DRAINAGE REPORT

Noble Homes, LLC
Tax Map 216 Lot 1
Parker Mountain Road
Barrington, New Hampshire

February 9, 2022

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INTRODUCTION:

This project is a proposed 3 lot residential subdivision with a 5+50 common driveway. Located on NH Route 126 Parker Mountain Road in Barrington. The project includes the construction of 3 single family homes and common driveway. Additional site improvements include drainage, utilities, and other related site improvements. The total area of disturbance for the construction of the common driveway is approximately 40,000 sf. or 0.92 acres.

PREDEVELOPMENT CONDITIONS:

The subject property is located on Parker Mountain Road (NH Route 126), just westerly of NH Route 202, on Harding Drive. The total property area is 10.66 acres and has 880+/- feet of frontage on Parker Mountain Road (NH Route 126).

There is a wetland that bisects the property and runs northerly to a culvert under NH Route 126 and eventually to the Isinglass River. The site is undeveloped and wooded. The site slopes towards NH Route 126 with varying slopes from gently sloping to very steep slopes. The entire site is Hinkley-Charlton, loamy sand, extremely rocky. This soil has a relatively highwater table and a moderate infiltration rate and is classified as a Hydrological Group B soil.

The site drainage is one drainage areas. The drainage area drains into an existing culvert under Rte. 126 and as noted above, flows southerly to the Isinglass River. The total watershed area included in the analysis is 1.21 acres.

POST DEVELOPMENT CONDITIONS:

This expansion to the site will include construction of a common driveway and related site improvements for 3 single family homes. The drainage system is open swales and culverts along the common driveway, and a small detention pond adjacent to Rte. 126. There is no change proposed to existing drainage patterns on the property.

Drainage from proposed impervious areas is routed through a single detention pond strategically located adjacent to the common driveway AND Rte. 126. The detention basin is designed to detain peak stormwater flows so that post development stormwater flows are less than pre-development stormwater flows.

DESIGN METHODOLOGY:

The drainage analysis in this study was completed using HydroCad Version 10.0-25, a stormwater modeling program utilizing TR-20 and TR-55 methodology. This program performs both the hydrologic computations for determination of runoff flows, and the hydraulic calculations for pipe, ditch, and pond design. Calculations were performed for the 2, 10, 25 and 50-year return frequency storms.Precipitation estimates were taken from the Northeast Regional Climate Center ExtremePrecipitation Tables. The following design parameters were used:

Rainfall distribution:	Type III
2-year storm rainfall:	3.24 inches
10-year storm rainfall:	5.15 inches
25-year storm rainfall:	6.35 inches
50-year storm rainfall:	7.22 inches

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DESIGN ANALYSIS:

Stormwater flows were analyzed to one, Northerly, design node. Peak runoff flows have been evaluated to ensure that post-development flows and volumes don't exceed pre-development flows and volumes. Mitigation for increased flows from the additional impervious surfaces has been provided by including the proposed detention systems as previously described. The peak flows are shown in the accompanying table:

Storm Event	PRE-DEVELOPMENT FLOWS (CFS)	POST-DEVELOPMENT FLOWS (CFS)
2- year		
100R	0.07	0.08
Result		-0.01
10-year		
100R	0.56	0.36
Result		-0.20
25-year		
100R	1.21	1.17
Result		-0.04
50-year		
100R	1.95	1.80
Result		-0.15

STORMWATER TREATMENT:

Stormwater treatment is provided to reduce pollutants and sediment from discharging into downstream public waters. As previously noted above, several best management practices are proposed for this project.

The detention pond is designed with a sediment forebay. The forebay provides pretreatment of runoff for initial settling of coarse sediments. Roadside swales are designed to be stone lined to protect against erosion and sediment transportation.

EROSION CONTROL:

This site has moderate slopes and potentially wet soil conditions. Cut and fill slopes should therefore be carefully monitored until vegetation is fully established and they are fully stabilized. Several best management practices are proposed to minimize erosion during construction. Following are some of the practices required for the development:

- Proper construction sequencing
- Minimizing disturbed area as much as practical
- Silt Fence
- Stone lined swales
- Stabilized construction entrance

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EXTREME PRECIPITATION TABLES

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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	71.153 degrees West
Latitude	43.194 degrees North
Elevation	0 feet
Date/Time	

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.26	0.40	0.49	0.65	0.81	1.02	**1yr**	0.70	0.98	1.19	1.51	1.94	2.49	2.74	**1yr**	2.21	2.63	3.05	3.76	4.33	**1yr**
2yr	0.32	0.49	0.61	0.80	1.01	1.28	**2yr**	0.87	1.16	1.48	1.87	2.36	2.98	3.33	**2yr**	2.64	3.20	3.70	4.41	5.03	**2yr**
5yr	0.37	0.58	0.72	0.97	1.24	1.58	**5yr**	1.07	1.44	1.84	2.34	2.96	3.76	4.24	**5yr**	3.33	4.08	4.70	5.54	6.27	**5yr**
10yr	0.41	0.65	0.82	1.11	1.45	1.87	**10yr**	1.25	1.70	2.19	2.79	3.54	4.48	5.10	**10yr**	3.96	4.90	5.63	6.59	7.41	**10yr**
25yr	0.48	0.76	0.97	1.34	1.78	2.32	**25yr**	1.54	2.11	2.73	3.50	4.46	5.65	6.51	**25yr**	5.00	6.26	7.15	8.29	9.25	**25yr**
50yr	0.54	0.87	1.11	1.55	2.09	2.75	**50yr**	1.80	2.50	3.25	4.18	5.32	6.74	7.84	**50yr**	5.97	7.54	8.58	9.87	10.95	**50yr**
100yr	0.60	0.98	1.26	1.79	2.45	3.25	**100yr**	2.11	2.95	3.86	4.98	6.35	8.05	9.44	**100yr**	7.12	9.08	10.29	11.76	12.96	**100yr**
200yr	0.69	1.12	1.45	2.08	2.87	3.84	**200yr**	2.48	3.48	4.58	5.92	7.58	9.61	11.37	**200yr**	8.51	10.94	12.35	14.01	15.35	**200yr**
500yr	0.82	1.35	1.75	2.54	3.55	4.80	**500yr**	3.07	4.35	5.73	7.45	9.56	12.16	14.56	**500yr**	10.76	14.00	15.73	17.68	19.22	**500yr**

