

Chapel Hill Crossing

STORMWATER IMPACT STATEMENT

PIN:

070909732515, 070918181304, 07090865111 070918068944, 070908785804, 070918264324 070908889647, 070908948411,070918099567



Calculations By: Charles N. Hill, Jr. PE

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NC Board of Engineers & Surveyors License #C-1209

Project # 2126

Revised: April 3, 2023 February 07, 2023 August 3, 2023

Project Description and Summary

The mixed-use project is located on multiple parcels on north and south sides of Old Chapel Hill Road. The project involves the construction of 3 apartment buildings, multi-story mixed-use building, 25 single family residential units, 35 townhomes along with the associated parking and infrastructure. The project is split between two sites by Old Chapel Hill Road; therefore all of the calculations are in two sections: North Site and South Site. Each site's stormwater calculations are "standalone" and being evaluated independently.

Calculations for peak discharge, runoff volume (2-yr only), and water quality treatment (85% TSS) for all of the proposed improvements are provided. Soils on the site are hydrologic soil group D. The proposed site is located in the Cape Fear River Basin within the Jordan Lake watershed protection district.

Per the Town of Chapel Hill stormwater ordinance, the stormwater runoff rate leaving the site under post-development conditions may not exceed the stormwater runoff rate under predevelopment conditions for the 1-year, 2-year, and 25-year storms. The additional runoff volume from the pre-development to post-development conditions for the 2-year storm must also be captured on-site. In addition, added impervious surfaces must be treated for 85% total suspended solids (TSS) removal.

Methodology

- The Durham County Soil Survey is used to identify the soil types located on the site.
- HydroCAD software is used to calculate pre- and post-development peak flow rates and volumes for each sub-basin. HydroCAD uses the SCS TR-20 method to develop hydrographs.
- HydroCAD software is used to calculate the composite curve number for each subbasin. HydroCAD uses the NRCS TR-55 method for calculation composite curve numbers.

North Site Discussion of Results

Q1/Q2/Q25:

For the peak discharge calculations, the north site was analyzed as two basins. Basin 1 includes the majority of the site and all of the proposed development. Basin 1 flows to the north and enters a stream that bisects the property. Basin 2 is undisturbed and flows to the south and enters the stream that bisects the site. The combined basins are analyzed at the lowest point on the eastern property line where the stream exits the site.

Under pre-development conditions, the time of concentration for Basin 1 was calculated to be 17.7 minutes. Under post-development conditions, the time of concentration is shown at the

minimum 5 minutes. Basin 2 remains unchanged with the proposed development and the time of concentration was calculated to be 27.4 minutes. As a result of the proposed improvements, there is a net increase in runoff from site for the 1-year, 2-year, and 25-year storms. Underground detention is proposed to provide attenuation.

With the addition of underground detention pond, the peak flow rate for Basin 1 for the 1-year, 2-year and 25-year storms will be reduced from the pre-development conditions. There is a reduction in peak flow rate for the 1-year storm of -3%, 2-year storm of -12%, 25-yr storm of -18%. The underground detention is also sized to safely pass the 100-yr storm.

2-yr Runoff Volume:

Per the Town of Chapel Hill Design Manual, "the post-development stormwater runoff rate leaving the site shall not exceed the pre-development (existing conditions) stormwater runoff rate leaving the site for the local 1-year, 2-year, and 25-year storm events." In addition, "the post-development stormwater runoff volume leaving the site shall not exceed the pre-development (existing conditions) stormwater runoff volume leaving the site for the local 2-year frequency, 24-hour duration storm event." The stormwater runoff volume for the site under pre-development conditions was calculated to be 33,411 cf, and the post-development volume was calculated to be 52,620 cf. The post-development volume includes the volumes from both the area draining to the pond as well as the area that bypasses the pond rather than Basin 1 as a combined basin with a common time of concentration. Because there is an increase, stormwater control measures are proposed to provide detention. The proposed underground detention pond provides 29,400 cf of storage during the 2-yr storm. Since this project will require a sandfilter for TSS Removal, the volume of the sand bed and piping will detain the additional volume needed.

85% TSS Removal:

The Town of Chapel Hill Design Manual states that BMP's shall be designed to remove 85% average total suspended solids from the post-development stormwater runoff.

The proposed project results in an increase in impervious surface of approximately 137,425 sf. As a result, a BMP must be installed to treat for 85% TSS removal for the additional impervious surface added.

In order to meet this requirement, a sandfilter addition is proposed to the underground detention. The total impervious area that drains to the sandfilter is 130,225 sf. The remaining 7,200 sf is not practical to collect in the proposed treatment system, and is generally considered negligible as compared to the total project. Given that the sand filter captures runoff from most of the proposed impervious areas, this requirement is met.

Preliminary sizing calculations for the sandfilter are included. Additional calculations will be provided with the ZCP submittal.

Conclusion:

Because the increase in impervious surfaces as a result of this project resulted in an increase in peak flow for the 1-year, 2-year, and 25-year storms, and in runoff volume for the 2-year storm, detention and treatment are proposed in the form of underground detention to meet the requirements of the Town's stormwater ordinance. In addition, a sandfilter will provide 85% TSS reduction for almost all of the proposed impervious areas.

South Site Discussion of Results

Q1/Q2/Q25:

For the peak discharge calculations, the south site was analyzed as three basins for the pre-and post-development conditions (Basin 3, Basin 4, Basin 5).

Basin 3 includes the majority of the site and flows to the southwest. Basin 3 has an existing "farm pond" and the analysis point is the discharge of this pond at the property boundary. Basin 4 includes the majority of eastern portion of the site and flows to the southeast. Basin 4 drains to the right-of-way of Pope Road. Basin 5 includes the northern portion of the site and flows to the northeast and northwest at predevelopment conditions. Basin 5 will drain to the right-of-way of Old Chapel Hill Road.

Under pre-development conditions, the time of concentration for Basin 3 was calculated to be 12.3 minutes. Under post-development conditions, the time of concentration is shown at the minimum 5 minutes.

Under pre-development conditions, the time of concentration for Basin 4 was calculated to be 8.8 minutes. Under post-development conditions, the time of concentration is shown at the minimum 5 minutes.

Under pre-development conditions, the time of concentration for Basin 5 was shown at the minimum 5 minutes. Under post-development conditions, the time of concentration is shown at the minimum 5 minutes.

As a result of the proposed improvements, there is a net increase in runoff from site for the 1-year, 2-year, and 25-year storms. Two underground detention and a wet pond are proposed to provide attenuation.

Table 1.1 shows the peak flow summary The SCMs are also sized to safely pass the 100-yr storm.

Table 1.1

Peak Flow Analysis Summary

Drainage Basin 3	Тс	Area	CN	Q1	Q2	Q25
Dramaye Basin 3	(min)	(ac)		(cfs)	(cfs)	(cfs)
Pre-Development	12.3	5.53	80	9.68	13.35	31.88
						= =
Basin 3 Area to Pond	5	4.98	95	20.12	24.60	45.29
Basin 3 Area to bypass Pond	5	0.55	84	1.51	2.00	4.37
Post-Development Basin 3				21.63	26.60	49.66
Post-Development Basin 3 with Treatment				2.29	3.26	6.84
Percent difference between Pre-Development and Post					4	
Development with Treatment				-76%	-76%	-79%

Drainage Basin 4	Тс	Area	CN	Q1	Q2	Q25
Dramago Baom 4	(min)	(ac)		(cfs)	(cfs)	(cfs)
Pre-Development	8.8	2.91	80	5.76	7.93	18.80
Basin 4 Area to Pond	5	2.80	90	9.71	12.27	24.20
Basin 4 Area to bypass Pond	8.4	0.11	80	0.21	0.30	0.70
Post-Development Basin 4				9.92	12.57	24.90
Post-Development Basin 4 with Treatment				3.72	4.98	21.86
Percent difference between Pre-Development and Post Development with Treatment				-35%	-37%	16%

		47/				
Drainage Basin 5	Тс	Area	CN	Q1	Q2	Q25
	(min)	(ac)		(cfs)	(cfs)	(cfs)
Pre-Development	5	4.26		2.00	2.00	0.04
	5	1.36	77	2.60	3.68	9.24
		-			=	
Basin 5 Area to Pond	5	1.13	95	4.58	5.60	10.30
Basin 5 Area to bypass Pond	5	0.17	80	0.37	0.51	1.20
Post-Development Basin 5				5.09	6.29	11.93
						h.
Post-Development Basin 5 with Treatment				1.46	2.21	4.86
Percent difference between Pre-Development and Post Development with Treatment				-44%	-40%	-47%

2-yr Runoff Volume:

Per the Town of Chapel Hill Design Manual, "the post-development stormwater runoff rate leaving the site shall not exceed the pre-development (existing conditions) stormwater runoff rate leaving the site for the local 1-year, 2-year, and 25-year storm events." In addition, "the post-development stormwater runoff volume leaving the site shall not exceed the pre-development (existing conditions) stormwater runoff volume leaving the site for the local 2-year frequency, 24-hour duration storm event."

The stormwater runoff volume for the pre-development conditions for Basin 3 was calculated to be 32,581 cf, and the post-development volume was calculated to be 55,191 cf. The post-development volume includes the volumes from both the area draining to the pond as well as the area that bypasses the pond rather than Basin 3 as a combined basin with a common time of concentration. Because there is an increase, stormwater control measures are proposed to provide detention. The proposed wet detention pond provides 32,752 cf of storage during the 2-yr storm.

The stormwater runoff volume for the pre-development conditions for Basin 4 was calculated to be 16,596 cf, and the post-development volume was calculated to be 24,786 cf. The post-development volume includes the volumes from both the area draining to the pond as well as the area that bypasses the pond rather than Basin 4 as a combined basin with a common time of concentration. Because there is an increase, stormwater control measures are proposed to provide detention. The proposed underground detention pond provides 11,281 cf of storage during the 2-yr storm.

The stormwater runoff volume for the pre-development conditions for Basin 5 was calculated to be 6,795 cf, and the post-development volume was calculated to be 12,981 cf. The post-development volume includes the volumes from both the area draining to the pond as well as the area that bypasses the pond rather than Basin 5 as a combined basin with a common time of concentration. Because there is an increase, stormwater control measures are proposed to provide detention. The proposed underground detention pond provides 6,469 cf of storage during the 2-yr storm.

85% TSS Removal:

The Town of Chapel Hill Design Manual states that BMP's shall be designed to remove 85% average total suspended solids from the post-development stormwater runoff.

The proposed project results in an increase in impervious surface of approximately 276,226 sf. As a result, BMP's must be installed to treat for 85% TSS removal for the additional impervious surface added.

In order to meet this requirement, two sandfilters addition are proposed to the underground detention and a wet detention pond. The total impervious area that drains to the sandfilters and wet pond is 276,226 sf. Given that the BMP's capture runoff from all of the proposed impervious areas, this requirement is met.

Preliminary sizing calculations for the sandfilter are included. Additional calculations will be provided with the ZCP submittal.

Conclusion:

Because the increase in impervious surfaces as a result of this project resulted in an increase in peak flow for the 1-year, 2-year, and 25-year storms, and in runoff volume for the 2-year storm, detention and treatment are proposed in the form of two underground detention with sandfilters and a wet pond to meet the requirements of the Town's stormwater ordinance. The SCM's will provide 85% TSS reduction for almost all of the proposed impervious areas.

STORMWATER PEAK RUNOFF CALCULATIONS



Project Name: Chapel Hill Crossing

Project Number: 2126

By:

AMO

Date: 2/9/2023

Revised:

CNH

Date: 8/3/2023

Peak Flow Analysis Summary -North Site

NORTH SITE

Drainage Basin 1	Tc (min)	Area (ac)	CN	Q1 (cfs)	Q2 (cfs)	Q25 (cfs)
Pre-Development	17.7	4.72	78	6.16	8.72	21.97
				1		
Basin 1 Area to Pond	5	3.50	95	14.16	17.31	31.86
Basin 1 Area to bypass Pond	5	1.22	82	3.02	4.07	9.23
Post-Development Basin 1				17.18	21.38	41.09
Post-Development Basin 1 with Treatment				5.95	7.65	17.93
Development and Post				-3%	-12%	-18%

Drainaga Rasin 2	Tc	Area	CN	Q1	Q2	Q25
Drainage Basin 2	(min)	(ac)		(cfs)	(cfs)	(cfs)
Pre-Development	27.4	1.79	77	1.68	2.42	6.32
Post Development	27.4	1.79	77	1.68	2.42	6.32
Percent difference between Pre- Development and Post Development				0%	0%	0%



Project Name: Chapel Hill Crossing

Project Number: 2126

By: Date:

AMO 2/9/2023 Revised:

CNH

Date:

8/3/2023

Peak Flow Analysis Summary

SOUTH SITE

		300111311	_			
Drainage Basin 3	Tc (min)	Area (ac)	CN	Q1 (cfs)	Q2 (cfs)	Q25 (cfs)
Pre-Development	12.3	5.53	80	9.68	13.35	31.88
Basin 3 Area to Pond	5	4.98	95	20.12	24.60	45.29
Basin 3 Area to bypass Pond	5	0.55	84	1.51	2.00	4.37
Post-Development Basin 3				21.63	26.60	49.66
Post-Development Basin 3 with Treatment Percent difference between Pre-				2.29	3.26	6.84
Development and Post Development with Treatment			-	-76%	-76%	-79%

Drainage Basin 4	Tc (min)	Area (ac)	CN	Q1 (cfs)	Q2 (cfs)	Q25 (cfs)
Pre-Development	8.8	2.91	80	5.76	7.93	18.80
Basin 4 Area to Pond	5	2.80	90	9.71	12.27	24.20
Basin 4 Area to bypass Pond	8.4	0.11	80	0.21	0.30	0.70
Post-Development Basin 4				9.92	12.57	24.90
Post-Development Basin 4 with Treatment				3.72	4.98	21.86
Percent difference between Pre- Development and Post Development with Treatment				-35%	-37%	16%

Drainage Basin 5/6	Tc	Area	CN	Q1	Q2	Q25
Diamage Basin 5/0	(min)	(ac)		(cfs)	(cfs)	(cfs)
Pre-Development						
	5	1.36	77	2.60	3.68	9.24
Basin 5/6 Area to Pond	5	1.13	95	4.58	5.60	10.30
Basin 5/6 Area to bypass Pond	5	0.22	80	0.51	0.69	1.63
Post-Development Basin 5/6				5.09	6.29	11.93
Post-Development Basin 5/6 with Treatment				1.46	2.21	4.86
Percent difference between Pre- Development and Post Development with Treatment				-44%	-40%	-47%

STORMWATER VOLUME CALCULATIONS (2-YR STORM)



Project Name: Chapel Hill Crossing

Project Number: 2126

By:

AMO

Date: 2/9/2023

Revised:

CNH

Date: 8/3/2023

Runoff Volume Analysis Summary

	V2 af	V2 (cf)
Pre-Development Basin 1	0.564	24,568
Pre-Development Basin 2	0.203	8,843
Pre-Development Runoff Volume		33,411
Post-Development Basin 1 area to Pond	0.831	36,198
Post-Development Basin 1 area to bypass Pond	0.174	7,579
Post-Development Basin 1		43,778
Post-Development Basin 2	0.203	8,843
Post Development Runoff Volume		52,620
Underground Detention 2-year Volume	1	29,400
Post Development Runoff Volume with Treatment Percent difference between Pre-Development and Post		23,220
Development with Treatment		-30.50%



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AMO

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CNH

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Runoff Volume Analysis Summary Basin 3

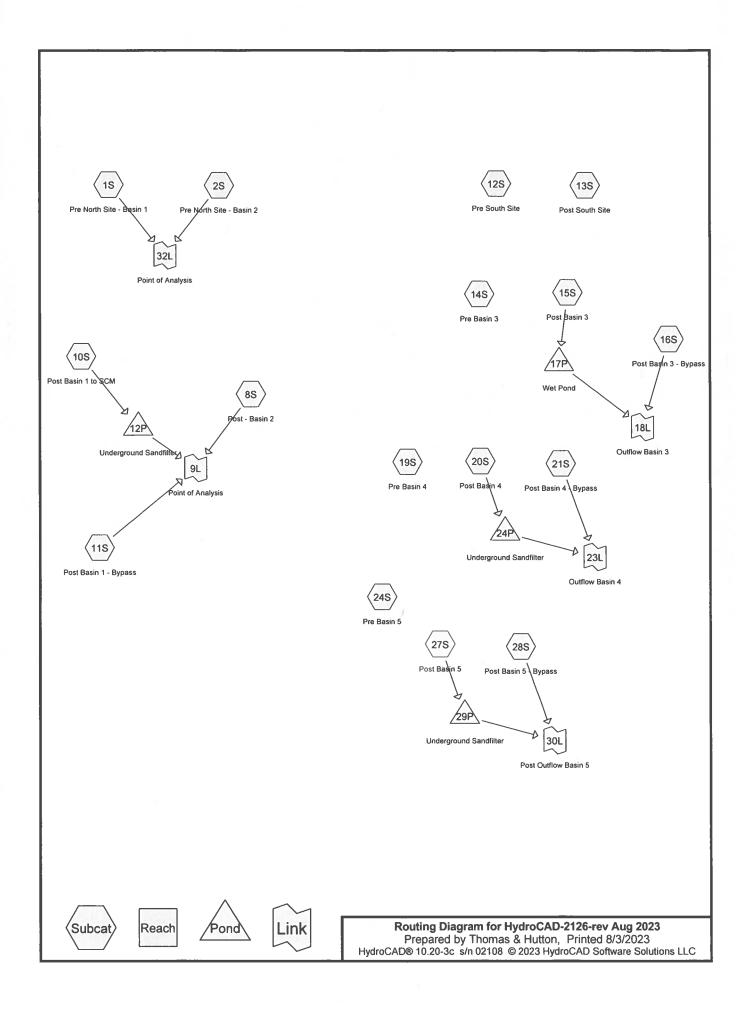
	V2 af	V2 (cf)
Pre-Development Basin 3 Pre-Development Runoff Volume	0.725	31,581 31,581
Post-Development Basin 3 area to Pond Post-Development Basin 3 area to bypass Pond	1.181 0.086	51,444
Post-Development Basin 3 area to bypass Pond Post-Development Basin 1 Post Development Runoff Volume	0.086	3,746 55,191 55,191
Wet Pond 2-year Volume		32,752
Post Development Runoff Volume with Treatment Percent difference between Pre-Development and Post	C.	22,439
Development with Treatment		-29%

Runoff Volume Analysis Summary Basin 4

	V2 af	V2 (cf)
Pre-Development Basin 4 Pre-Development Runoff Volume	0.381	16,596 16,596
Doot Development Design Appends Devel	٥٠٠٠	24.476
Post-Development Basin 4 area to Pond Post-Development Basin 4 area to bypass Pond	0.555 0.014	24,176 610
Post-Development Basin 4 Post Development Runoff Volume		24,786 24,786
Sandfilter 2-year Volume		11,281
Post Development Runoff Volume with Treatment		13,505
Percent difference between Pre-Development and Post		-19%

Runoff Volume Analysis Summary Basin 5/6

	V2 af	V2 (cf)
Pre-Development Basin 5/6	0.156	6,795
Pre-Development Runoff Volume		6,795
		11.510
Post-Development Basin 5/6 area to Pond	0.269	11,718
Post-Development Basin 5/6 area to bypass Pond	0.029	1,263
Post-Development Basin 5/6		12,981
Post Development Runoff Volume		12,981
Sandfilter 2-year Volume		6,469
Post Development Runoff Volume with Treatment		6,512
Percent difference between Pre-Development and Post		-4%



