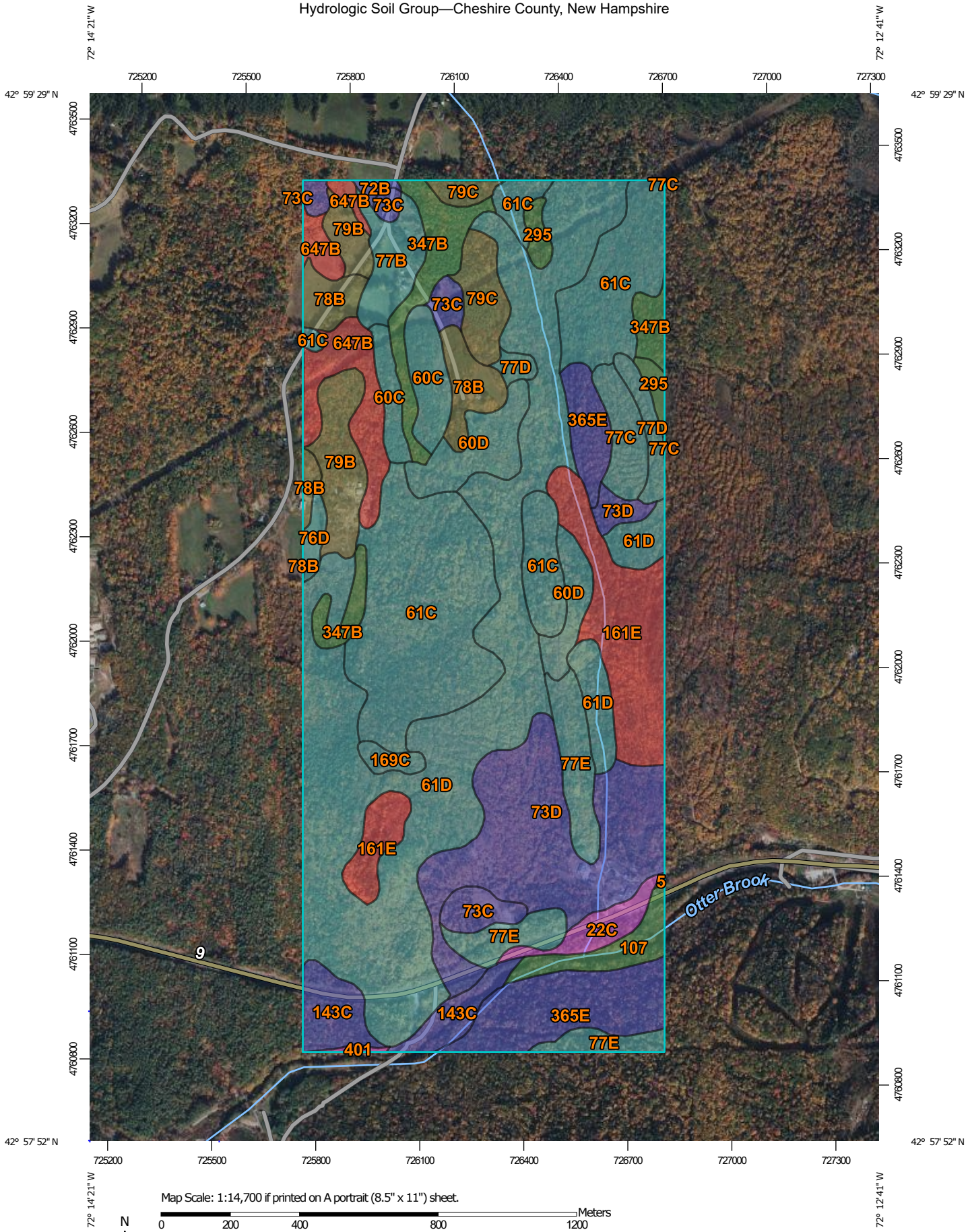
- Stone-lined ditches
- Inlet & Outlet Protection - Riprap Stabilization
- Stormwater Basins with multi-stage outlets
- Turf Establishment - Hydroseeding with mulch and tackifiers

Each of the above-mentioned permanent erosion control measures are designed in a project-specific manner within both state and local regulatory compliance standards.

TABLE OF CONTENTS

3. WEB SOIL SURVEY

Hydrologic Soil Group—Cheshire County, New Hampshire



MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Lines

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Points

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

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

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

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

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

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

Soil Survey Area: Cheshire County, New Hampshire
Survey Area Data: Version 28, Sep 3, 2024

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

Date(s) aerial images were photographed: May 27, 2020—Oct 31, 2020

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
5	Rippowam fine sandy loam	A/D	0.2	0.0%
22C	Colton gravelly sandy loam, 8 to 15 percent slopes	A	7.4	1.1%
60C	Tunbridge-Berkshire complex, 8 to 15 percent slopes, very stony	C	15.3	2.4%
60D	Tunbridge-Berkshire complex, 15 to 25 percent slopes, very stony	C	21.0	3.2%
61C	Tunbridge-Lyman-Rock outcrop complex, 8 to 15 percent slopes	C	101.5	15.7%
61D	Tunbridge-Lyman-Rock outcrop complex, 15 to 25 percent slopes	C	165.1	25.5%
72B	Berkshire fine sandy loam, 3 to 8 percent slopes	B	1.2	0.2%
73C	Berkshire fine sandy loam, 8 to 15 percent slopes, very stony	B	11.9	1.8%
73D	Berkshire fine sandy loam, 15 to 25 percent slopes, very stony	B	64.4	9.9%
76D	Marlow fine sandy loam, 15 to 25 percent slopes	C	2.8	0.4%
77B	Marlow fine sandy loam, 0 to 8 percent slopes, very stony	C	11.8	1.8%
77C	Marlow fine sandy loam, 8 to 15 percent slopes, very stony	C	9.5	1.5%
77D	Marlow fine sandy loam, 15 to 25 percent slopes, very stony	C	7.6	1.2%
77E	Marlow fine sandy loam, 25 to 50 percent slopes, very stony	C	24.4	3.8%
78B	Peru fine sandy loam, 3 to 8 percent slopes	C/D	16.7	2.6%

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
79B	Peru fine sandy loam, 0 to 8 percent slopes, very stony	C/D	20.0	3.1%
79C	Peru fine sandy loam, 8 to 15 percent slopes, very stony	C/D	13.2	2.0%
107	Rippowam-Saco complex	A/D	9.0	1.4%
143C	Monadnock fine sandy loam, 8 to 15 percent slopes, very stony	B	17.2	2.7%
161E	Lyman-Tunbridge-Rock outcrop complex, 25 to 60 percent slopes	D	39.8	6.1%
169C	Sunapee fine sandy loam, 8 to 15 percent slopes, very stony	C	2.9	0.5%
295	Greenwood mucky peat	A/D	4.9	0.7%
347B	Lyme and Moosilauke soils, 0 to 5 percent slopes, very stony	A/D	23.2	3.6%
365E	Monadnock and Berkshire soils, 25 to 60 percent slopes, extremely stony	B	35.2	5.4%
401	Occum fine sandy loam	A	0.7	0.1%
647B	Pillsbury fine sandy loam, 0 to 8 percent slopes, very stony	D	20.8	3.2%
Totals for Area of Interest			**647.8**	**100.0%**

Description

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.

Rating Options

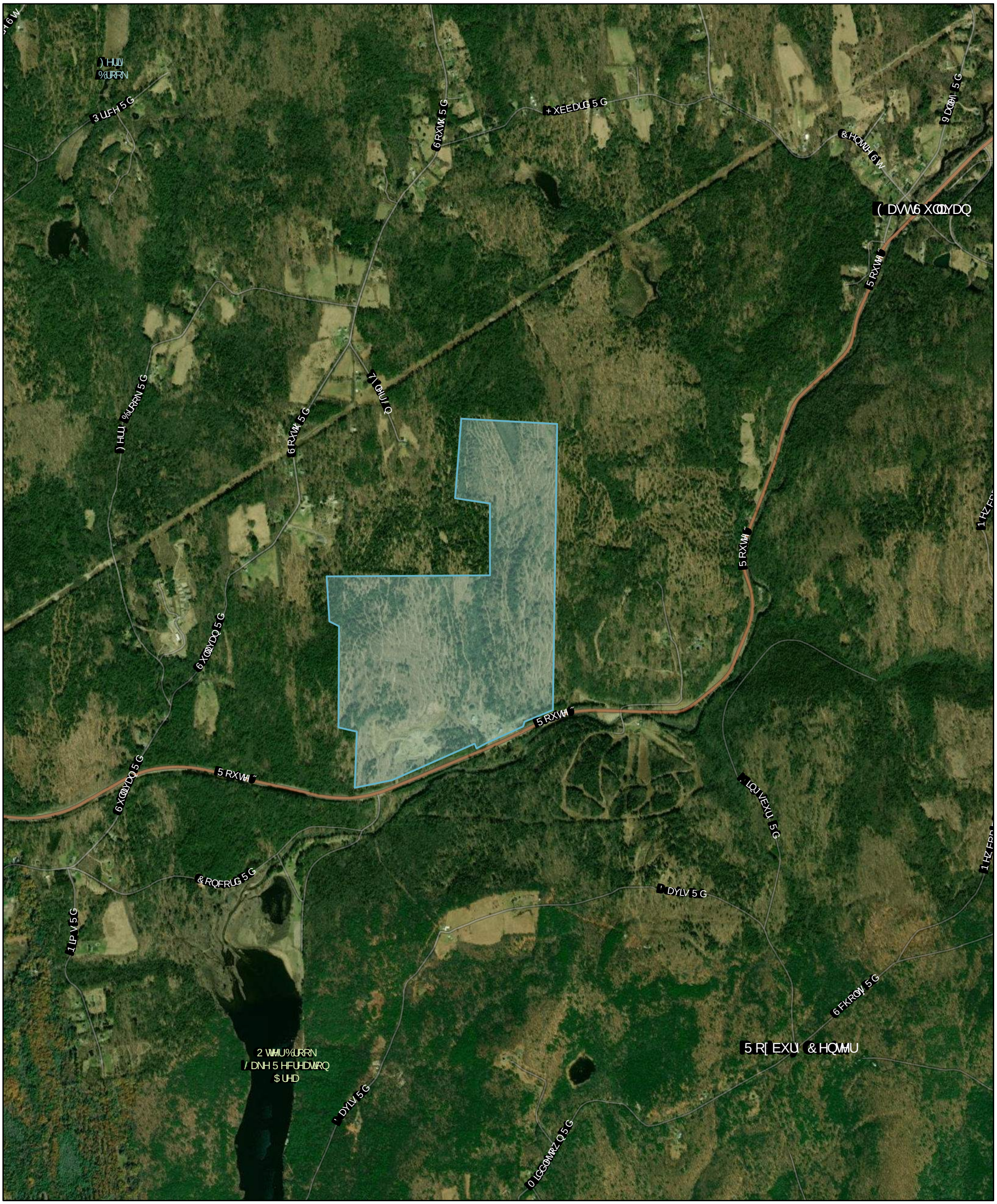
Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

4. AERIAL PHOTOGRAPH

$HULDO 0DS


3 UHH 5 G
6 RXWK 5 G
+ XEEDUG 5 G
& HQWHU 6 W
9 DOH 5 G
(DVW 6 XQQYDQ
5 RXWH
) HUU %URRN
6 RXWK 5 G
7 UHH J Q
6 XQQYDQ 5 G
5 RXWH
5 RXWH
6 XQQYDQ 5 G
5 RXWH
& RQFRUG 5 G
DYLV 5 G
LQJ VEXU 5 G
1 HZ FR
1 HZ FR
1 LP V 5 G
6 FKRQY 5 G
2 WWU %URRN
/ DNH 5 HFUHDWRQ
$ UHD
DYLV 5 G
0 LGGOHWRZQ 5 G
5 R[EXU & HQWHU
$ 0
PL
NP
9&*, (VUL 7RP7RP *DUPLQ 6
*HR7HFKQRORJLHV ,QF 0(7, 1$6$ 86*6
&HQVXV %XUHDX 86'$ 86):6 9&*, 0D[DU

5. EXTREME PRECIPITATION TABLES

Extreme Precipitation Tables

Northeast Regional Climate Center

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

Metadata for Point

Smoothing	Yes
State	New Hampshire
Location	New Hampshire, United States
Latitude	42.971 degrees North
Longitude	72.221 degrees West
Elevation	250 feet
Date/Time	Tue Apr 16 2024 10:32:39 GMT-0400 (Eastern Daylight Time)

Extreme Precipitation Estimates

	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	0.70	0.87	1.09	**1yr**	0.75	1.00	1.25	1.54	1.90	2.34	2.61	**1yr**	2.07	2.51	2.90	3.54	4.10	**1yr**
2yr	0.34	0.52	0.64	0.85	1.07	1.33	**2yr**	0.92	1.19	1.52	1.87	2.28	2.76	3.13	**2yr**	2.45	3.01	3.51	4.19	4.79	**2yr**
5yr	0.40	0.62	0.78	1.04	1.34	1.68	**5yr**	1.15	1.50	1.92	2.35	2.84	3.42	3.91	**5yr**	3.03	3.76	4.36	5.14	5.86	**5yr**
10yr	0.45	0.71	0.89	1.21	1.58	2.00	**10yr**	1.36	1.78	2.29	2.80	3.37	4.02	4.63	**10yr**	3.56	4.45	5.15	6.01	6.82	**10yr**
25yr	0.54	0.85	1.08	1.49	1.98	2.51	**25yr**	1.71	2.24	2.89	3.52	4.21	4.98	5.80	**25yr**	4.41	5.58	6.40	7.40	8.35	**25yr**
50yr	0.60	0.97	1.24	1.74	2.35	3.00	**50yr**	2.03	2.67	3.46	4.20	5.00	5.86	6.89	**50yr**	5.19	6.62	7.56	8.66	9.73	**50yr**
100yr	0.69	1.12	1.45	2.05	2.79	3.58	**100yr**	2.40	3.17	4.12	4.99	5.91	6.90	8.18	**100yr**	6.11	7.87	8.92	10.14	11.35	**100yr**
200yr	0.79	1.29	1.67	2.39	3.31	4.26	**200yr**	2.85	3.77	4.91	5.94	7.00	8.13	9.72	**200yr**	7.19	9.35	10.54	11.87	13.24	**200yr**
500yr	0.95	1.56	2.04	2.96	4.15	5.37	**500yr**	3.58	4.75	6.19	7.46	8.76	10.10	12.23	**500yr**	8.94	11.76	13.14	14.65	16.24	**500yr**

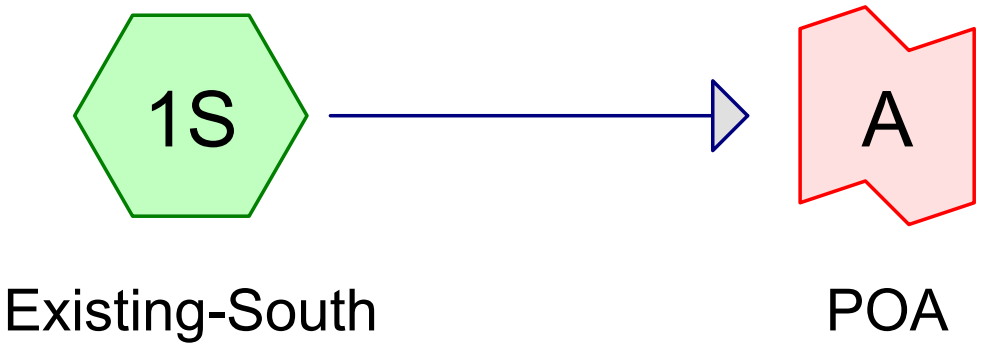
Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.23	0.36	0.44	0.59	0.73	0.81	**1yr**	0.63	0.80	1.02	1.35	1.58	2.06	2.30	**1yr**	1.83	2.22	2.50	3.14	3.35	**1yr**
2yr	0.32	0.49	0.61	0.82	1.02	1.17	**2yr**	0.88	1.14	1.33	1.71	2.16	2.70	3.05	**2yr**	2.39	2.94	3.42	4.10	4.67	**2yr**
5yr	0.36	0.56	0.70	0.96	1.22	1.39	**5yr**	1.05	1.36	1.56	2.00	2.50	3.17	3.63	**5yr**	2.81	3.49	4.04	4.81	5.46	**5yr**
10yr	0.40	0.61	0.76	1.06	1.37	1.59	**10yr**	1.19	1.55	1.77	2.25	2.79	3.58	4.15	**10yr**	3.17	3.99	4.63	5.41	6.15	**10yr**
25yr	0.45	0.68	0.85	1.22	1.60	1.89	**25yr**	1.38	1.85	2.07	2.64	3.20	4.22	4.94	**25yr**	3.74	4.75	5.51	6.35	7.22	**25yr**
50yr	0.49	0.75	0.93	1.34	1.80	2.15	**50yr**	1.56	2.10	2.33	3.00	3.55	4.81	5.66	**50yr**	4.26	5.44	6.32	7.17	8.19	**50yr**
100yr	0.54	0.82	1.02	1.48	2.03	2.44	**100yr**	1.75	2.39	2.64	3.40	3.94	5.48	6.50	**100yr**	4.85	6.25	7.25	8.14	9.29	**100yr**
200yr	0.59	0.88	1.12	1.62	2.26	2.78	**200yr**	1.95	2.72	2.99	3.87	4.36	6.28	7.48	**200yr**	5.56	7.20	8.35	9.26	10.57	**200yr**
500yr	0.66	0.99	1.27	1.85	2.63	3.31	**500yr**	2.27	3.24	3.52	4.60	5.00	7.54	9.08	**500yr**	6.67	8.73	10.09	11.04	12.56	**500yr**

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.31	0.48	0.58	0.79	0.97	1.13	**1yr**	0.83	1.11	1.27	1.57	2.01	2.52	2.85	**1yr**	2.23	2.75	3.17	3.81	4.42	**1yr**
2yr	0.35	0.54	0.67	0.91	1.12	1.27	**2yr**	0.97	1.25	1.43	1.80	2.30	2.86	3.25	**2yr**	2.54	3.12	3.64	4.33	4.94	**2yr**
5yr	0.43	0.67	0.83	1.14	1.45	1.68	**5yr**	1.25	1.64	1.85	2.29	2.84	3.73	4.26	**5yr**	3.30	4.09	4.70	5.55	6.35	**5yr**
10yr	0.53	0.82	1.01	1.41	1.83	2.10	**10yr**	1.58	2.05	2.26	2.75	3.37	4.56	5.23	**10yr**	4.04	5.03	5.82	6.69	7.67	**10yr**
25yr	0.69	1.05	1.31	1.87	2.46	2.81	**25yr**	2.12	2.75	2.94	3.48	4.21	5.94	6.88	**25yr**	5.26	6.61	7.58	8.57	9.83	**25yr**
50yr	0.84	1.27	1.59	2.28	3.07	3.50	**50yr**	2.65	3.42	3.58	4.17	4.99	7.25	8.45	**50yr**	6.42	8.12	9.27	10.33	11.85	**50yr**
100yr	1.03	1.55	1.94	2.81	3.85	4.38	**100yr**	3.32	4.28	4.37	4.99	5.92	8.84	10.36	**100yr**	7.82	9.96	11.29	12.46	14.28	**100yr**
200yr	1.26	1.89	2.39	3.47	4.83	5.49	**200yr**	4.17	5.37	5.33	5.97	7.03	10.77	12.70	**200yr**	9.54	12.21	13.78	15.00	17.19	**200yr**
500yr	1.65	2.45	3.15	4.58	6.52	7.39	**500yr**	5.62	7.23	6.93	7.57	8.81	13.96	16.61	**500yr**	12.35	15.97	17.90	19.18	21.95	**500yr**

6. HYDROCAD DRAINAGE ANALYSIS – PRE-DEVELOPMENT



Existing-South POA

Existing-East POA

Subcat Reach Pond Link

Routing Diagram for PRE-DEVELOPMENT
Prepared by Granite Engineering, LLC, Printed 4/8/2025

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-YR	Type III 24-hr		Default	24.00	1	2.76	2
2	10-YR	Type III 24-hr		Default	24.00	1	4.02	2
3	25-YR	Type III 24-hr		Default	24.00	1	4.98	2
4	50-YR	Type III 24-hr		Default	24.00	1	5.86	2
5	100-YR	Type III 24-hr		Default	24.00	1	6.90	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
3.032	61	>75% Grass cover, Good, HSG B (1S, 2S)
0.650	74	>75% Grass cover, Good, HSG C (1S, 2S)
0.153	80	>75% Grass cover, Good, HSG D (2S)
1.044	96	Gravel surface (1S, 2S)
1.908	86	Newly graded area, HSG B (1S, 2S)
1.207	91	Newly graded area, HSG C (1S, 2S)
0.827	98	Paved parking (1S)
1.196	98	Pavement/Roof (2S)
0.042	98	Water Surface, HSG B (2S)
4.434	30	Woods, Good, HSG A (2S)
33.549	55	Woods, Good, HSG B (1S, 2S)
106.897	70	Woods, Good, HSG C (1S, 2S)
6.333	77	Woods, Good, HSG D (1S, 2S)
161.272	**67**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
4.434	HSG A	2S
38.531	HSG B	1S, 2S
108.754	HSG C	1S, 2S
6.486	HSG D	1S, 2S
3.067	Other	1S, 2S
161.272		**TOTAL AREA**

Time span=0.00-48.00 hrs, dt=0.02 hrs, 2401 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

Subcatchment1S: Existing-South Runoff Area=22.238 ac 3.72% Impervious Runoff Depth=0.55"
Flow Length=2,469' Tc=70.5 min CN=69 Runoff=4.07 cfs 1.011 af

Subcatchment2S: Existing-East Runoff Area=139.034 ac 0.89% Impervious Runoff Depth=0.43"
Flow Length=6,891' Tc=63.3 min CN=66 Runoff=19.72 cfs 5.037 af

Link A: POA Inflow=4.07 cfs 1.011 af
Primary=4.07 cfs 1.011 af

Link B: POA Inflow=19.72 cfs 5.037 af
Primary=19.72 cfs 5.037 af

Total Runoff Area = 161.272 ac Runoff Volume = 6.048 af Average Runoff Depth = 0.45"
98.72% Pervious = 159.207 ac 1.28% Impervious = 2.065 ac

Time span=0.00-48.00 hrs, dt=0.02 hrs, 2401 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

Subcatchment1S: Existing-South Runoff Area=22.238 ac 3.72% Impervious Runoff Depth=1.28"
Flow Length=2,469' Tc=70.5 min CN=69 Runoff=11.06 cfs 2.371 af

Subcatchment2S: Existing-East Runoff Area=139.034 ac 0.89% Impervious Runoff Depth=1.10"
Flow Length=6,891' Tc=63.3 min CN=66 Runoff=61.33 cfs 12.721 af

Link A: POA Inflow=11.06 cfs 2.371 af
Primary=11.06 cfs 2.371 af

Link B: POA Inflow=61.33 cfs 12.721 af
Primary=61.33 cfs 12.721 af

Total Runoff Area = 161.272 ac Runoff Volume = 15.092 af Average Runoff Depth = 1.12"
98.72% Pervious = 159.207 ac 1.28% Impervious = 2.065 ac

Time span=0.00-48.00 hrs, dt=0.02 hrs, 2401 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

Subcatchment1S: Existing-South Runoff Area=22.238 ac 3.72% Impervious Runoff Depth=1.94"
Flow Length=2,469' Tc=70.5 min CN=69 Runoff=17.43 cfs 3.600 af

Subcatchment2S: Existing-East Runoff Area=139.034 ac 0.89% Impervious Runoff Depth=1.71"
Flow Length=6,891' Tc=63.3 min CN=66 Runoff=101.14 cfs 19.859 af

Link A: POA Inflow=17.43 cfs 3.600 af
Primary=17.43 cfs 3.600 af

Link B: POA Inflow=101.14 cfs 19.859 af
Primary=101.14 cfs 19.859 af

Total Runoff Area = 161.272 ac Runoff Volume = 23.460 af Average Runoff Depth = 1.75"
98.72% Pervious = 159.207 ac 1.28% Impervious = 2.065 ac

Time span=0.00-48.00 hrs, dt=0.02 hrs, 2401 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

Subcatchment1S: Existing-South Runoff Area=22.238 ac 3.72% Impervious Runoff Depth=2.60"
Flow Length=2,469' Tc=70.5 min CN=69 Runoff=23.78 cfs 4.825 af

Subcatchment2S: Existing-East Runoff Area=139.034 ac 0.89% Impervious Runoff Depth=2.34"
Flow Length=6,891' Tc=63.3 min CN=66 Runoff=141.45 cfs 27.077 af

Link A: POA Inflow=23.78 cfs 4.825 af
Primary=23.78 cfs 4.825 af

Link B: POA Inflow=141.45 cfs 27.077 af
Primary=141.45 cfs 27.077 af

Total Runoff Area = 161.272 ac Runoff Volume = 31.902 af Average Runoff Depth = 2.37"
98.72% Pervious = 159.207 ac 1.28% Impervious = 2.065 ac

Time span=0.00-48.00 hrs, dt=0.02 hrs, 2401 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

Subcatchment1S: Existing-South Runoff Area=22.238 ac 3.72% Impervious Runoff Depth=3.43"
Flow Length=2,469' Tc=70.5 min CN=69 Runoff=31.70 cfs 6.360 af

Subcatchment2S: Existing-East Runoff Area=139.034 ac 0.89% Impervious Runoff Depth=3.13"
Flow Length=6,891' Tc=63.3 min CN=66 Runoff=192.17 cfs 36.219 af

Link A: POA Inflow=31.70 cfs 6.360 af
Primary=31.70 cfs 6.360 af

Link B: POA Inflow=192.17 cfs 36.219 af
Primary=192.17 cfs 36.219 af

Total Runoff Area = 161.272 ac Runoff Volume = 42.580 af Average Runoff Depth = 3.17"
98.72% Pervious = 159.207 ac 1.28% Impervious = 2.065 ac

Summary for Subcatchment 1S: Existing-South

Runoff = 17.43 cfs @ 12.99 hrs, Volume= 3.600 af, Depth= 1.94"
Routed to Link A : POA

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-YR Rainfall=4.98"

	Area (ac)	CN	Description
	4.378	55	Woods, Good, HSG B
	0.121	61	>75% Grass cover, Good, HSG B
	0.460	86	Newly graded area, HSG B
	14.435	70	Woods, Good, HSG C
	0.245	74	>75% Grass cover, Good, HSG C
	1.293	77	Woods, Good, HSG D
	0.173	91	Newly graded area, HSG C
	0.000	80	>75% Grass cover, Good, HSG D
*	0.306	96	Gravel surface
*	0.827	98	Paved parking
	22.238	69	Weighted Average
	21.411		96.28% Pervious Area
	0.827		3.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	47	0.1064	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.76"
5.6	949	0.3161	2.81		**Shallow Concentrated Flow, Woods to Wetlands** Woodland Kv= 5.0 fps
11.0	548	0.1095	0.83		**Shallow Concentrated Flow, Wetlands** Forest w/Heavy Litter Kv= 2.5 fps
0.3	54	0.2963	2.72		**Shallow Concentrated Flow, Wetland to Culvert** Woodland Kv= 5.0 fps
0.0	62	0.1145	24.37	76.55	**Pipe Channel, Driveway Culvert** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013 Corrugated PE, smooth interior
5.0	316	0.0443	1.05		**Shallow Concentrated Flow, Woods to Wetlands** Woodland Kv= 5.0 fps
42.1	493	0.0061	0.20		**Shallow Concentrated Flow, Wetlands** Forest w/Heavy Litter Kv= 2.5 fps
70.5	2,469	Total			

Summary for Subcatchment 2S: Existing-East

[47] Hint: Peak is 368% of capacity of segment #5
[47] Hint: Peak is 1015% of capacity of segment #7

Runoff = 101.14 cfs @ 12.89 hrs, Volume= 19.859 af, Depth= 1.71"
Routed to Link B : POA

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-YR Rainfall=4.98"

	Area (ac)	CN	Description
	4.434	30	Woods, Good, HSG A
	29.171	55	Woods, Good, HSG B
	2.911	61	>75% Grass cover, Good, HSG B
	1.448	86	Newly graded area, HSG B
	92.462	70	Woods, Good, HSG C
	0.405	74	>75% Grass cover, Good, HSG C
	1.034	91	Newly graded area, HSG C
	5.040	77	Woods, Good, HSG D
	0.153	80	>75% Grass cover, Good, HSG D
*	0.738	96	Gravel surface
*	1.196	98	Pavement/Roof
	0.042	98	Water Surface, HSG B
	139.034	66	Weighted Average
	137.796		99.11% Pervious Area
	1.238		0.89% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.3	100	0.1500	0.16		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.76"
37.7	2,618	0.0535	1.16		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
4.2	835	0.0479	3.28		**Shallow Concentrated Flow, Water-USGS** Grassed Waterway Kv= 15.0 fps
7.7	2,324	0.1123	5.03		**Shallow Concentrated Flow, Wetland-Stream** Grassed Waterway Kv= 15.0 fps
0.0	38	0.0684	15.55	27.47	**Pipe Channel, 18" culvert** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
1.9	497	0.0865	4.41		**Shallow Concentrated Flow, Wetland-Water** Grassed Waterway Kv= 15.0 fps
0.0	21	0.0238	8.12	9.97	**Pipe Channel, 15" culvert** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
1.5	458	0.1154	5.10		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
63.3	6,891	Total			

Summary for Link A: POA

Inflow Area = 22.238 ac, 3.72% Impervious, Inflow Depth = 1.94" for 25-YR event
Inflow = 17.43 cfs @ 12.99 hrs, Volume= 3.600 af
Primary = 17.43 cfs @ 12.99 hrs, Volume= 3.600 af, Atten= 0%, Lag= 0.0 min

