June 12, 2020

Ms. Elizabeth Nijkamp
El Paso County
325 Akers Drive
Colorado Springs, CO 80922

RE: Major Amendment – Drainage Letter
Front Range Midway Solar Project
Fountain, CO

Dear Ms. Kijkamp:

CORE is writing this Drainage letter in support of the Major Amendment application to the Wind/Solar Energy Generation Overlay (WSE-O) district approved on April 24, 2018 (WSEO-17-001) for the Front Range Midway Solar Project (Project). Since the WSEO-17-001 approval in 2018, the FRMW Project design has been optimized resulting in changes to the Project boundary, layout and infrastructure. Per WSEO-17-001, many of the FRMW Project details remain the same, including the Applicant's intent to construct, operate, and maintain a 100.2-megawatt (MW) photovoltaic solar energy generation facility. The facilities included in the approved WSEO-17-001 included proposed solar panels, a project substation, and meteorological monitoring devices. The Project now includes the details for an Operations & Management facility and energy storage facility utilizing battery technology that will be coupled to the solar facility. The developable ground has also been reduced thus the project footprint has been revised to fit within the new project limits.

The minor basins within the site largely remained the same. The revised project layout removed the majority of the solar panels within basin A5 from the original approved permit. For this amendment, the original basin A5 has been divided into basins A5A and A5B. Panel layouts in basins A1, A6, and A7 stayed relatively the same. Panels in A8 were reduced with basin A10 and A11 still containing the largest concentration of panels. Basin A9 was combined with basin 12 from the original approved permit and now extends to the northeast corner of the property. Basin 12 has been redefined as the southeastern tip of the project with no development proposed.

The hydrology has been updated to represent the revised project footprint. Current rational method and Colorado Urban Hydrograph Procedure spreadsheets were used to determine the minor (5-yr) and major (100-yr) storm runoff. NOAA Atlas 14, volume 8, version 2, point precipitation frequency estimates from the Fountain station were used when calculating the hydrology. Extended Detention Basins have been recalculated utilizing the Mile High Flood District Detention spreadsheet version 4.03. The calculations are attached.

Sincerely,
CORE Consultants, Inc.

David Bacci

David Bacci P.E. #42104
Senior Project Engineer

NOAA Atlas 14, Volume 8, Version 2 FOUNTAIN
Station ID: 05-3063
Location name: Fountain, Colorado, USA*
Latitude: 38.6778°, Longitude: -104.7014°
Elevation:
Elevation (station metadata): 5560 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Deborah Martin, Sandra Pavlovic, Ishani Roy, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Michael Yekta, Geoffery Bonnin

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.267 (0.215-0.337)	0.319 (0.257-0.403)	0.413 (0.331-0.524)	0.500 (0.398-0.637)	0.631 (0.489-0.852)	0.743 (0.558-1.01)	0.863 (0.623-1.21)	0.994 (0.684-1.44)	1.18 (0.777-1.76)	1.33 (0.847-2.00)
10-min	0.390 (0.315-0.493)	0.467 (0.376-0.590)	0.605 (0.485-0.767)	0.732 (0.583-0.933)	0.925 (0.716-1.25)	1.09 (0.817-1.49)	1.26 (0.912-1.77)	1.46 (1.00-2.10)	1.73 (1.14-2.57)	1.95 (1.24-2.93)
15-min	0.476 (0.384-0.601)	0.569 (0.458-0.720)	0.737 (0.591-0.936)	0.892 (0.711-1.14)	1.13 (0.874-1.52)	1.33 (0.997-1.81)	1.54 (1.11-2.16)	1.78 (1.22-2.56)	2.11 (1.39-3.14)	2.38 (1.51-3.57)
30-min	0.674 (0.543-0.851)	0.804 (0.648-1.02)	1.04 (0.835-1.32)	1.26 (1.00-1.61)	1.59 (1.23-2.15)	1.88 (1.41-2.56)	2.18 (1.57-3.06)	2.51 (1.73-3.63)	2.99 (1.96-4.44)	3.37 (2.14-5.06)
60-min	0.864 (0.696-1.09)	1.01 (0.815-1.28)	1.30 (1.04-1.65)	1.57 (1.25-2.01)	2.01 (1.57-2.74)	2.40 (1.81-3.29)	2.82 (2.04-3.98)	3.29 (2.27-4.78)	3.98 (2.63-5.95)	4.55 (2.89-6.83)
2-hr	1.05 (0.854-1.32)	1.22 (0.988-1.53)	1.56 (1.25-1.96)	1.89 (1.51-2.39)	2.43 (1.92-3.31)	2.92 (2.22-4.00)	3.46 (2.53-4.87)	4.08 (2.84-5.90)	4.98 (3.32-7.40)	5.73 (3.68-8.54)
3-hr	1.16 (0.939-1.45)	1.32 (1.07-1.65)	1.67 (1.35-2.10)	2.03 (1.63-2.56)	2.64 (2.09-3.59)	3.19 (2.44-4.37)	3.82 (2.81-5.37)	4.53 (3.18-6.56)	5.60 (3.76-8.31)	6.49 (4.19-9.65)
6-hr	1.33 (1.08-1.65)	1.50 (1.22-1.86)	1.87 (1.52-2.34)	2.28 (1.84-2.85)	2.97 (2.38-4.04)	3.61 (2.80-4.94)	4.35 (3.23-6.10)	5.20 (3.69-7.49)	6.47 (4.39-9.56)	7.54 (4.92-11.1)
12-hr	1.49 (1.22-1.83)	1.69 (1.39-2.09)	2.13 (1.74-2.64)	2.58 (2.09-3.21)	3.33 (2.68-4.47)	4.02 (3.12-5.43)	4.80 (3.58-6.65)	5.68 (4.06-8.10)	6.99 (4.78-10.2)	8.09 (5.33-11.9)
24-hr	1.66 (1.37-2.04)	1.94 (1.60-2.38)	2.46 (2.02-3.03)	2.98 (2.43-3.68)	3.79 (3.04-5.00)	4.50 (3.51-6.00)	5.30 (3.97-7.25)	6.17 (4.43-8.70)	7.46 (5.14-10.8)	8.52 (5.67-12.4)
2-day	1.86 (1.54-2.26)	2.22 (1.84-2.71)	2.87 (2.37-3.51)	3.46 (2.84-4.25)	4.36 (3.49-5.66)	5.11 (3.99-6.72)	5.92 (4.46-8.00)	6.80 (4.91-9.47)	8.05 (5.59-11.5)	9.07 (6.10-13.1)
3-day	2.01 (1.67-2.44)	2.37 (1.97-2.88)	3.03 (2.51-3.69)	3.64 (3.00-4.46)	4.58 (3.69-5.93)	5.37 (4.21-7.04)	6.23 (4.72-8.39)	7.17 (5.21-9.95)	8.51 (5.95-12.2)	9.61 (6.50-13.8)
4-day	2.16 (1.80-2.61)	2.51 (2.09-3.05)	3.17 (2.63-3.85)	3.79 (3.12-4.62)	4.74 (3.84-6.14)	5.57 (4.38-7.29)	6.47 (4.92-8.70)	7.45 (5.44-10.3)	8.88 (6.23-12.7)	10.0 (6.83-14.4)
7-day	2.61 (2.18-3.14)	2.98 (2.49-3.59)	3.66 (3.05-4.42)	4.31 (3.57-5.23)	5.32 (4.33-6.84)	6.19 (4.91-8.06)	7.15 (5.48-9.56)	8.20 (6.03-11.3)	9.73 (6.89-13.8)	11.0 (7.53-15.7)
10-day	3.00 (2.51-3.59)	3.41 (2.86-4.09)	4.15 (3.47-5.00)	4.85 (4.03-5.87)	5.93 (4.83-7.57)	6.84 (5.43-8.85)	7.84 (6.02-10.4)	8.92 (6.59-12.2)	10.5 (7.46-14.8)	11.8 (8.11-16.8)
20-day	3.98 (3.36-4.75)	4.57 (3.85-5.45)	5.59 (4.69-6.68)	6.47 (5.41-7.78)	7.77 (6.33-9.76)	8.82 (7.03-11.3)	9.93 (7.66-13.0)	11.1 (8.24-15.0)	12.7 (9.12-17.8)	14.0 (9.78-19.8)
30-day	4.78 (4.04-5.67)	5.51 (4.66-6.55)	6.75 (5.69-8.04)	7.79 (6.53-9.33)	9.27 (7.55-11.5)	10.4 (8.32-13.2)	11.6 (8.98-15.1)	12.8 (9.56-17.2)	14.5 (10.4-20.1)	15.8 (11.1-22.2)
45-day	5.78 (4.91-6.83)	6.69 (5.68-7.92)	8.18 (6.92-9.71)	9.40 (7.91-11.2)	11.1 (9.02-13.6)	12.4 (9.87-15.5)	13.6 (10.6-17.6)	14.9 (11.1-19.8)	16.6 (12.0-22.8)	17.8 (12.6-25.0)
60-day	6.65 (5.66-7.84)	7.70 (6.54-9.08)	9.37 (7.94-11.1)	10.7 (9.05-12.8)	12.5 (10.2-15.4)	13.9 (11.1-17.3)	15.2 (11.8-19.5)	16.5 (12.4-21.9)	18.2 (13.2-24.9)	19.4 (13.8-27.2)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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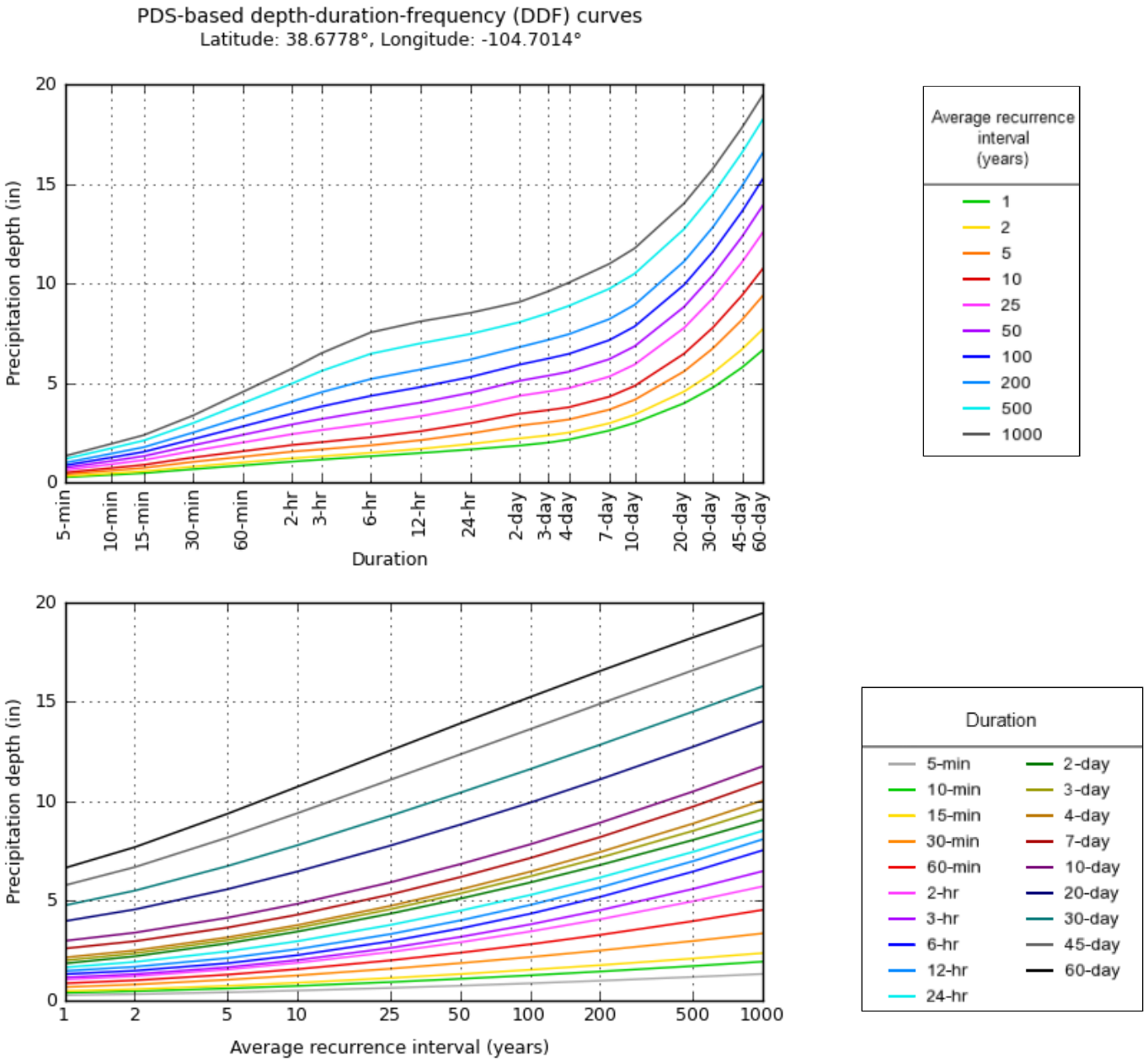
PF graphical



NOAA Atlas 14, Volume 8, Version 2

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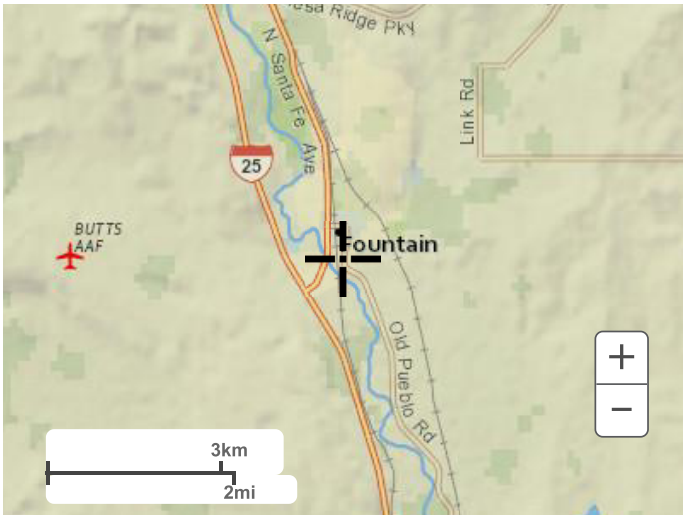
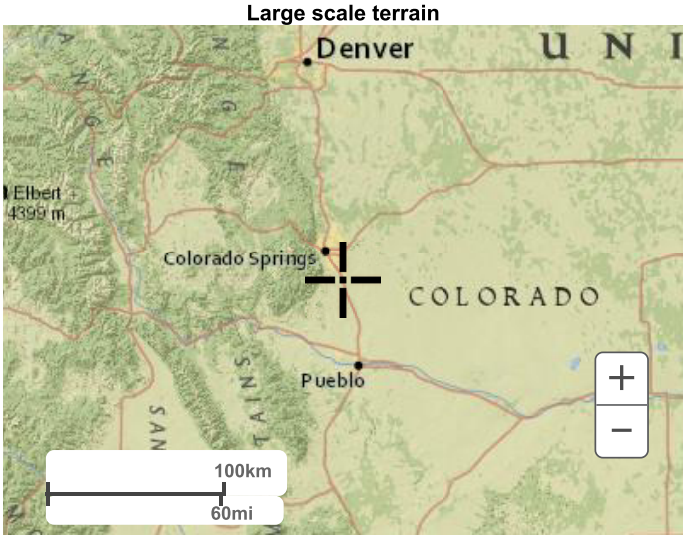
Maps & aerials

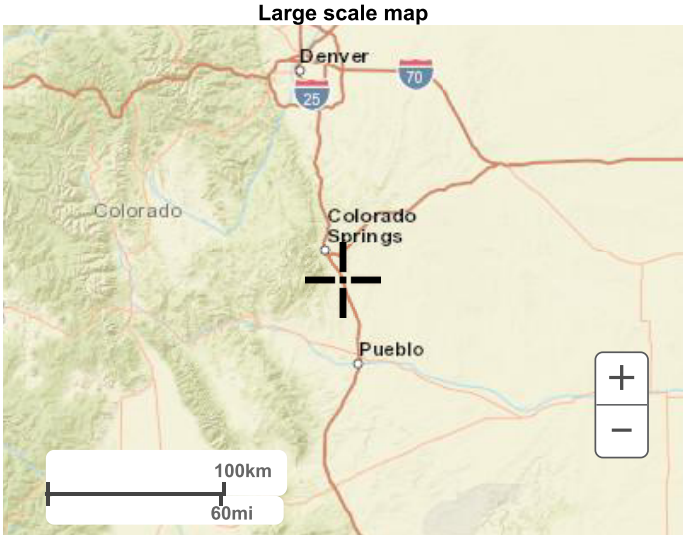
Small scale terrain



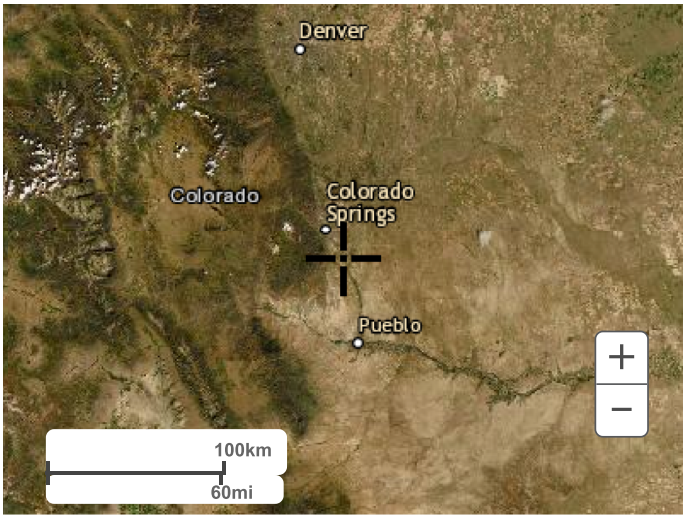
Large scale terrain



Large scale map



Large scale aerial



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National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

FRONT RANGE MIDWAY SOLAR PROJECT

CORE Project #: 19-177
Prepared By: DJB

COMPOSITE BASIN - WEIGHTED "C" CALCULATIONS

-REFERENCE UDFCD Vol.1 RUNOFF Table 6-3

				Lawns Clay Soil				
		Streets: Gravel	Gravel	2-7% Slope	>7% Slope	Historic		
% Imperv.		80.00%	40.00%	2.00%	2.00%	2.00%		
	Design						Total	Percent
BASIN	Point	Area	Area	Area	Area	Area	Area	Impervious
A-1	1	-	-	-	-	31.30	31.30	2.0%
A-2	2	-	-	-	-	72.65	72.65	2.0%
A-3	3	-	-	-	-	107.81	107.81	2.0%
A-4	4	-	-	-	-	33.49	33.49	2.0%
A-5B	5B	-	-	-	-	10.24	10.24	2.0%
A-6	6	-	-	-	-	34.04	34.04	2.0%
A-7	7	-	-	-	-	55.40	55.40	2.0%
A-8	8	-	-	-	-	89.54	89.54	2.0%
A-9	9	-	-	-	-	48.32	48.32	2.0%
A-12	12	-	-	-	-	28.57	28.57	2.0%

FRONT RANGE MID

CORE Project #: 19-177

Prepared By: DJB

COMPOSITE DEVELOPED BASIN -WEIGHTED "C" CALCULATIONS

-REFERENCE UDFCD Vol.1 RUNOFF Table 6-4

i = % imperviousness/100 expressed as a decimal

C_A = Runoff coefficient for NRCS HSG A soils

C_B = Runoff coefficient for NRCS HSG B soils

C_{CD} = Runoff coefficient for NRCS HSG C and D soils.

Natural Resource Conservation Service (NRCS)

Table 6-4. Runoff coefficient equations based on NRCS soil group and storm return period

NRCS Soil Group	Storm Return Period						
	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year	500-Year
A	$C_A = 0.84i^{1.302}$	$C_A = 0.86i^{1.276}$	$C_A = 0.87i^{1.232}$	$C_A = 0.84i^{1.124}$	$C_A = 0.85i+0.025$	$C_A = 0.78i+0.110$	$C_A = 0.65i+0.254$
B	$C_B = 0.84i^{1.169}$	$C_B = 0.86i^{1.088}$	$C_B = 0.81i+0.057$	$C_B = 0.63i+0.249$	$C_B = 0.56i+0.328$	$C_B = 0.47i+0.426$	$C_B = 0.37i+0.536$
C/D	$C_{C/D} = 0.83i^{1.122}$	$C_{C/D} = 0.82i+0.035$	$C_{C/D} = 0.74i+0.132$	$C_{C/D} = 0.56i+0.319$	$C_{C/D} = 0.49i+0.393$	$C_{C/D} = 0.41i+0.484$	$C_{C/D} = 0.32i+0.588$

Basin ID	% Imperv.	*i*	Soil Type	Runoff Coefficients, C				Basin Area	Total Area	Weighted Runoff Coefficients, C			
				2-Year	5-Year	10-Year	100-Year			2-Year	5-Year	10-Year	100-Year
A-1	2.0%	0.02	A	0.01	0.01	0.01	0.13		31.30	0.01	0.05	0.15	0.49
			B	0.01	0.01	0.07	0.44						
			C or D	0.01	0.05	0.15	0.49	31.30					
A-2	2.0%	0.02	A	0.01	0.01	0.01	0.13		72.65	0.01	0.05	0.15	0.49
			B	0.01	0.01	0.07	0.44						
			C or D	0.01	0.05	0.15	0.49	72.65					
A-3	2.0%	0.02	A	0.01	0.01	0.01	0.13		107.81	0.01	0.05	0.15	0.49
			B	0.01	0.01	0.07	0.44						
			C or D	0.01	0.05	0.15	0.49	107.81					
A-4	2.0%	0.02	A	0.01	0.01	0.01	0.13		33.49	0.01	0.05	0.15	0.49
			B	0.01	0.01	0.07	0.44						
			C or D	0.01	0.05	0.15	0.49	33.49					
A-5B	2.0%	0.02	A	0.01	0.01	0.01	0.13		10.24	0.01	0.05	0.15	0.49
			B	0.01	0.01	0.07	0.44						
			C or D	0.01	0.05	0.15	0.49	10.24					
A-6	2.0%	0.02	A	0.01	0.01	0.01	0.13		34.04	0.01	0.05	0.15	0.49
			B	0.01	0.01	0.07	0.44						
			C or D	0.01	0.05	0.15	0.49	34.04					

Basin ID	% Imperv.	*i*	Soil Type	Runoff Coefficients, C				Basin Area	Total Area	Weighted Runoff Coefficients, C			
				2-Year	5-Year	10-Year	100-Year			2-Year	5-Year	10-Year	100-Year
A-7	2.0%	0.02	A	0.01	0.01	0.01	0.13		55.40	0.01	0.05	0.15	0.49
			B	0.01	0.01	0.07	0.44						
			C or D	0.01	0.05	0.15	0.49	55.40					
A-8	2.0%	0.02	A	0.01	0.01	0.01	0.13		89.54	0.01	0.05	0.15	0.49
			B	0.01	0.01	0.07	0.44						
			C or D	0.01	0.05	0.15	0.49	89.54					
A-9	2.0%	0.02	A	0.01	0.01	0.01	0.13		48.32	0.01	0.05	0.15	0.49
			B	0.01	0.01	0.07	0.44						
			C or D	0.01	0.05	0.15	0.49	48.32					
A-12	2.0%	0.02	A	0.01	0.01	0.01	0.13		28.57	0.01	0.05	0.15	0.49
			B	0.01	0.01	0.07	0.44						
			C or D	0.01	0.05	0.15	0.49	28.57					

FRONT RANGE MIDWAY SOLAR PROJECT

CORE Project #: 19-177

Prepared By: DJB

TIME OF CONCENTRATION CALCULATIONS

-REFERENCE UDFCD Vol.1 Section 2.4

NRCS Conveyance factors, K -REFERENCE UDFCD Vol.1 RUNOFF Table 6-2

SF-2

Heavy Meadow	2.50	Short Grass Pasture & Lawns	7.00	Grassed Waterway	15.00
Tillage/field	5.00	Nearly Bare Ground	10.00	Paved Area & Shallow Gutter	20.00

SUB-BASIN DATA			INITIAL / OVERLAND TIME				CHANNEL / TRAVEL TIME T(t)							T(c) CHECK (URBANIZED BASINS)		FINAL T(c)
DRAIN BASIN	AREA ac.	C(5)	Length ft.	Elev Change	Slope %	T(i) min	Length ft.	Elev Change	Slope %	Coeff.	Velocity fps	T(t) min.	COMP. T(c)	% IMPER-VIOUS	USDCM Eq . 6-5	min.
A-1	31.30	0.05	300	2.7	0.9	34.1	1170	34.9	3.0	7.0	1.2	16.1	50.2	2.0%	37.8	37.8
A-2	72.65	0.05	300	3.1	1.0	32.4	1665	22.1	1.3	7.0	0.8	34.4	66.8	2.0%	51.6	51.6
A-3	107.81	0.05	300	5.5	1.8	26.8	2883	45.3	1.6	7.0	0.9	54.8	81.6	2.0%	67.0	67.0
A-4	33.49	0.05	300	2.2	0.7	36.2	3635	44.7	1.2	7.0	0.8	78.0	114.2	2.0%	84.5	84.5
A-5B	10.24	0.05	300	6.0	2.0	26.1	908	33.7	3.7	7.0	1.3	11.2	37.3	2.0%	34.1	34.1
A-6	34.04	0.05	300	4.6	1.5	28.4	1318	24.3	1.8	7.0	1.0	23.1	51.5	2.0%	43.1	43.1
A-7	55.40	0.05	300	8.8	2.9	23.0	2169	50.2	2.3	7.0	1.1	33.9	56.9	2.0%	51.3	51.3
A-8	89.54	0.05	300	5.3	1.8	27.2	3108	77.7	2.5	7.0	1.1	46.8	74.0	2.0%	61.0	61.0
A-9	48.32	0.05	300	8.9	3.0	22.9	2163	70.0	3.2	7.0	1.3	28.6	51.5	2.0%	47.3	47.3
A-12	28.57	0.05	300	5.0	1.7	27.7	2235	49.0	2.2	7.0	1.0	35.9	63.6	2.0%	52.8	52.8

FRONT RANGE MIDWAY SOLAR PROJECT

CORE Project #: 19-177
Prepared By: DJB

RATIONAL METHOD PEAK RUNOFF

5-Year STORM Rainfall Depth-Duration-Frequency (1-hr) = **1.3**

SF-3

-REFERENCE UDFCD Vol.1 EQ 5-1 & EQ 6-1

BASIN INFORMATON				DIRECT RUNOFF			
DESIGN POINT	DRAIN BASIN	AREA ac.	5yr Runoff COEFF	T(c) min	C x A	I in/hr	Q cfs
1	A-1	31.30	0.05	37.8	1.61	1.77	2.9
2	A-2	72.65	0.05	51.6	3.73	1.45	5.4
3	A-3	107.81	0.05	67.0	5.54	1.22	6.8
4	A-4	33.49	0.05	84.5	1.72	1.04	1.8
5B	A-5B	10.24	0.05	34.1	0.53	1.89	1.0
6	A-6	34.04	0.05	43.1	1.75	1.63	2.9
7	A-7	55.40	0.05	51.3	2.85	1.46	4.2
8	A-8	89.54	0.05	61.0	4.60	1.30	6.0
9	A-9	48.32	0.05	47.3	2.48	1.54	3.8
12	A-12	28.57	0.05	52.8	1.47	1.43	2.1

FRONT RANGE MIDWAY SOLAR PROJECT

CORE Project #: 19-177
Prepared By: DJB

RATIONAL METHOD PEAK RUNOFF

100-YR STORM

SF-3 Rainfall Depth-Duration-Frequency (1-hr) = **2.82**

-REFERENCE UDFCD Vol.1 EQ 5-1 & EQ 6-1

BASIN INFORMATON				DIRECT RUNOFF			
DESIGN POINT	DRAIN BASIN	AREA ac.	100yr RUNOFF COEFF C	T(c) min	C x A	I in/hr	Q cfs
1	A-1	31.30	0.49	37.83	15.41	3.84	59.23
2	A-2	72.65	0.49	51.62	35.76	3.15	112.65
3	A-3	107.81	0.49	66.99	53.06	2.64	140.33
4	A-4	33.49	0.49	84.51	16.48	2.25	37.10
5B	A-5B	10.24	0.49	34.12	5.04	4.10	20.65
6	A-6	34.04	0.49	43.09	16.75	3.54	59.34
7	A-7	55.40	0.49	51.27	27.27	3.16	86.30
8	A-8	89.54	0.49	60.97	44.07	2.82	124.26
9	A-9	48.32	0.49	47.25	23.78	3.34	79.38
12	A-12	28.57	0.49	52.77	14.06	3.11	43.67

FRONT RANGE MIDWAY SOLAR PROJECT

CORE Project #: 19-177
Prepared By: DJB

COMPOSITE BASIN - WEIGHTED "C" CALCULATIONS

-REFERENCE UDFCD Vol.1 RUNOFF Table 6-3

				Lawns Clay Soil				
		Streets: Gravel	Gravel	2-7% Slope	>7% Slope	Historic		
% Imperv.		80.00%	40.00%	2.00%	2.00%	2.00%		
	Design						Total	Percent
BASIN	Point	Area	Area	Area	Area	Area	Area	Impervious
A-1	1	1.48	-	-	-	29.82	31.30	5.7%
A-2	2	4.82	-	-	-	67.83	72.65	7.2%
A-3	3	-	-	-	-	107.81	107.81	2.0%
A-4	4	-	-	-	-	33.49	33.49	2.0%
A-5B	5B	1.20	-	-	-	9.54	10.74	10.7%
A-6	6	1.24	-	-	-	32.80	34.04	4.8%
A-7	7	1.87	-	-	-	53.53	55.40	4.6%
A-8	8	2.08	-	-	-	87.46	89.54	3.8%
A-9	9	1.55	-	-	-	46.77	48.32	4.5%
A-12	12	-	-	-	-	28.57	28.57	2.0%

FRONT RANGE MID

CORE Project #: 19-177

Prepared By: DJB

COMPOSITE DEVELOPED BASIN -WEIGHTED "C" CALCULATIONS

-REFERENCE UDFCD Vol.1 RUNOFF Table 6-4

i = % imperviousness/100 expressed as a decimal

C_A = Runoff coefficient for NRCS HSG A soils

C_B = Runoff coefficient for NRCS HSG B soils

C_{CD} = Runoff coefficient for NRCS HSG C and D soils.

Natural Resource Conservation Service (NRCS)

Table 6-4. Runoff coefficient equations based on NRCS soil group and storm return period

NRCS Soil Group	Storm Return Period						
	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year	500-Year
A	$C_A = 0.84i^{1.302}$	$C_A = 0.86i^{1.276}$	$C_A = 0.87i^{1.232}$	$C_A = 0.84i^{1.124}$	$C_A = 0.85i+0.025$	$C_A = 0.78i+0.110$	$C_A = 0.65i+0.254$
B	$C_B = 0.84i^{1.169}$	$C_B = 0.86i^{1.088}$	$C_B = 0.81i+0.057$	$C_B = 0.63i+0.249$	$C_B = 0.56i+0.328$	$C_B = 0.47i+0.426$	$C_B = 0.37i+0.536$
C/D	$C_{C/D} = 0.83i^{1.122}$	$C_{C/D} = 0.82i+0.035$	$C_{C/D} = 0.74i+0.132$	$C_{C/D} = 0.56i+0.319$	$C_{C/D} = 0.49i+0.393$	$C_{C/D} = 0.41i+0.484$	$C_{C/D} = 0.32i+0.588$

Basin ID	% Imperv.	*i*	Soil Type	Runoff Coefficients, C				Basin Area	Total Area	Weighted Runoff Coefficients, C			
				2-Year	5-Year	10-Year	100-Year			2-Year	5-Year	10-Year	100-Year
A-1	5.7%	0.06	A	0.02	0.02	0.03	0.15		31.30	0.03	0.08	0.17	0.51
			B	0.03	0.04	0.10	0.45						
			C or D	0.03	0.08	0.17	0.51	31.30					
A-2	7.2%	0.07	A	0.03	0.03	0.03	0.17		72.65	0.04	0.09	0.19	0.51
			B	0.04	0.05	0.12	0.46						
			C or D	0.04	0.09	0.19	0.51	72.65					
A-3	2.0%	0.02	A	0.01	0.01	0.01	0.13		107.81	0.01	0.05	0.15	0.49
			B	0.01	0.01	0.07	0.44						
			C or D	0.01	0.05	0.15	0.49	107.81					
A-4	2.0%	0.02	A	0.01	0.01	0.01	0.13		33.49	0.01	0.05	0.15	0.49
			B	0.01	0.01	0.07	0.44						
			C or D	0.01	0.05	0.15	0.49	33.49					
A-5B	10.7%	0.11	A	0.05	0.05	0.06	0.19		10.74	0.07	0.12	0.21	0.53
			B	0.06	0.08	0.14	0.48						
			C or D	0.07	0.12	0.21	0.53	10.74					
A-6	4.8%	0.05	A	0.02	0.02	0.02	0.15		34.04	0.03	0.07	0.17	0.50
			B	0.02	0.03	0.10	0.45						
			C or D	0.03	0.07	0.17	0.50	34.04					

Basin ID	% Imperv.	*i*	Soil Type	Runoff Coefficients, C				Basin Area	Total Area	Weighted Runoff Coefficients, C			
				2-Year	5-Year	10-Year	100-Year			2-Year	5-Year	10-Year	100-Year
A-7	4.6%	0.05	A	0.02	0.02	0.02	0.15		55.40	0.03	0.07	0.17	0.50
			B	0.02	0.03	0.09	0.45						
			C or D	0.03	0.07	0.17	0.50	55.40					
A-8	3.8%	0.04	A	0.01	0.01	0.02	0.14		89.54	0.02	0.07	0.16	0.50
			B	0.02	0.02	0.09	0.44						
			C or D	0.02	0.07	0.16	0.50	89.54					
A-9	4.5%	0.05	A	0.01	0.02	0.02	0.15		48.32	0.03	0.07	0.17	0.50
			B	0.02	0.03	0.09	0.45						
			C or D	0.03	0.07	0.17	0.50	48.32					
A-12	2.0%	0.02	A	0.01	0.01	0.01	0.13		28.57	0.01	0.05	0.15	0.49
			B	0.01	0.01	0.07	0.44						
			C or D	0.01	0.05	0.15	0.49	28.57					

FRONT RANGE MIDWAY SOLAR PROJECT

CORE Project #: 19-177

Prepared By: DJB

TIME OF CONCENTRATION CALCULATIONS

-REFERENCE UDFCD Vol.1 Section 2.4

NRCS Conveyance factors, K -REFERENCE UDFCD Vol.1 RUNOFF Table 6-2

SF-2

Heavy Meadow	2.50	Short Grass Pasture & Lawns	7.00	Grassed Waterway	15.00
Tillage/field	5.00	Nearly Bare Ground	10.00	Paved Area & Shallow Gutter	20.00

SUB-BASIN DATA			INITIAL / OVERLAND TIME				CHANNEL / TRAVEL TIME T(t)							T(c) CHECK (URBANIZED BASINS)		FINAL T(c)
DRAIN BASIN	AREA ac.	C(5)	Length ft.	Elev Change	Slope %	T(i) min	Length ft.	Elev Change	Slope %	Coeff.	Velocity fps	T(t) min.	COMP. T(c)	% IMPER-VIOUS	USDCM Eq . 6-5	min.
A-1	31.30	0.08	300	2.7	0.9	33.1	1170	34.9	3.0	7.0	1.2	16.1	49.3	5.7%	36.6	36.6
A-2	72.65	0.09	300	3.1	1.0	31.1	1665	22.1	1.3	7.0	0.8	34.4	65.5	7.2%	48.9	48.9
A-3	107.81	0.05	300	5.5	1.8	26.8	2883	45.3	1.6	7.0	0.9	54.8	81.6	2.0%	67.0	67.0
A-4	33.49	0.05	300	2.2	0.7	36.2	3635	44.7	1.2	7.0	0.8	78.0	114.2	2.0%	84.5	84.5
A-5B	10.74	0.12	300	6.0	2.0	24.3	908	33.7	3.7	7.0	1.3	11.2	35.5	10.7%	31.7	31.7
A-6	34.04	0.07	300	4.6	1.5	27.8	1318	24.3	1.8	7.0	1.0	23.1	50.9	4.8%	41.9	41.9
A-7	55.40	0.07	300	8.8	2.9	22.5	2169	50.2	2.3	7.0	1.1	33.9	56.4	4.6%	49.8	49.8
A-8	89.54	0.07	300	5.3	1.8	26.8	3108	77.7	2.5	7.0	1.1	46.8	73.6	3.8%	59.7	59.7
A-9	48.32	0.07	300	8.9	3.0	22.4	2163	70.0	3.2	7.0	1.3	28.6	51.1	4.5%	46.0	46.0
A-12	28.57	0.05	300	5.0	1.7	27.7	2235	49.0	2.2	7.0	1.0	35.9	63.6	2.0%	52.8	52.8

FRONT RANGE MIDWAY SOLAR PROJECT

CORE Project #: 19-177

Prepared By: DJB

RATIONAL METHOD PEAK RUNOFF

5-Year STORM Rainfall Depth-Duration-Frequency (1-hr) = **1.3**

SF-3

-REFERENCE UDFCD Vol.1 EQ 5-1 & EQ 6-1

BASIN INFORMATON				DIRECT RUNOFF			
DESIGN POINT	DRAIN BASIN	AREA ac.	5yr Runoff COEFF	T(c) min	C x A	I in/hr	Q cfs
1	A-1	31.30	0.08	36.6	2.56	1.81	4.6
2	A-2	72.65	0.09	48.9	6.82	1.51	10.3
3	A-3	107.81	0.05	67.0	5.54	1.22	6.8
4	A-4	33.49	0.05	84.5	1.72	1.04	1.8
5B	A-5B	10.74	0.12	31.7	1.32	1.98	2.6
6	A-6	34.04	0.07	41.9	2.54	1.66	4.2
7	A-7	55.40	0.07	49.8	4.04	1.49	6.0
8	A-8	89.54	0.07	59.7	5.93	1.32	7.8
9	A-9	48.32	0.07	46.0	3.48	1.56	5.4
12	A-12	28.57	0.05	52.8	1.47	1.43	2.1

FRONT RANGE MIDWAY SOLAR PROJECT

CORE Project #: 19-177
Prepared By: DJB

RATIONAL METHOD PEAK RUNOFF

100-YR STORM

SF-3 Rainfall Depth-Duration-Frequency (1-hr) = **2.82**

-REFERENCE UDFCD Vol.1 EQ 5-1 & EQ 6-1

BASIN INFORMATON				DIRECT RUNOFF			
DESIGN POINT	DRAIN BASIN	AREA ac.	100yr RUNOFF COEFF C	T(c) min	C x A	I in/hr	Q cfs
1	A-1	31.30	0.51	36.56	15.88	3.93	62.36
2	A-2	72.65	0.51	48.86	37.30	3.27	121.82
3	A-3	107.81	0.49	66.99	53.06	2.64	140.33
4	A-4	33.49	0.49	84.51	16.48	2.25	37.10
5B	A-5B	10.74	0.53	31.66	5.67	4.29	24.30
6	A-6	34.04	0.50	41.90	17.15	3.61	61.84
7	A-7	55.40	0.50	49.84	27.87	3.22	89.84
8	A-8	89.54	0.50	59.72	44.74	2.86	127.90
9	A-9	48.32	0.50	46.04	24.28	3.39	82.41
12	A-12	28.57	0.49	52.77	14.06	3.11	43.67

EXISTING 5-YR

Summary of CUHP Input Parameters (Version 2.0.0)

								Depression Storage		Horton's Infiltration Parameters			DCIA Level and Fractions			
Catchment Name/ID	SWMM Node/ID	Raingage Name/ID	Area (sq.mi.)	Dist. to Centroid (miles)	Length (miles)	Slope (ft./ft.)	Percent Imperv.	Pervious (inches)	Imperv. (inches)	Initial Rate (in./hr.)	Final Rate (in.hr.)	Decay Coeff. (1/sec.)	DCIA Level	Dir. Con'ct Imperv. Fraction	Receiv. Perv. Fraction	Percent Eff. Imperv.
A5A	A5A	5	0.316	0.479	1.072	0.014	2.0	0.35	0.05	3.00	0.50	0.0018	0.00	0.04	0.02	1.62
A10	A10	5	0.370	0.856	1.425	0.019	2.0	0.35	0.05	3.00	0.50	0.0018	0.00	0.04	0.02	1.62
A11	A11	5	0.345	0.785	1.525	0.019	2.0	0.35	0.05	3.00	0.50	0.0018	0.00	0.04	0.02	1.62

EXISTING 5-YR

Summary of Unit Hydrograph Parameters Used By Program and Calculated Results (Version 2.0.0)

		Unit Hydrograph Parameters and Results									Excess Precip.		Storm Hydrograph			
Catchment Name/ID	User Comment for Catchment	CT	Cp	W50 (min.)	W50 Before Peak	W75 (min.)	W75 Before Peak	Time to Peak (min.)	Peak (cfs)	Volume (c.f)	Excess (inches)	Excess (c.f.)	Time to Peak (min.)	Peak Flow (cfs)	Total Volume (c.f.)	Runoff per Unit Area (cfs/acre)
A5A	Existing 5-yr Storm	0.157	0.256	58.1	12.91	30.2	9.12	21.5	163	733,623	0.24	173,242	50.0	36	173,257	0.18
A10	Existing 5-yr Storm	0.157	0.268	77.7	17.50	40.4	12.37	29.2	143	858,967	0.24	202,842	60.0	32	202,840	0.14
A11	Existing 5-yr Storm	0.157	0.262	79.0	17.42	41.1	12.31	29.0	131	800,560	0.24	189,049	60.0	30	189,031	0.13

EXISTING 100-YR

Summary of CUHP Input Parameters (Version 2.0.0)

								Depression Storage		Horton's Infiltration Parameters			DCIA Level and Fractions			
Catchment Name/ID	SWMM Node/ID	Raingage Name/ID	Area (sq.mi.)	Dist. to Centroid (miles)	Length (miles)	Slope (ft./ft.)	Percent Imperv.	Pervious (inches)	Imperv. (inches)	Initial Rate (in./hr.)	Final Rate (in.hr.)	Decay Coeff. (1/sec.)	DCIA Level	Dir. Con'ct Imperv. Fraction	Receiv. Perv. Fraction	Percent Eff. Imperv.
A5A	A5A	100	0.316	0.479	1.072	0.014	2.0	0.35	0.05	3.00	0.50	0.0018	0.00	0.04	0.02	1.81
A10	A10	100	0.370	0.856	1.425	0.019	2.0	0.35	0.05	3.00	0.50	0.0018	0.00	0.04	0.02	1.81
A11	A11	100	0.345	0.785	1.525	0.019	2.0	0.35	0.05	3.00	0.50	0.0018	0.00	0.04	0.02	1.81

EXISTING 100-YR

Summary of Unit Hydrograph Parameters Used By Program and Calculated Results (Version 2.0.0)

		Unit Hydrograph Parameters and Results									Excess Precip.		Storm Hydrograph			
Catchment Name/ID	User Comment for Catchment	CT	Cp	W50 (min.)	W50 Before Peak	W75 (min.)	W75 Before Peak	Time to Peak (min.)	Peak (cfs)	Volume (c.f)	Excess (inches)	Excess (c.f.)	Time to Peak (min.)	Peak Flow (cfs)	Total Volume (c.f.)	Runoff per Unit Area (cfs/acre)
A5A	Existing 100-yr Storm	0.156	0.255	58.1	12.85	30.2	9.08	21.4	163	733,623	1.84	1,349,173	60.0	248	1,349,302	1.23
A10	Existing 100-yr Storm	0.156	0.267	77.7	17.43	40.4	12.31	29.0	143	858,967	1.84	1,579,688	70.0	233	1,579,673	0.99
A11	Existing 100-yr Storm	0.156	0.261	79.0	17.35	41.1	12.26	28.9	131	800,560	1.84	1,472,275	70.0	215	1,472,127	0.97

PROPOSED 5-YR

Summary of CUHP Input Parameters (Version 2.0.0)

								Depression Storage		Horton's Infiltration Parameters			DCIA Level and Fractions			
Catchment Name/ID	SWMM Node/ID	Raingage Name/ID	Area (sq.mi.)	Dist. to Centroid (miles)	Length (miles)	Slope (ft./ft.)	Percent Imperv.	Pervious (inches)	Imperv. (inches)	Initial Rate (in./hr.)	Final Rate (in.hr.)	Decay Coeff. (1/sec.)	DCIA Level	Dir. Con'ct Imperv. Fraction	Receiv. Perv. Fraction	Percent Eff. Imperv.
A5A	A5A	5	0.316	0.479	1.072	0.014	2.2	0.35	0.05	3.00	0.50	0.0018	0.00	0.04	0.02	1.78
A10	A10	5	0.370	0.856	1.425	0.019	4.3	0.35	0.05	3.00	0.50	0.0018	0.00	0.09	0.04	3.52
A11	A11	5	0.345	0.785	1.525	0.019	4.3	0.35	0.05	3.00	0.50	0.0018	0.00	0.09	0.04	3.52

PROPOSED 5-YR

Summary of Unit Hydrograph Parameters Used By Program and Calculated Results (Version 2.0.0)

		Unit Hydrograph Parameters and Results									Excess Precip.		Storm Hydrograph			
Catchment Name/ID	User Comment for Catchment	CT	Cp	W50 (min.)	W50 Before Peak	W75 (min.)	W75 Before Peak	Time to Peak (min.)	Peak (cfs)	Volume (c.f)	Excess (inches)	Excess (c.f.)	Time to Peak (min.)	Peak Flow (cfs)	Total Volume (c.f.)	Runoff per Unit Area (cfs/acre)
A5A	Proposed 5-yr Storm	0.156	0.255	58.1	12.86	30.2	9.09	21.4	163	733,623	0.24	174,696	50.0	36	174,712	0.18
A10	Proposed 5-yr Storm	0.150	0.257	77.5	16.78	40.3	11.86	28.0	143	858,967	0.26	222,537	60.0	35	222,533	0.15
A11	Proposed 5-yr Storm	0.150	0.251	78.8	16.71	41.0	11.81	27.9	131	800,560	0.26	207,405	60.0	32	207,385	0.14

PROPOSED 100-YR

Summary of CUHP Input Parameters (Version 2.0.0)

								Depression Storage		Horton's Infiltration Parameters			DCIA Level and Fractions			
Catchment Name/ID	SWMM Node/ID	Raingage Name/ID	Area (sq.mi.)	Dist. to Centroid (miles)	Length (miles)	Slope (ft./ft.)	Percent Imperv.	Pervious (inches)	Imperv. (inches)	Initial Rate (in./hr.)	Final Rate (in.hr.)	Decay Coeff. (1/sec.)	DCIA Level	Dir. Con'ct Imperv. Fraction	Receiv. Perv. Fraction	Percent Eff. Imperv.
A5A	A5A	100	0.316	0.479	1.072	0.014	2.2	0.35	0.05	3.00	0.50	0.0018	0.00	0.04	0.02	2.00
A10	A10	100	0.370	0.856	1.425	0.019	4.3	0.35	0.05	3.00	0.50	0.0018	0.00	0.09	0.04	3.92
A11	A11	100	0.345	0.785	1.525	0.019	4.3	0.35	0.05	3.00	0.50	0.0018	0.00	0.09	0.04	3.92

PROPOSED 100-YR

Summary of Unit Hydrograph Parameters Used By Program and Calculated Results (Version 2.0.0)

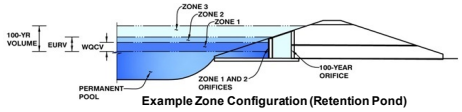
		Unit Hydrograph Parameters and Results									Excess Precip.		Storm Hydrograph			
Catchment Name/ID	User Comment for Catchment	CT	Cp	W50 (min.)	W50 Before Peak	W75 (min.)	W75 Before Peak	Time to Peak (min.)	Peak (cfs)	Volume (c.f)	Excess (inches)	Excess (c.f.)	Time to Peak (min.)	Peak Flow (cfs)	Total Volume (c.f.)	Runoff per Unit Area (cfs/acre)
A5A	Proposed 100-yr Storm	0.156	0.254	58.1	12.81	30.2	9.05	21.3	163	733,623	1.84	1,350,808	60.0	248	1,350,947	1.23
A10	Proposed 100-yr Storm	0.148	0.254	77.5	16.63	40.3	11.75	27.7	143	858,967	1.86	1,601,749	70.0	236	1,601,695	1.00
A11	Proposed 100-yr Storm	0.148	0.249	78.7	16.56	40.9	11.70	27.6	131	800,560	1.86	1,492,836	70.0	217	1,492,709	0.98

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.03 (May 2020)

Project: Front Range - Midway Solar Project

Basin ID: Basin A1



Example Zone Configuration (Retention Pond)

Watershed Information

Selected BMP Type =	**EDB**	
Watershed Area =	31.30	acres
Watershed Length =	1,470	ft
Watershed Length to Centroid =	530	ft
Watershed Slope =	0.026	ft/ft
Watershed Imperviousness =	5.70%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	0.0%	percent
Percentage Hydrologic Soil Groups C/D =	100.0%	percent
Target WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	User Input	

After providing required inputs above including 1-hour rainfall depths, click 'Run CUHP' to generate runoff hydrographs using the embedded Colorado Urban Hydrograph Procedure.

