Environmental Services

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Engineering Services

STORMWATER REPORT

PROPOSED FILLING STATION "ROUTE 66 EXPRESS MART" #249 WEST HIGH STREET EAST HAMPTON, CT 06424

NOVEMBER 18, 2020

PREPARED FOR:

PAULA FREE 249 WEST HIGH STREET EAST HAMPTON, CT 06424

PREPARED BY:

CMG ENVIRONMENTAL, INC. CMG ID 2017-194

67 Hall Road Sturbridge, MA 01566 Phone (774) 241–0901 Fax (774) 241–0906

TABLE OF CONTENTS

Project Description	1
Hydrologic Calculation Methodology	1
Flood Plain	2
Soils & Topography	2
Existing Conditions	3
Proposed Drainage Improvements	4
Conclusions	5

TABLES

Table 1	Pre vs. Post-Development Runoff Summary
Table 2	Watershed Subcatchment Areas
Table 3	Pipe Design Worksheet

<u>APPENDIX</u>

Appendix A	USGS Figure, FEMA Flood Zone Map, Rainfall Data
Appendix B	NRCS Soils Data
Appendix C	Pre-Development Drainage Calculations
Appendix D	Post-Development Drainage Calculations
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Environmental Services



STORMWATER MANAGEMENT NARRATIVE

This report provides engineering calculations and a summary of our technical evaluation of the proposed drainage and stormwater management improvements 249 West High Street in East Hampton, CT (the "Site").

Existing condition shows that the entire site drains to an off-site catch basin located at the intersection of West High St. (CT Route 66) and Middletown Ave. (CT Route 16).

Project Description

The Applicant, is proposing to renovate approximately 1,275 SF of existing first floor space into a convenience store and install two underground fuel storage tanks, four fueling islands and new filling station canopy. In conjunction with these improvements, the entire parking lot will be reconstructed with a proper accessible parking space, and landscaping.

Currently the site has no stormwater management system. The new parking lot will be constructed with deep sump hooded catchbasins to collect and direct runoff from paved areas to Hydroworks stormwater treatment unit. The storm sewer system has been designed in accordance with methods outlined in the CT DOT Drainage Manual. The system has also been designed to comply with the *Connecticut DEEP 2004 Connecticut Stormwater Quality Manual* by ensuring over 80 percent TSS removal. The project will result in a net reduction in impervious surface and therefore a reduction in peak rates of runoff without the need for a detention system.

Hydrologic Calculation Methodology

Hydrology	
Computer Model:	HydroCAD 10.0 $\Cinc{0}$ 1986-2015 Applied Microcomputer Systems, drainage modeling software;
Hydrologic Methodology:	TR-20 & TR-55 Methodology is used in order to model the effects of the existing & proposed on-site stormwater systems. A minimum 6-minute time of concentration is assumed in the included calculations.

Surface Runoff Conditions

Rainfall Intensity:	USGS Type III Rainfall – East Hampton, CT Point Precipitation Frequency Estimates				
	2-Year Storm = 3.38 in. 10-Year Storm = 5.20 in 25-Year Storm = 6.34 in. 100-Year Storm = 8.10 in.				
Watershed Areas:	Watershed areas are calculated using AutoCAD software based on the subcatchment areas delineated on the enclosed "Pre- Development Drainage Areas" Sheet D-1 and "Proposed Drainage Areas" Sheet D-2. The subcatchment areas shown, times of concentration and runoff coefficients are consistent with the Hydrologic Methodology discussed above.				

Flood Plain

The Site is not located within a designated Special Flood Hazard Area zone as shown on Flood Insurance Rate Map (FIRM) Town of East Hampton, CT Community Panel Number 09007C0141G, Revise Date August 08, 2008.

Appendix A includes a copy of Site USGS Site Location Map, FEMA Flood Insurance Mapping.

Soils & Topography

In general, the entire site drains to a low point in the western part of the property. Topography is fairly flat with the eastern area sloping down towards Middletown Ave which slopes down to off-site catch basin located at the intersection of Middletown Ave and West High Street.

According to the Natural Resources Conservation Service's online mapping the Site's soil types are classified as:

• Udorthents-Urban Land Complex, 0-25% slopes (map unit 306). Site soils are categorized as Hydrologic Soil Group "B".

Soil Permeability (k):

NRCS data estimates soil permeability at $0.00 \sim 1.98$ in / hour for these type of soils. This is consistent with a Rawls Rate k= 1.02 in/hour (Sandy Loam) based on a Hydrologic Soil Type "В".

CMG's hydrology calculations use a conservative approach and do not account for on-site infiltration.

Appendix B includes a copy of the NRCS soil descriptions and Rawls Table.

<u>Pre-Development Conditions:</u>

OUTFALL (1S) – Off-Site Catch Basin 1:

Stormwater runoff from the (**Subcatchment 2**) Site consists of 16,875 SF of impervious area and 29,664 SF of grassed area, drains to the west of the property and then through the grassed area to off-site catch basin 1, Stormwater runoff from (**Subcatchment 1**) consists of 16,801 SF of impervious area and 39,334 SF of grassed area, drains through Middletown Ave to off-site catch basin 1.

The "Pre-Development Drainage Map" D-1 and calculations are included as Appendix C.

Proposed Drainage Improvements

The project Applicant is proposing to incorporate on-site stormwater design improvements to collect, treat all Site's stormwater runoff to the maximum extent practicable given existing site conditions.

The following design elements will be incorporated into the proposed development's storm water management system:

OUTFALL (1S) – Off-Site Catch Basin 1:

- Four (4) new deep sump Catch Basins with hoods.
- **Stormwater treatment unit:** CMG is proposing a new stormwater treatment unit that will treat Stormwater prior to discharge to offsite catch basin.
- **Plunge pool:** CMG is proposing a new plunge pool with an overflow to offsite catch basin 1 to mitigate flows from the development of the site.

CMG is providing "**Post-Development Drainage Map**" **D-2** along with our hydrologic calculations as **Appendix D** to document the proposed Site stormwater management improvements.

Conclusion:

Table No. 1 shows the proposed stormwater design improvements for the Site will reduce offsite runoff to the existing Outfall 1S during all design storm events.

 Table No. 2 provides a summary of the Pre- and Post-Development drainage areas.

Table No. 3 demonstrates that the storm sewer system can convey the runoff from a 25 yr storm event without surcharging.

TABLE NO. 1

STORMWATER RUNOFF PEAK FLOW SUMMARY #249 W HIGH STREET EAST HAMPTON, CT

г ге-даг	sting Site Development				
		2-Year	10-Year	25-Year	100-Year
1S - OFF-SITE CATCH BASIN 1	Peak Flow (cfs)	2.70	6.64	9.39	13.84
D			• , •		
Propos	ed - Site Development (Fig D2) Cond	itions		
IS - FARMINGTON AVE	Peak Flow (cfs)	2.49	6.15	8.74	12.98
15 - FAMILIOTON AVE					

TABLE NO. 2

DRAINAGE AREA CALCULATIONS #249 W HIGH STREET EAST HAMPTON, CT

PRE-DEVELOPMENT DRAINAGE AREAS (s.f.)

On-Site	e Soil Type B				Watershed		
Area	Impervious	Gravel	Grass/Ldscp	Woods	s Total		
1	16,801	0	39,334	9,286	65,421		
2	2 16,875		0,875 0 29,664 6,739		53,278		
					Total		
33,676		0	68,998	16,025	118,699	s.f.	
			Total	Site Area=	2.72	Ac	
	Impervious=	33,676 85 023					

Total Open Space = 85,023 s.f.

POST-DEVELOPMENT DRAINAGE AREAS (s.f.)

	29,707	0	72,908	16,084 Site Area=	Total 118,699 s. 2.72 Ad
	, -	-	•		Total
	2,220	0	0,000	•	
1G	1G 2,220		9,068	0	11,288
1F	1,473	0	275	0	1,748
1E	8,885	0	21,992	6,735	37,612
1D	2,440	0	250	0	2,690
1C	1,523	0	971	0	2,494
1B	4,524	0	879	0	5,403
1A	8,642	0	39,473	9,349	57,464
Area	Impervious	Gravel	Grass/Ldscp	Woods	Total
On-Site		Soil T	уре В		Watershed

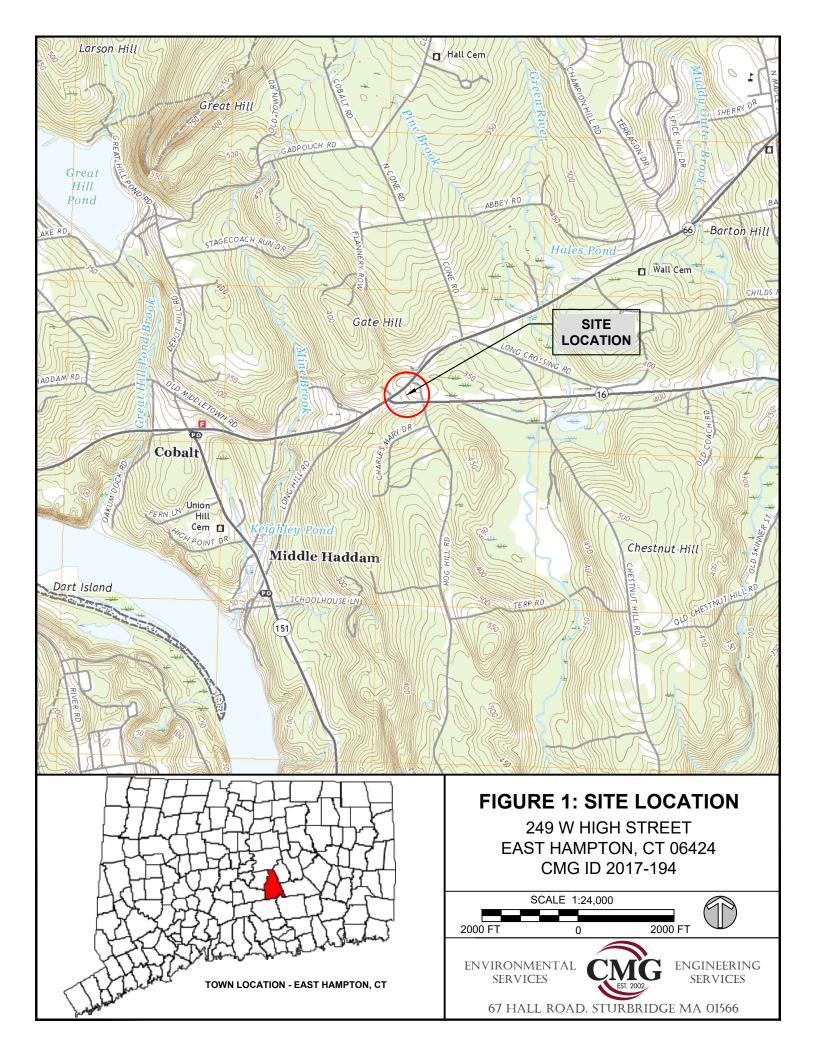
Note:

¹ All Drainage Areas are calculated using CAD Software based on Pre-

& Post Development Drainage Plans prepared by CMG date 10/28/20

Appendix A

USGS Site Location Map & FEMA Flood Plain Mapping



National Flood Hazard Layer FIRMette



Legend

72°32'41"W 41°34'5"N SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT Without Base Flood Elevation (BFE) Zone A. V. A9 With BFE or Depth Zone AE, AO, AH, VE, AR SPECIAL FLOOD HAZARD AREAS **Regulatory Floodway** 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X Future Conditions 1% Annual Chance Flood Hazard Zone X Area with Reduced Flood Risk due to Levee. See Notes. Zone X OTHER AREAS OF Area with Flood Risk due to Levee Zone D FLOOD HAZARD NO SCREEN Area of Minimal Flood Hazard Zone X Effective LOMRs OTHER AREAS Area of Undetermined Flood Hazard Zone D - - - - Channel, Culvert, or Storm Sewer GENERAL STRUCTURES LIIII Levee, Dike, or Floodwall 20.2 Cross Sections with 1% Annual Chance 09007C0135G 17.5 Water Surface Elevation TOWN CFILAN AMPTON Coastal Transect _ _ ക Base Flood Elevation Line (BFE) 090064 Limit of Study Jurisdiction Boundary — --- Coastal Transect Baseline OTHER **Profile Baseline** FEATURES Hydrographic Feature **Digital Data Available** Zone A No Digital Data Available MAP PANELS Unmapped The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location. This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 10/28/2020 at 2:19 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time. 09007C0141G This map image is void if the one or more of the following map eff. 8/28/USGS The National Map: Orthoimagery. Data refreshed October, elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for 72°32'4"W 41°33'38"N Feet 1:6.000 unmapped and unmodernized areas cannot be used for regulatory purposes. 250 500 1,000 1,500 2,000

Appendix B

NCRS Soil Mapping



USDA Natural Resources Conservation Service Web Soil Survey National Cooperative Soil Survey 10/26/2020 Page 1 of 3

