

NPDES\_Stormwater-REV1.1 Prepared by Keystone Consulting Engineers HydroCAD® 10.20-2b s/n 02767 © 2021 HydroCAD Software Solutions LLC

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# Area Listing (selected nodes)

Area	CN	Description
 (acres)		(subcatchment-numbers)
4.192	61	>75% Grass cover, Good, HSG B (12S, 34S)
0.792	74	>75% Grass cover, Good, HSG C (17S, 34S)
0.799	58	Meadow, non-grazed, HSG B (12S)
1.312	98	Paved parking & roofs (17S)
7.095	69	TOTAL AREA

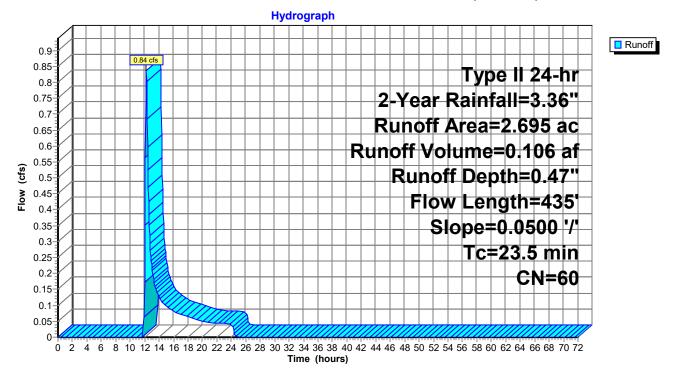
#### Summary for Subcatchment 12S: bio-retention basin #4a (BMP #9)

Runoff	=	0.84 cfs @	12.23 hrs,	Volume=	0.106 af,	Depth= 0.47"
Routed	l to Pond	13P : bio-ret	tention basi	n #4a		-

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Type II 24-hr 2-Year Rainfall=3.36"

Area	(ac) C	N Des	cription							
1.	896 6	61 >759	75% Grass cover, Good, HSG B							
0.	0.799 58 Meadow, non-grazed, HSG B									
2.	695 6	60 Weig	ghted Aver	rage						
2.	695	100.	00% Pervi	ous Area						
Tc	Length	Slope	Velocity	Capacity	Description					
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)						
20.5	150	0.0500	0.12		Sheet Flow,					
					Woods: Light underbrush n= 0.400 P2= 3.23"					
3.0	285	0.0500	1.57		Shallow Concentrated Flow,					
					Short Grass Pasture Kv= 7.0 fps					
23.5	435	Total								

#### Subcatchment 12S: bio-retention basin #4a (BMP #9)



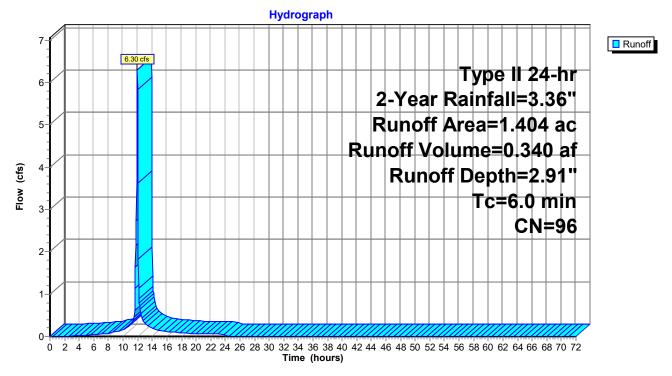
### Summary for Subcatchment 17S: SEEPAGE BED #4b (BMP #10)

Runoff = 6.30 cfs @ 11.96 hrs, Volume= 0.340 af, Depth= 2.91" Routed to Pond 15P : seepage pit with chambers #4b

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Type II 24-hr 2-Year Rainfall=3.36"

Area	(ac)	CN	Descr	ription			
1.	.312	98	Paveo	d parking	& roofs		
0.	.092	74	>75%	Grass co	over, Good,	I, HSG C	
1.	1.404 96 Weighted Average						
0.	0.092 6.55% Pervious Área						
1.	.312		93.45	% Imperv	vious Area		
Tc (min)	Lengt (fee		Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description	
6.0						Direct Entry,	

#### Subcatchment 17S: SEEPAGE BED #4b (BMP #10)

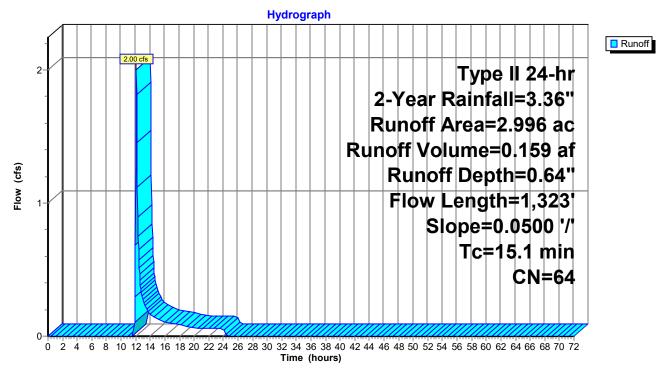


Runoff	=	2.00 cfs @	12.10 hrs,	Volume=	0.159 af	, Depth= 0.64"
Routed	to Re	each 23R : SŴL	-4			-

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Type II 24-hr 2-Year Rainfall=3.36"

_	Area	(ac)	CN De	scription						
	2.	296	61 >7	75% Grass cover, Good, HSG B						
_	0.	700	74 >75% Grass cover, Good, HSG C							
	2.996 64 Weighted Average									
	2.	996	10	0.00% Pervi	ious Area					
	Tc	Length	i Slope	e Velocity	Capacity	Description				
_	(min)	(feet	) (ft/ft	) (ft/sec)	(cfs)					
	9.3	150	0.0500	0.27		Sheet Flow,				
						Grass: Short n= 0.150 P2= 3.23"				
	5.8	1,173	0.0500	) 3.35		Shallow Concentrated Flow,				
_						Grassed Waterway Kv= 15.0 fps				
	15.1	1,323	5 Total							

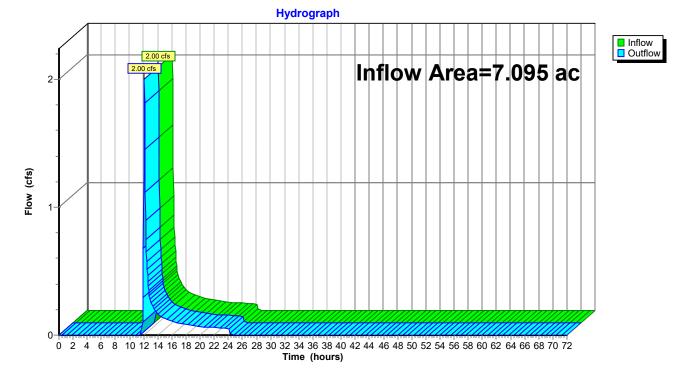
### Subcatchment 34S: SWL #4



# Summary for Reach 23R: SWL-4

Inflow Area =	7.095 ac, 18.49% Impervious, Inflow	v Depth = 0.27" for 2-Year event
Inflow =	2.00 cfs @ 12.10 hrs, Volume=	0.159 af
Outflow =	2.00 cfs @ 12.10 hrs, Volume=	0.159 af, Atten= 0%, Lag= 0.0 min
Routed to Link	37L : Discharge 001	