			Optional User Overrides
Water Quality Capture Volume (WQCV) =	0.106	acre-feet	acre-feet
Excess Urban Runoff Volume (EURV) =	0.142	acre-feet	acre-feet
2-yr Runoff Volume (P1 = 1.01 in.) =	0.209	acre-feet	1.01 inches
5-yr Runoff Volume (P1 = 1.3 in.) =	0.706	acre-feet	1.30 inches
10-yr Runoff Volume (P1 = 1.57 in.) =	1.295	acre-feet	1.57 inches
25-yr Runoff Volume (P1 = 2.01 in.) =	2.582	acre-feet	2.01 inches
50-yr Runoff Volume (P1 = 2.4 in.) =	3.589	acre-feet	2.40 inches
100-yr Runoff Volume (P1 = 2.82 in.) =	4.886	acre-feet	2.82 inches
500-yr Runoff Volume (P1 = 3.98 in.) =	8.083	acre-feet	3.98 inches
Approximate 2-yr Detention Volume =	0.095	acre-feet	
Approximate 5-yr Detention Volume =	0.300	acre-feet	
Approximate 10-yr Detention Volume =	0.455	acre-feet	
Approximate 25-yr Detention Volume =	0.605	acre-feet	
Approximate 50-yr Detention Volume =	0.651	acre-feet	
Approximate 100-yr Detention Volume =	1.002	acre-feet	

Define Zones and Basin Geometry

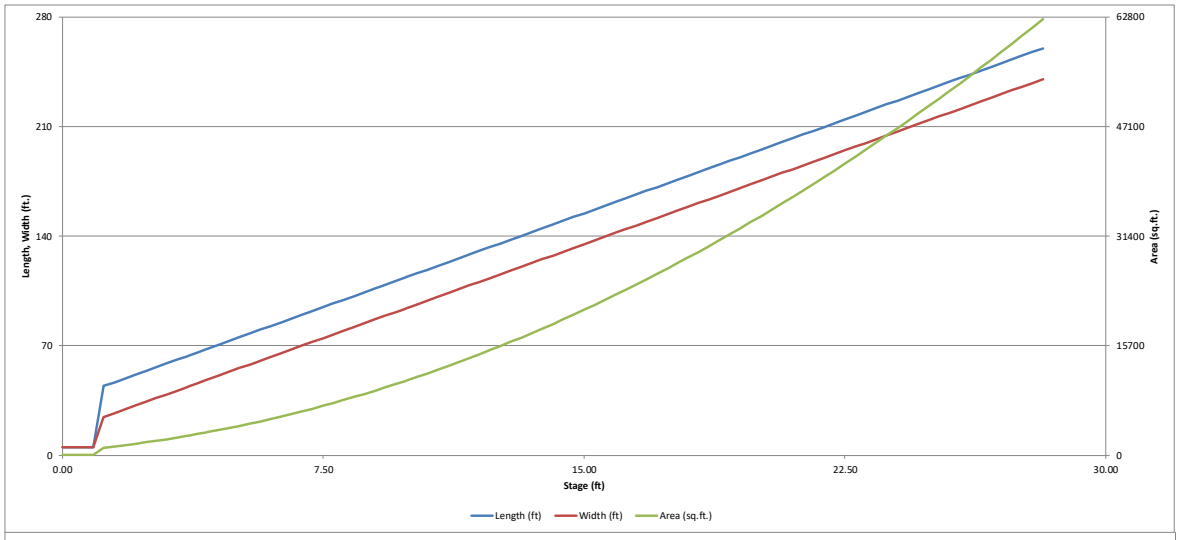
Zone 1 Volume (WQCV) =	0.106	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.036	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	0.860	acre-feet
Total Detention Basin Volume =	1.002	acre-feet
Initial Surcharge Volume (ISV) =	14	ft^3
Initial Surcharge Depth (ISD) =	0.50	ft
Total Available Detention Depth (H_{total}) =	9.90	ft
Depth of Trickle Channel (H_{TC}) =	0.50	ft
Slope of Trickle Channel (S_{TC}) =	0.005	ft/ft
Slopes of Main Basin Sides (S_{main}) =	4	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	2	
Initial Surcharge Area (A_{ISV}) =	28	ft^2
Surcharge Volume Length (L_{ISV}) =	5.3	ft
Surcharge Volume Width (W_{ISV}) =	5.3	ft
Depth of Basin Floor (H_{FLOOR}) =	0.19	ft
Length of Basin Floor (L_{FLOOR}) =	44.0	ft
Width of Basin Floor (W_{FLOOR}) =	24.3	ft
Area of Basin Floor (A_{FLOOR}) =	1,069	ft^2
Volume of Basin Floor (V_{FLOOR}) =	80	ft^3
Depth of Main Basin (H_{MAIN}) =	8.71	ft
Length of Main Basin (L_{MAIN}) =	113.7	ft
Width of Main Basin (W_{MAIN}) =	94.0	ft
Area of Main Basin (A_{MAIN}) =	10,683	ft^2
Volume of Main Basin (V_{MAIN}) =	43,930	ft^3
Calculated Total Basin Volume (V_{total}) =	**1.011**	acre-feet

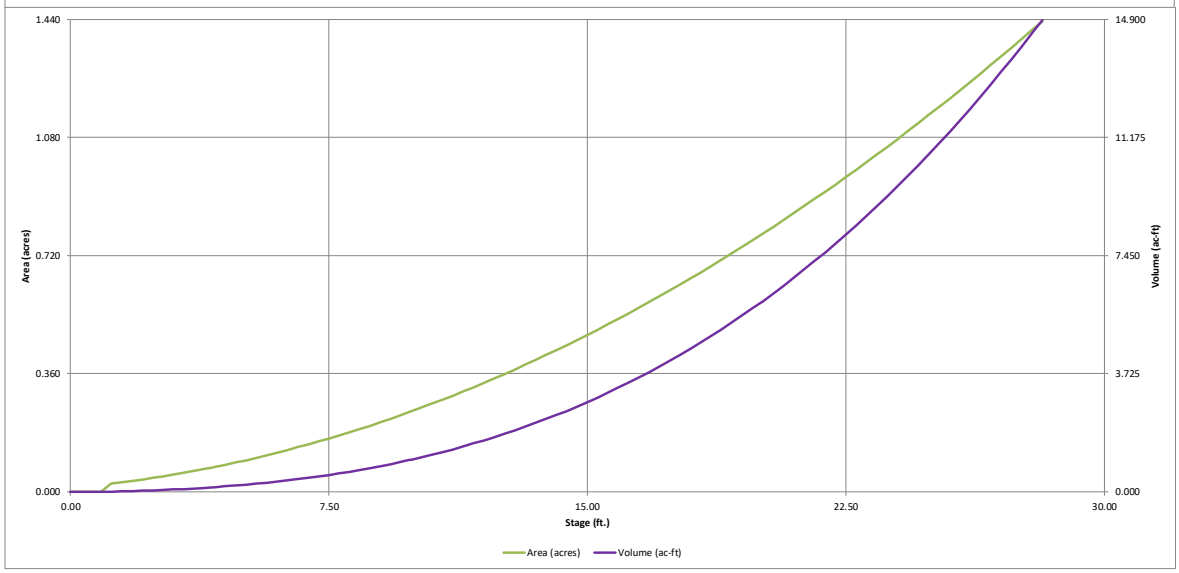
Depth Increment = 0.30 ft

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		5.3	5.3	28		0.001		
ISV	0.50		5.3	5.3	28		0.001	14	0.000
	0.60		5.3	5.3	28		0.001	17	0.000
	0.90		5.3	5.3	28		0.001	25	0.001
Floor	1.19		44.0	24.3	1,069		0.025	109	0.002
	1.20		44.1	24.4	1,074		0.025	119	0.003
	1.50		46.5	26.8	1,244		0.029	467	0.011
	1.80		48.9	29.2	1,426		0.033	867	0.020
	2.10		51.3	31.6	1,619		0.037	1,323	0.030
	2.40		53.7	34.0	1,824		0.042	1,840	0.042
	2.70		56.1	36.4	2,040		0.047	2,419	0.056
	3.00		58.5	38.8	2,267		0.052	3,065	0.070
	3.30		60.9	41.2	2,507		0.058	3,780	0.087
	3.60		63.3	43.6	2,757		0.063	4,570	0.105
Zone 1 (WQCV)	3.63		63.6	43.8	2,783		0.064	4,653	0.107
	3.90		65.7	46.0	3,020		0.069	5,436	0.125
Zone 2 (EURV)	4.14		67.6	47.9	3,238		0.074	6,187	0.142
	4.20		68.1	48.4	3,293		0.076	6,383	0.147
	4.50		70.5	50.8	3,579		0.082	7,413	0.170
	4.80		72.9	53.2	3,875		0.089	8,531	0.196
	5.10		75.3	55.6	4,184		0.096	9,739	0.224
	5.40		77.7	58.0	4,503		0.103	11,042	0.253
	5.70		80.1	60.4	4,835		0.111	12,443	0.286
	6.00		82.5	62.8	5,178		0.119	13,944	0.320
	6.30		84.9	65.2	5,532		0.127	15,550	0.357
	6.60		87.3	67.6	5,898		0.135	17,265	0.396
	6.90		89.7	70.0	6,275		0.144	19,090	0.438
	7.20		92.1	72.4	6,664		0.153	21,031	0.483
	7.50		94.5	74.8	7,065		0.162	23,090	0.530
	7.80		96.9	77.2	7,477		0.172	25,271	0.580
	8.10		99.3	79.6	7,900		0.181	27,577	0.633
	8.40		101.7	82.0	8,335		0.191	30,013	0.689
	8.70		104.1	84.4	8,782		0.202	32,580	0.748
	9.00		106.5	86.8	9,240		0.212	35,283	0.810
	9.30		108.9	89.2	9,710		0.223	38,125	0.875
	9.60		111.3	91.6	10,191		0.234	41,110	0.944
Zone 3 (100-year)	9.85		113.3	93.6	10,600		0.243	43,708	1.003
	9.90		113.7	94.0	10,683		0.245	44,241	1.016
	10.20		116.1	96.4	11,188		0.257	47,521	1.091
	10.50		118.5	98.8	11,703		0.269	50,954	1.170
	10.80		120.9	101.2	12,230		0.281	54,544	1.252
	11.10		123.3	103.6	12,769		0.293	58,294	1.338
	11.40		125.7	106.0	13,319		0.306	62,207	1.428
	11.70		128.1	108.4	13,881		0.319	66,286	1.522
	12.00		130.5	110.8	14,454		0.332	70,536	1.619
	12.30		132.9	113.2	15,039		0.345	74,960	1.721
	12.60		135.3	115.6	15,635		0.359	79,561	1.826
	12.90		137.7	118.0	16,243		0.373	84,343	1.936
	13.20		140.1	120.4	16,863		0.387	89,308	2.050
	13.50		142.5	122.8	17,493		0.402	94,461	2.169
	13.80		144.9	125.2	18,136		0.416	99,805	2.291
	14.10		147.3	127.6	18,790		0.431	105,344	2.418
	14.40		149.7	130.0	19,455		0.447	111,080	2.550
	14.70		152.1	132.4	20,132		0.462	117,018	2.686
	15.00		154.5	134.8	20,821		0.478	123,161	2.827
	15.30		156.9	137.2	21,521		0.494	129,512	2.973
	15.60		159.3	139.6	22,232		0.510	136,074	3.124
	15.90		161.7	142.0	22,955		0.527	142,852	3.279
	16.20		164.1	144.4	23,690		0.544	149,849	3.440
	16.50		166.5	146.8	24,436		0.561	157,067	3.606
	16.80		168.9	149.2	25,193		0.578	164,511	3.777
	17.10		171.3	151.6	25,962		0.596	172,184	3.953
	17.40		173.7	154.0	26,743		0.614	180,090	4.134
	17.70		176.1	156.4	27,535		0.632	188,231	4.321
	18.00		178.5	158.8	28,339		0.651	196,612	4.514
	18.30		180.9	161.2	29,154		0.669	205,236	4.712
	18.60		183.3	163.6	29,981		0.688	214,106	4.915
	18.90		185.7	166.0	30,819		0.708	223,226	5.125
	19.20		188.1	168.4	31,669		0.727	232,598	5.340
	19.50		190.5	170.8	32,530		0.747	242,228	5.561
	19.80		192.9	173.2	33,403		0.767	252,118	5.788
	20.10		195.3	175.6	34,287		0.787	262,271	6.021
	20.40		197.7	178.0	35,183		0.808	272,691	6.260
	20.70		200.1	180.4	36,090		0.829	283,382	6.506
	21.00		202.5	182.8	37,009		0.850	294,347	6.757
	21.30		204.9	185.2	37,940		0.871	305,589	7.015
	21.60		207.3	187.6	38,882		0.893	317,111	7.280
	21.90		209.7	190.0	39,835		0.914	328,919	7.551
	22.20		212.1	192.4	40,800		0.937	341,014	7.829
	22.50		214.5	194.8	41,776		0.959	353,400	8.113
	22.80		216.9	197.2	42,764		0.982	366,081	8.404
	23.10		219.3	199.6	43,764		1.005	379,060	8.702
	23.40		221.7	202.0	44,775		1.028	392,340	9.007
	23.70		224.1	204.4	45,797		1.051	405,926	9.319
	24.00		226.5	206.8	46,832		1.075	419,820	9.638
	24.30		228.9	209.2	47,877		1.099	434,026	9.964
	24.60		231.3	211.6	48,934		1.123	448,547	10.297
	24.90		233.7	214.0	50,003		1.148	463,388	10.638
	25.20		236.1	216.4	51,083		1.173	478,550	10.986
	25.50		238.5	218.8	52,175		1.198	494,039	11.342
	25.80		240.9	221.2	53,278		1.223	509,856	11.705
	26.10		243.3	223.6	54,393		1.249	526,006	12.075
	26.40		245.7	226.0	55,519		1.275	542,493	12.454
	26.70		248.1	228.4	56,657		1.301	559,319	12.840
	27.00		250.5	230.8	57,806		1.327	576,488	13.234
	27.30		252.9	233.2	58,967		1.354	594,004	13.636
	27.60		255.3	235.6	60,139		1.381	611,869	14.047
	27.90		257.7	238.0	61,323		1.408	630,088	14.465
	28.20		260.1	240.4	62,518		1.435	648,664	14.891

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.03 (May 2020)



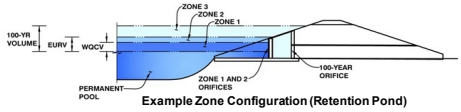


DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.03 (May 2020)

Project: Front Range - Midway Solar Project

Basin ID: Basin A2



Example Zone Configuration (Retention Pond)

Watershed Information

Selected BMP Type =	**EDB**	
Watershed Area =	72.65	acres
Watershed Length =	1,964	ft
Watershed Length to Centroid =	927	ft
Watershed Slope =	0.011	ft/ft
Watershed Imperviousness =	7.20%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	0.0%	percent
Percentage Hydrologic Soil Groups C/D =	100.0%	percent
Target WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	User Input	

After providing required inputs above including 1-hour rainfall depths, click 'Run CUHP' to generate runoff hydrographs using the embedded Colorado Urban Hydrograph Procedure.

			Optional User Overrides
Water Quality Capture Volume (WQCV) =	0.305	acre-feet	acre-feet
Excess Urban Runoff Volume (EURV) =	0.424	acre-feet	acre-feet
2-yr Runoff Volume (P1 = 1.01 in.) =	0.556	acre-feet	1.01 inches
5-yr Runoff Volume (P1 = 1.3 in.) =	1.732	acre-feet	1.30 inches
10-yr Runoff Volume (P1 = 1.57 in.) =	3.114	acre-feet	1.57 inches
25-yr Runoff Volume (P1 = 2.01 in.) =	6.107	acre-feet	2.01 inches
50-yr Runoff Volume (P1 = 2.4 in.) =	8.456	acre-feet	2.40 inches
100-yr Runoff Volume (P1 = 2.82 in.) =	11.469	acre-feet	2.82 inches
500-yr Runoff Volume (P1 = 3.98 in.) =	18.917	acre-feet	3.98 inches
Approximate 2-yr Detention Volume =	0.286	acre-feet	
Approximate 5-yr Detention Volume =	0.805	acre-feet	
Approximate 10-yr Detention Volume =	1.174	acre-feet	
Approximate 25-yr Detention Volume =	1.574	acre-feet	
Approximate 50-yr Detention Volume =	1.711	acre-feet	
Approximate 100-yr Detention Volume =	2.578	acre-feet	

Define Zones and Basin Geometry

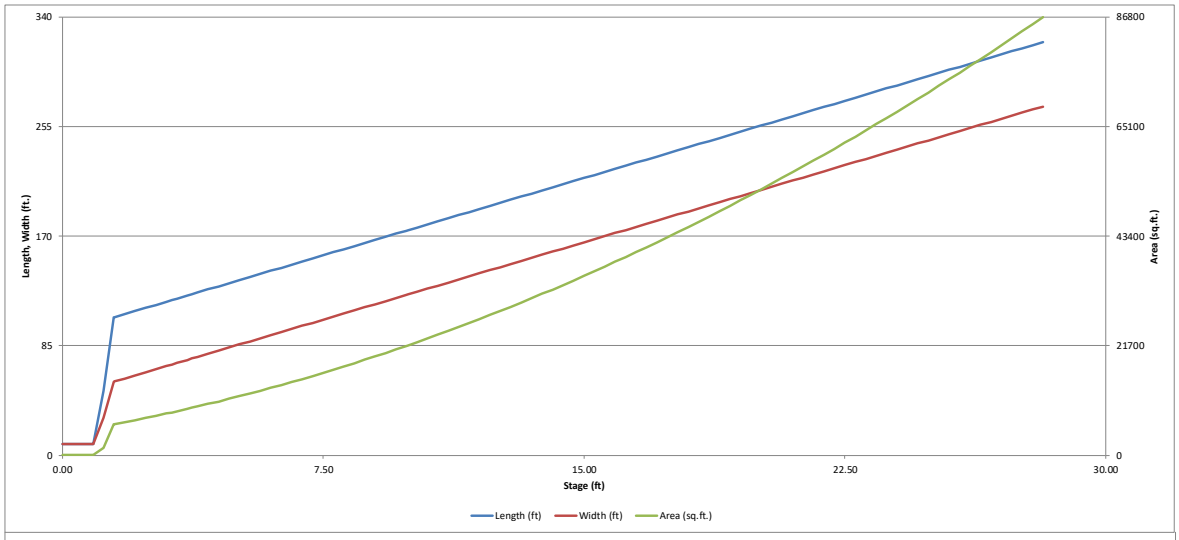
Zone 1 Volume (WQCV) =	0.305	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.119	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	2.154	acre-feet
Total Detention Basin Volume =	2.578	acre-feet
Initial Surcharge Volume (ISV) =	40	ft^3
Initial Surcharge Depth (ISD) =	0.50	ft
Total Available Detention Depth (H_{total}) =	9.90	ft
Depth of Trickle Channel (H_{TC}) =	0.50	ft
Slope of Trickle Channel (S_{TC}) =	0.005	ft/ft
Slopes of Main Basin Sides (S_{main}) =	4	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	2	
Initial Surcharge Area (A_{ISV}) =	80	ft^2
Surcharge Volume Length (L_{ISV}) =	8.9	ft
Surcharge Volume Width (W_{ISV}) =	8.9	ft
Depth of Basin Floor (H_{FLOOR}) =	0.48	ft
Length of Basin Floor (L_{FLOOR}) =	106.8	ft
Width of Basin Floor (W_{FLOOR}) =	56.9	ft
Area of Basin Floor (A_{FLOOR}) =	6,082	ft^2
Volume of Basin Floor (V_{FLOOR}) =	1,097	ft^3
Depth of Main Basin (H_{MAIN}) =	8.42	ft
Length of Main Basin (L_{MAIN}) =	174.2	ft
Width of Main Basin (W_{MAIN}) =	124.3	ft
Area of Main Basin (A_{MAIN}) =	21,651	ft^2
Volume of Main Basin (V_{MAIN}) =	110,044	ft^3
Calculated Total Basin Volume (V_{total}) =	**2.553**	acre-feet

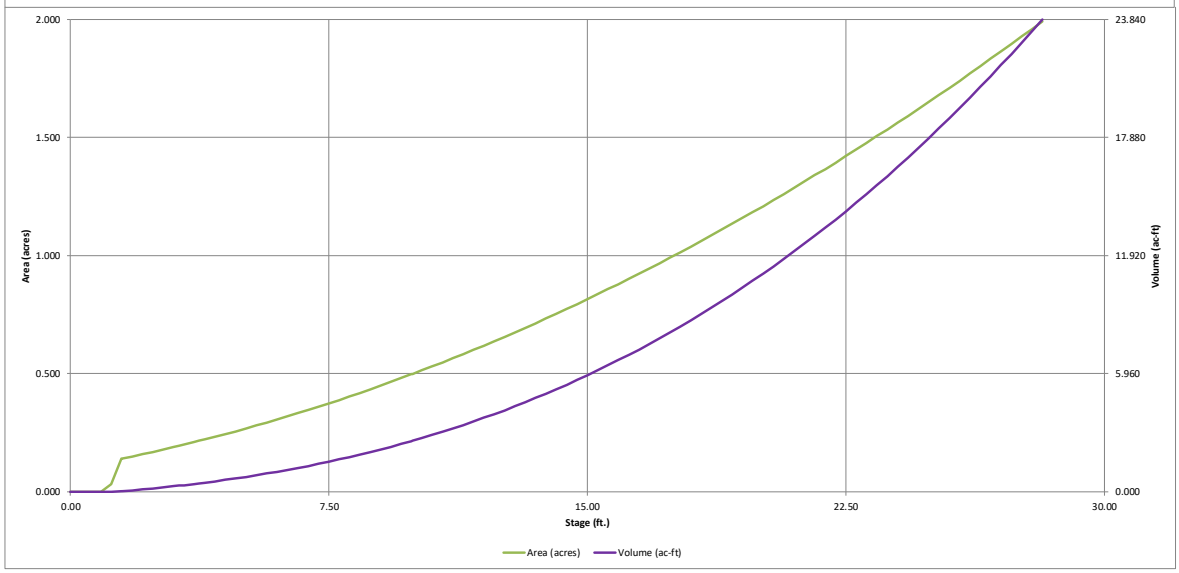
Depth Increment = 0.30 ft

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		8.9	8.9	80		0.002		
ISV	0.50		8.9	8.9	80		0.002	40	0.001
	0.60		8.9	8.9	80		0.002	48	0.001
	0.90		8.9	8.9	80		0.002	72	0.002
	1.20		49.7	28.9	1,438		0.033	204	0.005
Floor	1.48		106.8	56.9	6,082		0.140	1,182	0.027
	1.50		107.0	57.1	6,108		0.140	1,304	0.030
	1.80		109.4	59.5	6,508		0.149	3,196	0.073
	2.10		111.8	61.9	6,919		0.159	5,210	0.120
	2.40		114.2	64.3	7,342		0.169	7,349	0.169
	2.70		116.6	66.7	7,776		0.179	9,616	0.221
	3.00		119.0	69.1	8,221		0.189	12,015	0.276
Zone 1 (WQCV)	3.16		120.3	70.4	8,464		0.194	13,350	0.306
	3.30		121.4	71.5	8,678		0.199	14,550	0.334
	3.60		123.8	73.9	9,147		0.210	17,224	0.395
Zone 2 (EURV)	3.74		124.9	75.0	9,370		0.215	18,520	0.425
	3.90		126.2	76.3	9,627		0.221	20,040	0.460
	4.20		128.6	78.7	10,119		0.232	23,001	0.528
	4.50		131.0	81.1	10,622		0.244	26,112	0.599
	4.80		133.4	83.5	11,137		0.256	29,376	0.674
	5.10		135.8	85.9	11,663		0.268	32,796	0.753
	5.40		138.2	88.3	12,201		0.280	36,375	0.835
	5.70		140.6	90.7	12,751		0.293	40,117	0.921
	6.00		143.0	93.1	13,311		0.306	44,026	1.011
	6.30		145.4	95.5	13,884		0.319	48,105	1.104
	6.60		147.8	97.9	14,468		0.332	52,358	1.202
	6.90		150.2	100.3	15,063		0.346	56,787	1.304
	7.20		152.6	102.7	15,670		0.360	61,397	1.409
	7.50		155.0	105.1	16,288		0.374	66,190	1.520
	7.80		157.4	107.5	16,918		0.388	71,171	1.634
	8.10		159.8	109.9	17,560		0.403	76,343	1.753
	8.40		162.2	112.3	18,213		0.418	81,708	1.876
	8.70		164.6	114.7	18,877		0.433	87,272	2.003
	9.00		167.0	117.1	19,554		0.449	93,036	2.136
	9.30		169.4	119.5	20,241		0.465	99,005	2.273
	9.60		171.8	121.9	20,940		0.481	105,182	2.415
	9.90		174.2	124.3	21,651		0.497	111,570	2.561
Zone 3 (100-year)	9.94		174.5	124.6	21,746		0.499	112,438	2.581
	10.20		176.6	126.7	22,373		0.514	118,173	2.713
	10.50		179.0	129.1	23,107		0.530	124,995	2.869
	10.80		181.4	131.5	23,852		0.548	132,038	3.031
	11.10		183.8	133.9	24,608		0.565	139,307	3.198
	11.40		186.2	136.3	25,377		0.583	146,805	3.370
	11.70		188.6	138.7	26,156		0.600	154,534	3.548
	12.00		191.0	141.1	26,948		0.619	162,500	3.730
	12.30		193.4	143.5	27,750		0.637	170,704	3.919
	12.60		195.8	145.9	28,565		0.656	179,151	4.113
	12.90		198.2	148.3	29,391		0.675	187,844	4.312
	13.20		200.6	150.7	30,228		0.694	196,786	4.518
	13.50		203.0	153.1	31,077		0.713	205,982	4.729
	13.80		205.4	155.5	31,937		0.733	215,434	4.946
	14.10		207.8	157.9	32,809		0.753	225,145	5.169
	14.40		210.2	160.3	33,692		0.773	235,120	5.398
	14.70		212.6	162.7	34,587		0.794	245,362	5.633
	15.00		215.0	165.1	35,494		0.815	255,874	5.874
	15.30		217.4	167.5	36,412		0.836	266,659	6.122
	15.60		219.8	169.9	37,341		0.857	277,722	6.376
	15.90		222.2	172.3	38,282		0.879	289,065	6.636
	16.20		224.6	174.7	39,235		0.901	300,692	6.903
	16.50		227.0	177.1	40,199		0.923	312,607	7.176
	16.80		229.4	179.5	41,174		0.945	324,813	7.457
	17.10		231.8	181.9	42,161		0.968	337,313	7.744
	17.40		234.2	184.3	43,160		0.991	350,111	8.037
	17.70		236.6	186.7	44,170		1.014	363,210	8.338
	18.00		239.0	189.1	45,192		1.037	376,614	8.646
	18.30		241.4	191.5	46,225		1.061	390,326	8.961
	18.60		243.8	193.9	47,270		1.085	404,350	9.283
	18.90		246.2	196.3	48,326		1.109	418,689	9.612
	19.20		248.6	198.7	49,394		1.134	433,347	9.948
	19.50		251.0	201.1	50,473		1.159	448,327	10.292
	19.80		253.4	203.5	51,564		1.184	463,632	10.644
	20.10		255.8	205.9	52,666		1.209	479,266	11.002
	20.40		258.2	208.3	53,780		1.235	495,233	11.369
	20.70		260.6	210.7	54,905		1.260	511,535	11.743
	21.00		263.0	213.1	56,042		1.287	528,177	12.125
	21.30		265.4	215.5	57,190		1.313	545,161	12.515
	21.60		267.8	217.9	58,350		1.340	562,492	12.913
	21.90		270.2	220.3	59,522		1.366	580,173	13.319
	22.20		272.6	222.7	60,705		1.394	598,206	13.733
	22.50		275.0	225.1	61,899		1.421	616,597	14.155
	22.80		277.4	227.5	63,105		1.449	635,347	14.586
	23.10		279.8	229.9	64,323		1.477	654,461	15.024
	23.40		282.2	232.3	65,552		1.505	673,942	15.472
	23.70		284.6	234.7	66,792		1.533	693,793	15.927
	24.00		287.0	237.1	68,044		1.562	714,018	16.392
	24.30		289.4	239.5	69,308		1.591	734,620	16.865
	24.60		291.8	241.9	70,583		1.620	755,604	17.346
	24.90		294.2	244.3	71,869		1.650	776,971	17.837
	25.20		296.6	246.7	73,168		1.680	798,726	18.336
	25.50		299.0	249.1	74,477		1.710	820,873	18.845
	25.80		301.4	251.5	75,798		1.740	843,414	19.362
	26.10		303.8	253.9	77,131		1.771	866,353	19.889
	26.40		306.2	256.3	78,475		1.802	889,694	20.425
	26.70		308.6	258.7	79,831		1.833	913,439	20.970
	27.00		311.0	261.1	81,198		1.864	937,593	21.524
	27.30		313.4	263.5	82,577		1.896	962,159	22.088
	27.60		315.8	265.9	83,967		1.928	987,141	22.662
	27.90		318.2	268.3	85,369		1.960	1,012,541	23.245
	28.20		320.6	270.7	86,782		1.992	1,038,363	23.838

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.03 (May 2020)



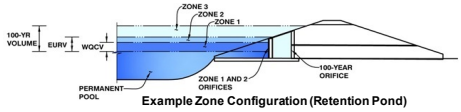


DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.03 (May 2020)

Project: Front Range - Midway Solar Project

Basin ID: Basin A5B



Example Zone Configuration (Retention Pond)

Watershed Information

Selected BMP Type =	**EDB**	
Watershed Area =	10.74	acres
Watershed Length =	1,208	ft
Watershed Length to Centroid =	514	ft
Watershed Slope =	0.033	ft/ft
Watershed Imperviousness =	10.70%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	0.0%	percent
Percentage Hydrologic Soil Groups C/D =	100.0%	percent
Target WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	User Input	

After providing required inputs above including 1-hour rainfall depths, click 'Run CUHP' to generate runoff hydrographs using the embedded Colorado Urban Hydrograph Procedure.

			Optional User Overrides
Water Quality Capture Volume (WQCV) =	0.064	acre-feet	acre-feet
Excess Urban Runoff Volume (EURV) =	0.096	acre-feet	acre-feet
2-yr Runoff Volume (P1 = 1.01 in.) =	0.107	acre-feet	1.01 inches
5-yr Runoff Volume (P1 = 1.3 in.) =	0.286	acre-feet	1.30 inches
10-yr Runoff Volume (P1 = 1.57 in.) =	0.493	acre-feet	1.57 inches
25-yr Runoff Volume (P1 = 2.01 in.) =	0.933	acre-feet	2.01 inches
50-yr Runoff Volume (P1 = 2.4 in.) =	1.280	acre-feet	2.40 inches
100-yr Runoff Volume (P1 = 2.82 in.) =	1.722	acre-feet	2.82 inches
500-yr Runoff Volume (P1 = 3.98 in.) =	2.820	acre-feet	3.98 inches
Approximate 2-yr Detention Volume =	0.066	acre-feet	
Approximate 5-yr Detention Volume =	0.157	acre-feet	
Approximate 10-yr Detention Volume =	0.213	acre-feet	
Approximate 25-yr Detention Volume =	0.286	acre-feet	
Approximate 50-yr Detention Volume =	0.315	acre-feet	
Approximate 100-yr Detention Volume =	0.457	acre-feet	

Define Zones and Basin Geometry

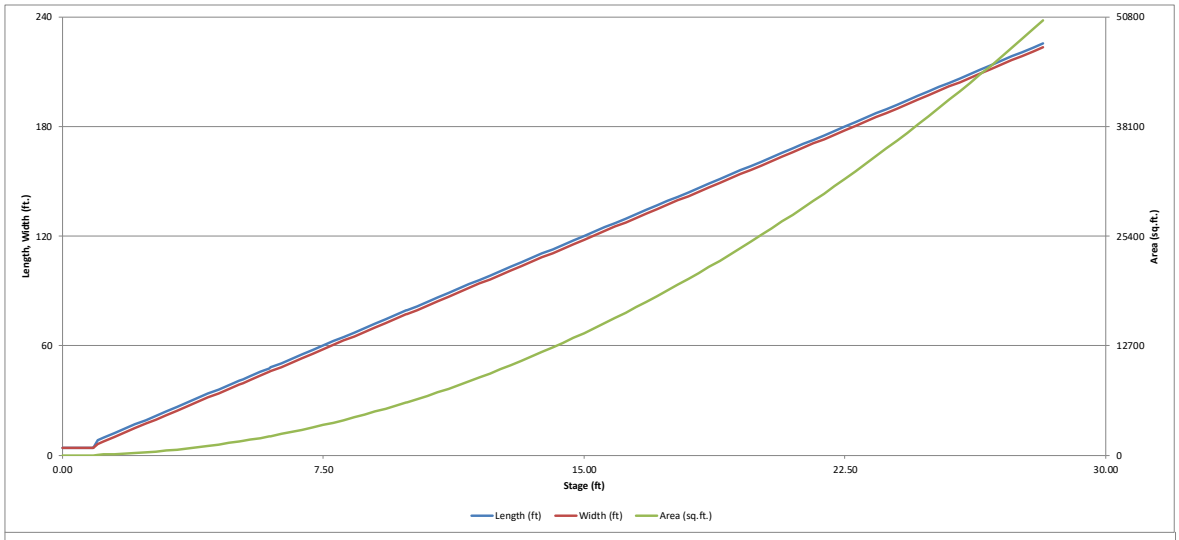
Zone 1 Volume (WQCV) =	0.064	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.033	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	0.361	acre-feet
Total Detention Basin Volume =	0.457	acre-feet
Initial Surcharge Volume (ISV) =	8	ft^3
Initial Surcharge Depth (ISD) =	0.50	ft
Total Available Detention Depth (H_{total}) =	9.90	ft
Depth of Trickle Channel (H_{TC}) =	0.50	ft
Slope of Trickle Channel (S_{TC}) =	0.005	ft/ft
Slopes of Main Basin Sides (S_{main}) =	4	H:V
Basin Length-to-Width Ratio (R_{LW}) =	2	
Initial Surcharge Area (A_{ISV}) =	17	ft^2
Surcharge Volume Length (L_{ISV}) =	4.1	ft
Surcharge Volume Width (W_{ISV}) =	4.1	ft
Depth of Basin Floor (H_{FLOOR}) =	0.02	ft
Length of Basin Floor (L_{FLOOR}) =	8.2	ft
Width of Basin Floor (W_{FLOOR}) =	6.1	ft
Area of Basin Floor (A_{FLOOR}) =	50	ft^2
Volume of Basin Floor (V_{FLOOR}) =	1	ft^3
Depth of Main Basin (H_{MAIN}) =	8.88	ft
Length of Main Basin (L_{MAIN}) =	79.2	ft
Width of Main Basin (W_{MAIN}) =	77.1	ft
Area of Main Basin (A_{MAIN}) =	6,107	ft^2
Volume of Main Basin (V_{MAIN}) =	19,851	ft^3
Calculated Total Basin Volume (V_{total}) =	**0.456**	acre-feet

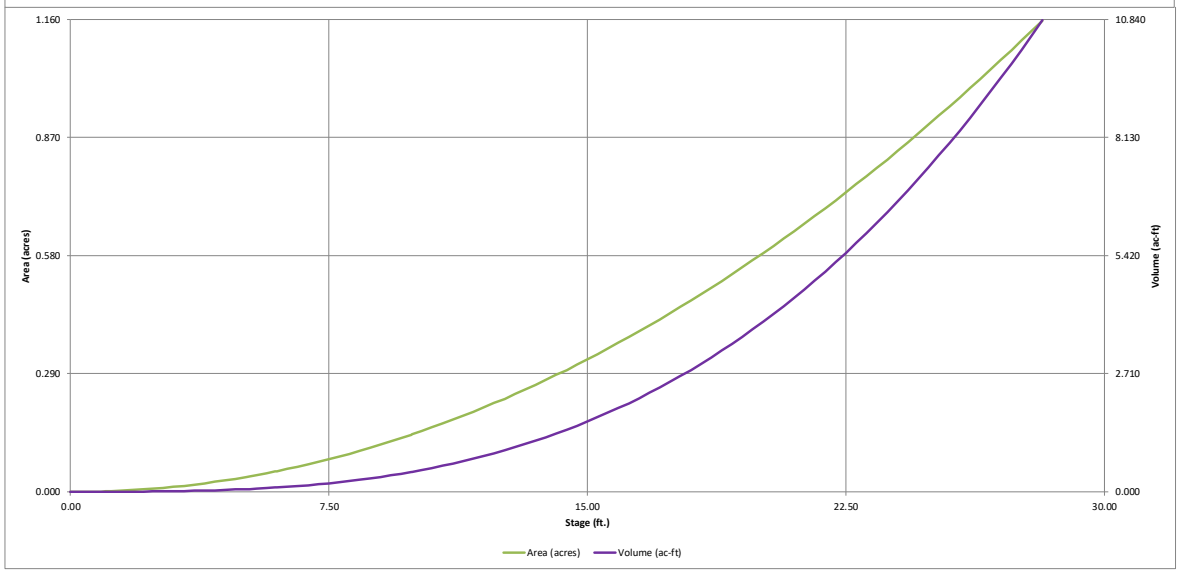
Depth Increment = 0.30 ft

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		4.1	4.1	17		0.000		
ISV	0.50		4.1	4.1	17		0.000	8	0.000
	0.60		4.1	4.1	17		0.000	10	0.000
	0.90		4.1	4.1	17		0.000	15	0.000
Floor	1.02		8.2	6.1	50		0.001	17	0.000
	1.20		9.6	7.5	72		0.002	28	0.001
	1.50		12.0	9.9	119		0.003	56	0.001
	1.80		14.4	12.3	177		0.004	101	0.002
	2.10		16.8	14.7	247		0.006	164	0.004
	2.40		19.2	17.1	328		0.008	250	0.006
	2.70		21.6	19.5	421		0.010	362	0.008
	3.00		24.0	21.9	526		0.012	504	0.012
	3.30		26.4	24.3	642		0.015	679	0.016
	3.60		28.8	26.7	769		0.018	890	0.020
	3.90		31.2	29.1	908		0.021	1,142	0.026
	4.20		33.6	31.5	1,059		0.024	1,436	0.033
	4.50		36.0	33.9	1,221		0.028	1,778	0.041
	4.80		38.4	36.3	1,394		0.032	2,170	0.050
	5.10		40.8	38.7	1,579		0.036	2,616	0.060
Zone 1 (WQCV)	5.20		41.6	39.5	1,644		0.038	2,777	0.064
	5.40		43.2	41.1	1,776		0.041	3,119	0.072
	5.70		45.6	43.5	1,984		0.046	3,682	0.085
Zone 2 (EURV)	5.95		47.6	45.5	2,166		0.050	4,201	0.096
	6.00		48.0	45.9	2,204		0.051	4,310	0.099
	6.30		50.4	48.3	2,435		0.056	5,006	0.115
	6.60		52.8	50.7	2,677		0.061	5,772	0.133
	6.90		55.2	53.1	2,932		0.067	6,613	0.152
	7.20		57.6	55.5	3,197		0.073	7,532	0.173
	7.50		60.0	57.9	3,474		0.080	8,533	0.196
	7.80		62.4	60.3	3,763		0.086	9,618	0.221
	8.10		64.8	62.7	4,063		0.093	10,792	0.248
	8.40		67.2	65.1	4,375		0.100	12,057	0.277
	8.70		69.6	67.5	4,699		0.108	13,418	0.308
	9.00		72.0	69.9	5,033		0.116	14,878	0.342
	9.30		74.4	72.3	5,380		0.124	16,439	0.377
	9.60		76.8	74.7	5,738		0.132	18,106	0.416
	9.90		79.2	77.1	6,107		0.140	19,883	0.456
Zone 3 (100-year)	9.91		79.3	77.2	6,119		0.140	19,944	0.458
	10.20		81.6	79.5	6,488		0.149	21,772	0.500
	10.50		84.0	81.9	6,880		0.158	23,777	0.546
	10.80		86.4	84.3	7,284		0.167	25,901	0.595
	11.10		88.8	86.7	7,700		0.177	28,148	0.646
	11.40		91.2	89.1	8,127		0.187	30,522	0.701
	11.70		93.6	91.5	8,565		0.197	33,026	0.758
	12.00		96.0	93.9	9,015		0.207	35,662	0.819
	12.30		98.4	96.3	9,477		0.218	38,436	0.882
	12.60		100.8	98.7	9,950		0.228	41,349	0.949
	12.90		103.2	101.1	10,434		0.240	44,407	1.019
	13.20		105.6	103.5	10,930		0.251	47,611	1.093
	13.50		108.0	105.9	11,438		0.263	50,966	1.170
	13.80		110.4	108.3	11,957		0.274	54,475	1.251
	14.10		112.8	110.7	12,488		0.287	58,142	1.335
	14.40		115.2	113.1	13,030		0.299	61,969	1.423
	14.70		117.6	115.5	13,584		0.312	65,961	1.514
	15.00		120.0	117.9	14,149		0.325	70,120	1.610
	15.30		122.4	120.3	14,726		0.338	74,451	1.709
	15.60		124.8	122.7	15,314		0.352	78,957	1.813
	15.90		127.2	125.1	15,914		0.365	83,641	1.920
	16.20		129.6	127.5	16,525		0.379	88,506	2.032
	16.50		132.0	129.9	17,148		0.394	93,557	2.148
	16.80		134.4	132.3	17,782		0.408	98,796	2.268
	17.10		136.8	134.7	18,428		0.423	104,228	2.393
	17.40		139.2	137.1	19,085		0.438	109,854	2.522
	17.70		141.6	139.5	19,754		0.453	115,680	2.656
	18.00		144.0	141.9	20,435		0.469	121,708	2.794
	18.30		146.4	144.3	21,127		0.485	127,942	2.937
	18.60		148.8	146.7	21,830		0.501	134,385	3.085
	18.90		151.2	149.1	22,545		0.518	141,041	3.238
	19.20		153.6	151.5	23,272		0.534	147,913	3.396
	19.50		156.0	153.9	24,010		0.551	155,005	3.558
	19.80		158.4	156.3	24,759		0.568	162,320	3.726
	20.10		160.8	158.7	25,520		0.586	169,862	3.899
	20.40		163.2	161.1	26,293		0.604	177,634	4.078
	20.70		165.6	163.5	27,077		0.622	185,639	4.262
	21.00		168.0	165.9	27,873		0.640	193,881	4.451
	21.30		170.4	168.3	28,680		0.658	202,363	4.646
	21.60		172.8	170.7	29,498		0.677	211,090	4.846
	21.90		175.2	173.1	30,328		0.696	220,064	5.052
	22.20		177.6	175.5	31,170		0.716	229,288	5.264
	22.50		180.0	177.9	32,023		0.735	238,767	5.481
	22.80		182.4	180.3	32,888		0.755	248,503	5.705
	23.10		184.8	182.7	33,764		0.775	258,501	5.934
	23.40		187.2	185.1	34,652		0.796	268,763	6.170
	23.70		189.6	187.5	35,551		0.816	279,293	6.412
	24.00		192.0	189.9	36,462		0.837	290,095	6.660
	24.30		194.4	192.3	37,385		0.858	301,172	6.914
	24.60		196.8	194.7	38,319		0.880	312,527	7.175
	24.90		199.2	197.1	39,264		0.901	324,164	7.442
	25.20		201.6	199.5	40,221		0.923	336,087	7.715
	25.50		204.0	201.9	41,189		0.946	348,298	7.996
	25.80		206.4	204.3	42,169		0.968	360,801	8.283
	26.10		208.8	206.7	43,161		0.991	373,600	8.577
	26.40		211.2	209.1	44,164		1.014	386,699	8.877
	26.70		213.6	211.5	45,178		1.037	400,100	9.185
	27.00		216.0	213.9	46,204		1.061	413,807	9.500
	27.30		218.4	216.3	47,242		1.085	427,823	9.821
	27.60		220.8	218.7	48,291		1.109	442,153	10.150
	27.90		223.2	221.1	49,351		1.133	456,799	10.487
	28.20		225.6	223.5	50,423		1.158	471,765	10.830

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.03 (May 2020)



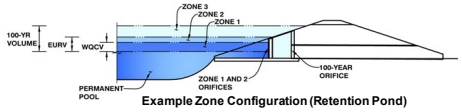


DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.03 (May 2020)

Project: Front Range - Midway Solar Project

Basin ID: Basin A6



Example Zone Configuration (Retention Pond)

Watershed Information

Selected BMP Type =	**EDB**	
Watershed Area =	34.04	acres
Watershed Length =	1,618	ft
Watershed Length to Centroid =	625	ft
Watershed Slope =	0.018	ft/ft
Watershed Imperviousness =	4.80%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	0.0%	percent
Percentage Hydrologic Soil Groups C/D =	100.0%	percent
Target WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	User Input	

After providing required inputs above including 1-hour rainfall depths, click 'Run CUHP' to generate runoff hydrographs using the embedded Colorado Urban Hydrograph Procedure.