MAF	PLEGEND		MAP INFORMATION		
Area of Interest (AOI)	S S	Spoil Area	The soil surveys that comprise your AOI were mapped at		
Area of Interest (AOI)	a Si	tony Spot	1:12,000.		
Soils		ery Stony Spot	Warning: Soil Map may not be valid at this scale.		
Soil Map Unit Polygo	IS	/et Spot	Enlargement of maps beyond the scale of mapping can cause		
Soil Map Unit Lines	-	ther	misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of		
Soil Map Unit Points		pecial Line Features	contrasting soils that could have been shown at a more detaile		
Special Point Features	Water Feature	S	scale.		
BlowoutBorrow Pit	~~ Si	treams and Canals	Please rely on the bar scale on each map sheet for map measurements.		
🔀 Clay Spot	Transportatio	n ails	Source of Map: Natural Resources Conservation Service		
Closed Depression		iterstate Highways	Web Soil Survey URL: Coordinate System: Web Mercator (EPSG:3857)		
Gravel Pit	🛹 U:	S Routes	Maps from the Web Soil Survey are based on the Web Mercate		
Gravelly Spot		lajor Roads	projection, which preserves direction and shape but distorts		
Candfill	n La	ocal Roads	distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more		
👗 🛛 Lava Flow	Background		accurate calculations of distance or area are required.		
Arsh or swamp	A	erial Photography	This product is generated from the USDA-NRCS certified data of the version date(s) listed below.		
Mine or Quarry			Soil Survey Area: State of Connecticut		
Miscellaneous Water			Survey Area Data: Version 20, Jun 9, 2020		
Perennial Water			Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.		
Rock Outcrop			Date(s) aerial images were photographed: Aug 30, 2019—O		
Saline Spot			15, 2019		
Sandy Spot			The orthophoto or other base map on which the soil lines were		
Severely Eroded Spo	t		compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor		
Sinkhole			shifting of map unit boundaries may be evident.		
Slide or Slip					
ß Sodic Spot					



Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
3	Ridgebury, Leicester, and Whitman soils, 0 to 8 percent slopes, extremely stony	3.3	1.9%
17	Timakwa and Natchaug soils, 0 to 2 percent slopes	6.3	3.6%
18	Catden and Freetown soils, 0 to 2 percent slopes	12.3	7.0%
60B	Canton and Charlton fine sandy loams, 3 to 8 percent slopes	7.2	4.1%
60C	Canton and Charlton fine sandy loams, 8 to 15 percent slopes	16.0	9.1%
61B	Canton and Charlton fine sandy loams, 0 to 8 percent slopes, very stony	7.7	4.4%
61C	Canton and Charlton fine sandy loams, 8 to 15 percent slopes, very stony	15.6	8.9%
73C	Charlton-Chatfield complex, 0 to 15 percent slopes, very rocky	28.8	16.4%
73E	Charlton-Chatfield complex, 15 to 45 percent slopes, very rocky	17.4	9.9%
84B	Paxton and Montauk fine sandy loams, 3 to 8 percent slopes	2.7	1.5%
85B	Paxton and Montauk fine sandy loams, 3 to 8 percent slopes, very stony	23.3	13.3%
306	Udorthents-Urban land complex	33.5	19.2%
308	Udorthents, smoothed	1.0	0.6%
Totals for Area of Interest		175.0	100.0%

State of Connecticut

306—Udorthents-Urban land complex

Map Unit Setting

National map unit symbol: 9Img Elevation: 0 to 2,000 feet Mean annual precipitation: 43 to 56 inches Mean annual air temperature: 45 to 55 degrees F Frost-free period: 120 to 185 days Farmland classification: Not prime farmland

Map Unit Composition

Udorthents and similar soils: 50 percent Urban land: 35 percent Minor components: 15 percent Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents

Setting

Down-slope shape: Convex Across-slope shape: Linear Parent material: Drift

Typical profile

A - 0 to 5 inches: loam C1 - 5 to 21 inches: gravelly loam C2 - 21 to 80 inches: very gravelly sandy loam

Properties and qualities

Slope: 0 to 25 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to high (0.00 to 1.98 in/hr)
Depth to water table: About 54 to 72 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Moderate (about 6.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified Land capability classification (nonirrigated): 3e Hydrologic Soil Group: B Hydric soil rating: No

Description of Urban Land

Typical profile

H - 0 to 6 inches: material

USDA

Interpretive groups

Land capability classification (irrigated): None specified Land capability classification (nonirrigated): 8 Hydrologic Soil Group: D Hydric soil rating: Unranked

Minor Components

Unnamed, undisturbed soils Percent of map unit: 8 percent Hydric soil rating: No

Udorthents, wet substratum

Percent of map unit: 5 percent Down-slope shape: Convex Across-slope shape: Linear Hydric soil rating: No

Rock outcrop

Percent of map unit: 2 percent Hydric soil rating: No

Data Source Information

Soil Survey Area: State of Connecticut Survey Area Data: Version 20, Jun 9, 2020



Type III 24-hr Rainfall=1.29"

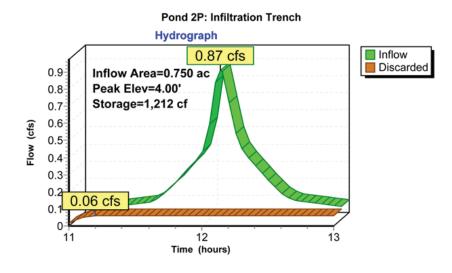


Table 2.3.3. 1982 Rawls Rates¹⁸

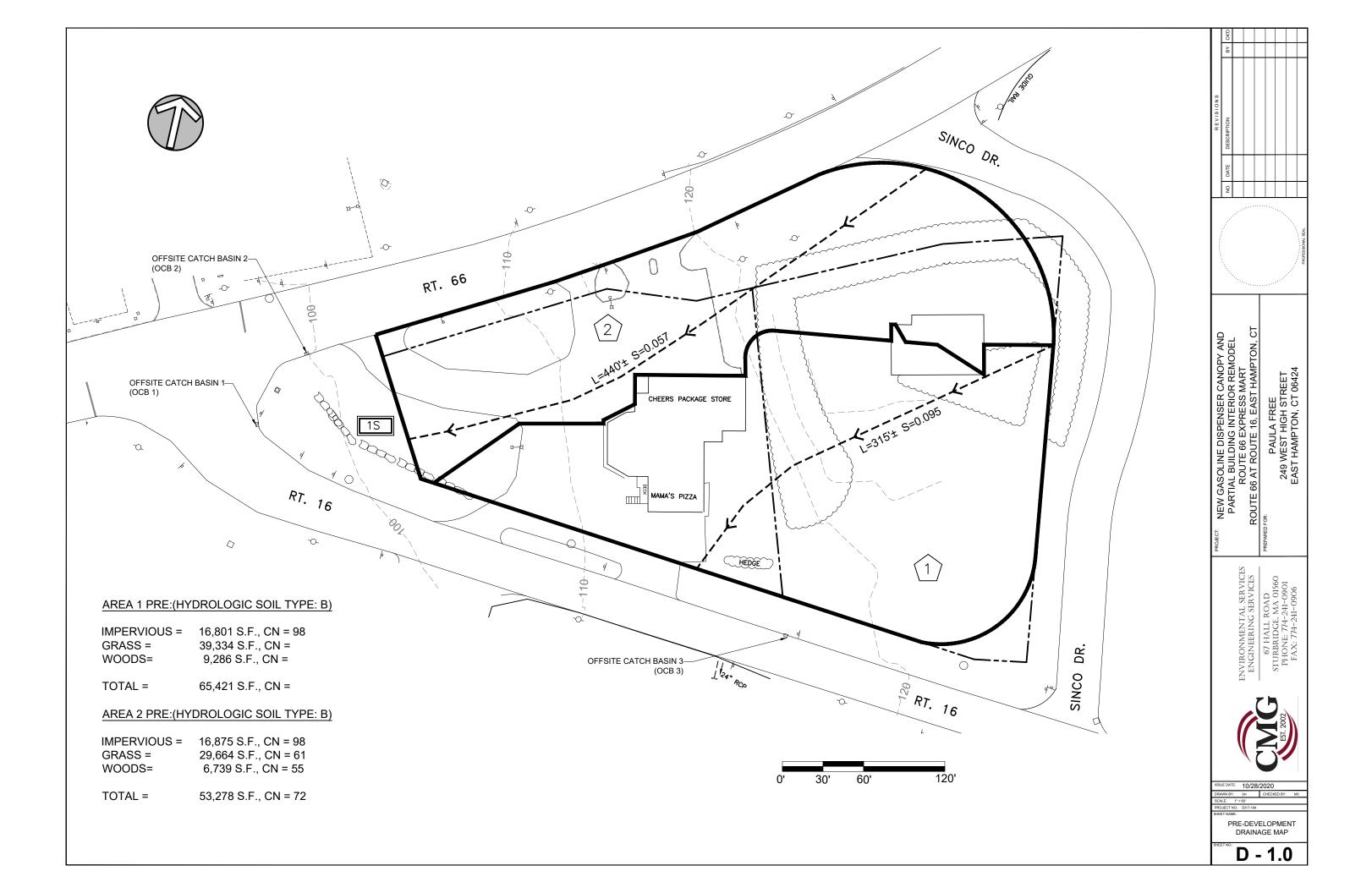
Texture Class	NRCS Hydrologic Soil Group	Infiltration Rate
	(HSG)	Inches/Hour
Sand	А	8.27
Loamy Sand	А	2.41
Sandy Loam	В	1.02
Loam	В	0.52
Silt Loam	С	0.27
Sandy Clay Loam	С	0.17
Clay Loam	D	0.09
Silty Clay Loam	D	0.06
Sandy Clay	D	0.05
Silty Clay	D	0.04
Clay	D	0.02

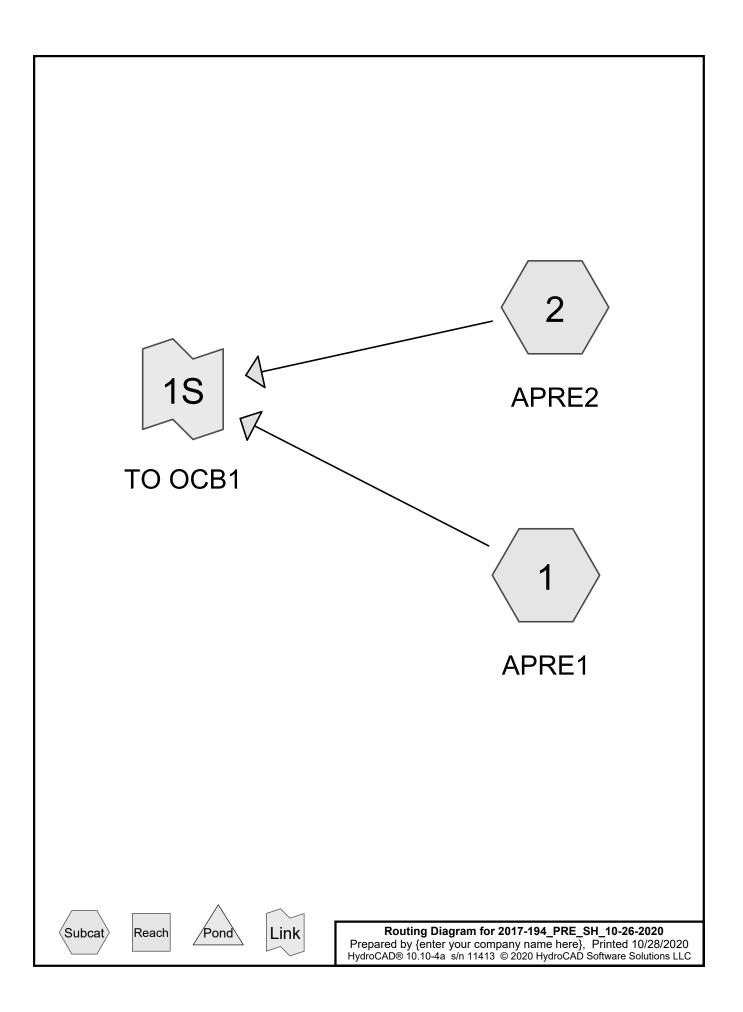
¹⁸ Rawls, Brakensiek and Saxton, 1982

Volume 3: Documenting Compliance with the Massachusetts Stormwater Management Standards

Appendix C

Pre-Development Drainage Calculations





Event#	Event	Storm Type	Curve	Mode	Duration	B/B	Depth	AMC
	Name				(hours)		(inches)	
1	2-Year Storm	Type III 24-hr		Default	24.00	1	3.38	2
2	10-Year Storm	Type III 24-hr		Default	24.00	1	5.20	2
3	25-Year Storm	Type III 24-hr		Default	24.00	1	6.34	2
4	100-Year Storm	Type III 24-hr		Default	24.00	1	8.10	2

Rainfall Events Listing (selected events)

Summary for Subcatchment 1: APRE1

Runoff = 1.48 cfs @ 12.10 hrs, Volume= 0.117 af, Depth= 0.93"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs Type III 24-hr 2-Year Storm Rainfall=3.38"

Area (sf) CN Description	
16,801 98 Paved parking, HSG B	
39,334 61 >75% Grass cover, Good, HSG B 9,286 55 Woods, Good, HSG B	
65,421 70 Weighted Average	
48,620 74.32% Pervious Area 16,801 25.68% Impervious Area	
Tc Length Slope Velocity Capacity Description (min) (feet) (ft/ft) (ft/sec) (cfs)	
6.0 Direct Entry, TCmin= 6 Minutes	
Subcatchment 1: APRE1	
Hydrograph	
(g) Mg	off
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 Time (hours)	

