# PRELIMINARY DRAINAGE REPORT

# "Timber Crest Estates" Medway, MA

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# PRELIMINARY DRAINAGE REPORT "Timber Crest Estates" MEDWAY, MASSACHUSETTS

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# DRAINAGE REPORT "Timber Crest Estates" MEDWAY, MASSACHUSETTS

#### Section 1.0: Introduction

These drainage calculations have been prepared to accompany the proposed Timber Crest Estates site plans, part of a Comprehensive Permit filing under MGL Ch. 40B. The drainage calculations herein are preliminary in nature to document that stormwater runoff rates can be controlled using appropriate structural and low-impact development techniques, whereas the plans and drainage design will ultimately comply with the Massachusetts Department of Environmental Protection's (DEP's) Stormwater Management Regulations when finalized.

#### Section 2.0: Existing Conditions

Timber Crest Estates is located in the northerly area of Medway (refer to USGS Locus Map), containing 9 parcels of mostly woodlands, totaling 163.1 acres. The site is bordered by residential areas along Winthrop Street and Ohlson Circle to the west, Fairway Lane to the north, Holliston Street to the east, and Fern Path and Howe Street to the south. The site is in the AR-I zoning district. Homes in the area are generally ranch or colonial-style homes situated on lots ranging in size from approximately ½ to 1+ acres.

The property is currently mostly wooded, except for a homesite at 102 Winthrop Street and two utility easements running parallel to each other across the site. These easements are for underground natural gas mains (Algonquin Gas Transmission Company) and overhead, electric power transmission lines (Boston Edison). The site topography is relatively gently sloping, characterized by small hills and lower valleys where the wetlands are located.

The site location is not within any mapped environmentally sensitive areas based on review of MassGIS data, except for a small certified vernal pool located in the northeast portion of the site and several other potential vernal pools. The site is not within any regulatory floodways (i.e., no 100-yr. floodplains, see attached Flood Insurance Rate Map), state-designated Outstanding Resource Waters, Areas of Critical Environmental Concern (see attached map), Zone II of public wells or Zone A of public water supplies, or priority habitat of endangered or rare species as mapped by the MA Division of Fisheries and Wildlife (see attached map).

The wetlands on the site have been delineated with most of the bordering vegetated wetlands approved via 2 Orders of Resource Area Delineation issued by the Medway Conservation Commission. The wetlands cover much of the interior portions of the site, and drain off-site to the northwest, northeast and southwest through three (3) different intermittent streams. Other discharge points are located along the west boundary of the

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site, towards the Winthrop Street drainage system and an isolated wetland. As such, the site was delineated into several sub-catchment areas, and runoff conditions were calculated at 5 design discharge points, representing the flow to each of the wetland areas and 2 areas near Winthrop Street (please refer to Appendix A-1 for Pre-Development Drainage Calcs and Appendix C for the Pre-Development Watershed Plan). These areas were delineated as a result of field investigations and review of the topography.

# **Section 3.0: Proposed Development**

Timber Crest Estates is a planned unit development with two separate independent neighborhoods, which are bisected by wetlands and open space. The project consists of 188 housing units, including 72 single family homes on the west portion of the site and 116 condominiums on the east portion of the site. The project has a subdivision roadway entrance for the single family house lots off of Winthrop Street, directly opposite from Stephanie Road. The subdivision roadways loop through the western portion of the site, ending in a cul de sac with an emergency access connecting to Ohlson Circle. The subdivision will be serviced by town sewer and water mains. Underground cable utilities and natural gas are also to be provided.

The eastern portion of the site containing the condominiums proposes a private roadway system that will connect Fairway Lane to the end of Fern Path. The condominiums will also be serviced by town sewer, requiring a pump station that will be privately maintained by the condominium association. Town water mains are proposed to be extended to these condos also, with underground cable utilities and natural gas also to be provided.

Several wetland crossings will be required to provide two access points for each portion of the development. Wetland replication areas will be provided at a ratio of 2:1. The site design features sustainable development technologies to minimize the impact on the environment. It utilizes several low impact/sustainable development techniques in the site design and stormwater management including the following:

- Narrower roadways and short driveways to reduce impervious area (porous pavement may also be utilized for parking),
- Roof drains, bioretention areas or rain gardens, and grass swales are planned or may be incorporated into the final design to the extent practicable.
- Stormwater infiltration basins and detention basins are proposed to control the majority of site runoff.

All stormwater runoff will be collected along roadway gutter-lines and directed to deep sump catch basins and/or swales. Runoff will then be directed to detention and infiltration basins which will store and infiltrate the runoff and slowly release it at a reduced flow rate from existing conditions. Some of the runoff will be discharged into the underlying soil thus providing recharge to the local aquifer. Refer to Appendix A-2 for the post-development runoff calculations and Appendix C for the watershed map.

# Section 4.0: Drainage Design Methodology

To determine changes in storm runoff for the proposed project, the HydroCAD Stormwater Modeling System software was used. This software closely approximates the USDA Soil Conservation Service (SCS) TR-20 methodology for calculating runoff. The calculations determined the change in the existing and post-development runoff rates to each drainage area for each of the 2 year, 10 year, and 100 year storm events. All storm events analyzed comply with Technical Paper-40 (Rainfall Frequency Atlas of the United States) Rainfall Data.

The final project design will fully comply with the Department of Environmental Protections (DEP) Stormwater Management Regulations, incorporating a number of Best Management Practices (BMP's) for water quality, recharge and runoff control. These preliminary calculations document compliance with rate control and sizing of the detention and infiltration systems to be utilized. Other calculations regarding pretreatment, water quality, and recharge volumes will be provided as design progresses. The appendices contain detailed runoff calculations for each drainage area, storage volume calculations, and pre-and post-development drainage maps.

The preliminary design includes the following, which may be modified as the design is finalized:

- Soil test pits will need to be conducted to document soil types and groundwater conditions that we've assumed at this time based on NRCS soils maps (refer to Appendix B) and the site topography and wetland locations.
- Infiltration basins are used extensively on the subdivision area of the site, where
  permeable sand and gravel soils (Hydrologic Soil Group A) are shown on the
  NRCS maps. Generally the condominium portion of the site utilizes detention
  basins where less permeable soils are listed.
- Roof drains will be used at the back roof areas of certain lots in the subdivision area that drain toward the central wetland area, and for back roof areas of all the condominium homes.
- Although some areas of porous pavement are shown for visitor parking on the site
  plans for the condominiums, these areas have been treated as impervious area in
  the drainage calculations. If utilized in final design, these porous pavement areas
  would further reduce offsite runoff rates and volumes.

# Section 5.0: Summary of Results

In accordance with the DEP requirements, drainage basins have been incorporated into the storm water design to control runoff for the 2 year, 10 year, and 100 year storm events below existing conditions. There are 5 off-site design points that were analyzed with a summary of runoff rates as follows.

# Comparison of Pre- & Post-Development Runoff Rates

Design Point 1 - To Wetlands @ Winthrop Street

	Pre development	Post development
	Rate	Rate
• To Design Point 1	1.12 cfs	0.66 cfs
10 Year Storm (4.70")  • To Design Point 1	4.65 cfs	3.51 cfs
• To Design Point 1	11.27 cfs	7.87 cfs

Design Point 2 - To Stream North

	Pre development	Post development
	Rate	Rate
• To Design Point 2	0.01 cfs	0.01 cfs
10 Year Storm (4.70")  • To Design Point 2	0.35 cfs	0.15 cfs
• To Design Point 2	4.45 cfs	2.70 cfs

**Design Point 3 - To Isolated Wetlands Onsite** 

	Pre development	Post development
·	Rate	Rate
• To Design Point 3	0.00 cfs	0.00 cfs
10 Year Storm (4.70")  • To Design Point 3	0.00 cfs	0.00 cfs
100 Year Storm (7.00")  ● To Design Point 3	0.13 cfs	0.11 cfs

# Design Point 4 - To Central Wetlands/Swamp Onsite

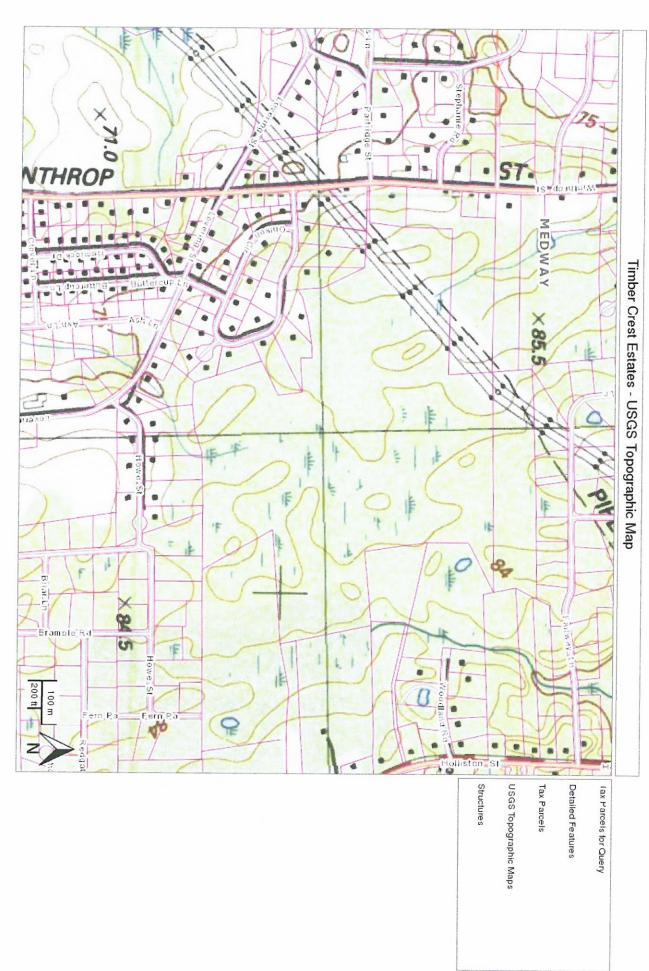
	Pre development	Post development
	Rate	Rate
<ul><li>2 Year Storm (3.40")</li><li>To Design Point 3</li></ul>	0.74 cfs	0.71 cfs
10 Year Storm (4.70")  • To Design Point 3	5.43 cfs	4.69 cfs
100 Year Storm (7.00")  • To Design Point 3	20.70 cfs	16.75 cfs

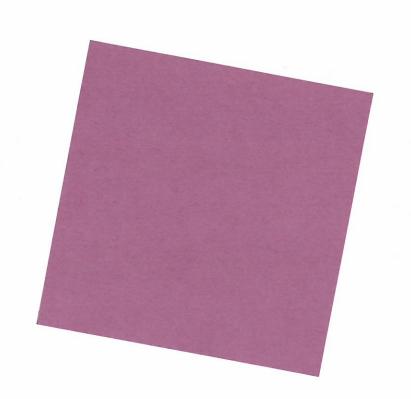
# Design Point 5 - To East Wetlands

	Pre development	Post development
	Rate	Rate
<ul><li>Year Storm (3.40")</li><li>To Design Point 3</li></ul>	2.07 cfs	1.18 cfs
10 Year Storm (4.70")  • To Design Point 3	5.94 cfs	4.64 cfs
100 Year Storm (7.00")  • To Design Point 3	17.93 cfs	15.53 cfs

	0					

3/17/2016



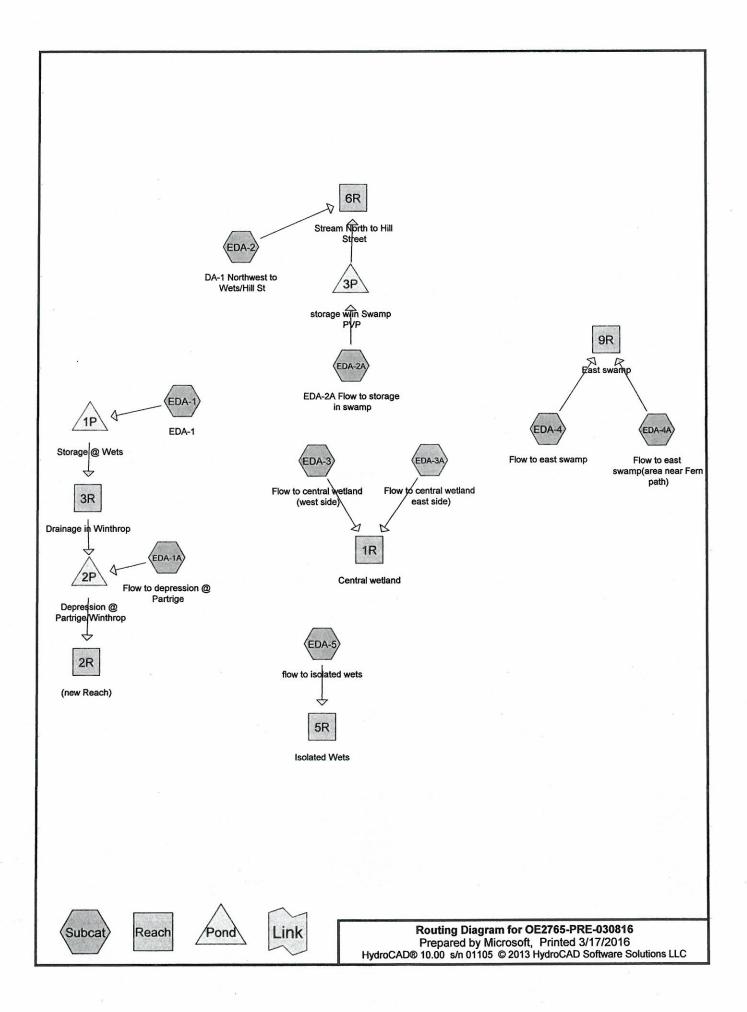






Appendix A-1
EXISTING HYDROLOGY CALCULATIONS
(STANDARD #2)

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# OE2765-PRE-030816

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# Summary for Subcatchment EDA-1: EDA-1

Runoff

1.12 cfs @ 12.43 hrs, Volume=

0.197 af, Depth= 0.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Type III 24-hr 2-Yr Storm Rainfall=3.20"

_	A	rea (sf)	CN [	Description									
	1	26,847	70 V	70 Woods, Good, HSG C									
		47,785	79 1	79 1 acre lots, 20% imp, HSG C									
		25,570											
75,185 30 Woods, Good, HSG A													
	2	75,387	59 V	Veighted A	verage								
	2	60,716	9	4.67% Per	vious Area								
		14,671	5	.33% Impe	ervious Area	a							
	Тс	Length	Slope	Velocity	Capacity	Description							
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)								
	12.3	50	0.0200	0.07		Sheet Flow,							
						Woods: Light underbrush n= 0.400 P2= 3.20"							
	6.2	360	0.0380	0.97		Shallow Concentrated Flow,							
_				230		Woodland Kv= 5.0 fps							
	18.5	410	Total										

# Summary for Subcatchment EDA-1A: Flow to depression @ Partrige

Runoff

0.04 cfs @ 12.99 hrs, Volume=

0.022 af, Depth= 0.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Type III 24-hr 2-Yr Storm Rainfall=3.20"

	Area (sf)	CN	Description		47					
	35,109	30	Woods, Go	od, HSG A		_				
	34,369	51	1 acre lots,	20% imp, I	HSG A					
	21,736	HSG C								
	91,214 50 Weighted Average									
	79,993		87.70% Pei							
	11,221		12.30% Imp	pervious Ar	ea					
To (min)		Slope (ft/ft)		Capacity (cfs)	Description					
10.5	50	0.0300	0.08		Sheet Flow,					
10.4	650	0.0430	1.04		Woods: Light underbrush n= 0.400 P2= 3.20"  Shallow Concentrated Flow,  Woodland Kv= 5.0 fps					
20.9	700	Total								

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# Summary for Subcatchment EDA-2: DA-1 Northwest to Wets/Hill St

Runoff

0.01 cfs @ 15.08 hrs, Volume=

0.008 af, Depth= 0.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Type III 24-hr 2-Yr Storm Rainfall=3.20"

_	Α	rea (sf)	CN I	Description		1463 6 483
		44,037	30 \	Noods, Go	od, HSG A	
		28,000	70. \	Noods, Go	od, HSG C	
•		72,037	46 \	Neighted A	verage	
		72,037		100.00% Pe	ervious Are	a
	Tc (min)	Length (feet)	Slope (ft/ft)		Capacity (cfs)	Description
•	3.9	50	0.0500	0.21		Sheet Flow,
	3.5	210	0.0400	1.00		Grass: Short n= 0.150 P2= 3.20"  Shallow Concentrated Flow,  Woodland Kv= 5.0 fps
-	7.4	260	Total			

# Summary for Subcatchment EDA-2A: EDA-2A Flow to storage in swamp

Runoff

0.16 cfs @ 14.94 hrs, Volume=

0.097 af, Depth= 0.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Type III 24-hr 2-Yr Storm Rainfall=3.20"

9800	Α	rea (sf)	CN E	Description			
	4	40,524	30 V	Voods, Go	od, HSG A		
	2	10,830	77 V	Voods, Go			
		43,003	70 V	Voods, Go	od, HSG C		(*)
8	6	94,357		Veighted A			
	6	94,357	1	00.00% Pe			
	Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description	
	7.1	50	0.0800	0.12		Sheet Flow, Woods: Light underbrush n= 0.400	P2= 3.20"
	8.9	395	0.0220	0.74		Shallow Concentrated Flow, Woodland Kv= 5.0 fps	1 2- 0.20
	16.0	445	Total				

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# Summary for Subcatchment EDA-3: Flow to central wetland (west side)

Runoff

= 0.01 cfs @ 23.99 hrs, Volume=

0.004 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Type III 24-hr 2-Yr Storm Rainfall=3.20"

A	rea (sf)	CN	Description			
5	85,808	30	Woods, Go	od, HSG A		***
1	17,238	70.	Woods, Go	od, HSG C		
	63,848	77 '	Woods, Go	od, HSG D		
	766,894 766,894		Weighted A 100.00% Po		a	
Tc (min)	Length (feet)	Slope (ft/ft)		Capacity (cfs)	Description	
16.3	50	0.0100	0.05		Sheet Flow, AB	
 6.6	325	0.0270	0.82		Woods: Light underbrush n= 0.400 P2= 3.20"  Shallow Concentrated Flow, BC  Woodland Kv= 5.0 fps	
22.9	375	Total				

# Summary for Subcatchment EDA-3A: Flow to central wetland east side)

Runoff

= 0

0.74 cfs @ 12.58 hrs, Volume=

0.220 af, Depth= 0.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Type III 24-hr 2-Yr Storm Rainfall=3.20"

_	A	rea (sf)	CN [	Description		
	2	71,480	30 \	Noods, Go	od, HSG A	
	2	10,377	70 ١	Voods, Go	od, HSG C	
		99,197	77 ١	Voods, Go	od, HSG D	
581,054 53 Weighted Average						
	5	81,054		100.00% Pe	ervious Are	a
	Tc	Length	Slope	Velocity	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	16.3	50	0.0100	0.05		Sheet Flow, ab
						Woods: Light underbrush n= 0.400 P2= 3.20"
	3.0	145	0.0260	0.81		Shallow Concentrated Flow, bc
_		100			Mark Charles And Back Laplace	Woodland Kv= 5.0 fps
	19.3	195	Total			

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# Summary for Subcatchment EDA-4: Flow to east swamp

Runoff

0.10 cfs @ 14.92 hrs, Volume=

0.066 af, Depth= 0.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Type III 24-hr 2-Yr Storm Rainfall=3.20"

	Α	rea (sf)	CN I	Description							
	2	77,589	30 \	Noods, Go	od, HSG A						
	1	73,077	70. \	Noods, Go	od, HSG C						
-		18,524	77 \	Noods, Go	od, HSG D						
10000	4	69,190	47	Neighted A	verage						
	4	69,190	•	100.00% Pe	00.00% Pervious Area						
	ES - 61	W 558-0	1 DESIGN	100 C							
	Tc	Length	Slope		Capacity	Description					
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)						
	10.5	50	0.0300	0.08		Sheet Flow, AB					
						Woods: Light underbrush n= 0.400 P2= 3.20"					
	4.5	235	0.0300	0.87		Shallow Concentrated Flow, BC					
14.00						Woodland Kv= 5.0 fps					
	15.0	285	Total								

# Summary for Subcatchment EDA-4A: Flow to east swamp(area near Fern path)

Runoff

2.07 cfs @ 12.21 hrs, Volume=

0.210 af, Depth= 0.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Type III 24-hr 2-Yr Storm Rainfall=3.20"

_	Α	rea (sf)	CN	Description		
	1	06,159	70	Woods, Go	od, HSG C	
		18,576	77 '	Woods, Go	od, HSG D	
	124,735 71 Weighted Average 124,735 100.00% Pervious					a
	Tc (min)	Length (feet)	Slope (ft/ft)		Capacity (cfs)	Description
88	11.3	50	0.0250	0.07		Sheet Flow, AB
	2.5	285	0.1500	1.94	4	Woods: Light underbrush n= 0.400 P2= 3.20"  Shallow Concentrated Flow, BC  Woodland Kv= 5.0 fps
	13.8	335	Total			

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# Summary for Subcatchment EDA-5: flow to isolated wets

[45] Hint: Runoff=Zero

Runoff

0.00 cfs @ 5.00 hrs, Volume=

0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Type III 24-hr 2-Yr Storm Rainfall=3.20"

_	Α	rea (sf)	CN E	Description			
	2	260,619	30 V	Voods, Go	od, HSG A		
	260,619		1	00.00% P	ervious Are	a	
lia-	Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description	
	10.5	50	0.0300	0.08		Sheet Flow,	
2500	3.9	210	0.0330	0.91		Woods: Light underbrush n= 0.400 P2= 3.20"  Shallow Concentrated Flow,  Woodland Kv= 5.0 fps	
	14.4	260	Total	0.0000000000000000000000000000000000000			

# Summary for Reach 1R: Central wetland

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

Inflow Area =

30.945 ac, 0.00% Impervious, Inflow Depth = 0.09" for 2-Yr Storm event

Inflow Outflow 0.74 cfs @ 12.58 hrs, Volume=

0.74 cfs @ 12.58 hrs. Volume=

0.224 af 0.224 af. Atten= 0%. Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs

# Summary for Reach 2R: (new Reach)

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

Inflow Area =

8.416 ac, 7.06% Impervious, Inflow Depth = 0.11" for 2-Yr Storm event

Inflow

0.29 cfs @ 13.36 hrs, Volume=

0.075 af

Outflow

0.29 cfs @ 13.36 hrs, Volume=

0.075 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-30.00 hrs. dt= 0.05 hrs.

# Summary for Reach 3R: Drainage in Winthrop

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

Inflow Area =

6.322 ac, 5.33% Impervious, Inflow Depth = 0.11" for 2-Yr Storm event

Inflow

0.26 cfs @ 13.33 hrs, Volume=

0.057 af

Outflow

0.26 cfs @ 13.33 hrs, Volume=

0.057 af, Atten= 0%, Lag= 0.0 min

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Routing by Stor-Ind+Trans method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs

#### Summary for Reach 5R: Isolated Wets

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

Inflow Area = 5.983 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-Yr Storm event

Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs

#### Summary for Reach 6R: Stream North to Hill Street

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

Inflow Area = 17.594 ac, 0.00% Impervious, Inflow Depth = 0.01" for 2-Yr Storm event

Inflow = 0.01 cfs @ 15.08 hrs, Volume= 0.008 af

Outflow = 0.01 cfs @ 15.08 hrs, Volume= 0.008 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs

#### Summary for Reach 9R: East swamp

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

Inflow Area = 13.635 ac, 0.00% Impervious, Inflow Depth = 0.24" for 2-Yr Storm event

Inflow = 2.07 cfs @ 12.21 hrs, Volume= 0.275 af

Outflow = 2.07 cfs @ 12.21 hrs, Volume= 0.275 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs

# Summary for Pond 1P: Storage @ Wets

Inflow Area = 6.322 ac, 5.33% Impervious, Inflow Depth = 0.37" for 2-Yr Storm event

Inflow = 1.12 cfs @ 12.43 hrs, Volume= 0.197 af

Outflow = 0.36 cfs @ 13.33 hrs, Volume= 0.182 af, Atten= 67%, Lag= 54.4 min

Discarded = 0.10 cfs @ 13.33 hrs, Volume= 0.125 af Primary = 0.26 cfs @ 13.33 hrs, Volume= 0.057 af

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Peak Elev= 260.05' @ 13.33 hrs Surf.Area= 4,179 sf Storage= 2,412 cf

Plug-Flow detention time= 220.6 min calculated for 0.182 af (92% of inflow) Center-of-Mass det. time= 185.2 min (1,123.1 - 938.0)

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Volume	Invert	Avail.St	orage	Storage Description						
#1 259.00' 8,718 cf				Custom Stage Data (Irregular) Listed below (Recalc)						
Elevation (fee	et)	(sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)				
259.0		850	120.0	0	0	850				
261.0	00	9,400	360.0	8,718	8,718	10,030				
Device	Routing	Inver	t Outle	et Devices						
#1	Discarded	259.00	1.02	0 in/hr Exfiltration	over Surface area					
#2	Primary	260.00	10.0' long x 12.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64							

Discarded OutFlow Max=0.10 cfs @ 13.33 hrs HW=260.05' (Free Discharge) 1=Exfiltration (Exfiltration Controls 0.10 cfs)

Primary OutFlow Max=0.26 cfs @ 13.33 hrs HW=260.05' (Free Discharge) 2=Broad-Crested Rectangular Weir (Weir Controls 0.26 cfs @ 0.56 fps)

# Summary for Pond 2P: Depression @ Partrige/Winthrop

Inflow Area :	= 8.416 ac,	7.06% Impervious, I	nflow Depth = 0.1	1" for 2-Yr Storm event
Inflow =		13.33 hrs, Volume=		
Outflow =	0.30 cfs @	13.36 hrs, Volume=	0.080 af,	Atten= 0%, Lag= 1.9 min
Discarded =	0.01 cfs @	13.36 hrs, Volume=		## Hard Color   110, 100   100
Primary =	0.29 cfs @	13.36 hrs, Volume=	0.075 af	

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Peak Elev= 254.48' @ 13.36 hrs Surf.Area= 179 sf Storage= 29 cf

Plug-Flow detention time= 2.1 min calculated for 0.080 af (100% of inflow) Center-of-Mass det. time= 2.1 min ( 934.2 - 932.1 )

Volume	Invert	Avail	.Storage	Storage Description						
#1	254.00'		6,459 cf	Custom Stage Da	ata (Irregular) List	ed below (Recalc)				
Elevatio (fee		ırf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)				
254.0	254.00 0 0.0		0.0	0	0	0				
255.5	0	1,720	170.0	860	860	2,303				
257.0	0	6,210	300.0	5,599	6,459	7,178				
Device	Routing	Inv	ert Outle	et Devices						
#1	Discarded	254.	00' 2.41	0 in/hr Exfiltration	over Surface are	a				
#2	Primary	254.	20' <b>12.0</b> '	20' 12.0" Round Culvert						
				L= 10.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 254.20' / 254.00' S= 0.0200 '/' Cc= 0.900						

n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

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Discarded OutFlow Max=0.01 cfs @ 13.36 hrs HW=254.48' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.29 cfs @ 13.36 hrs HW=254.48' (Free Discharge) 2=Culvert (Inlet Controls 0.29 cfs @ 1.60 fps)

### Summary for Pond 3P: storage w/in Swamp PVP

Inflow Area = 15.940 ac, 0.00% Impervious, Inflow Depth = 0.07" for 2-Yr Storm event
Inflow = 0.16 cfs @ 14.94 hrs, Volume= 0.097 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Peak Elev= 274.14' @ 24.95 hrs Surf.Area= 32,288 sf Storage= 4,225 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)

Center-of-Mass det. time= (not calculated: no outflow)

Volume	Inv	ert Ava	il.Storage	Storage Description						
#1	274.0	00'	48,566 cf	Custom Stage Da	ata (Irregular) List	ted below (Recalc)				
Elevatio (feet		Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)				
274.0	0	27,000	1,100.0	0	0	27,000				
275.0	0	74,000	1,890.0	48,566	48,566	214,976				
Device	Routing	In	vert Outle	et Devices						
#1	Primary	274	74.50' 50.0' long x 50.0' breadth Broad-Crested Rectangular Weir							
			Head	d (feet) 0.20 0.40	0.60 0.80 1.00	1.20 1.40 1.60				
			Coef	f. (English) 2.68 2	2.70 2.70 2.64 2.	63 2.64 2.64 2.63				

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=274.00' (Free Discharge) 1=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

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#### Summary for Subcatchment EDA-1: EDA-1

Runoff = 4.65 cfs @ 12.30 hrs, Volume=

0.563 af, Depth= 1.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Type III 24-hr 10-Yr Storm Rainfall=4.70"

_	Α	rea (sf)	CN E	Description						
	1	26,847	70 V	Voods, Go	od, HSG C					
		47,785	79 1	acre lots,	20% imp, H	HSG C				
		25,570			20% imp, H					
70-		75,185		Woods, Good, HSG A						
	2	275,387 59 Weighted Average								
	2	60,716	9	4.67% Per	vious Area					
		14,671	5	.33% Impe	ervious Area	a				
	Tc	Length	Slope	Velocity	Capacity	Description				
-	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)					
	12.3	50	0.0200	0.07		Sheet Flow,				
						Woods: Light underbrush n= 0.400 P2= 3.20"				
	6.2	360	0.0380	0.97		Shallow Concentrated Flow,				
						Woodland Kv= 5.0 fps				
	18.5	410	Total							

# Summary for Subcatchment EDA-1A: Flow to depression @ Partrige

Runoff = 0.57 cfs @ 12.45 hrs, Volume=

0.100 af, Depth= 0.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Type III 24-hr 10-Yr Storm Rainfall=4.70"

	A	rea (sf)	CN [	Description		
		35,109	30 V	Voods, Go	od, HSG A	
		34,369	51 1	acre lots,	20% imp, I	HSG A
102		21,736	79 1	acre lots,	20% imp, I	HSG C
		91,214	50 V	Veighted A	verage	
		79,993	8	7.70% Per	vious Area	
		11,221	1	2.30% Imp	pervious Ar	ea
	Tc	Length	Slope	Velocity	Capacity	Description
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	10.5	50	0.0300	0.08		Sheet Flow,
						Woods: Light underbrush n= 0.400 P2= 3.20"
	10.4	650	0.0430	1.04		Shallow Concentrated Flow,
						Woodland Kv= 5.0 fps
	20.9	700	Total		55000	

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# Summary for Subcatchment EDA-2: DA-1 Northwest to Wets/Hill St

Runoff

=

0.28 cfs @ 12.34 hrs, Volume=

0.054 af, Depth= 0.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Type III 24-hr 10-Yr Storm Rainfall=4.70"

<i>F</i>	rea (sf)	CN	Description				
	44,037	30	Woods, Go	od, HSG A			
	28,000	70	Woods, Go	od, HSG C			
	72,037	46	Weighted A	verage			
	72,037 100.00% Pervious Area						
Tc	Length	Slope		Capacity	Description		
<u>(min)</u>	(feet)	(ft/ft)	(ft/sec)	(cfs)			
3.9	50	0.0500	0.21		Sheet Flow,		
					Grass: Short n= 0.150 P2= 3.20"		
3.5	210	0.0400	1.00		Shallow Concentrated Flow,		
					Woodland Kv= 5.0 fps		
7.4	260	Total					

# Summary for Subcatchment EDA-2A: EDA-2A Flow to storage in swamp

Runoff

=

2.90 cfs @ 12.45 hrs, Volume=

0.579 af, Depth= 0.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Type III 24-hr 10-Yr Storm Rainfall=4.70"

A	rea (sf)	CN [	Description			
4	40,524	30 \	Voods, Go	od, HSG A		
2	10,830	77 \	Voods, Go	od, HSG D		
	43,003	70 \	Noods, Go	od, HSG C		
6	94,357	47 \	<b>Neighted</b> A	verage		
6	94,357	1	100.00% Pe	ervious Are	a	
9 <u></u>	125 1250					
					Description	
	(feet)		(ft/sec)	(cfs)		
7.1	50	0.0800	0.12		Sheet Flow,	
					Woods: Light underbrush n= 0.400 P:	2= 3.20"
8.9	395	0.0220	0.74		Shallow Concentrated Flow,	
					Woodland Kv= 5.0 fps	
16.0	445	Total				
	7.1 8.9	(min)         (feet)           7.1         50           8.9         395	440,524 30 \\ 210,830 77 \\ 43,003 70 \\ 694,357 47 \\ 694,357 1  Tc Length Slope (min) (feet) (ft/ft)  7.1 50 0.0800  8.9 395 0.0220	440,524 30 Woods, Go 210,830 77 Woods, Go 43,003 70 Woods, Go 694,357 47 Weighted A 694,357 100.00% Pe Tc Length Slope Velocity (min) (feet) (ft/ft) (ft/sec) 7.1 50 0.0800 0.12 8.9 395 0.0220 0.74	440,524 30 Woods, Good, HSG A 210,830 77 Woods, Good, HSG D 43,003 70 Woods, Good, HSG C 694,357 47 Weighted Average 694,357 100.00% Pervious Are  Tc Length Slope Velocity Capacity (min) (feet) (ft/ft) (ft/sec) (cfs) 7.1 50 0.0800 0.12  8.9 395 0.0220 0.74	440,524 30 Woods, Good, HSG A 210,830 77 Woods, Good, HSG D 43,003 70 Woods, Good, HSG C  694,357 47 Weighted Average 694,357 100.00% Pervious Area  Tc Length Slope Velocity Capacity (ft/ft) (ft/sec) (cfs)  7.1 50 0.0800 0.12 Sheet Flow, Woods: Light underbrush n= 0.400 P. 8.9 395 0.0220 0.74 Shallow Concentrated Flow, Woodland Kv= 5.0 fps

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# Summary for Subcatchment EDA-3: Flow to central wetland (west side)

Runoff

=

0.43 cfs @ 13.84 hrs, Volume=

0.254 af, Depth= 0.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Type III 24-hr 10-Yr Storm Rainfall=4.70"

	Α	rea (sf)	CN [	Description		
	5	85,808	30 \	Noods, Go	od, HSG A	
	1	17,238	70 \	Woods, Go	od, HSG C	
_		63,848	77 \	Noods, Go	od, HSG D	
	766,894 40 Weighted Average					
	7	66,894		100.00% Pe	ervious Are	a
	Тс	Length	Slope		Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	16.3	50	0.0100	0.05		Sheet Flow, AB
						Woods: Light underbrush n= 0.400 P2= 3.20"
	6.6	325	0.0270	0.82		Shallow Concentrated Flow, BC
_						Woodland Kv= 5.0 fps
9.00	22.9	375	Total		1 1025 25 20	