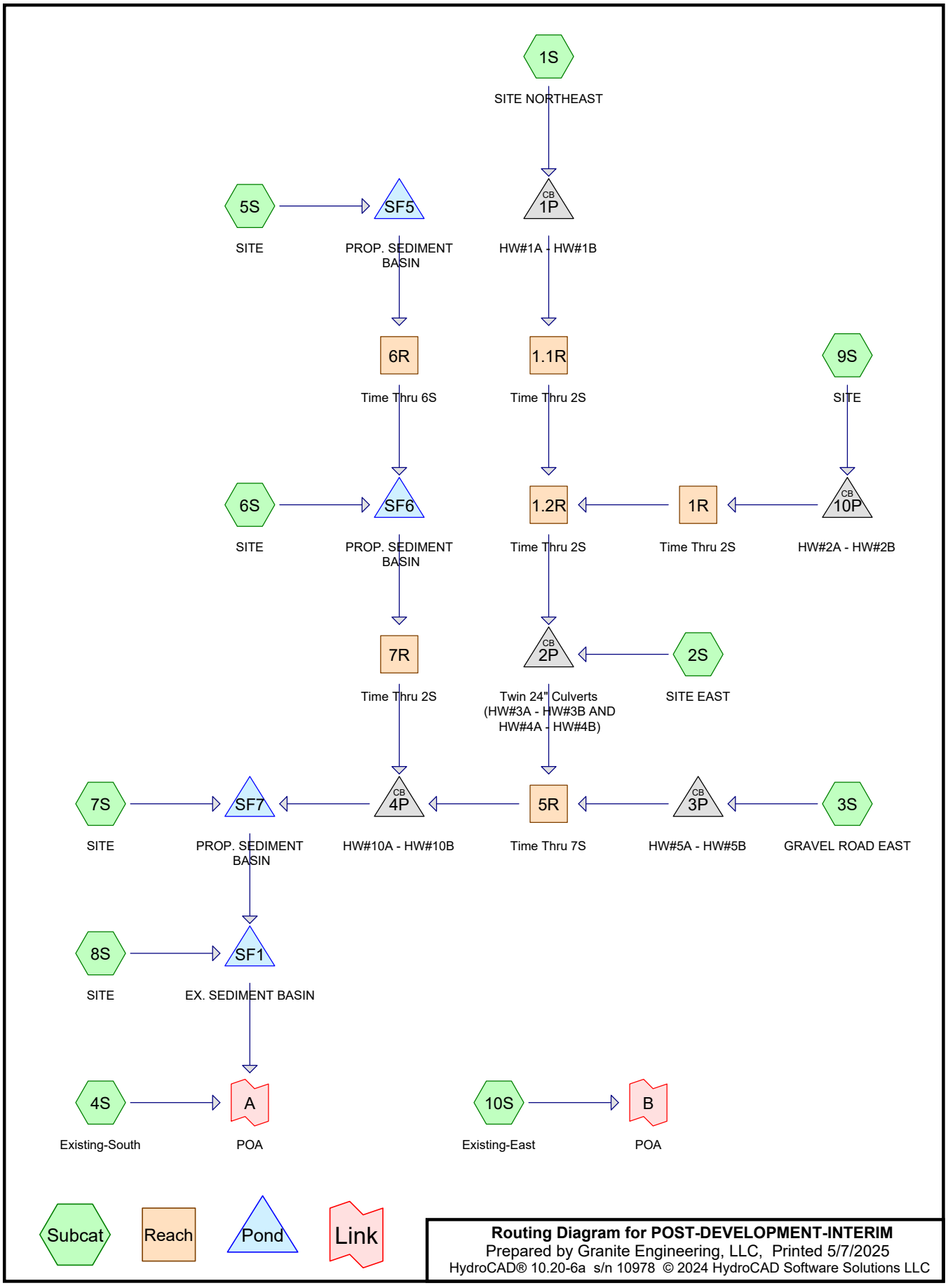
Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs

Summary for Link B: POA

Inflow Area = 139.034 ac, 0.89% Impervious, Inflow Depth = 1.71" for 25-YR event
Inflow = 101.14 cfs @ 12.89 hrs, Volume= 19.859 af
Primary = 101.14 cfs @ 12.89 hrs, Volume= 19.859 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs

7. HYDROCAD DRAINAGE ANALYSIS – INTERIM-DEVELOPMENT



Routing Diagram for POST-DEVELOPMENT-INTERIM
Prepared by Granite Engineering, LLC, Printed 5/7/2025

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-YR	Type III 24-hr		Default	24.00	1	2.76	2
2	10-YR	Type III 24-hr		Default	24.00	1	4.02	2
3	25-YR	Type III 24-hr		Default	24.00	1	4.98	2
4	50-YR	Type III 24-hr		Default	24.00	1	5.86	2
5	100-YR	Type III 24-hr		Default	24.00	1	6.90	2

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
15.713	61	>75% Grass cover, Good, HSG B (1S, 2S, 3S, 4S, 5S, 6S, 7S, 8S, 9S, 10S)
20.858	74	>75% Grass cover, Good, HSG C (1S, 2S, 3S, 4S, 5S, 6S, 7S, 8S, 10S)
1.092	80	>75% Grass cover, Good, HSG D (1S, 2S, 5S, 6S, 10S)
1.958	96	Gravel surface (2S, 3S, 4S, 5S, 6S, 7S, 8S, 9S, 10S)
0.092	96	Gravel surface, HSG C (1S)
2.439	98	Ledge (5S, 6S, 7S)
0.832	98	Paved parking (4S)
1.196	98	Pavement/Roof (10S)
0.042	98	Water Surface, HSG B (10S)
4.434	30	Woods, Good, HSG A (10S)
22.987	55	Woods, Good, HSG B (1S, 2S, 4S, 5S, 6S, 9S, 10S)
86.363	70	Woods, Good, HSG C (1S, 2S, 4S, 6S, 9S, 10S)
3.534	77	Woods, Good, HSG D (1S, 2S, 4S, 6S, 10S)
161.539	**68**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
4.434	HSG A	10S
38.742	HSG B	1S, 2S, 3S, 4S, 5S, 6S, 7S, 8S, 9S, 10S
107.313	HSG C	1S, 2S, 3S, 4S, 5S, 6S, 7S, 8S, 9S, 10S
4.626	HSG D	1S, 2S, 4S, 5S, 6S, 10S
6.424	Other	2S, 3S, 4S, 5S, 6S, 7S, 8S, 9S, 10S
161.539		**TOTAL AREA**

Time span=0.00-48.00 hrs, dt=0.02 hrs, 2401 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

Subcatchment1S: SITE NORTHEAST Runoff Area=79,760 sf 0.00% Impervious Runoff Depth=0.51"
Flow Length=450' Tc=7.2 min CN=68 Runoff=0.80 cfs 0.077 af

Subcatchment2S: SITE EAST Runoff Area=396,527 sf 0.00% Impervious Runoff Depth=0.28"
Flow Length=1,355' Tc=15.5 min CN=61 Runoff=1.13 cfs 0.211 af

Subcatchment3S: GRAVEL ROAD EAST Runoff Area=9,722 sf 0.00% Impervious Runoff Depth=0.96"
Tc=6.0 min CN=78 Runoff=0.24 cfs 0.018 af

Subcatchment4S: Existing-South Runoff Area=15.239 ac 5.46% Impervious Runoff Depth=0.63"
Flow Length=2,412' Tc=67.7 min CN=71 Runoff=3.47 cfs 0.795 af

Subcatchment5S: SITE Runoff Area=513,347 sf 9.83% Impervious Runoff Depth=0.86"
Flow Length=1,144' Tc=32.7 min CN=76 Runoff=6.03 cfs 0.842 af

Subcatchment6S: SITE Runoff Area=291,061 sf 9.05% Impervious Runoff Depth=0.67"
Flow Length=624' Tc=12.3 min CN=72 Runoff=3.69 cfs 0.373 af

Subcatchment7S: SITE Runoff Area=282,122 sf 10.43% Impervious Runoff Depth=0.71"
Tc=6.0 min CN=73 Runoff=4.84 cfs 0.385 af

Subcatchment8S: SITE Runoff Area=272,434 sf 0.00% Impervious Runoff Depth=0.47"
Tc=6.0 min CN=67 Runoff=2.53 cfs 0.245 af

Subcatchment9S: SITE Runoff Area=190,126 sf 0.00% Impervious Runoff Depth=0.40"
Flow Length=936' Tc=14.0 min CN=65 Runoff=1.03 cfs 0.146 af

Subcatchment10S: Existing-East Runoff Area=99.581 ac 1.24% Impervious Runoff Depth=0.47"
Flow Length=6,891' Tc=63.3 min CN=67 Runoff=15.86 cfs 3.902 af

Reach 1.1R: Time Thru 2S Avg. Flow Depth=0.20' Max Vel=1.82 fps Inflow=0.80 cfs 0.077 af
n=0.100 L=456.0' S=0.2237 '/' Capacity=7.45 cfs Outflow=0.70 cfs 0.077 af

Reach 1.2R: Time Thru 2S Avg. Flow Depth=0.26' Max Vel=4.22 fps Inflow=1.65 cfs 0.223 af
n=0.040 L=277.0' S=0.1264 '/' Capacity=132.55 cfs Outflow=1.64 cfs 0.223 af

Reach 1R: Time Thru 2S Avg. Flow Depth=0.20' Max Vel=3.63 fps Inflow=1.03 cfs 0.146 af
n=0.040 L=355.0' S=0.1211 '/' Capacity=129.78 cfs Outflow=1.03 cfs 0.146 af

Reach 5R: Time Thru 7S Avg. Flow Depth=0.22' Max Vel=2.87 fps Inflow=2.77 cfs 0.452 af
n=0.040 L=430.0' S=0.0535 '/' Capacity=158.33 cfs Outflow=2.75 cfs 0.452 af

Reach 6R: Time Thru 6S Avg. Flow Depth=0.30' Max Vel=0.94 fps Inflow=1.10 cfs 0.836 af
n=0.400 L=250.0' S=0.5376 '/' Capacity=14.89 cfs Outflow=1.10 cfs 0.835 af

Reach 7R: Time Thru 2S Avg. Flow Depth=0.10' Max Vel=3.24 fps Inflow=0.72 cfs 1.117 af
n=0.040 L=238.0' S=0.1870 '/' Capacity=204.97 cfs Outflow=0.72 cfs 1.117 af

Pond 1P: HW#1A - HW#1B Peak Elev=1,048.68' Inflow=0.80 cfs 0.077 af
15.0" Round Culvert n=0.013 L=41.0' S=0.0551 '/' Outflow=0.80 cfs 0.077 af

Pond 2P: Twin 24" Culverts (HW#3A - HW#3B AND HW#4A - Peak Elev=907.47' Inflow=2.66 cfs 0.435 af
24.0" Round Culvert x 2.00 n=0.013 L=27.0' S=0.0185 '/' Outflow=2.66 cfs 0.435 af

Pond 3P: HW#5A - HW#5B Peak Elev=907.24' Inflow=0.24 cfs 0.018 af
15.0" Round Culvert n=0.013 L=68.0' S=0.0074 '/' Outflow=0.24 cfs 0.018 af

Pond 4P: HW#10A - HW#10B Peak Elev=881.15' Inflow=2.80 cfs 1.569 af
30.0" Round Culvert n=0.013 L=47.0' S=0.0532 '/' Outflow=2.80 cfs 1.569 af

Pond 10P: HW#2A - HW#2B Peak Elev=990.23' Inflow=1.03 cfs 0.146 af
15.0" Round Culvert n=0.013 L=26.0' S=0.0673 '/' Outflow=1.03 cfs 0.146 af

Pond SF1: EX. SEDIMENT BASIN Peak Elev=863.63' Storage=74,573 cf Inflow=2.73 cfs 2.161 af
Discarded=0.17 cfs 0.495 af Primary=0.00 cfs 0.000 af Outflow=0.17 cfs 0.495 af

Pond SF5: PROP. SEDIMENT BASIN Peak Elev=1,089.61' Storage=15,322 cf Inflow=6.03 cfs 0.842 af
Outflow=1.10 cfs 0.836 af

Pond SF6: PROP. SEDIMENT BASIN Peak Elev=948.83' Storage=25,559 cf Inflow=3.74 cfs 1.208 af
Outflow=0.72 cfs 1.117 af

Pond SF7: PROP. SEDIMENT BASIN Peak Elev=872.83' Storage=10,645 cf Inflow=5.38 cfs 1.954 af
Outflow=1.69 cfs 1.916 af

Link A: POA Inflow=3.47 cfs 0.795 af
Primary=3.47 cfs 0.795 af

Link B: POA Inflow=15.86 cfs 3.902 af
Primary=15.86 cfs 3.902 af

Total Runoff Area = 161.539 ac Runoff Volume = 6.994 af Average Runoff Depth = 0.52"
97.21% Pervious = 157.031 ac 2.79% Impervious = 4.509 ac

Time span=0.00-48.00 hrs, dt=0.02 hrs, 2401 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

Subcatchment1S: SITE NORTHEAST Runoff Area=79,760 sf 0.00% Impervious Runoff Depth=1.22"
Flow Length=450' Tc=7.2 min CN=68 Runoff=2.33 cfs 0.186 af

Subcatchment2S: SITE EAST Runoff Area=396,527 sf 0.00% Impervious Runoff Depth=0.82"
Flow Length=1,355' Tc=15.5 min CN=61 Runoff=5.28 cfs 0.624 af

Subcatchment3S: GRAVEL ROAD EAST Runoff Area=9,722 sf 0.00% Impervious Runoff Depth=1.90"
Tc=6.0 min CN=78 Runoff=0.49 cfs 0.035 af

Subcatchment4S: Existing-South Runoff Area=15.239 ac 5.46% Impervious Runoff Depth=1.41"
Flow Length=2,412' Tc=67.7 min CN=71 Runoff=8.71 cfs 1.788 af

Subcatchment5S: SITE Runoff Area=513,347 sf 9.83% Impervious Runoff Depth=1.75"
Flow Length=1,144' Tc=32.7 min CN=76 Runoff=13.00 cfs 1.722 af

Subcatchment6S: SITE Runoff Area=291,061 sf 9.05% Impervious Runoff Depth=1.47"
Flow Length=624' Tc=12.3 min CN=72 Runoff=9.05 cfs 0.821 af

Subcatchment7S: SITE Runoff Area=282,122 sf 10.43% Impervious Runoff Depth=1.54"
Tc=6.0 min CN=73 Runoff=11.39 cfs 0.832 af

Subcatchment8S: SITE Runoff Area=272,434 sf 0.00% Impervious Runoff Depth=1.16"
Tc=6.0 min CN=67 Runoff=7.81 cfs 0.603 af

Subcatchment9S: SITE Runoff Area=190,126 sf 0.00% Impervious Runoff Depth=1.04"
Flow Length=936' Tc=14.0 min CN=65 Runoff=3.65 cfs 0.378 af

Subcatchment10S: Existing-East Runoff Area=99.581 ac 1.24% Impervious Runoff Depth=1.16"
Flow Length=6,891' Tc=63.3 min CN=67 Runoff=46.94 cfs 9.602 af

Reach 1.1R: Time Thru 2S Avg. Flow Depth=0.34' Max Vel=2.57 fps Inflow=2.33 cfs 0.186 af
n=0.100 L=456.0' S=0.2237 '/' Capacity=7.45 cfs Outflow=2.18 cfs 0.186 af

Reach 1.2R: Time Thru 2S Avg. Flow Depth=0.48' Max Vel=5.89 fps Inflow=5.51 cfs 0.564 af
n=0.040 L=277.0' S=0.1264 '/' Capacity=132.55 cfs Outflow=5.50 cfs 0.564 af

Reach 1R: Time Thru 2S Avg. Flow Depth=0.39' Max Vel=5.19 fps Inflow=3.65 cfs 0.378 af
n=0.040 L=355.0' S=0.1211 '/' Capacity=129.78 cfs Outflow=3.63 cfs 0.378 af

Reach 5R: Time Thru 7S Avg. Flow Depth=0.48' Max Vel=4.56 fps Inflow=10.95 cfs 1.224 af
n=0.040 L=430.0' S=0.0535 '/' Capacity=158.33 cfs Outflow=10.88 cfs 1.224 af

Reach 6R: Time Thru 6S Avg. Flow Depth=0.38' Max Vel=1.06 fps Inflow=1.70 cfs 1.715 af
n=0.400 L=250.0' S=0.5376 '/' Capacity=14.89 cfs Outflow=1.70 cfs 1.715 af

Reach 7R: Time Thru 2S Avg. Flow Depth=0.13' Max Vel=3.83 fps Inflow=1.15 cfs 2.359 af
n=0.040 L=238.0' S=0.1870 '/' Capacity=204.97 cfs Outflow=1.15 cfs 2.359 af

Pond 1P: HW#1A - HW#1B Peak Elev=1,049.02' Inflow=2.33 cfs 0.186 af
15.0" Round Culvert n=0.013 L=41.0' S=0.0551 '/' Outflow=2.33 cfs 0.186 af

Pond 2P: Twin 24" Culverts (HW#3A - HW#3B AND HW#4A - Peak Elev=908.00' Inflow=10.68 cfs 1.188 af
24.0" Round Culvert x 2.00 n=0.013 L=27.0' S=0.0185 '/' Outflow=10.68 cfs 1.188 af

Pond 3P: HW#5A - HW#5B Peak Elev=907.35' Inflow=0.49 cfs 0.035 af
15.0" Round Culvert n=0.013 L=68.0' S=0.0074 '/' Outflow=0.49 cfs 0.035 af

Pond 4P: HW#10A - HW#10B Peak Elev=881.88' Inflow=11.13 cfs 3.582 af
30.0" Round Culvert n=0.013 L=47.0' S=0.0532 '/' Outflow=11.13 cfs 3.582 af

Pond 10P: HW#2A - HW#2B Peak Elev=990.76' Inflow=3.65 cfs 0.378 af
15.0" Round Culvert n=0.013 L=26.0' S=0.0673 '/' Outflow=3.65 cfs 0.378 af

Pond SF1: EX. SEDIMENT BASIN Peak Elev=868.07' Storage=189,145 cf Inflow=9.38 cfs 4.947 af
Discarded=0.22 cfs 0.604 af Primary=0.00 cfs 0.000 af Outflow=0.22 cfs 0.604 af

Pond SF5: PROP. SEDIMENT BASIN Peak Elev=1,091.47' Storage=37,473 cf Inflow=13.00 cfs 1.722 af
Outflow=1.70 cfs 1.715 af

Pond SF6: PROP. SEDIMENT BASIN Peak Elev=949.73' Storage=55,472 cf Inflow=9.60 cfs 2.536 af
Outflow=1.15 cfs 2.359 af

Pond SF7: PROP. SEDIMENT BASIN Peak Elev=874.37' Storage=34,172 cf Inflow=17.91 cfs 4.414 af
Outflow=3.67 cfs 4.344 af

Link A: POA Inflow=8.71 cfs 1.788 af
Primary=8.71 cfs 1.788 af

Link B: POA Inflow=46.94 cfs 9.602 af
Primary=46.94 cfs 9.602 af

Total Runoff Area = 161.539 ac Runoff Volume = 16.592 af Average Runoff Depth = 1.23"
97.21% Pervious = 157.031 ac 2.79% Impervious = 4.509 ac

Time span=0.00-48.00 hrs, dt=0.02 hrs, 2401 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

Subcatchment1S: SITE NORTHEAST Runoff Area=79,760 sf 0.00% Impervious Runoff Depth=1.87"
Flow Length=450' Tc=7.2 min CN=68 Runoff=3.72 cfs 0.285 af

Subcatchment2S: SITE EAST Runoff Area=396,527 sf 0.00% Impervious Runoff Depth=1.36"
Flow Length=1,355' Tc=15.5 min CN=61 Runoff=9.72 cfs 1.029 af

Subcatchment3S: GRAVEL ROAD EAST Runoff Area=9,722 sf 0.00% Impervious Runoff Depth=2.69"
Tc=6.0 min CN=78 Runoff=0.70 cfs 0.050 af

Subcatchment4S: Existing-South Runoff Area=15.239 ac 5.46% Impervious Runoff Depth=2.10"
Flow Length=2,412' Tc=67.7 min CN=71 Runoff=13.39 cfs 2.669 af

Subcatchment5S: SITE Runoff Area=513,347 sf 9.83% Impervious Runoff Depth=2.52"
Flow Length=1,144' Tc=32.7 min CN=76 Runoff=18.88 cfs 2.474 af

Subcatchment6S: SITE Runoff Area=291,061 sf 9.05% Impervious Runoff Depth=2.18"
Flow Length=624' Tc=12.3 min CN=72 Runoff=13.72 cfs 1.215 af

Subcatchment7S: SITE Runoff Area=282,122 sf 10.43% Impervious Runoff Depth=2.26"
Tc=6.0 min CN=73 Runoff=17.03 cfs 1.222 af

Subcatchment8S: SITE Runoff Area=272,434 sf 0.00% Impervious Runoff Depth=1.79"
Tc=6.0 min CN=67 Runoff=12.63 cfs 0.932 af

Subcatchment9S: SITE Runoff Area=190,126 sf 0.00% Impervious Runoff Depth=1.64"
Flow Length=936' Tc=14.0 min CN=65 Runoff=6.14 cfs 0.597 af

Subcatchment10S: Existing-East Runoff Area=99.581 ac 1.24% Impervious Runoff Depth=1.79"
Flow Length=6,891' Tc=63.3 min CN=67 Runoff=76.24 cfs 14.847 af

Reach 1.1R: Time Thru 2S Avg. Flow Depth=0.42' Max Vel=2.97 fps Inflow=3.72 cfs 0.285 af
n=0.100 L=456.0' S=0.2237 '/' Capacity=7.45 cfs Outflow=3.53 cfs 0.285 af

Reach 1.2R: Time Thru 2S Avg. Flow Depth=0.61' Max Vel=6.73 fps Inflow=9.15 cfs 0.881 af
n=0.040 L=277.0' S=0.1264 '/' Capacity=132.55 cfs Outflow=9.13 cfs 0.881 af

Reach 1R: Time Thru 2S Avg. Flow Depth=0.51' Max Vel=5.96 fps Inflow=6.14 cfs 0.597 af
n=0.040 L=355.0' S=0.1211 '/' Capacity=129.78 cfs Outflow=6.12 cfs 0.597 af

Reach 5R: Time Thru 7S Avg. Flow Depth=0.66' Max Vel=5.43 fps Inflow=19.08 cfs 1.961 af
n=0.040 L=430.0' S=0.0535 '/' Capacity=158.33 cfs Outflow=18.98 cfs 1.961 af

Reach 6R: Time Thru 6S Avg. Flow Depth=0.41' Max Vel=1.12 fps Inflow=2.04 cfs 2.465 af
n=0.400 L=250.0' S=0.5376 '/' Capacity=14.89 cfs Outflow=2.04 cfs 2.465 af

Reach 7R: Time Thru 2S Avg. Flow Depth=0.15' Max Vel=4.10 fps Inflow=1.40 cfs 3.291 af
n=0.040 L=238.0' S=0.1870 '/' Capacity=204.97 cfs Outflow=1.40 cfs 3.290 af

Pond 1P: HW#1A - HW#1B Peak Elev=1,049.29' Inflow=3.72 cfs 0.285 af
15.0" Round Culvert n=0.013 L=41.0' S=0.0551 '/' Outflow=3.72 cfs 0.285 af

Pond 2P: Twin 24" Culverts (HW#3A - HW#3B AND HW#4A - Peak Elev=908.42' Inflow=18.69 cfs 1.911 af
24.0" Round Culvert x 2.00 n=0.013 L=27.0' S=0.0185 '/' Outflow=18.69 cfs 1.911 af

Pond 3P: HW#5A - HW#5B Peak Elev=907.42' Inflow=0.70 cfs 0.050 af
15.0" Round Culvert n=0.013 L=68.0' S=0.0074 '/' Outflow=0.70 cfs 0.050 af

Pond 4P: HW#10A - HW#10B Peak Elev=882.45' Inflow=19.49 cfs 5.251 af
30.0" Round Culvert n=0.013 L=47.0' S=0.0532 '/' Outflow=19.49 cfs 5.251 af

Pond 10P: HW#2A - HW#2B Peak Elev=991.46' Inflow=6.14 cfs 0.597 af
15.0" Round Culvert n=0.013 L=26.0' S=0.0673 '/' Outflow=6.14 cfs 0.597 af

Pond SF1: EX. SEDIMENT BASIN Peak Elev=871.26' Storage=287,358 cf Inflow=15.18 cfs 7.276 af
Discarded=0.25 cfs 0.679 af Primary=0.00 cfs 0.000 af Outflow=0.25 cfs 0.679 af

Pond SF5: PROP. SEDIMENT BASIN Peak Elev=1,092.92' Storage=58,141 cf Inflow=18.88 cfs 2.474 af
Outflow=2.04 cfs 2.465 af

Pond SF6: PROP. SEDIMENT BASIN Peak Elev=950.45' Storage=81,092 cf Inflow=14.56 cfs 3.681 af
Outflow=1.40 cfs 3.291 af

Pond SF7: PROP. SEDIMENT BASIN Peak Elev=875.86' Storage=61,868 cf Inflow=30.13 cfs 6.474 af
Outflow=4.53 cfs 6.343 af

Link A: POA Inflow=13.39 cfs 2.669 af
Primary=13.39 cfs 2.669 af

Link B: POA Inflow=76.24 cfs 14.847 af
Primary=76.24 cfs 14.847 af

Total Runoff Area = 161.539 ac Runoff Volume = 25.320 af Average Runoff Depth = 1.88"
97.21% Pervious = 157.031 ac 2.79% Impervious = 4.509 ac

Time span=0.00-48.00 hrs, dt=0.02 hrs, 2401 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

Subcatchment1S: SITE NORTHEAST Runoff Area=79,760 sf 0.00% Impervious Runoff Depth=2.51"
Flow Length=450' Tc=7.2 min CN=68 Runoff=5.10 cfs 0.384 af

Subcatchment2S: SITE EAST Runoff Area=396,527 sf 0.00% Impervious Runoff Depth=1.91"
Flow Length=1,355' Tc=15.5 min CN=61 Runoff=14.35 cfs 1.451 af

Subcatchment3S: GRAVEL ROAD EAST Runoff Area=9,722 sf 0.00% Impervious Runoff Depth=3.46"
Tc=6.0 min CN=78 Runoff=0.90 cfs 0.064 af

Subcatchment4S: Existing-South Runoff Area=15.239 ac 5.46% Impervious Runoff Depth=2.79"
Flow Length=2,412' Tc=67.7 min CN=71 Runoff=17.98 cfs 3.538 af

Subcatchment5S: SITE Runoff Area=513,347 sf 9.83% Impervious Runoff Depth=3.26"
Flow Length=1,144' Tc=32.7 min CN=76 Runoff=24.50 cfs 3.201 af

Subcatchment6S: SITE Runoff Area=291,061 sf 9.05% Impervious Runoff Depth=2.88"
Flow Length=624' Tc=12.3 min CN=72 Runoff=18.27 cfs 1.603 af

Subcatchment7S: SITE Runoff Area=282,122 sf 10.43% Impervious Runoff Depth=2.97"
Tc=6.0 min CN=73 Runoff=22.52 cfs 1.604 af

Subcatchment8S: SITE Runoff Area=272,434 sf 0.00% Impervious Runoff Depth=2.42"
Tc=6.0 min CN=67 Runoff=17.45 cfs 1.264 af

Subcatchment9S: SITE Runoff Area=190,126 sf 0.00% Impervious Runoff Depth=2.25"
Flow Length=936' Tc=14.0 min CN=65 Runoff=8.66 cfs 0.818 af

Subcatchment10S: Existing-East Runoff Area=99.581 ac 1.24% Impervious Runoff Depth=2.42"
Flow Length=6,891' Tc=63.3 min CN=67 Runoff=105.66 cfs 20.123 af

Reach 1.1R: Time Thru 2S Avg. Flow Depth=0.49' Max Vel=3.28 fps Inflow=5.10 cfs 0.384 af
n=0.100 L=456.0' S=0.2237 '/' Capacity=7.45 cfs Outflow=4.88 cfs 0.384 af

Reach 1.2R: Time Thru 2S Avg. Flow Depth=0.72' Max Vel=7.34 fps Inflow=12.80 cfs 1.202 af
n=0.040 L=277.0' S=0.1264 '/' Capacity=132.55 cfs Outflow=12.79 cfs 1.202 af

Reach 1R: Time Thru 2S Avg. Flow Depth=0.60' Max Vel=6.53 fps Inflow=8.66 cfs 0.818 af
n=0.040 L=355.0' S=0.1211 '/' Capacity=129.78 cfs Outflow=8.63 cfs 0.818 af

Reach 5R: Time Thru 7S Avg. Flow Depth=0.80' Max Vel=6.06 fps Inflow=27.40 cfs 2.717 af
n=0.040 L=430.0' S=0.0535 '/' Capacity=158.33 cfs Outflow=27.29 cfs 2.717 af

Reach 6R: Time Thru 6S Avg. Flow Depth=0.43' Max Vel=1.15 fps Inflow=2.31 cfs 3.191 af
n=0.400 L=250.0' S=0.5376 '/' Capacity=14.89 cfs Outflow=2.31 cfs 3.191 af

Reach 7R: Time Thru 2S Avg. Flow Depth=0.16' Max Vel=4.27 fps Inflow=1.59 cfs 4.021 af
n=0.040 L=238.0' S=0.1870 '/' Capacity=204.97 cfs Outflow=1.59 cfs 4.020 af

Pond 1P: HW#1A - HW#1B Peak Elev=1,049.63' Inflow=5.10 cfs 0.384 af
15.0" Round Culvert n=0.013 L=41.0' S=0.0551 '/' Outflow=5.10 cfs 0.384 af

