Worksheet Protected

Site-Level Low Impact Development (LID) Design Effective Impervious Calculator

LID Credit by Impervious Reduction Factor (IRF) Method

User Input

Calculated cells

***Design Storm: 1-Hour Rain Depth	WQCV Event	0.53	inches
***Minor Storm: 1-Hour Rain Depth	10-Year Event	1.75	inches
***Major Storm: 1-Hour Rain Depth	100-Year Event	2.52	inches
Optional User Defined Storm	CUHP		
(CUHP) NOAA 1 Hour Rainfall Depth and Frequency for User Defined Storm	100-Year Event		
Max Intensity for Optional User Defined Storm	0		

Designer:	Matt Larson
Company:	Classic Consulting Engineers & Surveyors, LLC
Date:	August 19, 2019
Project:	FOREST LAKES - FILING 5
Location:	POND C - FINAL DESIGN

SITE INFORMATION (USER-INPUT)

Sub-basin Identifier	FIL. 5
Receiving Pervious Area Soil Type	Sandy Loam
Total Area (ac., Sum of DCIA, UIA, RPA, & SPA)	29.940
Directly Connected Impervious Area (DCIA, acres)	5.737
Unconnected Impervious Area (UIA, acres)	3.833
Receiving Pervious Area (RPA, acres)	4.110
Separate Pervious Area (SPA, acres)	16.260
RPA Treatment Type: Conveyance (C), Volume (V), or Permeable Pavement (PP)	C

CALCULATED RESULTS (OUTPUT)

Total Calculated Area (ac, check against input)	29.940
Directly Connected Impervious Area (DCIA, %)	19.2%
Unconnected Impervious Area (UIA, %)	12.8%
Receiving Pervious Area (RPA, %)	13.7%
Separate Pervious Area (SPA, %)	54.3%
A_R (RPA / UIA)	1.072
I_a Check	0.480
f / I for WQCV Event:	2.0
f / I for 10-Year Event:	0.5
f / I for 100-Year Event:	0.3
f / I for Optional User Defined Storm CUHP:	
IRF for WQCV Event:	0.60
IRF for 10-Year Event:	0.89
IRF for 100-Year Event:	0.93
IRF for Optional User Defined Storm CUHP:	
Total Site Imperviousness: I_{total}	32.0%
Effective Imperviousness for WQCV Event:	26.9%
Effective Imperviousness for 10-Year Event:	30.6%
Effective Imperviousness for 100-Year Event:	31.1%
Effective Imperviousness for Optional User Defined Storm CUHP:	

LID / EFFECTIVE IMPERVIOUSNESS CREDITS

WQCV Event CREDIT: Reduce Detention By:	10.2%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10-Year Event CREDIT**: Reduce Detention By:	4.6%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
100-Year Event CREDIT**: Reduce Detention By:	2.9%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
User Defined CUHP CREDIT: Reduce Detention By:														

Total Site Imperviousness:	32.0%
Total Site Effective Imperviousness for WQCV Event:	26.9%
Total Site Effective Imperviousness for 10-Year Event:	30.6%
Total Site Effective Imperviousness for 100-Year Event:	31.1%
Total Site Effective Imperviousness for Optional User Defined Storm CUHP:	

Notes:

* Use Green-Ampt average infiltration rate values from Table 3-3.

** Flood control detention volume credits based on empirical equations from Storage Chapter of USDCM.

*** Method assumes that 1-hour rainfall depth is equivalent to 1-hour intensity for calculation purposed

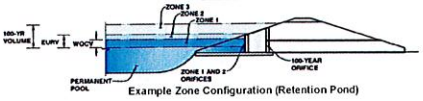
Replace with the SDI worksheet
File can be downloaded from
https://maperture.digitaldataservices.com/gvh/?viewer=cswdif

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)

Project: Forest Lakes Filing 5

Basin ID: Pond C - FINAL DESIGN



Example Zone Configuration (Retention Pond)