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Summary for Subcatchment 1S: Pre North Site - Basin 1

Runoff

6.16 cfs @ 12.11 hrs, Volume=

0.401 af, Depth> 1.02"

Routed to Link 32L : Point of Analysis

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type II 24-hr 1-Year Rainfall=3.00"

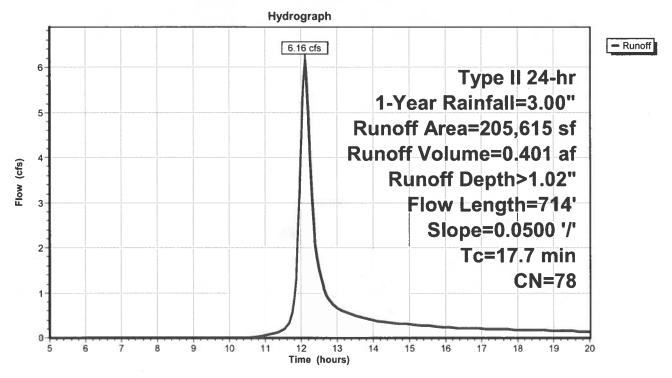
	Α	rea (sf)	CN E	Description		
*		6,578	98 lı	mprevious,	HSG D	
*		1,220	80 L	awn Good	, HSG D	
*	1	94,637	77 V	Voods, Go	od, HSG D	
		3,180	98 V	Vater Surfa	ace, HSG D	
	2	05,615	78 V	Veighted A	verage	
	1	95,857	9	5.25% Per	vious Area	
		9,758	4	.75% Impe	ervious Area	
	Тс	Length	Slope	Velocity	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	14.0	100	0.0500	0.12		Sheet Flow, Sheetflow
						Woods: Light underbrush n= 0.400 P2= 3.60"
	3.0	200	0.0500	1.12		Shallow Concentrated Flow, Shallow Concentrated
						Woodland Kv= 5.0 fps
	0.1	75		12.69		Lake or Reservoir, Old Pond Area
						Mean Depth= 5.00'
	0.6	339	0.0500	9.34	93.42	Channel Flow, Channel
						Area= 10.0 sf Perim= 6.0' r= 1.67'
						n= 0.050 Scattered brush, heavy weeds
	17.7	714	Total			

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Subcatchment 1S: Pre North Site - Basin 1



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Summary for Subcatchment 2S: Pre North Site - Basin 2

Runoff = 1.68 cfs @ 12.23 hrs, Volume=

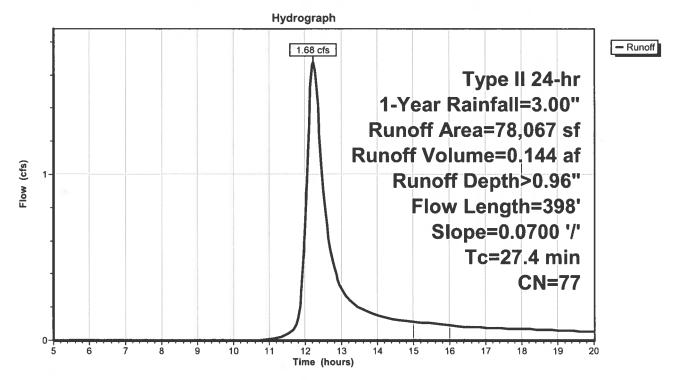
0.144 af, Depth> 0.96"

Routed to Link 32L: Point of Analysis

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type II 24-hr 1-Year Rainfall=3.00"

	Α	rea (sf)	CN E	Description		
*		78,067	77 V	Voods, Go	od, HSG D	
		78,067	1	00.00% Pe	ervious Are	a
	Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
_	25.5	250	0.0700	0.16		Sheet Flow, Sheetflow Woods: Light underbrush n= 0.400 P2= 3.60"
	1.9	148	0.0700	1.32		Shallow Concentrated Flow, Shallow Concentrated Woodland Kv= 5.0 fps
_	27.4	398	Total			

Subcatchment 2S: Pre North Site - Basin 2



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Summary for Link 32L: Point of Analysis

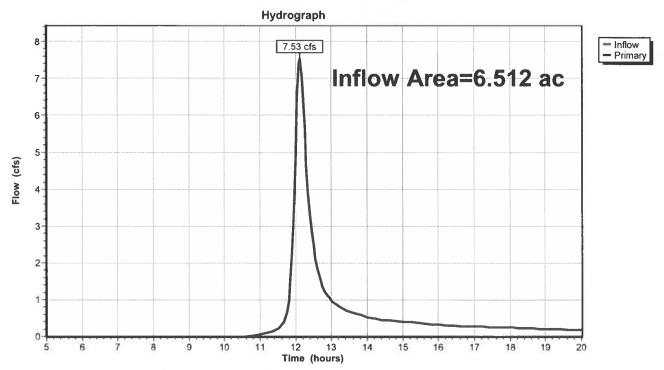
6.512 ac, 3.44% Impervious, Inflow Depth > 1.00" for 1-Year event Inflow Area =

Inflow =

7.53 cfs @ 12.12 hrs, Volume= 0.545 af 7.53 cfs @ 12.12 hrs, Volume= 0.545 af, Atten= 0%, Lag= 0.0 min Primary

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 32L: Point of Analysis



Summary for Subcatchment 10S: Post Basin 1 to SCM

Runoff

14.16 cfs @ 11.95 hrs, Volume=

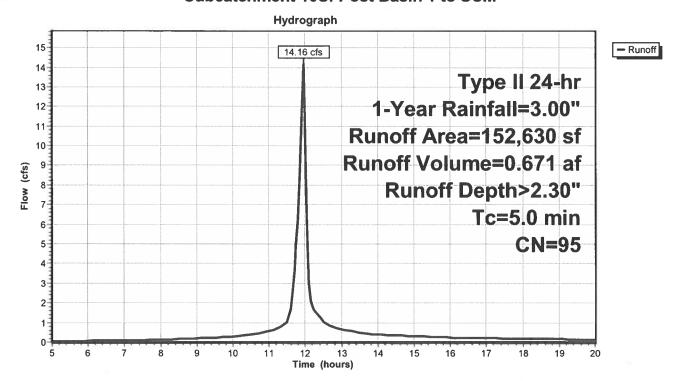
0.671 af, Depth> 2.30"

Routed to Pond 12P: Underground Sandfilter

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type II 24-hr 1-Year Rainfall=3.00"

Area (sf) CN	Description							
69,2	15 98	Roofs, HSC	Roofs, HSG D						
61,0	10 98	Paved park	Paved parking, HSG D						
22,4	05 80	>75% Gras	>75% Grass cover, Good, HSG D						
152,6	152,630 95 Weighted Average								
22,4	05	14.68% Per	vious Area						
130,2	25	85.32% Imp	pervious Ar	ea					
Tc Len	•		Capacity	Description					
(min) (fe	eet) (ft/	ft) (ft/sec)	(cfs)						
5.0				Direct Entry.	Direct				

Subcatchment 10S: Post Basin 1 to SCM



Summary for Subcatchment 11S: Post Basin 1 - Bypass

Runoff

=

3.02 cfs @ 11.96 hrs, Volume=

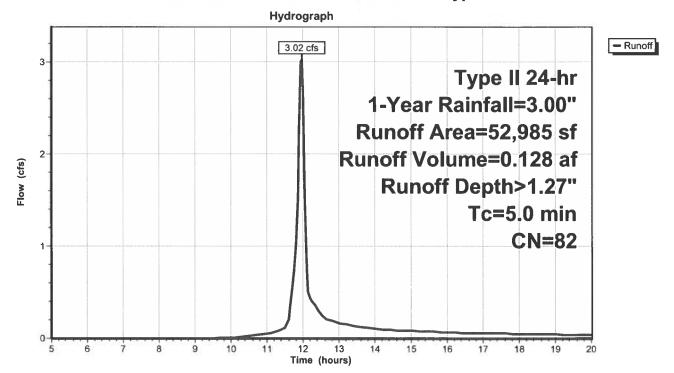
0.128 af, Depth> 1.27"

Routed to Link 9L : Point of Analysis

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type II 24-hr 1-Year Rainfall=3.00"

/	Area (sf)	CN	Description					
	32,496	80	>75% Grass cover, Good, HSG D					
	13,289	77	Woods, Good, HSG D					
*	7,200	98	Paved Parking, HSG D					
	52,985	82	2 Weighted Average					
	45,785		86.41% Pervious Area					
	7,200		13.59% Imp	pervious Ar	ea			
To	Length	Slope	e Velocity	Capacity	Description			
(min)	(feet)	(ft/ft) (ft/sec)	(cfs)				
5.0					Direct Entry, Direct			

Subcatchment 11S: Post Basin 1 - Bypass



Summary for Subcatchment 8S: Post - Basin 2

Runoff

=

1.68 cfs @ 12.23 hrs, Volume=

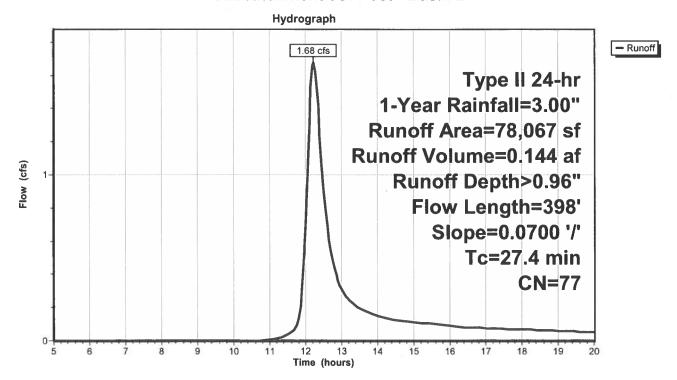
0.144 af, Depth> 0.96"

Routed to Link 9L : Point of Analysis

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type II 24-hr 1-Year Rainfall=3.00"

	Α	rea (sf)	CN D	escription		
*		78,067	77 V	Voods, Go	od, HSG D	-
	78,067 100.00% Pervious Area					a
	Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	25.5	250	0.0700	0.16		Sheet Flow, Sheetflow Woods: Light underbrush n= 0.400 P2= 3.60"
	1.9	148	0.0700	1.32		Shallow Concentrated Flow, Shallow Concentrated Woodland Kv= 5.0 fps
_	27.4	398	Total	· ·	·	

Subcatchment 8S: Post - Basin 2



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Summary for Pond 12P: Underground Sandfilter

3.504 ac, 85.32% Impervious, Inflow Depth > 2.30" for 1-Year event Inflow Area =

14.16 cfs @ 11.95 hrs, Volume= 0.671 af Inflow =

2.81 cfs @ 12.12 hrs, Volume= 2.81 cfs @ 12.12 hrs, Volume= 0.669 af, Atten= 80%, Lag= 10.1 min Outflow =

Primary = 0.669 af

Routed to Link 9L: Point of Analysis

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Peak Elev= 299.72' @ 12.12 hrs Surf.Area= 3,920 sf Storage= 10,643 cf

Plug-Flow detention time= 36.1 min calculated for 0.669 af (100% of inflow)

Center-of-Mass det. time= 35.0 min (782.5 - 747.5)

Volume	Inve	t Avail.Sto	rage Storage Description				
#1	297.00)' 39,20	00 cf Custom Stage Data (Prismatic) Listed below (Recalc)				
Elevatio	et)	Surf.Area (sq-ft)	Inc.Store Cum.Store (cubic-feet)				
297.0		3,920	0 0				
307.0	00	3,920	39,200 39,200				
Device	Routing	Invert	Outlet Devices				
#1	Primary	296.00'	24.0" Round Culvert L= 106.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 296.00' / 295.00' S= 0.0094 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf				
#2	Device 1	296.00'	6.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads				
#3	Device 1	298.00'	4.0" Vert. Orifice/Grate X 2.00 C= 0.600Limited to weir flow at low heads14.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)				
#4	Device 1	303.50'					

Primary OutFlow Max=2.80 cfs @ 12.12 hrs HW=299.70' (Free Discharge)

-1=Culvert (Passes 2.80 cfs of 24.87 cfs potential flow)

-2=Orifice/Grate (Orifice Controls 1.76 cfs @ 8.95 fps)

-3=Orifice/Grate (Orifice Controls 1.04 cfs @ 5.97 fps)

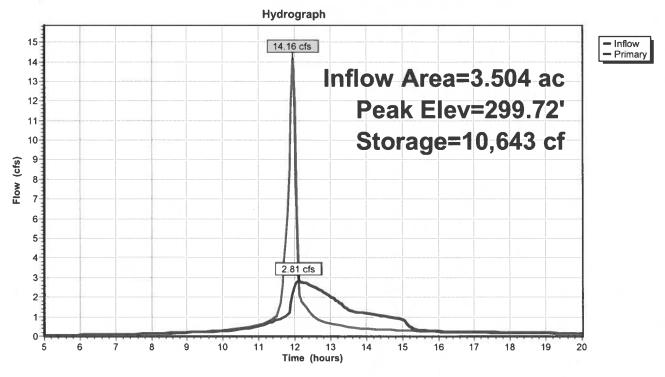
-4=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

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Pond 12P: Underground Sandfilter



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Summary for Link 9L: Point of Analysis

Inflow Area =

6.512 ac, 48.44% Impervious, Inflow Depth > 1.73" for 1-Year event

Inflow =

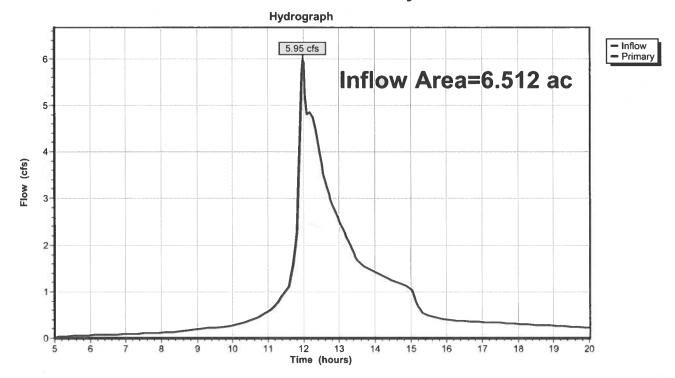
Primary

5.95 cfs @ 11.99 hrs, Volume= 5.95 cfs @ 11.99 hrs, Volume= 0.941 af

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

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 9L: Point of Analysis



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Summary for Subcatchment 1S: Pre North Site - Basin 1

Runoff = 8.72 cfs @ 12.11 hrs, Volume=

0.564 af, Depth> 1.43"

Routed to Link 32L : Point of Analysis

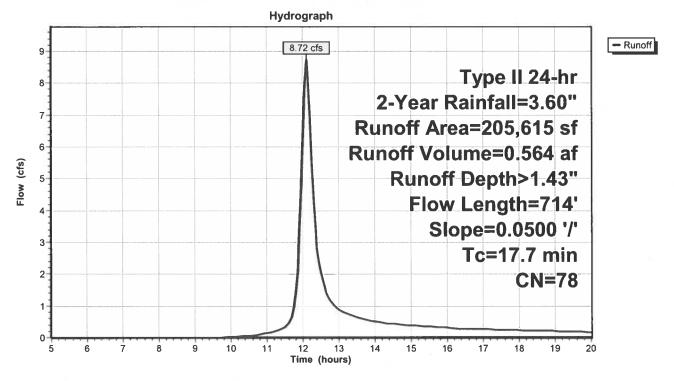
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type II 24-hr 2-Year Rainfall=3.60"

_	A	rea (sf)	CN [Description		
*		6,578	98 I	mprevious,	HSG D	
*		1,220		awn Good		
*	1	94,637			od, HSG D	
		3,180			ace, HSG D	
	205,615 78 Weighted Avera 195,857 95.25% Pervious 9,758 4.75% Impervious			Veighted A 5.25% Per	verage vious Area	
	Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	14.0	100	0.0500	0.12		Sheet Flow, Sheetflow
						Woods: Light underbrush n= 0.400 P2= 3.60"
	3.0	200	0.0500	1.12		Shallow Concentrated Flow, Shallow Concentrated
						Woodland Kv= 5.0 fps
	0.1	75		12.69		Lake or Reservoir, Old Pond Area
						Mean Depth= 5.00'
	0.6	339	0.0500	9.34	93.42	Channel Flow, Channel
						Area= 10.0 sf Perim= 6.0' r= 1.67'
						n= 0.050 Scattered brush, heavy weeds
	17.7	714	Total			

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Subcatchment 1S: Pre North Site - Basin 1



Summary for Subcatchment 2S: Pre North Site - Basin 2

Runoff

2.42 cfs @ 12.22 hrs, Volume=

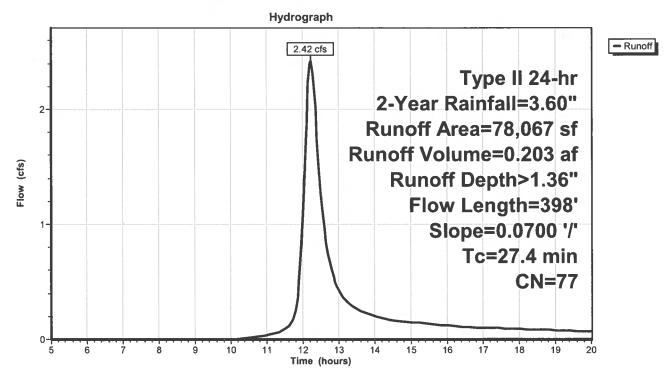
0.203 af, Depth> 1.36"

Routed to Link 32L: Point of Analysis

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type II 24-hr 2-Year Rainfall=3.60"

	Area (sf)	CN D	Description			
*	78,067	77 V	Voods, Go	od, HSG D		
	78,067	1	100.00% Pervious Area			
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description	
25.5	250	0.0700	0.16		Sheet Flow, Sheetflow Woods: Light underbrush n= 0.400 P2= 3.60"	
1.9	148	0.0700	1.32		Shallow Concentrated Flow, Shallow Concentrated Woodland Kv= 5.0 fps	
27.4	398	Total				

Subcatchment 2S: Pre North Site - Basin 2



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Summary for Link 32L: Point of Analysis

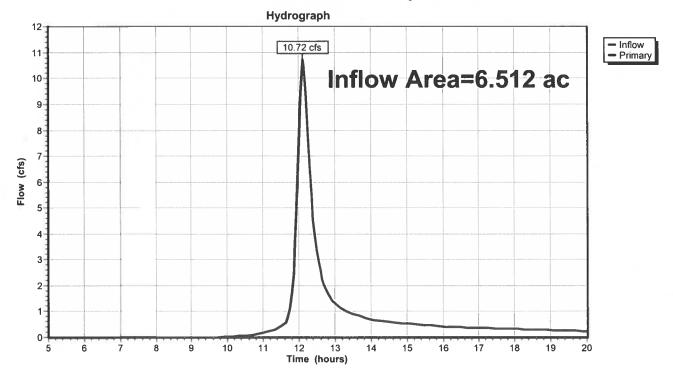
Inflow Area = 6.512 ac, 3.44% Impervious, Inflow Depth > 1.41" for 2-Year event

Inflow =

10.72 cfs @ 12.12 hrs, Volume= 0.767 af 10.72 cfs @ 12.12 hrs, Volume= 0.767 af, Atten= 0%, Lag= 0.0 min Primary =

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 32L: Point of Analysis



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Summary for Subcatchment 10S: Post Basin 1 to SCM