			Optional User Overrides
Water Quality Capture Volume (WQCV) =	0.099	acre-feet	acre-feet
Excess Urban Runoff Volume (EURV) =	0.128	acre-feet	acre-feet
2-yr Runoff Volume (P1 = 1.01 in.) =	0.208	acre-feet	1.01 inches
5-yr Runoff Volume (P1 = 1.3 in.) =	0.743	acre-feet	1.30 inches
10-yr Runoff Volume (P1 = 1.57 in.) =	1.381	acre-feet	1.57 inches
25-yr Runoff Volume (P1 = 2.01 in.) =	2.781	acre-feet	2.01 inches
50-yr Runoff Volume (P1 = 2.4 in.) =	3.874	acre-feet	2.40 inches
100-yr Runoff Volume (P1 = 2.82 in.) =	5.286	acre-feet	2.82 inches
500-yr Runoff Volume (P1 = 3.98 in.) =	8.761	acre-feet	3.98 inches
Approximate 2-yr Detention Volume =	0.085	acre-feet	
Approximate 5-yr Detention Volume =	0.295	acre-feet	
Approximate 10-yr Detention Volume =	0.461	acre-feet	
Approximate 25-yr Detention Volume =	0.607	acre-feet	
Approximate 50-yr Detention Volume =	0.648	acre-feet	
Approximate 100-yr Detention Volume =	1.012	acre-feet	

Define Zones and Basin Geometry

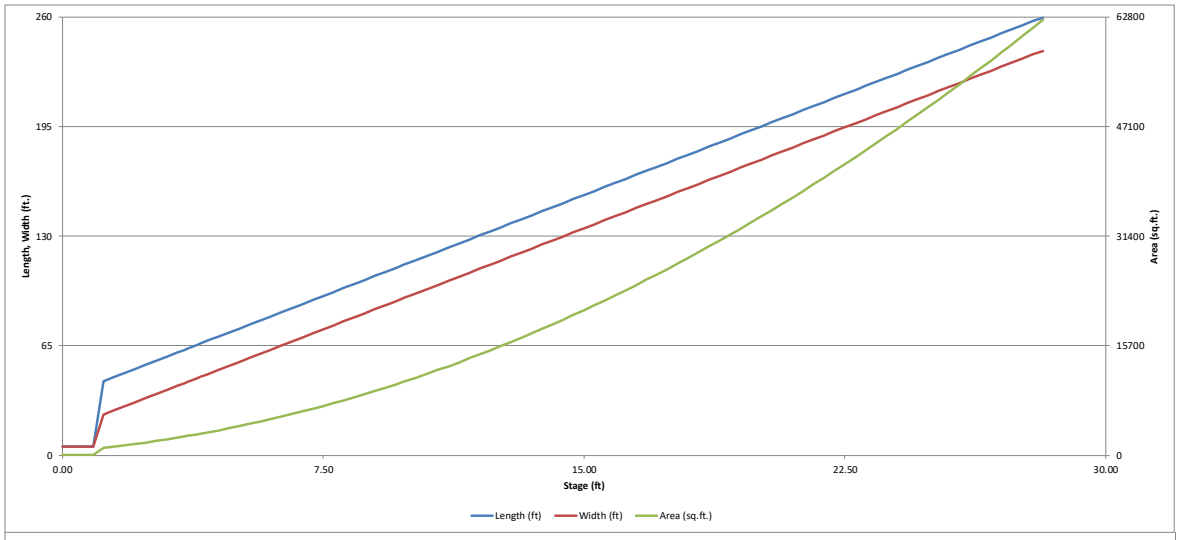
Zone 1 Volume (WQCV) =	0.099	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.029	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	0.884	acre-feet
Total Detention Basin Volume =	1.012	acre-feet
Initial Surcharge Volume (ISV) =	13	ft^3
Initial Surcharge Depth (ISD) =	0.50	ft
Total Available Detention Depth (H_{total}) =	9.90	ft
Depth of Trickle Channel (H_{TC}) =	0.50	ft
Slope of Trickle Channel (S_{TC}) =	0.005	ft/ft
Slopes of Main Basin Sides (S_{main}) =	4	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	2	
Initial Surcharge Area (A_{ISV}) =	26	ft^2
Surcharge Volume Length (L_{ISV}) =	5.1	ft
Surcharge Volume Width (W_{ISV}) =	5.1	ft
Depth of Basin Floor (H_{FLOOR}) =	0.19	ft
Length of Basin Floor (L_{FLOOR}) =	43.8	ft
Width of Basin Floor (W_{FLOOR}) =	24.1	ft
Area of Basin Floor (A_{FLOOR}) =	1,056	ft^2
Volume of Basin Floor (V_{FLOOR}) =	79	ft^3
Depth of Main Basin (H_{MAIN}) =	8.71	ft
Length of Main Basin (L_{MAIN}) =	113.5	ft
Width of Main Basin (W_{MAIN}) =	93.8	ft
Area of Main Basin (A_{MAIN}) =	10,643	ft^2
Volume of Main Basin (V_{MAIN}) =	43,698	ft^3
Calculated Total Basin Volume (V_{total}) =	**1.006**	acre-feet

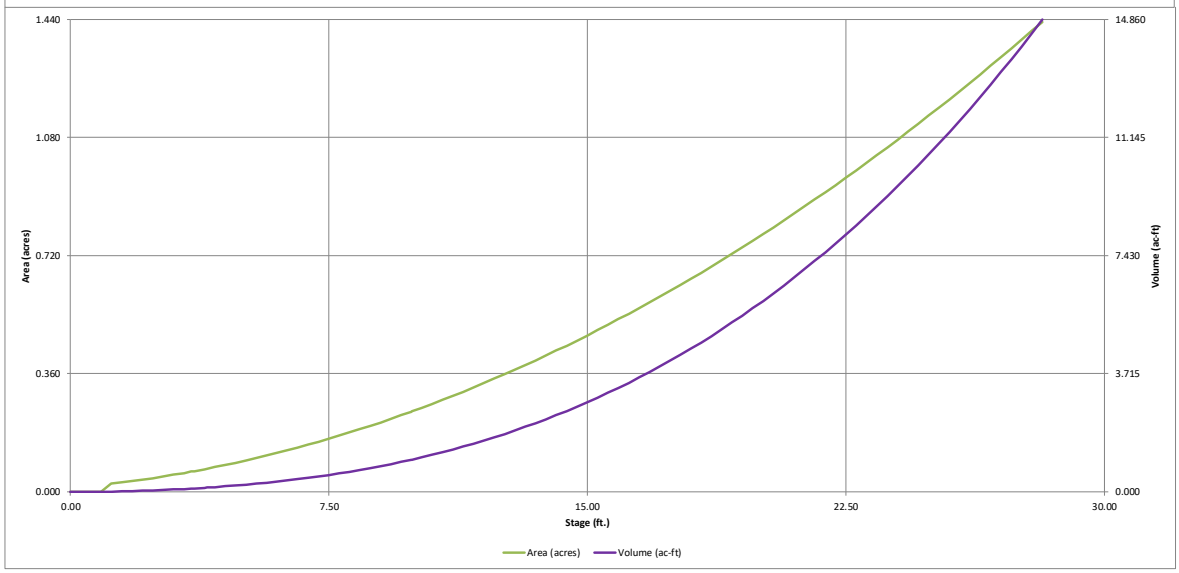
Depth Increment = 0.30 ft

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		5.1	5.1	26		0.001		
ISV	0.50		5.1	5.1	26		0.001	13	0.000
	0.60		5.1	5.1	26		0.001	15	0.000
	0.90		5.1	5.1	26		0.001	23	0.001
Floor	1.19		43.8	24.1	1,056		0.024	105	0.002
	1.20		43.9	24.2	1,061		0.024	116	0.003
	1.50		46.3	26.6	1,230		0.028	459	0.011
	1.80		48.7	29.0	1,411		0.032	855	0.020
	2.10		51.1	31.4	1,603		0.037	1,307	0.030
	2.40		53.5	33.8	1,807		0.041	1,818	0.042
	2.70		55.9	36.2	2,022		0.046	2,392	0.055
	3.00		58.3	38.6	2,249		0.052	3,032	0.070
	3.30		60.7	41.0	2,487		0.057	3,743	0.086
Zone 1 (WQCV)	3.52		62.5	42.7	2,669		0.061	4,310	0.099
	3.60		63.1	43.4	2,737		0.063	4,526	0.104
	3.90		65.5	45.8	2,998		0.069	5,386	0.124
Zone 2 (EURV)	3.97		66.1	46.3	3,061		0.070	5,598	0.129
	4.20		67.9	48.2	3,271		0.075	6,326	0.145
	4.50		70.3	50.6	3,555		0.082	7,349	0.169
	4.80		72.7	53.0	3,851		0.088	8,460	0.194
	5.10		75.1	55.4	4,159		0.095	9,661	0.222
	5.40		77.5	57.8	4,477		0.103	10,956	0.252
	5.70		79.9	60.2	4,808		0.110	12,349	0.283
	6.00		82.3	62.6	5,150		0.118	13,842	0.318
	6.30		84.7	65.0	5,503		0.126	15,440	0.354
	6.60		87.1	67.4	5,868		0.135	17,145	0.394
	6.90		89.5	69.8	6,245		0.143	18,962	0.435
	7.20		91.9	72.2	6,633		0.152	20,893	0.480
	7.50		94.3	74.6	7,032		0.161	22,943	0.527
	7.80		96.7	77.0	7,443		0.171	25,114	0.577
	8.10		99.1	79.4	7,866		0.181	27,410	0.629
	8.40		101.5	81.8	8,300		0.191	29,835	0.685
	8.70		103.9	84.2	8,746		0.201	32,391	0.744
	9.00		106.3	86.6	9,203		0.211	35,083	0.805
	9.30		108.7	89.0	9,672		0.222	37,914	0.870
	9.60		111.1	91.4	10,152		0.233	40,888	0.939
	9.90		113.5	93.8	10,643		0.244	44,007	1.010
Zone 3 (100-year)	9.91		113.6	93.8	10,660		0.245	44,113	1.013
	10.20		115.9	96.2	11,147		0.256	47,275	1.085
	10.50		118.3	98.6	11,661		0.268	50,696	1.164
	10.80		120.7	101.0	12,188		0.280	54,273	1.246
	11.10		123.1	103.4	12,726		0.292	58,010	1.332
	11.40		125.5	105.8	13,275		0.305	61,909	1.421
	11.70		127.9	108.2	13,836		0.318	65,976	1.515
	12.00		130.3	110.6	14,408		0.331	70,212	1.612
	12.30		132.7	113.0	14,992		0.344	74,622	1.713
	12.60		135.1	115.4	15,587		0.358	79,208	1.818
	12.90		137.5	117.8	16,194		0.372	83,975	1.928
	13.20		139.9	120.2	16,813		0.386	88,926	2.041
	13.50		142.3	122.6	17,443		0.400	94,064	2.159
	13.80		144.7	125.0	18,084		0.415	99,393	2.282
	14.10		147.1	127.4	18,737		0.430	104,915	2.409
	14.40		149.5	129.8	19,402		0.445	110,636	2.540
	14.70		151.9	132.2	20,078		0.461	116,557	2.676
	15.00		154.3	134.6	20,765		0.477	122,684	2.816
	15.30		156.7	137.0	21,464		0.493	129,018	2.962
	15.60		159.1	139.4	22,175		0.509	135,563	3.112
	15.90		161.5	141.8	22,897		0.526	142,324	3.267
	16.20		163.9	144.2	23,631		0.542	149,303	3.428
	16.50		166.3	146.6	24,376		0.560	156,503	3.593
	16.80		168.7	149.0	25,132		0.577	163,929	3.763
	17.10		171.1	151.4	25,901		0.595	171,584	3.939
	17.40		173.5	153.8	26,680		0.612	179,471	4.120
	17.70		175.9	156.2	27,471		0.631	187,593	4.307
	18.00		178.3	158.6	28,274		0.649	195,955	4.498
	18.30		180.7	161.0	29,088		0.668	204,559	4.696
	18.60		183.1	163.4	29,914		0.687	213,409	4.899
	18.90		185.5	165.8	30,752		0.706	222,508	5.108
	19.20		187.9	168.2	31,600		0.725	231,861	5.323
	19.50		190.3	170.6	32,461		0.745	241,470	5.543
	19.80		192.7	173.0	33,333		0.765	251,338	5.770
	20.10		195.1	175.4	34,216		0.785	261,470	6.003
	20.40		197.5	177.8	35,111		0.806	271,869	6.241
	20.70		199.9	180.2	36,017		0.827	282,538	6.486
	21.00		202.3	182.6	36,935		0.848	293,481	6.737
	21.30		204.7	185.0	37,865		0.869	304,700	6.995
	21.60		207.1	187.4	38,806		0.891	316,201	7.259
	21.90		209.5	189.8	39,758		0.913	327,985	7.530
	22.20		211.9	192.2	40,722		0.935	340,057	7.807
	22.50		214.3	194.6	41,698		0.957	352,420	8.090
	22.80		216.7	197.0	42,685		0.980	365,077	8.381
	23.10		219.1	199.4	43,683		1.003	378,032	8.678
	23.40		221.5	201.8	44,694		1.026	391,288	8.983
	23.70		223.9	204.2	45,715		1.049	404,849	9.294
	24.00		226.3	206.6	46,748		1.073	418,718	9.612
	24.30		228.7	209.0	47,793		1.097	432,899	9.938
	24.60		231.1	211.4	48,849		1.121	447,395	10.271
	24.90		233.5	213.8	49,917		1.146	462,210	10.611
	25.20		235.9	216.2	50,996		1.171	477,346	10.958
	25.50		238.3	218.6	52,087		1.196	492,809	11.313
	25.80		240.7	221.0	53,189		1.221	508,600	11.676
	26.10		243.1	223.4	54,303		1.247	524,723	12.046
	26.40		245.5	225.8	55,428		1.272	541,183	12.424
	26.70		247.9	228.2	56,565		1.299	557,981	12.809
	27.00		250.3	230.6	57,713		1.325	575,123	13.203
	27.30		252.7	233.0	58,873		1.352	592,611	13.604
	27.60		255.1	235.4	60,045		1.378	610,448	14.014
	27.90		257.5	237.8	61,228		1.406	628,639	14.432
	28.20		259.9	240.2	62,422		1.433	647,186	14.857

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.03 (May 2020)



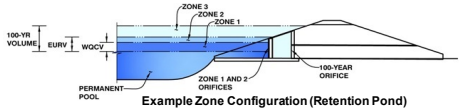


DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.03 (May 2020)

Project: Front Range - Midway Solar Project

Basin ID: Basin A7



Example Zone Configuration (Retention Pond)

Watershed Information

Selected BMP Type =	**EDB**	
Watershed Area =	55.40	acres
Watershed Length =	2,469	ft
Watershed Length to Centroid =	966	ft
Watershed Slope =	0.024	ft/ft
Watershed Imperviousness =	4.60%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	0.0%	percent
Percentage Hydrologic Soil Groups C/D =	100.0%	percent
Target WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	User Input	

After providing required inputs above including 1-hour rainfall depths, click 'Run CUHP' to generate runoff hydrographs using the embedded Colorado Urban Hydrograph Procedure.

			Optional User Overrides
Water Quality Capture Volume (WQCV) =	0.154	acre-feet	acre-feet
Excess Urban Runoff Volume (EURV) =	0.199	acre-feet	acre-feet
2-yr Runoff Volume (P1 = 1.01 in.) =	0.332	acre-feet	1.01 inches
5-yr Runoff Volume (P1 = 1.3 in.) =	1.203	acre-feet	1.30 inches
10-yr Runoff Volume (P1 = 1.57 in.) =	2.241	acre-feet	1.57 inches
25-yr Runoff Volume (P1 = 2.01 in.) =	4.525	acre-feet	2.01 inches
50-yr Runoff Volume (P1 = 2.4 in.) =	6.307	acre-feet	2.40 inches
100-yr Runoff Volume (P1 = 2.82 in.) =	8.610	acre-feet	2.82 inches
500-yr Runoff Volume (P1 = 3.98 in.) =	14.276	acre-feet	3.98 inches
Approximate 2-yr Detention Volume =	0.131	acre-feet	
Approximate 5-yr Detention Volume =	0.470	acre-feet	
Approximate 10-yr Detention Volume =	0.737	acre-feet	
Approximate 25-yr Detention Volume =	0.969	acre-feet	
Approximate 50-yr Detention Volume =	1.032	acre-feet	
Approximate 100-yr Detention Volume =	1.617	acre-feet	

Define Zones and Basin Geometry

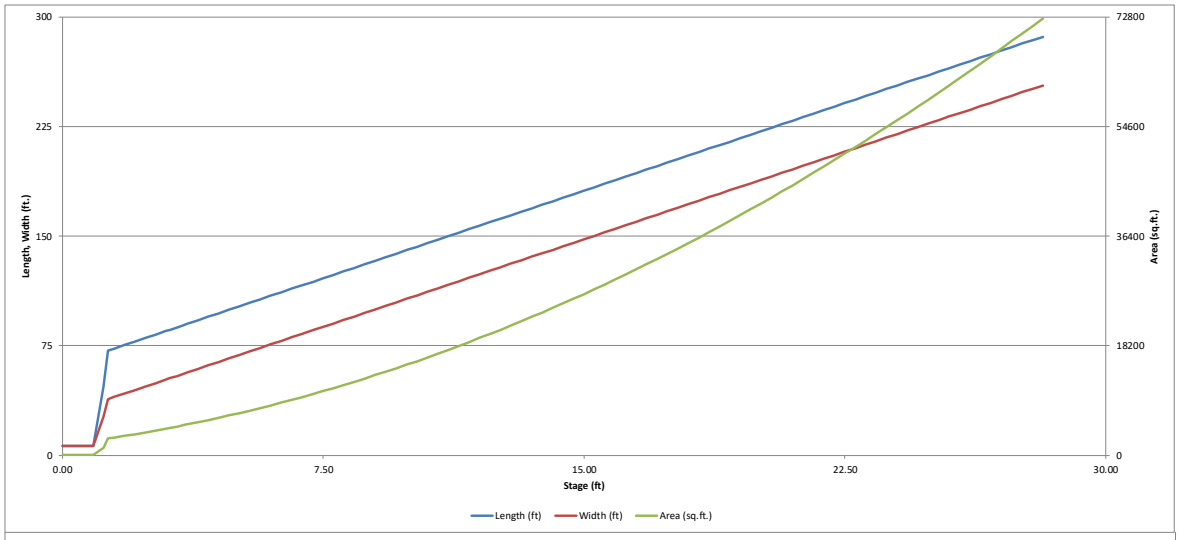
Zone 1 Volume (WQCV) =	0.154	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.045	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	1.418	acre-feet
Total Detention Basin Volume =	1.617	acre-feet
Initial Surcharge Volume (ISV) =	20	ft^3
Initial Surcharge Depth (ISD) =	0.50	ft
Total Available Detention Depth (H_{total}) =	9.90	ft
Depth of Trickle Channel (H_{TC}) =	0.50	ft
Slope of Trickle Channel (S_{TC}) =	0.005	ft/ft
Slopes of Main Basin Sides (S_{main}) =	4	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	2	
Initial Surcharge Area (A_{ISV}) =	40	ft^2
Surcharge Volume Length (L_{ISV}) =	6.4	ft
Surcharge Volume Width (W_{ISV}) =	6.4	ft
Depth of Basin Floor (H_{FLOOR}) =	0.32	ft
Length of Basin Floor (L_{FLOOR}) =	71.6	ft
Width of Basin Floor (W_{FLOOR}) =	38.4	ft
Area of Basin Floor (A_{FLOOR}) =	2,747	ft^2
Volume of Basin Floor (V_{FLOOR}) =	333	ft^3
Depth of Main Basin (H_{MAIN}) =	8.58	ft
Length of Main Basin (L_{MAIN}) =	140.3	ft
Width of Main Basin (W_{MAIN}) =	107.0	ft
Area of Main Basin (A_{MAIN}) =	15,008	ft^2
Volume of Main Basin (V_{MAIN}) =	69,146	ft^3
Calculated Total Basin Volume (V_{total}) =	**1.596**	acre-feet

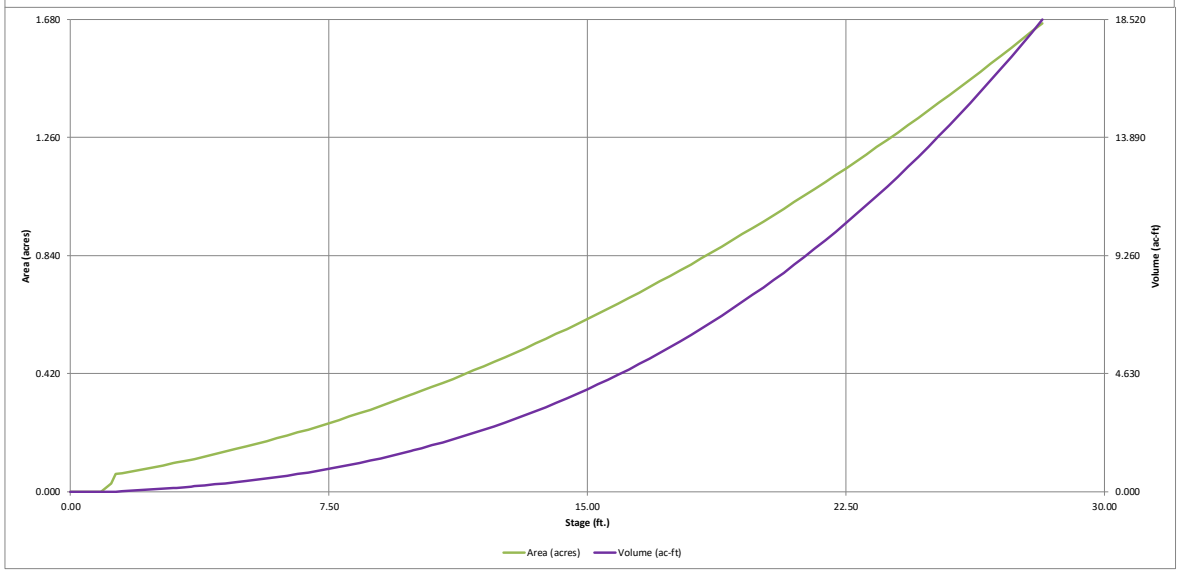
Depth Increment = 0.30 ft

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		6.4	6.4	40		0.001		
ISV	0.50		6.4	6.4	40		0.001	20	0.000
	0.60		6.4	6.4	40		0.001	24	0.001
	0.90		6.4	6.4	40		0.001	36	0.001
	1.20		47.2	26.4	1,243		0.029	141	0.003
Floor	1.32		71.6	38.4	2,747		0.063	375	0.009
	1.50		73.1	39.8	2,908		0.067	884	0.020
	1.80		75.5	42.2	3,184		0.073	1,797	0.041
	2.10		77.9	44.6	3,473		0.080	2,796	0.064
	2.40		80.3	47.0	3,772		0.087	3,882	0.089
	2.70		82.7	49.4	4,083		0.094	5,060	0.116
	3.00		85.1	51.8	4,406		0.101	6,333	0.145
Zone 1 (WQCV)	3.09		85.8	52.5	4,505		0.103	6,734	0.155
	3.30		87.5	54.2	4,740		0.109	7,705	0.177
Zone 2 (EURV)	3.51		89.2	55.9	4,981		0.114	8,726	0.200
	3.60		89.9	56.6	5,086		0.117	9,179	0.211
	3.90		92.3	59.0	5,443		0.125	10,758	0.247
	4.20		94.7	61.4	5,812		0.133	12,446	0.286
	4.50		97.1	63.8	6,193		0.142	14,246	0.327
	4.80		99.5	66.2	6,584		0.151	16,163	0.371
	5.10		101.9	68.6	6,988		0.160	18,198	0.418
	5.40		104.3	71.0	7,403		0.170	20,357	0.467
	5.70		106.7	73.4	7,829		0.180	22,641	0.520
	6.00		109.1	75.8	8,267		0.190	25,055	0.575
	6.30		111.5	78.2	8,716		0.200	27,602	0.634
	6.60		113.9	80.6	9,177		0.211	30,286	0.695
	6.90		116.3	83.0	9,650		0.222	33,110	0.760
	7.20		118.7	85.4	10,134		0.233	36,077	0.828
	7.50		121.1	87.8	10,629		0.244	39,191	0.900
	7.80		123.5	90.2	11,136		0.256	42,456	0.975
	8.10		125.9	92.6	11,655		0.268	45,874	1.053
	8.40		128.3	95.0	12,185		0.280	49,450	1.135
	8.70		130.7	97.4	12,727		0.292	53,187	1.221
	9.00		133.1	99.8	13,280		0.305	57,087	1.311
	9.30		135.5	102.2	13,844		0.318	61,156	1.404
	9.60		137.9	104.6	14,421		0.331	65,395	1.501
	9.90		140.3	107.0	15,008		0.345	69,809	1.603
Zone 3 (100-year)	9.95		140.7	107.4	15,107		0.347	70,562	1.620
	10.20		142.7	109.4	15,607		0.358	74,401	1.708
	10.50		145.1	111.8	16,218		0.372	79,175	1.818
	10.80		147.5	114.2	16,840		0.387	84,133	1.931
	11.10		149.9	116.6	17,474		0.401	89,280	2.050
	11.40		152.3	119.0	18,119		0.416	94,619	2.172
	11.70		154.7	121.4	18,776		0.431	100,153	2.299
	12.00		157.1	123.8	19,445		0.446	105,886	2.431
	12.30		159.5	126.2	20,124		0.462	111,821	2.567
	12.60		161.9	128.6	20,816		0.478	117,962	2.708
	12.90		164.3	131.0	21,519		0.494	124,311	2.854
	13.20		166.7	133.4	22,233		0.510	130,874	3.004
	13.50		169.1	135.8	22,959		0.527	137,652	3.160
	13.80		171.5	138.2	23,696		0.544	144,650	3.321
	14.10		173.9	140.6	24,445		0.561	151,871	3.486
	14.40		176.3	143.0	25,206		0.579	159,319	3.657
	14.70		178.7	145.4	25,978		0.596	166,996	3.834
	15.00		181.1	147.8	26,761		0.614	174,907	4.015
	15.30		183.5	150.2	27,556		0.633	183,054	4.202
	15.60		185.9	152.6	28,363		0.651	191,442	4.395
	15.90		188.3	155.0	29,181		0.670	200,073	4.593
	16.20		190.7	157.4	30,011		0.689	208,951	4.797
	16.50		193.1	159.8	30,852		0.708	218,081	5.006
	16.80		195.5	162.2	31,704		0.728	227,464	5.222
	17.10		197.9	164.6	32,569		0.748	237,104	5.443
	17.40		200.3	167.0	33,444		0.768	247,006	5.670
	17.70		202.7	169.4	34,331		0.788	257,172	5.904
	18.00		205.1	171.8	35,230		0.809	267,606	6.143
	18.30		207.5	174.2	36,140		0.830	278,311	6.389
	18.60		209.9	176.6	37,062		0.851	289,291	6.641
	18.90		212.3	179.0	37,995		0.872	300,550	6.900
	19.20		214.7	181.4	38,940		0.894	312,090	7.165
	19.50		217.1	183.8	39,897		0.916	323,915	7.436
	19.80		219.5	186.2	40,864		0.938	336,029	7.714
	20.10		221.9	188.6	41,844		0.961	348,435	7.999
	20.40		224.3	191.0	42,835		0.983	361,136	8.291
	20.70		226.7	193.4	43,837		1.006	374,137	8.589
	21.00		229.1	195.8	44,851		1.030	387,440	8.894
	21.30		231.5	198.2	45,876		1.053	401,048	9.207
	21.60		233.9	200.6	46,913		1.077	414,967	9.526
	21.90		236.3	203.0	47,962		1.101	429,198	9.853
	22.20		238.7	205.4	49,022		1.125	443,745	10.187
	22.50		241.1	207.8	50,093		1.150	458,612	10.528
	22.80		243.5	210.2	51,176		1.175	473,802	10.877
	23.10		245.9	212.6	52,271		1.200	489,319	11.233
	23.40		248.3	215.0	53,377		1.225	505,166	11.597
	23.70		250.7	217.4	54,495		1.251	521,346	11.968
	24.00		253.1	219.8	55,624		1.277	537,864	12.348
	24.30		255.5	222.2	56,764		1.303	554,721	12.735
	24.60		257.9	224.6	57,917		1.330	571,923	13.130
	24.90		260.3	227.0	59,080		1.356	589,473	13.532
	25.20		262.7	229.4	60,255		1.383	607,373	13.943
	25.50		265.1	231.8	61,442		1.411	625,627	14.362
	25.80		267.5	234.2	62,640		1.438	644,239	14.790
	26.10		269.9	236.6	63,850		1.466	663,212	15.225
	26.40		272.3	239.0	65,071		1.494	682,550	15.669
	26.70		274.7	241.4	66,304		1.522	702,256	16.122
	27.00		277.1	243.8	67,549		1.551	722,334	16.583
	27.30		279.5	246.2	68,804		1.580	742,787	17.052
	27.60		281.9	248.6	70,072		1.609	763,618	17.530
	27.90		284.3	251.0	71,351		1.638	784,831	18.017
	28.20		286.7	253.4	72,641		1.668	806,429	18.513

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.03 (May 2020)



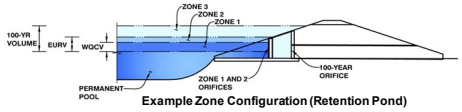


DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.03 (May 2020)

Project: Front Range - Midway Solar Project

Basin ID: Basin A8



Example Zone Configuration (Retention Pond)

Watershed Information

Selected BMP Type =	**EDB**	
Watershed Area =	89.54	acres
Watershed Length =	3,408	ft
Watershed Length to Centroid =	1,713	ft
Watershed Slope =	0.024	ft/ft
Watershed Imperviousness =	3.80%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	0.0%	percent
Percentage Hydrologic Soil Groups C/D =	100.0%	percent
Target WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	User Input	

After providing required inputs above including 1-hour rainfall depths, click 'Run CUHP' to generate runoff hydrographs using the embedded Colorado Urban Hydrograph Procedure.

			Optional User Overrides
Water Quality Capture Volume (WQCV) =	0.209	acre-feet	acre-feet
Excess Urban Runoff Volume (EURV) =	0.262	acre-feet	acre-feet
2-yr Runoff Volume (P1 = 1.01 in.) =	0.492	acre-feet	1.01 inches
5-yr Runoff Volume (P1 = 1.3 in.) =	1.886	acre-feet	1.30 inches
10-yr Runoff Volume (P1 = 1.57 in.) =	3.559	acre-feet	1.57 inches
25-yr Runoff Volume (P1 = 2.01 in.) =	7.253	acre-feet	2.01 inches
50-yr Runoff Volume (P1 = 2.4 in.) =	10.129	acre-feet	2.40 inches
100-yr Runoff Volume (P1 = 2.82 in.) =	13.856	acre-feet	2.82 inches
500-yr Runoff Volume (P1 = 3.98 in.) =	23.011	acre-feet	3.98 inches
Approximate 2-yr Detention Volume =	0.171	acre-feet	
Approximate 5-yr Detention Volume =	0.688	acre-feet	
Approximate 10-yr Detention Volume =	1.109	acre-feet	
Approximate 25-yr Detention Volume =	1.436	acre-feet	
Approximate 50-yr Detention Volume =	1.514	acre-feet	
Approximate 100-yr Detention Volume =	2.410	acre-feet	

Define Zones and Basin Geometry

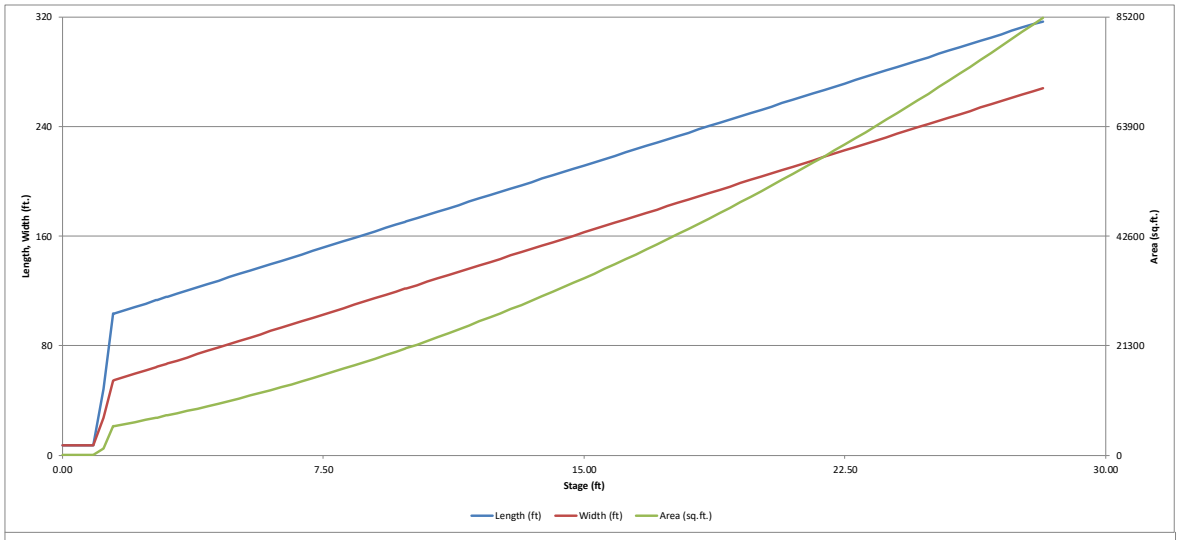
Zone 1 Volume (WQCV) =	0.209	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.053	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	2.149	acre-feet
Total Detention Basin Volume =	2.410	acre-feet
Initial Surcharge Volume (ISV) =	27	ft^3
Initial Surcharge Depth (ISD) =	0.50	ft
Total Available Detention Depth (H_{total}) =	9.90	ft
Depth of Trickle Channel (H_{TC}) =	0.50	ft
Slope of Trickle Channel (S_{TC}) =	0.005	ft/ft
Slopes of Main Basin Sides (S_{main}) =	4	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	2	
Initial Surcharge Area (A_{ISV}) =	55	ft^2
Surcharge Volume Length (L_{ISV}) =	7.4	ft
Surcharge Volume Width (W_{ISV}) =	7.4	ft
Depth of Basin Floor (H_{FLOOR}) =	0.47	ft
Length of Basin Floor (L_{FLOOR}) =	103.3	ft
Width of Basin Floor (W_{FLOOR}) =	54.4	ft
Area of Basin Floor (A_{FLOOR}) =	5,616	ft^2
Volume of Basin Floor (V_{FLOOR}) =	975	ft^3
Depth of Main Basin (H_{MAIN}) =	8.43	ft
Length of Main Basin (L_{MAIN}) =	170.7	ft
Width of Main Basin (W_{MAIN}) =	121.8	ft
Area of Main Basin (A_{MAIN}) =	20,796	ft^2
Volume of Main Basin (V_{MAIN}) =	104,588	ft^3
Calculated Total Basin Volume (V_{total}) =	**2.425**	acre-feet

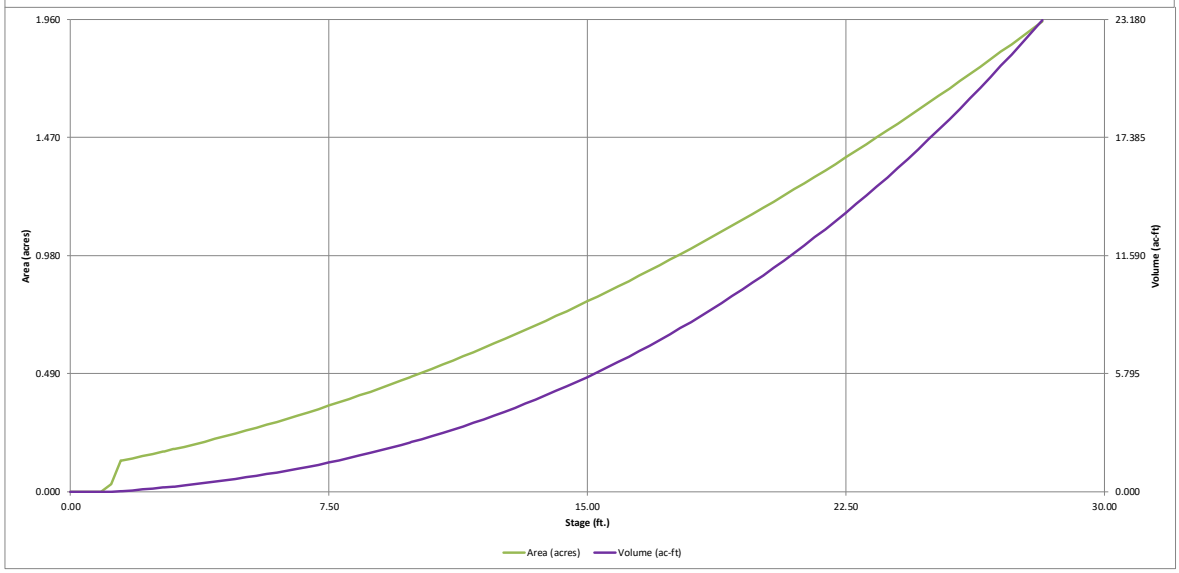
Depth Increment = 0.30 ft

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		7.4	7.4	55		0.001		
ISV	0.50		7.4	7.4	55		0.001	27	0.001
	0.60		7.4	7.4	55		0.001	33	0.001
	0.90		7.4	7.4	55		0.001	49	0.001
	1.20		48.2	27.4	1,320		0.030	165	0.004
Floor	1.47		103.3	54.4	5,616		0.129	1,034	0.024
	1.50		103.5	54.6	5,654		0.130	1,203	0.028
	1.80		105.9	57.0	6,039		0.139	2,957	0.068
	2.10		108.3	59.4	6,436		0.148	4,828	0.111
	2.40		110.7	61.8	6,844		0.157	6,820	0.157
	2.70		113.1	64.2	7,264		0.167	8,936	0.205
Zone 1 (WQCV)	2.73		113.3	64.5	7,307		0.168	9,154	0.210
	3.00		115.5	66.6	7,696		0.177	11,180	0.257
Zone 2 (EURV)	3.03		115.7	66.9	7,739		0.178	11,411	0.262
	3.30		117.9	69.0	8,139		0.187	13,554	0.311
	3.60		120.3	71.4	8,593		0.197	16,064	0.369
	3.90		122.7	73.8	9,059		0.208	18,711	0.430
	4.20		125.1	76.2	9,536		0.219	21,500	0.494
	4.50		127.5	78.6	10,025		0.230	24,434	0.561
	4.80		129.9	81.0	10,526		0.242	27,517	0.632
	5.10		132.3	83.4	11,038		0.253	30,751	0.706
	5.40		134.7	85.8	11,561		0.265	34,140	0.784
	5.70		137.1	88.2	12,096		0.278	37,689	0.865
	6.00		139.5	90.6	12,643		0.290	41,399	0.950
	6.30		141.9	93.0	13,201		0.303	45,276	1.039
	6.60		144.3	95.4	13,770		0.316	49,321	1.132
	6.90		146.7	97.8	14,352		0.329	53,539	1.229
	7.20		149.1	100.2	14,944		0.343	57,933	1.330
	7.50		151.5	102.6	15,548		0.357	62,507	1.435
	7.80		153.9	105.0	16,164		0.371	67,263	1.544
	8.10		156.3	107.4	16,791		0.385	72,206	1.658
	8.40		158.7	109.8	17,430		0.400	77,339	1.775
	8.70		161.1	112.2	18,080		0.415	82,665	1.898
	9.00		163.5	114.6	18,742		0.430	88,188	2.025
	9.30		165.9	117.0	19,415		0.446	93,912	2.156
	9.60		168.3	119.4	20,100		0.461	99,839	2.292
Zone 3 (100-year)	9.86		170.4	121.5	20,703		0.475	105,143	2.414
	9.90		170.7	121.8	20,796		0.477	105,973	2.433
	10.20		173.1	124.2	21,504		0.494	112,318	2.578
	10.50		175.5	126.6	22,224		0.510	118,877	2.729
	10.80		177.9	129.0	22,954		0.527	125,653	2.885
	11.10		180.3	131.4	23,697		0.544	132,650	3.045
	11.40		182.7	133.8	24,451		0.561	139,872	3.211
	11.70		185.1	136.2	25,216		0.579	147,322	3.382
	12.00		187.5	138.6	25,993		0.597	155,003	3.558
	12.30		189.9	141.0	26,782		0.615	162,919	3.740
	12.60		192.3	143.4	27,582		0.633	171,073	3.927
	12.90		194.7	145.8	28,393		0.652	179,469	4.120
	13.20		197.1	148.2	29,216		0.671	188,110	4.318
	13.50		199.5	150.6	30,051		0.690	197,000	4.522
	13.80		201.9	153.0	30,897		0.709	206,142	4.732
	14.10		204.3	155.4	31,754		0.729	215,539	4.948
	14.40		206.7	157.8	32,623		0.749	225,196	5.170
	14.70		209.1	160.2	33,504		0.769	235,114	5.397
	15.00		211.5	162.6	34,396		0.790	245,299	5.631
	15.30		213.9	165.0	35,300		0.810	255,753	5.871
	15.60		216.3	167.4	36,215		0.831	266,480	6.118
	15.90		218.7	169.8	37,142		0.853	277,484	6.370
	16.20		221.1	172.2	38,080		0.874	288,767	6.629
	16.50		223.5	174.6	39,030		0.896	300,333	6.895
	16.80		225.9	177.0	39,991		0.918	312,186	7.167
	17.10		228.3	179.4	40,964		0.940	324,329	7.446
	17.40		230.7	181.8	41,948		0.963	336,765	7.731
	17.70		233.1	184.2	42,944		0.986	349,499	8.023
	18.00		235.5	186.6	43,951		1.009	362,533	8.323
	18.30		237.9	189.0	44,970		1.032	375,871	8.629
	18.60		240.3	191.4	46,001		1.056	389,516	8.942
	18.90		242.7	193.8	47,043		1.080	403,472	9.262
	19.20		245.1	196.2	48,096		1.104	417,743	9.590
	19.50		247.5	198.6	49,161		1.129	432,331	9.925
	19.80		249.9	201.0	50,238		1.153	447,241	10.267
	20.10		252.3	203.4	51,325		1.178	462,475	10.617
	20.40		254.7	205.8	52,425		1.204	478,037	10.974
	20.70		257.1	208.2	53,536		1.229	493,931	11.339
	21.00		259.5	210.6	54,659		1.255	510,160	11.712
	21.30		261.9	213.0	55,793		1.281	526,727	12.092
	21.60		264.3	215.4	56,938		1.307	543,637	12.480
	21.90		266.7	217.8	58,095		1.334	560,891	12.876
	22.20		269.1	220.2	59,264		1.361	578,495	13.280
	22.50		271.5	222.6	60,444		1.388	596,451	13.693
	22.80		273.9	225.0	61,636		1.415	614,763	14.113
	23.10		276.3	227.4	62,839		1.443	633,434	14.542
	23.40		278.7	229.8	64,054		1.470	652,467	14.979
	23.70		281.1	232.2	65,280		1.499	671,867	15.424
	24.00		283.5	234.6	66,518		1.527	691,636	15.878
	24.30		285.9	237.0	67,767		1.556	711,779	16.340
	24.60		288.3	239.4	69,028		1.585	732,298	16.811
	24.90		290.7	241.8	70,300		1.614	753,197	17.291
	25.20		293.1	244.2	71,584		1.643	774,479	17.780
	25.50		295.5	246.6	72,879		1.673	796,148	18.277
	25.80		297.9	249.0	74,186		1.703	818,208	18.783
	26.10		300.3	251.4	75,505		1.733	840,661	19.299
	26.40		302.7	253.8	76,835		1.764	863,512	19.824
	26.70		305.1	256.2	78,176		1.795	886,763	20.357
	27.00		307.5	258.6	79,529		1.826	910,418	20.900
	27.30		309.9	261.0	80,893		1.857	934,482	21.453
	27.60		312.3	263.4	82,269		1.889	958,956	22.015
	27.90		314.7	265.8	83,657		1.920	983,844	22.586
	28.20		317.1	268.2	85,056		1.953	1,009,151	23.167

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.03 (May 2020)



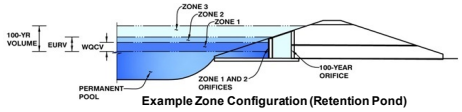


DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.03 (May 2020)

Project: Front Range - Midway Solar Project

Basin ID: Basin A9



Example Zone Configuration (Retention Pond)

Watershed Information

Selected BMP Type =	**EDB**	
Watershed Area =	48.32	acres
Watershed Length =	2,463	ft
Watershed Length to Centroid =	1,017	ft
Watershed Slope =	0.032	ft/ft
Watershed Imperviousness =	4.50%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	0.0%	percent
Percentage Hydrologic Soil Groups C/D =	100.0%	percent
Target WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	User Input	

After providing required inputs above including 1-hour rainfall depths, click 'Run CUHP' to generate runoff hydrographs using the embedded Colorado Urban Hydrograph Procedure.