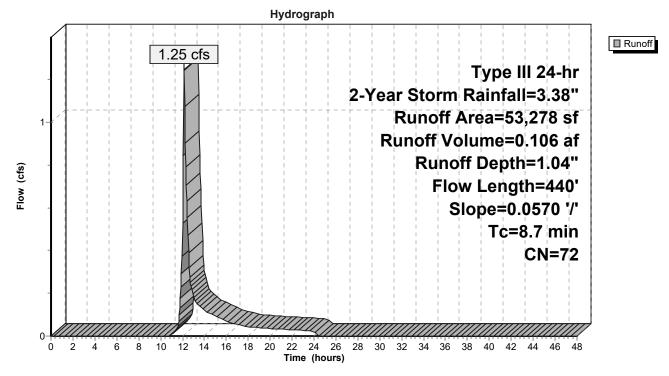
Summary for Subcatchment 2: APRE2

Runoff = 1.25 cfs @ 12.14 hrs, Volume= 0.106 af, Depth= 1.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs Type III 24-hr 2-Year Storm Rainfall=3.38"

_	A	rea (sf)	CN	Description			
		16,875	98	Paved park	ing, HSG B	}	
		29,664	61	>75% Gras	s cover, Go	bod, HSG B	
_		6,739	55	Noods, Go			
		53,278	72	Neighted A	verage		
		36,403		58.33% Per	vious Area		
		16,875		31.67% Imp	pervious Are	ea	
	_						
	Тс	Length	Slope	,	Capacity	Description	
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)		
	8.7	440	0.0570	0.84		Lag/CN Method, LAG/CN METHOD	
						-	

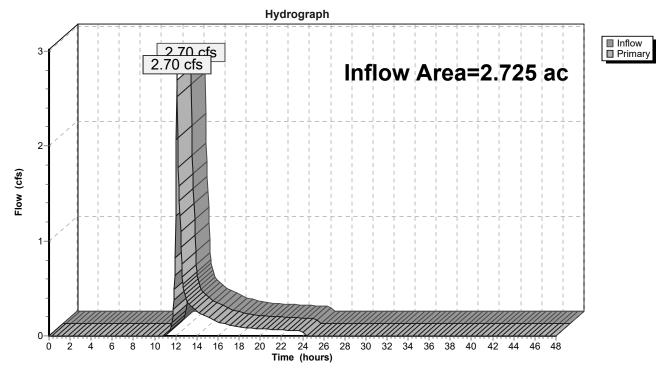




Summary for Link 1S: TO OCB1

Inflow Area	a =	2.725 ac, 28.37% Impervious, Inflow Depth = 0.98" for 2-Year Storm event
Inflow	=	2.70 cfs @ 12.12 hrs, Volume= 0.223 af
Primary	=	2.70 cfs @ 12.12 hrs, Volume= 0.223 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs



Link 1S: TO OCB1

Runoff 3.73 cfs @ 12.10 hrs, Volume= 0.274 af, Depth= 2.19" =

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs Type III 24-hr 10-Year Storm Rainfall=5.20"

	Area (sf) 16,801 39,334 9,286 65,421 48,620 16,801	98 F 61 > 55 V 70 V	75% Gras <u>Voods, Go</u> Veighted A 4.32% Pe	ing, HSG B s cover, Gc od, HSG B	od, HS	G B						
(mi	Tc Length n) (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Descri	ption						
	.0				Direct	Entry	, TCm	in= 6 I	Minute	S		
				Subcatc		t 1: Al	PRE1					
Flow (cfs)			.73 cfs	Hydrog			Runo Runo R	off A ff Vol unof	rea=6 ume= f Dep Tc=	all=5 55,42 0.27 th=2 =6.0 CN	5.20" 21 s1 74 af 2.19" min 1=70	
	0 2 4	6 8 10	12 14 16		24 26 (hours)	28 30	32 34	36 38	40 42	44	46 48	3

Type III 24-hr 10-Year Storm Rainfall=5.20" Printed 10/28/2020 HydroCAD® 10.10-4a s/n 11413 © 2020 HydroCAD Software Solutions LLC

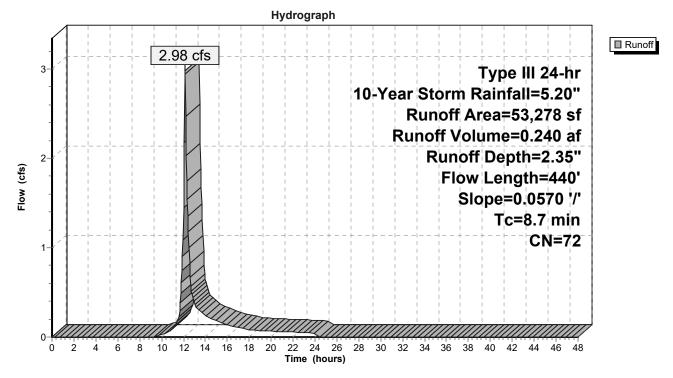
Summary for Subcatchment 2: APRE2

2.98 cfs @ 12.13 hrs, Volume= Runoff 0.240 af, Depth= 2.35" =

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs Type III 24-hr 10-Year Storm Rainfall=5.20"

_	A	rea (sf)	CN E	Description			
		16,875	98 F	Paved park	ing, HSG B	l	
		29,664	61 >	75% Gras	s cover, Go	ood, HSG B	
_		6,739	55 V	Voods, Go	od, HSG B		
		53,278	72 V	Veighted A	verage		
		36,403	6	68.33% Per	vious Area		
		16,875	3	81.67% Imp	pervious Are	ea	
	Тс	Length	Slope	Velocity	Capacity	Description	
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)		
	8.7	440	0.0570	0.84		Lag/CN Method, LAG/CN METHOD	

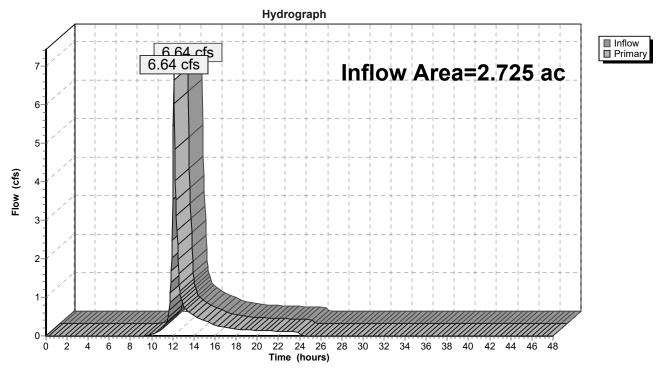
Subcatchment 2: APRE2



Summary for Link 1S: TO OCB1

Inflow Area	a =	2.725 ac, 28.37% Impervious, Inflow Depth = 2.26" for 10-Year Storm event
Inflow	=	6.64 cfs @ 12.11 hrs, Volume= 0.513 af
Primary	=	6.64 cfs @ 12.11 hrs, Volume= 0.513 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs



Link 1S: TO OCB1

Prepared by {enter your company name here} HydroCAD® 10.10-4a s/n 11413 © 2020 HydroCAD Software Solutions LLC

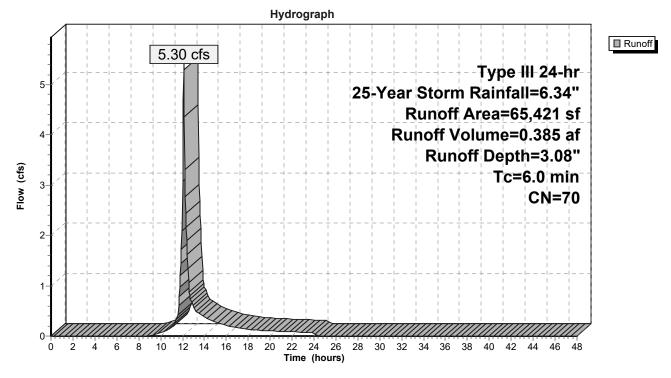
Summary for Subcatchment 1: APRE1

Runoff = 5.30 cfs @ 12.09 hrs, Volume= 0.385 af, Depth= 3.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs Type III 24-hr 25-Year Storm Rainfall=6.34"

A	rea (sf)	CN	Description					
	16,801	98	Paved park	ing, HSG B				
	39,334	61	>75% Gras	s cover, Go	ood, HSG B			
	9,286	55	Woods, Go	od, HSG B				
	65,421	70	Weighted A	verage				
	48,620		74.32% Per	vious Area				
	16,801		25.68% Imp	ervious Are	ea			
_				-				
Tc	Length	Slope		Capacity	Description			
(min)	(feet)	(ft/ft)) (ft/sec)	(cfs)				
6.0					Direct Entry, TCmin= 6 Minutes			

Subcatchment 1: APRE1



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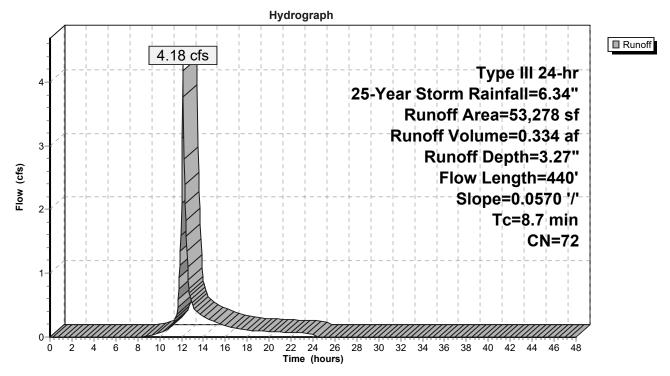
Summary for Subcatchment 2: APRE2

Runoff = 4.18 cfs @ 12.13 hrs, Volume= 0.334 af, Depth= 3.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs Type III 24-hr 25-Year Storm Rainfall=6.34"

_	A	rea (sf)	CN [Description			
		16,875	98 F	Paved park	ing, HSG B	6	
		29,664	61 >	75% Gras	s cover, Go	ood, HSG B	
_		6,739	55 V	Voods, Go	od, HSG B		
		53,278	72 V	Veighted A	verage		
		36,403	6	68.33% Per	vious Area		
		16,875	3	81.67% Imp	pervious Are	ea	
	Тс	Length	Slope	Velocity	Capacity	Description	
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)		
	8.7	440	0.0570	0.84		Lag/CN Method, LAG/CN METHOD	

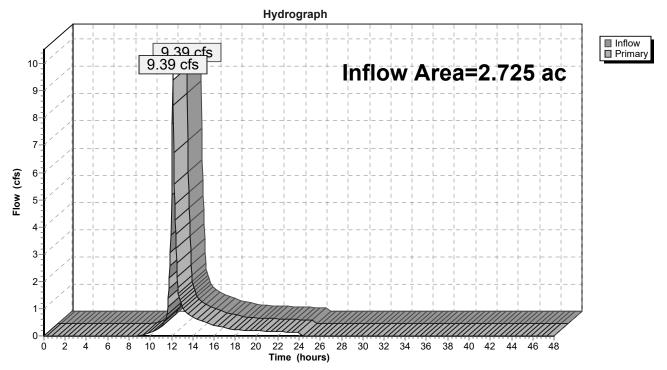
Subcatchment 2: APRE2



Summary for Link 1S: TO OCB1

Inflow Area	a =	2.725 ac, 28.37% Impervious, Inflow Depth = 3.17" for 25-Year Storm event
Inflow	=	9.39 cfs @ 12.11 hrs, Volume= 0.719 af
Primary	=	9.39 cfs $\overline{@}$ 12.11 hrs, Volume= 0.719 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs



Link 1S: TO OCB1

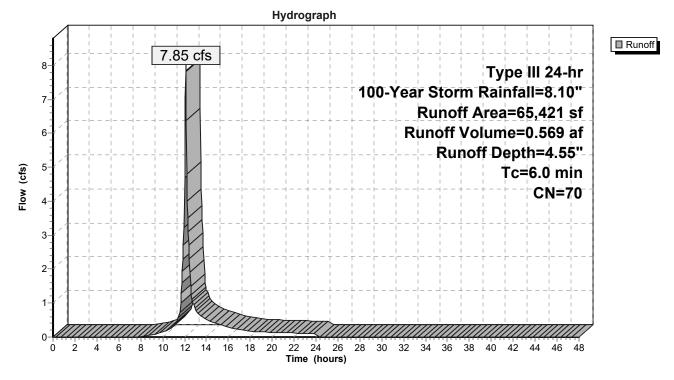
Summary for Subcatchment 1: APRE1

Runoff = 7.85 cfs @ 12.09 hrs, Volume= 0.569 af, Depth= 4.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs Type III 24-hr 100-Year Storm Rainfall=8.10"

Α	vrea (sf)	CN	Description					
	16,801	98	Paved park	ing, HSG B				
	39,334	61	>75% Ġras	s cover, Go	ood, HSG B			
	9,286	55	Woods, Go	od, HSG B				
	65,421	70	Weighted A	verage				
	48,620		74.32% Per	vious Area				
	16,801		25.68% Imp	pervious Are	ea			
_				. .				
Tc	5	Slope	,	Capacity	Description			
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)				
6.0					Direct Entry, TCmin= 6 Minutes			

Subcatchment 1: APRE1



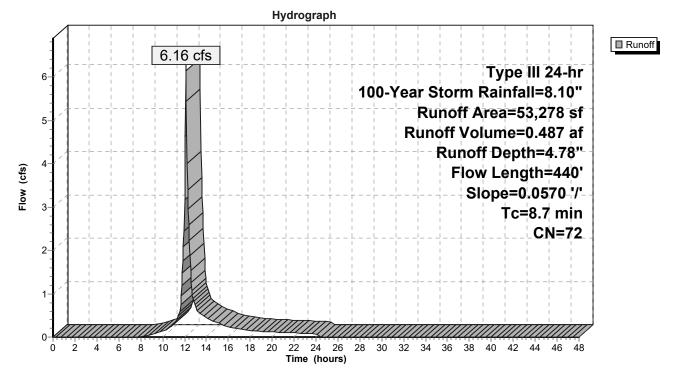
Summary for Subcatchment 2: APRE2

Runoff = 6.16 cfs @ 12.12 hrs, Volume= 0.487 af, Depth= 4.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs Type III 24-hr 100-Year Storm Rainfall=8.10"