Runoff = 17.31 cfs @ 11.95 hrs, Volume=

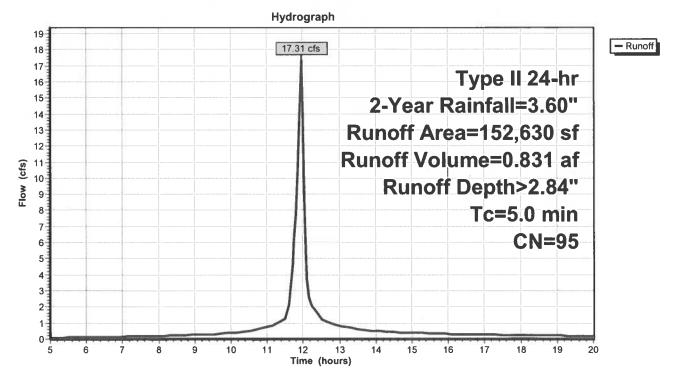
0.831 af, Depth> 2.84"

Routed to Pond 12P: Underground Sandfilter

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type II 24-hr 2-Year Rainfall=3.60"

Area (sf)	CN	Description							
69,215	98	Roofs, HSG	Roofs, HSG D						
61,010	98	Paved park	Paved parking, HSG D						
22,405	80	>75% Grass cover, Good, HSG D							
152,630 22,405 130,225	95	Weighted A 14.68% Per 85.32% Imp	vious Area						
Tc Lengtł (min) (feet		•	Capacity (cfs)	Description					
5.0				Direct Entry, Direct					

Subcatchment 10S: Post Basin 1 to SCM



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Summary for Subcatchment 11S: Post Basin 1 - Bypass

Runoff

4.07 cfs @ 11.96 hrs, Volume=

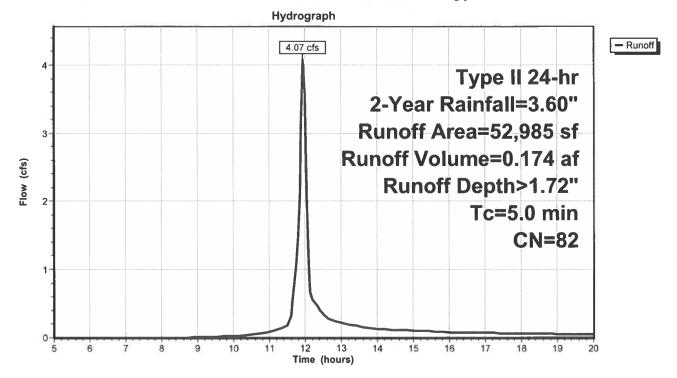
0.174 af, Depth> 1.72"

Routed to Link 9L: Point of Analysis

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type II 24-hr 2-Year Rainfall=3.60"

	A	ea (sf)	CN E	Description							_
		32,496	80 >	>75% Grass cover, Good, HSG D						_	
		13,289	77 V	Woods, Good, HSG D							
1	k	7,200	98 F	Paved Park	ing, HSG E)					
		52,985 45,785 7,200	8		verage vious Area pervious Ar						_
	Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description					
	5.0					Direct Entry.	Direct				

Subcatchment 11S: Post Basin 1 - Bypass



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Summary for Subcatchment 8S: Post - Basin 2

Runoff =

2.42 cfs @ 12.22 hrs, Volume=

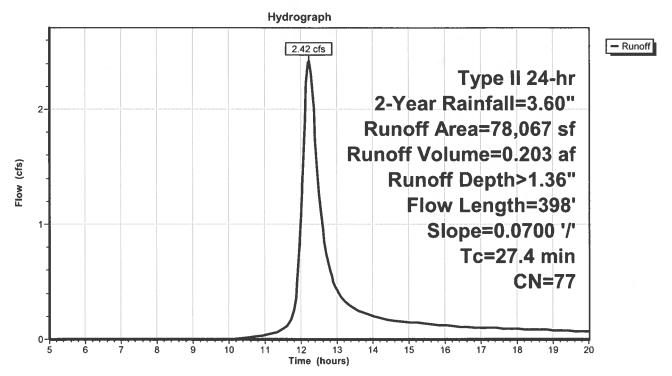
0.203 af, Depth> 1.36"

Routed to Link 9L : Point of Analysis

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type II 24-hr 2-Year Rainfall=3.60"

	Α	rea (sf)	CN E	Description						
*	·	78,067	77 V	77 Woods, Good, HSG D						
		78,067	1	00.00% Pe	ervious Are	а				
	Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description				
	25.5	250	0.0700	0.16		Sheet Flow, Sheetflow Woods: Light underbrush n= 0.400 P2= 3.60"				
	1.9	148	0.0700	1.32		Shallow Concentrated Flow, Shallow Concentrated Woodland Kv= 5.0 fps				
_	27.4	398	Total							

Subcatchment 8S: Post - Basin 2



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Summary for Pond 12P: Underground Sandfilter

3.504 ac, 85.32% Impervious, Inflow Depth > 2.84" for 2-Year event Inflow Area =

Inflow = 17.31 cfs @ 11.95 hrs, Volume= 0.831 af

3.20 cfs @ 12.12 hrs, Volume= 3.20 cfs @ 12.12 hrs, Volume= Outflow = 0.829 af, Atten= 81%, Lag= 10.4 min

Primary = 0.829 af

Routed to Link 9L: Point of Analysis

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Peak Elev= 300.44' @ 12.12 hrs Surf.Area= 3,920 sf Storage= 13,503 cf

Plug-Flow detention time= 40.0 min calculated for 0.829 af (100% of inflow)

Center-of-Mass det. time= 38.9 min (782.7 - 743.8)

Volume	Inve	rt Avail.Stor	rage Storage Description
#1	297.00	0' 39,20	00 cf Custom Stage Data (Prismatic) Listed below (Recalc)
Elevatio (fee		Surf.Area (sq-ft)	Inc.Store Cum.Store (cubic-feet)
297.0	0	3,920	0 0
307.0	0	3,920	39,200 39,200
Device	Routing	Invert	Outlet Devices
#1	Primary	296.00'	24.0" Round Culvert L= 106.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 296.00' / 295.00' S= 0.0094 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf
#2	Device 1	296.00'	6.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	298.00'	4.0" Vert. Orifice/Grate X 2.00 C= 0.600 Limited to weir flow at low heads
#4	Device 1	303.50'	14.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=3.20 cfs @ 12.12 hrs HW=300.43' (Free Discharge)

1=Culvert (Passes 3.20 cfs of 28.01 cfs potential flow)

-2=Orifice/Grate (Orifice Controls 1.93 cfs @ 9.84 fps)

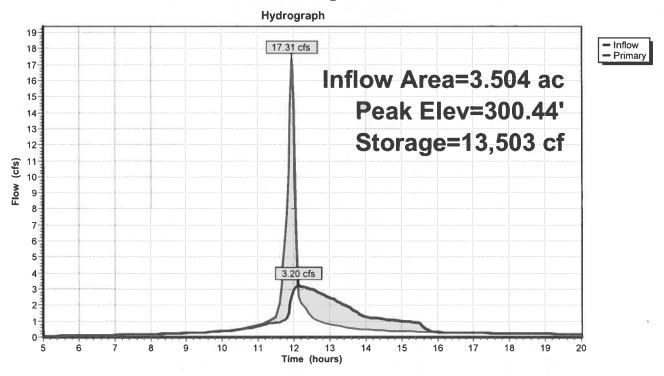
-3=Orifice/Grate (Orifice Controls 1.26 cfs @ 7.24 fps)

-4=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

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Pond 12P: Underground Sandfilter



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Summary for Link 9L: Point of Analysis

Inflow Area =

6.512 ac, 48.44% Impervious, Inflow Depth > 2.22" for 2-Year event

Inflow =

7.65 cfs @ 11.98 hrs, Volume= 7.65 cfs @ 11.98 hrs, Volume=

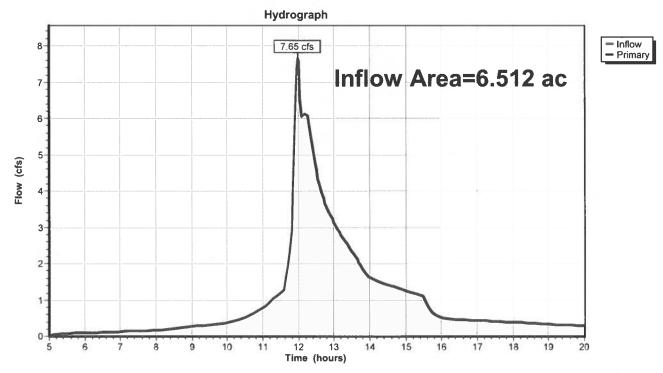
1.207 af

Primary

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

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 9L: Point of Analysis



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Summary for Subcatchment 1S: Pre North Site - Basin 1

Runoff

= 21.97 cfs @ 12.10 hrs, Volume=

1.436 af, Depth> 3.65"

Routed to Link 32L: Point of Analysis

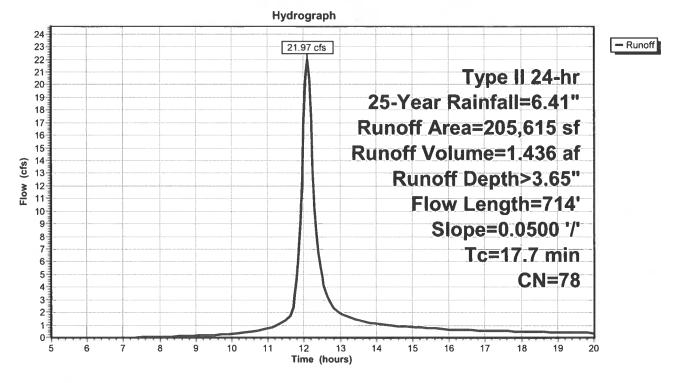
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type II 24-hr 25-Year Rainfall=6.41"

	Α	rea (sf)	CN E	Description		
*		6,578	98 I	mprevious,	HSG D	
*		1,220		awn Good		
*	1	94,637			od, HSG D	
		3,180			ace, HSG D	
	205,615 78 Weighted Average 195,857 95.25% Pervious Area 9,758 4.75% Impervious Area					
	Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	14.0	100	0.0500	0.12		Sheet Flow, Sheetflow
						Woods: Light underbrush n= 0.400 P2= 3.60"
	3.0	200	0.0500	1.12		Shallow Concentrated Flow, Shallow Concentrated
						Woodland Kv= 5.0 fps
	0.1	75		12.69		Lake or Reservoir, Old Pond Area
						Mean Depth= 5.00'
	0.6	339	0.0500	9.34	93.42	Channel Flow, Channel
						Area= 10.0 sf Perim= 6.0' r= 1.67'
						n= 0.050 Scattered brush, heavy weeds
	17.7	714	Total			,1

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Subcatchment 1S: Pre North Site - Basin 1



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Summary for Subcatchment 2S: Pre North Site - Basin 2

Runoff = 6.32 cfs @ 12.21 hrs, Volume=

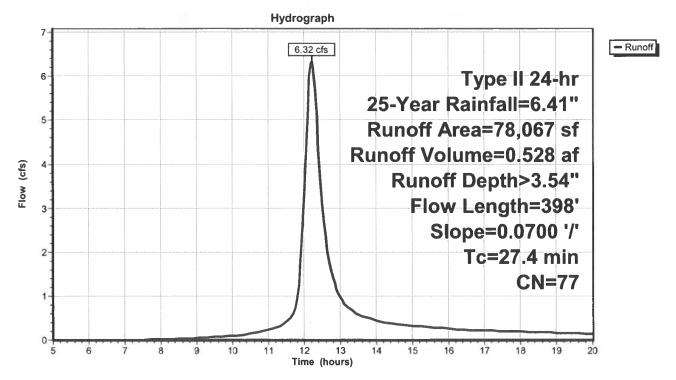
0.528 af, Depth> 3.54"

Routed to Link 32L: Point of Analysis

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type II 24-hr 25-Year Rainfall=6.41"

Α	rea (sf)	CN D	escription		
	78,067	77 V	Voods, Go	od, HSG D	
78,067 100.00% Pervious Area					a
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.5	250	0.0700	0.16		Sheet Flow, Sheetflow
1.9	148	0.0700	1.32		Woods: Light underbrush n= 0.400 P2= 3.60" Shallow Concentrated Flow, Shallow Concentrated Woodland Kv= 5.0 fps
27.4	398	Total			

Subcatchment 2S: Pre North Site - Basin 2



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Summary for Link 32L: Point of Analysis

Inflow Area =

3.44% Impervious, Inflow Depth > 3.62" for 25-Year event

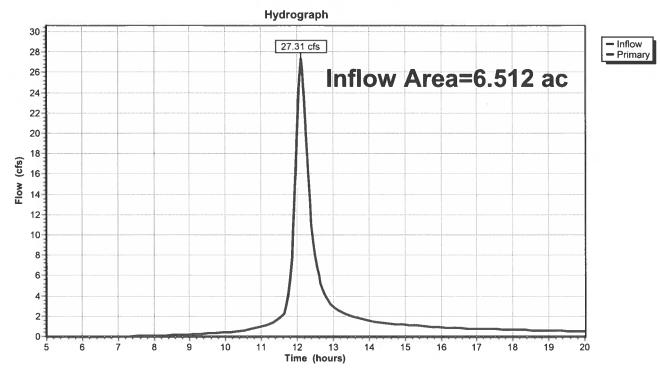
Inflow = Primary =

27.31 cfs @ 12.11 hrs, Volume= 1.964 af 27.31 cfs @ 12.11 hrs, Volume=

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

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 32L: Point of Analysis



Summary for Subcatchment 10S: Post Basin 1 to SCM

Runoff = 31.86 cfs @ 11.95 hrs, Volume=

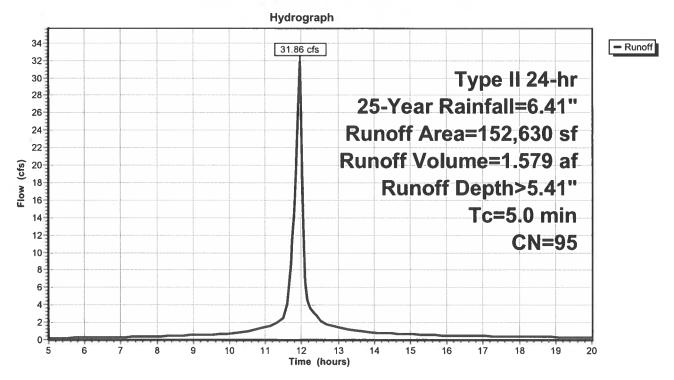
1.579 af, Depth> 5.41"

Routed to Pond 12P: Underground Sandfilter

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type II 24-hr 25-Year Rainfall=6.41"

	Area	(sf) CN	Description	escription						
•	69,2	215 98	Roofs, HSC	oofs, HSG D						
	61,0	10 98	Paved park	Paved parking, HSG D						
	22,4	105 80	>75% Grass cover, Good, HSG D							
	152,6 22,4 130,2	105	Weighted A 14.68% Pei 85.32% Imp	vious Area						
		ngth Slo eet) (ft	pe Velocity /ft) (ft/sec)	Capacity (cfs)	Description					
	5.0				Direct Entry, Direct					

Subcatchment 10S: Post Basin 1 to SCM



Summary for Subcatchment 11S: Post Basin 1 - Bypass

Runoff

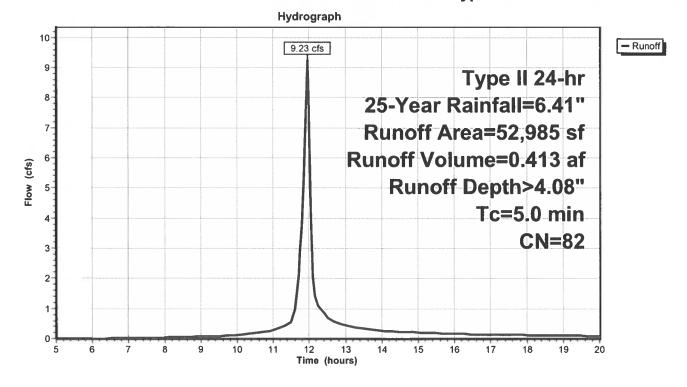
9.23 cfs @ 11.95 hrs, Volume= 0.413 af, Depth> 4.08"

Routed to Link 9L : Point of Analysis

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type II 24-hr 25-Year Rainfall=6.41"

	Area (sf)	CN	Description						
	32,496	80	>75% Gras	>75% Grass cover, Good, HSG D					
	13,289	77	Woods, Go						
*	7,200	98	Paved Parking, HSG D						
	52,985	82	2 Weighted Average						
	45,785		86.41% Per	rvious Area					
	7,200		13.59% Imp	pervious Ar	ea				
(r	Tc Length	Slop (ft/f		Capacity (cfs)	Description				
	5.0				Direct Entry, Direct				

Subcatchment 11S: Post Basin 1 - Bypass



Summary for Subcatchment 8S: Post - Basin 2

Runoff

=

6.32 cfs @ 12.21 hrs, Volume=

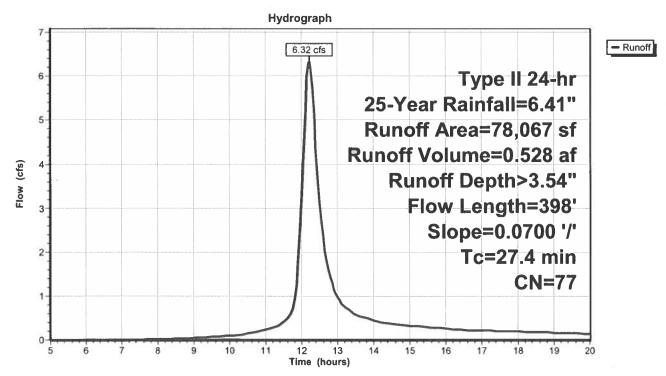
0.528 af, Depth> 3.54"

Routed to Link 9L: Point of Analysis

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type II 24-hr 25-Year Rainfall=6.41"

A	rea (sf)	CN [Description		
*	78,067	77 \	Noods, Go	od, HSG D	
78,067 100.00			100.00% Pe	% Pervious Area	
Tc (min)	Length (feet)	Slope (ft/ft)		Capacity (cfs)	Description
25.5	250	0.0700	0.16		Sheet Flow, Sheetflow Woods: Light underbrush n= 0.400 P2= 3.60"
1.9	148	0.0700	1.32		Shallow Concentrated Flow, Shallow Concentrated Woodland Kv= 5.0 fps
27.4	398	Total			

Subcatchment 8S: Post - Basin 2



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Summary for Pond 12P: Underground Sandfilter

Inflow Area =

3.504 ac, 85.32% Impervious, Inflow Depth > 5.41" for 25-Year event

Inflow =

1.576 af, Atten= 67%, Lag= 8.3 min

Outflow = Primary = 31.86 cfs @ 11.95 hrs, Volume= 1.579 af 10.41 cfs @ 12.09 hrs, Volume= 1.576 af, 10.41 cfs @ 12.09 hrs, Volume= 1.576 af

Routed to Link 9L: Point of Analysis

Routing by Stor-Ind method. Time Span= 5.00-20.00 hrs. dt= 0.05 hrs

Peak Elev= 303.75' @ 12.09 hrs Surf.Area= 3,920 sf Storage= 26,471 cf

Plug-Flow detention time= 53.5 min calculated for 1.575 af (100% of inflow)

Center-of-Mass det. time= 52.4 min (787.4 - 735.0)