# Summary for Subcatchment EDA-3A: Flow to central wetland east side)

Runoff

=

5.42 cfs @ 12.37 hrs, Volume=

0.807 af, Depth= 0.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Type III 24-hr 10-Yr Storm Rainfall=4.70"

A	rea (sf)	CN E	Description		
2	71,480	30 V	Voods, Go	od, HSG A	
2	10,377	70 V	Voods, Go	od, HSG C	
	99,197	77 V	Voods, Go	od, HSG D	
581,054 53 Weighted Average					
581,054 100.00% Pervious Area				ervious Are	a
Tc	Length	Slope		Capacity	Description
 (min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
16.3	50	0.0100	0.05		Sheet Flow, ab
					Woods: Light underbrush n= 0.400 P2= 3.20"
3.0	145	0.0260	0.81		Shallow Concentrated Flow, bc
		11			Woodland Kv= 5.0 fps
19.3	195	Total			

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# Summary for Subcatchment EDA-4: Flow to east swamp

Runoff

1.98 cfs @ 12.44 hrs, Volume=

0.391 af, Depth= 0.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Type III 24-hr 10-Yr Storm Rainfall=4.70"

_	A	rea (sf)	CN I	Description		
	2	77,589	30 \	Noods, Go	od, HSG A	
	1	73,077	70 \	Noods, Go	od, HSG C	
_		18,524	77 ١	Noods, Go	od, HSG D	
	4	69,190	47 \	Neighted A	verage	
	4	69,190			ervious Are	a
	Тс	Length	Slope	Velocity	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	10.5	50	0.0300	0.08		Sheet Flow, AB
						Woods: Light underbrush n= 0.400 P2= 3.20"
	4.5	235	0.0300	0.87		Shallow Concentrated Flow, BC
_						Woodland Kv= 5.0 fps
	15.0	285	Total			

# Summary for Subcatchment EDA-4A: Flow to east swamp(area near Fern path)

Runoff

4.82 cfs @ 12.20 hrs, Volume=

0.452 af, Depth= 1.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Type III 24-hr 10-Yr Storm Rainfall=4.70"

A	rea (st)	CN	Description		
1	106,159		Woods, Go		
_	18,576		Woods, Go		
	124,735 124,735		Weighted A 100.00% Pe	ea	
Tc (min)	Length (feet)	Slope (ft/ft)		Capacity (cfs)	Description
11.3	50	0.0250	0.07		Sheet Flow, AB Woods: Light underbrush n= 0.400 P2= 3.20"
2.5	285	0.1500	1.94		Shallow Concentrated Flow, BC Woodland Kv= 5.0 fps
13.8	335	Total			

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#### Summary for Subcatchment EDA-5: flow to isolated wets

Runoff

0.00 cfs @ 24.06 hrs, Volume=

0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Type III 24-hr 10-Yr Storm Rainfall=4.70"

Area (sf)		CN D	escription				
260,619		30 V	Woods, Good, HSG A				
260,619		1	00.00% Pe	ervious Are	а		
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description		
10.5	50	0.0300	0.08		Sheet Flow,		
3.9	210	0.0330	0.91		Woods: Light underbrush n= 0.400 P2= 3.20"  Shallow Concentrated Flow,  Woodland Kv= 5.0 fps		
14.4	260	Total					

#### Summary for Reach 1R: Central wetland

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

Inflow Area =

30.945 ac, 0.00% Impervious, Inflow Depth = 0.41" for 10-Yr Storm event

1.061 af

Inflow

Outflow

5.43 cfs @ 12.37 hrs, Volume= 5.43 cfs @ 12.37 hrs, Volume=

1.061 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs

# Summary for Reach 2R: (new Reach)

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

Inflow Area =

8.416 ac, 7.06% Impervious, Inflow Depth = 0.70" for 10-Yr Storm event

Inflow

3.43 cfs @ 12.63 hrs, Volume=

0.494 af

Outflow

3.43 cfs @ 12.63 hrs, Volume=

0.494 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs

# Summary for Reach 3R: Drainage in Winthrop

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

Inflow Area =

6.322 ac, 5.33% Impervious, Inflow Depth = 0.78" for 10-Yr Storm event 3.91 cfs @ 12.45 hrs. Volume=

0.410 af

Outflow =

Inflow

3.91 cfs @ 12.45 hrs, Volume=

0.410 af, Atten= 0%, Lag= 0.0 min

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Routing by Stor-Ind+Trans method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs

# Summary for Reach 5R: Isolated Wets

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

Inflow Area = 5.983 ac, 0.00% Impervious, Inflow Depth = 0.00" for 10-Yr Storm event

Inflow = 0.00 cfs @ 24.06 hrs, Volume= 0.000 af

Outflow = 0.00 cfs @ 24.06 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs

# Summary for Reach 6R: Stream North to Hill Street

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

Inflow Area = 17.594 ac, 0.00% Impervious, Inflow Depth > 0.14" for 10-Yr Storm event

Inflow = 0.35 cfs @ 19.59 hrs, Volume= 0.210 af

Outflow = 0.35 cfs @ 19.59 hrs, Volume= 0.210 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs

# Summary for Reach 9R: East swamp

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

Inflow Area = 13.635 ac, 0.00% Impervious, Inflow Depth = 0.74" for 10-Yr Storm event

Inflow = 5.94 cfs @ 12.25 hrs, Volume= 0.843 af

Outflow = 5.94 cfs @ 12.25 hrs, Volume= 0.843 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs

# Summary for Pond 1P: Storage @ Wets

Inflow Area = 6.322 ac, 5.33% Impervious, Inflow Depth = 1.07" for 10-Yr Storm event

Inflow = 4.65 cfs @ 12.30 hrs, Volume= 0.563 af

Outflow = 4.03 cfs @ 12.45 hrs, Volume= 0.545 af, Atten= 13%, Lag= 8.6 min

Discarded = 0.12 cfs @ 12.45 hrs, Volume= 0.135 af Primary = 3.91 cfs @ 12.45 hrs, Volume= 0.410 af

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Peak Elev= 260.28' @ 12.45 hrs Surf.Area= 5,279 sf Storage= 3,528 cf

Plug-Flow detention time= 82.9 min calculated for 0.544 af (97% of inflow) Center-of-Mass det. time= 66.7 min ( 961.8 - 895.2 )

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Volume	Invert	Avail.	Storage	Storage Description	1	-			
#1	259.00'	8,718 cf		Custom Stage Data (Irregular) Listed below (Recalc)					
Elevation Su		rf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)			
259.0 261.0		850 9,400	120.0 360.0	0 8,718	0 8,718	850 10,030			
Device	Routing	Inve	ert Outle	et Devices			2000		
#1	Discarded 259.0			1.020 in/hr Exfiltration over Surface area					
#2 Primary 260.00'			Head	10.0' long x 12.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64					

Discarded OutFlow Max=0.12 cfs @ 12.45 hrs HW=260.28' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.12 cfs)

Primary OutFlow Max=3.90 cfs @ 12.45 hrs HW=260.28' (Free Discharge) 2=Broad-Crested Rectangular Weir (Weir Controls 3.90 cfs @ 1.38 fps)

# Summary for Pond 2P: Depression @ Partrige/Winthrop

Inflow Area =	8.416 ac,	7.06% Impervious, Inflow	Depth = $0.73$ " fo	r 10-Yr Storm event
Inflow =	4.47 cfs @	12.45 hrs, Volume=	0.510 af	
Outflow =	3.56 cfs @	12.63 hrs, Volume=	0.510 af, Atten=	20%, Lag= 11.0 min
Discarded =	0.13 cfs @	12.63 hrs, Volume=	0.016 af	
Primary =	3.43 cfs @	12.63 hrs, Volume=	0.494 af	

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Peak Elev= 255.76' @ 12.63 hrs Surf.Area= 2,294 sf Storage= 1,376 cf

Plug-Flow detention time= 2.9 min calculated for 0.509 af (100% of inflow) Center-of-Mass det. time= 2.9 min (892.5 - 889.6)

Volume	Invert	vert Avail.Storage Storage Description							
#1	254.00'	6,459 cf		Custom Stage Data (Irregular) Listed below (Recalc)					
Elevatio		rf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)			
254.0 255.5 257.0	60	0 1,720 6,210	0.0 170.0 300.0	0 860 5,599	0 860 6,459	0 2,303 7,178			
Device	Routing	Inve	ert Outle	Outlet Devices					
#1 #2	Discarded 2		0' 12.0'	in/hr Exfiltration over Surface area Round Culvert					
L= 10.0' CPP, mitered to conform to f Inlet / Outlet Invert= 254.20' / 254.00' n= 0.011 Concrete pipe, straight & cle				1.20' / 254.00' S=	0.0200 '/' Cc= 0.900				

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Discarded OutFlow Max=0.13 cfs @ 12.63 hrs HW=255.75' (Free Discharge) 1=Exfiltration (Exfiltration Controls 0.13 cfs)

Primary OutFlow Max=3.43 cfs @ 12.63 hrs HW=255.75' (Free Discharge) 2=Culvert (Inlet Controls 3.43 cfs @ 4.36 fps)

# Summary for Pond 3P: storage w/in Swamp PVP

Inflow Area = 15.940 ac, 0.00% Impervious, Inflow Depth = 0.44" for 10-Yr Storm event Inflow = 2.90 cfs @ 12.45 hrs, Volume= 0.579 af

Outflow = 0.32 cfs @ 19.64 hrs, Volume= 0.156 af, Atten= 89%, Lag= 431.2 min

Primary = 0.32 cfs @ 19.64 hrs, Volume= 0.156 af

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Peak Elev= 274.52' @ 19.64 hrs Surf.Area= 48,421 sf Storage= 19,244 cf

Plug-Flow detention time= 530.5 min calculated for 0.156 af (27% of inflow) Center-of-Mass det. time= 334.2 min (1,286.3 - 952.2)

Volume	Invert /	Avail.Storage	Storage Description						
#1	274.00'	48,566 cf	Custom Stage Data (Irregular) Listed below (Recalc)						
Elevation (feet)	Surf.Ar (sq-		Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)				
274.00 275.00	27,0 74,0			0 48,566	27,000 214,976				

 Device
 Routing
 Invert
 Outlet Devices

 #1
 Primary
 274.50'
 50.0' long x 50.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.63

Primary OutFlow Max=0.31 cfs @ 19.64 hrs HW=274.52' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 0.31 cfs @ 0.35 fps)

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### Summary for Subcatchment EDA-1: EDA-1

Runoff

=

11.27 cfs @ 12.27 hrs, Volume=

1.212 af, Depth= 2.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Type III 24-hr 100-Yr Storm Rainfall=6.70"

A	rea (sf)	CN E	Description						
	126,847	70 V	Voods, Go	od, HSG C					
	47,785	79 1	acre lots,	20% imp, I	HSG C				
	25,570			20% imp, I					
	75,185	30 V	Voods, Go	od, HSG A					
2	275,387	59 V	Veighted A	verage					
2	260,716	9	4.67% Per	vious Area					
	14,671	5	5.33% Impervious Area						
Тс	Length	Slope	Velocity	Capacity	Description				
<u>(min)</u>	(feet)	(ft/ft)	(ft/sec)	(cfs)					
12.3	50	0.0200	0.07		Sheet Flow,				
					Woods: Light underbrush n= 0.400 P2= 3.20"				
6.2	360	0.0380	0.97		Shallow Concentrated Flow,				
					Woodland Kv= 5.0 fps				
18.5	410	Total							

# Summary for Subcatchment EDA-1A: Flow to depression @ Partrige

Runoff

2.06 cfs @ 12.34 hrs, Volume=

0.262 af, Depth= 1.50"

A	rea (sf)	CN I	Description						
	35,109	30 \	Woods, Good, HSG A						
	34,369		l acre lots,						
*****	21,736		acre lots,						
	91,214	50 \	Veighted A	verage					
	79,993	3	37.70% Per	vious Area	<b>1</b>				
	11,221	1	2.30% Imp	ervious Ar	ea				
			31 mm						
Тс	Length	Slope	Velocity	Capacity	Description				
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)					
10.5	50	0.0300	0.08		Sheet Flow,				
					Woods: Light underbrush n= 0.400 P2= 3.20"				
10.4	650	0.0430	1.04		Shallow Concentrated Flow,				
					Woodland Kv= 5.0 fps				
20.9	700	Total							

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# Summary for Subcatchment EDA-2: DA-1 Northwest to Wets/Hill St

Runoff

=

1.58 cfs @ 12.14 hrs, Volume=

0.162 af, Depth= 1.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Type III 24-hr 100-Yr Storm Rainfall=6.70"

22	Α	rea (sf)	CN I	Description							
0		44,037	30	Woods, Go	Voods, Good, HSG A						
<u> 22.</u>		28,000	70 \	Noods, Go	od, HSG C						
60		72,037	46	Neighted A	verage						
		72,037		100.00% Pe	ervious Are	a					
	Tc (min)	Length (feet)	Slope (ft/ft)		Capacity (cfs)	Description					
	3.9	50	0.0500	0.21		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"					
	3.5	210	0.0400	1.00		Shallow Concentrated Flow, Woodland Kv= 5.0 fps					
	7.4	260	Total								

# Summary for Subcatchment EDA-2A: EDA-2A Flow to storage in swamp

Runoff

13.37 cfs @ 12.27 hrs, Volume=

1.669 af, Depth= 1.26"

	Α	rea (sf)	CN I	Description					
	4	40,524	30	Woods, Good, HSG A					
	2	10,830	77 \	Noods, Go	od, HSG D				
		43,003	70	Noods, Go	od, HSG C				
	6	94,357	47	Neighted A	verage				
	6	94,357		100.00% Pe	ervious Area	a			
	Тс	Length	Slope		Capacity	Description			
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)				
	7.1	50	0.0800	0.12		Sheet Flow,			
						Woods: Light underbrush n= 0.400 P2= 3.20"			
	8.9	395	0.0220	0.74		Shallow Concentrated Flow,			
						Woodland Kv= 5.0 fps			
-	16.0	445	Total						

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# Summary for Subcatchment EDA-3: Flow to central wetland (west side)

Runoff

= 5.50 cfs

5.50 cfs @ 12.51 hrs, Volume=

1.074 af, Depth= 0.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Type III 24-hr 100-Yr Storm Rainfall=6.70"

_	A	rea (sf)	CN [	Description					
	5	85,808	30 \	Woods, Go	od, HSG A				
	1	17,238	70 \	Noods, Go	od, HSG C				
_		63,848	77 \	Noods, Go	od, HSG D				
	7	66,894	40 \	Veighted A	verage				
	7	66,894		100.00% Pervious Area					
	Tc	Length	Slope	Velocity	Capacity	Description			
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)				
	16.3	50	0.0100	0.05		Sheet Flow, AB			
						Woods: Light underbrush n= 0.400 P2= 3.20"			
	6.6	325	0.0270	0.82		Shallow Concentrated Flow, BC			
_						Woodland Kv= 5.0 fps			
	22.9	375	Total						

# Summary for Subcatchment EDA-3A: Flow to central wetland east side)

Runoff

=

16.73 cfs @ 12.30 hrs, Volume=

1.956 af, Depth= 1.76"

	A	rea (sf)	CN [	CN Description						
	2	71,480	30 \	Voods, Go	od, HSG A					
210,377 70 Woods, Good, HSG C					od, HSG C					
		99,197	77 \	Voods, Go	od, HSG D					
581,054 53 Weighted Average										
	5	81,054	1	00.00% Pe	ervious Are	a				
	Тс	Length	Slope		Capacity	Description				
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)					
	16.3	50	0.0100	0.05		Sheet Flow, ab				
						Woods: Light underbrush n= 0.400	P2= 3.20"			
	3.0	145	0.0260	0.81		Shallow Concentrated Flow, bc				
						Woodland Kv= 5.0 fps				
	19.3	195	Total							

Timber Crest Estates, MA Type III 24-hr 100-Yr Storm Rainfall=6.70"

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# Summary for Subcatchment EDA-4: Flow to east swamp

Runoff

9.22 cfs @ 12.26 hrs, Volume=

1.128 af, Depth= 1.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Type III 24-hr 100-Yr Storm Rainfall=6.70"

_	Α	rea (sf)	CN I	Description					
	2	277,589	30 \	Voods, Go	od, HSG A				
	1	73,077	70 \	Voods, Go	od, HSG C				
_		18,524	77 ١	Voods, Go	od, HSG D				
	4	69,190	47 \	Veighted Average					
	4	69,190	1	100.00% Pervious Area					
	Тс	Length	Slope	Velocity	Capacity	Description			
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)				
	10.5	50	0.0300	0.08		Sheet Flow, AB			
						Woods: Light underbrush n= 0.400 P2= 3.20"			
	4.5	235	0.0300	0.87		Shallow Concentrated Flow, BC			
_			17			Woodland Kv= 5.0 fps			
	15.0	285	Total						

# Summary for Subcatchment EDA-4A: Flow to east swamp(area near Fern path)

Runoff

9.03 cfs @ 12.20 hrs, Volume=

0.829 af, Depth= 3.47"

2	A	rea (sf)	CN [	Description					
	1	06,159			od, HSG C				
_		18,576		<u> Voods, Go</u>	od, HSG D				
		24,735		Weighted Average					
	1	24,735	1	100.00% Pe	ervious Are	a			
	Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description			
	11.3	50	0.0250	0.07		Sheet Flow, AB			
	2.5	285	0.1500	1.94	argolic.	Woods: Light underbrush n= 0.400 P2= 3.20"  Shallow Concentrated Flow, BC  Woodland Kv= 5.0 fps			
	13.8	335	Total						

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# Summary for Subcatchment EDA-5: flow to isolated wets

Runoff

0.13 cfs @ 14.85 hrs, Volume=

0.081 af, Depth= 0.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Type III 24-hr 100-Yr Storm Rainfall=6.70"

	Α	rea (sf)	CN D	escription		
	2					
_	2	60,619	1	00.00% Pe	ervious Are	a
	Tc Length Slope Velocity Capacity (min) (feet) (ft/ft) (ft/sec) (cfs)					Description
-	10.5	50	0.0300	0.08		Sheet Flow,
	3.9	210	0.0330	0.91		Woods: Light underbrush n= 0.400 P2= 3.20"  Shallow Concentrated Flow,  Woodland Kv= 5.0 fps
	14.4	260	Total			

### Summary for Reach 1R: Central wetland

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

Inflow Area =

30.945 ac, 0.00% Impervious, Inflow Depth = 1.17" for 100-Yr Storm event

Inflow

20.70 cfs @ 12.35 hrs, Volume=

3.030 af

Outflow

20.70 cfs @ 12.35 hrs, Volume=

3.030 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs

# Summary for Reach 2R: (new Reach)

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

Inflow Area =

8.416 ac. 7.06% Impervious, Inflow Depth = 1.80" for 100-Yr Storm event

Inflow

14.77 cfs @ 12.45 hrs, Volume=

1.261 af

Outflow

14.77 cfs @ 12.45 hrs, Volume=

1.261 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs

# Summary for Reach 3R: Drainage in Winthrop

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

Inflow Area =

6.322 ac, 5.33% Impervious, Inflow Depth = 1.99" for 100-Yr Storm event

Inflow

10.52 cfs @ 12.34 hrs. Volume=

1.048 af

Outflow

10.52 cfs @ 12.34 hrs, Volume=

1.048 af, Atten= 0%, Lag= 0.0 min

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Type III 24-hr 100-Yr Storm Rainfall=6.70" Printed 3/17/2016

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Routing by Stor-Ind+Trans method, Time Span= 5.00-30.00 hrs. dt= 0.05 hrs.

# Summary for Reach 5R: Isolated Wets

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

Inflow Area =

5.983 ac, 0.00% Impervious, Inflow Depth = 0.16"

for 100-Yr Storm event

Inflow

Outflow

0.13 cfs @ 14.85 hrs, Volume= 0.13 cfs @ 14.85 hrs, Volume=

0.081 af 0.081 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs

# Summary for Reach 6R: Stream North to Hill Street

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

Inflow Area =

17.594 ac, 0.00% Impervious, Inflow Depth > 0.96" for 100-Yr Storm event

Inflow Outflow

4.45 cfs @ 12.88 hrs, Volume= 4.45 cfs @ 12.88 hrs, Volume=

1.409 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs

# Summary for Reach 9R: East swamp

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

Inflow Area =

Inflow

13.635 ac.

0.00% Impervious, Inflow Depth = 1.72" for 100-Yr Storm event

17.93 cfs @ 12.22 hrs, Volume=

1.956 af

1.409 af

Outflow

17.93 cfs @ 12.22 hrs, Volume=

1.956 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs

# Summary for Pond 1P: Storage @ Wets

Inflow Area =

6.322 ac.

5.33% Impervious, Inflow Depth = 2.30" for 100-Yr Storm event

Inflow Outflow 11.27 cfs @ 12.27 hrs, Volume=

10.68 cfs @ 12.34 hrs, Volume=

1.212 af 1.193 af, Atten= 5%, Lag= 4.2 min

Discarded =

0.16 cfs @ 12.34 hrs, Volume=

0.145 af

Primary

10.52 cfs @ 12.34 hrs. Volume=

1.048 af

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Peak Elev= 260.54' @ 12.34 hrs Surf.Area= 6,602 sf Storage= 5,031 cf

Plug-Flow detention time= 42.6 min calculated for 1.193 af (98% of inflow)

Center-of-Mass det. time= 33.9 min ( 904.1 - 870.1 )

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Volume Invert Avail.Storage Storage Description									
#1	259.00'	9.00' 8,718 ct		Custom Stage Data (Irregular) Listed below (Recalc)					
Elevatio (feet		rf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)			
259.0	0	850	120.0	0	0	850			
261.0	0	9,400	360.0	8,718	8,718	10,030			
Device	Routing Inv		ert Outle	et Devices					
#1	Discarded	259.0	0' 1.02	0 in/hr Exfiltration	in/hr Exfiltration over Surface area				
#2	Primary 260.00		Head	10.0' long x 12.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64					

Discarded OutFlow Max=0.16 cfs @ 12.34 hrs HW=260.54' (Free Discharge) 1=Exfiltration (Exfiltration Controls 0.16 cfs)

Primary OutFlow Max=10.49 cfs @ 12.34 hrs HW=260.54' (Free Discharge) 2=Broad-Crested Rectangular Weir (Weir Controls 10.49 cfs @ 1.96 fps)

### Summary for Pond 2P: Depression @ Partrige/Winthrop

[93] Warning: Storage range exceeded by 17.24'

[88] Warning: Qout>Qin may require smaller dt or Finer Routing

[85] Warning: Oscillations may require smaller dt or Finer Routing (severity=1)

Inflow Area =	8.416 ac,	7.06% Impervious, Inflow	Depth = 1.87"	for 100-Yr Storm event
Inflow =	12.58 cfs @	12.34 hrs, Volume=	1.310 af	
Outflow =	15.11 cfs @	12.45 hrs, Volume=	1.310 af, Atte	en= 0%, Lag= 6.2 min
Discarded =	0.35 cfs @	12.40 hrs, Volume=	0.049 af	
Primary =	14.77 cfs @	12.45 hrs, Volume=	1.261 af	

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Peak Elev= 274.24' @ 12.45 hrs Surf.Area= 6,210 sf Storage= 6,459 cf

Plug-Flow detention time= 8.0 min calculated for 1.308 af (100% of inflow) Center-of-Mass det. time= 8.0 min (879.1 - 871.1)

Volume	Invert	t Avai	I.Storage	Storage Descripti	ion			
#1	254.00	I	6,459 cf	Custom Stage Data (Irregular) Listed below (Recalc)				
Elevatio (fee		urf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)		
254.0	0	0	0.0	0	0	0		
255.5	0	1,720	170.0	860	860	2,303		
257.0	0	6,210	300.0	5,599	6,459	7,178		
Device	Routing	In	vert Outle	et Devices				
#1	Discarded	iscarded 254		0 in/hr Exfiltration over Surface area			****	
#2	Primary	254	.20' 12.0'	" Round Culvert				

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L= 10.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 254.20' / 254.00' S= 0.0200 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

**Discarded OutFlow** Max=0.35 cfs @ 12.40 hrs HW=260.58' (Free Discharge) 1=Exfiltration (Exfiltration Controls 0.35 cfs)

Primary OutFlow Max=14.46 cfs @ 12.45 hrs HW=273.47' (Free Discharge) 2=Culvert (Inlet Controls 14.46 cfs @ 18.41 fps)

# Summary for Pond 3P: storage w/in Swamp PVP

Inflow Area = 15.940 ac, 0.00% Impervious, Inflow Depth = 1.26" for 100-Yr Storm event

Inflow = 13.37 cfs @ 12.27 hrs, Volume= 1.669 af

Outflow = 4.11 cfs @ 12.89 hrs, Volume= 1.247 af, Atten= 69%, Lag= 37.2 min

Primary = 4.11 cfs @ 12.89 hrs, Volume= 1.247 af

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 274.60' @ 12.89 hrs Surf.Area= 52,312 sf Storage= 23,297 cf

Plug-Flow detention time= 183.9 min calculated for 1.247 af (75% of inflow) Center-of-Mass det. time= 84.6 min ( 989.3 - 904.7 )

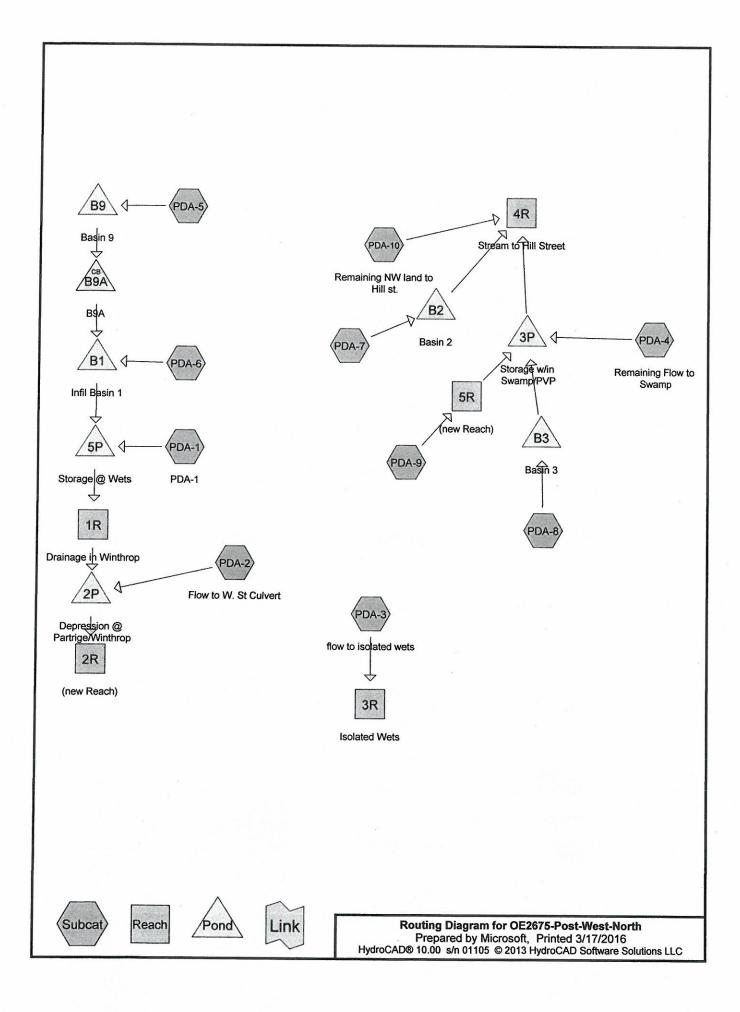
Volume	Invert A	vail.Storage	Storage Description				
#1	274.00' 48,566 cf		Custom Stage Data (Irregular) Listed below (Recalc)				
Elevation (feet)	Surf.Are (sq-		Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet Area (sq-ft)		
274.00 275.00	27,00 74,00		0 48,566	0 48,566	27,000 214,976		

 Device
 Routing
 Invert
 Outlet Devices

 #1
 Primary
 274.50'
 50.0' long x 50.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.63 2.64 2.63

Primary OutFlow Max=4.10 cfs @ 12.89 hrs HW=274.60' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 4.10 cfs @ 0.84 fps)

And as a			
	3		



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### Summary for Subcatchment PDA-1: PDA-1

[49] Hint: Tc<2dt may require smaller dt

Runoff =

0.20 cfs @ 12.11 hrs, Volume=

0.026 af, Depth= 0.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs Type III 24-hr 2-year Rainfall=3.20"

	A	Area (sf) CN Description										
		17,918	72 \	5								
		10,248	49	50-75% Gra	ass cover, I	Fair, HSG A						
	7,678 43 Woods/grass comb., Fair, HSG A											
35,844 59 Weighted Average												
		a										
	Тс	Length	Slope		Capacity	Description						
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)		service control of the service of					
	2.8	30	0.0400	0.18		Sheet Flow, AB						
						Grass: Short n= 0.150 P2= 3.20"						
	1.0	240	0.0600	3.94		Shallow Concentrated Flow, BC						
						Unpaved Kv= 16.1 fps						
	3.8	270	Total									

# Summary for Subcatchment PDA-10: Remaining NW land to Hill st.

Runoff

0.01 cfs @ 15.55 hrs, Volume=

0.005 af, Depth= 0.04"

Α	rea (sf)	CN	Description								
	41,322	32									
18,254 76 Woods/grass comb., Fair, HSG C											
59,576 45 Weighted Average											
	59,576		100.00% Pervious Area								
Tc (min)	Length (feet)	Slope (ft/ft)		Capacity (cfs)	Description						
15.1	50	0.0120	0.06		Sheet Flow, AB						
3.9	360	0.0090	1.53		Woods: Light underbrush n= 0.400 P2= 3.20"  Shallow Concentrated Flow, BC  Unpaved Kv= 16.1 fps						
19.0	410	Total	······································								

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### **OE2675-Post-West-North**

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# Summary for Subcatchment PDA-2: Flow to W. St Culvert

Runoff

0.29 cfs @ 12.15 hrs, Volume=

0.047 af, Depth= 0.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs Type III 24-hr 2-year Rainfall=3.20"

_	A	rea (sf)	CN I	Description					
		17,369	74	>75% Gras	s cover, Go	ood, HSG C			
		21,937	49	50-75% Gra	ass cover, I				
		25,136		Noods/gras					
		7,707		Paved park					
		72,149 58 Weighted Average							
		7,707	•	10.68% Imp	pervious Are	ea			
				1					
	Tc	Length	Slope	Velocity	Capacity	Description			
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)				
	4.4	50	0.0360	0.19		Sheet Flow, AB			
						Grass: Short n= 0.150 P2= 3.20"			
2.1 485 0.0560 3.81						Shallow Concentrated Flow, BC			
_						Unpaved Kv= 16.1 fps			
	6.5	535	Total	7893 860 0	-200 Victory (-400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 -				

# Summary for Subcatchment PDA-3: flow to isolated wets

[45] Hint: Runoff=Zero

Runoff

0.00 cfs @

0.00 hrs, Volume=

0.000 af, Depth= 0.00"

	A	rea (st)	CN L	escription	1	
	2	19,362	30 V	Voods, Go	od, HSG A	
	2	19,362	1	00.00% P	ervious Are	a
	Tc Length Slope Velocity Capacity (min) (feet) (ft/ft) (ft/sec) (cfs)					Description
	10.5	50	0.0300	0.08		Sheet Flow,
· <u></u>	3.9	210	0.0330	0.91		Woods: Light underbrush n= 0.400 P2= 3.20"  Shallow Concentrated Flow,  Woodland Kv= 5.0 fps
	14.4	260	Total			

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# Summary for Subcatchment PDA-4: Remaining Flow to Swamp

Runoff

= 0.86 cfs @ 12.43 hrs, Volume=

0.198 af, Depth= 0.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs Type III 24-hr 2-year Rainfall=3.20"

_	Α	rea (sf)	CN I	Description				
		20,045	30 \	Woods, Go	od, HSG A			
	2	10,845	77 \	Noods, Go	od, HSG D			
_	32,899 70 Woods, Good, HSG C							
	463,789 54 Weighted Average							
	463,789 100.00% Pervious Area							
	Tc	Length	Slope		Capacity	Description		
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)			
	2.9	50	0.0800	0.29		Sheet Flow,		
						Range n= 0.130 P2= 3.20"	,	
	3.4	230	0.0260	1.13		Shallow Concentrated Flow,		
						Short Grass Pasture Kv= 7.0 fps		
	4.1	165	0.0180	0.67		Shallow Concentrated Flow,		
_				,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		Woodland Kv= 5.0 fps		
	10.4	445	Total					

# **Summary for Subcatchment PDA-5:**

Runoff

1.15 cfs @ 12.13 hrs, Volume=

0.097 af, Depth= 0.98"

	Area	(ac) (	CN De	scription							
	0.169 43 Woods/grass comb., Fair, HSG A										
	0.	.588		75% Grass cover, Good, HSG C							
	0.	285		ods/grass							
	0.	111		ofs, HSG C		,					
	0.	036		ofs, HSG A							
3	1.	189	73 We	eighted Ave	rage						
	1.	042		64% Pervio							
	0.	147		36% Imper							
		22.2	Victoria)	oo /o milpor	1100071100						
	Tc	Length	Slope	Velocity	Capacity	Description					
	(min)	(feet)	(ft/ft		(cfs)	Description					
	7.5	50	0.0700		(3.3)	Sheet Flow, AB					
			0.07.00	0.11		Woods: Light underbrush n= 0.400 P2= 3.20"					
	0.8	192	0.0600	3.94		Shallow Concentrated Flow, BC					
				0.0		Unpaved Kv= 16.1 fps					
-	8.3	242	Total								

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# **Summary for Subcatchment PDA-6:**

Runoff

=

3.71 cfs @ 12.14 hrs, Volume=

0.314 af, Depth= 0.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs Type III 24-hr 2-year Rainfall=3.20"

		rea (sf)	CN [	Description					
	48,925 74 >75% Grass cover, Good, HSG C								
		34,262	98 F	Paved park	ing, HSG C				
		31,808			ing, HSG A				
		52,139	39 >	75% Gras	s cover, Go	ood, HSG A			
	1	167,134	73 V	Veighted A	verage				
	1	101,064	6	0.47% Per	vious Area				
		66,070	3	9.53% Imp	ervious Ar	ea			
	_					The state of the s			
	Tc	Length	Slope	Velocity	Capacity	Description			
-	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)				
	5.6	50	0.0200	0.15		Sheet Flow, AB			
	0.0	407	0.0000			Grass: Short n= 0.150 P2= 3.20"			
	0.9	127	0.0200	2.28		Shallow Concentrated Flow, BC			
	0.0	100	0.0400	0.00		Unpaved Kv= 16.1 fps			
	8.0	100	0.0100	2.03		Shallow Concentrated Flow, CD			
	1.2	475	0.0220	6 72	F 20	Paved Kv= 20.3 fps			
	1.4	4/3	0.0220	6.73	5.28	Pipe Channel, DE			
						12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'			
_	8.5	750	Total			n= 0.013 Concrete pipe, straight & clean			
	0.5	752	Total						

