

STORMWATER REPORT

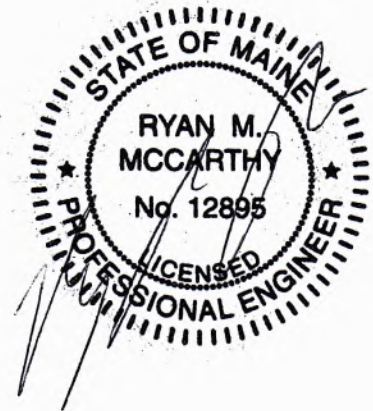
March 5, 2020
Revised May 6, 2020

Project:

Kittery Car Wash
Tax Map 28 Lot 25D
Route 236
Kittery, ME 03904

Prepared for:

Robert T. Brennan, Jr.
1911 SE 20th Street
Cape Coral, FL 33990



Prepared by:



89 Route 236 Suite 3
Kittery, Maine 03904

1. NARRATIVE

The project site is located on Tax Map 28 Lot 25D and is an existing undeveloped property. This application proposes to develop the site to accommodate a two-bay automatic car wash.

The total lot size is 7.44 acres and consists of both upland areas and wetlands. The proposed development will be confined to the upland area directly adjacent to Route 236 and MacKenzie Lane. Test pits completed on the site indicate that this upland area is mostly fill material that was brought onto the site. The proposed development has been designed so that wetlands impacts are not necessary. The proposed development is estimated to result in approximately 16,600 sf of impervious area and 32,100 sf of disturbed area. As the development is estimated to result in less than 1 acre of disturbed area and less than 1 acre of impervious surfaces, a Maine DEP Stormwater Permit-by-Rule from Maine DEP is not required.

Per the Town of Kittery Land Use & Development Code Section 16.8.8.1, the peak stormwater discharge from the site in the post-development conditions must be limited to the pre-development peak discharge for the 2-year and 25-year, 24-hour storm event. This report provides calculations and documentation to support that the proposed site plan and stormwater management system will meet this requirement.

2. SITE SOILS AND VEGETATIVE COVER

The York County Soil Survey, prepared by the USDA-NRCS, indicates the following soil types within the project subcatchment area:

<u>Symbol</u>	<u>Soils Name, Type, & Slope</u>	<u>Hydrologic Soil Group</u>
Bm	Biddeford mucky peat	D
LnB	Lyman loam	D
PeB	Peru fine sandy loam	C/D
Pg	Pits, gravel	(NONE)
Sc	Scantic silt loam	D

The York County Soil Survey indicates the site is primarily HSG D, however, does not account for the filled area where the development is proposed. As a result, test pits were completed and the fill was found to consist of dark colored, coarse textured soil (i.e. cobbly to stony fine sandy loam to loamy sand) that is representative of HSG B. For purposes of this analysis, HSG B was used for the upland fill areas and HSG D for all wetland areas.

See Appendix for York County Soil Survey data and report by Joseph W. Noel, Maine Certified Soil Scientist #209.

3. DESIGN METHODOLOGY

A computer-aided design software package, HydroCAD (v 10.00), was used to model the pre-development and post-development hydrology of the stormwater runoff generated from



the site. The model is based on the SCS TR-20 program and is subject to cumulative rainfall/volume dependent routing calculations. Hydrographs are prepared for each element of the watershed and routed through the storage-indication method to produce various time-based results.

Rainfall data for the 2-year and 25-year 24-hour duration storm event was obtained from the National Oceanic and Atmospheric Administration (NOAA) Precipitation Frequency Data Server for the subject parcel's location.

2-year 24-hour recurrence interval	3.30 inches
25-year 24-hour recurrence interval	6.58 inches

4. EXISTING DRAINAGE CONDITIONS

The entire site generally slopes and drains away from Route 236 and MacKenzie Lane to a wetland located to the rear and side of the property. For purposes of this analysis, the existing conditions subcatchment (EX-1) was limited to the portion of the property within the C-2 zoning district and includes offsite areas that flow onto the site from Route 236 and MacKenzie Lane.

5. PROPOSED WATERSHED ANALYSIS

For the proposed analysis, the existing conditions subcatchment was divided into three smaller subcatchments (PR-1, PR-2 and PR-3) that reflect the stormwater hydrology of the proposed site. The overall runoff characteristics will remain similar to the existing conditions with the stormwater ultimately flowing to the existing wetland located to the rear of the property. Peak flows during each design storm have been mitigated by the installation of a stormwater basin with a control outlet structure.

Subcatchment PR-1 consists of the areas of the site that will continue to flow directly to the wetland and will not be intercepted by the proposed stormwater basins. Most of this area is will remain the same vegetative cover as in the existing conditions except for a portion of the proposed driveway entrance off MacKenzie Lane.

Subcatchment PR-2 includes both areas of the site to be developed and areas that will remain unchanged. Approximately 3/4rds of the proposed paved surface and half of the proposed building runoff is included in this subcatchment. Runoff from this area is routed directly to the proposed stormwater basin.

Subcatchment PR-3 also includes both areas of the site to be developed and areas that will remain unchanged. The remaining 1/4th of the proposed paved surface and half of the proposed building runoff is included in this subcatchment. Runoff from this area is routed to a culvert adjacent to the proposed driveway that outlets to the proposed stormwater basin.



The proposed stormwater basin has been designed to mitigate any increase in peak flows from the site due to the development. A control outlet structure will allow stormwater within the basin to pond to a depth of 12 inches before reaching two 4" diameter orifices in the side of the structure. This orifice will limit the rate at which stormwater is discharged to the wetland. During larger storm events, the stormwater in the basin will reach the top of the control outlet structure and flow through the emergency overflow grate.

6. ANALYSIS AND RESULTS

The table below summarizes the results of the HydroCAD analysis for the 2-year and 25-year 24-hour storm event.

Table 1: Pre & Post Peak Discharge Results

Storm Event	PRE	POST	Change (+/-)
2-year 24 hour storm	2.30 cfs	2.02 cfs	- 0.28 cfs
25-year 24 hour storm	9.39 cfs	9.18 cfs	- 0.21 cfs

*HydroCAD results are provided in Appendix.

7. CONCLUSIONS

This stormwater report provides a comparative analysis of the peak stormwater runoff generated from the site in the pre-development conditions and the post-development conditions. The design reduces the post-development peak flows below the pre-development peak flows for both the 2-year and 25-year 24-hour storm event due to the design of the stormwater basin and control outlet structure.

As a result, it is the opinion of Tidewater Engineering & Surveying, Inc that there will be no adverse impacts or increased flooding on abutting properties as a result of this development if the designed stormwater measures are constructed properly.



Appendix A

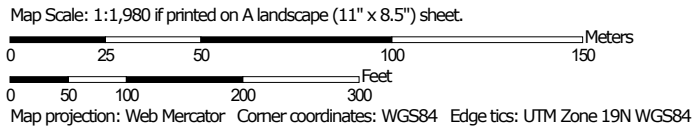
USDA-NRCS Soils Map



Hydrologic Soil Group—York County, Maine
(Kittery Car Wash)




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

 C
 C/D
 D
 Not rated or not available


Water Features

 Streams and Canals

Transportation

 Rails
 Interstate Highways
 US Routes
 Major Roads
 Local Roads

Background

 Aerial Photography

MAP INFORMATION

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

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: York County, Maine
 Survey Area Data: Version 18, Sep 16, 2019

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

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

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
Bm	Biddeford mucky peat, 0 to 3 percent slopes	D	6.4	75.1%
LnB	Lyman loam, 3 to 8 percent slopes, rocky	D	0.9	10.7%
MrC2	Marlow fine sandy loam, 8 to 15 percent slopes	C	0.0	0.3%
PeB	Peru fine sandy loam, 3 to 8 percent slopes	C/D	0.8	9.0%
Pg	Pits, gravel		0.4	4.6%
Sc	Scantic silt loam, 0 to 3 percent slopes	D	0.0	0.3%
Totals for Area of Interest			8.6	100.0%

Description

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

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

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

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

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

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

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

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Appendix B

Wetland & Soil Report by Joseph W. Noel



JOSEPH W. NOEL
P.O. BOX 174
SOUTH BERWICK, MAINE 03908
(207) 384-5587

CERTIFIED SOIL SCIENTIST * WETLAND SCIENTIST * LICENSED SITE EVALUATOR

March 2, 2020

Mr. Ryan M. McCarthy, P.E.
Tidewater Engineering & Surveying LLC
89 Route 236, Suite 3
Kittery, Maine 03904

RE: Wetland Delineation, Tax Map 28 - Lot 25D, Route 236, Kittery, Maine, JWN #19-129

Dear Ryan:

On November 4, 2019, February 28, 2020 and March 1, 2020, site visits were conducted at the above-referenced property. The purpose of the initial on-site was to identify and flag the wetland boundaries. The second visit was to conduct test pits where the commercial development is proposed and the third visit was to take pertinent photos.

Wetland Discussion

To determine the wetland boundary, the methodologies in the U.S. Army Corps of Engineers document *Corps of Engineers Wetlands Delineation Manual* (1987) along with the required *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region*, (Version 2.0) were used. The wetland boundary was field delineated with sequentially numbered blue flagging. Flagged sequences were differentiated by the placement of a letter before the numbers (e.g., A1, A2, etc.). These flags were survey located by Tidewater Engineering & Surveying LLC and placed on the project plans.

On February 28, 2020, you requested my opinion on whether a portion of the wetland designated as the "A" series would meet the Town of Kittery's Land Use and Development Code definition of a drainage ditch for setback purposes. Provided for this review by Tidewater Engineering & Surveying LLC was a plan with a portion of the located wetland with the "A" series sequences that designated the area that was 12 feet or less (i.e., between wetland flags A3 and A4 to A7). Per Section 16.2.2, a Drainage Ditch is:

A man-made, regularly maintained channel, trench or swale for conducting water that has a direction of flow to remove surface water or groundwater from land by means of gravity. For the purpose of this title, any new activity that reroutes a streambed or dredges a wetland is not considered to be a "drainage ditch". Where a drainage ditch widens out into a larger wetland, a route no more than 12

feet in with can be considered to be the drainage ditch. The remainder is considered wetland unless it is demonstrated that the originally developed drainage ditch was designed to be greater than 12 feet in width.

A small portion of the "A" series wetland appears to meet the Town of Kittery's definition of a drainage ditch. This small area (that is ≤ 12 feet wide per the project plans) is a regularly maintained roadside ditch/swale along MacKenzie Lane that drains surface water into the rest of the delineated wetland. This small-maintained ditched area is also between two uplands (filled area of the property and MacKenzie Lane – refer to attached photos). It is important to note that this is my professional opinion and the Town of Kittery has the final say on drainage ditch interpretations.

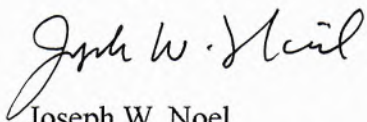
Test Pit Discussion

Three backhoe excavated test pits were conducted within the area planned for development. This area had been filled some time ago. You requested soil information for a better characterization of the fill material and the site's capacity for water infiltration. Specifically, determine the hydrologic soil group that would best fit these filled areas (i.e., anthropogenic landform).

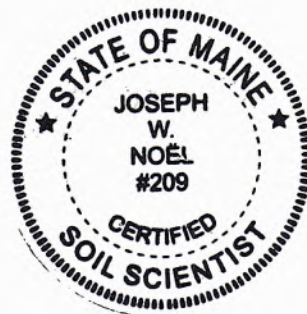
Three test pits logs are attached. These test pits found approximately 5 feet of dark colored, coarse textured soil (i.e., cobbly to stony fine sandy loam to loamy sand) with varying amounts of debris, such as: cement, asphalt, brick, metal, etc. (contained debris ranging from ~5% to ~30%). The undersigned estimated that the hydrologic soil group "B" would be a best fit to characterize the filled area. The surrounding wetland areas would classify as hydrologic soil group "D".

Please feel free to call with any questions or if you need additional information.