<u>Volume</u>	Inver	t Avail.Sto	rage Storage Description
#1	297.00	' 39,20	00 cf Custom Stage Data (Prismatic) Listed below (Recalc)
Elevatio		urf.Area (sq-ft)	Inc.Store Cum.Store (cubic-feet) (cubic-feet)
297.0	00	3,920	0 0
307.0	00	3,920	39,200 39,200
Device	Routing	Invert	Outlet Devices
#1	Primary	296.00'	24.0" Round Culvert
			L= 106.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 296.00' / 295.00' S= 0.0094 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf
#2	Device 1	296.00'	6.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	298.00'	4.0" Vert. Orifice/Grate X 2.00 C= 0.600 Limited to weir flow at low heads
#4	Device 1	303.50'	14.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=9.89 cfs @ 12.09 hrs HW=303.741" (Free Discharge)

1=Culvert (Passes 9.89 cfs of 39.27 cfs potential flow)

-2=Orifice/Grate (Orifice Controls 2.59 cfs @ 13.18 fps)

-3=Orifice/Grate (Orifice Controls 1.98 cfs @ 11.37 fps)

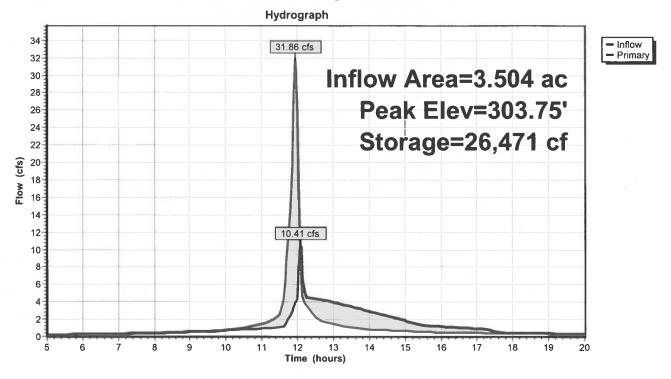
-4=Sharp-Crested Rectangular Weir (Weir Controls 5.32 cfs @ 1.60 fps)

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Pond 12P: Underground Sandfilter



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Summary for Link 9L: Point of Analysis

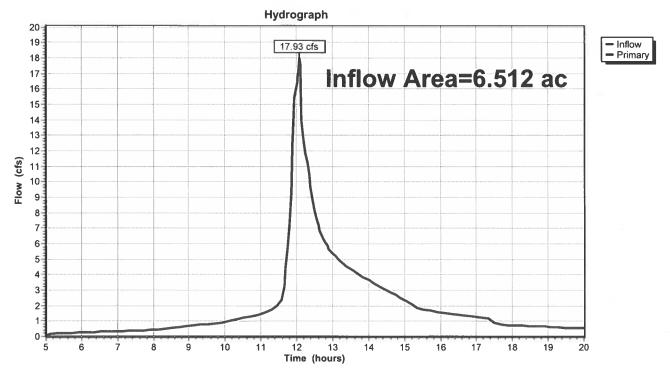
Inflow Area = 6.512 ac, 48.44% Impervious, Inflow Depth > 4.64" for 25-Year event

Inflow = 17.93 cfs @ 12.08 hrs, Volume= 2.517 af

Primary = 17.93 cfs @ 12.08 hrs, Volume= 2.517 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 9L: Point of Analysis



Summary for Subcatchment 12S: Pre South Site

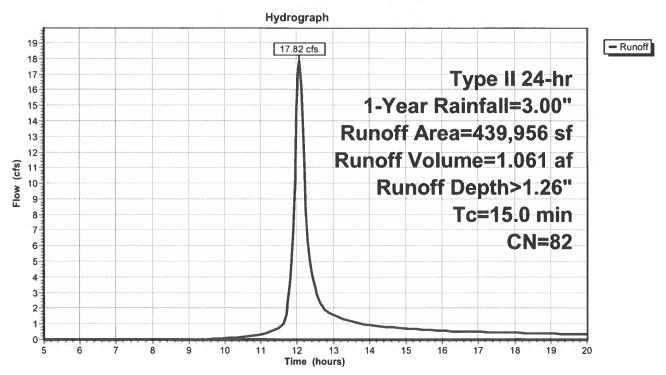
Runoff = 17.82 cfs @ 12.07 hrs, Volume=

1.061 af, Depth> 1.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type II 24-hr 1-Year Rainfall=3.00"

Area (s	f) CN	Description	Pescription Pescription						
52,18	35 98	Paved park	aved parking, HSG D						
16,11	17 84	50-75% Gra	0-75% Grass cover, Fair, HSG D						
354,75	53 79	Woods, Fai	Voods, Fair, HSG D						
16,90)1 98	Water Surfa	Vater Surface, HSG D						
439,95	56 82	82 Weighted Average							
370,87	70	84.30% Per	vious Area						
69,08	36	15.70% lmp	ervious Ar	ea					
Tc Len	gth Slo		Capacity	Description					
(min) (fe	et) (ft/	ft) (ft/sec)	(cfs)						
15.0				Direct Entry,	Direct Guess				

Subcatchment 12S: Pre South Site



Summary for Subcatchment 13S: Post South Site

Runoff

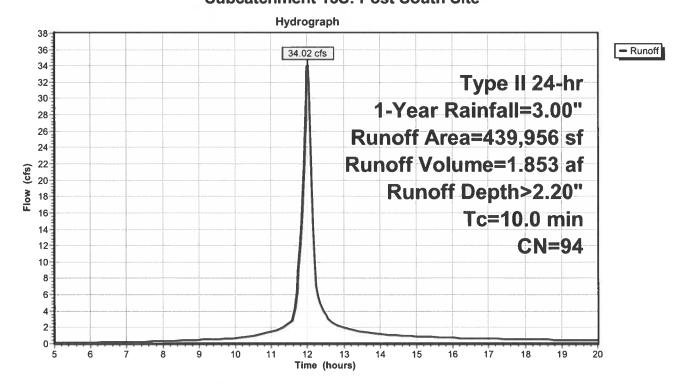
34.02 cfs @ 12.01 hrs, Volume=

1.853 af, Depth> 2.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type II 24-hr 1-Year Rainfall=3.00"

Ar	ea (sf)	CN I	Description						
2	99,170	98 I	Paved park	ing, HSG D					
140,786 84 50-75% Grass cover, Fa					Fair, HSG D				
439,956 94 Weighted Average									
1	140,786			32.00% Pervious Area					
2	99,170	68.00% Impervious Are			ea				
Tc (min)	Length (feet)	Slope (ft/ft)		Capacity (cfs)	Description				
10.0	(3 - 1)	(****)	(12000)	(5.5)	Direct Entry,	Direct Guess			

Subcatchment 13S: Post South Site



Summary for Subcatchment 14S: Pre Basin 3

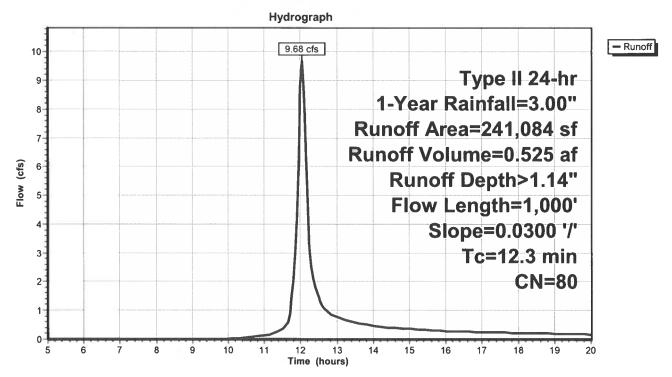
Runoff = 9.68 cfs @ 12.05 hrs, Volume=

0.525 af, Depth> 1.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type II 24-hr 1-Year Rainfall=3.00"

	Α	rea (sf)	CN I	Description				
		31,102	98 I	Paved park	ing, HSG D			
		6,970	84 5	0-75% Gra	ass cover, f	Fair, HSG D		
	2	03,012	77 \					
241,084 80 Weighted Average					verage			
	209,982			87.10% Pervious Area				
		31,102	•	12.90% Impervious Area				
	Тс	Length	Slope	Velocity	Capacity	Description		
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)			
	12.3	1,000	0.0300	1.36		Kirpich Method, Existing Flowpath		
						General overland flow k= 2.00		

Subcatchment 14S: Pre Basin 3



Summary for Subcatchment 15S: Post Basin 3

Runoff

=

20.12 cfs @ 11.95 hrs, Volume=

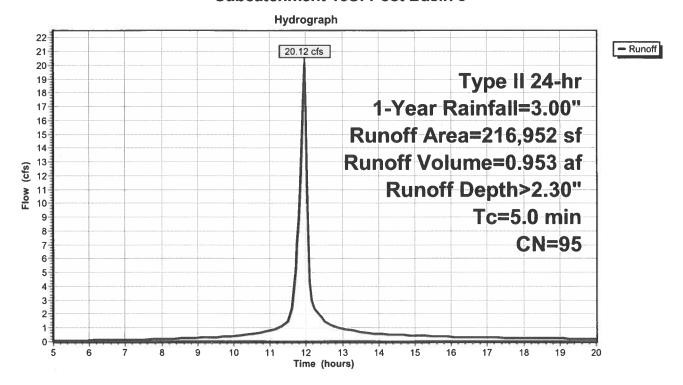
0.953 af, Depth> 2.30"

Routed to Pond 17P: Wet Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type II 24-hr 1-Year Rainfall=3.00"

Area (sf)	CN	Description	Description						
156,186	98	Paved park	Paved parking, HSG D						
49,920	84	50-75% Gra	50-75% Grass cover, Fair, HSG D						
10,846 98 Water Surface, HSG D									
216,952 95 Weighted Average 49,920 23.01% Pervious Area 167,032 76.99% Impervious Are			vious Area						
Tc Length (min) (feet)	Slop (ft/	•	Capacity (cfs)	Description					
5.0				Direct Entry, Estimate					

Subcatchment 15S: Post Basin 3



Summary for Subcatchment 16S: Post Basin 3 - Bypass

Runoff

=

1.51 cfs @ 11.96 hrs, Volume=

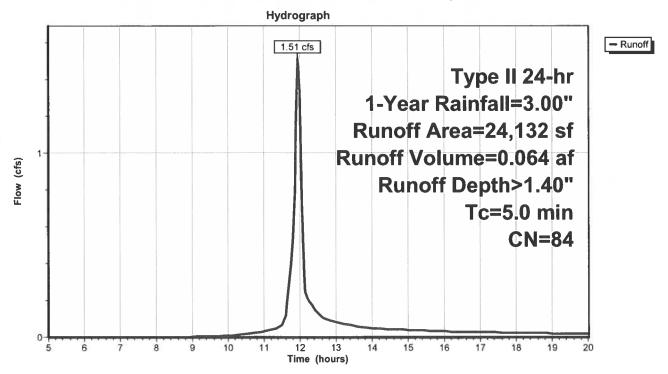
0.064 af, Depth> 1.40"

Routed to Link 18L: Outflow Basin 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type II 24-hr 1-Year Rainfall=3.00"

_	Α	rea (sf)	CN	Description						
_		24,132	84	50-75% Grass cover, Fair, HSG D						
_	24,132 100.00% Pervious Area									
	Tc (min)	Length (feet)	Slope (ft/ft)		Capacity (cfs)	Description				
_	5.0					Direct Entry Estimate				

Subcatchment 16S: Post Basin 3 - Bypass



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Summary for Pond 17P: Wet Pond

Inflow Area = 4.981 ac, 76.99% Impervious, Inflow Depth > 2.30" for 1-Year event

20.12 cfs @ 11.95 hrs, Volume= 0.953 af Inflow =

1.39 cfs @ 12.54 hrs, Volume= 1.39 cfs @ 12.54 hrs, Volume= 0.556 af, Atten= 93%, Lag= 35.5 min Outflow =

0.556 af Primary

Routed to Link 18L: Outflow Basin 3

Invert

Volume

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Starting Elev= 315.00' Surf.Area= 13,329 sf Storage= 36,523 cf

Peak Elev= 316.89' @ 12.54 hrs Surf.Area= 14,855 sf Storage= 63,094 cf (26,571 cf above start)

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

Avail.Storage Storage Description

Center-of-Mass det. time= 142.3 min (889.8 - 747.5)

#1	312.00	151,03	88 cf Custom	Stage Data (Prismatic) Listed below (Recalc)		
Elevation		Surf.Area	Inc.Store	Cum.Store		
(fee		(sq-ft)	(cubic-feet)	(cubic-feet)		
312.0	-	11,052	0	0		
314.0		12,538	23,590	23,590		
316.00		14,119	26,657	50,247		
318.0	00	15,780	29,899	80,146		
320.0	00	17,505	33,285	113,431		
322.0	00	20,102	37,607	151,038		
Device	Routing	Invert	Outlet Device:	es		
#1	Primary	312.00'	24.0" Round	Culvert		
			L= 120.0' RC	CP, square edge headwall, Ke= 0.500		
			Inlet / Outlet In	nvert= 312.00' / 310.00' S= 0.0167 '/' Cc= 0.900		
			n= 0.011 Cor	ncrete pipe, straight & clean, Flow Area= 3.14 sf		
#2	Device 1	320.00'	24.0' long Sha	arp-Crested Rectangular Weir 2 End Contraction(s)		
#3	Device 1	316.00'	8.0" Vert. Ori	fice/Grate C= 0.600 Limited to weir flow at low heads		
			20.0' long + 2.0 '/' SideZ x 10.0' breadth Broad-Crested Rectangular Weir			
				0.20		
#5	Device 1	315.00'		ifice/Grate C= 0.600 Limited to weir flow at low heads		

Primary OutFlow Max=1.39 cfs @ 12.54 hrs HW=316.89' (Free Discharge)

1=Culvert (Passes 1.39 cfs of 29.82 cfs potential flow)

-2=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

-3=Orifice/Grate (Orifice Controls 1.25 cfs @ 3.58 fps)

-5=Orifice/Grate (Orifice Controls 0.14 cfs @ 6.47 fps)

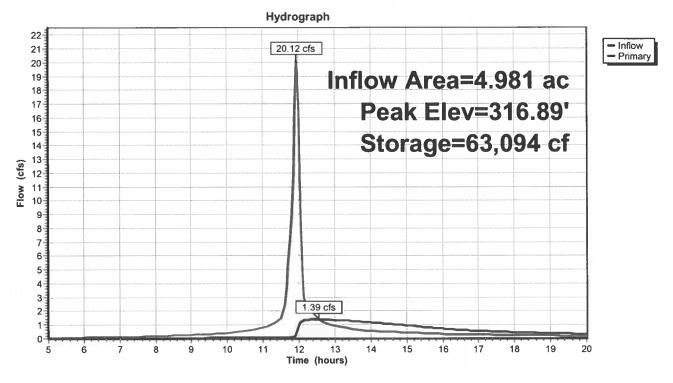
4=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

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Pond 17P: Wet Pond



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Summary for Link 18L: Outflow Basin 3

Inflow Area =

5.535 ac, 69.28% Impervious, Inflow Depth > 1.34" for 1-Year event

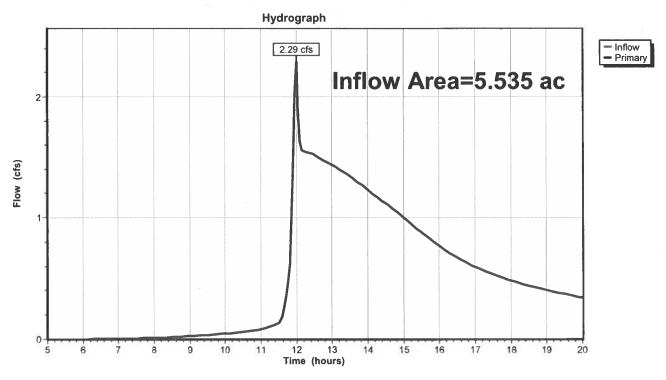
Inflow =

Primary =

2.29 cfs @ 12.00 hrs, Volume= 0.620 af 2.29 cfs @ 12.00 hrs, Volume= 0.620 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 18L: Outflow Basin 3



Summary for Subcatchment 19S: Pre Basin 4

Runoff

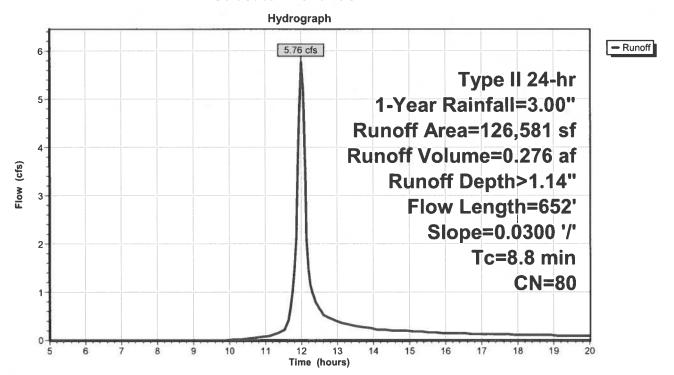
5.76 cfs @ 12.01 hrs, Volume=

0.276 af, Depth> 1.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type II 24-hr 1-Year Rainfall=3.00"

	Α	rea (sf)	CN [Description		
19,689 98 Roofs, HSG D						
9,104 80 >75% Grass cover, Goo					s cover, Go	ood, HSG D
97,788 77 Woods, Good, HSG D						
		26,581 06,892 19,689	8		verage vious Area pervious Ar	
	Tc (m <u>in)</u>	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
_	8.8	652	0.0300	1.23		Kirpich Method, Pre TOC General overland flow k= 2.00

Subcatchment 19S: Pre Basin 4



Summary for Subcatchment 20S: Post Basin 4

Runoff

=

9.71 cfs @ 11.95 hrs, Volume=

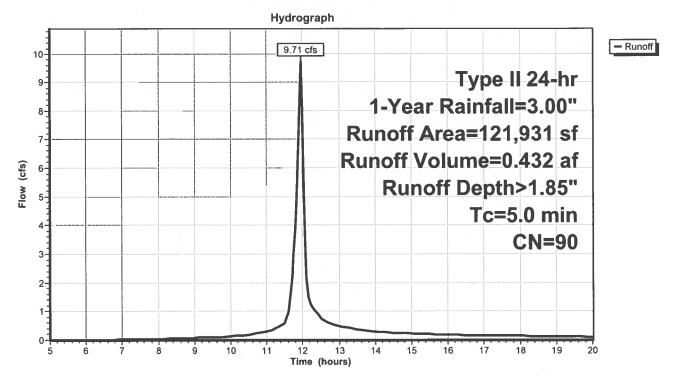
0.432 af, Depth> 1.85"

Routed to Pond 24P: Underground Sandfilter

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type II 24-hr 1-Year Rainfall=3.00"

Area	a (sf) CN	N De	escription					
67	,344 98	8 R	oofs, HSG	D				
54	,587 80	0 >7	75% Grass	s cover, Go	od, HSG D			
121	,931 90	0 W	eighted A	verage				
54	1,587	44	1.77% Per	vious Area				
67	7,344	55	5.23% Imp	ervious Are	ea			
Tc L (min)	•	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description	Fg		
5.0					Direct Entry,	Minimum		

Subcatchment 20S: Post Basin 4



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Summary for Subcatchment 21S: Post Basin 4 - Bypass