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs



Reach 23R: SWL-4

Post BMPs 9-10

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### Summary for Pond 13P: bio-retention basin #4a

Inflow Area = 2.695 ac, 0.00% Impervious, Inflow Depth = 0.47" for 2-Year event 0.84 cfs @ 12.23 hrs, Volume= Inflow = 0.106 af Outflow = 0.11 cfs @ 14.48 hrs, Volume= 0.106 af, Atten= 87%, Lag= 134.8 min Discarded = 0.11 cfs @ 14.48 hrs, Volume= 0.106 af Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af Routed to Reach 23R : SWL-4

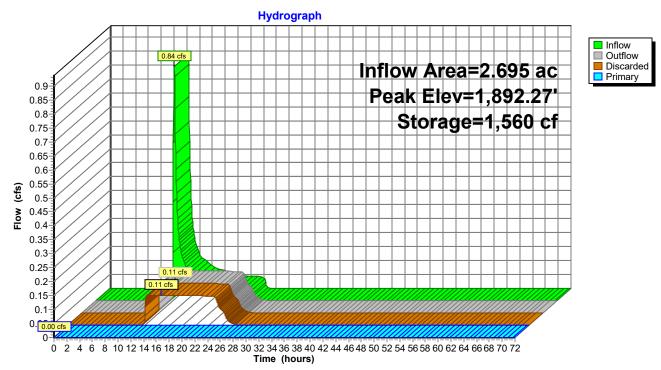
Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 1,892.27' @ 14.48 hrs Surf.Area= 5,829 sf Storage= 1,560 cf

Plug-Flow detention time= 158.0 min calculated for 0.106 af (100% of inflow) Center-of-Mass det. time= 157.9 min (1,086.6 - 928.6)

Volume	Invert	Avail.Sto	rage Storage	Description					
#1	1,892.00'	30,73	34 cf Custom	Stage Data (P	ismatic) Listed below (Recalc)				
Elevatio (feet		ırf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)					
1,892.0 1,894.0 1,896.0	0 0	5,542 7,636 9,920	0 13,178 17,556	0 13,178 30,734					
Device	Routing	Invert	Outlet Device						
#1	Discarded	1,892.00'		filtration over					
#2	Primary	1,894.00'	Head (feet) 0	.20 0.40 0.60	20.0' breadth Broad-Crested Rectangular Weir   0.80 1.00 1.20 1.40 1.60   70 2.64 2.63 2.64 2.63				
Discarde	Discarded OutFlow Max=0.11 cfs @ 14.48 hrs HW=1,892.27' (Free Discharge)								

**1=Exfiltration** (Exfiltration Controls 0.11 cfs)

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=1,892.00' (Free Discharge) **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)



## Pond 13P: bio-retention basin #4a

#### Summary for Pond 15P: seepage pit with chambers #4b

Inflow Area =	1.404 ac, 93.45% Impervious, Inflow D	Depth = 2.91" for 2-Year event						
Inflow =	6.30 cfs @ 11.96 hrs, Volume=	0.340 af						
Outflow =	0.22 cfs @ 10.90 hrs, Volume=	0.340 af, Atten= 96%, Lag= 0.0 min						
Discarded =	0.22 cfs @ 10.90 hrs, Volume=	0.340 af						
Primary =	0.00 cfs @ 0.00 hrs, Volume=	0.000 af						
Routed to Reach 23R : SWL-4								

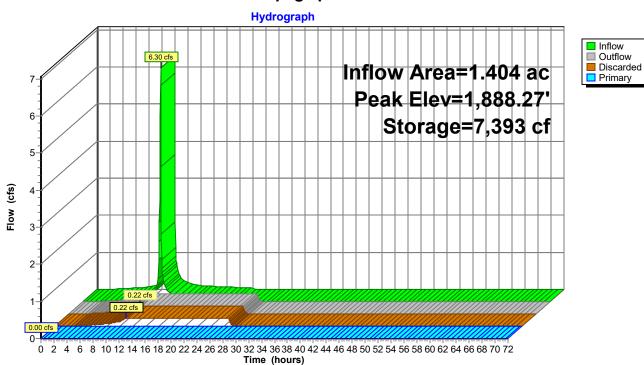
Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 1,888.27' @ 13.57 hrs Surf.Area= 12,000 sf Storage= 7,393 cf

Plug-Flow detention time= 290.7 min calculated for 0.340 af (100% of inflow) Center-of-Mass det. time= 290.7 min (1,059.8 - 769.1)

Volume	Invert	Avail.Sto	rage	Storage [	Description			
#1	1,887.00'	16,60	)9 cf		Custom Stage Data (Prismatic) Listed below (Recalc)			
						7 cf Embedded = $41,523$ cf x $40.0\%$ Voids		
#2	1,887.50'	6,47	77 cf		-360HD x 175			
						x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf		
						36.0"H x 4.17'L with 0.50' Overlap		
					nbers in 5 Row			
						x 5 rows = 64.6 cf		
		23,08	36 ct	I otal Ava	ilable Storage			
Flovetic		urf Araa	امر	Store	Cum Stara			
Elevatio		urf.Area		Store	Cum.Store			
(fee	,	(sq-ft)	(Cubi	c-feet)	(cubic-feet)			
1,887.0		12,000		0	0			
1,891.0	00	12,000	2	18,000	48,000			
Device	Routing	Invert	Outl	et Devices				
#1	Primary	1,887.00'		" Round				
	. milary	1,001100	-			nform to fill, Ke= 0.700		
						'/1,886.00' S= 0.0200 '/' Cc= 0.900		
					'	ooth interior, Flow Area= 3.14 sf		
#2	Device 1	1,888.40'				e/Grate C= 0.600		
		.,	-		flow at low here			
#3	Discarded	1,887.00'	0.80	0 in/hr Ext	filtration over	Surface area		
	<b>Discarded OutFlow</b> Max=0.22 cfs @ 10.90 hrs HW=1,887.04' (Free Discharge) 							

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=1,887.00' (Free Discharge)

-1=Culvert (Controls 0.00 cfs) -2=Orifice/Grate (Controls 0.00 cfs)