			Optional User Overrides	
Water Quality Capture Volume (WQCV) =	0.132	acre-feet		acre-feet
Excess Urban Runoff Volume (EURV) =	0.170	acre-feet		acre-feet
2-yr Runoff Volume (P1 = 1.01 in.) =	0.286	acre-feet	1.01	inches
5-yr Runoff Volume (P1 = 1.3 in.) =	1.045	acre-feet	1.30	inches
10-yr Runoff Volume (P1 = 1.57 in.) =	1.950	acre-feet	1.57	inches
25-yr Runoff Volume (P1 = 2.01 in.) =	3.941	acre-feet	2.01	inches
50-yr Runoff Volume (P1 = 2.4 in.) =	5.494	acre-feet	2.40	inches
100-yr Runoff Volume (P1 = 2.82 in.) =	7.503	acre-feet	2.82	inches
500-yr Runoff Volume (P1 = 3.98 in.) =	12.442	acre-feet	3.98	inches
Approximate 2-yr Detention Volume =	0.112	acre-feet		
Approximate 5-yr Detention Volume =	0.405	acre-feet		
Approximate 10-yr Detention Volume =	0.638	acre-feet		
Approximate 25-yr Detention Volume =	0.837	acre-feet		
Approximate 50-yr Detention Volume =	0.890	acre-feet		
Approximate 100-yr Detention Volume =	1.397	acre-feet		

Define Zones and Basin Geometry

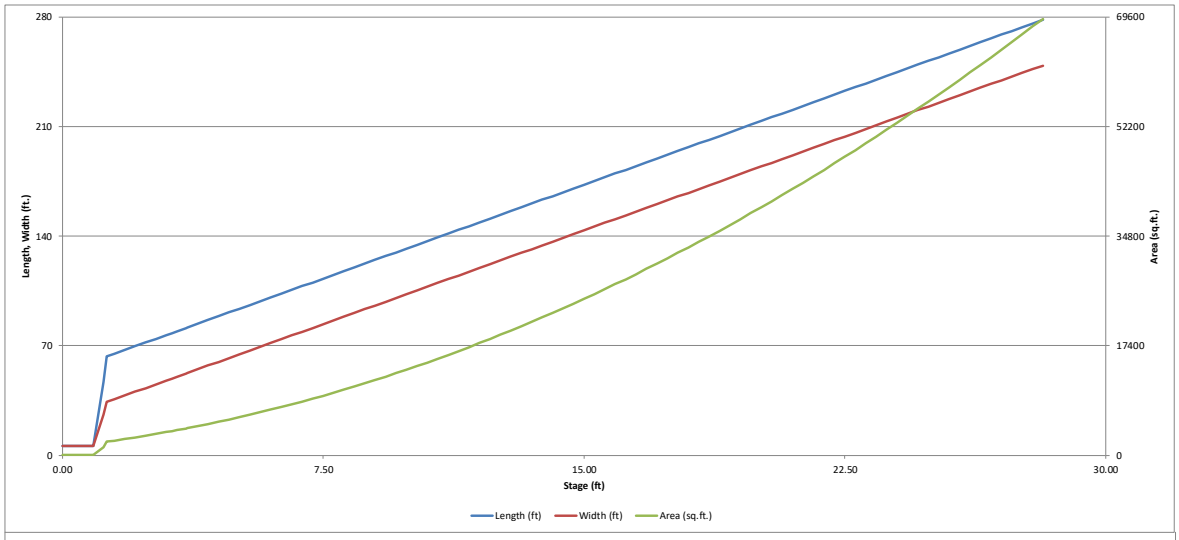
Zone 1 Volume (WQCV) =	0.132	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.038	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	1.228	acre-feet
Total Detention Basin Volume =	1.397	acre-feet
Initial Surcharge Volume (ISV) =	17	ft^3
Initial Surcharge Depth (ISD) =	0.50	ft
Total Available Detention Depth (H_{total}) =	9.90	ft
Depth of Trickle Channel (H_{TC}) =	0.50	ft
Slope of Trickle Channel (S_{TC}) =	0.005	ft/ft
Slopes of Main Basin Sides (S_{main}) =	4	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	2	
Initial Surcharge Area (A_{ISV}) =	34	ft^2
Surcharge Volume Length (L_{ISV}) =	5.9	ft
Surcharge Volume Width (W_{ISV}) =	5.9	ft
Depth of Basin Floor (H_{FLOOR}) =	0.28	ft
Length of Basin Floor (L_{FLOOR}) =	63.0	ft
Width of Basin Floor (W_{FLOOR}) =	33.9	ft
Area of Basin Floor (A_{FLOOR}) =	2,134	ft^2
Volume of Basin Floor (V_{FLOOR}) =	228	ft^3
Depth of Main Basin (H_{MAIN}) =	8.62	ft
Length of Main Basin (L_{MAIN}) =	132.0	ft
Width of Main Basin (W_{MAIN}) =	102.8	ft
Area of Main Basin (A_{MAIN}) =	13,569	ft^2
Volume of Main Basin (V_{MAIN}) =	60,580	ft^3
Calculated Total Basin Volume (V_{total}) =	**1.397**	acre-feet

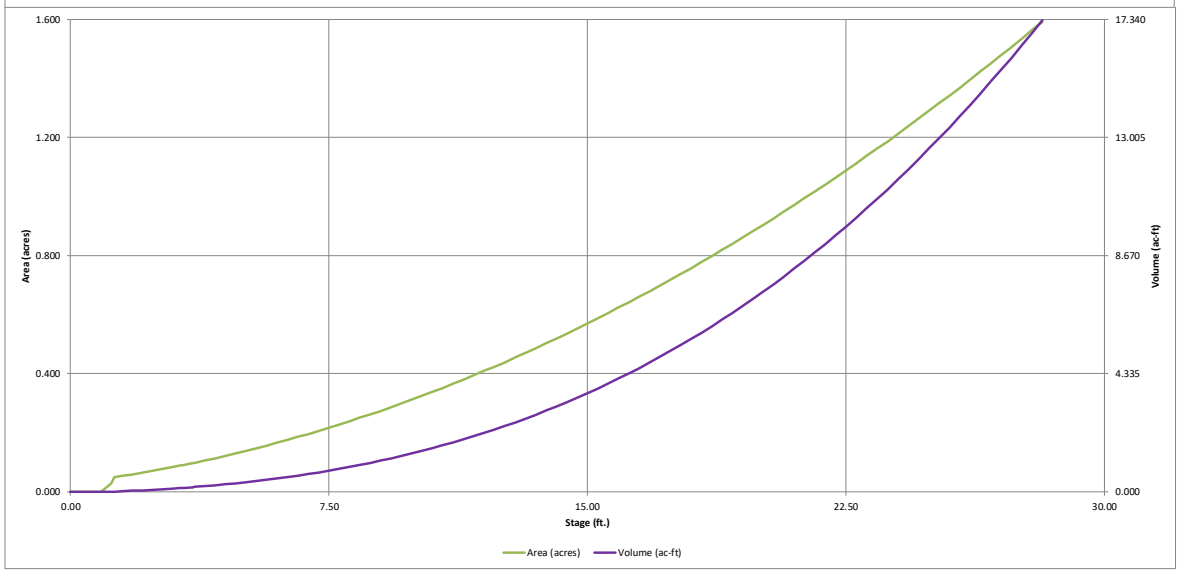
Depth Increment = 0.30 ft

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		5.9	5.9	34		0.001		
ISV	0.50		5.9	5.9	34		0.001	17	0.000
	0.60		5.9	5.9	34		0.001	21	0.000
	0.90		5.9	5.9	34		0.001	31	0.001
	1.20		46.7	25.9	1,208		0.028	131	0.003
Floor	1.28		63.0	33.9	2,134		0.049	263	0.006
	1.50		64.8	35.6	2,307		0.053	752	0.017
	1.80		67.2	38.0	2,554		0.059	1,481	0.034
	2.10		69.6	40.4	2,812		0.065	2,285	0.052
	2.40		72.0	42.8	3,082		0.071	3,169	0.073
	2.70		74.4	45.2	3,363		0.077	4,136	0.095
	3.00		76.8	47.6	3,656		0.084	5,188	0.119
Zone 1 (WQCV)	3.16		78.0	48.9	3,817		0.088	5,786	0.133
	3.30		79.2	50.0	3,960		0.091	6,330	0.145
Zone 2 (EURV)	3.56		81.2	52.1	4,233		0.097	7,395	0.170
	3.60		81.6	52.4	4,276		0.098	7,566	0.174
	3.90		84.0	54.8	4,603		0.106	8,897	0.204
	4.20		86.4	57.2	4,942		0.113	10,329	0.237
	4.50		88.8	59.6	5,293		0.122	11,864	0.272
	4.80		91.2	62.0	5,654		0.130	13,505	0.310
	5.10		93.6	64.4	6,028		0.138	15,258	0.350
	5.40		96.0	66.8	6,413		0.147	17,123	0.393
	5.70		98.4	69.2	6,809		0.156	19,106	0.439
	6.00		100.8	71.6	7,217		0.166	21,210	0.487
	6.30		103.2	74.0	7,637		0.175	23,438	0.538
	6.60		105.6	76.4	8,068		0.185	25,793	0.592
	6.90		108.0	78.8	8,510		0.195	28,280	0.649
	7.20		110.4	81.2	8,964		0.206	30,901	0.709
	7.50		112.8	83.6	9,430		0.216	33,659	0.773
	7.80		115.2	86.0	9,907		0.227	36,560	0.839
	8.10		117.6	88.4	10,396		0.239	39,605	0.909
	8.40		120.0	90.8	10,896		0.250	42,798	0.983
	8.70		122.4	93.2	11,407		0.262	46,143	1.059
	9.00		124.8	95.6	11,930		0.274	49,644	1.140
	9.30		127.2	98.0	12,465		0.286	53,303	1.224
	9.60		129.6	100.4	13,011		0.299	57,124	1.311
Zone 3 (100-year)	9.89		131.9	102.8	13,550		0.311	60,975	1.400
	9.90		132.0	102.8	13,569		0.312	61,111	1.403
	10.20		134.4	105.2	14,138		0.325	65,266	1.498
	10.50		136.8	107.6	14,719		0.338	69,595	1.598
	10.80		139.2	110.0	15,311		0.352	74,099	1.701
	11.10		141.6	112.4	15,915		0.365	78,783	1.809
	11.40		144.0	114.8	16,531		0.379	83,649	1.920
	11.70		146.4	117.2	17,157		0.394	88,702	2.036
	12.00		148.8	119.6	17,796		0.409	93,945	2.157
	12.30		151.2	122.0	18,446		0.423	99,381	2.281
	12.60		153.6	124.4	19,107		0.439	105,013	2.411
	12.90		156.0	126.8	19,780		0.454	110,846	2.545
	13.20		158.4	129.2	20,464		0.470	116,883	2.683
	13.50		160.8	131.6	21,160		0.486	123,126	2.827
	13.80		163.2	134.0	21,868		0.502	129,580	2.975
	14.10		165.6	136.4	22,587		0.519	136,248	3.128
	14.40		168.0	138.8	23,317		0.535	143,133	3.286
	14.70		170.4	141.2	24,059		0.552	150,239	3.449
	15.00		172.8	143.6	24,813		0.570	157,570	3.617
	15.30		175.2	146.0	25,578		0.587	165,128	3.791
	15.60		177.6	148.4	26,355		0.605	172,918	3.970
	15.90		180.0	150.8	27,143		0.623	180,942	4.154
	16.20		182.4	153.2	27,942		0.641	189,205	4.344
	16.50		184.8	155.6	28,754		0.660	197,709	4.539
	16.80		187.2	158.0	29,576		0.679	206,458	4.740
	17.10		189.6	160.4	30,411		0.698	215,456	4.946
	17.40		192.0	162.8	31,256		0.718	224,706	5.159
	17.70		194.4	165.2	32,113		0.737	234,211	5.377
	18.00		196.8	167.6	32,982		0.757	243,975	5.601
	18.30		199.2	170.0	33,863		0.777	254,001	5.831
	18.60		201.6	172.4	34,754		0.798	264,294	6.067
	18.90		204.0	174.8	35,658		0.819	274,855	6.310
	19.20		206.4	177.2	36,573		0.840	285,689	6.559
	19.50		208.8	179.6	37,499		0.861	296,800	6.814
	19.80		211.2	182.0	38,437		0.882	308,190	7.075
	20.10		213.6	184.4	39,386		0.904	319,863	7.343
	20.40		216.0	186.8	40,347		0.926	331,823	7.618
	20.70		218.4	189.2	41,320		0.949	344,072	7.899
	21.00		220.8	191.6	42,304		0.971	356,616	8.187
	21.30		223.2	194.0	43,299		0.994	369,456	8.482
	21.60		225.6	196.4	44,306		1.017	382,596	8.783
	21.90		228.0	198.8	45,325		1.041	396,040	9.092
	22.20		230.4	201.2	46,355		1.064	409,792	9.408
	22.50		232.8	203.6	47,396		1.088	423,854	9.730
	22.80		235.2	206.0	48,449		1.112	438,231	10.060
	23.10		237.6	208.4	49,514		1.137	452,925	10.398
	23.40		240.0	210.8	50,590		1.161	467,940	10.742
	23.70		242.4	213.2	51,678		1.186	483,280	11.095
	24.00		244.8	215.6	52,777		1.212	498,948	11.454
	24.30		247.2	218.0	53,887		1.237	514,947	11.822
	24.60		249.6	220.4	55,010		1.263	531,282	12.197
	24.90		252.0	222.8	56,143		1.289	547,954	12.579
	25.20		254.4	225.2	57,289		1.315	564,969	12.970
	25.50		256.8	227.6	58,445		1.342	582,329	13.368
	25.80		259.2	230.0	59,614		1.369	600,037	13.775
	26.10		261.6	232.4	60,793		1.396	618,098	14.190
	26.40		264.0	234.8	61,985		1.423	636,514	14.612
	26.70		266.4	237.2	63,188		1.451	655,290	15.043
	27.00		268.8	239.6	64,402		1.478	674,428	15.483
	27.30		271.2	242.0	65,628		1.507	693,932	15.930
	27.60		273.6	244.4	66,865		1.535	713,806	16.387
	27.90		276.0	246.8	68,114		1.564	734,053	16.852
	28.20		278.4	249.2	69,375		1.593	754,676	17.325

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.03 (May 2020)



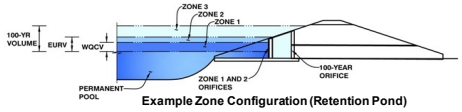


DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.03 (May 2020)

Project: Front Range - Midway Solar Project

Basin ID: Basin A10



Example Zone Configuration (Retention Pond)

Watershed Information

Selected BMP Type =	**EDB**	
Watershed Area =	236.63	acres
Watershed Length =	7,526	ft
Watershed Length to Centroid =	4,519	ft
Watershed Slope =	0.019	ft/ft
Watershed Imperviousness =	4.30%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	0.0%	percent
Percentage Hydrologic Soil Groups C/D =	100.0%	percent
Target WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	User Input	

After providing required inputs above including 1-hour rainfall depths, click 'Run CUHP' to generate runoff hydrographs using the embedded Colorado Urban Hydrograph Procedure.

			Optional User Overrides
Water Quality Capture Volume (WQCV) =	0.619	acre-feet	acre-feet
Excess Urban Runoff Volume (EURV) =	0.791	acre-feet	acre-feet
2-yr Runoff Volume (P1 = 1.01 in.) =	1.375	acre-feet	1.01 inches
5-yr Runoff Volume (P1 = 1.3 in.) =	5.086	acre-feet	1.30 inches
10-yr Runoff Volume (P1 = 1.57 in.) =	9.522	acre-feet	1.57 inches
25-yr Runoff Volume (P1 = 2.01 in.) =	19.293	acre-feet	2.01 inches
50-yr Runoff Volume (P1 = 2.4 in.) =	26.909	acre-feet	2.40 inches
100-yr Runoff Volume (P1 = 2.82 in.) =	36.763	acre-feet	2.82 inches
500-yr Runoff Volume (P1 = 3.98 in.) =	60.991	acre-feet	3.98 inches
Approximate 2-yr Detention Volume =	0.519	acre-feet	
Approximate 5-yr Detention Volume =	1.935	acre-feet	
Approximate 10-yr Detention Volume =	3.068	acre-feet	
Approximate 25-yr Detention Volume =	4.012	acre-feet	
Approximate 50-yr Detention Volume =	4.259	acre-feet	
Approximate 100-yr Detention Volume =	6.711	acre-feet	

Define Zones and Basin Geometry

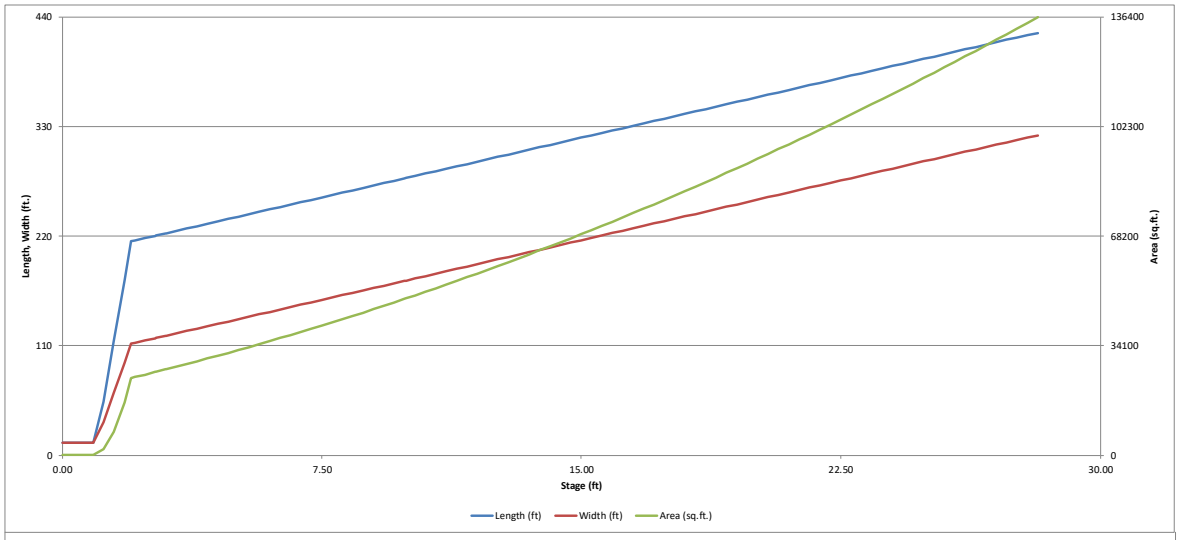
Zone 1 Volume (WQCV) =	0.619	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.172	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	5.920	acre-feet
Total Detention Basin Volume =	6.711	acre-feet
Initial Surcharge Volume (ISV) =	81	ft^3
Initial Surcharge Depth (ISD) =	0.50	ft
Total Available Detention Depth (H_{total}) =	9.90	ft
Depth of Trickle Channel (H_{TC}) =	0.50	ft
Slope of Trickle Channel (S_{TC}) =	0.005	ft/ft
Slopes of Main Basin Sides (S_{main}) =	4	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	2	
Initial Surcharge Area (A_{ISV}) =	162	ft^2
Surcharge Volume Length (L_{ISV}) =	12.7	ft
Surcharge Volume Width (W_{ISV}) =	12.7	ft
Depth of Basin Floor (H_{FLOOR}) =	0.99	ft
Length of Basin Floor (L_{FLOOR}) =	214.7	ft
Width of Basin Floor (W_{FLOOR}) =	111.7	ft
Area of Basin Floor (A_{FLOOR}) =	23,985	ft^2
Volume of Basin Floor (V_{FLOOR}) =	8,619	ft^3
Depth of Main Basin (H_{MAIN}) =	7.91	ft
Length of Main Basin (L_{MAIN}) =	278.0	ft
Width of Main Basin (W_{MAIN}) =	175.0	ft
Area of Main Basin (A_{MAIN}) =	48,645	ft^2
Volume of Main Basin (V_{MAIN}) =	281,564	ft^3
Calculated Total Basin Volume (V_{total}) =	**6.665**	acre-feet

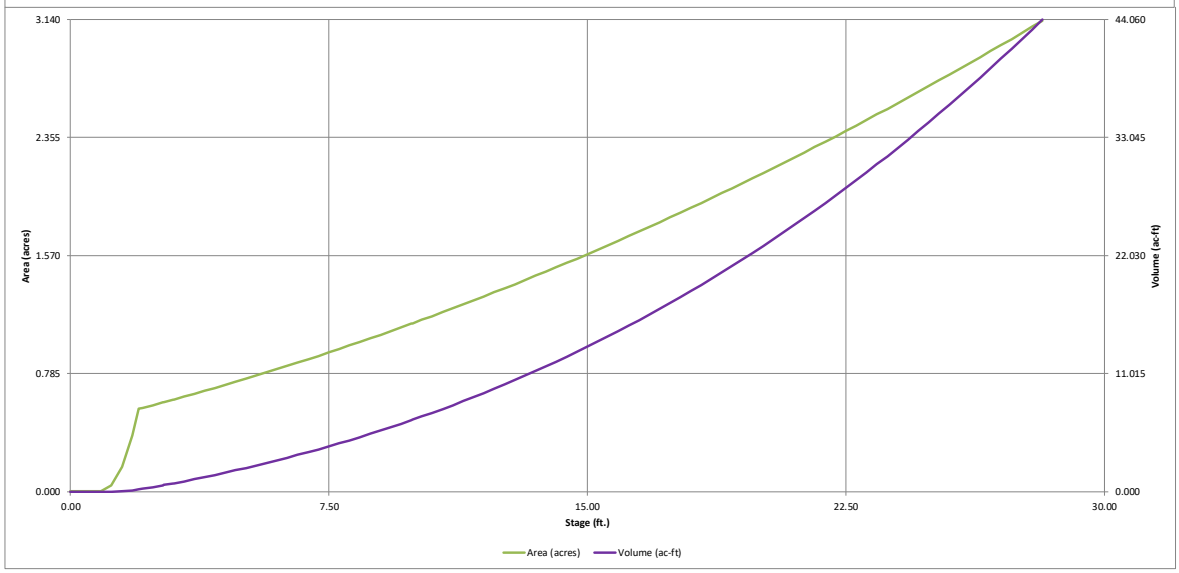
Depth Increment = 0.30 ft

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		12.7	12.7	162		0.004		
ISV	0.50		12.7	12.7	162		0.004	81	0.002
	0.60		12.7	12.7	162		0.004	97	0.002
	0.90		12.7	12.7	162		0.004	146	0.003
	1.20		53.5	32.7	1,751		0.040	326	0.007
	1.50		114.7	62.7	7,196		0.165	1,576	0.036
	1.80		175.9	92.7	16,312		0.374	5,011	0.115
Floor	1.99		214.7	111.7	23,985		0.551	8,816	0.202
	2.10		215.6	112.6	24,273		0.557	11,470	0.263
	2.40		218.0	115.0	25,067		0.575	18,871	0.433
	2.70		220.4	117.4	25,871		0.594	26,511	0.609
Zone 1 (WQCV)	2.72		220.5	117.6	25,926		0.595	27,029	0.621
	3.00		222.8	119.8	26,688		0.613	34,395	0.790
Zone 2 (EURV)	3.01		222.8	119.9	26,715		0.613	34,662	0.796
	3.30		225.2	122.2	27,516		0.632	42,525	0.976
	3.60		227.6	124.6	28,355		0.651	50,905	1.169
	3.90		230.0	127.0	29,206		0.670	59,539	1.367
	4.20		232.4	129.4	30,069		0.690	68,430	1.571
	4.50		234.8	131.8	30,943		0.710	77,582	1.781
	4.80		237.2	134.2	31,828		0.731	86,997	1.997
	5.10		239.6	136.6	32,725		0.751	96,680	2.219
	5.40		242.0	139.0	33,634		0.772	106,633	2.448
	5.70		244.4	141.4	34,554		0.793	116,861	2.683
	6.00		246.8	143.8	35,486		0.815	127,367	2.924
	6.30		249.2	146.2	36,429		0.836	138,154	3.172
	6.60		251.6	148.6	37,383		0.858	149,225	3.426
	6.90		254.0	151.0	38,349		0.880	160,585	3.687
	7.20		256.4	153.4	39,327		0.903	172,236	3.954
	7.50		258.8	155.8	40,316		0.926	184,182	4.228
	7.80		261.2	158.2	41,317		0.949	196,427	4.509
	8.10		263.6	160.6	42,329		0.972	208,974	4.797
	8.40		266.0	163.0	43,353		0.995	221,826	5.092
	8.70		268.4	165.4	44,388		1.019	234,987	5.395
	9.00		270.8	167.8	45,435		1.043	248,460	5.704
	9.30		273.2	170.2	46,493		1.067	262,249	6.020
	9.60		275.6	172.6	47,563		1.092	276,357	6.344
	9.90		278.0	175.0	48,645		1.117	290,788	6.676
Zone 3 (100-year)	9.94		278.3	175.3	48,790		1.120	292,737	6.720
	10.20		280.4	177.4	49,738		1.142	305,545	7.014
	10.50		282.8	179.8	50,842		1.167	320,632	7.361
	10.80		285.2	182.2	51,958		1.193	336,051	7.715
	11.10		287.6	184.6	53,085		1.219	351,807	8.076
	11.40		290.0	187.0	54,224		1.245	367,904	8.446
	11.70		292.4	189.4	55,375		1.271	384,343	8.823
	12.00		294.8	191.8	56,537		1.298	401,130	9.209
	12.30		297.2	194.2	57,710		1.325	418,266	9.602
	12.60		299.6	196.6	58,895		1.352	435,757	10.004
	12.90		302.0	199.0	60,092		1.380	453,605	10.413
	13.20		304.4	201.4	61,300		1.407	471,813	10.831
	13.50		306.8	203.8	62,520		1.435	490,386	11.258
	13.80		309.2	206.2	63,751		1.464	509,326	11.693
	14.10		311.6	208.6	64,993		1.492	528,637	12.136
	14.40		314.0	211.0	66,247		1.521	548,323	12.588
	14.70		316.4	213.4	67,513		1.550	568,387	13.048
	15.00		318.8	215.8	68,790		1.579	588,832	13.518
	15.30		321.2	218.2	70,079		1.609	609,662	13.996
	15.60		323.6	220.6	71,379		1.639	630,881	14.483
	15.90		326.0	223.0	72,691		1.669	652,491	14.979
	16.20		328.4	225.4	74,014		1.699	674,497	15.484
	16.50		330.8	227.8	75,349		1.730	696,901	15.999
	16.80		333.2	230.2	76,695		1.761	719,707	16.522
	17.10		335.6	232.6	78,053		1.792	742,919	17.055
	17.40		338.0	235.0	79,423		1.823	766,540	17.597
	17.70		340.4	237.4	80,804		1.855	790,574	18.149
	18.00		342.8	239.8	82,196		1.887	815,024	18.710
	18.30		345.2	242.2	83,600		1.919	839,893	19.281
	18.60		347.6	244.6	85,015		1.952	865,185	19.862
	18.90		350.0	247.0	86,442		1.984	890,903	20.452
	19.20		352.4	249.4	87,881		2.017	917,051	21.053
	19.50		354.8	251.8	89,331		2.051	943,633	21.663
	19.80		357.2	254.2	90,792		2.084	970,651	22.283
	20.10		359.6	256.6	92,265		2.118	998,109	22.913
	20.40		362.0	259.0	93,750		2.152	1,026,011	23.554
	20.70		364.4	261.4	95,246		2.187	1,054,360	24.205
	21.00		366.8	263.8	96,754		2.221	1,083,160	24.866
	21.30		369.2	266.2	98,273		2.256	1,112,414	25.538
	21.60		371.6	268.6	99,803		2.291	1,142,125	26.220
	21.90		374.0	271.0	101,346		2.327	1,172,297	26.912
	22.20		376.4	273.4	102,899		2.362	1,202,933	27.616
	22.50		378.8	275.8	104,464		2.398	1,234,038	28.330
	22.80		381.2	278.2	106,041		2.434	1,265,613	29.054
	23.10		383.6	280.6	107,629		2.471	1,297,663	29.790
	23.40		386.0	283.0	109,229		2.508	1,330,192	30.537
	23.70		388.4	285.4	110,840		2.545	1,363,202	31.295
	24.00		390.8	287.8	112,463		2.582	1,396,697	32.064
	24.30		393.2	290.2	114,098		2.619	1,430,681	32.844
	24.60		395.6	292.6	115,743		2.657	1,465,157	33.635
	24.90		398.0	295.0	117,401		2.695	1,500,128	34.438
	25.20		400.4	297.4	119,070		2.733	1,535,599	35.252
	25.50		402.8	299.8	120,750		2.772	1,571,571	36.078
	25.80		405.2	302.2	122,442		2.811	1,608,050	36.916
	26.10		407.6	304.6	124,145		2.850	1,645,038	37.765
	26.40		410.0	307.0	125,860		2.889	1,682,538	38.626
	26.70		412.4	309.4	127,587		2.929	1,720,555	39.499
	27.00		414.8	311.8	129,325		2.969	1,759,091	40.383
	27.30		417.2	314.2	131,074		3.009	1,798,151	41.280
	27.60		419.6	316.6	132,835		3.049	1,837,737	42.189
	27.90		422.0	319.0	134,608		3.090	1,877,853	43.110
	28.20		424.4	321.4	136,392		3.131	1,918,503	44.043

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.03 (May 2020)



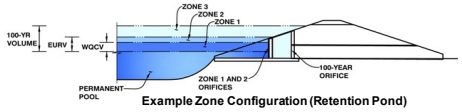


DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.03 (May 2020)

Project: Front Range - Midway Solar Project

Basin ID: Basin A11



Example Zone Configuration (Retention Pond)

Watershed Information

Selected BMP Type =	**EDB**	
Watershed Area =	220.54	acres
Watershed Length =	8,124	ft
Watershed Length to Centroid =	4,145	ft
Watershed Slope =	0.019	ft/ft
Watershed Imperviousness =	4.30%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	0.0%	percent
Percentage Hydrologic Soil Groups C/D =	100.0%	percent
Target WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	User Input	

After providing required inputs above including 1-hour rainfall depths, click 'Run CUHP' to generate runoff hydrographs using the embedded Colorado Urban Hydrograph Procedure.

		Optional User Overrides	
Water Quality Capture Volume (WQCV) =	0.577 acre-feet		acre-feet
Excess Urban Runoff Volume (EURV) =	0.737 acre-feet		acre-feet
2-yr Runoff Volume (P1 = 1.01 in.) =	1.282 acre-feet	1.01	inches
5-yr Runoff Volume (P1 = 1.3 in.) =	4.740 acre-feet	1.30	inches
10-yr Runoff Volume (P1 = 1.57 in.) =	8.874 acre-feet	1.57	inches
25-yr Runoff Volume (P1 = 2.01 in.) =	17.979 acre-feet	2.01	inches
50-yr Runoff Volume (P1 = 2.4 in.) =	25.077 acre-feet	2.40	inches
100-yr Runoff Volume (P1 = 2.82 in.) =	34.260 acre-feet	2.82	inches
500-yr Runoff Volume (P1 = 3.98 in.) =	56.839 acre-feet	3.98	inches
Approximate 2-yr Detention Volume =	0.484 acre-feet		
Approximate 5-yr Detention Volume =	1.804 acre-feet		
Approximate 10-yr Detention Volume =	2.859 acre-feet		
Approximate 25-yr Detention Volume =	3.740 acre-feet		
Approximate 50-yr Detention Volume =	3.970 acre-feet		
Approximate 100-yr Detention Volume =	6.255 acre-feet		

Define Zones and Basin Geometry

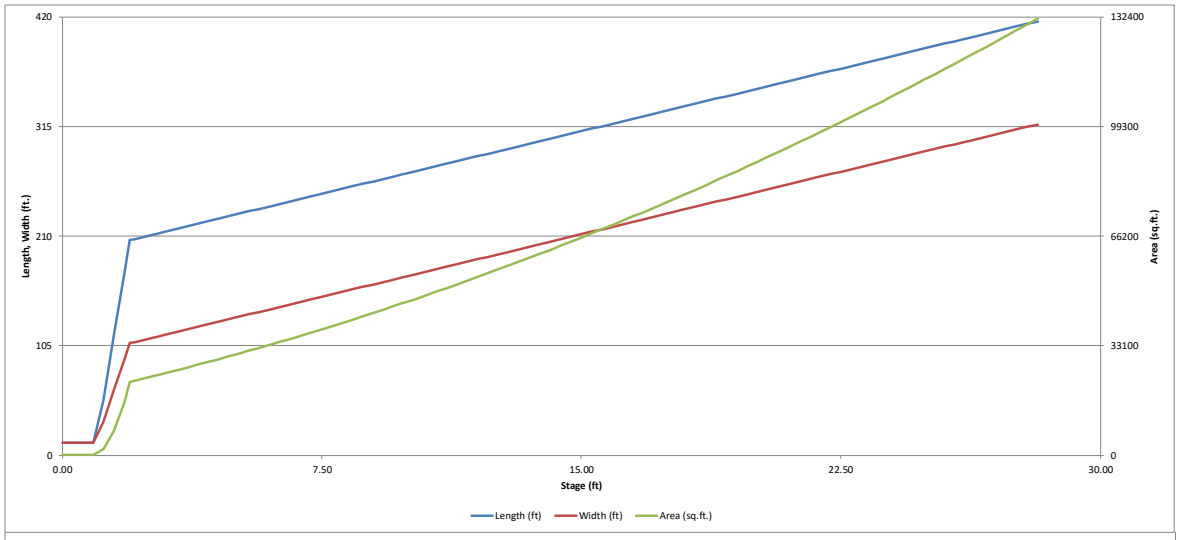
Zone 1 Volume (WQCV) =	0.577	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.160	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	5.518	acre-feet
Total Detention Basin Volume =	6.255	acre-feet
Initial Surcharge Volume (ISV) =	75	ft^3
Initial Surcharge Depth (ISD) =	0.50	ft
Total Available Detention Depth (H_{total}) =	9.90	ft
Depth of Trickle Channel (H_{TC}) =	0.50	ft
Slope of Trickle Channel (S_{TC}) =	0.005	ft/ft
Slopes of Main Basin Sides (S_{main}) =	4	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	2	
Initial Surcharge Area (A_{ISV}) =	151	ft^2
Surcharge Volume Length (L_{ISV}) =	12.3	ft
Surcharge Volume Width (W_{ISV}) =	12.3	ft
Depth of Basin Floor (H_{FLOOR}) =	0.95	ft
Length of Basin Floor (L_{FLOOR}) =	206.1	ft
Width of Basin Floor (W_{FLOOR}) =	107.3	ft
Area of Basin Floor (A_{FLOOR}) =	22,109	ft^2
Volume of Basin Floor (V_{FLOOR}) =	7,627	ft^3
Depth of Main Basin (H_{MAIN}) =	7.95	ft
Length of Main Basin (L_{MAIN}) =	269.7	ft
Width of Main Basin (W_{MAIN}) =	170.9	ft
Area of Main Basin (A_{MAIN}) =	46,084	ft^2
Volume of Main Basin (V_{MAIN}) =	265,302	ft^3
Calculated Total Basin Volume (V_{total}) =	**6.269**	acre-feet

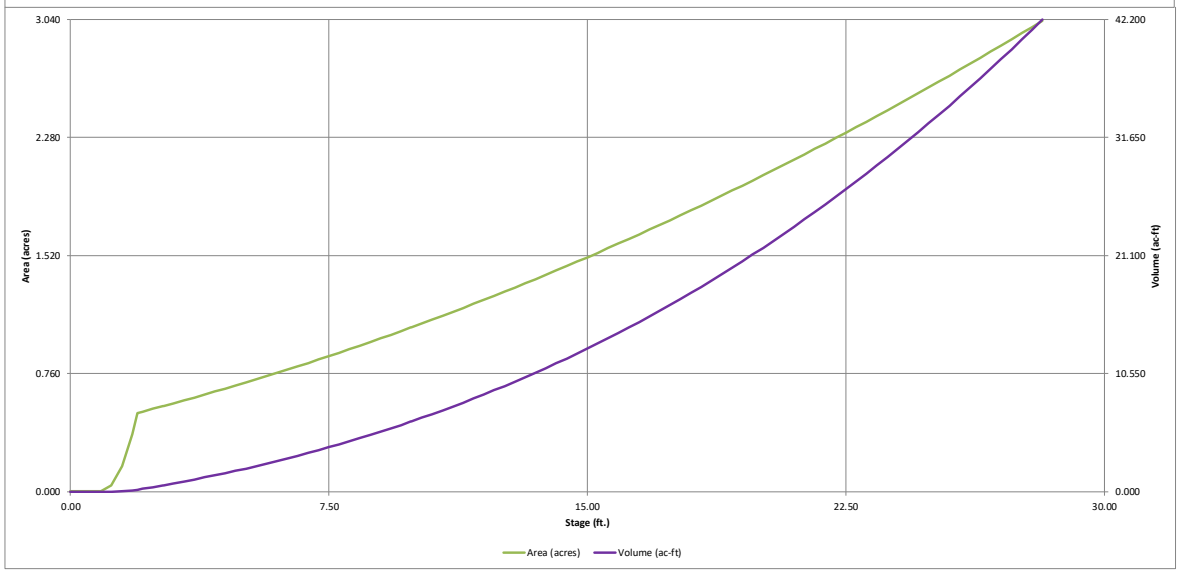
Depth Increment = 0.30 ft

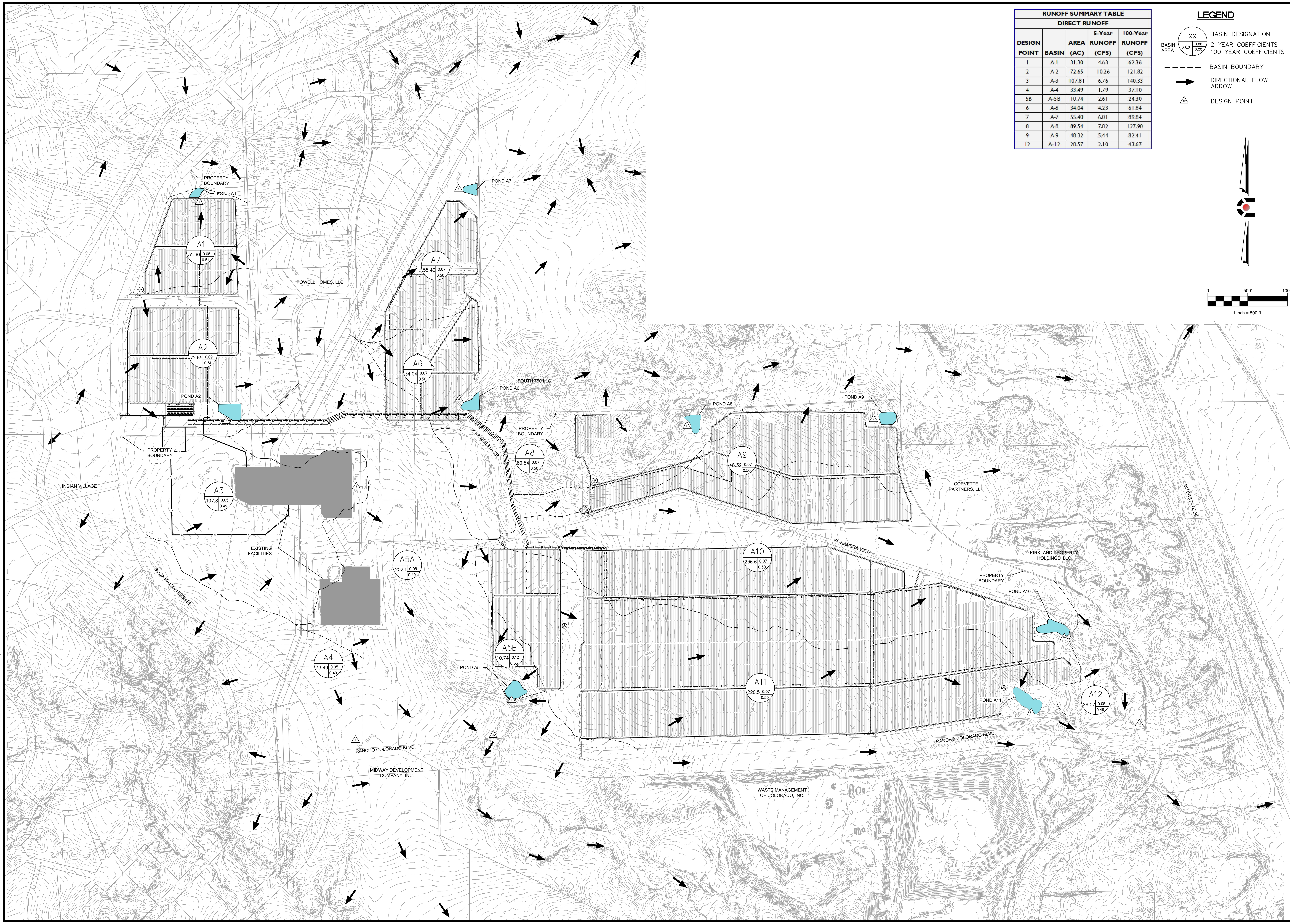
Stage - Storage Description	Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft^2)	Optional Override Area (ft^2)	Area (acre)	Volume (ft^3)	Volume (ac-ft)
Top of Micropool	0.00		12.3	12.3	151		0.003		
ISV	0.50		12.3	12.3	151		0.003	75	0.002
	0.60		12.3	12.3	151		0.003	91	0.002
	0.90		12.3	12.3	151		0.003	136	0.003
	1.20		53.1	32.3	1,714		0.039	310	0.007
	1.50		114.3	62.3	7,118		0.163	1,543	0.035
	1.80		175.5	92.3	16,194		0.372	4,948	0.114
Floor	1.95		206.1	107.3	22,109		0.508	7,809	0.179
	2.10		207.3	108.5	22,487		0.516	11,154	0.256
	2.40		209.7	110.9	23,250		0.534	18,014	0.414
	2.70		212.1	113.3	24,026		0.552	25,105	0.576
Zone 1 (WQCV)	2.71		212.2	113.4	24,052		0.552	25,346	0.582
Zone 2 (EURV)	2.99		214.4	115.6	24,786		0.569	32,183	0.739
	3.00		214.5	115.7	24,812		0.570	32,431	0.745
	3.30		216.9	118.1	25,610		0.588	39,994	0.918
	3.60		219.3	120.5	26,420		0.607	47,798	1.097
	3.90		221.7	122.9	27,241		0.625	55,847	1.282
	4.20		224.1	125.3	28,074		0.644	64,144	1.473
	4.50		226.5	127.7	28,918		0.664	72,693	1.669
	4.80		228.9	130.1	29,774		0.684	81,496	1.871
	5.10		231.3	132.5	30,641		0.703	90,558	2.079
	5.40		233.7	134.9	31,520		0.724	99,882	2.293
	5.70		236.1	137.3	32,410		0.744	109,471	2.513
	6.00		238.5	139.7	33,312		0.765	119,329	2.739
	6.30		240.9	142.1	34,226		0.786	129,460	2.972
	6.60		243.3	144.5	35,150		0.807	139,866	3.211
	6.90		245.7	146.9	36,087		0.828	150,551	3.456
	7.20		248.1	149.3	37,035		0.850	161,519	3.708
	7.50		250.5	151.7	37,994		0.872	172,773	3.966
	7.80		252.9	154.1	38,965		0.895	184,317	4.231
	8.10		255.3	156.5	39,948		0.917	196,153	4.503
	8.40		257.7	158.9	40,942		0.940	208,287	4.782
	8.70		260.1	161.3	41,947		0.963	220,720	5.067
	9.00		262.5	163.7	42,964		0.986	233,456	5.359
	9.30		264.9	166.1	43,993		1.010	246,499	5.659
	9.60		267.3	168.5	45,033		1.034	259,853	5.965
Zone 3 (100-year)	9.88		269.5	170.7	46,014		1.056	272,599	6.258
	9.90		269.7	170.9	46,084		1.058	273,520	6.279
	10.20		272.1	173.3	47,148		1.082	287,505	6.600
	10.50		274.5	175.7	48,222		1.107	301,810	6.929
	10.80		276.9	178.1	49,308		1.132	316,439	7.264
	11.10		279.3	180.5	50,406		1.157	331,396	7.608
	11.40		281.7	182.9	51,515		1.183	346,684	7.959
	11.70		284.1	185.3	52,636		1.208	362,306	8.317
	12.00		286.5	187.7	53,768		1.234	378,267	8.684
	12.30		288.9	190.1	54,912		1.261	394,568	9.058
	12.60		291.3	192.5	56,067		1.287	411,215	9.440
	12.90		293.7	194.9	57,234		1.314	428,210	9.830
	13.20		296.1	197.3	58,412		1.341	445,557	10.229
	13.50		298.5	199.7	59,602		1.368	463,258	10.635
	13.80		300.9	202.1	60,804		1.396	481,319	11.050
	14.10		303.3	204.5	62,016		1.424	499,742	11.472
	14.40		305.7	206.9	63,241		1.452	518,530	11.904
	14.70		308.1	209.3	64,477		1.480	537,687	12.344
	15.00		310.5	211.7	65,724		1.509	557,217	12.792
	15.30		312.9	214.1	66,983		1.538	577,123	13.249
	15.60		315.3	216.5	68,254		1.567	597,408	13.715
	15.90		317.7	218.9	69,536		1.596	618,076	14.189
	16.20		320.1	221.3	70,829		1.626	639,131	14.672
	16.50		322.5	223.7	72,134		1.656	660,575	15.165
	16.80		324.9	226.1	73,451		1.686	682,413	15.666
	17.10		327.3	228.5	74,779		1.717	704,647	16.176
	17.40		329.7	230.9	76,118		1.747	727,281	16.696
	17.70		332.1	233.3	77,470		1.778	750,319	17.225
	18.00		334.5	235.7	78,832		1.810	773,764	17.763
	18.30		336.9	238.1	80,206		1.841	797,619	18.311
	18.60		339.3	240.5	81,592		1.873	821,889	18.868
	18.90		341.7	242.9	82,989		1.905	846,576	19.435
	19.20		344.1	245.3	84,398		1.938	871,684	20.011
	19.50		346.5	247.7	85,818		1.970	897,216	20.597
	19.80		348.9	250.1	87,250		2.003	923,176	21.193
	20.10		351.3	252.5	88,693		2.036	949,567	21.799
	20.40		353.7	254.9	90,148		2.070	976,393	22.415
	20.70		356.1	257.3	91,614		2.103	1,003,657	23.041
	21.00		358.5	259.7	93,092		2.137	1,031,363	23.677
	21.30		360.9	262.1	94,582		2.171	1,059,513	24.323
	21.60		363.3	264.5	96,082		2.206	1,088,113	24.980
	21.90		365.7	266.9	97,595		2.240	1,117,164	25.647
	22.20		368.1	269.3	99,119		2.275	1,146,671	26.324
	22.50		370.5	271.7	100,654		2.311	1,176,636	27.012
	22.80		372.9	274.1	102,201		2.346	1,207,064	27.710
	23.10		375.3	276.5	103,760		2.382	1,237,958	28.420
	23.40		377.7	278.9	105,330		2.418	1,269,321	29.140
	23.70		380.1	281.3	106,911		2.454	1,301,157	29.870
	24.00		382.5	283.7	108,504		2.491	1,333,469	30.612
	24.30		384.9	286.1	110,109		2.528	1,366,261	31.365
	24.60		387.3	288.5	111,725		2.565	1,399,536	32.129
	24.90		389.7	290.9	113,352		2.602	1,433,297	32.904
	25.20		392.1	293.3	114,992		2.640	1,467,548	33.690
	25.50		394.5	295.7	116,642		2.678	1,502,293	34.488
	25.80		396.9	298.1	118,304		2.716	1,537,535	35.297
	26.10		399.3	300.5	119,978		2.754	1,573,277	36.117
	26.40		401.7	302.9	121,663		2.793	1,609,523	36.950
	26.70		404.1	305.3	123,360		2.832	1,646,276	37.793
	27.00		406.5	307.7	125,068		2.871	1,683,540	38.649
	27.30		408.9	310.1	126,788		2.911	1,721,318	39.516
	27.60		411.3	312.5	128,519		2.950	1,759,614	40.395
	27.90		413.7	314.9	130,262		2.990	1,798,431	41.286
	28.20		416.1	317.3	132,016		3.031	1,837,772	42.189

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.03 (May 2020)







RUNOFF SUMMARY TABLE				
DIRECT RUNOFF				
DESIGN POINT	BASIN	AREA (AC)	5-Year RUNOFF (CFS)	100-Year RUNOFF (CFS)
1	A-1	31.30	4.63	62.36
2	A-2	72.65	10.26	121.82
3	A-3	107.81	6.76	140.33
4	A-4	33.49	1.79	37.10
5B	A-5B	10.74	2.61	24.30
6	A-6	34.04	4.23	61.84
7	A-7	55.40	6.01	89.84
8	A-8	89.54	7.82	127.90
9	A-9	48.32	5.44	82.41
12	A-12	28.57	2.10	43.67

LEGEND

BASIN AREA — XX / XX.X / X.XX / X.XX — BASIN DESIGNATION; 2 YEAR COEFFICIENTS; 100 YEAR COEFFICIENTS

– – – – – – BASIN BOUNDARY

➔ DIRECTIONAL FLOW ARROW

△ DESIGN POINT

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DEVELOPMENT CONSULTING
NATURAL RESOURCES CONSULTING
LAND SURVEYING
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#	REVISION DESCRIPTION	DATE	BY
1	SUBMITTAL #1	[illegible]	[illegible]

FRONT RANGE MIDWAY SOLAR PROJECT

EL PASO COUNTY, FOUNTAIN, CO

EXHIBIT
OVERALL DRAINAGE MAP

DESIGNED BY: DJB
DRAWN BY: DJB
CHECKED BY: DJB

JOB NO. 19-177

SHEET 1 OF 1

6/8/2020 5:52 PM ; X:\19-177 FRMW SOLAR - EARLY ASSISTANCE\CIVIL\REPORTS\DRAINAGE LETTER\CP-DRAIN-MAP.DWG;

PRELIMINARY DRAINAGE REPORT
FOR
FRONT RANGE – MIDWAY SOLAR PROJECT
EL PASO COUNTY, CO
(WSEO 17-001)

PREPARED FOR:

TRADEWIND ENERGY, INC.
FRONT RANGE – MIDWAY SOLAR
16105 W. 113TH STREET SUITE 105
LENEXA, KS 66219
PHONE: (913) 888-9463
CONTACT: SCOTT ZIEMETZ

PREPARED BY:

CORE CONSULTANTS, INC.
1950 W. LITTLETON BOULEVARD, SUITE 109
LITTLETON, CO 80120
PHONE: 303-703-4444
CONTACT: DAVID BACCI
CORE PROJECT NUMBER: 17-012

FEBRUARY 26, 2018

APPROVAL BLOCKS

I. DESIGN ENGINEER'S STATEMENT:

The attached drainage plan and report were prepared under my direction and supervision and are correct to the best of my knowledge and belief. Said drainage report has been prepared according to the criteria established by the County for drainage reports and said report is in conformity with the applicable master plan of the drainage basin. I accept responsibility for any liability caused by any negligent acts, errors or omissions on my part in preparing this report.