Runoff

=

0.21 cfs @ 12.00 hrs, Volume=

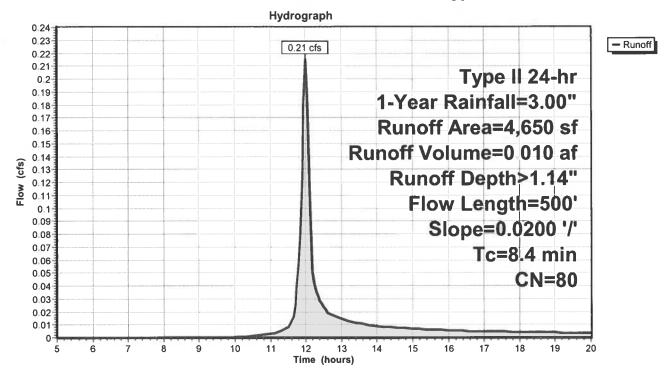
0.010 af, Depth> 1.14"

Routed to Link 23L: Outflow Basin 4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type II 24-hr 1-Year Rainfall=3.00"

A	rea (sf)	CN [Description			
	4,650	80 >	75% Gras	s cover, Go	ood, HSG D	
	4,650	1	00.00% Pe	ervious Are	а	
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description	
8.4	500	0.0200	0.99		Kirpich Method, TOC -Bypass General overland flow k= 2.00	

Subcatchment 21S: Post Basin 4 - Bypass



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Summary for Pond 24P: Underground Sandfilter

Inflow Area = 2.799 ac, 55.23% Impervious, Inflow Depth > 1.85" for 1-Year event

Inflow = 9.71 cfs @ 11.95 hrs, Volume= 0.432 af

Outflow = 3.55 cfs @ 12.07 hrs, Volume= 0.303 af, Atten= 63%, Lag= 7.1 min

Primary = 3.55 cfs @ 12.07 hrs, Volume= 0.303 af

Routed to Link 23L: Outflow Basin 4

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Peak Elev= 317.52' @ 12.07 hrs Surf.Area= 2,597 sf Storage= 9,153 cf

Plug-Flow detention time= 120.3 min calculated for 0.302 af (70% of inflow)

Center-of-Mass det. time= 55.5 min (823.8 - 768.3)

Volume	Inve	rt Avail.Stor	age Storage I	Description				
#1	314.00	0' 20,77	6 cf Custom	Stage Data (Pris	smatic) Listed below (Recalc)			
Elevation (fee		Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)				
314.0	00 1	2,597	0	0				
322.0	00	2,597	20,776	20,776				
Device	Routing	Invert	Outlet Devices	3				
#1	Primary	316.00'	24.0" Round Culvert					
	· · · · · · · · · · · · · · · · · · ·		L= 80.0' RCP, square edge headwall, Ke= 0.500					
			Inlet / Outlet Invert= 316.00' / 315.00' S= 0.0125 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf					
#2	Device 1	316.00'						
#3	Device 1	320.00'	7.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)					

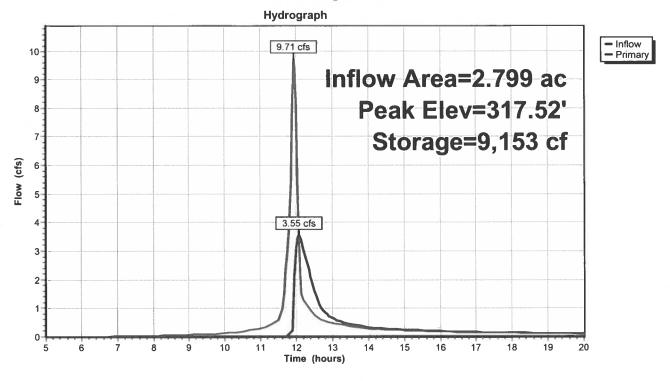
Primary OutFlow Max=3.50 cfs @ 12.07 hrs HW=317.50' (Free Discharge)

1=Culvert (Passes 3.50 cfs of 10.50 cfs potential flow)

2=Orifice/Grate (Orifice Controls 3.50 cfs @ 4.86 fps)
3=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

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Pond 24P: Underground Sandfilter



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Summary for Link 23L: Outflow Basin 4

Inflow Area =

2.906 ac, 53.20% Impervious, Inflow Depth > 1.29" for 1-Year event

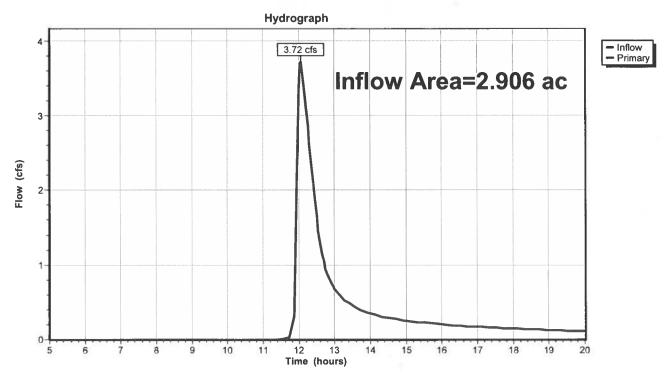
Inflow = Primary =

3.72 cfs @ 12.07 hrs, Volume= 0.313 af 3.72 cfs @ 12.07 hrs, Volume=

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

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 23L: Outflow Basin 4



Summary for Subcatchment 24S: Pre Basin 5

Runoff = 2.60 cfs @ 11.96 hrs, Volume=

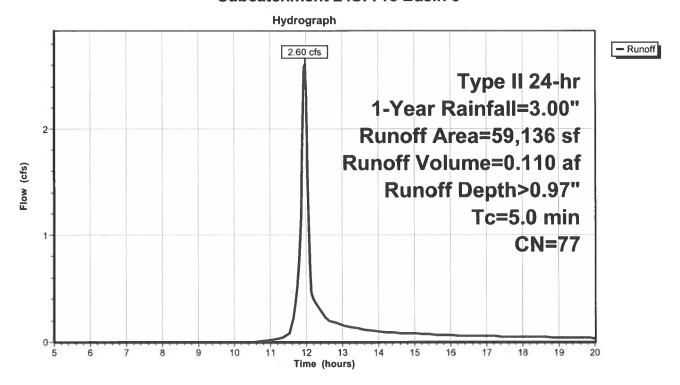
0.110 af, Depth> 0.97"

Routed to nonexistent node 26L

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type II 24-hr 1-Year Rainfall=3.00"

A	rea (sf)	CN	Description			
	174	98	Paved park	ing, HSG D		
	58,962	77	Woods, Go	od, HSG D		
	59,136 58,962 174		Weighted A 99.71% Per 0.29% Impe	vious Area	a	
Tc (min)	Length (feet)	Slope (ft/ft)	•	Capacity (cfs)	Description	
5.0					Direct Entry, Minimum	

Subcatchment 24S: Pre Basin 5



Summary for Subcatchment 27S: Post Basin 5

Runoff

4.58 cfs @ 11.95 hrs, Volume=

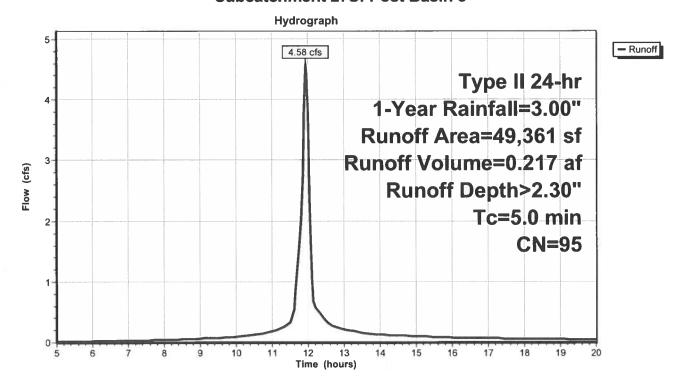
0.217 af, Depth> 2.30"

Routed to Pond 29P: Underground Sandfilter

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type II 24-hr 1-Year Rainfall=3.00"

A	rea (sf)	CN	Description			
	41,850	98	Roofs, HSG	D		
7,511 80 >75% Grass cover, Goo					ood, HSG D	
	49,361 7,511 41,850			verage vious Area pervious Are		
Tc (min)	Length (feet)	Slope _(ft/ft)	•	Capacity (cfs)	Description	
5.0			<u> </u>		Direct Entry, Minimum	

Subcatchment 27S: Post Basin 5



Summary for Subcatchment 28S: Post Basin 5 - Bypass

Runoff

0.51 cfs @ 11.96 hrs, Volume=

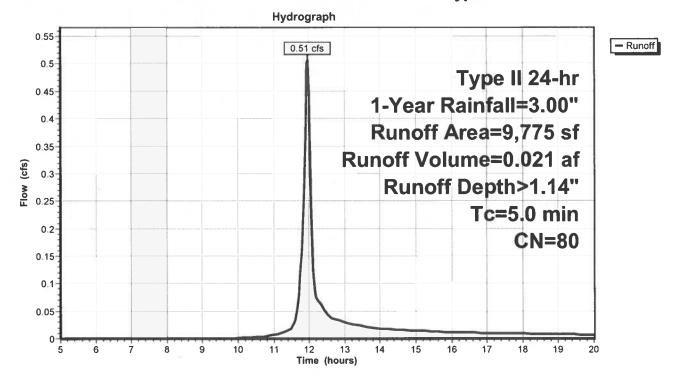
0.021 af, Depth> 1.14"

Routed to Link 30L: Post Outflow Basin 5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type II 24-hr 1-Year Rainfall=3.00"

	Area (sf)	CN [Description					
9,775 80 >75% Grass cover, Good, HSG D								
,	9,775 100.00% Pervious Area							
To (min	c Length) (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description			
5.0)				Direct Entry, Minimum			

Subcatchment 28S: Post Basin 5 - Bypass



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Summary for Pond 29P: Underground Sandfilter

Inflow Area = 1.133 ac, 84.78% Impervious, Inflow Depth > 2.30" for 1-Year event

Inflow = 4.58 cfs @ 11.95 hrs, Volume= 0.217 af

Outflow = 1.24 cfs @ 12.10 hrs, Volume= 0.124 af, Atten= 73%, Lag= 8.7 min

Primary = 1.24 cfs @ 12.10 hrs, Volume= 0.124 af

Routed to Link 30L: Post Outflow Basin 5

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Peak Elev= 323.86' @ 12.10 hrs Surf.Area= 1,911 sf Storage= 5,457 cf

Plug-Flow detention time= 160.9 min calculated for 0.124 af (57% of inflow)

Center-of-Mass det. time= 86.0 min (833.5 - 747.5)

Volume	Inve	ert Avail.Sto	rage Storage	Description			
#1	321.0	00' 13,3	77 cf Custom	7 cf Custom Stage Data (Prismatic) Listed below (Recalc)			
Elevation (fee		Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)			
321.0	00	1,911	0	0			
328.0	00	1,911	13,377	13,377			
Device	Routing	Invert	Outlet Devices	S			
#1	Primary	323.00'	24.0" Round	Culvert			
			L= 50.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 323.00' / 322.00' S= 0.0200 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf				
#2	Device 1	323.00'	8.1" Vert. Orif	fice/Grate C= 0.6	00 Limited to weir flow at low heads		
#3	Device 1		9.5" Vert. Orif	fice/Grate C= 0.6	00 Limited to weir flow at low heads		
#4	Device 1	329.00'	7.0' long Sha	rp-Crested Rectan	gular Weir 2 End Contraction(s)		

Primary OutFlow Max=1.24 cfs @ 12.10 hrs HW=323.85' (Free Discharge)

-1=Culvert (Passes 1.24 cfs of 4.03 cfs potential flow)

-2=Orifice/Grate (Orifice Controls 1.24 cfs @ 3.46 fps)

-3=Orifice/Grate (Controls 0.00 cfs)

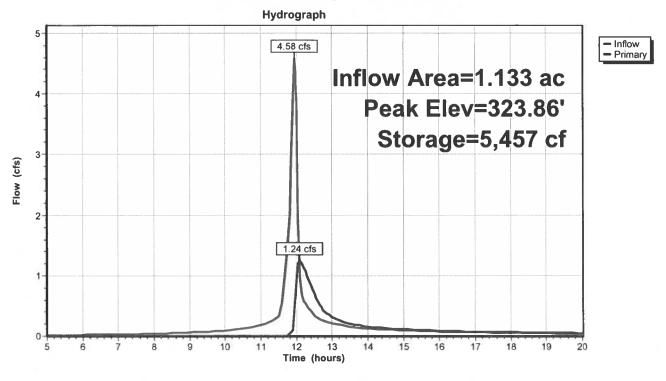
-4=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

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Pond 29P: Underground Sandfilter



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Summary for Link 30L: Post Outflow Basin 5

Inflow Area =

1.358 ac, 70.77% Impervious, Inflow Depth > 1.29" for 1-Year event

Inflow =

1.46 cfs @ 12.04 hrs, Volume= 0.146 af

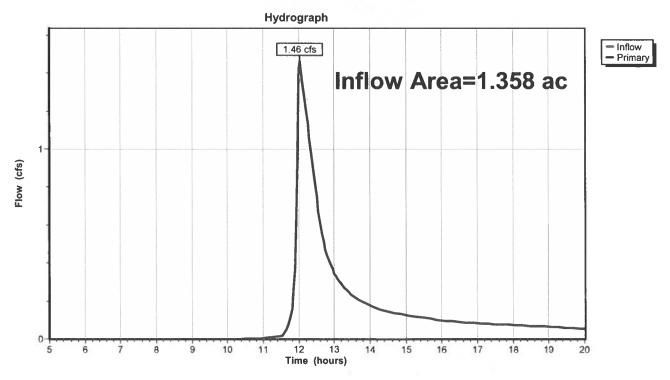
Primary =

1.46 cfs @ 12.04 hrs, Volume=

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

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 30L: Post Outflow Basin 5



Summary for Subcatchment 12S: Pre South Site

Runoff

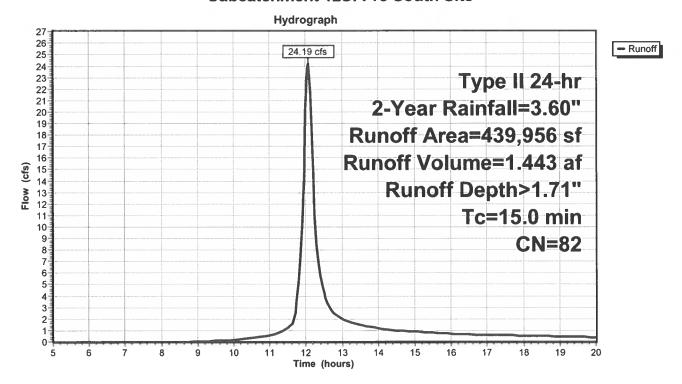
24.19 cfs @ 12.07 hrs, Volume=

1.443 af, Depth> 1.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type II 24-hr 2-Year Rainfall=3.60"

Area (sf) CN	Description							
52,1	85 98	Paved park	ing, HSG D						
16,1	17 84	50-75% Gra	50-75% Grass cover, Fair, HSG D						
354,7	53 79	Woods, Fair, HSG D							
16,9	01 98	Water Surfa	ace, HSG D	D					
439,956 82 Weighted Average									
370,8	70	84.30% Per	vious Area	a					
69,0	86	15.70% lm	pervious Ar	rea					
Tc Ler	ngth Slo	pe Velocity	Capacity	Description					
<u>(min)</u> (f	eet) (ft	ft) (ft/sec)	(cfs)						
15.0				Direct Entry, Direct Guess					

Subcatchment 12S: Pre South Site



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Summary for Subcatchment 13S: Post South Site

Runoff = 41.

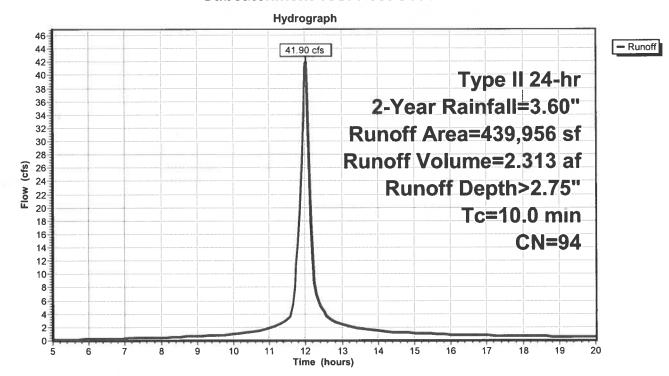
41.90 cfs @ 12.01 hrs, Volume=

2.313 af, Depth> 2.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type II 24-hr 2-Year Rainfall=3.60"

_	Α	rea (sf)	CN	Description				
	2	99,170	98	Paved park				
140,786 84 50-75% Grass cover, Fair, H						Fair, HSG D		
439,956 94 Weighted Average								
	1	40,786		32.00% Pei	vious Area			
	2	99,170		68.00% Imp	pervious Ar	ea		
	Tc (min)	Length (feet)	Slope (ft/ft)	•	Capacity (cfs)	Description		
-	10.0	(100)	V- 22	((Direct Entry, D	irect Guess	

Subcatchment 13S: Post South Site



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Summary for Subcatchment 14S: Pre Basin 3

Runoff

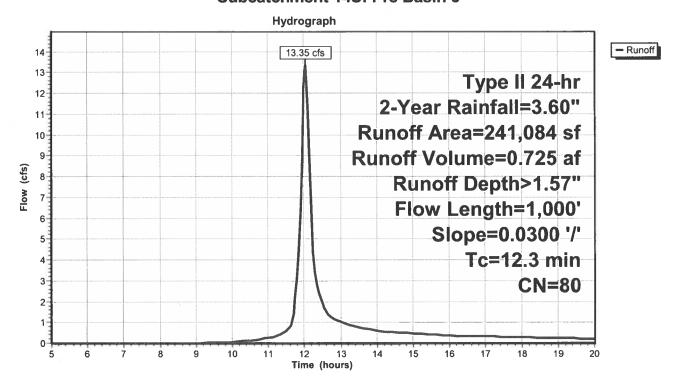
13.35 cfs @ 12.04 hrs, Volume=

0.725 af, Depth> 1.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type II 24-hr 2-Year Rainfall=3.60"

	Α	rea (sf)	CN	Description			
		31,102	98	Paved park	ing, HSG D		
		6,970	84	50-75% Gra	ass cover, f	Fair, HSG D	
_	203,012 77 Woods, Good, HSG D						
	2						
	2	09,982		87.10% Pei	rvious Area		
		31,102		12.90% lm <mark>։</mark>	pervious Ar	ea	
	Тс	Length	Slope		Capacity	Description	
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	<u> </u>	
	12.3	1,000	0.0300	1.36		Kirpich Method, Existing Flowpath	
						General overland flow k= 2.00	

Subcatchment 14S: Pre Basin 3



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Summary for Subcatchment 15S: Post Basin 3

Runoff

=

24.60 cfs @ 11.95 hrs, Volume=

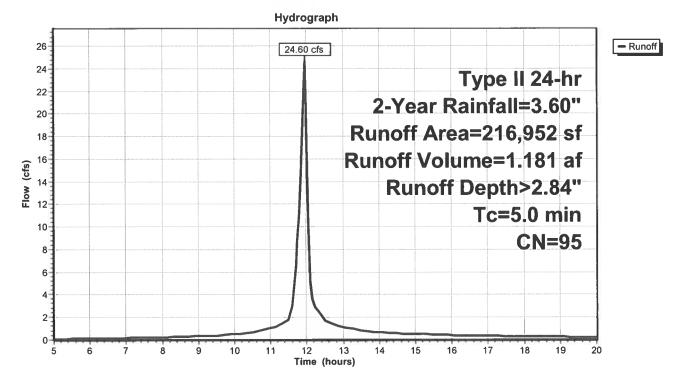
1.181 af, Depth> 2.84"

Routed to Pond 17P: Wet Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type II 24-hr 2-Year Rainfall=3.60"