Lower Confidence Limits

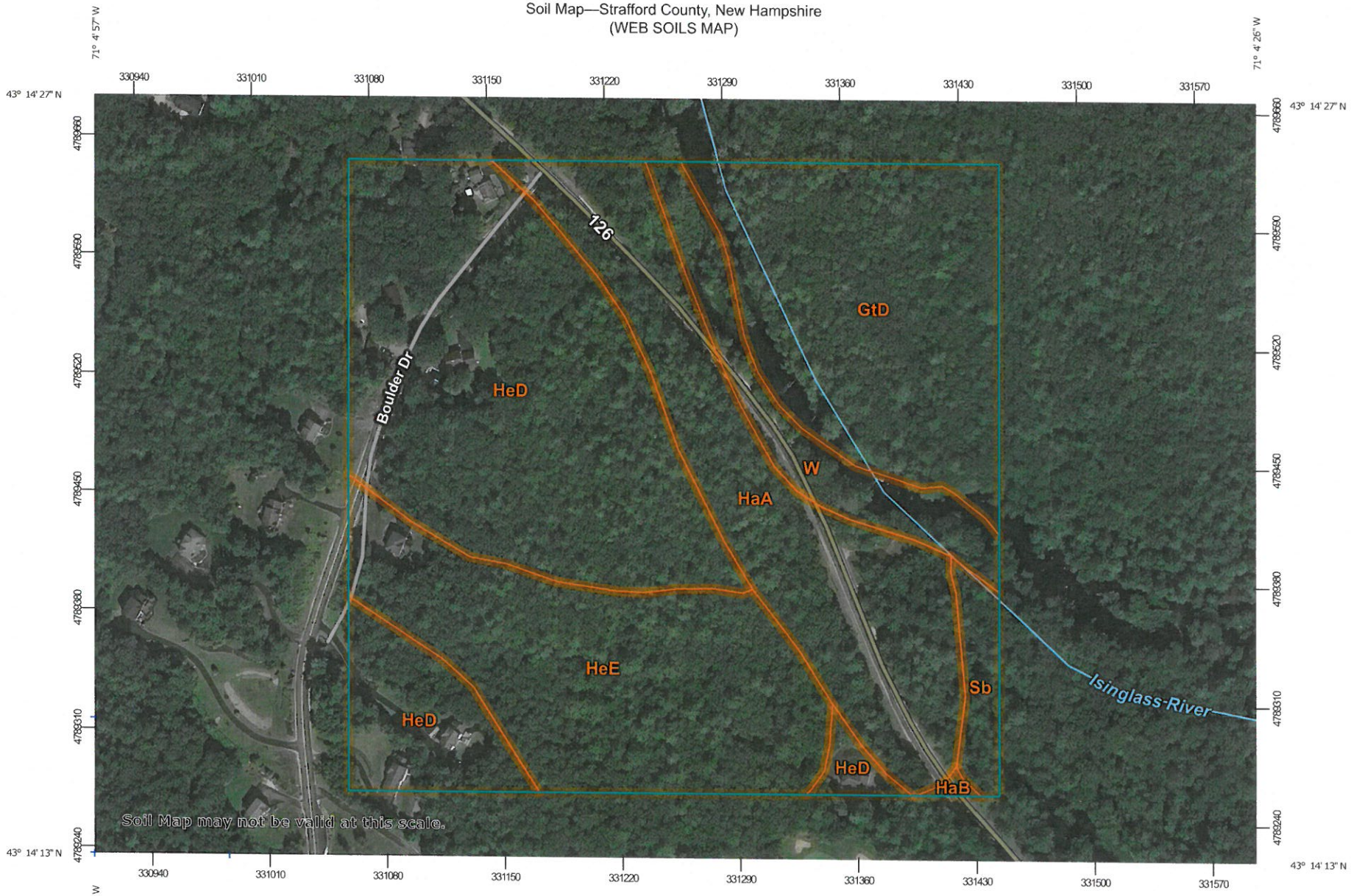
	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.23	0.35	0.43	0.58	0.71	0.89	**1yr**	0.61	0.87	0.97	1.28	1.52	2.00	2.46	**1yr**	1.77	2.37	2.79	3.36	3.73	**1yr**
2yr	0.31	0.48	0.59	0.80	0.99	1.17	**2yr**	0.85	1.14	1.34	1.78	2.29	2.87	3.18	**2yr**	2.54	3.06	3.56	4.30	4.91	**2yr**
5yr	0.35	0.54	0.67	0.92	1.17	1.40	**5yr**	1.01	1.36	1.59	2.09	2.70	3.38	3.78	**5yr**	2.99	3.63	4.21	5.20	5.69	**5yr**
10yr	0.39	0.59	0.74	1.03	1.33	1.59	**10yr**	1.15	1.56	1.80	2.37	3.05	3.79	4.27	**10yr**	3.36	4.11	4.77	6.00	6.35	**10yr**
25yr	0.45	0.68	0.84	1.21	1.59	1.90	**25yr**	1.37	1.85	2.11	2.76	3.55	4.39	5.01	**25yr**	3.88	4.82	5.64	7.26	8.07	**25yr**
50yr	0.49	0.75	0.94	1.35	1.81	2.17	**50yr**	1.57	2.12	2.38	3.10	3.99	4.88	5.62	**50yr**	4.32	5.40	6.37	8.38	9.30	**50yr**
100yr	0.56	0.84	1.05	1.52	2.09	2.49	**100yr**	1.80	2.43	2.69	3.48	4.48	5.42	6.30	**100yr**	4.79	6.05	7.23	9.67	10.64	**100yr**
200yr	0.62	0.94	1.19	1.72	2.39	2.84	**200yr**	2.07	2.78	3.03	3.91	5.03	5.97	8.57	**200yr**	5.29	8.25	8.19	11.16	12.20	**200yr**
500yr	0.73	1.09	1.40	2.03	2.89	3.41	**500yr**	2.49	3.34	3.57	4.55	5.88	6.75	10.39	**500yr**	5.97	9.99	9.66	13.52	14.59	**500yr**

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.28	0.44	0.53	0.72	0.88	1.07	**1yr**	0.76	1.05	1.23	1.67	2.10	2.73	3.13	**1yr**	2.42	3.01	3.43	4.05	4.77	**1yr**
2yr	0.33	0.50	0.62	0.84	1.04	1.24	**2yr**	0.90	1.21	1.44	1.90	2.44	3.16	3.52	**2yr**	2.80	3.38	3.90	4.54	5.18	**2yr**
5yr	0.40	0.61	0.76	1.04	1.32	1.57	**5yr**	1.14	1.54	1.82	2.41	3.08	4.16	4.74	**5yr**	3.68	4.56	5.21	5.89	6.88	**5yr**
10yr	0.47	0.72	0.89	1.24	1.61	1.91	**10yr**	1.39	1.87	2.19	2.91	3.70	5.18	5.98	**10yr**	4.58	5.75	6.53	7.17	8.49	**10yr**
25yr	0.58	0.88	1.10	1.56	2.06	2.47	**25yr**	1.78	2.41	2.82	3.73	4.71	6.93	8.16	**25yr**	6.13	7.85	8.77	9.36	10.39	**25yr**
50yr	0.68	1.03	1.28	1.84	2.48	2.99	**50yr**	2.14	2.92	3.41	4.51	5.68	8.64	10.36	**50yr**	7.65	9.96	11.00	11.45	12.62	**50yr**
100yr	0.80	1.21	1.51	2.19	3.00	3.62	**100yr**	2.59	3.54	4.14	5.46	6.85	10.81	13.15	**100yr**	9.57	12.64	13.79	14.00	15.35	**100yr**
200yr	0.94	1.41	1.79	2.59	3.61	4.40	**200yr**	3.12	4.30	5.02	6.62	8.26	13.56	14.45	**200yr**	12.00	13.89	17.28	17.12	18.68	**200yr**
500yr	1.17	1.74	2.24	3.25	4.62	5.68	**500yr**	3.99	5.55	6.46	8.55	10.61	18.30	19.31	**500yr**	16.20	18.57	23.30	22.39	24.25	**500yr**

WEB SOILS

Soil Map—Strafford County, New Hampshire
(WEB SOILS MAP)



Map Scale: 1:3,160 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 45 90 180 270

Feet: 0 150 300 600 900

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

MAP LEGEND

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

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

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

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Strafford County, New Hampshire
Survey Area Data: Version 22, Aug 31, 2021

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

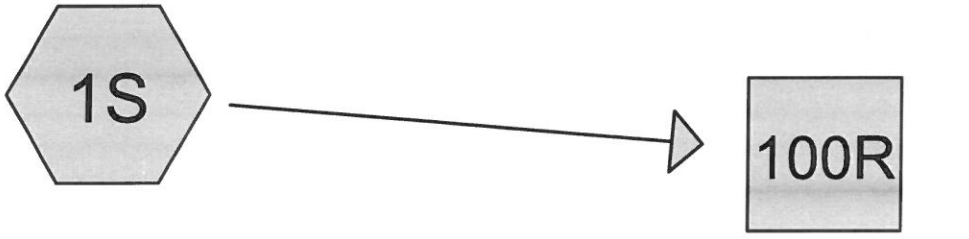
Date(s) aerial images were photographed: Jun 12, 2019—Aug 30, 2019

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
GtD	Gloucester extremely stony fine sandy loam, 8 to 25 percent slopes	6.9	19.3%
HaA	Hinckley loamy sand, 0 to 3 percent slopes	6.5	18.2%
HaB	Hinckley loamy sand, 3 to 8 percent slopes	0.1	0.2%
HeD	Hollis-Charlton extremely rocky fine sandy loams, 8 to 25 percent slopes	12.3	34.4%
HeE	Hollis-Charlton extremely rocky fine sandy loams, 25 to 60 percent slopes	7.1	19.8%
Sb	Saugatuck loamy sand	0.7	2.0%
W	Water	2.1	6.0%
Totals for Area of Interest		**35.7**	**100.0%**