Sincerely,



Joseph W. Noel
Maine Certified Soil Scientist #209
Wetland Scientist



PHOTOS

Tax Map 28 - Lot 25D, Route 236, Kittery, Maine

(Photos taken by Joseph W. Noel on March 1, 2020)



View Of The Wetland Area That Meets The Town of Kittery's Definition Of A Drainage Ditch



Another View Of The Wetland Area That Meets The Local Definition Of A Drainage Ditch

Appendix C
NOAA Rainfall Data



NOAA Atlas 14, Volume 10, Version 3
Location name: Kittery, Maine, USA*
Latitude: 43.1183°, Longitude: -70.756°
Elevation: 41.88 ft**



* source: ESRI Maps
 ** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

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

NOAA, National Weather Service, Silver Spring, Maryland

[PF tabular](#) | [PF graphical](#) | [Maps & aeriels](#)

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.307 (0.233-0.404)	0.370 (0.280-0.488)	0.473 (0.358-0.626)	0.558 (0.420-0.743)	0.675 (0.494-0.936)	0.763 (0.548-1.08)	0.855 (0.600-1.25)	0.959 (0.640-1.43)	1.11 (0.716-1.71)	1.23 (0.780-1.94)
10-min	0.435 (0.330-0.573)	0.524 (0.397-0.691)	0.669 (0.505-0.887)	0.790 (0.594-1.05)	0.956 (0.699-1.33)	1.08 (0.777-1.53)	1.21 (0.850-1.78)	1.36 (0.909-2.03)	1.57 (1.02-2.43)	1.75 (1.11-2.75)
15-min	0.511 (0.388-0.674)	0.616 (0.467-0.813)	0.787 (0.595-1.04)	0.929 (0.698-1.24)	1.12 (0.823-1.56)	1.27 (0.914-1.80)	1.43 (1.00-2.09)	1.60 (1.07-2.39)	1.85 (1.20-2.86)	2.05 (1.30-3.23)
30-min	0.687 (0.521-0.906)	0.829 (0.628-1.09)	1.06 (0.801-1.40)	1.25 (0.941-1.67)	1.52 (1.11-2.11)	1.71 (1.23-2.43)	1.92 (1.35-2.83)	2.16 (1.45-3.24)	2.51 (1.62-3.88)	2.80 (1.77-4.41)
60-min	0.863 (0.655-1.14)	1.04 (0.789-1.37)	1.33 (1.01-1.76)	1.58 (1.18-2.10)	1.91 (1.40-2.65)	2.16 (1.55-3.06)	2.42 (1.71-3.56)	2.73 (1.82-4.08)	3.18 (2.05-4.91)	3.55 (2.25-5.59)
2-hr	1.15 (0.879-1.51)	1.40 (1.07-1.84)	1.80 (1.37-2.37)	2.14 (1.61-2.83)	2.60 (1.91-3.60)	2.94 (2.13-4.16)	3.31 (2.35-4.87)	3.75 (2.51-5.59)	4.42 (2.86-6.81)	4.99 (3.17-7.83)
3-hr	1.36 (1.04-1.77)	1.65 (1.26-2.16)	2.14 (1.63-2.80)	2.54 (1.92-3.35)	3.09 (2.29-4.27)	3.50 (2.55-4.95)	3.94 (2.81-5.81)	4.48 (3.01-6.67)	5.31 (3.44-8.16)	6.01 (3.82-9.42)
6-hr	1.77 (1.36-2.29)	2.16 (1.66-2.81)	2.81 (2.15-3.67)	3.35 (2.55-4.39)	4.09 (3.04-5.63)	4.64 (3.40-6.54)	5.24 (3.76-7.69)	5.97 (4.02-8.84)	7.08 (4.61-10.9)	8.04 (5.13-12.6)
12-hr	2.23 (1.72-2.88)	2.75 (2.12-3.55)	3.60 (2.77-4.67)	4.31 (3.30-5.61)	5.28 (3.95-7.23)	6.00 (4.41-8.41)	6.78 (4.89-9.92)	7.74 (5.23-11.4)	9.20 (6.01-14.0)	10.5 (6.69-16.3)
24-hr	2.63 (2.04-3.37)	3.30 (2.56-4.24)	4.41 (3.41-5.67)	5.32 (4.10-6.89)	6.58 (4.95-8.99)	7.50 (5.56-10.5)	8.52 (6.20-12.5)	9.81 (6.65-14.4)	11.9 (7.76-18.0)	13.6 (8.76-21.2)
2-day	2.93 (2.29-3.74)	3.77 (2.94-4.81)	5.14 (4.00-6.58)	6.28 (4.86-8.09)	7.85 (5.96-10.7)	8.98 (6.73-12.6)	10.3 (7.59-15.2)	12.0 (8.15-17.6)	14.9 (9.77-22.6)	17.5 (11.3-27.0)
3-day	3.19 (2.50-4.04)	4.09 (3.20-5.20)	5.58 (4.35-7.11)	6.81 (5.29-8.73)	8.50 (6.48-11.6)	9.72 (7.32-13.7)	11.1 (8.27-16.5)	13.0 (8.88-19.1)	16.3 (10.7-24.7)	19.2 (12.4-29.6)
4-day	3.44 (2.70-4.35)	4.38 (3.44-5.55)	5.92 (4.63-7.53)	7.20 (5.60-9.21)	8.96 (6.84-12.2)	10.2 (7.71-14.3)	11.7 (8.70-17.3)	13.7 (9.32-20.0)	17.1 (11.2-25.8)	20.2 (13.0-31.1)
7-day	4.16 (3.28-5.24)	5.15 (4.06-6.50)	6.78 (5.32-8.58)	8.12 (6.35-10.3)	9.98 (7.64-13.5)	11.3 (8.55-15.8)	12.8 (9.57-18.9)	14.9 (10.2-21.7)	18.4 (12.2-27.8)	21.6 (14.0-33.2)
10-day	4.85 (3.84-6.09)	5.88 (4.64-7.39)	7.56 (5.95-9.54)	8.95 (7.01-11.4)	10.9 (8.33-14.6)	12.3 (9.25-16.9)	13.8 (10.3-20.1)	15.9 (10.9-23.1)	19.4 (12.8-29.1)	22.5 (14.6-34.4)
20-day	6.87 (5.47-8.58)	8.00 (6.36-10.00)	9.85 (7.80-12.3)	11.4 (8.96-14.4)	13.5 (10.3-17.9)	15.0 (11.3-20.4)	16.7 (12.3-23.7)	18.7 (12.9-27.0)	21.8 (14.5-32.6)	24.4 (15.8-37.2)
30-day	8.54 (6.82-10.6)	9.75 (7.77-12.1)	11.7 (9.31-14.7)	13.4 (10.6-16.8)	15.6 (12.0-20.5)	17.3 (13.0-23.3)	19.1 (13.9-26.6)	21.0 (14.6-30.2)	23.8 (15.9-35.4)	26.0 (16.9-39.6)
45-day	10.6 (8.50-13.2)	11.9 (9.53-14.8)	14.0 (11.2-17.5)	15.8 (12.5-19.8)	18.2 (14.0-23.8)	20.1 (15.1-26.7)	22.0 (15.9-30.2)	23.9 (16.6-34.1)	26.3 (17.6-39.1)	28.2 (18.4-42.9)
60-day	12.3 (9.91-15.3)	13.7 (11.0-17.0)	16.0 (12.8-19.8)	17.8 (14.2-22.3)	20.4 (15.6-26.5)	22.4 (16.8-29.6)	24.3 (17.6-33.3)	26.2 (18.3-37.4)	28.6 (19.2-42.4)	30.3 (19.8-46.0)

¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS). Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values. Please refer to NOAA Atlas 14 document for more information.

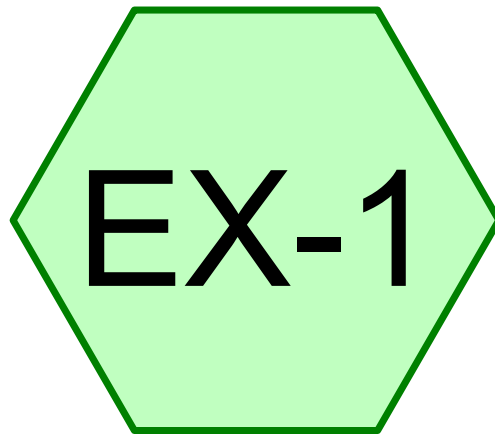
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PF graphical

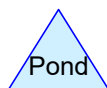
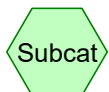
Appendix D

Pre-Development HydroCAD Results & Drainage Plan





Existing Subcatchment



Routing Diagram for Existing Conditions

Prepared by HP Inc., Printed 3/4/2020

HydroCAD® 10.00-24 s/n 09052 © 2018 HydroCAD Software Solutions LLC

Existing Conditions

Prepared by HP Inc.

HydroCAD® 10.00-24 s/n 09052 © 2018 HydroCAD Software Solutions LLC

Type III 24-hr 2 Year Rainfall=3.30"

Printed 3/4/2020

Page 2

Summary for Subcatchment EX-1: Existing Subcatchment

Runoff = 2.30 cfs @ 12.21 hrs, Volume= 9,995 cf, Depth> 0.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 Year Rainfall=3.30"

Area (sf)	CN	Description
56,478	61	>75% Grass cover, Good, HSG B
13,300	98	Paved parking, HSG B
481	96	Gravel surface, HSG B
148	55	Woods, Good, HSG B
14,065	55	Woods, Good, HSG B
952	80	>75% Grass cover, Good, HSG D
50,268	77	Woods, Good, HSG D
135,691	70	Weighted Average
122,391		90.20% Pervious Area
13,300		9.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.9	100	0.0300	0.14		Sheet Flow, Grass: Dense n= 0.240 P2= 3.30"
1.2	110	0.0450	1.48		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.0	7	0.4300	4.59		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
13.1	217	Total			

Existing Conditions

Prepared by HP Inc.

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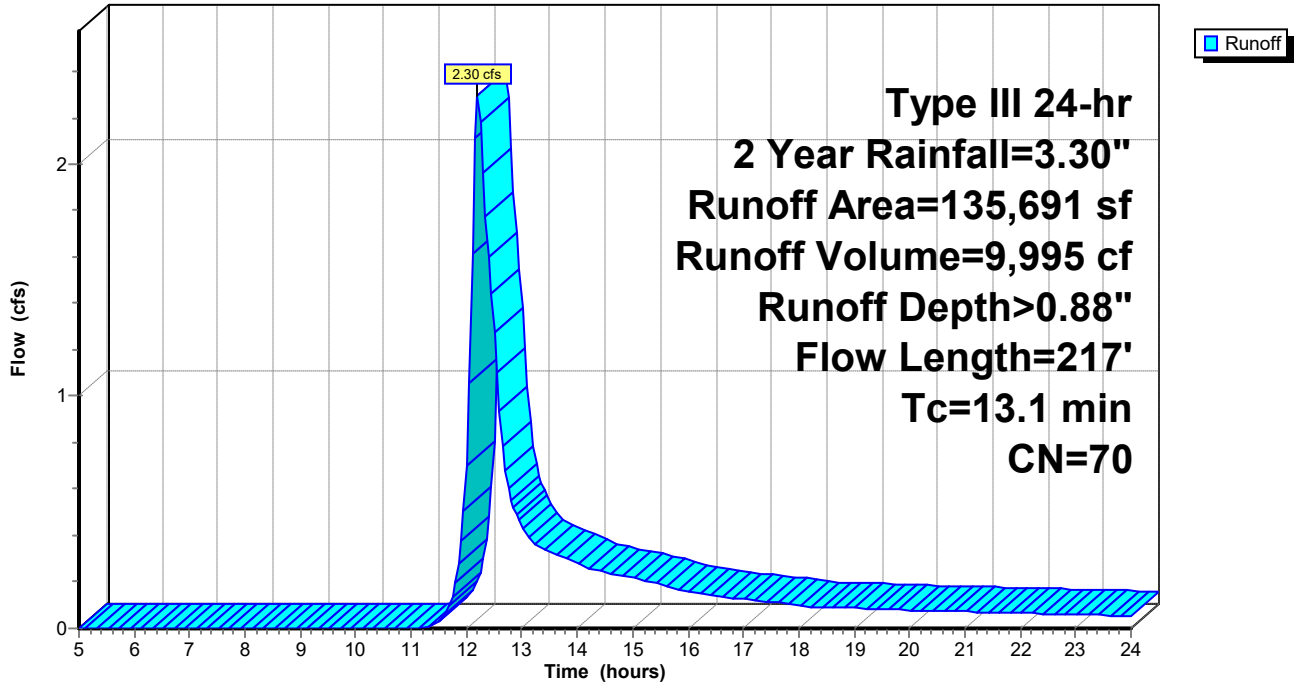
Type III 24-hr 2 Year Rainfall=3.30"