Area (sf)	CN	Description			
156,186	98)			
49,920	84	50-75% Gra	Fair, HSG D		
10,846	98	Water Surfa	ace, HSG D)	
216,952 49,920 167,032	95	Weighted A 23.01% Per 76.99% Imp	vious Area		
Tc Length (min) (feet)	Slop (ft/	•	Capacity (cfs)	Description	
5.0				Direct Entry, Estimate	

Subcatchment 15S: Post Basin 3



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Summary for Subcatchment 16S: Post Basin 3 - Bypass

Runoff =

2.00 cfs @ 11.96 hrs, Volume=

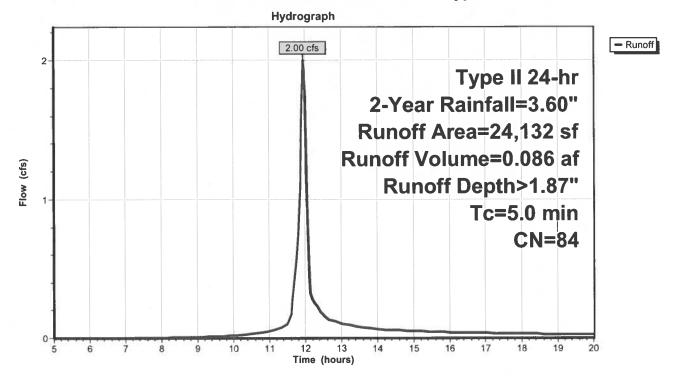
0.086 af, Depth> 1.87"

Routed to Link 18L: Outflow Basin 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type II 24-hr 2-Year Rainfall=3.60"

	Area (sf)	CN	Description				
	24,132 84 50-75% Grass cover, Fair, HSG D						
	24,132		100.00% P	ervious Are	a		
(mi	c Lengt		pe Velocity (ft) (ft/sec)	Capacity (cfs)	Description		
	<u>.0</u>	ι) (10	it) (ibsec)	(013)	Direct Entry, Estimate		_

Subcatchment 16S: Post Basin 3 - Bypass



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Summary for Pond 17P: Wet Pond

4.981 ac, 76.99% Impervious, Inflow Depth > 2.84" for 2-Year event Inflow Area =

24.60 cfs @ 11.95 hrs, Volume= 1.181 af Inflow =

1.81 cfs @ 12.51 hrs, Volume= 1.81 cfs @ 12.51 hrs, Volume= 0.766 af, Atten= 93%, Lag= 33.4 min Outflow

Primary 0.766 af

Routed to Link 18L: Outflow Basin 3

Invert

Volume

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Starting Elev= 315.00' Surf.Area= 13,329 sf Storage= 36,523 cf

Peak Elev= 317.30' @ 12.51 hrs Surf.Area= 15,197 sf Storage= 69,276 cf (32,752 cf above start)

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

Avail.Storage Storage Description

Center-of-Mass det. time= 148.0 min (891.8 - 743.8)

#1	312.0	0' 151,03	88 cf Custom	Stage Data (Pris	matic) Listed below (Recalc)		
Elevatio		Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)			
	(feet) 312.00 1				<i>y</i>		
		11,052	0	0			
314.0		12,538	23,590	23,590			
316.0		14,119	26,657	50,247			
318.0		15,780	29,899	80,146			
320.0		17,505	33,285	113,431			
322.0	00	20,102	37,607	151,038			
Device	Routing	Invert	Outlet Devices	3			
#1	Primary	312.00'	24.0" Round	Culvert			
	•		L= 120.0' RCP, square edge headwall, Ke= 0.500				
			Inlet / Outlet In	vert= 312.00 / 3	10.00' S= 0.0167 '/' Cc= 0.900		
			n= 0.011 Con	crete pipe, straid	ht & clean, Flow Area= 3.14 sf		
#2	Device 1	320.00'			tangular Weir 2 End Contraction(s)		
#3	Device 1	316.00'			.600 Limited to weir flow at low heads		
#4	Primary	321.00'			.0' breadth Broad-Crested Rectangular Weir		
	y	021.00			.80 1.00 1.20 1.40 1.60		
					0 2.69 2.68 2.69 2.67 2.64		
#5	Device 1	315.00'			.600 Limited to weir flow at low heads		
#O	DC TIOC I	310.00	L.O TOIL. OIII	100,01410 0 0	Entition to from how at low house		

Primary OutFlow Max=1.81 cfs @ 12.51 hrs HW=317.30' (Free Discharge)

1=Culvert (Passes 1.81 cfs of 31.36 cfs potential flow)

-2=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

-3=Orifice/Grate (Orifice Controls 1.65 cfs @ 4.73 fps)

-5=Orifice/Grate (Orifice Controls 0.16 cfs @ 7.17 fps)

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

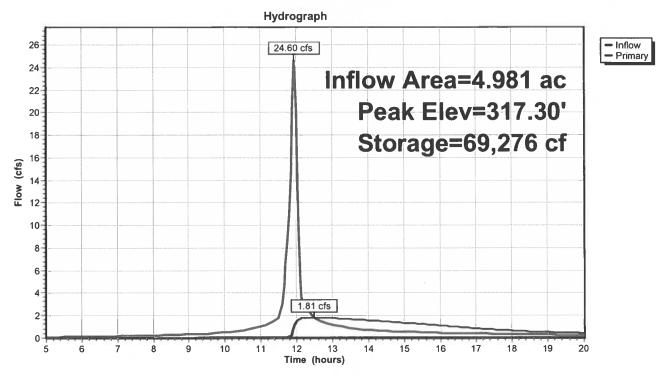
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Pond 17P: Wet Pond



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Summary for Link 18L: Outflow Basin 3

Inflow Area =

5.535 ac, 69.28% Impervious, Inflow Depth > 1.85" for 2-Year event

Inflow =

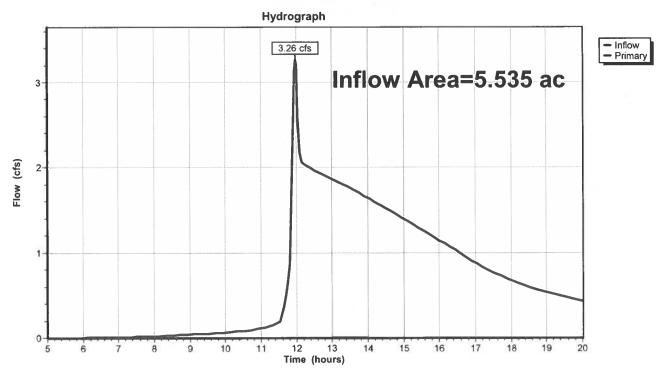
0.852 af

3.26 cfs @ 11.98 hrs, Volume= 3.26 cfs @ 11.98 hrs, Volume= Primary

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

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 18L: Outflow Basin 3



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Summary for Subcatchment 19S: Pre Basin 4

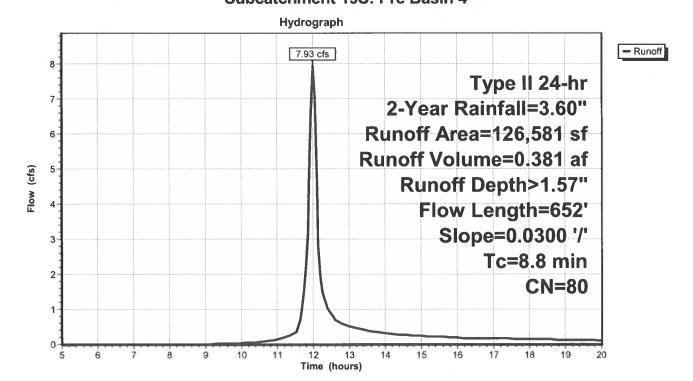
Runoff = 7.93 cfs @ 12.00 hrs, Volume=

0.381 af, Depth> 1.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type II 24-hr 2-Year Rainfall=3.60"

	A	rea (sf)	CN I	Description			
		19,689	98 I	Roofs, HSG			
		9,104	80 >	>75% Gras	s cover, Go		
		97,788					
	1	26,581	ا 80				
	1	06,892	8	34.45% Per	vious Area		
	19,689 15.55% Impervious /				pervious Ar	ea	
	Тс	Length	Slope		Capacity	Description	
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)		
	8.8	652	0.0300	1.23		Kirpich Method, Pre TOC	
						General overland flow k= 2.00	

Subcatchment 19S: Pre Basin 4



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Summary for Subcatchment 20S: Post Basin 4

Runoff

=

12.27 cfs @ 11.95 hrs, Volume=

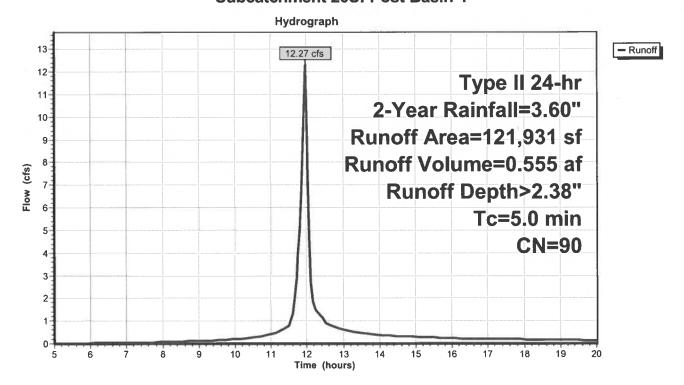
0.555 af, Depth> 2.38"

Routed to Pond 24P: Underground Sandfilter

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type II 24-hr 2-Year Rainfall=3.60"

Α	rea (sf)	CN	Description			
	67,344	98	Roofs, HSC			
	54,587	80	>75% Gras	s cover, Go	ood, HSG D	
1	21,931	90	Weighted A	verage		
	54,587		44.77% Pei	vious Area		
	67,344 55.23% Impervious Are				ea	
Tc (min)	Length (feet)	Slope (ft/ft)		Capacity (cfs)	Description	
5.0					Direct Entry, Minimum	 _

Subcatchment 20S: Post Basin 4



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Summary for Subcatchment 21S: Post Basin 4 - Bypass

Runoff

=

0.30 cfs @ 12.00 hrs, Volume=

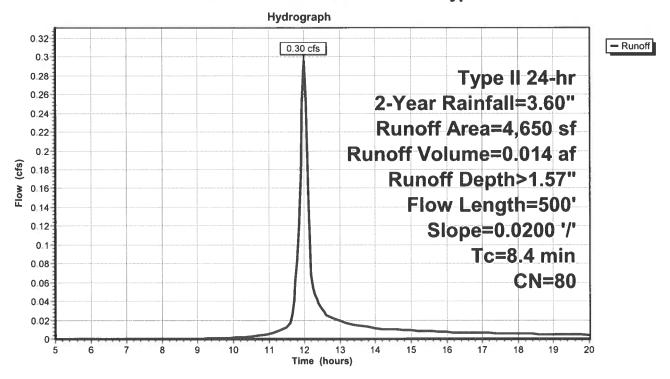
0.014 af, Depth> 1.57"

Routed to Link 23L: Outflow Basin 4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type II 24-hr 2-Year Rainfall=3.60"

A	rea (sf)	CN E	Description				
	4,650	80 >	75% Gras				
	4,650 100.00% Pervious Area						
Тс	Length	Slope		Capacity	Description		
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)			
8.4	500	0.0200	0.99		Kirpich Method, TOC -Bypass General overland flow k= 2.00		

Subcatchment 21S: Post Basin 4 - Bypass



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Summary for Pond 24P: Underground Sandfilter

2.799 ac, 55.23% Impervious, Inflow Depth > 2.38" for 2-Year event Inflow Area =

12.27 cfs @ 11.95 hrs, Volume= 0.555 af Inflow

4.74 cfs @ 12.07 hrs, Volume= 4.74 cfs @ 12.07 hrs, Volume= 0.425 af, Atten= 61%, Lag= 6.9 min Outflow =

0.425 af Primary

Routed to Link 23L: Outflow Basin 4

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Peak Elev= 318.34' @ 12.07 hrs Surf.Area= 2,597 sf Storage= 11,281 cf

Plug-Flow detention time= 108.6 min calculated for 0.423 af (76% of inflow) Center-of-Mass det. time= 50.1 min (812.5 - 762.4)

Volume	Invert	t Avail.Sto	rage Storage	Description	
#1	314.00	20,77	76 cf Custom	Stage Data (Pri	ismatic) Listed below (Recalc)
Elevatio		urf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	
314.0	00	2,597	0	0	
322.0	00	2,597	20,776	20,776	
Device	Routing	Invert	Outlet Devices	3	
#1	Primary	316.00'	24.0" Round	Culvert	
	•		L= 80.0' RCF	P, square edge l	neadwall, Ke= 0.500
			Inlet / Outlet Ir	nvert= 316.00' /	315.00' S= 0.0125 '/' Cc= 0.900
			n= 0.011 Con	crete pipe, strai	ght & clean, Flow Area= 3.14 sf
#2	Device 1	316.00'	11.5" Vert. Or	ifice/Grate C=	= 0.600 Limited to weir flow at low heads
#3	Device 1	320.00'	7.0' long Shar	rp-Crested Rec	tangular Weir 2 End Contraction(s)

Primary OutFlow Max=4.70 cfs @ 12.07 hrs HW=318.31' (Free Discharge)

-1=Culvert (Passes 4.70 cfs of 17.32 cfs potential flow)

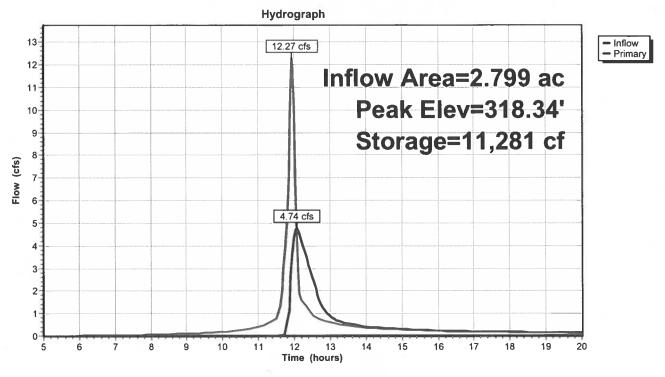
-2=Orifice/Grate (Orifice Controls 4.70 cfs @ 6.52 fps)

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

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Pond 24P: Underground Sandfilter



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Summary for Link 23L: Outflow Basin 4

Inflow Area =

2.906 ac, 53.20% Impervious, Inflow Depth > 1.81" for 2-Year event

Inflow =

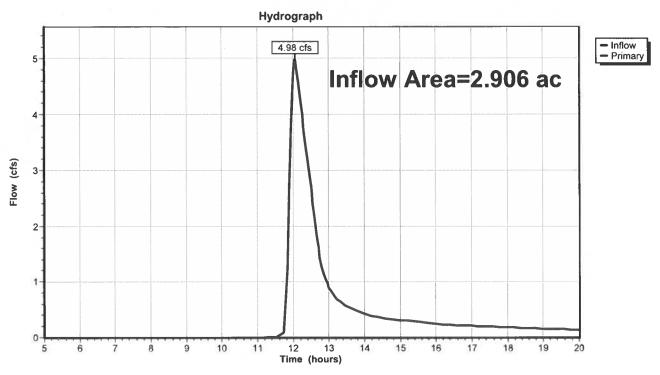
Primary

4.98 cfs @ 12.06 hrs, Volume= 4.98 cfs @ 12.06 hrs, Volume= 0.439 af

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

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 23L: Outflow Basin 4



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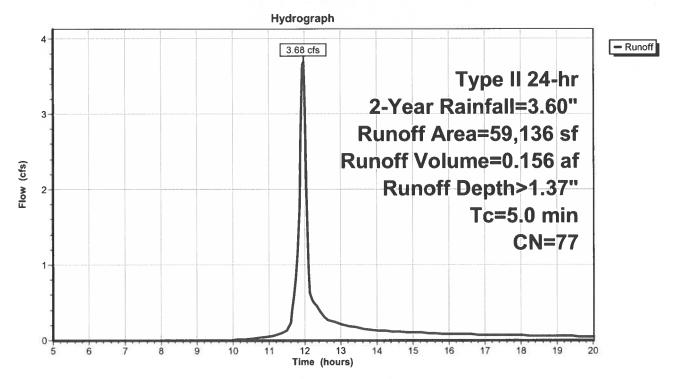
Summary for Subcatchment 24S: Pre Basin 5

Runoff = 3.68 cfs @ 11.96 hrs, Volume= Routed to nonexistent node 26L 0.156 af, Depth> 1.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type II 24-hr 2-Year Rainfall=3.60"

Are	a (sf)	CN I	Description			
	174	98 I	Paved parki	ng, HSG D		
5	8,962	77 \	Noods, Go	od, HSG D		
5	9,136	77 \	Veighted A	verage		
5	8,962	9	99.71% Per	vious Area		
	174	().29% Impe	rvious Area	3	
Tc I (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description	
5.0		. 7			Direct Entry, Minimum	

Subcatchment 24S: Pre Basin 5



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Summary for Subcatchment 27S: Post Basin 5

Runoff

5.60 cfs @ 11.95 hrs, Volume=

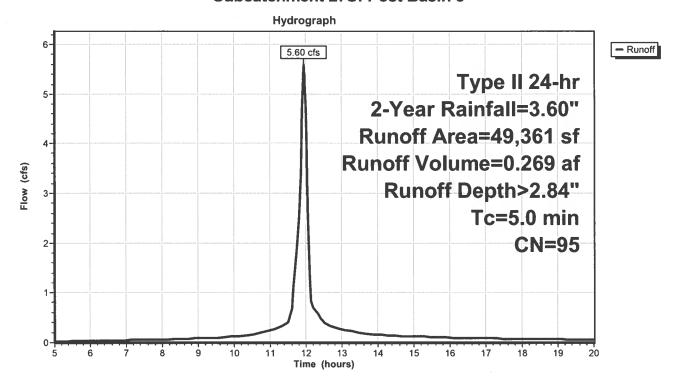
0.269 af, Depth> 2.84"

Routed to Pond 29P: Underground Sandfilter

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type II 24-hr 2-Year Rainfall=3.60"

	Α	rea (sf)	CN	Description				
		41,850	98	Roofs, HSC				
		7,511	80	>75% Gras	s cover, Go	ood, HSG D		
		49,361 7,511 41,850	95 Weighted Average 15.22% Pervious Area 84.78% Impervious Area					
	Tc (min)	Length (feet)	Slope (ft/ft)		Capacity (cfs)	Description		
_	5.0					Direct Entry,	Minimum	

Subcatchment 27S: Post Basin 5



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Summary for Subcatchment 28S: Post Basin 5 - Bypass

Runoff

=

0.69 cfs @ 11.96 hrs, Volume=

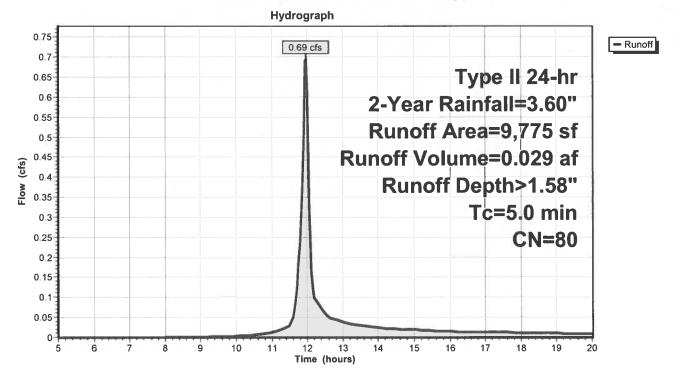
0.029 af, Depth> 1.58"

