pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF CLEAN WATER

MANAGED RELEASE CONCEPT (MRC) DESIGN SUMMARY

Complete One Design Summary Sheet for Each BMP Designed for MRC

GENERAL INFORMATION

Applicant Name:	**AAMPA Holdings, LLC**	Project Name:	**AAMPA Holdings – Ritner Hwy**
Applicant Address:	**1514 Commerce Ave, Suite 203**	Municipality:	**West Pennsboro Township**
City, State, Zip:	**Carlisle PA 17013**	County:	**Cumberland**

Permit Type: ☐ NPDES PAG-02 ☒ NPDES IP ☐ ESCGP ☐ ESP

	Pre-Development	Post-Development	Change
Impervious Area (acres):	0.00	7.94	7.94

MRC BMP INFORMATION

MRC BMP Type: **SS-1 – MRC Subsurface Inf. Basin 1** Stormwater BMP Manual Section: **6.4.3**

Will the BMP Include Vegetation? ☐ Yes ☒ No

If Yes, Identify Proposed Vegetation: _____

For Non-Vegetated BMPs Will There Be Pre- or Post-Treatment? ☒ Yes (Pre-) ☐ Yes (Post-) ☐ No

If Yes, Identify Proposed Pre- or Post-Treatment: **Snout, Flexstorm Inlet Filter Bags**

Name of Surface Water to Receive MRC BMP Discharges: **Big Spring Creek**

Designated Use of Surface Water: **HQ - CWF** Existing Use of Surface Water (if different): _____

Is the Surface Water Impaired? ☒ Yes ☐ No

If Yes, Identify Cause(s): **Organic Enrichment / Oxygen Depletion**

Will the BMP have an impermeable liner? ☐ Yes ☒ No

If Yes, explain why a liner is proposed: _____

BMP Media Description: **See PCSM Plan**

Are Any Deviations from MRC Design Standards Proposed? ☒ Yes ☐ No

If Yes, Identify Deviations:

The soil media depth is greater than the maximum design standard of 4 feet. The depth of 6 feet was required to meet the volume requirements in the DEP Spreadsheet and to keep the volume generated from the 100yr-24hr storm within the stone section.

The maximum ponding depth is greater than the maximum requirement. This is due to the higher volume needed to meet the volume requirement in the DEP Spreadsheet. The outlets can not be modified to increase outflow and reduce the ponding depth without discharging more water than what is allowed by the design standards.

The footprint of the BMP can not be increased due to the affect of the utilities located within and around the subsurface BMP. Additionally, more blasting and excavating will be necessary to increase the footprint of the BMP and the BMP has been sized to limit the amount of blasting and excavating to the maximum extent practicable.

MRC BMP DESIGN VALUES AND STANDARDS		
Parameter	**Design Value**	**Design Standard**
Actual Contributing Impervious Area to BMP (acres)	**7.94**	
Equivalent Contributing Impervious Area to BMP (acres)	**7.83**	
Total Drainage Area to BMP (acres)	**7.94**	
MRC BMP Release Rate (cfs)	**0.08**	*No greater than 0.01 cfs / acre of equivalent contributing impervious*
Underdrain Outflow Rate During 1.2-Inch/2-Hour Storm (cfs)	**0.08**	<= *MRC BMP Release Rate (cfs)*
Maximum Storm Event Routed to MRC BMP	**100-yr/24-hr**	

MRC BMP Design Summary
Revised, August 25, 2020

Parameter	Design Value	Design Standard
BMP Footprint Area (ft^2)	**59,772**	
Bottom BMP Elevation (Native Soils) (ft)	**599.00**	
2-Yr/24-Hr Storm Ponding Depth (ft)	**1.43**	*1 ft (recommended) (2 ft max)*
Maximum Ponding Depth (ft)	**4.87**	*4 ft (max)*
Overflow Bypass Elevation (ft)	**602.30**	
Media Depth (ft)	**6.0**	*2 ft (min) – 4 ft (max)*
Media Void Space (%)	**100/30/15**	
Internal Water Storage (IWS) Depth (ft)	**1.0**	*1 ft recommended*
Top of IWS Elevation (ft)	**600.00**	
Underdrain Pipe Diameter (in)	**24.0**	
Underdrain Orifice Diameter (in)	**2.1**	
Underdrain Outlet Elevation (ft)	**600.00**	
IWS Available for Routing (%)	**50 – in stone**	*50% max*
Separation Distance (Groundwater) (ft)	**>1.0**	*1 ft (min) (2 ft recommended)*
Infiltration Rate (in/hr)	**0.29**	
Volume of Overflow During 1.2-Inch/2-Hour Storm (cf)	**0**	*0 (No overflow allowed)*
1-Yr/24-Hr **Pre**-Development Peak Rate (cfs)	**0.14**	
2-Yr/24-Hr **Post**-Development Peak Rate (cfs)	**0.13**	*1-Yr/24-Hr Pre-Development Peak Rate (or per approved Act 167 Plan)*
10-Yr/24-Hr **Post**-Development Peak Rate (cfs)	**0.84**	*10-Yr/24-Hr Pre-Development Peak Rate*
50-Yr/24-Hr **Post**-Development Peak Rate (cfs)	**5.07**	*50-Yr/24-Hr Pre-Development Peak Rate*
100-Yr/24-Hr **Post**-Development Peak Rate (cfs)	**7.23**	*100-Yr/24-Hr Pre-Development Peak Rate*
Total 2-Yr/24-Hr Runoff Volume Managed by BMP (cf)	**57,499**	
Ponding Time @ 2-Yr/24-Hr Storm (hrs)	**118.8**	*72 hrs (surface), 7 days (underground)*
Ponding Time @ 10-Yr/24-Hr Storm (hrs)	**151.2**	*72 hrs (surface), 7 days (underground)*
Ponding Time @ 50-Yr/24-Hr Storm (hrs)	**154.4**	*72 hrs (surface), 7 days (underground)*
Ponding Time @ 100-Yr/24-Hr Storm (hrs)	**155.0**	*72 hrs (surface), 7 days (underground)*

Justin T. Doty
Licensed P.E. Name

Justin T. Doty Digitally signed by Justin T. Doty Date: 2025.03.05 16:21:19 -05'00'
Licensed P.E. Signature

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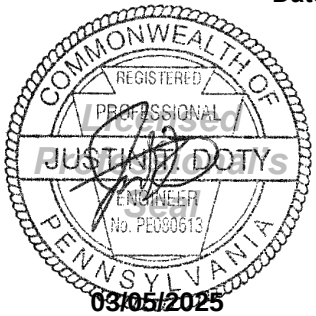
License No.

03-05-25
Date



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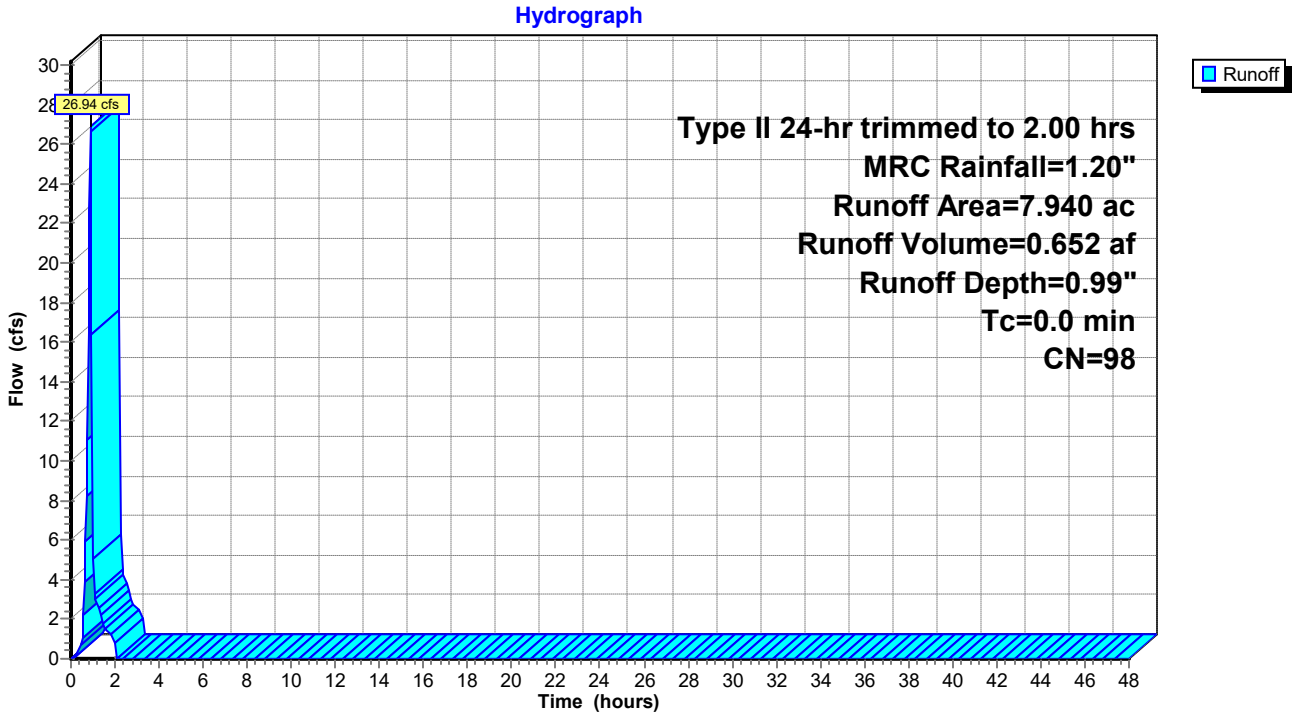
Summary for Subcatchment WS-2: WS-2

Runoff = 26.94 cfs @ 0.89 hrs, Volume= 0.652 af, Depth= 0.99"
Routed to Pond SS-1 : SS-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr trimmed to 2.00 hrs MRC Rainfall=1.20"

Area (ac)	CN	Description
7.940	98	Paved parking, HSG B
7.940		100.00% Impervious Area

Subcatchment WS-2: WS-2



Summary for Pond SS-1: SS-1

Inflow Area = 7.940 ac,100.00% Impervious, Inflow Depth = 0.99" for MRC event
Inflow = 26.94 cfs @ 0.89 hrs, Volume= 0.652 af
Outflow = 0.67 cfs @ 1.99 hrs, Volume= 0.652 af, Atten= 98%, Lag= 66.0 min
Discarded = 0.59 cfs @ 1.99 hrs, Volume= 0.617 af
Primary = 0.08 cfs @ 1.99 hrs, Volume= 0.036 af
Routed to Reach OUT-A : BYPASS PIPE A OUTLET