COLORADO LICENSED
DAVID JOSE BACCI
42104
PROFESSIONAL ENGINEER

3/26/18

David Bacci, P.E. #42104 Date

II. OWNER/DEVELOPER'S STATEMENT:

I, the developer, have read and will comply with all the requirements specified in this Drainage Report and Plan.

Dave Iadarola

Development Manager

III. EL PASO COUNTY STATEMENT:

Filed in accordance with the requirements of the Drainage Criteria Manual, Volumes 1 and 2, El Paso County Engineering Criteria Manual and Land Development Code as amended.

Jennifer Irvine P.E., Date
County Engineer / ECM Administrator

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I. GENERAL LOCATION AND DESCRIPTION

A. SITE LOCATION

This Final Drainage Report provides remediation for changes in the drainage patterns resulting from the development of the proposed Front Range – Midway Solar Project. The Project would consist of a 100 megawatt (MW) distributed generation photovoltaic solar facility that would encompass approximately 1,085 acres in El Paso County (EPC), Colorado. The Project is located west of Intersate-25 (I-25) approximately 20 miles south of downtown Colorado Springs on private and county owned lands. The Project is bound on the west by county lands and by disperse residential development to the northwest and southwest, by rangeland to the north, by a gravel pit to the east, and by the Midway Waste Management Landfill to the south. Other facilities in the near vicinity include the Pikes Peak International Raceway approximately 1.5 miles to the north and the Fort Carson Military Reservation approximately one mile to the west. The Mountain States Telephone compound is also located within the project area. Front Range - Midway Solar Project is located in Section 20, Township 17 South, Range 65 West of the 6th Principal Meridian, El Paso County, Colorado. A vicinity map for the site can be found in Appendix A.

B. DESCRIPTION OF PROPERTY

The project area is flat to gently rolling, at elevations ranging from approximately 5,360 to 5,520 feet. The site has naturally occurring slopes ranging from 2 to 10 percent and is covered with native grass and very few deciduous trees. Surface runoff is to the north, south and east. Runoff from the northern portion of the site flows north into two separate conveyances. After merging into one conveyance, these flows continue east under I25 through a series of bridges and eventually into Fountain Creek. Flows from the southeast portion of the site flow east under I25 through an existing box culvert and continue east into Fountain Creek. Flows from the southwest portion of the site flow south into Sand Creek then under I25 through a series of bridges and continue into Fountain Creek which flows to the south along the east side of I-25 to Pueblo where it joins the Arkansas River. The proposed improvements to the site consists of a 100 megawatt (MW) photovoltaic solar array, distribution poles, a meteorological station, inverters, site access roads, and other necessary ancillary features. The soils vary throughout the site and include mainly Wilid Silt Loam, (Hydrologic soil group C), Fort Loam (Hydrologic soil group C), Kim Loam (Hydrologic soil group B) and Schamber Razor (Hydrologic soil group A). A soils map has been provided and can be found in Appendix A.

II. DRAINAGE BASINS AND SUB-BASINS

A. MAJOR DRAINAGE BASINS

The existing drainage patterns for the major basin will follow the historic patterns. Front Range – Midway Solar site will drain east and cross under I25 in 3 locations

eventually outfalling into Fountain Creek. Fountain Creek flows to the south along the east side of I-25 and is part of the Arkansas River basin

The site falls within Zone X, as shown on the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) panels 08041C1155F, 08041C1160F, 08041C1170F, and 08041C1165F. A copy of the FIRM map can be found in Appendix A.

B. MINOR DRAINAGE BASINS

Minor Drainage Basins for Front Range – Midway Solar Project have been delineated per the preliminary layout of the solar arrays. Layout of the arrays and access roads may change during the preliminary development of the site. Overall, the proposed drainage patterns for the sub-basins will follow the historic patterns prior to development. For sub-basins within the site, runoff will drain to the north, south and east.

Basin (A1) will flow north to a proposed Extended Detention Basin. The outlet structure for this extended detention basin will release the historic runoff to the northeast into an east-flowing conveyance and through a series of bridges under I25 to Fountain Creek.

Basin (A2) will flow southeast to a proposed Extended Detention Basin. The outlet structure for this extended detention basin will release the historic runoff overland to the northeast and into an east-flowing conveyance then through a series of bridges under I25 to Fountain Creek.

Basin (A3) will flow to the east and will be collected in an existing Extended Detention Basin. Flowrates or flow patterns within this basin will not be affected by this development.

Basin (A4) will flow to the south and eventually into Sand Creek. Flowrates or flow patterns within this basin will not be affected by this development.

Basin (A5) will flow southeast to a proposed Extended Detention Basin. The outlet structure for this extended detention basin will release the historic runoff overland to the south into Sand Creek. Sand Creek crosses I25 through a series of bridges and flows into Fountain Creek.

Basin (A6) flows east into a proposed Extended Detention Basin. The outlet structure for this extended detention basin will release the historic runoff to the east through a series of bridges under I25 to Fountain Creek.

Basin (A7) flows northeast into a proposed Extended Detention Basin. The outlet structure for this extended detention basin will release the historic runoff to the east through a series of bridges under I25 to Fountain Creek.

Basin (A8) will flow to the northeast into a proposed Extended Detention Basin. The outlet structure for this extended detention basin will release the historic runoff to the east through a series of bridges under I25 to Fountain Creek.

Basin (A9) will flow to the northeast into a proposed Extended Detention Basin. The outlet structure for this extended detention basin will release the historic runoff overland to the east through a series of bridges under I25 to Fountain Creek.

Basin (A10) will flow to the east into a proposed Extended Detention Basin. The outlet structure for this extended detention basin will release the historic flowrate to the southeast into a conveyance that continues east under I25 through an existing box culvert eventually flowing into Fountain Creek.

Basin (A11) will flow to the east into a proposed Extended Detention Basin. The outlet structure for this extended detention basin will release the historic flowrate to the southeast into a conveyance that continues east under I25 through an existing box culvert eventually flowing into Fountain Creek.

Basin (A12) flows east into a proposed Extended Detention Basin. The outlet structure for this extended detention basin will release the historic runoff to the east through a series of bridges under I25 to Fountain Creek

The developed minor basins will include pole mounted solar arrays with native ground beneath and 3" thick gravel access roads constructed of ¾" gravel on top of 12" re-compacted soil. The development will slightly increase the imperviousness of the site due to the addition of gravel roads. Extended Detention Basins have been designed to mitigate the increase in runoff. A total of 9 extended detention basins will be designed during the construction document design phase. The extended detention basins will be privately owned and maintained.

III. DRAINAGE DESIGN CRITERIA

A. REGULATIONS

This Final Drainage Report is in accordance with El Paso County Drainage Criteria Manual and the *Urban Drainage and Flood Control District (UDFCD) Storm Drainage Criteria Manual*. These manuals were used as a basis of design for the site. All applicable tables, figures, and charts from the referenced reports and criteria manuals used in the drainage design of the site can be found in

Appendix B. The report will analyze the minor (5-year) and major (100-year) storm events.

B. Drainage Studies, Master Plans, and Site Constraints

There are no previous drainage studies, master plans or site constraints for this development.

C. Hydrology

A combination of the Rational Method and the Colorado Urban Hydrograph Procedure (CUHP) was used to determine the flow rates for various basins within the site. Basins Larger than 160 acres were evaluated using CUHP. The rational method was used for all other basins. The sub-basins were delineated based on the existing topography for the project. Flow rates for each basin can be found in Appendix A. Stormwater Management Model (SWMM) is typically used in conjunction with CUHP when the routing of extended detention basin s, channels and/or storm networks as necessary. Because this site is located at the top of a basin; each basin flows into its own extended detention basin or separate concentrated point. Because of this, no routing is required and SWMM was not used. The impervious panels are going to be pole mounted with the ground underneath them to remain vegetated. The gravel access roads will be constructed to slow surface flows and promote infiltration back into the ground. As a result, there will be very slight increase in runoff once the development is constructed.

The intensity-frequency curves used in the Rational Method calculations were taken from the El Paso County Drainage Criteria Manual. All drainage facilities were analyzed and designed for both the minor (5-year) and major (100-year) storm events. Time of concentration calculations were used to determine the rainfall intensity. The development of the site will slightly increase the imperviousness of the site; therefore, detention will be required in various locations for the development. These calculations also can be found in Appendix A.

D. Hydraulics

Hydraulic calculations for street and inlet capacity will not be necessary for this development.

E. Water Quality Enhancement

Water quality measures within the extended detention basins will be required and will be designed during the construction design process. The design will employ the Four-Step process for selecting structural BMP's as described in the El Paso Drainage Criteria Manual.

IV. STORMWATER MANAGEMENT FACILITY DESIGN

A. STORMWATER CONVEYANCE FACILITIES

The general concept for the drainage design is to maintain the historic drainage patterns and release rates for the site. By doing this, it reduces the impact to the existing channels and ultimately Fountain Creek and Sand Creek. No public infrastructure is proposed within this site.

B. STORMWATER STORAGE FACILITIES

Extended Detention Basins for the site will be required. Basins A1-A2 and A5-A12 will have Extended Detention Basins within their respective basins. Extended Detention Basins will be designed per the El Paso County Drainage Criteria Manual and the *Urban Drainage and Flood Control District (UDFCD) Storm Drainage Criteria Manual*. Extended Detention Basin calculations can be found in Appendix A.

C. WATER QUALITY ENHANCEMENT BEST MANAGEMENT PRACTICES

Water quality measures within the extended detention basins will be required. Outlet structures, micro pools and essential components of the outlet structures will be designed per the El Paso County Drainage Criteria Manual and the *Urban Drainage and Flood Control District (UDFCD) Storm Drainage Criteria Manual.* Outlet structure calculations can be found in Appendix A.

D. FLOODPLAIN MODIFICATION

There will be no modification to the floodplain.

E. ADDITIONAL PERMITTING REQUIREMENTS

No additional permitting will be required for this site.

F. GENERAL

All applicable tables, figures, and charts from the referenced reports and criteria manuals used in the drainage design of the site can be found in Appendix B. The site is not going to be platted at this time therefore no drainage fees are due.

REFERENCES

A. El Paso County Drainage Criteria Manual, Volumes 1 and 2.

B. Drainage Criteria Manual, Volumes 1, 2, & 3, Urban Drainage and Flood Control District, June 2001, Revised June 2004.

APPENDIX A
HYDROLOGIC CALCULATIONS

VICINITY MAP

FIRM MAP

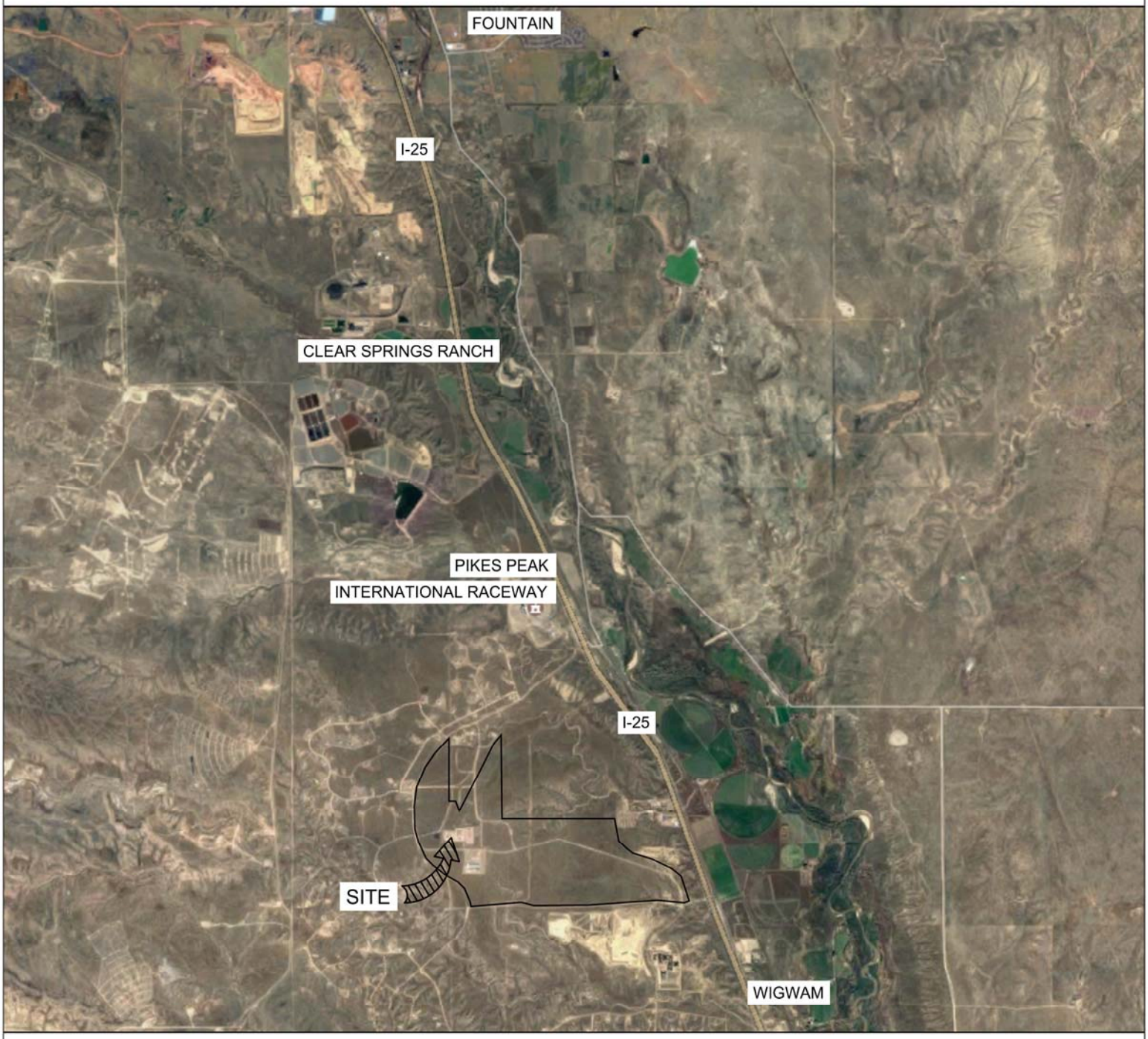
SOILS MAP

CIA CALCULATIONS

CUHP CALCULATIONS

EXTENDED DETENTION BASIN CALCULATIONS

DRAINAGE PLAN



PROJECT: FRONT RANGE - MIDWAY SOLAR
VICINITY MAP
DATE: 07/21/2017

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LAND SURVEYING
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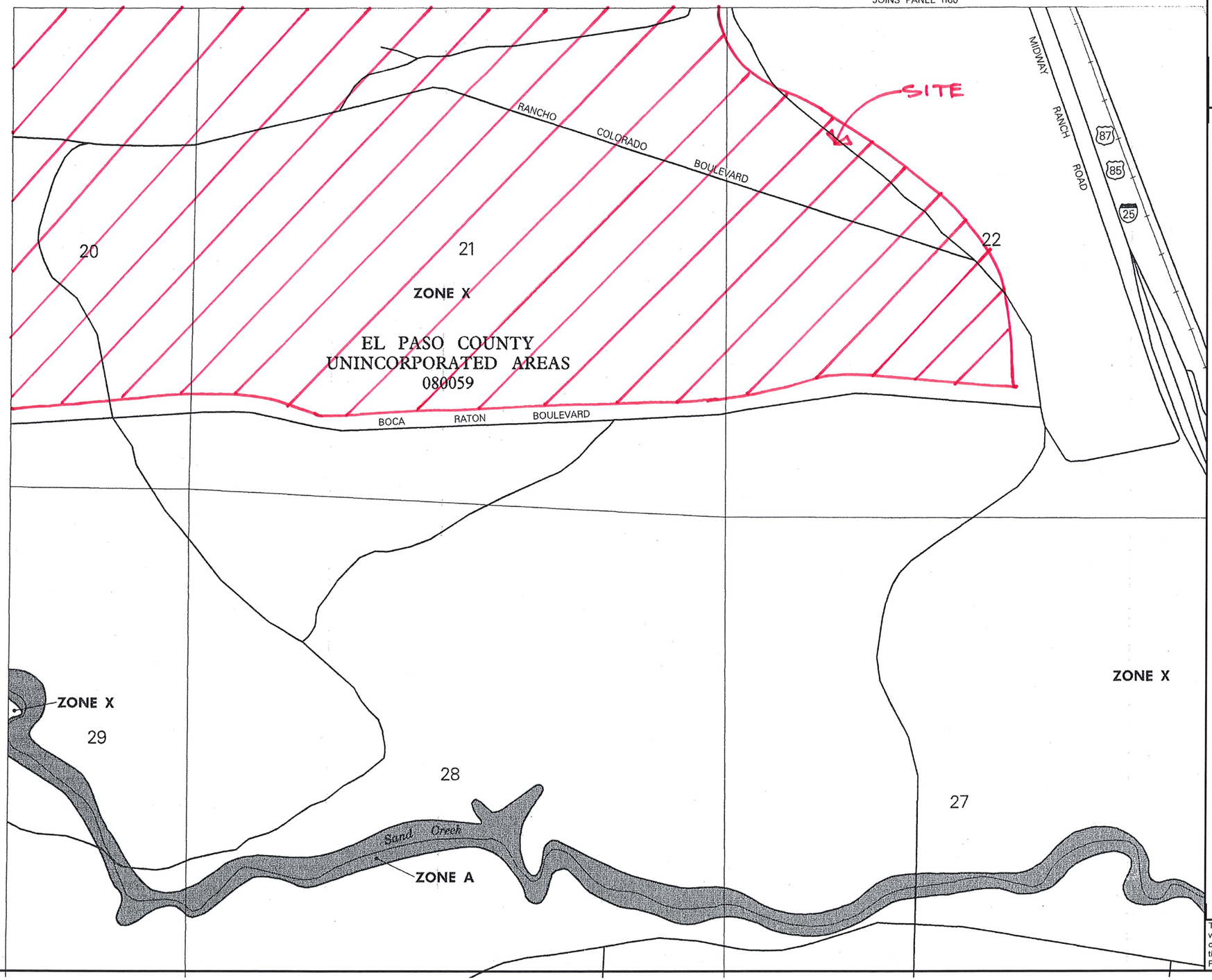
1950 W. Littleton Blvd., Ste. 109
Littleton, CO 80120

104°41'15"
38°33'45"

JOINS PANEL 1160



APPROXIMATE SCALE IN FEET
1000 0 1000

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

EL PASO COUNTY, COLORADO AND INCORPORATED AREAS

PANEL 1170 OF 1300
(SEE MAP INDEX FOR PANELS NOT PRINTED)

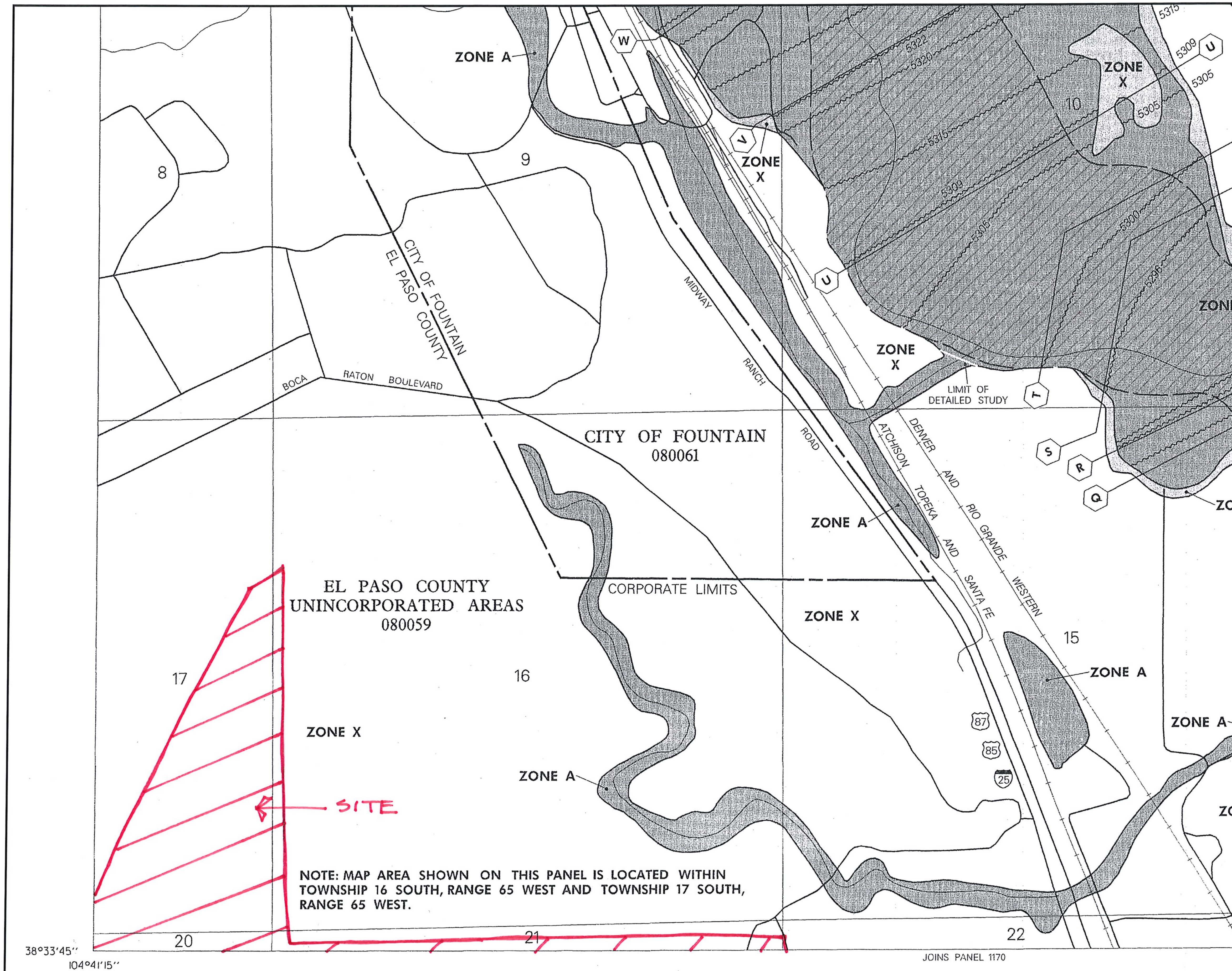
CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
EL PASO COUNTY, UNINCORPORATED AREAS	080059	1170	F

MAP NUMBER
08041C1170 F

EFFECTIVE DATE:
MARCH 17, 1997

Federal Emergency Management Agency



APPROXIMATE SCALE IN FEET

1000 0 1000

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

EL PASO COUNTY, COLORADO AND INCORPORATED AREAS

PANEL 1160 OF 1300

(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS:

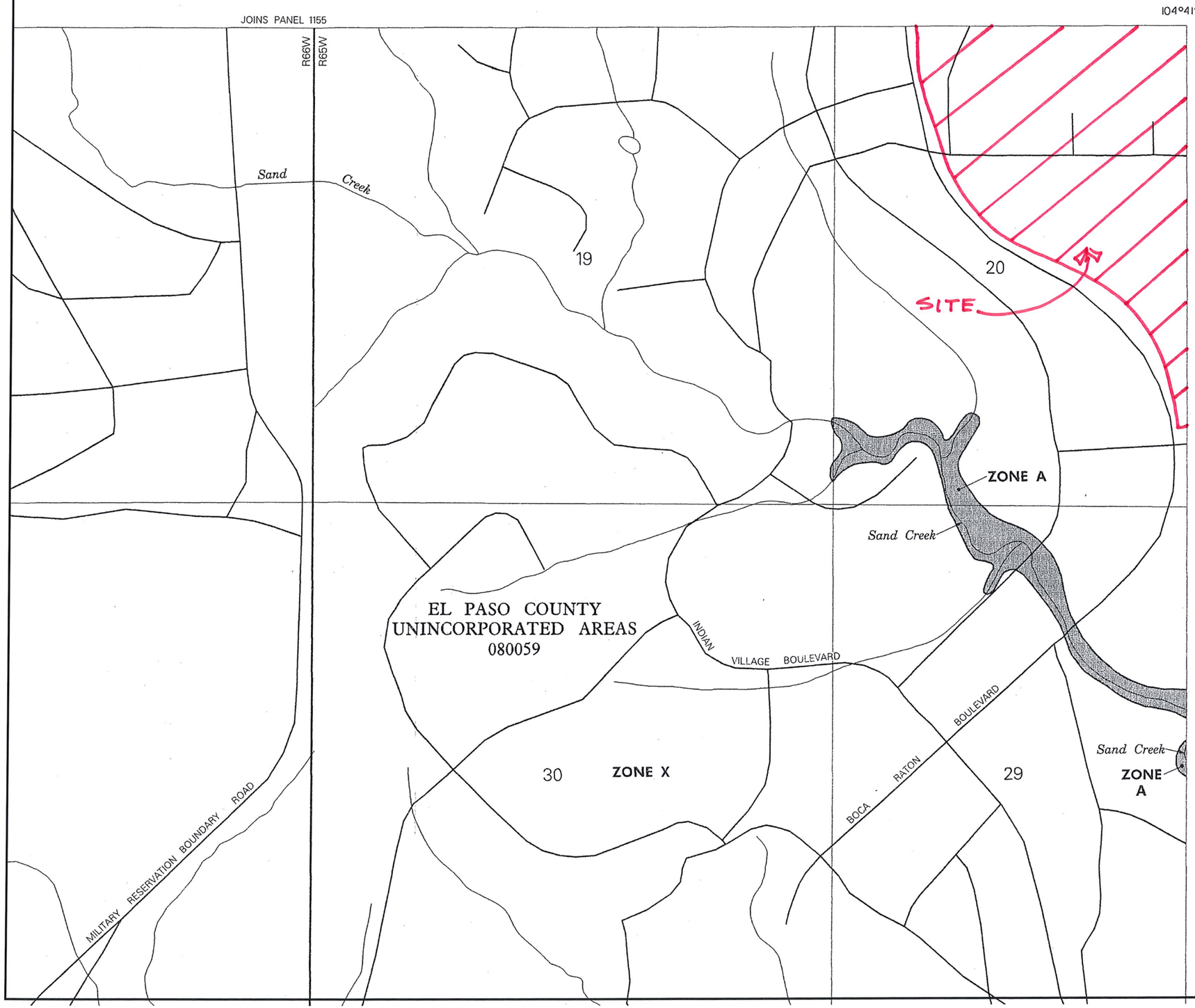
COMMUNITY	NUMBER	PANEL	SUFFIX
EL PASO COUNTY, UNINCORPORATED AREAS	080059	1160	F
FOUNTAIN, CITY OF	080061	1160	F

MAP NUMBER
08041C1160 F

EFFECTIVE DATE:
MARCH 17, 1997

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov



APPROXIMATE SCALE IN FEET

1000 0 1000

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

EL PASO COUNTY, COLORADO AND INCORPORATED AREAS

PANEL 1165 OF 1300

(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
EL PASO COUNTY, UNINCORPORATED AREAS	080059	1165	F

MAP NUMBER
08041C1165 F

EFFECTIVE DATE:
MARCH 17, 1997

Federal Emergency Management Agency

APPROXIMATE SCALE IN FEET

1000 0 1000

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

EL PASO COUNTY, COLORADO AND INCORPORATED AREAS

PANEL 1155 OF 1300

(SEE MAP INDEX FOR PANELS NOT PRINTED)

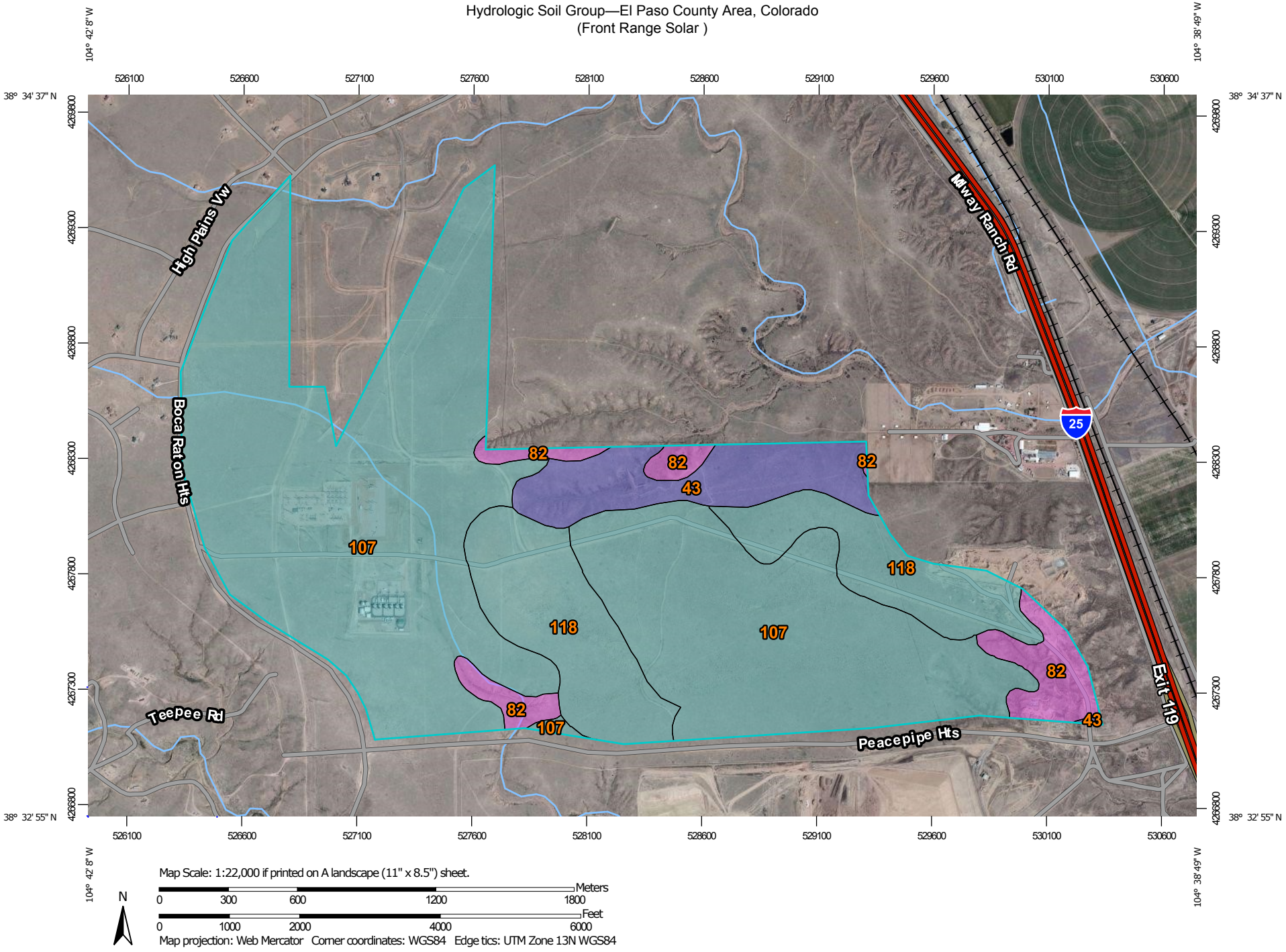
CONTAINS: COMMUNITY	NUMBER	PANEL	SUFFIX
EL PASO COUNTY UNINCORPORATED AREAS	080059	1155	F
FOUNTAIN, CITY OF	080061	1155	F

MAP NUMBER 08041C1155 F

EFFECTIVE DATE: MARCH 17, 1997

Federal Emergency Management Agency

Hydrologic Soil Group—El Paso County Area, Colorado
(Front Range Solar)



Map Scale: 1:22,000 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 300 600 1200 1800

Feet: 0 1000 2000 4000 6000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A
A/D
B
B/D
C
C/D
D
Not rated or not available

Soil Rating Lines

A
A/D
B
B/D
C
C/D
D
Not rated or not available

Soil Rating Points

A
A/D
B
B/D
C
C/D
D
Not rated or not available

Water Features

Streams and Canals

Transportation

Rails
Interstate Highways
US Routes
Major Roads
Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: El Paso County Area, Colorado
Survey Area Data: Version 14, Sep 23, 2016

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 15, 2011—Sep 22, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — El Paso County Area, Colorado (CO625)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
43	Kim loam, 1 to 8 percent slopes	B	88.1	7.4%
82	Schamber-Razor complex, 8 to 50 percent slopes	A	65.6	5.5%
107	Wilid silt loam, 0 to 3 percent slopes	C	841.7	70.5%
118	Fort loam, 1 to 5 percent slopes, cool	C	198.6	16.6%
Totals for Area of Interest			**1,194.0**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

FRONT RANGE - MIDWAY SOLAR

CORE Project #: 17-012

Prepared By: GMV

COMPOSITE BASIN - WEIGHTED "C" CALCULATIONS

-REFERENCE UDFCD Vol.1 RUNOFF Table 6-3

	Residential							Lawns				
	Single Family			Multi-Unit				Clay Soil				
	0.25 acres	3 DU's/Ac 3,0000 sf 2 story	5 DU's/Ac 3,000 sf 2 story	(attached)	Roof	Gravel Road	Substation	2-7% Slope	>7% Slope	Historic		
% Imperv.	45.00%	48.00%	63.00%	75.00%	90.00%	80.00%	40.00%	2.00%	2.00%	2.00%		
											Total	Percent
BASIN	Area	Area	Area	Area	Area	Area	Area	Area	Area	Area	Area	Impervious
A1	0.00					1.47				27.87	29.34	5.9%
A2	0.00					2.89	2.07			72.37	77.33	5.9%
A3	0.00					0.00				106.70	106.70	2.0%
A4	0.00					0.00				31.31	31.31	2.0%
A6	0.00					1.77				46.21	47.98	4.9%
A7	0.00					1.77				57.91	59.68	4.3%
A8	0.00					1.76				86.05	87.81	3.6%
A9	0.00					1.37				31.49	32.86	5.3%
A12	0.00					0.57				10.40	10.97	6.1%
TOTAL	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**19.62**	**2.07**	**0.00**	**0.00**	**913.76**	**935.45**	**3.7%**

FRONT RANGE - MIDWAY SOLAR

CORE Project #: 17-012

Prepared By: GMV

COMPOSITE DEVELOPED BASIN -WEIGHTED "C" CALCULATIONS

-REFERENCE EL PASO COUNTY DRAINAGE CRITERIA MANUAL

$$C = \frac{\sum_{i=1}^{n} CiAi}{At}$$

Eq 5-2
El Paso County DCM

"C"
Frequency

10		100		
A&B	C&D	A&B	C&D	
0.15	0.25	0.2	0.3	Historic
0.8	0.8	0.85	0.85	Gravel
0.5	0.6	0.6	0.7	Substation

Basin ID	% Imperv.	*i*	Soil Type	Runoff Coefficients, C				Basin Area	Total Area	Weighted Runoff Coefficients, C			
				2-Year	5-Year	10-Year	100-Year			2-Year	5-Year	10-Year	100-Year
A1	5.9%	0.06	A	0.02	0.02	0.18	0.23		29.34	0.03	0.08	0.28	0.33
			B	0.03	0.04	0.18	0.23						
			C or D	0.03	0.08	0.28	0.33	29.34					
A2	5.9%	0.06	A	0.02	0.02	0.18	0.24		77.33	0.03	0.08	0.28	0.33
			B	0.03	0.04	0.18	0.24						
			C or D	0.03	0.08	0.28	0.33	77.33					
A3	2.0%	0.02	A	0.01	0.01	0.15	0.20		106.70	0.01	0.05	0.25	0.30
			B	0.01	0.01	0.15	0.20						
			C or D	0.01	0.05	0.25	0.30	106.70					
A4	2.0%	0.02	A	0.01	0.01	0.15	0.20		31.31	0.01	0.05	0.25	0.30
			B	0.01	0.01	0.15	0.20						
			C or D	0.01	0.05	0.25	0.30	31.31					
A6	4.9%	0.05	A	0.02	0.02	0.17	0.22		47.98	0.03	0.07	0.27	0.32
			B	0.02	0.03	0.17	0.22						
			C or D	0.03	0.07	0.27	0.32	47.98					

Basin ID	% Imperv.	*i*	Soil Type	Runoff Coefficients, C				Basin Area	Total Area	Weighted Runoff Coefficients, C			
				2-Year	5-Year	10-Year	100-Year			2-Year	5-Year	10-Year	100-Year
A7	4.3%	0.04	A	0.01	0.02	0.17	0.22		59.68	0.02	0.07	0.27	0.32
			B	0.02	0.03	0.17	0.22						
			C or D	0.02	0.07	0.27	0.32	59.68					
A8	3.6%	0.04	A	0.01	0.01	0.16	0.21		87.81	0.02	0.06	0.26	0.31
			B	0.02	0.02	0.16	0.21						
			C or D	0.02	0.06	0.26	0.31	87.81					
A9	5.3%	0.05	A	0.02	0.02	0.18	0.23		32.86	0.03	0.08	0.27	0.32
			B	0.03	0.03	0.18	0.23						
			C or D	0.03	0.08	0.27	0.32	32.86					
A12	6.1%	0.06	A	0.02	0.02	0.18	0.23		29.34	0.04	0.08	0.28	0.33
			B	0.03	0.04	0.18	0.23						
			C or D	0.04	0.08	0.28	0.33	29.34					

FRONT RANGE - MIDWAY SOLAR

CORE Project #: 17-012

Prepared By: GMV

Tc = 1.87 (1.1 - C10)L^0.5*s^-0.33 (El Paso County DCM Vol. 1)

TIME OF CONCENTRATION CALCULATIONS

-REFERENCE UDFCD Vol.1 Section 2.4

NRCS Conveyance factors, K -REFERENCE UDFCD Vol.1 RUNOFF Table 6-2

SF-2

Heavy Meadow	2.50	Short Grass Pasture & Lawns	7.00	Grassed Waterway	15.00
Tillage/field	5.00	Nearly Bare Ground	10.00	Paved Area & Shallow Gutter	20.00

SUB-BASIN DATA			INITIAL / OVERLAND TIME			TRAVEL TIME T(t)						T(c) CHECK (URBANIZED BASINS)		FINAL T(c)
DRAIN BASIN	AREA ac.	C(10)	Length ft.	Slope %	T(i) min	Length ft.	Slope %	Coeff.	Velocity fps	T(t) min.	COMP. T(c)	% IMPER-VIOUS	USDCM Eq . 6-5	min.
A1	29.34	0.28	300	1.0%	26.6	1009	2.8%	7.00	1.2	14.0	40.6	5.9%		40.6
A2	77.33	0.28	300	1.3%	24.2	2086	0.7%	7.00	0.6	57.9	82.1	5.9%		82.1
A3	106.70	0.25	300	2.0%	21.9	2874	1.5%	7.00	0.9	53.2	75.1	2.0%		75.1
A4	31.31	0.25	300	1.7%	23.3	3634	1.2%	7.00	0.8	75.7	99.0	2.0%		99.0
A6	47.98	0.27	300	1.3%	24.4	1578	1.8%	7.00	0.9	29.2	53.6	4.9%		53.6
A7	59.68	0.27	300	2.7%	19.5	2169	2.2%	7.00	1.0	36.2	55.7	4.3%		55.7
A8	87.81	0.26	300	1.7%	23.0	3108	1.9%	7.00	1.0	51.8	74.8	3.6%		74.8
A9	32.86	0.27	300	2.7%	19.4	1597	3.6%	7.00	1.3	20.5	39.9	5.3%		39.9
A12	10.97	0.28	300	2.3%	20.1	196	4.6%	7.00	1.5	2.2	22.3	6.1%		22.3

FRONT RANGE - MIDWAY SOLAR

CORE Project #: 17-012

Prepared By: GMV

RATIONAL METHOD PEAK RUNOFF

10-YR STORM

SF-3 *Rainfall Depth-Duration-Frequency (1-hr) =* **1.55**

-REFERENCE UDFCD Vol.1 EQ 5-1 & EQ 6-1

BASIN INFORMATON				DIRECT RUNOFF				TOTAL RUNOFF				
DESIGN POINT	DRAIN BASIN	AREA ac.	10yr RUNOFF COEFF	T(c) min	C x A	I in/hr	Q cfs	T(c) min	SUM C x A	I in/hr	Q cfs	REMARKS
1	A1	29.34	0.28	40.6	8.14	2.02	16.5					
2	A2	77.33	0.28	82.1	21.65	1.26	27.3					
3	A3	106.70	0.25	75.1	26.68	1.34	35.8					
4	A4	31.31	0.25	99.0	7.83	1.11	8.7					
6	A6	47.98	0.27	53.6	12.97	1.69	21.9					
7	A7	59.68	0.27	55.7	15.89	1.65	26.2					
8	A8	87.81	0.26	74.8	22.92	1.35	30.9					
9	A9	32.86	0.27	39.9	8.97	2.04	18.3					
12	A12	10.97	0.28	22.3	3.06	2.88	8.8					

FRONT RANGE - MIDWAY SOLAR

CORE Project #: 17-012

Prepared By: GMV

RATIONAL METHOD PEAK RUNOFF

100-YR STORM

SF-3 *Rainfall Depth-Duration-Frequency (1-hr) =* **2.58**

-REFERENCE UDFCD Vol.1 EQ 5-1 & EQ 6-1

BASIN INFORMATON				DIRECT RUNOFF				TOTAL RUNOFF				
DESIGN POINT	DRAIN BASIN	AREA ac.	100yr RUNOFF COEFF	T(c) min	C x A	I in/hr	Q cfs	T(c) min	SUM C x A	I in/hr	Q cfs	REMARKS
1	A1	29.34	0.33	40.6	9.61	3.37	32.3					
2	A2	77.33	0.33	82.1	25.62	2.10	53.8					
3	A3	106.70	0.30	75.1	32.01	2.24	71.6					
4	A4	31.31	0.30	99.0	9.39	1.84	17.3					
6	A6	47.98	0.32	53.6	15.37	2.81	43.2					
7	A7	59.68	0.32	55.7	18.88	2.74	51.7					
8	A8	87.81	0.31	74.8	27.31	2.24	61.2					
9	A9	32.86	0.32	39.9	10.61	3.40	36.1					
12	A12	10.97	0.33	22.3	3.61	4.79	17.3					

Summary of Unit Hydrograph Parameters Used By Program and Calculated Results (Version 2.0.0) - Existing 2 Yr.