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Subcatchment EX-1: Existing Subcatchment

Hydrograph



Existing Conditions

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Type III 24-hr 25 Year Rainfall=6.58"

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Summary for Subcatchment EX-1: Existing Subcatchment

Runoff = 9.39 cfs @ 12.19 hrs, Volume= 36,909 cf, Depth> 3.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 Year Rainfall=6.58"

Area (sf)	CN	Description
56,478	61	>75% Grass cover, Good, HSG B
13,300	98	Paved parking, HSG B
481	96	Gravel surface, HSG B
148	55	Woods, Good, HSG B
14,065	55	Woods, Good, HSG B
952	80	>75% Grass cover, Good, HSG D
50,268	77	Woods, Good, HSG D
135,691	70	Weighted Average
122,391		90.20% Pervious Area
13,300		9.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.9	100	0.0300	0.14		Sheet Flow, Grass: Dense n= 0.240 P2= 3.30"
1.2	110	0.0450	1.48		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.0	7	0.4300	4.59		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
13.1	217	Total			

Existing Conditions

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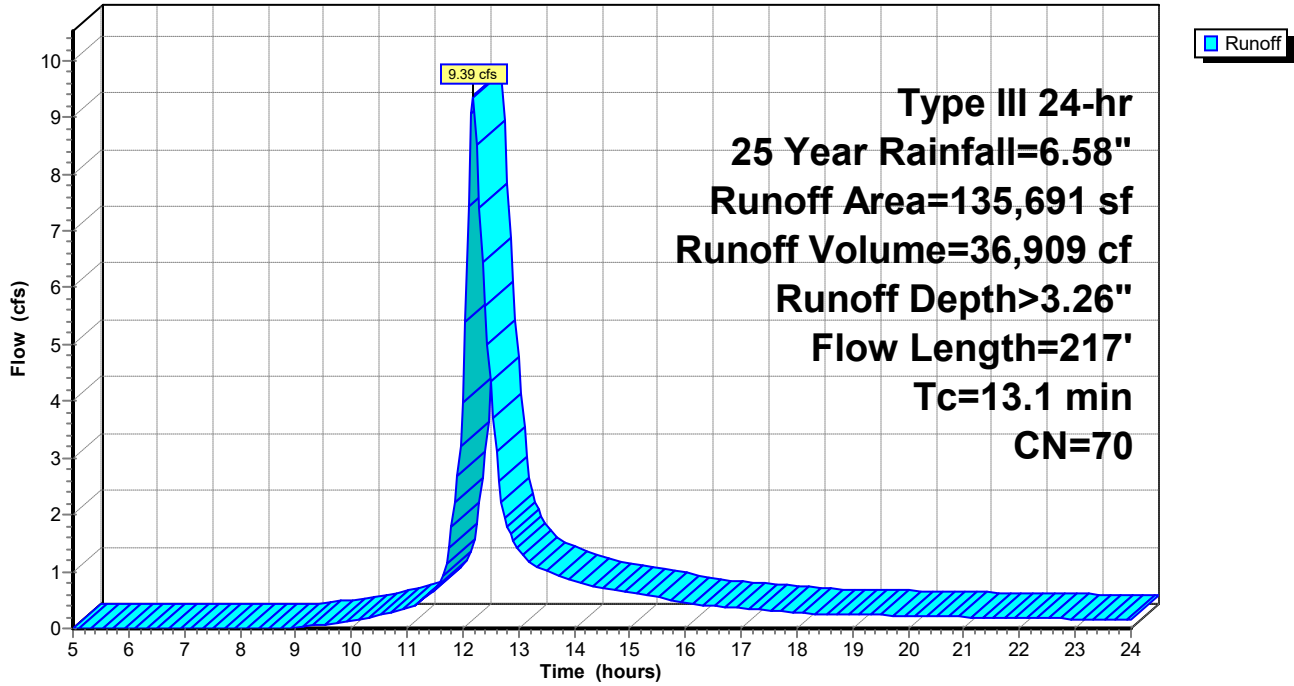
Type III 24-hr 25 Year Rainfall=6.58"

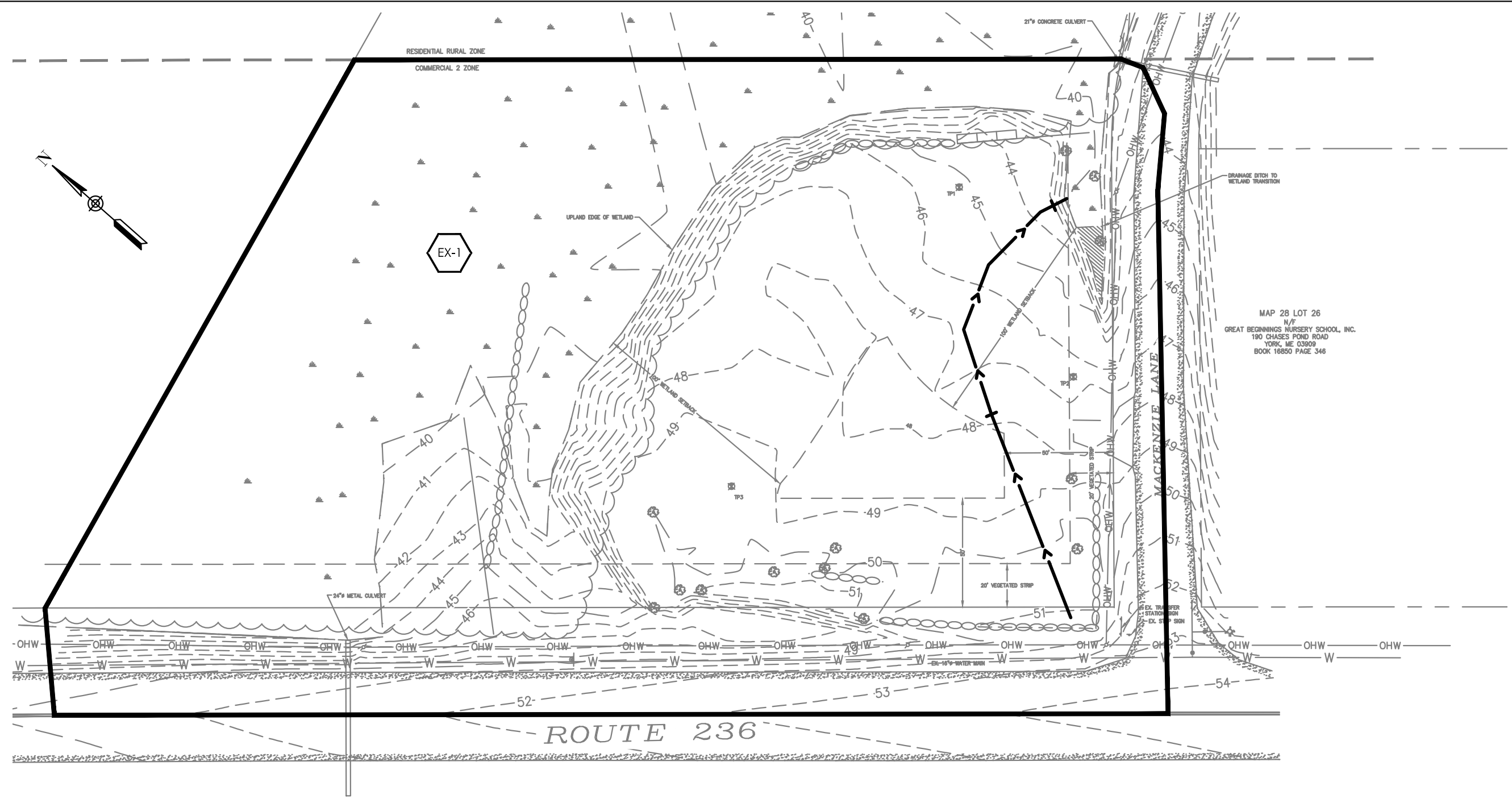
Printed 3/4/2020

Page 5

Subcatchment EX-1: Existing Subcatchment

Hydrograph






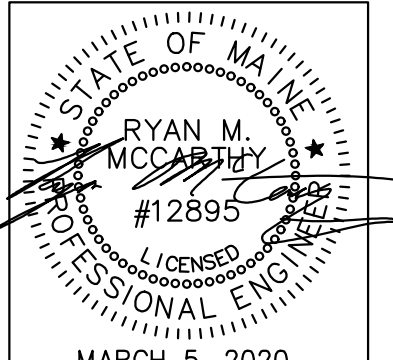
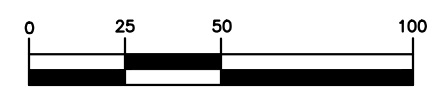


POST-DEVELOPMENT DRAINAGE NOTES:

1. THE PURPOSE OF THIS PLAN IS TO DEPICT THE SUBCATCHMENT LIMITS, CORRESPONDING NODES AND FLOW PATHS ASSOCIATED WITH THE HYDROCAD ANALYSIS INCLUDED IN THE STORMWATER REPORT FOR A SITE PLAN APPLICATION LOCATED ON TAX MAP 28 LOT 25D.
2. THE PROPOSED DEVELOPMENT ON THE SITE AS-SHOWN CORRESPONDS WITH THE SITE PLAN APPLICATION SUBMITTED TO THE TOWN OF KITTERY FOR REVIEW AND APPROVAL BY THE PLANNING BOARD.

LEGEND

-  SUBCATCHMENT
-  POND
-  FLOWPATH TO



NOT VALID UNLESS SIGNED AND STAMPED

TIDEWATER
ENGINEERING & SURVEYING, INC.
89 Route 236 Suite 3, Kittery, ME 03904
(207)439-2222 • www.tidewatercivil.com