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 600.90' @ 1.99 hrs Surf.Area= 1.370 ac Storage= 0.577 af

Plug-Flow detention time= 379.9 min calculated for 0.652 af (100% of inflow)
Center-of-Mass det. time= 379.2 min (436.6 - 57.4)

Volume	Invert	Avail.Storage	Storage Description
#1	599.00'	7.483 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

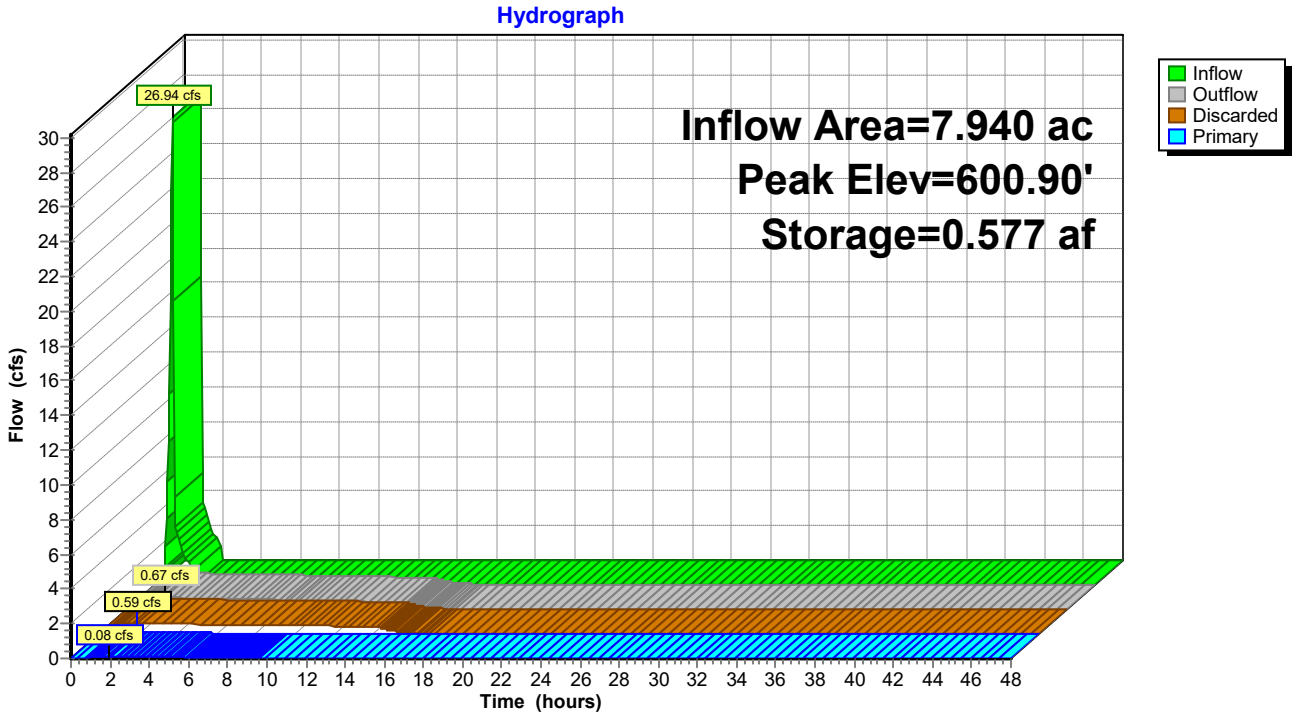
Elevation (feet)	Surf.Area (acres)	Voids (%)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
599.00	1.370	0.0	0.000	0.000
600.00	1.370	15.0	0.205	0.205
605.00	1.370	30.0	2.055	2.261
613.00	1.370	30.0	3.288	5.548
614.00	2.500	100.0	1.935	7.483

Device	Routing	Invert	Outlet Devices
#1	Discarded	599.00'	**0.290 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 595.00'
#2	Device 5	600.00'	**1.8" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 5	602.30'	**1.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#4	Device 5	604.80'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#5	Primary	599.00'	**18.0" Round Culvert** L= 11.0' Ke= 1.000 Inlet / Outlet Invert= 599.00' / 598.90' S= 0.0091 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Discarded OutFlow Max=0.59 cfs @ 1.99 hrs HW=600.90' (Free Discharge)
└**1=Exfiltration** (Controls 0.59 cfs)

Primary OutFlow Max=0.08 cfs @ 1.99 hrs HW=600.90' (Free Discharge)
└**5=Culvert** (Passes 0.08 cfs of 6.86 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 0.08 cfs @ 4.38 fps)
  ├**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)
  └**4=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond SS-1: SS-1


Hydrograph
Inflow Area=7.940 ac
Peak Elev=600.90'
Storage=0.577 af
Inflow
Outflow
Discarded
Primary
26.94 cfs
0.67 cfs
0.59 cfs
0.08 cfs
Flow (cfs)
Time (hours)
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30

Stage-Discharge for Pond SS-1: SS-1

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
599.00	0.00	0.00	0.00
599.20	0.42	0.42	0.00
599.40	0.44	0.44	0.00
599.60	0.46	0.46	0.00
599.80	0.48	0.48	0.00
600.00	0.50	0.50	0.00
600.20	0.55	0.52	0.03
600.40	0.59	0.54	0.05
600.60	0.62	0.56	0.06
600.80	0.65	0.58	0.07
601.00	0.68	0.60	0.08
601.20	0.71	0.62	0.09
601.40	0.74	0.64	0.10
601.60	0.77	0.66	0.11
601.80	0.79	0.68	0.11
602.00	0.82	0.70	0.12
602.20	0.85	0.72	0.12
602.40	0.97	0.74	0.23
602.60	1.40	0.76	0.64
602.80	1.96	0.78	1.18
603.00	2.59	0.80	1.79
603.20	3.26	0.82	2.44
603.40	3.94	0.84	3.10
603.60	4.61	0.86	3.75
603.80	5.25	0.88	4.37
604.00	5.85	0.90	4.95
604.20	6.40	0.92	5.48
604.40	6.89	0.94	5.95
604.60	7.30	0.96	6.34
604.80	7.63	0.98	6.65
605.00	9.60	1.00	8.60
605.20	12.53	1.02	11.51
605.40	16.06	1.04	15.02
605.60	16.50	1.06	15.43
605.80	16.78	1.08	15.70
606.00	17.06	1.10	15.95
606.20	17.33	1.12	16.21
606.40	17.60	1.14	16.46
606.60	17.86	1.16	16.70
606.80	18.13	1.18	16.94
607.00	18.38	1.20	17.18
607.20	18.64	1.22	17.42
607.40	18.89	1.24	17.65
607.60	19.14	1.26	17.88
607.80	19.39	1.28	18.11
608.00	19.63	1.30	18.33
608.20	19.87	1.32	18.55
608.40	20.11	1.34	18.77
608.60	20.35	1.36	18.98
608.80	20.58	1.38	19.20
609.00	20.81	1.40	19.41
609.20	21.04	1.42	19.62
609.40	21.27	1.44	19.82
609.60	21.49	1.46	20.03
609.80	21.71	1.48	20.23
610.00	21.93	1.50	20.43
610.20	22.15	1.52	20.63
610.40	22.37	1.54	20.83
610.60	22.58	1.56	21.02
610.80	22.80	1.58	21.21
611.00	23.01	1.60	21.40
611.20	23.22	1.62	21.59
611.40	23.42	1.64	21.78
611.60	23.63	1.66	21.97
611.80	23.83	1.68	22.15
612.00	24.04	1.70	22.34
612.20	24.24	1.72	22.52
612.40	24.44	1.74	22.70
612.60	24.64	1.76	22.88
612.80	24.84	1.78	23.05
613.00	25.03	1.80	23.23
613.20	25.29	1.89	23.40
613.40	25.55	1.98	23.58
613.60	25.81	2.06	23.75
613.80	26.07	2.15	23.92
614.00	**26.33**	**2.24**	**24.09**

Stage-Area-Storage for Pond SS-1: SS-1

Elevation (feet)	Surface (acres)	Storage (acre-feet)
599.00	1.370	0.000
599.20	1.370	0.041
599.40	1.370	0.082
599.60	1.370	0.123
599.80	1.370	0.164
600.00	1.370	0.205
600.20	1.370	0.288
600.40	1.370	0.370
600.60	1.370	0.452
600.80	1.370	0.534
601.00	1.370	0.616
601.20	1.370	0.699
601.40	1.370	0.781
601.60	1.370	0.863
601.80	1.370	0.945
602.00	1.370	1.027
602.20	1.370	1.110
602.40	1.370	1.192
602.60	1.370	1.274
602.80	1.370	1.356
603.00	1.370	1.438
603.20	1.370	1.521
603.40	1.370	1.603
603.60	1.370	1.685
603.80	1.370	1.767
604.00	1.370	1.849
604.20	1.370	1.932
604.40	1.370	2.014
604.60	1.370	2.096
604.80	1.370	2.178
605.00	1.370	2.261
605.20	1.370	2.343
605.40	1.370	2.425
605.60	1.370	2.507
605.80	1.370	2.589
606.00	1.370	2.672
606.20	1.370	2.754
606.40	1.370	2.836
606.60	1.370	2.918
606.80	1.370	3.000
607.00	1.370	3.083
607.20	1.370	3.165
607.40	1.370	3.247
607.60	1.370	3.329
607.80	1.370	3.411
608.00	1.370	3.493
608.20	1.370	3.576
608.40	1.370	3.658
608.60	1.370	3.740
608.80	1.370	3.822
609.00	1.370	3.905
609.20	1.370	3.987
609.40	1.370	4.069
609.60	1.370	4.151
609.80	1.370	4.233
610.00	1.370	4.315
610.20	1.370	4.398
610.40	1.370	4.480
610.60	1.370	4.562
610.80	1.370	4.644
611.00	1.370	4.726
611.20	1.370	4.809
611.40	1.370	4.891
611.60	1.370	4.973
611.80	1.370	5.055
612.00	1.370	5.137
612.20	1.370	5.220
612.40	1.370	5.302
612.60	1.370	5.384
612.80	1.370	5.466
613.00	1.370	5.548
613.20	1.596	5.845
613.40	1.822	6.187
613.60	2.048	6.574
613.80	2.274	7.006
614.00	**2.500**	**7.483**