# **Summary for Subcatchment PDA-7:**

Runoff

=

1.47 cfs @ 12.24 hrs, Volume=

0.170 af, Depth= 0.64"

Area (sf)	CN	Description
27,162	74	>75% Grass cover, Good, HSG C
23,788	98	Paved parking, HSG C
24,566	98	Paved parking, HSG A
63,067	39	>75% Grass cover, Good, HSG A
138,583	66	Weighted Average
90,229		65.11% Pervious Area
48,354		34.89% Impervious Area

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	Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8782	9.3	50	0.0400	0.09		Sheet Flow, AB
						Woods: Light underbrush n= 0.400 P2= 3.20"
	1.1	191	0.0300	2.79		Shallow Concentrated Flow, BC
						Unpaved Kv= 16.1 fps
	2.3	234	0.0070	1.70		Shallow Concentrated Flow, CD
						Paved Kv= 20.3 fps
	1.5	470	0.0100	5.36	4.21	Pipe Channel, DE
						12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'
2763						n= 0.011 Concrete pipe, straight & clean
N-116	14.2	945	Total			

# **Summary for Subcatchment PDA-8:**

Runoff = 1.05 cfs @ 12.33 hrs, Volume=

0.149 af, Depth= 0.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs Type III 24-hr 2-year Rainfall=3.20"

A	rea (sf)	CN E	Description					
	61,028	98 F	aved park	ing, HSG A				
	77,580	39 >	75% Gras	s cover, Go	ood, HSG A			
	10,977	43 V	Voods/gras	ss comb., F	Fair, HSG A			
1	49,585	63 V	Veighted A	verage				
	88,557	5	59.20% Pervious Area					
	61,028	4	0.80% Imp	pervious Ar	ea			
Тс	Length	Slope	Velocity	Capacity	Description			
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)				
15.1	50	0.0120	0.06		Sheet Flow, AB			
					Woods: Light underbrush n= 0.400 P2= 3.20"			
1.8	239	0.0190	2.22		Shallow Concentrated Flow, BC			
					Unpaved Kv= 16.1 fps			
0.8	80	0.0070	1.70		Shallow Concentrated Flow, CD			
			V-10 10 1		Paved Kv= 20.3 fps			
0.2	47	0.0100	4.54	3.56	10 元			
					12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'			
					n= 0.013 Concrete pipe, straight & clean			
17.9	416	Total						

# **Summary for Subcatchment PDA-9:**

Runoff = 0.01 cfs @ 13.77 hrs, Volume=

0.008 af, Depth= 0.11"

Timber Crest Estates, MA Type III 24-hr 2-year Rainfall=3.20" Printed 3/17/2016

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		rea (sf)	CN [	Description						
A4040	38,132 49 50-75% Grass cover, Fair, HSG A									
		38,132			ervious Are					
	Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description				
	11.3	50	0.0250	0.07		Sheet Flow, AB				
	1.7	253	0.0250	2.55		Woods: Light underbrush n= 0.400 P2= 3.20"  Shallow Concentrated Flow, BC  Unpaved Kv= 16.1 fps				
	13.0	303	Total							

# Summary for Reach 1R: Drainage in Winthrop

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

Inflow Area = 5.849 ac, 28.45% Impervious, Inflow Depth = 0.05" for 2-year event

Inflow = 0.24 cfs @ 13.94 hrs, Volume= 0.025 af

Outflow = 0.24 cfs @ 13.94 hrs, Volume= 0.025 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

# Summary for Reach 2R: (new Reach)

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

Inflow Area = 7.505 ac, 24.53% Impervious, Inflow Depth = 0.11" for 2-year event

Inflow = 0.30 cfs @ 13.92 hrs, Volume= 0.070 af

Outflow = 0.30 cfs @ 13.92 hrs, Volume= 0.070 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

# Summary for Reach 3R: Isolated Wets

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

Inflow Area = 5.036 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-year event

Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

# Summary for Reach 4R: Stream to Hill Street

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

Inflow Area = 19.506 ac, 12.87% Impervious, Inflow Depth = 0.00" for 2-year event

Inflow = 0.01 cfs @ 15.55 hrs, Volume= 0.005 af

Outflow = 0.01 cfs @ 15.55 hrs, Volume= 0.005 af, Atten= 0%, Lag= 0.0 min

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Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

# Summary for Reach 5R: (new Reach)

[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area =

0.875 ac, 0.00% Impervious, Inflow Depth = 0.11" for 2-year event

Inflow

0.01 cfs @ 13.77 hrs, Volume=

0.008 af

Outflow

0.01 cfs @ 13.81 hrs, Volume=

0.008 af, Atten= 0%, Lag= 2.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Max. Velocity= 1.60 fps, Min. Travel Time= 1.2 min Avg. Velocity = 1.34 fps, Avg. Travel Time= 1.4 min

Peak Storage= 1 cf @ 13.79 hrs

Average Depth at Peak Storage= 0.03'

Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 6.21 cfs

12.0" Round Pipe

n= 0.011 Concrete pipe, straight & clean

Length= 115.0' Slope= 0.0217 '/'

Inlet Invert= 279.50', Outlet Invert= 277.00'



# Summary for Pond 2P: Depression @ Partrige/Winthrop

Inflow Area = 7.505 ac, 24.53% Impervious, Inflow Depth = 0.12" for 2-year event

Inflow 0.31 cfs @ 13.92 hrs, Volume= 0.072 af

0.31 cfs @ 13.92 hrs, Volume= Outflow 0.072 af, Atten= 0%, Lag= 0.2 min

Discarded = 0.01 cfs @ 13.92 hrs, Volume= 0.002 af Primary 0.30 cfs @ 13.92 hrs, Volume= 0.070 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs Peak Elev= 255.50' @ 13.92 hrs Surf.Area= 1,723 sf Storage= 3 cf

Plug-Flow detention time= 0.1 min calculated for 0.072 af (100% of inflow) Center-of-Mass det. time= 0.1 min ( 910.1 - 910.0 )

Volume	Invert	Avail.Storage	Storage Description
#1	255.50'	5,599 cf	Custom Stage Data (Irregular) Listed below (Recalc)

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Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
255.50	1,720	170.0	0	0	1,720
257.00	6,210	300.0	5,599	5,599	6,595

Device	Routing	Invert	Outlet Devices			
#1	Discarded	255.50'	2.410 in/hr Exfiltration over Surface area			
#2	Primary	ary 254.20' 12.0" Round Culvert				
			L= 10.0' CPP, mitered to conform to fill, Ke= 0.700			
			Inlet / Outlet Invert= 254.20' / 254.00' S= 0.0200 '/' Cc= 0.900			
			n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf			

**Discarded OutFlow** Max=0.10 cfs @ 13.92 hrs HW=255.50' (Free Discharge) 1=Exfiltration (Exfiltration Controls 0.10 cfs)

Primary OutFlow Max=2.99 cfs @ 13.92 hrs HW=255.50' (Free Discharge) 2=Culvert (Inlet Controls 2.99 cfs @ 3.80 fps)

# Summary for Pond 3P: Storage w/in Swamp/PVP

Inflow Area = 14.957 ac, 9.37% Impervious, Inflow Depth = 0.17" for 2-year event 0.86 cfs @ 12.43 hrs, Volume= 0.206 af

Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs Peak Elev= 274.27' @ 25.30 hrs Surf.Area= 39,707 sf Storage= 8,985 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)

Center-of-Mass det. time= (not calculated: no outflow)

Volume			ail.Storag	e Storage Descripti	ion			
#1	274.	00'	53,729	f Custom Stage D	ata (Irregular) Liste	ed below (Recalc)	(2)	
Elevation (fee	et)	Surf.Area (sq-ft)	Perir (fee		Cum.Store (cubic-feet)	Wet.Area (sq-ft)		
274.0 275.0		27,000 86,000	1,100 1,890		0 53,729	27,000 214,976		
Device	Routing	<u> </u>	vert O	utlet Devices				
#1	Primary	274	H	50.0' long x 50.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63				

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=274.00' (Free Discharge)
1=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

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### Summary for Pond 5P: Storage @ Wets

Inflow Area = 5.849 ac, 28.45% Impervious, Inflow Depth = 0.24" for 2-year event

Inflow = 0.66 cfs @ 12.73 hrs, Volume= 0.115 af

Outflow = 0.34 cfs @ 13.94 hrs, Volume= 0.115 af, Atten= 48%, Lag= 72.1 min

Discarded = 0.10 cfs @ 13.94 hrs, Volume= 0.089 af Primary = 0.24 cfs @ 13.94 hrs, Volume= 0.025 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs Peak Elev= 260.04' @ 13.94 hrs Surf.Area= 4,167 sf Storage= 2,402 cf

Plug-Flow detention time= 242.5 min calculated for 0.115 af (100% of inflow)

Center-of-Mass det. time= 242.3 min (1,087.4 - 845.0)

Invert	Avail.S	torage	Storage Description	n			
259.00'		718 cf	Custom Stage Data (Irregular) Listed below (Recalc)				
		Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)		
	850 9,400	120.0 360.0	0 8,718	0 8,718	850 10,030		
outing	Inver	t Outle	et Devices				
#1 Discarded #2 Primary		' 10.0' Head	long x 12.0' bread d (feet) 0.20 0.40	dth Broad-Crested 0.60 0.80 1.00 1	d Rectangular Weir .20 1.40 1.60		
	259.00' Sur  outing scarded	259.00' 8,  Surf.Area (sq-ft)  850 9,400  Duting Inversed 259.00	259.00' 8,718 cf  Surf.Area Perim. (sq-ft) (feet)  850 120.0 9,400 360.0  Duting Invert Outle scarded 259.00' 1.02 imary 260.00' 10.0' Head	Surf.Area   Perim.   Inc.Store   (sq-ft)   (feet)   (cubic-feet)	Surf.Area   Perim.   Inc.Store   Cum.Store   (sq-ft)   (feet)   (cubic-feet)   (cubic-feet)       850	Surf.Area   Perim.   Inc.Store   Cum.Store   Wet.Area   (sq-ft)   (feet)   (cubic-feet)   (cubic-feet)   (sq-ft)   (sq-ft)	

Discarded OutFlow Max=0.10 cfs @ 13.94 hrs HW=260.04' (Free Discharge) 1=Exfiltration (Exfiltration Controls 0.10 cfs)

Primary OutFlow Max=0.24 cfs @ 13.94 hrs HW=260.04' (Free Discharge) 2=Broad-Crested Rectangular Weir (Weir Controls 0.24 cfs @ 0.54 fps)

# Summary for Pond B1: Infil Basin 1

Inflow Area =	5.026 ac, 33.10% Impervious, Inflow Depth = 0.82" for 2-year event	
Inflow =	3.71 cfs @ 12.14 hrs, Volume= 0.342 af	
Outflow =	0.86 cfs @ 12.75 hrs, Volume= 0.342 af, Atten= 77%, Lag= 37.0 i	min
Discarded =	0.26 cfs @ 12.75 hrs, Volume= 0.253 af	
Primary =	0.60 cfs @ 12.75 hrs Volume= 0.089 af	

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs Peak Elev= 262.43' @ 12.75 hrs Surf.Area= 4,581 sf Storage= 5,458 cf

Plug-Flow detention time= 162.4 min calculated for 0.341 af (100% of inflow) Center-of-Mass det. time= 162.4 min (1,023.0 - 860.6)

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Volume	Invert	Avail.St	orage	Storage Description						
#1	261.00'	21,036 c		Custom Stage Data (Irregular) Listed below (Recalc)						
Elevation (fee	et)	urf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)				
261.0	00	3,080	336.8	0	0	3,080				
263.0		5,255	378.0	8,239	8,239	5,530				
265.0	00	7,615	418.4	12,797	21,036	8,211				
Device	Routing	Inver	Outle	et Devices						
#1	Discarded	261.00	2.41	0 in/hr Exfiltration o	ver Surface area					
#2	Primary	262.00	12.0	" Round Culvert						
			Inlet	<ul><li>0.0' CPP, mitered t</li><li>/ Outlet Invert= 262.</li><li>.011 Concrete pipe,</li></ul>	00' / 261.80' S= 0	.0067 '/' Cc= 0.90	0			

**Discarded OutFlow** Max=0.26 cfs @ 12.75 hrs HW=262.43' (Free Discharge) 1=Exfiltration (Exfiltration Controls 0.26 cfs)

Primary OutFlow Max=0.60 cfs @ 12.75 hrs HW=262.43' (Free Discharge) 2=Culvert (Barrel Controls 0.60 cfs @ 2.70 fps)

# Summary for Pond B2: Basin 2

Inflow Area =	3.181 ac, 34.89% Impervious, Inflow I	Depth = 0.64" for 2-vear event
Inflow =	1.47 cfs @ 12.24 hrs, Volume=	0.170 af
Outflow =	0.92 cfs @ 12.53 hrs, Volume=	0.170 af, Atten= 38%, Lag= 17.4 min
Discarded =	0.92 cfs @ 12.53 hrs, Volume=	0.170 af
Primary =	0.00 cfs @ 0.00 hrs, Volume=	0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs Peak Elev= 276.64' @ 12.53 hrs Surf.Area= 4,786 sf Storage= 646 cf

Plug-Flow detention time= 5.2 min calculated for 0.170 af (100% of inflow) Center-of-Mass det. time= 5.2 min ( 903.9 - 898.7 )

Volume	Invert	Avail	Ctorogo	Ctorono Donorintio						
		Avaii.	Storage	Storage Description						
#1	276.50' 26,449		6,449 cf	cf Custom Stage Data (Irregular) Listed below (Recalc)						
Elevation (fee		ırf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet Area (sq-ft)				
276.5 278.5 280.5	50	4,665 6,582 8,725	300.6 338.3 376.0	0 11,192 15,257	0 11,192 26,449	4,665 6,685 8,944				
Device	Routing	Inve	ert Outle	et Devices						
#1	Discarded	276.5	50' <b>8.270</b>	in/hr Exfiltration o	over Surface area					
#2	Primary	276.5	50' <b>12.0</b> "	Round Culvert						
			L= 30	0.0' CPP, mitered to	o conform to fill, k	(e= 0.700				

Inlet / Outlet Invert= 276.50' / 276.00' S= 0.0167 '/' Cc= 0.900

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n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf

#3 Device 2

278.00' 4.0" Vert. Orifice/Grate C= 0.600

**Discarded OutFlow** Max=0.92 cfs @ 12.53 hrs HW=276.64' (Free Discharge) 1=Exfiltration (Exfiltration Controls 0.92 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=276.50' (Free Discharge) -2=Culvert (Controls 0.00 cfs)
-3=Orifice/Grate (Controls 0.00 cfs)

### Summary for Pond B3: Basin 3

Inflow Area = 3.434 ac, 40.80% Impervious, Inflow Depth = 0.52" for 2-year event Inflow 1.05 cfs @ 12.33 hrs, Volume= 0.149 af 0.68 cfs @ 12.64 hrs, Volume= Outflow 0.149 af, Atten= 35%, Lag= 18.4 min Discarded = 0.68 cfs @ 12.64 hrs, Volume= 0.149 af Primary 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs Peak Elev= 276.15' @ 12.64 hrs Surf.Area= 3,575 sf Storage= 513 cf

Plug-Flow detention time= 5.3 min calculated for 0.148 af (100% of inflow) Center-of-Mass det. time= 5.3 min ( 920.8 - 915.6 )

Volume	Invert	Avail.St	orage	Storage Description						
#1	276.00'	20,0	056 cf	Custom Stage Data (Irregular) Listed below (Recalc)						
Elevetic		ως Λ	Dawina	I 01	0 01	147.4.1				
Elevation			Perim.	Inc.Store	Cum.Store	Wet.Area				
(fee	et)	(sq-ft)	(feet)	(cubic-feet)	(cubic-feet)	(sq-ft)				
276.0	00	3,475	231.6	0	0	3,475				
278.0	00	4,980	269.4	8,410	8,410	5,063				
280.0	00	6,709		11,646	20,056	6,886				
						• =====				
Device	Routing	Invert	Outle	et Devices						
#1	Discarded	276.00	8.270	in/hr Exfiltration o	ver Surface area					
#2	Primary	276.00		Round Culvert						
	S <del>.</del> ./		L= 30	0.0' CPP, mitered t	o conform to fill. k	(e= 0.700				
						0.0167 '/' Cc= 0.900				
				013 Concrete pipe,						
#3	Device 2	278.40'			C= 0.600	. 1011 / 11 04 0.7 0 01				

Discarded OutFlow Max=0.68 cfs @ 12.64 hrs HW=276.14' (Free Discharge) -1=Exfiltration (Exfiltration Controls 0.68 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=276.00' (Free Discharge) -2=Culvert (Controls 0.00 cfs) 3=Orifice/Grate (Controls 0.00 cfs)

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# Summary for Pond B9: Basin 9

Inflow Area = 1.189 ac, 12.36% Impervious, Inflow Depth = 0.98" for 2-year event

Inflow = 1.15 cfs @ 12.13 hrs, Volume= 0.097 af

Outflow 0.66 cfs @ 12.36 hrs, Volume= 0.097 af, Atten= 43%, Lag= 13.5 min

Discarded = 0.07 cfs @ 12.36 hrs, Volume= 0.070 af Primary 0.59 cfs @ 12.36 hrs, Volume= 0.028 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs Peak Elev= 271.44' @ 12.36 hrs Surf.Area= 2,860 sf Storage= 1,086 cf

Plug-Flow detention time= 131.1 min calculated for 0.097 af (100% of inflow)

Center-of-Mass det. time= 131.1 min ( 998.6 - 867.5 )

Volume	Invert A	vail.Storage	Storage Description	1	
#1	271.00'	1,898 cf	<b>Custom Stage Dat</b>	<b>a (Irregular)</b> Listed	below (Recalc)
Elevation (feet)	Surf.Are		Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
271.00 271.70	2,11 3,36		0 1,898	0 1,898	2,111 3,467

Device	Routing	Invert	Outlet Devices	
#1 #2	Discarded Primary		1.020 in/hr Exfiltration over Surface are 2.0" x 2.0" Horiz. Orifice/Grate X 36.00	
	<b>3</b> 11		Limited to weir flow at low heads	0-0.000

Discarded OutFlow Max=0.07 cfs @ 12.36 hrs HW=271.44' (Free Discharge) 1=Exfiltration (Exfiltration Controls 0.07 cfs)

Primary OutFlow Max=0.59 cfs @ 12.36 hrs HW=271.44' (Free Discharge) 2=Orifice/Grate (Weir Controls 0.59 cfs @ 0.64 fps)

# Summary for Pond B9A: B9A

[57] Hint: Peaked at 269.38' (Flood elevation advised)

Inflow Area = 1.189 ac, 12.36% Impervious, Inflow Depth = 0.28" for 2-year event

Inflow 0.59 cfs @ 12.36 hrs, Volume= 0.028 af

Outflow 0.59 cfs @ 12.36 hrs, Volume= 0.028 af, Atten= 0%, Lag= 0.0 min

Primary 0.59 cfs @ 12.36 hrs, Volume= 0.028 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs Peak Elev= 269.38' @ 12.36 hrs

Device	Routing	Invert	Outlet Devices	
#1	Primary	269.00'	12.0" Round Culvert L= 150.0' RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 269.00' / 267.50' S= 0.0100 '/' Cc= 0.900 n= 0.013 Concrete pine straight & clean Flow Area= 0.79 sf	

Timber Crest Estates, MA
Type III 24-hr 2-year Rainfall=3.20"

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Primary OutFlow Max=0.59 cfs @ 12.36 hrs HW=269.37' (Free Discharge) 1=Culvert (Barrel Controls 0.59 cfs @ 3.26 fps)

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# Summary for Subcatchment PDA-1: PDA-1

[49] Hint: Tc<2dt may require smaller dt

Runoff

0.90 cfs @ 12.07 hrs, Volume=

0.071 af, Depth= 1.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs Type III 24-hr 10-year Rainfall=4.65"

	rea (sf)	CN [	Description				
	17,918	72 \	Voods/gras	ss comb., C	Good, HSG C		
	10,248	49 5	0-75% Gra	ass cover, I	Fair, HSG A		
	7,678				Fair, HSG A		
	35,844		Veighted A				
	35,844 100.00% Pervious Area						
18.0%							
Tc	Length	Slope	Velocity	Capacity	Description		
<u>(min)</u>	(feet)	(ft/ft)	(ft/sec)	(cfs)			
2.8	30	0.0400	0.18		Sheet Flow, AB		
					Grass: Short n= 0.150 P2= 3.20"		
1.0	240	0.0600	3.94		Shallow Concentrated Flow, BC		
					Unpaved Kv= 16.1 fps		
3.8	270	Total					

# Summary for Subcatchment PDA-10: Remaining NW land to Hill st.

Runoff = 0.15 cfs @ 12.55 hrs, Volume=

0.038 af, Depth= 0.34"

	A	rea (sf)	CN	Description								
		41,322 18,254	32 76	Woods/gra	/oods/grass comb., Good, HSG A							
8.		59,576 59,576	45 Weighted Average									
	Tc (min)	Length (feet)	Slope (ft/ft)		Capacity (cfs)	Description						
	15.1	50	0.0120			Sheet Flow, AB Woods: Light underbrush n= 0.400	P2= 3.20"					
-	3.9	360	0.0090	1.53		Shallow Concentrated Flow, BC Unpaved Kv= 16.1 fps						
	19.0	410	Total									

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# Summary for Subcatchment PDA-2: Flow to W. St Culvert

Runoff

1.53 cfs @ 12.12 hrs, Volume=

0.135 af, Depth= 0.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs Type III 24-hr 10-year Rainfall=4.65"

A	rea (sf)	CN I	Description							
	17,369	74 :	74 >75% Grass cover, Good, HSG C							
	21,937	49	50-75% Gra	ass cover, I	Fair, HSG A					
	25,136	43 \	Noods/gras	ss comb., F	Fair, HSG A					
V	7,707	98 I	Paved park	ing, HSG C						
	72,149	58 \	Neighted A	verage						
	64,442	8	39.32% Per	vious Area						
	7,707	j	0.68% Imp	pervious Ar	ea					
Tc	Length	Slope	Velocity	Capacity	Description					
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	Y Y					
4.4	50	0.0360	0.19		Sheet Flow, AB					
					Grass: Short n= 0.150 P2= 3.20"					
2.1	485	0.0560	3.81		Shallow Concentrated Flow, BC					
			Unpaved Kv= 16.1 fps							
6.5	535	Total								

# Summary for Subcatchment PDA-3: flow to isolated wets

[45] Hint: Runoff=Zero

Runoff

0.00 cfs @ 0.00 hrs, Volume=

0.000 af, Depth= 0.00"

Α	rea (sf)	CN [	Description		8
2	19,362	30 V	Voods, Go	od, HSG A	
2	19,362	1	00.00% Pe	ervious Are	a
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	50	0.0300	0.08		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
3.9	210	0.0330	0.91		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
14.4	260	Total			

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# Summary for Subcatchment PDA-4: Remaining Flow to Swamp

Runoff = 5.66 cfs

5.66 cfs @ 12.19 hrs, Volume=

0.672 af, Depth= 0.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs Type III 24-hr 10-year Rainfall=4.65"

_	Α	rea (sf)	CN I	Description			
Ī	2	20,045	30	Woods, Go	od, HSG A		
	2	10,845	7.7	Woods, Go	od, HSG D		
		32,899	70 \	Woods, Go	od, HSG C		
	4	63,789		100.00% Pe	ervious Are	а	
		Length	Slope		Capacity	Description	
-	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)		
	2.9	50	0.0800	0.29		Sheet Flow,	
						Range n= 0.130 P2= 3.20"	
	3.4	230	0.0260	1.13		Shallow Concentrated Flow,	
						Short Grass Pasture Kv= 7.0 fps	
	4.1	165	0.0180	0.67		Shallow Concentrated Flow,	
_						Woodland Kv= 5.0 fps	
	10.4	445	Total				

### **Summary for Subcatchment PDA-5:**

Runoff = 2.52 cfs @ 12.12 hrs, Volume=

0.199 af, Depth= 2.01"

	Area	(ac)	CN D	escription			
	0	169	43 W	oods/grass	comb., Fair	, HSG A	
	0	.588	74 >7	75% Grass c	over, Good	, HSG C	
	0.	.285	76 W	oods/grass	comb., Fair	, HSG C	
	0.	.111	98 R	oofs, HSG C			
	0.	.036	98 R	oofs, HSG A			
	1.	189	73 W	eighted Ave	rage		
	1.	042	87	.64% Pervio	us Area		
	0.	147	12	2.36% Imper	vious Area		
	Tc	Length	Slop		Capacity	Description	
_	(min)	(feet)	(ft/f	t) (ft/sec)	(cfs)		111-5
	7.5	50	0.070	0.11		Sheet Flow, AB	
						Woods: Light underbrush n= 0.400 P2= 3.20"	
	8.0	192	0.060	0 3.94		Shallow Concentrated Flow, BC	
_						Unpaved Kv= 16.1 fps	
	8.3	242	Total				

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# **Summary for Subcatchment PDA-6:**

Runoff = 8.00 cfs @ 12.13 hrs, Volume=

0.643 af, Depth= 2.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs Type III 24-hr 10-year Rainfall=4.65"

A	rea (sf)	CN [	CN Description							
	48,925 74 >75% Grass cover, Good, HSG C									
	34,262 98 Paved parking, HSG C									
	31,808 98 Paved parking, HSG A									
	52,139									
	167,134	73 V	Veighted A	verage						
1	101,064	6	0.47% Per	vious Area						
	66,070	3	9.53% Imp	pervious Ar	ea					
Tc	Length	Slope	Velocity	Capacity	Description					
<u>(min)</u>	(feet)	(ft/ft) (ft/sec)		(cfs)						
5.6	50	0.0200	0.15		Sheet Flow, AB					
			- Manthaman		Grass: Short n= 0.150 P2= 3.20"					
0.9	127	0.0200	2.28		Shallow Concentrated Flow, BC					
				Unpaved Kv= 16.1 fps						
8.0	100	0.0100	2.03		Shallow Concentrated Flow, CD					
4.0	475	0.0000	0.70		Paved Kv= 20.3 fps					
1.2	475	0.0220	6.73	5.28						
					12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'					
				-	n= 0.013 Concrete pipe, straight & clean					
8.5	752	Total								

# **Summary for Subcatchment PDA-7:**

Runoff = 4.02 cfs @ 12.21 hrs, Volume=

0.396 af, Depth= 1.49"

 Area (sf)	CN	Description
27,162	74	>75% Grass cover, Good, HSG C
23,788	98	Paved parking, HSG C
24,566	98	Paved parking, HSG A
63,067	39	>75% Grass cover, Good, HSG A
138,583	66	Weighted Average
90,229		65.11% Pervious Area
48,354		34.89% Impervious Area

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	Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	9.3	50	0.0400	0.09		Sheet Flow, AB
	1.1	191	0.0300	2.79		Woods: Light underbrush n= 0.400 P2= 3.20"  Shallow Concentrated Flow, BC
	2.3	234	0.0070	1.70		Unpaved Kv= 16.1 fps Shallow Concentrated Flow, CD Paved Kv= 20.3 fps
	1.5	470	0.0100	5.36	4.21	Pipe Channel, DE 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
_	14.2	945	Total			J

# **Summary for Subcatchment PDA-8:**

Runoff = 3.32 cfs @ 12.27 hrs, Volume=

0.370 af, Depth= 1.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs Type III 24-hr 10-year Rainfall=4.65"

	Α	Area (sf) CN Description								
	61,028 98 Paved parking, HSG A									
		77,580		>75% Grass cover, Good, HSG A						
		10,977		Woods/grass comb., Fair, HSG A						
	1	49,585	TO ANY COLUMN TO A STATE OF THE	Weighted Average						
		88,557			vious Area					
		61,028			ervious Ar	§				
	Tc	Length	Slope	Velocity	Capacity	Description				
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	<u> </u>				
Ro-16	15.1	50	0.0120	0.06		Sheet Flow, AB				
						Woods: Light underbrush n= 0.400 P2= 3.20"				
	1.8	239	0.0190	2.22		Shallow Concentrated Flow, BC				
						Unpaved Kv= 16.1 fps				
	8.0	80	0.0070	1.70		Shallow Concentrated Flow, CD				
						Paved Kv= 20.3 fps				
	0.2	47	0.0100	4.54	3.56	Pipe Channel, DE				
						12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'				
_						n= 0.013 Concrete pipe, straight & clean				
	17.9	416	Total							

# Summary for Subcatchment PDA-9:

Runoff = 0.22 cfs @ 12.35 hrs, Volume=

0.037 af, Depth= 0.51"

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Α	rea (sf)	CN [	Description						
	38,132	49 5	50-75% Grass cover, Fair, HSG A						
	38,132			ervious Are					
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description				
11.3	50	0.0250	0.07	(3)	Sheet Flow, AB				
1.7	253	0.0250	2.55		Woods: Light underbrush n= 0.400 P2= 3.20"  Shallow Concentrated Flow, BC  Unpaved Kv= 16.1 fps				
13.0	303	Total							

# Summary for Reach 1R: Drainage in Winthrop

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

Inflow Area = 5.849 ac, 28.45% Impervious, Inflow Depth = 0.78" for 10-year event

Inflow = 3.21 cfs @ 12.60 hrs, Volume= 0.380 af

Outflow = 3.21 cfs @ 12.60 hrs, Volume= 0.380 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

# Summary for Reach 2R: (new Reach)

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

Inflow Area = 7.505 ac, 24.53% Impervious, Inflow Depth = 0.80" for 10-year event

Inflow = 3.26 cfs @ 12.74 hrs, Volume= 0.499 af

Outflow = 3.26 cfs @ 12.74 hrs, Volume= 0.499 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

# Summary for Reach 3R: Isolated Wets

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

Inflow Area = 5.036 ac, 0.00% Impervious, Inflow Depth = 0.00" for 10-year event

Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

# Summary for Reach 4R: Stream to Hill Street

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

Inflow Area = 19.506 ac, 12.87% Impervious, Inflow Depth = 0.02" for 10-year event

Inflow = 0.15 cfs @ 12.55 hrs, Volume= 0.038 af

Outflow = 0.15 cfs @ 12.55 hrs, Volume= 0.038 af, Atten= 0%, Lag= 0.0 min

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Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

# Summary for Reach 5R: (new Reach)

#### [52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area =

0.875 ac, 0.00% Impervious, Inflow Depth = 0.51" for 10-year event

Inflow

0.22 cfs @ 12.35 hrs, Volume=

0.037 af

Outflow

0.21 cfs @ 12.37 hrs, Volume=

0.037 af, Atten= 0%, Lag= 0.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Max. Velocity= 3.69 fps, Min. Travel Time= 0.5 min

Avg. Velocity = 1.99 fps, Avg. Travel Time= 1.0 min

Peak Storage= 7 cf @ 12.36 hrs

Average Depth at Peak Storage= 0.13'

Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 6.21 cfs

12.0" Round Pipe

n= 0.011 Concrete pipe, straight & clean

Length= 115.0' Slope= 0.0217 '/'

Inlet Invert= 279.50', Outlet Invert= 277.00'



# Summary for Pond 2P: Depression @ Partrige/Winthrop

# [85] Warning: Oscillations may require smaller dt or Finer Routing (severity=3)

Inflow Area =

7.505 ac, 24.53% Impervious, Inflow Depth = 0.82" for 10-year event

Inflow

3.63 cfs @ 12.55 hrs, Volume= 3.37 cfs @ 12.74 hrs, Volume=

0.516 af 0.516 af, Atten= 7%, Lag= 11.4 min

Discarded =

Outflow

0.11 cfs @ 12.74 hrs, Volume=

0.016 af

Primary

3.26 cfs @ 12.74 hrs, Volume=

0.499 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs Peak Elev= 255.65' @ 12.74 hrs Surf.Area= 2,053 sf Storage= 290 cf

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

Center-of-Mass det. time= 0.4 min (835.5 - 835.1)

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Volume	Invert	Avail.	.Storage	Storage Description	on			
#1	255.50'		5,599 cf	Custom Stage Data (Irregular) Listed below (Recalc)				
Elevation (fee	1,120	urf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)		
255.5	50	1,720	170.0	0	0	1,720		
257.0	00	6,210	300.0	5,599	5,599	6,595		
Device	Routing	Inv	ert Outle	et Devices				
#1	Discarded	255.	50' 2.41	0 in/hr Exfiltration	over Surface are	a		
#2	Primary	254.	20' <b>12.0</b> '	" Round Culvert				
			L= 1	0.0' CPP, mitered	to conform to fill,	Ke= 0.700		
						= 0.0200 '/' Cc= 0.900		
			n= 0	.011 Concrete pipe	e, straight & clean	, Flow Area= 0.79 sf		

**Discarded OutFlow** Max=0.11 cfs @ 12.74 hrs HW=255.65' (Free Discharge) 1=Exfiltration (Exfiltration Controls 0.11 cfs)

Primary OutFlow Max=3.26 cfs @ 12.74 hrs HW=255.65' (Free Discharge) 2=Culvert (Inlet Controls 3.26 cfs @ 4.15 fps)

### Summary for Pond 3P: Storage w/in Swamp/PVP

Inflow Area = 14.957 ac, 9.37% Impervious, Inflow Depth = 0.57" for 10-year event 10.709 af 0.00 cfs @ 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs Peak Elev= 274.70' @ 25.35 hrs Surf.Area= 64,500 sf Storage= 30,878 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow) Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.S		Storage Description				
#1	274.00'	53,	,729 cf	Custom Stage Data (Irregular) Listed below (Recalc)				
Elevation (feet)		f.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)		
274.00	) 2	27,000	1,100.0	0	0	27,000		
275.00	) (	86,000 1,		53,729	53,729	214,976		
Device	Routing	Inve	rt Outle	et Devices				
#1	Primary	274.75		long x 50.0' bread (feet) 0.20 0.40		d Rectangular Weir 1.20, 1.40, 1.60	40	

Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=274.00' (Free Discharge) 1=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

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## Summary for Pond 5P: Storage @ Wets