2, 10, 25, 50-YEAR PRE-DEVELOPMENT



Subcatchment 1

Design point

Subcat Reach Pond Link

Routing Diagram for Ex con

Prepared by New Hampshire Land Consultants, PLLC, Printed 2/8/2022

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.026	61	>75% Grass cover, Good, HSG B (1S)
1.186	55	Woods, Good, HSG B (1S)
1.213	**55**	**TOTAL AREA**

Soil Listing (all nodes)

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

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.026	0.000	0.000	0.000	0.026	>75% Grass cover, Good	1S
0.000	1.186	0.000	0.000	0.000	1.186	Woods, Good	1S
0.000	**1.213**	**0.000**	**0.000**	**0.000**	**1.213**	**TOTAL AREA**	

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

Subcatchment 1S: Subcatchment 1 Runoff Area=52,819 sf 0.00% Impervious Runoff Depth>0.16"
Flow Length=457' Tc=14.6 min CN=55 Runoff=0.07 cfs 0.016 af

Reach 100R: Design point Inflow=0.07 cfs 0.016 af
Outflow=0.07 cfs 0.016 af

Total Runoff Area = 1.213 ac Runoff Volume = 0.016 af Average Runoff Depth = 0.16"
100.00% Pervious = 1.213 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1S: Subcatchment 1

Runoff = 0.07 cfs @ 12.51 hrs, Volume= 0.016 af, Depth> 0.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR-24HR Rainfall=2.98"

	Area (sf)	CN	Description
	1,146	61	>75% Grass cover, Good, HSG B
*	51,673	55	Woods, Good, HSG B
	52,819	55	Weighted Average
	52,819		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	50	0.0400	0.09		**Sheet Flow, 1** Woods: Light underbrush n= 0.400 P2= 2.92"
4.8	407	0.0810	1.42		**Shallow Concentrated Flow, 2** Woodland Kv= 5.0 fps
14.6	457	Total			

Summary for Reach 100R: Design point

Inflow Area = 1.213 ac, 0.00% Impervious, Inflow Depth > 0.16" for 2YR-24HR event
Inflow = 0.07 cfs @ 12.51 hrs, Volume= 0.016 af
Outflow = 0.07 cfs @ 12.51 hrs, Volume= 0.016 af, Atten= 0%, Lag= 0.0 min

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

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

Subcatchment 1S: Subcatchment 1 Runoff Area=52,819 sf 0.00% Impervious Runoff Depth>0.64"
Flow Length=457' Tc=14.6 min CN=55 Runoff=0.56 cfs 0.065 af

Reach 100R: Design point Inflow=0.56 cfs 0.065 af
Outflow=0.56 cfs 0.065 af

Total Runoff Area = 1.213 ac Runoff Volume = 0.065 af Average Runoff Depth = 0.64"
100.00% Pervious = 1.213 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1S: Subcatchment 1

Runoff = 0.56 cfs @ 12.27 hrs, Volume= 0.065 af, Depth> 0.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR-24HR Rainfall=4.48"

	Area (sf)	CN	Description
	1,146	61	>75% Grass cover, Good, HSG B
*	51,673	55	Woods, Good, HSG B
	52,819	55	Weighted Average
	52,819		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	50	0.0400	0.09		**Sheet Flow, 1** Woods: Light underbrush n= 0.400 P2= 2.92"
4.8	407	0.0810	1.42		**Shallow Concentrated Flow, 2** Woodland Kv= 5.0 fps
14.6	457	Total			

Summary for Reach 100R: Design point

Inflow Area = 1.213 ac, 0.00% Impervious, Inflow Depth > 0.64" for 10YR-24HR event
Inflow = 0.56 cfs @ 12.27 hrs, Volume= 0.065 af
Outflow = 0.56 cfs @ 12.27 hrs, Volume= 0.065 af, Atten= 0%, Lag= 0.0 min

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

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

Subcatchment 1S: Subcatchment 1 Runoff Area=52,819 sf 0.00% Impervious Runoff Depth>1.18"
Flow Length=457' Tc=14.6 min CN=55 Runoff=1.21 cfs 0.119 af

Reach 100R: Design point Inflow=1.21 cfs 0.119 af
Outflow=1.21 cfs 0.119 af

Total Runoff Area = 1.213 ac Runoff Volume = 0.119 af Average Runoff Depth = 1.18"
100.00% Pervious = 1.213 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1S: Subcatchment 1

Runoff = 1.21 cfs @ 12.23 hrs, Volume= 0.119 af, Depth> 1.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YR-24HR Rainfall=5.65"

	Area (sf)	CN	Description
	1,146	61	>75% Grass cover, Good, HSG B
*	51,673	55	Woods, Good, HSG B
	52,819	55	Weighted Average
	52,819		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	50	0.0400	0.09		**Sheet Flow, 1** Woods: Light underbrush n= 0.400 P2= 2.92"
4.8	407	0.0810	1.42		**Shallow Concentrated Flow, 2** Woodland Kv= 5.0 fps
14.6	457	Total			

Summary for Reach 100R: Design point

Inflow Area = 1.213 ac, 0.00% Impervious, Inflow Depth > 1.18" for 25YR-24HR event
Inflow = 1.21 cfs @ 12.23 hrs, Volume= 0.119 af
Outflow = 1.21 cfs @ 12.23 hrs, Volume= 0.119 af, Atten= 0%, Lag= 0.0 min

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

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

Subcatchment 1S: Subcatchment 1 Runoff Area=52,819 sf 0.00% Impervious Runoff Depth>1.77"
Flow Length=457' Tc=14.6 min CN=55 Runoff=1.95 cfs 0.179 af

Reach 100R: Design point Inflow=1.95 cfs 0.179 af
Outflow=1.95 cfs 0.179 af

Total Runoff Area = 1.213 ac Runoff Volume = 0.179 af Average Runoff Depth = 1.77"
100.00% Pervious = 1.213 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1S: Subcatchment 1

Runoff = 1.95 cfs @ 12.22 hrs, Volume= 0.179 af, Depth> 1.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 50YR-24HR Rainfall=6.74"

	Area (sf)	CN	Description
	1,146	61	>75% Grass cover, Good, HSG B
*	51,673	55	Woods, Good, HSG B
	52,819	55	Weighted Average
	52,819		100.00% Pervious Area

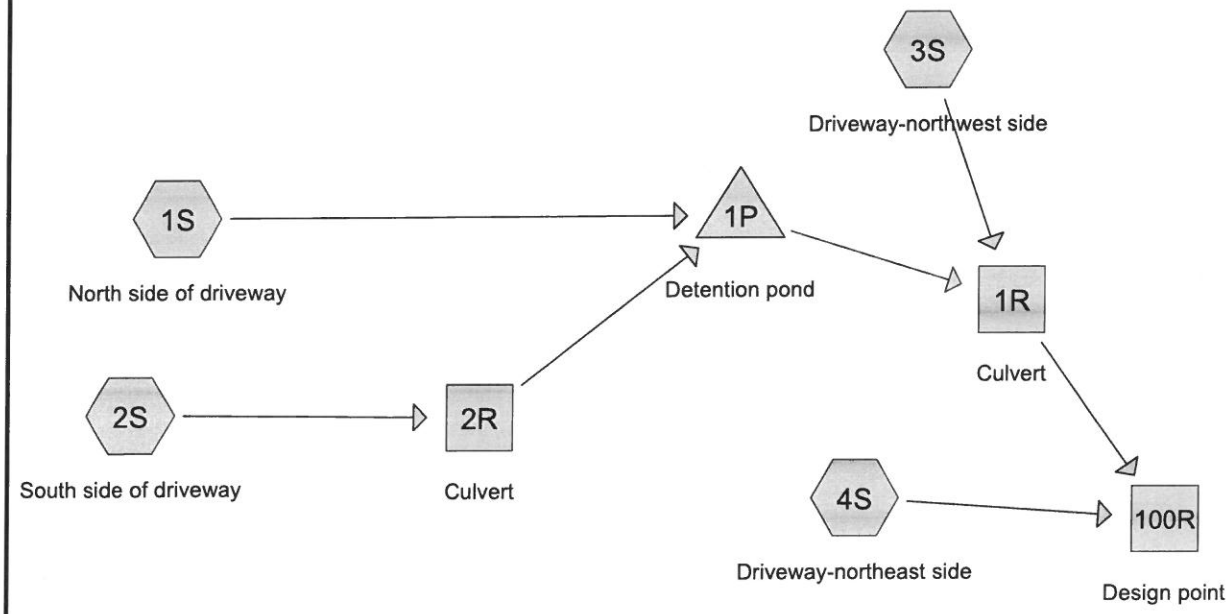
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	50	0.0400	0.09		**Sheet Flow, 1** Woods: Light underbrush n= 0.400 P2= 2.92"
4.8	407	0.0810	1.42		**Shallow Concentrated Flow, 2** Woodland Kv= 5.0 fps
14.6	457	Total			