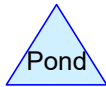
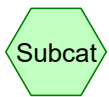
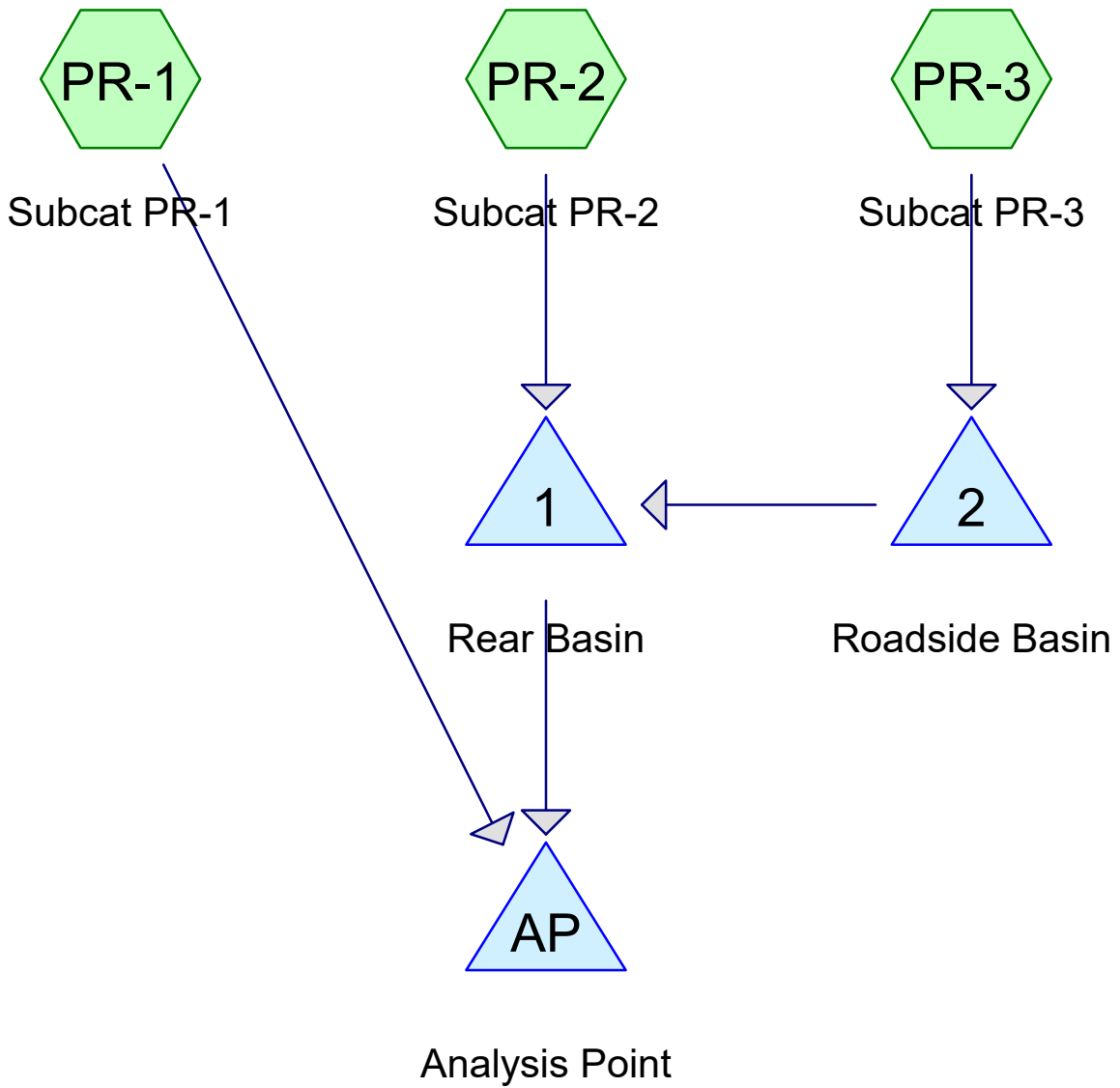
EXISTING DRAINAGE PLAN
PREPARED FOR
ROBERT T. BRENNAN, JR.
1911 SE 20TH STREET, CAPE CORAL, FL 33990
FOR A PROPOSED CAR WASH ON
TAX MAP 28 LOT 25D
KITTERY, YORK COUNTY, MAINE

JOB #:	19-134
DATE:	MAR. 5, 2020
SCALE:	1" = 150'
SHEET:	1 OF 1

Appendix E

Post-Development HydroCAD Results & Drainage Plan





Proposed Conditions

Type III 24-hr 2 Year Rainfall=3.30"

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Page 2

Time span=5.00-24.00 hrs, dt=0.05 hrs, 381 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 PR-1: Subcat PR-1 Runoff Area=95,155 sf 12.81% Impervious Runoff Depth>1.04"
Flow Length=100' Slope=0.0700 '/' Tc=12.8 min CN=73 Runoff=2.00 cfs 8,279 cf

Subcatchment PR-2: Subcat PR-2 Runoff Area=26,893 sf 39.84% Impervious Runoff Depth>1.22"
Tc=6.0 min CN=76 Runoff=0.84 cfs 2,736 cf

Subcatchment PR-3: Subcat PR-3 Runoff Area=13,643 sf 50.08% Impervious Runoff Depth>1.48"
Tc=6.0 min CN=80 Runoff=0.53 cfs 1,680 cf

Pond 1: Rear Basin Peak Elev=43.82' Storage=1,723 cf Inflow=1.37 cfs 4,414 cf
Discarded=0.06 cfs 2,384 cf Primary=0.17 cfs 1,429 cf Outflow=0.22 cfs 3,814 cf

Pond 2: Roadside Basin Peak Elev=44.14' Storage=23 cf Inflow=0.53 cfs 1,680 cf
15.0" Round Culvert n=0.013 L=80.0' S=0.0100 '/' Outflow=0.53 cfs 1,678 cf

Pond AP: Analysis Point Inflow=2.02 cfs 9,709 cf
Primary=2.02 cfs 9,709 cf

Total Runoff Area = 135,691 sf Runoff Volume = 12,695 cf Average Runoff Depth = 1.12"
78.08% Pervious = 105,954 sf 21.92% Impervious = 29,737 sf

Proposed Conditions

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Type III 24-hr 2 Year Rainfall=3.30"

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Summary for Subcatchment PR-1: Subcat PR-1

Runoff = 2.00 cfs @ 12.20 hrs, Volume= 8,279 cf, Depth> 1.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 Year Rainfall=3.30"

Area (sf)	CN	Description
11,213	98	Paved parking, HSG B
944	98	Paved parking, HSG B
0	61	>75% Grass cover, Good, HSG B
0	61	>75% Grass cover, Good, HSG B
16,324	61	>75% Grass cover, Good, HSG B
1,242	61	>75% Grass cover, Good, HSG B
148	55	Woods, Good, HSG B
14,065	55	Woods, Good, HSG B
34	98	Paved parking, HSG D
50,268	77	Woods, Good, HSG D
917	80	>75% Grass cover, Good, HSG D
95,155	73	Weighted Average
82,964		87.19% Pervious Area
12,191		12.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.8	100	0.0700	0.13		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.30"

Proposed Conditions

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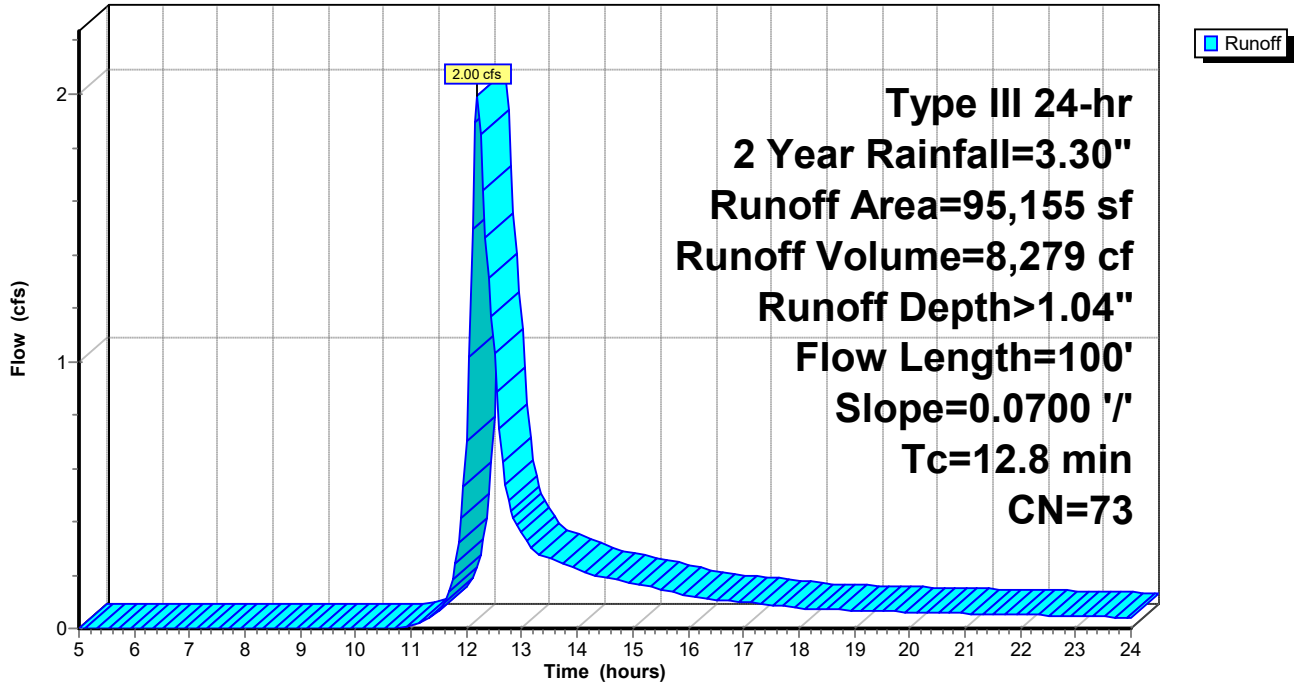
Type III 24-hr 2 Year Rainfall=3.30"

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Page 4

Subcatchment PR-1: Subcat PR-1

Hydrograph



Proposed Conditions

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Type III 24-hr 2 Year Rainfall=3.30"

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Summary for Subcatchment PR-2: Subcat PR-2

Runoff = 0.84 cfs @ 12.10 hrs, Volume= 2,736 cf, Depth> 1.22"

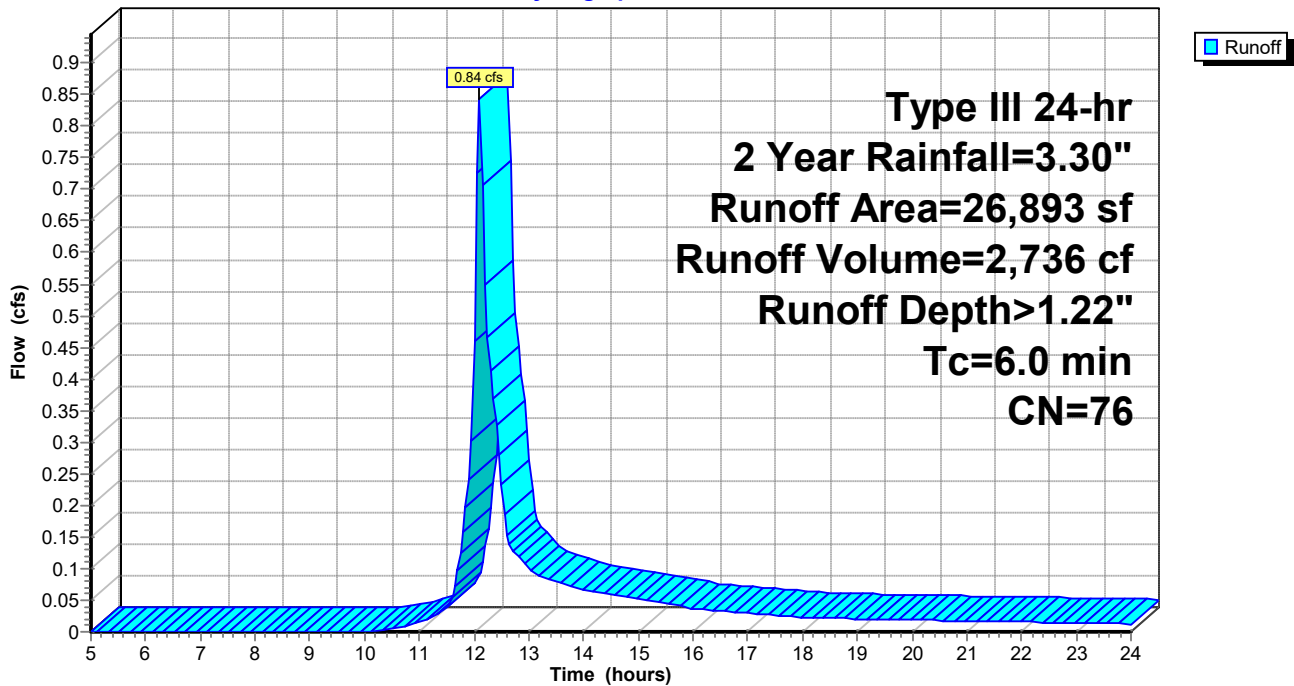
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 Year Rainfall=3.30"

Area (sf)	CN	Description
13,527	61	>75% Grass cover, Good, HSG B
9,877	98	Paved parking, HSG B
836	98	Roofs, HSG B
2,653	61	>75% Grass cover, Good, HSG B
26,893	76	Weighted Average
16,180		60.16% Pervious Area
10,713		39.84% Impervious Area

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

Subcatchment PR-2: Subcat PR-2

Hydrograph



Proposed Conditions

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Type III 24-hr 2 Year Rainfall=3.30"

