

October 14, 2022

Timothy Malley
Chairman, Hudson Planning Board
12 School Street
Hudson, NH 03051

RE: Core Compliance Testing
Drainage Summary Letter
79 River Road
Hudson, NH 03051
Map 251 Lot 8

Dear Mr. Malley:

On behalf of our client, Kenneth MacGrath, Allen & Major Associates (A&M) is pleased to provide this drainage summary in support of the Site Plan application for the proposed building addition at the Core Compliance Testing facility, with an address of 79 River Road. This analysis will demonstrate that the proposed project will match or reduce the rate and volume of runoff for all design storm events.

Existing Conditions

The site is located on the west side of River Road, approximately 1,000 feet south of Pine Road. It is comprised of a single parcel, identified on Tax Map 251 as Lot 8. The site is developed with a building of approximately 3,600 square feet and 7 parking spaces. The Limit Brook passes through the rear of the site, which is wooded.

Elevations on site range from a high elevation of 128 on the south side of the existing building, to a low elevation of 102 on the rear of the site. Wetlands were flagged by Gove Environmental Services in August 2022 on the rear of the site, in the vicinity of the Limit Brook. These flags were located during the field survey by A&M and are shown on the plans. A 50' buffer from the wetlands is shown on the plans and the project does not propose any disturbance within this buffer.

Stormwater flows from the high point at the building, over the site, and discharges to two locations, River Road and Limit Brook. Stormwater from the front portion of the development is collected by a series of catch basins and is then directed to a leaching catch basin, which is in the landscaped area between the parking lot and the roadway. This runoff is then infiltrated to the ground. The only runoff that reaches River Road, during the design storm events, is from the landscaped area between the parking lot and the roadway. Stormwater from the rear of the site flows overland into the Limit Brook. A review of the NRCS soil report for Hillsborough County indicates that the soil on site is Windsor loamy sand, which is classified as Hydrologic Soil Group Type "A" soil. Copies of the NRCS soils report and the Existing Watershed Plan, sheet WS-1, are included with this summary.

Proposed Conditions

The project proposes to construct a building addition, in two phases, adding a total of approximately 6,400 square feet of floor space, along with 6 additional parking spaces. The project will also require the reconstruction of the facility's septic system. The disturbance related to the project is limited to approximately 13,500 square feet and work is not proposed within the 50' wetland buffer or other critical areas.

Stormwater runoff was analyzed at the two discharge points (or Study Points) described above, to ensure that project does not result in an increase in the peak rate and volume of runoff. Runoff from the new parking spaces will be directed to the existing leaching catch basin. This basin was modeled using HydroCAD 10.20 software, which shows that the existing system has sufficient capacity to infiltrate all runoff from the additional pavement, for all design storm events. Runoff from the new roof area will be directed to a stone drip edge surrounding the building addition. This runoff will then infiltrate to the ground. As demonstrated by the following table, the project provides for sufficient stormwater storage and infiltration so that the peak rate and volume of runoff is matched or reduced for all design storm events. Copies of the HydroCAD worksheets are attached to this summary.

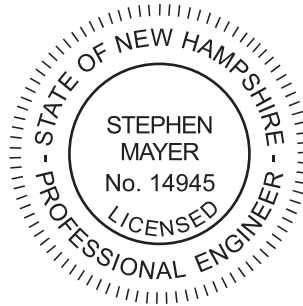
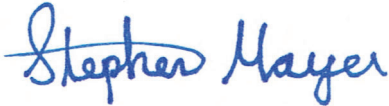
DISCHARGE POINT #1 (Flow to River Road)				
	2-Year	10-Year	25-Year	50-Year
Existing Flow (CFS)	0.00	0.00	0.02	0.05
Proposed Flow (CFS)	0.00	0.00	0.02	0.05
Change (CFS)	0.00	0.00	0.00	0.00
Existing Volume (CF)	0	61	200	387
Proposed Volume (CF)	0	53	173	334
Change (CF)	0	-8	-27	-53

DISCHARGE POINT #2 (Flow to Limit Brook)				
	2-Year	10-Year	25-Year	50-Year
Existing Flow (CFS)	0.15	0.22	0.28	0.35
Proposed Flow (CFS)	0.00	0.00	0.01	0.08
Change (CFS)	-0.15	-0.22	-0.27	-0.27
Existing Volume (CF)	503	886	1,529	2,364
Proposed Volume (CF)	0	57	344	794
Change (CF)	-503	-829	-1,185	-1,570

Summary

As shown in the table above, the proposed project will have a positive impact on the stormwater runoff from the site by matching or reducing the peak rate and volume of runoff from the site. All runoff from the additional impervious area will be infiltrated and the buffer to the wetlands will be maintained and protected.

Very truly yours,
ALLEN & MAJOR ASSOCIATES, INC.



Stephen Mayer, PE
Senior Project Engineer

Attachments:

1. Extreme Precipitation Tables (Northeast Regional Climate Center)
2. NRCS Soil Report for Hillsborough County
3. National Flood Hazard FIRMette
4. Existing HydroCAD worksheets
5. Proposed HydroCAD worksheets
6. Existing Watershed Plan, Sheet WS-1
7. Proposed Watershed Plan, Sheet WS-2

Extreme Precipitation Tables

Northeast Regional Climate Center

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

Smoothing	Yes
State	New Hampshire
Location	
Longitude	71.422 degrees West
Latitude	42.703 degrees North
Elevation	0 feet
Date/Time	Thu, 06 Oct 2022 08:07:16 -0400

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.28	0.42	0.52	0.69	0.86	1.08	1yr	0.74	1.02	1.25	1.57	1.98	2.50	2.74	1yr	2.21	2.64	3.08	3.77	4.39	1yr
2yr	0.33	0.51	0.64	0.84	1.06	1.33	2yr	0.92	1.22	1.54	1.92	2.40	2.99	3.31	2yr	2.64	3.19	3.70	4.43	5.03	2yr
5yr	0.40	0.62	0.77	1.03	1.32	1.68	5yr	1.14	1.53	1.95	2.44	3.03	3.77	4.21	5yr	3.33	4.05	4.68	5.56	6.29	5yr
10yr	0.45	0.70	0.89	1.20	1.56	2.00	10yr	1.35	1.81	2.33	2.92	3.63	4.49	5.05	10yr	3.98	4.85	5.59	6.61	7.44	10yr
25yr	0.53	0.84	1.07	1.47	1.95	2.52	25yr	1.69	2.26	2.94	3.70	4.60	5.68	6.42	25yr	5.02	6.17	7.08	8.32	9.31	25yr
50yr	0.59	0.95	1.22	1.72	2.32	3.02	50yr	2.00	2.68	3.54	4.45	5.52	6.78	7.70	50yr	6.00	7.40	8.47	9.90	11.03	50yr
100yr	0.68	1.11	1.42	2.02	2.75	3.60	100yr	2.37	3.18	4.23	5.32	6.60	8.10	9.24	100yr	7.17	8.89	10.14	11.78	13.08	100yr
200yr	0.78	1.27	1.64	2.36	3.26	4.30	200yr	2.81	3.77	5.06	6.38	7.90	9.68	11.10	200yr	8.56	10.68	12.14	14.03	15.51	200yr
500yr	0.93	1.54	2.01	2.92	4.09	5.44	500yr	3.53	4.73	6.42	8.10	10.03	12.26	14.16	500yr	10.85	13.61	15.40	17.67	19.44	500yr

Lower Confidence Limits

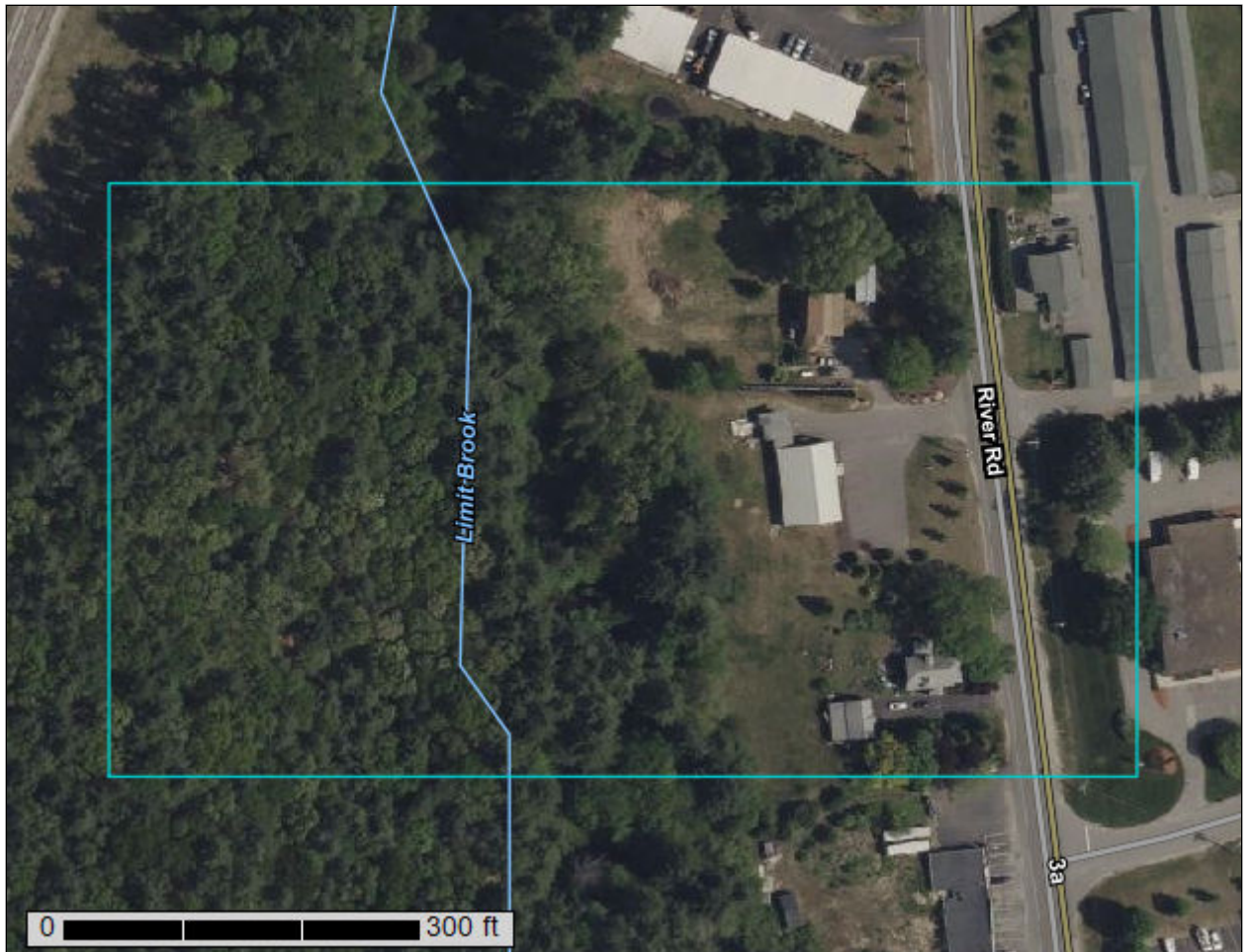
	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.23	0.35	0.43	0.57	0.70	0.80	1yr	0.61	0.79	1.07	1.34	1.69	2.33	2.56	1yr	2.06	2.46	2.74	3.07	3.94	1yr
2yr	0.32	0.49	0.60	0.82	1.01	1.21	2yr	0.87	1.18	1.38	1.80	2.31	2.92	3.24	2yr	2.59	3.11	3.61	4.32	4.92	2yr
5yr	0.36	0.56	0.69	0.95	1.21	1.43	5yr	1.05	1.40	1.64	2.13	2.72	3.52	3.95	5yr	3.12	3.80	4.35	5.20	5.91	5yr
10yr	0.40	0.61	0.76	1.06	1.37	1.61	10yr	1.19	1.58	1.83	2.41	3.07	4.06	4.59	10yr	3.60	4.41	5.01	5.97	6.79	10yr
25yr	0.45	0.69	0.86	1.23	1.62	1.89	25yr	1.39	1.85	2.14	2.84	3.58	4.91	5.61	25yr	4.35	5.39	6.04	7.16	8.15	25yr
50yr	0.49	0.75	0.94	1.35	1.81	2.14	50yr	1.57	2.09	2.41	3.22	4.03	5.67	6.54	50yr	5.02	6.29	6.97	8.23	9.34	50yr
100yr	0.54	0.82	1.03	1.48	2.03	2.42	100yr	1.75	2.36	2.72	3.46	4.54	6.56	7.65	100yr	5.81	7.36	8.04	9.46	10.72	100yr
200yr	0.60	0.90	1.14	1.64	2.29	2.74	200yr	1.98	2.68	3.05	3.90	5.15	7.61	8.96	200yr	6.73	8.62	9.29	10.86	12.31	200yr
500yr	0.68	1.01	1.29	1.88	2.67	3.23	500yr	2.31	3.16	3.58	4.57	6.09	9.24	11.09	500yr	8.18	10.66	11.24	13.04	14.77	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	1.29	1.68	2.12	2.65	2.92	1yr	2.35	2.81	3.38	4.16	4.77	1yr
2yr	0.35	0.55	0.67	0.91	1.13	1.32	2yr	0.97	1.29	1.50	1.95	2.50	3.07	3.41	2yr	2.72	3.28	3.81	4.55	5.17	2yr
5yr	0.44	0.67	0.84	1.15	1.46	1.69	5yr	1.26	1.65	1.92	2.46	3.09	4.04	4.51	5yr	3.57	4.34	5.01	5.95	6.68	5yr
10yr	0.53	0.81	1.00	1.40	1.81	2.07	10yr	1.56	2.02	2.35	2.94	3.67	4.99	5.60	10yr	4.42	5.39	6.19	7.29	8.13	10yr
25yr	0.68	1.03	1.28	1.83	2.41	2.69	25yr	2.08	2.63	3.05	3.74	4.60	6.59	7.44	25yr	5.83	7.15	8.19	9.56	10.57	25yr
50yr	0.82	1.24	1.55	2.23	3.00	3.29	50yr	2.59	3.21	3.72	4.49	5.45	8.13	9.22	50yr	7.19	8.86	10.12	11.74	12.89	50yr
100yr	1.00	1.51	1.89	2.72	3.74	4.02	100yr	3.22	3.93	4.55	5.64	6.47	10.04	11.41	100yr	8.88	10.97	12.50	14.44	15.72	100yr
200yr	1.21	1.82	2.31	3.34	4.66	4.91	200yr	4.02	4.80	5.55	6.81	7.69	12.39	14.12	200yr	10.97	13.58	15.46	17.75	19.20	200yr
500yr	1.57	2.34	3.02	4.38	6.23	6.39	500yr	5.38	6.25	7.23	8.75	9.64	16.37	18.68	500yr	14.49	17.96	20.49	23.33	24.99	500yr



Custom Soil Resource Report for Hillsborough County, New Hampshire, Eastern Part



Preface

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

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

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

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

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

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

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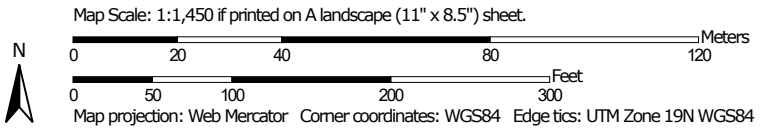
Soil Map

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

Custom Soil Resource Report Soil Map




Soil Map may not be valid at this scale.



MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines


 Soil Map Unit Points

Special Point Features






-  Blowout
-  Borrow Pit
-  Clay Spot
-  Closed Depression
-  Gravel Pit
-  Gravelly Spot
-  Landfill
-  Lava Flow
-  Marsh or swamp
-  Mine or Quarry
-  Miscellaneous Water
-  Perennial Water
-  Rock Outcrop
-  Saline Spot
-  Sandy Spot
-  Severely Eroded Spot
-  Sinkhole
-  Slide or Slip
-  Sodic Spot

-  Spoil Area
-  Stony Spot
-  Very Stony Spot
-  Wet Spot
-  Other
-  Special Line Features

Water Features

 Streams and Canals

Transportation

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

Background

 Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Hillsborough County, New Hampshire, Eastern Part
 Survey Area Data: Version 25, Sep 12, 2022

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

Date(s) aerial images were photographed: May 22, 2022—Jun 5, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND

MAP INFORMATION

imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
AgA	Agawam fine sandy loam, 0 to 3 percent slopes	2.2	22.2%
WdA	Windsor loamy sand, 0 to 3 percent slopes	4.5	44.9%
WdB	Windsor loamy sand, 3 to 8 percent slopes	0.4	3.9%
WdC	Windsor loamy sand, 8 to 15 percent slopes	2.9	29.0%
Totals for Area of Interest		10.0	100.0%

Map Unit Descriptions

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

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

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

Custom Soil Resource Report

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

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

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

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

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

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

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

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

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

Hillsborough County, New Hampshire, Eastern Part

AgA—Agawam fine sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2tyqw
Elevation: 0 to 1,040 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 250 days
Farmland classification: All areas are prime farmland

Map Unit Composition

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

Description of Agawam

Setting

Landform: Moraines, kames, kame terraces, outwash plains, outwash terraces
Landform position (two-dimensional): Summit, shoulder, backslope, footslope
Landform position (three-dimensional): Side slope, crest, riser, tread, rise, dip
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Coarse-loamy eolian deposits over sandy and gravelly glaciofluvial deposits derived from gneiss, granite, schist, and/or phyllite

Typical profile

Ap - 0 to 11 inches: fine sandy loam
Bw1 - 11 to 16 inches: fine sandy loam
Bw2 - 16 to 26 inches: fine sandy loam
2C1 - 26 to 39 inches: loamy fine sand
2C2 - 39 to 55 inches: loamy fine sand
2C3 - 55 to 65 inches: loamy sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 15 to 35 inches to strongly contrasting textural stratification
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: B
Ecological site: F145XY008MA - Dry Outwash

Custom Soil Resource Report

Hydric soil rating: No

Minor Components

Ninigret

Percent of map unit: 5 percent

Landform: Terraces

Down-slope shape: Linear

Across-slope shape: Concave

Hydric soil rating: No

Windsor

Percent of map unit: 4 percent

Landform: Dunes, deltas, outwash terraces, outwash plains

Landform position (three-dimensional): Tread, riser

Down-slope shape: Convex, linear

Across-slope shape: Convex, linear

Hydric soil rating: No

Walpole

Percent of map unit: 3 percent

Landform: Deltas, depressions, outwash terraces, depressions, outwash plains

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Tread, talf, dip

Down-slope shape: Concave

Across-slope shape: Concave

Hydric soil rating: Yes

Hinckley

Percent of map unit: 3 percent

Landform: Deltas, kames, eskers, outwash plains

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

Landform position (three-dimensional): Head slope, nose slope, side slope, crest, rise

Down-slope shape: Convex

Across-slope shape: Convex, linear

Hydric soil rating: No

WdA—Windsor loamy sand, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2svkg

Elevation: 0 to 990 feet

Mean annual precipitation: 36 to 71 inches

Mean annual air temperature: 39 to 55 degrees F

Frost-free period: 140 to 240 days

Farmland classification: Farmland of local importance

Map Unit Composition

Windsor, loamy sand, and similar soils: 85 percent

Minor components: 15 percent

Custom Soil Resource Report

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

Description of Windsor, Loamy Sand

Setting

Landform: Outwash plains, outwash terraces, deltas, dunes

Landform position (three-dimensional): Tread, riser

Down-slope shape: Linear, convex

Across-slope shape: Linear, convex

Parent material: Loose sandy glaciofluvial deposits derived from granite and/or loose sandy glaciofluvial deposits derived from schist and/or loose sandy glaciofluvial deposits derived from gneiss

Typical profile

O - 0 to 1 inches: moderately decomposed plant material

A - 1 to 3 inches: loamy sand

Bw - 3 to 25 inches: loamy sand

C - 25 to 65 inches: sand

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Excessively drained

Runoff class: Low

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

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

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

Available water supply, 0 to 60 inches: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2s

Hydrologic Soil Group: A

Ecological site: F144AY022MA - Dry Outwash

Hydric soil rating: No

Minor Components

Deerfield, loamy sand

Percent of map unit: 10 percent

Landform: Deltas, terraces, outwash plains

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Tread, tal

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

Hinckley, loamy sand

Percent of map unit: 5 percent

Landform: Deltas, kames, eskers, outwash plains

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

Landform position (three-dimensional): Head slope, nose slope, crest, side slope, rise

Down-slope shape: Convex

Custom Soil Resource Report

Across-slope shape: Convex, linear
Hydric soil rating: No

WdB—Windsor loamy sand, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2svkf
Elevation: 0 to 1,210 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Farmland of local importance

Map Unit Composition

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

Description of Windsor, Loamy Sand

Setting

Landform: Dunes, outwash plains, deltas, outwash terraces
Landform position (three-dimensional): Tread, riser
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Parent material: Loose sandy glaciofluvial deposits derived from granite and/or loose sandy glaciofluvial deposits derived from schist and/or loose sandy glaciofluvial deposits derived from gneiss

Typical profile

O - 0 to 1 inches: moderately decomposed plant material
A - 1 to 3 inches: loamy sand
Bw - 3 to 25 inches: loamy sand
C - 25 to 65 inches: sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.5 inches)

Interpretive groups

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

Custom Soil Resource Report

Hydrologic Soil Group: A
Ecological site: F144AY022MA - Dry Outwash
Hydric soil rating: No

Minor Components

Hinckley, loamy sand

Percent of map unit: 10 percent
Landform: Deltas, kames, eskers, outwash plains
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Head slope, nose slope, crest, side slope, rise
Down-slope shape: Convex
Across-slope shape: Convex, linear
Hydric soil rating: No

Deerfield, loamy sand

Percent of map unit: 5 percent
Landform: Deltas, terraces, outwash plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

WdC—Windsor loamy sand, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2svkq
Elevation: 0 to 1,260 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Windsor

Setting

Landform: — error in exists on —
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope, riser
Down-slope shape: Convex
Across-slope shape: Convex, linear

Custom Soil Resource Report

Parent material: Loose sandy glaciofluvial deposits derived from granite and/or loose sandy glaciofluvial deposits derived from schist and/or loose sandy glaciofluvial deposits derived from gneiss

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material

Ap - 1 to 11 inches: loamy sand

Bw - 11 to 31 inches: loamy sand

C - 31 to 65 inches: sand

Properties and qualities

Slope: 8 to 15 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Excessively drained

Runoff class: Low

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

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

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

Available water supply, 0 to 60 inches: Low (about 4.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: A

Ecological site: F144AY022MA - Dry Outwash

Hydric soil rating: No

Minor Components

Hinckley

Percent of map unit: 10 percent

Landform: Deltas, kames, eskers, outwash plains

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

Landform position (three-dimensional): Head slope, nose slope, side slope, crest, rise

Down-slope shape: Convex

Across-slope shape: Convex, linear

Hydric soil rating: No

Deerfield

Percent of map unit: 5 percent

Landform: Deltas, terraces, outwash plains

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Tread, talf

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

Soil Information for All Uses

Soil Properties and Qualities

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

Soil Physical Properties

Soil Physical Properties are measured or inferred from direct observations in the field or laboratory. Examples of soil physical properties include percent clay, organic matter, saturated hydraulic conductivity, available water capacity, and bulk density.

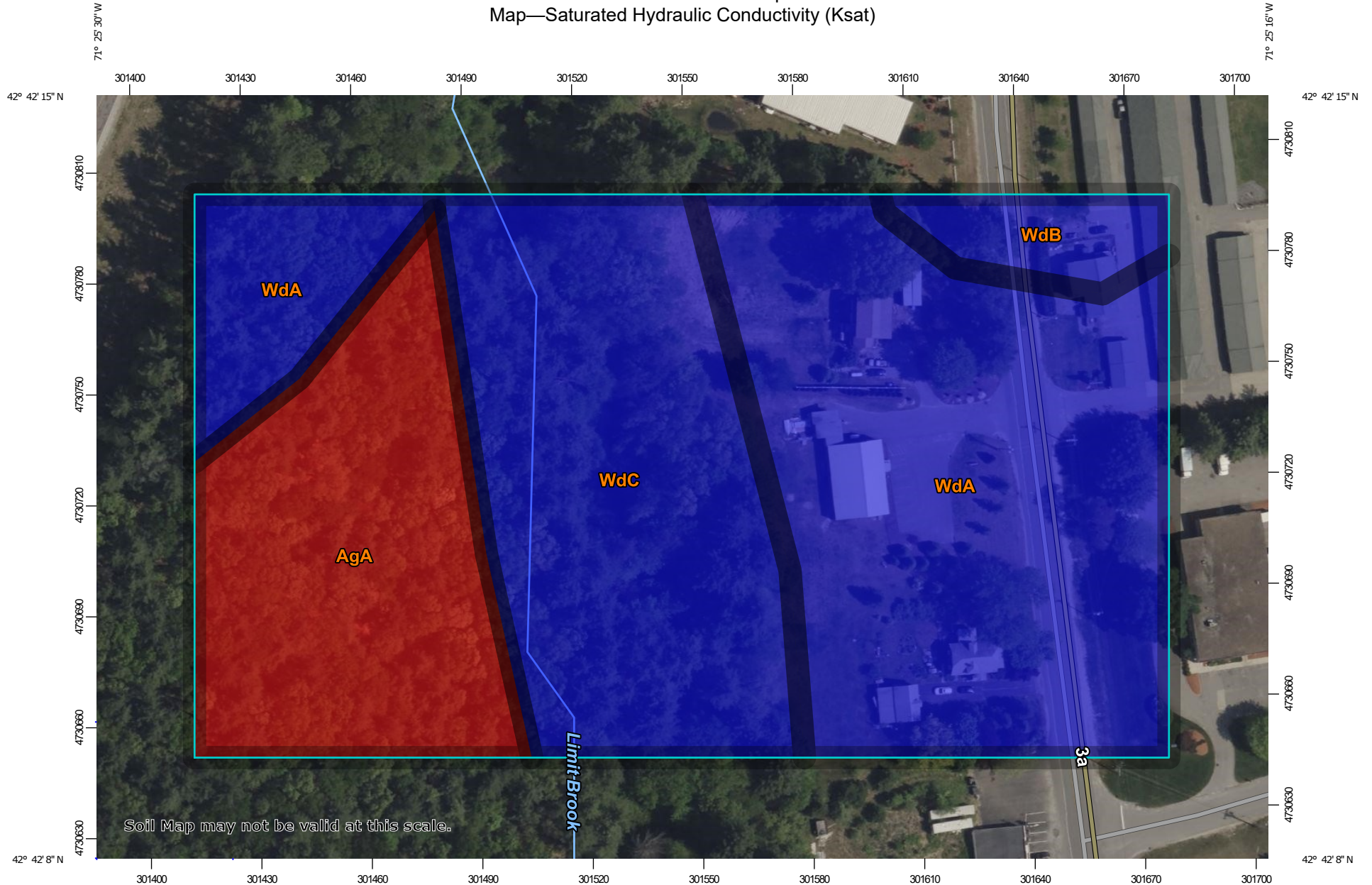
Saturated Hydraulic Conductivity (Ksat)

Saturated hydraulic conductivity (Ksat) refers to the ease with which pores in a saturated soil transmit water. The estimates are expressed in terms of micrometers per second. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Saturated hydraulic conductivity is considered in the design of soil drainage systems and septic tank absorption fields.

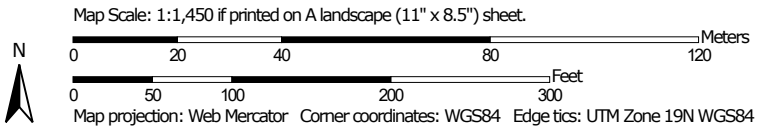
For each soil layer, this attribute is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.

The numeric Ksat values have been grouped according to standard Ksat class limits.

Custom Soil Resource Report Map—Saturated Hydraulic Conductivity (Ksat)




Soil Map may not be valid at this scale.






MAP LEGEND

Area of Interest (AOI)




 Area of Interest (AOI)

Soils




Soil Rating Polygons

-  <= 77.6364
-  > 77.6364 and <= 100.0000
-  Not rated or not available


Soil Rating Lines

-  <= 77.6364
-  > 77.6364 and <= 100.0000
-  Not rated or not available






Soil Rating Points

-  <= 77.6364
-  > 77.6364 and <= 100.0000
-  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.