# Pond 15P: seepage pit with chambers #4b

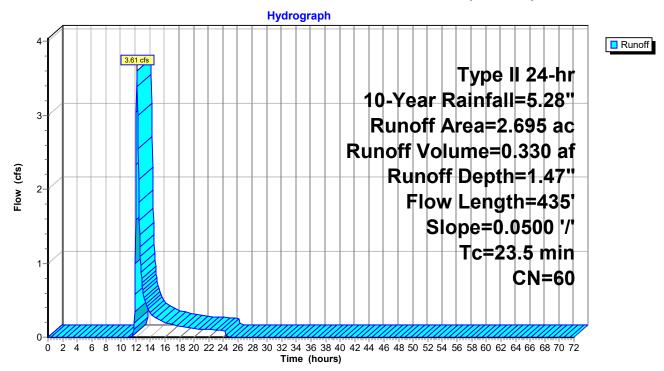
#### Summary for Subcatchment 12S: bio-retention basin #4a (BMP #9)

Runoff = 3.61 cfs @ 12.19 hrs, Volume= 0.330 af, Depth= 1.47" Routed to Pond 13P : bio-retention basin #4a

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Type II 24-hr 10-Year Rainfall=5.28"

Area	(ac) (	N Des	cription							
1.	896	61 >75	75% Grass cover, Good, HSG B							
0.	799	58 Mea	Meadow, non-grazed, HSG B							
2.	2.695 60 Weighted Average									
2.	695	100.	00% Pervi	ous Area						
Tc	Length	Slope	Velocity	Capacity	Description					
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)						
20.5	150	0.0500	0.12		Sheet Flow,					
					Woods: Light underbrush n= 0.400 P2= 3.23"					
3.0	285	0.0500	1.57		Shallow Concentrated Flow,					
					Short Grass Pasture Kv= 7.0 fps					
23.5	435	Total								

#### Subcatchment 12S: bio-retention basin #4a (BMP #9)

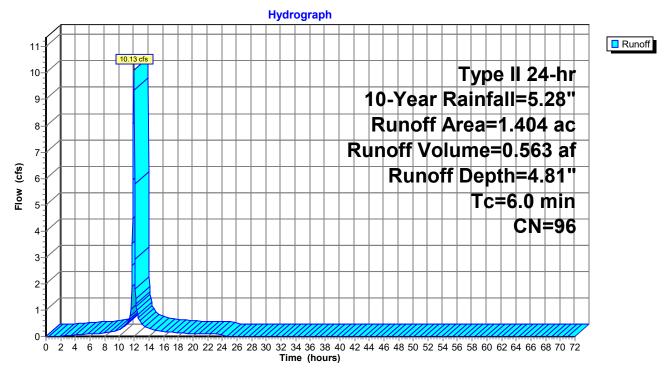


Runoff = 10.13 cfs @ 11.96 hrs, Volume= 0.563 af, Depth= 4.81" Routed to Pond 15P : seepage pit with chambers #4b

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Type II 24-hr 10-Year Rainfall=5.28"

Area	(ac)	CN	Desc	ription			
1.	.312	98	Pave	d parking	& roofs		
0.	.092	74	>75%	6 Grass co	over, Good,	, HSG C	
1.	1.404 96 Weighted Average						
0.	0.092 6.55% Pervious Area						
1.	.312		93.45	5% Imperv	vious Area		
Tc (min)	Lengt (fee		Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description	
6.0						Direct Entry,	

#### Subcatchment 17S: SEEPAGE BED #4b (BMP #10)

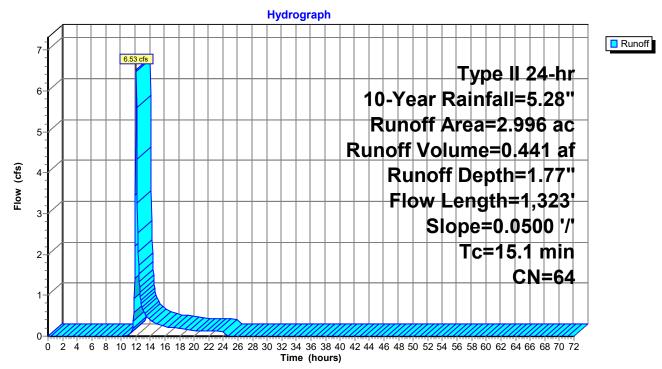


Runoff = 6.53 cfs @ 12.08 hrs, Volume= 0.441 af, Depth= 1.77" Routed to Reach 23R : SWL-4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Type II 24-hr 10-Year Rainfall=5.28"

Area	(ac)	CN Des	cription				
2.	296	61 >75	>75% Grass cover, Good, HSG B				
0.	700	74 >75	% Grass c	over, Good	, HSG C		
2.	996	64 We	ighted Ave	rage			
2.	996	100	.00% Pervi	ous Area			
Тс	Length			Capacity	Description		
(min)	(feet	) (ft/ft)	(ft/sec)	(cfs)			
9.3	150	0.0500	0.27		Sheet Flow,		
					Grass: Short n= 0.150 P2= 3.23"		
5.8	1,173	0.0500	3.35		Shallow Concentrated Flow,		
					Grassed Waterway Kv= 15.0 fps		
15.1	1,323	5 Total					

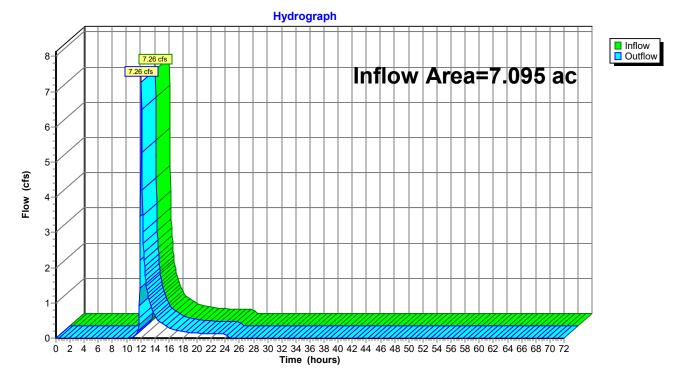
# Subcatchment 34S: SWL #4



# Summary for Reach 23R: SWL-4

Inflow Area =	7.095 ac, 18.49% Impervious, Inflow	Depth = 0.95" for 10-Year event					
Inflow =	7.26 cfs @ 12.09 hrs, Volume=	0.560 af					
Outflow =	7.26 cfs @ 12.09 hrs, Volume=	0.560 af, Atten= 0%, Lag= 0.0 min					
Routed to Link 37L : Discharge 001							

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs



Reach 23R: SWL-4

Post BMPs 9-10

### Summary for Pond 13P: bio-retention basin #4a

Inflow Area =	2.695 ac,	0.00% Impervious,	Inflow Depth = 1.47" for 10-Year event				
Inflow =	3.61 cfs @	12.19 hrs, Volume	= 0.330 af				
Outflow =	0.13 cfs @	19.29 hrs, Volume	= 0.330 af, Atten= 96%, Lag= 425.7 min				
Discarded =	0.13 cfs @	19.29 hrs, Volume	= 0.330 af				
Primary =	0.00 cfs @	0.00 hrs, Volume	= 0.000 af				
Routed to Reach 23R : SWL-4							