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Summary for Subcatchment PR-3: Subcat PR-3

Runoff = 0.53 cfs @ 12.10 hrs, Volume= 1,680 cf, Depth> 1.48"

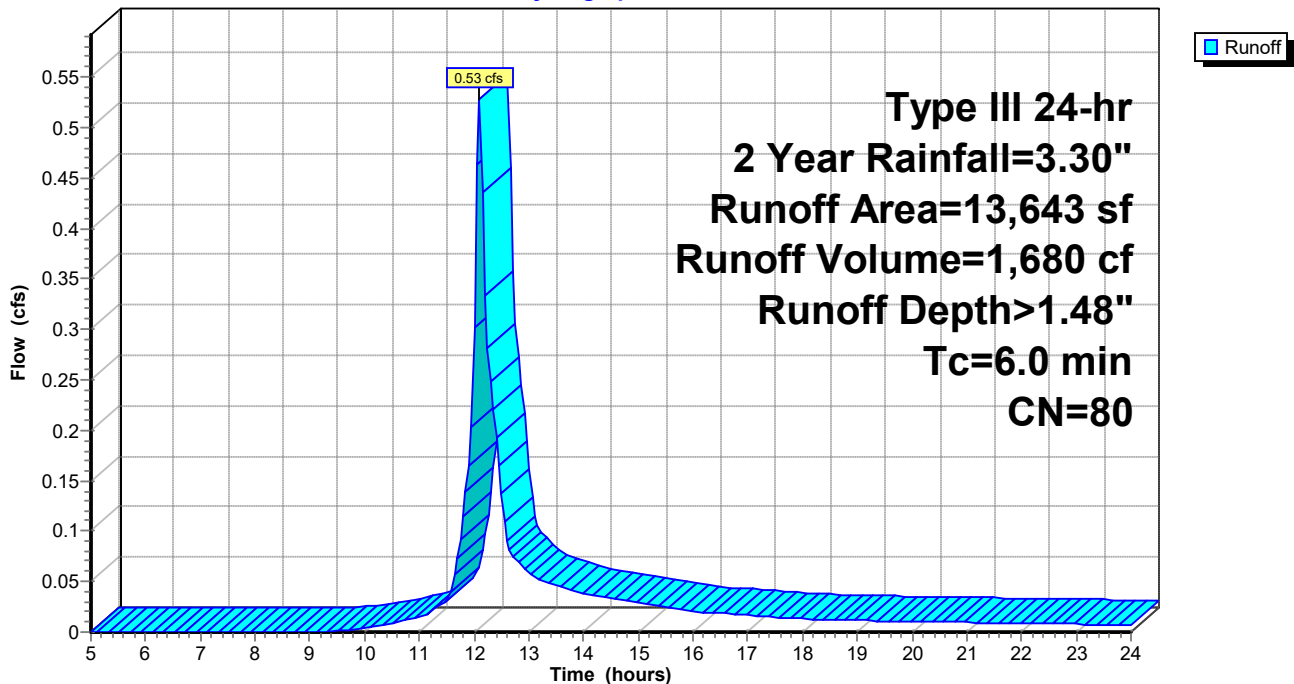
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 Year Rainfall=3.30"

Area (sf)	CN	Description
6,810	61	>75% Grass cover, Good, HSG B
3	98	Paved parking, HSG B
3,907	98	Paved parking, HSG B
836	98	Roofs, HSG B
2,087	98	Paved parking, HSG B
13,643	80	Weighted Average
6,810		49.92% Pervious Area
6,833		50.08% Impervious Area

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

Subcatchment PR-3: Subcat PR-3

Hydrograph



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Type III 24-hr 2 Year Rainfall=3.30"

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Summary for Pond 1: Rear Basin

[79] Warning: Submerged Pond 2 Primary device # 1 INLET by 0.02'

Inflow Area = 40,536 sf, 43.29% Impervious, Inflow Depth > 1.31" for 2 Year event
Inflow = 1.37 cfs @ 12.10 hrs, Volume= 4,414 cf
Outflow = 0.22 cfs @ 12.66 hrs, Volume= 3,814 cf, Atten= 84%, Lag= 33.6 min
Discarded = 0.06 cfs @ 12.66 hrs, Volume= 2,384 cf
Primary = 0.17 cfs @ 12.66 hrs, Volume= 1,429 cf

Routing by Stor-Ind method, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 43.82' @ 12.66 hrs Surf.Area= 2,413 sf Storage= 1,723 cf
Flood Elev= 45.00' Surf.Area= 3,663 sf Storage= 5,277 cf

Plug-Flow detention time= 178.9 min calculated for 3,814 cf (86% of inflow)
Center-of-Mass det. time= 117.5 min (966.3 - 848.8)

Volume	Invert	Avail.Storage	Storage Description
#1	43.00'	5,277 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
43.00	1,790	0	0
44.00	2,550	2,170	2,170
45.00	3,663	3,107	5,277

Device	Routing	Invert	Outlet Devices
#1	Primary	41.30'	15.0" Round Culvert L= 30.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 41.30' / 41.00' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	44.50'	15.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	43.50'	4.0" Vert. Orifice/Grate C= 0.600
#4	Discarded	43.00'	1.000 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.06 cfs @ 12.66 hrs HW=43.82' (Free Discharge)
↑**4=Exfiltration** (Exfiltration Controls 0.06 cfs)

Primary OutFlow Max=0.17 cfs @ 12.66 hrs HW=43.82' (Free Discharge)
↑**1=Culvert** (Passes 0.17 cfs of 8.13 cfs potential flow)
↑**2=Orifice/Grate** (Controls 0.00 cfs)
↑**3=Orifice/Grate** (Orifice Controls 0.17 cfs @ 1.92 fps)

Proposed Conditions

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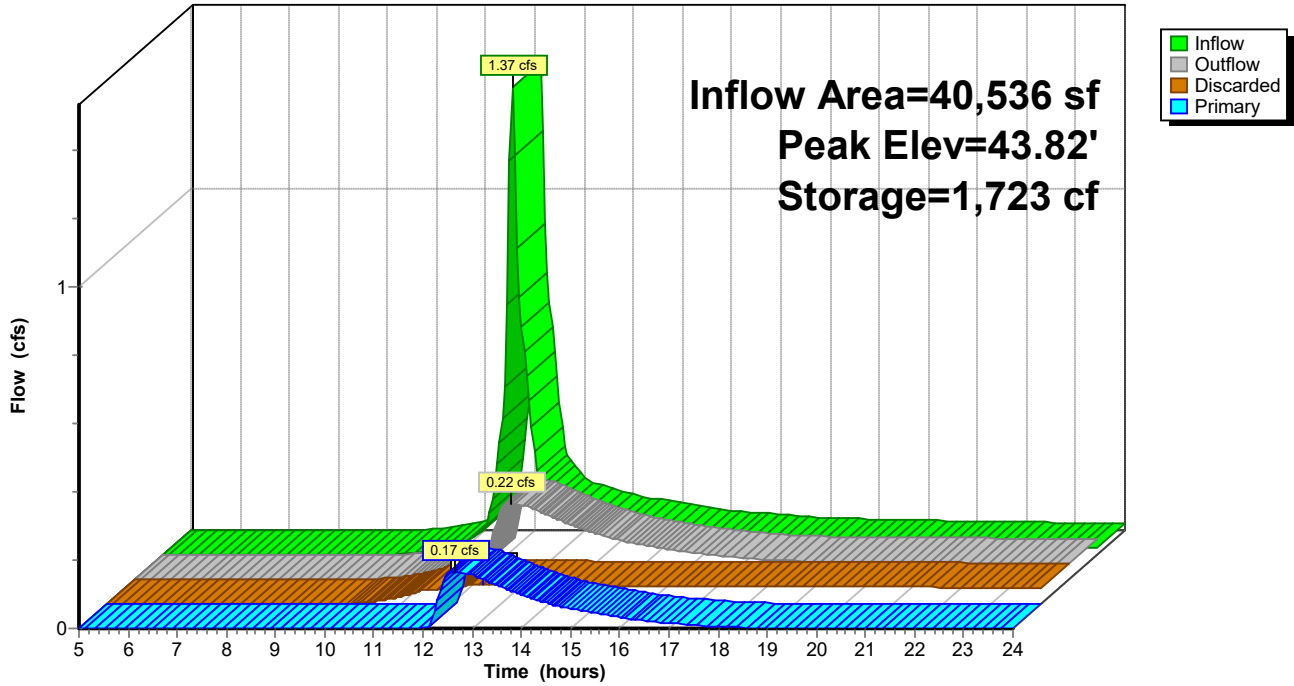
Type III 24-hr 2 Year Rainfall=3.30"

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Pond 1: Rear Basin

Hydrograph



Proposed Conditions

Type III 24-hr 2 Year Rainfall=3.30"

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Summary for Pond 2: Roadside Basin

Inflow Area = 13,643 sf, 50.08% Impervious, Inflow Depth > 1.48" for 2 Year event
 Inflow = 0.53 cfs @ 12.10 hrs, Volume= 1,680 cf
 Outflow = 0.53 cfs @ 12.11 hrs, Volume= 1,678 cf, Atten= 0%, Lag= 0.6 min
 Primary = 0.53 cfs @ 12.11 hrs, Volume= 1,678 cf

Routing by Stor-Ind method, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 44.14' @ 12.11 hrs Surf.Area= 105 sf Storage= 23 cf
 Flood Elev= 46.00' Surf.Area= 618 sf Storage= 641 cf

Plug-Flow detention time= 1.7 min calculated for 1,674 cf (100% of inflow)
 Center-of-Mass det. time= 1.1 min (841.7 - 840.6)

Volume	Invert	Avail.Storage	Storage Description
#1	43.80'	641 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
43.80	35	0	0
45.00	283	191	191
46.00	618	451	641

Device	Routing	Invert	Outlet Devices
#1	Primary	43.80'	15.0" Round Culvert L= 80.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 43.80' / 43.00' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=0.52 cfs @ 12.11 hrs HW=44.13' (Free Discharge)
 ↑**1=Culvert** (Inlet Controls 0.52 cfs @ 1.97 fps)

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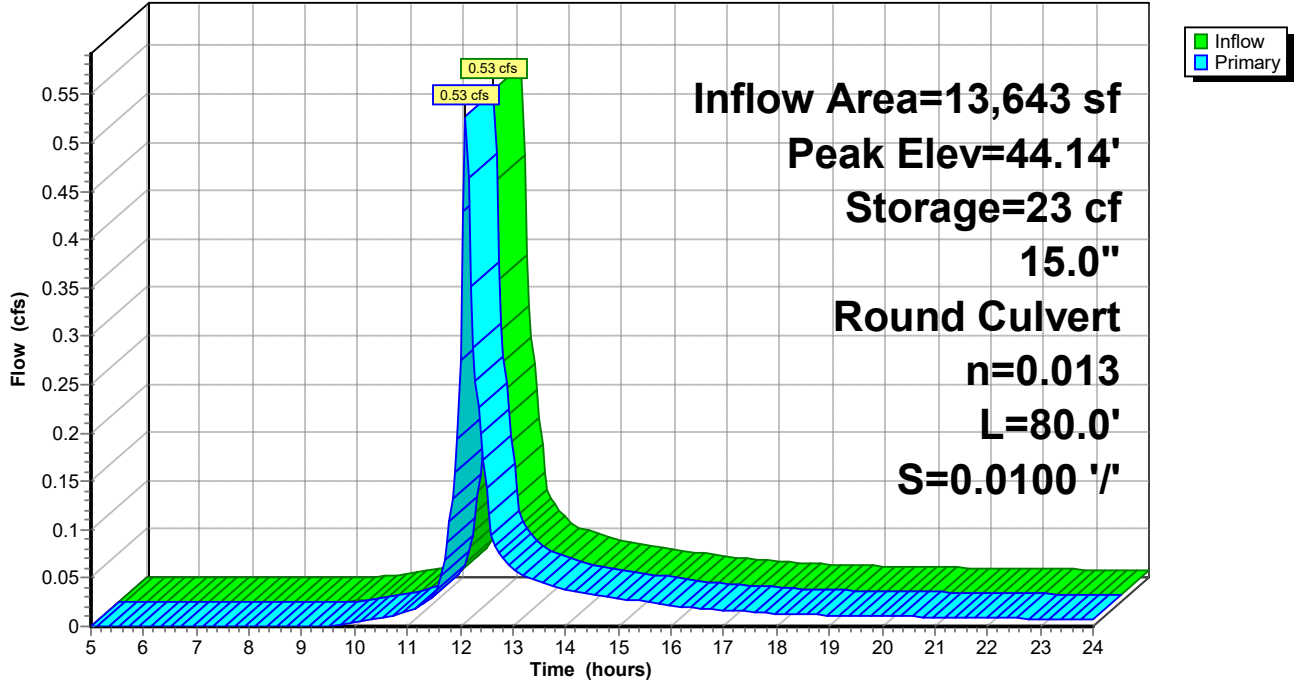
Type III 24-hr 2 Year Rainfall=3.30"