Summary for Reach 100R: Design point

Inflow Area = 1.213 ac, 0.00% Impervious, Inflow Depth > 1.77" for 50YR-24HR event
Inflow = 1.95 cfs @ 12.22 hrs, Volume= 0.179 af
Outflow = 1.95 cfs @ 12.22 hrs, Volume= 0.179 af, Atten= 0%, Lag= 0.0 min

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

2, 10, 25, 50-YEAR POST-DEVELOPMENT



Subcat Reach Pond Link

Routing Diagram for Pro con

Prepared by New Hampshire Land Consultants, PLLC, Printed 2/8/2022

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.829	61	>75% Grass cover, Good, HSG B (1S, 2S, 3S, 4S)
0.023	98	Impervious, HSG B (3S, 4S)
0.231	98	Pavement, HSG B (1S, 2S)
0.129	55	Woods, Good, HSG B (1S)
1.213	**68**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
1.213	HSG B	1S, 2S, 3S, 4S
0.000	HSG C	
0.000	HSG D	
0.000	Other	
1.213		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.829	0.000	0.000	0.000	0.829	>75% Grass cover, Good	1S, 2S, 3S, 4S
0.000	0.023	0.000	0.000	0.000	0.023	Impervious	3S, 4S
0.000	0.231	0.000	0.000	0.000	0.231	Pavement	1S, 2S
0.000	0.129	0.000	0.000	0.000	0.129	Woods, Good	1S
0.000	**1.213**	**0.000**	**0.000**	**0.000**	**1.213**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	1R	494.50	494.25	25.0	0.0100	0.012	15.0	0.0	0.0
2	1P	497.00	496.75	25.0	0.0100	0.012	15.0	0.0	0.0

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

Subcatchment 1S: North side of driveway Runoff Area=23,737 sf 20.21% Impervious Runoff Depth>0.51"
Tc=5.0 min CN=67 Runoff=0.30 cfs 0.023 af

Subcatchment 2S: South side of driveway Runoff Area=26,141 sf 20.06% Impervious Runoff Depth>0.55"
Tc=5.0 min CN=68 Runoff=0.36 cfs 0.028 af

Subcatchment 3S: Driveway-northwest side Runoff Area=1,231 sf 35.50% Impervious Runoff Depth>0.81"
Tc=5.0 min CN=74 Runoff=0.03 cfs 0.002 af

Subcatchment 4S: Driveway-northeast side Runoff Area=1,710 sf 34.04% Impervious Runoff Depth>0.81"
Tc=5.0 min CN=74 Runoff=0.04 cfs 0.003 af

Reach 1R: Culvert Avg. Flow Depth=0.07' Max Vel=1.58 fps Inflow=0.04 cfs 0.021 af
15.0" Round Pipe n=0.012 L=25.0' S=0.0100 '/' Capacity=7.00 cfs Outflow=0.04 cfs 0.021 af

Reach 2R: Culvert Inflow=0.36 cfs 0.028 af
Outflow=0.36 cfs 0.028 af

Reach 100R: Design point Inflow=0.08 cfs 0.023 af
Outflow=0.08 cfs 0.023 af

Pond 1P: Detention pond Peak Elev=498.32' Storage=1,438 cf Inflow=0.66 cfs 0.051 af
Primary=0.03 cfs 0.019 af Secondary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.019 af

Total Runoff Area = 1.213 ac Runoff Volume = 0.055 af Average Runoff Depth = 0.55"
79.06% Pervious = 0.959 ac 20.94% Impervious = 0.254 ac

Summary for Subcatchment 1S: North side of driveway

Runoff = 0.30 cfs @ 12.10 hrs, Volume= 0.023 af, Depth> 0.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR-24HR Rainfall=2.98"

	Area (sf)	CN	Description
	13,301	61	>75% Grass cover, Good, HSG B
*	4,797	98	Pavement, HSG B
	5,639	55	Woods, Good, HSG B
	23,737	67	Weighted Average
	18,940		79.79% Pervious Area
	4,797		20.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 15**

Summary for Subcatchment 2S: South side of driveway

Runoff = 0.36 cfs @ 12.10 hrs, Volume= 0.028 af, Depth> 0.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR-24HR Rainfall=2.98"

	Area (sf)	CN	Description
	20,896	61	>75% Grass cover, Good, HSG B
*	5,245	98	Pavement, HSG B
	26,141	68	Weighted Average
	20,896		79.94% Pervious Area
	5,245		20.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 1**

Summary for Subcatchment 3S: Driveway-northwest side

Runoff = 0.03 cfs @ 12.09 hrs, Volume= 0.002 af, Depth> 0.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR-24HR Rainfall=2.98"

	Area (sf)	CN	Description
*	437	98	Impervious, HSG B
	794	61	>75% Grass cover, Good, HSG B
	1,231	74	Weighted Average
	794		64.50% Pervious Area
	437		35.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 1**

Summary for Subcatchment 4S: Driveway-northeast side

Runoff = 0.04 cfs @ 12.09 hrs, Volume= 0.003 af, Depth> 0.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR-24HR Rainfall=2.98"

	Area (sf)	CN	Description
*	582	98	Impervious, HSG B
	1,128	61	>75% Grass cover, Good, HSG B
	1,710	74	Weighted Average
	1,128		65.96% Pervious Area
	582		34.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 1**

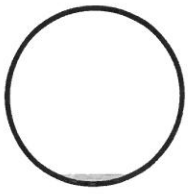
Summary for Reach 1R: Culvert

Inflow Area = 1.173 ac, 20.50% Impervious, Inflow Depth > 0.21" for 2YR-24HR event
Inflow = 0.04 cfs @ 12.11 hrs, Volume= 0.021 af
Outflow = 0.04 cfs @ 12.11 hrs, Volume= 0.021 af, Atten= 1%, Lag= 0.4 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 1.58 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.34 fps, Avg. Travel Time= 0.3 min

Peak Storage= 1 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.07'
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 7.00 cfs

15.0" Round Pipe
n= 0.012
Length= 25.0' Slope= 0.0100 '/'
Inlet Invert= 494.50', Outlet Invert= 494.25'



Summary for Reach 2R: Culvert

Inflow Area = 0.600 ac, 20.06% Impervious, Inflow Depth > 0.55" for 2YR-24HR event
Inflow = 0.36 cfs @ 12.10 hrs, Volume= 0.028 af
Outflow = 0.36 cfs @ 12.10 hrs, Volume= 0.028 af, Atten= 0%, Lag= 0.0 min

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

Summary for Reach 100R: Design point

Inflow Area = 1.213 ac, 20.94% Impervious, Inflow Depth > 0.23" for 2YR-24HR event
Inflow = 0.08 cfs @ 12.10 hrs, Volume= 0.023 af
Outflow = 0.08 cfs @ 12.10 hrs, Volume= 0.023 af, Atten= 0%, Lag= 0.0 min

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

Summary for Pond 1P: Detention pond

Inflow Area = 1.145 ac, 20.13% Impervious, Inflow Depth > 0.53" for 2YR-24HR event
Inflow = 0.66 cfs @ 12.10 hrs, Volume= 0.051 af
Outflow = 0.03 cfs @ 17.57 hrs, Volume= 0.019 af, Atten= 95%, Lag= 328.6 min
Primary = 0.03 cfs @ 17.57 hrs, Volume= 0.019 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 498.32' @ 17.57 hrs Surf.Area= 1,634 sf Storage= 1,438 cf
Flood Elev= 500.50' Surf.Area= 3,604 sf Storage= 7,106 cf