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

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

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

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

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

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

Soil Survey Area: Hillsborough County, New Hampshire, Eastern Part
 Survey Area Data: Version 25, Sep 12, 2022

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

Date(s) aerial images were photographed: May 22, 2022—Jun 5, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND

MAP INFORMATION

imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Saturated Hydraulic Conductivity (Ksat)

Map unit symbol	Map unit name	Rating (micrometers per second)	Acres in AOI	Percent of AOI
AgA	Agawam fine sandy loam, 0 to 3 percent slopes	77.6364	2.2	22.2%
WdA	Windsor loamy sand, 0 to 3 percent slopes	100.0000	4.5	44.9%
WdB	Windsor loamy sand, 3 to 8 percent slopes	100.0000	0.4	3.9%
WdC	Windsor loamy sand, 8 to 15 percent slopes	100.0000	2.9	29.0%
Totals for Area of Interest			10.0	100.0%

Rating Options—Saturated Hydraulic Conductivity (Ksat)

Units of Measure: micrometers per second

Aggregation Method: Dominant Component

Component Percent Cutoff: None Specified

Tie-break Rule: Fastest

Interpret Nulls as Zero: No

Layer Options (Horizon Aggregation Method): Depth Range (Weighted Average)

Top Depth: 0

Bottom Depth: 100

Units of Measure: Inches

Soil Qualities and Features

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

Hydrologic Soil Group

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

Custom Soil Resource Report

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

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

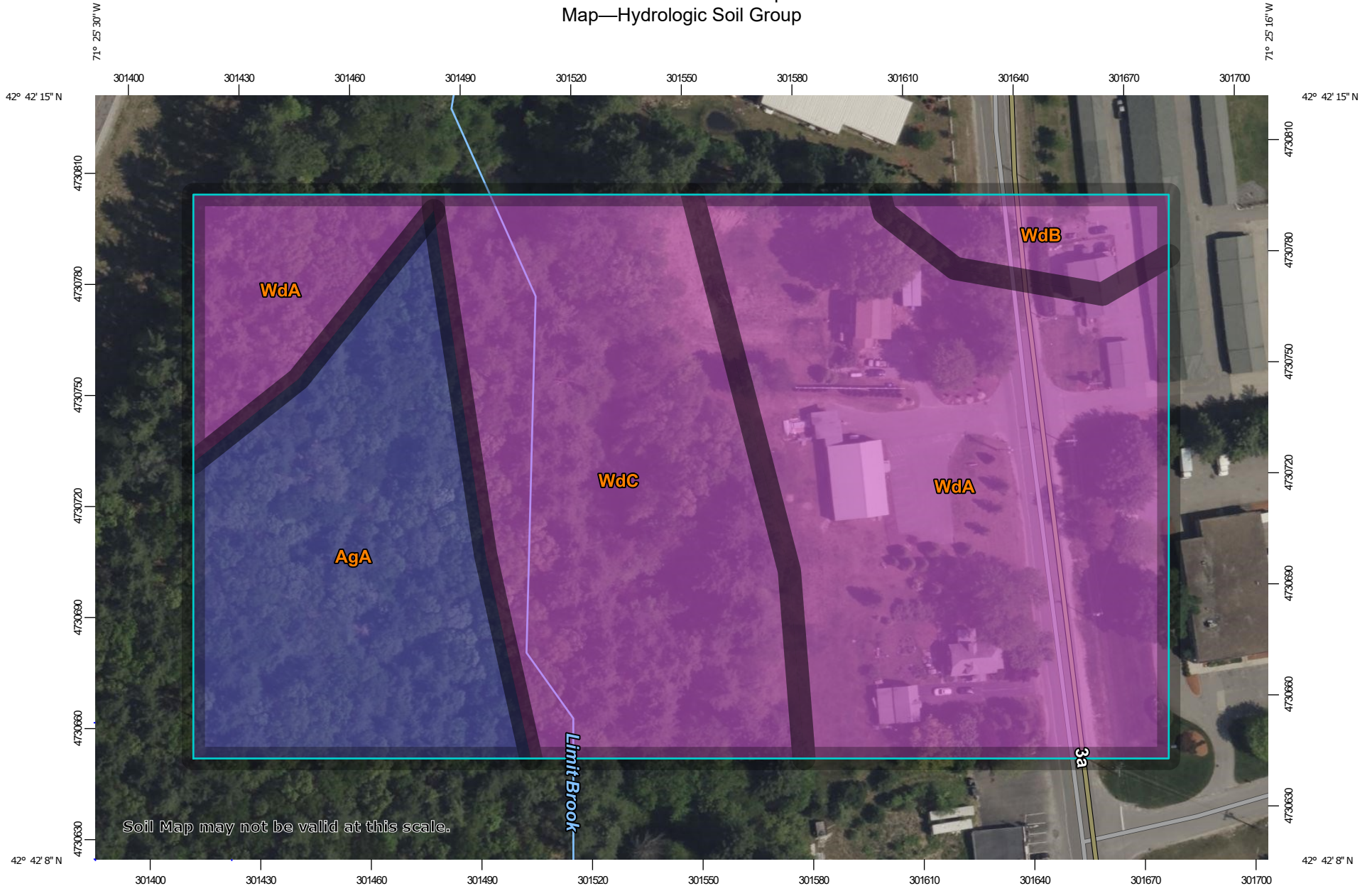
Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

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

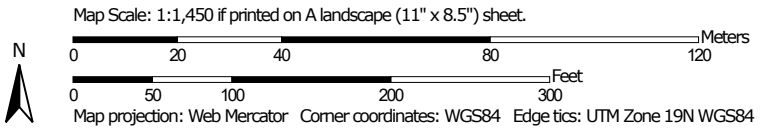
Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over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

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


Custom Soil Resource Report
Map—Hydrologic Soil Group



Soil Map may not be valid at this scale.











MAP LEGEND









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

Soils





Soil Rating Polygons

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


Soil Rating Lines

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






Soil Rating Points

-  A
-  A/D
-  B
-  B/D


Water Features

-  Streams and Canals





Transportation

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

Background

-  Aerial Photography

Soils (continued)

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

MAP INFORMATION

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

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

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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.

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The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND

MAP INFORMATION

imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
AgA	Agawam fine sandy loam, 0 to 3 percent slopes	B	2.2	22.2%
WdA	Windsor loamy sand, 0 to 3 percent slopes	A	4.5	44.9%
WdB	Windsor loamy sand, 3 to 8 percent slopes	A	0.4	3.9%
WdC	Windsor loamy sand, 8 to 15 percent slopes	A	2.9	29.0%
Totals for Area of Interest			10.0	100.0%

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

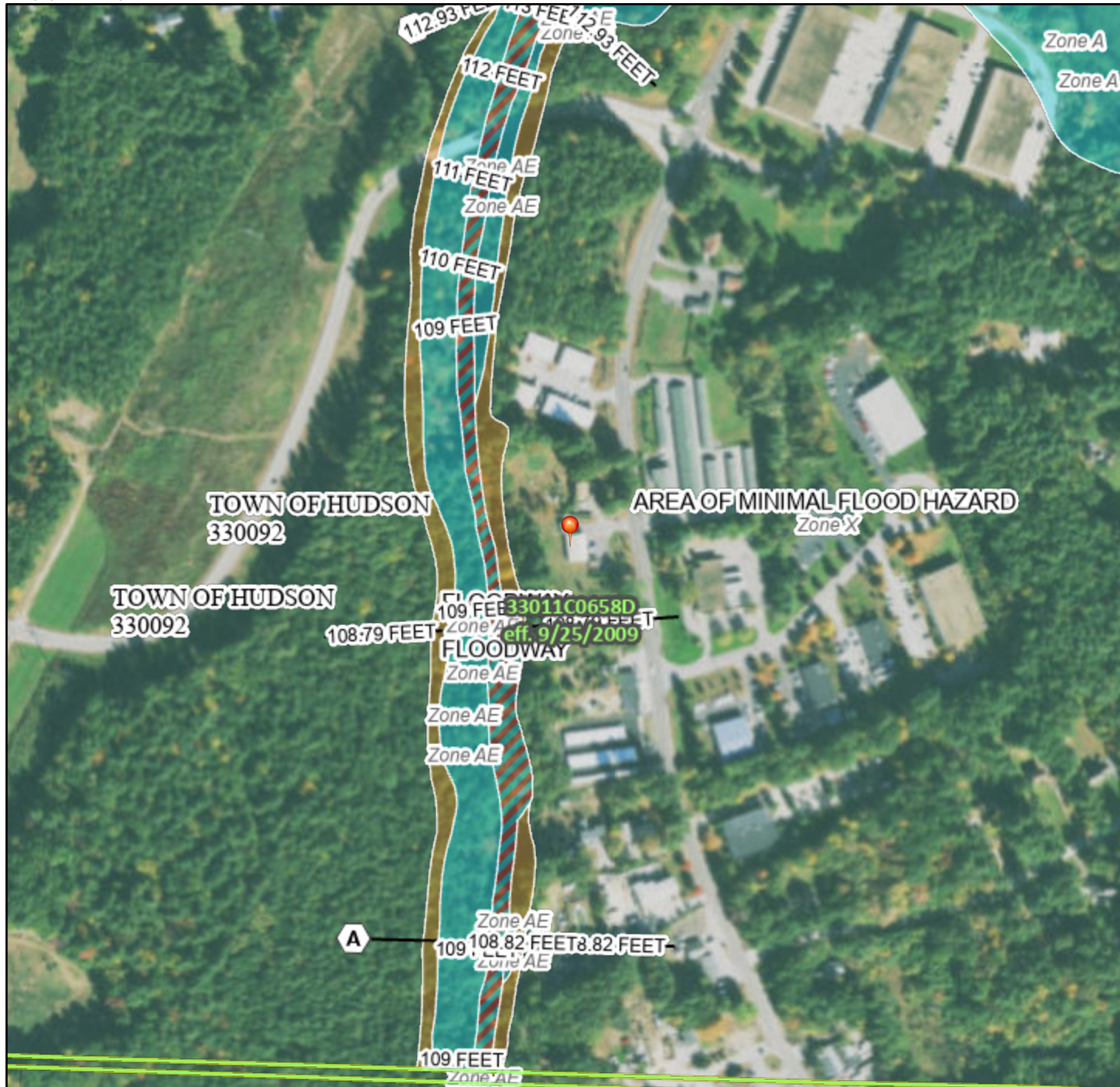
Component Percent Cutoff: None Specified

Tie-break Rule: Higher

National Flood Hazard Layer FIRMMette



71°25'40"W 42°42'25"N



Legend

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

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

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

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

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

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

MAP PANELS		Digital Data Available
		No Digital Data Available
		Unmapped

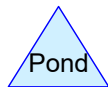
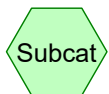
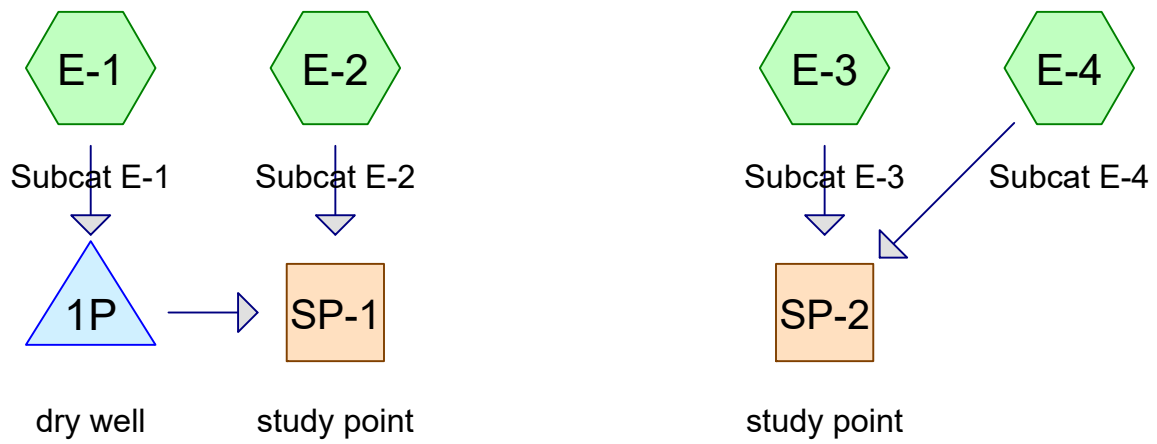


The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

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

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 7/6/2022 at 11:11 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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



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Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-year	Type III 24-hr		Default	24.00	1	2.99	2
2	10-year	Type III 24-hr		Default	24.00	1	4.49	2
3	25-year	Type III 24-hr		Default	24.00	1	5.68	2
4	50-year	Type III 24-hr		Default	24.00	1	6.78	2

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Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
27,899	39	>75% Grass cover, Good, HSG A (E-1, E-2, E-4)
9,169	98	Paved parking, HSG A (E-1)
3,781	98	Roofs, HSG A (E-1, E-3)
10,434	30	Woods, Good, HSG A (E-4)
51,282	52	TOTAL AREA

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Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
51,282	HSG A	E-1, E-2, E-3, E-4
0	HSG B	
0	HSG C	
0	HSG D	
0	Other	
51,282		TOTAL AREA

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Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Sub Num
27,899	0	0	0	0	27,899	>75% Grass cover, Good	
9,169	0	0	0	0	9,169	Paved parking	
3,781	0	0	0	0	3,781	Roofs	
10,434	0	0	0	0	10,434	Woods, Good	
51,282	0	0	0	0	51,282	TOTAL AREA	

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Type III 24-hr 2-year Rainfall=2.99"

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Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment E-1: Subcat E-1 Runoff Area=13,991 sf 76.91% Impervious Runoff Depth=1.51"
Tc=6.0 min CN=84 Runoff=0.57 cfs 1,758 cf

Subcatchment E-2: Subcat E-2 Runoff Area=6,713 sf 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=39 Runoff=0.00 cfs 0 cf

Subcatchment E-3: Subcat E-3 Runoff Area=2,189 sf 100.00% Impervious Runoff Depth=2.76"
Tc=6.0 min CN=98 Runoff=0.15 cfs 503 cf

Subcatchment E-4: Subcat E-4 Runoff Area=28,389 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=173' Tc=6.0 min CN=36 Runoff=0.00 cfs 0 cf

Reach SP-1: study point Inflow=0.00 cfs 0 cf
Outflow=0.00 cfs 0 cf

Reach SP-2: study point Inflow=0.15 cfs 503 cf
Outflow=0.15 cfs 503 cf

Pond 1P: dry well Peak Elev=113.45' Storage=187 cf Inflow=0.57 cfs 1,758 cf
Discarded=0.26 cfs 1,758 cf Primary=0.00 cfs 0 cf Outflow=0.26 cfs 1,758 cf

Total Runoff Area = 51,282 sf Runoff Volume = 2,261 cf Average Runoff Depth = 0.53"
74.75% Pervious = 38,333 sf 25.25% Impervious = 12,949 sf