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Pond 2: Roadside Basin

Hydrograph



Proposed Conditions

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Type III 24-hr 2 Year Rainfall=3.30"

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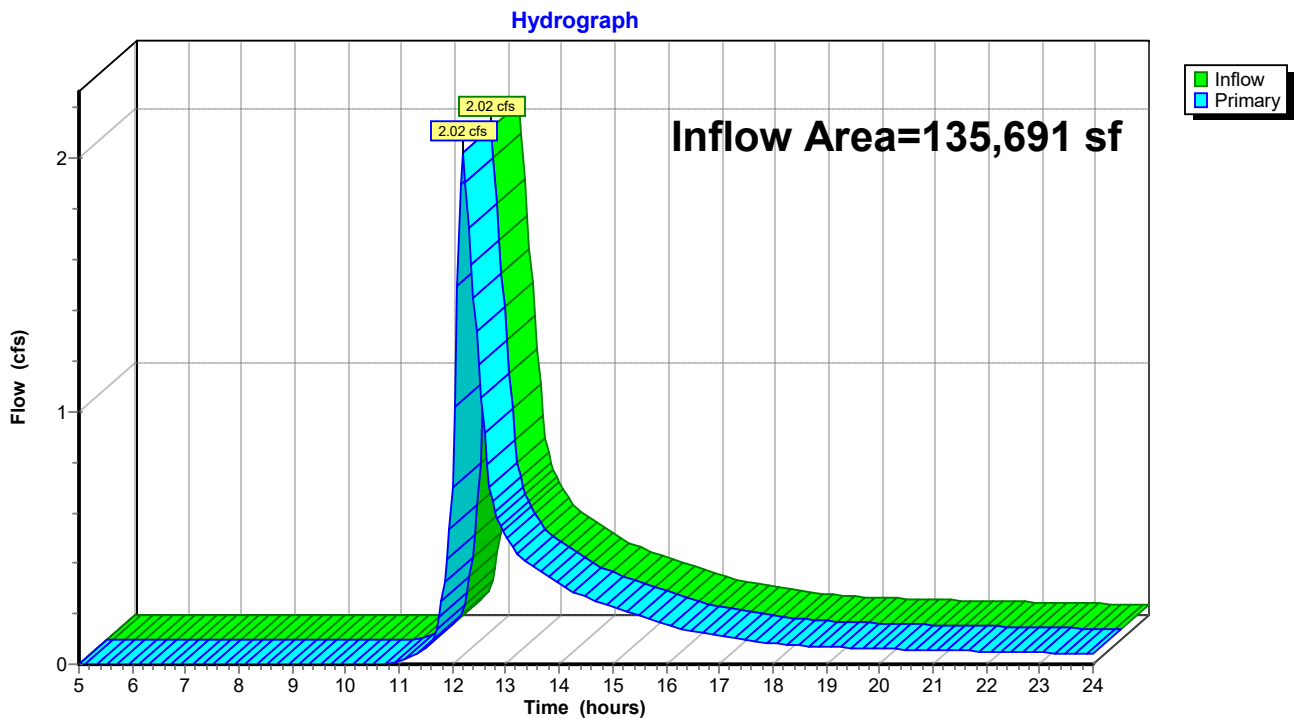
Summary for Pond AP: Analysis Point

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

Inflow Area = 135,691 sf, 21.92% Impervious, Inflow Depth > 0.86" for 2 Year event
Inflow = 2.02 cfs @ 12.20 hrs, Volume= 9,709 cf
Primary = 2.02 cfs @ 12.20 hrs, Volume= 9,709 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs

Pond AP: Analysis Point



Proposed Conditions

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Type III 24-hr 25 Year Rainfall=6.58"

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Time span=5.00-24.00 hrs, dt=0.05 hrs, 381 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 PR-1: Subcat PR-1 Runoff Area=95,155 sf 12.81% Impervious Runoff Depth>3.57"
Flow Length=100' Slope=0.0700 '/' Tc=12.8 min CN=73 Runoff=7.27 cfs 28,288 cf

Subcatchment PR-2: Subcat PR-2 Runoff Area=26,893 sf 39.84% Impervious Runoff Depth>3.88"
Tc=6.0 min CN=76 Runoff=2.75 cfs 8,701 cf

Subcatchment PR-3: Subcat PR-3 Runoff Area=13,643 sf 50.08% Impervious Runoff Depth>4.30"
Tc=6.0 min CN=80 Runoff=1.54 cfs 4,894 cf

Pond 1: Rear Basin Peak Elev=44.76' Storage=4,424 cf Inflow=4.28 cfs 13,592 cf
Discarded=0.08 cfs 3,105 cf Primary=2.13 cfs 9,383 cf Outflow=2.21 cfs 12,488 cf

Pond 2: Roadside Basin Peak Elev=44.40' Storage=58 cf Inflow=1.54 cfs 4,894 cf
15.0" Round Culvert n=0.013 L=80.0' S=0.0100 '/' Outflow=1.53 cfs 4,892 cf

Pond AP: Analysis Point Inflow=9.18 cfs 37,671 cf
Primary=9.18 cfs 37,671 cf

Total Runoff Area = 135,691 sf Runoff Volume = 41,883 cf Average Runoff Depth = 3.70"
78.08% Pervious = 105,954 sf 21.92% Impervious = 29,737 sf

Proposed Conditions

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Type III 24-hr 25 Year Rainfall=6.58"

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Summary for Subcatchment PR-1: Subcat PR-1

Runoff = 7.27 cfs @ 12.18 hrs, Volume= 28,288 cf, Depth> 3.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 Year Rainfall=6.58"

Area (sf)	CN	Description
11,213	98	Paved parking, HSG B
944	98	Paved parking, HSG B
0	61	>75% Grass cover, Good, HSG B
0	61	>75% Grass cover, Good, HSG B
16,324	61	>75% Grass cover, Good, HSG B
1,242	61	>75% Grass cover, Good, HSG B
148	55	Woods, Good, HSG B
14,065	55	Woods, Good, HSG B
34	98	Paved parking, HSG D
50,268	77	Woods, Good, HSG D
917	80	>75% Grass cover, Good, HSG D
95,155	73	Weighted Average
82,964		87.19% Pervious Area
12,191		12.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.8	100	0.0700	0.13		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.30"

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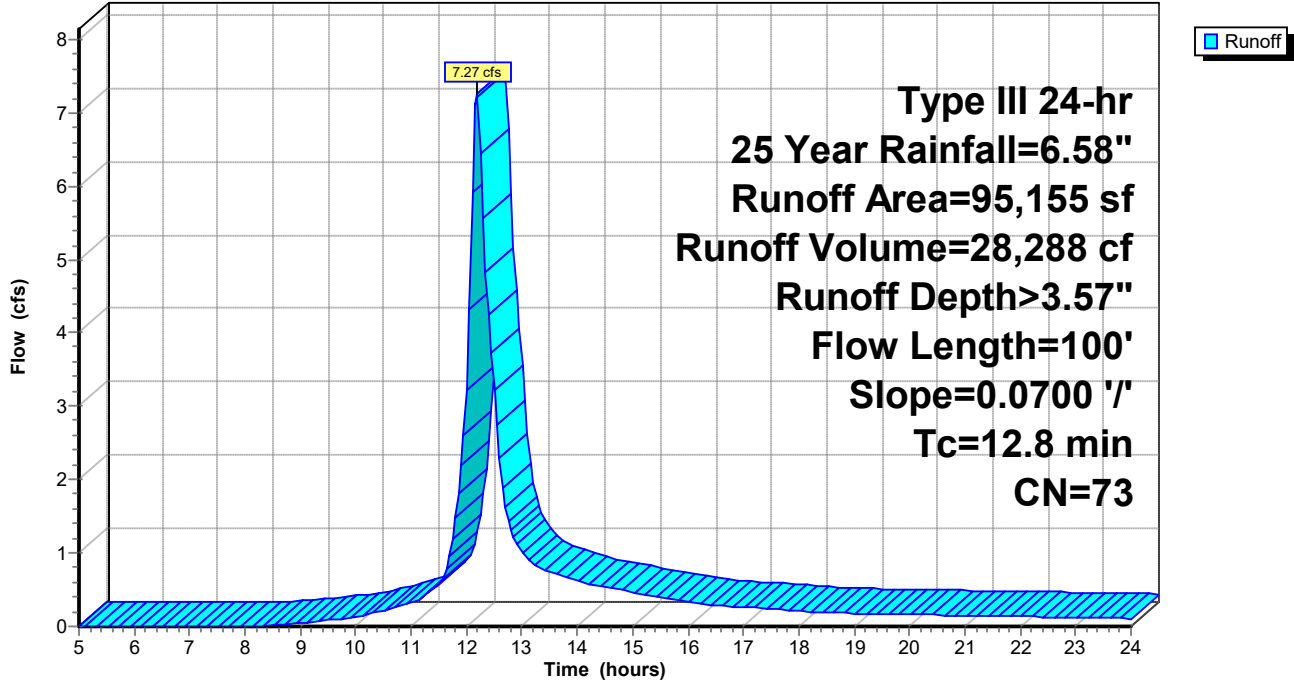
Type III 24-hr 25 Year Rainfall=6.58"

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Subcatchment PR-1: Subcat PR-1

Hydrograph



Proposed Conditions

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Type III 24-hr 25 Year Rainfall=6.58"

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Summary for Subcatchment PR-2: Subcat PR-2

Runoff = 2.75 cfs @ 12.09 hrs, Volume= 8,701 cf, Depth> 3.88"

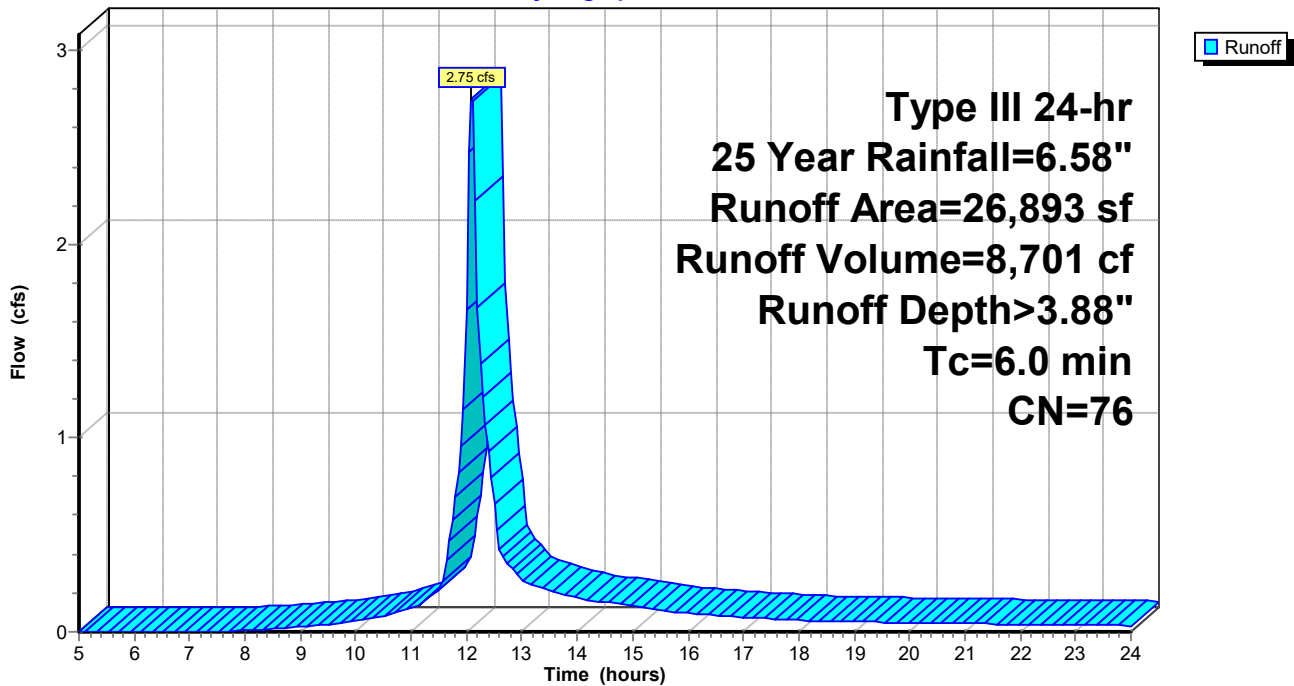
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25 Year Rainfall=6.58"