MRC BMP 2-YR/24-HR RUNOFF VOLUME MANAGED BY BMP CALCULATIONS:

SS-1:

BMP Invert: 599.00
Overflow Discharge Invert: 602.30
Total Volume Depth Below Overflow: **3.30'**
Volume at Elevation 602.30 (from HydroCAD): **1.320 ac-ft**

1.320 ac-ft * 43,560 cu-ft = 57,499 ft^3

WORKSHEET 4 - EQUIVILENT IMPERVIOUS AREA CALCULATIONS

PROJECT AMAPA Holdings - Ritner Hwy
Drainage Area: WS-2 MRC
1.2in-2hr Rainfall 1.20 in

Managed Area 7.94 acres

Developed Conditions:

Cover Type/Condition	Soil Type	Area (sf)	Area (Ac)	CN	S	Ia (0.2*S)	Q Runoff (In)	Runoff Volume (ft3)
Meadow	B	0	0.00	58	7.24	1.45	0.01	0
Impervious	B	345866	7.94	98	0.20	0.04	0.99	28409
Open Space	B	0	0.00	61	6.39	1.28	0.00	0
Total			7.94					**28409**

¡uivilent Impervious Area: 28,409 / (0.0833 ft. * 43,560 sq. ft. / acre) **7.83 acres**

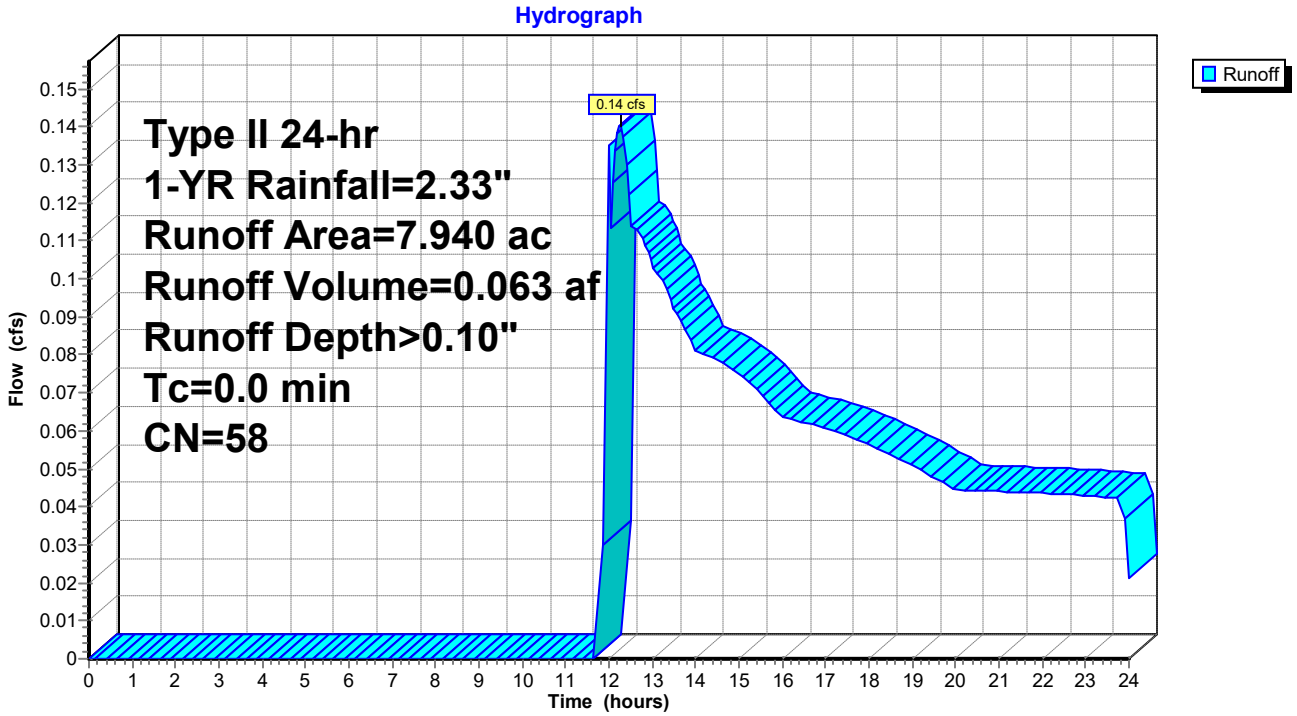
Summary for Subcatchment WS-2: WS-2 SS-1

Runoff = 0.14 cfs @ 12.26 hrs, Volume= 0.063 af, Depth> 0.10"
Routed to nonexistent node SS-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-YR Rainfall=2.33"

Area (ac)	CN	Description
7.940	58	Meadow, non-grazed, HSG B
7.940		100.00% Pervious Area

Subcatchment WS-2: WS-2 SS-1



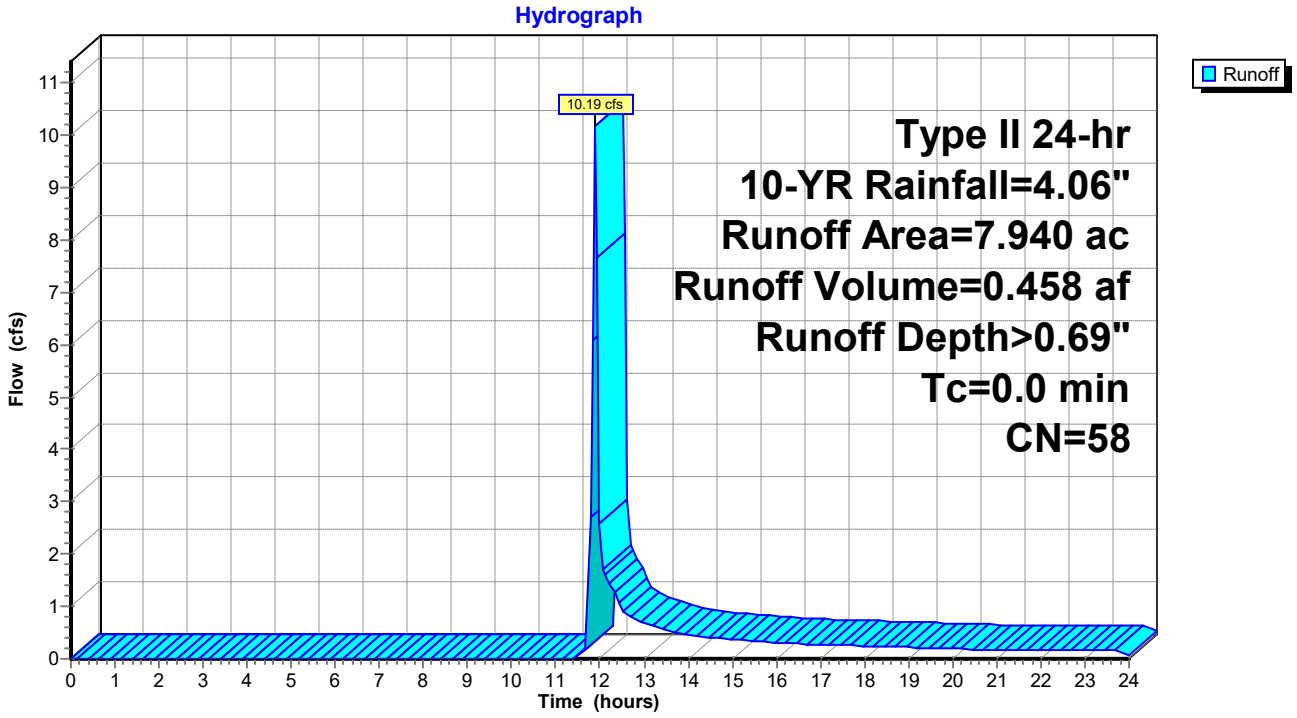
Summary for Subcatchment WS-2: WS-2 SS-1

Runoff = 10.19 cfs @ 11.91 hrs, Volume= 0.458 af, Depth> 0.69"
Routed to nonexistent node SS-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR Rainfall=4.06"

Area (ac)	CN	Description
7.940	58	Meadow, non-grazed, HSG B
7.940		100.00% Pervious Area

Subcatchment WS-2: WS-2 SS-1



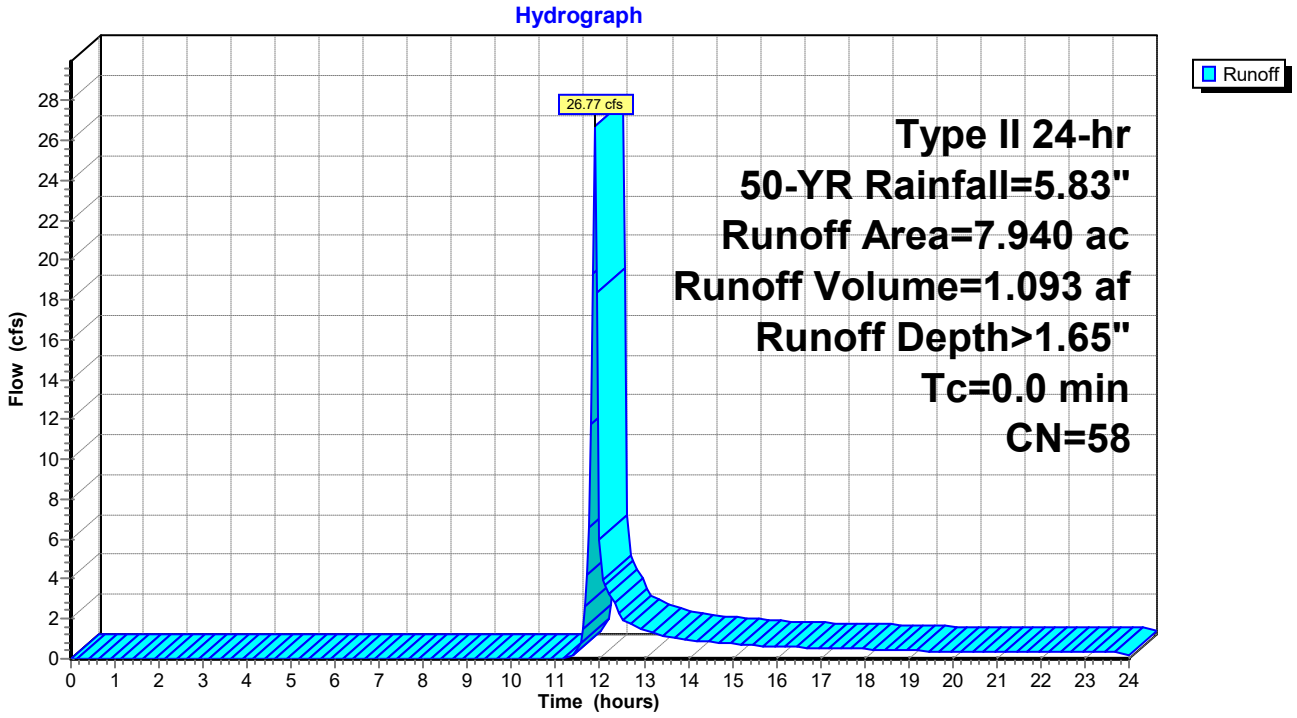
Summary for Subcatchment WS-2: WS-2 SS-1