		Unit Hydrograph Parameters and Results									Excess Precip.		Storm Hydrograph			
Catchment Name/ID	User Comment for Catchment	CT	Cp	W50 (min.)	W50 Before Peak	W75 (min.)	W75 Before Peak	Time to Peak (min.)	Peak (cfs)	Volume (c.f)	Excess (inches)	Excess (c.f.)	Time to Peak (min.)	Peak Flow (cfs)	Total Volume (c.f.)	Runoff per Unit Area (cfs/acre)
A5	Existing 2 Yr	0.157	0.255	58.4	12.93	30.3	9.14	21.6	160	722,867	0.05	38,675	50.0	8	38,680	0.04
A10	Existing 2 Yr	0.157	0.277	81.7	18.91	42.5	13.36	31.5	151	955,935	0.05	51,145	65.0	8	51,135	0.03
A11	Existing 2 Yr	0.157	0.264	78.6	17.46	40.9	12.34	29.1	134	813,146	0.05	43,505	60.0	7	43,502	0.03

Summary of CUHP Input Parameters (Version 2.0.0) - Existing 2 Yr.

								Depression Storage		Horton's Infiltration Parameters			DCIA Level and Fractions			
Catchment Name/ID	SWMM Node/ID	Raingage Name/ID	Area (sq.mi.)	Dist. to Centroid (miles)	Length (miles)	Slope (ft./ft.)	Percent Imperv.	Pervious (inches)	Imperv. (inches)	Initial Rate (in./hr.)	Final Rate (in.hr.)	Decay Coeff. (1/sec.)	DCIA Level	Dir. Con'ct Imperv. Fraction	Receiv. Perv. Fraction	Percent Eff. Imperv.
A5	A5	2	0.311	0.479	1.072	0.014	2.0	0.35	0.05	3.00	0.50	0.0018	0.00	0.04	0.02	1.53
A10	A10	2	0.411	0.856	1.692	0.019	2.0	0.35	0.05	3.00	0.50	0.0018	0.00	0.04	0.02	1.53
A11	A11	2	0.350	0.785	1.525	0.019	2.0	0.35	0.05	3.00	0.50	0.0018	0.00	0.04	0.02	1.53

Summary of Unit Hydrograph Parameters Used By Program and Calculated Results (Version 2.0.0) - Existing 100 Yr

		Unit Hydrograph Parameters and Results									Excess Precip.		Storm Hydrograph			
Catchment Name/ID	User Comment for Catchment	CT	Cp	W50 (min.)	W50 Before Peak	W75 (min.)	W75 Before Peak	Time to Peak (min.)	Peak (cfs)	Volume (c.f)	Excess (inches)	Excess (c.f.)	Time to Peak (min.)	Peak Flow (cfs)	Total Volume (c.f.)	Runoff per Unit Area (cfs/acre)
A5	Existing 100 Yr	0.156	0.253	58.3	12.85	30.3	9.08	21.4	160	722,867	1.84	1,329,393	60.0	243	1,329,567	1.22
A10	Existing 100 Yr	0.156	0.276	81.7	18.79	42.5	13.28	31.3	151	955,935	1.84	1,758,017	70.0	250	1,757,673	0.95
A11	Existing 100 Yr	0.156	0.263	78.6	17.35	40.9	12.26	28.9	134	813,146	1.84	1,495,420	70.0	219	1,495,317	0.98

Summary of CUHP Input Parameters (Version 2.0.0) - Existing 100 Yr.

								Depression Storage		Horton's Infiltration Parameters			DCIA Level and Fractions			
Catchment Name/ID	SWMM Node/ID	Raingage Name/ID	Area (sq.mi.)	Dist. to Centroid (miles)	Length (miles)	Slope (ft./ft.)	Percent Imperv.	Pervious (inches)	Imperv. (inches)	Initial Rate (in./hr.)	Final Rate (in.hr.)	Decay Coeff. (1/sec.)	DCIA Level	Dir. Con'ct Imperv. Fraction	Receiv. Perv. Fraction	Percent Eff. Imperv.
A5	A5	100	0.311	0.479	1.072	0.014	2.0	0.35	0.05	3.00	0.50	0.0018	0.00	0.04	0.02	1.81
A10	A10	100	0.411	0.856	1.692	0.019	2.0	0.35	0.05	3.00	0.50	0.0018	0.00	0.04	0.02	1.81
A11	A11	100	0.350	0.785	1.525	0.019	2.0	0.35	0.05	3.00	0.50	0.0018	0.00	0.04	0.02	1.81

Summary of Unit Hydrograph Parameters Used By Program and Calculated Results (Version 2.0.0) - Proposed 2 Yr.

		Unit Hydrograph Parameters and Results									Excess Precip.		Storm Hydrograph			
Catchment Name/ID	User Comment for Catchment	CT	Cp	W50 (min.)	W50 Before Peak	W75 (min.)	W75 Before Peak	Time to Peak (min.)	Peak (cfs)	Volume (c.f)	Excess (inches)	Excess (c.f.)	Time to Peak (min.)	Peak Flow (cfs)	Total Volume (c.f.)	Runoff per Unit Area (cfs/acre)
A5	Proposed 2 Yr.	0.154	0.250	58.3	12.70	30.3	8.98	21.2	160	722,867	0.06	44,815	50.0	9	44,822	0.05
A10	Proposed 2 Yr.	0.153	0.270	81.6	18.43	42.4	13.02	30.7	151	955,935	0.07	62,244	60.0	9	62,228	0.04
A11	Proposed 2 Yr.	0.152	0.256	78.5	16.96	40.8	11.99	28.3	134	813,146	0.07	54,219	60.0	8	54,216	0.04

Summary of CUHP Input Parameters (Version 2.0.0) - Proposed 2 Yr.

								Depression Storage		Horton's Infiltration Parameters			DCIA Level and Fractions			
Catchment Name/ID	SWMM Node/ID	Raingage Name/ID	Area (sq.mi.)	Dist. to Centroid (miles)	Length (miles)	Slope (ft./ft.)	Percent Imperv.	Pervious (inches)	Imperv. (inches)	Initial Rate (in./hr.)	Final Rate (in.hr.)	Decay Coeff. (1/sec.)	DCIA Level	Dir. Con'ct Imperv. Fraction	Receiv. Perv. Fraction	Percent Eff. Imperv.
A5	A5	2	0.311	0.479	1.072	0.014	3.1	0.35	0.05	3.00	0.50	0.0018	0.00	0.06	0.03	2.38
A10	A10	2	0.411	0.856	1.692	0.019	3.5	0.35	0.05	3.00	0.50	0.0018	0.00	0.07	0.04	2.70
A11	A11	2	0.350	0.785	1.525	0.019	3.7	0.35	0.05	3.00	0.50	0.0018	0.00	0.07	0.04	2.85

Summary of Unit Hydrograph Parameters Used By Program and Calculated Results (Version 2.0.0) - Proposed 100 Yr.

		Unit Hydrograph Parameters and Results									Excess Precip.		Storm Hydrograph			
Catchment Name/ID	User Comment for Catchment	CT	Cp	W50 (min.)	W50 Before Peak	W75 (min.)	W75 Before Peak	Time to Peak (min.)	Peak (cfs)	Volume (c.f)	Excess (inches)	Excess (c.f.)	Time to Peak (min.)	Peak Flow (cfs)	Total Volume (c.f.)	Runoff per Unit Area (cfs/acre)
A5	Proposed 100 Yr.	0.156	0.253	58.3	12.85	30.3	9.08	21.4	160	722,867	1.84	1,329,393	60.0	243	1,329,567	1.22
A10	Proposed 100 Yr.	0.156	0.276	81.7	18.79	42.5	13.28	31.3	151	955,935	1.84	1,758,017	70.0	250	1,757,673	0.95
A11	Proposed 100 Yr.	0.156	0.263	78.6	17.35	40.9	12.26	28.9	134	813,146	1.84	1,495,420	70.0	219	1,495,317	0.98

Summary of CUHP Input Parameters (Version 2.0.0) - Proposed 100 Yr.

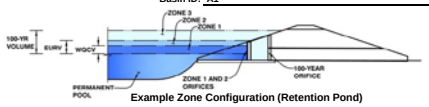
								Depression Storage		Horton's Infiltration Parameters			DCIA Level and Fractions			
Catchment Name/ID	SWMM Node/ID	Raingage Name/ID	Area (sq.mi.)	Dist. to Centroid (miles)	Length (miles)	Slope (ft./ft.)	Percent Imperv.	Pervious (inches)	Imperv. (inches)	Initial Rate (in./hr.)	Final Rate (in.hr.)	Decay Coeff. (1/sec.)	DCIA Level	Dir. Con'ct Imperv. Fraction	Receiv. Perv. Fraction	Percent Eff. Imperv.
A5	A5	100	0.311	0.479	1.072	0.014	2.0	0.35	0.05	3.00	0.50	0.0018	0.00	0.04	0.02	1.81
A10	A10	100	0.411	0.856	1.692	0.019	2.0	0.35	0.05	3.00	0.50	0.0018	0.00	0.04	0.02	1.81
A11	A11	100	0.350	0.785	1.525	0.019	2.0	0.35	0.05	3.00	0.50	0.0018	0.00	0.04	0.02	1.81

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)

Project: Front Range - Midway Solar

Basin ID: A1



Example Zone Configuration (Retention Pond)

Required Volume Calculation

Selected BMP Type =	EDB		
Watershed Area =	29.34	acres	
Watershed Length =	2,200	ft	
Watershed Slope =	0.030	ft/ft	
Watershed Imperviousness =	5.90%	percent	
Percentage Hydrologic Soil Group A =	0.0%	percent	
Percentage Hydrologic Soil Group B =	0.0%	percent	
Percentage Hydrologic Soil Groups C/D =	100.0%	percent	
Desired WQCV Drain Time =	40.0	hours	
Location for 1-hr Rainfall Depths =	User Input		
Water Quality Capture Volume (WQCV) =	0.103	acre-feet	
Excess Urban Runoff Volume (EURV) =	0.138	acre-feet	
2-yr Runoff Volume (P1 = 1.19 in.) =	0.116	acre-feet	
5-yr Runoff Volume (P1 = 1.5 in.) =	0.345	acre-feet	
10-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet	
25-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet	
50-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet	
100-yr Runoff Volume (P1 = 2.52 in.) =	3.650	acre-feet	
500-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet	
Approximate 2-yr Detention Volume =	0.109	acre-feet	
Approximate 5-yr Detention Volume =	0.331	acre-feet	
Approximate 10-yr Detention Volume =	0.000	acre-feet	
Approximate 25-yr Detention Volume =	0.000	acre-feet	
Approximate 50-yr Detention Volume =	0.000	acre-feet	
Approximate 100-yr Detention Volume =	0.852	acre-feet	

Optional User Override 1-hr Precipitation

1.19	inches
1.50	inches
	inches
	inches
	inches
2.52	inches
	inches

Stage-Storage Calculation

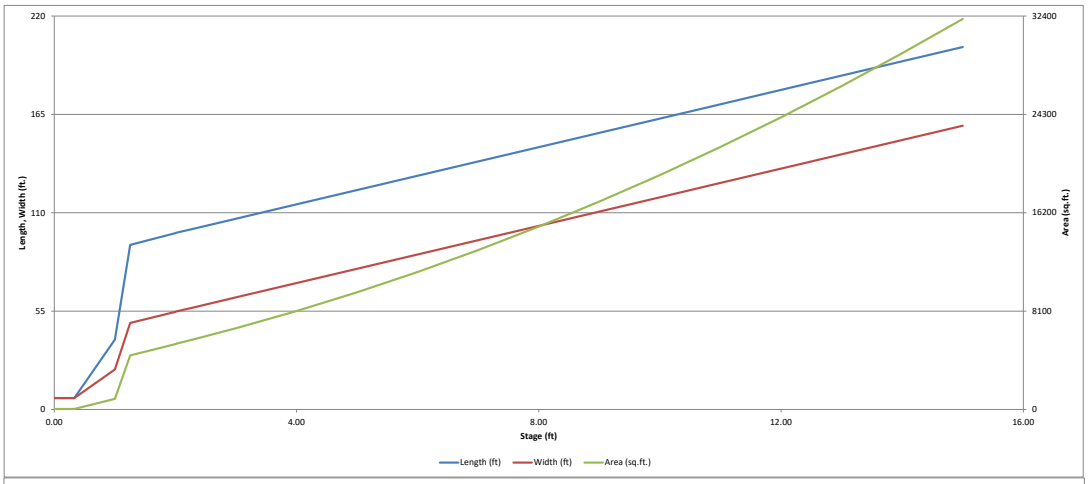
Zone 1 Volume (WQCV) =	0.103	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.035	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	0.714	acre-feet
Total Detention Basin Volume =	0.852	acre-feet
Initial Surcharge Volume (ISV) =	13	ft^3
Initial Surcharge Depth (ISD) =	0.33	ft
Total Available Detention Depth (H_{total}) =	6.00	ft
Depth of Trickle Channel (H_{TC}) =	0.50	ft
Slope of Trickle Channel (S_{TC}) =	0.005	ft/ft
Slopes of Main Basin Sides (S_{main}) =	4	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	2	
Initial Surcharge Area (A_{ISV}) =	41	ft^2
Surcharge Volume Length (L_{ISV}) =	6.4	ft
Surcharge Volume Width (W_{ISV}) =	6.4	ft
Depth of Basin Floor (H_{FLOOR}) =	0.42	ft
Length of Basin Floor (L_{FLOOR}) =	92.7	ft
Width of Basin Floor (W_{FLOOR}) =	48.7	ft
Area of Basin Floor (A_{FLOOR}) =	4,515	ft^2
Volume of Basin Floor (V_{FLOOR}) =	703	ft^3
Depth of Main Basin (H_{MAIN}) =	4.75	ft
Length of Main Basin (L_{MAIN}) =	130.7	ft
Width of Main Basin (W_{MAIN}) =	86.7	ft
Area of Main Basin (A_{MAIN}) =	11,328	ft^2
Volume of Main Basin (V_{MAIN}) =	36,384	ft^3
Calculated Total Basin Volume (V_{total}) =	**0.852**	acre-feet

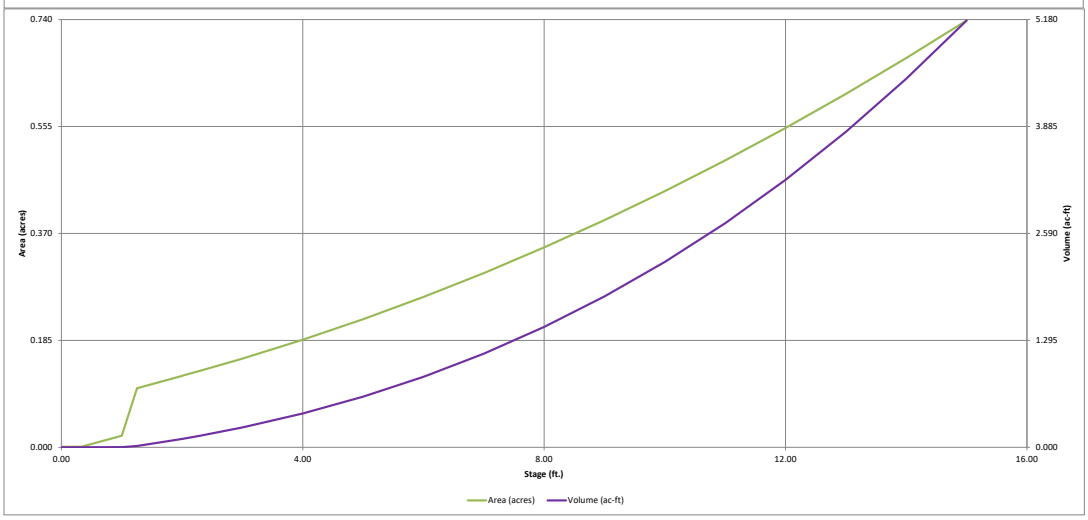
Depth Increment = 1 ft

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		6.4	6.4	41		0.001		
ISV	0.33		6.4	6.4	41		0.001	13	0.000
	1.00		39.0	22.4	873		0.020	93	0.002
Floor	1.25		92.1	48.4	4,454		0.102	726	0.017
	2.00		98.6	54.6	5,384		0.124	4,383	0.101
Zone 1 (WQCV)	2.01		98.8	54.8	5,408		0.124	4,490	0.103
Zone 2 (EURV)	2.29		101.0	57.0	5,757		0.132	6,053	0.139
	3.00		106.7	62.7	6,687		0.154	10,467	0.240
	4.00		114.7	70.7	8,106		0.186	17,853	0.410
	5.00		122.7	78.7	9,653		0.222	26,721	0.613
Zone 3 (100-year)	6.00		130.7	86.7	11,328		0.260	37,201	0.854
	7.00		138.7	94.7	13,131		0.301	49,419	1.135
	8.00		146.7	102.7	15,061		0.346	63,505	1.458
	9.00		154.7	110.7	17,120		0.393	79,585	1.827
	10.00		162.7	118.7	19,307		0.443	97,788	2.245
	11.00		170.7	126.7	21,622		0.496	118,242	2.714
	12.00		178.7	134.7	24,065		0.552	141,075	3.239
	13.00		186.7	142.7	26,636		0.611	166,415	3.820
	14.00		194.7	150.7	29,335		0.673	194,390	4.463
	15.00		202.7	158.7	32,162		0.738	225,128	5.168

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)



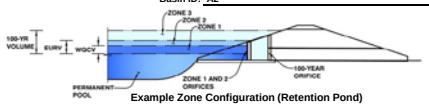


DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)

Project: Front Range - Midway Solar

Basin ID: A2



Example Zone Configuration (Retention Pond)

Required Volume Calculation

Selected BMP Type =	EDB		
Watershed Area =	77.33	acres	
Watershed Length =	2,282	ft	
Watershed Slope =	0.014	ft/ft	
Watershed Imperviousness =	6.80%	percent	
Percentage Hydrologic Soil Group A =	0.0%	percent	
Percentage Hydrologic Soil Group B =	0.0%	percent	
Percentage Hydrologic Soil Groups C/D =	100.0%	percent	
Desired WQCV Drain Time =	40.0	hours	
Location for 1-hr Rainfall Depths =	User Input		
Water Quality Capture Volume (WQCV) =	0.308	acre-feet	Optional User Override 1-hr Precipitation
Excess Urban Runoff Volume (EURV) =	0.424	acre-feet	
2-yr Runoff Volume (P1 = 1.19 in.) =	0.360	acre-feet	1.19 inches
5-yr Runoff Volume (P1 = 1.5 in.) =	0.995	acre-feet	1.50 inches
10-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet	inches
25-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet	inches
50-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet	inches
100-yr Runoff Volume (P1 = 2.52 in.) =	9.689	acre-feet	2.52 inches
500-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet	inches
Approximate 2-yr Detention Volume =	0.336	acre-feet	
Approximate 5-yr Detention Volume =	0.953	acre-feet	
Approximate 10-yr Detention Volume =	0.000	acre-feet	
Approximate 25-yr Detention Volume =	0.000	acre-feet	
Approximate 50-yr Detention Volume =	0.000	acre-feet	
Approximate 100-yr Detention Volume =	2.390	acre-feet	

Stage-Storage Calculation

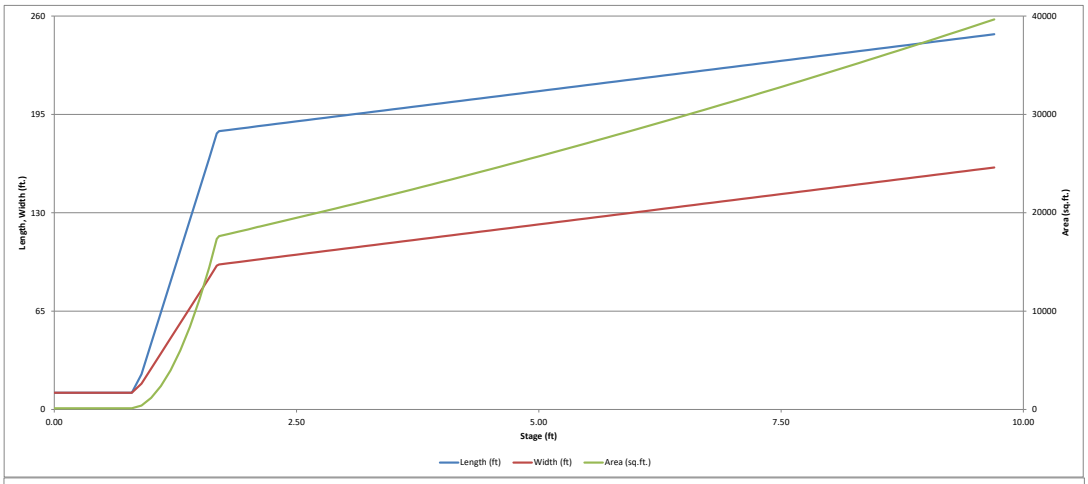
Zone 1 Volume (WQCV) =	0.308	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.116	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	1.966	acre-feet
Total Detention Basin Volume =	2.390	acre-feet
Initial Surcharge Volume (ISV) =	40	ft^3
Initial Surcharge Depth (ISD) =	0.33	ft
Total Available Detention Depth (H_{total}) =	6.00	ft
Depth of Trickle Channel (H_{TC}) =	0.50	ft
Slope of Trickle Channel (S_{TC}) =	0.005	ft/ft
Slopes of Main Basin Sides (S_{main}) =	4	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	2	
Initial Surcharge Area (A_{ISV}) =	122	ft^2
Surcharge Volume Length (L_{ISV}) =	11.0	ft
Surcharge Volume Width (W_{ISV}) =	11.0	ft
Depth of Basin Floor (H_{FLOOR}) =	0.85	ft
Length of Basin Floor (L_{FLOOR}) =	183.8	ft
Width of Basin Floor (W_{FLOOR}) =	95.7	ft
Area of Basin Floor (A_{FLOOR}) =	17,598	ft^2
Volume of Basin Floor (V_{FLOOR}) =	5,416	ft^3
Depth of Main Basin (H_{MAIN}) =	4.32	ft
Length of Main Basin (L_{MAIN}) =	218.4	ft
Width of Main Basin (W_{MAIN}) =	130.3	ft
Area of Main Basin (A_{MAIN}) =	28,462	ft^2
Volume of Main Basin (V_{MAIN}) =	98,625	ft^3
Calculated Total Basin Volume (V_{total}) =	**2.391**	acre-feet

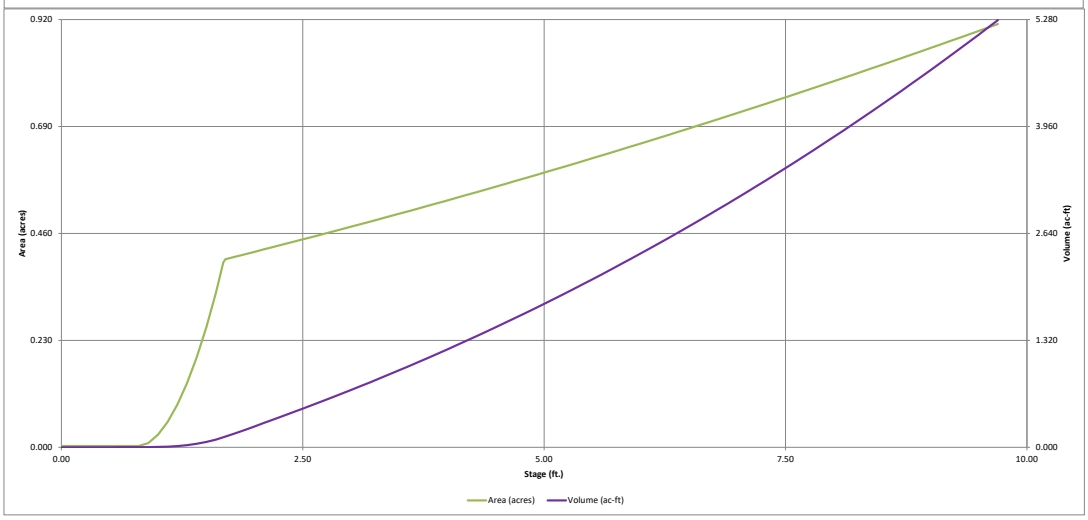
Depth Increment = 0.1 ft

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		11.0	11.0	122		0.003		
ISV	0.33		11.0	11.0	122		0.003	39	0.001
	0.40		11.0	11.0	122		0.003	48	0.001
	0.50		11.0	11.0	122		0.003	60	0.001
	0.60		11.0	11.0	122		0.003	72	0.002
	0.70		11.0	11.0	122		0.003	84	0.002
	0.80		11.0	11.0	122		0.003	96	0.002
	0.90		23.3	17.0	397		0.009	116	0.003
	1.00		43.7	27.0	1,182		0.027	192	0.004
	1.10		64.1	37.0	2,374		0.055	366	0.008
	1.20		84.5	47.0	3,975		0.091	680	0.016
	1.30		104.9	57.0	5,984		0.137	1,175	0.027
	1.40		125.3	67.0	8,400		0.193	1,890	0.043
	1.50		145.7	77.0	11,225		0.258	2,868	0.066
	1.60		166.1	87.0	14,457		0.332	4,149	0.095
Floor	1.68		182.4	95.0	17,337		0.398	5,419	0.124
	1.70		183.9	95.8	17,627		0.405	5,770	0.132
	1.80		184.7	96.6	17,852		0.410	7,544	0.173
	1.90		185.5	97.4	18,077		0.415	9,340	0.214
	2.00		186.3	98.2	18,304		0.420	11,159	0.256
	2.10		187.2	99.1	18,556		0.426	13,187	0.303
Zone 1 (WQCV)	2.12		187.4	99.3	18,601		0.427	13,558	0.311
	2.20		188.0	99.9	18,785		0.431	15,054	0.346
	2.30		188.8	100.7	19,016		0.437	16,944	0.389
Zone 2 (EURV)	2.39		189.5	101.4	19,225		0.441	18,665	0.428
	2.40		189.6	101.5	19,249		0.442	18,857	0.433
	2.50		190.4	102.3	19,482		0.447	20,793	0.477
	2.60		191.2	103.1	19,717		0.453	22,753	0.522
	2.70		192.0	103.9	19,953		0.458	24,737	0.568
	2.80		192.8	104.7	20,190		0.464	26,744	0.614
	2.90		193.6	105.5	20,429		0.469	28,775	0.661
	3.00		194.4	106.3	20,669		0.474	30,830	0.708
	3.10		195.2	107.1	20,910		0.480	32,909	0.755
	3.20		196.0	107.9	21,153		0.486	35,012	0.804
	3.30		196.8	108.7	21,396		0.491	37,139	0.853
	3.40		197.6	109.5	21,642		0.497	39,291	0.902
	3.50		198.4	110.3	21,888		0.502	41,468	0.952
	3.60		199.2	111.1	22,135		0.508	43,669	1.003
	3.70		200.0	111.9	22,384		0.514	45,895	1.054
	3.80		200.8	112.7	22,635		0.520	48,146	1.105
	3.90		201.6	113.5	22,886		0.525	50,422	1.158
	4.00		202.4	114.3	23,139		0.531	52,723	1.210
	4.10		203.2	115.1	23,393		0.537	55,050	1.264
	4.20		204.0	115.9	23,648		0.543	57,402	1.318
	4.30		204.8	116.7	23,905		0.549	59,779	1.372
	4.40		205.6	117.5	24,162		0.555	62,183	1.428
	4.50		206.4	118.3	24,422		0.561	64,612	1.483
	4.60		207.2	119.1	24,682		0.567	67,067	1.540
	4.70		208.0	119.9	24,944		0.573	69,548	1.597
	4.80		208.8	120.7	25,207		0.579	72,056	1.654
	4.90		209.6	121.5	25,471		0.585	74,590	1.712
	5.00		210.4	122.3	25,736		0.591	77,150	1.771
	5.10		211.2	123.1	26,003		0.597	79,737	1.831
	5.20		212.0	123.9	26,271		0.603	82,351	1.891
	5.30		212.8	124.7	26,541		0.609	84,991	1.951
	5.40		213.6	125.5	26,811		0.616	87,659	2.012
	5.50		214.4	126.3	27,083		0.622	90,354	2.074
	5.60		215.2	127.1	27,357		0.628	93,076	2.137
	5.70		216.0	127.9	27,631		0.634	95,825	2.200
	5.80		216.8	128.7	27,907		0.641	98,602	2.264
	5.90		217.6	129.5	28,184		0.647	101,406	2.328
Zone 3 (100-year)	6.00		218.4	130.3	28,462		0.653	104,239	2.393
	6.10		219.2	131.1	28,742		0.660	107,099	2.459
	6.20		220.0	131.9	29,023		0.666	109,987	2.525
	6.30		220.8	132.7	29,305		0.673	112,904	2.592
	6.40		221.6	133.5	29,588		0.679	115,848	2.660
	6.50		222.4	134.3	29,873		0.686	118,821	2.728
	6.60		223.2	135.1	30,159		0.692	121,823	2.797
	6.70		224.0	135.9	30,446		0.699	124,853	2.866
	6.80		224.8	136.7	30,735		0.706	127,912	2.936
	6.90		225.6	137.5	31,025		0.712	131,000	3.007
	7.00		226.4	138.3	31,316		0.719	134,117	3.079
	7.10		227.2	139.1	31,608		0.726	137,263	3.151
	7.20		228.0	139.9	31,902		0.732	140,439	3.224
	7.30		228.8	140.7	32,197		0.739	143,644	3.298
	7.40		229.6	141.5	32,493		0.746	146,878	3.372
	7.50		230.4	142.3	32,791		0.753	150,143	3.447
	7.60		231.2	143.1	33,090		0.760	153,437	3.522
	7.70		232.0	143.9	33,390		0.767	156,761	3.599
	7.80		232.8	144.7	33,691		0.773	160,115	3.676
	7.90		233.6	145.5	33,994		0.780	163,499	3.753
	8.00		234.4	146.3	34,298		0.787	166,913	3.832
	8.10		235.2	147.1	34,603		0.794	170,359	3.911
	8.20		236.0	147.9	34,910		0.801	173,834	3.991
	8.30		236.8	148.7	35,217		0.808	177,340	4.071
	8.40		237.6	149.5	35,526		0.816	180,878	4.152
	8.50		238.4	150.3	35,837		0.823	184,446	4.234
	8.60		239.2	151.1	36,148		0.830	188,045	4.317
	8.70		240.0	151.9	36,461		0.837	191,675	4.400
	8.80		240.8	152.7	36,775		0.844	195,337	4.484
	8.90		241.6	153.5	37,091		0.851	199,031	4.569
	9.00		242.4	154.3	37,408		0.859	202,756	4.655
	9.10		243.2	155.1	37,726		0.866	206,512	4.741
	9.20		244.0	155.9	38,045		0.873	210,301	4.828
	9.30		244.8	156.7	38,365		0.881	214,121	4.916
	9.40		245.6	157.5	38,687		0.888	217,974	5.004
	9.50		246.4	158.3	39,010		0.896	221,859	5.093
	9.60		247.2	159.1	39,335		0.903	225,776	5.183
	9.70		248.0	159.9	39,661		0.910	229,726	5.274

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)



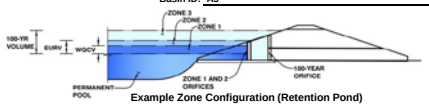


DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)

Project: Front Range - Midway Solar

Basin ID: A5



Example Zone Configuration (Retention Pond)

Required Volume Calculation

Selected BMP Type =	EDB		
Watershed Area =	199.14	acres	
Watershed Length =	4,884	ft	
Watershed Slope =	0.014	ft/ft	
Watershed Imperviousness =	3.10%	percent	
Percentage Hydrologic Soil Group A =	0.0%	percent	
Percentage Hydrologic Soil Group B =	0.0%	percent	
Percentage Hydrologic Soil Groups C/D =	100.0%	percent	
Desired WQCV Drain Time =	40.0	hours	
Location for 1-hr Rainfall Depths =	User Input		
Water Quality Capture Volume (WQCV) =	0.383	acre-feet	
Excess Urban Runoff Volume (EURV) =	0.468	acre-feet	
2-yr Runoff Volume (P1 = 1.19 in.) =	0.381	acre-feet	1.19 inches
5-yr Runoff Volume (P1 = 1.5 in.) =	1.655	acre-feet	1.50 inches
10-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet	inches
25-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet	inches
50-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet	inches
100-yr Runoff Volume (P1 = 2.52 in.) =	24.208	acre-feet	2.52 inches
500-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet	inches
Approximate 2-yr Detention Volume =	0.355	acre-feet	
Approximate 5-yr Detention Volume =	1.604	acre-feet	
Approximate 10-yr Detention Volume =	0.000	acre-feet	
Approximate 25-yr Detention Volume =	0.000	acre-feet	
Approximate 50-yr Detention Volume =	0.000	acre-feet	
Approximate 100-yr Detention Volume =	4.400	acre-feet	

Optional User Override 1-hr Precipitation

Stage-Storage Calculation

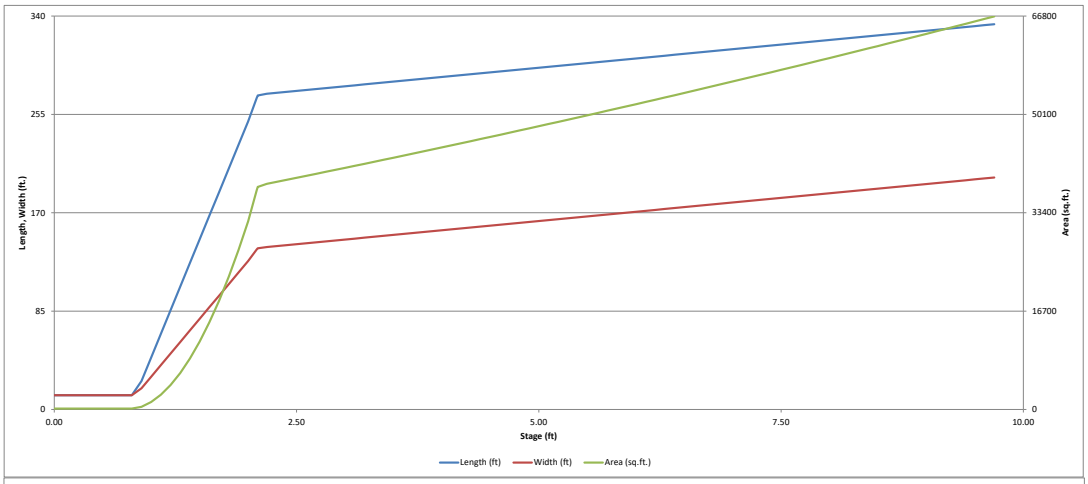
Zone 1 Volume (WQCV) =	0.383	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.085	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	3.933	acre-feet
Total Detention Basin Volume =	4.400	acre-feet
Initial Surcharge Volume (ISV) =	50	ft^3
Initial Surcharge Depth (ISD) =	0.33	ft
Total Available Detention Depth (H_{total}) =	6.00	ft
Depth of Trickle Channel (H_{TC}) =	0.50	ft
Slope of Trickle Channel (S_{TC}) =	0.005	ft/ft
Slopes of Main Basin Sides (S_{main}) =	4	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	2	
Initial Surcharge Area (A_{ISV}) =	152	ft^2
Surcharge Volume Length (L_{ISV}) =	12.3	ft
Surcharge Volume Width (W_{ISV}) =	12.3	ft
Depth of Basin Floor (H_{FLOOR}) =	1.27	ft
Length of Basin Floor (L_{FLOOR}) =	272.2	ft
Width of Basin Floor (W_{FLOOR}) =	139.7	ft
Area of Basin Floor (A_{FLOOR}) =	38,019	ft^2
Volume of Basin Floor (V_{FLOOR}) =	17,227	ft^3
Depth of Main Basin (H_{MAIN}) =	3.90	ft
Length of Main Basin (L_{MAIN}) =	303.3	ft
Width of Main Basin (W_{MAIN}) =	170.9	ft
Area of Main Basin (A_{MAIN}) =	51,828	ft^2
Volume of Main Basin (V_{MAIN}) =	174,339	ft^3
Calculated Total Basin Volume (V_{total}) =	**4.401**	acre-feet

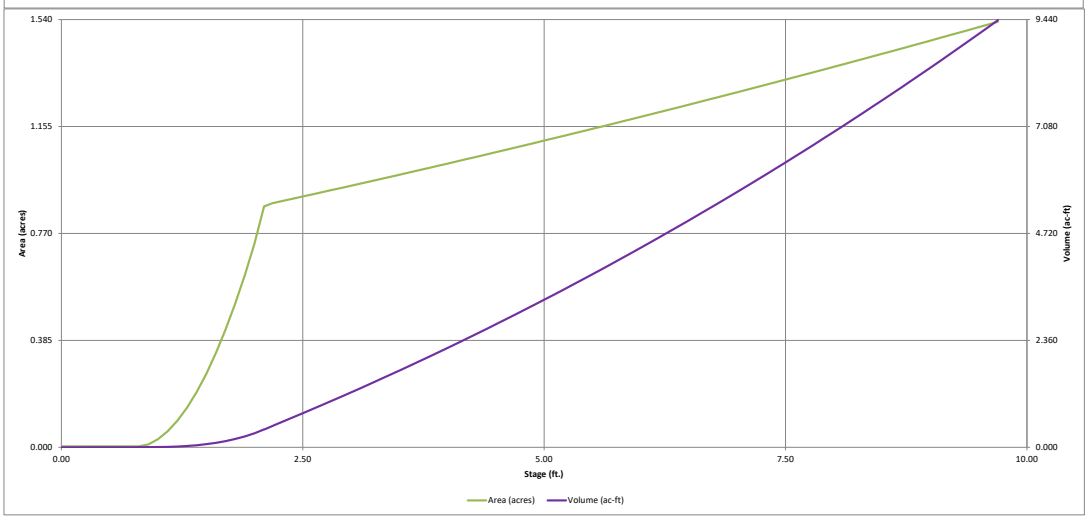
Depth Increment = 0.1 ft

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		12.3	12.3	152		0.003		
ISV	0.33		12.3	12.3	152		0.003	49	0.001
	0.40		12.3	12.3	152		0.003	59	0.001
	0.50		12.3	12.3	152		0.003	74	0.002
	0.60		12.3	12.3	152		0.003	89	0.002
	0.70		12.3	12.3	152		0.003	105	0.002
	0.80		12.3	12.3	152		0.003	120	0.003
	0.90		24.6	18.3	450		0.010	143	0.003
	1.00		45.0	28.3	1,273		0.029	226	0.005
	1.10		65.4	38.3	2,504		0.057	411	0.009
	1.20		85.8	48.3	4,143		0.095	740	0.017
	1.30		106.2	58.3	6,190		0.142	1,253	0.029
	1.40		126.6	68.3	8,645		0.198	1,992	0.046
	1.50		147.0	78.3	11,508		0.264	2,996	0.069
	1.60		167.4	88.3	14,779		0.339	4,307	0.099
	1.70		187.8	98.3	18,458		0.424	5,965	0.137
	1.80		208.2	108.3	22,545		0.518	8,012	0.184
	1.90		228.6	118.3	27,040		0.621	10,488	0.241
	2.00		249.0	128.3	31,943		0.733	13,434	0.308
Zone 1 (WQCV)	2.09		269.4	138.3	37,254		0.855	16,890	0.388
	2.10		271.4	139.3	37,808		0.868	17,266	0.396
Floor	2.10		271.4	139.3	37,808		0.868	17,266	0.396
Zone 2 (EURV)	2.19		272.9	140.4	38,304		0.879	20,698	0.475
	2.20		272.9	140.5	38,337		0.880	21,082	0.484
	2.30		273.7	141.3	38,668		0.888	24,932	0.572
	2.40		274.5	142.1	39,001		0.895	28,815	0.662
	2.50		275.3	142.9	39,335		0.903	32,732	0.751
	2.60		276.1	143.7	39,670		0.911	36,682	0.842
	2.70		276.9	144.5	40,006		0.918	40,666	0.934
	2.80		277.7	145.3	40,344		0.926	44,684	1.026
	2.90		278.5	146.1	40,683		0.934	48,735	1.119
	3.00		279.3	146.9	41,023		0.942	52,820	1.213
	3.10		280.1	147.7	41,365		0.950	56,940	1.307
	3.20		280.9	148.5	41,708		0.957	61,093	1.403
	3.30		281.7	149.3	42,052		0.965	65,281	1.499
	3.40		282.5	150.1	42,398		0.973	69,504	1.596
	3.50		283.3	150.9	42,744		0.981	73,761	1.693
	3.60		284.1	151.7	43,092		0.989	78,053	1.792
	3.70		284.9	152.5	43,442		0.997	82,379	1.891
	3.80		285.7	153.3	43,792		1.005	86,741	1.991
	3.90		286.5	154.1	44,144		1.013	91,138	2.092
	4.00		287.3	154.9	44,497		1.022	95,570	2.194
	4.10		288.1	155.7	44,851		1.030	100,037	2.297
	4.20		288.9	156.5	45,207		1.038	104,540	2.400
	4.30		289.7	157.3	45,564		1.046	109,079	2.504
	4.40		290.5	158.1	45,922		1.054	113,653	2.609
	4.50		291.3	158.9	46,282		1.062	118,263	2.715
	4.60		292.1	159.7	46,643		1.071	122,910	2.822
	4.70		292.9	160.5	47,005		1.079	127,592	2.929
	4.80		293.7	161.3	47,368		1.087	132,311	3.037
	4.90		294.5	162.1	47,733		1.096	137,066	3.147
	5.00		295.3	162.9	48,099		1.104	141,857	3.257
	5.10		296.1	163.7	48,466		1.113	146,685	3.367
	5.20		296.9	164.5	48,834		1.121	151,550	3.479
	5.30		297.7	165.3	49,204		1.130	156,452	3.592
	5.40		298.5	166.1	49,575		1.138	161,391	3.705
	5.50		299.3	166.9	49,947		1.147	166,367	3.819
	5.60		300.1	167.7	50,321		1.155	171,381	3.934
	5.70		300.9	168.5	50,696		1.164	176,432	4.050
	5.80		301.7	169.3	51,072		1.172	181,520	4.167
	5.90		302.5	170.1	51,449		1.181	186,646	4.285
Zone 3 (100-year)	6.00		303.3	170.9	51,828		1.190	191,810	4.403
	6.10		304.1	171.7	52,208		1.199	197,012	4.523
	6.20		304.9	172.5	52,589		1.207	202,252	4.643
	6.30		305.7	173.3	52,972		1.216	207,530	4.764
	6.40		306.5	174.1	53,356		1.225	212,846	4.886
	6.50		307.3	174.9	53,741		1.234	218,201	5.009
	6.60		308.1	175.7	54,127		1.243	223,594	5.133
	6.70		308.9	176.5	54,515		1.251	229,026	5.258
	6.80		309.7	177.3	54,904		1.260	234,497	5.383
	6.90		310.5	178.1	55,294		1.269	240,007	5.510
	7.00		311.3	178.9	55,686		1.278	245,556	5.637
	7.10		312.1	179.7	56,079		1.287	251,144	5.765
	7.20		312.9	180.5	56,473		1.296	256,772	5.895
	7.30		313.7	181.3	56,868		1.306	262,439	6.025
	7.40		314.5	182.1	57,265		1.315	268,146	6.156
	7.50		315.3	182.9	57,663		1.324	273,892	6.288
	7.60		316.1	183.7	58,062		1.333	279,678	6.421
	7.70		316.9	184.5	58,462		1.342	285,504	6.554
	7.80		317.7	185.3	58,864		1.351	291,371	6.689
	7.90		318.5	186.1	59,267		1.361	297,277	6.825
	8.00		319.3	186.9	59,671		1.370	303,224	6.961
	8.10		320.1	187.7	60,077		1.379	309,212	7.099
	8.20		320.9	188.5	60,484		1.389	315,240	7.237
	8.30		321.7	189.3	60,892		1.398	321,308	7.376
	8.40		322.5	190.1	61,301		1.407	327,418	7.516
	8.50		323.3	190.9	61,712		1.417	333,569	7.658
	8.60		324.1	191.7	62,124		1.426	339,760	7.800
	8.70		324.9	192.5	62,537		1.436	345,994	7.943
	8.80		325.7	193.3	62,952		1.445	352,268	8.087
	8.90		326.5	194.1	63,368		1.455	358,584	8.232
	9.00		327.3	194.9	63,785		1.464	364,942	8.378
	9.10		328.1	195.7	64,203		1.474	371,341	8.525
	9.20		328.9	196.5	64,623		1.484	377,782	8.673
	9.30		329.7	197.3	65,044		1.493	384,266	8.822
	9.40		330.5	198.1	65,466		1.503	390,791	8.971
	9.50		331.3	198.9	65,890		1.513	397,359	9.122
	9.60		332.1	199.7	66,315		1.522	403,969	9.274
	9.70		332.9	200.5	66,741		1.532	410,622	9.427

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)



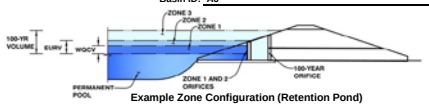


DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)

Project: Front Range - Midway Solar

Basin ID: A6



Example Zone Configuration (Retention Pond)

Required Volume Calculation

Selected BMP Type =	EDB		
Watershed Area =	47.98	acres	
Watershed Length =	1,777	ft	
Watershed Slope =	0.014	ft/ft	
Watershed Imperviousness =	3.50%	percent	
Percentage Hydrologic Soil Group A =	5.0%	percent	
Percentage Hydrologic Soil Group B =	0.0%	percent	
Percentage Hydrologic Soil Groups C/D =	95.0%	percent	
Desired WQCV Drain Time =	40.0	hours	
Location for 1-hr Rainfall Depths =	User Input		
Water Quality Capture Volume (WQCV) =	0.103	acre-feet	Optional User Override 1-hr Precipitation
Excess Urban Runoff Volume (EURV) =	0.127	acre-feet	
2-yr Runoff Volume (P1 = 1.19 in.) =	0.103	acre-feet	1.19 inches
5-yr Runoff Volume (P1 = 1.5 in.) =	0.405	acre-feet	1.50 inches
10-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet	inches
25-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet	inches
50-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet	inches
100-yr Runoff Volume (P1 = 2.52 in.) =	5.636	acre-feet	2.52 inches
500-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet	inches
Approximate 2-yr Detention Volume =	0.096	acre-feet	
Approximate 5-yr Detention Volume =	0.392	acre-feet	
Approximate 10-yr Detention Volume =	0.000	acre-feet	
Approximate 25-yr Detention Volume =	0.000	acre-feet	
Approximate 50-yr Detention Volume =	0.000	acre-feet	
Approximate 100-yr Detention Volume =	1.092	acre-feet	