Pond 2P: Twin 24" Culverts (HW#3A - HW#3B AND HW#4A - Peak Elev=908.82' Inflow=26.88 cfs 2.653 af
24.0" Round Culvert x 2.00 n=0.013 L=27.0' S=0.0185 '/' Outflow=26.88 cfs 2.653 af

Pond 3P: HW#5A - HW#5B Peak Elev=907.48' Inflow=0.90 cfs 0.064 af
15.0" Round Culvert n=0.013 L=68.0' S=0.0074 '/' Outflow=0.90 cfs 0.064 af

Pond 4P: HW#10A - HW#10B Peak Elev=883.15' Inflow=27.96 cfs 6.737 af
30.0" Round Culvert n=0.013 L=47.0' S=0.0532 '/' Outflow=27.96 cfs 6.737 af

Pond 10P: HW#2A - HW#2B Peak Elev=992.52' Inflow=8.66 cfs 0.818 af
15.0" Round Culvert n=0.013 L=26.0' S=0.0673 '/' Outflow=8.66 cfs 0.818 af

Pond SF1: EX. SEDIMENT BASIN Peak Elev=873.47' Storage=364,062 cf Inflow=20.73 cfs 9.107 af
Discarded=0.28 cfs 0.749 af Primary=0.00 cfs 0.000 af Outflow=0.28 cfs 0.749 af

Pond SF5: PROP. SEDIMENT BASIN Peak Elev=1,094.20' Storage=79,219 cf Inflow=24.50 cfs 3.201 af
Outflow=2.31 cfs 3.191 af

Pond SF6: PROP. SEDIMENT BASIN Peak Elev=951.09' Storage=105,232 cf Inflow=19.32 cfs 4.794 af
Outflow=1.59 cfs 4.021 af

Pond SF7: PROP. SEDIMENT BASIN Peak Elev=877.27' Storage=92,937 cf Inflow=42.35 cfs 8.341 af
Outflow=5.15 cfs 7.843 af

Link A: POA Inflow=17.98 cfs 3.538 af
Primary=17.98 cfs 3.538 af

Link B: POA Inflow=105.66 cfs 20.123 af
Primary=105.66 cfs 20.123 af

Total Runoff Area = 161.539 ac Runoff Volume = 34.051 af Average Runoff Depth = 2.53"
97.21% Pervious = 157.031 ac 2.79% Impervious = 4.509 ac

Time span=0.00-48.00 hrs, dt=0.02 hrs, 2401 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

Subcatchment1S: SITE NORTHEAST Runoff Area=79,760 sf 0.00% Impervious Runoff Depth=3.33"
Flow Length=450' Tc=7.2 min CN=68 Runoff=6.82 cfs 0.508 af

Subcatchment2S: SITE EAST Runoff Area=396,527 sf 0.00% Impervious Runoff Depth=2.63"
Flow Length=1,355' Tc=15.5 min CN=61 Runoff=20.30 cfs 1.995 af

Subcatchment3S: GRAVEL ROAD EAST Runoff Area=9,722 sf 0.00% Impervious Runoff Depth=4.38"
Tc=6.0 min CN=78 Runoff=1.14 cfs 0.082 af

Subcatchment4S: Existing-South Runoff Area=15.239 ac 5.46% Impervious Runoff Depth=3.64"
Flow Length=2,412' Tc=67.7 min CN=71 Runoff=23.64 cfs 4.622 af

Subcatchment5S: SITE Runoff Area=513,347 sf 9.83% Impervious Runoff Depth=4.17"
Flow Length=1,144' Tc=32.7 min CN=76 Runoff=31.31 cfs 4.094 af

Subcatchment6S: SITE Runoff Area=291,061 sf 9.05% Impervious Runoff Depth=3.74"
Flow Length=624' Tc=12.3 min CN=72 Runoff=23.86 cfs 2.085 af

Subcatchment7S: SITE Runoff Area=282,122 sf 10.43% Impervious Runoff Depth=3.85"
Tc=6.0 min CN=73 Runoff=29.20 cfs 2.077 af

Subcatchment8S: SITE Runoff Area=272,434 sf 0.00% Impervious Runoff Depth=3.23"
Tc=6.0 min CN=67 Runoff=23.48 cfs 1.682 af

Subcatchment9S: SITE Runoff Area=190,126 sf 0.00% Impervious Runoff Depth=3.03"
Flow Length=936' Tc=14.0 min CN=65 Runoff=11.84 cfs 1.100 af

Subcatchment10S: Existing-East Runoff Area=99.581 ac 1.24% Impervious Runoff Depth=3.23"
Flow Length=6,891' Tc=63.3 min CN=67 Runoff=142.52 cfs 26.783 af

Reach 1.1R: Time Thru 2S Avg. Flow Depth=0.57' Max Vel=3.58 fps Inflow=6.82 cfs 0.508 af
n=0.100 L=456.0' S=0.2237 '/' Capacity=7.45 cfs Outflow=6.56 cfs 0.508 af

Reach 1.2R: Time Thru 2S Avg. Flow Depth=0.83' Max Vel=7.94 fps Inflow=17.40 cfs 1.608 af
n=0.040 L=277.0' S=0.1264 '/' Capacity=132.55 cfs Outflow=17.38 cfs 1.608 af

Reach 1R: Time Thru 2S Avg. Flow Depth=0.70' Max Vel=7.08 fps Inflow=11.84 cfs 1.100 af
n=0.040 L=355.0' S=0.1211 '/' Capacity=129.78 cfs Outflow=11.82 cfs 1.100 af

Reach 5R: Time Thru 7S Avg. Flow Depth=0.96' Max Vel=6.67 fps Inflow=37.99 cfs 3.685 af
n=0.040 L=430.0' S=0.0535 '/' Capacity=158.33 cfs Outflow=37.85 cfs 3.685 af

Reach 6R: Time Thru 6S Avg. Flow Depth=0.79' Max Vel=1.62 fps Inflow=8.64 cfs 4.083 af
n=0.400 L=250.0' S=0.5376 '/' Capacity=14.89 cfs Outflow=8.64 cfs 4.083 af

Reach 7R: Time Thru 2S Avg. Flow Depth=0.26' Max Vel=5.69 fps Inflow=3.81 cfs 5.319 af
n=0.040 L=238.0' S=0.1870 '/' Capacity=204.97 cfs Outflow=3.81 cfs 5.317 af

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
4.434	HSG A	10S
38.742	HSG B	1S, 2S, 3S, 4S, 5S, 6S, 7S, 8S, 9S, 10S
107.313	HSG C	1S, 2S, 3S, 4S, 5S, 6S, 7S, 8S, 9S, 10S
4.626	HSG D	1S, 2S, 4S, 5S, 6S, 10S
6.424	Other	2S, 3S, 4S, 5S, 6S, 7S, 8S, 9S, 10S

Summary for Subcatchment 1S: SITE NORTHEAST

Runoff = 3.72 cfs @ 12.11 hrs, Volume= 0.285 af, Depth= 1.87"
Routed to Pond 1P : HW#1A - HW#1B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-YR Rainfall=4.98"

Area (sf)	CN	Description
7,928	61	>75% Grass cover, Good, HSG B
1,133	74	>75% Grass cover, Good, HSG C
4,008	96	Gravel surface, HSG C
6,578	80	>75% Grass cover, Good, HSG D
28,924	55	Woods, Good, HSG B
11,631	70	Woods, Good, HSG C
19,558	77	Woods, Good, HSG D
79,760	68	Weighted Average
79,760		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.2	50	0.3600	0.20		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.76"
3.0	400	0.1000	2.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
7.2	450	Total			

Summary for Subcatchment 2S: SITE EAST

Runoff = 9.72 cfs @ 12.24 hrs, Volume= 1.029 af, Depth= 1.36"
Routed to Pond 2P : Twin 24" Culverts (HW#3A - HW#3B AND HW#4A - HW#4B)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-YR Rainfall=4.98"

	Area (sf)	CN	Description
	32,017	61	>75% Grass cover, Good, HSG B
	30,361	74	>75% Grass cover, Good, HSG C
*	16,204	96	Gravel surface
	4,922	80	>75% Grass cover, Good, HSG D
	258,834	55	Woods, Good, HSG B
	52,359	70	Woods, Good, HSG C
	1,830	77	Woods, Good, HSG D
	396,527	61	Weighted Average
	396,527		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.1200	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.76"
5.2	697	0.2009	2.24		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.1	458	0.2500	2.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.7	150	0.2500	3.50		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
15.5	1,355	Total			

Summary for Subcatchment 3S: GRAVEL ROAD EAST

Runoff = 0.70 cfs @ 12.09 hrs, Volume= 0.050 af, Depth= 2.69"
Routed to Pond 3P : HW#5A - HW#5B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-YR Rainfall=4.98"

	Area (sf)	CN	Description
	4,539	61	>75% Grass cover, Good, HSG B
	774	74	>75% Grass cover, Good, HSG C
*	4,409	96	Gravel surface
	9,722	78	Weighted Average
	9,722		100.00% Pervious Area

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

Summary for Subcatchment 4S: Existing-South

Runoff = 13.39 cfs @ 12.94 hrs, Volume= 2.669 af, Depth= 2.10"
Routed to Link A : POA

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-YR Rainfall=4.98"

	Area (ac)	CN	Description
	2.176	55	Woods, Good, HSG B
	0.591	61	>75% Grass cover, Good, HSG B
	0.000	86	Newly graded area, HSG B
	6.949	70	Woods, Good, HSG C
	3.418	74	>75% Grass cover, Good, HSG C
	1.001	77	Woods, Good, HSG D
	0.000	91	Newly graded area, HSG C
	0.000	80	>75% Grass cover, Good, HSG D
*	0.272	96	Gravel surface
*	0.832	98	Paved parking
	15.239	71	Weighted Average
	14.407		94.54% Pervious Area
	0.832		5.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	64	0.1719	0.16		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.76"
1.7	350	0.4629	3.40		**Shallow Concentrated Flow, Woods to Grass** Woodland Kv= 5.0 fps
1.1	485	0.1979	7.16		**Shallow Concentrated Flow, Grass to Woods** Unpaved Kv= 16.1 fps
0.5	68	0.2059	2.27		**Shallow Concentrated Flow, Woods to Wetlands** Woodland Kv= 5.0 fps
10.2	520	0.1154	0.85		**Shallow Concentrated Flow, Wetlands** Forest w/Heavy Litter Kv= 2.5 fps
0.3	54	0.2963	2.72		**Shallow Concentrated Flow, Wetland to Culvert** Woodland Kv= 5.0 fps
0.0	62	0.1145	24.37	76.55	**Pipe Channel, Driveway Culvert** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013 Corrugated PE, smooth interior
5.0	316	0.0443	1.05		**Shallow Concentrated Flow, Woods to Wetlands** Woodland Kv= 5.0 fps
42.1	493	0.0061	0.20		**Shallow Concentrated Flow, Wetlands** Forest w/Heavy Litter Kv= 2.5 fps
67.7	2,412	Total			

Summary for Subcatchment 5S: SITE

Runoff = 18.88 cfs @ 12.46 hrs, Volume= 2.474 af, Depth= 2.52"
Routed to Pond SF5 : PROP. SEDIMENT BASIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-YR Rainfall=4.98"

	Area (sf)	CN	Description
	45,965	61	>75% Grass cover, Good, HSG B
*	3,490	96	Gravel surface
	388,911	74	>75% Grass cover, Good, HSG C
	23,808	80	>75% Grass cover, Good, HSG D
	695	55	Woods, Good, HSG B
	0	77	Woods, Good, HSG D
*	50,478	98	Ledge
	513,347	76	Weighted Average
	462,869		90.17% Pervious Area
	50,478		9.83% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	50	0.4000	0.46		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.76"
0.1	32	1.0000	7.00		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
5.2	220	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
9.1	296	0.0060	0.54		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
13.5	400	0.0050	0.49		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
3.0	146	0.0130	0.80		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
32.7	1,144	Total			

Summary for Subcatchment 6S: SITE

Runoff = 13.72 cfs @ 12.18 hrs, Volume= 1.215 af, Depth= 2.18"
Routed to Pond SF6 : PROP. SEDIMENT BASIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-YR Rainfall=4.98"

	Area (sf)	CN	Description
	6,742	55	Woods, Good, HSG B
*	3,869	96	Gravel surface
	73,338	61	>75% Grass cover, Good, HSG B
	66,888	74	>75% Grass cover, Good, HSG C
	5,594	80	>75% Grass cover, Good, HSG D
	101,770	70	Woods, Good, HSG C
	6,533	77	Woods, Good, HSG D
*	26,327	98	Ledge
	291,061	72	Weighted Average
	264,734		90.95% Pervious Area
	26,327		9.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	50	0.1000	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.76"
1.8	339	0.4000	3.16		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.1	35	1.0000	7.00		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
3.4	200	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
12.3	624	Total			

Summary for Subcatchment 7S: SITE

Runoff = 17.03 cfs @ 12.09 hrs, Volume= 1.222 af, Depth= 2.26"
Routed to Pond SF7 : PROP. SEDIMENT BASIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-YR Rainfall=4.98"

	Area (sf)	CN	Description
	108,120	61	>75% Grass cover, Good, HSG B
*	15,842	96	Gravel surface
	128,735	74	>75% Grass cover, Good, HSG C
	0	80	>75% Grass cover, Good, HSG D
*	29,425	98	Ledge
	282,122	73	Weighted Average
	252,697		89.57% Pervious Area
	29,425		10.43% Impervious Area

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

Summary for Subcatchment 8S: SITE

Runoff = 12.63 cfs @ 12.09 hrs, Volume= 0.932 af, Depth= 1.79"
Routed to Pond SF1 : EX. SEDIMENT BASIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-YR Rainfall=4.98"

	Area (sf)	CN	Description
	150,099	61	>75% Grass cover, Good, HSG B
*	4,455	96	Gravel surface
	117,880	74	>75% Grass cover, Good, HSG C
	0	80	>75% Grass cover, Good, HSG D
	272,434	67	Weighted Average
	272,434		100.00% Pervious Area

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

Summary for Subcatchment 9S: SITE

Runoff = 6.14 cfs @ 12.21 hrs, Volume= 0.597 af, Depth= 1.64"
Routed to Pond 10P : HW#2A - HW#2B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-YR Rainfall=4.98"

	Area (sf)	CN	Description
	15,575	61	>75% Grass cover, Good, HSG B
*	3,906	96	Gravel surface
	105,301	70	Woods, Good, HSG C
	65,344	55	Woods, Good, HSG B
	190,126	65	Weighted Average
	190,126		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	50	0.0822	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.76"
6.2	826	0.2000	2.24		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.3	60	0.2000	3.13		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
14.0	936	Total			

Summary for Subcatchment 10S: Existing-East

[47] Hint: Peak is 278% of capacity of segment #5
[47] Hint: Peak is 765% of capacity of segment #7

Runoff = 76.24 cfs @ 12.88 hrs, Volume= 14.847 af, Depth= 1.79"
Routed to Link B : POA

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-YR Rainfall=4.98"

	Area (ac)	CN	Description
	4.434	30	Woods, Good, HSG A
	12.534	55	Woods, Good, HSG B
	5.077	61	>75% Grass cover, Good, HSG B
	0.000	86	Newly graded area, HSG B
	73.191	70	Woods, Good, HSG C
	0.574	74	>75% Grass cover, Good, HSG C
	0.000	91	Newly graded area, HSG C
	1.892	77	Woods, Good, HSG D
	0.153	80	>75% Grass cover, Good, HSG D
*	0.488	96	Gravel surface
*	1.196	98	Pavement/Roof
	0.042	98	Water Surface, HSG B
	99.581	67	Weighted Average
	98.343		98.76% Pervious Area
	1.238		1.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.3	100	0.1500	0.16		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.76"
37.7	2,618	0.0535	1.16		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
4.2	835	0.0479	3.28		**Shallow Concentrated Flow, Water-USGS** Grassed Waterway Kv= 15.0 fps
7.7	2,324	0.1123	5.03		**Shallow Concentrated Flow, Wetland-Stream** Grassed Waterway Kv= 15.0 fps
0.0	38	0.0684	15.55	27.47	**Pipe Channel, 18" culvert** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
1.9	497	0.0865	4.41		**Shallow Concentrated Flow, Wetland-Water** Grassed Waterway Kv= 15.0 fps
0.0	21	0.0238	8.12	9.97	**Pipe Channel, 15" culvert** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
1.5	458	0.1154	5.10		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
63.3	6,891	Total			

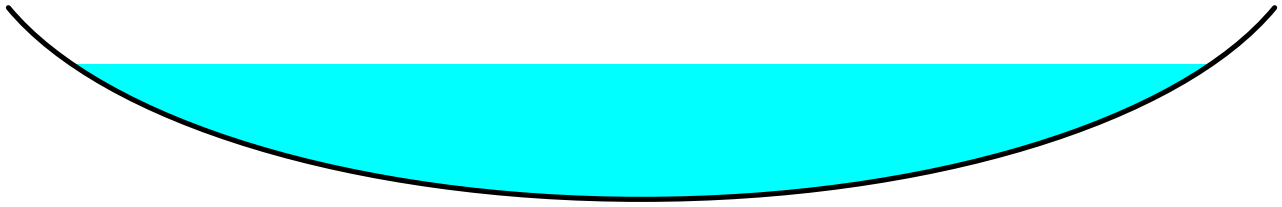
Summary for Reach 1.1R: Time Thru 2S

Inflow Area = 1.831 ac, 0.00% Impervious, Inflow Depth = 1.87" for 25-YR event
Inflow = 3.72 cfs @ 12.11 hrs, Volume= 0.285 af
Outflow = 3.53 cfs @ 12.14 hrs, Volume= 0.285 af, Atten= 5%, Lag= 1.8 min
Routed to Reach 1.2R : Time Thru 2S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Max. Velocity= 2.97 fps, Min. Travel Time= 2.6 min
Avg. Velocity = 0.96 fps, Avg. Travel Time= 7.9 min

Peak Storage= 541 cf @ 12.14 hrs
Average Depth at Peak Storage= 0.42' , Surface Width= 4.20'
Bank-Full Depth= 0.60' Flow Area= 2.0 sf, Capacity= 7.45 cfs

5.00' x 0.60' deep Parabolic Channel, n= 0.100 Earth, dense brush, high stage
Length= 456.0' Slope= 0.2237 '/'
Inlet Invert= 1,046.00', Outlet Invert= 944.00'



‡

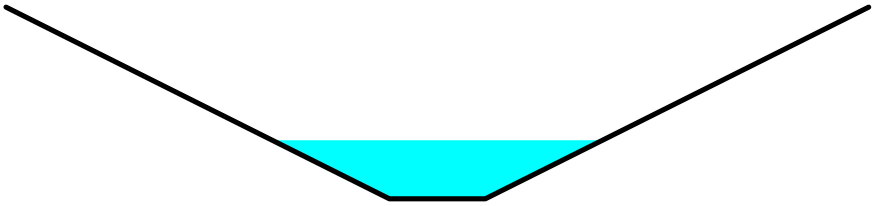
Summary for Reach 1.2R: Time Thru 2S

Inflow Area = 6.196 ac, 0.00% Impervious, Inflow Depth = 1.71" for 25-YR event
Inflow = 9.15 cfs @ 12.19 hrs, Volume= 0.881 af
Outflow = 9.13 cfs @ 12.20 hrs, Volume= 0.881 af, Atten= 0%, Lag= 0.6 min
Routed to Pond 2P : Twin 24" Culverts (HW#3A - HW#3B AND HW#4A - HW#4B)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Max. Velocity= 6.73 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 2.62 fps, Avg. Travel Time= 1.8 min

Peak Storage= 376 cf @ 12.20 hrs
Average Depth at Peak Storage= 0.61' , Surface Width= 3.44'
Bank-Full Depth= 2.00' Flow Area= 10.0 sf, Capacity= 132.55 cfs

1.00' x 2.00' deep channel, n= 0.040 Earth, cobble bottom, clean sides
Side Slope Z-value= 2.0 '/' Top Width= 9.00'
Length= 277.0' Slope= 0.1264 '/'
Inlet Invert= 943.00', Outlet Invert= 908.00'



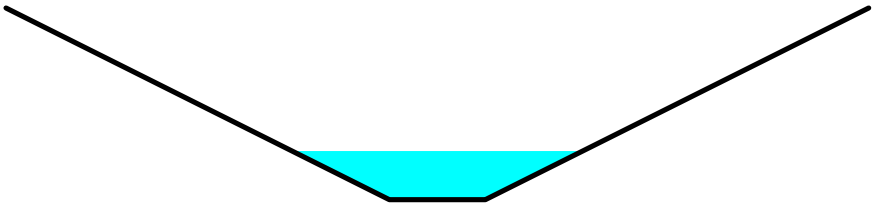
Summary for Reach 1R: Time Thru 2S

Inflow Area = 4.365 ac, 0.00% Impervious, Inflow Depth = 1.64" for 25-YR event
Inflow = 6.14 cfs @ 12.21 hrs, Volume= 0.597 af
Outflow = 6.12 cfs @ 12.22 hrs, Volume= 0.597 af, Atten= 0%, Lag= 0.8 min
Routed to Reach 1.2R : Time Thru 2S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Max. Velocity= 5.96 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 2.46 fps, Avg. Travel Time= 2.4 min

Peak Storage= 364 cf @ 12.22 hrs
Average Depth at Peak Storage= 0.51' , Surface Width= 3.03'
Bank-Full Depth= 2.00' Flow Area= 10.0 sf, Capacity= 129.78 cfs

1.00' x 2.00' deep channel, n= 0.040 Earth, cobble bottom, clean sides
Side Slope Z-value= 2.0 '/' Top Width= 9.00'
Length= 355.0' Slope= 0.1211 '/'
Inlet Invert= 987.00', Outlet Invert= 944.00'



Summary for Reach 5R: Time Thru 7S

Inflow Area = 15.522 ac, 0.00% Impervious, Inflow Depth = 1.52" for 25-YR event
Inflow = 19.08 cfs @ 12.22 hrs, Volume= 1.961 af
Outflow = 18.98 cfs @ 12.23 hrs, Volume= 1.961 af, Atten= 1%, Lag= 1.0 min
Routed to Pond 4P : HW#10A - HW#10B

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Max. Velocity= 5.43 fps, Min. Travel Time= 1.3 min
Avg. Velocity = 1.69 fps, Avg. Travel Time= 4.3 min

Peak Storage= 1,502 cf @ 12.23 hrs
Average Depth at Peak Storage= 0.66' , Surface Width= 6.63'
Bank-Full Depth= 2.00' Flow Area= 16.0 sf, Capacity= 158.33 cfs

4.00' x 2.00' deep channel, n= 0.040 Earth, cobble bottom, clean sides
Side Slope Z-value= 2.0 '/' Top Width= 12.00'
Length= 430.0' Slope= 0.0535 '/'
Inlet Invert= 905.50', Outlet Invert= 882.50'

Summary for Reach 6R: Time Thru 6S

Inflow Area = 11.785 ac, 9.83% Impervious, Inflow Depth > 2.51" for 25-YR event
Inflow = 2.04 cfs @ 14.91 hrs, Volume= 2.465 af
Outflow = 2.04 cfs @ 14.95 hrs, Volume= 2.465 af, Atten= 0%, Lag= 2.8 min
Routed to Pond SF6 : PROP. SEDIMENT BASIN

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Max. Velocity= 1.12 fps, Min. Travel Time= 3.7 min
Avg. Velocity = 0.67 fps, Avg. Travel Time= 6.3 min

Peak Storage= 458 cf @ 14.95 hrs
Average Depth at Peak Storage= 0.41' , Surface Width= 6.93'
Bank-Full Depth= 1.00' Flow Area= 8.0 sf, Capacity= 14.89 cfs

2.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 6.0 '/' Top Width= 14.00'
Length= 250.0' Slope= 0.5376 '/'
Inlet Invert= 1,086.40', Outlet Invert= 952.00'

‡

Summary for Reach 7R: Time Thru 2S

Inflow Area = 18.467 ac, 9.55% Impervious, Inflow Depth > 2.14" for 25-YR event
Inflow = 1.40 cfs @ 24.65 hrs, Volume= 3.291 af
Outflow = 1.40 cfs @ 24.66 hrs, Volume= 3.290 af, Atten= 0%, Lag= 0.6 min
Routed to Pond 4P : HW#10A - HW#10B

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Max. Velocity= 4.10 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 3.62 fps, Avg. Travel Time= 1.1 min

Peak Storage= 81 cf @ 24.66 hrs
Average Depth at Peak Storage= 0.15' , Surface Width= 2.60'
Bank-Full Depth= 2.00' Flow Area= 12.0 sf, Capacity= 204.97 cfs

2.00' x 2.00' deep channel, n= 0.040
Side Slope Z-value= 2.0 '/' Top Width= 10.00'
Length= 238.0' Slope= 0.1870 '/'
Inlet Invert= 927.00', Outlet Invert= 882.50'

Summary for Pond 1P: HW#1A - HW#1B

Inflow Area = 1.831 ac, 0.00% Impervious, Inflow Depth = 1.87" for 25-YR event
Inflow = 3.72 cfs @ 12.11 hrs, Volume= 0.285 af
Outflow = 3.72 cfs @ 12.11 hrs, Volume= 0.285 af, Atten= 0%, Lag= 0.0 min
Primary = 3.72 cfs @ 12.11 hrs, Volume= 0.285 af
Routed to Reach 1.1R : Time Thru 2S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Peak Elev= 1,049.29' @ 12.11 hrs
Flood Elev= 1,052.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	1,048.26'	**15.0" Round Culvert** L= 41.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,048.26' / 1,046.00' S= 0.0551 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=3.70 cfs @ 12.11 hrs HW=1,049.28' TW=1,046.41' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 3.70 cfs @ 3.44 fps)

Summary for Pond 2P: Twin 24" Culverts (HW#3A - HW#3B AND HW#4A - HW#4B)

[61] Hint: Exceeded Reach 1.2R outlet invert by 0.42' @ 12.22 hrs

Inflow Area = 15.299 ac, 0.00% Impervious, Inflow Depth = 1.50" for 25-YR event
Inflow = 18.69 cfs @ 12.22 hrs, Volume= 1.911 af
Outflow = 18.69 cfs @ 12.22 hrs, Volume= 1.911 af, Atten= 0%, Lag= 0.0 min
Primary = 18.69 cfs @ 12.22 hrs, Volume= 1.911 af
Routed to Reach 5R : Time Thru 7S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Peak Elev= 908.42' @ 12.22 hrs
Flood Elev= 910.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	907.00'	**24.0" Round Culvert X 2.00** L= 27.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 907.00' / 906.50' S= 0.0185 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=18.67 cfs @ 12.22 hrs HW=908.42' TW=906.16' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 18.67 cfs @ 5.50 fps)

Summary for Pond 3P: HW#5A - HW#5B

Inflow Area = 0.223 ac, 0.00% Impervious, Inflow Depth = 2.69" for 25-YR event
Inflow = 0.70 cfs @ 12.09 hrs, Volume= 0.050 af
Outflow = 0.70 cfs @ 12.09 hrs, Volume= 0.050 af, Atten= 0%, Lag= 0.0 min
Primary = 0.70 cfs @ 12.09 hrs, Volume= 0.050 af
Routed to Reach 5R : Time Thru 7S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Peak Elev= 907.42' @ 12.09 hrs
Flood Elev= 910.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	907.00'	**15.0" Round Culvert** L= 68.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 907.00' / 906.50' S= 0.0074 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=0.70 cfs @ 12.09 hrs HW=907.42' TW=905.97' (Dynamic Tailwater)
1=Culvert (Barrel Controls 0.70 cfs @ 2.88 fps)

Summary for Pond 4P: HW#10A - HW#10B

Inflow Area = 33.989 ac, 5.19% Impervious, Inflow Depth > 1.85" for 25-YR event
Inflow = 19.49 cfs @ 12.23 hrs, Volume= 5.251 af
Outflow = 19.49 cfs @ 12.23 hrs, Volume= 5.251 af, Atten= 0%, Lag= 0.0 min
Primary = 19.49 cfs @ 12.23 hrs, Volume= 5.251 af
Routed to Pond SF7 : PROP. SEDIMENT BASIN

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Peak Elev= 882.45' @ 12.23 hrs
Flood Elev= 884.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	880.50'	**30.0" Round Culvert** L= 47.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 880.50' / 878.00' S= 0.0532 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 4.91 sf

Primary OutFlow Max=19.46 cfs @ 12.23 hrs HW=882.45' TW=874.19' (Dynamic Tailwater)
1=Culvert (Inlet Controls 19.46 cfs @ 4.75 fps)

Summary for Pond 10P: HW#2A - HW#2B

[57] Hint: Peaked at 991.46' (Flood elevation advised)

Inflow Area = 4.365 ac, 0.00% Impervious, Inflow Depth = 1.64" for 25-YR event
Inflow = 6.14 cfs @ 12.21 hrs, Volume= 0.597 af
Outflow = 6.14 cfs @ 12.21 hrs, Volume= 0.597 af, Atten= 0%, Lag= 0.0 min
Primary = 6.14 cfs @ 12.21 hrs, Volume= 0.597 af
Routed to Reach 1R : Time Thru 2S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Peak Elev= 991.46' @ 12.21 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	989.75'	**15.0" Round Culvert** L= 26.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 989.75' / 988.00' S= 0.0673 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=6.13 cfs @ 12.21 hrs HW=991.45' TW=987.51' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 6.13 cfs @ 4.99 fps)

Summary for Pond SF1: EX. SEDIMENT BASIN

Inflow Area = 46.719 ac, 5.22% Impervious, Inflow Depth > 1.87" for 25-YR event
Inflow = 15.18 cfs @ 12.10 hrs, Volume= 7.276 af
Outflow = 0.25 cfs @ 48.00 hrs, Volume= 0.679 af, Atten= 98%, Lag= 2,154.0 min
Discarded = 0.25 cfs @ 48.00 hrs, Volume= 0.679 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link A : POA