Runoff = 26.77 cfs @ 11.90 hrs, Volume= 1.093 af, Depth> 1.65"
Routed to nonexistent node SS-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 50-YR Rainfall=5.83"

Area (ac)	CN	Description
7.940	58	Meadow, non-grazed, HSG B
7.940		100.00% Pervious Area

Subcatchment WS-2: WS-2 SS-1



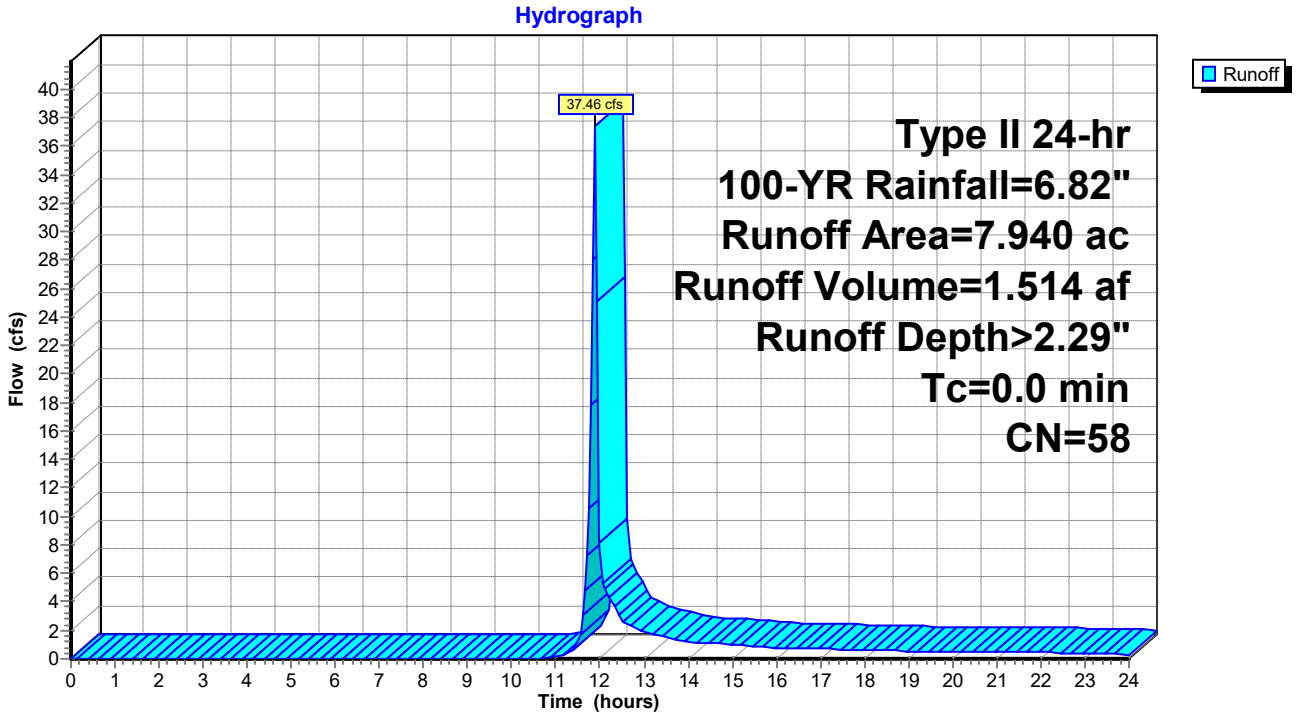
Summary for Subcatchment WS-2: WS-2 SS-1

Runoff = 37.46 cfs @ 11.90 hrs, Volume= 1.514 af, Depth> 2.29"
Routed to nonexistent node SS-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YR Rainfall=6.82"

Area (ac)	CN	Description
7.940	58	Meadow, non-grazed, HSG B
7.940		100.00% Pervious Area

Subcatchment WS-2: WS-2 SS-1



AAMPA Holdings - Ritner Hwy

SS-1 MRC Dewatering Time 2 Year Storm Event

*WATER SURFACE ELEVATION	STORAGE VOLUME (Ac. FT.)	STORAGE VOLUME (CU. FT.)	INCREMENTAL STORAGE VOLUME (CF)	** DISCHARGE (CFS)	AVERAGE DISCHARGE (CFS)	TIME (HRS.)	ACCUMULATED TIME (HRS.)
600.00		17119.1		0.00			0.0
			5401.4		0.03	60.02	
600.30		22520.5		0.05			60.0
			3528.3		0.06	16.33	
600.50		26048.8		0.07			76.4
			3441.3		0.08	11.95	
600.70		29490.1		0.09			88.3
			4748		0.10	13.2	
601.00		34238.1		0.11			101.5
			5357.9		0.12	12.40255	
601.30		39596.0		0.13			113.9
			2308.7		0.13	4.93312	
601.43		41904.7		0.13			**118.8**

AAMPA Holdings - Ritner Hwy

SS-1 MRC Dewatering Time 10 Year Storm Event

*WATER SURFACE ELEVATION	STORAGE VOLUME (Ac. FT.)	STORAGE VOLUME (CU. FT.)	INCREMENTAL STORAGE VOLUME (CF)	** DISCHARGE (CFS)	AVERAGE DISCHARGE (CFS)	TIME (HRS.)	ACCUMULATED TIME (HRS.)
600.00		17119.1		0.00			0.0
			5401.4		0.03	60.02	
600.30		22520.5		0.05			60.0
			3528.3		0.06	16.33	
600.50		26048.8		0.07			76.4
			3441.3		0.08	11.95	
600.70		29490.1		0.09			88.3
			4748		0.10	13.2	
601.00		34238.1		0.11			101.5
			5357.9		0.12	12.40255	
601.30		39596.0		0.13			113.9
			3571.9		0.135	7.349588	
601.50		43167.9		0.14			121.2
			3571.9		0.15	6.84	
601.70		46739.8		0.15			128.1
			5401.4		0.16	9.68	
602.00		52141.2		0.16			137.8
			5357.9		0.165	9.0	
602.30		57499.1		0.17			146.8
			3571.9		0.315	3.149824	
602.50		61071.0		0.46			149.9
			2875		0.65	1.228632	
602.66		63946.0		0.84			**151.2**

AAMPA Holdings - Ritner Hwy

SS-1 MRC Dewatering Time 50 Year Storm Event

*WATER SURFACE ELEVATION	STORAGE VOLUME (Ac. FT.)	STORAGE VOLUME (CU. FT.)	INCREMENTAL STORAGE VOLUME (CF)	** DISCHARGE (CFS)	AVERAGE DISCHARGE (CFS)	TIME (HRS.)	ACCUMULATED TIME (HRS.)
600.00		17119.1		0.00			0.0
			5401.4		0.03	60.02	
600.30		22520.5		0.05			60.0
			3528.3		0.06	16.33	
600.50		26048.8		0.07			76.4
			3441.3		0.08	11.95	
600.70		29490.1		0.09			88.3
			4748		0.10	13.2	
601.00		34238.1		0.11			101.5
			5357.9		0.12	12.40255	
601.30		39596.0		0.13			113.9
			3571.9		0.135	7.349588	
601.50		43167.9		0.14			121.2
			6571.9		0.15	12.59	
601.70		49739.8		0.15			133.8
			2401.4		0.16	4.30	
602.00		52141.2		0.16			138.1
			5357.9		0.165	9.0	
602.30		57499.1		0.17			147.2
			3571.9		0.315	3.149824	
602.50		61071.0		0.46			150.3
			3571.9		0.705	1.407368	
602.70		64642.9		0.95			151.7
			5401.5		1.395	1.075568	
603.00		70044.4		1.84			152.8
			5357.8		2.33	0.6	
603.30		75402.2		2.82			153.4
			3572		3.15	0.314991	
603.50		78974.2		3.48			153.7
			3789.7		3.8	0.277025	
603.70		82763.9		4.12			154.0
			5183.6		4.565	0.315419	
604.00		87947.5		5.01			154.3
			348.5		5.04	0.019207	
604.02		88296.0		5.07			**154.4**

AAMPA Holdings - Ritner Hwy

SS-1 MRC Dewatering Time 100 Year Storm Event

*WATER SURFACE ELEVATION	STORAGE VOLUME (Ac. FT.)	STORAGE VOLUME (CU. FT.)	INCREMENTAL STORAGE VOLUME (CF)	** DISCHARGE (CFS)	AVERAGE DISCHARGE (CFS)	TIME (HRS.)	ACCUMULATED TIME (HRS.)
600.00		17119.1		0.00			0.0
			5401.4		0.03	60.02	
600.30		22520.5		0.05			60.0
			3528.3		0.06	16.33	
600.50		26048.8		0.07			76.4
			3441.3		0.08	11.95	
600.70		29490.1		0.09			88.3
			4748		0.10	13.2	
601.00		34238.1		0.11			101.5
			5357.9		0.12	12.40255	
601.30		39596.0		0.13			113.9
			3571.9		0.135	7.349588	
601.50		43167.9		0.14			121.2
			6571.9		0.15	12.59	
601.70		49739.8		0.15			133.8
			2401.4		0.16	4.30	
602.00		52141.2		0.16			138.1
			5357.9		0.165	9.0	
602.30		57499.1		0.17			147.2
			3571.9		0.315	3.149824	
602.50		61071.0		0.46			150.3
			3571.9		0.705	1.407368	
602.70		64642.9		0.95			151.7
			5401.5		1.395	1.075568	
603.00		70044.4		1.84			152.8
			5357.8		2.33	0.6	
603.30		75402.2		2.82			153.4
			3572		3.15	0.314991	
603.50		78974.2		3.48			153.7
			3789.7		3.8	0.277025	
603.70		82763.9		4.12			154.0
			5183.6		4.565	0.315419	
604.00		87947.5		5.01			154.3
			5357.9		5.4	0.275612	
604.30		93305.4		5.79			154.6
			3571.9		6.005	0.165228	
604.50		96877.3		6.22			154.8
			6621.1		6.725	0.273486	
604.87		103498.4		7.23			**155.0**