Required Volume Calculation

Selected BMP Type =	EDB	
Watershed Area =	29.94	acres
Watershed Length =	1,200	ft
Watershed Slope =	0.080	ft/ft
Watershed Imperviousness =	32.00%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	100.0%	percent
Percentage Hydrologic Soil Groups C/D =	0.0%	percent
Desired WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	User Input	
Water Quality Capture Volume (WQCV) =	0.393	acre-feet
Excess Urban Runoff Volume (EURV) =	0.988	acre-feet
2-yr Runoff Volume (P1 = 1.19 in.) =	0.762	acre-feet
5-yr Runoff Volume (P1 = 1.5 in.) =	1.080	acre-feet
10-yr Runoff Volume (P1 = 1.75 in.) =	1.620	acre-feet
25-yr Runoff Volume (P1 = 2 in.) =	2.644	acre-feet
50-yr Runoff Volume (P1 = 2.25 in.) =	3.320	acre-feet
100-yr Runoff Volume (P1 = 2.52 in.) =	4.204	acre-feet
500-yr Runoff Volume (P1 = 3.1 in.) =	5.896	acre-feet
Approximate 2-yr Detention Volume =	0.712	acre-feet
Approximate 5-yr Detention Volume =	1.013	acre-feet
Approximate 10-yr Detention Volume =	1.457	acre-feet
Approximate 25-yr Detention Volume =	1.675	acre-feet
Approximate 50-yr Detention Volume =	1.763	acre-feet
Approximate 100-yr Detention Volume =	2.070	acre-feet

Optional User Override 1-hr Precipitation

1.19	inches
1.50	inches
1.75	inches
2.00	inches
2.25	inches
2.52	inches
3.10	inches

Stage-Storage Calculation

Zone 1 Volume (WQCV) =	0.393	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.595	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	1.082	acre-feet
Total Detention Basin Volume =	2.070	acre-feet
Initial Surcharge Volume (ISV) =	user	ft^3
Initial Surcharge Depth (ISD) =	user	ft
Total Available Detention Depth (H_{TOTAL}) =	user	ft
Depth of Trickle Channel (H_{TC}) =	user	ft
Slope of Trickle Channel (S_{TC}) =	user	ft/ft
Slopes of Main Basin Sides (S_{MAIN}) =	user	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	user	

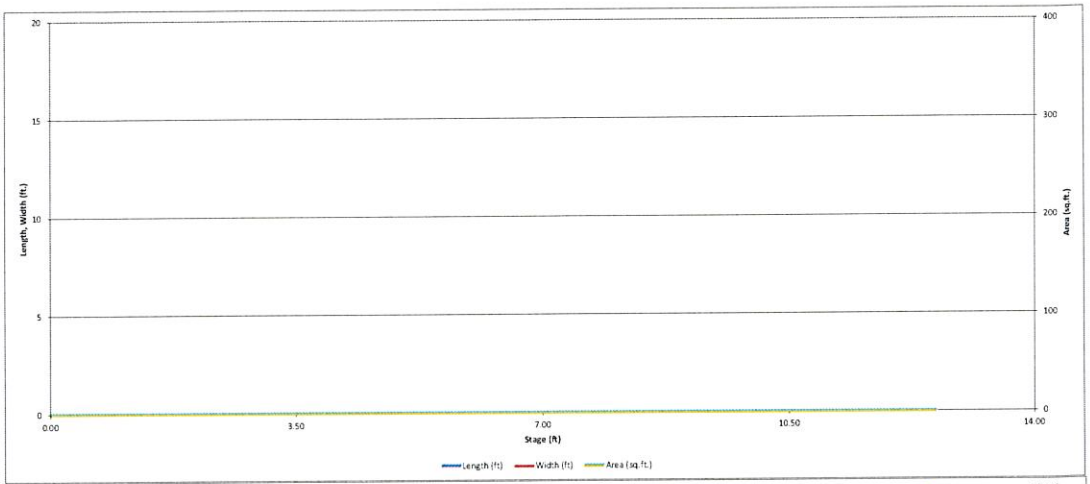
Initial Surcharge Area (A_{ISV}) =	user	ft^2
Surcharge Volume Length (L_{ISV}) =	user	ft
Surcharge Volume Width (W_{ISV}) =	user	ft
Depth of Basin Floor (H_{FLOOR}) =	user	ft
Length of Basin Floor (L_{FLOOR}) =	user	ft
Width of Basin Floor (W_{FLOOR}) =	user	ft
Area of Basin Floor (A_{FLOOR}) =	user	ft^2
Volume of Basin Floor (V_{FLOOR}) =	user	ft^3
Depth of Main Basin (H_{MAIN}) =	user	ft
Length of Main Basin (L_{MAIN}) =	user	ft
Width of Main Basin (W_{MAIN}) =	user	ft
Area of Main Basin (A_{MAIN}) =	user	ft^2
Volume of Main Basin (V_{MAIN}) =	user	ft^3
Calculated Total Basin Volume (V_{TOTAL}) =	user	acre-feet