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Peak Elev= 871.26' @ 48.00 hrs Surf.Area= 33,100 sf Storage= 287,358 cf
Flood Elev= 874.00' Surf.Area= 37,000 sf Storage= 383,539 cf

Plug-Flow detention time= 1,118.4 min calculated for 0.679 af (9% of inflow)
Center-of-Mass det. time= 498.9 min (1,848.3 - 1,349.4)

Volume	Invert	Avail.Storage	Storage Description
#1	860.00'	383,539 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
860.00	18,100	555.0	0	0	18,100
862.00	20,900	605.0	38,966	38,966	22,859
864.00	23,400	630.0	44,276	83,243	25,609
866.00	26,000	655.0	49,377	132,620	28,470
868.00	28,600	681.0	54,579	187,199	31,540
870.00	31,100	695.0	59,683	246,882	33,600
872.00	34,300	735.0	65,374	312,256	38,371
874.00	37,000	745.0	71,283	383,539	40,263

Device	Routing	Invert	Outlet Devices
#1	Discarded	860.00'	**0.300 in/hr Exfiltration over Wetted area** Phase-In= 0.01'
#2	Primary	873.50'	**20.0' long + 4.0 '/' SideZ x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.25 cfs @ 48.00 hrs HW=871.26' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.25 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=860.00' TW=0.00' (Dynamic Tailwater)
└**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond SF5: PROP. SEDIMENT BASIN

Inflow Area = 11.785 ac, 9.83% Impervious, Inflow Depth = 2.52" for 25-YR event
Inflow = 18.88 cfs @ 12.46 hrs, Volume= 2.474 af
Outflow = 2.04 cfs @ 14.91 hrs, Volume= 2.465 af, Atten= 89%, Lag= 146.6 min
Primary = 2.04 cfs @ 14.91 hrs, Volume= 2.465 af
Routed to Reach 6R : Time Thru 6S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Peak Elev= 1,092.92' @ 14.91 hrs Surf.Area= 15,438 sf Storage= 58,141 cf
Flood Elev= 1,096.00' Surf.Area= 20,888 sf Storage= 113,862 cf

Plug-Flow detention time= 361.0 min calculated for 2.464 af (100% of inflow)
Center-of-Mass det. time= 359.4 min (1,216.6 - 857.3)

Volume	Invert	Avail.Storage	Storage Description
#1	1,088.00'	113,862 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,088.00	8,550	420.0	0	0	8,550
1,090.00	11,100	480.0	19,595	19,595	12,940
1,092.00	14,000	540.0	25,044	44,639	17,916
1,094.00	17,225	600.0	31,169	75,808	23,477
1,096.00	20,888	665.0	38,054	113,862	30,142

Device	Routing	Invert	Outlet Devices
#1	Primary	1,088.00'	**12.0" Round Culvert** L= 57.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,088.00' / 1,087.40' S= 0.0105 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	1,088.00'	**6.0" Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	1,094.25'	**48.0" x 48.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.04 cfs @ 14.91 hrs HW=1,092.92' TW=1,086.81' (Dynamic Tailwater)
└**1=Culvert** (Passes 2.04 cfs of 7.39 cfs potential flow)
├**2=Orifice** (Orifice Controls 2.04 cfs @ 10.40 fps)
└**3=Grate** (Controls 0.00 cfs)

Summary for Pond SF6: PROP. SEDIMENT BASIN

Inflow Area = 18.467 ac, 9.55% Impervious, Inflow Depth > 2.39" for 25-YR event
Inflow = 14.56 cfs @ 12.18 hrs, Volume= 3.681 af
Outflow = 1.40 cfs @ 24.65 hrs, Volume= 3.291 af, Atten= 90%, Lag= 748.5 min
Primary = 1.40 cfs @ 24.65 hrs, Volume= 3.291 af
Routed to Reach 7R : Time Thru 2S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Peak Elev= 950.45' @ 24.65 hrs Surf.Area= 36,760 sf Storage= 81,092 cf
Flood Elev= 952.00' Surf.Area= 41,570 sf Storage= 141,921 cf

Plug-Flow detention time= 696.7 min calculated for 3.290 af (89% of inflow)
Center-of-Mass det. time= 617.8 min (1,715.6 - 1,097.8)

Volume	Invert	Avail.Storage	Storage Description
#1	948.00'	141,921 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
948.00	29,650	1,225.0	0	0	29,650
950.00	35,434	1,285.0	64,998	64,998	41,894
952.00	41,570	1,345.0	76,922	141,921	54,724

Device	Routing	Invert	Outlet Devices
#1	Primary	948.00'	**12.0" Round Culvert** L= 118.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 948.00' / 928.00' S= 0.1695 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	948.00'	**6.0" Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	951.10'	**48.0" x 48.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.40 cfs @ 24.65 hrs HW=950.45' TW=927.15' (Dynamic Tailwater)
└─**1=Culvert** (Passes 1.40 cfs of 5.28 cfs potential flow)
  ├─**2=Orifice** (Orifice Controls 1.40 cfs @ 7.14 fps)
  └─**3=Grate** (Controls 0.00 cfs)

Summary for Pond SF7: PROP. SEDIMENT BASIN

Inflow Area = 40.465 ac, 6.03% Impervious, Inflow Depth > 1.92" for 25-YR event
Inflow = 30.13 cfs @ 12.15 hrs, Volume= 6.474 af
Outflow = 4.53 cfs @ 14.00 hrs, Volume= 6.343 af, Atten= 85%, Lag= 111.5 min
Primary = 4.53 cfs @ 14.00 hrs, Volume= 6.343 af
Routed to Pond SF1 : EX. SEDIMENT BASIN

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Peak Elev= 875.86' @ 14.00 hrs Surf.Area= 20,309 sf Storage= 61,868 cf
Flood Elev= 880.00' Surf.Area= 29,910 sf Storage= 165,729 cf

Plug-Flow detention time= 156.2 min calculated for 6.343 af (98% of inflow)

Center-of-Mass det. time= 125.4 min (1,421.9 - 1,296.5)

Volume	Invert	Avail.Storage	Storage Description
#1	872.00'	165,729 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
872.00	12,025	790.0	0	0	12,025
874.00	16,165	870.0	28,088	28,088	22,722
876.00	20,650	930.0	36,724	64,812	31,503
878.00	25,250	980.0	45,823	110,635	39,339
880.00	29,910	1,035.0	55,094	165,729	48,386

Device	Routing	Invert	Outlet Devices
#1	Primary	872.00'	**12.0" Round Culvert** L= 252.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 872.00' / 870.00' S= 0.0079 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	872.00'	**10.0" Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	877.15'	**48.0" x 48.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=4.53 cfs @ 14.00 hrs HW=875.86' TW=862.81' (Dynamic Tailwater)
↑└─**1=Culvert** (Barrel Controls 4.53 cfs @ 5.76 fps)
  ↑└─**2=Orifice** (Passes 4.53 cfs of 4.87 cfs potential flow)
  └─**3=Grate** (Controls 0.00 cfs)

Summary for Link A: POA

Inflow Area = 61.958 ac, 5.28% Impervious, Inflow Depth = 0.52" for 25-YR event
Inflow = 13.39 cfs @ 12.94 hrs, Volume= 2.669 af
Primary = 13.39 cfs @ 12.94 hrs, Volume= 2.669 af, Atten= 0%, Lag= 0.0 min

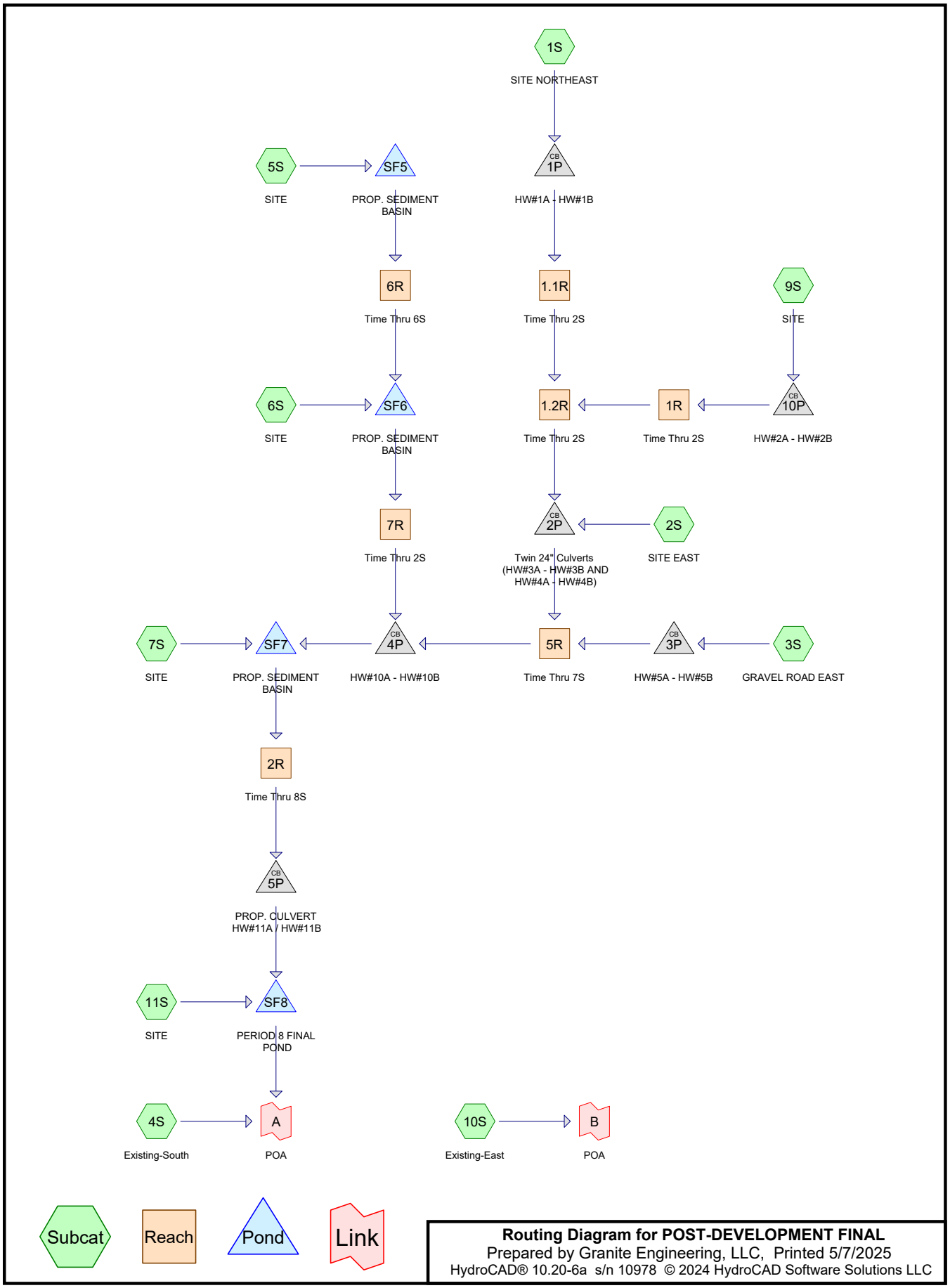
Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs

Summary for Link B: POA

Inflow Area = 99.581 ac, 1.24% Impervious, Inflow Depth = 1.79" for 25-YR event
Inflow = 76.24 cfs @ 12.88 hrs, Volume= 14.847 af
Primary = 76.24 cfs @ 12.88 hrs, Volume= 14.847 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs

8. HYDROCAD DRAINAGE ANALYSIS – POST-DEVELOPMENT



Routing Diagram for POST-DEVELOPMENT FINAL
Prepared by Granite Engineering, LLC, Printed 5/7/2025

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-YR	Type III 24-hr		Default	24.00	1	2.76	2
2	10-YR	Type III 24-hr		Default	24.00	1	4.02	2
3	25-YR	Type III 24-hr		Default	24.00	1	4.98	2
4	50-YR	Type III 24-hr		Default	24.00	1	5.86	2
5	100-YR	Type III 24-hr		Default	24.00	1	6.90	2

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
15.722	61	>75% Grass cover, Good, HSG B (1S, 2S, 3S, 4S, 5S, 6S, 7S, 9S, 10S, 11S)
20.850	74	>75% Grass cover, Good, HSG C (1S, 2S, 3S, 4S, 5S, 6S, 7S, 10S, 11S)
1.092	80	>75% Grass cover, Good, HSG D (1S, 2S, 5S, 6S, 10S)
1.958	96	Gravel surface (2S, 3S, 4S, 5S, 6S, 7S, 9S, 10S, 11S)
0.092	96	Gravel surface, HSG C (1S)
2.439	98	Ledge (5S, 6S, 7S)
0.832	98	Paved parking (4S)
1.196	98	Pavement/Roof (10S)
0.042	98	Water Surface, HSG B (10S)
4.434	30	Woods, Good, HSG A (10S)
22.987	55	Woods, Good, HSG B (1S, 2S, 4S, 5S, 6S, 9S, 10S)
86.363	70	Woods, Good, HSG C (1S, 2S, 4S, 6S, 9S, 10S)
3.534	77	Woods, Good, HSG D (1S, 2S, 4S, 6S, 10S)
161.540	**68**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
4.434	HSG A	10S
38.750	HSG B	1S, 2S, 3S, 4S, 5S, 6S, 7S, 9S, 10S, 11S
107.305	HSG C	1S, 2S, 3S, 4S, 5S, 6S, 7S, 9S, 10S, 11S
4.626	HSG D	1S, 2S, 4S, 5S, 6S, 10S
6.424	Other	2S, 3S, 4S, 5S, 6S, 7S, 9S, 10S, 11S
161.540		**TOTAL AREA**

Summary for Subcatchment 1S: SITE NORTHEAST

Runoff = 3.72 cfs @ 12.11 hrs, Volume= 0.285 af, Depth= 1.87"
Routed to Pond 1P : HW#1A - HW#1B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-YR Rainfall=4.98"

Area (sf)	CN	Description
7,928	61	>75% Grass cover, Good, HSG B
1,133	74	>75% Grass cover, Good, HSG C
4,008	96	Gravel surface, HSG C
6,578	80	>75% Grass cover, Good, HSG D
28,924	55	Woods, Good, HSG B
11,631	70	Woods, Good, HSG C
19,558	77	Woods, Good, HSG D
79,760	68	Weighted Average
79,760		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.2	50	0.3600	0.20		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.76"
3.0	400	0.1000	2.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
7.2	450	Total			

Summary for Subcatchment 2S: SITE EAST

Runoff = 9.72 cfs @ 12.24 hrs, Volume= 1.029 af, Depth= 1.36"
Routed to Pond 2P : Twin 24" Culverts (HW#3A - HW#3B AND HW#4A - HW#4B)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-YR Rainfall=4.98"

	Area (sf)	CN	Description
	32,017	61	>75% Grass cover, Good, HSG B
	30,361	74	>75% Grass cover, Good, HSG C
*	16,204	96	Gravel surface
	4,922	80	>75% Grass cover, Good, HSG D
	258,834	55	Woods, Good, HSG B
	52,359	70	Woods, Good, HSG C
	1,830	77	Woods, Good, HSG D
	396,527	61	Weighted Average
	396,527		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.1200	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.76"
5.2	697	0.2009	2.24		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.1	458	0.2500	2.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.7	150	0.2500	3.50		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
15.5	1,355	Total			

Summary for Subcatchment 3S: GRAVEL ROAD EAST

Runoff = 0.70 cfs @ 12.09 hrs, Volume= 0.050 af, Depth= 2.69"
Routed to Pond 3P : HW#5A - HW#5B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-YR Rainfall=4.98"

	Area (sf)	CN	Description
	4,539	61	>75% Grass cover, Good, HSG B
	774	74	>75% Grass cover, Good, HSG C
*	4,409	96	Gravel surface
	9,722	78	Weighted Average
	9,722		100.00% Pervious Area

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

Summary for Subcatchment 4S: Existing-South

Runoff = 13.39 cfs @ 12.94 hrs, Volume= 2.669 af, Depth= 2.10"
Routed to Link A : POA

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-YR Rainfall=4.98"

	Area (ac)	CN	Description
	2.176	55	Woods, Good, HSG B
	0.591	61	>75% Grass cover, Good, HSG B
	0.000	86	Newly graded area, HSG B
	6.949	70	Woods, Good, HSG C
	3.418	74	>75% Grass cover, Good, HSG C
	1.001	77	Woods, Good, HSG D
	0.000	91	Newly graded area, HSG C
	0.000	80	>75% Grass cover, Good, HSG D
*	0.272	96	Gravel surface
*	0.832	98	Paved parking
	15.239	71	Weighted Average
	14.407		94.54% Pervious Area
	0.832		5.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	64	0.1719	0.16		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.76"
1.7	350	0.4629	3.40		**Shallow Concentrated Flow, Woods to Grass** Woodland Kv= 5.0 fps
1.1	485	0.1979	7.16		**Shallow Concentrated Flow, Grass to Woods** Unpaved Kv= 16.1 fps
0.5	68	0.2059	2.27		**Shallow Concentrated Flow, Woods to Wetlands** Woodland Kv= 5.0 fps
10.2	520	0.1154	0.85		**Shallow Concentrated Flow, Wetlands** Forest w/Heavy Litter Kv= 2.5 fps
0.3	54	0.2963	2.72		**Shallow Concentrated Flow, Wetland to Culvert** Woodland Kv= 5.0 fps
0.0	62	0.1145	24.37	76.55	**Pipe Channel, Driveway Culvert** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013 Corrugated PE, smooth interior
5.0	316	0.0443	1.05		**Shallow Concentrated Flow, Woods to Wetlands** Woodland Kv= 5.0 fps
42.1	493	0.0061	0.20		**Shallow Concentrated Flow, Wetlands** Forest w/Heavy Litter Kv= 2.5 fps
67.7	2,412	Total			

Summary for Subcatchment 5S: SITE

Runoff = 18.88 cfs @ 12.46 hrs, Volume= 2.474 af, Depth= 2.52"
Routed to Pond SF5 : PROP. SEDIMENT BASIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-YR Rainfall=4.98"

	Area (sf)	CN	Description
	45,965	61	>75% Grass cover, Good, HSG B
*	3,490	96	Gravel surface
	388,911	74	>75% Grass cover, Good, HSG C
	23,808	80	>75% Grass cover, Good, HSG D
	695	55	Woods, Good, HSG B
	0	77	Woods, Good, HSG D
*	50,478	98	Ledge
	513,347	76	Weighted Average
	462,869		90.17% Pervious Area
	50,478		9.83% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	50	0.4000	0.46		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.76"
0.1	32	1.0000	7.00		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
5.2	220	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
9.1	296	0.0060	0.54		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
13.5	400	0.0050	0.49		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
3.0	146	0.0130	0.80		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
32.7	1,144	Total			

Summary for Subcatchment 6S: SITE

Runoff = 13.72 cfs @ 12.18 hrs, Volume= 1.215 af, Depth= 2.18"
Routed to Pond SF6 : PROP. SEDIMENT BASIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-YR Rainfall=4.98"

	Area (sf)	CN	Description
	6,742	55	Woods, Good, HSG B
*	3,869	96	Gravel surface
	73,338	61	>75% Grass cover, Good, HSG B
	66,888	74	>75% Grass cover, Good, HSG C
	5,594	80	>75% Grass cover, Good, HSG D
	101,770	70	Woods, Good, HSG C
	6,533	77	Woods, Good, HSG D
*	26,327	98	Ledge
	291,061	72	Weighted Average
	264,734		90.95% Pervious Area
	26,327		9.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	50	0.1000	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.76"
1.8	339	0.4000	3.16		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.1	35	1.0000	7.00		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
3.4	200	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
12.3	624	Total			

Summary for Subcatchment 7S: SITE

Runoff = 17.03 cfs @ 12.09 hrs, Volume= 1.222 af, Depth= 2.26"
Routed to Pond SF7 : PROP. SEDIMENT BASIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-YR Rainfall=4.98"

	Area (sf)	CN	Description
	108,120	61	>75% Grass cover, Good, HSG B
*	15,842	96	Gravel surface
	128,735	74	>75% Grass cover, Good, HSG C
	0	80	>75% Grass cover, Good, HSG D
*	29,425	98	Ledge
	282,122	73	Weighted Average
	252,697		89.57% Pervious Area
	29,425		10.43% Impervious Area

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

Summary for Subcatchment 9S: SITE

Runoff = 6.14 cfs @ 12.21 hrs, Volume= 0.597 af, Depth= 1.64"
Routed to Pond 10P : HW#2A - HW#2B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-YR Rainfall=4.98"

	Area (sf)	CN	Description
	15,575	61	>75% Grass cover, Good, HSG B
*	3,906	96	Gravel surface
	105,301	70	Woods, Good, HSG C
	65,344	55	Woods, Good, HSG B
	190,126	65	Weighted Average
	190,126		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	50	0.0822	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.76"
6.2	826	0.2000	2.24		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.3	60	0.2000	3.13		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
14.0	936	Total			

Summary for Subcatchment 10S: Existing-East

[47] Hint: Peak is 278% of capacity of segment #5
[47] Hint: Peak is 765% of capacity of segment #7

Runoff = 76.24 cfs @ 12.88 hrs, Volume= 14.847 af, Depth= 1.79"
Routed to Link B : POA

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-YR Rainfall=4.98"

	Area (ac)	CN	Description
	4.434	30	Woods, Good, HSG A
	12.534	55	Woods, Good, HSG B
	5.077	61	>75% Grass cover, Good, HSG B
	0.000	86	Newly graded area, HSG B
	73.191	70	Woods, Good, HSG C
	0.574	74	>75% Grass cover, Good, HSG C
	0.000	91	Newly graded area, HSG C
	1.892	77	Woods, Good, HSG D
	0.153	80	>75% Grass cover, Good, HSG D
*	0.488	96	Gravel surface
*	1.196	98	Pavement/Roof
	0.042	98	Water Surface, HSG B
	99.581	67	Weighted Average
	98.343		98.76% Pervious Area
	1.238		1.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.3	100	0.1500	0.16		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.76"
37.7	2,618	0.0535	1.16		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
4.2	835	0.0479	3.28		**Shallow Concentrated Flow, Water-USGS** Grassed Waterway Kv= 15.0 fps
7.7	2,324	0.1123	5.03		**Shallow Concentrated Flow, Wetland-Stream** Grassed Waterway Kv= 15.0 fps
0.0	38	0.0684	15.55	27.47	**Pipe Channel, 18" culvert** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
1.9	497	0.0865	4.41		**Shallow Concentrated Flow, Wetland-Water** Grassed Waterway Kv= 15.0 fps
0.0	21	0.0238	8.12	9.97	**Pipe Channel, 15" culvert** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
1.5	458	0.1154	5.10		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
63.3	6,891	Total			

Summary for Subcatchment 11S: SITE

Runoff = 12.64 cfs @ 12.09 hrs, Volume= 0.933 af, Depth= 1.79"
Routed to Pond SF8 : PERIOD 8 FINAL POND

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-YR Rainfall=4.98"

	Area (sf)	CN	Description
	150,452	61	>75% Grass cover, Good, HSG B
*	4,455	96	Gravel surface
	117,543	74	>75% Grass cover, Good, HSG C
	0	80	>75% Grass cover, Good, HSG D
	272,450	67	Weighted Average
	272,450		100.00% Pervious Area

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

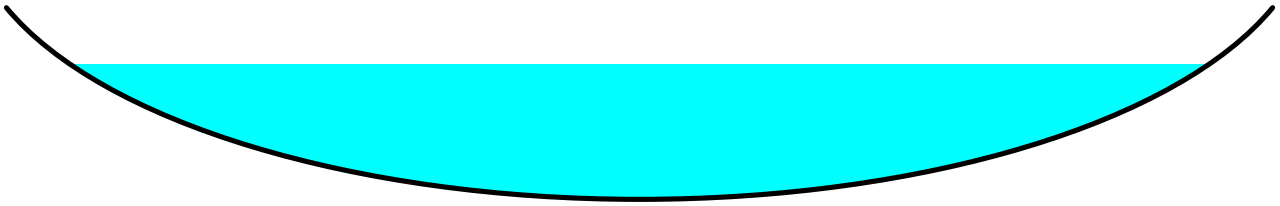
Summary for Reach 1.1R: Time Thru 2S

Inflow Area = 1.831 ac, 0.00% Impervious, Inflow Depth = 1.87" for 25-YR event
Inflow = 3.72 cfs @ 12.11 hrs, Volume= 0.285 af
Outflow = 3.53 cfs @ 12.14 hrs, Volume= 0.285 af, Atten= 5%, Lag= 1.8 min
Routed to Reach 1.2R : Time Thru 2S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Max. Velocity= 2.97 fps, Min. Travel Time= 2.6 min
Avg. Velocity = 0.96 fps, Avg. Travel Time= 7.9 min

Peak Storage= 541 cf @ 12.14 hrs
Average Depth at Peak Storage= 0.42' , Surface Width= 4.20'
Bank-Full Depth= 0.60' Flow Area= 2.0 sf, Capacity= 7.45 cfs

5.00' x 0.60' deep Parabolic Channel, n= 0.100 Earth, dense brush, high stage
Length= 456.0' Slope= 0.2237 '/'
Inlet Invert= 1,046.00', Outlet Invert= 944.00'



‡

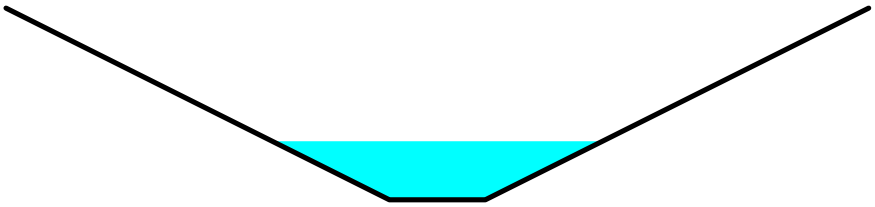
Summary for Reach 1.2R: Time Thru 2S

Inflow Area = 6.196 ac, 0.00% Impervious, Inflow Depth = 1.71" for 25-YR event
Inflow = 9.15 cfs @ 12.19 hrs, Volume= 0.881 af
Outflow = 9.13 cfs @ 12.20 hrs, Volume= 0.881 af, Atten= 0%, Lag= 0.6 min
Routed to Pond 2P : Twin 24" Culverts (HW#3A - HW#3B AND HW#4A - HW#4B)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Max. Velocity= 6.73 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 2.62 fps, Avg. Travel Time= 1.8 min

Peak Storage= 376 cf @ 12.20 hrs
Average Depth at Peak Storage= 0.61' , Surface Width= 3.44'
Bank-Full Depth= 2.00' Flow Area= 10.0 sf, Capacity= 132.55 cfs

1.00' x 2.00' deep channel, n= 0.040 Earth, cobble bottom, clean sides
Side Slope Z-value= 2.0 '/' Top Width= 9.00'
Length= 277.0' Slope= 0.1264 '/'
Inlet Invert= 943.00', Outlet Invert= 908.00'



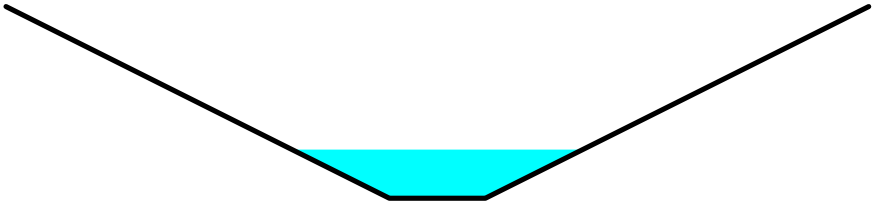
Summary for Reach 1R: Time Thru 2S

Inflow Area = 4.365 ac, 0.00% Impervious, Inflow Depth = 1.64" for 25-YR event
Inflow = 6.14 cfs @ 12.21 hrs, Volume= 0.597 af
Outflow = 6.12 cfs @ 12.22 hrs, Volume= 0.597 af, Atten= 0%, Lag= 0.8 min
Routed to Reach 1.2R : Time Thru 2S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Max. Velocity= 5.96 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 2.46 fps, Avg. Travel Time= 2.4 min

Peak Storage= 364 cf @ 12.22 hrs
Average Depth at Peak Storage= 0.51' , Surface Width= 3.03'
Bank-Full Depth= 2.00' Flow Area= 10.0 sf, Capacity= 129.78 cfs

1.00' x 2.00' deep channel, n= 0.040 Earth, cobble bottom, clean sides
Side Slope Z-value= 2.0 '/' Top Width= 9.00'
Length= 355.0' Slope= 0.1211 '/'
Inlet Invert= 987.00', Outlet Invert= 944.00'



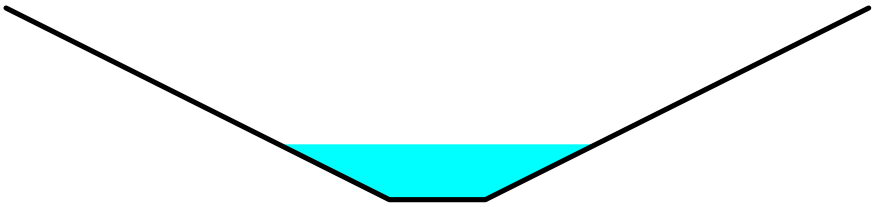
Summary for Reach 2R: Time Thru 8S

Inflow Area = 40.465 ac, 6.03% Impervious, Inflow Depth > 1.88" for 25-YR event
Inflow = 4.82 cfs @ 13.78 hrs, Volume= 6.355 af
Outflow = 4.82 cfs @ 13.79 hrs, Volume= 6.354 af, Atten= 0%, Lag= 1.0 min
Routed to Pond 5P : PROP. CULVERT HW#11A / HW#11B

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Max. Velocity= 3.85 fps, Min. Travel Time= 1.3 min
Avg. Velocity = 2.84 fps, Avg. Travel Time= 1.7 min