Plug-Flow detention time= 238.2 min calculated for 0.019 af (37% of inflow)
Center-of-Mass det. time= 130.3 min (969.3 - 839.0)

Volume	Invert	Avail.Storage	Storage Description
#1	497.00'	7,106 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
497.00	565	0	0
498.00	1,346	956	956
500.00	3,123	4,469	5,425
500.50	3,604	1,682	7,106

Device	Routing	Invert	Outlet Devices
#1	Secondary	500.00'	**5.0' 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
#2	Primary	497.00'	**15.0" Round Culvert** L= 25.0' Ke= 0.500 Inlet / Outlet Invert= 497.00' / 496.75' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#3	Device 2	497.00'	**1.0" Vert. Orifice/Grate** C= 0.600

#4	Device 2	498.60'	**9.0" Vert. Orifice/Grate** C= 0.600
#5	Device 2	500.00'	**15.0" Horiz. Orifice/Grate** C= 0.600
			Limited to weir flow at low heads

Primary OutFlow Max=0.03 cfs @ 17.57 hrs HW=498.32' (Free Discharge)
└─**2=Culvert** (Passes 0.03 cfs of 4.66 cfs potential flow)
  ├─**3=Orifice/Grate** (Orifice Controls 0.03 cfs @ 5.45 fps)
  ├─**4=Orifice/Grate** (Controls 0.00 cfs)
  └─**5=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=497.00' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

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

Subcatchment 1S: North side of driveway Runoff Area=23,737 sf 20.21% Impervious Runoff Depth>1.32"
Tc=5.0 min CN=67 Runoff=0.88 cfs 0.060 af

Subcatchment 2S: South side of driveway Runoff Area=26,141 sf 20.06% Impervious Runoff Depth>1.39"
Tc=5.0 min CN=68 Runoff=1.03 cfs 0.069 af

Subcatchment 3S: Driveway-northwestside Runoff Area=1,231 sf 35.50% Impervious Runoff Depth>1.81"
Tc=5.0 min CN=74 Runoff=0.06 cfs 0.004 af

Subcatchment 4S: Driveway-northeastside Runoff Area=1,710 sf 34.04% Impervious Runoff Depth>1.81"
Tc=5.0 min CN=74 Runoff=0.09 cfs 0.006 af

Reach 1R: Culvert Avg. Flow Depth=0.19' Max Vel=2.97 fps Inflow=0.35 cfs 0.087 af
15.0" Round Pipe n=0.012 L=25.0' S=0.0100 '/' Capacity=7.00 cfs Outflow=0.35 cfs 0.087 af

Reach 2R: Culvert Inflow=1.03 cfs 0.069 af
Outflow=1.03 cfs 0.069 af

Reach 100R: Design point Inflow=0.36 cfs 0.093 af
Outflow=0.36 cfs 0.093 af

Pond 1P: Detention pond Peak Elev=498.90' Storage=2,519 cf Inflow=1.91 cfs 0.130 af
Primary=0.34 cfs 0.083 af Secondary=0.00 cfs 0.000 af Outflow=0.34 cfs 0.083 af

Total Runoff Area = 1.213 ac Runoff Volume = 0.140 af Average Runoff Depth = 1.38"
79.06% Pervious = 0.959 ac 20.94% Impervious = 0.254 ac

Summary for Subcatchment 1S: North side of driveway

Runoff = 0.88 cfs @ 12.09 hrs, Volume= 0.060 af, Depth> 1.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR-24HR Rainfall=4.48"

	Area (sf)	CN	Description
	13,301	61	>75% Grass cover, Good, HSG B
*	4,797	98	Pavement, HSG B
	5,639	55	Woods, Good, HSG B
	23,737	67	Weighted Average
	18,940		79.79% Pervious Area
	4,797		20.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 15**

Summary for Subcatchment 2S: South side of driveway

Runoff = 1.03 cfs @ 12.09 hrs, Volume= 0.069 af, Depth> 1.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR-24HR Rainfall=4.48"

	Area (sf)	CN	Description
	20,896	61	>75% Grass cover, Good, HSG B
*	5,245	98	Pavement, HSG B
	26,141	68	Weighted Average
	20,896		79.94% Pervious Area
	5,245		20.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 1**

Summary for Subcatchment 3S: Driveway-northwest side

Runoff = 0.06 cfs @ 12.08 hrs, Volume= 0.004 af, Depth> 1.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR-24HR Rainfall=4.48"

	Area (sf)	CN	Description
*	437	98	Impervious, HSG B
	794	61	>75% Grass cover, Good, HSG B
	1,231	74	Weighted Average
	794		64.50% Pervious Area
	437		35.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 1**

Summary for Subcatchment 4S: Driveway-northeast side

Runoff = 0.09 cfs @ 12.08 hrs, Volume= 0.006 af, Depth> 1.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR-24HR Rainfall=4.48"

	Area (sf)	CN	Description
*	582	98	Impervious, HSG B
	1,128	61	>75% Grass cover, Good, HSG B
	1,710	74	Weighted Average
	1,128		65.96% Pervious Area
	582		34.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 1**

Summary for Reach 1R: Culvert

Inflow Area = 1.173 ac, 20.50% Impervious, Inflow Depth > 0.89" for 10YR-24HR event
Inflow = 0.35 cfs @ 12.60 hrs, Volume= 0.087 af
Outflow = 0.35 cfs @ 12.61 hrs, Volume= 0.087 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 2.97 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.80 fps, Avg. Travel Time= 0.2 min

Peak Storage= 3 cf @ 12.60 hrs
Average Depth at Peak Storage= 0.19'
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 7.00 cfs

15.0" Round Pipe
n= 0.012
Length= 25.0' Slope= 0.0100 '/'
Inlet Invert= 494.50', Outlet Invert= 494.25'

Summary for Reach 2R: Culvert

Inflow Area = 0.600 ac, 20.06% Impervious, Inflow Depth > 1.39" for 10YR-24HR event
Inflow = 1.03 cfs @ 12.09 hrs, Volume= 0.069 af
Outflow = 1.03 cfs @ 12.09 hrs, Volume= 0.069 af, Atten= 0%, Lag= 0.0 min

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

Summary for Reach 100R: Design point

Inflow Area = 1.213 ac, 20.94% Impervious, Inflow Depth > 0.92" for 10YR-24HR event
Inflow = 0.36 cfs @ 12.59 hrs, Volume= 0.093 af
Outflow = 0.36 cfs @ 12.59 hrs, Volume= 0.093 af, Atten= 0%, Lag= 0.0 min

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

Summary for Pond 1P: Detention pond

Inflow Area = 1.145 ac, 20.13% Impervious, Inflow Depth > 1.36" for 10YR-24HR event
Inflow = 1.91 cfs @ 12.09 hrs, Volume= 0.130 af
Outflow = 0.34 cfs @ 12.61 hrs, Volume= 0.083 af, Atten= 82%, Lag= 31.4 min
Primary = 0.34 cfs @ 12.61 hrs, Volume= 0.083 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 498.90' @ 12.61 hrs Surf.Area= 2,143 sf Storage= 2,519 cf
Flood Elev= 500.50' Surf.Area= 3,604 sf Storage= 7,106 cf

Plug-Flow detention time= 154.6 min calculated for 0.083 af (64% of inflow)
Center-of-Mass det. time= 75.8 min (892.3 - 816.5)

Volume	Invert	Avail.Storage	Storage Description
#1	497.00'	7,106 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
497.00	565	0	0
498.00	1,346	956	956
500.00	3,123	4,469	5,425
500.50	3,604	1,682	7,106

Device	Routing	Invert	Outlet Devices
#1	Secondary	500.00'	**5.0' 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
#2	Primary	497.00'	**15.0" Round Culvert** L= 25.0' Ke= 0.500 Inlet / Outlet Invert= 497.00' / 496.75' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#3	Device 2	497.00'	**1.0" Vert. Orifice/Grate** C= 0.600