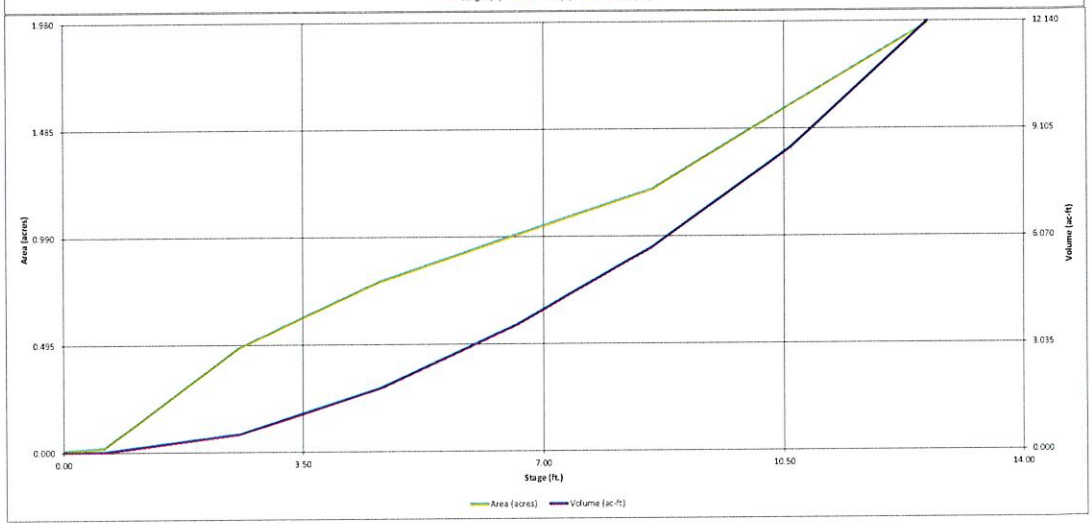
Depth Increment = 0.25 ft

Stage - Storage Description	Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft^2)	Optional Override Area (ft^2)	Area (acre)	Volume (ft^3)	Volume (ac-ft)
Top of Micropool	--	0.00	--	--	--	250	0.006		
	--	0.60	--	--	--	854	0.020	323	0.007
	--	2.60	--	--	--	21,152	0.486	22,337	0.513
	--	4.60	--	--	--	34,109	0.783	77,598	1.781
	--	6.60	--	--	--	43,501	0.999	155,208	3.563
	--	8.60	--	--	--	52,587	1.207	251,296	5.769
	--	10.60	--	--	--	69,456	1.594	373,339	8.571
	--	12.60	--	--	--	85,859	1.971	528,654	12.136

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)



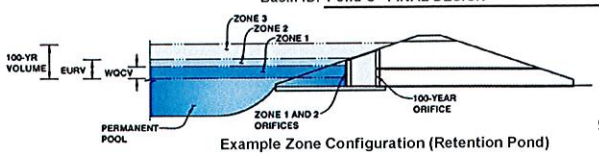


Detention Basin Outlet Structure Design

UD-Detention, Version 3.07 (February 2017)

Project: Forest Lakes Filing 5

Basin ID: Pond C - FINAL DESIGN



Example Zone Configuration (Retention Pond)

	Stage (ft)	Zone Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	2.34	0.393	Orifice Plate
Zone 2 (EURV)	3.47	0.595	Orifice Plate
Zone 3 (100-year)	4.97	1.082	Weir&Pipe (Restrict)
		2.070	Total

User Input: Orifice at Underdrain Outlet (typically used to drain WQCV in a Filtration BMP)

Underdrain Orifice Invert Depth =	N/A	ft (distance below the filtration media surface)
Underdrain Orifice Diameter =	N/A	inches

Calculated Parameters for Underdrain

Underdrain Orifice Area =	N/A	ft^2
Underdrain Orifice Centroid =	N/A	feet

User Input: Orifice Plate with one or more orifices or Elliptical Slot Weir (typically used to drain WQCV and/or EURV in a sedimentation BMP)

Invert of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Orifice Plate =	4.60	ft (relative to basin bottom at Stage = 0 ft)
Orifice Plate: Orifice Vertical Spacing =	12.20	inches
Orifice Plate: Orifice Area per Row =	N/A	inches