A	vrea (sf)	CN [Description						
	16,875	98 F	Paved park	3					
	29,664	61 >	>75% Grass cover, Good, HSG B						
	6,739	55 \	Voods, Go	od, HSG B					
	53,278	72 \	Veighted A	verage					
	36,403	6	8.33% Per	vious Area					
	16,875	3	81.67% Imp	pervious Are	ea				
_									
Tc	Length	Slope			Description				
<u>(min)</u>	(feet)	(ft/ft)	(ft/sec)	(cfs)					
8.7	440	0.0570	0.84		Lag/CN Method, LAG/CN METHOD				
(min)	16,875 Length (feet)	Slope (ft/ft)	31.67% Imp Velocity (ft/sec)		ea Description				

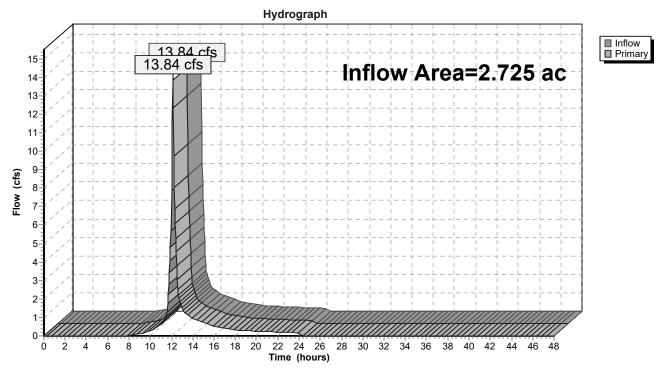
Subcatchment 2: APRE2



Summary for Link 1S: TO OCB1

Inflow Are	a =	2.725 ac, 28.37% Impervious, Inflow Depth = 4.65" for 100-Year Storm event
Inflow	=	13.84 cfs @ 12.10 hrs, Volume=
Primary	=	13.84 cfs @ 12.10 hrs, Volume= 1.057 af, Atten= 0%, Lag= 0.0 min

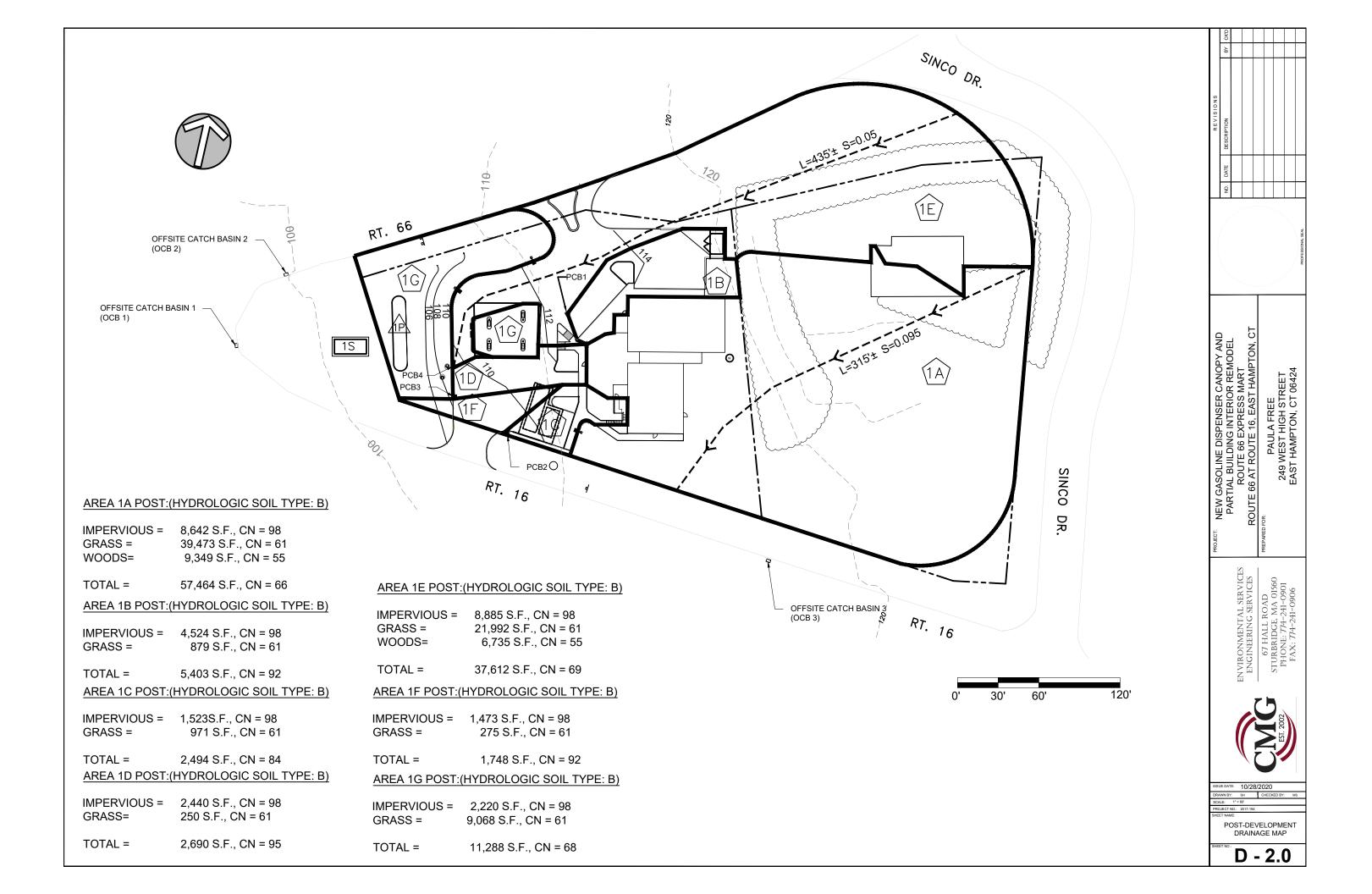
Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

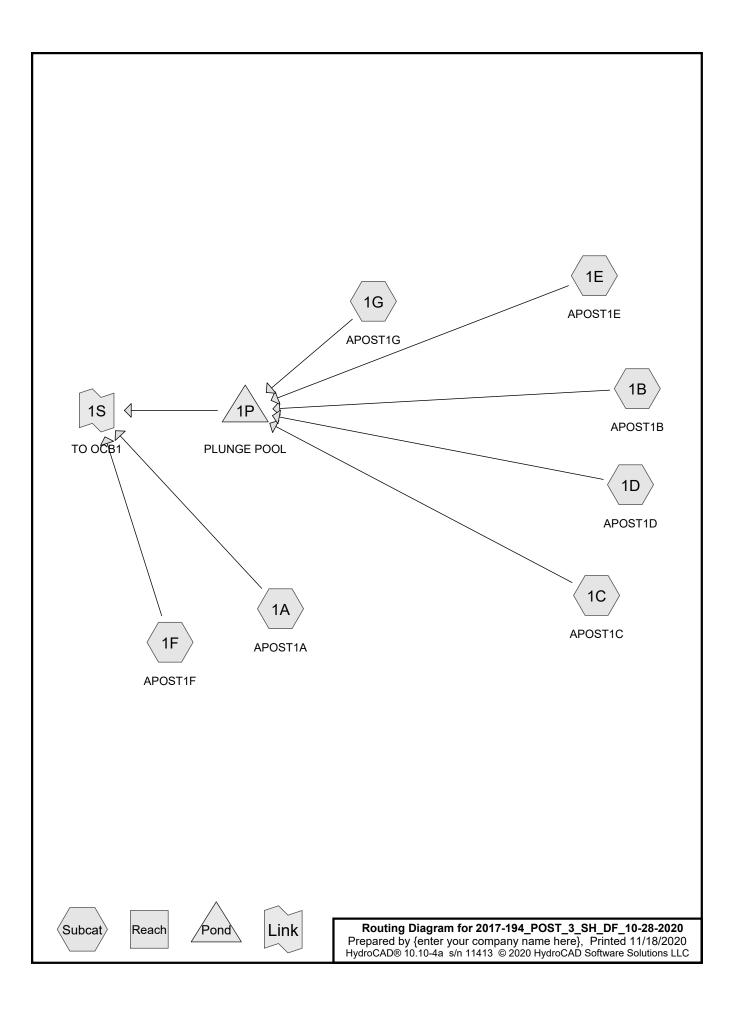


Link 1S: TO OCB1

Appendix D

Post-Development Drainage Calculations





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Type III 24-hr 2-Year Storm Rainfall=3.38" Printed 11/18/2020 olutions LLC Page 2

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Summary for Subcatchment 1A: APOST1A

Runoff = 0.94 cfs @ 12.11 hrs, Volume= 0.081 af, Depth= 0.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs Type III 24-hr 2-Year Storm Rainfall=3.38"

Area (sf)	CN Description
8,642	98 Paved parking, HSG B
39,473	61 >75% Grass cover, Good, HSG B
9,349	55 Woods, Good, HSG B
57,464 48,822	66 Weighted Average 84.96% Pervious Area
8,642	15.04% Impervious Area
0,012	
Tc Length	Slope Velocity Capacity Description
(min) (feet)	(ft/ft) (ft/sec) (cfs)
6.0	Direct Entry, TCmin= 6 Minutes
	Subcatchment 1A: APOST1A
	Hydrograph
1-	0.94 cfs
	Type III 24-hr
	2-Year Storm Rainfall=3.38"
	Runoff Area=57,464 sf
	Runoff Volume=0.081 af
cts)	Runoff Depth=0.74"
Flow (cfs)	Tc=6.0 min
ι.	CN=66

8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 Time (hours)

Type III 24-hr 2-Year Storm Rainfall=3.38" Printed 11/18/2020

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Summary for Subcatchment 1B: APOST1B

Runoff 0.35 cfs @ 12.09 hrs, Volume= 0.026 af, Depth= 2.52" =

0.36 0.35 cfs 0.34 0.32 0.3 0.28 0.28 0.28 0.28 0.28 0.28 0.28 0.28 0.24 0.24 0.22 0.22 0.24 0.22 0.2 0.																	n	riptio	esci	D	CN	sf)	rea (A
5,403 92 Weighted Average 879 16.27% Pervious Area 4,524 83.73% Impervious Area Tc Length (feet) (ft/ft) (ft/sec) (cfs) 6.0 Direct Entry, TCmin= 6 Minutes Subcatchment 1B: APOST1B Hydrograph 0.35 cfs 7 0.35 cfs 7																								
879 16.27% Pervious Area 4,524 83.73% Impervious Area Tc Length Slope Velocity Capacity Description (min) (feet) (ft/ft) (ft/sec) (cfs) 6.0 Direct Entry, TCmin= 6 Minutes Subcatchment 1B: APOST1B Hydrograph 0.35 cfs 0.35 cfs 0.												G E	HS	od,										
4,524 83.73% Impervious Area Tc Length Slope Velocity Capacity Description (ff/f) (ff/sec) (cfs) 6.0 Direct Entry, TCmin= 6 Minutes Subcatchment 1B: APOST1B Hydrograph 0.35 cfs 0.35 cfs 0.																					92			
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Type III 24-hr 2-Year Storm Rainfall=3.38" Printed 11/18/2020

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Summary for Subcatchment 1C: APOST1C

Runoff 0.12 cfs @ 12.09 hrs, Volume= 0.009 af, Depth= 1.83" =

A	rea (sf)	CN	Descrip																	
	1,523 971	98 61	Paved >75% (нs	G F	2										
	2,494 971	84	Weight 38.93%	ed Av	vera viou:	ge s Are	a	110	<u> </u>											
	1,523		61.07%	•																
Tc (min)	Length (feet)	Slope (ft/ft			Cap	oacity (cfs)		escr	iptic	on										
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Type III 24-hr 2-Year Storm Rainfall=3.38" Printed 11/18/2020

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Summary for Subcatchment 1D: APOST1D

Runoff 0.19 cfs @ 12.09 hrs, Volume= 0.015 af, Depth= 2.82" =

Area (st) CN	Descriptior	1												
2,44		Paved parl													
25	0 61	>75% Gras	s cover,	Good	, HSC	βB									
2,69		Weighted A													
25		9.29% Per													
2,44	0	90.71% lm	pervious	Area											
Tc Leng			Capaci		escrip	otion									
(min) (fee	et) (ft/	ft) (ft/sec)	(cf	_/		F . (- 7/	<u> </u>							
6.0				D	irect	Entry	, IC	-mir	n= 6	5 Min	utes				
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Type III 24-hr 2-Year Storm Rainfall=3.38" Printed 11/18/2020

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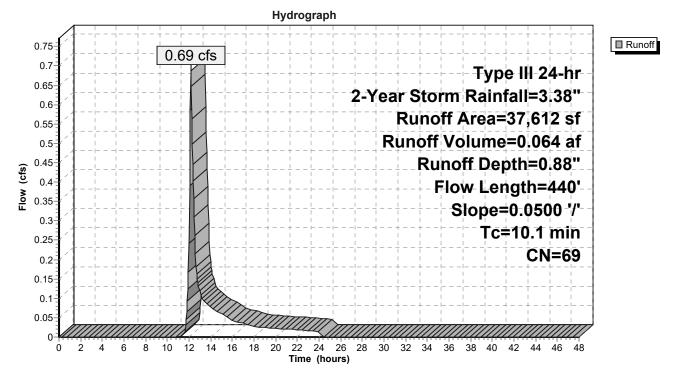
Summary for Subcatchment 1E: APOST1E