#4	Device 2	498.60'	**9.0" Vert. Orifice/Grate** C= 0.600
#5	Device 2	500.00'	**15.0" Horiz. Orifice/Grate** C= 0.600
			Limited to weir flow at low heads

Primary OutFlow Max=0.34 cfs @ 12.61 hrs HW=498.90' (Free Discharge)
└─**2=Culvert** (Passes 0.34 cfs of 6.60 cfs potential flow)
  ├─**3=Orifice/Grate** (Orifice Controls 0.04 cfs @ 6.56 fps)
  ├─**4=Orifice/Grate** (Orifice Controls 0.30 cfs @ 1.85 fps)
  └─**5=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=497.00' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

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

Subcatchment 1S: North side of driveway Runoff Area=23,737 sf 20.21% Impervious Runoff Depth>2.09"
Tc=5.0 min CN=67 Runoff=1.43 cfs 0.095 af

Subcatchment 2S: South side of driveway Runoff Area=26,141 sf 20.06% Impervious Runoff Depth>2.17"
Tc=5.0 min CN=68 Runoff=1.64 cfs 0.109 af

Subcatchment 3S: Driveway-northwest side Runoff Area=1,231 sf 35.50% Impervious Runoff Depth>2.69"
Tc=5.0 min CN=74 Runoff=0.10 cfs 0.006 af

Subcatchment 4S: Driveway-northeast side Runoff Area=1,710 sf 34.04% Impervious Runoff Depth>2.69"
Tc=5.0 min CN=74 Runoff=0.13 cfs 0.009 af

Reach 1R: Culvert Avg. Flow Depth=0.34' Max Vel=4.19 fps Inflow=1.13 cfs 0.162 af
15.0" Round Pipe n=0.012 L=25.0' S=0.0100 '/' Capacity=7.00 cfs Outflow=1.13 cfs 0.162 af

Reach 2R: Culvert Inflow=1.64 cfs 0.109 af
Outflow=1.64 cfs 0.109 af

Reach 100R: Design point Inflow=1.17 cfs 0.170 af
Outflow=1.17 cfs 0.170 af

Pond 1P: Detention pond Peak Elev=499.22' Storage=3,268 cf Inflow=3.06 cfs 0.203 af
Primary=1.09 cfs 0.155 af Secondary=0.00 cfs 0.000 af Outflow=1.09 cfs 0.155 af

Total Runoff Area = 1.213 ac Runoff Volume = 0.219 af Average Runoff Depth = 2.16"
79.06% Pervious = 0.959 ac 20.94% Impervious = 0.254 ac

Summary for Subcatchment 1S: North side of driveway

Runoff = 1.43 cfs @ 12.08 hrs, Volume= 0.095 af, Depth> 2.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YR-24HR Rainfall=5.65"

	Area (sf)	CN	Description
	13,301	61	>75% Grass cover, Good, HSG B
*	4,797	98	Pavement, HSG B
	5,639	55	Woods, Good, HSG B
	23,737	67	Weighted Average
	18,940		79.79% Pervious Area
	4,797		20.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 15**

Summary for Subcatchment 2S: South side of driveway

Runoff = 1.64 cfs @ 12.08 hrs, Volume= 0.109 af, Depth> 2.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YR-24HR Rainfall=5.65"

	Area (sf)	CN	Description
	20,896	61	>75% Grass cover, Good, HSG B
*	5,245	98	Pavement, HSG B
	26,141	68	Weighted Average
	20,896		79.94% Pervious Area
	5,245		20.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 1**

Summary for Subcatchment 3S: Driveway-northwest side

Runoff = 0.10 cfs @ 12.08 hrs, Volume= 0.006 af, Depth> 2.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YR-24HR Rainfall=5.65"

	Area (sf)	CN	Description
*	437	98	Impervious, HSG B
	794	61	>75% Grass cover, Good, HSG B
	1,231	74	Weighted Average
	794		64.50% Pervious Area
	437		35.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 1**

Summary for Subcatchment 4S: Driveway-northeast side

Runoff = 0.13 cfs @ 12.08 hrs, Volume= 0.009 af, Depth> 2.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YR-24HR Rainfall=5.65"

	Area (sf)	CN	Description
*	582	98	Impervious, HSG B
	1,128	61	>75% Grass cover, Good, HSG B
	1,710	74	Weighted Average
	1,128		65.96% Pervious Area
	582		34.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 1**

Summary for Reach 1R: Culvert

Inflow Area = 1.173 ac, 20.50% Impervious, Inflow Depth > 1.65" for 25YR-24HR event
Inflow = 1.13 cfs @ 12.39 hrs, Volume= 0.162 af
Outflow = 1.13 cfs @ 12.39 hrs, Volume= 0.162 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 4.19 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.99 fps, Avg. Travel Time= 0.2 min

Peak Storage= 7 cf @ 12.39 hrs
Average Depth at Peak Storage= 0.34'
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 7.00 cfs

15.0" Round Pipe
n= 0.012
Length= 25.0' Slope= 0.0100 '/'
Inlet Invert= 494.50', Outlet Invert= 494.25'

Summary for Reach 2R: Culvert

Inflow Area = 0.600 ac, 20.06% Impervious, Inflow Depth > 2.17" for 25YR-24HR event
Inflow = 1.64 cfs @ 12.08 hrs, Volume= 0.109 af
Outflow = 1.64 cfs @ 12.08 hrs, Volume= 0.109 af, Atten= 0%, Lag= 0.0 min

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

Summary for Reach 100R: Design point

Inflow Area = 1.213 ac, 20.94% Impervious, Inflow Depth > 1.69" for 25YR-24HR event
Inflow = 1.17 cfs @ 12.38 hrs, Volume= 0.170 af
Outflow = 1.17 cfs @ 12.38 hrs, Volume= 0.170 af, Atten= 0%, Lag= 0.0 min

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

Summary for Pond 1P: Detention pond

Inflow Area = 1.145 ac, 20.13% Impervious, Inflow Depth > 2.13" for 25YR-24HR event
Inflow = 3.06 cfs @ 12.08 hrs, Volume= 0.203 af
Outflow = 1.09 cfs @ 12.40 hrs, Volume= 0.155 af, Atten= 64%, Lag= 18.7 min
Primary = 1.09 cfs @ 12.40 hrs, Volume= 0.155 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 499.22' @ 12.40 hrs Surf.Area= 2,433 sf Storage= 3,268 cf
Flood Elev= 500.50' Surf.Area= 3,604 sf Storage= 7,106 cf

Plug-Flow detention time= 108.6 min calculated for 0.155 af (76% of inflow)
Center-of-Mass det. time= 48.2 min (854.5 - 806.4)

Volume	Invert	Avail.Storage	Storage Description
#1	497.00'	7,106 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
497.00	565	0	0
498.00	1,346	956	956
500.00	3,123	4,469	5,425
500.50	3,604	1,682	7,106

Device	Routing	Invert	Outlet Devices
#1	Secondary	500.00'	**5.0' 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
#2	Primary	497.00'	**15.0" Round Culvert** L= 25.0' Ke= 0.500 Inlet / Outlet Invert= 497.00' / 496.75' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#3	Device 2	497.00'	**1.0" Vert. Orifice/Grate** C= 0.600

#4	Device 2	498.60'	**9.0" Vert. Orifice/Grate** C= 0.600
#5	Device 2	500.00'	**15.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.09 cfs @ 12.40 hrs HW=499.22' (Free Discharge)
└─**2=Culvert** (Passes 1.09 cfs of 7.47 cfs potential flow)
  ├─**3=Orifice/Grate** (Orifice Controls 0.04 cfs @ 7.11 fps)
  ├─**4=Orifice/Grate** (Orifice Controls 1.05 cfs @ 2.69 fps)
  └─**5=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=497.00' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

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

Subcatchment 1S: North side of driveway Runoff Area=23,737 sf 20.21% Impervious Runoff Depth>2.87"
Tc=5.0 min CN=67 Runoff=1.97 cfs 0.130 af

Subcatchment 2S: South side of driveway Runoff Area=26,141 sf 20.06% Impervious Runoff Depth>2.97"
Tc=5.0 min CN=68 Runoff=2.25 cfs 0.148 af