Peak Storage= 370 cf @ 13.79 hrs
Average Depth at Peak Storage= 0.58' , Surface Width= 3.32'
Bank-Full Depth= 2.00' Flow Area= 10.0 sf, Capacity= 78.15 cfs

1.00' x 2.00' deep channel, n= 0.040
Side Slope Z-value= 2.0 '/' Top Width= 9.00'
Length= 296.0' Slope= 0.0439 '/'
Inlet Invert= 864.00', Outlet Invert= 851.00'



Summary for Reach 5R: Time Thru 7S

Inflow Area = 15.522 ac, 0.00% Impervious, Inflow Depth = 1.52" for 25-YR event
Inflow = 19.08 cfs @ 12.22 hrs, Volume= 1.961 af
Outflow = 18.98 cfs @ 12.23 hrs, Volume= 1.961 af, Atten= 1%, Lag= 1.0 min
Routed to Pond 4P : HW#10A - HW#10B

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Max. Velocity= 5.43 fps, Min. Travel Time= 1.3 min
Avg. Velocity = 1.69 fps, Avg. Travel Time= 4.3 min

Peak Storage= 1,502 cf @ 12.23 hrs
Average Depth at Peak Storage= 0.66' , Surface Width= 6.63'
Bank-Full Depth= 2.00' Flow Area= 16.0 sf, Capacity= 158.33 cfs

4.00' x 2.00' deep channel, n= 0.040 Earth, cobble bottom, clean sides
Side Slope Z-value= 2.0 '/' Top Width= 12.00'
Length= 430.0' Slope= 0.0535 '/'
Inlet Invert= 905.50', Outlet Invert= 882.50'

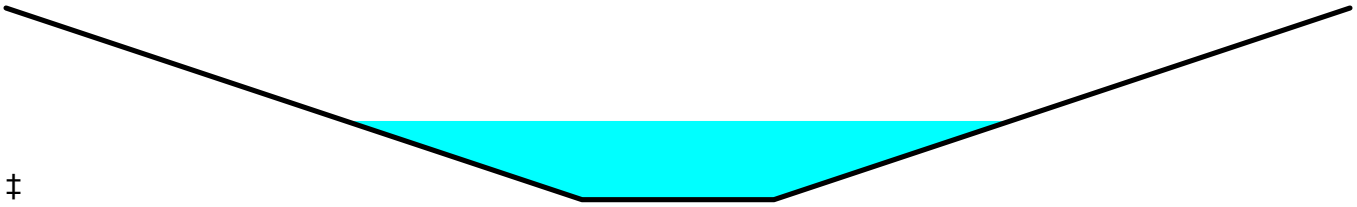
Summary for Reach 6R: Time Thru 6S

Inflow Area = 11.785 ac, 9.83% Impervious, Inflow Depth > 2.51" for 25-YR event
Inflow = 2.04 cfs @ 14.91 hrs, Volume= 2.465 af
Outflow = 2.04 cfs @ 14.95 hrs, Volume= 2.465 af, Atten= 0%, Lag= 2.8 min
Routed to Pond SF6 : PROP. SEDIMENT BASIN

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Max. Velocity= 1.12 fps, Min. Travel Time= 3.7 min
Avg. Velocity = 0.67 fps, Avg. Travel Time= 6.3 min

Peak Storage= 458 cf @ 14.95 hrs
Average Depth at Peak Storage= 0.41' , Surface Width= 6.93'
Bank-Full Depth= 1.00' Flow Area= 8.0 sf, Capacity= 14.89 cfs

2.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 6.0 '/' Top Width= 14.00'
Length= 250.0' Slope= 0.5376 '/'
Inlet Invert= 1,086.40', Outlet Invert= 952.00'



‡

Summary for Reach 7R: Time Thru 2S

Inflow Area = 18.467 ac, 9.55% Impervious, Inflow Depth > 2.14" for 25-YR event
Inflow = 1.40 cfs @ 24.65 hrs, Volume= 3.291 af
Outflow = 1.40 cfs @ 24.66 hrs, Volume= 3.290 af, Atten= 0%, Lag= 0.6 min
Routed to Pond 4P : HW#10A - HW#10B

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Max. Velocity= 4.15 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 3.68 fps, Avg. Travel Time= 1.1 min

Peak Storage= 80 cf @ 24.66 hrs
Average Depth at Peak Storage= 0.15' , Surface Width= 2.59'
Bank-Full Depth= 2.00' Flow Area= 12.0 sf, Capacity= 209.53 cfs

2.00' x 2.00' deep channel, n= 0.040
Side Slope Z-value= 2.0 '/' Top Width= 10.00'
Length= 238.0' Slope= 0.1954 '/'
Inlet Invert= 927.00', Outlet Invert= 880.50'

Summary for Pond 1P: HW#1A - HW#1B

Inflow Area = 1.831 ac, 0.00% Impervious, Inflow Depth = 1.87" for 25-YR event
Inflow = 3.72 cfs @ 12.11 hrs, Volume= 0.285 af
Outflow = 3.72 cfs @ 12.11 hrs, Volume= 0.285 af, Atten= 0%, Lag= 0.0 min
Primary = 3.72 cfs @ 12.11 hrs, Volume= 0.285 af
Routed to Reach 1.1R : Time Thru 2S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Peak Elev= 1,049.29' @ 12.11 hrs
Flood Elev= 1,052.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	1,048.26'	**15.0" Round Culvert** L= 41.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,048.26' / 1,046.00' S= 0.0551 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=3.70 cfs @ 12.11 hrs HW=1,049.28' TW=1,046.41' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 3.70 cfs @ 3.44 fps)

Summary for Pond 2P: Twin 24" Culverts (HW#3A - HW#3B AND HW#4A - HW#4B)

[61] Hint: Exceeded Reach 1.2R outlet invert by 0.42' @ 12.22 hrs

Inflow Area = 15.299 ac, 0.00% Impervious, Inflow Depth = 1.50" for 25-YR event
Inflow = 18.69 cfs @ 12.22 hrs, Volume= 1.911 af
Outflow = 18.69 cfs @ 12.22 hrs, Volume= 1.911 af, Atten= 0%, Lag= 0.0 min
Primary = 18.69 cfs @ 12.22 hrs, Volume= 1.911 af
Routed to Reach 5R : Time Thru 7S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Peak Elev= 908.42' @ 12.22 hrs
Flood Elev= 910.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	907.00'	**24.0" Round Culvert X 2.00** L= 27.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 907.00' / 906.50' S= 0.0185 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=18.67 cfs @ 12.22 hrs HW=908.42' TW=906.16' (Dynamic Tailwater)
↑**1=Culvert** (Barrel Controls 18.67 cfs @ 5.50 fps)

Summary for Pond 3P: HW#5A - HW#5B

Inflow Area = 0.223 ac, 0.00% Impervious, Inflow Depth = 2.69" for 25-YR event
Inflow = 0.70 cfs @ 12.09 hrs, Volume= 0.050 af
Outflow = 0.70 cfs @ 12.09 hrs, Volume= 0.050 af, Atten= 0%, Lag= 0.0 min
Primary = 0.70 cfs @ 12.09 hrs, Volume= 0.050 af
Routed to Reach 5R : Time Thru 7S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Peak Elev= 907.42' @ 12.09 hrs
Flood Elev= 910.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	907.00'	**15.0" Round Culvert** L= 68.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 907.00' / 906.50' S= 0.0074 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=0.70 cfs @ 12.09 hrs HW=907.42' TW=905.97' (Dynamic Tailwater)
1=Culvert (Barrel Controls 0.70 cfs @ 2.88 fps)

Summary for Pond 4P: HW#10A - HW#10B

[62] Hint: Exceeded Reach 7R OUTLET depth by 1.86' @ 12.24 hrs

Inflow Area = 33.989 ac, 5.19% Impervious, Inflow Depth > 1.85" for 25-YR event
Inflow = 19.49 cfs @ 12.23 hrs, Volume= 5.251 af
Outflow = 19.49 cfs @ 12.23 hrs, Volume= 5.251 af, Atten= 0%, Lag= 0.0 min
Primary = 19.49 cfs @ 12.23 hrs, Volume= 5.251 af
Routed to Pond SF7 : PROP. SEDIMENT BASIN

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Peak Elev= 882.45' @ 12.23 hrs
Flood Elev= 884.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	880.50'	**30.0" Round Culvert** L= 47.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 880.50' / 878.00' S= 0.0532 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 4.91 sf

Primary OutFlow Max=19.46 cfs @ 12.23 hrs HW=882.45' TW=874.19' (Dynamic Tailwater)
1=Culvert (Inlet Controls 19.46 cfs @ 4.75 fps)

Summary for Pond 5P: PROP. CULVERT HW#11A / HW#11B

[62] Hint: Exceeded Reach 2R OUTLET depth by 0.71' @ 13.80 hrs

Inflow Area = 40.465 ac, 6.03% Impervious, Inflow Depth > 1.88" for 25-YR event
Inflow = 4.82 cfs @ 13.79 hrs, Volume= 6.354 af
Outflow = 4.82 cfs @ 13.79 hrs, Volume= 6.354 af, Atten= 0%, Lag= 0.0 min
Primary = 4.82 cfs @ 13.79 hrs, Volume= 6.354 af
Routed to Pond SF8 : PERIOD 8 FINAL POND

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Peak Elev= 852.29' @ 13.79 hrs
Flood Elev= 854.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	851.00'	**15.0" Round Culvert** L= 41.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 851.00' / 848.00' S= 0.0732 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=4.82 cfs @ 13.79 hrs HW=852.29' TW=844.68' (Dynamic Tailwater)
1=Culvert (Inlet Controls 4.82 cfs @ 3.93 fps)

Summary for Pond 10P: HW#2A - HW#2B

[57] Hint: Peaked at 991.46' (Flood elevation advised)

Inflow Area = 4.365 ac, 0.00% Impervious, Inflow Depth = 1.64" for 25-YR event
Inflow = 6.14 cfs @ 12.21 hrs, Volume= 0.597 af
Outflow = 6.14 cfs @ 12.21 hrs, Volume= 0.597 af, Atten= 0%, Lag= 0.0 min
Primary = 6.14 cfs @ 12.21 hrs, Volume= 0.597 af
Routed to Reach 1R : Time Thru 2S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Peak Elev= 991.46' @ 12.21 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	989.75'	**15.0" Round Culvert** L= 26.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 989.75' / 988.00' S= 0.0673 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=6.13 cfs @ 12.21 hrs HW=991.45' TW=987.51' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 6.13 cfs @ 4.99 fps)

Summary for Pond SF5: PROP. SEDIMENT BASIN

Inflow Area = 11.785 ac, 9.83% Impervious, Inflow Depth = 2.52" for 25-YR event
Inflow = 18.88 cfs @ 12.46 hrs, Volume= 2.474 af
Outflow = 2.04 cfs @ 14.91 hrs, Volume= 2.465 af, Atten= 89%, Lag= 146.6 min
Primary = 2.04 cfs @ 14.91 hrs, Volume= 2.465 af
Routed to Reach 6R : Time Thru 6S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Peak Elev= 1,092.92' @ 14.91 hrs Surf.Area= 15,438 sf Storage= 58,141 cf
Flood Elev= 1,096.00' Surf.Area= 20,888 sf Storage= 113,862 cf

Plug-Flow detention time= 361.0 min calculated for 2.464 af (100% of inflow)
Center-of-Mass det. time= 359.4 min (1,216.6 - 857.3)

Volume	Invert	Avail.Storage	Storage Description
#1	1,088.00'	113,862 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,088.00	8,550	420.0	0	0	8,550
1,090.00	11,100	480.0	19,595	19,595	12,940
1,092.00	14,000	540.0	25,044	44,639	17,916
1,094.00	17,225	600.0	31,169	75,808	23,477
1,096.00	20,888	665.0	38,054	113,862	30,142

Device	Routing	Invert	Outlet Devices
#1	Primary	1,088.00'	**12.0" Round Culvert** L= 57.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,088.00' / 1,087.40' S= 0.0105 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	1,088.00'	**6.0" Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	1,094.25'	**48.0" x 48.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.04 cfs @ 14.91 hrs HW=1,092.92' TW=1,086.81' (Dynamic Tailwater)
└─**1=Culvert** (Passes 2.04 cfs of 7.39 cfs potential flow)
  ├─**2=Orifice** (Orifice Controls 2.04 cfs @ 10.40 fps)
  └─**3=Grate** (Controls 0.00 cfs)

Summary for Pond SF6: PROP. SEDIMENT BASIN

Inflow Area = 18.467 ac, 9.55% Impervious, Inflow Depth > 2.39" for 25-YR event
Inflow = 14.56 cfs @ 12.18 hrs, Volume= 3.681 af
Outflow = 1.40 cfs @ 24.65 hrs, Volume= 3.291 af, Atten= 90%, Lag= 748.5 min
Primary = 1.40 cfs @ 24.65 hrs, Volume= 3.291 af
Routed to Reach 7R : Time Thru 2S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Peak Elev= 950.45' @ 24.65 hrs Surf.Area= 36,760 sf Storage= 81,092 cf
Flood Elev= 952.00' Surf.Area= 41,570 sf Storage= 141,921 cf

Plug-Flow detention time= 696.7 min calculated for 3.290 af (89% of inflow)
Center-of-Mass det. time= 617.8 min (1,715.6 - 1,097.8)

Volume	Invert	Avail.Storage	Storage Description
#1	948.00'	141,921 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
948.00	29,650	1,225.0	0	0	29,650
950.00	35,434	1,285.0	64,998	64,998	41,894
952.00	41,570	1,345.0	76,922	141,921	54,724

Device	Routing	Invert	Outlet Devices
#1	Primary	948.00'	**12.0" Round Culvert** L= 118.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 948.00' / 928.00' S= 0.1695 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	948.00'	**6.0" Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	951.10'	**48.0" x 48.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.40 cfs @ 24.65 hrs HW=950.45' TW=927.15' (Dynamic Tailwater)
└─**1=Culvert** (Passes 1.40 cfs of 5.28 cfs potential flow)
  ├─**2=Orifice** (Orifice Controls 1.40 cfs @ 7.14 fps)
  └─**3=Grate** (Controls 0.00 cfs)

Summary for Pond SF7: PROP. SEDIMENT BASIN

Inflow Area = 40.465 ac, 6.03% Impervious, Inflow Depth > 1.92" for 25-YR event
Inflow = 30.13 cfs @ 12.15 hrs, Volume= 6.474 af
Outflow = 4.82 cfs @ 13.78 hrs, Volume= 6.355 af, Atten= 84%, Lag= 97.7 min
Primary = 4.82 cfs @ 13.78 hrs, Volume= 6.355 af
Routed to Reach 2R : Time Thru 8S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Peak Elev= 875.78' @ 13.78 hrs Surf.Area= 20,137 sf Storage= 60,390 cf
Flood Elev= 880.00' Surf.Area= 29,910 sf Storage= 165,729 cf

Plug-Flow detention time= 149.4 min calculated for 6.355 af (98% of inflow)
Center-of-Mass det. time= 121.3 min (1,417.9 - 1,296.5)

Volume	Invert	Avail.Storage	Storage Description
#1	872.00'	165,729 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
872.00	12,025	790.0	0	0	12,025
874.00	16,165	870.0	28,088	28,088	22,722
876.00	20,650	930.0	36,724	64,812	31,503
878.00	25,250	980.0	45,823	110,635	39,339
880.00	29,910	1,035.0	55,094	165,729	48,386

Device	Routing	Invert	Outlet Devices
#1	Primary	872.00'	**12.0" Round Culvert** L= 157.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 872.00' / 865.00' S= 0.0446 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	872.00'	**10.0" Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	877.15'	**48.0" x 48.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=4.82 cfs @ 13.78 hrs HW=875.78' TW=864.58' (Dynamic Tailwater)
↑└─**1=Culvert** (Passes 4.82 cfs of 6.85 cfs potential flow)
↑ ├─**2=Orifice** (Orifice Controls 4.82 cfs @ 8.83 fps)
└─**3=Grate** (Controls 0.00 cfs)

Summary for Pond SF8: PERIOD 8 FINAL POND

Inflow Area = 46.720 ac, 5.22% Impervious, Inflow Depth > 1.87" for 25-YR event
Inflow = 15.02 cfs @ 12.10 hrs, Volume= 7.286 af
Outflow = 0.40 cfs @ 48.00 hrs, Volume= 1.009 af, Atten= 97%, Lag= 2,154.0 min
Discarded = 0.40 cfs @ 48.00 hrs, Volume= 1.009 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link A : POA

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs

Peak Elev= 851.68' @ 48.00 hrs Surf.Area= 41,346 sf Storage= 273,414 cf
Flood Elev= 856.00' Surf.Area= 161,730 sf Storage= 580,012 cf

Plug-Flow detention time= 1,156.1 min calculated for 1.009 af (14% of inflow)
Center-of-Mass det. time= 555.3 min (1,902.2 - 1,346.9)

Volume	Invert	Avail.Storage	Storage Description
#1	842.00'	580,012 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
842.00	16,810	570.0	0	0	16,810
844.00	21,415	645.0	38,132	38,132	24,163
846.00	26,000	705.0	47,341	85,473	30,748
848.00	30,516	775.0	56,456	141,929	39,124
850.00	36,160	852.0	66,596	208,525	49,226
852.00	42,390	922.0	78,468	286,993	59,265
854.00	49,835	1,060.0	92,125	379,117	81,121
856.00	161,730	1,805.0	200,894	580,012	250,997

Device	Routing	Invert	Outlet Devices
#1	Discarded	842.00'	**0.300 in/hr Exfiltration over Wetted area** Phase-In= 0.01'
#2	Primary	855.50'	**30.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Discarded OutFlow Max=0.40 cfs @ 48.00 hrs HW=851.68' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.40 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=842.00' TW=0.00' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Link A: POA

Inflow Area = 61.959 ac, 5.28% Impervious, Inflow Depth = 0.52" for 25-YR event
Inflow = 13.39 cfs @ 12.94 hrs, Volume= 2.669 af
Primary = 13.39 cfs @ 12.94 hrs, Volume= 2.669 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs

Summary for Link B: POA

Inflow Area = 99.581 ac, 1.24% Impervious, Inflow Depth = 1.79" for 25-YR event
Inflow = 76.24 cfs @ 12.88 hrs, Volume= 14.847 af
Primary = 76.24 cfs @ 12.88 hrs, Volume= 14.847 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs

9. RIP RAP APRON CALCULATIONS

GRANITE ENGINEERING, LLC
civil engineering ● land planning ● municipal services

RIP RAP OUTLET PROTECTION APRON CALCULATIONS

Project:	Gordon - Keene Pit	Date:	4/23/2025
Location:	HW#1B (1P)	Job No.:	2302011

INPUTS

Q	**3.72**	cfs	peak flow in the 25-year 24-hr storm event
Tw	**0.39**	ft	tailwater at the end of apron
d_o	**1.25**	ft	diameter in feet of outlet

OUTPUTS

D_{50}	**2.84**	in	median stone size (in)
Common D_{50}	**4.00**	in	median stone size (in)
Riprap Depth	**10**	in	(min.10 inches)
$L_{1\ OR\ 2}$	**12**	ft	L1 and L2 differ depending if TW is > or < D0/2
W_1	**16**	ft	
W_2	**4**	ft	

Equations

$$\mathbf{D_{50}} = \frac{C}{Tw}\left[\frac{Q}{d_o}\right]^{4/3}$$

$\mathbf{D_{50}}$	median stone size (ft)
Q	design discharge (cfs)
Tw	tailwater depth above the invert of the culvert (ft)
d_o	pipe diameter (ft)

150 Dow Street, Tower 2, Suite 421, Manchester, New Hampshire 03101
Jeffrey Merritt, P.E. (603) 715-7779 Brenton Cole, P.E. (603) 657-8388

GRANITE ENGINEERING, LLC
civil engineering ● land planning ● municipal services

RIP RAP OUTLET PROTECTION APRON CALCULATIONS

Project:	Gordon - Keene Pit	Date:	4/23/2025
Location:	HW#2B (10P)	Job No.:	2302011

INPUTS

Q	**6.13**	cfs	peak flow in the 25-year 24-hr storm event
Tw	**0.5**	ft	tailwater at the end of apron
d_o	**1.25**	ft	diameter in feet of outlet

OUTPUTS

	D_{50}	**4.31**	in	median stone size (in)
Common	D_{50}	**6.00**	in	median stone size (in)
Riprap Depth		**15**	in	(min.10 inches)
	$L_{1\ OR\ 2}$	**15**	ft	L1 and L2 differ depending if TW is > or < D0/2
	W_1	**18**	ft	
	W_2	**4**	ft	

Equations

$$\mathbf{D_{50}} = \frac{C}{Tw}\left[\frac{Q}{d_o}\right]^{4/3}$$

$\mathbf{D_{50}}$	median stone size (ft)
Q	design discharge (cfs)
Tw	tailwater depth above the invert of the culvert (ft)
d_o	pipe diameter (ft)

150 Dow Street, Tower 2, Suite 421, Manchester, New Hampshire 03101
Jeffrey Merritt, P.E. (603) 715-7779 Brenton Cole, P.E. (603) 657-8388

GRANITE ENGINEERING, LLC
civil engineering ● land planning ● municipal services

RIP RAP OUTLET PROTECTION APRON CALCULATIONS

Project:	Gordon - Keene Pit	Date:	4/23/2025
Location:	HW#3B & HW#4B (2P)	Job No.:	2302011

INPUTS

Q	**18.67**	cfs	peak flow in the 25-year 24-hr storm event
Tw	**0.51**	ft	tailwater at the end of apron
d_o	**2**	ft	diameter in feet of outlet

OUTPUTS

	D_{50}	**11.65**	in	median stone size (in)
Common	D_{50}	**12.00**	in	median stone size (in)
Riprap Depth		**30**	in	(min.10 inches)
	$L_{1\ OR\ 2}$	**25**	ft	L1 and L2 differ depending if TW is > or < D0/2
	W_1	**31**	ft	
	W_2	**6**	ft	

Equations

$$D_{50} = \frac{C}{Tw}\left[\frac{Q}{d_o}\right]^{4/3}$$

D_{50}	median stone size (ft)
Q	design discharge (cfs)
Tw	tailwater depth above the invert of the culvert (ft)
d_o	pipe diameter (ft)

150 Dow Street, Tower 2, Suite 421, Manchester, New Hampshire 03101
Jeffrey Merritt, P.E. (603) 715-7779 Brenton Cole, P.E. (603) 657-8388

GRANITE ENGINEERING, LLC
civil engineering ● land planning ● municipal services

RIP RAP OUTLET PROTECTION APRON CALCULATIONS

Project:	Gordon - Keene Pit	Date:	4/23/2025
Location:	HW#5B (3P)	Job No.:	2302011

INPUTS

Q	**0.7**	cfs	peak flow in the 25-year 24-hr storm event
Tw	**0.39**	ft	tailwater at the end of apron
d_o	**1.25**	ft	diameter in feet of outlet

OUTPUTS

	D_{50}	**0.31**	in	median stone size (in)
Common	D_{50}	**4.00**	in	median stone size (in)
Riprap Depth		**10**	in	(min.10 inches)
	$L_{1 \text{ OR } 2}$	**9**	ft	L1 and L2 differ depending if TW is > or < D0/2
	W_1	**13**	ft	
	W_2	**4**	ft	

Equations

$$\mathbf{D_{50}} = \frac{C}{Tw}\left[\frac{Q}{d_o}\right]^{4/3}$$

$\mathbf{D_{50}}$	median stone size (ft)
Q	design discharge (cfs)
Tw	tailwater depth above the invert of the culvert (ft)
d_o	pipe diameter (ft)

150 Dow Street, Tower 2, Suite 421, Manchester, New Hampshire 03101
Jeffrey Merritt, P.E. (603) 715-7779 Brenton Cole, P.E. (603) 657-8388

GRANITE ENGINEERING, LLC
civil engineering ● land planning ● municipal services

RIP RAP OUTLET PROTECTION APRON CALCULATIONS

Project:	Gordon - Keene Pit	Date:	4/23/2025
Location:	HW#6B (SF5)	Job No.:	2302011

INPUTS

Q	**2.04**	cfs	peak flow in the 25-year 24-hr storm event
Tw	**0.41**	ft	tailwater at the end of apron
d_o	**1.0**	ft	diameter in feet of outlet

OUTPUTS

D_{50}	**1.51**	in	median stone size (in)
Common D_{50}	**4.00**	in	median stone size (in)
Riprap Depth	**10**	in	(min.10 inches)
$L_{1\ OR\ 2}$	**9**	ft	L1 and L2 differ depending if TW is > or < D0/2
W_1	**12**	ft	
W_2	**3**	ft	

Equations

$$\mathbf{D_{50}} = \frac{C}{Tw}\left[\frac{Q}{d_o}\right]^{4/3}$$

$\mathbf{D_{50}}$	median stone size (ft)
Q	design discharge (cfs)
Tw	tailwater depth above the invert of the culvert (ft)
d_o	pipe diameter (ft)

150 Dow Street, Tower 2, Suite 421, Manchester, New Hampshire 03101
Jeffrey Merritt, P.E. (603) 715-7779 Brenton Cole, P.E. (603) 657-8388

GRANITE ENGINEERING, LLC
civil engineering ● land planning ● municipal services

RIP RAP OUTLET PROTECTION APRON CALCULATIONS

Project:	Gordon - Keene Pit	Date:	4/23/2025
Location:	HW#7B (SF6)	Job No.:	2302011

INPUTS

Q	**1.4**	cfs	peak flow in the 25-year 24-hr storm event
Tw	**0.15**	ft	tailwater at the end of apron
d_o	**1.0**	ft	diameter in feet of outlet

OUTPUTS

D_{50}	**2.51**	in	median stone size (in)
Common D_{50}	**4.00**	in	median stone size (in)
Riprap Depth	**10**	in	(min.10 inches)
$L_{1 \text{ OR } 2}$	**9**	ft	L1 and L2 differ depending if TW is > or < D0/2
W_1	**12**	ft	
W_2	**3**	ft	

Equations

$$D_{50} = \frac{C}{Tw}\left[\frac{Q}{d_o}\right]^{4/3}$$

D_{50}	median stone size (ft)
Q	design discharge (cfs)
Tw	tailwater depth above the invert of the culvert (ft)
d_o	pipe diameter (ft)

150 Dow Street, Tower 2, Suite 421, Manchester, New Hampshire 03101
Jeffrey Merritt, P.E. (603) 715-7779 Brenton Cole, P.E. (603) 657-8388

GRANITE ENGINEERING, LLC
civil engineering ● land planning ● municipal services

RIP RAP OUTLET PROTECTION APRON CALCULATIONS

Project:	Gordon - Keene Pit	Date:	4/23/2025
Location:	HW#8B (SF7)	Job No.:	2302011

INPUTS

Q	**4.82**	cfs	peak flow in the 25-year 24-hr storm event
Tw	**0.57**	ft	tailwater at the end of apron
d_o	**1.0**	ft	diameter in feet of outlet

OUTPUTS

D_{50}	**3.43**	in	median stone size (in)
Common D_{50}	**4.00**	in	median stone size (in)
Riprap Depth	**10**	in	(min.10 inches)
$L_{1\ OR\ 2}$	**17**	ft	L1 and L2 differ depending if TW is > or < D0/2
W_1	**10**	ft	
W_2	**3**	ft	

Equations

$$\mathbf{D_{50}} = \frac{C}{Tw}\left[\frac{Q}{d_o}\right]^{4/3}$$

$\mathbf{D_{50}}$	median stone size (ft)
Q	design discharge (cfs)
Tw	tailwater depth above the invert of the culvert (ft)
d_o	pipe diameter (ft)

150 Dow Street, Tower 2, Suite 421, Manchester, New Hampshire 03101
Jeffrey Merritt, P.E. (603) 715-7779 Brenton Cole, P.E. (603) 657-8388

GRANITE ENGINEERING, LLC
civil engineering ● land planning ● municipal services

RIP RAP OUTLET PROTECTION APRON CALCULATIONS

Project:	Gordon - Keene Pit	Date:	4/23/2025
Location:	HW#10B (5P)	Job No.:	2302011

INPUTS

Q	**4.82**	cfs	peak flow in the 25-year 24-hr storm event
Tw	**0.78**	ft	tailwater at the end of apron
d_o	**1.25**	ft	diameter in feet of outlet

OUTPUTS

	D_{50}	**2.00**	in	median stone size (in)
Common	D_{50}	**4.00**	in	median stone size (in)
Riprap Depth		**10**	in	(min.10 inches)
	$L_{1 \text{ OR } 2}$	**16**	ft	L1 and L2 differ depending if TW is > or < D0/2
	W_1	**10**	ft	
	W_2	**4**	ft	

Equations

$$\mathbf{D_{50}} = \frac{C}{Tw}\left[\frac{Q}{d_o}\right]^{4/3}$$

$\mathbf{D_{50}}$	median stone size (ft)
Q	design discharge (cfs)
Tw	tailwater depth above the invert of the culvert (ft)
d_o	pipe diameter (ft)

150 Dow Street, Tower 2, Suite 421, Manchester, New Hampshire 03101
Jeffrey Merritt, P.E. (603) 715-7779 Brenton Cole, P.E. (603) 657-8388

GRANITE ENGINEERING, LLC
civil engineering ● land planning ● municipal services

RIP RAP OUTLET PROTECTION APRON CALCULATIONS

Project:	Gordon - Keene Pit	Date:	4/23/2025
Location:	HW#11B (4P - Final)	Job No.:	2302011

INPUTS

Q	**2.21**	cfs	peak flow in the 25-year 24-hr storm event
Tw	**1.07**	ft	tailwater at the end of apron
d_o	**1.25**	ft	diameter in feet of outlet

OUTPUTS

D_{50}	**0.52**	in	median stone size (in)
Common D_{50}	**4.00**	in	median stone size (in)
Riprap Depth	**10**	in	(min.10 inches)
$L_{1 \text{ OR } 2}$	**12**	ft	L1 and L2 differ depending if TW is > or < D0/2
W_1	**9**	ft	
W_2	**4**	ft	

Equations

$$D_{50} = \frac{C}{Tw}\left[\frac{Q}{d_o}\right]^{4/3}$$

D_{50}	median stone size (ft)
Q	design discharge (cfs)
Tw	tailwater depth above the invert of the culvert (ft)
d_o	pipe diameter (ft)

150 Dow Street, Tower 2, Suite 421, Manchester, New Hampshire 03101
Jeffrey Merritt, P.E. (603) 715-7779 Brenton Cole, P.E. (603) 657-8388

10. SITE SPECIFIC SOIL REPORT

Hurley Environmental
AND LAND PLANNING, LLC

SITE-SPECIFIC SOIL SURVEY REPORT
For
21 Route 9 Keene

1. MAPPING STANDARDS

Site-Specific Soil Mapping Standards for New Hampshire and Vermont. SSSNNE Special Publication No. 3, Version 7.0, July 2021. This map product is within the technical standards of the National Cooperative Soil Survey. It is a special product, intended for the submission to NH DES Alteration of Terrain. It was produced by a professional soil scientist and is not a product of the USDA Natural Resource Conservation Service.