3163-01 - Existing HydroCAD

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Type III 24-hr 2-year Rainfall=2.99"

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Summary for Subcatchment E-1: Subcat E-1

Runoff = 0.57 cfs @ 12.09 hrs, Volume= 1,758 cf, Depth= 1.51"
 Routed to Pond 1P : dry well

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type III 24-hr 2-year Rainfall=2.99"

Area (sf)	CN	Description
3,231	39	>75% Grass cover, Good, HSG A
9,169	98	Paved parking, HSG A
1,592	98	Roofs, HSG A
13,991	84	Weighted Average
3,231		23.09% Pervious Area
10,760		76.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR-55 Min

Summary for Subcatchment E-2: Subcat E-2

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
 Routed to Reach SP-1 : study point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type III 24-hr 2-year Rainfall=2.99"

Area (sf)	CN	Description
6,713	39	>75% Grass cover, Good, HSG A
6,713		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR-55 Min

Summary for Subcatchment E-3: Subcat E-3

Runoff = 0.15 cfs @ 12.08 hrs, Volume= 503 cf, Depth= 2.76"
 Routed to Reach SP-2 : study point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type III 24-hr 2-year Rainfall=2.99"

3163-01 - Existing HydroCAD

Type III 24-hr 2-year Rainfall=2.99"

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Area (sf)	CN	Description
2,189	98	Roofs, HSG A
2,189		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR-55 Min

Summary for Subcatchment E-4: Subcat E-4

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
 Routed to Reach SP-2 : study point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type III 24-hr 2-year Rainfall=2.99"

Area (sf)	CN	Description
17,955	39	>75% Grass cover, Good, HSG A
10,434	30	Woods, Good, HSG A
28,389	36	Weighted Average
28,389		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.4	50	0.0660	0.24		Sheet Flow, A-B Grass: Short n= 0.150 P2= 3.28"
0.3	40	0.1000	2.21		Shallow Concentrated Flow, B-C Short Grass Pasture Kv= 7.0 fps
0.6	83	0.1900	2.18		Shallow Concentrated Flow, C-D Woodland Kv= 5.0 fps
4.3	173	Total,	Increased to minimum Tc = 6.0 min		

Summary for Reach SP-1: study point

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

Inflow Area = 20,704 sf, 51.97% Impervious, Inflow Depth = 0.00" for 2-year event
 Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Summary for Reach SP-2: study point

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

3163-01 - Existing HydroCAD

Type III 24-hr 2-year Rainfall=2.99"

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Inflow Area = 30,579 sf, 7.16% Impervious, Inflow Depth = 0.20" for 2-year event
 Inflow = 0.15 cfs @ 12.08 hrs, Volume= 503 cf
 Outflow = 0.15 cfs @ 12.08 hrs, Volume= 503 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Summary for Pond 1P: dry well

Dimensions of system taken from plans by HSI Inc. 2004

Exfiltration rate taken from plans by HSI Inc. 2 min per inch at TP-1 and applied 2x safety factor. 15 in per hour used.

Groundwater assumed to be bottom of brook since it was not detected in the test pit.

Inflow Area = 13,991 sf, 76.91% Impervious, Inflow Depth = 1.51" for 2-year event
 Inflow = 0.57 cfs @ 12.09 hrs, Volume= 1,758 cf
 Outflow = 0.26 cfs @ 12.28 hrs, Volume= 1,758 cf, Atten= 53%, Lag= 11.6 min
 Discarded = 0.26 cfs @ 12.28 hrs, Volume= 1,758 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
 Routed to Reach SP-1 : study point

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Peak Elev= 113.45' @ 12.28 hrs Surf.Area= 600 sf Storage= 187 cf

Flood Elev= 125.92' Surf.Area= 600 sf Storage= 2,442 cf

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

Center-of-Mass det. time= 3.3 min (836.0 - 832.7)

Volume	Invert	Avail.Storage	Storage Description
#1	112.42'	2,117 cf	Stone storage (Conic) Listed below (Recalc) 7,500 cf Overall - 443 cf Embedded = 7,057 cf x 30.0% Voids
#2	113.42'	325 cf	6.00'D x 11.50'H Vertical Cone/Cylinder Inside #1 443 cf Overall - 6.0" Wall Thickness = 325 cf
		2,442 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
112.42	600	0	0	600
124.92	600	7,500	7,500	1,685

Device	Routing	Invert	Outlet Devices
#0	Primary	124.92'	Automatic Storage Overflow (Discharged without head)
#1	Discarded	112.42'	15.000 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 103.00' Phase-In= 0.01'

Discarded OutFlow Max=0.26 cfs @ 12.28 hrs HW=113.45' (Free Discharge)

↑**1=Exfiltration** (Controls 0.26 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=112.42' TW=0.00' (Dynamic Tailwater)

3163-01 - Existing HydroCAD

Type III 24-hr 10-year Rainfall=4.49"

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Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment E-1: Subcat E-1 Runoff Area=13,991 sf 76.91% Impervious Runoff Depth=2.81"
Tc=6.0 min CN=84 Runoff=1.05 cfs 3,273 cf

Subcatchment E-2: Subcat E-2 Runoff Area=6,713 sf 0.00% Impervious Runoff Depth=0.11"
Tc=6.0 min CN=39 Runoff=0.00 cfs 61 cf

Subcatchment E-3: Subcat E-3 Runoff Area=2,189 sf 100.00% Impervious Runoff Depth=4.25"
Tc=6.0 min CN=98 Runoff=0.22 cfs 776 cf

Subcatchment E-4: Subcat E-4 Runoff Area=28,389 sf 0.00% Impervious Runoff Depth=0.05"
Flow Length=173' Tc=6.0 min CN=36 Runoff=0.00 cfs 110 cf

Reach SP-1: study point Inflow=0.00 cfs 61 cf
Outflow=0.00 cfs 61 cf

Reach SP-2: study point Inflow=0.22 cfs 886 cf
Outflow=0.22 cfs 886 cf

Pond 1P: dry well Peak Elev=115.49' Storage=588 cf Inflow=1.05 cfs 3,273 cf
Discarded=0.38 cfs 3,273 cf Primary=0.00 cfs 0 cf Outflow=0.38 cfs 3,273 cf

Total Runoff Area = 51,282 sf Runoff Volume = 4,221 cf Average Runoff Depth = 0.99"
74.75% Pervious = 38,333 sf 25.25% Impervious = 12,949 sf

3163-01 - Existing HydroCAD

Type III 24-hr 10-year Rainfall=4.49"

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Summary for Subcatchment E-1: Subcat E-1

Runoff = 1.05 cfs @ 12.09 hrs, Volume= 3,273 cf, Depth= 2.81"
 Routed to Pond 1P : dry well

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-year Rainfall=4.49"

Area (sf)	CN	Description
3,231	39	>75% Grass cover, Good, HSG A
9,169	98	Paved parking, HSG A
1,592	98	Roofs, HSG A
13,991	84	Weighted Average
3,231		23.09% Pervious Area
10,760		76.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR-55 Min

Summary for Subcatchment E-2: Subcat E-2

Runoff = 0.00 cfs @ 14.74 hrs, Volume= 61 cf, Depth= 0.11"
 Routed to Reach SP-1 : study point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-year Rainfall=4.49"

Area (sf)	CN	Description
6,713	39	>75% Grass cover, Good, HSG A
6,713		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR-55 Min

Summary for Subcatchment E-3: Subcat E-3

Runoff = 0.22 cfs @ 12.08 hrs, Volume= 776 cf, Depth= 4.25"
 Routed to Reach SP-2 : study point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-year Rainfall=4.49"

Area (sf)	CN	Description
2,189	98	Roofs, HSG A
2,189		100.00% Impervious Area

3163-01 - Existing HydroCAD

Type III 24-hr 10-year Rainfall=4.49"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR-55 Min

Summary for Subcatchment E-4: Subcat E-4

Runoff = 0.00 cfs @ 15.66 hrs, Volume= 110 cf, Depth= 0.05"
 Routed to Reach SP-2 : study point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-year Rainfall=4.49"

Area (sf)	CN	Description
17,955	39	>75% Grass cover, Good, HSG A
10,434	30	Woods, Good, HSG A
28,389	36	Weighted Average
28,389		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.4	50	0.0660	0.24		Sheet Flow, A-B Grass: Short n= 0.150 P2= 3.28"
0.3	40	0.1000	2.21		Shallow Concentrated Flow, B-C Short Grass Pasture Kv= 7.0 fps
0.6	83	0.1900	2.18		Shallow Concentrated Flow, C-D Woodland Kv= 5.0 fps
4.3	173	Total, Increased to minimum Tc = 6.0 min			

Summary for Reach SP-1: study point

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

Inflow Area = 20,704 sf, 51.97% Impervious, Inflow Depth = 0.04" for 10-year event
 Inflow = 0.00 cfs @ 14.74 hrs, Volume= 61 cf
 Outflow = 0.00 cfs @ 14.74 hrs, Volume= 61 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Summary for Reach SP-2: study point

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

Inflow Area = 30,579 sf, 7.16% Impervious, Inflow Depth = 0.35" for 10-year event
 Inflow = 0.22 cfs @ 12.08 hrs, Volume= 886 cf
 Outflow = 0.22 cfs @ 12.08 hrs, Volume= 886 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Summary for Pond 1P: dry well

Dimensions of system taken from plans by HSI Inc. 2004

Exfiltration rate taken from plans by HSI Inc. 2 min per inch at TP-1 and applied 2x safety factor. 15 in per hour used.

Groundwater assumed to be bottom of brook since it was not detected in the test pit.

Inflow Area = 13,991 sf, 76.91% Impervious, Inflow Depth = 2.81" for 10-year event
 Inflow = 1.05 cfs @ 12.09 hrs, Volume= 3,273 cf
 Outflow = 0.38 cfs @ 12.36 hrs, Volume= 3,273 cf, Atten= 64%, Lag= 16.5 min
 Discarded = 0.38 cfs @ 12.36 hrs, Volume= 3,273 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
 Routed to Reach SP-1 : study point

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 115.49' @ 12.36 hrs Surf.Area= 600 sf Storage= 588 cf
 Flood Elev= 125.92' Surf.Area= 600 sf Storage= 2,442 cf

Plug-Flow detention time= 9.0 min calculated for 3,273 cf (100% of inflow)
 Center-of-Mass det. time= 9.0 min (823.9 - 814.9)

Volume	Invert	Avail.Storage	Storage Description
#1	112.42'	2,117 cf	Stone storage (Conic) Listed below (Recalc) 7,500 cf Overall - 443 cf Embedded = 7,057 cf x 30.0% Voids
#2	113.42'	325 cf	6.00'D x 11.50'H Vertical Cone/Cylinder Inside #1 443 cf Overall - 6.0" Wall Thickness = 325 cf
		2,442 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
112.42	600	0	0	600
124.92	600	7,500	7,500	1,685

Device	Routing	Invert	Outlet Devices
#0	Primary	124.92'	Automatic Storage Overflow (Discharged without head)
#1	Discarded	112.42'	15.000 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 103.00' Phase-In= 0.01'

Discarded OutFlow Max=0.38 cfs @ 12.36 hrs HW=115.49' (Free Discharge)
 ↑**1=Exfiltration** (Controls 0.38 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=112.42' TW=0.00' (Dynamic Tailwater)

3163-01 - Existing HydroCAD

Type III 24-hr 25-year Rainfall=5.68"

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Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment E-1: Subcat E-1 Runoff Area=13,991 sf 76.91% Impervious Runoff Depth=3.90"
Tc=6.0 min CN=84 Runoff=1.45 cfs 4,545 cf

Subcatchment E-2: Subcat E-2 Runoff Area=6,713 sf 0.00% Impervious Runoff Depth=0.36"
Tc=6.0 min CN=39 Runoff=0.02 cfs 200 cf

Subcatchment E-3: Subcat E-3 Runoff Area=2,189 sf 100.00% Impervious Runoff Depth=5.44"
Tc=6.0 min CN=98 Runoff=0.28 cfs 993 cf

Subcatchment E-4: Subcat E-4 Runoff Area=28,389 sf 0.00% Impervious Runoff Depth=0.23"
Flow Length=173' Tc=6.0 min CN=36 Runoff=0.03 cfs 536 cf

Reach SP-1: study point Inflow=0.02 cfs 200 cf
Outflow=0.02 cfs 200 cf

Reach SP-2: study point Inflow=0.28 cfs 1,529 cf
Outflow=0.28 cfs 1,529 cf

Pond 1P: dry well Peak Elev=117.29' Storage=942 cf Inflow=1.45 cfs 4,545 cf
Discarded=0.49 cfs 4,545 cf Primary=0.00 cfs 0 cf Outflow=0.49 cfs 4,545 cf

Total Runoff Area = 51,282 sf Runoff Volume = 6,274 cf Average Runoff Depth = 1.47"
74.75% Pervious = 38,333 sf 25.25% Impervious = 12,949 sf

3163-01 - Existing HydroCAD

Type III 24-hr 25-year Rainfall=5.68"

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Summary for Subcatchment E-1: Subcat E-1

Runoff = 1.45 cfs @ 12.09 hrs, Volume= 4,545 cf, Depth= 3.90"
 Routed to Pond 1P : dry well

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type III 24-hr 25-year Rainfall=5.68"

Area (sf)	CN	Description
3,231	39	>75% Grass cover, Good, HSG A
9,169	98	Paved parking, HSG A
1,592	98	Roofs, HSG A
13,991	84	Weighted Average
3,231		23.09% Pervious Area
10,760		76.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR-55 Min

Summary for Subcatchment E-2: Subcat E-2

Runoff = 0.02 cfs @ 12.38 hrs, Volume= 200 cf, Depth= 0.36"
 Routed to Reach SP-1 : study point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type III 24-hr 25-year Rainfall=5.68"

Area (sf)	CN	Description
6,713	39	>75% Grass cover, Good, HSG A
6,713		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR-55 Min

Summary for Subcatchment E-3: Subcat E-3

Runoff = 0.28 cfs @ 12.08 hrs, Volume= 993 cf, Depth= 5.44"
 Routed to Reach SP-2 : study point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type III 24-hr 25-year Rainfall=5.68"

Area (sf)	CN	Description
2,189	98	Roofs, HSG A
2,189		100.00% Impervious Area

3163-01 - Existing HydroCAD

Type III 24-hr 25-year Rainfall=5.68"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR-55 Min

Summary for Subcatchment E-4: Subcat E-4

Runoff = 0.03 cfs @ 12.48 hrs, Volume= 536 cf, Depth= 0.23"
 Routed to Reach SP-2 : study point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type III 24-hr 25-year Rainfall=5.68"

Area (sf)	CN	Description
17,955	39	>75% Grass cover, Good, HSG A
10,434	30	Woods, Good, HSG A
28,389	36	Weighted Average
28,389		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.4	50	0.0660	0.24		Sheet Flow, A-B Grass: Short n= 0.150 P2= 3.28"
0.3	40	0.1000	2.21		Shallow Concentrated Flow, B-C Short Grass Pasture Kv= 7.0 fps
0.6	83	0.1900	2.18		Shallow Concentrated Flow, C-D Woodland Kv= 5.0 fps
4.3	173	Total, Increased to minimum Tc = 6.0 min			

Summary for Reach SP-1: study point

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

Inflow Area = 20,704 sf, 51.97% Impervious, Inflow Depth = 0.12" for 25-year event
 Inflow = 0.02 cfs @ 12.38 hrs, Volume= 200 cf
 Outflow = 0.02 cfs @ 12.38 hrs, Volume= 200 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Summary for Reach SP-2: study point

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

Inflow Area = 30,579 sf, 7.16% Impervious, Inflow Depth = 0.60" for 25-year event
 Inflow = 0.28 cfs @ 12.08 hrs, Volume= 1,529 cf
 Outflow = 0.28 cfs @ 12.08 hrs, Volume= 1,529 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Summary for Pond 1P: dry well

Dimensions of system taken from plans by HSI Inc. 2004

Exfiltration rate taken from plans by HSI Inc. 2 min per inch at TP-1 and applied 2x safety factor. 15 in per hour used.