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 1,893.43' @ 19.29 hrs Surf.Area= 7,042 sf Storage= 9,017 cf

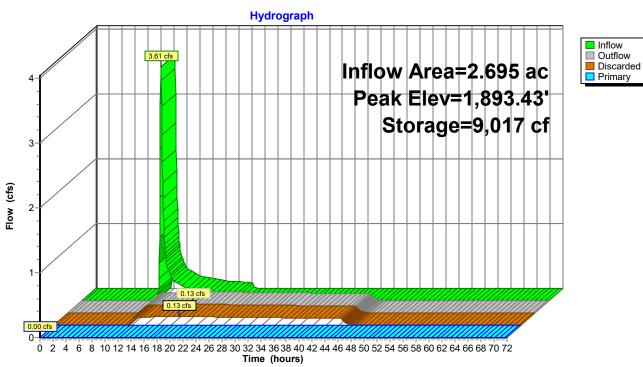
Plug-Flow detention time= 783.1 min calculated for 0.329 af (100% of inflow) Center-of-Mass det. time= 783.5 min (1,667.9 - 884.4)

Volume	Invert	Avail.Sto	rage Storage D	escription					
#1	1,892.00'	30,73	34 cf Custom S	Stage Data (Pr	ismatic) Listed below (Recalc)				
Elevatio (fee		ırf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)					
1,892.0	00	5,542	0	0					
1,894.00		7,636	13,178	13,178					
1,896.0	00	9,920	17,556	30,734					
Device	Routing	Invert	Outlet Devices						
#1	Discarded	1,892.00'	0.800 in/hr Exfi	iltration over \$	Surface area				
#2	Primary	1,894.00'	20.0' long + 3.0	0 '/' SideZ x 2	0.0' breadth Broad-Crested Rectangular Weir				
	,	,	•		0.80 1.00 1.20 1.40 1.60				
					70 2.64 2.63 2.64 2.64 2.63				
Discard	Discarded OutFlow Max=0.13 cfs @ 19.29 hrs HW=1,893.43' (Free Discharge)								

**1=Exfiltration** (Exfiltration Controls 0.13 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,892.00' (Free Discharge) ←2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Post BMPs 9-10 Type II 24-hr 10-Year Rainfall=5.28" Printed 11/16/2022 LLC Page 16



# Pond 13P: bio-retention basin #4a

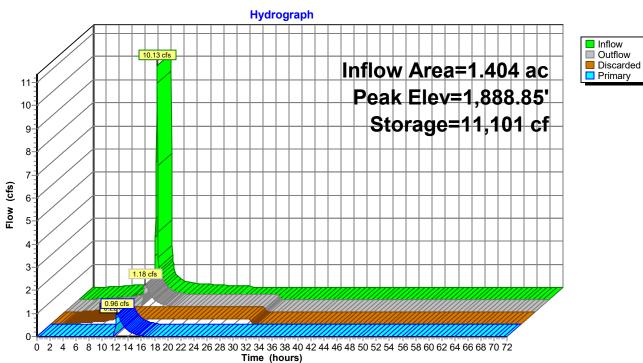
Inflow Area =	1.404 ac, 9	3.45% Impervious, Infl	ow Depth = 4.81" for 10-Year event				
Inflow =	10.13 cfs @	11.96 hrs, Volume=	0.563 af				
Outflow =	1.18 cfs @	12.28 hrs, Volume=	0.563 af, Atten= 88%, Lag= 19.3 min				
Discarded =	0.22 cfs @	9.90 hrs, Volume=	0.443 af				
Primary =	0.96 cfs @	12.28 hrs, Volume=	0.119 af				
Routed to Reach 23R : SWL-4							

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 1,888.85' @ 12.28 hrs Surf.Area= 12,000 sf Storage= 11,101 cf

Plug-Flow detention time= 287.2 min calculated for 0.562 af (100% of inflow) Center-of-Mass det. time= 287.3 min (1,044.6 - 757.3)

Volume	Invert	Avail.Sto	rage	Storage [	Description		
#1	1,887.00'	16,60	)9 cf				
#2	1,887.50'	6.47	77 cf	48,000 cf Overall - 6,477 cf Embedded = 41,523 cf x 40.0% Voids <b>Cultec R-360HD</b> x 175 Inside #1			
<i>π</i> ∠	1,007.00	0,77	1 01			< 36.0"H => 9.99 sf x 3.67'L = 36.6 cf	
						36.0"H x 4.17'L with 0.50' Overlap	
					nbers in 5 Row	-	
						x 5 rows = 64.6 cf	
		23,08	36 cf	Total Ava	ilable Storage		
Elevatio	on Su	ırf.Area	Inc	.Store	Cum.Store		
(fee	et)	(sq-ft)	(cubio	c-feet)	(cubic-feet)		
1,887.0	00	12,000		0	0		
1,891.0	00	12,000	4	18,000	48,000		
Device	Routing	Invert	Outle	et Devices	i		
#1	Primary	1,887.00'	24.0	" Round	Culvert		
	-		L= 5	0.0' CPP	, mitered to cor	form to fill, Ke= 0.700	
			Inlet	/ Outlet In	vert= 1,887.00'	/ 1,886.00' S= 0.0200 '/' Cc= 0.900	
			n= 0	.013 Corr	ugated PE, smo	both interior, Flow Area= 3.14 sf	
#2	Device 1	1,888.40'				e/Grate C= 0.600	
					flow at low hea		
#3	Discarded	1,887.00'	0.80	0 in/hr Ext	filtration over \$	Surface area	
Discarded OutFlow Max=0.22 cfs @ 9.90 hrs HW=1,887.04' (Free Discharge)							

Primary OutFlow Max=0.96 cfs @ 12.28 hrs HW=1,888.85' (Free Discharge) -1=Culvert (Passes 0.96 cfs of 12.37 cfs potential flow) -2=Orifice/Grate (Orifice Controls 0.96 cfs @ 2.14 fps)



# Pond 15P: seepage pit with chambers #4b

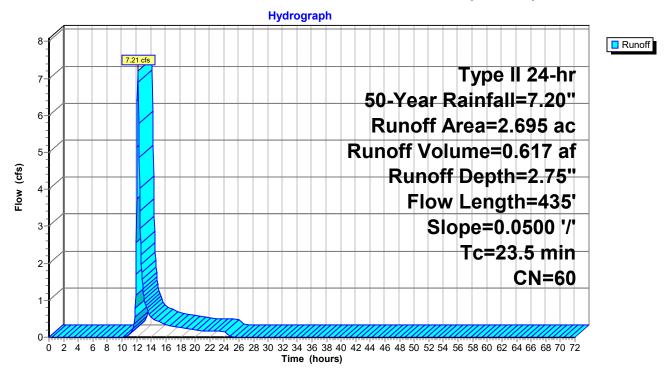
#### Summary for Subcatchment 12S: bio-retention basin #4a (BMP #9)