Hydrologic Soil Group was determined using SSSNNE Special Publication No. 5.
Scale of soil map:
Approximately 1" equals 100'
Contours:
Intervals of 2 feet

2. DATE SOIL MAP PRODUCED

Date(s) of on-site field work: 7/15/24
Date(s) of test pits: 7/15/24
Test pits recorded by: Luke Hurley, CSS #095

3. GEOGRAPHIC LOCATION AND SIZE OF SITE

City or town where soil mapping was conducted: Keene/Sulivan
Location: Gordon Gravel Pit, 21 Route 9, Keene, Map 215, Lots7 & 8/Sullivan Map 5, Lots 46 & 46-1
Size of area: approximately 25 acres
Was the map for the entire lot? No
The area where the map was created for the proposed area of cut slope as part of the gravel pit expansion to tie into the slopes of the site. Thes mapped area has had some historical logging but is mostly forested with steep rock exposed slopes.

4. PURPOSE OF THE SOIL MAP

Was the map prepared to meet the requirement of Alteration of Terrain? No
If no, what was the purpose of the map? Town of Keene
Who was the map prepared for? Granite Engineering, Inc.

5. SOIL IDENTIFICATION LEGEND

SSSM SYM.	SSS MAP NAME	HISS SYM.	HYDROLOGIC SOIL GRP.
168	Sunapee	321	B
61	Tunbridge Lyman Rock Outcrop	224/227	C
92	Lyman	224	D

SLOPE PHASE:
0-8% B 8-15% C 15-25% D 25%+ E

168 Sunapee 321 B
The Sunapee series consists of very deep, moderately well drained soils formed in loamy melt-out till on hills and mountains in glaciated uplands. Estimated saturated hydraulic conductivity is moderately high or high in the mineral solum and moderately high to very high in the substratum. Slope ranges from 0 to 60 percent. These soils have an ESHWT between 15-40 inches and have no significant ledge within the profile of 40". Thes soils are found in the lower area adjacent to the current access road in an isolated area within the mapped portion, but extend outside of it and are also found in the higher upper flat areas of the mapped portion.
Typical Profile
0-12" Fill Log Landing
12-16" 10YR3/2, FSL, GR, FR
16-36" 2.5Y5/3, FSL, GR, FR Redox 15% @ 20"
36-70" 2.5Y5/4, S, GR, FR Redox 15%
ESHWT 20"
Observed Water None
Refusal None

61 Tunbridge Lyman Rock Outcrop 224/227 C
This series is the dominant series in the mapped area. These soils overlap in such a frequency that they can not be separated out into individual series. The soils are located along the steep exposed rock slopes, as well as some of the upper flat areas. Some portions of this mapped unit have limited soil on top to a depth of approximately 20 inches.

The Tunbridge series consists of moderately deep, well drained soils on glaciated uplands. They formed in loamy supraglacial till. Saturated hydraulic conductivity is moderately high or high throughout the mineral soil. Slope ranges from 0 to 80 percent. These soils have no ESHWT within 40 inches and have ledge between 20-40 inches.

The Lyman series consists of shallow, somewhat excessively drained soils on glaciated uplands. They formed in loamy supraglacial till. Estimated saturated hydraulic conductivity is moderately high or high throughout the mineral soil. Slope ranges from 0 to 80 percent. This series has shallow to exposed ledge less than 20 inches from the surface.

92 Lyman 224 D
The Lyman series consists of shallow, somewhat excessively drained soils on glaciated uplands. They formed in loamy supraglacial till. Estimated saturated hydraulic conductivity is moderately high or high throughout the mineral soil. Slope ranges from 0 to 80 percent.

6. RESPONSIBLE SOIL SCIENTIST
Name: Luke Hurley
Certified Soil Scientist Number: CSS #095

MAP 5 LOT 41-2
ELIZABETH NEWCOMBE
1 MILL POND ROAD
NELSON, NH 03457

MAP 215 LOT 8
G2 HOLDINGS, LLC
250 NORTH STREET
JAFFREY, NH 03452

KEENE

SULLIVAN

TEST PIT 1

TEST PIT 2

TEST PIT 3

TEST PIT 4

150' (TYP.)

75' (TYP.)

7. OTHER DISTINGUISHING FEATURES OF SITE
Is the site in a natural condition? The current mapping portion, yes.

8. Inclusions
No Inclusions were mapped.

Test Pits:
TP1
0-6” 10YR3/2, FSL, GR, FR
6-14” 10YR3/2, FSL, GR, FR
ESHWT None
Observed Water None
Refusal Ledge @14”

TP2
0-12” Fill, Old Log Landing
12-16” 10YR3/2, FSL, GR, FR
16-36” 2.5Y5/3, FSL, GR, FR Redox 15% @ 20”
36-70” 2.5Y5/4, S, GR, FR Redox 15%
ESHWT 20”
Observed Water None
Refusal None

TP3
0-6” 10YR3/2, FSL, GR, FR
6-14” 10YR4/4, FSL, GR, FR
14-36” 2.5Y5/4, S, GR, FR
ESHWT None
Observed Water None
Refusal 36”

TP4
0-8” 10YR3/2, FSL, GR, FR
8-18” 10YR4/3, FSL, GR, FR
18-32” 7.5YR5/4, S, GR, FR
32-44” 2.5Y4/4, S, GR, FR Redox 15%
44-70” 2.5Y5/4, S, GR, FR Redox 15%
ESHWT 32”
Observed Water None
Refusal 70”

TP5
Ledge @ 6”

11. OPERATIONS & MAINTENANCE MANUAL

Stormwater Management
Operation and Maintenance (O&M) Manual

for:

GORDON SERVICES - KEENE

Located at:

Keene: Map 215; Lots 7 & 8
Sullivan: Map 5; Lots 46 & 46-1
57 Route 9
Keene & Sullivan, New Hampshire

Prepared for:

G2 HOLDINGS, LLC
250 NORTH STREET
JAFFREY, NH 03452

Prepared by:

GRANITE ENGINEERING, LLC
150 DOW STREET, TOWER 2, SUITE 421
MANCHESTER, NH 03101
603.518.8030 | www.GraniteEng.com

Stormwater Management
Operation and Maintenance (O&M) Manual

Table of Contents

Stormwater Management
Operation and Maintenance (O&M) Manual

I. Compliance with Stormwater Facility Maintenance Requirements

The owner of the subject property is responsible for ensuring that stormwater facilities installed on the property are properly maintained and that they function as designed. In some cases, this maintenance responsibility may be assigned to others through special agreements. Any transfer of responsibility for inspection and maintenance activities or transfer of ownership shall be documented in writing. The contract documents will require the contractor to designate a person responsible for maintenance of the sedimentation control features during construction. Long-term operation and maintenance for the stormwater management facilities are presented below.

II. Inspection & Maintenance – Annual Reporting

Requirements for the inspection and maintenance of stormwater facilities, as well as reporting requirements, are included in this Stormwater Management Operation and Maintenance (O&M) Manual.

Verification that the Stormwater facilities have been properly inspected and maintained; copies of the annual report should be documented on site for future reporting upon request.

Copies of the Inspection and Maintenance forms for each of the stormwater facilities are located in Appendix B and C. A standard annual reporting form is provided in Appendix A.

III. Preventative Measures to Reduce Maintenance Costs

The most effective way to maintain your water quality facility is to prevent the pollutants from entering the facility in the first place. Common pollutants include sediment, trash & debris, chemicals, dog wastes, runoff from stored materials, illicit discharges into the storm drainage system and many others. A thoughtful maintenance program will include measures to address these potential contaminants and will save money and time in the long run. Key points to consider in your maintenance program include:

- Educate property owners/residents to be aware of how their actions affect water quality, and how they can help reduce maintenance costs
- Keep properties, streets and gutters, and parking lots free of trash, debris, and lawn clippings
- Ensure the proper disposal of hazardous wastes and chemicals
- Plan lawn care to minimize the use of chemicals and pesticides
- Sweep paved surfaces and put the sweepings back on the lawn
- Be aware of automobiles leaking fluids. Use absorbents such as cat litter to soak up drippings – dispose of properly
- Re-vegetate disturbed and bare areas to maintain vegetative stabilization.
- Clean out the upstream components of the storm drainage system, including inlets, storm sewers, and outfalls
- Do not store materials outdoors (including landscaping materials) unless properly protected from runoff

IV. Access

All stormwater management facilities located on the site have a designated access location. Refer to the Stormwater Plan located in Appendix E for access locations.

V. Safety

Keep safety considerations at the forefront of inspection procedures at all times. Likely hazards should be anticipated and avoided. Never enter 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.

If a toxic or flammable substance is discovered, leave the immediate area and contact the local authority at 911.

Potentially dangerous (e.g., fuel, chemicals, hazardous materials) substances found in the areas must be referred to the local authority immediately for response. The emergency contact number is 911.

Vertical drops may be encountered in areas located within and around the facility. Avoid walking on top of retaining walls or other structures that have a significant vertical drop. If a vertical drop is identified within the pond that is greater than 48” in height, make the appropriate note/comment on the maintenance inspection form.

If any hazard is found within the facility area that poses an immediate threat to public safety, contact the local authority immediately.

VI. Field Inspection Equipment

It is imperative that the appropriate equipment is taken to the field with the inspector(s). This is to ensure the safety of the inspector and allow the inspections to be performed as efficiently as possible. Below is a list of the equipment that may be necessary to perform the inspections of all Stormwater Management Facilities:

- Protective clothing and boots
- Safety equipment (vest, hard hat, confined space entry equipment
- Communication equipment
- Operation and Maintenance Manual for the site including stormwater management facility location maps
- Clipboard
- Stormwater Facility Maintenance Inspection Forms (See Appendix B)
- Manhole Lid Remover
- Shovel
- Camera or phone camera

Some of the items identified above need not be carried by the inspector (manhole lid remover, shovel, and confined space entry equipment). However, this equipment should be available in the vehicle driven to the site.

VII. Inspecting Stormwater Management Facilities

The quality of stormwater relies heavily on the proper operation and maintenance of permanent best management practices. Stormwater management facilities must be periodically inspected to ensure that they function as designed. The inspection will determine the appropriate maintenance that is required for the facility.

A. Inspection Procedures

All stormwater management facilities are required to be inspected by a qualified individual. Inspections should follow the inspection guidance found in Appendix B of this manual.

B. Inspection Report

The person(s) conducting the inspection activities shall complete the appropriate inspection report for the specific facility. Inspection reports are located in Appendix B.

A record of inspection and maintenance activities shall be recorded on the Inspection and Maintenance Lot presented below. Photographs of each practice that is subject to the I&M requirement should be taken at each inspection of that practice. Records of Inspection forms, photos and Inspection Maintenance Logs shall be made available to DES and the Town of Bethlehem upon request.

VIII. Maintenance Requirements

Stormwater management facilities must be properly maintained to ensure that they operate correctly and provide the water quality treatment for which they were designed. Routine maintenance performed on a frequently scheduled basis can help avoid more costly rehabilitative maintenance that results when facilities are not adequately maintained.

The Long-Term Inspection and Maintenance Log provides a record of maintenance activities. Maintenance Logs for each facility type are provided in Appendix C.

Infiltration Systems

- Systems should be inspected at least twice annually, and following any rainfall event exceeding 2.5 inches in a 24 hour period, with maintenance or rehabilitation conducted as warranted by such inspection.
- Pretreatment measures should be inspected at least twice annually, and cleaned of accumulated sediment as warranted by inspection, but no less than once annually.

- Trash and debris should be removed at each inspection.
- Remove accumulated sediment based on inspection.
- Periodically mow the embankments and remove woody vegetation.
- Inspect and repair embankments and spillways based on inspection.
- At least once annually, system should be inspected for drawdown time. If bioretention system does not drain within 72-hours following a rainfall event, then a qualified professional should assess the condition of the facility to determine measures required to restore filtration function, including but not limited to removal of accumulated sediments or reconstruction of filter.

Sedimentation Basins

- The bottoms, interior and exterior side slopes, and crests of earthen detention basins should be mowed, and the vegetation maintained in healthy conditions, as appropriate to the function of the facility and type of vegetation.
- Vegetated embankments that serve as “berms” or “dams” that impound water should be mowed at least once annually to prevent the establishment of woody vegetation.
- Embankments should be inspected at least annually by a qualified professional for settlements, erosion, seepage, animal burrows, woody vegetation, and other conditions that could degrade the embankment and reduce its stability for impounding water. Immediate corrective action should be implemented if any such conditions are found.
- Inlet and outlet pipes, inlet and outlet structures, energy dissipation structures or practices, and other structural appurtenances should be inspected at least annually by a qualified professional, and corrective action implemented (e.g., maintenance, repairs, or replacement) as indicated by such inspection.
- Trash and debris should be removed from the basin and any inlet or outlet structures whenever observed by inspection.
- Accumulated sediment should be removed when it significantly affects basin capacity.

Level Spreaders

- Inspect at least once annually for accumulation of sediment and debris and for signs of erosion within approach channel, spreader channel, or down-slope of the spreader.
- Remove debris whenever observed during inspection.
- Remove sediment when accumulation exceeds 25% of level spreader channel depth.
- Mow as required by landscaping design. At a minimum, mow annually to control woody vegetation within the spreader.
- Snow should not be stored within or down-slope of the level spreader or its approach channel.
- Repair any erosion and re-grade or replace stone berm material, as warranted by inspection.
- Reconstruct the spreader if down-slope channelization indicates that the spreader is not level or that discharge has become concentrated, and corrections cannot be made through minor re-grading.

IX. Control of Invasive Species

During maintenance activities, check for the presence of invasive plants and remove in a safe manner as described on the following pages. They should be controlled as described in Appendix D.

Invasive plants are introduced, alien, or non-native plants, which have been moved by people from their native habitat to a new area. Some exotic plants are imported for human use such as landscaping, erosion control, or food crops. They also can arrive as "hitchhikers" among shipments of other plants, seeds, packing materials, or fresh produce. Some exotic plants become invasive and cause harm by:

- becoming weedy and overgrown;
- killing established shade trees;
- obstructing pipes and drainage systems;
- forming dense beds in water;
- lowering water levels in lakes, streams, and wetlands;
- destroying natural communities;
- promoting erosion on stream banks and hillsides; and
- resisting control except by hazardous chemicals.

Appendix A

Annual Inspection and Maintenance Reporting Form
for
Stormwater Facilities

Date: _____

Re: Certification of Inspection and Maintenance; Submittal of forms

Property/Subdivision Name: Gordon Services - Keene / Sullivan

Property Address: 57 Route 9, Keene

Contact Name: G2 Holdings LLC c/o Cody Gordon

I verify that the required stormwater facility inspections and required maintenance have been completed in accordance with the Operations and Maintenance Manual associated with the above-referenced property.

The required Stormwater Facility Inspection and Maintenance forms are hereby provided.

Cody Gordon

_____ _____

Name of Party Responsible for Inspection & Maintenance

G2 Holdings LLC

_____ _____

Authorized Signature

Signature

Appendix B

Birchwood Roadway Improvement

Address: Ridge Road & Cedar Drive, Bethlehem, New Hampshire

Owner: Birchwood Subdivision Homeowners' Association / Richard C. & Dina A. Southwell

Date: _____ E-mail: rcsouthwell@yahoo.com & dinasouthwell@hotmail.com
Phone: (401) 339-0907

I. GENERAL INSPECTION RESULTS					
Item	Inspection Results				BMP's in General
1	☐	Apparent problems	☐	No problems	BMP does not appear to be well maintained.
2	☐	Design flaws	☐	No flaws	BMP observed to have significant design flaws which lessen its effectiveness.
3	☐	Unauthorized modifications	☐	No modifications	BMP has unauthorized modifications that reduce its effectiveness.
4	☐	BMP removed	☐	BMP present	BMP has been destroyed or removed from property.
5	☐	Trash	☐	No Trash	Trash and debris has accumulated on/in BMP. Yard waste in BMP.
6	☐	Contaminated	☐	Uncontaminated	Evidence of Oil, gasoline. Contaminants or other pollutants.
7	☐	Smells	☐	Doesn't smell	Unpleasant odors from the BMP.
8	☐	Weeds	☐	No weeds	Invasive, nuisance vegetation or weeds are present.
II. BMP SPECIFIC INSPECTION RESULTS – Sediment Forebay					
Item	Inspection Results				BMP's in General
1	☐	Apparent problems	☐	No problems	BMP does not appear to be well maintained.
2	☐	Design flaws	☐	No flaws	BMP observed to have significant design flaws which lessen its effectiveness.
3	☐	Unauthorized modifications	☐	No modifications	BMP has unauthorized modifications that reduce its effectiveness.
4	☐	BMP removed	☐	BMP present	BMP has been destroyed or removed from property.
5	☐	Trash	☐	No Trash	Trash and debris has accumulated on/in BMP. Yard waste in BMP.

6	☐	Contaminated	☐	Uncontaminated	Evidence of Oil, gasoline. Contaminants or Animal Waste.
7	☐	Smells	☐	Doesn't smell	Unpleasant odors from the BMP.
8	☐	Weeds	☐	No weeds	Invasive, nuisance vegetation or weeds are present.
III. BMP SPECIFIC INSPECTION RESULTS – Infiltration Systems					
Item	Inspection Results				BMP's in General
1	☐	Apparent problems	☐	No problems	BMP does not appear to be well maintained.
2	☐	Design flaws	☐	No flaws	BMP observed to have significant design flaws which lessen its effectiveness.
3	☐	Unauthorized modifications	☐	No modifications	BMP has unauthorized modifications that reduce its effectiveness.
4	☐	BMP removed	☐	BMP present	BMP has been destroyed or removed from property.
5	☐	Trash	☐	No Trash	Trash and debris has accumulated on/in BMP. Yard waste in BMP.
6	☐	Contaminated	☐	Uncontaminated	Evidence of Oil, gasoline. Contaminants or Animal Waste.
7	☐	Smells	☐	Doesn't smell	Unpleasant odors from the BMP.
8	☐	Weeds	☐	No weeds	Invasive, nuisance vegetation or weeds are present.
IV. BMP SPECIFIC INSPECTION RESULTS – Level Spreader					
Item	Inspection Results				BMP's in General
1	☐	Apparent problems	☐	No problems	BMP does not appear to be well maintained.
2	☐	Design flaws	☐	No flaws	BMP observed to have significant design flaws which lessen its effectiveness.
3	☐	Unauthorized modifications	☐	No modifications	BMP has unauthorized modifications that reduce its effectiveness.
4	☐	BMP removed	☐	BMP present	BMP has been destroyed or removed from property.
5	☐	Trash	☐	No Trash	Trash and debris has accumulated on/in BMP. Yard waste in BMP.
6	☐	Contaminated	☐	Uncontaminated	Evidence of Oil, gasoline. Contaminants or Animal Waste.
7	☐	Smells	☐	Doesn't smell	Unpleasant odors from the BMP.
8	☐	Weeds	☐	No weeds	Invasive, nuisance vegetation or weeds are present.

V. BMP SPECIFIC INSPECTION RESULTS –Buffer					
Item	Inspection Results				BMP's in General
1	□	Apparent problems	□	No problems	BMP does not appear to be well maintained.
2	□	Design flaws	□	No flaws	BMP observed to have significant design flaws which lessen its effectiveness.
3	□	Unauthorized modifications	□	No modifications	BMP has unauthorized modifications that reduce its effectiveness.
4	□	BMP removed	□	BMP present	BMP has been destroyed or removed from property.
5	□	Trash	□	No Trash	Trash and debris has accumulated on/in BMP. Yard waste in BMP.
6	□	Contaminated	□	Uncontaminated	Evidence of Oil, gasoline. Contaminants or Animal Waste.
7	□	Smells	□	Doesn't smell	Unpleasant odors from the BMP.
8	□	Weeds	□	No weeds	Invasive, nuisance vegetation or weeds are present.
VI. BMP SPECIFIC INSPECTION RESULTS –Detention Basins					
Item	Inspection Results				BMP's in General
1	□	Apparent problems	□	No problems	BMP does not appear to be well maintained.
2	□	Design flaws	□	No flaws	BMP observed to have significant design flaws which lessen its effectiveness.
3	□	Unauthorized modifications	□	No modifications	BMP has unauthorized modifications that reduce its effectiveness.
4	□	BMP removed	□	BMP present	BMP has been destroyed or removed from property.
5	□	Trash	□	No Trash	Trash and debris has accumulated on/in BMP. Yard waste in BMP.
6	□	Contaminated	□	Uncontaminated	Evidence of Oil, gasoline. Contaminants or Animal Waste.
7	□	Smells	□	Doesn't smell	Unpleasant odors from the BMP.
8	□	Weeds	□	No weeds	Invasive, nuisance vegetation or weeds are present.
VII. BMP SPECIFIC INSPECTION RESULTS –Wet Pond					
Item	Inspection Results				BMP's in General
1	□	Apparent problems	□	No problems	BMP does not appear to be well maintained.
2	□	Design flaws	□	No flaws	BMP observed to have significant design flaws which lessen its effectiveness.

3	□	Unauthorized modifications	□	No modifications	BMP has unauthorized modifications that reduce its effectiveness.
4	□	BMP removed	□	BMP present	BMP has been destroyed or removed from property.
5	□	Trash	□	No Trash	Trash and debris has accumulated on/in BMP. Yard waste in BMP.
6	□	Contaminated	□	Uncontaminated	Evidence of Oil, gasoline. Contaminants or Animal Waste.
7	□	Smells	□	Doesn't smell	Unpleasant odors from the BMP.
8	□	Weeds	□	No weeds	Invasive, nuisance vegetation or weeds are present.

1. Is maintenance needed at this time? ☐ Yes ☐ No
2. Maintenance items needed/completed:

_____

_____

Appendix C

Long-Term Inspection & Maintenance Log

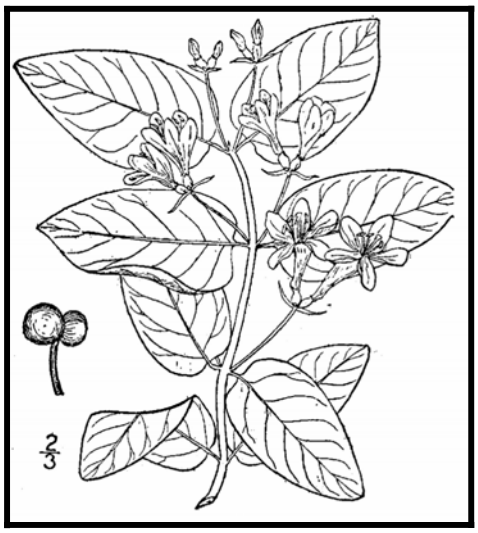
Date	Inspection (Yes or No)	Maintenance (Yes or No)	List BMPs Inspected and/or Provide Comments	Inspected By:

Appendix D

UNIVERSITY of NEW HAMPSHIRE COOPERATIVE EXTENSION

Methods for Disposing Non-Native Invasive Plants

Prepared by the Invasives Species Outreach Group, volunteers interested in helping people control invasive plants. Assistance provided by the Piscataquog Land Conservancy and the NH Invasives Species Committee. Edited by Karen Bennett, Extension Forestry Professor and Specialist.



Tatarian honeysuckle
Lonicera tatarica
USDA-NRCS PLANTS Database / Britton, N.L., and A. Brown. 1913. *An illustrated flora of the northern United States, Canada and the British Possessions*. Vol. 3: 282.

Non-native invasive plants crowd out natives in natural and managed landscapes. They cost taxpayers billions of dollars each year from lost agricultural and forest crops, decreased biodiversity, impacts to natural resources and the environment, and the cost to control and eradicate them.

Invasive plants grow well even in less than desirable conditions such as sandy soils along roadsides, shaded wooded areas, and in wetlands. In ideal conditions, they grow and spread even faster. There are many ways to remove these non-native invasives, but once removed, care is needed to dispose the removed plant material so the plants don't grow where disposed.

Knowing how a particular plant reproduces indicates its method of spread and helps determine the appropriate disposal method. Most are spread by seed and are dispersed by wind, water, animals, or people. Some reproduce by vegetative means from pieces of stems or roots forming new plants. Others spread through both seed and vegetative means.

Because movement and disposal of viable plant parts is restricted (see NH Regulations), viable invasive parts can't be brought to most transfer stations in the state. Check with your transfer station to see if there is an approved, designated area for invasives disposal. This fact sheet gives recommendations for rendering plant parts non-viable.

Control of invasives is beyond the scope of this fact sheet. For information about control visit www.nhinvasives.org or contact your UNH Cooperative Extension office.

New Hampshire Regulations

Prohibited invasive species shall only be disposed of in a manner that renders them nonliving and nonviable. (Agr. 3802.04)

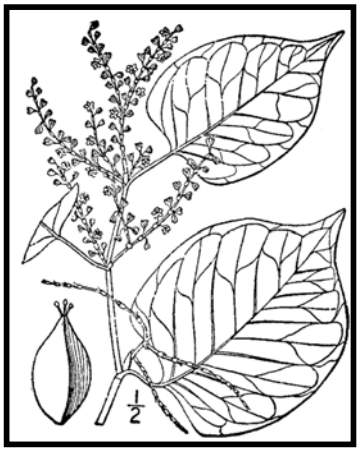
No person shall collect, transport, import, export, move, buy, sell, distribute, propagate or transplant any living and viable portion of any plant species, which includes all of their cultivars and varieties, listed in Table 3800.1 of the New Hampshire prohibited invasive species list. (Agr 3802.01)

Appendix D

How and When to Dispose of Invasives?

To prevent seed from spreading remove invasive plants before seeds are set (produced). Some plants continue to grow, flower and set seed even after pulling or cutting. Seeds can remain viable in the ground for many years. If the plant has flowers or seeds, place the flowers and seeds in a heavy plastic bag "head first" at the weeding site and transport to the disposal site. The following are general descriptions of disposal methods. See the chart for recommendations by species.

Burning: Large woody branches and trunks can be used as firewood or burned in piles. For outside burning, a written fire permit from the local forest fire warden is required unless the ground is covered in snow. Brush larger than 5 inches in diameter can't be burned. Invasive plants with easily airborne seeds like black swallow-wort with mature seed pods (indicated by their brown color) shouldn't be burned as the seeds may disperse by the hot air created by the fire.



Japanese knotweed
Polygonum cuspidatum
USDA-NRCS PLANTS Database / Britton, N.L., and A. Brown. 1913. *An illustrated flora of the northern United States, Canada and the British Possessions*. Vol. 1: 676.

Bagging (solarization): Use this technique with softer-tissue plants. Use heavy black or clear plastic bags (contractor grade), making sure that no parts of the plants poke through. Allow the bags to sit in the sun for several weeks and on dark pavement for the best effect.

Tarping and Drying: Pile material on a sheet of plastic and cover with a tarp, fastening the tarp to the ground and monitoring it for escapes. Let the material dry for several weeks, or until it is clearly nonviable.

Chipping: Use this method for woody plants that don't reproduce vegetatively.

Burying: This is risky, but can be done with watchful diligence. Lay thick plastic in a deep pit before placing the cut up plant material in the hole. Place the material away from the edge of the plastic before covering it with more heavy plastic. Eliminate as much air as possible and toss in soil to weight down the material in the pit. Note that the top of the buried material should be at least three feet underground. Japanese knotweed should be at least 5 feet underground!

Drowning: Fill a large barrel with water and place soft-tissue plants in the water. Check after a few weeks and look for rotted plant material (roots, stems, leaves, flowers). Well-rotted plant material may be composted. A word of caution- seeds may still be viable after using this method. Do this before seeds are set. This method isn't used often. Be prepared for an awful stink!

Composting: Invasive plants can take root in compost. Don't compost any invasives unless you know there is no viable (living) plant material left. Use one of the above techniques (bagging, tarping, drying, chipping, or drowning) to render the plants nonviable before composting. Closely examine the plant before composting and avoid composting seeds.

Be diligent looking for seedlings for *years* in areas where removal and disposal took place.

Appendix D
Suggested Disposal Methods for Non-Native Invasive Plants

This table provides information concerning the disposal of removed invasive plant material. If the infestation is treated with herbicide and left in place, these guidelines don't apply. Don't bring invasives to a local transfer station, unless there is a designated area for their disposal, or they have been rendered non-viable. This listing includes wetland and upland plants from the New Hampshire Prohibited Invasive Species List. The disposal of aquatic plants isn't addressed.