Groundwater assumed to be bottom of brook since it was not detected in the test pit.

Inflow Area = 13,991 sf, 76.91% Impervious, Inflow Depth = 3.90" for 25-year event
 Inflow = 1.45 cfs @ 12.09 hrs, Volume= 4,545 cf
 Outflow = 0.49 cfs @ 12.38 hrs, Volume= 4,545 cf, Atten= 66%, Lag= 17.4 min
 Discarded = 0.49 cfs @ 12.38 hrs, Volume= 4,545 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
 Routed to Reach SP-1 : study point

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 117.29' @ 12.38 hrs Surf.Area= 600 sf Storage= 942 cf
 Flood Elev= 125.92' Surf.Area= 600 sf Storage= 2,442 cf

Plug-Flow detention time= 12.6 min calculated for 4,543 cf (100% of inflow)
 Center-of-Mass det. time= 12.6 min (818.1 - 805.6)

Volume	Invert	Avail.Storage	Storage Description
#1	112.42'	2,117 cf	Stone storage (Conic) Listed below (Recalc) 7,500 cf Overall - 443 cf Embedded = 7,057 cf x 30.0% Voids
#2	113.42'	325 cf	6.00'D x 11.50'H Vertical Cone/Cylinder Inside #1 443 cf Overall - 6.0" Wall Thickness = 325 cf
		2,442 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
112.42	600	0	0	600
124.92	600	7,500	7,500	1,685

Device	Routing	Invert	Outlet Devices
#0	Primary	124.92'	Automatic Storage Overflow (Discharged without head)
#1	Discarded	112.42'	15.000 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 103.00' Phase-In= 0.01'

Discarded OutFlow Max=0.49 cfs @ 12.38 hrs HW=117.29' (Free Discharge)
 ↑1=Exfiltration (Controls 0.49 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=112.42' TW=0.00' (Dynamic Tailwater)

3163-01 - Existing HydroCAD

Type III 24-hr 50-year Rainfall=6.78"

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Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment E-1: Subcat E-1 Runoff Area=13,991 sf 76.91% Impervious Runoff Depth=4.93"
Tc=6.0 min CN=84 Runoff=1.82 cfs 5,749 cf

Subcatchment E-2: Subcat E-2 Runoff Area=6,713 sf 0.00% Impervious Runoff Depth=0.69"
Tc=6.0 min CN=39 Runoff=0.05 cfs 387 cf

Subcatchment E-3: Subcat E-3 Runoff Area=2,189 sf 100.00% Impervious Runoff Depth=6.54"
Tc=6.0 min CN=98 Runoff=0.33 cfs 1,193 cf

Subcatchment E-4: Subcat E-4 Runoff Area=28,389 sf 0.00% Impervious Runoff Depth=0.50"
Flow Length=173' Tc=6.0 min CN=36 Runoff=0.13 cfs 1,171 cf

Reach SP-1: study point Inflow=0.05 cfs 387 cf
Outflow=0.05 cfs 387 cf

Reach SP-2: study point Inflow=0.35 cfs 2,364 cf
Outflow=0.35 cfs 2,364 cf

Pond 1P: dry well Peak Elev=118.98' Storage=1,273 cf Inflow=1.82 cfs 5,749 cf
Discarded=0.61 cfs 5,749 cf Primary=0.00 cfs 0 cf Outflow=0.61 cfs 5,749 cf

Total Runoff Area = 51,282 sf Runoff Volume = 8,500 cf Average Runoff Depth = 1.99"
74.75% Pervious = 38,333 sf 25.25% Impervious = 12,949 sf

3163-01 - Existing HydroCAD

Type III 24-hr 50-year Rainfall=6.78"

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Summary for Subcatchment E-1: Subcat E-1

Runoff = 1.82 cfs @ 12.09 hrs, Volume= 5,749 cf, Depth= 4.93"
 Routed to Pond 1P : dry well

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type III 24-hr 50-year Rainfall=6.78"

Area (sf)	CN	Description
3,231	39	>75% Grass cover, Good, HSG A
9,169	98	Paved parking, HSG A
1,592	98	Roofs, HSG A
13,991	84	Weighted Average
3,231		23.09% Pervious Area
10,760		76.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR-55 Min

Summary for Subcatchment E-2: Subcat E-2

Runoff = 0.05 cfs @ 12.15 hrs, Volume= 387 cf, Depth= 0.69"
 Routed to Reach SP-1 : study point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type III 24-hr 50-year Rainfall=6.78"

Area (sf)	CN	Description
6,713	39	>75% Grass cover, Good, HSG A
6,713		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR-55 Min

Summary for Subcatchment E-3: Subcat E-3

Runoff = 0.33 cfs @ 12.08 hrs, Volume= 1,193 cf, Depth= 6.54"
 Routed to Reach SP-2 : study point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type III 24-hr 50-year Rainfall=6.78"

Area (sf)	CN	Description
2,189	98	Roofs, HSG A
2,189		100.00% Impervious Area

3163-01 - Existing HydroCAD

Type III 24-hr 50-year Rainfall=6.78"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR-55 Min

Summary for Subcatchment E-4: Subcat E-4

Runoff = 0.13 cfs @ 12.35 hrs, Volume= 1,171 cf, Depth= 0.50"
 Routed to Reach SP-2 : study point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type III 24-hr 50-year Rainfall=6.78"

Area (sf)	CN	Description
17,955	39	>75% Grass cover, Good, HSG A
10,434	30	Woods, Good, HSG A
28,389	36	Weighted Average
28,389		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.4	50	0.0660	0.24		Sheet Flow, A-B Grass: Short n= 0.150 P2= 3.28"
0.3	40	0.1000	2.21		Shallow Concentrated Flow, B-C Short Grass Pasture Kv= 7.0 fps
0.6	83	0.1900	2.18		Shallow Concentrated Flow, C-D Woodland Kv= 5.0 fps
4.3	173	Total, Increased to minimum Tc = 6.0 min			

Summary for Reach SP-1: study point

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

Inflow Area = 20,704 sf, 51.97% Impervious, Inflow Depth = 0.22" for 50-year event
 Inflow = 0.05 cfs @ 12.15 hrs, Volume= 387 cf
 Outflow = 0.05 cfs @ 12.15 hrs, Volume= 387 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Summary for Reach SP-2: study point

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

Inflow Area = 30,579 sf, 7.16% Impervious, Inflow Depth = 0.93" for 50-year event
 Inflow = 0.35 cfs @ 12.10 hrs, Volume= 2,364 cf
 Outflow = 0.35 cfs @ 12.10 hrs, Volume= 2,364 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Summary for Pond 1P: dry well

Dimensions of system taken from plans by HSI Inc. 2004

Exfiltration rate taken from plans by HSI Inc. 2 min per inch at TP-1 and applied 2x safety factor. 15 in per hour used.

Groundwater assumed to be bottom of brook since it was not detected in the test pit.

Inflow Area = 13,991 sf, 76.91% Impervious, Inflow Depth = 4.93" for 50-year event
 Inflow = 1.82 cfs @ 12.09 hrs, Volume= 5,749 cf
 Outflow = 0.61 cfs @ 12.38 hrs, Volume= 5,749 cf, Atten= 67%, Lag= 17.6 min
 Discarded = 0.61 cfs @ 12.38 hrs, Volume= 5,749 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
 Routed to Reach SP-1 : study point

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 118.98' @ 12.38 hrs Surf.Area= 600 sf Storage= 1,273 cf
 Flood Elev= 125.92' Surf.Area= 600 sf Storage= 2,442 cf

Plug-Flow detention time= 15.0 min calculated for 5,749 cf (100% of inflow)
 Center-of-Mass det. time= 15.0 min (813.9 - 799.0)

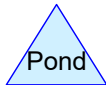
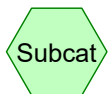
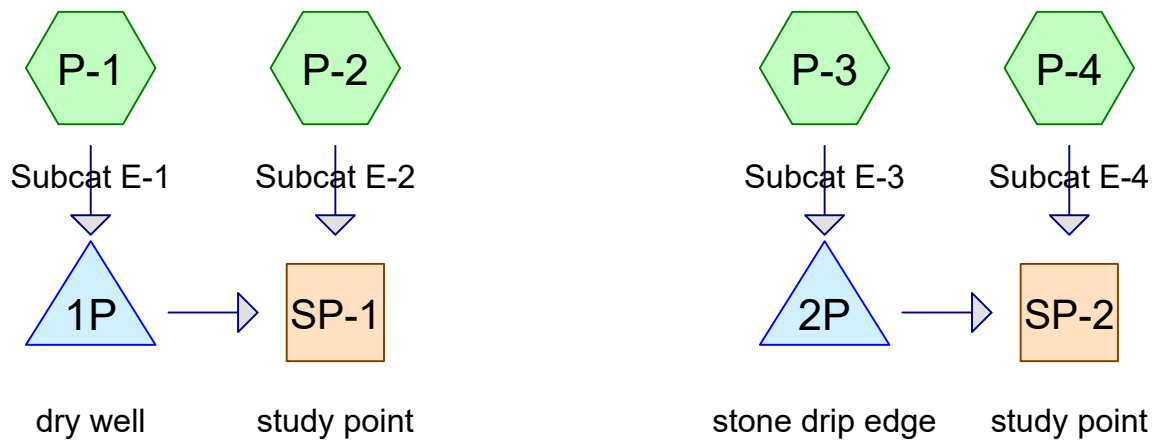
Volume	Invert	Avail.Storage	Storage Description
#1	112.42'	2,117 cf	Stone storage (Conic) Listed below (Recalc) 7,500 cf Overall - 443 cf Embedded = 7,057 cf x 30.0% Voids
#2	113.42'	325 cf	6.00'D x 11.50'H Vertical Cone/Cylinder Inside #1 443 cf Overall - 6.0" Wall Thickness = 325 cf
		2,442 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
112.42	600	0	0	600
124.92	600	7,500	7,500	1,685

Device	Routing	Invert	Outlet Devices
#0	Primary	124.92'	Automatic Storage Overflow (Discharged without head)
#1	Discarded	112.42'	15.000 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 103.00' Phase-In= 0.01'

Discarded OutFlow Max=0.61 cfs @ 12.38 hrs HW=118.98' (Free Discharge)
 ↑**1=Exfiltration** (Controls 0.61 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=112.42' TW=0.00' (Dynamic Tailwater)



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Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-year	Type III 24-hr		Default	24.00	1	2.99	2
2	10-year	Type III 24-hr		Default	24.00	1	4.49	2
3	25-year	Type III 24-hr		Default	24.00	1	5.68	2
4	50-year	Type III 24-hr		Default	24.00	1	6.78	2

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Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
20,176	39	>75% Grass cover, Good, HSG A (P-1, P-2, P-4)
10,371	98	Paved parking, HSG A (P-1)
10,300	98	Roofs, HSG A (P-1, P-3)
10,434	30	Woods, Good, HSG A (P-4)
51,282	61	TOTAL AREA

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Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
51,282	HSG A	P-1, P-2, P-3, P-4
0	HSG B	
0	HSG C	
0	HSG D	
0	Other	
51,282		TOTAL AREA

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Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Sub Num
20,176	0	0	0	0	20,176	>75% Grass cover, Good	
10,371	0	0	0	0	10,371	Paved parking	
10,300	0	0	0	0	10,300	Roofs	
10,434	0	0	0	0	10,434	Woods, Good	
51,282	0	0	0	0	51,282	TOTAL AREA	

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Type III 24-hr 2-year Rainfall=2.99"

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Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment P-1: Subcat E-1 Runoff Area=14,860 sf 80.51% Impervious Runoff Depth=1.65"
Tc=6.0 min CN=86 Runoff=0.66 cfs 2,048 cf

Subcatchment P-2: Subcat E-2 Runoff Area=5,791 sf 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=39 Runoff=0.00 cfs 0 cf

Subcatchment P-3: Subcat E-3 Runoff Area=8,709 sf 100.00% Impervious Runoff Depth=2.76"
Tc=6.0 min CN=98 Runoff=0.58 cfs 2,002 cf

Subcatchment P-4: Subcat E-4 Runoff Area=21,923 sf 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=35 Runoff=0.00 cfs 0 cf

Reach SP-1: study point Inflow=0.00 cfs 0 cf
Outflow=0.00 cfs 0 cf

Reach SP-2: study point Inflow=0.00 cfs 0 cf
Outflow=0.00 cfs 0 cf

Pond 1P: dry well Peak Elev=113.56' Storage=208 cf Inflow=0.66 cfs 2,048 cf
Discarded=0.35 cfs 2,048 cf Primary=0.00 cfs 0 cf Outflow=0.35 cfs 2,048 cf

Pond 2P: stone drip edge Peak Elev=119.98' Storage=226 cf Inflow=0.58 cfs 2,002 cf
Discarded=0.31 cfs 2,002 cf Primary=0.00 cfs 0 cf Outflow=0.31 cfs 2,002 cf

Total Runoff Area = 51,282 sf Runoff Volume = 4,050 cf Average Runoff Depth = 0.95"
59.69% Pervious = 30,610 sf 40.31% Impervious = 20,672 sf