Area (sf)	CN	Description
13,527	61	>75% Grass cover, Good, HSG B
9,877	98	Paved parking, HSG B
836	98	Roofs, HSG B
2,653	61	>75% Grass cover, Good, HSG B
26,893	76	Weighted Average
16,180		60.16% Pervious Area
10,713		39.84% Impervious Area

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

Subcatchment PR-2: Subcat PR-2

Hydrograph



Proposed Conditions

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Type III 24-hr 25 Year Rainfall=6.58"

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Summary for Subcatchment PR-3: Subcat PR-3

Runoff = 1.54 cfs @ 12.09 hrs, Volume= 4,894 cf, Depth> 4.30"

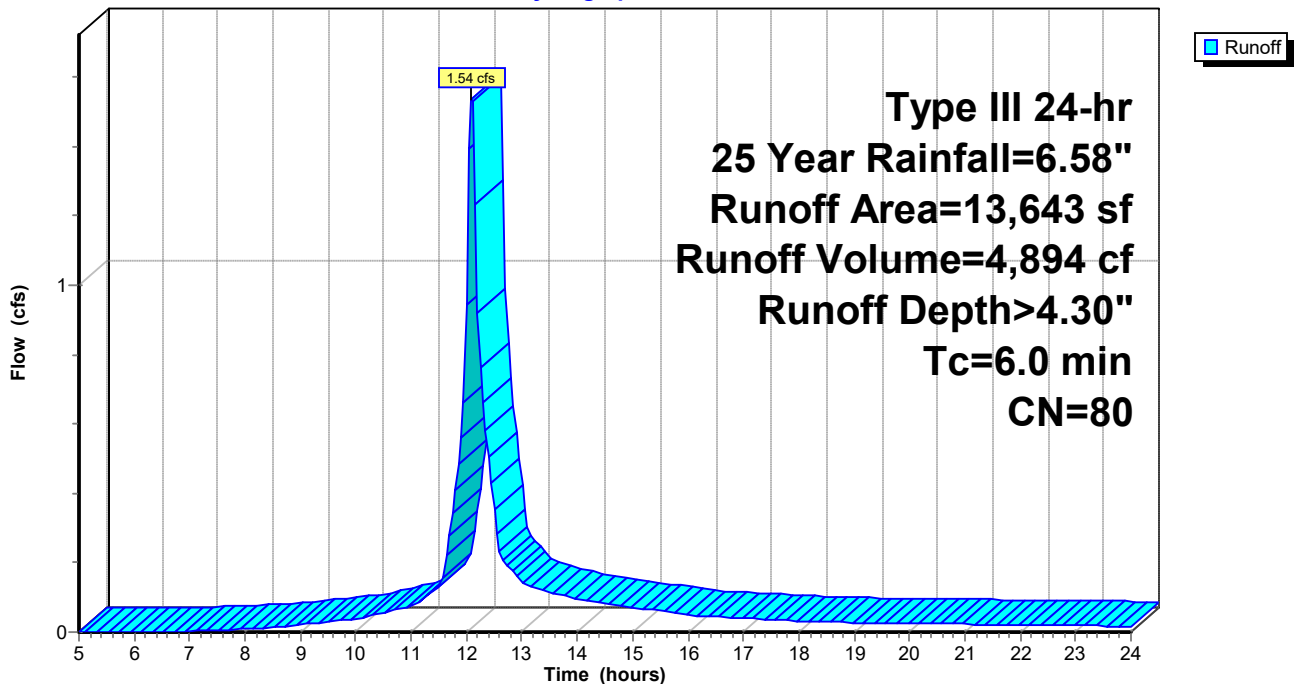
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 Year Rainfall=6.58"

Area (sf)	CN	Description
6,810	61	>75% Grass cover, Good, HSG B
3	98	Paved parking, HSG B
3,907	98	Paved parking, HSG B
836	98	Roofs, HSG B
2,087	98	Paved parking, HSG B
13,643	80	Weighted Average
6,810		49.92% Pervious Area
6,833		50.08% Impervious Area

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

Subcatchment PR-3: Subcat PR-3

Hydrograph



Proposed Conditions

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Type III 24-hr 25 Year Rainfall=6.58"

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Summary for Pond 1: Rear Basin

[81] Warning: Exceeded Pond 2 by 0.60' @ 12.60 hrs

Inflow Area = 40,536 sf, 43.29% Impervious, Inflow Depth > 4.02" for 25 Year event
 Inflow = 4.28 cfs @ 12.10 hrs, Volume= 13,592 cf
 Outflow = 2.21 cfs @ 12.26 hrs, Volume= 12,488 cf, Atten= 48%, Lag= 9.8 min
 Discarded = 0.08 cfs @ 12.26 hrs, Volume= 3,105 cf
 Primary = 2.13 cfs @ 12.26 hrs, Volume= 9,383 cf

Routing by Stor-Ind method, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 44.76' @ 12.26 hrs Surf.Area= 3,394 sf Storage= 4,424 cf
 Flood Elev= 45.00' Surf.Area= 3,663 sf Storage= 5,277 cf

Plug-Flow detention time= 105.8 min calculated for 12,488 cf (92% of inflow)
 Center-of-Mass det. time= 64.6 min (881.0 - 816.3)

Volume	Invert	Avail.Storage	Storage Description
#1	43.00'	5,277 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
43.00	1,790	0	0
44.00	2,550	2,170	2,170
45.00	3,663	3,107	5,277

Device	Routing	Invert	Outlet Devices
#1	Primary	41.30'	15.0" Round Culvert L= 30.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 41.30' / 41.00' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	44.50'	15.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	43.50'	4.0" Vert. Orifice/Grate C= 0.600
#4	Discarded	43.00'	1.000 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.08 cfs @ 12.26 hrs HW=44.76' (Free Discharge)
 ↳4=Exfiltration (Exfiltration Controls 0.08 cfs)

Primary OutFlow Max=2.11 cfs @ 12.26 hrs HW=44.76' (Free Discharge)
 ↳1=Culvert (Passes 2.11 cfs of 9.94 cfs potential flow)
 ↳2=Orifice/Grate (Weir Controls 1.67 cfs @ 1.66 fps)
 ↳3=Orifice/Grate (Orifice Controls 0.44 cfs @ 5.03 fps)

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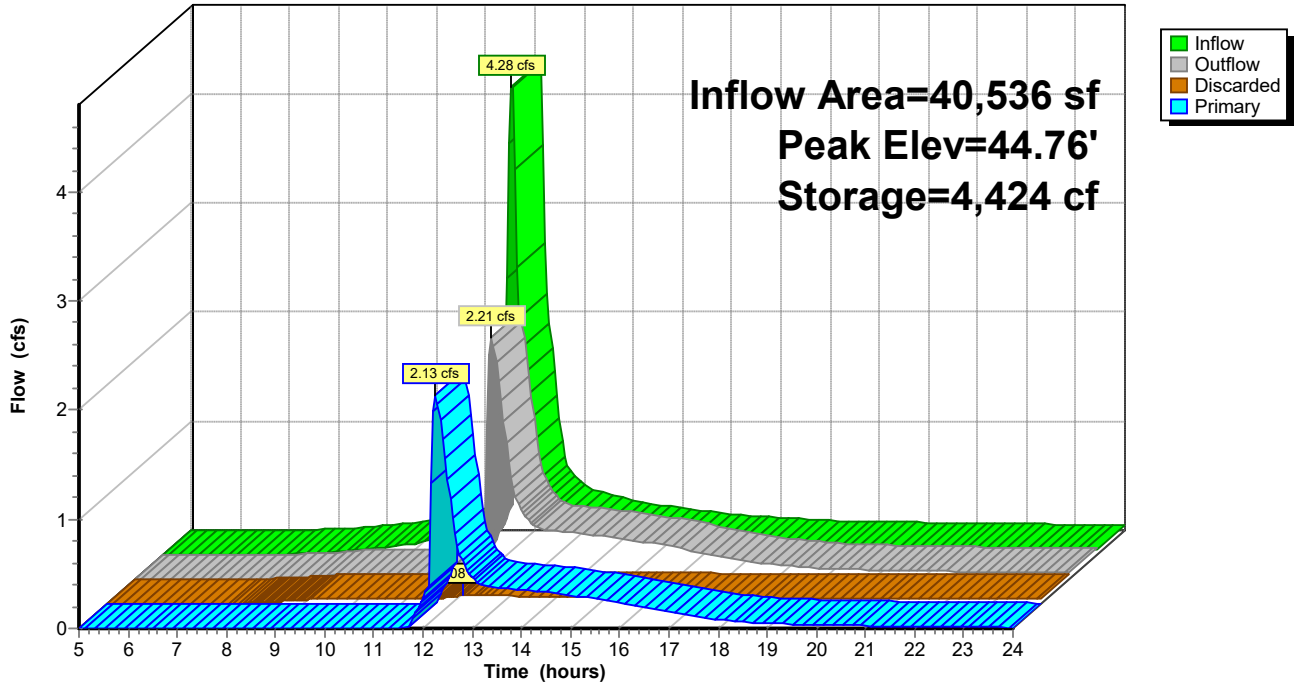
Type III 24-hr 25 Year Rainfall=6.58"

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Pond 1: Rear Basin

Hydrograph



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Summary for Pond 2: Roadside Basin

Inflow Area = 13,643 sf, 50.08% Impervious, Inflow Depth > 4.30" for 25 Year event
 Inflow = 1.54 cfs @ 12.09 hrs, Volume= 4,894 cf
 Outflow = 1.53 cfs @ 12.10 hrs, Volume= 4,892 cf, Atten= 0%, Lag= 0.6 min
 Primary = 1.53 cfs @ 12.10 hrs, Volume= 4,892 cf

Routing by Stor-Ind method, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 44.40' @ 12.10 hrs Surf.Area= 159 sf Storage= 58 cf
 Flood Elev= 46.00' Surf.Area= 618 sf Storage= 641 cf

Plug-Flow detention time= 1.2 min calculated for 4,892 cf (100% of inflow)
 Center-of-Mass det. time= 0.8 min (810.8 - 809.9)

Volume	Invert	Avail.Storage	Storage Description
#1	43.80'	641 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
43.80	35	0	0
45.00	283	191	191
46.00	618	451	641

Device	Routing	Invert	Outlet Devices
#1	Primary	43.80'	15.0" Round Culvert L= 80.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 43.80' / 43.00' S= 0.0100 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=1.53 cfs @ 12.10 hrs HW=44.40' (Free Discharge)
 ↑**1=Culvert** (Inlet Controls 1.53 cfs @ 2.63 fps)