Runoff = 7.21 cfs @ 12.18 hrs, Volume= 0.617 af, Depth= 2.75" Routed to Pond 13P : bio-retention basin #4a

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Type II 24-hr 50-Year Rainfall=7.20"

Area	(ac) (	CN Des	cription					
1.	.896	61 >75	75% Grass cover, Good, HSG B					
0.	0.799 58 Meadow, non-grazed, HSG B							
2.	.695	60 Wei	ghted Avei	rage				
2.	.695	100.	00% Pervi	ous Area				
Tc	Length	Slope		Capacity	Description			
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)				
20.5	150	0.0500	0.12		Sheet Flow,			
					Woods: Light underbrush n= 0.400 P2= 3.23"			
3.0	285	0.0500	1.57		Shallow Concentrated Flow,			
					Short Grass Pasture Kv= 7.0 fps			
23.5	435	Total						

#### Subcatchment 12S: bio-retention basin #4a (BMP #9)



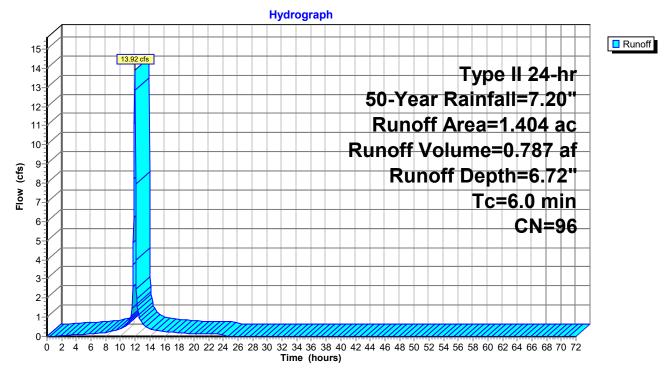
#### Summary for Subcatchment 17S: SEEPAGE BED #4b (BMP #10)

0.787 af, Depth= 6.72" Runoff = 13.92 cfs @ 11.96 hrs, Volume= Routed to Pond 15P : seepage pit with chambers #4b

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Type II 24-hr 50-Year Rainfall=7.20"

Area	(ac)	CN	Desc	ription		
1.	312	98	Pave	d parking	& roofs	
0.	092	74	>75%	6 Grass co	over, Good,	I, HSG C
1.	404	96	Weig	hted Aver	age	
0.	092		6.55%	% Perviou	s Ārea	
1.	312		93.45	5% Imperv	vious Area	
Tc (min)	Lengt (fee		Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0						Direct Entry,

#### Subcatchment 17S: SEEPAGE BED #4b (BMP #10)



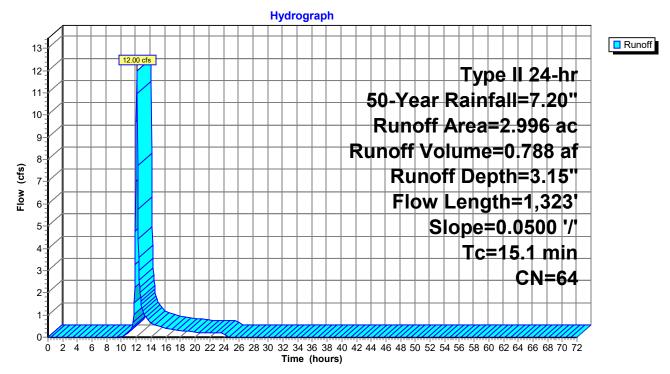
#### Summary for Subcatchment 34S: SWL #4

Runoff = 12.00 cfs @ 12.08 hrs, Volume= 0.788 af, Depth= 3.15" Routed to Reach 23R : SWL-4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Type II 24-hr 50-Year Rainfall=7.20"

_	Area	(ac)	CN	Desc	cription		
	2.	296	61	>75%	6 Grass co	over, Good,	HSG B
	0.	700	74	>75%	6 Grass co	over, Good,	HSG C
	2.	996	64	Weig	ghted Aver	age	
	2.	996		100.	00% Pervi	ous Area	
	Тс	Lengtl	n S	Slope	Velocity	Capacity	Description
_	(min)	(feet	)	(ft/ft)	(ft/sec)	(cfs)	
	9.3	150	) O.C	0500	0.27		Sheet Flow,
							Grass: Short n= 0.150 P2= 3.23"
	5.8	1,173	3 0.0	0500	3.35		Shallow Concentrated Flow,
_							Grassed Waterway Kv= 15.0 fps
_	15.1	1,32	3 To	otal			

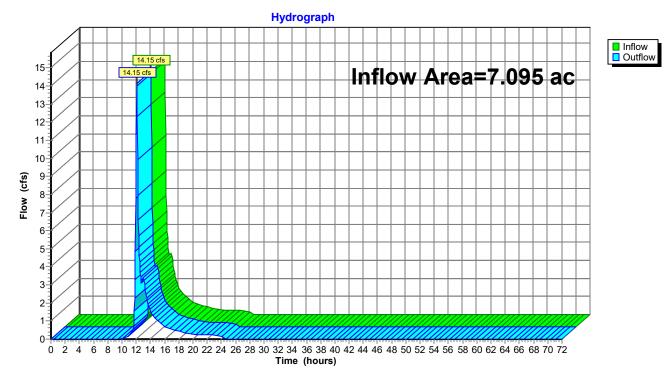
#### Subcatchment 34S: SWL #4



# Summary for Reach 23R: SWL-4

Inflow Area =	7.095 ac, 18.49% Impervious, Inflow	Depth = 2.10" for 50-Year event					
Inflow =	14.15 cfs @ 12.08 hrs, Volume=	1.239 af					
Outflow =	14.15 cfs @ 12.08 hrs, Volume=	1.239 af, Atten= 0%, Lag= 0.0 min					
Routed to Link 37L : Discharge 001							

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs



Reach 23R: SWL-4

## Summary for Pond 13P: bio-retention basin #4a

Inflow Area =	2.695 ac,	0.00% Impervious, In	flow Depth = 2.75" for 50-Year event				
Inflow =	7.21 cfs @	12.18 hrs, Volume=	0.617 af				
Outflow =	1.00 cfs @	13.06 hrs, Volume=	0.617 af, Atten= 86%, Lag= 52.6 min				
Discarded =	0.14 cfs @	13.06 hrs, Volume=	0.454 af				
Primary =	0.86 cfs @	13.06 hrs, Volume=	0.163 af				
Routed to Reach 23R : SWL-4							