Inflow Area = 5.849 ac, 28.45% Impervious, Inflow Depth = 1.02" for 10-year event
Inflow = 3.51 cfs @ 12.45 hrs, Volume= 0.499 af
Outflow = 3.33 cfs @ 12.60 hrs, Volume= 0.494 af, Atten= 5%, Lag= 9.3 min
Discarded = 0.12 cfs @ 12.60 hrs, Volume= 0.114 af
Primary = 3.21 cfs @ 12.60 hrs, Volume= 0.380 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs Peak Elev= 260.25' @ 12.60 hrs Surf.Area= 5,111 sf Storage= 3,350 cf

Plug-Flow detention time= 77.4 min calculated for 0.493 af (99% of inflow) Center-of-Mass det. time= 73.3 min (896.1 - 822.8)

Volume	Invert	Avail.S	torage	prage Storage Description						
#1	259.00'	8,718 cf		Custom Stage Data (Irregular) Listed below (Recalc)						
Elevation (feet)		rf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)				
259.00 261.00		850 9,400	120.0 360.0	0 8,718	0 8,718	850 10,030				
Device I	Routing	Inver	t Outle	et Devices						
#1 Discarded #2 Primary			1.020 in/hr Exfiltration over Surface area 10.0' long x 12.0' breadth Broad-Crested Rectar Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.4		l Rectangular Weir .20 1.40 1.60					
#1	Discarded	ng Invert Out rded 259.00' <b>1.0</b> ry 260.00' <b>10</b> . Hea		let Devices						

Discarded OutFlow Max=0.12 cfs @ 12.60 hrs HW=260.25' (Free Discharge) 1=Exfiltration (Exfiltration Controls 0.12 cfs)

Primary OutFlow Max=3.21 cfs @ 12.60 hrs HW=260.25' (Free Discharge) 2=Broad-Crested Rectangular Weir (Weir Controls 3.21 cfs @ 1.29 fps)

# Summary for Pond B1: Infil Basin 1

Inflow Area =	5.026 ac, 33.10% Impervious, Inflo	w Depth = 1.80" for 10-year event
Inflow =	9.74 cfs @ 12.14 hrs, Volume=	0.753 af
Outflow =	3.54 cfs @ 12.50 hrs, Volume=	0.753 af, Atten= 64%, Lag= 22.1 min
Discarded =	0.32 cfs @ 12.50 hrs, Volume=	0.326 af
Primary =	3.22 cfs @ 12.50 hrs, Volume=	0.427 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs Peak Elev= 263.43' @ 12.50 hrs Surf.Area= 5,730 sf Storage= 10,622 cf

Plug-Flow detention time= 111.8 min calculated for 0.752 af (100% of inflow) Center-of-Mass det. time= 112.0 min ( 948.5 - 836.5 )

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Type III 24-hr 10-year Rainfall=4.65" Printed 3/17/2016

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Volume	Invert	Avail.St	orage	age Storage Description				
<b>#</b> 1 261.00' 21,036		036 cf	Custom Stage Data (Irregular) Listed below (Recalc)					
			Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)		
261.0	00	3,080	336.8	0	0	3,080		
263.0	00	5,255	378.0	8,239	8,239	5,530		
265.0	00	7,615	418.4	12,797	21,036	8,211		
Device Routing Invert C		Outl	et Devices					
#1	Discarded	261.00	2.41	2.410 in/hr Exfiltration over Surface area				
#2	#2 Primary 262.00' 1		12.0	12.0" Round Culvert				
			Inlet	<ul><li>0.0' CPP, mitered t</li><li>/ Outlet Invert= 262.</li><li>.011 Concrete pipe,</li></ul>	00' / 261.80' S= 0	0.0067 '/' Cc= 0.900		

**Discarded OutFlow** Max=0.32 cfs @ 12.50 hrs HW=263.43' (Free Discharge) 1=Exfiltration (Exfiltration Controls 0.32 cfs)

Primary OutFlow Max=3.22 cfs @ 12.50 hrs HW=263.43' (Free Discharge) 2=Culvert (Inlet Controls 3.22 cfs @ 4.10 fps)

### Summary for Pond B2: Basin 2

Inflow Area =	3.181 ac, 34.89% Impervious, Inflow D	epth = 1.49" for 10-year event
Inflow =	4.02 cfs @ 12.21 hrs, Volume=	0.396 af
Outflow =	1.04 cfs @ 12.76 hrs, Volume=	0.396 af, Atten= 74%, Lag= 32.9 min
Discarded =	1.04 cfs @ 12.76 hrs, Volume=	0.396 af
Primary =	0.00 cfs @ 0.00 hrs, Volume=	0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs Peak Elev= 277.37' @ 12.76 hrs Surf.Area= 5,457 sf Storage= 4,389 cf

Plug-Flow detention time= 30.2 min calculated for 0.395 af (100% of inflow) Center-of-Mass det. time= 30.2 min ( 900.4 - 870.2 )

Volume	Invert Av	ail.Storage	Storage Description	n	
#1	276.50'	26,449 cf	<b>Custom Stage Dat</b>	a (Irregular) Listed	below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)		Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
276.50	4,665	300.6	0	0	4,665
278.50	6,582	338.3	11,192	11,192	6,685
280.50	8,725	376.0	15,257	26,449	8,944

Device	Routing	invert	Outlet Devices
#1	Discarded	276.50'	8.270 in/hr Exfiltration over Surface area
#2	Primary	276.50'	12.0" Round Culvert

L= 30.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 276.50' / 276.00' S= 0.0167 '/' Cc= 0.900

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n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf

#3 Device 2

Volume

278.00' 4.0" Vert. Orifice/Grate C= 0.600

Discarded OutFlow Max=1.04 cfs @ 12.76 hrs HW=277.37' (Free Discharge) -1=Exfiltration (Exfiltration Controls 1.04 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=276.50' (Free Discharge) -2=Culvert (Controls 0.00 cfs)

3=Orifice/Grate (Controls 0.00 cfs)

### Summary for Pond B3: Basin 3

Inflow Area = 3.434 ac, 40.80% Impervious, Inflow Depth = 1.29" for 10-year event Inflow 3.32 cfs @ 12.27 hrs, Volume= 0.370 af

Outflow 0.82 cfs @ 12.97 hrs, Volume= 0.370 af, Atten= 75%, Lag= 41.5 min

0.82 cfs @ 12.97 hrs, Volume= Discarded = 0.370 af Primary 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs. dt= 0.05 hrs. Peak Elev= 277.12' @ 12.97 hrs Surf.Area= 4,286 sf Storage= 4,344 cf

Plug-Flow detention time= 42.4 min calculated for 0.369 af (100% of inflow) Center-of-Mass det. time= 42.3 min (924.8 - 882.5)

			Otorago Docoriptio		
#1	276.00'	20,056 cf	Custom Stage Dat	ta (Irregular) Listed	below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)		Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
276.00	3,475	231.6	0	0	3,475
278.00	4,980	269.4	8,410	8,410	5,063
280.00	6,709	307.1	11.646	20.056	6 886

Avail.Storage Storage Description

Device	Routing	Invert	Outlet Devices
#1	Discarded	276.00'	8.270 in/hr Exfiltration over Surface area
#2	Primary	276.00'	12.0" Round Culvert
			L= 30.0' CPP, mitered to conform to fill, Ke= 0.700
			Inlet / Outlet Invert= 276.00' / 275.50' S= 0.0167 '/' Cc= 0.900
			n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#3	Device 2	278.40'	4.0" Vert. Orifice/Grate C= 0.600

Discarded OutFlow Max=0.82 cfs @ 12.97 hrs HW=277.12' (Free Discharge) 1=Exfiltration (Exfiltration Controls 0.82 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=276.00' (Free Discharge) -2=Culvert (Controls 0.00 cfs) 

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### Summary for Pond B9: Basin 9

Inflow Area = 1.189 ac, 12.36% Impervious, Inflow Depth = 2.01" for 10-year event

Inflow = 2.52 cfs @ 12.12 hrs, Volume= 0.199 af

Outflow = 2.00 cfs @ 12.21 hrs, Volume= 0.199 af, Atten= 21%, Lag= 5.1 min

Discarded = 0.07 cfs @ 12.21 hrs, Volume= 0.089 af Primary = 1.92 cfs @ 12.21 hrs, Volume= 0.111 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs Peak Elev= 271.56' @ 12.21 hrs Surf.Area= 3,086 sf Storage= 1,445 cf

Plug-Flow detention time= 88.8 min calculated for 0.199 af (100% of inflow)

Center-of-Mass det. time= 89.0 min ( 934.8 - 845.8 )

<u>Volume</u>	Invert	Avail.	Storage	Storage Description	n			
#1	271.00'	•	1,898 cf	Custom Stage Da	ta (Irregular) Liste	ed below (Recalc)		
Elevatio		ırf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)		
271.0 271.7		2,111 3,360	406.0 426.0	0 1,898	0 1,898	2,111 3,467		
Device	Routing	Inve	ert Outle	et Devices				
#1 Discarded		271.0	00' 1.02	in/hr Exfiltration	over Surface area	a		
#2 Primary 271.40'		0' 2.0"	0" x 2.0" Horiz. Orifice/Grate X 36.00 C= 0.600					

Limited to weir flow at low heads

Discarded OutFlow Max=0.07 cfs @ 12.21 hrs HW=271.56' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.07 cfs)

Primary OutFlow Max=1.91 cfs @ 12.21 hrs HW=271.56' (Free Discharge) 2=Orifice/Grate (Orifice Controls 1.91 cfs @ 1.91 fps)

### Summary for Pond B9A: B9A

[57] Hint: Peaked at 269.73' (Flood elevation advised)

Inflow Area = 1.189 ac, 12.36% Impervious, Inflow Depth = 1.12" for 10-year event

Inflow = 1.92 cfs @ 12.21 hrs, Volume= 0.111 af

Outflow = 1.92 cfs @ 12.21 hrs, Volume= 0.111 af, Atten= 0%, Lag= 0.0 min

Primary = 1.92 cfs @ 12.21 hrs, Volume= 0.111 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs Peak Elev= 269.73' @ 12.21 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	269.00'	12.0" Round Culvert
			L= 150.0' RCP, groove end w/headwall, Ke= 0.200
			Inlet / Outlet Invert= 269.00' / 267.50' S= 0.0100 '/' Cc= 0.900
			n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Timber Crest Estates, MA Type III 24-hr 10-year Rainfall=4.65"

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Primary OutFlow Max=1.91 cfs @ 12.21 hrs HW=269.72' (Free Discharge) 1=Culvert (Barrel Controls 1.91 cfs @ 4.39 fps)

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### Summary for Subcatchment PDA-1: PDA-1

[49] Hint: Tc<2dt may require smaller dt

Runoff = 2.25 cfs @ 12.07 hrs, Volume=

0.158 af, Depth= 2.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs Type III 24-hr 100-year Rainfall=6.70"

	A	rea (sf)	CN	Description	*		
		17,918	72	/Voods/gra	ss comb., C	Good, HSG C	
		10,248	49	50-75% Gra	ass cover, I	Fair, HSG A	
		7,678	43 \	Noods/gras	ss comb., F	Fair, HSG A	
		35,844	59 \	Neighted A	verage		
		35,844			ervious Are	a	
	Tc	Length	Slope	Velocity	Capacity	Description	
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)		
	2.8	30	0.0400	0.18		Sheet Flow, AB	
						Grass: Short n= 0.150 P2= 3.20"	
	1.0	240	0.0600	3.94		Shallow Concentrated Flow, BC	
						Unpaved Kv= 16.1 fps	
.0	3.8	270	Total		0.0040		

# Summary for Subcatchment PDA-10: Remaining NW land to Hill st.

Runoff = 0.88 cfs @ 12.35 hrs, Volume=

0.125 af, Depth= 1.10"

_	Α	rea (sf)	CN [	Description				
		41,322	32 \	Noods/gras	ss comb., C	Good, HSG A		
-		18,254	76 \	Voods/gras	ss comb., F	fair, HSG C		
	59,576 45 Weighted Average							
		59,576	1	00.00% Pe	ervious Are	a		
	Tc	Length	Slope	Velocity	Capacity	Description		
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)			
	15.1	50	0.0120	0.06		Sheet Flow, AB		
						Woods: Light underbrush n= 0.400 P2= 3.20"		
	3.9	360	0.0090	1.53		Shallow Concentrated Flow, BC		
_						Unpaved Kv= 16.1 fps		
	19.0	410	Total					

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### Summary for Subcatchment PDA-2: Flow to W. St Culvert

Runoff =

3.95 cfs @ 12.11 hrs, Volume=

0.305 af, Depth= 2.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs Type III 24-hr 100-year Rainfall=6.70"

	Α	rea (sf)	CN I	CN Description								
		17,369	74 :	74 >75% Grass cover, Good, HSG C								
		21,937	49	50-75% Gra	ass cover, I	Fair, HSG A						
		25,136	43 \	Noods/gras	ss comb., F	Fair, HSG A						
10.7		7,707	98 F	Paved park	ing, HSG C							
		72,149	58 \	Neighted A	verage							
		64,442	8	39.32% Per	vious Area							
		7,707	•	10.68% Imp	pervious Ar	ea						
	Tc	Length	Slope	Velocity	Capacity	Description						
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)							
0.	4.4	50	0.0360	0.19		Sheet Flow, AB						
						Grass: Short n= 0.150 P2= 3.20"						
	2.1	485	0.0560	3.81		Shallow Concentrated Flow, BC						
v <u></u>						Unpaved Kv= 16.1 fps						
	6.5	535	Total									

# Summary for Subcatchment PDA-3: flow to isolated wets

Runoff

0.11 cfs @ 14.85 hrs, Volume=

0.068 af, Depth= 0.16"

7.22	Α	rea (sf)	CN D	escription	2 10020	
1000	2	19,362	30 V	Voods, Go	od, HSG A	
	219,362		1	00.00% Pe	ervious Are	а
	Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
-	10.5	50	0.0300	0.08	(0.0)	Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
	3.9	210	0.0330	0.91		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
-	14.4	260	Total			

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# Summary for Subcatchment PDA-4: Remaining Flow to Swamp

Runoff

= 17.89 cfs @ 12.16 hrs, Volume=

1.639 af, Depth= 1.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs Type III 24-hr 100-year Rainfall=6.70"

92	Α	rea (sf)	CN I	Description			
	2	20,045	30 \	Woods, Go	od, HSG A		-
	2	10,845	7.7	Noods, Go	od, HSG D		
_		32,899	70 \	Noods, Go	od, HSG C		
	4	63,789	54 \	Neighted A	verage		-
	4	63,789		100.00% Pe	ervious Are	a	
	Tc	Length	Slope	Velocity	Capacity	Description	
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	•	
	2.9	50	0.0800	0.29		Sheet Flow,	-
						Range n= 0.130 P2= 3.20"	
	3.4	230	0.0260	1.13		Shallow Concentrated Flow,	
	2 2	-				Short Grass Pasture Kv= 7.0 fps	
	4.1	165	0.0180	0.67		Shallow Concentrated Flow,	
_						Woodland Kv= 5.0 fps	
	10.4	445	Total				_

# **Summary for Subcatchment PDA-5:**

Runoff

4.67 cfs @ 12.12 hrs, Volume=

0.364 af, Depth= 3.68"

Area	(ac)	CN Des	scription		
0	.169	43 Wo	ods/grass	comb., Fair	. HSG A
0	.588			over, Good	
0	.285			comb., Fair	
0	.111		fs, HSG C		,
0	.036	98 Roc	fs, HSG A		
1.	.189	73 Wei	ghted Ave	rage	
1.	.042		34% Pervio		
0.	.147	12.3	36% Impen	vious Area	
			2002		
Тс	Length		Velocity	Capacity	Description
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	•
7.5	50	0.0700	0.11		Sheet Flow, AB
					Woods: Light underbrush n= 0.400 P2= 3.20"
8.0	192	0.0600	3.94		Shallow Concentrated Flow, BC
					Unpaved Kv= 16.1 fps
8.3	242	Total			

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### **Summary for Subcatchment PDA-6:**

Runoff = 14.97 cfs @ 12.12 hrs, Volume=

1.176 af, Depth= 3.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs Type III 24-hr 100-year Rainfall=6.70"

	Area (sf)	CN [	Description					
	48,925	74 >	>75% Grass cover, Good, HSG C					
	34,262	98. F	Paved park	ing, HSG C				
	31,808	98 F	Paved park	ing, HSG A				
	52,139	39 >	75% Gras	s cover, Go	ood, HSG A			
***	167,134	73 V	Veighted A	verage				
70	101,064	6	0.47% Per	vious Area				
	66,070	3	9.53% Imp	ervious Ar	ea			
Tc	Length	Slope	Velocity	Capacity	Description			
<u>(min)</u>	(feet)	(ft/ft)	(ft/sec)	(cfs)				
5.6	50	0.0200	0.15		Sheet Flow, AB	2012077		
					Grass: Short n= 0.150 P2= 3.20"			
0.9	127	0.0200	2.28		Shallow Concentrated Flow, BC			
					Unpaved Kv= 16.1 fps			
8.0	100	0.0100	2.03		Shallow Concentrated Flow, CD			
			*		Paved Kv= 20.3 fps			
1.2	475	0.0220	6.73	5.28				
					12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'			
					n= 0.013 Concrete pipe, straight & clean			
8.5	752	Total		*				

# Summary for Subcatchment PDA-7:

Runoff = 8.41 cfs @ 12.20 hrs, Volume=

0.788 af, Depth= 2.97"

Area	ı (sf)	CN	Description	
27	,162	74	>75% Grass cover, Good, HSG C	
23	,788	98	Paved parking, HSG C	
24	,566	98	Paved parking, HSG A	
63	,067	39	>75% Grass cover, Good, HSG A	
138	,583	66	Weighted Average	
90	,229		65.11% Pervious Area	
48	354		34.89% Impervious Area	

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_	Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	9.3	50	0.0400	0.09		Sheet Flow, AB
	1.1	191	0.0300	2.79		Woods: Light underbrush n= 0.400 P2= 3.20"  Shallow Concentrated Flow, BC  Unpaved Kv= 16.1 fps
	2.3	234	0.0070	1.70		Shallow Concentrated Flow, CD
	1.5	470	0.0100	5.36	4.21	Paved Kv= 20.3 fps  Pipe Channel, DE  12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
	14.2	945	Total			

## **Summary for Subcatchment PDA-8:**

Runoff

7.40 cfs @ 12.26 hrs, Volume=

0.766 af, Depth= 2.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs Type III 24-hr 100-year Rainfall=6.70"

A	rea (sf)	CN E	Description					
	61,028	98 F	aved park	ing, HSG A				
	77,580	39 >	75% Gras	s cover, Go	ood, HSG A			
*	10,977	43 V	Voods/gras	ss comb., F	Fair, HSG A			
1	49,585	63 V	Veighted A	verage				
	88,557		59.20% Pervious Area					
	61,028	4	0.80% Imp	ervious Ar	ea			
Тс	Length	Slope	Velocity	Capacity	Description			
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)				
15.1	50	0.0120	0.06		Sheet Flow, AB			
					Woods: Light underbrush n= 0.400 P2= 3.20"			
1.8	239	0.0190	2.22		Shallow Concentrated Flow, BC			
					Unpaved Kv= 16.1 fps			
8.0	80	0.0070	1.70		Shallow Concentrated Flow, CD			
121 121					Paved Kv= 20.3 fps			
0.2	47	0.0100	4.54	3.56	Pipe Channel, DE			
					12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'			
					n= 0.013 Concrete pipe, straight & clean			
17.9	416	Total						

# **Summary for Subcatchment PDA-9:**

Runoff

0.95 cfs @ 12.21 hrs, Volume=

0.104 af, Depth= 1.42"

Timber Crest Estates, MA
Type III 24-hr 100-year Rainfall=6.70"
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A	rea (sf)	CN E	Description		
	38,132	49 5	0-75% Gra	ass cover, I	Fair, HSG A
	38,132 100.00% Pervious Area				a
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	50	0.0250	0.07		Sheet Flow, AB Woods: Light underbrush n= 0.400 P2= 3.20"
1.7	253	0.0250	2.55		Shallow Concentrated Flow, BC Unpaved Kv= 16.1 fps
13.0	303	Total			

## Summary for Reach 1R: Drainage in Winthrop

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

Inflow Area = 5.849 ac, 28.45% Impervious, Inflow Depth = 2.14" for 100-year event

Inflow = 6.79 cfs @ 12.50 hrs, Volume= 1.045 af

Outflow = 6.79 cfs @ 12.50 hrs, Volume= 1.045 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

# Summary for Reach 2R: (new Reach)

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

Inflow Area = 7.505 ac, 24.53% Impervious, Inflow Depth = 2.05" for 100-year event

Inflow = 5.85 cfs @ 12.74 hrs, Volume= 1.284 af

Outflow = 5.85 cfs @ 12.74 hrs, Volume= 1.284 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

# Summary for Reach 3R: Isolated Wets

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

Inflow Area = 5.036 ac, 0.00% Impervious, Inflow Depth = 0.16" for 100-year event

Inflow = 0.11 cfs @ 14.85 hrs, Volume= 0.068 af

Outflow = 0.11 cfs @ 14.85 hrs, Volume= 0.068 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

# Summary for Reach 4R: Stream to Hill Street

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

Inflow Area = 19.506 ac, 12.87% Impervious, Inflow Depth > 0.70" for 100-year event

Inflow = 2.70 cfs @ 13.80 hrs, Volume= 1.133 af

Outflow = 2.70 cfs @ 13.80 hrs, Volume= 1.133 af, Atten= 0%, Lag= 0.0 min

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Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs. dt= 0.05 hrs.

## Summary for Reach 5R: (new Reach)

[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area =

0.875 ac, 0.00% Impervious, Inflow Depth = 1.42" for 100-year event

Inflow =

0.95 cfs @ 12.21 hrs, Volume=

0.104 af

Outflow =

0.94 cfs @ 12.22 hrs, Volume=

0.104 af, Atten= 1%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Max. Velocity= 5.70 fps, Min. Travel Time= 0.3 min

Avg. Velocity = 2.57 fps, Avg. Travel Time= 0.7 min

Peak Storage= 19 cf @ 12.22 hrs

Average Depth at Peak Storage= 0.26'

Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 6.21 cfs

12.0" Round Pipe

n= 0.011 Concrete pipe, straight & clean

Length= 115.0' Slope= 0.0217 '/'

Inlet Invert= 279.50', Outlet Invert= 277.00'



# Summary for Pond 2P: Depression @ Partrige/Winthrop

[93] Warning: Storage range exceeded by 0.77

[85] Warning: Oscillations may require smaller dt or Finer Routing (severity=8)

Inflow Area =

7.505 ac, 24.53% Impervious, Inflow Depth = 2.16" for 100-year event

Inflow

8.01 cfs @ 12.49 hrs, Volume=

1.349 af

Outflow = 6.19 cfs @ 12.74 hrs, Volume=

1.349 af, Atten= 23%, Lag= 15.1 min

Discarded =

0.35 cfs @ 12.70 hrs, Volume=

0.066 af

Primary

5.85 cfs @ 12.74 hrs, Volume=

1.284 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs Peak Elev= 257.77' @ 12.74 hrs Surf.Area= 6,210 sf Storage= 5,599 cf

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

Center-of-Mass det. time= 9.1 min (842.9 - 833.8)

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Volume	Invert	Avail	.Storage	Storage Description	on		
#1	255.50'		5,599 cf	Custom Stage Da	ata (Irregular) List	ed below (Recalc)	
Elevation (fee		urf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
255.		1,720	170.0	0	0	1,720	
257.0	JU	6,210	300.0	5,599	5,599	6,595	
Device	Routing	Inv	ert Outle	et Devices			
#1	Discarded	255.	50' 2.41	0 in/hr Exfiltration	over Surface are	a	
#2	Primary	254.	20' <b>12.0</b> '	" Round Culvert			
			Inlet		4.20' / 254.00' S=	Ke= 0.700 = 0.0200 '/' Cc= 0.900 , Flow Area= 0.79 sf	)

**Discarded OutFlow** Max=0.35 cfs @ 12.70 hrs HW=257.59' (Free Discharge) 1=Exfiltration (Exfiltration Controls 0.35 cfs)

Primary OutFlow Max=5.80 cfs @ 12.74 hrs HW=257.72' (Free Discharge) 2=Culvert (Inlet Controls 5.80 cfs @ 7.38 fps)

### Summary for Pond 3P: Storage w/in Swamp/PVP

Inflow Area = 14.957 ac, 9.37% Impervious, Inflow Depth = 1.42" for 100-year event

Inflow = 18.73 cfs @ 12.17 hrs, Volume= 1.764 af

Outflow = 2.32 cfs @ 13.87 hrs, Volume= 0.971 af, Atten= 88%, Lag= 102.5 min

Primary = 2.32 cfs @ 13.87 hrs, Volume= 0.971 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs Peak Elev= 274.82' @ 13.87 hrs Surf.Area= 72,701 sf Storage= 39,207 cf

Plug-Flow detention time= 285.8 min calculated for 0.969 af (55% of inflow)

Center-of-Mass det. time= 157.2 min (1,033.5 - 876.3)

Volume	Invert Av	ail.Storage	Storage Description	1	
#1	274.00'	53,729 cf	Custom Stage Date	a (Irregular) Listed	below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)		Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
274.00 275.00	27,000 86,000		0 53,729	0 53,729	27,000 214,976

Device	Routing	IIIVEIL	Outlet Devices
#1	Primary	274.75	50.0' long x 50.0' breadth Broad-Crested Rectangular Weir
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=2.31 cfs @ 13.87 hrs HW=274.82' (Free Discharge)
—1=Broad-Crested Rectangular Weir (Weir Controls 2.31 cfs @ 0.69 fps)

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## Summary for Pond 5P: Storage @ Wets

Inflow Area = 5.849 ac, 28.45% Impervious, Inflow Depth = 2.45" for 100-year event

Inflow = 7.87 cfs @ 12.46 hrs, Volume= 1.196 af

Outflow = 6.93 cfs @ 12.50 hrs, Volume= 1.182 af, Atten= 12%, Lag= 2.7 min

Discarded = 0.14 cfs @ 12.50 hrs, Volume= 0.138 af Primary = 6.79 cfs @ 12.50 hrs, Volume= 1.045 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs Peak Elev= 260.41' @ 12.50 hrs Surf.Area= 5,902 sf Storage= 4,215 cf

Plug-Flow detention time= 39.5 min calculated for 1.181 af (99% of inflow)

Center-of-Mass det. time= 34.2 min (867.1 - 832.9)

Volume	Invert	Avail.St	orage	Storage Description						
#1	#1 259.00' 8,718 cf		718 cf	Custom Stage Data (Irregular) Listed below (Recalc)						
Elevation Surf.Area (feet) (sq-ft)		Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)					
259.0 261.0		850 9,400	120.0 360.0	0 8,718	0 8,718	850 10,030				
Device	Routing	Inver	t Outle	et Devices						
#1	Discarded 259.00' 1.02		20 in/hr Exfiltration over Surface area							
#2			10.0	0.0' long x 12.0' breadth Broad-Crested Rectangular Weir						
			Head	d (feet) 0.20 0.40	0.60 0.80 1.00 1.2	20 1.40 1.60				
			Coef	f. (English) 2.57 2.	62 2.70 2.67 2.66	2.67 2.66 2.64				

Discarded OutFlow Max=0.14 cfs @ 12.50 hrs HW=260.41' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.14 cfs)

Primary OutFlow Max=6.78 cfs @ 12.50 hrs HW=260.41' (Free Discharge) 2=Broad-Crested Rectangular Weir (Weir Controls 6.78 cfs @ 1.67 fps)

# Summary for Pond B1: Infil Basin 1

[93] Warning: Storage range exceeded by 2.21'

Inflow Area = 5.026 ac, 33.10% Impervious, Inflow Depth = 3.43" for 100-year event
Inflow = 20.01 cfs @ 12.14 hrs, Volume= 1.438 af
Outflow = 7.68 cfs @ 12.46 hrs, Volume= 1.438 af, Atten= 62%, Lag= 19.0 min

Discarded = 0.42 cfs @ 12.45 hrs, Volume= 0.399 af Primary = 7.25 cfs @ 12.46 hrs, Volume= 1.038 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs Peak Elev= 267.21' @ 12.46 hrs Surf.Area= 7,615 sf Storage= 21,036 cf

Plug-Flow detention time= 88.0 min calculated for 1.435 af (100% of inflow) Center-of-Mass det. time= 88.3 min ( 910.4 - 822.0 )

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Volume	Invert	Avail.St	orage	Storage Description					
#1	261.00'	21,036 cf		Custom Stage Data (Irregular) Listed below (Recalc)					
Elevation (fee	• • • • • • • • • • • • • • • • • • • •	urf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)			
261.0 263.0 265.0	00	3,080 5,255 7,615	336.8 378.0 418.4	0 8,239 12,797	0 8,239 21,036	3,080 5,530 8,211			
Device	Routing	Invert	Outle	et Devices					
#1 Discarded 261.00' <b>2</b> #2 Primary 262.00' <b>1</b> L:			12.0' L= 30 Inlet	0 in/hr Exfiltration o " Round Culvert 0.0' CPP, mitered to / Outlet Invert= 262. .011 Concrete pipe,	o conform to fill, K 00' / 261.80' S= 0	0.0067 '/' Cc= 0.900			

**Discarded OutFlow** Max=0.42 cfs @ 12.45 hrs HW=267.18' (Free Discharge) 1=Exfiltration (Exfiltration Controls 0.42 cfs)

Primary OutFlow Max=7.07 cfs @ 12.46 hrs HW=266.98' (Free Discharge) 2=Culvert (Inlet Controls 7.07 cfs @ 9.00 fps)

## Summary for Pond B2: Basin 2

Inflow Area =	3.181 ac, 34.89% Impervious, Inflow I	Depth = 2.97" for 100-vear event
Inflow =	8.41 cfs @ 12.20 hrs, Volume=	0.788 af
Outflow =	1.56 cfs @ 12.89 hrs, Volume=	0.788 af, Atten= 82%, Lag= 41.2 min
Discarded =	1.28 cfs @ 12.89 hrs, Volume=	0.750 af
Primary =	0.28 cfs @ 12.89 hrs, Volume=	0.037 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs Peak Elev= 278.60' @ 12.89 hrs Surf.Area= 6,681 sf Storage= 11,846 cf

Plug-Flow detention time= 76.7 min calculated for 0.788 af (100% of inflow) Center-of-Mass det. time= 76.6 min (926.2 - 849.5)

Volume Invert Avail.Storage			Storage	Storage Description	1		
#1	#1 276.50' 26,449 cf		6,449 cf	Custom Stage Data (Irregular) Listed below (Recalc)			
Elevation (fee		ırf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
276.5 278.5 280.5	50	4,665 6,582 8,725	300.6 338.3 376.0	0 11,192 15,257	0 11,192 26,449	4,665 6,685 8,944	
Device	ce Routing Invert Outlet Devices						
#1 #2	Discarded Primary	276. 276.		70 in/hr Exfiltration over Surface area 0" Round Culvert			

Inlet / Outlet Invert= 276.50' / 276.00' S= 0.0167 '/' Cc= 0.900

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n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf

#3 Device 2

Volume

278.00' 4.0" Vert. Orifice/Grate C= 0.600

Discarded OutFlow Max=1.28 cfs @ 12.89 hrs HW=278.60' (Free Discharge) T—1=Exfiltration (Exfiltration Controls 1.28 cfs)

Primary OutFlow Max=0.28 cfs @ 12.89 hrs HW=278.60' (Free Discharge) -2=Culvert (Passes 0.28 cfs of 4.22 cfs potential flow)
-3=Orifice/Grate (Orifice Controls 0.28 cfs @ 3.16 fps)

### Summary for Pond B3: Basin 3

Inflow Area = 3.434 ac, 40.80% Impervious, Inflow Depth = 2.68" for 100-year event

Inflow 7.40 cfs @ 12.26 hrs, Volume= 0.766 af

Outflow 1.26 cfs @ 13.15 hrs, Volume= 0.766 af, Atten= 83%, Lag= 53.5 min

1.07 cfs @ 13.15 hrs, Volume= Discarded = 0.745 af 0.19 cfs @ 13.15 hrs, Volume= Primary 0.021 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs. dt= 0.05 hrs. Peak Elev= 278.76' @ 13.15 hrs Surf.Area= 5,609 sf Storage= 12,447 cf

Plug-Flow detention time= 112.0 min calculated for 0.765 af (100% of inflow)

Avail.Storage Storage Description

Center-of-Mass det. time= 111.8 min ( 971.7 - 859.9 )

Invert

		7 10 011.	Otorago	age etologe besoliption				
#1	276.00	)' 2	0,056 cf	Custom Stage Data	a (Irregular) Listed	below (Recalc)		
Elevation (fee		Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)		
276.0	00	3,475	231.6	0	0	3,475		
278.0		4,980	269.4	8,410	8,410	5,063		
280.0	00	6,709	307.1	11,646	20,056	6,886		
Device	Routing	Inve	ert Outle	et Devices	5			
#1	Discarded	276.0	00' 8.270	70 in/hr Exfiltration over Surface area				
#2			00' 12.0'	12.0" Round Culvert				
			L= 30	0.0' CPP, mitered to	o conform to fill, K	e= 0.700		
			Inlet	/ Outlet Invert= 276.	00' / 275.50' S= 0	.0167 '/' Cc= 0.900		
			n= 0.	013 Concrete pipe,	straight & clean, F	Flow Area= 0.79 sf		
#3	Device 2	278.4	10' <b>4.0</b> " '	Vert. Orifice/Grate	C = 0.600			

Discarded OutFlow Max=1.07 cfs @ 13.15 hrs HW=278.76' (Free Discharge) 1=Exfiltration (Exfiltration Controls 1.07 cfs)

Primary OutFlow Max=0.19 cfs @ 13.15 hrs HW=278.76' (Free Discharge) -2=Culvert (Passes 0.19 cfs of 5.02 cfs potential flow)

-3=Orifice/Grate (Orifice Controls 0.19 cfs @ 2.13 fps)

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#### OE2675-Post-West-North

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## Summary for Pond B9: Basin 9

[93] Warning: Storage range exceeded by 0.99'

[88] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 1.189 ac, 12.36% Impervious, Inflow Depth = 3.68" for 100-year event Inflow 4.67 cfs @ 12.12 hrs, Volume= 0.364 af Outflow 5.55 cfs @ 12.15 hrs, Volume= 0.364 af, Atten= 0%, Lag= 1.8 min Discarded = 0.08 cfs @ 12.15 hrs, Volume= 0.103 af 5.47 cfs @ 12.15 hrs, Volume= Primary 0.262 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs Peak Elev= 272.69' @ 12.15 hrs Surf.Area= 3,360 sf Storage= 1,898 cf