<table>
<tr><th>Woody Plants</th><th>Method of Reproducing</th><th>Methods of Disposal</th></tr>
<tr><td rowspan="2">Norway maple
(Acer platanoides)
European barberry
(Berberis vulgaris)
Japanese barberry
(Berberis thunbergii)
autumn olive
(Elaeagnus umbellata)
burning bush
(Euonymus alatus)
Morrow's honeysuckle
(Lonicera morrowii)
Tatarian honeysuckle
(Lonicera tatarica)
showy bush honeysuckle
(Lonicera x bella)
common buckthorn
(Rhamnus cathartica)
glossy buckthorn
(Frangula alnus)</td><td rowspan="2">Fruit and Seeds</td><td>Prior to fruit/seed ripening
Seedlings and small plants
▪ Pull or cut and leave on site with roots exposed. No special care needed.
Larger plants
▪ Use as firewood.
▪ Make a brush pile.
▪ Chip.
▪ Burn.</td></tr>
<tr><td>After fruit/seed is ripe
Don't remove from site.
▪ Burn.
▪ Make a covered brush pile.
▪ Chip once all fruit has dropped from branches.
▪ Leave resulting chips on site and monitor.</td></tr>
<tr><td rowspan="2">oriental bittersweet
(Celastrus orbiculatus)
multiflora rose
(Rosa multiflora)</td><td rowspan="2">Fruits, Seeds, Plant Fragments</td><td>Prior to fruit/seed ripening
Seedlings and small plants
▪ Pull or cut and leave on site with roots exposed. No special care needed.
Larger plants
▪ Make a brush pile.
▪ Burn.</td></tr>
<tr><td>After fruit/seed is ripe
Don't remove from site.
▪ Burn.
▪ Make a covered brush pile.
▪ Chip – only after material has fully dried (1 year) and all fruit has dropped from branches. Leave resulting chips on site and monitor.</td></tr>
</table>

Appendix D

<table>
<tr><th>Non-Woody Plants</th><th>Method of Reproducing</th><th>Methods of Disposal</th></tr>
<tr><td rowspan="2">garlic mustard
(Alliaria petiolata)
spotted knapweed
(Centaurea maculosa)
▪ Sap of related knapweed can cause skin irritation and tumors. Wear gloves when handling.
black swallow-wort
(Cynanchum nigrum)
▪ May cause skin rash. Wear gloves and long sleeves when handling.
pale swallow-wort
(Cynanchum rossicum)
giant hogweed
(Heracleum mantegazzianum)
▪ Can cause major skin rash. Wear gloves and long sleeves when handling.
dame’s rocket
(Hesperis matronalis)
perennial pepperweed
(Lepidium latifolium)
purple loosestrife
(Lythrum salicaria)
Japanese stilt grass
(Microstegium vimineum)
mile-a-minute weed
(Polygonum perfoliatum)</td><td rowspan="2">Fruits and Seeds</td><td>Prior to flowering
Depends on scale of infestation
Small infestation
▪ Pull or cut plant and leave on site with roots exposed.

Large infestation
▪ Pull or cut plant and pile. (You can pile onto or cover with plastic sheeting).
▪ Monitor. Remove any re-sprouting material.</td></tr>
<tr><td>During and following flowering
Do nothing until the following year or remove flowering heads and bag and let rot.

Small infestation
▪ Pull or cut plant and leave on site with roots exposed.

Large infestation
▪ Pull or cut plant and pile remaining material. (You can pile onto plastic or cover with plastic sheeting).
▪ Monitor. Remove any re-sprouting material.</td></tr>
<tr><td>common reed
(Phragmites australis)
Japanese knotweed
(Polygonum cuspidatum)
Bohemian knotweed
(Polygonum x bohemicum)</td><td>Fruits, Seeds, Plant Fragments
Primary means of spread in these species is by plant parts. Although all care should be given to preventing the dispersal of seed during control activities, the presence of seed doesn’t materially influence disposal activities.</td><td>Small infestation
▪ Bag all plant material and let rot.
▪ Never pile and use resulting material as compost.
▪ Burn.

Large infestation
▪ Remove material to unsuitable habitat (dry, hot and sunny or dry and shaded location) and scatter or pile.
▪ Monitor and remove any sprouting material.
▪ Pile, let dry, and burn.</td></tr>
</table>

January 2010

Appendix E

Site Deicing Data Form				
(This form shall be completed for each storm event throughout the season)				
Site:				
Date:				
Air Temperature	Pavement Temperature	Relative Humidity	Dew Point	Sky
Reason for applying:				
Site:				
Chemical:				
Application Time:				
Application Amount:				
Observation (first day):				
Observation (after event):				
Observation (before next application):				
Name:				

12. PLANS

A. PRE-DEVELOPMENT DRAINAGE AREAS PLAN (22” X 34”)

B. OVERALL INTERIM POST-DEVELOPMENT DRAINAGE AREAS PLAN (22” X 34”)

C. INTERIM DRAIN AREAS PLAN (22” X 34”)

D. OVERALL FINAL POST-DEVELOPMENT DRAINAGE AREAS PLAN (22” X 34”)

E. POST-DEVELOPMENT DRAINAGE AREAS PLANS (22” X 34”)

SITE SPECIFIC SOIL MAP UNIT KEY

SYMBOL	MAP UNIT	HYDROLOGIC SOIL GROUP
168	SUNAPEE	B
61	TUNBRIDGE LYMAN ROCK OUTCROP	C
92	LYMAN	D

SLOPE PHASE: 0–8%=B, 8–15%=C, 15–25%=D, 25%+=E

THIS MAP PRODUCT IS WITHIN THE TECHNICAL STANDARDS OF THE NATIONAL COOPERATIVE SOILS SURVEY. IT IS A SPECIAL PURPOSE PRODUCT, PRODUCED BY A CERTIFIED SOIL SCIENTIST, AND IS NOT A PRODUCT OF THE USDA NATURAL RESOURCE CONSERVATION SERVICE. THERE IS A NARRATIVE REPORT THAT ACCOMPANIES THIS MAP AND MAP KEY.

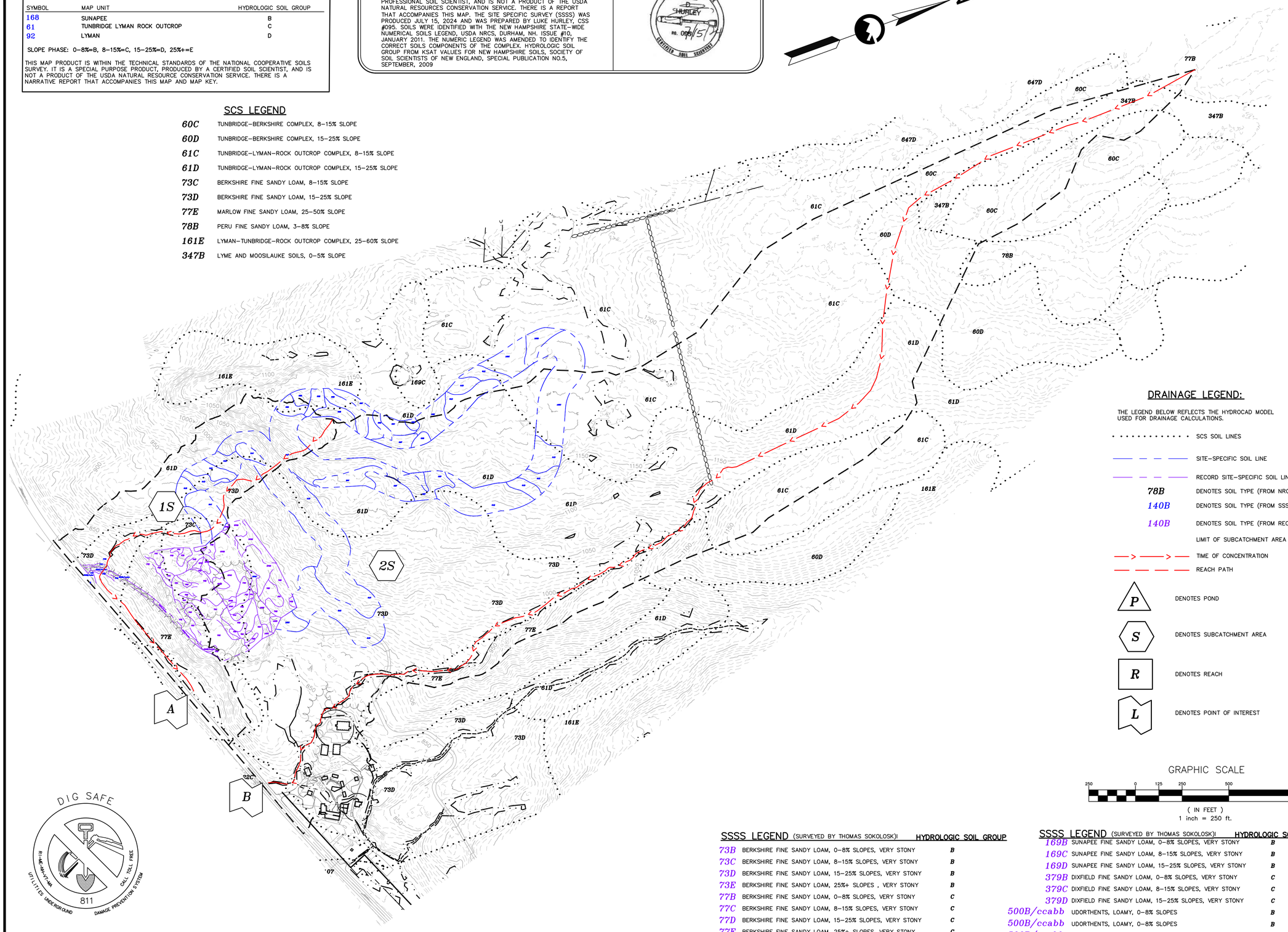
THIS MAP PRODUCT IS WITHIN THE TECHNICAL STANDARDS OF THE NATIONAL COOPERATIVE SOIL SURVEY. IT IS A SPECIAL PURPOSE PRODUCT, INTENDED FOR INFILTRATION REQUIREMENTS BY THE NH DES ALTERATION AND TERRAIN BUREAU. IT WAS PRODUCED BY A PROFESSIONAL SOIL SCIENTIST, AND IS NOT A PRODUCT OF THE USDA NATURAL RESOURCES CONSERVATION SERVICE. THERE IS A REPORT THAT ACCOMPANIES THIS MAP. THE SITE SPECIFIC SURVEY (SSSS) WAS PRODUCED JULY 15, 2024 AND WAS PREPARED BY LUKE HURLEY, CSS #095. SOILS WERE IDENTIFIED WITH THE NEW HAMPSHIRE STATE-WIDE NUMERICAL SOILS LEGEND, USDA NRCS, DURHAM, NH. ISSUE #10, JANUARY 2011. THE NUMERIC LEGEND WAS AMENDED TO IDENTIFY THE CORRECT SOILS COMPONENTS OF THE COMPLEX. HYDROLOGIC SOIL GROUP FROM KSAT VALUES FOR NEW HAMPSHIRE SOILS, SOCIETY OF SOIL SCIENTISTS OF NEW ENGLAND, SPECIAL PUBLICATION NO.5, SEPTEMBER, 2009

STATE OF NEW HAMPSHIRE — LUKE D HURLEY — NO. 095 — 7/15 — CERTIFIED SOIL SCIENTIST

NOTES:
1. THE PURPOSE OF THIS PLAN IS TO DEPICT THE VARIOUS STORMWATER SUBCATCHMENT AREAS, CORRESPONDING TIMES OF CONCENTRATION, PONDS, AND REACHES ASSOCIATED WITH THE SUBJECT PARCEL PRE-DEVELOPMENT.

SCS LEGEND

60C	TUNBRIDGE–BERKSHIRE COMPLEX, 8–15% SLOPE
60D	TUNBRIDGE–BERKSHIRE COMPLEX, 15–25% SLOPE
61C	TUNBRIDGE–LYMAN–ROCK OUTCROP COMPLEX, 8–15% SLOPE
61D	TUNBRIDGE–LYMAN–ROCK OUTCROP COMPLEX, 15–25% SLOPE
73C	BERKSHIRE FINE SANDY LOAM, 8–15% SLOPE
73D	BERKSHIRE FINE SANDY LOAM, 15–25% SLOPE
77E	MARLOW FINE SANDY LOAM, 25–50% SLOPE
78B	PERU FINE SANDY LOAM, 3–8% SLOPE
161E	LYMAN–TUNBRIDGE–ROCK OUTCROP COMPLEX, 25–60% SLOPE
347B	LYME AND MOOSILAUKE SOILS, 0–5% SLOPE



DIG SAFE — CALL TOLL FREE 811 — DAMAGE PREVENTION SYSTEM — UTILITIES UNDERGROUND

DRAINAGE LEGEND:

THE LEGEND BELOW REFLECTS THE HYDROCAD MODEL USED FOR DRAINAGE CALCULATIONS.

- SCS SOIL LINES
- SITE–SPECIFIC SOIL LINE
- RECORD SITE–SPECIFIC SOIL LINE
- 78B — DENOTES SOIL TYPE (FROM NRCS)
- 140B — DENOTES SOIL TYPE (FROM SSSS)
- 140B — DENOTES SOIL TYPE (FROM RECORD SSSS)
- LIMIT OF SUBCATCHMENT AREA
- TIME OF CONCENTRATION
- REACH PATH
- P — DENOTES POND
- S — DENOTES SUBCATCHMENT AREA
- R — DENOTES REACH
- L — DENOTES POINT OF INTEREST

GRAPHIC SCALE

250 0 125 250 500 1,000

(IN FEET)
1 inch = 250 ft.

SSSS LEGEND (SURVEYED BY THOMAS SOKOLOSK)I — HYDROLOGIC SOIL GROUP

73B	BERKSHIRE FINE SANDY LOAM, 0–8% SLOPES, VERY STONY	B
73C	BERKSHIRE FINE SANDY LOAM, 8–15% SLOPES, VERY STONY	B
73D	BERKSHIRE FINE SANDY LOAM, 15–25% SLOPES, VERY STONY	B
73E	BERKSHIRE FINE SANDY LOAM, 25%+ SLOPES , VERY STONY	B
77B	BERKSHIRE FINE SANDY LOAM, 0–8% SLOPES, VERY STONY	C
77C	BERKSHIRE FINE SANDY LOAM, 8–15% SLOPES, VERY STONY	C
77D	BERKSHIRE FINE SANDY LOAM, 15–25% SLOPES, VERY STONY	C
77E	BERKSHIRE FINE SANDY LOAM, 25%+ SLOPES, VERY STONY	C

SSSS LEGEND (SURVEYED BY THOMAS SOKOLOSK)I — HYDROLOGIC SOIL GROUP

169B	SUNAPEE FINE SANDY LOAM, 0–8% SLOPES, VERY STONY	B
169C	SUNAPEE FINE SANDY LOAM, 8–15% SLOPES, VERY STONY	B
169D	SUNAPEE FINE SANDY LOAM, 15–25% SLOPES, VERY STONY	B
379B	DIXFIELD FINE SANDY LOAM, 0–8% SLOPES, VERY STONY	C
379C	DIXFIELD FINE SANDY LOAM, 8–15% SLOPES, VERY STONY	C
379D	DIXFIELD FINE SANDY LOAM, 15–25% SLOPES, VERY STONY	C
500B/ccabb	UDORTHENTS, LOAMY, 0–8% SLOPES	B
500B/ccabb	UDORTHENTS, LOAMY, 0–8% SLOPES	B
500B/ccabb	URBAN LAND, 8–15% SLOPES	B

GRANITE ENGINEERING
civil engineering
land planning
municipal services

REVISIONS

No.	DATE	COMMENTS	BY
1	12/20/24	PROJECT SUBMITTAL	JD
2	2/3/25	REVISED PER CITY COMMENTS	JD
3	5/9/25	REVISED PER CITY COMMENTS	JD

OWNER/APPLICANT:
62 HOLDINGS, LLC
250 NORTH STREET
JAFFREY, NH 03452

GRANITE ENGINEERING
civil engineering • land planning • municipal services
150 Dow Street, Tower 2, Suite 421
Manchester,
New Hampshire 03101
603.518.8030
www.GraniteEng.com

STAMP:

LOCATION:
KEENE TAX MAP 215 LOTS 7 & 8
SULLIVAN TAX MAP 5 LOTS 46 & 46-1
57 ROUTE 9
KEENE & SULLIVAN, NEW HAMPSHIRE
CHESHIRE COUNTY

PROJECT:
GORDON SERVICES KEENE

TITLE:
PRE-DEVELOPMENT DRAIN AREAS PLAN

PROJECT No.	DATE:	SCALE:
23-0201-1	MAY 9, 2025	HORIZ. 1"=250'
SHEET: 1 OF 5		

P:\23\2302011\dwg\Production Plans\2302011-DRAINAGE.dwg, DRAINAGE PRE, 4/24/2025 10:04:50 AM, justind, AutoCAD PDF (General Documentation).pc3, ANSI full bleed D (34.00 x 22.00 Inches), 1:1

SITE SPECIFIC SOIL MAP UNIT KEY

SYMBOL	MAP UNIT	HYDROLOGIC SOIL GROUP
168	SUNAPEE	B
61	TUNBRIDGE LYMAN ROCK OUTCROP	C
92	LYMAN	D

SLOPE PHASE: 0-8%=B, 8-15%=C, 15-25%=D, 25%+=E

THIS MAP PRODUCT IS WITHIN THE TECHNICAL STANDARDS OF THE NATIONAL COOPERATIVE SOILS SURVEY. IT IS A SPECIAL PURPOSE PRODUCT, PRODUCED BY A CERTIFIED SOIL SCIENTIST, AND IS NOT A PRODUCT OF THE USDA NATURAL RESOURCE CONSERVATION SERVICE. THERE IS A NARRATIVE REPORT THAT ACCOMPANIES THIS MAP AND MAP KEY.

THIS MAP PRODUCT IS WITHIN THE TECHNICAL STANDARDS OF THE NATIONAL COOPERATIVE SOIL SURVEY. IT IS A SPECIAL PURPOSE PRODUCT, INTENDED FOR INFILTRATION REQUIREMENTS BY THE NH DES ALTERATION AND TERRAIN BUREAU. IT WAS PRODUCED BY A PROFESSIONAL SOIL SCIENTIST, AND IS NOT A PRODUCT OF THE USDA NATURAL RESOURCES CONSERVATION SERVICE. THERE IS A REPORT THAT ACCOMPANIES THIS MAP. THE SITE SPECIFIC SURVEY (SSSS) WAS PRODUCED JULY 15, 2024 AND WAS PREPARED BY LUKE HURLEY, CSS #095. SOILS WERE IDENTIFIED WITH THE NEW HAMPSHIRE STATE-WIDE NUMERICAL SOILS LEGEND, USDA NRCS, DURHAM, NH. ISSUE #10, JANUARY 2011. THE NUMERIC LEGEND WAS AMENDED TO IDENTIFY THE CORRECT SOILS COMPONENTS OF THE COMPLEX. HYDROLOGIC SOIL GROUP FROM KSAT VALUES FOR NEW HAMPSHIRE SOILS, SOCIETY OF SOIL SCIENTISTS OF NEW ENGLAND, SPECIAL PUBLICATION NO.5, SEPTEMBER, 2009

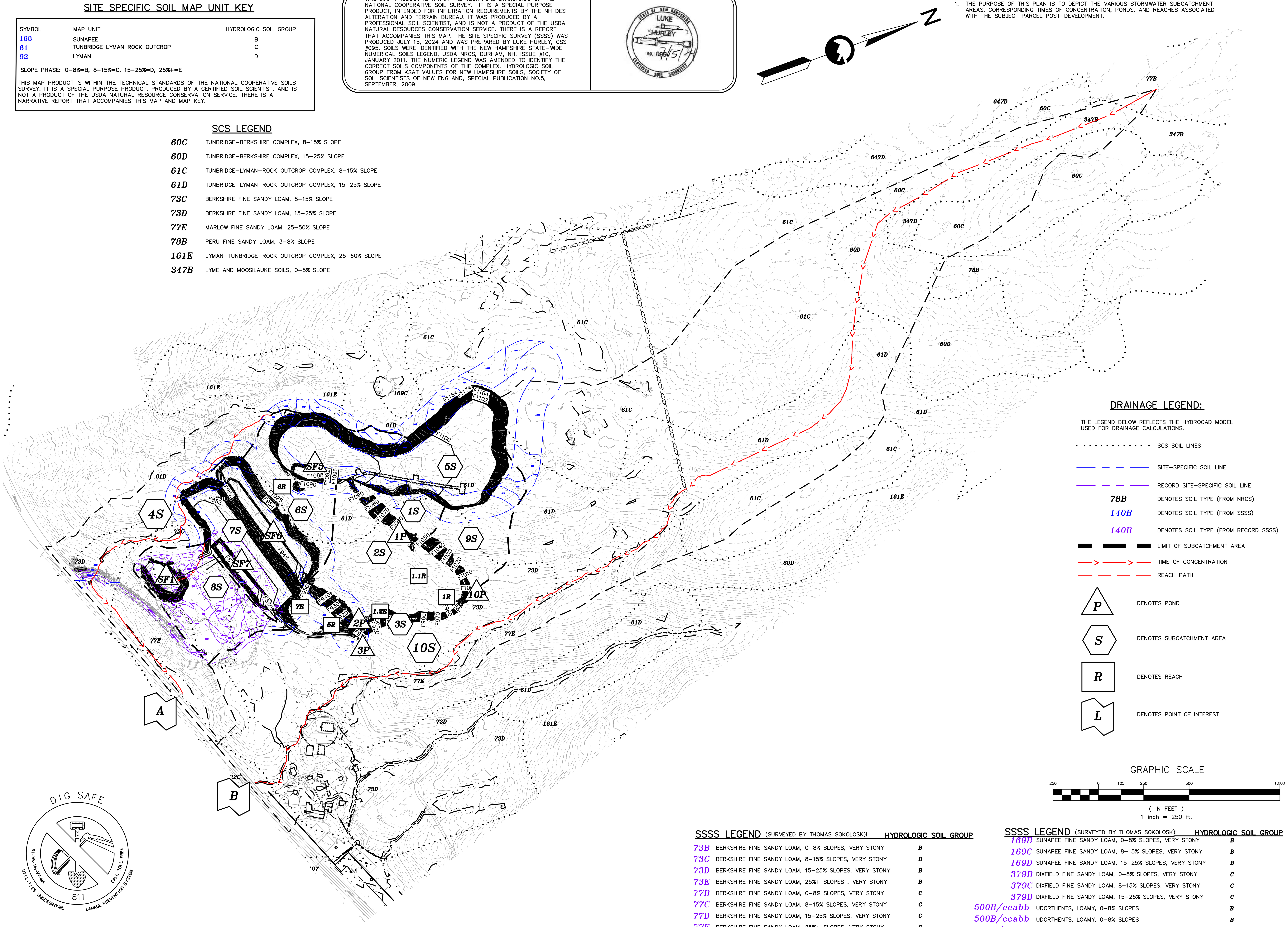
STATE OF NEW HAMPSHIRE — LUKE D. HURLEY — No. 095 — CERTIFIED SOIL SCIENTIST — 7/15/24

NOTES:

1. THE PURPOSE OF THIS PLAN IS TO DEPICT THE VARIOUS STORMWATER SUBCATCHMENT AREAS, CORRESPONDING TIMES OF CONCENTRATION, PONDS, AND REACHES ASSOCIATED WITH THE SUBJECT PARCEL POST-DEVELOPMENT.

SCS LEGEND

60C	TUNBRIDGE-BERKSHIRE COMPLEX, 8-15% SLOPE
60D	TUNBRIDGE-BERKSHIRE COMPLEX, 15-25% SLOPE
61C	TUNBRIDGE-LYMAN-ROCK OUTCROP COMPLEX, 8-15% SLOPE
61D	TUNBRIDGE-LYMAN-ROCK OUTCROP COMPLEX, 15-25% SLOPE
73C	BERKSHIRE FINE SANDY LOAM, 8-15% SLOPE
73D	BERKSHIRE FINE SANDY LOAM, 15-25% SLOPE
77E	MARLOW FINE SANDY LOAM, 25-50% SLOPE
78B	PERU FINE SANDY LOAM, 3-8% SLOPE
161E	LYMAN-TUNBRIDGE-ROCK OUTCROP COMPLEX, 25-60% SLOPE
347B	LYME AND MOOSILAUKE SOILS, 0-5% SLOPE



DRAINAGE LEGEND:

THE LEGEND BELOW REFLECTS THE HYDROCAD MODEL USED FOR DRAINAGE CALCULATIONS.

SCS SOIL LINES

SITE-SPECIFIC SOIL LINE

RECORD SITE-SPECIFIC SOIL LINE

78B DENOTES SOIL TYPE (FROM NRCS)

140B DENOTES SOIL TYPE (FROM SSSS)

140B DENOTES SOIL TYPE (FROM RECORD SSSS)

LIMIT OF SUBCATCHMENT AREA

TIME OF CONCENTRATION

REACH PATH

P DENOTES POND

S DENOTES SUBCATCHMENT AREA

R DENOTES REACH

L DENOTES POINT OF INTEREST

GRAPHIC SCALE

0 125 250 500 1,000

(IN FEET)
1 inch = 250 ft.

DIG SAFE — CALL TOLL FREE 811 — UTILITIES UNDERGROUND DAMAGE PREVENTION SYSTEM — RI-ME-NH-VT-MA

SSSS LEGEND (SURVEYED BY THOMAS SOKOLOSKI)

		HYDROLOGIC SOIL GROUP
73B	BERKSHIRE FINE SANDY LOAM, 0-8% SLOPES, VERY STONY	B
73C	BERKSHIRE FINE SANDY LOAM, 8-15% SLOPES, VERY STONY	B
73D	BERKSHIRE FINE SANDY LOAM, 15-25% SLOPES, VERY STONY	B
73E	BERKSHIRE FINE SANDY LOAM, 25%+ SLOPES , VERY STONY	B
77B	BERKSHIRE FINE SANDY LOAM, 0-8% SLOPES, VERY STONY	C
77C	BERKSHIRE FINE SANDY LOAM, 8-15% SLOPES, VERY STONY	C
77D	BERKSHIRE FINE SANDY LOAM, 15-25% SLOPES, VERY STONY	C
77E	BERKSHIRE FINE SANDY LOAM, 25%+ SLOPES, VERY STONY	C

SSSS LEGEND (SURVEYED BY THOMAS SOKOLOSKI)

		HYDROLOGIC SOIL GROUP
169B	SUNAPEE FINE SANDY LOAM, 0-8% SLOPES, VERY STONY	B
169C	SUNAPEE FINE SANDY LOAM, 8-15% SLOPES, VERY STONY	B
169D	SUNAPEE FINE SANDY LOAM, 15-25% SLOPES, VERY STONY	B
379B	DIXFIELD FINE SANDY LOAM, 0-8% SLOPES, VERY STONY	C
379C	DIXFIELD FINE SANDY LOAM, 8-15% SLOPES, VERY STONY	C
379D	DIXFIELD FINE SANDY LOAM, 15-25% SLOPES, VERY STONY	C
500B/ccabb	UDORTHENTS, LOAMY, 0-8% SLOPES	B
500B/ccabb	UDORTHENTS, LOAMY, 0-8% SLOPES	B
500B/ccabb	URBAN LAND, 8-15% SLOPES	B

GRANITE ENGINEERING
civil engineering
land planning
municipal services

REVISIONS

No.	DATE	COMMENTS	BY
1	12/20/24	PROJECT SUBMITTAL	JD
2	2/3/25	REVISED PER CITY COMMENTS	JD
3	5/9/25	REVISED PER CITY COMMENTS	JD

OWNER/APPLICANT:
G2 HOLDINGS, LLC
250 NORTH STREET
JAFFREY, NH 03452

GRANITE ENGINEERING
civil engineering ● land planning ● municipal services
150 Dow Street, Tower 2, Suite 421
Manchester, New Hampshire 03101
603.518.8030
www.GraniteEng.com

STAMP:
STATE OF NEW HAMPSHIRE — BRENTON J. COLE — No. 14744 — 2/3/25 — LICENSED PROFESSIONAL ENGINEER

LOCATION:
KEENE TAX MAP 215 LOTS 7 & 8
SULLIVAN TAX MAP 5 LOTS 46 & 46-1
57 ROUTE 9
KEENE & SULLIVAN, NEW HAMPSHIRE
CHESHIRE COUNTY

PROJECT:
GORDON SERVICES
KEENE

TITLE:
INTERIM
POST-DEVELOPMENT
DRAIN AREAS PLAN

PROJECT No.	DATE:	SCALE:
23-0201-1	MAY 9, 2025	HORIZ. 1"=250'
SHEET:	2 OF 5	

SITE SPECIFIC SOIL MAP UNIT KEY

SYMBOL	MAP UNIT	HYDROLOGIC SOIL GROUP
168	SUNAPEE	B
61	TUNBRIDGE LYMAN ROCK OUTCROP	C
92	LYMAN	D

SLOPE PHASE: 0–8%=B, 8–15%=C, 15–25%=D, 25%+=E

THIS MAP PRODUCT IS WITHIN THE TECHNICAL STANDARDS OF THE NATIONAL COOPERATIVE SOILS SURVEY. IT IS A SPECIAL PURPOSE PRODUCT, PRODUCED BY A CERTIFIED SOIL SCIENTIST, AND IS NOT A PRODUCT OF THE USDA NATURAL RESOURCE CONSERVATION SERVICE. THERE IS A NARRATIVE REPORT THAT ACCOMPANIES THIS MAP AND MAP KEY.