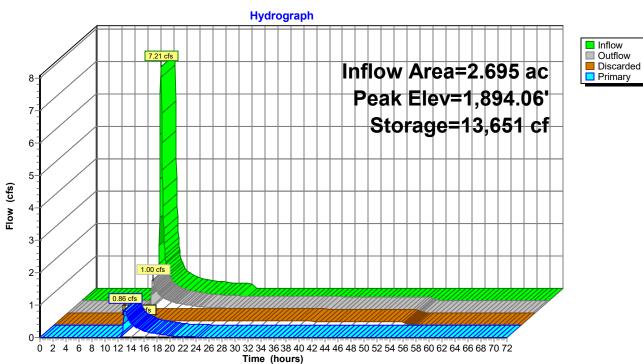
Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 1,894.06' @ 13.06 hrs Surf.Area= 7,706 sf Storage= 13,651 cf

Plug-Flow detention time= 778.6 min calculated for 0.616 af (100% of inflow) Center-of-Mass det. time= 779.4 min (1,644.2 - 864.8)

Volume	Invert	Avail.Sto	0 0	escription	in the law (Decele)
#1	1,892.00'	30,73	34 cf Custom S	Stage Data (Pl	<b>ismatic)</b> Listed below (Recalc)
Elevatio (fee		rf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	
1,892.0	0	5,542	0	0	
1,894.0	0	7,636	13,178	13,178	
1,896.0	0	9,920	17,556	30,734	
Device	Routing	Invert	Outlet Devices		
#1	Discarded	1,892.00'	0.800 in/hr Exf	iltration over	Surface area
#2	Primary	1,894.00'	20.0' long + 3.	0 '/' SideZ x 2	20.0' breadth Broad-Crested Rectangular Weir
	-		Head (feet) 0.2	20 0.40 0.60	0.80 1.00 1.20 1.40 1.60
			Coef. (English)	2.68 2.70 2	70 2.64 2.63 2.64 2.64 2.63
<b>D</b> . 1		Mar. 0 44 -5	C 10 00 has 1		

**Discarded OutFlow** Max=0.14 cfs @ 13.06 hrs HW=1,894.06' (Free Discharge) **1=Exfiltration** (Exfiltration Controls 0.14 cfs)

Primary OutFlow Max=0.82 cfs @ 13.06 hrs HW=1,894.06' (Free Discharge) **2=Broad-Crested Rectangular Weir** (Weir Controls 0.82 cfs @ 0.66 fps)



# Pond 13P: bio-retention basin #4a

#### Summary for Pond 15P: seepage pit with chambers #4b

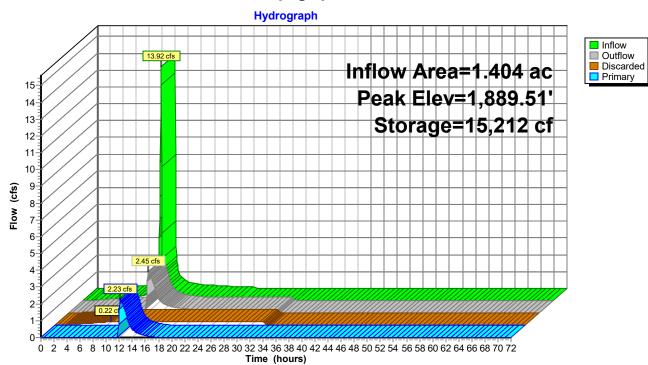
Inflow Area =	1.404 ac, 🤉	3.45% Impervious,	Inflow Depth = 6.72" for 50-Year event
Inflow =	13.92 cfs @	11.96 hrs, Volume=	= 0.787 af
Outflow =	2.45 cfs @	12.16 hrs, Volume=	= 0.787 af, Atten= 82%, Lag= 12.1 min
Discarded =	0.22 cfs @	8.60 hrs, Volume=	= 0.498 af
Primary =	2.23 cfs @	12.16 hrs, Volume=	= 0.288 af
Routed to Rea	ach 23R : SŴL	4	

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 1,889.51' @ 12.16 hrs Surf.Area= 12,000 sf Storage= 15,212 cf

Plug-Flow detention time= 244.7 min calculated for 0.786 af (100% of inflow) Center-of-Mass det. time= 244.9 min (995.3 - 750.5)

Volume	Invert	Avail.Sto	rage	Storage D	escription			
#1	1,887.00'		)9 cf	Custom S	stage Data (Pri	smatic) Listed below (Recalc)		
						cf Embedded = $41,523$ cf x $40.0\%$ Voids		
#2	1,887.50'	6,47	77 cf		<b>360HD</b> x 175			
					• • • • • • • •	36.0"H => 9.99 sf x 3.67'L = 36.6 cf		
						36.0"H x 4.17'L with 0.50' Overlap		
					bers in 5 Rows	-		
						x 5 rows = 64.6 cf		
		23,08	36 cf	Total Avai	lable Storage			
Elevetia		<b>f</b> A	ما	Ctore	Curra Chara			
Elevatio		urf.Area		Store	Cum.Store			
(fee	/	(sq-ft)	(Cubi	c-feet)	(cubic-feet)			
1,887.0		12,000		0	0			
1,891.0	00	12,000	2	18,000	48,000			
<b>.</b> .	<b>D</b> ()		<b>•</b> •					
Device	Routing	Invert		et Devices				
#1	Primary	1,887.00'		" Round C				
						form to fill, Ke= 0.700		
			Inlet	/ Outlet Inv	/ert= 1,887.00'	/ 1,886.00' S= 0.0200 '/' Cc= 0.900		
			n= 0	.013 Corru	igated PE, smo	ooth interior, Flow Area= 3.14 sf		
#2	Device 1	1,888.40'	12.0	"W x 6.0"	H Vert. Orifice	/Grate C= 0.600		
			Limi	mited to weir flow at low heads				
#3	Discarded	1,887.00'	0.80	0 in/hr Exf	iltration over S	Surface area		
	<b>Discarded OutFlow</b> Max=0.22 cfs @ 8.60 hrs HW=1,887.04' (Free Discharge) 							

Primary OutFlow Max=2.22 cfs @ 12.16 hrs HW=1,889.51' (Free Discharge) -1=Culvert (Passes 2.22 cfs of 16.40 cfs potential flow) -2=Orifice/Grate (Orifice Controls 2.22 cfs @ 4.45 fps)



# Pond 15P: seepage pit with chambers #4b

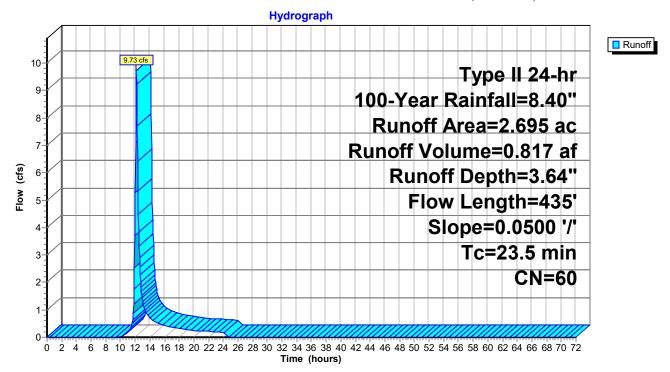
#### Summary for Subcatchment 12S: bio-retention basin #4a (BMP #9)