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Type III 24-hr 2-year Rainfall=2.99"

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Summary for Subcatchment P-1: Subcat E-1

Runoff = 0.66 cfs @ 12.09 hrs, Volume= 2,048 cf, Depth= 1.65"
 Routed to Pond 1P : dry well

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type III 24-hr 2-year Rainfall=2.99"

Area (sf)	CN	Description
2,897	39	>75% Grass cover, Good, HSG A
10,371	98	Paved parking, HSG A
1,592	98	Roofs, HSG A
14,860	86	Weighted Average
2,897		19.49% Pervious Area
11,963		80.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR-55 Min

Summary for Subcatchment P-2: Subcat E-2

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
 Routed to Reach SP-1 : study point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type III 24-hr 2-year Rainfall=2.99"

Area (sf)	CN	Description
5,791	39	>75% Grass cover, Good, HSG A
5,791		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR-55 Min

Summary for Subcatchment P-3: Subcat E-3

Runoff = 0.58 cfs @ 12.08 hrs, Volume= 2,002 cf, Depth= 2.76"
 Routed to Pond 2P : stone drip edge

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type III 24-hr 2-year Rainfall=2.99"

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Type III 24-hr 2-year Rainfall=2.99"

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Area (sf)	CN	Description
8,709	98	Roofs, HSG A
8,709		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR-55 Min

Summary for Subcatchment P-4: Subcat E-4

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
 Routed to Reach SP-2 : study point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type III 24-hr 2-year Rainfall=2.99"

Area (sf)	CN	Description
11,488	39	>75% Grass cover, Good, HSG A
10,434	30	Woods, Good, HSG A
21,923	35	Weighted Average
21,923		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR-55 MIN

Summary for Reach SP-1: study point

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

Inflow Area = 20,651 sf, 57.93% Impervious, Inflow Depth = 0.00" for 2-year event
 Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Summary for Reach SP-2: study point

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

Inflow Area = 30,631 sf, 28.43% Impervious, Inflow Depth = 0.00" for 2-year event
 Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

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Type III 24-hr 2-year Rainfall=2.99"

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Summary for Pond 1P: dry well

Dimensions of system taken from plans by HSI Inc. 2004

Exfiltration rate taken from plans by HSI Inc. 2 min per inch at TP-1 and applied 2x safety factor. 15 in per hour used.

Groundwater assumed since it was not detected in the test pit.

Inflow Area = 14,860 sf, 80.51% Impervious, Inflow Depth = 1.65" for 2-year event
 Inflow = 0.66 cfs @ 12.09 hrs, Volume= 2,048 cf
 Outflow = 0.35 cfs @ 12.23 hrs, Volume= 2,048 cf, Atten= 47%, Lag= 8.7 min
 Discarded = 0.35 cfs @ 12.23 hrs, Volume= 2,048 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
 Routed to Reach SP-1 : study point

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Peak Elev= 113.56' @ 12.23 hrs Surf.Area= 600 sf Storage= 208 cf

Flood Elev= 125.92' Surf.Area= 600 sf Storage= 2,442 cf

Plug-Flow detention time= 2.9 min calculated for 2,048 cf (100% of inflow)

Center-of-Mass det. time= 2.9 min (828.4 - 825.5)

Volume	Invert	Avail.Storage	Storage Description
#1	112.42'	2,117 cf	Stone storage (Conic) Listed below (Recalc) 7,500 cf Overall - 443 cf Embedded = 7,057 cf x 30.0% Voids
#2	113.42'	325 cf	6.00'D x 11.50'H Vertical Cone/Cylinder Inside #1 443 cf Overall - 6.0" Wall Thickness = 325 cf
		2,442 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
112.42	600	0	0	600
124.92	600	7,500	7,500	1,685

Device	Routing	Invert	Outlet Devices
#0	Primary	124.92'	Automatic Storage Overflow (Discharged without head)
#1	Discarded	112.42'	15.000 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 110.00' Phase-In= 0.01'

Discarded OutFlow Max=0.35 cfs @ 12.23 hrs HW=113.56' (Free Discharge)

↑**1=Exfiltration** (Controls 0.35 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=112.42' TW=0.00' (Dynamic Tailwater)

Summary for Pond 2P: stone drip edge

Exfiltration rate taken from plans by HSI Inc. 4 min per inch at TP-3 and applied 2x safety factor. 7.5 in per hour used.

Groundwater assumed based on TP-3.

[92] Warning: Device #2 is above defined storage

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Type III 24-hr 2-year Rainfall=2.99"

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Inflow Area = 8,709 sf, 100.00% Impervious, Inflow Depth = 2.76" for 2-year event
 Inflow = 0.58 cfs @ 12.08 hrs, Volume= 2,002 cf
 Outflow = 0.31 cfs @ 12.21 hrs, Volume= 2,002 cf, Atten= 47%, Lag= 7.7 min
 Discarded = 0.31 cfs @ 12.21 hrs, Volume= 2,002 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
 Routed to Reach SP-2 : study point

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 119.98' @ 12.21 hrs Surf.Area= 772 sf Storage= 226 cf
 Flood Elev= 122.00' Surf.Area= 772 sf Storage= 695 cf

Plug-Flow detention time= 3.8 min calculated for 2,001 cf (100% of inflow)
 Center-of-Mass det. time= 3.8 min (761.7 - 757.8)

Volume	Invert	Avail.Storage	Storage Description
#1	119.00'	695 cf	Stone storage (Irregular) Listed below (Recalc) 2,316 cf Overall x 30.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
119.00	772	521.0	0	0	772
122.00	772	521.0	2,316	2,316	2,335

Device	Routing	Invert	Outlet Devices
#1	Discarded	119.00'	7.500 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 117.00' Phase-In= 0.01'
#2	Primary	122.00'	113.0' 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=0.31 cfs @ 12.21 hrs HW=119.98' (Free Discharge)
 ↑1=Exfiltration (Controls 0.31 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=119.00' TW=0.00' (Dynamic Tailwater)
 ↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

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Type III 24-hr 10-year Rainfall=4.49"

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Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment P-1: Subcat E-1 Runoff Area=14,860 sf 80.51% Impervious Runoff Depth=2.99"
Tc=6.0 min CN=86 Runoff=1.19 cfs 3,708 cf

Subcatchment P-2: Subcat E-2 Runoff Area=5,791 sf 0.00% Impervious Runoff Depth=0.11"
Tc=6.0 min CN=39 Runoff=0.00 cfs 53 cf

Subcatchment P-3: Subcat E-3 Runoff Area=8,709 sf 100.00% Impervious Runoff Depth=4.25"
Tc=6.0 min CN=98 Runoff=0.88 cfs 3,087 cf

Subcatchment P-4: Subcat E-4 Runoff Area=21,923 sf 0.00% Impervious Runoff Depth=0.03"
Tc=6.0 min CN=35 Runoff=0.00 cfs 57 cf

Reach SP-1: study point Inflow=0.00 cfs 53 cf
Outflow=0.00 cfs 53 cf

Reach SP-2: study point Inflow=0.00 cfs 57 cf
Outflow=0.00 cfs 57 cf

Pond 1P: dry well Peak Elev=115.25' Storage=539 cf Inflow=1.19 cfs 3,708 cf
Discarded=0.57 cfs 3,708 cf Primary=0.00 cfs 0 cf Outflow=0.57 cfs 3,708 cf

Pond 2P: stone drip edge Peak Elev=120.75' Storage=405 cf Inflow=0.88 cfs 3,087 cf
Discarded=0.46 cfs 3,087 cf Primary=0.00 cfs 0 cf Outflow=0.46 cfs 3,087 cf

Total Runoff Area = 51,282 sf Runoff Volume = 6,904 cf Average Runoff Depth = 1.62"
59.69% Pervious = 30,610 sf 40.31% Impervious = 20,672 sf

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Type III 24-hr 10-year Rainfall=4.49"

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Summary for Subcatchment P-1: Subcat E-1

Runoff = 1.19 cfs @ 12.09 hrs, Volume= 3,708 cf, Depth= 2.99"
 Routed to Pond 1P : dry well

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-year Rainfall=4.49"

Area (sf)	CN	Description
2,897	39	>75% Grass cover, Good, HSG A
10,371	98	Paved parking, HSG A
1,592	98	Roofs, HSG A
14,860	86	Weighted Average
2,897		19.49% Pervious Area
11,963		80.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR-55 Min

Summary for Subcatchment P-2: Subcat E-2

Runoff = 0.00 cfs @ 14.74 hrs, Volume= 53 cf, Depth= 0.11"
 Routed to Reach SP-1 : study point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-year Rainfall=4.49"

Area (sf)	CN	Description
5,791	39	>75% Grass cover, Good, HSG A
5,791		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR-55 Min

Summary for Subcatchment P-3: Subcat E-3

Runoff = 0.88 cfs @ 12.08 hrs, Volume= 3,087 cf, Depth= 4.25"
 Routed to Pond 2P : stone drip edge

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-year Rainfall=4.49"

Area (sf)	CN	Description
8,709	98	Roofs, HSG A
8,709		100.00% Impervious Area

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Type III 24-hr 10-year Rainfall=4.49"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR-55 Min

Summary for Subcatchment P-4: Subcat E-4

Runoff = 0.00 cfs @ 17.14 hrs, Volume= 57 cf, Depth= 0.03"
 Routed to Reach SP-2 : study point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-year Rainfall=4.49"

Area (sf)	CN	Description
11,488	39	>75% Grass cover, Good, HSG A
10,434	30	Woods, Good, HSG A
21,923	35	Weighted Average
21,923		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR-55 MIN

Summary for Reach SP-1: study point

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

Inflow Area = 20,651 sf, 57.93% Impervious, Inflow Depth = 0.03" for 10-year event
 Inflow = 0.00 cfs @ 14.74 hrs, Volume= 53 cf
 Outflow = 0.00 cfs @ 14.74 hrs, Volume= 53 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Summary for Reach SP-2: study point

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

Inflow Area = 30,631 sf, 28.43% Impervious, Inflow Depth = 0.02" for 10-year event
 Inflow = 0.00 cfs @ 17.14 hrs, Volume= 57 cf
 Outflow = 0.00 cfs @ 17.14 hrs, Volume= 57 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Summary for Pond 1P: dry well

Dimensions of system taken from plans by HSI Inc. 2004

Exfiltration rate taken from plans by HSI Inc. 2 min per inch at TP-1 and applied 2x safety factor. 15 in per hour used.

Groundwater assumed since it was not detected in the test pit.

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Type III 24-hr 10-year Rainfall=4.49"

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Inflow Area = 14,860 sf, 80.51% Impervious, Inflow Depth = 2.99" for 10-year event
 Inflow = 1.19 cfs @ 12.09 hrs, Volume= 3,708 cf
 Outflow = 0.57 cfs @ 12.25 hrs, Volume= 3,708 cf, Atten= 52%, Lag= 9.8 min
 Discarded = 0.57 cfs @ 12.25 hrs, Volume= 3,708 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
 Routed to Reach SP-1 : study point

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 115.25' @ 12.25 hrs Surf.Area= 600 sf Storage= 539 cf
 Flood Elev= 125.92' Surf.Area= 600 sf Storage= 2,442 cf

Plug-Flow detention time= 5.8 min calculated for 3,708 cf (100% of inflow)
 Center-of-Mass det. time= 5.8 min (814.4 - 808.6)

Volume	Invert	Avail.Storage	Storage Description
#1	112.42'	2,117 cf	Stone storage (Conic) Listed below (Recalc) 7,500 cf Overall - 443 cf Embedded = 7,057 cf x 30.0% Voids
#2	113.42'	325 cf	6.00'D x 11.50'H Vertical Cone/Cylinder Inside #1 443 cf Overall - 6.0" Wall Thickness = 325 cf
		2,442 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
112.42	600	0	0	600
124.92	600	7,500	7,500	1,685

Device	Routing	Invert	Outlet Devices
#0	Primary	124.92'	Automatic Storage Overflow (Discharged without head)
#1	Discarded	112.42'	15.000 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 110.00' Phase-In= 0.01'

Discarded OutFlow Max=0.57 cfs @ 12.25 hrs HW=115.25' (Free Discharge)
 ↑1=Exfiltration (Controls 0.57 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=112.42' TW=0.00' (Dynamic Tailwater)

Summary for Pond 2P: stone drip edge

Exfiltration rate taken from plans by HSI Inc. 4 min per inch at TP-3 and applied 2x safety factor. 7.5 in per hour used.

Groundwater assumed based on TP-3.