0.69 cfs @ 12.16 hrs, Volume= 0.064 af, Depth= 0.88" Runoff =

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs Type III 24-hr 2-Year Storm Rainfall=3.38"

A	rea (sf)	CN I	Description		
	8,885	98	Paved park	ing, HSG B	3
	21,992	61 :	>75% Ġras	s cover, Go	bod, HSG B
	6,735	55	Noods, Go	od, HSG B	
	37,612	69	Neighted A	verage	
	28,727	-	76.38% Pei	vious Area	l
	8,885	2	23.62% Imp	pervious Ar	ea
Тс	Length	Slope	,	Capacity	Description
<u>(min)</u>	(feet)	(ft/ft)	(ft/sec)	(cfs)	
10.1	440	0.0500	0.73		Lag/CN Method, LAG/CN

Subcatchment 1E: APOST1E

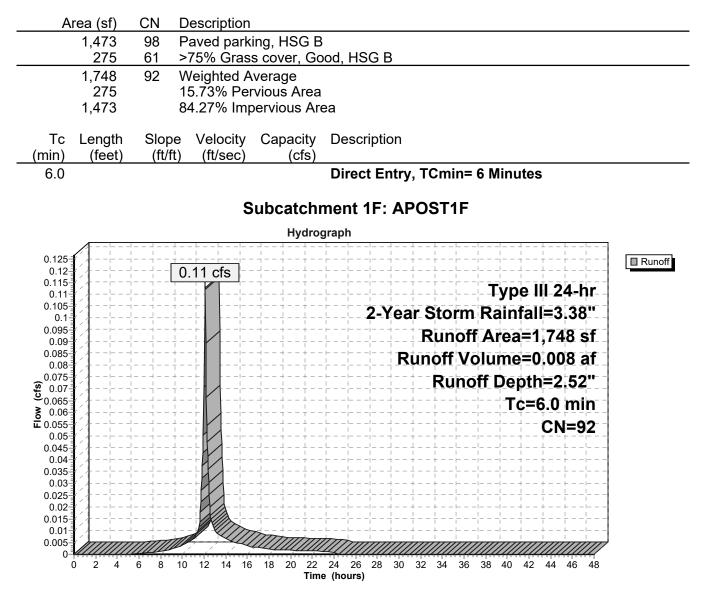


Type III 24-hr 2-Year Storm Rainfall=3.38" Printed 11/18/2020

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Summary for Subcatchment 1F: APOST1F

0.11 cfs @ 12.09 hrs, Volume= Runoff 0.008 af, Depth= 2.52" =

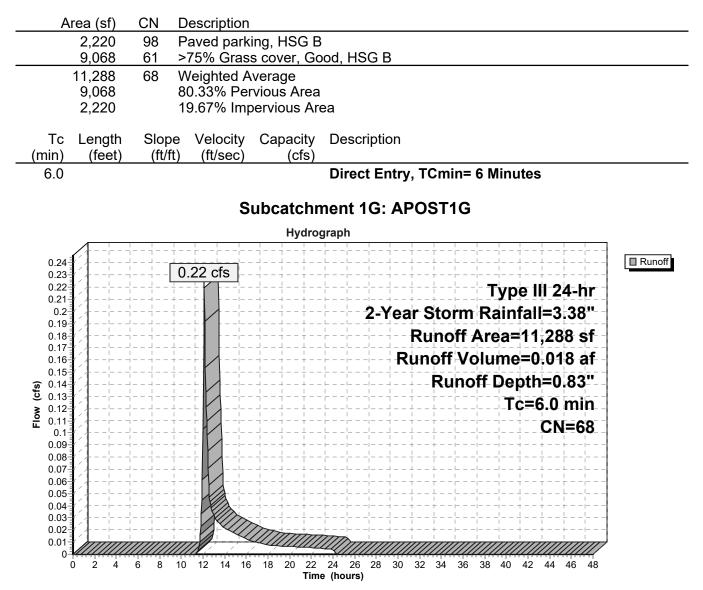


Type III 24-hr 2-Year Storm Rainfall=3.38" Printed 11/18/2020

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Summary for Subcatchment 1G: APOST1G

0.22 cfs @ 12.11 hrs, Volume= Runoff 0.018 af, Depth= 0.83" =



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Summary for Pond 1P: PLUNGE POOL

Inflow Area =	1.366 ac, 32.93% Impervious, Inflow Depth = 1.15" for 2-Year Storm event
Inflow =	1.48 cfs @ 12.12 hrs, Volume= 0.131 af
Outflow =	1.43 cfs @ 12.13 hrs, Volume= 0.123 af, Atten= 3%, Lag= 0.7 min
Primary =	1.43 cfs @ 12.13 hrs, Volume= 0.123 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 2 Peak Elev= 103.64' @ 12.13 hrs Surf.Area= 532 sf Storage= 424 cf

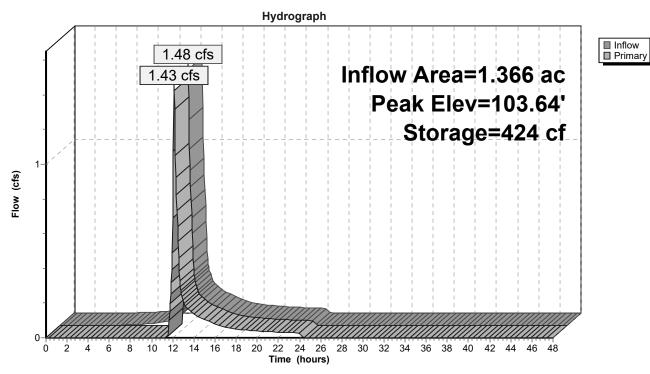
Plug-Flow detention time= 50.0 min calculated for 0.123 af (94% of inflow) Center-of-Mass det. time= 17.8 min (865.6 - 847.8)

Volume	١n	vert Avai	I.Storage	Storage Description	on		
#1	102.	50'	615 cf	Custom Stage Da	ata (Irregular) List	ed below (Recalc)	1
Elevatic (fee		Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
102.5	50	194	103.0	0	0	194	
103.5	50	532	122.0	349	349	552	
104.0	00	532	122.0	266	615	613	
Device #1	Routing Primary		.50' 10.0 Head	<u>et Devices</u> ' long x 45.0' brea d (feet) 0.20 0.40 f. (English) 2.68 2.	0.60 0.80 1.00	1.20 1.40 1.60	

Primary OutFlow Max=1.40 cfs @ 12.13 hrs HW=103.64' (Free Discharge) **1=Broad-Crested Rectangular Weir** (Weir Controls 1.40 cfs @ 1.00 fps)

Type III 24-hr 2-Year Storm Rainfall=3.38" Printed 11/18/2020 olutions LLC Page 10

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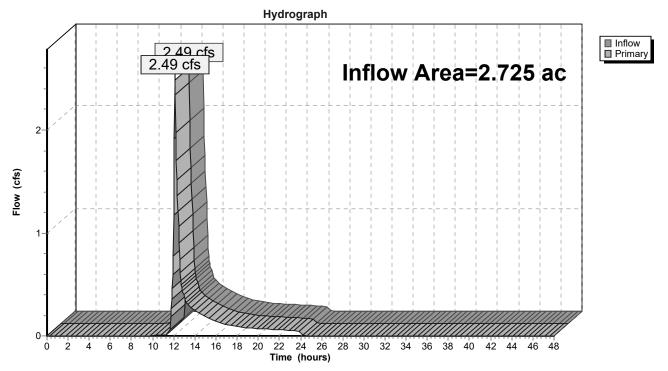
Pond 1P: PLUNGE POOL

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Summary for Link 1S: TO OCB1

Inflow Area =	2.725 ac, 25.03% Impervious, Inflow De	epth = 0.93" for 2-Year Storm event
Inflow =	2.49 cfs @ 12.12 hrs, Volume=	0.212 af
Primary =	2.49 cfs @ 12.12 hrs, Volume=	0.212 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs



Link 1S: TO OCB1

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Type III 24-hr 10-Year Storm Rainfall=5.20"Printed 11/18/2020Solutions LLCPage 12

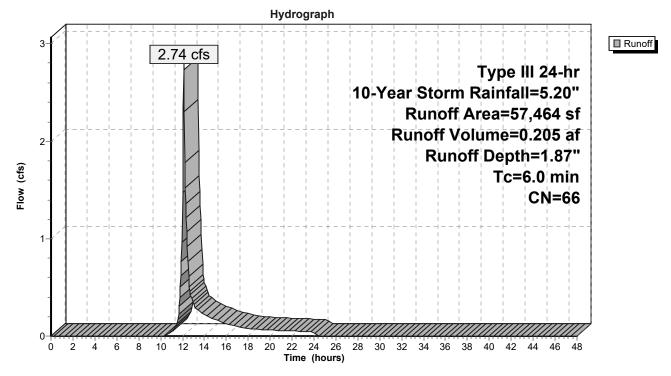
Summary for Subcatchment 1A: APOST1A

Runoff = 2.74 cfs @ 12.10 hrs, Volume= 0.205 af, Depth= 1.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs Type III 24-hr 10-Year Storm Rainfall=5.20"

	A	rea (sf)	CN	Description		
		8,642	98	Paved park	ing, HSG B	5
		39,473	61	>75% Ġras	s cover, Go	bod, HSG B
		9,349	55	Woods, Go	od, HSG B	
		57,464	66	Weighted A	verage	
		48,822		84.96% Pei	rvious Area	
		8,642		15.04% Imp	pervious Are	ea
	Tc	Length	Slope	Velocity	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	6.0					Direct Entry, TCmin= 6 Minutes
						-
				-		

Subcatchment 1A: APOST1A



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Type III 24-hr 10-Year Storm Rainfall=5.20" Printed 11/18/2020 Solutions LLC Page 13

Summary for Subcatchment 1B: APOST1B

Runoff = 0.58 cfs @ 12.09 hrs, Volume= 0.044 af, Depth= 4.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs Type III 24-hr 10-Year Storm Rainfall=5.20"

А	rea (sf)	CN E	Description											
	4,524 879			ing, HSG B s cover, Go		CR								
	5,403 879 4,524	92 V 1	Veighted A 6.27% Pe		·									
Tc min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Desci	iption								
6.0					Direc	t Entry	γ, τ Ο	;min=	6 M	inute	S			
			s	ubcatchr	nent 1	B: Al	POS	ST1B						
				Hydro	graph									
-										1	I I		🛛 🗖 Ru	nof
0.6		0).58 cfs				 							
0.55							 					24-hr		
0.5						10-Ye	1	L L	1 1	1	1	1 I		
0.45					· <mark></mark>	-ii ! !		Runo noff N				1 - C		
0.4	//				· <mark></mark>		Rui					44 ai 4.28''		
6 0.35		$\frac{1}{1}\frac{1}{1}-$				-¦ 	$\frac{1}{1}$ ·					+. <u>20</u> min		
0.35 0.35					· <mark></mark>	- -	$\frac{1}{1}$ ·		-¦¦			N=92		
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0.20		$\frac{1}{1}\frac{1}{1}-$		$-\frac{1}{1}$ $-\frac{1}{1}$ $-\frac{1}{1}$ $-\frac{1}{1}$ $-\frac{1}{1}$ $-\frac{1}{1}$	$\cdot \frac{1}{1} = -\frac{1}{1} = -\frac{1}{1}$	$-\frac{1}{1}\frac{1}{1}$	$\frac{1}{1} = -$		-¦¦		- <u> </u>	$\frac{1}{1} = -\frac{1}{1}$		
0.2	,	$ \frac{1}{1} \frac{1}{1} -$			·	-11	$\frac{1}{1} = -$		-		- +			
	/				·		<u>.</u>				- +			
0.1		 -			·	- -			-	 	- 			
0.05											-			
0-	0 2 4	6 8 10	<u></u>	18 20 22	24 26	28 30	32	34 36	38	40 42	<i>44</i>	46 4	8	

Time (hours)

Type III 24-hr 10-Year Storm Rainfall=5.20" Printed 11/18/2020

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Summary for Subcatchment 1C: APOST1C

Runoff 0.22 cfs @ 12.09 hrs, Volume= 0.016 af, Depth= 3.45" =

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs Type III 24-hr 10-Year Storm Rainfall=5.20"

Area (sf)		Description							
1,523			king, HSG I						
971			s cover, G	000, HSC	iВ				
2,494 971		Neighted A	verage rvious Area	-					
1,523	-		pervious Area						
1,020	, c	01.07 /0 IIII		ica					
Tc Length	Slope	Velocity	Capacity	Descrip	otion				
min) (feet)	(ft/ft)	(ft/sec)	(cfs)	-					
6.0				Direct	Entry, T	Cmin= 6	Minutes		
		_							
		S	Subcatch	ment 10	C: APO	ST1C			
			Hydro	ograph					
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0.24	-).22 cfs	+ + -		+				
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0.21					0-Year	r Storm	Rainfal	=5.20"	
0.19	+-		+ -			Runoff	Area=2	.494 sf	
0.18		·			RI		olume=0		
0.16	$-\frac{1}{1}\frac{1}{1} \frac{1}{1}$	$\cdot = \frac{1}{1} \cdot $	$-\frac{1}{1}\frac{1}{1}\frac{1}{1}-$	$-\frac{1}{1}$ $-\frac{1}{1}$ $-\frac{1}{1}$ $-\frac{1}{1}$		' '	ff Depth		
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Si 0.14 0.13 0.13 0.12 0.12 0.12		·						6.0 min	
6 0.12						- +	·!	CN=84	
0.1						- +		·	
0.08			+ + -		+	- + -		· +	
0.07							·	· <u> </u> <u> </u>	
0.05					$-\frac{1}{1}\frac{1}{1}$	$-\frac{1}{1}\frac{1}{1}\frac{1}{1}$	$\frac{1}{1}\frac{1}{1}\frac{1}{1}$	$ \frac{1}{1} \frac{1}{1}$	
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0.02	i i i		TTT		- I I	1 1 1			