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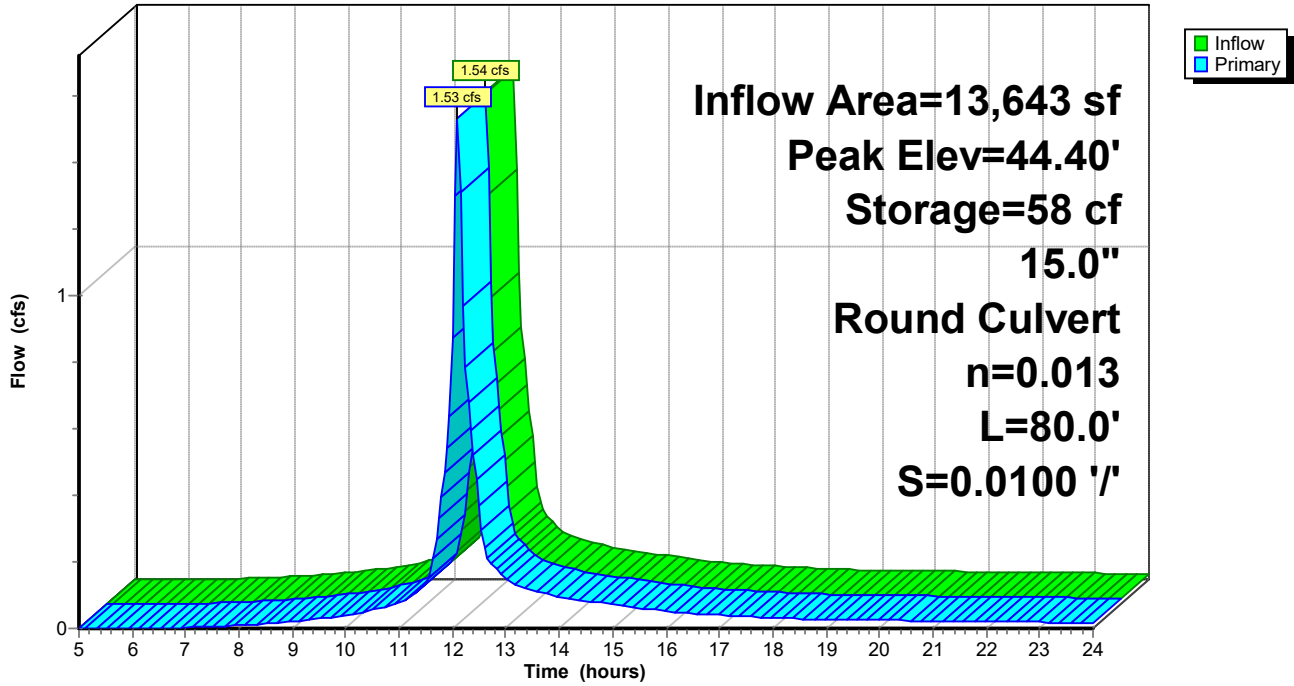
Type III 24-hr 25 Year Rainfall=6.58"

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Pond 2: Roadside Basin

Hydrograph



Proposed Conditions

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Type III 24-hr 25 Year Rainfall=6.58"

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Summary for Pond AP: Analysis Point

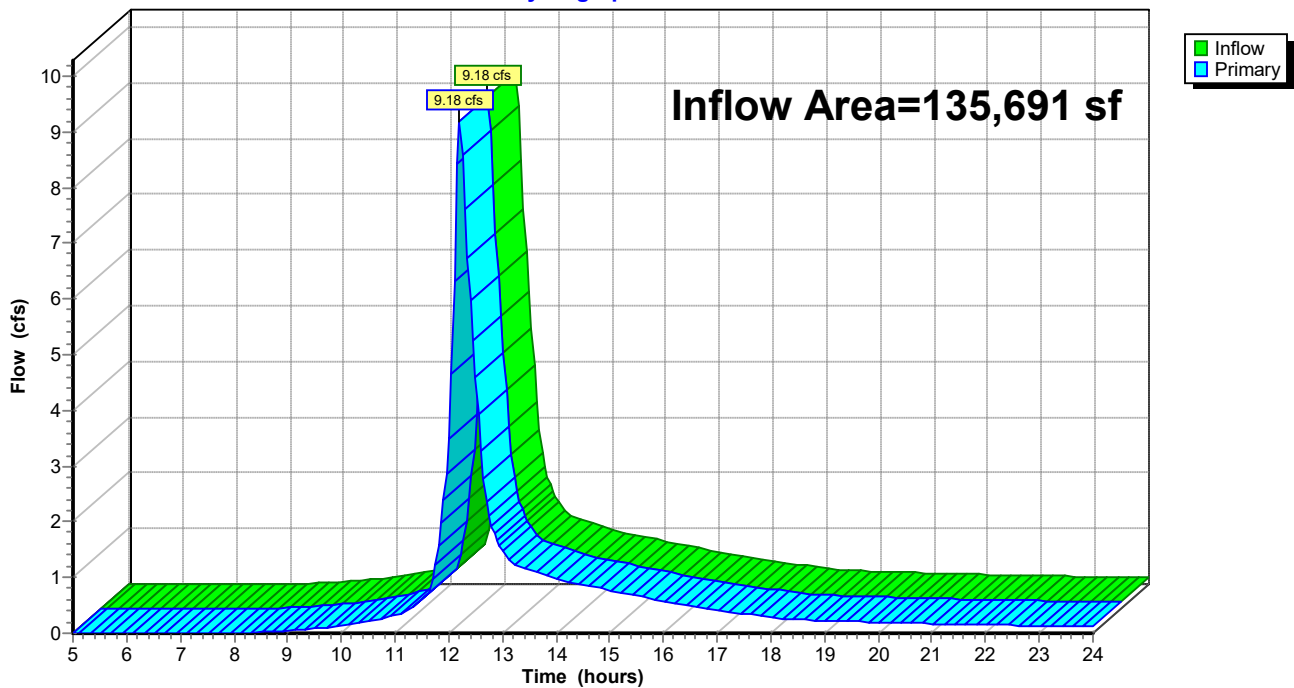
[40] Hint: Not Described (Outflow=Inflow)

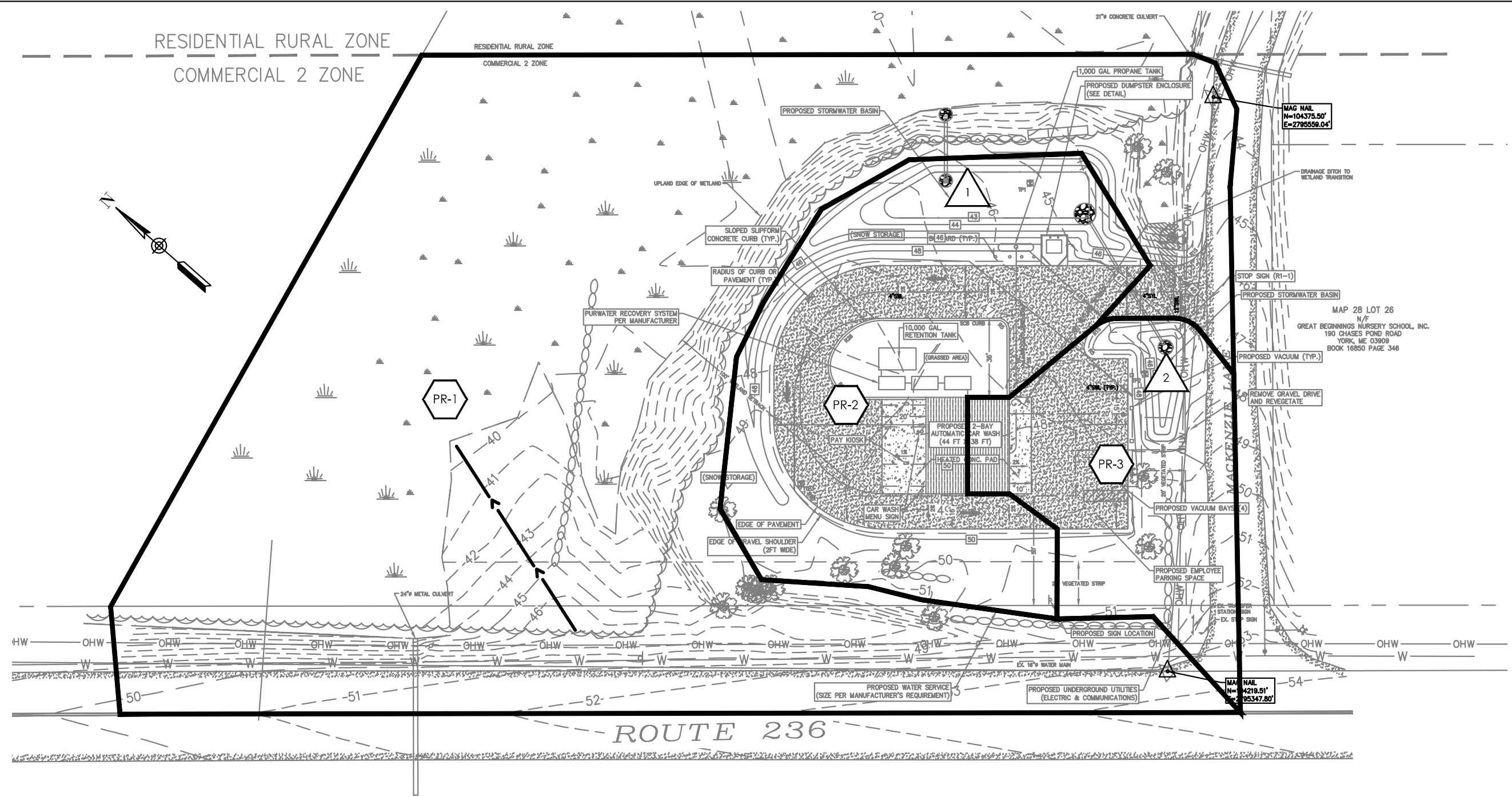
Inflow Area = 135,691 sf, 21.92% Impervious, Inflow Depth > 3.33" for 25 Year event
Inflow = 9.18 cfs @ 12.20 hrs, Volume= 37,671 cf
Primary = 9.18 cfs @ 12.20 hrs, Volume= 37,671 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs

Pond AP: Analysis Point

Hydrograph





STATE OF MAINE
 RYAN M. MCCARTHY
 #12895
 LICENSED PROFESSIONAL ENGINEER
 MAY 6, 2020

NOT VALID UNLESS SIGNED AND STAMPED

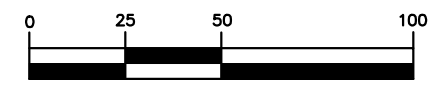
TIDEWATER
 ENGINEERING & SURVEYING, INC.
 89 Route 236 Suite 3, Kittery, ME 03904
 (207)439-2222 • www.tidewatercivil.com

PROPOSED DRAINAGE PLAN
 PREPARED FOR
ROBERT T. BRENNAN, JR.
 1911 SE 20TH STREET, CAPE CORAL, FL 33990
 FOR A PROPOSED CAR WASH ON
TAX MAP 28 LOT 25D
 KITTERY, YORK COUNTY, MAINE

JOB #:	19-134
DATE:	MAR. 5, 2020
SCALE:	1" = 50'
SHEET:	1 OF 1

POST-DEVELOPMENT DRAINAGE NOTES:

1. THE PURPOSE OF THIS PLAN IS TO DEPICT THE SUBCATCHMENT LIMITS, CORRESPONDING NODES AND FLOW PATHS ASSOCIATED WITH THE HYDROCAD ANALYSIS INCLUDED IN THE STORMWATER REPORT FOR A SITE PLAN APPLICATION LOCATED ON TAX MAP 28 LOT 25D.
2. THE PROPOSED DEVELOPMENT ON THE SITE AS-SHOWN CORRESPONDS WITH THE SITE PLAN APPLICATION SUBMITTED TO THE TOWN OF KITTERY FOR REVIEW AND APPROVAL BY THE PLANNING BOARD.



LEGEND

- SUBCATCHMENT
- POND
- FLOWPATH Tc

NO.	DATE:	SUBMISSION/REVISION DESCRIPTION
1	5/6/20	REVISED BASIN SIZE & CONTROL OUTLET