Subcatchment 3S: Driveway-northwest side Runoff Area=1,231 sf 35.50% Impervious Runoff Depth>3.56"
Tc=5.0 min CN=74 Runoff=0.13 cfs 0.008 af

Subcatchment 4S: Driveway-northeast side Runoff Area=1,710 sf 34.04% Impervious Runoff Depth>3.56"
Tc=5.0 min CN=74 Runoff=0.18 cfs 0.012 af

Reach 1R: Culvert Avg. Flow Depth=0.42' Max Vel=4.72 fps Inflow=1.73 cfs 0.238 af
15.0" Round Pipe n=0.012 L=25.0' S=0.0100 '/' Capacity=7.00 cfs Outflow=1.73 cfs 0.238 af

Reach 2R: Culvert Inflow=2.25 cfs 0.148 af
Outflow=2.25 cfs 0.148 af

Reach 100R: Design point Inflow=1.80 cfs 0.250 af
Outflow=1.80 cfs 0.250 af

Pond 1P: Detention pond Peak Elev=499.57' Storage=4,164 cf Inflow=4.22 cfs 0.279 af
Primary=1.68 cfs 0.229 af Secondary=0.00 cfs 0.000 af Outflow=1.68 cfs 0.229 af

Total Runoff Area = 1.213 ac Runoff Volume = 0.299 af Average Runoff Depth = 2.96"
79.06% Pervious = 0.959 ac 20.94% Impervious = 0.254 ac

Summary for Subcatchment 1S: North side of driveway

Runoff = 1.97 cfs @ 12.08 hrs, Volume= 0.130 af, Depth> 2.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 50YR-24HR Rainfall=6.74"

	Area (sf)	CN	Description
	13,301	61	>75% Grass cover, Good, HSG B
*	4,797	98	Pavement, HSG B
	5,639	55	Woods, Good, HSG B
	23,737	67	Weighted Average
	18,940		79.79% Pervious Area
	4,797		20.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 15**

Summary for Subcatchment 2S: South side of driveway

Runoff = 2.25 cfs @ 12.08 hrs, Volume= 0.148 af, Depth> 2.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 50YR-24HR Rainfall=6.74"

	Area (sf)	CN	Description
	20,896	61	>75% Grass cover, Good, HSG B
*	5,245	98	Pavement, HSG B
	26,141	68	Weighted Average
	20,896		79.94% Pervious Area
	5,245		20.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 1**

Summary for Subcatchment 3S: Driveway-northwest side

Runoff = 0.13 cfs @ 12.08 hrs, Volume= 0.008 af, Depth> 3.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 50YR-24HR Rainfall=6.74"

	Area (sf)	CN	Description
*	437	98	Impervious, HSG B
	794	61	>75% Grass cover, Good, HSG B
	1,231	74	Weighted Average
	794		64.50% Pervious Area
	437		35.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 1**

Summary for Subcatchment 4S: Driveway-northeast side

Runoff = 0.18 cfs @ 12.08 hrs, Volume= 0.012 af, Depth> 3.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 50YR-24HR Rainfall=6.74"

	Area (sf)	CN	Description
*	582	98	Impervious, HSG B
	1,128	61	>75% Grass cover, Good, HSG B
	1,710	74	Weighted Average
	1,128		65.96% Pervious Area
	582		34.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 1**

Summary for Reach 1R: Culvert

Inflow Area = 1.173 ac, 20.50% Impervious, Inflow Depth > 2.43" for 50YR-24HR event
Inflow = 1.73 cfs @ 12.32 hrs, Volume= 0.238 af
Outflow = 1.73 cfs @ 12.33 hrs, Volume= 0.238 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 4.72 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 2.10 fps, Avg. Travel Time= 0.2 min

Peak Storage= 9 cf @ 12.32 hrs
Average Depth at Peak Storage= 0.42'
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 7.00 cfs

15.0" Round Pipe
n= 0.012
Length= 25.0' Slope= 0.0100 '/'
Inlet Invert= 494.50', Outlet Invert= 494.25'

Summary for Reach 2R: Culvert

Inflow Area = 0.600 ac, 20.06% Impervious, Inflow Depth > 2.97" for 50YR-24HR event
Inflow = 2.25 cfs @ 12.08 hrs, Volume= 0.148 af
Outflow = 2.25 cfs @ 12.08 hrs, Volume= 0.148 af, Atten= 0%, Lag= 0.0 min

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

Summary for Reach 100R: Design point

Inflow Area = 1.213 ac, 20.94% Impervious, Inflow Depth > 2.47" for 50YR-24HR event
Inflow = 1.80 cfs @ 12.30 hrs, Volume= 0.250 af
Outflow = 1.80 cfs @ 12.30 hrs, Volume= 0.250 af, Atten= 0%, Lag= 0.0 min

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

Summary for Pond 1P: Detention pond

Inflow Area = 1.145 ac, 20.13% Impervious, Inflow Depth > 2.92" for 50YR-24HR event
Inflow = 4.22 cfs @ 12.08 hrs, Volume= 0.279 af
Outflow = 1.68 cfs @ 12.34 hrs, Volume= 0.229 af, Atten= 60%, Lag= 15.5 min
Primary = 1.68 cfs @ 12.34 hrs, Volume= 0.229 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 499.57' @ 12.34 hrs Surf.Area= 2,741 sf Storage= 4,164 cf
Flood Elev= 500.50' Surf.Area= 3,604 sf Storage= 7,106 cf

Plug-Flow detention time= 88.8 min calculated for 0.229 af (82% of inflow)
Center-of-Mass det. time= 39.4 min (838.7 - 799.3)

Volume	Invert	Avail.Storage	Storage Description
#1	497.00'	7,106 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
497.00	565	0	0
498.00	1,346	956	956
500.00	3,123	4,469	5,425
500.50	3,604	1,682	7,106

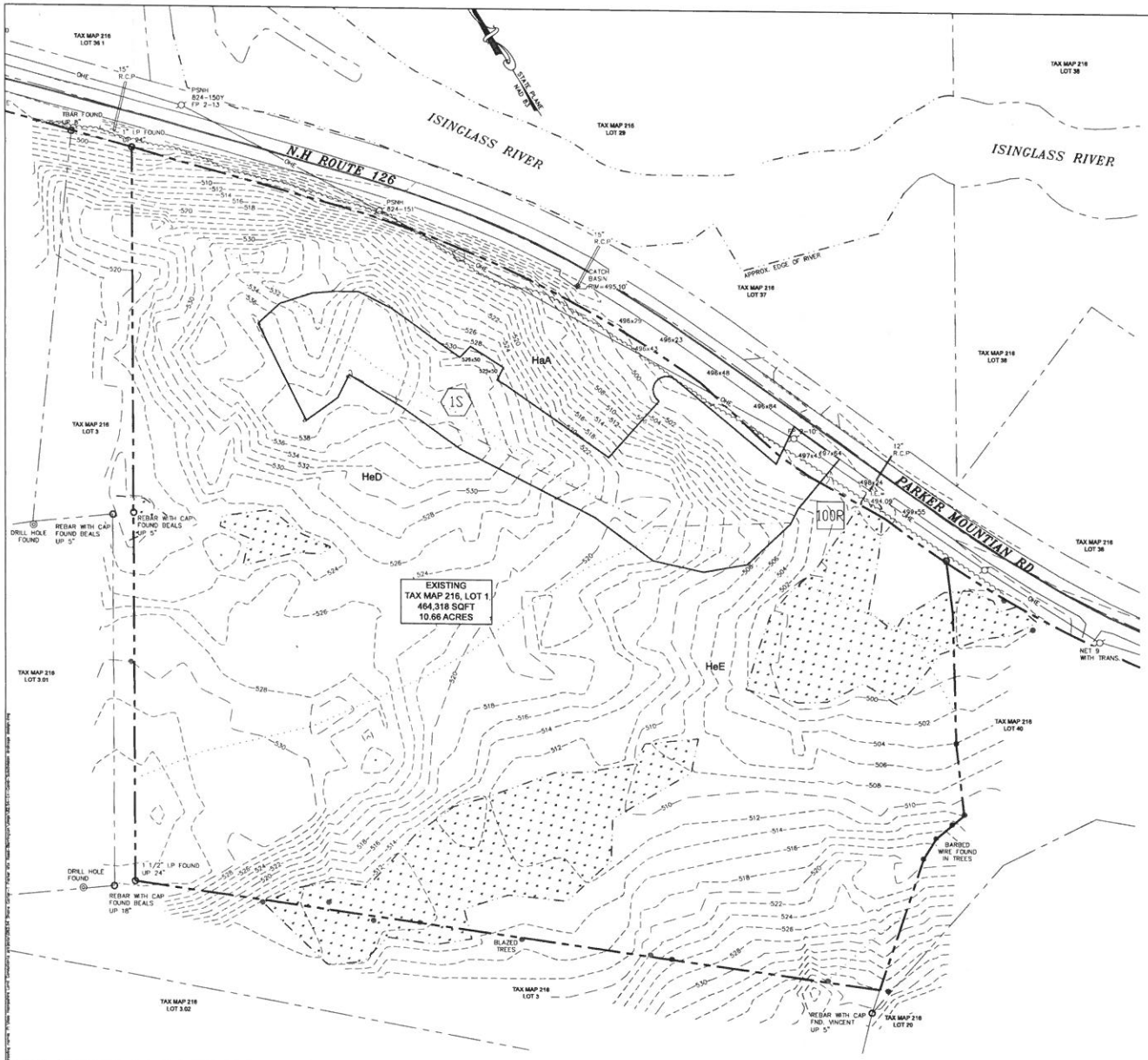
Device	Routing	Invert	Outlet Devices
#1	Secondary	500.00'	**5.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#2	Primary	497.00'	**15.0" Round Culvert** L= 25.0' Ke= 0.500 Inlet / Outlet Invert= 497.00' / 496.75' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#3	Device 2	497.00'	**1.0" Vert. Orifice/Grate** C= 0.600