0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 Time (hours)

0.04

0

Type III 24-hr 10-Year Storm Rainfall=5.20" Printed 11/18/2020

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Summary for Subcatchment 1D: APOST1D

Runoff 0.30 cfs @ 12.09 hrs, Volume= 0.024 af, Depth= 4.62" =

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs Type III 24-hr 10-Year Storm Rainfall=5.20"

	۸,	rea (sf)	CN D	escription										
	AI	2,440			ing, HSG B	2								
		2,440			s cover, Go		3							
		2,690		Veighted A										
		250		.29% Perv										
		2,440	9	0.71% Imp	pervious Ar	ea								
	Тс	Length	Slope	Velocity	Capacity	Descripti	on							
<u> </u>	nin)	(feet)	(ft/ft)	(ft/sec)	(cfs)									
	6.0					Direct E	ntry, T	Cmi	n= 6	Minu	ites			
				•	1			•••	_					
				S	ubcatchr	nent 1D:	APO	511	D					
					Hydro	graph								
	1	/					 					· <u> </u>		Runoff
	0.32	<i </i 	0	.30 cfs	+ +		 +	- +	-		i i + +	+	 	
	0.3	/ 	+-				 +	 	-	- Typ	be l	l 24- ł	hr	
	0.28	(10	-Year	Sto	rm	Rair	fall	=5.20)	
	0.26	/			+ +		 +	Rur	noff	Are	a=2	,690 :	sf	
	0.24	/		- - - 			R					.024 a	1	
	0.22	['-			=4.62		
fs)	0.2	/					+ +				17 1			
Flow (cfs)	0.18		+-				++	-+	-		1 1	6.0 mi	1	
FIQ	0.10	/									<u> </u> <u> </u>	CN=9	15 -	
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	0.06													

0.02 Ó 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 Ż 4 Time (hours)

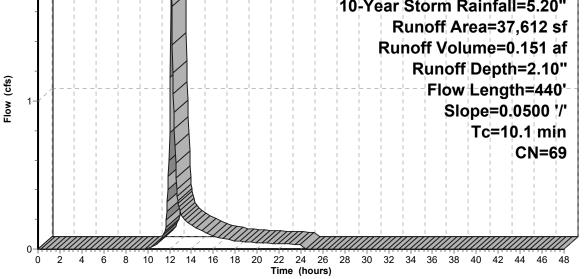
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Type III 24-hr 10-Year Storm Rainfall=5.20"Printed 11/18/2020Solutions LLCPage 16

Summary for Subcatchment 1E: APOST1E

Runoff = 1.80 cfs @ 12.15 hrs, Volume= 0.151 af, Depth= 2.10"

Are	ea (sf)	CN E	escription											
	8,885	98 F	aved park	ing, HSG B										
	1,992													
	6,735	55 V	Voods, Go	od, HSG B										
3	7,612		Veighted A											
	8,727			vious Area										
	8,885	2	3.62% Imp	ervious Are	ea									
т. (I	01		O	Description									
	Length	Slope	Velocity	Capacity	Description									
(min)	(feet)	<u>(ft/ft)</u>	(ft/sec)	(cfs)										
10.1	440	0.0500	0.73		Lag/CN Method, LAG/CN									
			0	···baatabu										
			3	upcatchi	ment 1E: APOST1E									
				Hydrog	graph									
2-			80 cfs		Type III 24-hr 10-Year Storm Rainfall=5.20" Runoff Area=37,612 sf									



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Type III 24-hr 10-Year Storm Rainfall=5.20" Printed 11/18/2020

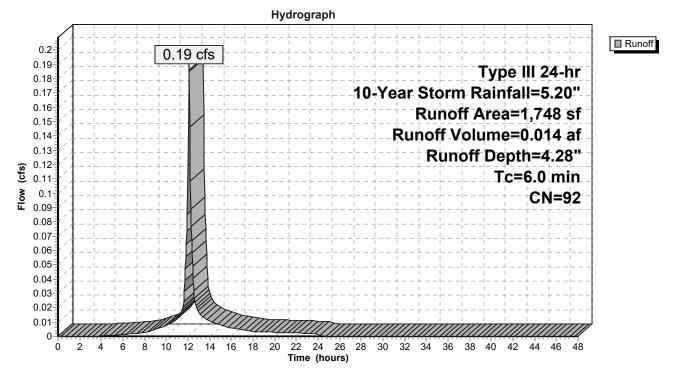
Summary for Subcatchment 1F: APOST1F

Runoff 0.19 cfs @ 12.09 hrs, Volume= 0.014 af, Depth= 4.28" =

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs Type III 24-hr 10-Year Storm Rainfall=5.20"

A	rea (sf)	CN I	Description		
	1,473	98 I	Paved park	ing, HSG B	
	275	61 >	>75% Gras	s cover, Go	ood, HSG B
	1,748		Neighted A		
	275		15.73% Per	vious Area	
	1,473	8	34.27% Imp	pervious Are	ea
т.	المربع مرالم	<u>Olana</u>	Mala site :	0 it -	Description
Tc	Length	Slope	Velocity	Capacity	Description
<u>(min)</u>	(feet)	(ft/ft)	(ft/sec)	(cfs)	
6.0					Direct Entry, TCmin= 6 Minutes
					-

Subcatchment 1F: APOST1F

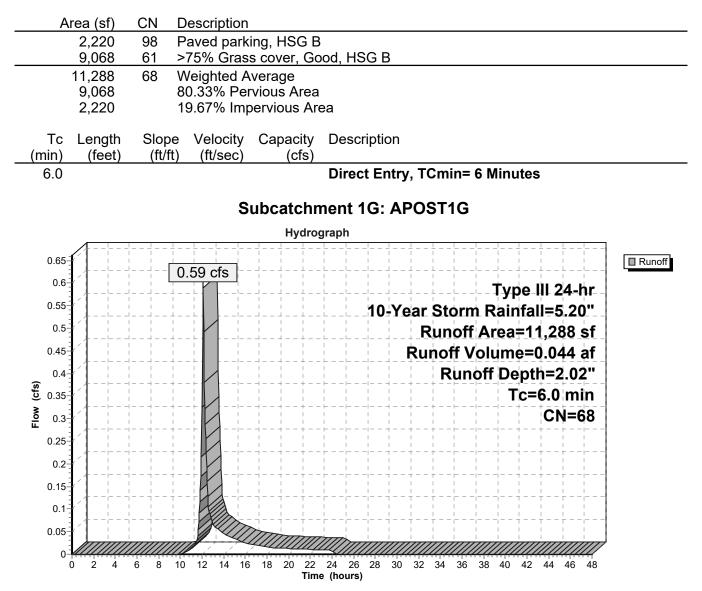


Type III 24-hr 10-Year Storm Rainfall=5.20" Printed 11/18/2020

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Summary for Subcatchment 1G: APOST1G

0.59 cfs @ 12.10 hrs, Volume= Runoff 0.044 af, Depth= 2.02" =



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Summary for Pond 1P: PLUNGE POOL

Inflow Area =	1.366 ac, 32.93% Impervious, Inflow D	epth = 2.46" for 10-Year Storm event
Inflow =	3.33 cfs @ 12.12 hrs, Volume=	0.280 af
Outflow =	3.27 cfs @ 12.12 hrs, Volume=	0.272 af, Atten= 2%, Lag= 0.4 min
Primary =	3.27 cfs @ 12.12 hrs, Volume=	0.272 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 2 Peak Elev= 103.75' @ 12.12 hrs Surf.Area= 532 sf Storage= 480 cf

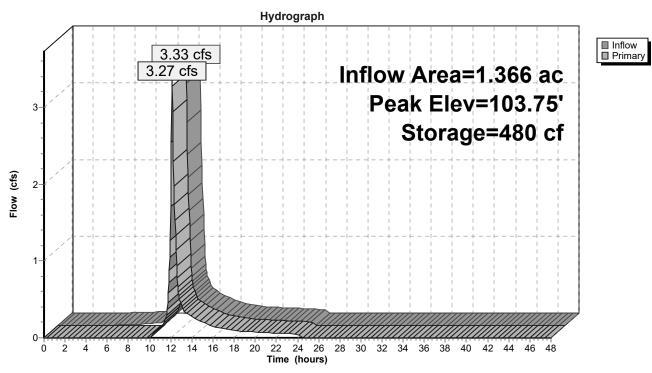
Plug-Flow detention time= 27.4 min calculated for 0.272 af (97% of inflow) Center-of-Mass det. time= 11.0 min (841.8 - 830.8)

Volume	Inv	ert Avai	I.Storage	Storage Descripti	on		
#1	102.	50'	615 cf	Custom Stage D	ata (Irregular) List	ed below (Recalc)
Elevatio (fee 102.5 103.5 104.0	50 50	Surf.Area (sq-ft) 194 532 532	Perim. (feet) 103.0 122.0 122.0	Inc.Store (cubic-feet) 0 349 266	Cum.Store (cubic-feet) 0 349 615	Wet.Area (sq-ft) 194 552 613	
Device #1	Routing Primary	<u>In</u> 103	.50' 10.0 Head	<u>et Devices</u> ' long x 45.0' brea d (feet) 0.20 0.40 f. (English) 2.68 2	0.60 0.80 1.00	1.20 1.40 1.60	

Primary OutFlow Max=3.19 cfs @ 12.12 hrs HW=103.74' (Free Discharge) **1=Broad-Crested Rectangular Weir** (Weir Controls 3.19 cfs @ 1.32 fps)

Type III 24-hr 10-Year Storm Rainfall=5.20" Printed 11/18/2020 Solutions LLC Page 20

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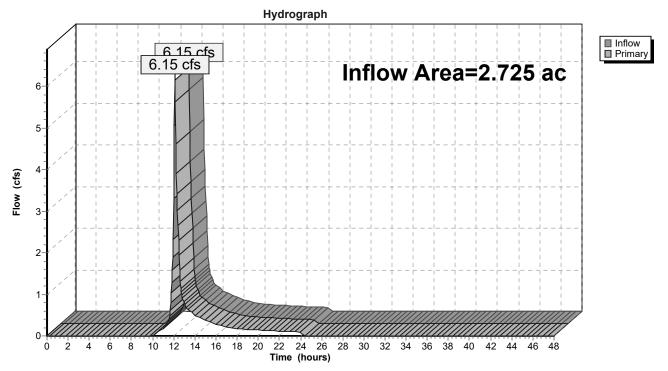
Pond 1P: PLUNGE POOL

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Summary for Link 1S: TO OCB1

Inflow Area	a =	2.725 ac, 25.03% Impervious, Inflow Depth = 2.16" for 10-Year Storm event
Inflow	=	6.15 cfs @ 12.11 hrs, Volume= 0.491 af
Primary	=	6.15 cfs @ 12.11 hrs, Volume= 0.491 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs



Link 1S: TO OCB1

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Type III 24-hr 25-Year Storm Rainfall=6.34" Printed 11/18/2020

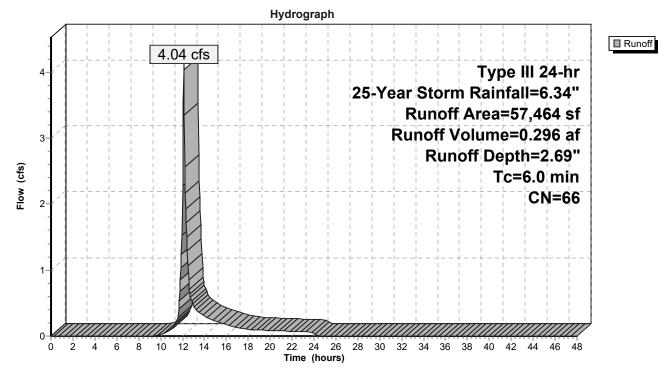
Summary for Subcatchment 1A: APOST1A

4.04 cfs @ 12.10 hrs, Volume= Runoff 0.296 af, Depth= 2.69" =

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs Type III 24-hr 25-Year Storm Rainfall=6.34"

Are	ea (sf)	CN I	Description		
	8,642	98	Paved park	ing, HSG B	
3	9,473	61 :	>75% Gras	s cover, Go	ood, HSG B
	9,349	55	Noods, Go	od, HSG B	
5	57,464	66	Neighted A	verage	
4	8,822	8	34.96% Per	vious Area	
	8,642		15.04% Imp	ervious Are	ea
Тс	Length	Slope		Capacity	Description
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
6.0					Direct Entry, TCmin= 6 Minutes
					-

Subcatchment 1A: APOST1A



Type III 24-hr 25-Year Storm Rainfall=6.34" Printed 11/18/2020

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Summary for Subcatchment 1B: APOST1B

Runoff 0.72 cfs @ 12.09 hrs, Volume= 0.056 af, Depth= 5.40" =

A	vrea (sf)	CN	Desc																		
	4,524	98	Pave							~ -											
	879	61	>75%				Go	od,	HS	<u>G B</u>											
	5,403 879	92	Weig 16.27				rea														
	4,524		83.73					ea													
_					•																
Tc min)	Length (feet)	Slop (ft/f		locity t/sec		apac (ct		De	scri	ptic	n										
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(S) 0.45 0.4 0.4							<u>+</u>			 		L 1	± = =	L		- T	c=6	5.0	mi	n	
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	~ _ 7	5 0	10 12	17		, 20		e (hoι		20	50	02	0-7	00	55	10	T4		10	40	