Plug-Flow detention time= 59.4 min calculated for 0.364 af (100% of inflow) Center-of-Mass det. time= 59.3 min (887.6 - 828.3)

Volume	Invert	Avail.	Storage	Storage Description					
#1	271.00'	2000 to 10000 to 10000	1,898 cf	Custom Stage Data	a (Irregular) Listed	below (Recalc)			
Elevation (feet		f.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)			
271.00 271.70		2,111 3,360	406.0 426.0	0 1,898	0 1,898	2,111 3,467			
Device	Routing	Inve	ert Outle	et Devices					
				020 in/hr Exfiltration over Surface area					
#2	Primary	271.4		x 2.0" Horiz. Orifice ed to weir flow at lov		= 0.600			

Discarded OutFlow Max=0.08 cfs @ 12.15 hrs HW=272.69' (Free Discharge) 1=Exfiltration (Exfiltration Controls 0.08 cfs)

Primary OutFlow Max=5.46 cfs @ 12.15 hrs HW=272.68' (Free Discharge) -2=Orifice/Grate (Orifice Controls 5.46 cfs @ 5.46 fps)

# Summary for Pond B9A: B9A

[57] Hint: Peaked at 272.96' (Flood elevation advised)

[81] Warning: Exceeded Pond B9 by 0.26' @ 12.15 hrs

1.189 ac, 12.36% Impervious, Inflow Depth = 2.64" for 100-year event Inflow Area = Inflow 5.47 cfs @ 12.15 hrs, Volume= 0.262 af

Outflow 5.47 cfs @ 12.15 hrs, Volume= 0.262 af, Atten= 0%, Lag= 0.0 min

5.47 cfs @ 12.15 hrs, Volume= Primary 0.262 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs Peak Elev= 272.96' @ 12.15 hrs

Timber Crest Estates, MA Type III 24-hr 100-year Rainfall=6.70"

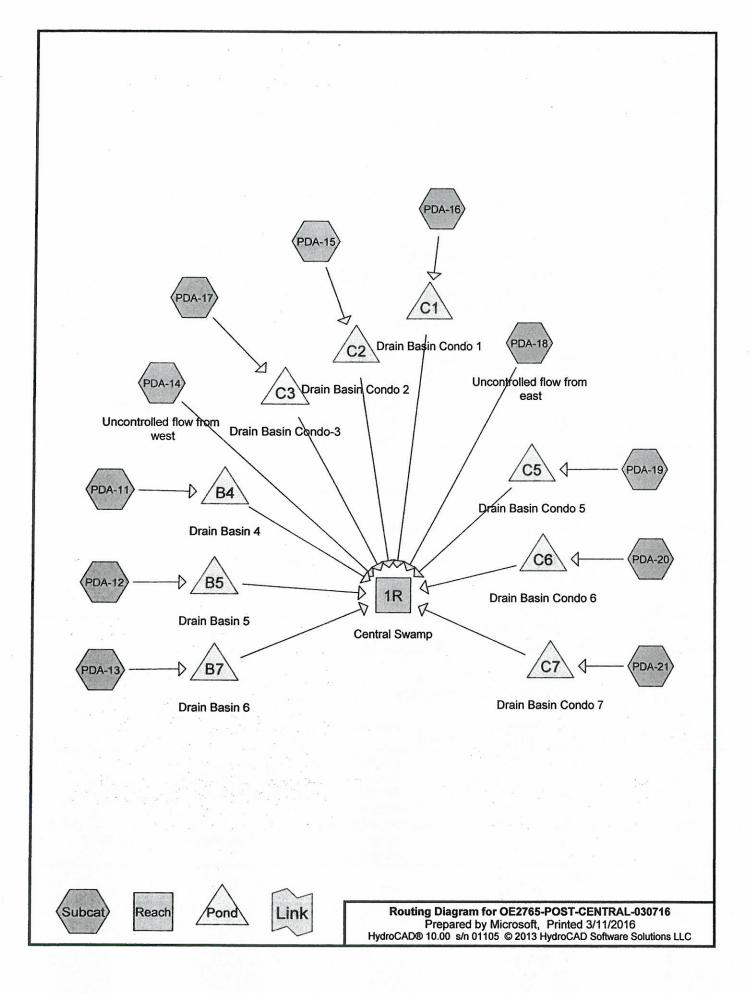
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Device	Routing	Invert	Outlet Devices
#1	Primary		12.0" Round Culvert L= 150.0' RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 269.00' / 267.50' S= 0.0100 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=5.46 cfs @ 12.15 hrs HW=272.93' (Free Discharge) 1=Culvert (Barrel Controls 5.46 cfs @ 6.95 fps)



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### **Summary for Subcatchment PDA-11:**

Runoff =

0.51 cfs @ 12.39 hrs, Volume=

0.090 af, Depth= 0.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Type III 24-hr 2-Yr Storm Rainfall=3.20"

Α	rea (sf)	CN I	Description					
	45,302	98 I	Paved park	ing, HSG A				
	92,434	39 :	>75% Gras	s cover, Go	od, HSG A			
1	37,736	58 \	Neighted A	verage				
	92,434	(	67.11% Per	vious Area				
	45,302	;	32.89% Imp	pervious Are	ea			
Tc (min)	Length (feet)	Slope (ft/ft)		Capacity (cfs)	Description			
12.3	50	0.0200	0.07	20 10 10 10 11 11 11 11 11 11 11 11 11 11	Sheet Flow, AB			
2.0	198	0.0100	1.61		Woods: Light underbrush n= 0.400 P2= 3.20"  Shallow Concentrated Flow, BC  Unpaved Kv= 16.1 fps			
14.3	248	Total						

# **Summary for Subcatchment PDA-12:**

Runoff =

0.96 cfs @ 12.15 hrs, Volume=

0.092 af, Depth= 0.69"

	Α	rea (sf)	CN [	Description					
-		32,983		Paved parking, HSG A					
_		37,272	39 >	75% Gras	s cover, Go	ood, HSG A			
		70,255	67 V	Veighted A	verage				
		37,272	5	3.05% Per	vious Area				
		32,983	4	6.95% Imp	ervious Ar	ea			
	Tc	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description			
_	(min)				(CIS)	Observa Flores A.D.			
	7.4	50	0.0100	0.11		Sheet Flow, AB Grass: Short n= 0.150 P2= 3.20"			
	0.7	128	0.0200	2.87		Shallow Concentrated Flow, BC			
	0.8	334	0.0250	7.17	5.63	Paved Kv= 20.3 fps  Pipe Channel, CD  12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013			
	8.9	512	Total						

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### **Summary for Subcatchment PDA-13:**

Runoff = 1.00 cfs @ 12.21 hrs, Volume=

0.127 af, Depth= 0.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Type III 24-hr 2-Yr Storm Rainfall=3.20"

	Α	rea (sf)	CN [	Description					
		44,415	98 F	aved parking, HSG A					
		80,750	39 >	75% Gras	s cover, Go	ood, HSG A			
		6,128	98 F	Paved park	ing, HSG C				
_		7,167	74 >	75% Gras	s cover, Go	ood, HSG C			
	1	38,460	62 V	Veighted A	verage				
		87,917	6	3.50% Per	vious Area				
		50,543	3	6.50% Imp	pervious Are	ea			
	Tc	Length	Slope	Velocity	Capacity	Description			
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)				
	8.1	50	0.0080	0.10		Sheet Flow, AB			
						Grass: Short n= 0.150 P2= 3.20"			
	0.7	99	0.0200	2.28		Shallow Concentrated Flow, BC			
		000	0.0400			Unpaved Kv= 16.1 fps			
	2.0	262	0.0120	2.22		Shallow Concentrated Flow, CD			
	0.2	40	0.0100	4.54	2.50	Paved Kv= 20.3 fps			
	0.2	49	0.0100	4.54	3.56				
						12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'			
-	44.0	460	Total			n= 0.013 Concrete pipe, straight & clean			
	11.0	460	Total						

# Summary for Subcatchment PDA-14: Uncontrolled flow from west

Runoff = 0.11 cfs @ 15.06 hrs, Volume=

0.068 af, Depth= 0.07"

Area (sf)	CN	Description		
239,485	30	Woods, Good, HSG A		
122,926	70	Woods, Good, HSG C		
65,500	77	Woods, Good, HSG D		
 60,920	39	>75% Grass cover, Good, HSG A		
488,831	47	Weighted Average		
488,831		100.00% Pervious Area		

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66	Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	16.3	50	0.0100	0.05		Sheet Flow,
	6.6	325	0.0270	0.82	w.	Woods: Light underbrush n= 0.400 P2= 3.20"  Shallow Concentrated Flow,  Woodland Kv= 5.0 fps
- 37	22.9	375	Total			

### **Summary for Subcatchment PDA-15:**

Runoff

0.72 cfs @ 12.10 hrs, Volume=

0.054 af, Depth= 2.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Type III 24-hr 2-Yr Storm Rainfall=3.20"

^	roo (cf)	CNI	Dogorintion					
	rea (sf)		Description					
	5,000	98 F	Paved park	ing, HSG A				
	1,000	39 >	75% Grass cover, Good, HSG A					
	1,500				ood, HSG D			
	5,000			ing, HSG D				
	12,500	91 \	1 Weighted Average					
	2,500	2	20.00% Pervious Area					
	10,000	3	80.00% Impervious Area					
Tc	Length	Slope	Velocity	Capacity	Description			
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)				
5.1	31	0.0100	0.10		Sheet Flow, AB			
					Grass: Short n= 0.150 P2= 3.20"			
1.5	182	0.0100	2.03		Shallow Concentrated Flow, BC			
000400000		,			Paved Kv= 20.3 fps			
6.6	213	Total						

# **Summary for Subcatchment PDA-16:**

Runoff

1.41 cfs @ 12.10 hrs, Volume=

0.106 af, Depth= 1.34"

	Area (sf)	CN	Description		
	24,559	98	Paved parking, HSG A		
	13,082	39	>75% Grass cover, Good, HSG A		
	1,000	80	>75% Grass cover, Good, HSG D		
92	2,626	98	Paved parking, HSG D		
	41,267	79	Weighted Average	2	
	14,082		34.12% Pervious Area		
	27,185		65.88% Impervious Area		

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	Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description	
	5.1	31	0.0100	0.10		Sheet Flow, AB	
						Grass: Short n= 0.150 P2= 3.20"	
	1.5	182	0.0100	2.03		Shallow Concentrated Flow, BC	
50 <u>-11</u>						Paved Kv= 20.3 fps	
_	6.6	213	Total				

### **Summary for Subcatchment PDA-17:**

[49] Hint: Tc<2dt may require smaller dt

Runoff = 2.51 cfs @ 12.07 hrs, Volume=

0.178 af, Depth= 2.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Type III 24-hr 2-Yr Storm Rainfall=3.20"

Α	rea (sf)	CN [	Description						
	23,913	98 F	Paved parking, HSG C						
	1,369	98 F	aved park	ing, HSG D					
	9,200	74 >	75% Gras	s cover, Go	ood, HSG C				
	10,309	80 >	75% Gras	75% Grass cover, Good, HSG D					
	44,791	89 V	Veighted A						
	19,509 43.56% Pervious Area								
	25,282	5	6.44% lmp	ervious Ar	ea				
Тс	Length	Slope	Velocity	Capacity	Description				
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)					
3.6	20	0.0100	0.09		Sheet Flow, AB				
					Grass: Short n= 0.150 P2= 3.20"				
1.2	193	0.0180	2.72		Shallow Concentrated Flow, BC				
					Paved Kv= 20.3 fps				
0.2	108	0.0800	9.97	29.90	Channel Flow, CD				
					Area= 3.0 sf Perim= 5.0' r= 0.60'				
					n= 0.030 Earth, grassed & winding				
5.0	321	Total							

# Summary for Subcatchment PDA-18: Uncontrolled flow from east

Runoff = 0.15 cfs @ 12.51 hrs, Volume=

0.071 af, Depth= 0.13"

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Aı	rea (sf)	CN	Description				
1	10,517	30	Woods, Go				
	37,164	70	Woods, Go	od, HSG C			
,	40,560	77	Woods, Go	od, HSG D			
	62,000	39 :	>75% Gras	s cover, Go	ood, HSG A		
	24,500	74 :	>75% Gras	s cover, Go	ood, HSG C		
20 2000 00000 00000	12,000 80 >75% Grass cover, Good, HSG D						
286,741 50 Weighted Average							
2	286,741			ervious Are	ea		
Tc	Length	Slope	Velocity	Capacity	Description		
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)			
4.3	50	0.0400	0.20		Sheet Flow,		
					Grass: Short n= 0.150 P2= 3.20"		
3.6	210	0.0370	0.96		Shallow Concentrated Flow,		
1200					Woodland Kv= 5.0 fps		
7.9	260	Total			•		

### **Summary for Subcatchment PDA-19:**

Runoff = 1.27 cfs @ 12.11 hrs, Volume=

0.098 af, Depth= 1.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Type III 24-hr 2-Yr Storm Rainfall=3.20"

	A	rea (sf)	CN [	Description							
		25,700	98 F	Paved park	aved parking, HSG A						
_		12,500	39 >	75% Gras	s cover, Go	ood, HSG A					
		38,200	79 V	Veighted A	eighted Average						
		12,500	3	2.72% Per	vious Area						
	25,700 67.28% Impervious Area										
	Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description					
	7.4	50	0.0100	0.11		Sheet Flow, AB					
	0.1	5	0.0100	1.61		Grass: Short n= 0.150 P2= 3.20"  Shallow Concentrated Flow, BC  Unpaved Kv= 16.1 fps					
	7.5	55	Total								

# **Summary for Subcatchment PDA-20:**

Runoff = 2.92 cfs @ 12.11 hrs, Volume=

0.226 af, Depth= 2.26"

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	Α	rea (sf)	CN E	escription						
		36,590			aved parking, HSG C					
		15,682	74 >	75% Gras	s cover, Go	ood, HSG C				
		52,272	91 V	Veighted A	eighted Average					
		15,682	3	0.00% Per	rvious Area					
		36,590	7	0.00% Imp	pervious Are	ea				
		53		73.4						
	Tc	Length	Slope	Velocity	Capacity	Description				
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)					
	7.4	50	0.0100	0.11		Sheet Flow, AB				
						Grass: Short n= 0.150 P2= 3.20"				
	0.2	15	0.0100	1.61		Shallow Concentrated Flow, BC				
						Unpaved Kv= 16.1 fps				
**	7.6	65	Total							

## **Summary for Subcatchment PDA-21:**

Runoff = 1.41 cfs @ 12.11 hrs, Volume=

0.107 af, Depth= 1.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Type III 24-hr 2-Yr Storm Rainfall=3.20"

	Α	rea (sf)	CN E	Description					
_		15,000	98 F	Paved parking, HSG C					
		15,600	74 >	75% Gras	s cover, Go	ood, HSG C	×		
_		30,600	86 V	Veighted A					
		15,600	5	0.98% Per	vious Area				
	15,000 49.02% Impervious Are					ea			
					L	Saring to the second of the second			
	Тс	Length	Slope	Velocity	Capacity	Description			
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)				
	7.4	50	0.0100	0.11		Sheet Flow, AB			
						Grass: Short n= 0.150 P2= 3.20"			
	0.2	15	0.0100	1.61		Shallow Concentrated Flow, BC			
50		7 1/2 2000				Unpaved Kv= 16.1 fps			
-	7.6	65	Total						

# Summary for Reach 1R: Central Swamp

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

Inflow Area = 30.800 ac, 20.02% Impervious, Inflow Depth > 0.25" for 2-Yr Storm event

Inflow = 0.69 cfs @ 14.49 hrs, Volume= 0.654 af

Outflow = 0.69 cfs @ 14.49 hrs, Volume= 0.654 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs

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### Summary for Pond B4: Drain Basin 4

Inflow Area = 3.162 ac, 32.89% Impervious, Inflow Depth = 0.34" for 2-Yr Storm event 
Inflow = 0.51 cfs @ 12.39 hrs, Volume= 0.090 af 
Outflow = 0.19 cfs @ 13.07 hrs, Volume= 0.090 af 
Outflow = 0.19 cfs @ 13.07 hrs, Volume= 0.090 af 
Outflow = 0.090 af 
O

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Peak Elev= 270.68' @ 13.07 hrs Surf.Area= 3,353 sf Storage= 584 cf

Plug-Flow detention time= 26.1 min calculated for 0.090 af (100% of inflow)

Avail Ctorogo Ctorogo Description

Center-of-Mass det. time= 26.1 min ( 966.6 - 940.5 )

volume	inve	t Avail.S	torage	Storage Description	n		
#1	270.50	)' 21	,857 cf	<b>Custom Stage Dat</b>	a (Irregular) Listed	l below (Recalc)	
Elevation (fee		Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
270.5	50	3,174	340.4	0	0	3,174	
272.5	50	5,447	401.7	8,519	8,519	6,869	
274.5	50	7,970	439.4	13,337	21,857	9,529	
Device	Routing	Inve	rt Outle	et Devices			
#1	Discarded	270.50	) 2.41	0 in/hr Exfiltration o	over Surface area		
#2	Primary	271.00		" Round Culvert			
			L= 3	0.0' CPP, mitered t	to conform to fill, k	(e= 0.700	
			Inlet	/ Outlet Invert= 271	.00' / 270.00' S= 0	0.0333 '/' Cc= 0.900	
			n= 0	.013 Concrete pipe	, straight & clean,	Flow Area= 0.79 sf	
#3	Device 2	272.00	)' 3.0"	Vert. Orifice/Grate	C= 0.600		
#4	Device 2	273.00	)' 12.0'	" W x 18.0" H Vert.	Orifice/Grate C=	0.600	

Discarded OutFlow Max=0.19 cfs @ 13.07 hrs HW=270.68' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.19 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=270.50' (Free Discharge)

-2=Culvert (Controls 0.00 cfs)

3=Orifice/Grate (Controls 0.00 cfs)

-4=Orifice/Grate (Controls 0.00 cfs)

### Summary for Pond B5: Drain Basin 5

Inflow Area =	1.613 ac, 46.95% Impervious, Inflow De	epth = 0.69" for 2-Yr Storm event
Inflow =	0.96 cfs @ 12.15 hrs, Volume=	0.092 af
Outflow =	0.70 cfs @ 12.29 hrs, Volume=	0.092 af, Atten= 27%, Lag= 8.3 min
Discarded =	0.70 cfs @ 12.29 hrs, Volume=	0.092 af
Primary =	0.00 cfs @ 5.00 hrs, Volume=	0.000 af

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs

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Peak Elev= 271.06' @ 12.29 hrs Surf.Area= 3,655 sf Storage= 232 cf

Plug-Flow detention time= 3.8 min calculated for 0.092 af (100% of inflow) Center-of-Mass det. time= 3.8 min (893.5 - 889.7)

Volume	Invert	Avail.9	Storage	Storage Description	n		
#1	271.00'	21	1,026 cf	<b>Custom Stage Dat</b>	ta (Irregular) Listed	below (Recalc)	
Elevatio	1 T.	urf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
271.0	00	3,608	247.5	0	0	3,608	2
273.0	00	5,223	286.6	8,781	8,781	5,354	
275.0	00	7,068	326.3	12,245	21,026	7,385	
Device	Routing	Inve	ert Outle	et Devices			
#1	Discarded	271.0	0' 8.27	0 in/hr Exfiltration o	over Surface area		
#2	Primary	273.0	0' 12.0'	" Round Culvert			
	-			0.0' RCP, mitered			
				/ Outlet Invert= 273 .011 Concrete pipe		).0500 '/'    Cc= 0.900 Flow Area= 0.79 sf	)

Discarded OutFlow Max=0.70 cfs @ 12.29 hrs HW=271.06' (Free Discharge) 1=Exfiltration (Exfiltration Controls 0.70 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=271.00' (Free Discharge) 2=Culvert (Controls 0.00 cfs)

# Summary for Pond B7: Drain Basin 6

Inflow Area =	3.179 ac, 36.50% Impervious, Inflow I	Depth = 0.48" for 2-Yr Storm event
Inflow =	1.00 cfs @ 12.21 hrs, Volume=	0.127 af
Outflow =	0.20 cfs @ 13.71 hrs, Volume=	0.127 af, Atten= 80%, Lag= 90.1 min
Discarded =	0.20 cfs @ 13.71 hrs, Volume=	0.127 af
Primary =	0.00 cfs @ 5.00 hrs, Volume=	0.000 af

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Peak Elev= 267.44' @ 13.71 hrs Surf.Area= 3,498 sf Storage= 1,453 cf

Plug-Flow detention time= 73.3 min calculated for 0.127 af (100% of inflow) Center-of-Mass det. time= 73.2 min ( 987.3 - 914.1 )

Volume	Invert	Avail.	Storage	Storage Description	1			
#1	267.00' 20,349 cf		0,349 cf	Custom Stage Data (Irregular) Listed below (Recalc)				
Elevation (feet)		.Area sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)		
267.00		3.092	309.1	0	0	3,092		
268.00		4,048	328.0	3,559	3,559	4,102		
270.00	6	5,129	365.7	10,105	13,665	6,295		
271.00		7,255	384.6	6,684	20,349	7,485		

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Device	Routing	Invert	Outlet Devices
#1	Discarded	267.00'	2.410 in/hr Exfiltration over Surface area
#2	Primary	267.00'	12.0" Round Culvert
			L= 25.0' RCP, mitered to conform to fill, Ke= 0.700
			Inlet / Outlet Invert= 267.00' / 266.50' S= 0.0200 '/' Cc= 0.900
			n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#3	Device 2	270.00'	3.0" Vert. Orifice/Grate C= 0.600
	D01100 L	270.00	vert. Office/Grate C= 0.000

Discarded OutFlow Max=0.20 cfs @ 13.71 hrs HW=267.44' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.20 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=267.00' (Free Discharge)

2=Culvert (Controls 0.00 cfs)

3=Orifice/Grate (Controls 0.00 cfs)

# Summary for Pond C1: Drain Basin Condo 1

Inflow Area = 0.947 ac, 65.88% Impervious, Inflow Depth = 1.34" for 2-Yr Storm event Inflow = 1.41 cfs @ 12.10 hrs, Volume= 0.106 af

Outflow = 0.12 cfs @ 13.63 hrs, Volume= 0.103 af, Atten= 91%, Lag= 91.9 min

Primary = 0.12 cfs @ 13.63 hrs, Volume= 0.103 af

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Peak Elev= 275.08' @ 13.63 hrs Surf.Area= 2,453 sf Storage= 2,226 cf

Plug-Flow detention time= 266.7 min calculated for 0.103 af (98% of inflow) Center-of-Mass det. time= 254.5 min (1,101.0 - 846.5)

Volume	Inv	ert Avai	I.Storage	Storage Description	on		
#1	274.	00'	6,543 cf	Custom Stage Data (Irregular) Listed below (Recalc)			
			Perim. (feet)	7701.740		Wet.Area (sq-ft)	
274.0	00	1,699	238.0	0	0	1,699	
276.5	276.50 3,659 2		285.0	6,543	6,543	3,761	
Device	Routing	Inv	vert Outle	et Devices			
#1	Primary	274	.00' 12.0'	" Round Culvert			
	5		L= 2	0.0' RCP, groove	end w/headwall,	Ke= 0.200	
				/ Outlet Invert= 274			
5				.011 Concrete pipe	e, straight & clean	, Flow Area= 0.79 sf	
#2	Primary	274.	.00' <b>2.0</b> "	Vert. Orifice/Grate	C = 0.600		
#3	Device 1	275.	.00' <b>6.0"</b>	Vert. Orifice/Grate C= 0.600			

Primary OutFlow Max=0.12 cfs @ 13.63 hrs HW=275.08' (Free Discharge)

-1=Culvert (Passes 0.02 cfs of 3.01 cfs potential flow)
-3=Orifice/Grate (Orifice Controls 0.02 cfs @ 0.95 fps)

-2=Orifice/Grate (Orifice Controls 0.10 cfs @ 4.80 fps)

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### Summary for Pond C2: Drain Basin Condo 2

Inflow Area = 0.287 ac, 80.00% Impervious, Inflow Depth = 2.26" for 2-Yr Storm event

Inflow = 0.72 cfs @ 12.10 hrs, Volume= 0.054 af

Outflow = 0.19 cfs @ 12.47 hrs, Volume= 0.054 af, Atten= 73%, Lag= 22.3 min

Discarded = 0.19 cfs @ 12.47 hrs, Volume= 0.054 af Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Peak Elev= 272.58' @ 12.47 hrs Surf.Area= 1,013 sf Storage= 523 cf

Plug-Flow detention time= 15.9 min calculated for 0.054 af (100% of inflow)

Center-of-Mass det. time= 15.8 min ( 818.9 - 803.0 )

Volume	Invert	Avail.S	Storage	ge Storage Description				
#1 272.00' 2,400		,400 cf	Custom Stage Data (Irregular) Listed below (Recalc)					
	Elevation Surf.Area (feet) (sq-ft)		Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)		
272.0 274.0		795 1,657	124.9 162.6	0 2,400	0 2,400	795 1,704		
Device	Routing	Inve	ert Outle	et Devices				
#1	Discarded	272.0	0' 8.270	8.270 in/hr Exfiltration over Surface area				
#2	Primary	272.0		12.0" Round Culvert				
				0.0' RCP, groove				
						0.0167 '/' Cc= 0.900	)	
			n= 0.	.011 Concrete pipe	e, straight & clean,	Flow Area= 0.79 sf		
#3	Device 2	273.0	0' 4.0"	Vert. Orifice/Grate	C = 0.600			

Discarded OutFlow Max=0.19 cfs @ 12.47 hrs HW=272.58' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.19 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=272.00' (Free Discharge)

-2=Culvert (Controls 0.00 cfs)

**1**—3=Orifice/Grate (Controls 0.00 cfs)

# **Summary for Pond C3: Drain Basin Condo-3**

Inflow Area = 1.028 ac, 56.44% Impervious, Inflow Depth = 2.08" for 2-Yr Storm event

Inflow = 2.51 cfs @ 12.07 hrs, Volume= 0.178 af

Outflow = 0.12 cfs @ 14.86 hrs, Volume= 0.152 af, Atten= 95%, Lag= 167.0 min

Primary = 0.12 cfs @ 14.86 hrs, Volume= 0.152 af

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Peak Elev= 272.34' @ 14.86 hrs Surf.Area= 4,254 sf Storage= 4,681 cf

Plug-Flow detention time= 439.0 min calculated for 0.151 af (85% of inflow) Center-of-Mass det. time= 375.6 min (1,185.7 - 810.2)

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Volume	Inv	ert Avail.	Storage	Storage Descriptio	n			
#1	#1 271.00' 14,064 d		4,064 cf	Custom Stage Data (Irregular) Listed below (Recalc)				
Elevation (fee	et)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store Wet.Area (cubic-feet) (sq-ft)			
271.0			257.0	0	0	2,900		
272.0		3,740 2		3,311	3,311	3,749		
274.0	274.00 7,200 3		370.0	10,753	14,064	8,624		
Device	Routing	Inv	ert Outle	et Devices				
#1	Primary	271.0	00' <b>12.0</b> '	' Round Culvert				
				0.0' RCP, mitered				
				et / Outlet Invert= 271.00' / 270.50' S= 0.0167 '/' Cc= 0.900				
#2 #3	Device 1 Device 1	ce 1 271.00' <b>2.0</b> "		.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf Vert. Orifice/Grate C= 0.600 Vert. Orifice/Grate C= 0.600				

Primary OutFlow Max=0.12 cfs @ 14.86 hrs HW=272.34' (Free Discharge)

-1=Culvert (Passes 0.12 cfs of 3.06 cfs potential flow)

-2=Orifice/Grate (Orifice Controls 0.12 cfs @ 5.40 fps)

-3=Orifice/Grate (Controls 0.00 cfs)

## Summary for Pond C5: Drain Basin Condo 5

Inflow Area = 0.877 ac, 67.28% Impervious, Inflow Depth = 1.34" for 2-Yr Storm event

Inflow = 1.27 cfs @ 12.11 hrs, Volume= 0.098 af

Outflow = 0.10 cfs @ 13.91 hrs, Volume= 0.098 af, Atten= 92%, Lag= 107.9 min

Primary = 0.10 cfs @ 13.91 hrs, Volume= 0.098 af

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Peak Elev= 270.05' @ 13.91 hrs Surf.Area= 4,917 sf Storage= 1,882 cf

Plug-Flow detention time= 196.0 min calculated for 0.097 af (100% of inflow)

Center-of-Mass det. time= 195.7 min ( 1,043.1 - 847.4 )

Volume	Inv	ert Avail.	.Storage	Storage Description					
#1 269.00'		00' 1	3,497 cf	Custom Stage Data (Irregular) Listed below (Recalc)					
Elevatio			Perim. (feet)	GainGlorg		Wet.Area (sq-ft)			
269.0	0	0	0.0	0	0 .	0			
270.0	0	4,863	351.1	1,621	1,621	9,811			
272.0	0	7,082	388.8	11,876	13,497	12,151			
Device	Routing	iting Invert C		et Devices		,			
#1	Primary	269.0	00' <b>12.0</b> '	' Round Culvert					
			L= 30	0.0' RCP, mitered	to conform to fill,	Ke= 0.700			
#2	Device 1	269.0	n= 0.		, straight & clean,	0.0167 '/' Cc= 0.900 Flow Area= 0.79 sf			

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#3 Primary

271.00' 4.0' long x 2.0' breadth Broad-Crested Rectangular Weir

Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00

2.50 3.00 3.50

Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88

2.85 3.07 3.20 3.32

Primary OutFlow Max=0.10 cfs @ 13.91 hrs HW=270.05' (Free Discharge)

-1=Culvert (Passes 0.10 cfs of 2.48 cfs potential flow)

2=Orifice/Grate (Orifice Controls 0.10 cfs @ 4.74 fps)

-3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

## Summary for Pond C6: Drain Basin Condo 6

Inflow Area =

1.200 ac, 70.00% Impervious, Inflow Depth = 2.26" for 2-Yr Storm event

Inflow

2.92 cfs @ 12.11 hrs, Volume=

0.226 af 0.163 af, Atten= 95%, Lag= 180.4 min

Outflow Primary 0.13 cfs @ 15.12 hrs, Volume= 0.13 cfs @ 15.12 hrs, Volume=

0.163 af

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs. dt= 0.05 hrs. Peak Elev= 270.29' @ 15.12 hrs Surf.Area= 5,642 sf Storage= 6,333 cf

Plug-Flow detention time= 482.1 min calculated for 0.163 af (72% of inflow)

Avail Storage Storage Description

Center-of-Mass det. time= 393.3 min (1,197.3 - 804.0)

volume	olume mvert Avall.Storaç		Storage	e Storage Description				
#1	269.	00' 1	7,824 cf	Custom Stage Dat	a (Irregular) Listed	below (Recalc)		
Elevati		Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)		
269.	00	4,228	372.7	0	0	4,228		
272.	00	7,839	429.5	17,824	17,824	8,048		
Device #1	Routing Primary	Inve 269.0	00' 12.0'	et Devices " Round Culvert 0.0' RCP, mitered	to conform to fill. K	0-0.700		
			Inlet	하다 아이지를 보고 있다고 바쁜 보겠다는 그 <b>*</b> + 1 하시스 아이들의 하스 아이지를 했다. 기술이다. 1	.00' / 268.00' S= 0	.0333 '/' Cc= 0.900		
#2	Device 1	1 270.2	20' 4.0"	Vert. Orifice/Grate	C= 0.600			
#3	Device 1	271.0	0.8 '0.8	W x 12.0" H Vert. O	rifice/Grate C= 0	.600		
#4	Device 1	269.0	00' 2.0"	Vert. Orifice/Grate	C= 0.600			

Primary OutFlow Max=0.13 cfs @ 15.12 hrs HW=270.29' (Free Discharge)

-1=Culvert (Passes 0.13 cfs of 2.96 cfs potential flow)

-2=Orifice/Grate (Orifice Controls 0.02 cfs @ 1.01 fps)

-3=Orifice/Grate (Controls 0.00 cfs)

-4=Orifice/Grate (Orifice Controls 0.12 cfs @ 5.28 fps)

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### Summary for Pond C7: Drain Basin Condo 7

Inflow Area = 0.702 ac, 49.02% Impervious, Inflow Depth = 1.84" for 2-Yr Storm event

Inflow = 1.41 cfs @ 12.11 hrs, Volume= 0.107 af

Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Peak Elev= 270.37' @ 24.50 hrs Surf.Area= 3,999 sf Storage= 4,679 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)

Center-of-Mass det. time= (not calculated: no outflow)

Volume	Inve	ert Avail.S	Storage	Storage Description				
#1	#1 269.00' 15,300		5,300 cf	Custom Stage Data (Irregular) Listed below (Recalc)				
Elevation (feet)		Surf.Area Perir (sq-ft) (fee		Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)		
	269.00 2,824 27		275.8	0	0	2,824		
270.00	270.00 3,679 2		294.7	3,242	3,242	3,728		
272.50 6,066		6,066	341.8	12,058	15,300	6,243		
Device	Routing	Inve	ert Outle	et Devices				
#1	Primary	270.0	00' 12.0'	" Round Culvert				
	3. <del>4</del>		L= 3	0.0' RCP, mitered	to conform to fill.	Ke= 0.700		
				T (강경향상)		: 0.0333 '/' Cc= 0.900		
						Flow Area= 0.79 sf		
#2	Device 1	271.0		Vert. Orifice/Grate		, , , , , , , , , , , , , , , , , , , ,		

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HVV=269.00' (Free Discharge)

1=Culvert (Controls 0.00 cfs)

2=Orifice/Grate (Controls 0.00 cfs)

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## **Summary for Subcatchment PDA-11:**

Runoff

2.35 cfs @ 12.24 hrs, Volume=

0.266 af, Depth= 1.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Type III 24-hr 10-Yr Storm Rainfall=4.70"

_	Α	rea (sf)	CN [	Description					
		45,302	98 F	aved park	ing, HSG A				
_		92,434	39 >	75% Gras	s cover, Go	ood, HSG A			
	137,736 58 Weighted Av			Veighted A	verage				
	92,434			67.11% Pervious Area					
	45,302		3	32.89% Impervious Area					
	Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description			
	12.3	50	0.0200	0.07		Sheet Flow, AB			
_	2.0	198	0.0100	1.61		Woods: Light underbrush n= 0.400 P2= 3.20"  Shallow Concentrated Flow, BC  Unpaved Kv= 16.1 fps			
	14.3	248	Total						