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF CLEAN WATER

MANAGED RELEASE CONCEPT (MRC) DESIGN SUMMARY

Complete One Design Summary Sheet for Each BMP Designed for MRC

GENERAL INFORMATION

Applicant Name:	**AAMPA Holdings, LLC**	Project Name:	**AAMPA Holdings – Ritner Hwy**
Applicant Address:	**1514 Commerce Ave, Suite 203**	Municipality:	**West Pennsboro Township**
City, State, Zip:	**Carlisle PA 17013**	County:	**Cumberland**

Permit Type: ☐ NPDES PAG-02 ☒ NPDES IP ☐ ESCGP ☐ ESP

	Pre-Development	Post-Development	Change
Impervious Area (acres):	0.00	7.94	7.94

MRC BMP INFORMATION

MRC BMP Type: **SS-1 – MRC Subsurface Inf. Basin 1** Stormwater BMP Manual Section: **6.4.3**

Will the BMP Include Vegetation? ☐ Yes ☒ No

If Yes, Identify Proposed Vegetation: _____

For Non-Vegetated BMPs Will There Be Pre- or Post-Treatment? ☒ Yes (Pre-) ☐ Yes (Post-) ☐ No

If Yes, Identify Proposed Pre- or Post-Treatment: **Snout, Flexstorm Inlet Filter Bags**

Name of Surface Water to Receive MRC BMP Discharges: **Big Spring Creek**

Designated Use of Surface Water: **HQ - CWF** Existing Use of Surface Water (if different): _____

Is the Surface Water Impaired? ☒ Yes ☐ No

If Yes, Identify Cause(s): **Organic Enrichment / Oxygen Depletion**

Will the BMP have an impermeable liner? ☐ Yes ☒ No

If Yes, explain why a liner is proposed: _____

BMP Media Description: **See PCSM Plan**

Are Any Deviations from MRC Design Standards Proposed? ☒ Yes ☐ No

If Yes, Identify Deviations:

The soil media depth is greater than the maximum design standard of 4 feet. The depth of 6 feet was required to meet the volume requirements in the DEP Spreadsheet and to keep the volume generated from the 100yr-24hr storm within the stone section.

The maximum ponding depth is greater than the maximum requirement. This is due to the higher volume needed to meet the volume requirement in the DEP Spreadsheet. The outlets can not be modified to increase outflow and reduce the ponding depth without discharging more water than what is allowed by the design standards.

MRC BMP DESIGN VALUES AND STANDARDS		
Parameter	**Design Value**	**Design Standard**
Actual Contributing Impervious Area to BMP (acres)	**7.94**	
Equivalent Contributing Impervious Area to BMP (acres)	**7.83**	
Total Drainage Area to BMP (acres)	**7.94**	
MRC BMP Release Rate (cfs)	**0.08**	*No greater than 0.01 cfs / acre of equivalent contributing impervious*
Underdrain Outflow Rate During 1.2-Inch/2-Hour Storm (cfs)	**0.08**	<= *MRC BMP Release Rate (cfs)*
Maximum Storm Event Routed to MRC BMP	**100-yr/24-hr**	

MRC BMP Design Summary
Revised, August 25, 2020

Parameter	Design Value	Design Standard
BMP Footprint Area (ft^2)	**59,772**	
Bottom BMP Elevation (Native Soils) (ft)	**599.00**	
2-Yr/24-Hr Storm Ponding Depth (ft)	**1.43**	*1 ft (recommended) (2 ft max)*
Maximum Ponding Depth (ft)	**4.87**	*4 ft (max)*
Overflow Bypass Elevation (ft)	**602.30**	
Media Depth (ft)	**6.0**	*2 ft (min) – 4 ft (max)*
Media Void Space (%)	**100/30/15**	
Internal Water Storage (IWS) Depth (ft)	**1.0**	*1 ft recommended*
Top of IWS Elevation (ft)	**600.00**	
Underdrain Pipe Diameter (in)	**24.0**	
Underdrain Orifice Diameter (in)	**2.1**	
Underdrain Outlet Elevation (ft)	**600.00**	
IWS Available for Routing (%)	**50 – in stone**	*50% max*
Separation Distance (Groundwater) (ft)	**>1.0**	*1 ft (min) (2 ft recommended)*
Infiltration Rate (in/hr)	**0.29**	
Volume of Overflow During 1.2-Inch/2-Hour Storm (cf)	**0**	*0 (No overflow allowed)*
1-Yr/24-Hr **Pre**-Development Peak Rate (cfs)	**0.14**	
2-Yr/24-Hr **Post**-Development Peak Rate (cfs)	**0.13**	*1-Yr/24-Hr Pre-Development Peak Rate (or per approved Act 167 Plan)*
10-Yr/24-Hr **Post**-Development Peak Rate (cfs)	**0.84**	*10-Yr/24-Hr Pre-Development Peak Rate*
50-Yr/24-Hr **Post**-Development Peak Rate (cfs)	**5.07**	*50-Yr/24-Hr Pre-Development Peak Rate*
100-Yr/24-Hr **Post**-Development Peak Rate (cfs)	**7.23**	*100-Yr/24-Hr Pre-Development Peak Rate*
Total 2-Yr/24-Hr Runoff Volume Managed by BMP (cf)	**57,499**	
Ponding Time @ 2-Yr/24-Hr Storm (hrs)	**118.8**	*72 hrs (surface), 7 days (underground)*
Ponding Time @ 10-Yr/24-Hr Storm (hrs)	**151.2**	*72 hrs (surface), 7 days (underground)*
Ponding Time @ 50-Yr/24-Hr Storm (hrs)	**154.4**	*72 hrs (surface), 7 days (underground)*
Ponding Time @ 100-Yr/24-Hr Storm (hrs)	**155.0**	*72 hrs (surface), 7 days (underground)*

Justin T. Doty
Licensed P.E. Name

Licensed P.E. Signature

PE080613
License No.

Date

Licensed Professional's Seal

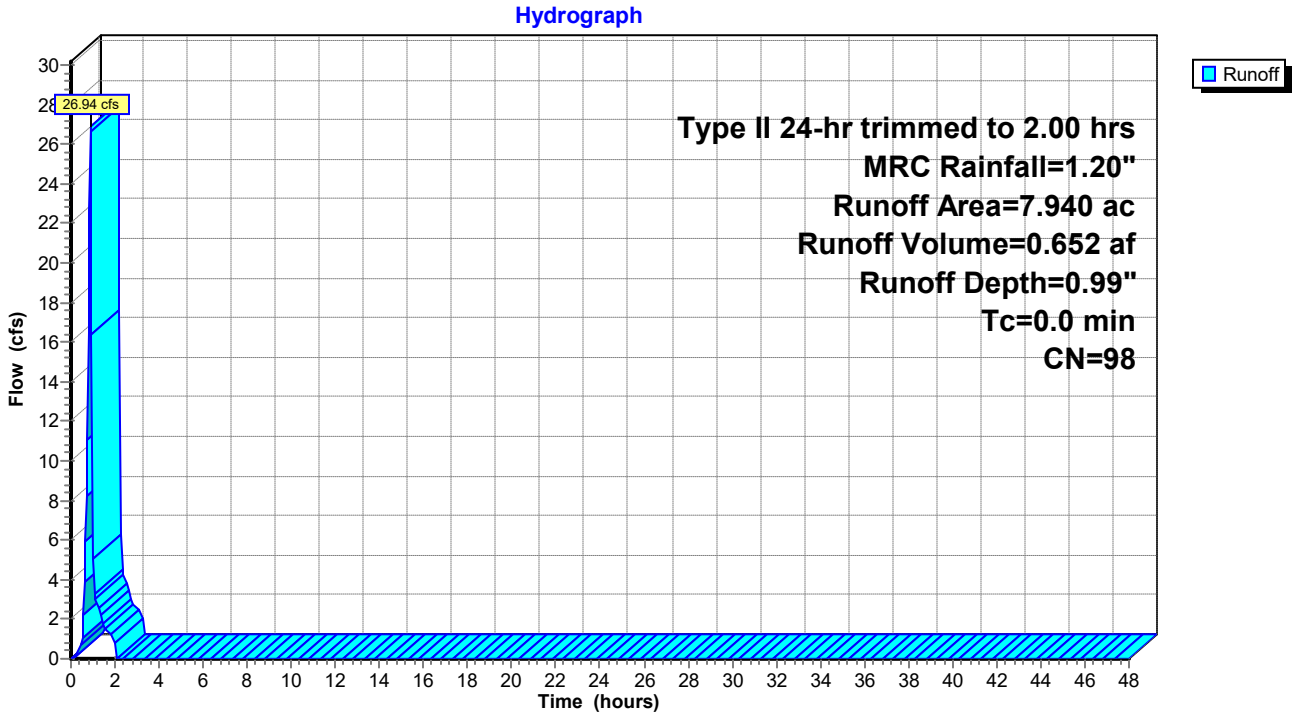
Summary for Subcatchment WS-2: WS-2

Runoff = 26.94 cfs @ 0.89 hrs, Volume= 0.652 af, Depth= 0.99"
Routed to Pond SS-1 : SS-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr trimmed to 2.00 hrs MRC Rainfall=1.20"

Area (ac)	CN	Description
7.940	98	Paved parking, HSG B
7.940		100.00% Impervious Area

Subcatchment WS-2: WS-2



Summary for Pond SS-1: SS-1

Inflow Area = 7.940 ac,100.00% Impervious, Inflow Depth = 0.99" for MRC event
Inflow = 26.94 cfs @ 0.89 hrs, Volume= 0.652 af
Outflow = 0.67 cfs @ 1.99 hrs, Volume= 0.652 af, Atten= 98%, Lag= 66.0 min
Discarded = 0.59 cfs @ 1.99 hrs, Volume= 0.617 af
Primary = 0.08 cfs @ 1.99 hrs, Volume= 0.036 af
Routed to Reach OUT-A : BYPASS PIPE A OUTLET

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 600.90' @ 1.99 hrs Surf.Area= 1.370 ac Storage= 0.577 af