[92] Warning: Device #2 is above defined storage

Inflow Area = 8,709 sf, 100.00% Impervious, Inflow Depth = 4.25" for 10-year event
 Inflow = 0.88 cfs @ 12.08 hrs, Volume= 3,087 cf
 Outflow = 0.46 cfs @ 12.21 hrs, Volume= 3,087 cf, Atten= 47%, Lag= 7.7 min
 Discarded = 0.46 cfs @ 12.21 hrs, Volume= 3,087 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
 Routed to Reach SP-2 : study point

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

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Type III 24-hr 10-year Rainfall=4.49"

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Peak Elev= 120.75' @ 12.21 hrs Surf.Area= 772 sf Storage= 405 cf
 Flood Elev= 122.00' Surf.Area= 772 sf Storage= 695 cf

Plug-Flow detention time= 5.2 min calculated for 3,086 cf (100% of inflow)
 Center-of-Mass det. time= 5.2 min (755.1 - 749.9)

Volume	Invert	Avail.Storage	Storage Description
#1	119.00'	695 cf	Stone storage (Irregular) Listed below (Recalc) 2,316 cf Overall x 30.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
119.00	772	521.0	0	0	772
122.00	772	521.0	2,316	2,316	2,335

Device	Routing	Invert	Outlet Devices
#1	Discarded	119.00'	7.500 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 117.00' Phase-In= 0.01'
#2	Primary	122.00'	113.0' 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=0.46 cfs @ 12.21 hrs HW=120.75' (Free Discharge)
 ↑1=Exfiltration (Controls 0.46 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=119.00' TW=0.00' (Dynamic Tailwater)
 ↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

3163-01 - Proposed HydroCAD

Type III 24-hr 25-year Rainfall=5.68"

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Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment P-1: Subcat E-1 Runoff Area=14,860 sf 80.51% Impervious Runoff Depth=4.11"
Tc=6.0 min CN=86 Runoff=1.61 cfs 5,085 cf

Subcatchment P-2: Subcat E-2 Runoff Area=5,791 sf 0.00% Impervious Runoff Depth=0.36"
Tc=6.0 min CN=39 Runoff=0.02 cfs 173 cf

Subcatchment P-3: Subcat E-3 Runoff Area=8,709 sf 100.00% Impervious Runoff Depth=5.44"
Tc=6.0 min CN=98 Runoff=1.11 cfs 3,950 cf

Subcatchment P-4: Subcat E-4 Runoff Area=21,923 sf 0.00% Impervious Runoff Depth=0.19"
Tc=6.0 min CN=35 Runoff=0.01 cfs 344 cf

Reach SP-1: study point Inflow=0.02 cfs 173 cf
Outflow=0.02 cfs 173 cf

Reach SP-2: study point Inflow=0.01 cfs 344 cf
Outflow=0.01 cfs 344 cf

Pond 1P: dry well Peak Elev=116.64' Storage=813 cf Inflow=1.61 cfs 5,085 cf
Discarded=0.77 cfs 5,085 cf Primary=0.00 cfs 0 cf Outflow=0.77 cfs 5,085 cf

Pond 2P: stone drip edge Peak Elev=121.34' Storage=543 cf Inflow=1.11 cfs 3,950 cf
Discarded=0.59 cfs 3,950 cf Primary=0.00 cfs 0 cf Outflow=0.59 cfs 3,950 cf

Total Runoff Area = 51,282 sf Runoff Volume = 9,551 cf Average Runoff Depth = 2.23"
59.69% Pervious = 30,610 sf 40.31% Impervious = 20,672 sf

3163-01 - Proposed HydroCAD

Type III 24-hr 25-year Rainfall=5.68"

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Summary for Subcatchment P-1: Subcat E-1

Runoff = 1.61 cfs @ 12.09 hrs, Volume= 5,085 cf, Depth= 4.11"
 Routed to Pond 1P : dry well

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type III 24-hr 25-year Rainfall=5.68"

Area (sf)	CN	Description
2,897	39	>75% Grass cover, Good, HSG A
10,371	98	Paved parking, HSG A
1,592	98	Roofs, HSG A
14,860	86	Weighted Average
2,897		19.49% Pervious Area
11,963		80.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR-55 Min

Summary for Subcatchment P-2: Subcat E-2

Runoff = 0.02 cfs @ 12.38 hrs, Volume= 173 cf, Depth= 0.36"
 Routed to Reach SP-1 : study point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type III 24-hr 25-year Rainfall=5.68"

Area (sf)	CN	Description
5,791	39	>75% Grass cover, Good, HSG A
5,791		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR-55 Min

Summary for Subcatchment P-3: Subcat E-3

Runoff = 1.11 cfs @ 12.08 hrs, Volume= 3,950 cf, Depth= 5.44"
 Routed to Pond 2P : stone drip edge

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type III 24-hr 25-year Rainfall=5.68"

Area (sf)	CN	Description
8,709	98	Roofs, HSG A
8,709		100.00% Impervious Area

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Type III 24-hr 25-year Rainfall=5.68"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR-55 Min

Summary for Subcatchment P-4: Subcat E-4

Runoff = 0.01 cfs @ 13.70 hrs, Volume= 344 cf, Depth= 0.19"
 Routed to Reach SP-2 : study point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type III 24-hr 25-year Rainfall=5.68"

Area (sf)	CN	Description
11,488	39	>75% Grass cover, Good, HSG A
10,434	30	Woods, Good, HSG A
21,923	35	Weighted Average
21,923		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR-55 MIN

Summary for Reach SP-1: study point

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

Inflow Area = 20,651 sf, 57.93% Impervious, Inflow Depth = 0.10" for 25-year event
 Inflow = 0.02 cfs @ 12.38 hrs, Volume= 173 cf
 Outflow = 0.02 cfs @ 12.38 hrs, Volume= 173 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Summary for Reach SP-2: study point

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

Inflow Area = 30,631 sf, 28.43% Impervious, Inflow Depth = 0.13" for 25-year event
 Inflow = 0.01 cfs @ 13.70 hrs, Volume= 344 cf
 Outflow = 0.01 cfs @ 13.70 hrs, Volume= 344 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Summary for Pond 1P: dry well

Dimensions of system taken from plans by HSI Inc. 2004

Exfiltration rate taken from plans by HSI Inc. 2 min per inch at TP-1 and applied 2x safety factor. 15 in per hour used.

Groundwater assumed since it was not detected in the test pit.

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Type III 24-hr 25-year Rainfall=5.68"

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Inflow Area = 14,860 sf, 80.51% Impervious, Inflow Depth = 4.11" for 25-year event
 Inflow = 1.61 cfs @ 12.09 hrs, Volume= 5,085 cf
 Outflow = 0.77 cfs @ 12.25 hrs, Volume= 5,085 cf, Atten= 52%, Lag= 9.7 min
 Discarded = 0.77 cfs @ 12.25 hrs, Volume= 5,085 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
 Routed to Reach SP-1 : study point

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 116.64' @ 12.25 hrs Surf.Area= 600 sf Storage= 813 cf
 Flood Elev= 125.92' Surf.Area= 600 sf Storage= 2,442 cf

Plug-Flow detention time= 7.2 min calculated for 5,083 cf (100% of inflow)
 Center-of-Mass det. time= 7.2 min (806.8 - 799.7)

Volume	Invert	Avail.Storage	Storage Description
#1	112.42'	2,117 cf	Stone storage (Conic) Listed below (Recalc) 7,500 cf Overall - 443 cf Embedded = 7,057 cf x 30.0% Voids
#2	113.42'	325 cf	6.00'D x 11.50'H Vertical Cone/Cylinder Inside #1 443 cf Overall - 6.0" Wall Thickness = 325 cf
		2,442 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
112.42	600	0	0	600
124.92	600	7,500	7,500	1,685

Device	Routing	Invert	Outlet Devices
#0	Primary	124.92'	Automatic Storage Overflow (Discharged without head)
#1	Discarded	112.42'	15.000 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 110.00' Phase-In= 0.01'

Discarded OutFlow Max=0.77 cfs @ 12.25 hrs HW=116.64' (Free Discharge)
 ↑1=Exfiltration (Controls 0.77 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=112.42' TW=0.00' (Dynamic Tailwater)

Summary for Pond 2P: stone drip edge

Exfiltration rate taken from plans by HSI Inc. 4 min per inch at TP-3 and applied 2x safety factor. 7.5 in per hour used.

Groundwater assumed based on TP-3.

[92] Warning: Device #2 is above defined storage

Inflow Area = 8,709 sf, 100.00% Impervious, Inflow Depth = 5.44" for 25-year event
 Inflow = 1.11 cfs @ 12.08 hrs, Volume= 3,950 cf
 Outflow = 0.59 cfs @ 12.21 hrs, Volume= 3,950 cf, Atten= 47%, Lag= 7.5 min
 Discarded = 0.59 cfs @ 12.21 hrs, Volume= 3,950 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
 Routed to Reach SP-2 : study point

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

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Type III 24-hr 25-year Rainfall=5.68"

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Peak Elev= 121.34' @ 12.21 hrs Surf.Area= 772 sf Storage= 543 cf
 Flood Elev= 122.00' Surf.Area= 772 sf Storage= 695 cf

Plug-Flow detention time= 5.9 min calculated for 3,949 cf (100% of inflow)
 Center-of-Mass det. time= 5.9 min (751.9 - 746.0)

Volume	Invert	Avail.Storage	Storage Description
#1	119.00'	695 cf	Stone storage (Irregular) Listed below (Recalc) 2,316 cf Overall x 30.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
119.00	772	521.0	0	0	772
122.00	772	521.0	2,316	2,316	2,335

Device	Routing	Invert	Outlet Devices
#1	Discarded	119.00'	7.500 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 117.00' Phase-In= 0.01'
#2	Primary	122.00'	113.0' 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=0.59 cfs @ 12.21 hrs HW=121.34' (Free Discharge)
 ↑1=Exfiltration (Controls 0.59 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=119.00' TW=0.00' (Dynamic Tailwater)
 ↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

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Type III 24-hr 50-year Rainfall=6.78"

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Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment P-1: Subcat E-1 Runoff Area=14,860 sf 80.51% Impervious Runoff Depth=5.15"
Tc=6.0 min CN=86 Runoff=2.00 cfs 6,383 cf

Subcatchment P-2: Subcat E-2 Runoff Area=5,791 sf 0.00% Impervious Runoff Depth=0.69"
Tc=6.0 min CN=39 Runoff=0.05 cfs 334 cf

Subcatchment P-3: Subcat E-3 Runoff Area=8,709 sf 100.00% Impervious Runoff Depth=6.54"
Tc=6.0 min CN=98 Runoff=1.33 cfs 4,747 cf

Subcatchment P-4: Subcat E-4 Runoff Area=21,923 sf 0.00% Impervious Runoff Depth=0.43"
Tc=6.0 min CN=35 Runoff=0.08 cfs 794 cf

Reach SP-1: study point Inflow=0.05 cfs 334 cf
Outflow=0.05 cfs 334 cf

Reach SP-2: study point Inflow=0.08 cfs 794 cf
Outflow=0.08 cfs 794 cf

Pond 1P: dry well Peak Elev=117.92' Storage=1,065 cf Inflow=2.00 cfs 6,383 cf
Discarded=0.96 cfs 6,383 cf Primary=0.00 cfs 0 cf Outflow=0.96 cfs 6,383 cf

Pond 2P: stone drip edge Peak Elev=121.89' Storage=669 cf Inflow=1.33 cfs 4,747 cf
Discarded=0.72 cfs 4,747 cf Primary=0.00 cfs 0 cf Outflow=0.72 cfs 4,747 cf

Total Runoff Area = 51,282 sf Runoff Volume = 12,257 cf Average Runoff Depth = 2.87"
59.69% Pervious = 30,610 sf 40.31% Impervious = 20,672 sf

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Type III 24-hr 50-year Rainfall=6.78"

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Summary for Subcatchment P-1: Subcat E-1

Runoff = 2.00 cfs @ 12.09 hrs, Volume= 6,383 cf, Depth= 5.15"
 Routed to Pond 1P : dry well

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type III 24-hr 50-year Rainfall=6.78"

Area (sf)	CN	Description
2,897	39	>75% Grass cover, Good, HSG A
10,371	98	Paved parking, HSG A
1,592	98	Roofs, HSG A
14,860	86	Weighted Average
2,897		19.49% Pervious Area
11,963		80.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR-55 Min

Summary for Subcatchment P-2: Subcat E-2

Runoff = 0.05 cfs @ 12.15 hrs, Volume= 334 cf, Depth= 0.69"
 Routed to Reach SP-1 : study point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type III 24-hr 50-year Rainfall=6.78"

Area (sf)	CN	Description
5,791	39	>75% Grass cover, Good, HSG A
5,791		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR-55 Min

Summary for Subcatchment P-3: Subcat E-3

Runoff = 1.33 cfs @ 12.08 hrs, Volume= 4,747 cf, Depth= 6.54"
 Routed to Pond 2P : stone drip edge

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type III 24-hr 50-year Rainfall=6.78"

Area (sf)	CN	Description
8,709	98	Roofs, HSG A
8,709		100.00% Impervious Area

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Type III 24-hr 50-year Rainfall=6.78"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR-55 Min

Summary for Subcatchment P-4: Subcat E-4

Runoff = 0.08 cfs @ 12.37 hrs, Volume= 794 cf, Depth= 0.43"
 Routed to Reach SP-2 : study point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type III 24-hr 50-year Rainfall=6.78"

Area (sf)	CN	Description
11,488	39	>75% Grass cover, Good, HSG A
10,434	30	Woods, Good, HSG A
21,923	35	Weighted Average
21,923		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR-55 MIN

Summary for Reach SP-1: study point

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

Inflow Area = 20,651 sf, 57.93% Impervious, Inflow Depth = 0.19" for 50-year event
 Inflow = 0.05 cfs @ 12.15 hrs, Volume= 334 cf
 Outflow = 0.05 cfs @ 12.15 hrs, Volume= 334 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Summary for Reach SP-2: study point

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

Inflow Area = 30,631 sf, 28.43% Impervious, Inflow Depth = 0.31" for 50-year event
 Inflow = 0.08 cfs @ 12.37 hrs, Volume= 794 cf
 Outflow = 0.08 cfs @ 12.37 hrs, Volume= 794 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Summary for Pond 1P: dry well

Dimensions of system taken from plans by HSI Inc. 2004

Exfiltration rate taken from plans by HSI Inc. 2 min per inch at TP-1 and applied 2x safety factor. 15 in per hour used.

Groundwater assumed since it was not detected in the test pit.

3163-01 - Proposed HydroCAD

Type III 24-hr 50-year Rainfall=6.78"

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Inflow Area = 14,860 sf, 80.51% Impervious, Inflow Depth = 5.15" for 50-year event
 Inflow = 2.00 cfs @ 12.09 hrs, Volume= 6,383 cf
 Outflow = 0.96 cfs @ 12.24 hrs, Volume= 6,383 cf, Atten= 52%, Lag= 9.5 min
 Discarded = 0.96 cfs @ 12.24 hrs, Volume= 6,383 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
 Routed to Reach SP-1 : study point

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 117.92' @ 12.24 hrs Surf.Area= 600 sf Storage= 1,065 cf
 Flood Elev= 125.92' Surf.Area= 600 sf Storage= 2,442 cf

Plug-Flow detention time= 8.0 min calculated for 6,381 cf (100% of inflow)
 Center-of-Mass det. time= 8.0 min (801.4 - 793.4)

Volume	Invert	Avail.Storage	Storage Description
#1	112.42'	2,117 cf	Stone storage (Conic) Listed below (Recalc) 7,500 cf Overall - 443 cf Embedded = 7,057 cf x 30.0% Voids
#2	113.42'	325 cf	6.00'D x 11.50'H Vertical Cone/Cylinder Inside #1 443 cf Overall - 6.0" Wall Thickness = 325 cf
		2,442 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
112.42	600	0	0	600
124.92	600	7,500	7,500	1,685

Device	Routing	Invert	Outlet Devices
#0	Primary	124.92'	Automatic Storage Overflow (Discharged without head)
#1	Discarded	112.42'	15.000 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 110.00' Phase-In= 0.01'

Discarded OutFlow Max=0.96 cfs @ 12.24 hrs HW=117.92' (Free Discharge)
 ↑1=Exfiltration (Controls 0.96 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=112.42' TW=0.00' (Dynamic Tailwater)

Summary for Pond 2P: stone drip edge

Exfiltration rate taken from plans by HSI Inc. 4 min per inch at TP-3 and applied 2x safety factor. 7.5 in per hour used.