Runoff = 9.73 cfs @ 12.17 hrs, Volume= 0.817 af, Depth= 3.64" Routed to Pond 13P : bio-retention basin #4a

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Type II 24-hr 100-Year Rainfall=8.40"

Area	(ac) (	N Des	cription						
1.	896	61 >75	75% Grass cover, Good, HSG B						
0.	799	58 Mea	Meadow, non-grazed, HSG B						
2.	2.695 60 Weighted Average								
2.	695	100.	00% Pervi	ous Area					
Tc	Length	Slope	Velocity	Capacity	Description				
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)					
20.5	150	0.0500	0.12		Sheet Flow,				
					Woods: Light underbrush n= 0.400 P2= 3.23"				
3.0	285	0.0500	1.57		Shallow Concentrated Flow,				
					Short Grass Pasture Kv= 7.0 fps				
23.5	435	Total							

#### Subcatchment 12S: bio-retention basin #4a (BMP #9)



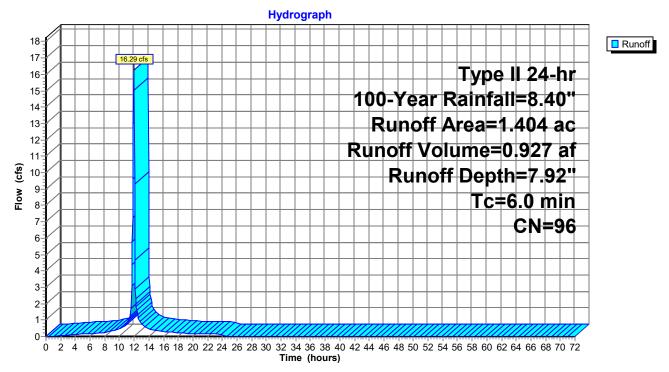
#### Summary for Subcatchment 17S: SEEPAGE BED #4b (BMP #10)

Runoff = 16.29 cfs @ 11.96 hrs, Volume= 0.927 af, Depth= 7.92" Routed to Pond 15P : seepage pit with chambers #4b

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Type II 24-hr 100-Year Rainfall=8.40"

Area	(ac)	CN	Desc	ription		
1.	.312	98	Pave	d parking	& roofs	
0.	.092	74	>75%	6 Grass co	over, Good,	HSG C
1.	404	96	Weig	hted Aver	age	
0.	.092		6.55	% Perviou	s Area	
1.	.312		93.45	5% Imperv	vious Area	
Tc (min)	Lengt (fee		Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0						Direct Entry,

### Subcatchment 17S: SEEPAGE BED #4b (BMP #10)



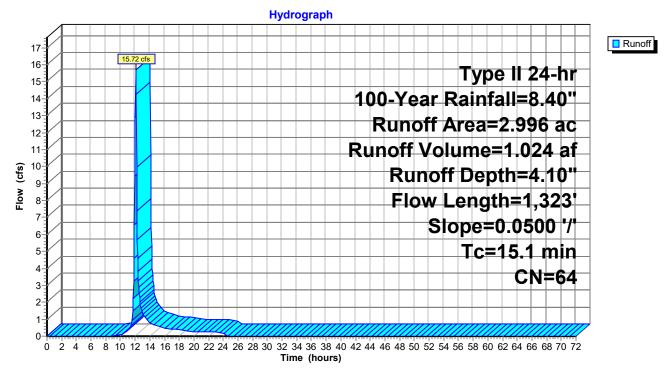
#### Summary for Subcatchment 34S: SWL #4

Runoff = 15.72 cfs @ 12.07 hrs, Volume= 1.024 af, Depth= 4.10" Routed to Reach 23R : SWL-4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Type II 24-hr 100-Year Rainfall=8.40"

A	Area (	(ac)	CN	Desc	cription		
	2.2	296	61	>75%	6 Grass co	over, Good,	HSG B
	0.	700	74	>75%	6 Grass co	over, Good,	HSG C
	2.996 64 Weighted Average						
	2.9	996		100.0	00% Pervi	ous Area	
	Тс	Lengtl	n S	lope	Velocity	Capacity	Description
(n	nin)	(feet	) (	(ft/ft)	(ft/sec)	(cfs)	
	9.3	150	0.0	)500	0.27		Sheet Flow,
							Grass: Short n= 0.150 P2= 3.23"
	5.8	1,173	3 0.0	)500	3.35		Shallow Concentrated Flow,
							Grassed Waterway Kv= 15.0 fps
1	15.1	1,323	3 To	tal			

### Subcatchment 34S: SWL #4



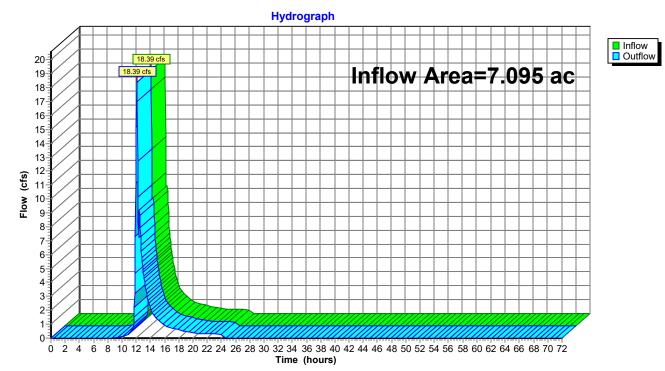
# Summary for Reach 23R: SWL-4

Post BMPs 9-10

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Inflow Area =	7.095 ac, 18.49% Impervious, Inflow	Depth = 3.01" for 100-Year event
Inflow =	18.39 cfs @ 12.08 hrs, Volume=	1.782 af
Outflow =	18.39 cfs @_ 12.08 hrs, Volume=	1.782 af, Atten= 0%, Lag= 0.0 min
Routed to Link	< 37L : Discharge 001	

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs



#### Reach 23R: SWL-4

#### Summary for Pond 13P: bio-retention basin #4a

Inflow Area =	2.695 ac,	0.00% Impervious, Inflo	w Depth = 3.64" for 100-Year event
Inflow =	9.73 cfs @	12.17 hrs, Volume=	0.817 af
Outflow =	3.87 cfs @	12.51 hrs, Volume=	0.817 af, Atten= 60%, Lag= 20.1 min
Discarded =	0.14 cfs @	12.51 hrs, Volume=	0.459 af
Primary =	3.73 cfs @	12.51 hrs, Volume=	0.357 af
Routed to Read	ch 23R : SŴI	4	