Calculated Parameters for Plate

WQ Orifice Area per Row =	N/A	ft^2
Elliptical Half-Width =	N/A	feet
Elliptical Slot Centroid =	N/A	feet
Elliptical Slot Area =	N/A	ft^2

User Input: Stage and Total Area of Each Orifice Row (numbered from lowest to highest)

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	1.53	3.07					
Orifice Area (sq. inches)	1.00	8.00	14.00					

	Row 9 (optional)	Row 10 (optional)	Row 11 (optional)	Row 12 (optional)	Row 13 (optional)	Row 14 (optional)	Row 15 (optional)	Row 16 (optional)
Stage of Orifice Centroid (ft)								
Orifice Area (sq. inches)								

User Input: Vertical Orifice (Circular or Rectangular)

	Not Selected	Not Selected	
Invert of Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)
Vertical Orifice Diameter =	N/A	N/A	inches

Calculated Parameters for Vertical Orifice

	Not Selected	Not Selected	
Vertical Orifice Area =	N/A	N/A	ft^2
Vertical Orifice Centroid =	N/A	N/A	feet

User Input: Overflow Weir (Dropbox) and Grate (Flat or Sloped)

	Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, Ho =	4.60	N/A	ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length =	4.00	N/A	feet
Overflow Weir Slope =	4.00	N/A	H:V (enter zero for flat grate)
Horiz. Length of Weir Sides =	4.00	N/A	feet
Overflow Grate Open Area % =	70%	N/A	%, grate open area/total area
Debris Clogging % =	50%	N/A	%

Calculated Parameters for Overflow Weir

	Zone 3 Weir	Not Selected	
Height of Grate Upper Edge, H_t =	5.60	N/A	feet
Over Flow Weir Slope Length =	4.12	N/A	feet
Grate Open Area / 100-yr Orifice Area =	3.67	N/A	should be ≥ 4
Overflow Grate Open Area w/o Debris =	11.54	N/A	ft^2
Overflow Grate Open Area w/ Debris =	5.77	N/A	ft^2

User Input: Outlet Pipe w/ Flow Restriction Plate (Circular Orifice, Restrictor Plate, or Rectangular Orifice)

	Zone 3 Restrictor	Not Selected	
Depth to Invert of Outlet Pipe =	0.20	N/A	ft (distance below basin bottom at Stage = 0 ft)
Outlet Pipe Diameter =	24.00	N/A	inches
Restrictor Plate Height Above Pipe Invert =	24.00		inches

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

	Zone 3 Restrictor	Not Selected	
Outlet Orifice Area =	3.14	N/A	ft^2
Outlet Orifice Centroid =	1.00	N/A	feet
Half-Central Angle of Restrictor Plate on Pipe =	3.14	N/A	radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage=	9.27	ft (relative to basin bottom at Stage = 0 ft)
Spillway Crest Length =	25.00	feet
Spillway End Slopes =	10.00	H:V
Freeboard above Max Water Surface =	1.00	feet

Calculated Parameters for Spillway

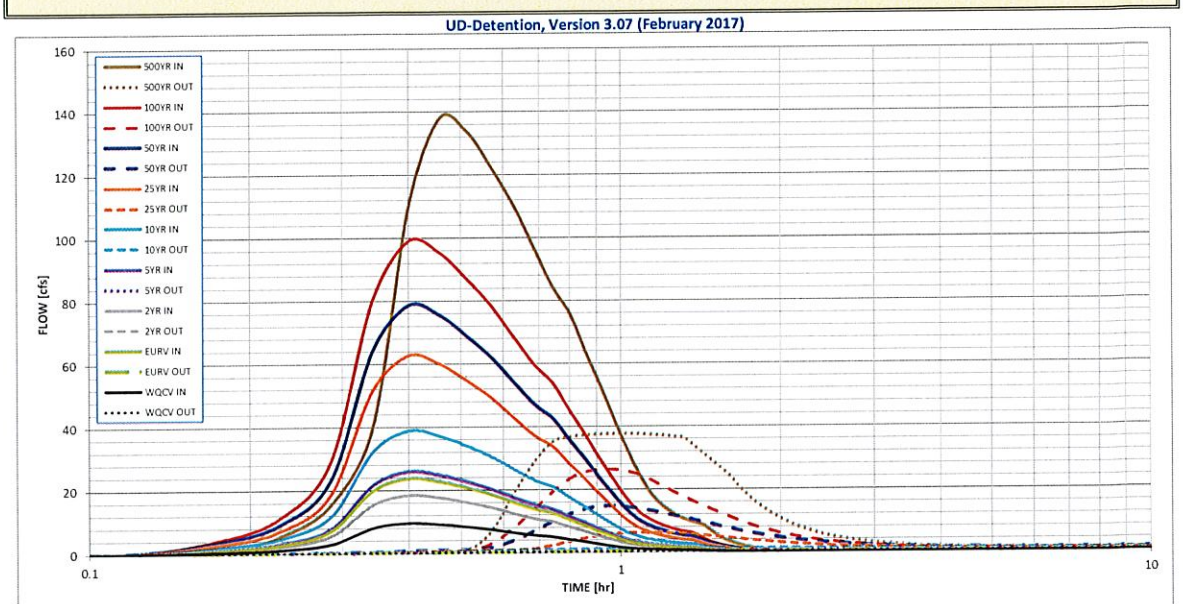
Spillway Design Flow Depth=	0.72	feet
Stage at Top of Freeboard =	10.99	feet
Basin Area at Top of Freeboard =	1.67	acres