Type III 24-hr 25-Year Storm Rainfall=6.34" Printed 11/18/2020

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Summary for Subcatchment 1C: APOST1C

Runoff 0.29 cfs @ 12.09 hrs, Volume= 0.022 af, Depth= 4.52" =

<u> </u>	1,523	98	Pave	ed pa	ırkir	ng, l	HSC	ЗB														
	971	61	>75%					Go	od,	HS	G E	}										
	2,494	84	Weig	hted	I Av	/era	ge															
	971 1,523		38.9																			
	1,525		61.0	/ 70 11	mp		Jus	Ale	a													
Тс	Length	Slop	e Ve	elocit	y	Ca	paci	ity	De	scr	iptic	on										
min)	(feet)	(ft/ft	:) (1	ft/sec	c)		(cf	s)														
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Type III 24-hr 25-Year Storm Rainfall=6.34" Printed 11/18/2020

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Summary for Subcatchment 1D: APOST1D

Runoff 0.37 cfs @ 12.09 hrs, Volume= 0.030 af, Depth= 5.75" =

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs Type III 24-hr 25-Year Storm Rainfall=6.34"

А	rea (sf)	CN [Description												
	2,440		Paved park												
	250		>75% Gras		ood, H	ISG E	8								
	2,690		Neighted A												
	250		9.29% Per												
	2,440	, i	90.71% Imj	bervious A	rea										
Тс	Length	Slope	Velocity	Capacity	Des	scriptio	on								
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)		•									
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			_												
			S	ubcatch	ment	: 1D:	APC)ST	1D						
				Hydro	ograph										
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0.36-							 			Ty	/pe	UL 2	24-ľ	1 r _	
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Time (hours)

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Type III 24-hr 25-Year Storm Rainfall=6.34" Printed 11/18/2020

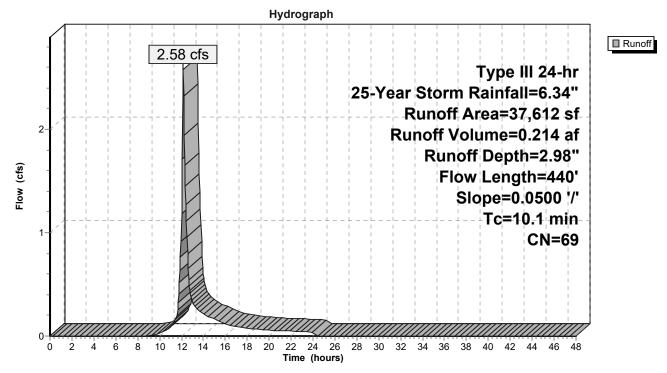
Summary for Subcatchment 1E: APOST1E

2.58 cfs @ 12.15 hrs, Volume= Runoff 0.214 af, Depth= 2.98" =

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs Type III 24-hr 25-Year Storm Rainfall=6.34"

<i>F</i>	Area (sf)	CN [Description		
	8,885	98 F	Paved park	ing, HSG B	3
	21,992	61 >	75% Gras	s cover, Go	bod, HSG B
	6,735	55 V	Voods, Go	od, HSG B	
	37,612	69 V	Veighted A	verage	
	28,727	7	6.38% Per	vious Area	
	8,885	2	23.62% Imp	pervious Ar	ea
_					
Tc	5	Slope	Velocity	Capacity	Description
<u>(min)</u>	(feet)	(ft/ft)	(ft/sec)	(cfs)	
10.1	440	0.0500	0.73		Lag/CN Method, LAG/CN

Subcatchment 1E: APOST1E



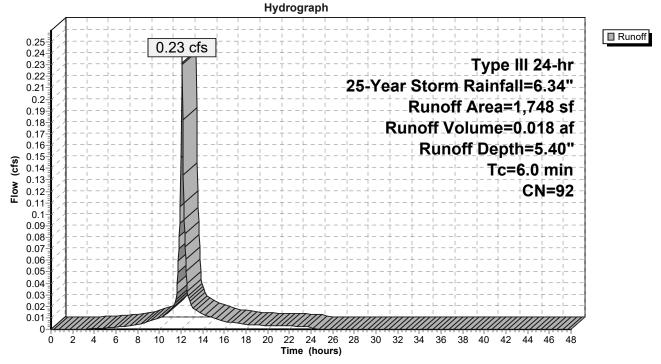
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Type III 24-hr 25-Year Storm Rainfall=6.34" Printed 11/18/2020 Solutions LLC Page 27

Summary for Subcatchment 1F: APOST1F

Runoff = 0.23 cfs @ 12.09 hrs, Volume= 0.018 af, Depth= 5.40"

A	rea (sf)	CN	Description											
	1,473	98	98 Paved parking, HSG B											
	275	61	>75% Grass cover, Good, HSG B											
	1,748	92	Weighted A	verage										
	275		15.73% Pei	vious Area										
	1,473	,473 84.27% Impervious Area												
Tc (min)	Length (feet)	Slope (ft/ft)	•	Capacity (cfs)	Description									
6.0					Direct Entry, TCmin= 6 Minutes									
	Subcatchment 1F: APOST1F													



0.1 0.05 0-

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Type III 24-hr 25-Year Storm Rainfall=6.34" Printed 11/18/2020 Solutions LLC Page 28

Summary for Subcatchment 1G: APOST1G

Runoff = 0.85 cfs @ 12.10 hrs, Volume= 0.062 af, Depth= 2.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs Type III 24-hr 25-Year Storm Rainfall=6.34"

	Area (sf)	CN E	Description						
	2,220	98 F	Paved park	ing, HSG B					
	9,068	61 >	>75% Gras	s cover, Go	od, HSG B				
	11,288	68 V	Neighted A	verage					
	9,068	6	30.33% Per	vious Area					
	2,220) 1	19.67% Imp	pervious Are	ea				
	Tc Lengt			Capacity	Descriptior	l			
<u> </u>	nin) (fee	t) (ft/ft)	(ft/sec)	(cfs)					
	6.0				Direct Ent	ry, TCm	in= 6 M	inutes	
			S	ubcatchn	nent 1G: A	APOST	1G		
				Hydrog	ranh				
		+-		пушоц 	<u> </u>	-++		+++	
	0.95	<u>+ -</u>	<u> </u>	+ +	 + -	- + +	 -⊢	+++	Runoff
	0.9	C).85 cfs			- + +		+++	
	0.85	+ -		+ +		+ +	- T	ype III 24-ł	hr
	0.8				25-1	/ear St	orm Ra	ainfall=6.34	1"
	0.75							ea=11,288 s	
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	0.65							me=0.062 a	
-	0.6					·-++ F	Runoff	Depth=2.88	B*** -
Flow (cfs)	0.55					·		Tc=6.0 mi	n
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	0.15								

0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 Time (hours)

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Summary for Pond 1P: PLUNGE POOL

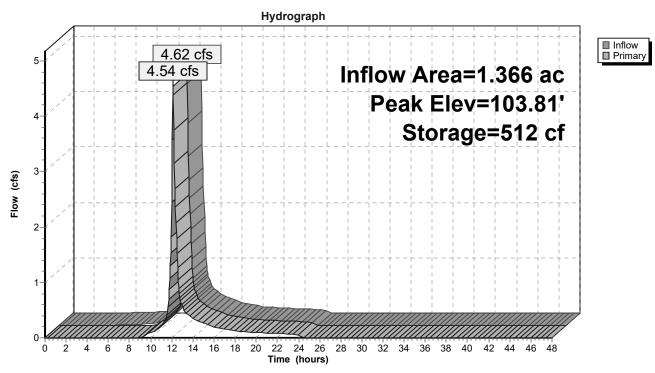
Inflow Area =	1.366 ac, 32.93% Impervious, Inflow D	Depth = 3.37" for 25-Year Storm event
Inflow =	4.62 cfs @ 12.12 hrs, Volume=	0.384 af
Outflow =	4.54 cfs @ 12.12 hrs, Volume=	0.376 af, Atten= 2%, Lag= 0.4 min
Primary =	4.54 cfs @ 12.12 hrs, Volume=	0.376 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 2 Peak Elev= 103.81' @ 12.12 hrs Surf.Area= 532 sf Storage= 512 cf

Plug-Flow detention time= 21.3 min calculated for 0.376 af (98% of inflow) Center-of-Mass det. time= 9.1 min (832.5 - 823.4)

Volume	Inv	vert Ava	il.Storage	Storage Description	on		
#1	102.	50'	615 cf	Custom Stage D	ata (Irregular) List	ed below (Recalc)
Elevatio (fee 102.5 103.5 104.0	et) 50 50	Surf.Area (sq-ft) 194 532 532	Perim. (feet) 103.0 122.0 122.0	Inc.Store (cubic-feet) 0 349 266	Cum.Store (cubic-feet) 0 349 615	Wet.Area (sq-ft) 194 552 613	
Device #1	Routing Primary		3.50' 10.0 Hea	et Devices ' long x 45.0' brea d (feet) 0.20 0.40 f. (English) 2.68 2	0.60 0.80 1.00	1.20 1.40 1.60	

Primary OutFlow Max=4.42 cfs @ 12.12 hrs HW=103.80' (Free Discharge) **1=Broad-Crested Rectangular Weir** (Weir Controls 4.42 cfs @ 1.47 fps) Prepared by {enter your company name here} HydroCAD® 10.10-4a s/n 11413 © 2020 HydroCAD Software Solutions LLC



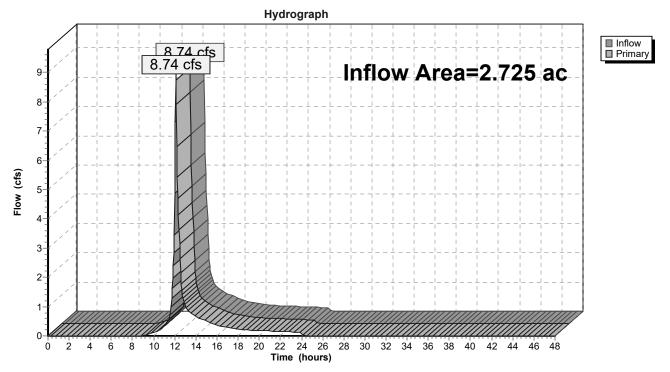
Pond 1P: PLUNGE POOL

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Summary for Link 1S: TO OCB1

Inflow Area	a =	2.725 ac, 25.03% Impervious, Inflow Depth = 3.04" for 25-Year Storm event
Inflow	=	8.74 cfs @ 12.11 hrs, Volume= 0.690 af
Primary	=	8.74 cfs $\overline{@}$ 12.11 hrs, Volume= 0.690 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs



Link 1S: TO OCB1

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Type III 24-hr 100-Year Storm Rainfall=8.10" Printed 11/18/2020

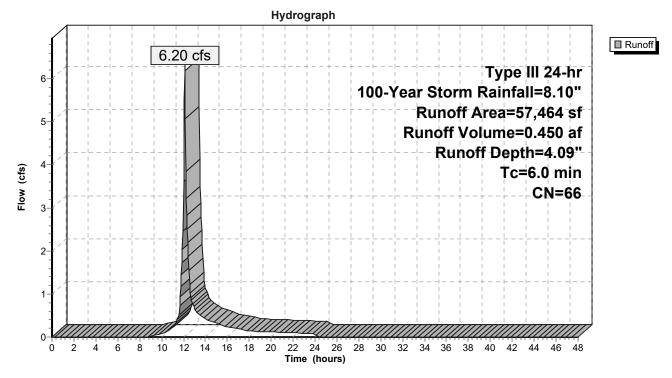
Summary for Subcatchment 1A: APOST1A

Runoff 6.20 cfs @ 12.09 hrs, Volume= 0.450 af, Depth= 4.09" =

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs Type III 24-hr 100-Year Storm Rainfall=8.10"

A	rea (sf)	CN	Description		
	8,642	98	Paved park	ing, HSG B	
	39,473	61	>75% Gras	s cover, Go	ood, HSG B
	9,349	55	Woods, Go	od, HSG B	
	57,464	66	Weighted A	verage	
	48,822		84.96% Per	vious Area	
	8,642		15.04% Imp	ervious Are	ea
Та	ما به مربع	Clana	Valasitu	Conositu	Description
Tc	Length	Slope		Capacity	Description
(min)	(feet)	(ft/ft) (ft/sec)	(cfs)	
6.0					Direct Entry, TCmin= 6 Minutes

Subcatchment 1A: APOST1A

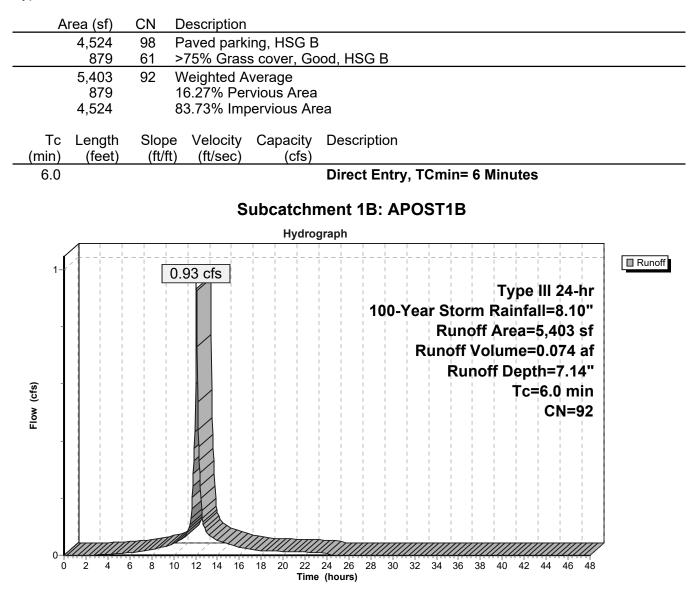


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Type III 24-hr 100-Year Storm Rainfall=8.10" Printed 11/18/2020 Solutions LLC Page 33