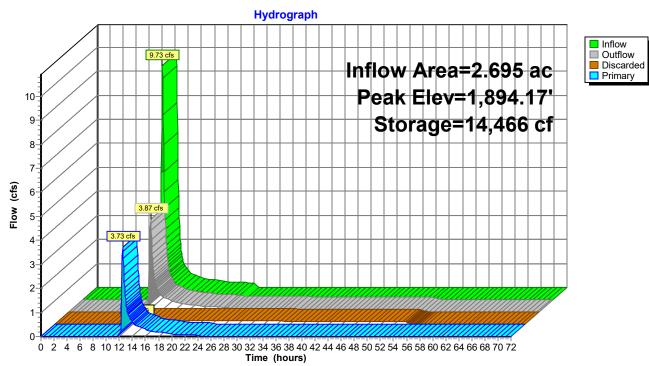
Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 1,894.17' @ 12.51 hrs Surf.Area= 7,826 sf Storage= 14,466 cf

Plug-Flow detention time= 595.4 min calculated for 0.817 af (100% of inflow) Center-of-Mass det. time= 595.1 min (1,451.6 - 856.5)

Invert	Avail.Sto	rage Storage	Description	
1,892.00'	30,73	34 cf Custom	Stage Data (Pi	ismatic) Listed below (Recalc)
Su		Inc.Store	Cum.Store	
	(sq-ft)	(cubic-feet)	(cubic-feet)	
	5,542	0	0	
	7,636	13,178	13,178	
	9,920	17,556	30,734	
outing	Invert	Outlet Device	S	
iscarded	1,892.00'	0.800 in/hr Ex	filtration over	Surface area
rimarv	1.894.00'	20.0' long + 3	3.0 '/' SideZ x 2	0.0' breadth Broad-Crested Rectangular Weir
,	,	•		0
		· · ·		70 2.64 2.63 2.64 2.64 2.63
			,	
r	1,892.00' Su outing iscarded rimary	1,892.00' 30,73 Surf.Area (sq-ft) 5,542 7,636 9,920 outing Invert iscarded 1,892.00' rimary 1,894.00'	1,892.00' 30,734 cf Custom   Surf.Area Inc.Store   (sq-ft) (cubic-feet)   5,542 0   7,636 13,178   9,920 17,556   outling Invert Outlet Device   iscarded 1,892.00' 0.800 in/hr Ex   rimary 1,894.00' 20.0' long + 3   Head (feet) 0   Coef. (English	1,892.00' 30,734 cf Custom Stage Data (Pr   Surf.Area Inc.Store Cum.Store   (sq-ft) (cubic-feet) (cubic-feet)   5,542 0 0   7,636 13,178 13,178   9,920 17,556 30,734   outing Invert Outlet Devices   iscarded 1,892.00' 0.800 in/hr Exfiltration over 4   rimary 1,894.00' 20.0' long + 3.0 '/' SideZ x 2   Head (feet) 0.20 0.40 0.60

**Discarded OutFlow** Max=0.14 cfs @ 12.51 hrs HW=1,894.17' (Free Discharge) **1=Exfiltration** (Exfiltration Controls 0.14 cfs)

Primary OutFlow Max=3.67 cfs @ 12.51 hrs HW=1,894.17' (Free Discharge) —2=Broad-Crested Rectangular Weir (Weir Controls 3.67 cfs @ 1.08 fps) Post BMPs 9-10



# Pond 13P: bio-retention basin #4a

#### Summary for Pond 15P: seepage pit with chambers #4b

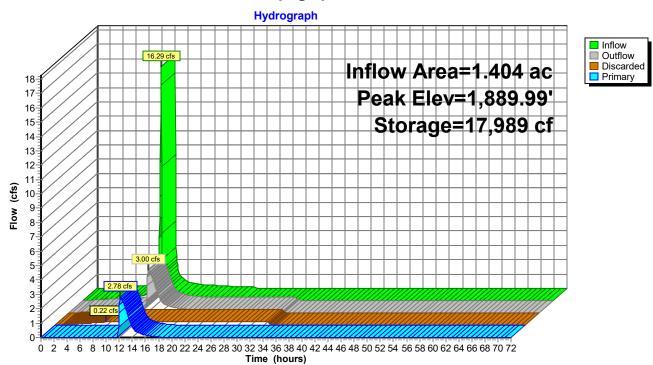
Inflow Area =	1.404 ac, 9	3.45% Impervious, Int	low Depth = 7.92" for 100-Year event
Inflow =	16.29 cfs @	11.96 hrs, Volume=	0.927 af
Outflow =	3.00 cfs @	12.16 hrs, Volume=	0.927 af, Atten= 82%, Lag= 11.8 min
Discarded =	0.22 cfs @	7.85 hrs, Volume=	0.526 af
Primary =	2.78 cfs @	12.16 hrs, Volume=	0.400 af
Routed to Rea	ich 23R : SWL	-4	

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 1,889.99' @ 12.16 hrs Surf.Area= 12,000 sf Storage= 17,989 cf

Plug-Flow detention time= 227.6 min calculated for 0.926 af (100% of inflow) Center-of-Mass det. time= 227.8 min (975.3 - 747.4)

Volume	Invert	Avail.Sto	rage	Storage De	escription			
#1	1,887.00'	16,60	)9 cf			Prismatic) Listed below (Recalc)		
						77 cf Embedded = $41,523$ cf x 40.0% Voids		
#2	1,887.50'	6,47	77 cf		860HD x 175			
						x = 36.0"H => 9.99 sf x 3.67'L = 36.6 cf		
				Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap 175 Chambers in 5 Rows				
					-	ws 2 x 5 rows = 64.6 cf		
		22.09	PG of					
		23,00	36 cf	Total Avail	able Storage	;		
Elevatio	n Su	urf.Area	Inc	.Store	Cum.Store			
(fee	t)	(sq-ft)	(cubio	c-feet)	(cubic-feet)			
1,887.0	0	12,000		0	C			
1,891.0			4	8,000	48,000			
Device	Routing	Invert	Outle	et Devices				
#1	Primary	1,887.00'		" Round C				
				,		onform to fill, Ke= 0.700		
						0' / 1,886.00' S= 0.0200 '/' Cc= 0.900		
		4 000 401				nooth interior, Flow Area= 3.14 sf		
#2	Device 1	1,888.40'	-			ce/Grate C= 0.600		
#2	Discordod	1 997 001		Limited to weir flow at low heads 0.800 in/hr Exfiltration over Surface area				
#3	Discarded	1,887.00'	0.00			Surface area		
	<b>Discarded OutFlow</b> Max=0.22 cfs @ 7.85 hrs HW=1,887.04' (Free Discharge) <b>3=Exfiltration</b> (Exfiltration Controls 0.22 cfs)							

Primary OutFlow Max=2.78 cfs @ 12.16 hrs HW=1,889.98' (Free Discharge) -1=Culvert (Passes 2.78 cfs of 18.80 cfs potential flow) -2=Orifice/Grate (Orifice Controls 2.78 cfs @ 5.55 fps)



# Pond 15P: seepage pit with chambers #4b