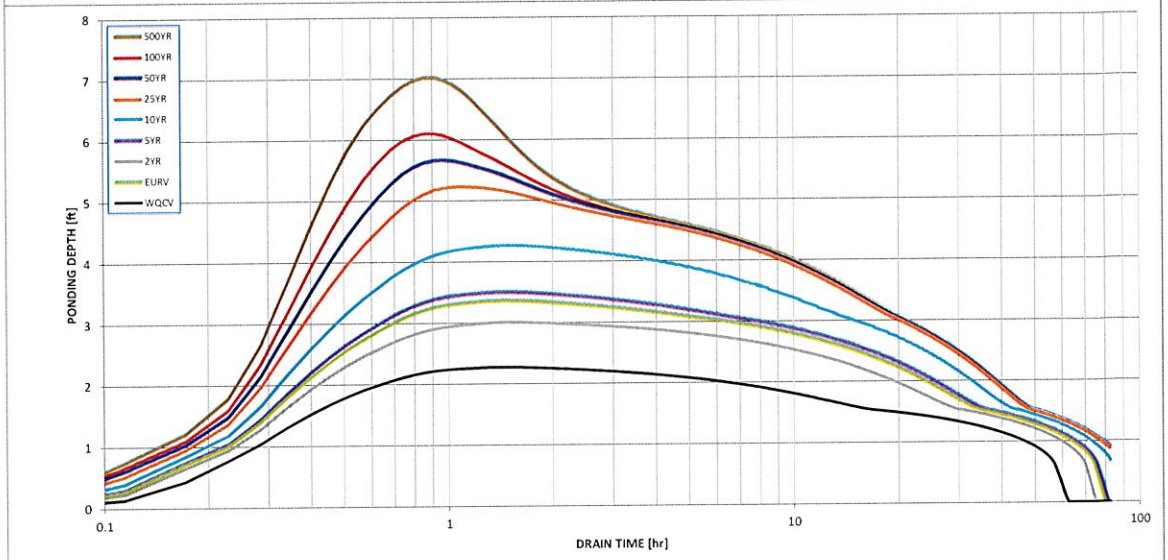
Routed Hydrograph Results

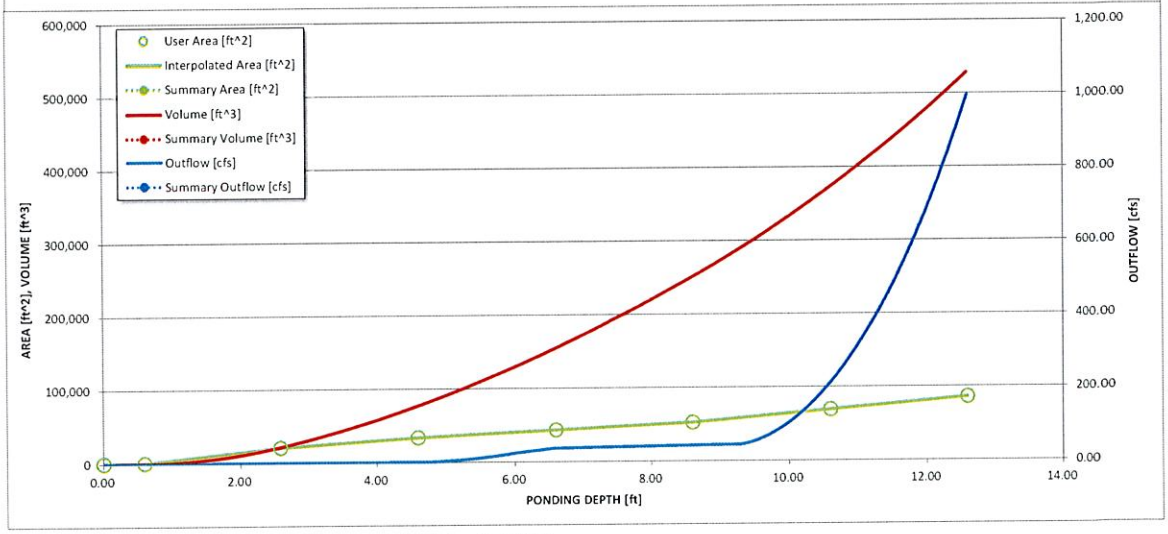
Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
One-Hour Rainfall Depth (in) =	0.53	1.07	1.19	1.50	1.75	2.00	2.25	2.52	3.10
Calculated Runoff Volume (acre-ft) =	0.393	0.988	0.762	1.080	1.620	2.644	3.320	4.204	5.896
OPTIONAL Override Runoff Volume (acre-ft) =									
Inflow Hydrograph Volume (acre-ft) =	0.392	0.987	0.761	1.078	1.617	2.640	3.316	4.199	5.885
Predevelopment Unit Peak Flow, q (cfs/acre) =	0.00	0.00	0.02	0.03	0.30	0.94	1.29	1.71	2.48
Predevelopment Peak Q (cfs) =	0.0	0.0	0.5	0.896	9.0	28.0	38.7	51.3	74.4
Peak Inflow Q (cfs) =	9.5	23.8	18.4	25.9	38.7	62.8	78.6	99.1	137.9
Peak Outflow Q (cfs) =	0.3	0.7	0.4	0.747	1.0	6.5	14.7	26.5	37.7
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.8	0.1	0.2	0.4	0.5	0.5
Structure Controlling Flow =	Plate	Plate	Plate	Plate	Plate	Overflow Grate 1	Overflow Grate 1	Overflow Grate 1	Outlet Plate 1
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	N/A	N/A	0.4	1.2	2.2	3.1
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	55	66	64	66	68	63	57	49	44
Time to Drain 99% of Inflow Volume (hours) =	59	74	70	75	80	81	79	76	70
Maximum Ponding Depth (ft) =	2.27	3.37	3.01	3.51	4.26	5.24	5.67	6.11	7.02
Area at Maximum Ponding Depth (acres) =	0.41	0.60	0.55	0.62	0.73	0.85	0.90	0.95	1.04
Maximum Volume Stored (acre-ft) =	0.365	0.925	0.719	1.010	1.516	2.305	2.672	3.087	3.992

Detention Basin Outlet Structure Design

UD-Detention, Version 3.07 (February 2017)







S-A-V-D Chart Axis Override	X-axis	Left Y-Axis	Right Y-Axis
minimum bound			
maximum bound			

Detention Basin Outlet Structure Design

Outflow Hydrograph Workbook Filename: _____

Storm Inflow Hydrographs **UD-Detention, Version 3.07 (February 2017)**

The user can override the calculated inflow hydrographs from this workbook with inflow hydrographs developed in a separate program.