## **Summary for Subcatchment PDA-12:**

Runoff =

2.56 cfs @ 12.14 hrs, Volume=

0.215 af, Depth= 1.60"

	Α	rea (sf)	CN E	escription		and the later forms of the stage of					
		32,983			ing, HSG A						
		37,272	39 >	>75% Grass cover, Good, HSG A							
		70,255	67 V	7 Weighted Average							
		37,272	5	53.05% Pervious Area							
		32,983	4	6.95% Imp	pervious Ar	ea					
				8							
	Tc	Length	Slope	Velocity	Capacity	Description					
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)						
	7.4	50	0.0100	0.11		Sheet Flow, AB					
						Grass: Short n= 0.150 P2= 3.20"					
	0.7	128	0.0200	2.87		Shallow Concentrated Flow, BC					
						Paved Kv= 20.3 fps					
	8.0	334	0.0250	7.17	5.63	Pipe Channel, CD					
						12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'					
_						n= 0.013					
	8.9	512	Total								

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### **Summary for Subcatchment PDA-13:**

Runoff

3.53 cfs @ 12.17 hrs, Volume=

0.333 af, Depth= 1.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Type III 24-hr 10-Yr Storm Rainfall=4.70"

	Α	rea (sf)	CN [	Description			
		44,415	98 F	Paved park	ing, HSG A		
		80,750	39 >	75% Gras	s cover, Go	ood, HSG A	
		6,128		Paved parking, HSG C			
_		7,167	74 >	-75% Gras	s cover, Go	ood, HSG C	
	1	38,460	62 \	<b>Neighted A</b>	verage		
		87,917	6	3.50% Per	vious Area		
		50,543	3	36.50% Imp	pervious Ar	ea	
	-						
	Tc	Length	Slope	Velocity	Capacity	Description	
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)		
	8.1	50	0.0080	0.10		Sheet Flow, AB	
	02000					Grass: Short n= 0.150 P2= 3.20"	
	0.7	99	0.0200	2.28		Shallow Concentrated Flow, BC	
						Unpaved Kv= 16.1 fps	
	2.0	262	0.0120	2.22		Shallow Concentrated Flow, CD	
		10	0.0400	4.54	0.50	Paved Kv= 20.3 fps	
	0.2	49	0.0100	4.54	3.56	Pipe Channel, DE	
						12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'	
33						n= 0.013 Concrete pipe, straight & clean	
	11.0	460	Total				

## Summary for Subcatchment PDA-14: Uncontrolled flow from west

Runoff

1.86 cfs @ 12.55 hrs, Volume=

0.407 af, Depth= 0.44"

Area (sf)	CN	Description
239,485	30	Woods, Good, HSG A
122,926	70	Woods, Good, HSG C
65,500	77	Woods, Good, HSG D
60,920	39	>75% Grass cover, Good, HSG A
488,831	47	Weighted Average
488,831		100.00% Pervious Area

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	Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	16.3	50	0.0100	0.05	1 16	Sheet Flow,
	6.6	325	0.0270	0.82	2001	Woods: Light underbrush n= 0.400 P2= 3.20"  Shallow Concentrated Flow,  Woodland Kv= 5.0 fps
_	22.9	375	Total			

# **Summary for Subcatchment PDA-15:**

Runoff

1.15 cfs @ 12.10 hrs, Volume=

0.088 af, Depth> 3.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Type III 24-hr 10-Yr Storm Rainfall=4.70"

	Α	rea (sf)	CN	Description		
		5,000				
		1,000	39	>75% Gras	s cover, Go	ood, HSG A
		1,500	80	>75% Gras	s cover, Go	ood, HSG D
12		5,000	98	Paved park	ing, HSG D	
		12,500	91	Weighted A	verage	
		2,500		20.00% Per		radaki wa walio ili ili ili ili ili ili ili ili ili
		10,000	;	30.00% Imp	pervious Ar	ea
				•		
	Tc	Length	Slope	Velocity	Capacity	Description
-	(min)	(feet)	(ft/ft)		(cfs)	and the second s
	5.1	31	0.0100	0.10		Sheet Flow, AB
						Grass: Short n= 0.150 P2= 3.20"
	1.5	182	0.0100	2.03		Shallow Concentrated Flow, BC
						Paved Kv= 20.3 fps
9	6.6	213	Total			

# **Summary for Subcatchment PDA-16:**

Runoff

2.73 cfs @ 12.10 hrs, Volume=

0.201 af, Depth= 2.55"

 Area (sf)	CN	Description
24,559	98	Paved parking, HSG A
13,082	39	>75% Grass cover, Good, HSG A
1,000	80	>75% Grass cover, Good, HSG D
2,626	98	Paved parking, HSG D
41,267	79	Weighted Average
14,082		34.12% Pervious Area
27,185		65.88% Impervious Area
		·

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	Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	5.1	31	0.0100	0.10		Sheet Flow, AB
						Grass: Short n= 0.150 P2= 3.20"
	1.5	182	0.0100	2.03		Shallow Concentrated Flow, BC
_				w.		Paved Kv= 20.3 fps
	6.6	213	Total			

### **Summary for Subcatchment PDA-17:**

[49] Hint: Tc<2dt may require smaller dt

Runoff = 4.12 cfs @ 12.07 hrs, Volume=

0.299 af, Depth> 3.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Type III 24-hr 10-Yr Storm Rainfall=4.70"

	Α	rea (sf)	CN E	Description						
		23,913	98 F	Paved parking, HSG C						
		1,369		Paved parking, HSG D						
		9,200				ood, HSG C				
10,309 80 >75% Grass cover, Good, HSG D										
44,791 89 Weighted Average										
	19,509 43.56% Pervious Area									
		25,282	. 5	6.44% Imp	pervious Are	ea				
	Tc	Length	Slope	Velocity	Capacity	Description				
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)					
	3.6	20	0.0100	0.09		Sheet Flow, AB				
						Grass: Short n= 0.150 P2= 3.20"				
	1.2	193	0.0180	2.72		Shallow Concentrated Flow, BC				
						Paved Kv= 20.3 fps				
	0.2	108	0.0800	9.97	29.90	Channel Flow, CD				
						Area= 3.0 sf Perim= 5.0' r= 0.60'				
_						n= 0.030 Earth, grassed & winding				
	5.0	321	Total							

# Summary for Subcatchment PDA-18: Uncontrolled flow from east

Runoff = 2.26 cfs @ 12.17 hrs, Volume=

0.315 af, Depth= 0.57"

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	Α	rea (sf)	CN [	Description			
	1	10,517	30 \	Noods, Go	od, HSG A		
		37,164	70 \	Noods, Go	od, HSG C		
		40,560			od, HSG D		
		62,000	39 >	75% Gras	s cover, Go	ood, HSG A	
		24,500	74 >	75% Gras	s cover, Go	ood, HSG C	
_		12,000	80 >	75% Gras	s cover, Go	ood, HSG D	
	286,741 50 Weighted Average						
	2	86,741	1	100.00% Pe	ervious Are	a	
	Tc	Length	Slope	Velocity	Capacity	Description	
-	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)		
	4.3	50	0.0400	0.20		Sheet Flow,	
						Grass: Short n= 0.150 P2= 3.20"	
	3.6	210	0.0370	0.96		Shallow Concentrated Flow,	
						Woodland Kv= 5.0 fps	
	7.9	260	Total				

## **Summary for Subcatchment PDA-19:**

Runoff = 2.45 cfs @ 12.11 hrs, Volume=

0.186 af, Depth= 2.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Type III 24-hr 10-Yr Storm Rainfall=4.70"

_	Α	rea (sf)	CN E	escription			
		25,700	98 F	aved park	ing, HSG A		
		12,500	39 >	75% Grass	s cover, Go	ood, HSG A	
		38,200	79 V	Veighted A	verage		
		12,500	3	2.72% Per	vious Area		
		25,700	6	7.28% Imp	ervious Ar	ea	
	_						
	Tc	Length	Slope	Velocity	Capacity	Description	
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)		
	7.4	50	0.0100	0.11		Sheet Flow, AB	
						Grass: Short n= 0.150 P2= 3.20"	
	0.1	5	0.0100	1.61		Shallow Concentrated Flow, BC	
_						Unpaved Kv= 16.1 fps	
	7.5	55	Total			*	

## **Summary for Subcatchment PDA-20:**

Runoff = 4.67 cfs @ 12.11 hrs, Volume=

0.369 af, Depth> 3.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Type III 24-hr 10-Yr Storm Rainfall=4.70"

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-	Α	rea (sf)	CN D	Description		
_		36,590	98 F	aved park	ing, HSG C	
		15,682				ood, HSG C
		52,272		Veighted A		
		15,682			vious Area	
		36,590			ervious Ar	
		00,000	> <b>■</b> (1)	0.0070 1111	701 V1000 7 11 1	<b></b>
	Tc	Length	Slope	Velocity	Capacity	Description
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	2.44.4
-	7.4	50	0.0100	0.11		Sheet Flow, AB
						Grass: Short n= 0.150 P2= 3.20"
	0.2	15	0.0100	1.61		Shallow Concentrated Flow, BC
						Unpaved Kv= 16.1 fps
	7.6	65	Total			

## **Summary for Subcatchment PDA-21:**

Runoff =

2.43 cfs @ 12.11 hrs, Volume=

0.187 af, Depth= 3.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Type III 24-hr 10-Yr Storm Rainfall=4.70"

7524	Α	rea (sf)	CN D	escription			*
		15,000	98 F	aved park	ing, HSG C	;	
		15,600	74 >	75% Gras	s cover, Go	ood, HSG C	
		30,600	86 V	Veighted A	verage		
		15,600	5	0.98% Per	vious Area		
		15,000	4	9.02% Imp	pervious Are	ea	
	Tc	Length	Slope	Velocity	Capacity	Description	
-	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)		
	7.4	50	0.0100	0.11		Sheet Flow, AB	
						Grass: Short n= 0.150 P2= 3.20"	
	0.2	15	0.0100	1.61		Shallow Concentrated Flow, BC	
-						Unpaved Kv= 16.1 fps	
	7.6	65	Total				

## Summary for Reach 1R: Central Swamp

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

Inflow Area =

30.800 ac, 20.02% Impervious, Inflow Depth > 0.63" for 10-Yr Storm event

Inflow =

4.64 cfs @ 12.44 hrs, Volume=

1.619 af

Outflow =

4.64 cfs @ 12.44 hrs, Volume=

1.619 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs

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## Summary for Pond B4: Drain Basin 4

Inflow Area = 3.162 ac, 32.89% Impervious, Inflow Depth = 1.01" for 10-Yr Storm event
Inflow = 2.35 cfs @ 12.24 hrs, Volume= 0.266 af
Outflow = 0.25 cfs @ 15.25 hrs, Volume= 0.266 af, Atten= 89%, Lag= 180.9 min

Discarded = 0.25 cfs @ 15.25 hrs, Volume= 0.266 af Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Peak Elev= 271.77' @ 15.25 hrs Surf.Area= 4,546 sf Storage= 4,872 cf

Plug-Flow detention time= 227.6 min calculated for 0.265 af (100% of inflow)

Avail.Storage Storage Description

Center-of-Mass det. time= 227.4 min (1,122.2 - 894.8)

Invert

#1 270.50 21,857 cf Custom Stage Data (Irregular) Listed below (Recalc) Elevation Surf.Area Inc.Store Cum.Store Perim. Wet.Area (feet) (feet) (cubic-feet) (cubic-feet) (sq-ft) (sq-ft) 3,174 3,174 270.50 340.4 0 0 8,519 272.50 5,447 401.7 8,519 6,869 7,970 274.50 439.4 13,337 21,857 9,529

Device	Routing	Invert	Outlet Devices
#1	Discarded	270.50'	2.410 in/hr Exfiltration over Surface area
#2	Primary	271.00'	12.0" Round Culvert
			L= 30.0' CPP, mitered to conform to fill, Ke= 0.700
			Inlet / Outlet Invert= 271.00' / 270.00' S= 0.0333 '/' Cc= 0.900
			n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#3	Device 2	272.00'	3.0" Vert. Orifice/Grate C= 0.600
#4	Device 2	273.00'	12.0" W x 18.0" H Vert. Orifice/Grate C= 0.600

Discarded OutFlow Max=0.25 cfs @ 15.25 hrs HW=271.77' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.25 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=270.50' (Free Discharge)

-2=Culvert (Controls 0.00 cfs)

3=Orifice/Grate (Controls 0.00 cfs)

-4=Orifice/Grate (Controls 0.00 cfs)

## Summary for Pond B5: Drain Basin 5

Inflow Area = 1.613 ac, 46.95% Impervious, Inflow Depth = 1.60" for 10-Yr Storm event

Inflow = 2.56 cfs @ 12.14 hrs, Volume= 0.215 af

Outflow = 0.77 cfs @ 12.56 hrs, Volume= 0.215 af, Atten= 70%, Lag= 25.2 min

Discarded = 0.77 cfs @ 12.56 hrs, Volume= 0.215 af Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs

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Peak Elev= 271.52' @ 12.56 hrs Surf.Area= 3,999 sf Storage= 1,976 cf

Plug-Flow detention time= 16.4 min calculated for 0.215 af (100% of inflow)

Center-of-Mass det. time= 16.3 min (878.2 - 861.9)

Volume	Volume Invert Avail.Storage		Storage Description	on				
#1	271.00'	21,026 cf		Custom Stage Data (Irregular) Listed below (Recalc)				
Elevatio		rf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)		
271.0	00	3,608	247.5	0	Ó	3,608		
273.0	00	5,223	286.6	8,781	8,781	5,354		
275.0	00	7,068	326.3	12,245	21,026	7,385		
Device Routing Invert Outle			et Devices					
#1	Discarded	271.00	0' 8.27	0 in/hr Exfiltration	over Surface area			
#2	#2 Primary 273.00' 12.0'		" Round Culvert					
		L= 20.0' RCP, mitered to conform to fill, Ke= 0.700						
						0.0500 '/' Cc= 0.900		
	n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf							

**Discarded OutFlow** Max=0.77 cfs @ 12.56 hrs HW=271.52' (Free Discharge) 1=Exfiltration (Exfiltration Controls 0.77 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=271.00' (Free Discharge) —2=Culvert (Controls 0.00 cfs)

## Summary for Pond B7: Drain Basin 6

Inflow Area =	3.179 ac, 36.50% Impervious, Inflow De	epth = 1.26" for 10-Yr Storm event
Inflow =	3.53 cfs @ 12.17 hrs, Volume=	0.333 af
Outflow =	0.27 cfs @ 15.53 hrs, Volume=	0.333 af, Atten= 92%, Lag= 201.6 min
Discarded =	0.27 cfs @ 15.53 hrs, Volume=	0.333 af
Primary =	0.00 cfs @ 5.00 hrs, Volume=	0.000 af

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Peak Elev= 268.78' @ 15.53 hrs Surf.Area= 4,807 sf Storage= 7,004 cf

Plug-Flow detention time= 311.6 min calculated for 0.332 af (100% of inflow) Center-of-Mass det. time= 311.6 min (1,190.0 - 878.4)

Volume	Invert Av	ail.Storage	Storage Descripti	on		
#1	267.00' 20,349 cf		Custom Stage Da	ata (Irregular) List	ed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft		Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
267.00	3,092	2 309.1	0	0	3,092	
268.00	4,048	328.0	3,559	3,559	4,102	
270.00	6,129	365.7	10,105	13,665	6,295	
271.00	7,25	384.6	6,684	20,349	7,485	

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Device	Routing	Invert	Outlet Devices
#1	Discarded	267.00'	2.410 in/hr Exfiltration over Surface area
#2	Primary	267.00'	12.0" Round Culvert
			L= 25.0' RCP, mitered to conform to fill, Ke= 0.700
			Inlet / Outlet Invert= 267.00' / 266.50' S= 0.0200 '/' Cc= 0.900
		Security over the contribution of the con-	n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#3	Device 2	270.00'	3.0" Vert. Orifice/Grate C= 0.600

Discarded OutFlow Max=0.27 cfs @ 15.53 hrs HW=268.78' (Free Discharge) -1=Exfiltration (Exfiltration Controls 0.27 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=267.00' (Free Discharge) -2=Culvert (Controls 0.00 cfs)

-3=Orifice/Grate (Controls 0.00 cfs)

Invert

## Summary for Pond C1: Drain Basin Condo 1

Inflow Area = 0.947 ac, 65.88% Impervious, Inflow Depth = 2.55" for 10-Yr Storm event

Inflow 2.73 cfs @ 12.10 hrs, Volume= 0.201 af

Outflow 0.68 cfs @ 12.51 hrs, Volume= = 0.197 af, Atten= 75%, Lag= 24.6 min

Primary 0.68 cfs @ 12.51 hrs, Volume= 0.197 af

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs. dt= 0.05 hrs. Peak Elev= 275.59' @ 12.51 hrs Surf.Area= 2,857 sf Storage= 3,574 cf

Plug-Flow detention time= 192.8 min calculated for 0.197 af (98% of inflow) Center-of-Mass det. time= 182.3 min (1,010.1 - 827.8)

#1	274.00'	6,543 cf	Custom Stage Dat	a (Irregular) Listed	below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
274.00	1,699	238.0	0	0	1,699
276.50	3,659	285.0	6,543	6,543	3,761

Avail.Storage Storage Description

Device	Routing	Invert	Outlet Devices	
#1	Primary	274.00'	12.0" Round Culvert	
		* 1,500	L= 20.0' RCP, groove end w/headwall, Ke= 0.200	
			Inlet / Outlet Invert= 274.00' / 273.80' S= 0.0100 '/' Cc= 0.900	
			n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf	
#2	Primary	274.00'	2.0" Vert. Orifice/Grate C= 0.600	
#3	Device 1	275.00'	6.0" Vert. Orifice/Grate C= 0.600	

Primary OutFlow Max=0.68 cfs @ 12.51 hrs HW=275.59' (Free Discharge)

1=Culvert (Passes 0.55 cfs of 4.35 cfs potential flow)

3=Orifice/Grate (Orifice Controls 0.55 cfs @ 2.79 fps) -2=Orifice/Grate (Orifice Controls 0.13 cfs @ 5.90 fps)

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#### Summary for Pond C2: Drain Basin Condo 2

[82] Warning: Early inflow requires earlier time span

Inflow Area = 0.287 ac, 80.00% Impervious, Inflow Depth > 3.69" for 10-Yr Storm event 1.15 cfs @ 12.10 hrs, Volume= 0.088 af 0.25 cfs @ 12.52 hrs, Volume= 0.088 af 0.23 cfs @ 12.52 hrs, Volume= 0.088 af 0.01 cfs @ 12.52 hrs, Volume= 0.088 af 0.01 cfs @ 12.52 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Peak Elev= 273.07' @ 12.52 hrs Surf.Area= 1,218 sf Storage= 1,072 cf

Plug-Flow detention time= 30.6 min calculated for 0.088 af (100% of inflow) Center-of-Mass det. time= 30.5 min (820.4 - 789.9)

Avail Storage Storage Description

volume	mven	Avaii.St	Jiage S	torage Description				
#1	272.00'	2,4	00 cf C	ustom Stage Data	a (Irregular) Listed	below (Recalc)		
Elevatio		urf.Area I (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)		
272.0 274.0		795 1,657	124.9 162.6	0 2,400	0 2,400	795 1,704		
Device	Routing	Invert	Outlet	Devices				
#1				8.270 in/hr Exfiltration over Surface area 12.0" Round Culvert				
#2	Primary	272.00'	L= 30.	0' RCP, groove e Outlet Invert= 272.	nd w/headwall, Ke 00' / 271.50' S= 0 straight & clean, F	.0167 '/' Cc= 0.900		
#3	Device 2	273.00'		ert. Orifice/Grate				

**Discarded OutFlow** Max=0.23 cfs @ 12.52 hrs HW=273.07' (Free Discharge) 1=Exfiltration (Exfiltration Controls 0.23 cfs)

Primary OutFlow Max=0.01 cfs @ 12.52 hrs HW=273.07' (Free Discharge)

2=Culvert (Passes 0.01 cfs of 3.57 cfs potential flow)

3=Orifice/Grate (Orifice Controls 0.01 cfs @ 0.91 fps)

# **Summary for Pond C3: Drain Basin Condo-3**

Inflow Area = 1.028 ac, 56.44% Impervious, Inflow Depth > 3.49" for 10-Yr Storm event
Inflow = 4.12 cfs @ 12.07 hrs, Volume= 0.299 af
Outflow = 0.18 cfs @ 14.97 hrs, Volume= 0.219 af, Atten= 96%, Lag= 174.0 min
Outflow = 0.18 cfs @ 14.97 hrs, Volume= 0.219 af

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Peak Elev= 273.09' @ 14.97 hrs Surf.Area= 5,483 sf Storage= 8,298 cf

Plug-Flow detention time= 480.5 min calculated for 0.219 af (73% of inflow)

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Center-of-Mass det. time= 392.7 min (1,188.4 - 795.7)

Volume	Inv	ert Avai	l.Storage	Storage Descriptio	n		
#1	271.	00'	14,064 cf	Custom Stage Date	ta (Irregular) Liste	ed below (Recalc)	
Elevation (fee		Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
271.0	00	2,900	257.0	0	0	2,900	
272.0	00	3,740	276.0	3,311	3,311	3,749	
274.0	00	7,200	370.0	10,753	14,064	8,624	
Device	Routing	In	vert Outle	et Devices			
#1	Primary	271	.00' 12.0'	" Round Culvert			
	-		L= 3	0.0' RCP, mitered	to conform to fill,	Ke= 0.700	
			Inlet	/ Outlet Invert= 271	.00' / 270.50' S=	0.0167 '/' Cc= 0.900	
			n= 0	.011 Concrete pipe	, straight & clean,	Flow Area= 0.79 sf	
#2	Device 1	271	.00' 2.0"	Vert. Orifice/Grate	C = 0.600		
#3	Device 1	273	.00' <b>8.0"</b>	Vert. Orifice/Grate	C = 0.600		

Primary OutFlow Max=0.18 cfs @ 14.97 hrs HW=273.09' (Free Discharge)

1=Culvert (Passes 0.18 cfs of 4.20 cfs potential flow)

2=Orifice/Grate (Orifice Controls 0.15 cfs @ 6.82 fps)

-3=Orifice/Grate (Orifice Controls 0.03 cfs @ 1.01 fps)

# Summary for Pond C5: Drain Basin Condo 5

Inflow Area = 0.877 ac, 67.28% Impervious, Inflow Depth = 2.55" for 10-Yr Storm event

Inflow = 2.45 cfs @ 12.11 hrs, Volume= 0.186 af

Outflow = 0.13 cfs @ 15.11 hrs, Volume= 0.178 af, Atten= 95%, Lag= 180.2 min

Primary = 0.13 cfs @ 15.11 hrs, Volume= 0.178 af

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Peak Elev= 270.54' @ 15.11 hrs Surf.Area= 5,420 sf Storage= 4,390 cf

Plug-Flow detention time= 380.8 min calculated for 0.178 af (96% of inflow)

Center-of-Mass det. time= 358.3 min (1,187.0 - 828.6)

Volume	Inv	ert Ava	il.Storage	Storage Description					
#1	269.	00'	13,497 cf	Custom Stage Dat	ta (Irregular) Liste	d below (Recalc)			
Elevatio (fee		Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)			
269.0 270.0 272.0	0	0 4,863 7,082	0.0 351.1 388.8	0 1,621 11,876	0 1,621 13,497	9,811 12,151			
Device #1	Routing	lr		et Devices					

L= 30.0' RCP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 269.00' / 268.50' S= 0.0167 '/' Cc= 0.900

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#2	Device 1	269.00'	n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf  2.0" Vert. Orifice/Grate C= 0.600
#3	Primary	271.00'	
#3	rilliary	27 1.00	4.0' long x 2.0' breadth Broad-Crested Rectangular Weir
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00
			2.50 3.00 3.50
			Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88
			2.85 3.07 3.20 3.32

Primary OutFlow Max=0.13 cfs @ 15.11 hrs HW=270.54' (Free Discharge)

1=Culvert (Passes 0.13 cfs of 3.40 cfs potential flow)
2=Orifice/Grate (Orifice Controls 0.13 cfs @ 5.81 fps)
3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

## Summary for Pond C6: Drain Basin Condo 6

[82] Warning: Early inflow requires earlier time span

Inflow Area = 1.200 ac, 70.00% Impervious, Inflow Depth > 3.69" for 10-Yr Storm event Inflow = 0.369 af

Outflow = 0.41 cfs @ 13.11 hrs, Volume= 0.289 af, Atten= 91%, Lag= 60.1 min

Primary = 0.41 cfs @ 13.11 hrs, Volume= 0.289 af

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Peak Elev= 270.78' @ 13.11 hrs Surf.Area= 6,232 sf Storage= 9,232 cf

Plug-Flow detention time= 364.1 min calculated for 0.289 af (78% of inflow)

Avail Storage Storage Description

Center-of-Mass det. time= 285.8 min (1,076.6 - 790.8)

Volunte	1110	eit Ava	ii.Storage	Storage Description	II .		
#1	269.0	00'	17,824 cf	Custom Stage Da	ta (Irregular) Listed	below (Recalc)	
Elevation (fee		Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
269.0	00	4,228	372.7	0	0	4,228	
272.0	00	7,839	429.5	17,824	17,824	8,048	
Device #1	Routing Primary		0.00' 12.0	et Devices " Round Culvert			
			Inlet n= 0	/ Outlet Invert= 269 .011 Concrete pipe	, straight & clean, F	.0333 '/' Cc= 0.900	
#2	Device 1			Vert. Orifice/Grate			
#3	Device 1			W x 12.0" H Vert. C		.600	
#4	Device 1	269	.00' <b>2.0"</b>	Vert. Orifice/Grate	C= 0.600		

Primary OutFlow Max=0.41 cfs @ 13.11 hrs HW=270.78' (Free Discharge)

-1=Culvert (Passes 0.41 cfs of 3.77 cfs potential flow)

-2=Orifice/Grate (Orifice Controls 0.27 cfs @ 3.08 fps)

-3=Orifice/Grate (Controls 0.00 cfs)

-4=Orifice/Grate (Orifice Controls 0.14 cfs @ 6.26 fps)

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## Summary for Pond C7: Drain Basin Condo 7

Inflow Area = 0.702 ac, 49.02% Impervious, Inflow Depth = 3.19" for 10-Yr Storm event

Inflow = 2.43 cfs @ 12.11 hrs, Volume= 0.187 af

Outflow = 0.02 cfs @ 24.03 hrs, Volume= 0.013 af, Atten= 99%, Lag= 715.4 min

Primary = 0.02 cfs @ 24.03 hrs, Volume= 0.013 af

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Peak Elev= 271.10' @ 24.03 hrs Surf.Area= 4,658 sf Storage= 7,825 cf

Plug-Flow detention time= 874.6 min calculated for 0.013 af (7% of inflow)

Center-of-Mass det. time= 637.4 min (1,445.7 - 808.3)

Volume	Inv	ert Avail.	Storage	Storage Description						
#1	269.	00' 1	5,300 cf	Custom Stage Date	ta (Irregular) Listed	d below (Recalc)				
Elevation (fee		Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)				
269.0	00	2,824	275.8	0	0	2,824				
270.0	00	3,679	294.7	3,242	3,242	3,728				
272.5	50	6,066	341.8	12,058	15,300	6,243				
Device	Routing	Inve	ert Outle	et Devices						
#1	Primary	270.0	00' 12.0'	" Round Culvert						
			L= 3	0.0' RCP, mitered	to conform to fill, I	<e= 0.700<="" td=""><td></td></e=>				
			Inlet	/ Outlet Invert= 270	.00' / 269.00' S=	0.0333 '/' Cc= 0.900				
			n= 0.	.011 Concrete pipe	, straight & clean,	Flow Area= 0.79 sf				
#2	Device 1	271.0	00' 4.0"	Vert. Orifice/Grate	C = 0.600					

Primary OutFlow Max=0.02 cfs @ 24.03 hrs HW=271.10' (Free Discharge)

1=Culvert (Passes 0.02 cfs of 2.59 cfs potential flow)

2=Orifice/Grate (Orifice Controls 0.02 cfs @ 1.09 fps)

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## **Summary for Subcatchment PDA-11:**

Runoff

=

5.93 cfs @ 12.21 hrs, Volume=

0.582 af, Depth= 2.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Type III 24-hr 100-Yr Storm Rainfall=6.70"

	A	rea (sf)	CN [	Description		
		45,302	98 F	aved park	ing, HSG A	
		92,434	39 >	75% Gras	s cover, Go	ood, HSG A
	1	37,736	58 V	Veighted A	verage	
		92,434	6	7.11% Per	vious Area	
		45,302	3	32.89% lmp	ervious Ar	ea
(	Tc min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	12.3	50	0.0200	0.07		Sheet Flow, AB
	2.0	198	0.0100	1.61		Woods: Light underbrush n= 0.400 P2= 3.20"  Shallow Concentrated Flow, BC  Unpaved Kv= 16.1 fps
	14.3	248	Total			

## **Summary for Subcatchment PDA-12:**

Runoff

=

5.11 cfs @ 12.13 hrs, Volume=

0.413 af, Depth= 3.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Type III 24-hr 100-Yr Storm Rainfall=6.70"

A	rea (sf)	CN E	escription					
	32,983	98 F	98 Paved parking, HSG A					
W	37,272	39 >	75% Gras	s cover, Go	ood, HSG A			
***************************************	70,255	67 V	Veighted A	verage				
	37,272			vious Area				
	32,983	17		pervious Ar				
Tc	Length	Slope	Velocity	Capacity	Description			
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)				
7.4	50	0.0100	0.11		Sheet Flow, AB			
					Grass: Short n= 0.150 P2= 3.20"			
0.7	128	0.0200	2.87		Shallow Concentrated Flow, BC			
			0.000		Paved Kv= 20.3 fps			
0.8	334	0.0250	7.17	5.63				
					12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'			
					n= 0.013			
8.9	512	Total	VI					

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## **Summary for Subcatchment PDA-13:**

Runoff

7.87 cfs @ 12.16 hrs, Volume=

0.684 af, Depth= 2.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Type III 24-hr 100-Yr Storm Rainfall=6.70"

	Α	rea (sf)	CN [	Description								
		44,415	98 F	98 Paved parking, HSG A								
		80,750	39 >	75% Ġras	s cover, Go	ood, HSG A						
		6,128	98 F	Paved park	ing, HSG C							
		7,167	74 >	75% Gras	s cover, Go	ood, HSG C						
	1	38,460	62 V	Veighted A	verage							
		87,917	6	3.50% Per	vious Area							
		50,543	3	6.50% Imp	pervious Ar	ea						
	Тс	Length	Slope	Velocity	Capacity	Description						
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)							
	8.1	50	0.0080	0.10		Sheet Flow, AB						
						Grass: Short n= 0.150 P2= 3.20"						
	0.7	99	0.0200	2.28		Shallow Concentrated Flow, BC						
		222				Unpaved Kv= 16.1 fps						
	2.0	262	0.0120	2.22		Shallow Concentrated Flow, CD						
						Paved Kv= 20.3 fps						
*	0.2	49	0.0100	4.54	3.56	Pipe Channel, DE						
						12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'						
_						n= 0.013 Concrete pipe, straight & clean						
	11.0	460	Total									

# Summary for Subcatchment PDA-14: Uncontrolled flow from west

Runoff

8.26 cfs @ 12.40 hrs, Volume=

1.175 af, Depth= 1.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Type III 24-hr 100-Yr Storm Rainfall=6.70"

	Area (sf)	CN	Description	
	239,485	30	Woods, Good, HSG A	
	122,926	70	Woods, Good, HSG C	
	65,500	77	Woods, Good, HSG D	
- 1	60,920	39	>75% Grass cover, Good, HSG A	
	488,831	47	Weighted Average	
	488,831		100.00% Pervious Area	

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	50	0.0100	0.05		Sheet Flow,
					Woods: Light underbrush n= 0.400 P2= 3.20"
6.6	325	0.0270	0.82		Shallow Concentrated Flow,
					Woodland Kv= 5.0 fps
22.9	375	Total			

## **Summary for Subcatchment PDA-15:**

Runoff

1.72 cfs @ 12.09 hrs, Volume=

0.134 af, Depth> 5.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Type III 24-hr 100-Yr Storm Rainfall=6.70"

A	rea (sf)	CN	Description					
	5,000	98	Paved park	ing, HSG A				
	1,000	39	>75% Gras	s cover, Go	ood, HSG A			
	1,500	80	>75% Gras	s cover, Go	ood, HSG D			
	5,000	98	Paved park	ing, HSG D				
	12,500	91	91 Weighted Average					
	2,500		20.00% Per	rvious Area	p.			
	10,000		80.00% Imp	pervious Ar	ea			
			·					
Tc	Length	Slope	Velocity	Capacity	Description			
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)				
5.1	31	0.0100	0.10	100000000000000000000000000000000000000	Sheet Flow, AB			
					Grass: Short n= 0.150 P2= 3.20"			
1.5	182	0.0100	2.03		Shallow Concentrated Flow, BC			
5					Paved Kv= 20.3 fps			
6.6	213	Total						

# **Summary for Subcatchment PDA-16:**

Runoff

4.59 cfs @ 12.10 hrs, Volume=

0.340 af, Depth= 4.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Type III 24-hr 100-Yr Storm Rainfall=6.70"

Area (sf)	CN	Description
24,559	98	Paved parking, HSG A
13,082	39	>75% Grass cover, Good, HSG A
1,000	80	>75% Grass cover, Good, HSG D
2,626	98	Paved parking, HSG D
41,267	79	Weighted Average
14,082		34.12% Pervious Area
27,185		65.88% Impervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	31	0.0100	0.10		Sheet Flow, AB
					Grass: Short n= 0.150 P2= 3.20"
1.5	182	0.0100	2.03		Shallow Concentrated Flow, BC
					Paved Kv= 20.3 fps
6.6	213	Total			

## **Summary for Subcatchment PDA-17:**

[49] Hint: Tc<2dt may require smaller dt

Runoff = 6.26 cfs @ 12.07 hrs, Volume=

0.463 af, Depth> 5.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Type III 24-hr 100-Yr Storm Rainfall=6.70"