Plug-Flow detention time= 379.9 min calculated for 0.652 af (100% of inflow)
Center-of-Mass det. time= 379.2 min (436.6 - 57.4)

Volume	Invert	Avail.Storage	Storage Description
#1	599.00'	7.483 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

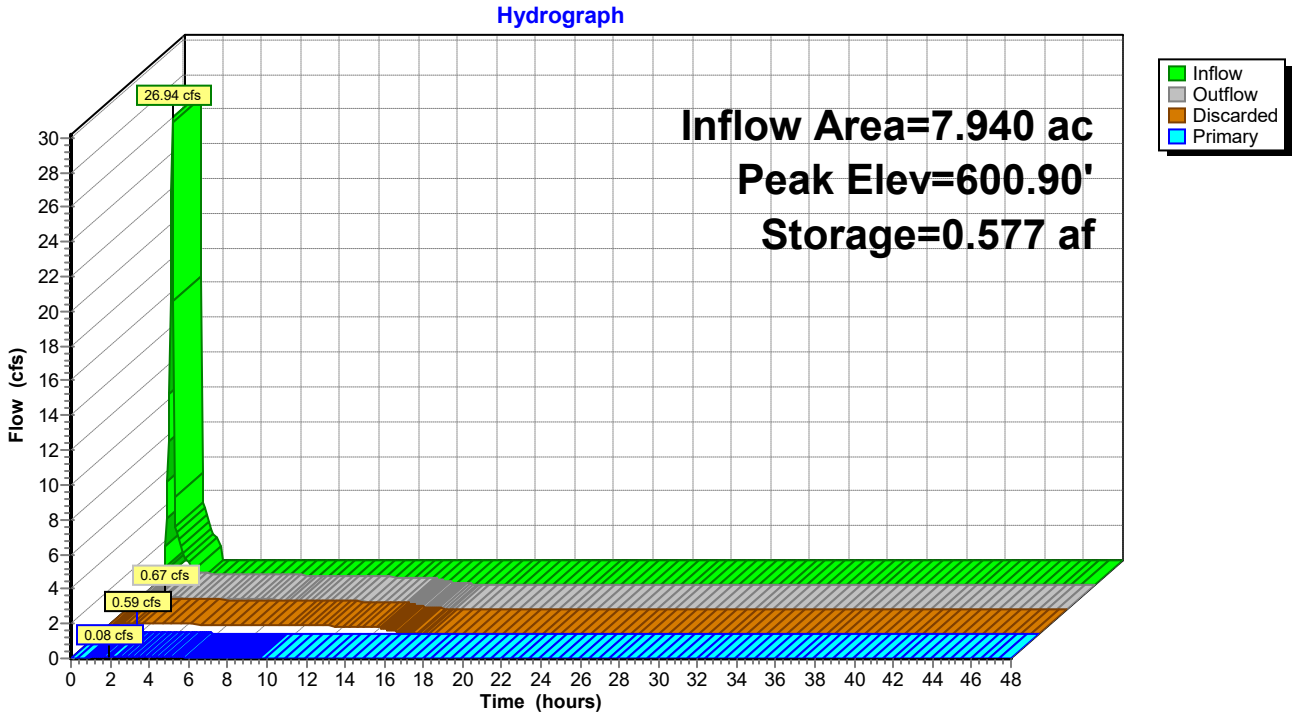
Elevation (feet)	Surf.Area (acres)	Voids (%)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
599.00	1.370	0.0	0.000	0.000
600.00	1.370	15.0	0.205	0.205
605.00	1.370	30.0	2.055	2.261
613.00	1.370	30.0	3.288	5.548
614.00	2.500	100.0	1.935	7.483

Device	Routing	Invert	Outlet Devices
#1	Discarded	599.00'	**0.290 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 595.00'
#2	Device 5	600.00'	**1.8" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 5	602.30'	**1.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#4	Device 5	604.80'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#5	Primary	599.00'	**18.0" Round Culvert** L= 11.0' Ke= 1.000 Inlet / Outlet Invert= 599.00' / 598.90' S= 0.0091 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Discarded OutFlow Max=0.59 cfs @ 1.99 hrs HW=600.90' (Free Discharge)
└**1=Exfiltration** (Controls 0.59 cfs)

Primary OutFlow Max=0.08 cfs @ 1.99 hrs HW=600.90' (Free Discharge)
└**5=Culvert** (Passes 0.08 cfs of 6.86 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 0.08 cfs @ 4.38 fps)
  ├**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)
  └**4=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond SS-1: SS-1


Hydrograph
Inflow Area=7.940 ac
Peak Elev=600.90'
Storage=0.577 af
Inflow
Outflow
Discarded
Primary
26.94 cfs
0.67 cfs
0.59 cfs
0.08 cfs
Flow (cfs)
Time (hours)
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30

Stage-Discharge for Pond SS-1: SS-1

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
599.00	0.00	0.00	0.00
599.20	0.42	0.42	0.00
599.40	0.44	0.44	0.00
599.60	0.46	0.46	0.00
599.80	0.48	0.48	0.00
600.00	0.50	0.50	0.00
600.20	0.55	0.52	0.03
600.40	0.59	0.54	0.05
600.60	0.62	0.56	0.06
600.80	0.65	0.58	0.07
601.00	0.68	0.60	0.08
601.20	0.71	0.62	0.09
601.40	0.74	0.64	0.10
601.60	0.77	0.66	0.11
601.80	0.79	0.68	0.11
602.00	0.82	0.70	0.12
602.20	0.85	0.72	0.12
602.40	0.97	0.74	0.23
602.60	1.40	0.76	0.64
602.80	1.96	0.78	1.18
603.00	2.59	0.80	1.79
603.20	3.26	0.82	2.44
603.40	3.94	0.84	3.10
603.60	4.61	0.86	3.75
603.80	5.25	0.88	4.37
604.00	5.85	0.90	4.95
604.20	6.40	0.92	5.48
604.40	6.89	0.94	5.95
604.60	7.30	0.96	6.34
604.80	7.63	0.98	6.65
605.00	9.60	1.00	8.60
605.20	12.53	1.02	11.51
605.40	16.06	1.04	15.02
605.60	16.50	1.06	15.43
605.80	16.78	1.08	15.70
606.00	17.06	1.10	15.95
606.20	17.33	1.12	16.21
606.40	17.60	1.14	16.46
606.60	17.86	1.16	16.70
606.80	18.13	1.18	16.94
607.00	18.38	1.20	17.18
607.20	18.64	1.22	17.42
607.40	18.89	1.24	17.65
607.60	19.14	1.26	17.88
607.80	19.39	1.28	18.11
608.00	19.63	1.30	18.33
608.20	19.87	1.32	18.55
608.40	20.11	1.34	18.77
608.60	20.35	1.36	18.98
608.80	20.58	1.38	19.20
609.00	20.81	1.40	19.41
609.20	21.04	1.42	19.62
609.40	21.27	1.44	19.82
609.60	21.49	1.46	20.03
609.80	21.71	1.48	20.23
610.00	21.93	1.50	20.43
610.20	22.15	1.52	20.63
610.40	22.37	1.54	20.83
610.60	22.58	1.56	21.02
610.80	22.80	1.58	21.21
611.00	23.01	1.60	21.40
611.20	23.22	1.62	21.59
611.40	23.42	1.64	21.78
611.60	23.63	1.66	21.97
611.80	23.83	1.68	22.15
612.00	24.04	1.70	22.34
612.20	24.24	1.72	22.52
612.40	24.44	1.74	22.70
612.60	24.64	1.76	22.88
612.80	24.84	1.78	23.05
613.00	25.03	1.80	23.23
613.20	25.29	1.89	23.40
613.40	25.55	1.98	23.58
613.60	25.81	2.06	23.75
613.80	26.07	2.15	23.92
614.00	**26.33**	**2.24**	**24.09**

Stage-Area-Storage for Pond SS-1: SS-1

Elevation (feet)	Surface (acres)	Storage (acre-feet)
599.00	1.370	0.000
599.20	1.370	0.041
599.40	1.370	0.082
599.60	1.370	0.123
599.80	1.370	0.164
600.00	1.370	0.205
600.20	1.370	0.288
600.40	1.370	0.370
600.60	1.370	0.452
600.80	1.370	0.534
601.00	1.370	0.616
601.20	1.370	0.699
601.40	1.370	0.781
601.60	1.370	0.863
601.80	1.370	0.945
602.00	1.370	1.027
602.20	1.370	1.110
602.40	1.370	1.192
602.60	1.370	1.274
602.80	1.370	1.356
603.00	1.370	1.438
603.20	1.370	1.521
603.40	1.370	1.603
603.60	1.370	1.685
603.80	1.370	1.767
604.00	1.370	1.849
604.20	1.370	1.932
604.40	1.370	2.014
604.60	1.370	2.096
604.80	1.370	2.178
605.00	1.370	2.261
605.20	1.370	2.343
605.40	1.370	2.425
605.60	1.370	2.507
605.80	1.370	2.589
606.00	1.370	2.672
606.20	1.370	2.754
606.40	1.370	2.836
606.60	1.370	2.918
606.80	1.370	3.000
607.00	1.370	3.083
607.20	1.370	3.165
607.40	1.370	3.247
607.60	1.370	3.329
607.80	1.370	3.411
608.00	1.370	3.493
608.20	1.370	3.576
608.40	1.370	3.658
608.60	1.370	3.740
608.80	1.370	3.822
609.00	1.370	3.905
609.20	1.370	3.987
609.40	1.370	4.069
609.60	1.370	4.151
609.80	1.370	4.233
610.00	1.370	4.315
610.20	1.370	4.398
610.40	1.370	4.480
610.60	1.370	4.562
610.80	1.370	4.644
611.00	1.370	4.726
611.20	1.370	4.809
611.40	1.370	4.891
611.60	1.370	4.973
611.80	1.370	5.055
612.00	1.370	5.137
612.20	1.370	5.220
612.40	1.370	5.302
612.60	1.370	5.384
612.80	1.370	5.466
613.00	1.370	5.548
613.20	1.596	5.845
613.40	1.822	6.187
613.60	2.048	6.574
613.80	2.274	7.006
614.00	**2.500**	**7.483**

MRC BMP 2-YR/24-HR RUNOFF VOLUME MANAGED BY BMP CALCULATIONS:

SS-1:

BMP Invert: 599.00
Overflow Discharge Invert: 602.30
Total Volume Depth Below Overflow: **3.30'**
Volume at Elevation 602.30 (from HydroCAD): **1.320 ac-ft**