Stage-Storage Calculation

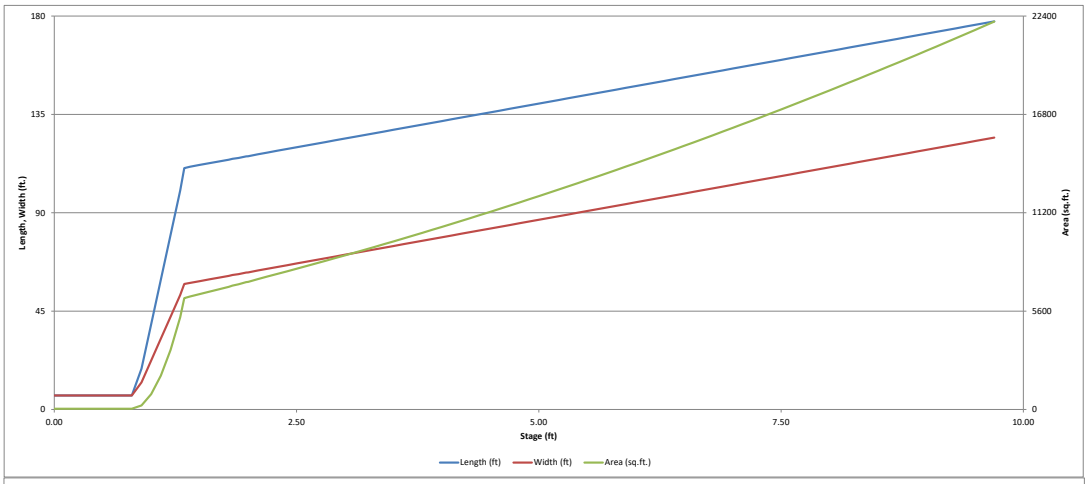
Zone 1 Volume (WQCV) =	0.103	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.023	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	0.965	acre-feet
Total Detention Basin Volume =	1.092	acre-feet
Initial Surcharge Volume (ISV) =	14	ft^3
Initial Surcharge Depth (ISD) =	0.33	ft
Total Available Detention Depth (H_{total}) =	6.00	ft
Depth of Trickle Channel (H_{TC}) =	0.50	ft
Slope of Trickle Channel (S_{TC}) =	0.005	ft/ft
Slopes of Main Basin Sides (S_{main}) =	4	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	2	
Initial Surcharge Area (A_{ISV}) =	41	ft^2
Surcharge Volume Length (L_{ISV}) =	6.4	ft
Surcharge Volume Width (W_{ISV}) =	6.4	ft
Depth of Basin Floor (H_{FLOOR}) =	0.51	ft
Length of Basin Floor (L_{FLOOR}) =	110.7	ft
Width of Basin Floor (W_{FLOOR}) =	57.5	ft
Area of Basin Floor (A_{FLOOR}) =	6,367	ft^2
Volume of Basin Floor (V_{FLOOR}) =	1,179	ft^3
Depth of Main Basin (H_{MAIN}) =	4.66	ft
Length of Main Basin (L_{MAIN}) =	148.0	ft
Width of Main Basin (W_{MAIN}) =	94.8	ft
Area of Main Basin (A_{MAIN}) =	14,025	ft^2
Volume of Main Basin (V_{MAIN}) =	46,342	ft^3
Calculated Total Basin Volume (V_{total}) =	**1.092**	acre-feet

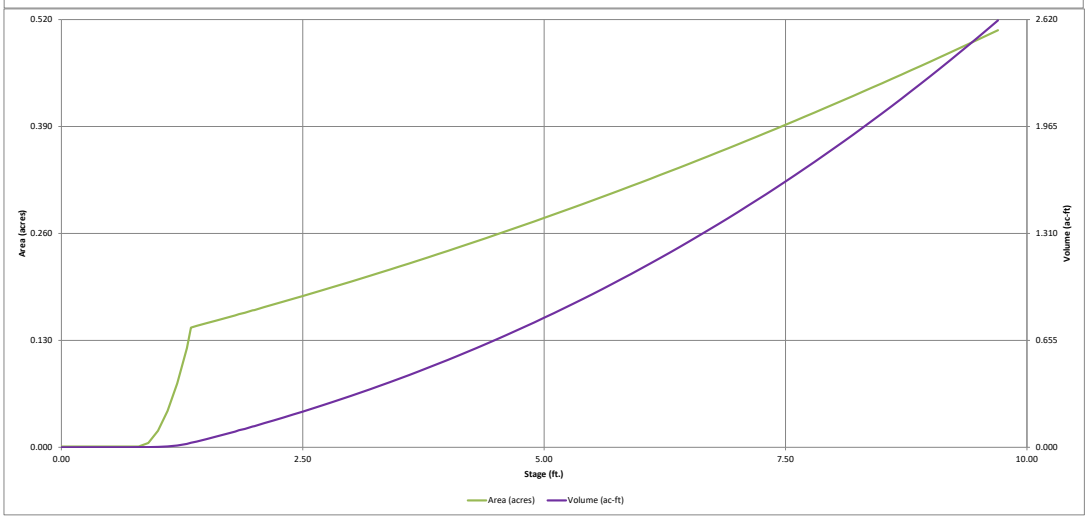
Depth Increment = 0.1 ft

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		6.4	6.4	41		0.001		
ISV	0.33		6.4	6.4	41		0.001	13	0.000
	0.40		6.4	6.4	41		0.001	16	0.000
	0.50		6.4	6.4	41		0.001	20	0.000
	0.60		6.4	6.4	41		0.001	24	0.001
	0.70		6.4	6.4	41		0.001	28	0.001
	0.80		6.4	6.4	41		0.001	32	0.001
	0.90		18.6	12.4	231		0.005	41	0.001
	1.00		39.0	22.4	875		0.020	93	0.002
	1.10		59.4	32.4	1,926		0.044	230	0.005
	1.20		79.8	42.4	3,385		0.078	492	0.011
	1.30		100.2	52.4	5,253		0.121	921	0.021
Floor	1.34		110.4	57.4	6,340		0.146	1,210	0.028
	1.40		111.1	57.9	6,433		0.148	1,530	0.035
	1.50		111.9	58.7	6,568		0.151	2,180	0.050
	1.60		112.7	59.5	6,706		0.154	2,844	0.065
	1.70		113.5	60.3	6,844		0.157	3,521	0.081
	1.80		114.3	61.1	6,984		0.160	4,212	0.097
Zone 1 (WQCV)	1.84		114.7	61.5	7,054		0.162	4,563	0.105
	1.90		115.1	61.9	7,125		0.164	4,918	0.113
Zone 2 (EURV)	1.98		115.8	62.6	7,253		0.166	5,565	0.128
	2.00		115.9	62.7	7,267		0.167	5,637	0.129
	2.10		116.8	63.6	7,425		0.170	6,445	0.148
	2.20		117.6	64.4	7,570		0.174	7,195	0.165
	2.30		118.4	65.2	7,716		0.177	7,959	0.183
	2.40		119.2	66.0	7,863		0.181	8,738	0.201
	2.50		120.0	66.8	8,012		0.184	9,532	0.219
	2.60		120.8	67.6	8,162		0.187	10,341	0.237
	2.70		121.6	68.4	8,313		0.191	11,165	0.256
	2.80		122.4	69.2	8,466		0.194	12,004	0.276
	2.90		123.2	70.0	8,620		0.198	12,858	0.295
	3.00		124.0	70.8	8,775		0.201	13,728	0.315
	3.10		124.8	71.6	8,932		0.205	14,613	0.335
	3.20		125.6	72.4	9,089		0.209	15,514	0.356
	3.30		126.4	73.2	9,248		0.212	16,431	0.377
	3.40		127.2	74.0	9,409		0.216	17,364	0.399
	3.50		128.0	74.8	9,570		0.220	18,313	0.420
	3.60		128.8	75.6	9,733		0.223	19,278	0.443
	3.70		129.6	76.4	9,897		0.227	20,259	0.465
	3.80		130.4	77.2	10,062		0.231	21,257	0.488
	3.90		131.2	78.0	10,229		0.235	22,272	0.511
	4.00		132.0	78.8	10,397		0.239	23,303	0.535
	4.10		132.8	79.6	10,566		0.243	24,351	0.559
	4.20		133.6	80.4	10,737		0.246	25,416	0.583
	4.30		134.4	81.2	10,909		0.250	26,499	0.608
	4.40		135.2	82.0	11,082		0.254	27,598	0.634
	4.50		136.0	82.8	11,256		0.258	28,715	0.659
	4.60		136.8	83.6	11,432		0.262	29,849	0.685
	4.70		137.6	84.4	11,609		0.266	31,001	0.712
	4.80		138.4	85.2	11,787		0.271	32,171	0.739
	4.90		139.2	86.0	11,966		0.275	33,359	0.766
	5.00		140.0	86.8	12,147		0.279	34,564	0.793
	5.10		140.8	87.6	12,329		0.283	35,788	0.822
	5.20		141.6	88.4	12,512		0.287	37,030	0.850
	5.30		142.4	89.2	12,697		0.291	38,291	0.879
	5.40		143.2	90.0	12,883		0.296	39,570	0.908
	5.50		144.0	90.8	13,070		0.300	40,867	0.938
	5.60		144.8	91.6	13,259		0.304	42,184	0.968
	5.70		145.6	92.4	13,448		0.309	43,519	0.999
	5.80		146.4	93.2	13,639		0.313	44,874	1.030
	5.90		147.2	94.0	13,832		0.318	46,247	1.062
Zone 3 (100-year)	6.00		148.0	94.8	14,025		0.322	47,640	1.094
	6.10		148.8	95.6	14,220		0.326	49,052	1.126
	6.20		149.6	96.4	14,416		0.331	50,484	1.159
	6.30		150.4	97.2	14,613		0.335	51,935	1.192
	6.40		151.2	98.0	14,812		0.340	53,407	1.226
	6.50		152.0	98.8	15,012		0.345	54,898	1.260
	6.60		152.8	99.6	15,213		0.349	56,409	1.295
	6.70		153.6	100.4	15,416		0.354	57,941	1.330
	6.80		154.4	101.2	15,620		0.359	59,492	1.366
	6.90		155.2	102.0	15,825		0.363	61,065	1.402
	7.00		156.0	102.8	16,031		0.368	62,657	1.438
	7.10		156.8	103.6	16,239		0.373	64,271	1.475
	7.20		157.6	104.4	16,448		0.378	65,905	1.513
	7.30		158.4	105.2	16,658		0.382	67,560	1.551
	7.40		159.2	106.0	16,869		0.387	69,237	1.589
	7.50		160.0	106.8	17,082		0.392	70,934	1.628
	7.60		160.8	107.6	17,296		0.397	72,653	1.668
	7.70		161.6	108.4	17,511		0.402	74,394	1.708
	7.80		162.4	109.2	17,728		0.407	76,156	1.748
	7.90		163.2	110.0	17,946		0.412	77,939	1.789
	8.00		164.0	110.8	18,165		0.417	79,745	1.831
	8.10		164.8	111.6	18,386		0.422	81,572	1.873
	8.20		165.6	112.4	18,607		0.427	83,422	1.915
	8.30		166.4	113.2	18,830		0.432	85,294	1.958
	8.40		167.2	114.0	19,055		0.437	87,188	2.002
	8.50		168.0	114.8	19,280		0.443	89,105	2.046
	8.60		168.8	115.6	19,507		0.448	91,044	2.090
	8.70		169.6	116.4	19,735		0.453	93,006	2.135
	8.80		170.4	117.2	19,964		0.458	94,991	2.181
	8.90		171.2	118.0	20,195		0.464	96,999	2.227
	9.00		172.0	118.8	20,427		0.469	99,030	2.273
	9.10		172.8	119.6	20,660		0.474	101,084	2.321
	9.20		173.6	120.4	20,895		0.480	103,162	2.368
	9.30		174.4	121.2	21,131		0.485	105,263	2.417
	9.40		175.2	122.0	21,368		0.491	107,388	2.465
	9.50		176.0	122.8	21,606		0.496	109,537	2.515
	9.60		176.8	123.6	21,846		0.502	111,710	2.565
	9.70		177.6	124.4	22,087		0.507	113,906	2.615

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)



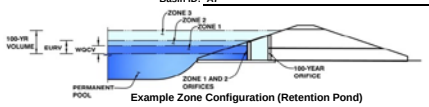


DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)

Project: Front Range - Midway Solar

Basin ID: A7



Example Zone Configuration (Retention Pond)

Required Volume Calculation

Selected BMP Type =	EDB		
Watershed Area =	59.68	acres	
Watershed Length =	2,133	ft	
Watershed Slope =	0.013	ft/ft	
Watershed Imperviousness =	4.20%	percent	
Percentage Hydrologic Soil Group A =	0.0%	percent	
Percentage Hydrologic Soil Group B =	0.0%	percent	
Percentage Hydrologic Soil Groups C/D =	100.0%	percent	
Desired WQCV Drain Time =	40.0	hours	
Location for 1-hr Rainfall Depths =	User Input		
Water Quality Capture Volume (WQCV) =	0.153	acre-feet	Optional User Override 1-hr Precipitation
Excess Urban Runoff Volume (EURV) =	0.195	acre-feet	
2-yr Runoff Volume (P1 = 1.19 in.) =	0.161	acre-feet	1.19 inches
5-yr Runoff Volume (P1 = 1.5 in.) =	0.577	acre-feet	1.50 inches
10-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet	inches
25-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet	inches
50-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet	inches
100-yr Runoff Volume (P1 = 2.52 in.) =	7.321	acre-feet	2.52 inches
500-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet	inches
Approximate 2-yr Detention Volume =	0.150	acre-feet	
Approximate 5-yr Detention Volume =	0.556	acre-feet	
Approximate 10-yr Detention Volume =	0.000	acre-feet	
Approximate 25-yr Detention Volume =	0.000	acre-feet	
Approximate 50-yr Detention Volume =	0.000	acre-feet	
Approximate 100-yr Detention Volume =	1.498	acre-feet	

Stage-Storage Calculation

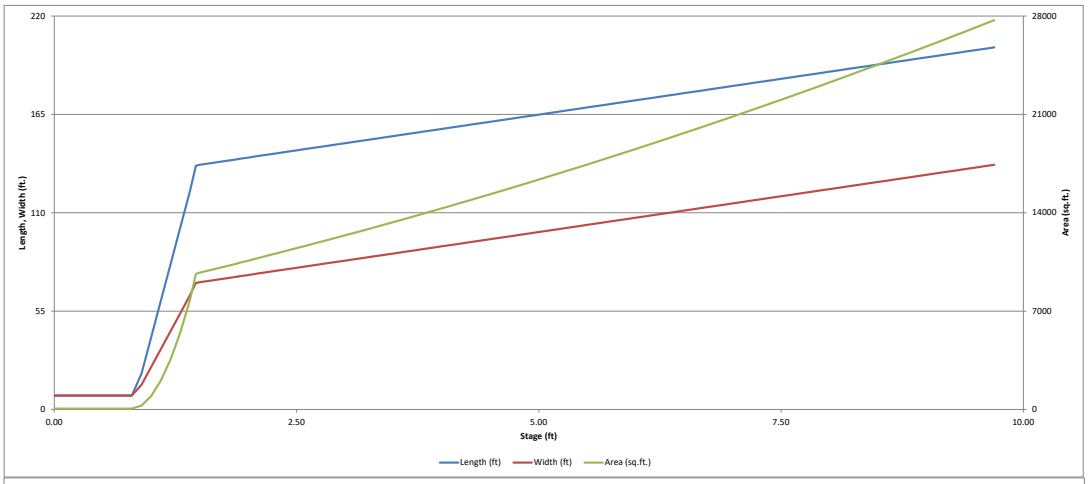
Zone 1 Volume (WQCV) =	0.153	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.042	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	1.303	acre-feet
Total Detention Basin Volume =	1.498	acre-feet
Initial Surcharge Volume (ISV) =	20	ft^3
Initial Surcharge Depth (ISD) =	0.33	ft
Total Available Detention Depth (H_{total}) =	6.00	ft
Depth of Trickle Channel (H_{TC}) =	0.50	ft
Slope of Trickle Channel (S_{TC}) =	0.005	ft/ft
Slopes of Main Basin Sides (S_{main}) =	4	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	2	
Initial Surcharge Area (A_{ISV}) =	61	ft^2
Surcharge Volume Length (L_{ISV}) =	7.8	ft
Surcharge Volume Width (W_{ISV}) =	7.8	ft
Depth of Basin Floor (H_{FLOOR}) =	0.63	ft
Length of Basin Floor (L_{FLOOR}) =	136.6	ft
Width of Basin Floor (W_{FLOOR}) =	70.9	ft
Area of Basin Floor (A_{FLOOR}) =	9,687	ft^2
Volume of Basin Floor (V_{FLOOR}) =	2,213	ft^3
Depth of Main Basin (H_{MAIN}) =	4.54	ft
Length of Main Basin (L_{MAIN}) =	172.9	ft
Width of Main Basin (W_{MAIN}) =	107.2	ft
Area of Main Basin (A_{MAIN}) =	18,539	ft^2
Volume of Main Basin (V_{MAIN}) =	62,975	ft^3
Calculated Total Basin Volume (V_{total}) =	**1.498**	acre-feet

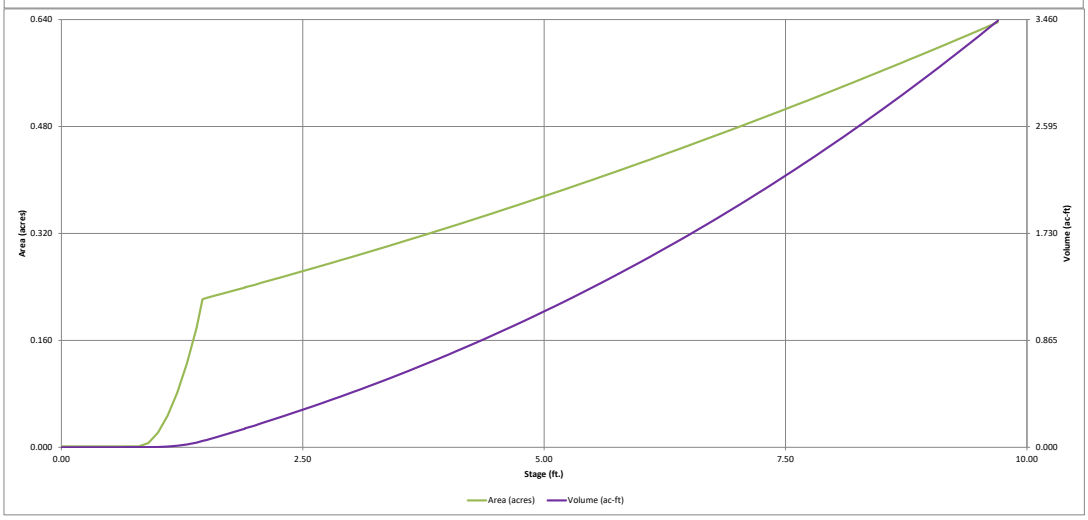
Depth Increment = 0.1 ft

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		7.8	7.8	61		0.001		
ISV	0.33		7.8	7.8	61		0.001	19	0.000
	0.40		7.8	7.8	61		0.001	24	0.001
	0.50		7.8	7.8	61		0.001	30	0.001
	0.60		7.8	7.8	61		0.001	36	0.001
	0.70		7.8	7.8	61		0.001	42	0.001
	0.80		7.8	7.8	61		0.001	48	0.001
	0.90		20.0	13.8	276		0.006	60	0.001
	1.00		40.4	23.8	961		0.022	118	0.003
	1.10		60.8	33.8	2,054		0.047	265	0.006
	1.20		81.2	43.8	3,556		0.082	543	0.012
	1.30		101.6	53.8	5,465		0.125	990	0.023
	1.40		122.0	63.8	7,782		0.179	1,649	0.038
Floor	1.46		136.3	70.8	9,647		0.221	2,258	0.052
	1.50		136.8	71.1	9,734		0.223	2,549	0.059
	1.60		137.6	71.9	9,901		0.227	3,531	0.081
	1.70		138.4	72.7	10,069		0.231	4,529	0.104
	1.80		139.2	73.5	10,239		0.235	5,545	0.127
	1.90		140.0	74.3	10,410		0.239	6,577	0.151
Zone 1 (WQCV)	1.90		140.1	74.4	10,427		0.239	6,681	0.153
	2.00		140.8	75.1	10,582		0.243	7,627	0.175
Zone 2 (EURV)	2.07		141.5	75.8	10,721		0.246	8,479	0.195
	2.10		141.7	76.0	10,773		0.247	8,801	0.202
	2.20		142.5	76.8	10,948		0.251	9,887	0.227
	2.30		143.3	77.6	11,124		0.255	10,991	0.252
	2.40		144.1	78.4	11,301		0.259	12,112	0.278
	2.50		144.9	79.2	11,480		0.264	13,251	0.304
	2.60		145.7	80.0	11,660		0.268	14,408	0.331
	2.70		146.5	80.8	11,841		0.272	15,583	0.358
	2.80		147.3	81.6	12,023		0.276	16,776	0.385
	2.90		148.1	82.4	12,207		0.280	17,988	0.413
	3.00		148.9	83.2	12,392		0.284	19,218	0.441
	3.10		149.7	84.0	12,578		0.289	20,466	0.470
	3.20		150.5	84.8	12,766		0.293	21,733	0.499
	3.30		151.3	85.6	12,955		0.297	23,019	0.528
	3.40		152.1	86.4	13,145		0.302	24,324	0.558
	3.50		152.9	87.2	13,337		0.306	25,648	0.589
	3.60		153.7	88.0	13,529		0.311	26,992	0.620
	3.70		154.5	88.8	13,723		0.315	28,354	0.651
	3.80		155.3	89.6	13,919		0.320	29,736	0.683
	3.90		156.1	90.4	14,115		0.324	31,138	0.715
	4.00		156.9	91.2	14,313		0.329	32,560	0.747
	4.10		157.7	92.0	14,512		0.333	34,001	0.781
	4.20		158.5	92.8	14,713		0.338	35,462	0.814
	4.30		159.3	93.6	14,914		0.342	36,943	0.848
	4.40		160.1	94.4	15,117		0.347	38,445	0.883
	4.50		160.9	95.2	15,322		0.352	39,967	0.918
	4.60		161.7	96.0	15,527		0.356	41,509	0.953
	4.70		162.5	96.8	15,734		0.361	43,072	0.989
	4.80		163.3	97.6	15,942		0.366	44,656	1.025
	4.90		164.1	98.4	16,151		0.371	46,261	1.062
	5.00		164.9	99.2	16,362		0.376	47,887	1.099
	5.10		165.7	100.0	16,574		0.380	49,533	1.137
	5.20		166.5	100.8	16,787		0.385	51,201	1.175
	5.30		167.3	101.6	17,002		0.390	52,891	1.214
	5.40		168.1	102.4	17,218		0.395	54,602	1.253
	5.50		168.9	103.2	17,435		0.400	56,334	1.293
	5.60		169.7	104.0	17,653		0.405	58,089	1.334
	5.70		170.5	104.8	17,873		0.410	59,865	1.374
	5.80		171.3	105.6	18,093		0.415	61,663	1.416
	5.90		172.1	106.4	18,316		0.420	63,484	1.457
Zone 3 (100-year)	6.00		172.9	107.2	18,539		0.426	65,326	1.500
	6.10		173.7	108.0	18,764		0.431	67,192	1.543
	6.20		174.5	108.8	18,990		0.436	69,079	1.586
	6.30		175.3	109.6	19,217		0.441	70,990	1.630
	6.40		176.1	110.4	19,446		0.446	72,923	1.674
	6.50		176.9	111.2	19,676		0.452	74,879	1.719
	6.60		177.7	112.0	19,907		0.457	76,858	1.764
	6.70		178.5	112.8	20,139		0.462	78,860	1.810
	6.80		179.3	113.6	20,373		0.468	80,886	1.857
	6.90		180.1	114.4	20,608		0.473	82,935	1.904
	7.00		180.9	115.2	20,844		0.479	85,007	1.951
	7.10		181.7	116.0	21,082		0.484	87,104	2.000
	7.20		182.5	116.8	21,320		0.489	89,224	2.048
	7.30		183.3	117.6	21,560		0.495	91,368	2.098
	7.40		184.1	118.4	21,802		0.501	93,536	2.147
	7.50		184.9	119.2	22,045		0.506	95,728	2.198
	7.60		185.7	120.0	22,288		0.512	97,945	2.249
	7.70		186.5	120.8	22,534		0.517	100,186	2.300
	7.80		187.3	121.6	22,780		0.523	102,452	2.352
	7.90		188.1	122.4	23,028		0.529	104,742	2.405
	8.00		188.9	123.2	23,277		0.534	107,057	2.458
	8.10		189.7	124.0	23,527		0.540	109,397	2.511
	8.20		190.5	124.8	23,779		0.546	111,763	2.566
	8.30		191.3	125.6	24,032		0.552	114,153	2.621
	8.40		192.1	126.4	24,286		0.558	116,569	2.676
	8.50		192.9	127.2	24,541		0.563	119,010	2.732
	8.60		193.7	128.0	24,798		0.569	121,477	2.789
	8.70		194.5	128.8	25,056		0.575	123,970	2.846
	8.80		195.3	129.6	25,316		0.581	126,489	2.904
	8.90		196.1	130.4	25,576		0.587	129,033	2.962
	9.00		196.9	131.2	25,838		0.593	131,604	3.021
	9.10		197.7	132.0	26,101		0.599	134,201	3.081
	9.20		198.5	132.8	26,366		0.605	136,824	3.141
	9.30		199.3	133.6	26,631		0.611	139,474	3.202
	9.40		200.1	134.4	26,898		0.617	142,151	3.263
	9.50		200.9	135.2	27,166		0.624	144,854	3.325
	9.60		201.7	136.0	27,436		0.630	147,584	3.388
	9.70		202.5	136.8	27,707		0.636	150,341	3.451

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)



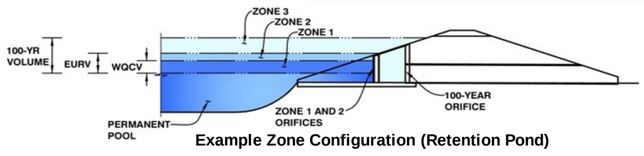


DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)

Project: Front Range - Midway Solar

Basin ID: A8



Example Zone Configuration (Retention Pond)

Required Volume Calculation

Selected BMP Type =	EDB	
Watershed Area =	87.81	acres
Watershed Length =	2,421	ft
Watershed Slope =	0.024	ft/ft
Watershed Imperviousness =	3.90%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	0.0%	percent
Percentage Hydrologic Soil Groups C/D =	100.0%	percent
Desired WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	User Input	
Water Quality Capture Volume (WQCV) =	0.210	acre-feet
Excess Urban Runoff Volume (EURV) =	0.264	acre-feet
2-yr Runoff Volume (P1 = 1.19 in.) =	0.218	acre-feet
5-yr Runoff Volume (P1 = 1.5 in.) =	0.816	acre-feet
10-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet
25-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet
50-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet
100-yr Runoff Volume (P1 = 2.52 in.) =	10.745	acre-feet
500-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet
Approximate 2-yr Detention Volume =	0.203	acre-feet
Approximate 5-yr Detention Volume =	0.788	acre-feet
Approximate 10-yr Detention Volume =	0.000	acre-feet
Approximate 25-yr Detention Volume =	0.000	acre-feet
Approximate 50-yr Detention Volume =	0.000	acre-feet
Approximate 100-yr Detention Volume =	2.136	acre-feet

Optional User Override 1-hr Precipitation

1.19	inches
1.50	inches
	inches
	inches
	inches
2.52	inches
	inches

Stage-Storage Calculation

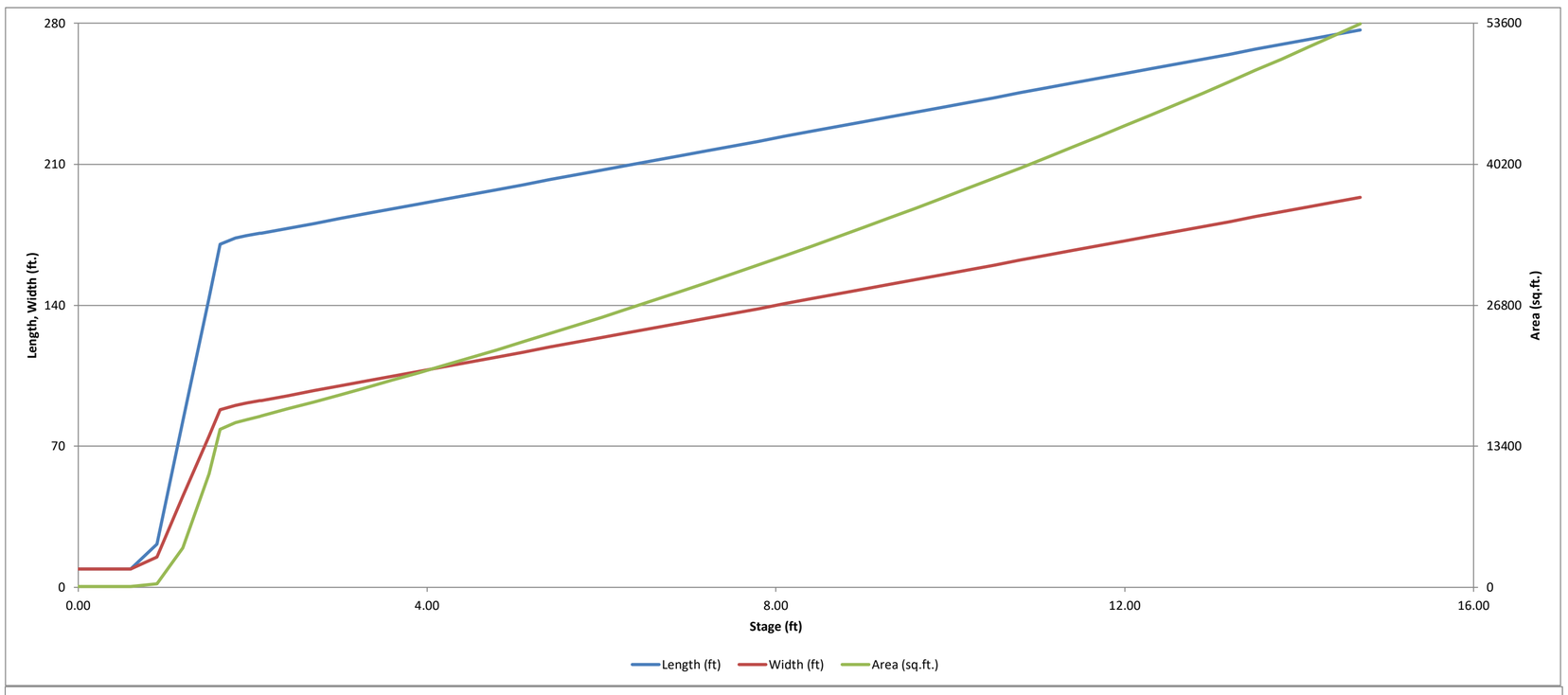
Zone 1 Volume (WQCV) =	0.210	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.054	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	1.871	acre-feet
Total Detention Basin Volume =	2.136	acre-feet
Initial Surcharge Volume (ISV) =	27	ft^3
Initial Surcharge Depth (ISD) =	0.33	ft
Total Available Detention Depth (H_{total}) =	6.00	ft
Depth of Trickle Channel (H_{TC}) =	0.50	ft
Slope of Trickle Channel (S_{TC}) =	0.005	ft/ft
Slopes of Main Basin Sides (S_{main}) =	4	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	2	
Initial Surcharge Area (A_{ISV}) =	83	ft^2
Surcharge Volume Length (L_{ISV}) =	9.1	ft
Surcharge Volume Width (W_{ISV}) =	9.1	ft
Depth of Basin Floor (H_{FLOOR}) =	0.80	ft
Length of Basin Floor (L_{FLOOR}) =	172.0	ft
Width of Basin Floor (W_{FLOOR}) =	89.0	ft
Area of Basin Floor (A_{FLOOR}) =	15,306	ft^2
Volume of Basin Floor (V_{FLOOR}) =	4,397	ft^3
Depth of Main Basin (H_{MAIN}) =	4.37	ft
Length of Main Basin (L_{MAIN}) =	207.0	ft
Width of Main Basin (W_{MAIN}) =	123.9	ft
Area of Main Basin (A_{MAIN}) =	25,657	ft^2
Volume of Main Basin (V_{MAIN}) =	88,563	ft^3
Calculated Total Basin Volume (V_{total}) =	**2.136**	acre-feet

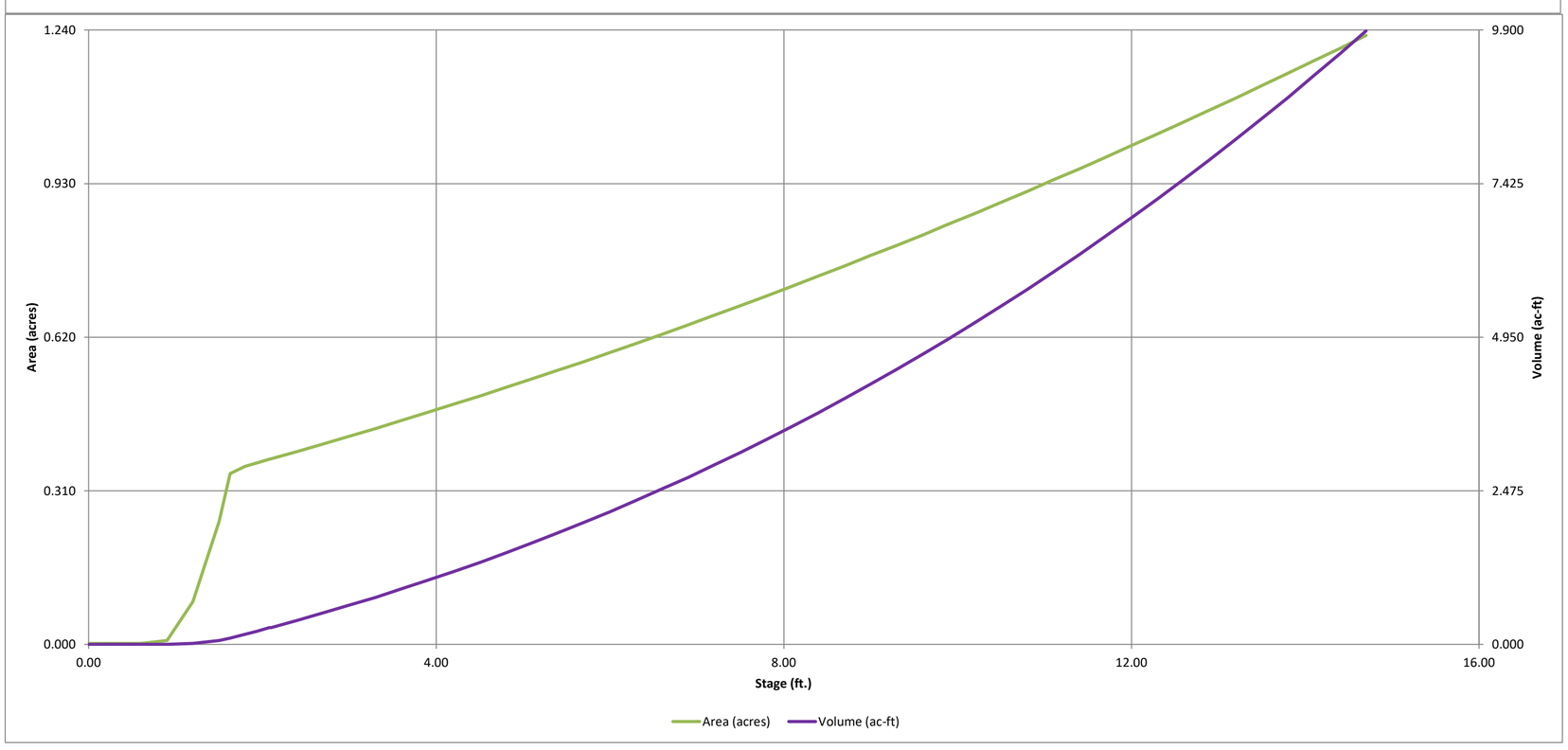
Depth Increment = 0.3 ft

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		9.1	9.1	83		0.002		
ISV	0.33		9.1	9.1	83		0.002	27	0.001
	0.60		9.1	9.1	83		0.002	49	0.001
	0.90		21.4	15.1	323		0.007	80	0.002
	1.20		82.6	45.1	3,724		0.085	596	0.014
	1.50		143.8	75.1	10,798		0.248	2,682	0.062
Floor	1.63		170.3	88.1	15,003		0.344	4,352	0.100
	1.80		173.3	90.3	15,645		0.359	6,980	0.160
Zone 1 (WQCV)	1.93		174.4	91.4	15,941		0.366	9,191	0.211
Zone 2 (EURV)	2.08		175.6	92.6	16,262		0.373	11,606	0.266
	2.10		175.8	92.7	16,305		0.374	11,931	0.274
	2.40		178.2	95.1	16,955		0.389	16,920	0.388
	2.70		180.6	97.5	17,617		0.404	22,105	0.507
	3.00		183.0	99.9	18,290		0.420	27,491	0.631
	3.30		185.4	102.3	18,975		0.436	33,080	0.759
	3.60		187.8	104.7	19,671		0.452	38,877	0.892
	3.90		190.2	107.1	20,379		0.468	44,884	1.030
	4.20		192.6	109.5	21,098		0.484	51,106	1.173
	4.50		195.0	111.9	21,829		0.501	57,544	1.321
	4.80		197.4	114.3	22,572		0.518	64,204	1.474
	5.10		199.8	116.7	23,326		0.535	71,088	1.632
	5.40		202.2	119.1	24,091		0.553	78,201	1.795
	5.70		204.6	121.5	24,868		0.571	85,544	1.964
Zone 3 (100-year)	6.00		207.0	123.9	25,657		0.589	93,123	2.138
	6.30		209.4	126.3	26,457		0.607	100,939	2.317
	6.60		211.8	128.7	27,268		0.626	108,998	2.502
	6.90		214.2	131.1	28,091		0.645	117,301	2.693
	7.20		216.6	133.5	28,926		0.664	125,854	2.889
	7.50		219.0	135.9	29,772		0.683	134,658	3.091
	7.80		221.4	138.3	30,629		0.703	143,718	3.299
	8.10		223.8	140.7	31,499		0.723	153,037	3.513
	8.40		226.2	143.1	32,379		0.743	162,618	3.733
	8.70		228.6	145.5	33,271		0.764	172,466	3.959
	9.00		231.0	147.9	34,175		0.785	182,582	4.192
	9.30		233.4	150.3	35,090		0.806	192,972	4.430
	9.60		235.8	152.7	36,017		0.827	203,638	4.675
	9.90		238.2	155.1	36,955		0.848	214,583	4.926
	10.20		240.6	157.5	37,905		0.870	225,812	5.184
	10.50		243.0	159.9	38,867		0.892	237,328	5.448
	10.80		245.4	162.3	39,839		0.915	249,133	5.719
	11.10		247.8	164.7	40,824		0.937	261,232	5.997
	11.40		250.2	167.1	41,820		0.960	273,628	6.282
	11.70		252.6	169.5	42,827		0.983	286,325	6.573
	12.00		255.0	171.9	43,846		1.007	299,326	6.872
	12.30		257.4	174.3	44,876		1.030	312,634	7.177
	12.60		259.8	176.7	45,918		1.054	326,253	7.490
	12.90		262.2	179.1	46,972		1.078	340,186	7.810
	13.20		264.6	181.5	48,037		1.103	354,437	8.137
	13.50		267.0	183.9	49,113		1.127	369,009	8.471
	13.80		269.4	186.3	50,201		1.152	383,906	8.813
	14.10		271.8	188.7	51,301		1.178	399,131	9.163
	14.40		274.2	191.1	52,412		1.203	414,688	9.520
	14.70		276.6	193.5	53,534		1.229	430,579	9.885

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)



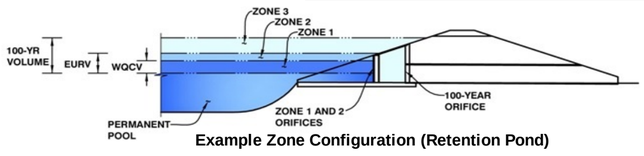


DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)

Project: Front Range - Midway Solar

Basin ID: A9



Example Zone Configuration (Retention Pond)

Required Volume Calculation

Selected BMP Type =	EDB	
Watershed Area =	32.86	acres
Watershed Length =	1,854	ft
Watershed Slope =	0.038	ft/ft
Watershed Imperviousness =	5.20%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	0.0%	percent
Percentage Hydrologic Soil Groups C/D =	100.0%	percent
Desired WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	User Input	
Water Quality Capture Volume (WQCV) =	0.103	acre-feet
Excess Urban Runoff Volume (EURV) =	0.135	acre-feet
2-yr Runoff Volume (P1 = 1.19 in.) =	0.113	acre-feet
5-yr Runoff Volume (P1 = 1.5 in.) =	0.358	acre-feet
10-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet
25-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet
50-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet
100-yr Runoff Volume (P1 = 2.52 in.) =	4.064	acre-feet
500-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet
Approximate 2-yr Detention Volume =	0.105	acre-feet
Approximate 5-yr Detention Volume =	0.344	acre-feet
Approximate 10-yr Detention Volume =	0.000	acre-feet
Approximate 25-yr Detention Volume =	0.000	acre-feet
Approximate 50-yr Detention Volume =	0.000	acre-feet
Approximate 100-yr Detention Volume =	0.903	acre-feet

Optional User Override 1-hr Precipitation

1.19	inches
1.50	inches
	inches
	inches
	inches
2.52	inches
	inches

Stage-Storage Calculation

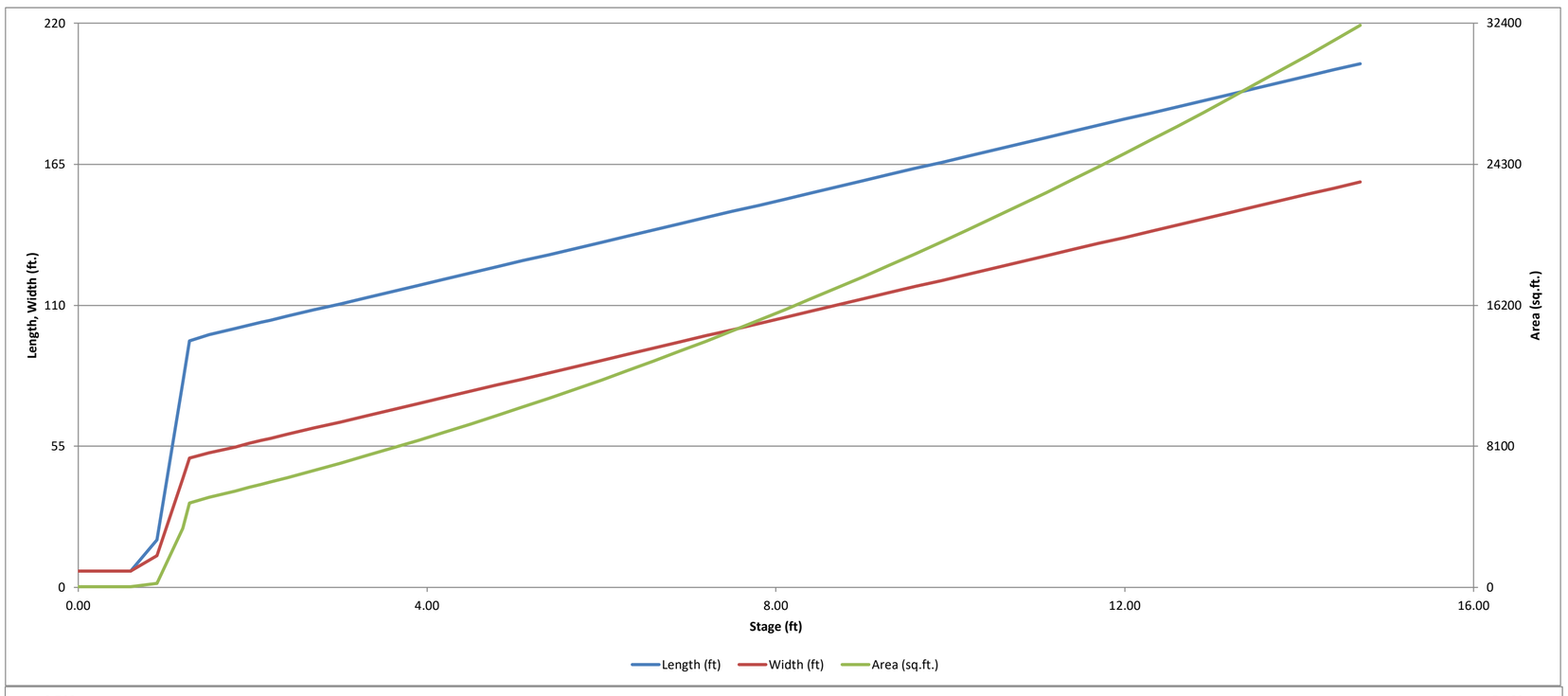
Zone 1 Volume (WQCV) =	0.103	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.032	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	0.768	acre-feet
Total Detention Basin Volume =	0.903	acre-feet
Initial Surcharge Volume (ISV) =	13	ft^3
Initial Surcharge Depth (ISD) =	0.33	ft
Total Available Detention Depth (H_{total}) =	6.00	ft
Depth of Trickle Channel (H_{TC}) =	0.50	ft
Slope of Trickle Channel (S_{TC}) =	0.005	ft/ft
Slopes of Main Basin Sides (S_{main}) =	4	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	2	
Initial Surcharge Area (A_{ISV}) =	41	ft^2
Surcharge Volume Length (L_{ISV}) =	6.4	ft
Surcharge Volume Width (W_{ISV}) =	6.4	ft
Depth of Basin Floor (H_{FLOOR}) =	0.44	ft
Length of Basin Floor (L_{FLOOR}) =	96.7	ft
Width of Basin Floor (W_{FLOOR}) =	50.7	ft
Area of Basin Floor (A_{FLOOR}) =	4,903	ft^2
Volume of Basin Floor (V_{FLOOR}) =	796	ft^3
Depth of Main Basin (H_{MAIN}) =	4.73	ft
Length of Main Basin (L_{MAIN}) =	134.6	ft
Width of Main Basin (W_{MAIN}) =	88.5	ft
Area of Main Basin (A_{MAIN}) =	11,907	ft^2
Volume of Main Basin (V_{MAIN}) =	38,526	ft^3
Calculated Total Basin Volume (V_{total}) =	**0.903**	acre-feet