Routed to Link 30L: Post Outflow Basin 5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type II 24-hr 2-Year Rainfall=3.60"

A	rea (sf)	CN [Description										
	9,775	80 >	80 >75% Grass cover, Good, HSG D										
	9,775	1	100.00% Pervious Area										
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description								
5.0					Direct Entry, Minimum								

Subcatchment 28S: Post Basin 5 - Bypass



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Summary for Pond 29P: Underground Sandfilter

1.133 ac, 84.78% Impervious, Inflow Depth > 2.84" for 2-Year event Inflow Area =

Inflow = 5.60 cfs @ 11.95 hrs, Volume= 0.269 af

1.76 cfs @ 12.08 hrs, Volume= 1.76 cfs @ 12.08 hrs, Volume= = 0.175 af, Atten= 68%, Lag= 7.8 min Outflow

0.175 af Primary

Routed to Link 30L: Post Outflow Basin 5

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Peak Elev= 324.39' @ 12.08 hrs Surf.Area= 1,911 sf Storage= 6,469 cf

Plug-Flow detention time= 144.0 min calculated for 0.175 af (65% of inflow)

Center-of-Mass det. time= 75.4 min (819.2 - 743.8)

Vc	lume	Inve	rt Avail.Sto	rage Storage	Description	_
	#1	321.0	0' 13,3	77 cf Custom	Stage Data (Prismatic) Listed below (Recalc)	
E	levatio (feet		Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	
	321.0	0	1,911	0	0	
	328.0	0	1,911	13,377	13,377	
D€	evice	Routing	Invert	Outlet Devices	es	_
	#1	Primary	323.00'	24.0" Round	Culvert	
				Inlet / Outlet In	P, square edge headwall, Ke= 0.500 Invert= 323.00' / 322.00' S= 0.0200 '/' Cc= 0.900 ncrete pipe, straight & clean, Flow Area= 3.14 sf	
	#2	Device 1	323.00'	8.1" Vert. Orif	fice/Grate C= 0.600 Limited to weir flow at low heads	
	#3	Device 1	326.00'		fice/Grate C= 0.600 Limited to weir flow at low heads	
	#4	Device 1	329.00'	7.0' long Sha	rp-Crested Rectangular Weir 2 End Contraction(s)	

Primary OutFlow Max=1.76 cfs @ 12.08 hrs HW=324.38' (Free Discharge)

-1=Culvert (Passes 1.76 cfs of 9.21 cfs potential flow)

-2=Orifice/Grate (Orifice Controls 1.76 cfs @ 4.91 fps)

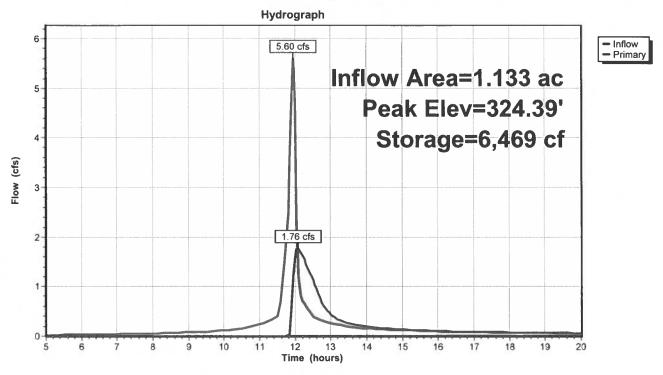
-3=Orifice/Grate (Controls 0.00 cfs)

-4=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

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Pond 29P: Underground Sandfilter



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Summary for Link 30L: Post Outflow Basin 5

Inflow Area =

1.358 ac, 70.77% Impervious, Inflow Depth > 1.81" for 2-Year event

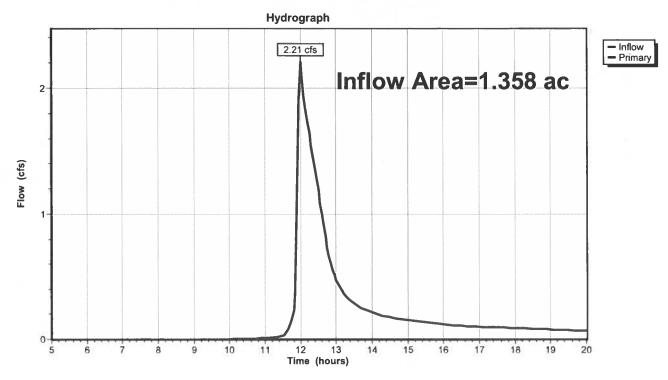
Inflow =

Primary =

2.21 cfs @ 12.01 hrs, Volume= 0.205 af 2.21 cfs @ 12.01 hrs, Volume= 0.205 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 30L: Post Outflow Basin 5



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Summary for Subcatchment 12S: Pre South Site

Runoff

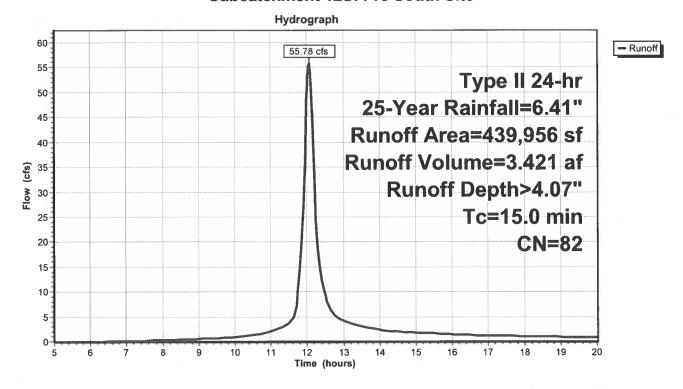
55.78 cfs @ 12.07 hrs, Volume=

3.421 af, Depth> 4.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type II 24-hr 25-Year Rainfall=6.41"

Α	rea (sf)	CN	Description				
	52,185	98	Paved park	ing, HSG D)		
	16,117	84	50-75% Gra	ass cover, F	Fair, HSG D		
3	54,753	79	Woods, Fai	r, HSG D			
	16,901	98	Water Surfa	ace, HSG D)		
4	39,956	82	Weighted A	verage			
3	70,870		84.30% Per	vious Area			
	69,086		15.70% lmp	ervious Ar	ea		
Tc	Length	Slope	•	Capacity	Description		
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)			
15.0					Direct Entry.	Direct Guess	

Subcatchment 12S: Pre South Site



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Summary for Subcatchment 13S: Post South Site

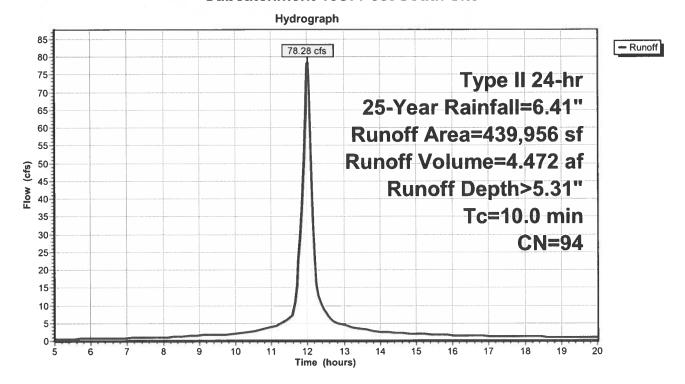
Runoff = 78.28 cfs @ 12.01 hrs, Volume=

4.472 af, Depth> 5.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type II 24-hr 25-Year Rainfall=6.41"

_	Α	rea (sf)	CN	Description						
	2	99,170	98	Paved park	ing, HSG D)				
	1	40,786	84	50-75% Gra	ass cover, F	Fair, HSG D				
	4	39,956	94	Weighted A	verage					
	140,786 32.00% Pervious Area									
	2	99,170		68.00% Impervious Area						
	То	Longth	Clane	Volocity	Consoity	Description				
	Tc (min)	Length (feet)	Slope (ft/ft)		Capacity (cfs)	Description				
		(leet)	(IVIL	(IUSEC)	(015)	Direct Entry Direct Cuses				
	10.0					Direct Entry, Direct Guess				

Subcatchment 13S: Post South Site



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Summary for Subcatchment 14S: Pre Basin 3

Runoff

31.88

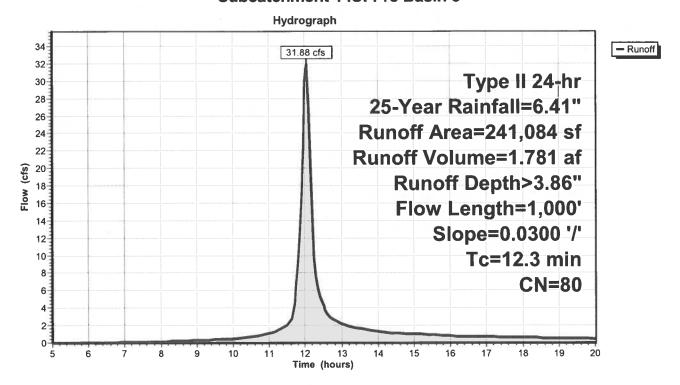
31.88 cfs @ 12.04 hrs, Volume=

1.781 af, Depth> 3.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type II 24-hr 25-Year Rainfall=6.41"

Aı	ea (sf)	CN I	Description				
	31,102	98	Paved park	ing, HSG D)		
	6,970	84	50-75% Gra	ass cover, F	Fair, HSG D		
2	03,012	77	Woods, Go	od, HSG D			
2	41,084	80 '	Weighted A	verage			
209,982 87.10% Pervious Are							
31,102 12.90% Impervious Are				pervious Ar	ea		
_							
Tc	Length	Slope	•	Capacity	Description		
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)			
12.3	1,000	0.0300	1.36		Kirpich Method, Existing Flowpath		
					General overland flow k= 2.00	4	

Subcatchment 14S: Pre Basin 3



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Summary for Subcatchment 15S: Post Basin 3

Runoff = 45.29 cfs @ 11.95 hrs, Volume=

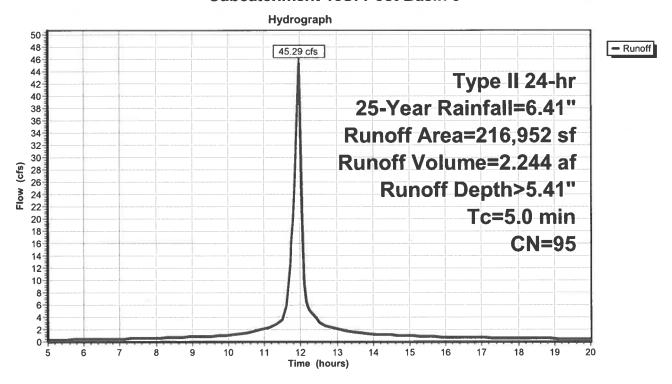
2.244 af, Depth> 5.41"

Routed to Pond 17P: Wet Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type II 24-hr 25-Year Rainfall=6.41"

Area (sf)	CN	Description	Description Paved parking, HSG D							
156,186	98	Paved park								
49,920	84	50-75% Gra	0-75% Grass cover, Fair, HSG D							
10,846	98	Water Surfa	Water Surface, HSG D							
216,952	95	Weighted A	Weighted Average							
49,920		23.01% Per	23.01% Pervious Area							
167,032		76.99% Imp	ervious Ar	ea						
Tc Lengtl			Capacity	Description						
(min) (feet) (ft/	ft) (ft/sec)	(cfs)							
5.0		Direct Entry, Estimate								

Subcatchment 15S: Post Basin 3



Summary for Subcatchment 16S: Post Basin 3 - Bypass

Runoff

=

4.37 cfs @ 11.95 hrs, Volume=

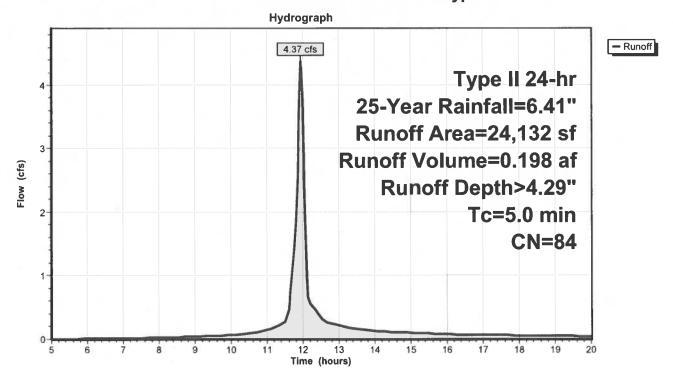
0.198 af, Depth> 4.29"

Routed to Link 18L: Outflow Basin 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type II 24-hr 25-Year Rainfall=6.41"

	Α	rea (sf)	CN E	Description						
		24,132	84 5	50-75% Grass cover, Fair, HSG D						
		24,132	1	100.00% Pervious Area						
	Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description				
-	5.0	(,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	(1010)	(10000)	(010)	Direct Entry, Estimate				

Subcatchment 16S: Post Basin 3 - Bypass



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Summary for Pond 17P: Wet Pond

4.981 ac, 76.99% Impervious, Inflow Depth > 5.41" for 25-Year event Inflow Area =

2.244 af Inflow =

45.29 cfs @ 11.95 hrs, Volume= 3.04 cfs @ 12.55 hrs, Volume= 3.04 cfs @ 12.55 hrs, Volume= 1.647 af, Atten= 93%, Lag= 35.8 min Outflow

Primary = 1.647 af

Routed to Link 18L: Outflow Basin 3

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Starting Elev= 315.00' Surf.Area= 13,329 sf Storage= 36,523 cf

Peak Elev= 319.16' @ 12.55 hrs Surf.Area= 16,779 sf Storage= 99,003 cf (62,480 cf above start)

Plug-Flow detention time= 416.2 min calculated for 0.806 af (36% of inflow)

Center-of-Mass det. time= 179.0 min (914.0 - 735.0)

Volume	Inver	t Avail.Sto	rage Storage	e Description				
#1	312.00)' 151,03	38 cf Custom	n Stage Data (Prismatic) Listed below (Recalc)				
Elevatio		Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)				
312.0 314.0 316.0 318.0 320.0	00 00 00	11,052 12,538 14,119 15,780 17,505	0 23,590 26,657 29,899 33,285	0 23,590 50,247 80,146 113,431				
322.0	00	20,102	37,607	151,038				
Device	Routing	Invert	Outlet Device	es				
#1	Primary	312.00'	L= 120.0' Ro Inlet / Outlet	24.0" Round Culvert L= 120.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 312.00' / 310.00' S= 0.0167 '/' Cc= 0.900				
#2 #3 #4	Device 1 Device 1 Primary	320.00' 316.00' 321.00'	n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf 24.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 8.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads 20.0' long + 2.0 '/' SideZ x 10.0' 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) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64					
#5	Device 1	315.00'	2.0" Vert. Or	rifice/Grate C= 0.600 Limited to weir flow at low heads				

Primary OutFlow Max=3.04 cfs @ 12.55 hrs HW=319.16' (Free Discharge)

1=Culvert (Passes 3.04 cfs of 37.54 cfs potential flow)

-2=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

-3=Orifice/Grate (Orifice Controls 2.82 cfs @ 8.09 fps)

-5=Orifice/Grate (Orifice Controls 0.21 cfs @ 9.72 fps)

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

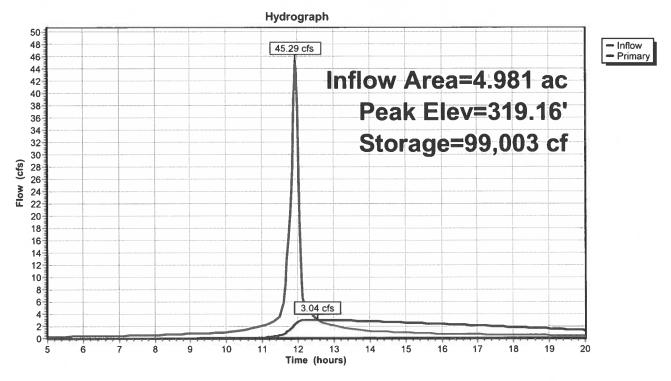
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Pond 17P: Wet Pond



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Summary for Link 18L: Outflow Basin 3

Inflow Area =

5.535 ac, 69.28% Impervious, Inflow Depth > 4.00" for 25-Year event

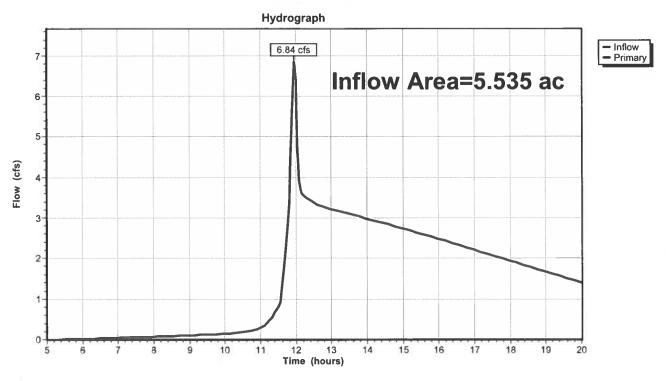
Inflow =

Primary

6.84 cfs @ 11.96 hrs, Volume= 1.845 af 6.84 cfs @ 11.96 hrs, Volume= 1.845 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 18L: Outflow Basin 3



Summary for Subcatchment 19S: Pre Basin 4

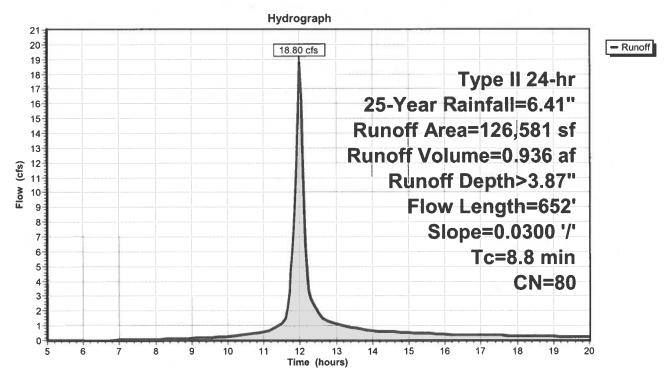
Runoff = 18.80 cfs @ 12.00 hrs, Volume=

0.936 af, Depth> 3.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type II 24-hr 25-Year Rainfall=6.41"

	Α	rea (sf)	CN [Description					
		19,689	98 F	Roofs, HSG	D D				
		9,104	80 >	75% Gras	s cover, Go	ood, HSG D			
٠		97,788	77 \	<u> Voods, Go</u>	od, HSG D				
126,581 80 Weighted Average					verage				
	1	06,892	3	84.45% Per	vious Area				
		19,689	1	5.55% lmp	pervious Ar	ea			
	Тс	Length	Slope	Velocity	Capacity	Description			
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)				
_	8.8	652	0.0300	1.23		Kirpich Method, Pre TOC			
						General overland flow k= 2.00			

Subcatchment 19S: Pre Basin 4



Summary for Subcatchment 20S: Post Basin 4

Runoff = 24.20 cfs @ 11.95 hrs, Volume=

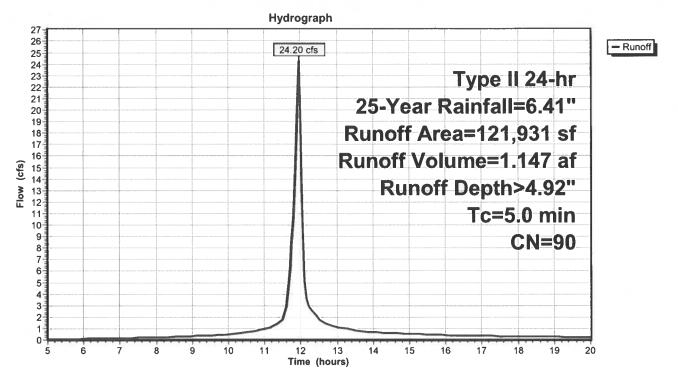
1.147 af, Depth> 4.92"