1.320 ac-ft * 43,560 cu-ft = 57,499 ft^3

WORKSHEET 4 - EQUIVILENT IMPERVIOUS AREA CALCULATIONS

PROJECT AMAPA Holdings - Ritner Hwy
Drainage Area: WS-2 MRC
1.2in-2hr Rainfall 1.20 in

Managed Area 7.94 acres

Developed Conditions:

Cover Type/Condition	Soil Type	Area (sf)	Area (Ac)	CN	S	Ia (0.2*S)	Q Runoff (In)	Runoff Volume (ft3)
Meadow	B	0	0.00	58	7.24	1.45	0.01	0
Impervious	B	345866	7.94	98	0.20	0.04	0.99	28409
Open Space	B	0	0.00	61	6.39	1.28	0.00	0
Total			7.94					**28409**

¡uivilent Impervious Area: 28,409 / (0.0833 ft. * 43,560 sq. ft. / acre) **7.83 acres**

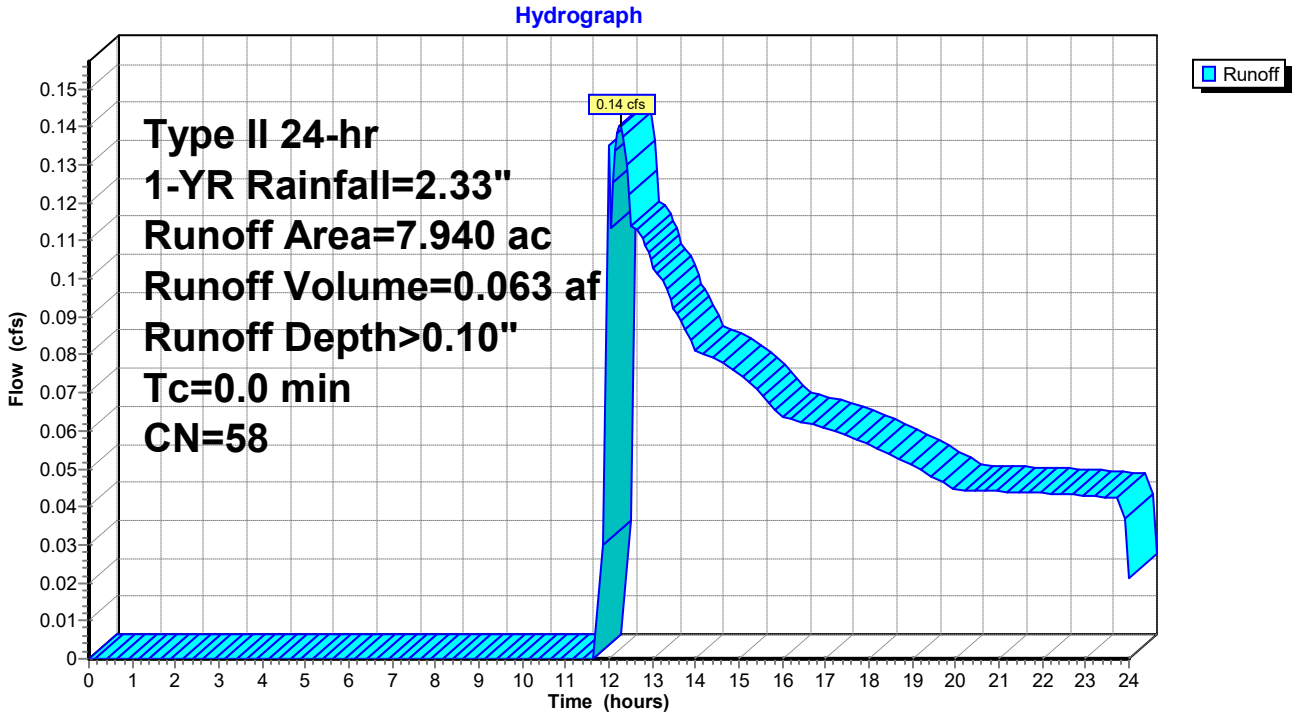
Summary for Subcatchment WS-2: WS-2 SS-1

Runoff = 0.14 cfs @ 12.26 hrs, Volume= 0.063 af, Depth> 0.10"
Routed to nonexistent node SS-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-YR Rainfall=2.33"

Area (ac)	CN	Description
7.940	58	Meadow, non-grazed, HSG B
7.940		100.00% Pervious Area

Subcatchment WS-2: WS-2 SS-1



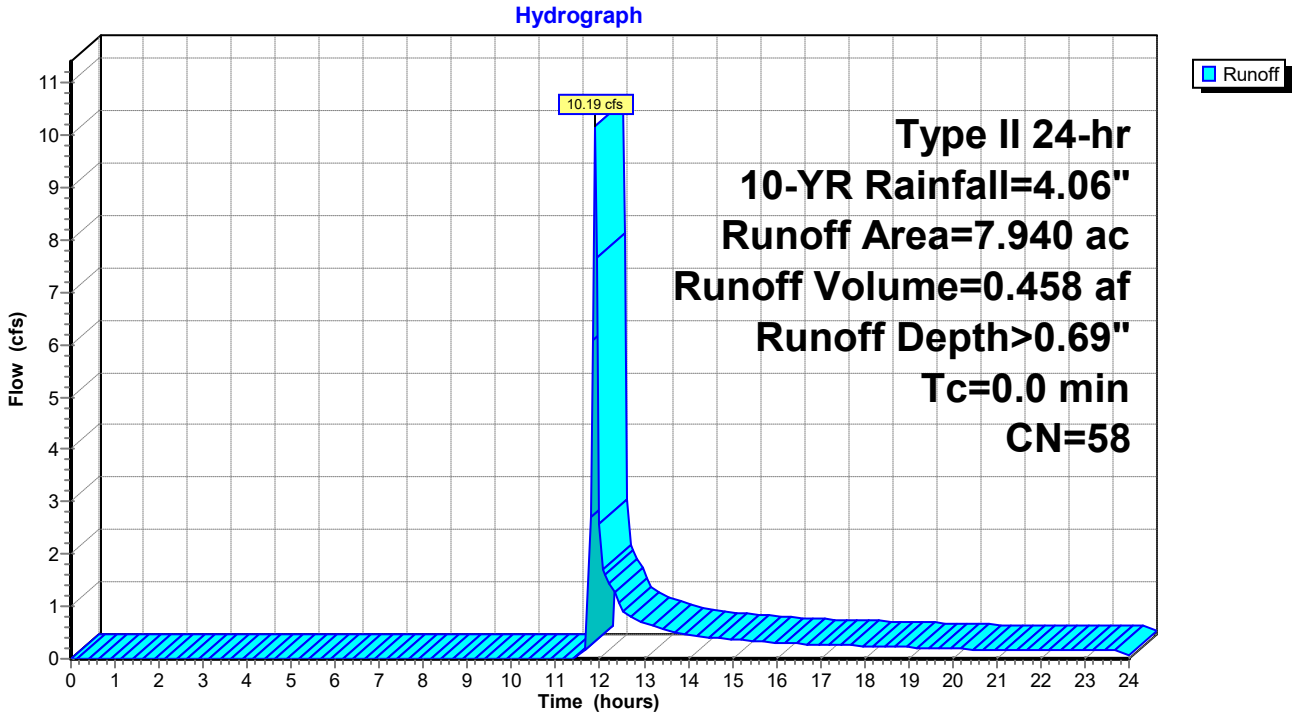
Summary for Subcatchment WS-2: WS-2 SS-1

Runoff = 10.19 cfs @ 11.91 hrs, Volume= 0.458 af, Depth> 0.69"
Routed to nonexistent node SS-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR Rainfall=4.06"

Area (ac)	CN	Description
7.940	58	Meadow, non-grazed, HSG B
7.940		100.00% Pervious Area

Subcatchment WS-2: WS-2 SS-1



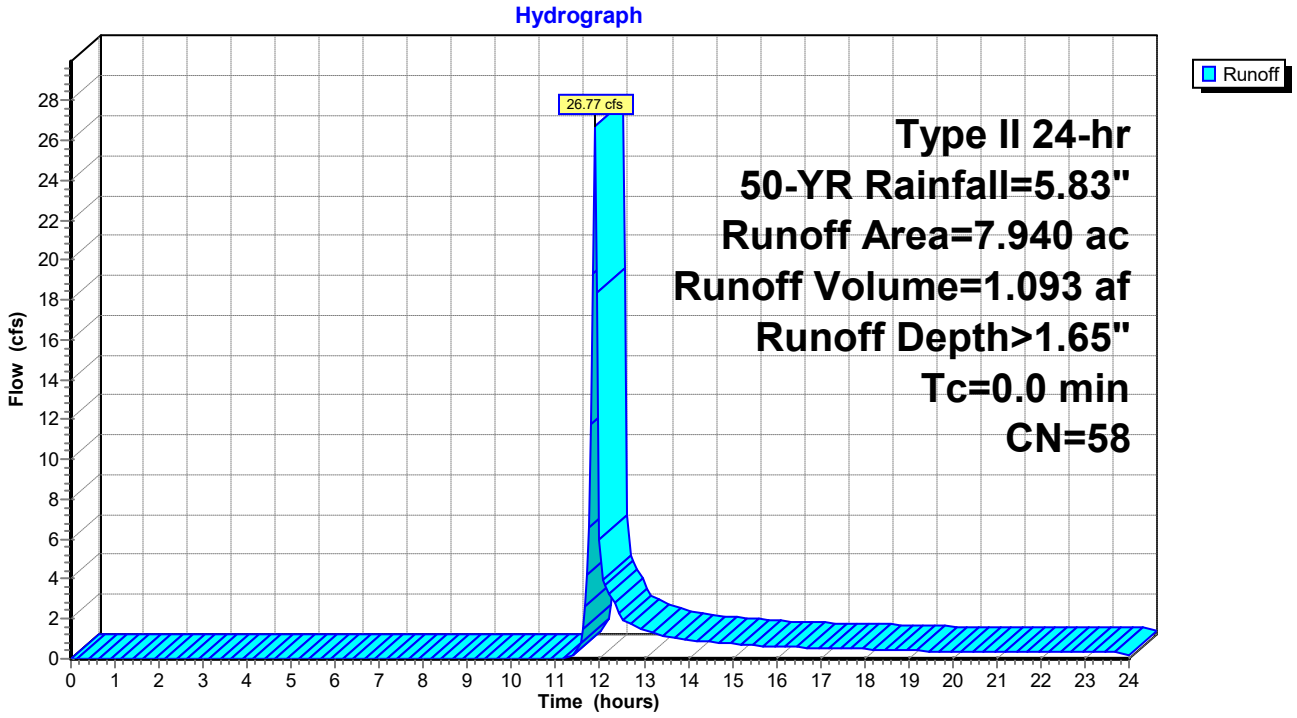
Summary for Subcatchment WS-2: WS-2 SS-1