Groundwater assumed based on TP-3.

[92] Warning: Device #2 is above defined storage

Inflow Area = 8,709 sf, 100.00% Impervious, Inflow Depth = 6.54" for 50-year event
 Inflow = 1.33 cfs @ 12.08 hrs, Volume= 4,747 cf
 Outflow = 0.72 cfs @ 12.20 hrs, Volume= 4,747 cf, Atten= 46%, Lag= 7.3 min
 Discarded = 0.72 cfs @ 12.20 hrs, Volume= 4,747 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
 Routed to Reach SP-2 : study point

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

3163-01 - Proposed HydroCAD

Type III 24-hr 50-year Rainfall=6.78"

Prepared by Allen & Major Associates, Inc

Printed 10/11/2022

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Peak Elev= 121.89' @ 12.20 hrs Surf.Area= 772 sf Storage= 669 cf
 Flood Elev= 122.00' Surf.Area= 772 sf Storage= 695 cf

Plug-Flow detention time= 6.4 min calculated for 4,746 cf (100% of inflow)
 Center-of-Mass det. time= 6.4 min (749.8 - 743.4)

Volume	Invert	Avail.Storage	Storage Description
#1	119.00'	695 cf	Stone storage (Irregular) Listed below (Recalc) 2,316 cf Overall x 30.0% Voids

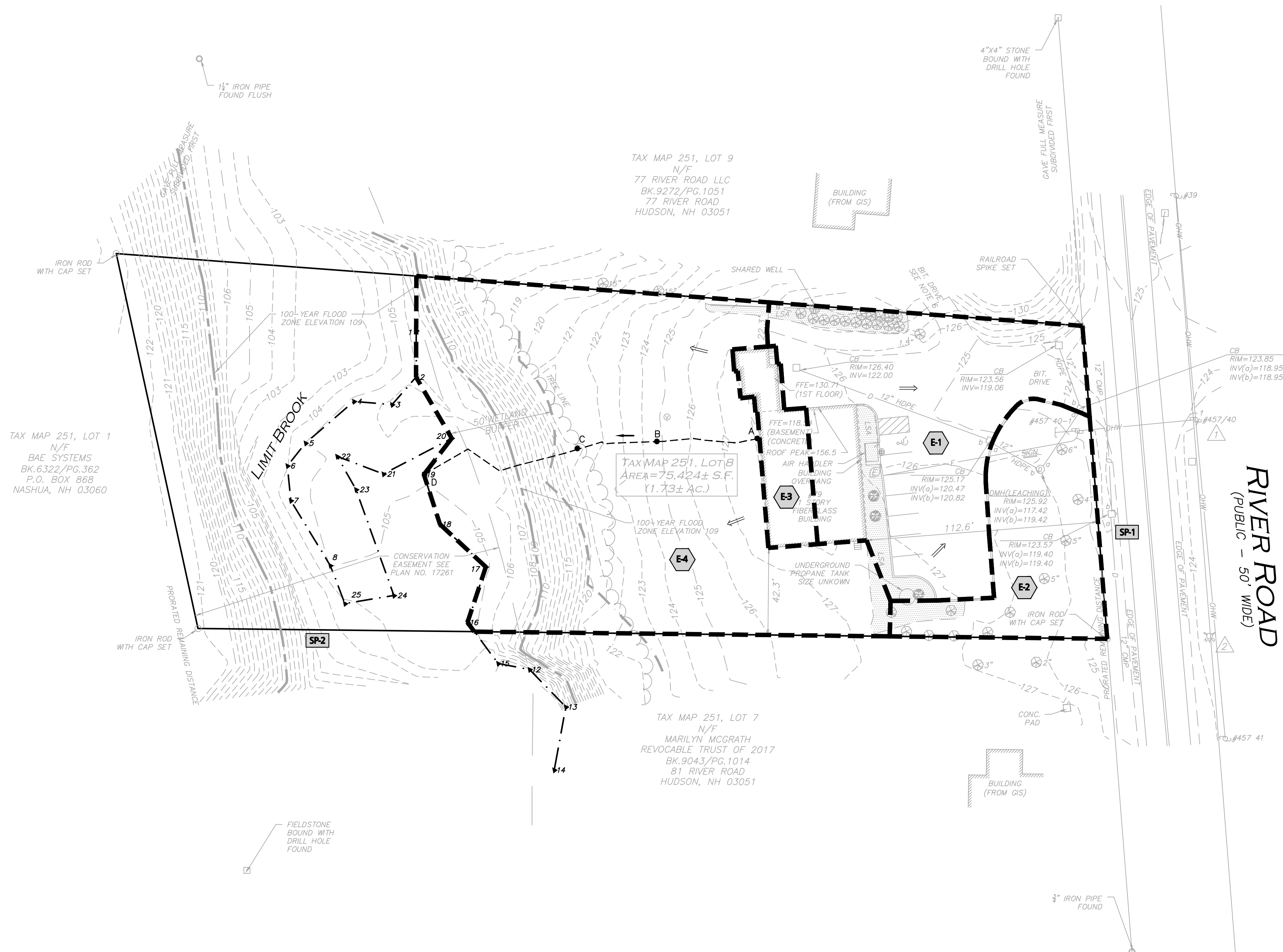
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
119.00	772	521.0	0	0	772
122.00	772	521.0	2,316	2,316	2,335

Device	Routing	Invert	Outlet Devices
#1	Discarded	119.00'	7.500 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 117.00' Phase-In= 0.01'
#2	Primary	122.00'	113.0' 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=0.72 cfs @ 12.20 hrs HW=121.89' (Free Discharge)
 ↑1=Exfiltration (Controls 0.72 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=119.00' TW=0.00' (Dynamic Tailwater)
 ↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

R:\PROJECTS\3163-01\CIVIL\DRAWINGS\CURRENT\C-3163-01_WATERSHED-EXISTING.DWG



LEGEND

SUBCATCHMENT BOUNDARY

To FLOW PATH

SUBCATCHMENT LABEL

FLOW DIRECTION

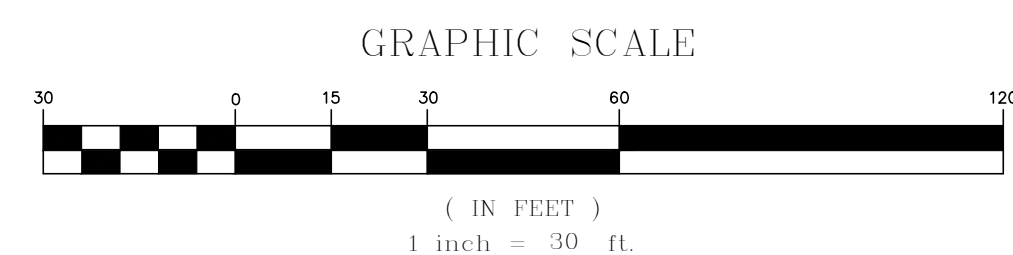
TAX MAP 251, LOT 1
N/F
BAE SYSTEMS
BK.6322/PG.362
P.O. BOX 868
NASHUA, NH 03060

TAX MAP 251, LOT 9
N/F
77 RIVER ROAD LLC
BK.9272/PG.1051
77 RIVER ROAD
HUDSON, NH 03051

TAX MAP 251, LOT 8
AREA=75,424± S.F.
(1.73± AC.)

TAX MAP 251, LOT 7
N/F
MARILYN MCGRATH
REVOCABLE TRUST OF 2017
BK.9043/PG.1014
81 RIVER ROAD
HUDSON, NH 03051

RIVER ROAD
(PUBLIC - 50' WIDE)



REV	DATE	DESCRIPTION

APPLICANT/OWNER:
KENNETH L. MACGRATH
20 BALDWIN ROAD
MILFORD, NH 03055

PROJECT:
**SITE PLAN FOR
CORE COMPLIANCE TESTING**
79 RIVER ROAD
HUDSON, NH

PROJECT NO.	3163-01	DATE:	10-14-22
SCALE:	1" = 30'	DWG. NAME:	C-3163-01
DESIGNED BY:	SM	CHECKED BY:	SM

PREPARED BY:

ALLEN & MAJOR ASSOCIATES, INC.
civil engineering • land surveying
environmental consulting • landscape architecture
www.allenmajor.com
400 HARVEY ROAD
MANCHESTER, NH 03103
TEL: (603) 627-5500
FAX: (603) 627-5501

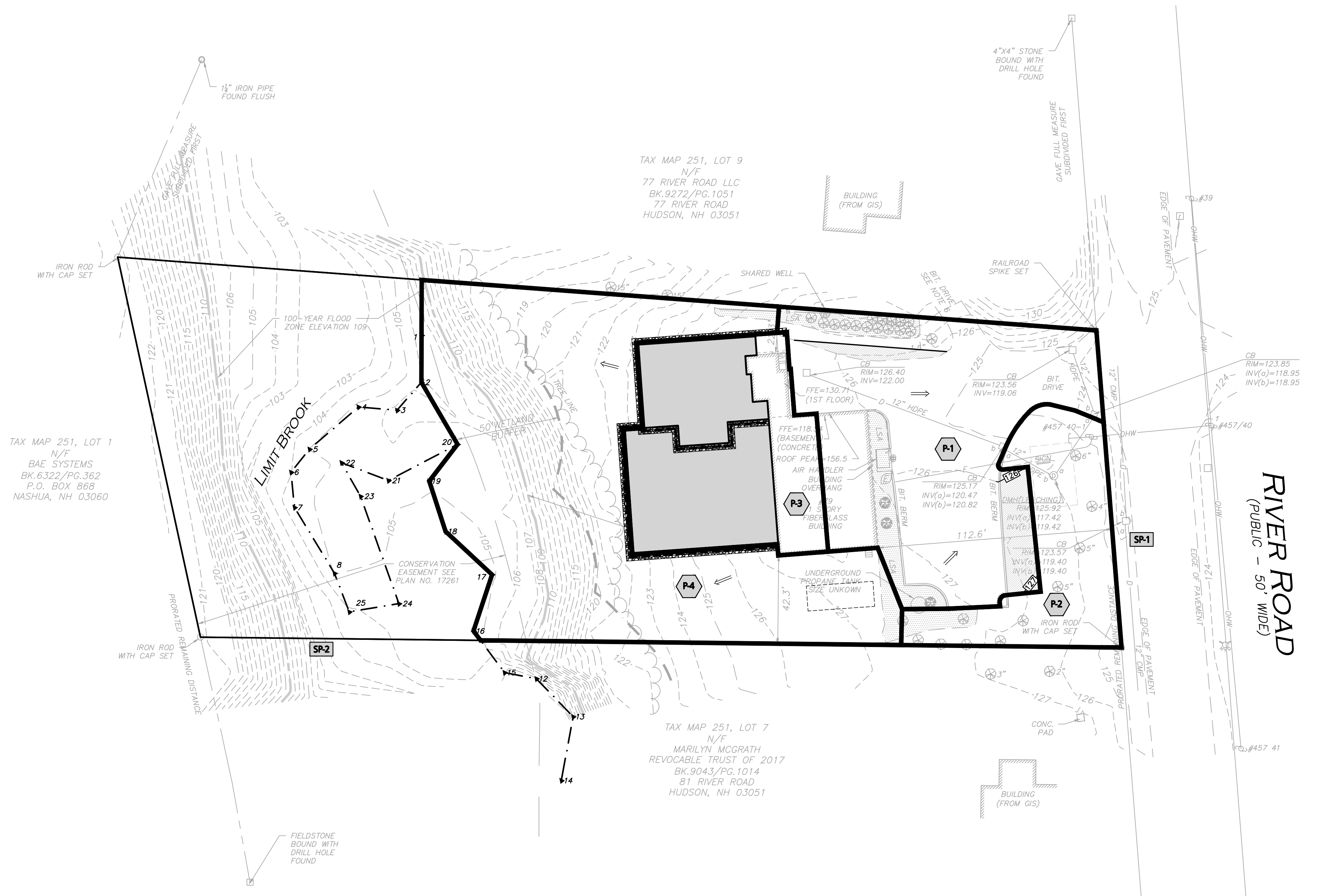
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DRAWING TITLE:	SHEET No.
EXISTING WATERSHED PLAN	WS-1

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R:\PROJECTS\3163-01\CIVIL\DRAWINGS\CURRENT\C-3163-01_WATERSHED-PROPOSED.DWG



TAX MAP 251, LOT 1
N/F
BAE SYSTEMS
BK.6322/PG.362
P.O. BOX 868
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TAX MAP 251, LOT 9
N/F
77 RIVER ROAD LLC
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HUDSON, NH 03051

TAX MAP 251, LOT 7
N/F
MARILYN MCGRATH
REVOCABLE TRUST OF 2017
BK.9043/PG.1014
81 RIVER ROAD
HUDSON, NH 03051

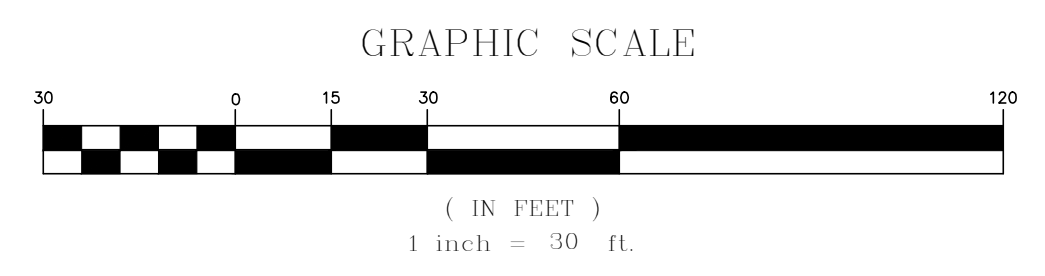
LEGEND

SUBCATCHMENT BOUNDARY

SUBCATCHMENT LABEL

FLOW DIRECTION

RIVER ROAD
(PUBLIC - 50' WIDE)



REV	DATE	DESCRIPTION

APPLICANT/OWNER:
KENNETH L. MACGRATH
20 BALDWIN ROAD
MILFORD, NH 03055

PROJECT:
**SITE PLAN FOR
CORE COMPLIANCE TESTING**
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ALLEN & MAJOR ASSOCIATES, INC.
civil engineering • land surveying
environmental consulting • landscape architecture
www.allenmajor.com
400 HARVEY ROAD
MANCHESTER, NH 03103
TEL: (603) 627-5500
FAX: (603) 627-5501

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DRAWING TITLE:	SHEET No.
PROPOSED WATERSHED PLAN	WS-2

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