Summary for Subcatchment 1B: APOST1B

Runoff = 0.93 cfs @ 12.09 hrs, Volume= 0.074 af, Depth= 7.14"



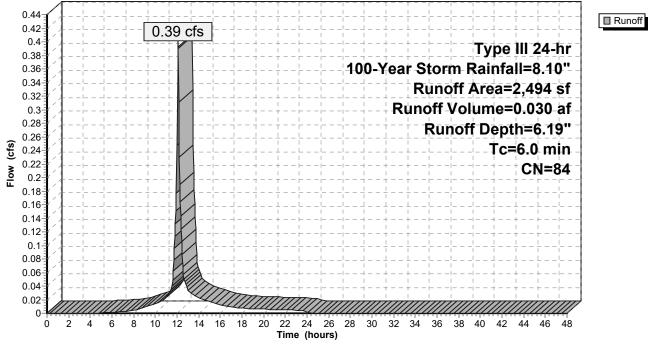
Prepared by {enter your company name here} HydroCAD® 10.10-4a s/n 11413 © 2020 HydroCAD Software Solutions LLC

Type III 24-hr 100-Year Storm Rainfall=8.10" Printed 11/18/2020 e Solutions LLC Page 34

Summary for Subcatchment 1C: APOST1C

Runoff = 0.39 cfs @ 12.09 hrs, Volume= 0.030 af, Depth= 6.19"

Α	rea (sf)	CN [Description						
	1,523	98 F	Paved park	ing, HSG E	3				
	971	61 >	-75% Gras	s cover, Go	ood, HSG B				
	2,494		Veighted A						
	971	3	38.93% Pei	vious Area					
	1,523	6	61.07% Imp	pervious Ar	ea				
_									
Tc	Length	Slope	Velocity	Capacity	Description				
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)					
6.0					Direct Entry,	TCmin=	ະ 6 Minເ	utes	
			S	ubcatchr	nent 1C: AP	OST1C			
				Hydro	graph				
0.44-		1			· · · · · · · ·			ттг I I I	
0.44	1/1-15-1							<u> </u>	 Runoff



Type III 24-hr 100-Year Storm Rainfall=8.10" Printed 11/18/2020

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Summary for Subcatchment 1D: APOST1D

Runoff 0.47 cfs @ 12.09 hrs, Volume= 0.039 af, Depth= 7.50" =

A	rea (sf)	CN	Desci																	
	2,440	98 64				HSG E			<u>с п</u>											
	<u>250</u> 2,690	<u>61</u> 95	Veigl			ver, Go	<u>. 200</u>	H2	GΒ											
	2,000	00	9.29%	6 Per	vious	Area														
	2,440		90.71	% Im	pervi	ous Ar	ea													
Tc min)	Length (feet)	Slop (ft/f		locity /sec)	Ca	pacity (cfs)	De	escri	ptio	n										
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Type III 24-hr 100-Year Storm Rainfall=8.10" Printed 11/18/2020

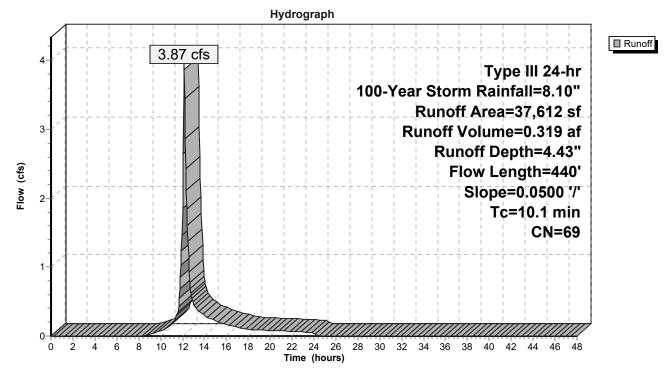
Summary for Subcatchment 1E: APOST1E

Runoff 3.87 cfs @ 12.15 hrs, Volume= 0.319 af, Depth= 4.43" =

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs Type III 24-hr 100-Year Storm Rainfall=8.10"

A	rea (sf)	CN	Description		
	8,885	98	Paved park	ing, HSG B	3
	21,992	61	>75% Ġras	s cover, Go	bod, HSG B
	6,735	55	Woods, Go	od, HSG B	
	37,612	69	Weighted A	verage	
	28,727		76.38% Pei	vious Area	l
	8,885		23.62% Imp	pervious Ar	ea
Тс	Length	Slope	,	Capacity	Description
<u>(min)</u>	(feet)	(ft/ft)	(ft/sec)	(cfs)	
10.1	440	0.0500	0.73		Lag/CN Method, LAG/CN

Subcatchment 1E: APOST1E



0.02

0 2 4 6 8

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10 12 14 16 18

20

Time (hours)

Type III 24-hr 100-Year Storm Rainfall=8.10" Printed 11/18/2020 Solutions LLC Page 37

Summary for Subcatchment 1F: APOST1F

Runoff = 0.30 cfs @ 12.09 hrs, Volume= 0.024 af, Depth= 7.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs Type III 24-hr 100-Year Storm Rainfall=8.10"

	A	rea (sf)		Description										
		1,473			ing, HSG B									
		275			s cover, Go	ood, HS	SG B							
		1,748		Veighted A										
		275			vious Area									
		1,473	8	4.27% Imp	pervious Ar	ea								
	Тс	Longth	Slope	Velocity	Capacity	Dece	ription							
(n	nin)	Length (feet)	(ft/ft)	(ft/sec)	(cfs)	Desci	npuon							
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				S	ubcatch	ment [·]	1F: Al	POS	T1F					
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				<u> </u>				$\frac{1}{T} = -\frac{1}{T}$			$\frac{1}{7} = -\frac{1}{7}$			Runoff
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<u>s</u>	0.16	·						$\frac{1}{1}\frac{1}{1}$			+	CN	=92	
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Type III 24-hr 100-Year Storm Rainfall=8.10" Printed 11/18/2020

Summary for Subcatchment 1G: APOST1G

Runoff 1.29 cfs @ 12.09 hrs, Volume= 0.093 af, Depth= 4.32" =

А	rea (sf)	CN	Description									
	2,220			ing, HSG B								
	9,068			s cover, Go		G B						
	11,288		Weighted A									
	9,068			rvious Area								
	2,220		19.07 % 111	pervious Ar	ea							
Tc	Length	Slope		Capacity	Descr	ription						
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)								
6.0					Direc	t Entry	, TCr	nin= (6 Minu	utes		
			S	ubcatchr	nent 1	G: AF	POS ⁻	T1G				
			_	Hydrog	graph	_		_				
ſ												Runoff
-		1	.29 cfs									
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Flow (cfs)										Tc=(6.0 min	
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2017-194_POST_3_SH_DF_10-28-2020 Prepared by {enter your company name here}

Summary for Pond 1P: PLUNGE POOL

Inflow Area =	1.366 ac, 32.93% Impervious, Inflow Depth = 4.87" for 100-Year Storm event
Inflow =	6.69 cfs @ 12.11 hrs, Volume= 0.554 af
Outflow =	6.59 cfs @ 12.12 hrs, Volume= 0.546 af, Atten= 2%, Lag= 0.3 min
Primary =	6.59 cfs @ 12.12 hrs, Volume= 0.546 af

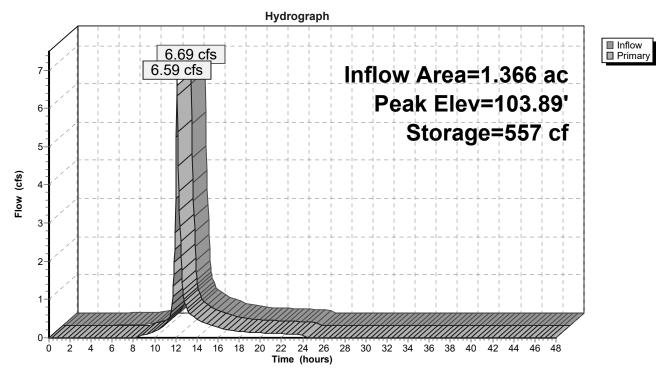
Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 2 Peak Elev= 103.89' @ 12.12 hrs Surf.Area= 532 sf Storage= 557 cf

Plug-Flow detention time= 15.8 min calculated for 0.546 af (98% of inflow) Center-of-Mass det. time= 7.3 min (821.9 - 814.6)

Volume	Inv	ert Ava	il.Storage	Storage Descripti	on		
#1	102.	50'	615 cf	Custom Stage D	ata (Irregular) List	ed below (Recald	;)
Elevatio (fee 102.5 103.5 104.0	50 50	Surf.Area (sq-ft) 194 532 532	Perim. (feet) 103.0 122.0 122.0	Inc.Store (cubic-feet) 0 349 266	Cum.Store (cubic-feet) 0 349 615	Wet.Area (sq-ft) 194 552 613	
Device #1	Routing Primary		3.50' 10.0 Head	et Devices ' long x 45.0' brea d (feet) 0.20 0.40 f. (English) 2.68 2	0.60 0.80 1.00	1.20 1.40 1.60	

Primary OutFlow Max=6.42 cfs @ 12.12 hrs HW=103.88' (Free Discharge) **1=Broad-Crested Rectangular Weir** (Weir Controls 6.42 cfs @ 1.67 fps)

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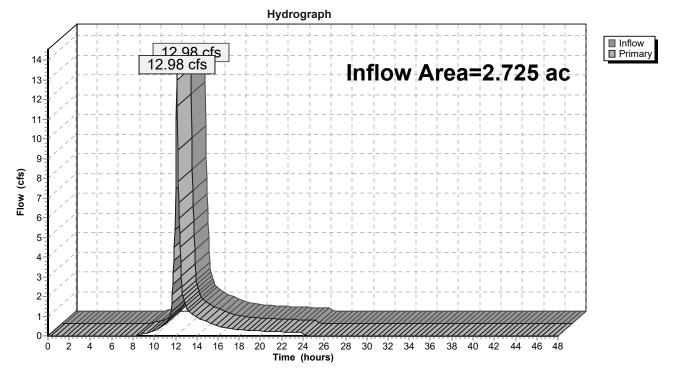
Pond 1P: PLUNGE POOL

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Summary for Link 1S: TO OCB1

Inflow Are	a =	2.725 ac, 25.03% Impervious, Inflow Depth = 4.49" for 100-Year Storm event
Inflow	=	12.98 cfs @ 12.10 hrs, Volume= 1.020 af
Primary	=	12.98 cfs @ 12.10 hrs, Volume= 1.020 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs



Link 1S: TO OCB1

Table No. 3 RATIONAL METHOD PIPE DESIGN WORKSHEET CHEERS PROPOSED FILLING STATION / CONVENIENCE STORE EAST HAMPTON, CT

	PIPE SEGMENT		INCREMENTAL AREA					FLOW TIME (min.) 25			-Yr	25-Yr	DESIGN CON	IGN CONDITIONS Design (25-Yr) Inverts			Inverts	Remarks		
LOCATION	From	То	DESIGNATION A (A	cres) Total	IAC	C*A	Sum (C*A)	To Inlet	In Chan.	Г <mark>ot.</mark> I (ir	ı/hr)	Q (cfs)	Pipe Diam (in.)	Length (ft)	Slope (%) Q-full (c	s) V-Full (fps	Depth Peak (in.)	V-Peak (fps)	Up	Down
n-Site Catch Basins:																				
	PCB-1	PCB-2		0.124	0.83	0.10		6		6	6.3	0.65	12	96	0.026 5.	76 7.34	1.4	0.83	107.63	105.13 PCB-1 Rim =112.13
	PCB-2	PCB-3		0.057	0.66	0.04	0.14	6		6	6.3	0.89	12	46	0.008 3.	4.19	3.2	1.13	105.13	104.74 PCB-2 Rim =108.63
	PCB-3	PCB-4	(.062	0.88	0.05	0.20	6		6	6.3	1.23	12	21	0.010 3.	4.55	4.1	1.57	104.30	104.09 PCB-3 Rim=107.80
	PCB-4	HG-4	(.863	0.38	0.33	0.53	6		6	6.3	3.32	12	6	0.025 5.	5 7.19	7.1	4.23	103.59	103.44 PCB-4 Rim=109.60

Notes:

1) Runoff Coefficient C-Values used; Impervious(Pavement) C=0.95 Grass/OpenSpace C=0.21, Mannings "n", RCP n=0.013

2) Rainfall Intensity I (in/hr) values taken from NOAA Precipitation Frequency Data Server.

3) Six (6) minute minimum flow time used for minimum time of concentration (Tc) to CB inlet to system

4) Standard Grate Capacity= 0.95 cfs est.

Drainage	Contribu	ting Area	Total		Runoff Coefficient
Structure	Impervious	Grass/Lawn	s.f.	Ac.	С
PCB-1	4,524	879	5,403	0.124	0.83
PCB-2	1,523	971	2,494	0.057	0.66
PCB-3	2,440	250	2,690	0.062	0.88
PCB-4	8,885	28,727	37,612	0.863	0.38