	Α	rea (sf)	CN [	Description							
		23,913	98 F	aved park	ing, HSG C						
		1,369	98 F	aved park	aved parking, HSG D						
		9,200	74 >	75% Gras	s cover, Go	ood, HSG C					
		10,309	80 >	75% Gras	s cover, Go	ood, HSG D					
		19,509	4	3.56% Pe	rvious Area						
25,282 56.44% Impervious Are						ea					
	10.00		120								
	Тс	Length	Slope	Velocity	Capacity	Description					
-	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)						
	3.6	20	0.0100	0.09		Sheet Flow, AB					
						Grass: Short n= 0.150 P2= 3.20"					
	1.2	193	0.0180	2.72		Shallow Concentrated Flow, BC					
						Paved Kv= 20.3 fps					
	0.2	108	0.0800	9.97	29.90	Channel Flow, CD					
						Area= 3.0 sf Perim= 5.0' r= 0.60'					
_						n= 0.030 Earth, grassed & winding					
	5.0	321	Total								

# Summary for Subcatchment PDA-18: Uncontrolled flow from east

Runoff = 8.97 cfs @ 12.14 hrs, Volume=

0.824 af, Depth= 1.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Type III 24-hr 100-Yr Storm Rainfall=6.70"

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_	A	rea (sf)	CN [	Description		
	1	10,517	30 V	Voods, Go	od, HSG A	
		37,164	70 V	Voods, Go	od, HSG C	
		40,560	77 V	Voods, Go	od, HSG D	
		62,000	39 >	75% Gras	s cover, Go	ood, HSG A
		24,500	74 >	75% Grass	s cover, Go	ood, HSG C
12,000 80 >75% Grass cover, Go						ood, HSG D
	286,741 50 Weighted Average					
	286,741			00.00% Pe	ervious Are	a
	Тс	Length	Slope	Velocity	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	4.3	50	0.0400	0.20		Sheet Flow,
						Grass: Short n= 0.150 P2= 3.20"
	3.6	210	0.0370	0.96		Shallow Concentrated Flow,
_						Woodland Kv= 5.0 fps
	7.9	260	Total			

## **Summary for Subcatchment PDA-19:**

Runoff = 4.13 cfs @ 12.11 hrs, Volume=

0.315 af, Depth= 4.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Type III 24-hr 100-Yr Storm Rainfall=6.70"

<i>F</i>	rea (sf)	CN [	N Description					
	25,700	98 F	Paved park	ing, HSG A				
	12,500	39 >	75% Gras	s cover, Go	ood, HSG A			
	38,200	79 V	Veighted A	verage				
	12,500	3	2.72% Per	vious Area				
25,700 67.28% Impervious Are					ea			
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description			
7.4	50	0.0100	0.11		Sheet Flow, AB	-		
0.1	5	0.0100	1.61		Grass: Short n= 0.150 P2= 3.20"  Shallow Concentrated Flow, BC  Unpaved Kv= 16.1 fps			
7.5	55	Total						

## **Summary for Subcatchment PDA-20:**

Runoff = 6.98 cfs @ 12.11 hrs, Volume=

0.562 af, Depth> 5.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Type III 24-hr 100-Yr Storm Rainfall=6.70"

Type III 24-hr 100-Yr Storm Rainfall=6.70" Printed 3/11/2016

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	Α	rea (sf)	CN D	escription						
		36,590			ing, HSG C					
		15,682	74 >	75% Gras	s cover, Go	ood, HSG C				
		52,272	91 V	Veighted A	eighted Average					
15,682 30.00% Pervious Area										
		36,590	7	0.00% Imp	pervious Ar	ea				
				8.5						
	Tc	Length	Slope	Velocity	Capacity	Description				
17	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)					
	7.4	50	0.0100	0.11		Sheet Flow, AB				
						Grass: Short n= 0.150 P2= 3.20"				
	0.2	15	0.0100	1.61		Shallow Concentrated Flow, BC				
	4			370779444444		Unpaved Kv= 16.1 fps				
	7.6	65	Total							

## **Summary for Subcatchment PDA-21:**

Runoff = 3.80 cfs @ 12.11 hrs, Volume=

0.297 af, Depth> 5.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Type III 24-hr 100-Yr Storm Rainfall=6.70"

	Area (sf) CN Description									
		15,000	15,000 98 Paved parking, HSG C 15,600 74 >75% Grass cover, Good, HSG C							
		30,600	86 V	Veighted Average						
15,600 50.98% Pervious Area										
	15,000 49.02% Impervious Area					ea				
	Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description				
	7.4	50	0.0100	0.11		Sheet Flow, AB				
	0.2	15	0.0100	1.61		Grass: Short n= 0.150 P2= 3.20"  Shallow Concentrated Flow, BC  Unpaved Kv= 16.1 fps				
	7.6	65	Total							

## Summary for Reach 1R: Central Swamp

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

Inflow Area = 30.800 ac, 20.02% Impervious, Inflow Depth > 1.46" for 100-Yr Storm event

Inflow = 16.60 cfs @ 12.36 hrs, Volume= 3.757 af

Outflow = 16.60 cfs @ 12.36 hrs, Volume= 3.757 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs

Invert

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## Summary for Pond B4: Drain Basin 4

Inflow Area = 3.162 ac, 32.89% Impervious, Inflow Depth = 2.21" for 100-Yr Storm event 
Inflow = 5.93 cfs @ 12.21 hrs, Volume= 0.582 af 
Outflow = 0.62 cfs @ 14.20 hrs, Volume= 0.566 af, Atten= 90%, Lag= 119.1 min 
Discarded = 0.28 cfs @ 14.20 hrs, Volume= 0.426 af 
Primary = 0.28 cfs @ 14.20 hrs, Volume= 0.140 af

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Peak Elev= 273.06' @ 14.20 hrs Surf.Area= 6,110 sf Storage= 11,775 cf

Plug-Flow detention time= 291.9 min calculated for 0.566 af (97% of inflow) Center-of-Mass det. time= 276.8 min (1,145.6 - 868.8)

Avail Storage Storage Description

Volume	HIVELL	Avaii.S	waye	Storage Description	l .		
#1 270.50' 21,85°		857 cf	<b>Custom Stage Dat</b>	a (Irregular) Listed	below (Recalc)		
Elevation (fee		ırf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
270.5		3,174	340.4	0	0	3,174	
272.5	50	5,447	401.7	8,519	8,519	6,869	
274.5	50	7,970	439.4	13,337	21,857	9,529	
Device	Routing	Inve	rt Outle	et Devices			
#1	Discarded	270.50	) 2.41	0 in/hr Exfiltration o	ver Surface area		
#2	Primary	271.00	)' 12.0'	" Round Culvert			
	-555. (GRECT-WELL) (MESSON -		L= 3	0.0' CPP, mitered t	o conform to fill. K	e= 0.700	
			Inlet	/ Outlet Invert= 271.	.00' / 270.00' S = 0	.0333 '/' Cc= 0.900	
			n= 0	.013 Concrete pipe,	straight & clean, I	Flow Area= 0.79 sf	
#3	Device 2	272.00		Vert. Orifice/Grate			
#4	Device 2	273.00	)' 12.0'	" W x 18.0" H Vert.	Orifice/Grate C=	0.600	

Discarded OutFlow Max=0.34 cfs @ 14.20 hrs HW=273.06' (Free Discharge) 1=Exfiltration (Exfiltration Controls 0.34 cfs)

Primary OutFlow Max=0.28 cfs @ 14.20 hrs HW=273.06' (Free Discharge)

-2=Culvert (Passes 0.28 cfs of 4.17 cfs potential flow)

-3=Orifice/Grate (Orifice Controls 0.23 cfs @ 4.67 fps)
-4=Orifice/Grate (Orifice Controls 0.05 cfs @ 0.81 fps)

## Summary for Pond B5: Drain Basin 5

Inflow Area =	1.613 ac, 46.95% Impervious, Inflow D	epth = 3.07" for 100-Yr Storm event
Inflow =	5.11 cfs @ 12.13 hrs, Volume=	0.413 af
Outflow =	0.90 cfs @ 12.70 hrs, Volume=	0.413 af, Atten= 82%, Lag= 34.1 min
Discarded =	0.90 cfs @ 12.70 hrs, Volume=	0.413 af
Primary =	0.00 cfs @ 5.00 hrs, Volume=	0.000 af

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs

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Peak Elev= 272.37' @ 12.70 hrs Surf.Area= 4,678 sf Storage= 5,640 cf

Plug-Flow detention time= 50.0 min calculated for 0.412 af (100% of inflow) Center-of-Mass det. time= 50.0 min (892.3 - 842.4)

Volume	Invert	Avail.	Storage	Storage Description	on		
#1	271.00'	2	1,026 cf	Custom Stage Data (Irregular) Listed below (Recalc)			
Elevatio (fee		ırf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
271.0 273.0	0	3,608 5,223	247.5 286.6	0 8,781	0 8,781	3,608 5,354	
275.0	0	7,068	326.3	12,245	21,026	7,385	
Device	Routing	Inv	ert Outle	et Devices			
#1	Discarded	271.0	00' 8.27	0 in/hr Exfiltration	over Surface area		
#2	Primary	273.0	00' 12.0'	" Round Culvert			
				어린 살아 있었다. 그 그 그 그 그 아이들은 이렇게 되었다. 그 나는 그 그 아이들은 모든 아이들은 것이 되었다. 그 그 없는 그 그 그 그 그 그 그 그 그 그 그 그 그 그 그 그	to conform to fill, k		
			Inlet	/ Outlet Invert= 273	3.00' / 272.00' S = 0	0.0500 '/' Cc= 0.900	0
			n= 0	.011 Concrete pipe	e, straight & clean,	Flow Area= 0.79 sf	

Discarded OutFlow Max=0.90 cfs @ 12.70 hrs HW=272.37' (Free Discharge) 1=Exfiltration (Exfiltration Controls 0.90 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=271.00' (Free Discharge) 2=Culvert ( Controls 0.00 cfs)

## Summary for Pond B7: Drain Basin 6

Inflow Area =	3.179 ac, 36.50% Impervious, Inflow D	Depth = 2.58" for 100-Yr Storm event
Inflow =	7.87 cfs @ 12.16 hrs, Volume=	0.684 af
Outflow =	0.50 cfs @ 15.40 hrs, Volume=	0.557 af, Atten= 94%, Lag= 194.5 min
Discarded =	0.37 cfs @ 15.40 hrs, Volume=	0.504 af
Primary =	0.13 cfs @ 15.40 hrs, Volume=	0.053 af

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Peak Elev= 270.44' @ 15.40 hrs Surf.Area= 6,612 sf Storage= 16,462 cf

Plug-Flow detention time= 410.0 min calculated for 0.556 af (81% of inflow) Center-of-Mass det. time= 334.1 min (1,189.9 - 855.9)

Volume	Invert	Avail.S	Storage	Storage Description	1	
#1	267.00'	20	,349 cf	Custom Stage Date	a (Irregular) Listed	below (Recalc)
Elevation (feet)	Surf./	Area sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
267.00	3	,092	309.1	0	0	3,092
268.00	4	,048	328.0	3,559	3,559	4,102
270.00	6	,129	365.7	10,105	13,665	6,295
271.00	7	,255	384.6	6,684	20,349	7,485

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Type III 24-hr 100-Yr Storm Rainfall=6.70" Printed 3/11/2016

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Device	Routing	Invert	Outlet Devices
#1	Discarded	267.00'	2.410 in/hr Exfiltration over Surface area
#2	Primary		12.0" Round Culvert
			L= 25.0' RCP, mitered to conform to fill, Ke= 0.700
			Inlet / Outlet Invert= 267.00' / 266.50' S= 0.0200 '/' Cc= 0.900
			n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#3	Device 2	270.00'	3.0" Vert. Orifice/Grate C= 0.600

**Discarded OutFlow** Max=0.37 cfs @ 15.40 hrs HW=270.44' (Free Discharge) **1=Exfiltration** (Exfiltration Controls 0.37 cfs)

Primary OutFlow Max=0.13 cfs @ 15.40 hrs HW=270.44' (Free Discharge)

2=Culvert (Passes 0.13 cfs of 5.72 cfs potential flow)

3=Orifice/Grate (Orifice Controls 0.13 cfs @ 2.70 fps)

## Summary for Pond C1: Drain Basin Condo 1

Inflow Area = 0.947 ac, 65.88% Impervious, Inflow Depth = 4.31" for 100-Yr Storm event 4.59 cfs @ 12.10 hrs, Volume= 0.340 af Outflow = 1.15 cfs @ 12.50 hrs, Volume= 0.334 af, Atten= 75%, Lag= 23.9 min 0.334 af

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Peak Elev= 276.35' @ 12.50 hrs Surf.Area= 3,516 sf Storage= 5,988 cf

Plug-Flow detention time= 152.5 min calculated for 0.334 af (98% of inflow) Center-of-Mass det. time= 141.1 min (953.8 - 812.7)

Volume	Inv	ert Avai	I.Storage	Storage Descript	ion		
#1	274.0	00'	6,543 cf	<b>Custom Stage D</b>	ata (Irregular) Lis	ted below (Recalc)	
Elevation (fee		Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
274.0		1,699	238.0	0	0	1,699	
276.5	50	3,659	285.0	6,543	6,543	3,761	
Device	Routing	In	vert Outle	et Devices			
#1	Primary	274	.00' 12.0'	Round Culvert	31 2 11 1011		
				0.0' RCP, groove			
						= 0.0100 '/' Cc= 0.900	1
<b>4</b> 0	Deimone	074				n, Flow Area= 0.79 sf	
#2 #3	Primary Device 1	274		Vert. Orifice/Grate			
#3	Device i	275	.00 6.0"	Vert. Orifice/Grate	e C= 0.600		

Primary OutFlow Max=1.15 cfs @ 12.50 hrs HW=276.34' (Free Discharge)

1=Culvert (Passes 0.99 cfs of 6.10 cfs potential flow)
1-3=Orifice/Grate (Orifice Controls 0.99 cfs @ 5.04 fps)

-2=Orifice/Grate (Orifice Controls 0.99 cfs @ 5.04 fps)

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#3

Device 2

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## Summary for Pond C2: Drain Basin Condo 2

[82] Warning: Early inflow requires earlier time span

Inflow Area = 0.287 ac, 80.00% Impervious, Inflow Depth > 5.62" for 100-Yr Storm event

Inflow = 1.72 cfs @ 12.09 hrs, Volume= 0.134 af

Outflow = 0.50 cfs @ 12.43 hrs, Volume= 0.134 af, Atten= 71%, Lag= 20.2 min

Discarded = 0.27 cfs @ 12.43 hrs, Volume= 0.120 af Primary = 0.24 cfs @ 12.43 hrs, Volume= 0.014 af

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Peak Elev= 273.48' @ 12.43 hrs Surf.Area= 1,403 sf Storage= 1,606 cf

Plug-Flow detention time= 33.8 min calculated for 0.134 af (100% of inflow)

Avail.Storage Storage Description

Center-of-Mass det. time= 33.7 min (814.2 - 780.6)

Invert

#1	272.0	0'	2,400 cf C	ustom Stage Dat	a (Irregular) Listed	below (Recalc)	
Elevation (fee		Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
272.0	00	795	124.9	0	0	795	
274.0	00	1,657	162.6	2,400	2,400	1,704	
Device	Routing	Inv		Devices			
#1	Discarde	d 272.0	00' <b>8.270 i</b>	n/hr Exfiltration o	ver Surface area		
#2	Primary	272.	00' <b>12.0"</b> I	Round Culvert			
			Inlet / 0	Outlet Invert= 272.		= 0.200 .0167 '/'     Cc= 0.900 Flow Area= 0.79 sf	ĺ

Discarded OutFlow Max=0.27 cfs @ 12.43 hrs HW=273.48' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.27 cfs)

Primary OutFlow Max=0.23 cfs @ 12.43 hrs HW=273.48' (Free Discharge)

2=Culvert (Passes 0.23 cfs of 4.56 cfs potential flow)

3=Orifice/Grate (Orifice Controls 0.23 cfs @ 2.69 fps)

# Summary for Pond C3: Drain Basin Condo-3

[82] Warning: Early inflow requires earlier time span

Inflow Area = 1.028 ac, 56.44% Impervious, Inflow Depth > 5.40" for 100-Yr Storm event

273.00' **4.0" Vert. Orifice/Grate** C= 0.600

Inflow = 6.26 cfs @ 12.07 hrs, Volume= 0.463 af

Outflow = 0.89 cfs @ 12.58 hrs, Volume= 0.367 af, Atten= 86%, Lag= 30.2 min

Primary = 0.89 cfs @ 12.58 hrs, Volume= 0.367 af

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs

Invert

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Peak Elev= 273.52' @ 12.58 hrs Surf.Area= 6,276 sf Storage= 10,863 cf

Plug-Flow detention time= 341.1 min calculated for 0.366 af (79% of inflow) Center-of-Mass det. time= 265.6 min (1,050.3 - 784.7)

Avail.Storage Storage Description

#1	271.0	00'	14,064 cf	Custom Stage Date	ta (Irregular) Listed	below (Recalc)
Elevation		Surf.Area	Perim.	Inc.Store	Cum.Store	Wet.Area
(fee	et)	(sq-ft)	(feet)	(cubic-feet)	(cubic-feet)	(sq-ft)
271.0	00	2,900	257.0	0	0	2,900
272.0		3,740	276.0	3,311	3,311	3,749
274.0	00	7,200	370.0	10,753	14,064	8,624
Device	Routing	In	vert Outle	et Devices		
#1	Primary	271	.00' 12.0'	' Round Culvert		
			L= 3	0.0' RCP, mitered	to conform to fill, k	Ke= 0.700
			Inlet	/ Outlet Invert= 271	.00' / 270.50' S= 0	0.0167 '/' Cc= 0.900
			n= 0	.011 Concrete pipe	, straight & clean,	Flow Area= 0.79 sf
#2	Device 1			Vert. Orifice/Grate	C= 0.600	
#3	Device 1	273	.00' <b>8.0</b> "	Vert. Orifice/Grate	C= 0.600	

Primary OutFlow Max=0.89 cfs @ 12.58 hrs HW=273.52' (Free Discharge)

1=Culvert (Passes 0.89 cfs of 4.75 cfs potential flow)

2=Orifice/Grate (Orifice Controls 0.16 cfs @ 7.52 fps)

-3=Orifice/Grate (Orifice Controls 0.73 cfs @ 2.47 fps)

# Summary for Pond C5: Drain Basin Condo 5

Inflow Area =	0.877 ac, 67.28% Impervious, Inflow Depth = 4.31" for 100-Yr Storm event
Inflow -	4.12 of @ 12.11 hrs Volume 0.245 -5

Inflow = 4.13 cfs @ 12.11 hrs, Volume= 0.315 af
Outflow = 0.33 cfs @ 13.48 hrs, Volume= 0.255 af, Atten= 92%, Lag= 82.2 min

Primary = 0.33 cfs @ 13.48 hrs, Volume= 0.255 af

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Peak Elev= 271.07' @ 13.48 hrs Surf.Area= 5,997 sf Storage= 7,412 cf

Plug-Flow detention time= 399.5 min calculated for 0.255 af (81% of inflow)

Center-of-Mass det. time= 325.1 min ( 1,138.6 - 813.5 )

Volume	Invert	Avail	.Storage	Storage Description	n		
#1	269.00'	•	13,497 cf	<b>Custom Stage Dat</b>	a (Irregular) Listed	d below (Recalc)	
Elevation (feet)		Area sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
269.00 270.00 272.00		0 1,863 7,082	0.0 351.1 388.8	0 1,621 11,876	0 1,621 13,497	9,811 12,151	

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Device	Routing	Invert	Outlet Devices
#1	Primary	269.00'	12.0" Round Culvert
			L= 30.0' RCP, mitered to conform to fill, Ke= 0.700
			Inlet / Outlet Invert= 269.00' / 268.50' S= 0.0167 '/' Cc= 0.900
			n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#2	Device 1	269.00'	2.0" Vert. Orifice/Grate C= 0.600
#3	Primary	271.00'	4.0' long x 2.0' breadth Broad-Crested Rectangular Weir
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00
			2.50 3.00 3.50
			Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88
			2.85 3.07 3.20 3.32

Primary OutFlow Max=0.33 cfs @ 13.48 hrs HW=271.07' (Free Discharge)

-1=Culvert (Passes 0.15 cfs of 4.18 cfs potential flow)

-2=Orifice/Grate (Orifice Controls 0.15 cfs @ 6.78 fps)

3=Broad-Crested Rectangular Weir (Weir Controls 0.18 cfs @ 0.66 fps)

## Summary for Pond C6: Drain Basin Condo 6

[82] Warning: Early inflow requires earlier time span

1.200 ac, 70.00% Impervious, Inflow Depth > 5.62" for 100-Yr Storm event Inflow Area =

Inflow 6.98 cfs @ 12.11 hrs, Volume= 0.562 af

1.11 cfs @ 12.61 hrs, Volume= 0.472 af, Atten= 84%, Lag= 30.4 min Outflow

1.11 cfs @ 12.61 hrs, Volume= 0.472 af Primary

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Peak Elev= 271.39' @ 12.61 hrs Surf.Area= 7,020 sf Storage= 13,323 cf

Plug-Flow detention time= 299.1 min calculated for 0.472 af (84% of inflow)

Center-of-Mass det. time= 232.8 min (1,014.3 - 781.5)

\/ali.maa	las.	A:1 (	24	Changes Description	_		
Volume	Inv	ert Avail.	Storage	Storage Description	0		
#1	269.0	00' 17	7,824 cf	<b>Custom Stage Dat</b>	a (Irregular) Listed	below (Recalc)	
Elevation	n	Surf.Area	Perim.	Inc.Store	Cum.Store	Wet.Area	
(fee	et)	(sq-ft)	(feet)	(cubic-feet)	(cubic-feet)	(sq-ft)	
269.0	00	4,228	372.7	0	0	4,228	
272.0		7,839	429.5	17,824	17,824	8,048	
		.,		,	,	, , , , , , , , , , , , , , , , , , , ,	
Device	Routing	Inve	ert Outle	et Devices			25 31%
#1	Primary	269.0	0' 12.0	" Round Culvert			
			L= 3	0.0' RCP, mitered to	to conform to fill, K	e= 0.700	
				[1] [1] [1] [1] [2] [1] [1] [1] [1] [1] [1] [1] [1] [1] [1	"어린다는 이 이 사람이 아이를 가게 보면 되었다면 하는데 그 바꾸게 어떻게 느 먹었다.	.0333 '/' Cc= 0.900	
				.011 Concrete pipe			
#2	Device 1	270.2		Vert. Orifice/Grate			
#3	Device 1			W x 12.0" H Vert. O		.600	
#4	Device 1	269.0		Vert. Orifice/Grate			

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Primary OutFlow Max=1.11 cfs @ 12.61 hrs HW=271.39' (Free Discharge)

-1=Culvert (Passes 1.11 cfs of 4.59 cfs potential flow)

-2=Orifice/Grate (Orifice Controls 0.43 cfs @ 4.88 fps)

-3=Orifice/Grate (Orifice Controls 0.53 cfs @ 2.01 fps)

-4=Orifice/Grate (Orifice Controls 0.16 cfs @ 7.32 fps)

## Summary for Pond C7: Drain Basin Condo 7

Inflow Area = 0.702 ac, 49.02% Impervious, Inflow Depth > 5.08" for 100-Yr Storm event

Inflow 3.80 cfs @ 12.11 hrs, Volume= 0.297 af

Outflow 0.19 cfs @ 14.74 hrs, Volume= 0.122 af, Atten= 95%, Lag= 157.9 min

Primary 0.19 cfs @ 14.74 hrs, Volume= 0.122 af

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs Peak Elev= 271.37' @ 14.74 hrs Surf.Area= 4,910 sf Storage= 9,090 cf

Plug-Flow detention time= 402.8 min calculated for 0.122 af (41% of inflow)

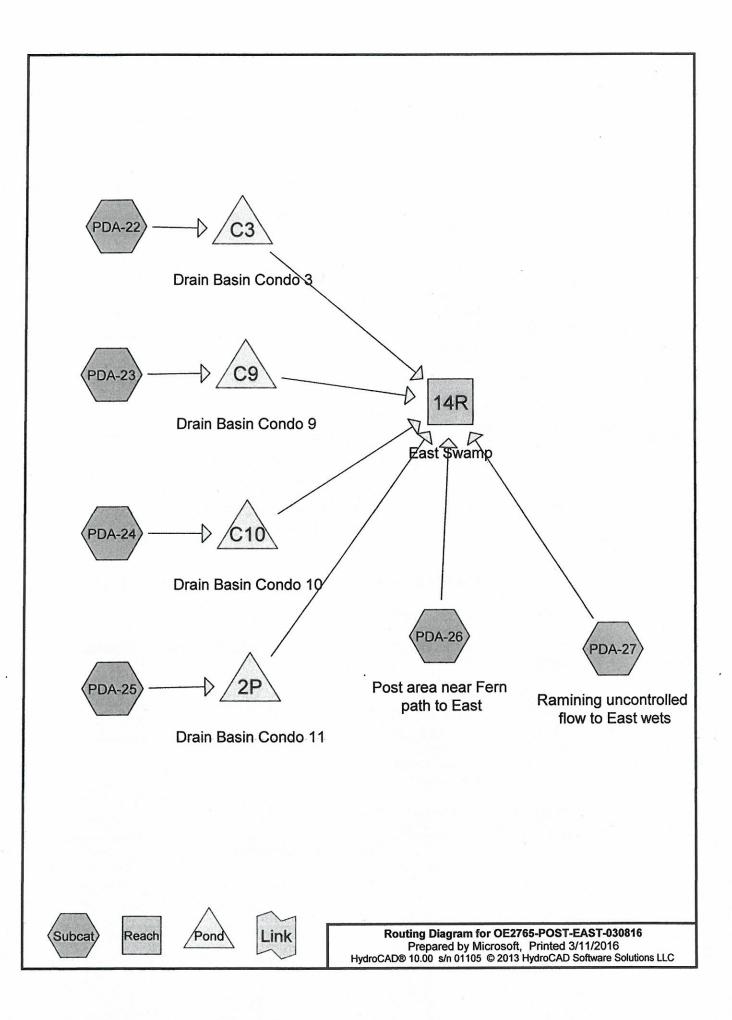
Center-of-Mass det. time= 279.2 min (1,074.6 - 795.4)

Volume	Inv	ert Ava	il.Storage	Storage Description	on		
#1	269.	00'	15,300 cf	Custom Stage Da	ita (Irregular) List	ed below (Recalc)	
Elevation (fee		Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
269.0	00	2,824	275.8	0	0	2,824	
270.0	00	3,679	294.7	3,242	3,242	3,728	
272.5	50	6,066	341.8	12,058	15,300	6,243	
Device	Routing	<u>In</u>	vert Outle	et Devices			
#1	Primary	270	.00' 12.0	" Round Culvert			
			L= 3	0.0' RCP, mitered	to conform to fill,	Ke= 0.700	
1						= 0.0333 '/' Cc= 0.900	
#2	Device 1	271		.011 Concrete pipe Vert. Orifice/Grate		, Flow Area= 0.79 sf	

Primary OutFlow Max=0.19 cfs @ 14.74 hrs HW=271.37' (Free Discharge)

-1=Culvert (Passes 0.19 cfs of 3.11 cfs potential flow)

2=Orifice/Grate (Orifice Controls 0.19 cfs @ 2.15 fps)



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## **Summary for Subcatchment PDA-22:**

Runoff

4.18 cfs @ 12.11 hrs, Volume=

0.299 af, Depth> 1.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 2-Yr Storm Rainfall=3.20"

	Area	(ac) (	CN Des	cription						
	1.	765	98 Pav	ed parking	, HSG A					
	1.	247	39 >75	% Grass c	over, Good	, HSG A				
	0.	.275	98 Pav	ed parking	, HSG D					
-	0.	110	80 >75	% Grass c	over, Good	, HSG D				
	3.397 76 Weighted Average									
	1.	357	39.9	5% Pervio	us Area					
	2.	040	60.0	5% Imper	ious Area					
	Tc	Length	Slope	Velocity	Capacity	Description				
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)					
	5.6	50	0.0200	0.15		Sheet Flow, AB				
						Grass: Short n= 0.150 P2= 3.20"				
	0.8	80	0.0100	1.61		Shallow Concentrated Flow, BC				
						Unpaved Kv= 16.1 fps				
	0.9	112	0.0100	2.03		Shallow Concentrated Flow, CD				
	197					Paved Kv= 20.3 fps				
-	7.3	242	Total							

## **Summary for Subcatchment PDA-23:**

Runoff

1.74 cfs @ 12.09 hrs, Volume=

0.120 af, Depth> 2.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 2-Yr Storm Rainfall=3.20"

Α	rea (sf)	CN I	Description			
	20,500	98 I	Paved park	ing, HSG C		•
	10,300	74 >	<u> 75% Ġras</u>	s cover, Go	ood, HSG C	
	30,800	90 \	Veighted A	verage		•
	10,300	3	3.44% Per	vious Area		
	20,500	6	6.56% Imp	ervious Ar	ea	
Tc	Length	Slope	Velocity	Capacity	Description	
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)		_
6.0					Direct Entry, TR55-MIN	

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## **Summary for Subcatchment PDA-24:**

Runoff

1.39 cfs @ 12.09 hrs, Volume=

0.097 af, Depth> 2.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 2-Yr Storm Rainfall=3.20"

	rea (sf)	CN	Description			
	6,100	98	Paved park	ing, HSG D	)	
	10,000	98	Paved park	ing, HSG C		
	2,000	80	>75% Gras	s cover, Go	ood, HSG D	
	5,670	74	>75% Gras	s cover, Go	ood, HSG C	
	23,770	91				
	7,670		32.27% Per			
	16,100		67.73% Imp	ervious Ar	ea	
Tc	Length	Slope	Velocity	Capacity	Description	
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)		
6.0					<b>Direct Entry, TR55-MIN</b>	

## **Summary for Subcatchment PDA-25:**

Runoff

1.32 cfs @ 12.10 hrs, Volume=

0.089 af, Depth> 1.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 2-Yr Storm Rainfall=3.20"

	Area (sf)	CN	Description								
*	5,307	98	Paved road	I, HSG C							
	1,913	98	Paved park	ing, HSG C							
	30,676	74		>75% Grass cover, Good, HSG C							
	37,896 30,676 7,220	79	Weighted A 80.95% Per 19.05% Imp	rvious Area							
(m	Tc Length in) (feet)	Slope (ft/ft		Capacity (cfs)	Description	149713					
(	6.0		100000		Direct Entry, TR55-MIN	V					

# Summary for Subcatchment PDA-26: Post area near Fern path to East

Runoff = 1.06 cfs @ 12.21 hrs, Volume=

0.095 af, Depth> 0.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 2-Yr Storm Rainfall=3.20"

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	Α	rea (sf)	CN	Description		
-	W. AME IN ALL	8,250	74 :	>75% Gras	s cover, Go	ood, HSG C
		8,090	77 '	Noods, Go	od, HSG D	
		42,800	70 Y	Noods, Go	od, HSG C	
		59,140	72 \	Neighted A	verage	
		59,140		100.00% Pe		a
	Tc	Length	Slope	Velocity	Capacity	Description
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	12.3	50	0.0200	0.07		Sheet Flow,
						Woods: Light underbrush n= 0.400 P2= 3.20"
	1.1	50	0.0250	0.79		Shallow Concentrated Flow,
						Woodland Kv= 5.0 fps
	13.4	100	Total			

## Summary for Subcatchment PDA-27: Ramining uncontrolled flow to East wets

Runoff = 0.13 cfs @ 12.61 hrs, Volume=

0.050 af, Depth> 0.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 2-Yr Storm Rainfall=3.20"

	Α	rea (sf)	CN	Description		
	1	23,796	30	Woods, Go		
		15,000	39	>75% Gras	ood, HSG A	
		ood, HSG C				
_		13,524	77 Y	Noods, Go	od, HSG D	
	2	60,974	50 V	Neighted A	verage	+
	2	60,974	a			
	Tc	Length	Slope	Velocity	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	12.3	50	0.0200	0.07		Sheet Flow,
						Woods: Light underbrush n= 0.400 P2= 3.20"
	1.1	50	0.0250	0.79		Shallow Concentrated Flow,
						Woodland Kv= 5.0 fps
	13.4	100	Total			

# Summary for Reach 14R: East Swamp

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

Inflow Area = 12.869 ac, 23.67% Impervious, Inflow Depth > 0.23" for 2-Yr Storm event

Inflow = 1.18 cfs @ 12.21 hrs, Volume= 0.244 af

Outflow = 1.18 cfs @ 12.21 hrs, Volume= 0.244 af, Atten= 0%, Lag= 0.0 min

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

## Summary for Pond 2P: Drain Basin Condo 11

Inflow Area = 0.870 ac, 19.05% Impervious, Inflow Depth > 1.23" for 2-Yr Storm event 1.32 cfs @ 12.10 hrs, Volume= 0.089 af 0.06 cfs @ 15.65 hrs, Volume= 0.045 af, Atten= 95%, Lag= 213.5 min 0.06 cfs @ 15.65 hrs, Volume= 0.045 af Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Peak Elev= 270.93' @ 15.65 hrs Surf.Area= 2,613 sf Storage= 2,303 cf

Plug-Flow detention time= 215.1 min calculated for 0.045 af (50% of inflow) Center-of-Mass det. time= 129.3 min (935.4 - 806.2)

Volum	<u>e l</u>	nvert A	vail.Storage	Storage Descript	ion		
#1	27	'O.00'	11,782 cf	Custom Stage D	ata (Irregular) List	ed below (Recalc)	
Elevat	tion eet)	Surf.Are			Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
270	0.00	2,35	0 187.0	0	0	2,350	
274	1.00	3,58	225.0	11,782	11,782	3,844	
Device	Routi	ng	Invert Out	let Devices			
#1	Prima	ry 2	71.00' <b>2.0</b> '	Vert. Orifice/Grat	e C= 0.600		
#2	Disca	rded 2	70.00' <b>1.0</b> 2	20 in/hr Exfiltration	over Surface are	a	

Discarded OutFlow Max=0.06 cfs @ 15.65 hrs HW=270.93' (Free Discharge) 2=Exfiltration (Exfiltration Controls 0.06 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=270.00' (Free Discharge) 1=Orifice/Grate (Controls 0.00 cfs)

# Summary for Pond C10: Drain Basin Condo 10

Inflow Area = 0.546 ac, 67.73% Impervious, Inflow Depth > 2.13" for 2-Yr Storm event
Inflow = 1.39 cfs @ 12.09 hrs, Volume= 0.097 af
Outflow = 0.04 cfs @ 16.16 hrs, Volume= 0.024 af, Atten= 97%, Lag= 244.2 min

Primary = 0.04 cfs @ 16.16 hrs, Volume= 0.024 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Peak Elev= 272.06' @ 16.16 hrs Surf.Area= 3,487 sf Storage= 3,287 cf