Runoff = 26.77 cfs @ 11.90 hrs, Volume= 1.093 af, Depth> 1.65"
Routed to nonexistent node SS-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 50-YR Rainfall=5.83"

Area (ac)	CN	Description
7.940	58	Meadow, non-grazed, HSG B
7.940		100.00% Pervious Area

Subcatchment WS-2: WS-2 SS-1



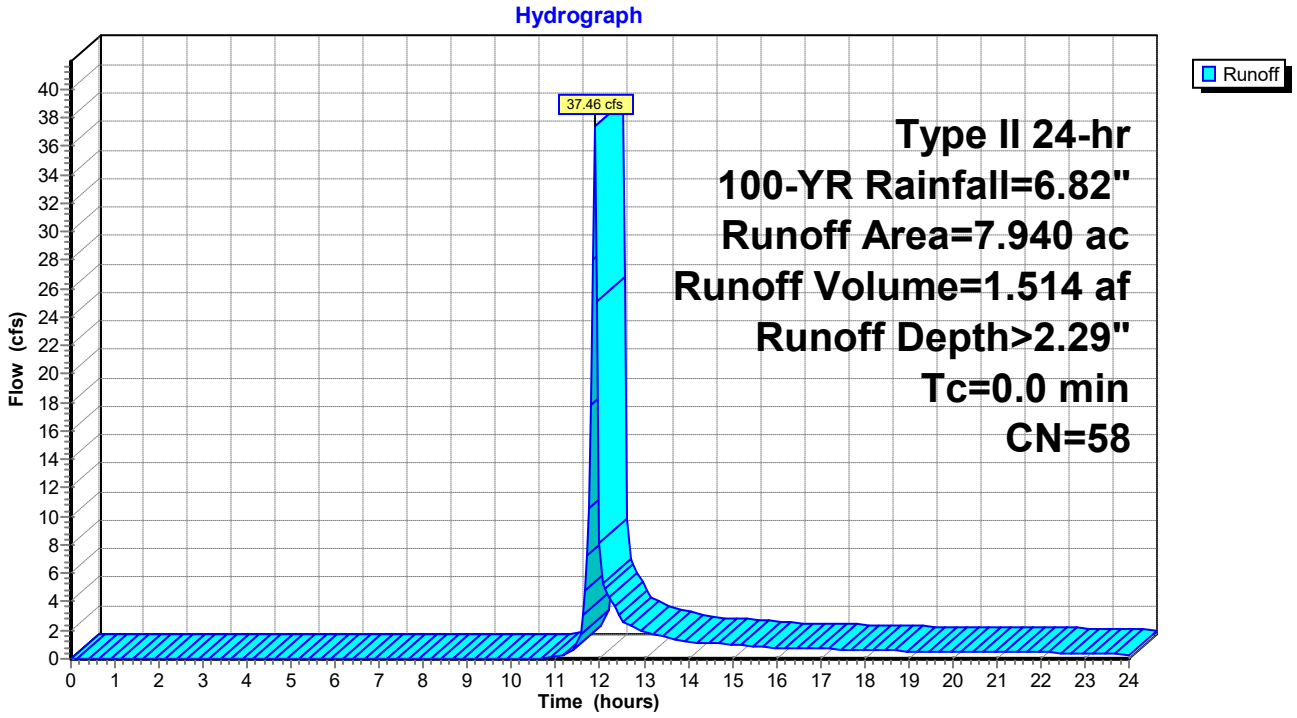
Summary for Subcatchment WS-2: WS-2 SS-1

Runoff = 37.46 cfs @ 11.90 hrs, Volume= 1.514 af, Depth> 2.29"
Routed to nonexistent node SS-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YR Rainfall=6.82"

Area (ac)	CN	Description
7.940	58	Meadow, non-grazed, HSG B
7.940		100.00% Pervious Area

Subcatchment WS-2: WS-2 SS-1



AAMPA Holdings - Ritner Hwy

SS-1 MRC Dewatering Time 2 Year Storm Event

*WATER SURFACE ELEVATION	STORAGE VOLUME (Ac. FT.)	STORAGE VOLUME (CU. FT.)	INCREMENTAL STORAGE VOLUME (CF)	** DISCHARGE (CFS)	AVERAGE DISCHARGE (CFS)	TIME (HRS.)	ACCUMULATED TIME (HRS.)
600.00		17119.1		0.00			0.0
			5401.4		0.03	60.02	
600.30		22520.5		0.05			60.0
			3528.3		0.06	16.33	
600.50		26048.8		0.07			76.4
			3441.3		0.08	11.95	
600.70		29490.1		0.09			88.3
			4748		0.10	13.2	
601.00		34238.1		0.11			101.5
			5357.9		0.12	12.40255	
601.30		39596.0		0.13			113.9
			2308.7		0.13	4.93312	
601.43		41904.7		0.13			**118.8**

AAMPA Holdings - Ritner Hwy

SS-1 MRC Dewatering Time 10 Year Storm Event

*WATER SURFACE ELEVATION	STORAGE VOLUME (Ac. FT.)	STORAGE VOLUME (CU. FT.)	INCREMENTAL STORAGE VOLUME (CF)	** DISCHARGE (CFS)	AVERAGE DISCHARGE (CFS)	TIME (HRS.)	ACCUMULATED TIME (HRS.)
600.00		17119.1		0.00			0.0
			5401.4		0.03	60.02	
600.30		22520.5		0.05			60.0
			3528.3		0.06	16.33	
600.50		26048.8		0.07			76.4
			3441.3		0.08	11.95	
600.70		29490.1		0.09			88.3
			4748		0.10	13.2	
601.00		34238.1		0.11			101.5
			5357.9		0.12	12.40255	
601.30		39596.0		0.13			113.9
			3571.9		0.135	7.349588	
601.50		43167.9		0.14			121.2
			3571.9		0.15	6.84	
601.70		46739.8		0.15			128.1
			5401.4		0.16	9.68	
602.00		52141.2		0.16			137.8
			5357.9		0.165	9.0	
602.30		57499.1		0.17			146.8
			3571.9		0.315	3.149824	
602.50		61071.0		0.46			149.9
			2875		0.65	1.228632	
602.66		63946.0		0.84			**151.2**

AAMPA Holdings - Ritner Hwy

SS-1 MRC Dewatering Time 50 Year Storm Event

*WATER SURFACE ELEVATION	STORAGE VOLUME (Ac. FT.)	STORAGE VOLUME (CU. FT.)	INCREMENTAL STORAGE VOLUME (CF)	** DISCHARGE (CFS)	AVERAGE DISCHARGE (CFS)	TIME (HRS.)	ACCUMULATED TIME (HRS.)
600.00		17119.1		0.00			0.0
			5401.4		0.03	60.02	
600.30		22520.5		0.05			60.0
			3528.3		0.06	16.33	
600.50		26048.8		0.07			76.4
			3441.3		0.08	11.95	
600.70		29490.1		0.09			88.3
			4748		0.10	13.2	
601.00		34238.1		0.11			101.5
			5357.9		0.12	12.40255	
601.30		39596.0		0.13			113.9
			3571.9		0.135	7.349588	
601.50		43167.9		0.14			121.2
			6571.9		0.15	12.59	
601.70		49739.8		0.15			133.8
			2401.4		0.16	4.30	
602.00		52141.2		0.16			138.1
			5357.9		0.165	9.0	
602.30		57499.1		0.17			147.2
			3571.9		0.315	3.149824	
602.50		61071.0		0.46			150.3
			3571.9		0.705	1.407368	
602.70		64642.9		0.95			151.7
			5401.5		1.395	1.075568	
603.00		70044.4		1.84			152.8
			5357.8		2.33	0.6	
603.30		75402.2		2.82			153.4
			3572		3.15	0.314991	
603.50		78974.2		3.48			153.7
			3789.7		3.8	0.277025	
603.70		82763.9		4.12			154.0
			5183.6		4.565	0.315419	
604.00		87947.5		5.01			154.3
			348.5		5.04	0.019207	
604.02		88296.0		5.07			**154.4**

AAMPA Holdings - Ritner Hwy

SS-1 MRC Dewatering Time 100 Year Storm Event

*WATER SURFACE ELEVATION	STORAGE VOLUME (Ac. FT.)	STORAGE VOLUME (CU. FT.)	INCREMENTAL STORAGE VOLUME (CF)	** DISCHARGE (CFS)	AVERAGE DISCHARGE (CFS)	TIME (HRS.)	ACCUMULATED TIME (HRS.)
600.00		17119.1		0.00			0.0
			5401.4		0.03	60.02	
600.30		22520.5		0.05			60.0
			3528.3		0.06	16.33	
600.50		26048.8		0.07			76.4
			3441.3		0.08	11.95	
600.70		29490.1		0.09			88.3
			4748		0.10	13.2	
601.00		34238.1		0.11			101.5
			5357.9		0.12	12.40255	
601.30		39596.0		0.13			113.9
			3571.9		0.135	7.349588	
601.50		43167.9		0.14			121.2
			6571.9		0.15	12.59	
601.70		49739.8		0.15			133.8
			2401.4		0.16	4.30	
602.00		52141.2		0.16			138.1
			5357.9		0.165	9.0	
602.30		57499.1		0.17			147.2
			3571.9		0.315	3.149824	
602.50		61071.0		0.46			150.3
			3571.9		0.705	1.407368	
602.70		64642.9		0.95			151.7
			5401.5		1.395	1.075568	
603.00		70044.4		1.84			152.8
			5357.8		2.33	0.6	
603.30		75402.2		2.82			153.4
			3572		3.15	0.314991	
603.50		78974.2		3.48			153.7
			3789.7		3.8	0.277025	
603.70		82763.9		4.12			154.0
			5183.6		4.565	0.315419	
604.00		87947.5		5.01			154.3
			5357.9		5.4	0.275612	
604.30		93305.4		5.79			154.6
			3571.9		6.005	0.165228	
604.50		96877.3		6.22			154.8
			6621.1		6.725	0.273486	
604.87		103498.4		7.23			**155.0**