#4	Device 2	498.60'	**9.0" Vert. Orifice/Grate** C= 0.600
#5	Device 2	500.00'	**15.0" Horiz. Orifice/Grate** C= 0.600
			Limited to weir flow at low heads

Primary OutFlow Max=1.68 cfs @ 12.34 hrs HW=499.57' (Free Discharge)
└**2=Culvert** (Passes 1.68 cfs of 8.24 cfs potential flow)
  ├**3=Orifice/Grate** (Orifice Controls 0.04 cfs @ 7.65 fps)
  ├**4=Orifice/Grate** (Orifice Controls 1.64 cfs @ 3.71 fps)
  └**5=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=497.00' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

DRAINAGE AREA PLANS



**THIS DRAWING IS FOR DRAINAGE PURPOSES ONLY

WATERSHED KEY

(#) SUBCATCHMENT

[#] REACH

REVISIONS

NO.	DATE	DESCRIPTION	BY

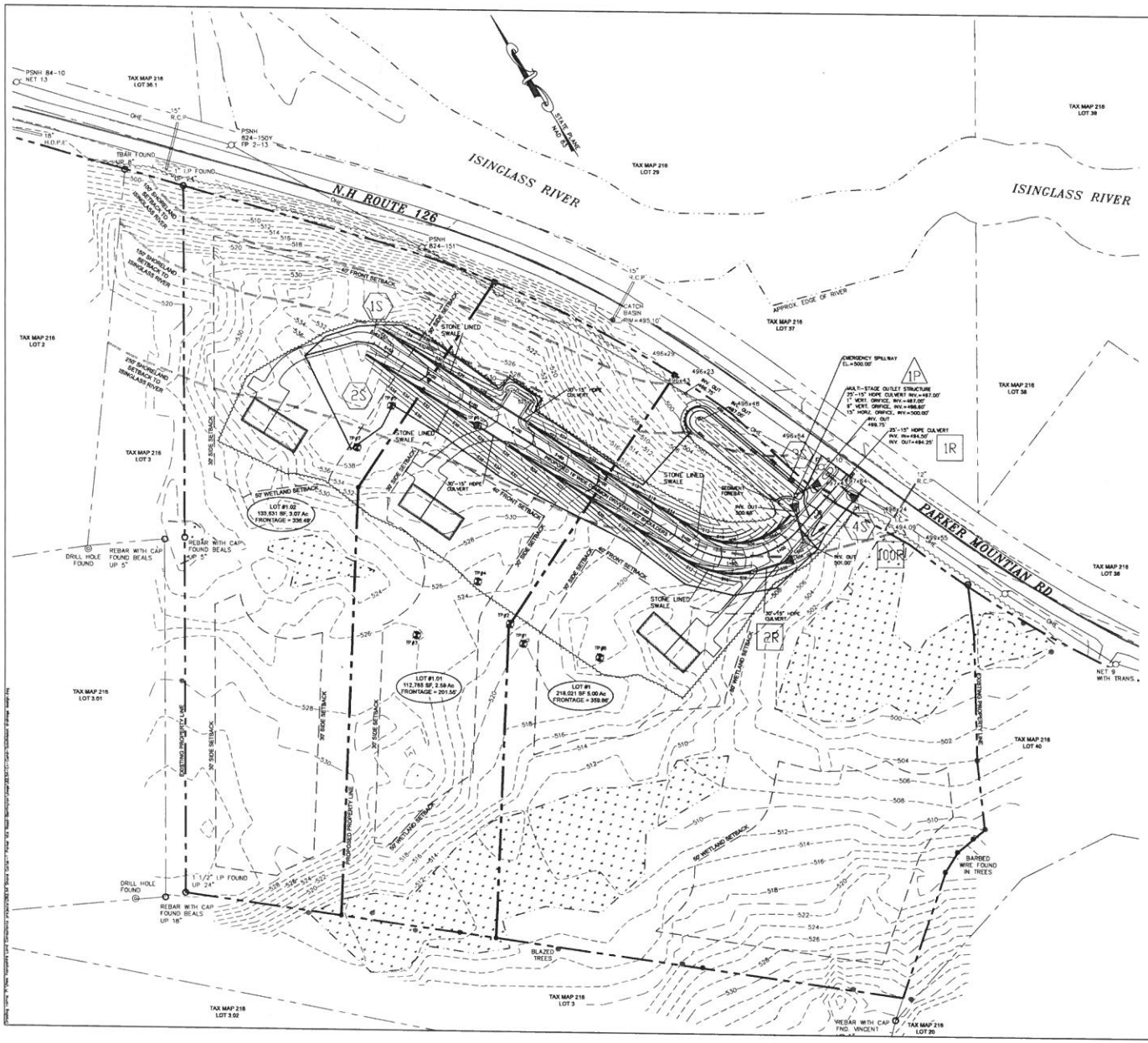
GRAPHIC SCALE
25 12.5 0 50
SCALE: 1"=50'

N.H. LAND Consultants
SURVEYING-LAND PLANNING-REAL ESTATE
A Veteran Owned Company
800 FIRST NH TURNPIKE, NORTHWOOD, NH 03261 PH: 603-942-5250 WEBSITE: NHLANDCONSULTANTS.COM

EXISTING WATERSHED PLAN
TAX MAP 216 LOT 1
ROUTE 126 (PARKER MOUNTAIN ROAD) BARRINGTON NH
OWNED BY
NOBLE HOMES, LLC
P.O. BOX 185, DEERFIELD, NH 03037
BOOK 4986 PAGE 272

STRAFFORD CO.
JOB NO: 82.54
DATE: FEBRUARY 9, 2022

EWP
SHT. 1 of 2



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WATERSHED KEY

- (#) SUBCATCHMENT
- [#] REACH
- △# POND

REVISIONS

NO.	DATE	DESCRIPTION	BY

GRAPHIC SCALE
25 12.5 0 50
SCALE: 1"=50'

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PROPOSED WATERSHED PLAN
TAX MAP 216 LOT 1
ROUTE 126 (PARKER MOUNTAIN ROAD), BARRINGTON, NH

OWNED BY
NOBLE HOMES, LLC
P.O. BOX 185, DEERFIELD, NH 03037
BOOK 4985 PAGE 272

STRAFFORD CO.
JOB NO. 82.54
DATE: FEBRUARY 9, 2021
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SHT. 2 of 2