Time Interval	SOURCE	WORKBOOK	WORKBOOK	WORKBOOK	WORKBOOK	WORKBOOK	WORKBOOK	WORKBOOK	WORKBOOK	WORKBOOK
	TIME	WQCV [cfs]	EURV [cfs]	2 Year [cfs]	5 Year [cfs]	10 Year [cfs]	25 Year [cfs]	50 Year [cfs]	100 Year [cfs]	500 Year [cfs]
3.43 min	0:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:03:26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydrograph Constant	0:06:52	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:10:17	0.43	1.04	0.81	1.14	1.68	2.67	3.31	4.11	5.52
1.456	0:13:43	1.15	2.82	2.19	3.07	4.56	7.34	9.14	11.43	15.61
	0:17:09	2.95	7.25	5.62	7.90	11.72	18.85	23.47	29.34	40.07
	0:20:35	8.10	19.91	15.45	21.70	32.18	51.72	64.38	80.44	109.76
	0:24:01	9.55	23.78	18.38	25.94	38.73	62.81	78.62	99.14	137.93
	0:27:26	9.10	22.72	17.55	24.80	37.06	60.22	75.46	95.41	133.57
	0:30:52	8.28	20.68	15.98	22.57	33.74	54.80	68.67	86.90	122.00
	0:34:18	7.38	18.51	14.28	20.21	30.26	49.28	61.82	78.29	109.98
	0:37:44	6.35	16.03	12.35	17.51	26.27	42.94	53.98	68.49	96.45
	0:41:10	5.54	13.95	10.75	15.23	22.83	37.39	47.07	59.79	84.33
	0:44:35	5.01	12.64	9.74	13.81	20.70	33.85	42.55	53.97	75.92
	0:48:01	4.12	10.48	8.05	11.45	17.23	28.27	35.59	45.24	63.90
	0:51:27	3.35	8.59	6.59	9.39	14.19	23.36	29.45	37.49	53.04
	0:54:53	2.56	6.66	5.09	7.29	11.09	18.39	23.26	29.71	42.26
	0:58:19	1.89	5.00	3.80	5.49	8.42	14.09	17.90	22.95	32.80
	1:01:44	1.38	3.62	2.75	3.98	6.16	10.43	13.31	17.15	24.65
	1:05:10	1.07	2.78	2.12	3.06	4.69	7.88	10.02	12.86	18.38
	1:08:36	0.88	2.29	1.75	2.51	3.83	6.38	8.09	10.34	14.70
	1:12:02	0.75	1.94	1.48	2.12	3.24	5.38	6.81	8.70	12.35
	1:15:28	0.66	1.70	1.30	1.86	2.83	4.69	5.93	7.57	10.72
	1:18:53	0.59	1.53	1.17	1.67	2.54	4.21	5.31	6.77	9.57
	1:22:19	0.55	1.41	1.08	1.54	2.34	3.86	4.87	6.20	8.75
	1:25:45	0.40	1.03	0.79	1.13	1.72	2.85	3.61	4.62	6.59
	1:29:11	0.30	0.76	0.58	0.83	1.26	2.07	2.62	3.35	4.76
	1:32:37	0.22	0.56	0.43	0.61	0.92	1.53	1.94	2.47	3.53
	1:36:02	0.16	0.41	0.31	0.45	0.68	1.14	1.44	1.84	2.62
	1:39:28	0.11	0.29	0.22	0.32	0.49	0.83	1.05	1.35	1.93
	1:42:54	0.08	0.21	0.16	0.23	0.35	0.59	0.75	0.97	1.39
	1:46:20	0.06	0.15	0.11	0.16	0.25	0.43	0.55	0.70	1.01
	1:49:46	0.04	0.10	0.08	0.11	0.17	0.30	0.38	0.49	0.71
	1:53:11	0.02	0.06	0.04	0.07	0.11	0.19	0.24	0.32	0.46
	1:56:37	0.01	0.03	0.02	0.03	0.06	0.10	0.14	0.18	0.27
	2:00:03	0.00	0.01	0.01	0.01	0.02	0.04	0.06	0.08	0.13
	2:03:29	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.02	0.04
	2:06:55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2:10:20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2:13:46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2:17:12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2:20:38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2:24:04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2:27:29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2:30:55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2:34:21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2:37:47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2:41:13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2:44:38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2:48:04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2:51:30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2:54:56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2:58:22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:01:47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:05:13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:08:39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:12:05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:15:31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:18:56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:22:22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:25:48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:29:14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:32:40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:36:05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:39:31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:42:57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:46:23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:49:49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:53:14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:56:40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:00:06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:03:32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:06:58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Detention Basin Outlet Structure Design

UD-Detention, Version 3.07 (February 2017)

Summary Stage-Area-Volume-Discharge Relationships

The user can create a summary S-A-V-D by entering the desired stage increments and the remainder of the table will populate automatically.

The user should graphically compare the summary S-A-V-D table to the full S-A-V-D table in the chart to confirm it captures all key transition points.

Stage - Storage Description	Stage [ft]	Area [ft^2]	Area [acres]	Volume [ft^3]	Volume [ac-ft]	Total Outflow [cfs]

For best results, include the stages of all grade slope changes (e.g. ISV and Floor) from the S-A-V table on Sheet 'Basin'.

Also include the inverts of all outlets (e.g. vertical orifice, overflow grate, and spillway, where applicable).