Plug-Flow detention time= 304.0 min calculated for 0.024 af (24% of inflow) Center-of-Mass det. time= 181.5 min ( 952.3 - 770.8 )

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Volume	Inve	ert Ava	il.Storage	Storage Description			
#1	271.0	00'	6,914 cf	<b>Custom Stage Data</b>	a (Irregular) Liste	ed below (Recalc)	
Elevatio	7.7	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
271.0 273.0		2,738 4,230	230.0 267.0	0 6,914	0 6,914	2,738 4,283	
Device	Routing	In	vert Outle	et Devices		<b>15</b>	
#1 #2	Primary Primary			Vert. Orifice/Grate " Vert. Orifice/Grate	C= 0.600 C= 0.600		

Primary OutFlow Max=0.04 cfs @ 16.16 hrs HW=272.06' (Free Discharge)

1=Orifice/Grate (Orifice Controls 0.03 cfs @ 4.86 fps)
2=Orifice/Grate (Orifice Controls 0.02 cfs @ 0.82 fps)

## **Summary for Pond C3: Drain Basin Condo 3**

Inflow Area =	3.397 ac, 60.05% Impervious, Inflow D	epth > 1.05" for 2-Yr Storm event
Inflow =	4.18 cfs @ 12.11 hrs, Volume=	0.299 af
Outflow =	1.07 cfs @ 12.55 hrs, Volume=	0.298 af, Atten= 74%, Lag= 26.3 min
Discarded =	1.07 cfs @ 12.55 hrs, Volume=	0.298 af
Primary =	0.00 cfs @ 5.00 hrs, Volume=	0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Peak Elev= 272.62' @ 12.55 hrs Surf.Area= 5,584 sf Storage= 3,233 cf

Plug-Flow detention time= 20.6 min calculated for 0.297 af (100% of inflow) Center-of-Mass det. time= 20.1 min (834.6 - 814.5)

Volume	Inver	t Avail.S	torage	Storage Description					
#1	272.00	' 15,	,963 cf	<b>Custom Stage Dat</b>	Custom Stage Data (Irregular) Listed below (Recalc)				
Elevatio (fee 272.0 274.5	et) 00	surf.Area (sq-ft) 4,880 8,020	Perim. (feet) 395.0 442.0	Inc.Store (cubic-feet) 0 15,963	Cum.Store (cubic-feet) 0 15,963	Wet.Area (sq-ft) 4,880 8,181			
Device	Routing	Inve	rt Outle	et Devices					
#1	Discarded	272.00	)' <b>8.27</b> (	0 in/hr Exfiltration of	over Surface area				
#2	Primary	272.00	)' 12.0'	" Round Culvert					
	a <del></del>		L= 5	0.0' RCP, square e	edge headwall, Ke	= 0.500	6		
			Inlet	/ Outlet Invert= 272	.00' / 271.00' S=	0.0200 '/' Cc= 0.900			
			n= 0	.011 Concrete pipe	, straight & clean,	Flow Area= 0.79 sf			
#3	Device 2	273.00	)' <b>7.0"</b>	Vert. Orifice/Grate	C= 0.600				
#4	Device 2	273.80	)' <b>24.0</b> '	" W x 1.0" H Vert. C	rifice/Grate C=	0.600			

Timber Crest Estates, Medway, MA
Type III 24-hr 2-Yr Storm Rainfall=3.20"
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**Discarded OutFlow** Max=1.07 cfs @ 12.55 hrs HW=272.62' (Free Discharge) 1=Exfiltration (Exfiltration Controls 1.07 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=272.00' (Free Discharge)

2=Culvert (Controls 0.00 cfs)

-3=Orifice/Grate (Controls 0.00 cfs)

-4=Orifice/Grate (Controls 0.00 cfs)

## Summary for Pond C9: Drain Basin Condo 9

Inflow Area = 0.707 ac, 66.56% Impervious, Inflow Depth > 2.04" for 2-Yr Storm event

Inflow = 1.74 cfs @ 12.09 hrs, Volume= 0.120 af

Outflow = 0.13 cfs @ 13.50 hrs, Volume= 0.075 af, Atten= 93%, Lag= 84.5 min

Primary = 0.13 cfs @ 13.50 hrs, Volume= 0.075 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Peak Elev= 271.10' @ 13.50 hrs Surf.Area= 3,149 sf Storage= 3,060 cf

Plug-Flow detention time= 225.1 min calculated for 0.075 af (62% of inflow) Center-of-Mass det. time= 151.8 min ( 926.4 - 774.6 )

Volume	Inv	vert Ava	il.Storage	Storage Description	n		
#1	270	.00'	6,190 cf	Custom Stage Dat	a (Irregular) Listed	below (Recalc)	
Elevation (fee		Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
270.0 272.0		2,440 3,800	207.0 245.0	0 6,190	0 6,190	2,440 3,880	
Device	Routing	In	vert Outle	et Devices			
#1 #2	Primary Primary			Vert. Orifice/Grate Vert. Orifice/Grate	C= 0.600 C= 0.600		

271.40' 10.0" Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=0.13 cfs @ 13.50 hrs HW=271.10' (Free Discharge)

1=Orifice/Grate (Orifice Controls 0.11 cfs @ 4.85 fps)

-2=Orifice/Grate (Orifice Controls 0.02 cfs @ 1.07 fps)

-3=Orifice/Grate (Controls 0.00 cfs)

#3

**Primary** 

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## **Summary for Subcatchment PDA-22:**

Runoff

8.59 cfs @ 12.11 hrs, Volume=

0.601 af, Depth> 2.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 10-Yr Storm Rainfall=4.70"

	Area	(ac) C	N Des	cription			
	1.	765	98 Pave	ed parking	HSG A		
	1.	247	39 >759	% Grass co	over, Good	, HSG A	
	0.	275	98 Pave	ed parking	HSG D		
	0.	110	80 >759	% Grass co	over, Good	, HSG D	
	3.	397	76 Wei	ghted Aver	age		
	1.	357	39.9	5% Pervio	us Area		
	2.	040	60.0	5% Imperv	ious Area		
	Tc	Length	Slope	Velocity	Capacity	Description	
85	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)		
7000	5.6	50	0.0200	0.15		Sheet Flow, AB	
						Grass: Short n= 0.150 P2= 3.20"	
	0.8	80	0.0100	1.61		Shallow Concentrated Flow, BC	
						Unpaved Kv= 16.1 fps	
	0.9	112	0.0100	2.03		Shallow Concentrated Flow, CD	
						Paved Kv= 20.3 fps	
	7.3	242	Total				

## **Summary for Subcatchment PDA-23:**

Runoff

-

2.82 cfs @ 12.09 hrs, Volume=

0.200 af, Depth> 3.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 10-Yr Storm Rainfall=4.70"

	Α	rea (sf)	CN I	Description				
		20,500	98 1	Paved park	ing, HSG C			
0.22		10,300	74 >	75% Gras	s cover, Go	ood, HSG C		
		30,800	90 \	Veighted A	verage			
		10,300	3	3.44% Per	vious Area			
		20,500	6	6.56% Imp	ervious Ar	ea		
							(e) (a)	
	Тс	Length	Slope		Capacity	Description		
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)			
	6.0					Direct Entry, TR55-MIN		

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## **Summary for Subcatchment PDA-24:**

Runoff

2.22 cfs @ 12.09 hrs, Volume=

0.159 af, Depth> 3.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 10-Yr Storm Rainfall=4.70"

	, Д	rea (sf)	CN	Description				
		6,100	98	Paved park	ing, HSG D			
		10,000	98	Paved park	ing, HSG C	r Same		
		2,000	80	>75% Gras	s cover, Go	ood, HSG D		
174		5,670	74	>75% Gras	s cover, Go	ood, HSG C		
		23,770	91	Weighted A	verage			
		7,670	;	32.27% Per	vious Area			
	#	16,100		67.73% Imp	ervious Ar	еа		
	Тс	Length	Slope	Velocity	Capacity	Description		
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	•		
	6.0					Direct Entry, T	R55-MIN	

## **Summary for Subcatchment PDA-25:**

Runoff

2.55 cfs @ 12.09 hrs, Volume=

0.172 af, Depth> 2.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 10-Yr Storm Rainfall=4.70"

	Area (sf)	CN	Description					
*	5,307	98	Paved road	, HSG C				
	1,913	98	Paved park	ing, HSG C	,			
	30,676				ood, HSG C		(4)	
	37,896 30,676 7,220		Weighted A 80.95% Pei 19.05% Imp	vious Area		•		
To (min	-	Slope (ft/ft)		Capacity (cfs)	Description	*		
6.0	)				Direct Entry	TDEE MIN		

6.0

Direct Entry, TR55-MIN

## Summary for Subcatchment PDA-26: Post area near Fern path to East

Runoff 2.41 cfs @ 12.20 hrs, Volume= 0.205 af, Depth> 1.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 10-Yr Storm Rainfall=4.70"

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	٨	roo (of)	CN I			
_	A	rea (sf)	CN I	Description		
		8,250	74 >	75% Gras	s cover, Go	ood, HSG C
		8,090	77 \	Voods, Go	od, HSG D	
		42,800	70 ١	Voods, Go	od, HSG C	
		59,140	72 \	Veighted A	verage	
		59,140	•	00.00% Pe	ervious Are	a
	Tc	Length	Slope	Velocity	Capacity	Description
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	12.3	50	0.0200	0.07		Sheet Flow,
						Woods: Light underbrush n= 0.400 P2= 3.20"
	1.1	50	0.0250	0.79		Shallow Concentrated Flow,
						Woodland Kv= 5.0 fps
	13.4	100	Total			

# Summary for Subcatchment PDA-27: Ramining uncontrolled flow to East wets

Runoff = 1.79 cfs @ 12.31

1.79 cfs @ 12.31 hrs, Volume= 0.247 af, Depth> 0.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 10-Yr Storm Rainfall=4.70"

_	A	rea (sf)	CN [	Description				
	1	23,796	30 \	Voods, Go				
		15,000 39 >75% Grass cover, Good, HSG A						
		22,175 74 >75% Grass cover, Good, HSG C						
		86,479	70 V	Voods, Go	od, HSG C			
_		13,524	77 V	Voods, Go	od, HSG D			
	2	60,974	50 V	Veighted A	verage			
	2	60,974	1	00.00% Pe	ervious Are	a		
	Tc	Length	Slope		Capacity	Description		
_	(min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description .		
_		_				Description		
***	(min) 12.3	(feet)	(ft/ft) 0.0200	(ft/sec) 0.07				
-	(min)	(feet)	(ft/ft)	(ft/sec)		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20" Shallow Concentrated Flow,		
_	(min) 12.3	(feet) 50	(ft/ft) 0.0200	(ft/sec) 0.07		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"		

## Summary for Reach 14R: East Swamp

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

Inflow Area = 12.869 ac, 23.67% Impervious, Inflow Depth > 0.72" for 10-Yr Storm event 4.64 cfs @ 12.29 hrs, Volume= 0.767 af

Outflow = 4.64 cfs @ 12.29 hrs, Volume= 0.767 af, Atten= 0%, Lag= 0.0 min

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

## Summary for Pond 2P: Drain Basin Condo 11

Inflow Area = 0.870 ac, 19.05% Impervious, Inflow Depth > 2.37" for 10-Yr Storm event
Inflow = 2.55 cfs @ 12.09 hrs, Volume= 0.172 af
Outflow = 0.15 cfs @ 14.50 hrs, Volume= 0.098 af, Atten= 94%, Lag= 144.2 min
Discarded = 0.07 cfs @ 14.50 hrs, Volume= 0.054 af

Primary = 0.08 cfs @ 14.50 hrs, Volume= 0.054 ar

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Peak Elev= 271.67' @ 14.50 hrs Surf.Area= 2,833 sf Storage= 4,319 cf

Plug-Flow detention time= 212.7 min calculated for 0.098 af (57% of inflow)

Center-of-Mass det. time= 134.4 min ( 925.8 - 791.4 )

Volume Invert Avail.Storage Storage Description #1 270.00 11,782 cf Custom Stage Data (Irregular) Listed below (Recalc) Elevation Surf.Area Perim. Inc.Store Cum.Store Wet.Area (feet) (sq-ft) (feet) (cubic-feet) (cubic-feet) (sq-ft) 270.00 2,350 187.0 0 2,350 0 274.00 3,584 225.0 3,844 11,782 11,782 Device Routing **Outlet Devices** Invert

#1 Primary 271.00' 2.0" Vert. Orifice/Grate C= 0.600
#2 Discarded 270.00' 1.020 in/hr Exfiltration over Surface area

**Discarded OutFlow** Max=0.07 cfs @ 14.50 hrs HW=271.67' (Free Discharge) **2=Exfiltration** (Exfiltration Controls 0.07 cfs)

Primary OutFlow Max=0.08 cfs @ 14.50 hrs HW=271.67' (Free Discharge) 1=Orifice/Grate (Orifice Controls 0.08 cfs @ 3.68 fps)

# Summary for Pond C10: Drain Basin Condo 10

[82] Warning: Early inflow requires earlier time span

Inflow Area = 0.546 ac, 67.73% Impervious, Inflow Depth > 3.49" for 10-Yr Storm event

Inflow = 2.22 cfs @ 12.09 hrs, Volume= 0.159 af

Outflow = 0.36 cfs @ 12.57 hrs, Volume= 0.083 af, Atten= 84%, Lag= 28.8 min

Primary = 0.36 cfs @ 12.57 hrs, Volume= 0.083 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Peak Elev= 272.28' @ 12.57 hrs Surf.Area= 3,659 sf Storage= 4,095 cf

Plug-Flow detention time= 194.7 min calculated for 0.083 af (52% of inflow) Center-of-Mass det. time= 111.8 min (871.2 - 759.3)

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Volume

Invert

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Volume Invert Avail.Storage		il.Storage	Storage Description	×			
#1	271.0	<b>D</b> '	6,914 cf	Custom Stage Data (Irregular) Listed below (Recalc)			
Elevation (feet)		Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
271.00		2,738	230.0	0	0	2,738	
273.00		4,230	267.0	6,914	6,914	4,283	
Device I	Routing	In	vert Outle	et Devices			
#1 F	Primary	271	.00' 1.0"	Vert. Orifice/Grate	C= 0.600		
#2 F	Primary	272	2.00' <b>12.0</b> '	" Vert. Orifice/Grate	C = 0.600		

Primary OutFlow Max=0.36 cfs @ 12.57 hrs HW=272.28' (Free Discharge)

1=Orifice/Grate (Orifice Controls 0.03 cfs @ 5.37 fps)

-2=Orifice/Grate (Orifice Controls 0.33 cfs @ 1.82 fps)

## **Summary for Pond C3: Drain Basin Condo 3**

Inflow Area =	3.397 ac, 60.05% Impervious, Inflow De	epth > 2.12" for 10-Yr Storm event
Inflow =	8.59 cfs @ 12.11 hrs, Volume=	0.601 af
Outflow =	1.88 cfs @ 12.56 hrs, Volume=	0.601 af, Atten= 78%, Lag= 27.3 min
Discarded =	1.28 cfs @ 12.56 hrs, Volume=	0.557 af
Primary =	0.60 cfs @ 12.56 hrs, Volume=	0.043 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Peak Elev= 273.51' @ 12.56 hrs Surf.Area= 6,683 sf Storage= 8,689 cf

Plug-Flow detention time= 50.3 min calculated for 0.601 af (100% of inflow) Center-of-Mass det. time= 50.0 min ( 848.8 - 798.8 )

Avail.Storage Storage Description

#1	272.0	0'	15,963 cf	Custom Stage Dat	a (Irregular) Listed	below (Recalc)
Elevation (fee		Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
272.0 274.5		4,880 8,020	395.0 442.0	0 15,963	0 15,963	4,880 8,181
Device	Routing	<u>In</u>	vert Outle	et Devices		
#1	Discarde	d 272	.00' 8.27	in/hr Exfiltration o	over Surface area	
#2	Primary	272	.00' 12.0'	' Round Culvert		
			Inlet	0.0' RCP, square e / Outlet Invert= 272 .011 Concrete pipe	.00' / 271.00' S= 0	0.0200 '/' Cc= 0.900
#3 #4	Device 2 Device 2	273 273	.00' <b>7.0"</b>	Vert. Orifice/Grate ' W x 1.0" H Vert. O	C= 0.600	

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**Discarded OutFlow** Max=1.28 cfs @ 12.56 hrs HW=273.51' (Free Discharge) **1=Exfiltration** (Exfiltration Controls 1.28 cfs)

Primary OutFlow Max=0.60 cfs @ 12.56 hrs HW=273.51' (Free Discharge)

-2=Culvert (Passes 0.60 cfs of 3.80 cfs potential flow)

-3=Orifice/Grate (Orifice Controls 0.60 cfs @ 2.43 fps)

-4=Orifice/Grate (Controls 0.00 cfs)

## Summary for Pond C9: Drain Basin Condo 9

[82] Warning: Early inflow requires earlier time span

Inflow Area = 0.707 ac, 66.56% Impervious, Inflow Depth > 3.39" for 10-Yr Storm event

Inflow = 2.82 cfs @ 12.09 hrs, Volume= 0.200 af

Outflow = 0.48 cfs @ 12.56 hrs, Volume= 0.144 af, Atten= 83%, Lag= 28.3 min

Primary = 0.48 cfs @ 12.56 hrs, Volume= 0.144 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Peak Elev= 271.55' @ 12.56 hrs Surf.Area= 3,471 sf Storage= 4,571 cf

Plug-Flow detention time= 171.8 min calculated for 0.144 af (72% of inflow)

Center-of-Mass det. time= 107.6 min (870.2 - 762.5)

Volume	Inv	ert Ava	il.Storage	Storage Description					
#1	270.	00'	6,190 cf	Custom Stage Data (Irregular) Listed below (Recalc)					
Elevatio		Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)			
270.0	00	2,440	207.0	0	0	2,440			
272.0	00	3,800	245.0	6,190	6,190	3,880			
Device	Routing	In	vert Outle	et Devices					
#1	Primary	ary 270.00' <b>2.0"</b>		Vert. Orifice/Grate	C= 0.600				
#2	Primary			Vert. Orifice/Grate	C = 0.600				
#3	Primary	271	.40' <b>10.0</b> '	" Vert. Orifice/Grate	C = 0.600				

Primary OutFlow Max=0.48 cfs @ 12.56 hrs HW=271.55' (Free Discharge)

1=Orifice/Grate (Orifice Controls 0.13 cfs @ 5.84 fps)

-2=Orifice/Grate (Orifice Controls 0.26 cfs @ 3.00 fps)

-3=Orifice/Grate (Orifice Controls 0.09 cfs @ 1.34 fps)

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## **Summary for Subcatchment PDA-22:**

Runoff = 15.00 cfs @ 12.11 hrs, Volume=

1.056 af, Depth> 3.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 100-Yr Storm Rainfall=6.70"

	Area (ac) CN Description						
	1.	765					
	1.	247	39 >75	% Grass c	, HSG A		
	0.	275	98 Pav				
_	0.	110	80 >75	% Grass c	over, Good	, HSG D	
	3.	397	76 Wei	ghted Ave	rage		
	1.	357	39.9	5% Pervio	us Area		
	2.	040	60.0	5% Imperv	ious Area		
	Тс	Length	Slope	Velocity	Capacity	Description	
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)		
	5.6	50	0.0200	0.15		Sheet Flow, AB	
						Grass: Short n= 0.150 P2= 3.20"	
	8.0	80	0.0100	1.61		Shallow Concentrated Flow, BC	
						Unpaved Kv= 16.1 fps	
	0.9	112	0.0100	2.03		Shallow Concentrated Flow, CD	
						Paved Kv= 20.3 fps	
	7.3	242	Total				

### **Summary for Subcatchment PDA-23:**

Runoff = 4.24 cfs @ 12.09 hrs, Volume=

0.308 af, Depth> 5.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 100-Yr Storm Rainfall=6.70"

<u> </u>	Area (sf)	CN	Description					
	20,500	98	Paved park					
-	10,300	74						
	30,800 90 Weighted Average							
	10,300 33.44% Pervious Area							
	20,500		66.56% Imp	pervious Ar	ea			
0	S 0 179	02:00						
	C Length	Slope	Velocity	Capacity	Description			
(mi	n) (feet)	(ft/ft)	(ft/sec)	(cfs)				
6	0				Direct Entry TR55	-MIN	2	

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### **Summary for Subcatchment PDA-24:**

Runoff

3.31 cfs @ 12.09 hrs, Volume=

0.242 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 100-Yr Storm Rainfall=6.70"

A	rea (sf)	CN I	Description				
	6,100	98	Paved park	ing, HSG D	)		
	10,000	98.	Paved park	ing, HSG C			
	2,000	80 :	>75% Gras	s cover, Go	ood, HSG D		
	5,670	74 :	>75% Gras	s cover, Go	ood, HSG C		
	23,770	91 \	Neighted A	verage			_
	7,670	3	32.27% Per	vious Area			
	16,100	6	67.73% lmp	ervious Ar	ea		
		121 77					
Tc	Length	Slope		Capacity	Description		
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)			
6.0					Direct Entry.	TR55-MIN	

### **Summary for Subcatchment PDA-25:**

Runoff

4.28 cfs @ 12.09 hrs, Volume=

0.293 af, Depth> 4.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 100-Yr Storm Rainfall=6.70"

	Area (sf)	CN	Description				
*	5,307	98	Paved road	I, HSG C			
	1,913	98	Paved park	ing, HSG C	- "1 ->		
	30,676	74	>75% Ġras	s cover, Go	ood, HSG C		
8	37,896	79	Weighted A	verage			
	30,676		80.95% Pe				•
	7,220		19.05% lm	pervious Ar	ea		
	Tc Length	Slope	Velocity	Capacity	Description		
(m	in) (feet)	(ft/ft)	(ft/sec)	(cfs)			
(	6.0				Direct Entry, T	R55-MIN	

# Summary for Subcatchment PDA-26: Post area near Fern path to East

Runoff = 4.45 cfs @ 12.19 hrs, Volume=

0.376 af, Depth> 3.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 100-Yr Storm Rainfall=6.70"

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Type III 24-hr 100-Yr Storm Rainfall=6.70"
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* <u></u>	Α	rea (sf)	CN	Description						
		8,250	74 :	>75% Gras	Grass cover, Good, HSG C					
		8,090	77	Noods, Go	ds, Good, HSG D					
		42,800	70 '	Noods, Go	ods, Good, HSG C					
	59,140 72 Weighted Average									
	59,140 100.00% Pervious Area									
	Тс	Length	Slope	Velocity	Capacity	Description				
(	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)					
	12.3	50	0.0200	0.07		Sheet Flow,				
						Woods: Light underbrush n= 0.400 P2= 3.20"				
	1.1	50	0.0250	0.79		Shallow Concentrated Flow,				
				9		Woodland Kv= 5.0 fps				
	13.4	100	Total							

### Summary for Subcatchment PDA-27: Ramining uncontrolled flow to East wets

Runoff = 6.97 cfs @ 12.22 hrs, Volume=

0.670 af, Depth> 1.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 100-Yr Storm Rainfall=6.70"

	Α	rea (sf)	CN [	Description						
	1	23,796	30 \	Woods, Good, HSG A						
		15,000	39 >	75% Gras	s cover, Go	ood, HSG A				
		22,175	74 >	75% Gras	s cover, Go	ood, HSG C				
		86,479	70 \	Voods, Go	oods, Good, HSG C					
_	63	13,524	77 \	77 Woods, Good, HSG D						
	260,974 50 Weighted Average									
	260,974 100.00% Pervious Area					a				
	Tc	Length	Slope	Velocity	Capacity	Description				
_	'(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)					
	12.3	50	0.0200	0.07		Sheet Flow,				
						Woods: Light underbrush n= 0.400 P2= 3.20"				
	1.1	50	0.0250	0.79		Shallow Concentrated Flow,				
						Woodland Kv= 5.0 fps				
077.0	13.4	100	Total							

### Summary for Reach 14R: East Swamp

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

Inflow Area = 12.869 ac, 23.67% Impervious, Inflow Depth > 1.68" for 100-Yr Storm event

Inflow = 15.55 cfs @ 12.22 hrs, Volume= 1.800 af

Outflow = 15.55 cfs @ 12.22 hrs, Volume= 1.800 af, Atten= 0%, Lag= 0.0 min

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

### Summary for Pond 2P: Drain Basin Condo 11

Inflow Area = 0.870 ac, 19.05% Impervious, Inflow Depth > 4.04" for 100-Yr Storm event Inflow 4.28 cfs @ 12.09 hrs, Volume= 0.293 af Outflow 0.22 cfs @ 14.75 hrs, Volume= 0.152 af, Atten= 95%, Lag= 159.5 min Discarded = 0.08 cfs @ 14.75 hrs, Volume= 0.065 af

Primary 0.14 cfs @ 14.75 hrs, Volume= 0.086 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Peak Elev= 272.85' @ 14.75 hrs Surf.Area= 3,201 sf Storage= 7.869 cf

Plug-Flow detention time= 223.6 min calculated for 0.151 af (52% of inflow)

Center-of-Mass det. time= 143.2 min (922.2 - 779.0)

Volume	Inve	rt Avai	il.Storage	Storage Descriptio	n		
#1	270.00	)'	11,782 cf	Custom Stage Dat	ta (Irregular) Listed	below (Recalc)	
Elevation (fee	13.5 · · · · · · · · · · · · · · · · · · ·	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
270.0 274.0		2,350 3,584	187.0 225.0	0 11,782	0 11,782	2,350 3,844	
Device	Routing	In	vert Outle	et Devices			
#1 #2	Primary Discarded	271 I 270		Vert. Orifice/Grate 0 in/hr Exfiltration of	C= 0.600		

**Discarded OutFlow** Max=0.08 cfs @ 14.75 hrs HW=272.85' (Free Discharge) -2=Exfiltration (Exfiltration Controls 0.08 cfs)

Primary OutFlow Max=0.14 cfs @ 14.75 hrs HW=272.85' (Free Discharge) -1=Orifice/Grate (Orifice Controls 0.14 cfs @ 6.39 fps)

# Summary for Pond C10: Drain Basin Condo 10

[82] Warning: Early inflow requires earlier time span

Inflow Area = 0.546 ac, 67.73% Impervious, Inflow Depth > 5.33" for 100-Yr Storm event

Inflow 3.31 cfs @ 12.09 hrs, Volume= 0.242 af

Outflow 1.26 cfs @ 12.33 hrs, Volume= 0.165 af, Atten= 62%, Lag= 14.5 min

Primary 1.26 cfs @ 12.33 hrs, Volume= 0.165 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs. dt= 0.05 hrs. Peak Elev= 272.58' @ 12.33 hrs Surf.Area= 3,891 sf Storage= 5,213 cf

Plug-Flow detention time= 150.5 min calculated for 0.165 af (68% of inflow) Center-of-Mass det. time= 81.5 min (832.6 - 751.0)

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Volume

Invert

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Volume	Inve	ert Ava	il.Storage	Storage Description			
#1	271.0	0'	6,914 cf	<b>Custom Stage Data</b>	(Irregular) List	ed below (Recalc)	
Elevatio (fee		Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
271.0	0	2,738	230.0	0	0	2,738	
273.0	0	4,230	267.0	6,914	6,914	4,283	
Device	Routing	In	vert Outle	et Devices			
#1	Primary	271	1.00' <b>1.0"</b>	Vert. Orifice/Grate	C= 0.600		
#2	Primary	272	2.00' <b>12.0</b>	" Vert. Orifice/Grate	C= 0.600		

Primary OutFlow Max=1.26 cfs @ 12.33 hrs HW=272.58' (Free Discharge)

-1=Orifice/Grate (Orifice Controls 0.03 cfs @ 5.97 fps)

-2=Orifice/Grate (Orifice Controls 1.23 cfs @ 2.59 fps)

### **Summary for Pond C3: Drain Basin Condo 3**

Inflow Area =	3.397 ac, 60.05% Impervious, Inflow I	Depth > 3.73" for 100-Yr Storm event
Inflow =	15.00 cfs @ 12.11 hrs, Volume=	1.056 af
Outflow =	3.59 cfs @ 12.53 hrs, Volume=	1.055 af, Atten= 76%, Lag= 25.3 min
Discarded =	1.53 cfs @ 12.53 hrs, Volume=	0.797 af
Primary =	2.05 cfs @ 12.53 hrs, Volume=	0.258 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Peak Elev= 274.49' @ 12.53 hrs Surf.Area= 8,004 sf Storage= 15,871 cf

Plug-Flow detention time= 57.2 min calculated for 1.055 af (100% of inflow) Center-of-Mass det. time= 56.9 min ( 842.9 - 786.0 )

Avail.Storage Storage Description

#1	272.00'	15,9	963 cf	Custom Stage Dat	a (Irregular) Listed	below (Recalc)
Elevation (fee		ırf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
272.0 274.5		4,880 8,020	395.0 442.0	0 15,963	0 15,963	4,880 8,181
Device	Routing	Inver	t Outle	et Devices		
#1	Discarded	272.00	8.270	in/hr Exfiltration o	ver Surface area	
#2	Primary	272.00	12.0"	' Round Culvert		
			Inlet n= 0.	011 Concrete pipe	.00' / 271.00' S= 0 straight & clean,	0.0200 '/' Cc= 0.900
#3 #4	Device 2 Device 2	273.00 273.80		Vert. Orifice/Grate ' W x 1.0" H Vert. O		0.600

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**Discarded OutFlow** Max=1.53 cfs @ 12.53 hrs HW=274.49' (Free Discharge) 1=Exfiltration (Exfiltration Controls 1.53 cfs)

Primary OutFlow Max=2.05 cfs @ 12.53 hrs HW=274.49' (Free Discharge)

**2=Culvert** (Passes 2.05 cfs of 5.33 cfs potential flow)

-3=Orifice/Grate (Orifice Controls 1.41 cfs @ 5.26 fps)

-4=Orifice/Grate (Orifice Controls 0.64 cfs @ 3.87 fps)

### Summary for Pond C9: Drain Basin Condo 9

[82] Warning: Early inflow requires earlier time span

Inflow Area = 0.707 ac, 66.56% Impervious, Inflow Depth > 5.22" for 100-Yr Storm event

Inflow = 4.24 cfs @ 12.09 hrs, Volume= 0.308 af

Outflow = 1.51 cfs @ 12.36 hrs, Volume= 0.245 af, Atten= 64%, Lag= 16.1 min

Primary = 1.51 cfs @ 12.36 hrs, Volume= 0.245 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Peak Elev= 271.96' @ 12.36 hrs Surf.Area= 3,770 sf Storage= 6,038 cf

Plug-Flow detention time= 134.7 min calculated for 0.245 af (80% of inflow) Center-of-Mass det. time= 80.4 min ( 834.0 - 753.6 )

Volume	Inv	ert Ava	il.Storage	Storage Description			
#1	270.	00'	6,190 cf	<b>Custom Stage Data</b>	(Irregular) Liste	ed below (Recalc)	
Elevation (fee		Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
270.0	00	2,440	207.0	0	0	2,440	
272.0	00	3,800	245.0	6,190	6,190	3,880	
Device	Routing	ln	vert Outle	et Devices .			
#1	Primary	270	.00' 2.0"	Vert. Orifice/Grate	C= 0.600		(
#2	Primary			Vert. Orifice/Grate	C= 0.600		
#3	Primary	271	.40' 10.0'	" Vert. Orifice/Grate	C= 0.600		

Primary OutFlow Max=1.51 cfs @ 12.36 hrs HW=271.96' (Free Discharge)

1=Orifice/Grate (Orifice Controls 0.14 cfs @ 6.59 fps)

-2=Orifice/Grate (Orifice Controls 0.37 cfs @ 4.29 fps)

-3=Orifice/Grate (Orifice Controls 0.99 cfs @ 2.55 fps)

	*	

Appendix B NRCS SOIL INFORMATION

# MAP LEGEND

### Not rated or not available Streams and Canals Interstate Highways Major Roads Local Roads **US Routes** C/D Water Features Transportation 飁 Not rated or not available Area of Interest (AOI) Soil Rating Polygons Area of Interest (AOI) B/D C/D В

Background

Soil Rating Lines

⋖

1

Aerial Photography

AD

B/D

O

В

C/D

Not rated or not available \*

Soil Rating Points

AD Ф 

4

-

# MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:25,000.

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

misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting Enlargement of maps beyond the scale of mapping can cause 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: http://websoilsurvey.nrcs.usda.gov Coordinate System: Web Mercator (EPSG:3857)

Albers equal-area conic projection, should be used if more accurate Maps from the Web Soil Survey are based on the Web Mercator distance and area. A projection that preserves area, such as the projection, which preserves direction and shape but distorts 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: Norfolk and Suffolk Counties, Massachusetts Survey Area Data: Version 11, Sep 28, 2015 Soil map units are labeled (as space allows) for map scales 1:50,000

Date(s) aerial images were photographed: Apr 8, 2011—Apr 9,

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

# **Hydrologic Soil Group**

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
31A	Walpole sandy loam, 0 to 3 percent slopes	B/D	7.9	1.8%
51	Swansea muck, 0 to 1 percent slopes	B/D	31.9	7.1%
71B	Ridgebury fine sandy loam, 2 to 8 percent slopes, extremely stony	D	16.1	3.6%
73A	Whitman fine sandy loam, 0 to 5 percent slopes, extremely stony	D	32.6	7.3%
103B	Charlton-Hollis-Rock outcrop complex, 3 to 8 percent slopes	A	1.3	0.3%
254B	Merrimac fine sandy loam, 3 to 8 percent slopes	A	0.2	0.0%
300B	Montauk fine sandy loam, 3 to 8 percent slopes	С	0.4	0.1%
312B	Woodbridge fine sandy loam, 0 to 8 percent slopes, extremely stony	C/D	6.6	1.5%
315B	Scituate fine sandy loam, 3 to 8 percent slopes	С	92.4	20.7%
317B	Scituate fine sandy loam, 3 to 8 percent slopes, extremely stony	С	35.2	7.9%
420B	Canton fine sandy loam, 3 to 8 percent slopes	А	8.9	2.0%
422B	Canton fine sandy loam, 3 to 8 percent slopes, extremely stony	A	204.5	45.8%
422C	Canton fine sandy loam, 8 to 15 percent slopes, extremely stony	A	2.4	0.5%
628C	Canton-Urban land complex, 3 to 15 percent slopes	A	6.4	1.4%
Totals for Area of Inter	est		446.7	100.0%

### Description

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

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

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

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

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

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

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

## **Rating Options**

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

4.004.0.000

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Appendix C
PRE- AND POST-DEVELOPMENT DRAINAGE MAPS

a a				
esserie en la companya de la company				