THIS MAP PRODUCT IS WITHIN THE TECHNICAL STANDARDS OF THE NATIONAL COOPERATIVE SOIL SURVEY. IT IS A SPECIAL PURPOSE PRODUCT, INTENDED FOR INFILTRATION REQUIREMENTS BY THE NH DES ALTERATION AND TERRAIN BUREAU. IT WAS PRODUCED BY A PROFESSIONAL SOIL SCIENTIST, AND IS NOT A PRODUCT OF THE USDA NATURAL RESOURCES CONSERVATION SERVICE. THERE IS A REPORT THAT ACCOMPANIES THIS MAP. THE SITE SPECIFIC SURVEY (SSSS) WAS PRODUCED JULY 15, 2024 AND WAS PREPARED BY LUKE HURLEY, CSS #095. SOILS WERE IDENTIFIED WITH THE NEW HAMPSHIRE STATE-WIDE NUMERICAL SOILS LEGEND, USDA NRCS, DURHAM, NH. ISSUE #10, JANUARY 2011. THE NUMERIC LEGEND WAS AMENDED TO IDENTIFY THE CORRECT SOILS COMPONENTS OF THE COMPLEX. HYDROLOGIC SOIL GROUP FROM KSAT VALUES FOR NEW HAMPSHIRE SOILS, SOCIETY OF SOIL SCIENTISTS OF NEW ENGLAND, SPECIAL PUBLICATION NO.5, SEPTEMBER, 2009

STATE OF NEW HAMPSHIRE — LUKE D HURLEY — NO. 095 — CERTIFIED SOIL SCIENTIST

NOTES:

1. THE PURPOSE OF THIS PLAN IS TO DEPICT THE VARIOUS STORMWATER SUBCATCHMENT AREAS, CORRESPONDING TIMES OF CONCENTRATION, PONDS, AND REACHES ASSOCIATED WITH THE SUBJECT PARCEL AFTER THE PROPOSED DEVELOPMENT.

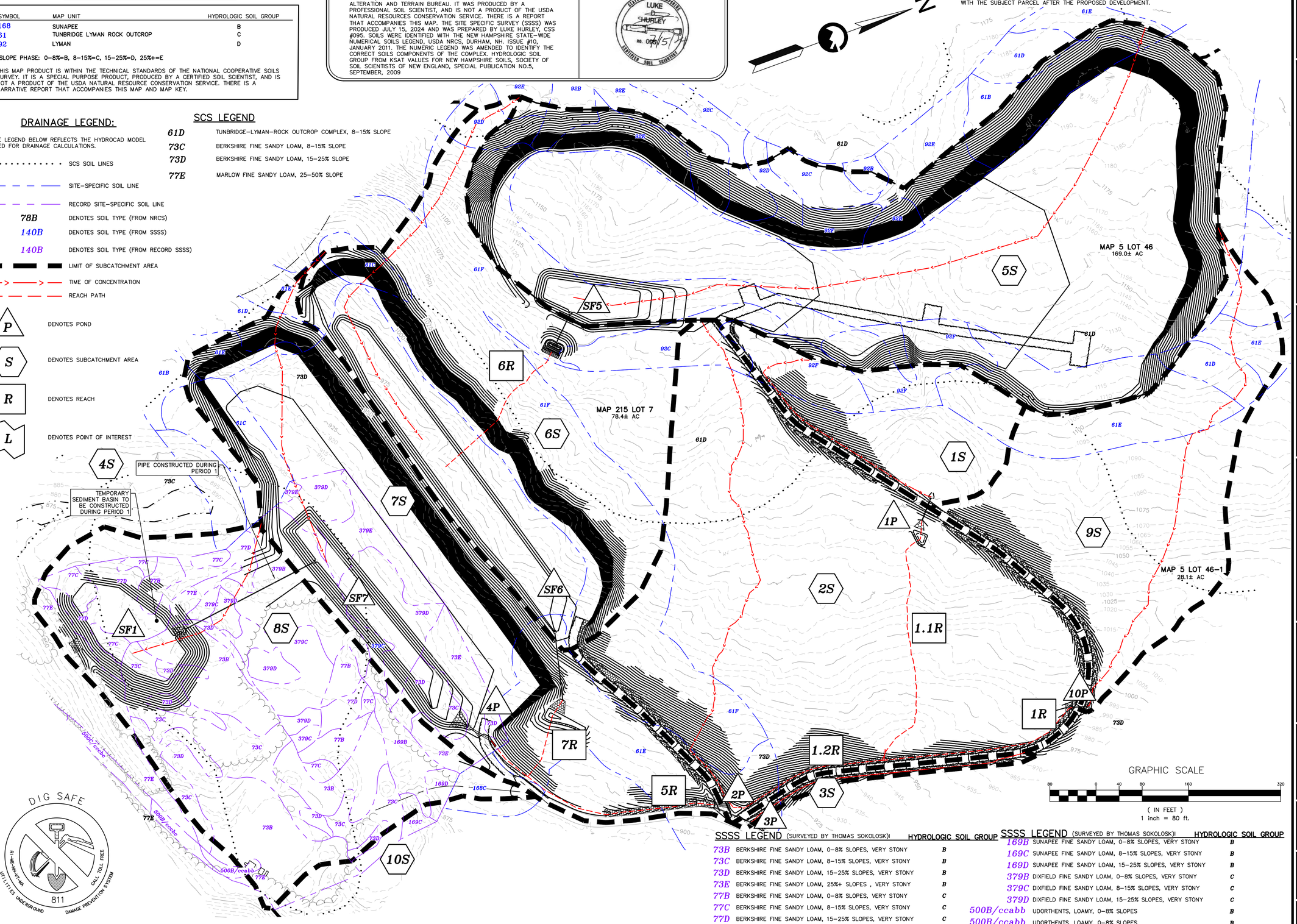
DRAINAGE LEGEND:

THE LEGEND BELOW REFLECTS THE HYDROCAD MODEL USED FOR DRAINAGE CALCULATIONS.

- SCS SOIL LINES
- SITE-SPECIFIC SOIL LINE
- RECORD SITE-SPECIFIC SOIL LINE
- 78B — DENOTES SOIL TYPE (FROM NRCS)
- 140B — DENOTES SOIL TYPE (FROM SSSS)
- 140B — DENOTES SOIL TYPE (FROM RECORD SSSS)
- LIMIT OF SUBCATCHMENT AREA
- TIME OF CONCENTRATION
- REACH PATH
- P — DENOTES POND
- S — DENOTES SUBCATCHMENT AREA
- R — DENOTES REACH
- L — DENOTES POINT OF INTEREST

SCS LEGEND

61D	TUNBRIDGE-LYMAN-ROCK OUTCROP COMPLEX, 8-15% SLOPE
73C	BERKSHIRE FINE SANDY LOAM, 8-15% SLOPE
73D	BERKSHIRE FINE SANDY LOAM, 15-25% SLOPE
77E	MARLOW FINE SANDY LOAM, 25-50% SLOPE



GRAPHIC SCALE

80 0 40 80 160 320

(IN FEET)
1 inch = 80 ft.

SSSS LEGEND (SURVEYED BY THOMAS SOKOLOSK)I

		HYDROLOGIC SOIL GROUP
73B	BERKSHIRE FINE SANDY LOAM, 0–8% SLOPES, VERY STONY	B
73C	BERKSHIRE FINE SANDY LOAM, 8–15% SLOPES, VERY STONY	B
73D	BERKSHIRE FINE SANDY LOAM, 15–25% SLOPES, VERY STONY	B
73E	BERKSHIRE FINE SANDY LOAM, 25%+ SLOPES , VERY STONY	B
77B	BERKSHIRE FINE SANDY LOAM, 0–8% SLOPES, VERY STONY	C
77C	BERKSHIRE FINE SANDY LOAM, 8–15% SLOPES, VERY STONY	C
77D	BERKSHIRE FINE SANDY LOAM, 15–25% SLOPES, VERY STONY	C
77E	BERKSHIRE FINE SANDY LOAM, 25%+ SLOPES, VERY STONY	C

SSSS LEGEND (SURVEYED BY THOMAS SOKOLOSK)I

		HYDROLOGIC SOIL GROUP
169B	SUNAPEE FINE SANDY LOAM, 0–8% SLOPES, VERY STONY	B
169C	SUNAPEE FINE SANDY LOAM, 8–15% SLOPES, VERY STONY	B
169D	SUNAPEE FINE SANDY LOAM, 15–25% SLOPES, VERY STONY	B
379B	DIXFIELD FINE SANDY LOAM, 0–8% SLOPES, VERY STONY	C
379C	DIXFIELD FINE SANDY LOAM, 8–15% SLOPES, VERY STONY	C
379D	DIXFIELD FINE SANDY LOAM, 15–25% SLOPES, VERY STONY	C
500B/ccabb	UDORTHENTS, LOAMY, 0–8% SLOPES	B
500B/ccabb	UDORTHENTS, LOAMY, 0–8% SLOPES	B
500B/ccabb	URBAN LAND, 8–15% SLOPES	B

DIG SAFE — 811 — CALL TOLL FREE — DAMAGE PREVENTION SYSTEM — UTILITIES UNDERGROUND

GRANITE ENGINEERING
civil engineering
land planning
municipal services

REVISIONS

No.	DATE	COMMENTS	BY
1	12/20/24	PROJECT SUBMITTAL	JD
2	2/3/25	REVISED PER CITY COMMENTS	JD
3	5/9/25	REVISED PER CITY COMMENTS	JD

OWNER/APPLICANT:
62 HOLDINGS, LLC
250 NORTH STREET
JAFFREY, NH 03452

GRANITE ENGINEERING
civil engineering • land planning • municipal services
150 Dow Street, Tower 2, Suite 421
Manchester,
New Hampshire 03101
603.518.8030
www.GraniteEng.com

STAMP:

STATE OF NEW HAMPSHIRE — BRENTON J. BOLE — No. 14744 — 2/3/25 — LICENSED PROFESSIONAL ENGINEER

LOCATION:
KEENE TAX MAP 215 LOTS 7 & 8
SULLIVAN TAX MAP 5 LOTS 46 & 46-1
57 ROUTE 9
KEENE & SULLIVAN, NEW HAMPSHIRE
CHESHIRE COUNTY

PROJECT:
GORDON SERVICES KEENE

TITLE:
INTERIM DRAIN AREAS PLAN

PROJECT No.	DATE:	SCALE:
23-0201-1	MAY 9, 2025	HORIZ. 1"=80'
SHEET:	3 OF 5	

P:\23\23020\1\eng\Production Plans\23020111-DRAINAGE.dwg, DRAINAGE POST-INTERIM, 4/24/2025 10:07:48 AM, justind, AutoCAD PDF (General Documentation).pc3, ANSI full bleed D (34.00 x 22.00 Inches), 1:1

SITE SPECIFIC SOIL MAP UNIT KEY

SYMBOL	MAP UNIT	HYDROLOGIC SOIL GROUP
168	SUNAPEE	B
61	TUNBRIDGE LYMAN ROCK OUTCROP	C
92	LYMAN	D

SLOPE PHASE: 0–8%=B, 8–15%=C, 15–25%=D, 25%+=E

THIS MAP PRODUCT IS WITHIN THE TECHNICAL STANDARDS OF THE NATIONAL COOPERATIVE SOILS SURVEY. IT IS A SPECIAL PURPOSE PRODUCT, PRODUCED BY A CERTIFIED SOIL SCIENTIST, AND IS NOT A PRODUCT OF THE USDA NATURAL RESOURCE CONSERVATION SERVICE. THERE IS A NARRATIVE REPORT THAT ACCOMPANIES THIS MAP AND MAP KEY.

THIS MAP PRODUCT IS WITHIN THE TECHNICAL STANDARDS OF THE NATIONAL COOPERATIVE SOIL SURVEY. IT IS A SPECIAL PURPOSE PRODUCT, INTENDED FOR INFILTRATION REQUIREMENTS BY THE NH DES ALTERATION AND TERRAIN BUREAU. IT WAS PRODUCED BY A PROFESSIONAL SOIL SCIENTIST, AND IS NOT A PRODUCT OF THE USDA NATURAL RESOURCES CONSERVATION SERVICE. THERE IS A REPORT THAT ACCOMPANIES THIS MAP. THE SITE SPECIFIC SURVEY (SSSS) WAS PRODUCED JULY 15, 2024 AND WAS PREPARED BY LUKE HURLEY, CSS #095. SOILS WERE IDENTIFIED WITH THE NEW HAMPSHIRE STATE-WIDE NUMERICAL SOILS LEGEND, USDA NRCS, DURHAM, NH. ISSUE #10, JANUARY 2011. THE NUMERIC LEGEND WAS AMENDED TO IDENTIFY THE CORRECT SOILS COMPONENTS OF THE COMPLEX. HYDROLOGIC SOIL GROUP FROM KSAT VALUES FOR NEW HAMPSHIRE SOILS, SOCIETY OF SOIL SCIENTISTS OF NEW ENGLAND, SPECIAL PUBLICATION NO.5, SEPTEMBER, 2009

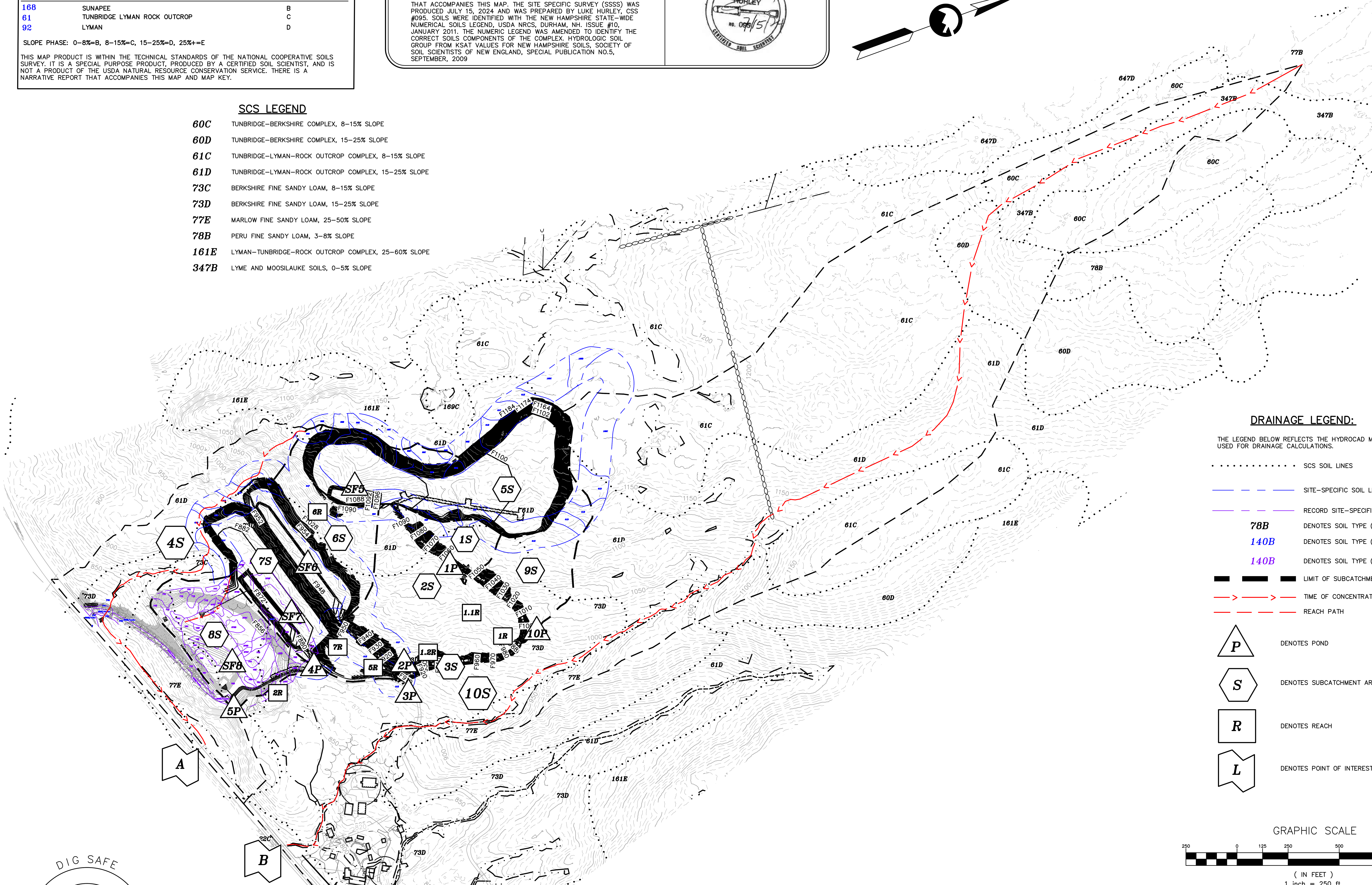
STATE OF NEW HAMPSHIRE
LUKE D. HURLEY
NO. 095
CERTIFIED SOIL SCIENTIST
7/15/24

NOTES:

1. THE PURPOSE OF THIS PLAN IS TO DEPICT THE VARIOUS STORMWATER SUBCATCHMENT AREAS, CORRESPONDING TIMES OF CONCENTRATION, PONDS, AND REACHES ASSOCIATED WITH THE SUBJECT PARCEL POST-DEVELOPMENT.

SCS LEGEND

60C	TUNBRIDGE–BERKSHIRE COMPLEX, 8–15% SLOPE
60D	TUNBRIDGE–BERKSHIRE COMPLEX, 15–25% SLOPE
61C	TUNBRIDGE–LYMAN–ROCK OUTCROP COMPLEX, 8–15% SLOPE
61D	TUNBRIDGE–LYMAN–ROCK OUTCROP COMPLEX, 15–25% SLOPE
73C	BERKSHIRE FINE SANDY LOAM, 8–15% SLOPE
73D	BERKSHIRE FINE SANDY LOAM, 15–25% SLOPE
77E	MARLOW FINE SANDY LOAM, 25–50% SLOPE
78B	PERU FINE SANDY LOAM, 3–8% SLOPE
161E	LYMAN–TUNBRIDGE–ROCK OUTCROP COMPLEX, 25–60% SLOPE
347B	LYME AND MOOSILAUKE SOILS, 0–5% SLOPE



DRAINAGE LEGEND:

THE LEGEND BELOW REFLECTS THE HYDROCAD MODEL USED FOR DRAINAGE CALCULATIONS.

SCS SOIL LINES
SITE-SPECIFIC SOIL LINE
RECORD SITE-SPECIFIC SOIL LINE
78B DENOTES SOIL TYPE (FROM NRCS)
140B DENOTES SOIL TYPE (FROM SSSS)
140B DENOTES SOIL TYPE (FROM RECORD SSSS)
LIMIT OF SUBCATCHMENT AREA
TIME OF CONCENTRATION
REACH PATH
P DENOTES POND
S DENOTES SUBCATCHMENT AREA
R DENOTES REACH
L DENOTES POINT OF INTEREST

GRAPHIC SCALE

250 0 125 250 500 1,000

(IN FEET)
1 inch = 250 ft.

SSSS LEGEND (SURVEYED BY THOMAS SOKOLOSK)I

		HYDROLOGIC SOIL GROUP
73B	BERKSHIRE FINE SANDY LOAM, 0–8% SLOPES, VERY STONY	B
73C	BERKSHIRE FINE SANDY LOAM, 8–15% SLOPES, VERY STONY	B
73D	BERKSHIRE FINE SANDY LOAM, 15–25% SLOPES, VERY STONY	B
73E	BERKSHIRE FINE SANDY LOAM, 25%+ SLOPES , VERY STONY	B
77B	BERKSHIRE FINE SANDY LOAM, 0–8% SLOPES, VERY STONY	C
77C	BERKSHIRE FINE SANDY LOAM, 8–15% SLOPES, VERY STONY	C
77D	BERKSHIRE FINE SANDY LOAM, 15–25% SLOPES, VERY STONY	C
77E	BERKSHIRE FINE SANDY LOAM, 25%+ SLOPES, VERY STONY	C

SSSS LEGEND (SURVEYED BY THOMAS SOKOLOSK)I

		HYDROLOGIC SOIL GROUP
169B	SUNAPEE FINE SANDY LOAM, 0–8% SLOPES, VERY STONY	B
169C	SUNAPEE FINE SANDY LOAM, 8–15% SLOPES, VERY STONY	B
169D	SUNAPEE FINE SANDY LOAM, 15–25% SLOPES, VERY STONY	B
379B	DIXFIELD FINE SANDY LOAM, 0–8% SLOPES, VERY STONY	C
379C	DIXFIELD FINE SANDY LOAM, 8–15% SLOPES, VERY STONY	C
379D	DIXFIELD FINE SANDY LOAM, 15–25% SLOPES, VERY STONY	C
500B/ccabb	UDORTHENTS, LOAMY, 0–8% SLOPES	B
500B/ccabb	UDORTHENTS, LOAMY, 0–8% SLOPES	B
500B/ccabb	URBAN LAND, 8–15% SLOPES	B

DIG SAFE
811
CALL TOLL FREE
DAMAGE PREVENTION SYSTEM
UTILITIES UNDERGROUND
RI–ME–NH–VT–MA

GRANITE ENGINEERING
civil engineering
land planning
municipal services

REVISIONS

No.	DATE	COMMENTS	BY
1	12/20/24	PROJECT SUBMITTAL	JD
2	2/3/25	REVISED PER CITY COMMENTS	JD
3	5/9/25	REVISED PER CITY COMMENTS	JD

OWNER/APPLICANT:
G2 HOLDINGS, LLC
250 NORTH STREET
JAFFREY, NH 03452

GRANITE ENGINEERING
civil engineering • land planning • municipal services
150 Dow Street, Tower 2, Suite 421
Manchester,
New Hampshire 03101
603.518.8030
www.GraniteEng.com

STAMP:
STATE OF NEW HAMPSHIRE
BRENTON J. COLE
No. 14744
2/3/25
LICENSED
PROFESSIONAL ENGINEER

LOCATION:
KEENE TAX MAP 215 LOTS 7 & 8
SULLIVAN TAX MAP 5 LOTS 46 & 46-1
57 ROUTE 9
KEENE & SULLIVAN, NEW HAMPSHIRE
CHESHIRE COUNTY

PROJECT:
GORDON SERVICES
KEENE

TITLE:
FINAL
POST-DEVELOPMENT
DRAIN AREAS PLAN

PROJECT No.	DATE:	SCALE:
23-0201-1	MAY 9, 2025	HORIZ. 1"=250'
SHEET:	4 OF 5	

SITE SPECIFIC SOIL MAP UNIT KEY

SYMBOL	MAP UNIT	HYDROLOGIC SOIL GROUP
168	SUNAPEE	B
61	TUNBRIDGE LYMAN ROCK OUTCROP	C
92	LYMAN	D

SLOPE PHASE: 0–8%=B, 8–15%=C, 15–25%=D, 25%+=E

THIS MAP PRODUCT IS WITHIN THE TECHNICAL STANDARDS OF THE NATIONAL COOPERATIVE SOILS SURVEY. IT IS A SPECIAL PURPOSE PRODUCT, PRODUCED BY A CERTIFIED SOIL SCIENTIST, AND IS NOT A PRODUCT OF THE USDA NATURAL RESOURCE CONSERVATION SERVICE. THERE IS A NARRATIVE REPORT THAT ACCOMPANIES THIS MAP AND MAP KEY.

THIS MAP PRODUCT IS WITHIN THE TECHNICAL STANDARDS OF THE NATIONAL COOPERATIVE SOIL SURVEY. IT IS A SPECIAL PURPOSE PRODUCT, INTENDED FOR INFILTRATION REQUIREMENTS BY THE NH DES ALTERATION AND TERRAIN BUREAU. IT WAS PRODUCED BY A PROFESSIONAL SOIL SCIENTIST, AND IS NOT A PRODUCT OF THE USDA NATURAL RESOURCES CONSERVATION SERVICE. THERE IS A REPORT THAT ACCOMPANIES THIS MAP. THE SITE SPECIFIC SURVEY (SSSS) WAS PRODUCED JULY 15, 2024 AND WAS PREPARED BY LUKE HURLEY, CSS #095. SOILS WERE IDENTIFIED WITH THE NEW HAMPSHIRE STATE-WIDE NUMERICAL SOILS LEGEND, USDA NRCS, DURHAM, NH. ISSUE #10, JANUARY 2011. THE NUMERIC LEGEND WAS AMENDED TO IDENTIFY THE CORRECT SOILS COMPONENTS OF THE COMPLEX. HYDROLOGIC SOIL GROUP FROM KSAT VALUES FOR NEW HAMPSHIRE SOILS, SOCIETY OF SOIL SCIENTISTS OF NEW ENGLAND, SPECIAL PUBLICATION NO.5, SEPTEMBER, 2009

STATE OF NEW HAMPSHIRE — LUKE D HURLEY — NO. 095 — CERTIFIED SOIL SCIENTIST

NOTES:

1. THE PURPOSE OF THIS PLAN IS TO DEPICT THE VARIOUS STORMWATER SUBCATCHMENT AREAS, CORRESPONDING TIMES OF CONCENTRATION, PONDS, AND REACHES ASSOCIATED WITH THE SUBJECT PARCEL AFTER THE PROPOSED DEVELOPMENT.

DRAINAGE LEGEND:

THE LEGEND BELOW REFLECTS THE HYDROCAD MODEL USED FOR DRAINAGE CALCULATIONS.

- SCS SOIL LINES
- SITE-SPECIFIC SOIL LINE
- RECORD SITE-SPECIFIC SOIL LINE
- 78B — DENOTES SOIL TYPE (FROM NRCS)
- 140B — DENOTES SOIL TYPE (FROM SSSS)
- 140B — DENOTES SOIL TYPE (FROM RECORD SSSS)
- LIMIT OF SUBCATCHMENT AREA
- TIME OF CONCENTRATION
- REACH PATH
- P — DENOTES POND
- S — DENOTES SUBCATCHMENT AREA
- R — DENOTES REACH
- L — DENOTES POINT OF INTEREST

SCS LEGEND

61D	TUNBRIDGE-LYMAN-ROCK OUTCROP COMPLEX, 8-15% SLOPE
73C	BERKSHIRE FINE SANDY LOAM, 8-15% SLOPE
73D	BERKSHIRE FINE SANDY LOAM, 15-25% SLOPE
77E	MARLOW FINE SANDY LOAM, 25-50% SLOPE

MAP 5 LOT 46
169.0± AC

MAP 215 LOT 7
78.4± AC

MAP 5 LOT 46-1
28.1± AC

PIPE TO BE REMOVED AT START OF PERIOD 8

SEDIMENT BASIN TO BE CONSTRUCTED DURING PERIOD 8

PIPE TO BE INSTALLED AT START OF PERIOD 8

PROPOSED GRADING TO BE COMPLETED DURING THE FINAL PHASE (PERIOD 8) OF THE PROJECT

DIG SAFE — CALL TOLL FREE 811 — UTILITIES UNDERGROUND — DAMAGE PREVENTION SYSTEM

GRAPHIC SCALE
80 0 40 80 160 320
(IN FEET)
1 inch = 80 ft.

SSSS LEGEND (SURVEYED BY THOMAS SOKOLOSK)I

		HYDROLOGIC SOIL GROUP
73B	BERKSHIRE FINE SANDY LOAM, 0–8% SLOPES, VERY STONY	B
73C	BERKSHIRE FINE SANDY LOAM, 8–15% SLOPES, VERY STONY	B
73D	BERKSHIRE FINE SANDY LOAM, 15–25% SLOPES, VERY STONY	B
73E	BERKSHIRE FINE SANDY LOAM, 25%+ SLOPES , VERY STONY	B
77B	BERKSHIRE FINE SANDY LOAM, 0–8% SLOPES, VERY STONY	C
77C	BERKSHIRE FINE SANDY LOAM, 8–15% SLOPES, VERY STONY	C
77D	BERKSHIRE FINE SANDY LOAM, 15–25% SLOPES, VERY STONY	C
77E	BERKSHIRE FINE SANDY LOAM, 25%+ SLOPES, VERY STONY	C

SSSS LEGEND (SURVEYED BY THOMAS SOKOLOSK)I

		HYDROLOGIC SOIL GROUP
169B	SUNAPEE FINE SANDY LOAM, 0–8% SLOPES, VERY STONY	B
169C	SUNAPEE FINE SANDY LOAM, 8–15% SLOPES, VERY STONY	B
169D	SUNAPEE FINE SANDY LOAM, 15–25% SLOPES, VERY STONY	B
379B	DIXFIELD FINE SANDY LOAM, 0–8% SLOPES, VERY STONY	C
379C	DIXFIELD FINE SANDY LOAM, 8–15% SLOPES, VERY STONY	C
379D	DIXFIELD FINE SANDY LOAM, 15–25% SLOPES, VERY STONY	C
500B/ccabb	UDORTHENTS, LOAMY, 0–8% SLOPES	B
500B/ccabb	UDORTHENTS, LOAMY, 0–8% SLOPES	B
500B/ccabb	URBAN LAND, 8–15% SLOPES	B

GRANITE ENGINEERING
civil engineering
land planning
municipal services

REVISIONS

No.	DATE	COMMENTS	BY
1	12/20/24	PROJECT SUBMITTAL	JD
2	2/3/25	REVISED PER CITY COMMENTS	JD
3	5/9/25	REVISED PER CITY COMMENTS	JD

OWNER/APPLICANT:
62 HOLDINGS, LLC
250 NORTH STREET
JAFFREY, NH 03452

GRANITE ENGINEERING
civil engineering • land planning • municipal services
150 Dow Street, Tower 2, Suite 421
Manchester,
New Hampshire 03101
603.518.8030
www.GraniteEng.com

STAMP:
STATE OF NEW HAMPSHIRE — BRENTON J. BOLE — No. 14744 — 2/3/25 — LICENSED PROFESSIONAL ENGINEER

LOCATION:
KEENE TAX MAP 215 LOTS 7 & 8
SULLIVAN TAX MAP 5 LOTS 46 & 46-1
57 ROUTE 9
KEENE & SULLIVAN, NEW HAMPSHIRE
CHESHIRE COUNTY

PROJECT:
GORDON SERVICES KEENE

TITLE:
FINAL DRAIN AREAS PLAN

PROJECT No.	DATE:	SCALE:
23-0201-1	MAY 9, 2025	HORIZ. 1"=80'
SHEET:	5 OF 5	