Routed to Pond 24P: Underground Sandfilter

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type II 24-hr 25-Year Rainfall=6.41"

Α	rea (sf)	CN I	Description			
	67,344	98	Roofs, HSG	D		
	54,587	80 >	>75% Gras	s cover, Go	ood, HSG D	
	21,931 54,587 67,344	4		verage vious Area pervious Ar		
Tc (min)	Length (feet)	Slope (ft/ft)	•	Capacity (cfs)	Description	
5.0					Direct Entry, Minimum	

Subcatchment 20S: Post Basin 4



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Summary for Subcatchment 21S: Post Basin 4 - Bypass

Runoff

0.70 cfs @ 12.00 hrs, Volume=

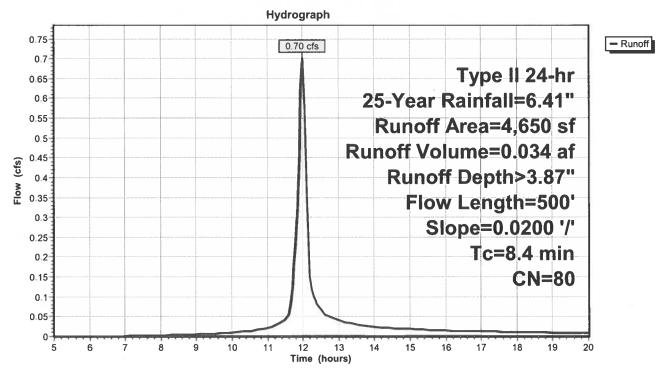
0.034 af, Depth> 3.87"

Routed to Link 23L: Outflow Basin 4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type II 24-hr 25-Year Rainfall=6.41"

_	Α	rea (sf)	CN [Description						
		4,650	80 >	75% Grass cover, Good, HSG D						
		4,650	1	100.00% Pervious Area						
	Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description				
_	8.4	500	0.0200	0.99		Kirpich Method, TOC -Bypass General overland flow k= 2.00				

Subcatchment 21S: Post Basin 4 - Bypass



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Summary for Pond 24P: Underground Sandfilter

2.799 ac, 55.23% Impervious, Inflow Depth > 4.92" for 25-Year event Inflow Area =

24.20 cfs @ 11.95 hrs, Volume= 1.147 af Inflow =

21.17 cfs @ 12.01 hrs, Volume= 21.17 cfs @ 12.01 hrs, Volume= 1.013 af, Atten= 13%, Lag= 3.5 min Outflow =

1.013 af Primary

Routed to Link 23L: Outflow Basin 4

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Peak Elev= 320.74' @ 12.01 hrs Surf.Area= 2,597 sf Storage= 17,499 cf

Plug-Flow detention time= 80.8 min calculated for 1.010 af (88% of inflow) Center-of-Mass det. time= 42.5 min (789.7 - 747.2)

Volume	Inve	ert Avail.Sto	rage Storage D	Description			
#1	314.0	00' 20,7	76 cf Custom S	6 cf Custom Stage Data (Prismatic) Listed below (Recalc)			
Elevation (fee		Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)			
314.0	00	2,597	0	0			
322.0	00	2,597	20,776	20,776			
Device	Routing	Invert	Outlet Devices				
#1			24.0" Round Culvert L= 80.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 316.00' / 315.00' S= 0.0125 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf				
#2 #3	Device 1 Device 1	I 1 I 1 I I I I I I I I I I I I I I I I			= 0.600 Limited to weir flow at low heads tangular Weir 2 End Contraction(s)		

Primary OutFlow Max=19.71 cfs @ 12.01 hrs HW=320.68' (Free Discharge)

1=Culvert (Passes 19.71 cfs of 29.02 cfs potential flow)

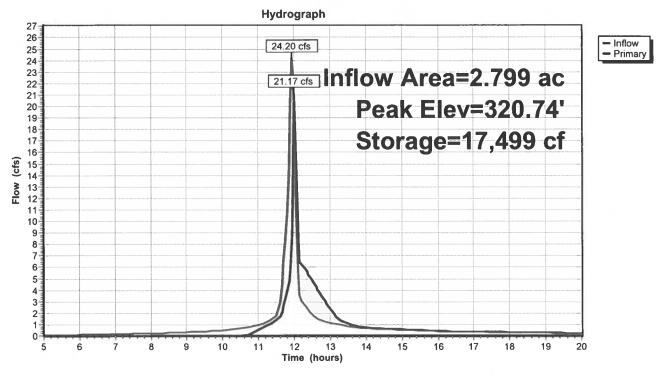
-2=Orifice/Grate (Orifice Controls 7.12 cfs @ 9.87 fps)

-3=Sharp-Crested Rectangular Weir (Weir Controls 12.59 cfs @ 2.70 fps)

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Pond 24P: Underground Sandfilter



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Summary for Link 23L: Outflow Basin 4

Inflow Area =

2.906 ac, 53.20% Impervious, Inflow Depth > 4.33" for 25-Year event

Inflow = Primary =

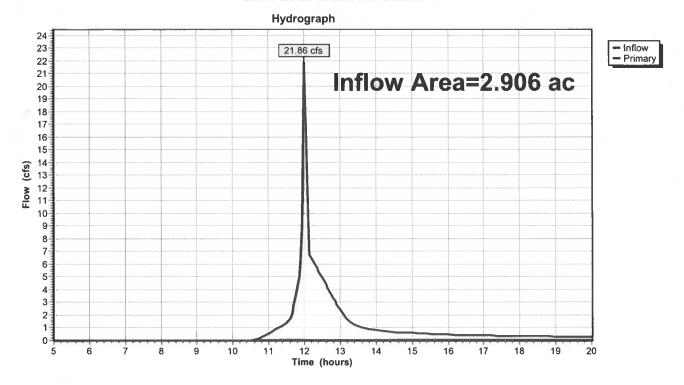
21.86 cfs @ 12.01 hrs, Volume= 21.86 cfs @ 12.01 hrs, Volume=

1.048 af

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

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 23L: Outflow Basin 4



Summary for Subcatchment 24S: Pre Basin 5

Runoff = 9.24 cfs @ 11.96 hrs, Volume=

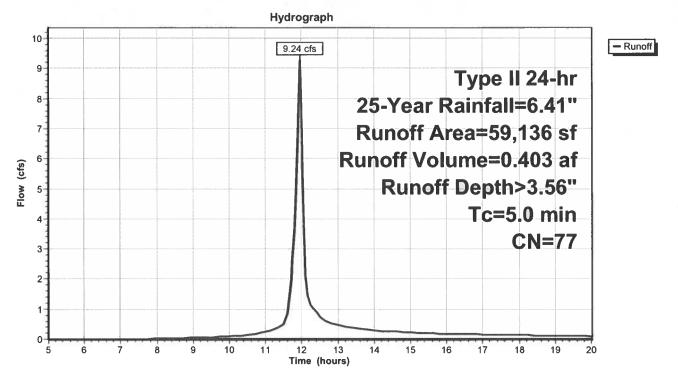
0.403 af, Depth> 3.56"

Routed to nonexistent node 26L

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type II 24-hr 25-Year Rainfall=6.41"

Area (sf)	CN	Description			
174	98	Paved park	ing, HSG D		
58,962	77	Woods, Go	od, HSG D		
59,136 58,962 174	77	Weighted A 99.71% Per 0.29% Impe	vious Area		
Tc Length (min) (feet		•	Capacity (cfs)	Description	
5.0				Direct Entry, Minimum	

Subcatchment 24S: Pre Basin 5



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Summary for Subcatchment 27S: Post Basin 5

Runoff =

10.30 cfs @ 11.95 hrs, Volume=

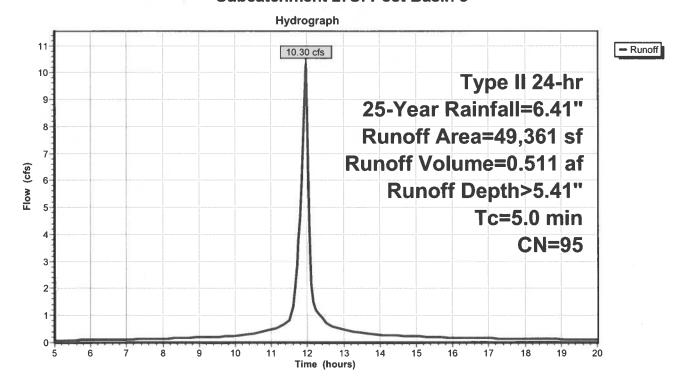
0.511 af, Depth> 5.41"

Routed to Pond 29P: Underground Sandfilter

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type II 24-hr 25-Year Rainfall=6.41"

	Area (sf)	CN	Description					
	41,850	98	Roofs, HSG D					
	7,511	80	>75% Grass cover, Good, HSG D					
	49,361	95	95 Weighted Average					
	7,511	7,511 15.22% Pervious Area						
	41,850		84.78% Imp	pervious Ar	ea			
_								
-	c Length	Slope	•	Capacity	Description			
(min) (feet)	(ft/ft)	(ft/sec)	(cfs)				
5.	0				Direct Entry,	Minimum		

Subcatchment 27S: Post Basin 5



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Summary for Subcatchment 28S: Post Basin 5 - Bypass

Runoff =

1.63 cfs @ 11.95 hrs, Volume=

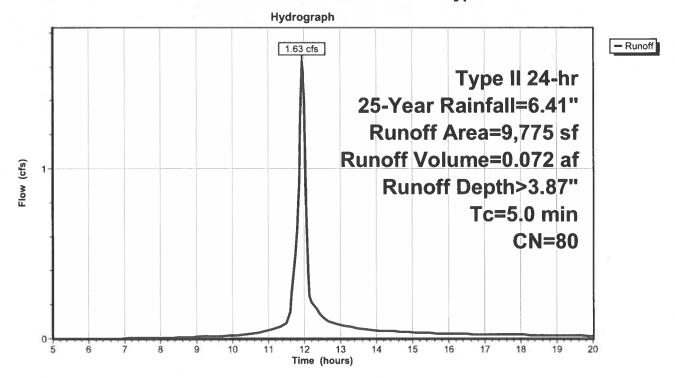
0.072 af, Depth> 3.87"

Routed to Link 30L: Post Outflow Basin 5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type II 24-hr 25-Year Rainfall=6.41"

A	rea (sf)	CN E	Description						
	9,775	80 >	75% Grass cover, Good, HSG D						
	9,775	1	100.00% Pervious Area						
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description				
5.0					Direct Entry, Minimum				

Subcatchment 28S: Post Basin 5 - Bypass



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Summary for Pond 29P: Underground Sandfilter

Inflow Area = 1.133 ac, 84.78% Impervious, Inflow Depth > 5.41" for 25-Year event

Inflow = 10.30 cfs @ 11.95 hrs, Volume= 0.511 af

Outflow = 4.12 cfs @ 12.07 hrs, Volume= 0.415 af, Atten= 60%, Lag= 6.9 min

Primary = 4.12 cfs @ 12.07 hrs, Volume= 0.415 af

Routed to Link 30L: Post Outflow Basin 5

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Peak Elev= 326.59' @ 12.07 hrs Surf.Area= 1,911 sf Storage= 10,680 cf

Plug-Flow detention time= 116.6 min calculated for 0.415 af (81% of inflow) Center-of-Mass det. time= 63.9 min (798.9 - 735.0)

Volume	Inve	rt Avail.Sto	rage Storage	Description	
#1	321.0	0' 13,3	77 cf Custom Stage Data (Prismatic) Listed belo		atic) Listed below (Recalc)
Elevation (feet)		Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	
321.0		1,911	0	0	
328.0	טט	1,911	13,377	13,377	
Device	Routing	Invert	Outlet Devices	3	
#1	Primary	323.00'	Inlet / Outlet Ir	P, square edge head nvert= 323.00' / 322	dwall, Ke= 0.500 .00' S= 0.0200 '/' Cc= 0.900 & clean, Flow Area= 3.14 sf
#2 #3	Device 1 Device 1	323.00' 326.00'			DO Limited to weir flow at low heads DO Limited to weir flow at low heads
#3 #4	Device 1	329.00'			ular Weir 2 End Contraction(s)

Primary OutFlow Max=4.02 cfs @ 12.07 hrs HW=326.55' (Free Discharge)

-1=Culvert (Passes 4.02 cfs of 24.17 cfs potential flow)

2=Orifice/Grate (Orifice Controls 3.09 cfs @ 8.63 fps)

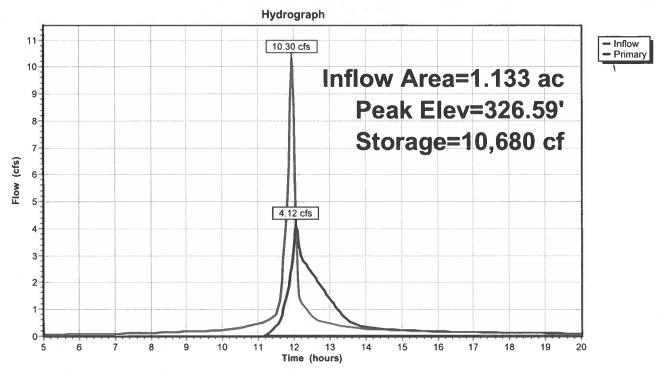
-3=Orifice/Grate (Orifice Controls 0.93 cfs @ 2.53 fps)

-4=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

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Pond 29P: Underground Sandfilter



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Summary for Link 30L: Post Outflow Basin 5

Inflow Area =

1.358 ac, 70.77% Impervious, Inflow Depth > 4.31" for 25-Year event

Inflow =

Primary

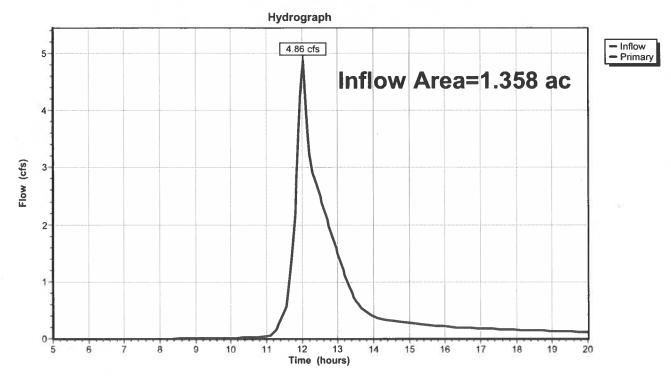
4.86 cfs @ 12.04 hrs, Volume= 0.488 af 4.86 cfs @ 12.04 hrs, Volume= 0.488 af,

0.488 af

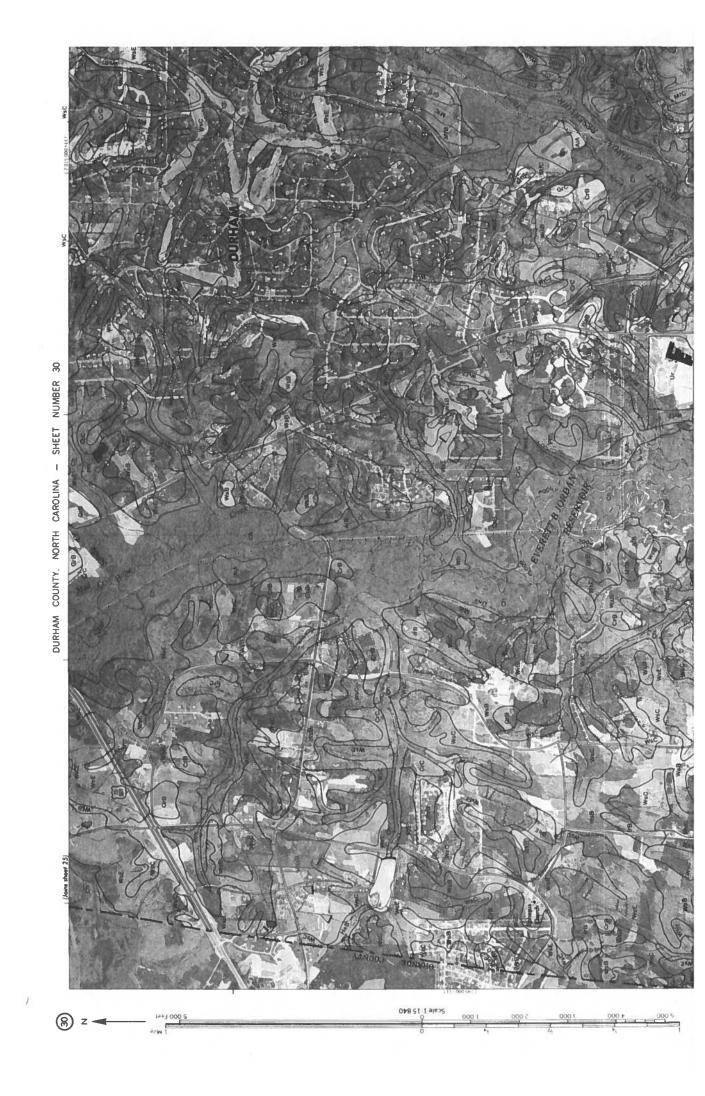
0.488 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 30L: Post Outflow Basin 5







35° 57' 2" N

Natural Resources

USDA

35° 56' 24" N

National Flood Hazard Layer FIRMette

79°0'10"W 35°57'1"N



78°59'33"W 35°56'31"N **CITY OF DURHAM** DURHAMICOUNTRY AREA OF MINIMAL FLOOD HAZARD eff. 10/19/2018 370085 1:6.000 TOWN OF CHAPEL HIEL \$70180 YAREA MOT INCLODED) ITOMMIN OF CELAIPEL FILL f.10/19/2018

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PAI

SPECIAL FLOOD
VAZARD AREAS
F

Without Base Flood Elevation
Zone A, V, A99
With BFE or Depth Zone AE, A0
Regulatory Floodway
0.2% Annual Chance Flood F
of 1% annual chance flood w

depth less than one foot or v

areas of less than one squar

Chance Flood Hazard Zone X
Area with Reduced Flood RIs
Levee. See Notes. Zone X
FLOOD HAZARD
Area with Flood Risk due to I

Area with Flood Risk due to I

Effective LOMRs
Area of Undeterm

OTHER AREAS

Area of Undetermined Flood

GENERAL --- Channel, Culvert, or Storm Si
STRUCTURES 1111111 Levee, Dike, or Floodwall

20.2 Cross Sections with 1% Annu 17.5 Water Surface Elevation

- - - Coastal Transect
- - - Coastal Transect
- - - Innt of Study

--- Coastal Transect Baseline
--- Profile Baseline

OTHER

FEATURES

Hydrographic Feature

Digital Data Available

No Digital Data Available

Unmapped

MAP PANELS

The pin displayed on the map is an ipoint selected by the user and does an authoritative property location.

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

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. The was exported on L18/2023 at 8:45 AM and does no reflect changes or amendments subsequent to this datime. The NFHL and effective information may change become superseded by new data over time.

This map image is void if the one or more of the follow elements do not appear: basemap imagery, flood zone legend, scale bar, map creation date, community iden FIRM panel number, and FIRM effective date. Map ims unmapped and unmodernized areas cannot be used fr