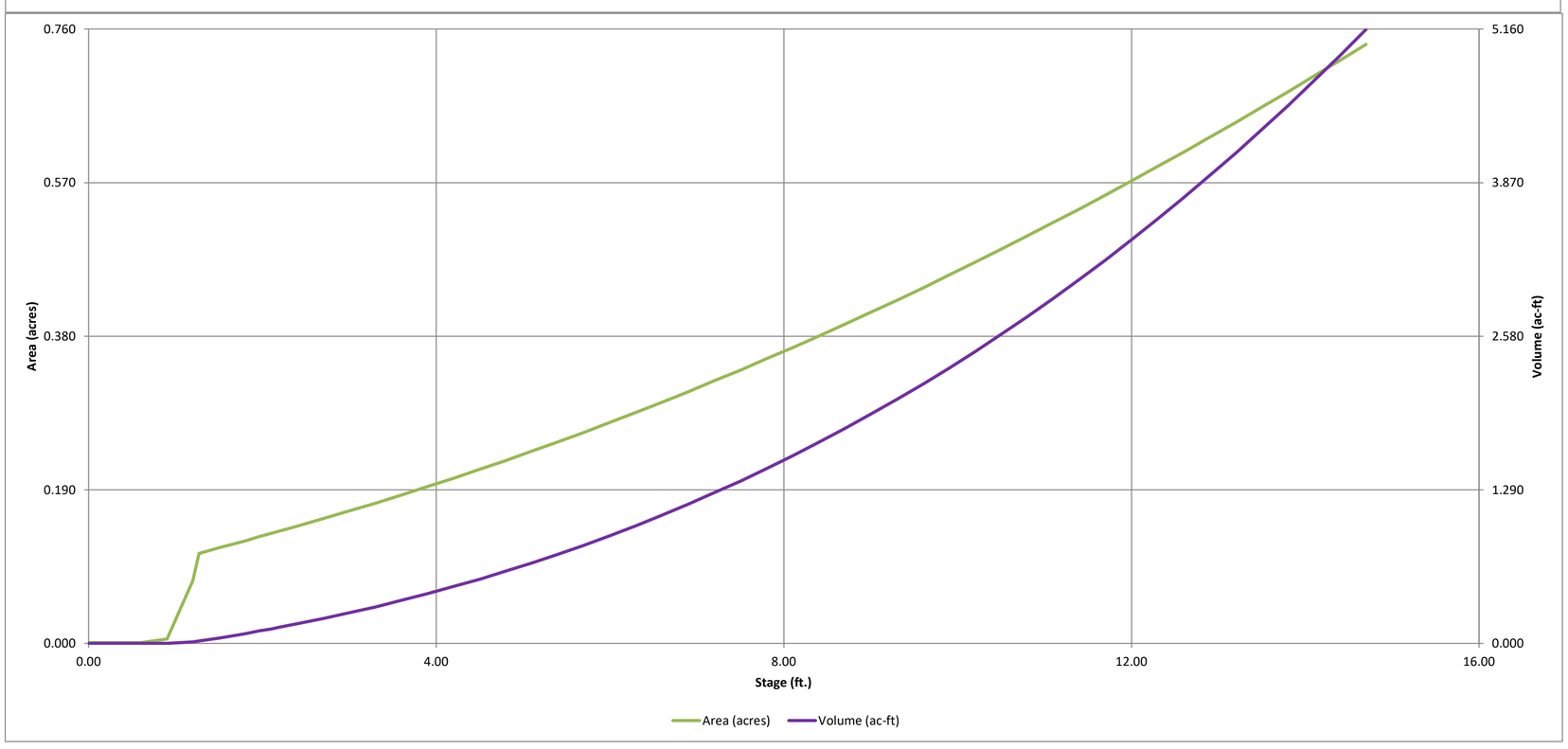
Depth Increment = 0.3 ft

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		6.4	6.4	41		0.001		
ISV	0.33		6.4	6.4	41		0.001	13	0.000
	0.60		6.4	6.4	41		0.001	24	0.001
	0.90		18.6	12.4	230		0.005	41	0.001
	1.20		79.8	42.4	3,382		0.078	491	0.011
Floor	1.27		96.1	50.4	4,843		0.111	818	0.019
	1.50		98.5	52.4	5,161		0.118	1,925	0.044
	1.80		100.9	54.8	5,529		0.127	3,528	0.081
Zone 1 (WQCV)	1.96		102.2	56.2	5,743		0.132	4,486	0.103
	2.10		103.4	57.3	5,922		0.136	5,303	0.122
Zone 2 (EURV)	2.20		104.2	58.1	6,051		0.139	5,901	0.135
	2.40		105.8	59.7	6,313		0.145	7,138	0.164
	2.70		108.2	62.1	6,716		0.154	9,092	0.209
	3.00		110.6	64.5	7,130		0.164	11,168	0.256
	3.30		113.0	66.9	7,556		0.173	13,371	0.307
	3.60		115.4	69.3	7,993		0.184	15,703	0.360
	3.90		117.8	71.7	8,442		0.194	18,168	0.417
	4.20		120.2	74.1	8,903		0.204	20,770	0.477
	4.50		122.6	76.5	9,375		0.215	23,511	0.540
	4.80		125.0	78.9	9,858		0.226	26,396	0.606
	5.10		127.4	81.3	10,353		0.238	29,427	0.676
	5.40		129.8	83.7	10,860		0.249	32,609	0.749
	5.70		132.2	86.1	11,378		0.261	35,944	0.825
Zone 3 (100-year)	6.00		134.6	88.5	11,907		0.273	39,437	0.905
	6.30		137.0	90.9	12,449		0.286	43,090	0.989
	6.60		139.4	93.3	13,001		0.298	46,907	1.077
	6.90		141.8	95.7	13,565		0.311	50,892	1.168
	7.20		144.2	98.1	14,141		0.325	55,047	1.264
	7.50		146.6	100.5	14,728		0.338	59,377	1.363
	7.80		149.0	102.9	15,327		0.352	63,885	1.467
	8.10		151.4	105.3	15,937		0.366	68,575	1.574
	8.40		153.8	107.7	16,559		0.380	73,449	1.686
	8.70		156.2	110.1	17,192		0.395	78,511	1.802
	9.00		158.6	112.5	17,837		0.409	83,765	1.923
	9.30		161.0	114.9	18,493		0.425	89,214	2.048
	9.60		163.4	117.3	19,161		0.440	94,862	2.178
	9.90		165.8	119.7	19,840		0.455	100,712	2.312
	10.20		168.2	122.1	20,531		0.471	106,767	2.451
	10.50		170.6	124.5	21,233		0.487	113,032	2.595
	10.80		173.0	126.9	21,947		0.504	119,508	2.744
	11.10		175.4	129.3	22,673		0.520	126,201	2.897
	11.40		177.8	131.7	23,410		0.537	133,113	3.056
	11.70		180.2	134.1	24,158		0.555	140,248	3.220
	12.00		182.6	136.5	24,918		0.572	147,609	3.389
	12.30		185.0	138.9	25,689		0.590	155,200	3.563
	12.60		187.4	141.3	26,472		0.608	163,024	3.743
	12.90		189.8	143.7	27,267		0.626	171,085	3.928
	13.20		192.2	146.1	28,073		0.644	179,385	4.118
	13.50		194.6	148.5	28,891		0.663	187,929	4.314
	13.80		197.0	150.9	29,720		0.682	196,721	4.516
	14.10		199.4	153.3	30,560		0.702	205,762	4.724
	14.40		201.8	155.7	31,412		0.721	215,058	4.937
	14.70		204.2	158.1	32,276		0.741	224,611	5.156

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)



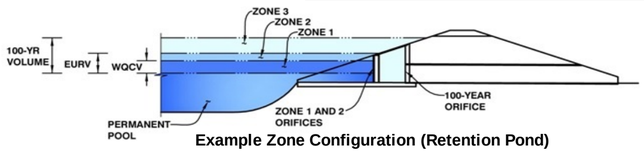


DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)

Project: Front Range - Midway Solar

Basin ID: A10



Example Zone Configuration (Retention Pond)

Required Volume Calculation

Selected BMP Type =	EDB	
Watershed Area =	263.34	acres
Watershed Length =	7,992	ft
Watershed Slope =	0.014	ft/ft
Watershed Imperviousness =	3.50%	percent
Percentage Hydrologic Soil Group A =	5.0%	percent
Percentage Hydrologic Soil Group B =	0.0%	percent
Percentage Hydrologic Soil Groups C/D =	95.0%	percent
Desired WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	User Input	
Water Quality Capture Volume (WQCV) =	0.568	acre-feet
Excess Urban Runoff Volume (EURV) =	0.695	acre-feet
2-yr Runoff Volume (P1 = 1.19 in.) =	0.565	acre-feet
5-yr Runoff Volume (P1 = 1.5 in.) =	2.225	acre-feet
10-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet
25-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet
50-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet
100-yr Runoff Volume (P1 = 2.52 in.) =	30.934	acre-feet
500-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet
Approximate 2-yr Detention Volume =	0.526	acre-feet
Approximate 5-yr Detention Volume =	2.150	acre-feet
Approximate 10-yr Detention Volume =	0.000	acre-feet
Approximate 25-yr Detention Volume =	0.000	acre-feet
Approximate 50-yr Detention Volume =	0.000	acre-feet
Approximate 100-yr Detention Volume =	5.991	acre-feet

Optional User Override 1-hr Precipitation

1.19	inches
1.50	inches
	inches
	inches
	inches
2.52	inches
	inches

Stage-Storage Calculation

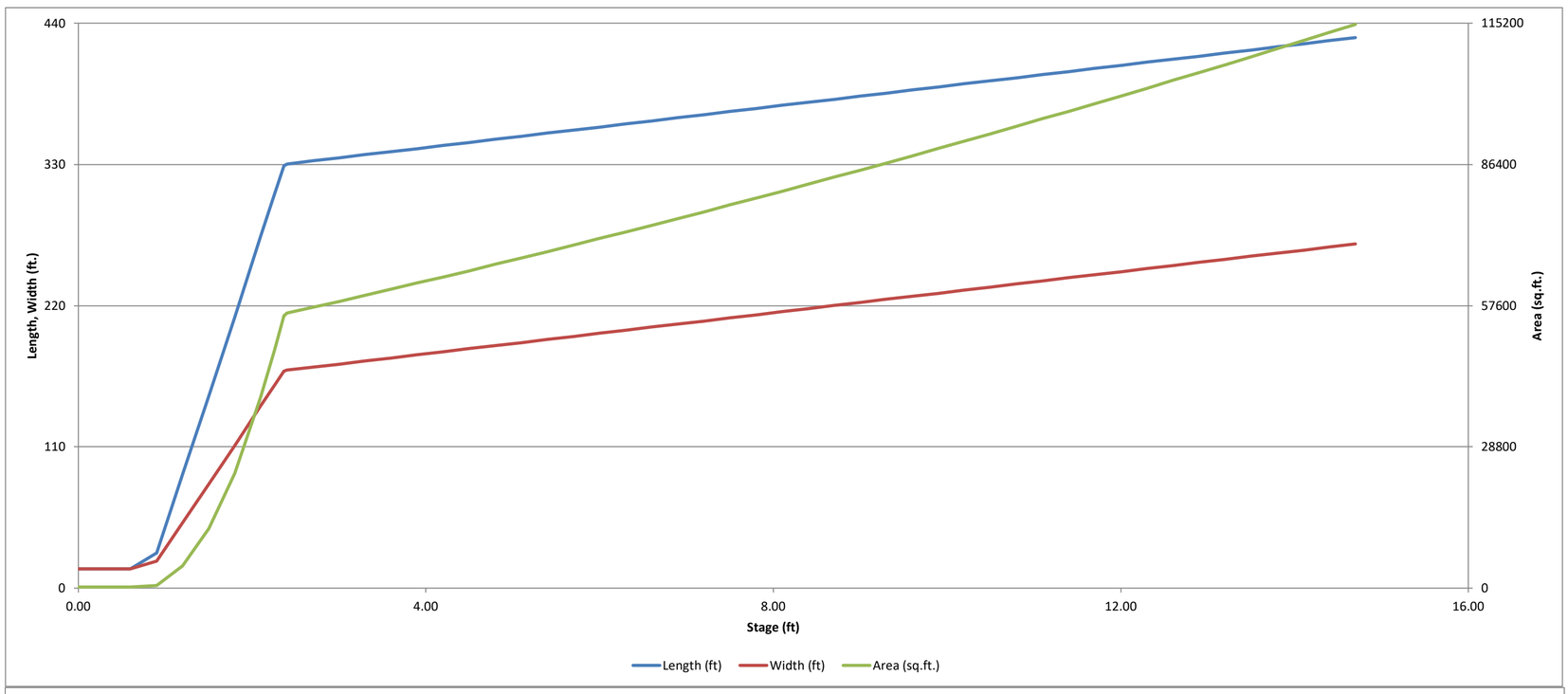
Zone 1 Volume (WQCV) =	0.568	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.127	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	5.297	acre-feet
Total Detention Basin Volume =	5.991	acre-feet
Initial Surcharge Volume (ISV) =	74	ft^3
Initial Surcharge Depth (ISD) =	0.33	ft
Total Available Detention Depth (H_{total}) =	6.00	ft
Depth of Trickle Channel (H_{TC}) =	0.50	ft
Slope of Trickle Channel (S_{TC}) =	0.005	ft/ft
Slopes of Main Basin Sides (S_{main}) =	4	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	2	
Initial Surcharge Area (A_{ISV}) =	225	ft^2
Surcharge Volume Length (L_{ISV}) =	15.0	ft
Surcharge Volume Width (W_{ISV}) =	15.0	ft
Depth of Basin Floor (H_{FLOOR}) =	1.54	ft
Length of Basin Floor (L_{FLOOR}) =	330.1	ft
Width of Basin Floor (W_{FLOOR}) =	169.5	ft
Area of Basin Floor (A_{FLOOR}) =	55,951	ft^2
Volume of Basin Floor (V_{FLOOR}) =	30,753	ft^3
Depth of Main Basin (H_{MAIN}) =	3.63	ft
Length of Main Basin (L_{MAIN}) =	359.1	ft
Width of Main Basin (W_{MAIN}) =	198.5	ft
Area of Main Basin (A_{MAIN}) =	71,281	ft^2
Volume of Main Basin (V_{MAIN}) =	230,060	ft^3
Calculated Total Basin Volume (V_{total}) =	**5.992**	acre-feet

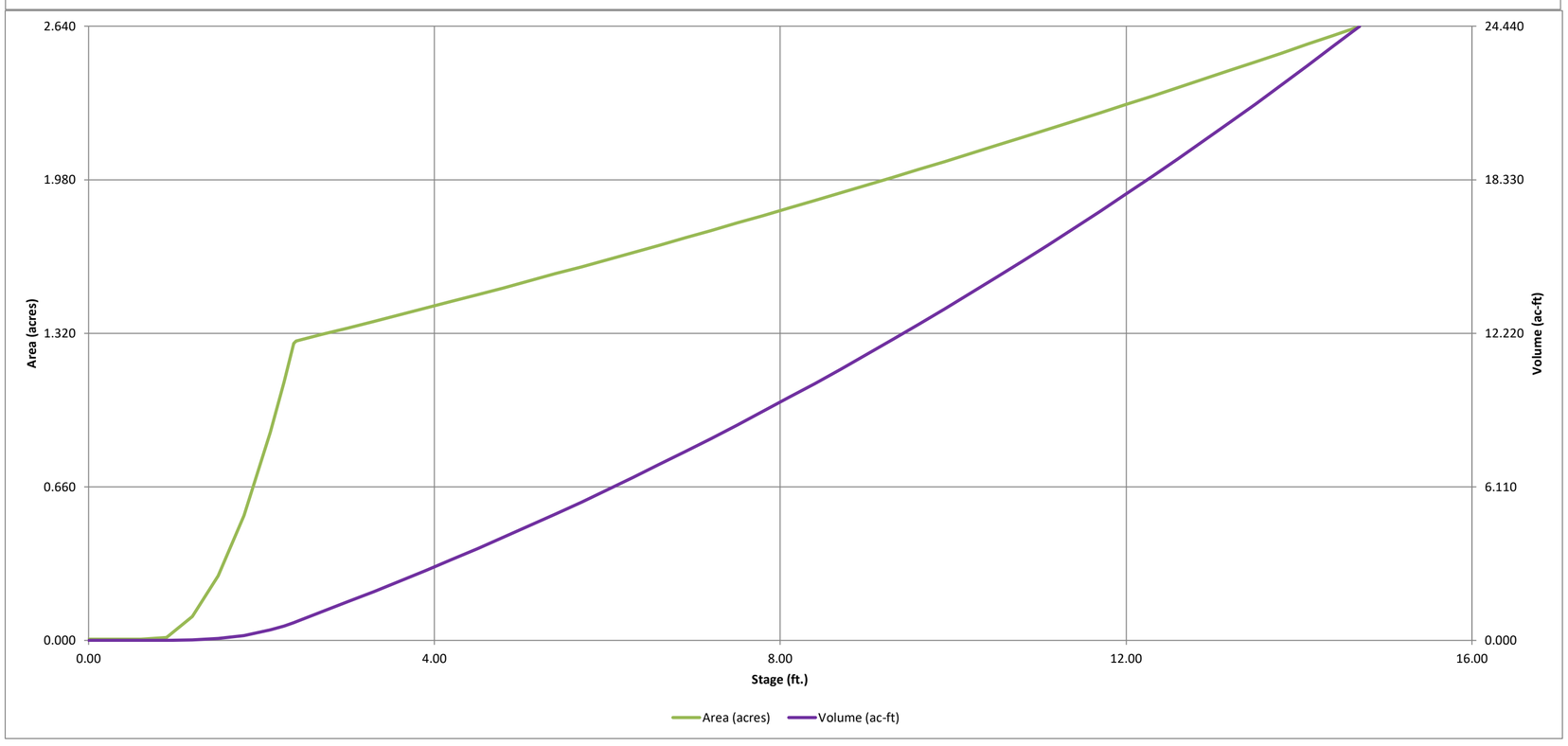
Depth Increment = 0.3 ft

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		15.0	15.0	225		0.005		
ISV	0.33		15.0	15.0	225		0.005	72	0.002
	0.60		15.0	15.0	225		0.005	133	0.003
	0.90		27.2	21.0	572		0.013	210	0.005
	1.20		88.4	51.0	4,510		0.104	880	0.020
	1.50		149.6	81.0	12,120		0.278	3,283	0.075
	1.80		210.8	111.0	23,402		0.537	8,520	0.196
	2.10		274.1	142.0	38,918		0.893	18,078	0.415
Zone 1 (WQCV)	2.26		306.7	158.0	48,460		1.112	25,054	0.575
Zone 2 (EURV)	2.37		329.2	169.0	55,627		1.277	30,775	0.706
Floor	2.37		329.2	169.0	55,627		1.277	30,775	0.706
	2.40		330.3	169.7	56,051		1.287	32,453	0.745
	2.70		332.7	172.1	57,257		1.314	49,449	1.135
	3.00		335.1	174.5	58,474		1.342	66,808	1.534
	3.30		337.5	176.9	59,703		1.371	84,535	1.941
	3.60		339.9	179.3	60,944		1.399	102,631	2.356
	3.90		342.3	181.7	62,196		1.428	121,102	2.780
	4.20		344.7	184.1	63,459		1.457	139,950	3.213
	4.50		347.1	186.5	64,734		1.486	159,178	3.654
	4.80		349.5	188.9	66,020		1.516	178,791	4.104
	5.10		351.9	191.3	67,318		1.545	198,792	4.564
	5.40		354.3	193.7	68,628		1.575	219,183	5.032
	5.70		356.7	196.1	69,949		1.606	239,970	5.509
Zone 3 (100-year)	6.00		359.1	198.5	71,281		1.636	261,154	5.995
	6.30		361.5	200.9	72,625		1.667	282,739	6.491
	6.60		363.9	203.3	73,981		1.698	304,730	6.996
	6.90		366.3	205.7	75,348		1.730	327,129	7.510
	7.20		368.7	208.1	76,727		1.761	349,940	8.034
	7.50		371.1	210.5	78,117		1.793	373,166	8.567
	7.80		373.5	212.9	79,518		1.825	396,811	9.110
	8.10		375.9	215.3	80,931		1.858	420,878	9.662
	8.40		378.3	217.7	82,356		1.891	445,371	10.224
	8.70		380.7	220.1	83,792		1.924	470,293	10.796
	9.00		383.1	222.5	85,240		1.957	495,648	11.379
	9.30		385.5	224.9	86,699		1.990	521,438	11.971
	9.60		387.9	227.3	88,170		2.024	547,668	12.573
	9.90		390.3	229.7	89,652		2.058	574,342	13.185
	10.20		392.7	232.1	91,146		2.092	601,461	13.808
	10.50		395.1	234.5	92,651		2.127	629,030	14.441
	10.80		397.5	236.9	94,168		2.162	657,053	15.084
	11.10		399.9	239.3	95,697		2.197	685,532	15.738
	11.40		402.3	241.7	97,237		2.232	714,472	16.402
	11.70		404.7	244.1	98,788		2.268	743,876	17.077
	12.00		407.1	246.5	100,351		2.304	773,746	17.763
	12.30		409.5	248.9	101,925		2.340	804,087	18.459
	12.60		411.9	251.3	103,511		2.376	834,902	19.167
	12.90		414.3	253.7	105,109		2.413	866,195	19.885
	13.20		416.7	256.1	106,718		2.450	897,969	20.615
	13.50		419.1	258.5	108,338		2.487	930,227	21.355
	13.80		421.5	260.9	109,970		2.525	962,973	22.107
	14.10		423.9	263.3	111,614		2.562	996,210	22.870
	14.40		426.3	265.7	113,269		2.600	1,029,942	23.644
	14.70		428.7	268.1	114,936		2.639	1,064,173	24.430

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)



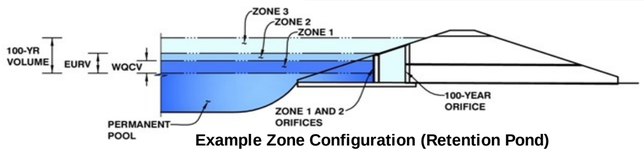


DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)

Project: Front Range - Midway Solar

Basin ID: A11



Example Zone Configuration (Retention Pond)

Required Volume Calculation

Selected BMP Type =	EDB	
Watershed Area =	224.01	acres
Watershed Length =	8,048	ft
Watershed Slope =	0.019	ft/ft
Watershed Imperviousness =	3.70%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	0.0%	percent
Percentage Hydrologic Soil Groups C/D =	100.0%	percent
Desired WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	User Input	
Water Quality Capture Volume (WQCV) =	0.509	acre-feet
Excess Urban Runoff Volume (EURV) =	0.637	acre-feet
2-yr Runoff Volume (P1 = 1.19 in.) =	0.523	acre-feet
5-yr Runoff Volume (P1 = 1.5 in.) =	2.028	acre-feet
10-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet
25-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet
50-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet
100-yr Runoff Volume (P1 = 2.52 in.) =	27.367	acre-feet
500-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet
Approximate 2-yr Detention Volume =	0.488	acre-feet
Approximate 5-yr Detention Volume =	1.959	acre-feet
Approximate 10-yr Detention Volume =	0.000	acre-feet
Approximate 25-yr Detention Volume =	0.000	acre-feet
Approximate 50-yr Detention Volume =	0.000	acre-feet
Approximate 100-yr Detention Volume =	5.329	acre-feet

Optional User Override 1-hr Precipitation

1.19	inches
1.50	inches
	inches
	inches
	inches
2.52	inches
	inches

Stage-Storage Calculation

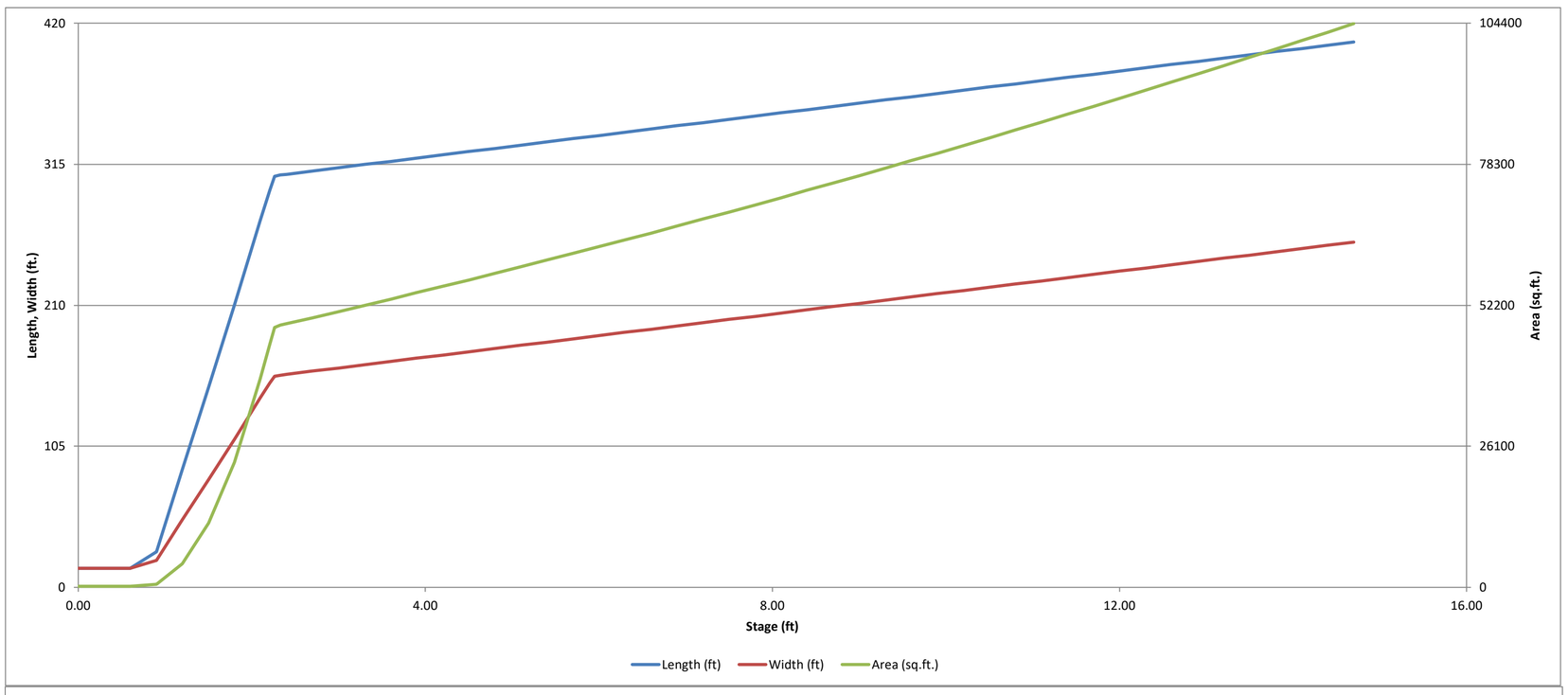
Zone 1 Volume (WQCV) =	0.509	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.127	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	4.692	acre-feet
Total Detention Basin Volume =	5.329	acre-feet
Initial Surcharge Volume (ISV) =	67	ft^3
Initial Surcharge Depth (ISD) =	0.33	ft
Total Available Detention Depth (H_{total}) =	6.00	ft
Depth of Trickle Channel (H_{TC}) =	0.50	ft
Slope of Trickle Channel (S_{TC}) =	0.005	ft/ft
Slopes of Main Basin Sides (S_{main}) =	4	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	2	
Initial Surcharge Area (A_{ISV}) =	202	ft^2
Surcharge Volume Length (L_{ISV}) =	14.2	ft
Surcharge Volume Width (W_{ISV}) =	14.2	ft
Depth of Basin Floor (H_{FLOOR}) =	1.43	ft
Length of Basin Floor (L_{FLOOR}) =	306.5	ft
Width of Basin Floor (W_{FLOOR}) =	157.5	ft
Area of Basin Floor (A_{FLOOR}) =	48,260	ft^2
Volume of Basin Floor (V_{FLOOR}) =	24,633	ft^3
Depth of Main Basin (H_{MAIN}) =	3.74	ft
Length of Main Basin (L_{MAIN}) =	336.4	ft
Width of Main Basin (W_{MAIN}) =	187.4	ft
Area of Main Basin (A_{MAIN}) =	63,025	ft^2
Volume of Main Basin (V_{MAIN}) =	207,340	ft^3
Calculated Total Basin Volume (V_{total}) =	**5.329**	acre-feet

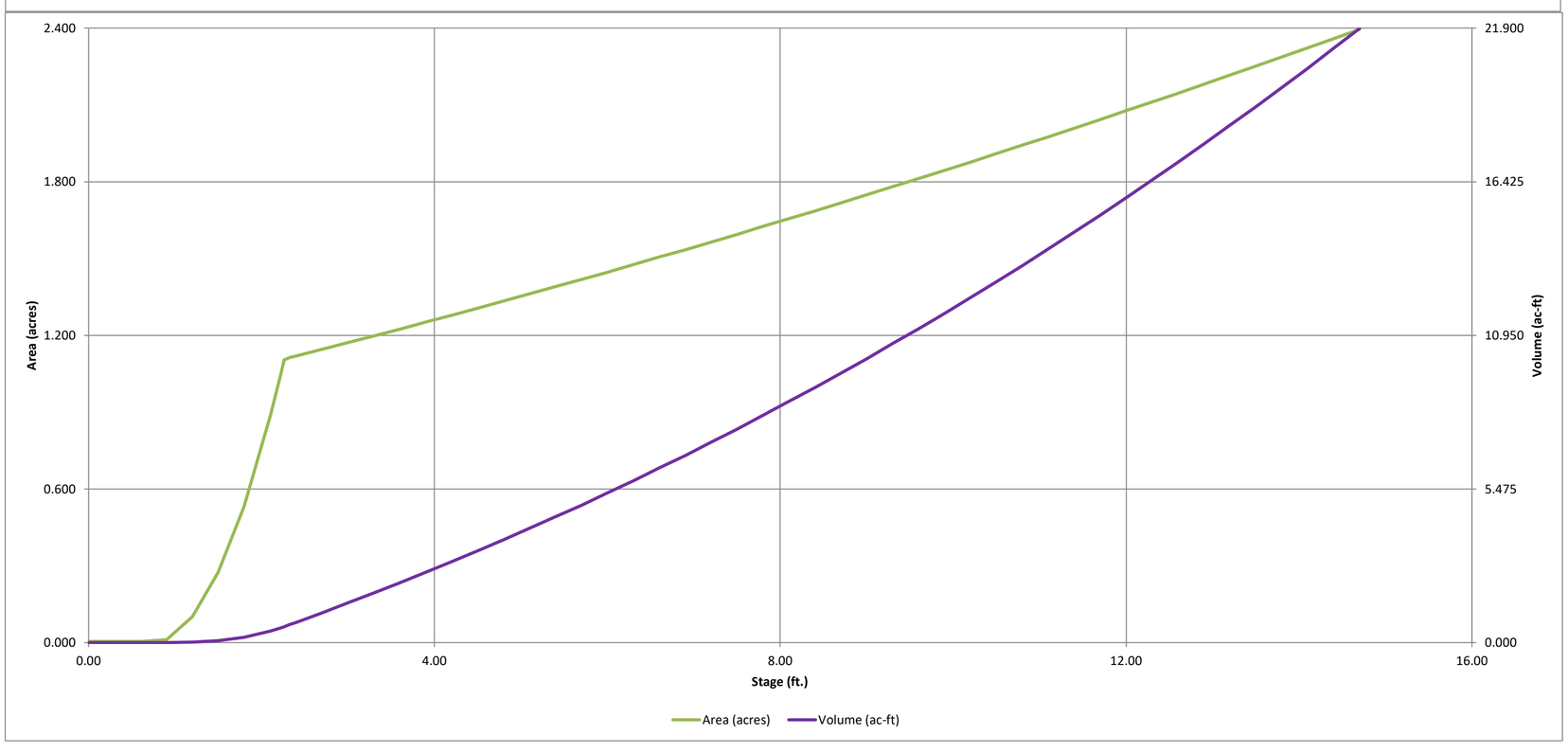
Depth Increment = 0.3 ft

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		14.2	14.2	202		0.005		
ISV	0.33		14.2	14.2	202		0.005	65	0.001
	0.60		14.2	14.2	202		0.005	119	0.003
	0.90		26.4	20.2	534		0.012	189	0.004
	1.20		87.6	50.2	4,400		0.101	837	0.019
	1.50		148.8	80.2	11,937		0.274	3,196	0.073
	1.80		210.0	110.2	23,146		0.531	8,366	0.192
	2.10		273.3	141.2	38,587		0.886	17,834	0.409
Zone 1 (WQCV)	2.21		295.7	152.2	45,009		1.033	22,427	0.515
Floor	2.26		305.9	157.2	48,091		1.104	24,754	0.568
Zone 2 (EURV)	2.33		307.0	158.0	48,510		1.114	28,140	0.646
	2.40		307.6	158.6	48,771		1.120	31,545	0.724
	2.70		310.0	161.0	49,895		1.145	46,344	1.064
	3.00		312.4	163.4	51,031		1.172	61,483	1.411
	3.30		314.8	165.8	52,179		1.198	76,964	1.767
	3.60		317.2	168.2	53,338		1.224	92,791	2.130
	3.90		319.6	170.6	54,508		1.251	108,968	2.502
	4.20		322.0	173.0	55,691		1.278	125,498	2.881
	4.50		324.4	175.4	56,884		1.306	142,383	3.269
	4.80		326.8	177.8	58,089		1.334	159,629	3.665
	5.10		329.2	180.2	59,306		1.361	177,238	4.069
	5.40		331.6	182.6	60,534		1.390	195,214	4.481
	5.70		334.0	185.0	61,774		1.418	213,560	4.903
Zone 3 (100-year)	6.00		336.4	187.4	63,025		1.447	232,279	5.332
	6.30		338.8	189.8	64,288		1.476	251,376	5.771
	6.60		341.2	192.2	65,562		1.505	270,853	6.218
	6.90		343.6	194.6	66,848		1.535	290,714	6.674
	7.20		346.0	197.0	68,145		1.564	310,963	7.139
	7.50		348.4	199.4	69,454		1.594	331,602	7.613
	7.80		350.8	201.8	70,774		1.625	352,636	8.095
	8.10		353.2	204.2	72,106		1.655	374,068	8.587
	8.40		355.6	206.6	73,449		1.686	395,901	9.089
	8.70		358.0	209.0	74,804		1.717	418,139	9.599
	9.00		360.4	211.4	76,171		1.749	440,785	10.119
	9.30		362.8	213.8	77,549		1.780	463,842	10.648
	9.60		365.2	216.2	78,938		1.812	487,315	11.187
	9.90		367.6	218.6	80,339		1.844	511,206	11.736
	10.20		370.0	221.0	81,752		1.877	535,520	12.294
	10.50		372.4	223.4	83,176		1.909	560,258	12.862
	10.80		374.8	225.8	84,611		1.942	585,426	13.440
	11.10		377.2	228.2	86,058		1.976	611,026	14.027
	11.40		379.6	230.6	87,517		2.009	637,062	14.625
	11.70		382.0	233.0	88,987		2.043	663,537	15.233
	12.00		384.4	235.4	90,468		2.077	690,455	15.851
	12.30		386.8	237.8	91,962		2.111	717,820	16.479
	12.60		389.2	240.2	93,466		2.146	745,633	17.117
	12.90		391.6	242.6	94,982		2.180	773,900	17.766
	13.20		394.0	245.0	96,510		2.216	802,624	18.426
	13.50		396.4	247.4	98,049		2.251	831,808	19.096
	13.80		398.8	249.8	99,600		2.287	861,455	19.776
	14.10		401.2	252.2	101,162		2.322	891,569	20.468
	14.40		403.6	254.6	102,736		2.358	922,153	21.170
	14.70		406.0	257.0	104,321		2.395	953,211	21.883

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)



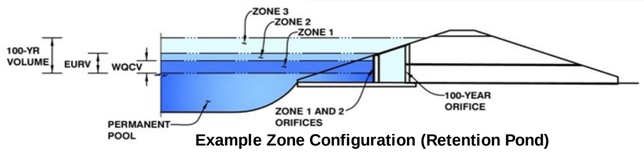


DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)

Project: Front Range - Midway Solar

Basin ID: A12



Example Zone Configuration (Retention Pond)

Required Volume Calculation

Selected BMP Type =	EDB		
Watershed Area =	10.97	acres	**Note: L / W Ratio < 1**
Watershed Length =	444	ft	**L / W Ratio = 0.4**
Watershed Slope =	0.040	ft/ft	
Watershed Imperviousness =	6.70%	percent	
Percentage Hydrologic Soil Group A =	0.0%	percent	
Percentage Hydrologic Soil Group B =	0.0%	percent	
Percentage Hydrologic Soil Groups C/D =	100.0%	percent	
Desired WQCV Drain Time =	40.0	hours	
Location for 1-hr Rainfall Depths =	User Input		
Water Quality Capture Volume (WQCV) =	0.043	acre-feet	Optional User Override 1-hr Precipitation
Excess Urban Runoff Volume (EURV) =	0.059	acre-feet	
2-yr Runoff Volume (P1 = 1.19 in.) =	0.050	acre-feet	1.19 inches
5-yr Runoff Volume (P1 = 1.5 in.) =	0.140	acre-feet	1.50 inches
10-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet	inches
25-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet	inches
50-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet	inches
100-yr Runoff Volume (P1 = 2.52 in.) =	1.373	acre-feet	2.52 inches
500-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet	inches
Approximate 2-yr Detention Volume =	0.047	acre-feet	
Approximate 5-yr Detention Volume =	0.134	acre-feet	
Approximate 10-yr Detention Volume =	0.000	acre-feet	
Approximate 25-yr Detention Volume =	0.000	acre-feet	
Approximate 50-yr Detention Volume =	0.000	acre-feet	
Approximate 100-yr Detention Volume =	0.337	acre-feet	

Stage-Storage Calculation

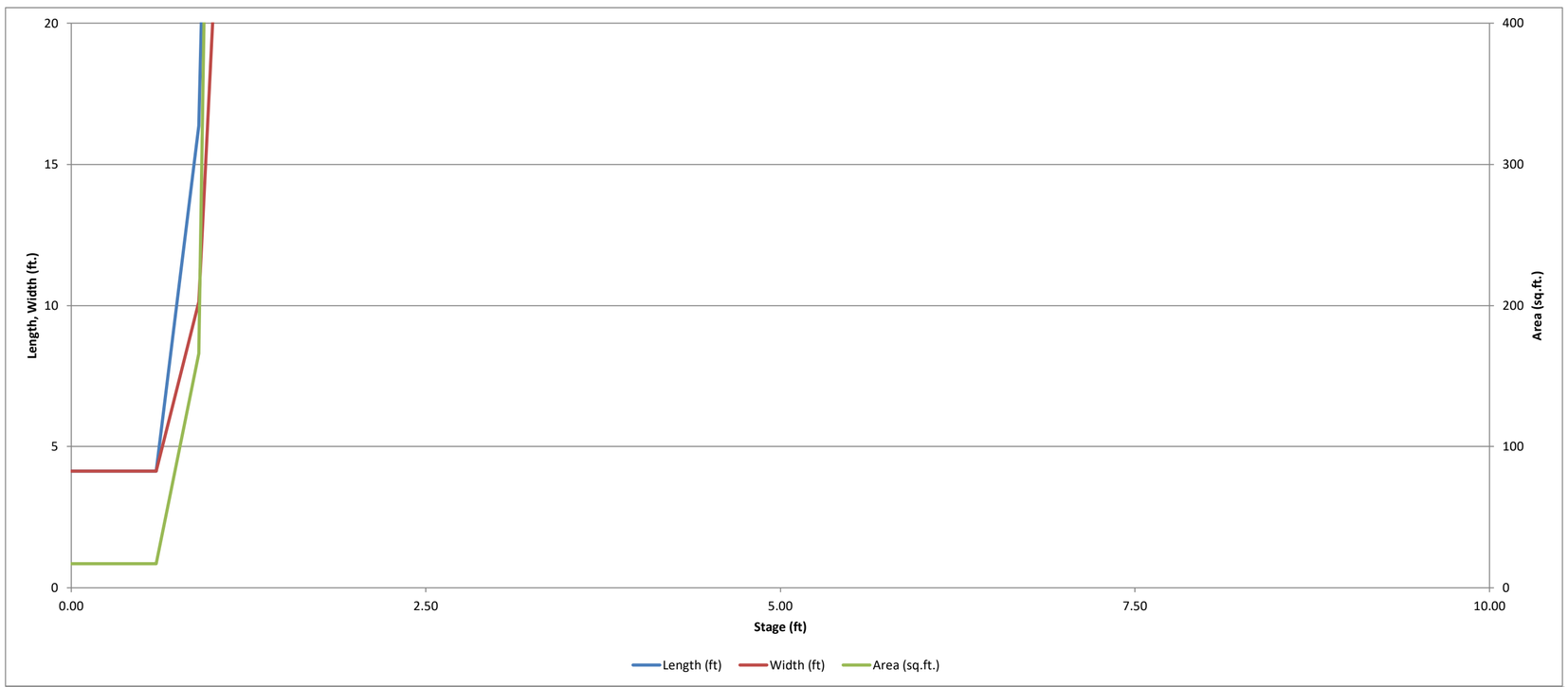
Zone 1 Volume (WQCV) =	0.043	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.016	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	0.278	acre-feet
Total Detention Basin Volume =	0.337	acre-feet
Initial Surcharge Volume (ISV) =	6	ft^3
Initial Surcharge Depth (ISD) =	0.33	ft
Total Available Detention Depth (H_{total}) =	6.00	ft
Depth of Trickle Channel (H_{TC}) =	0.50	ft
Slope of Trickle Channel (S_{TC}) =	0.005	ft/ft
Slopes of Main Basin Sides (S_{main}) =	4	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	2	
Initial Surcharge Area (A_{ISV}) =	17	ft^2
Surcharge Volume Length (L_{ISV}) =	4.1	ft
Surcharge Volume Width (W_{ISV}) =	4.1	ft
Depth of Basin Floor (H_{FLOOR}) =	0.20	ft
Length of Basin Floor (L_{FLOOR}) =	44.4	ft
Width of Basin Floor (W_{FLOOR}) =	23.9	ft
Area of Basin Floor (A_{FLOOR}) =	1,059	ft^2
Volume of Basin Floor (V_{FLOOR}) =	80	ft^3
Depth of Main Basin (H_{MAIN}) =	4.97	ft
Length of Main Basin (L_{MAIN}) =	84.2	ft
Width of Main Basin (W_{MAIN}) =	63.6	ft
Area of Main Basin (A_{MAIN}) =	5,357	ft^2
Volume of Main Basin (V_{MAIN}) =	14,583	ft^3
Calculated Total Basin Volume (V_{total}) =	**0.337**	acre-feet

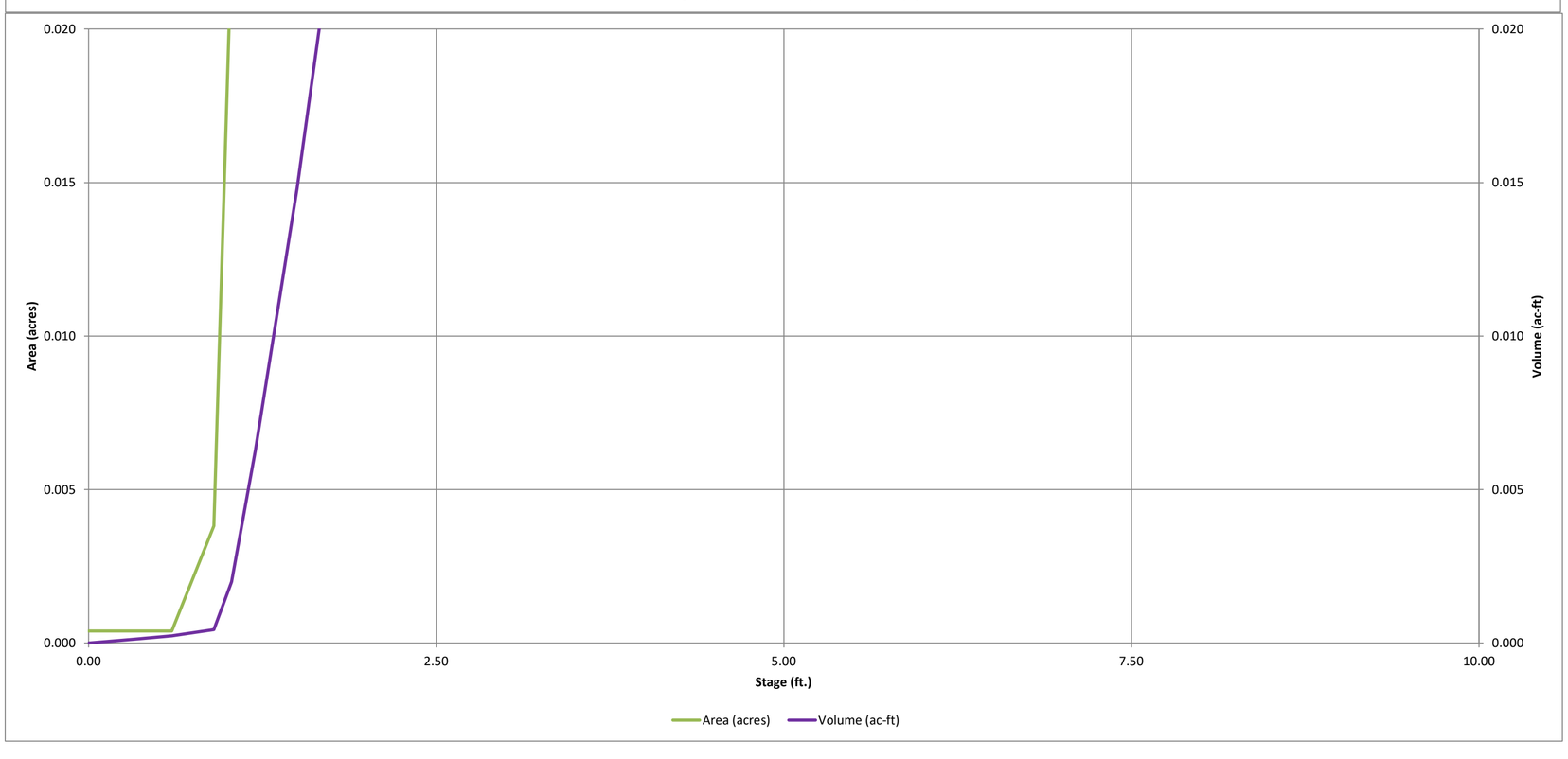
Depth Increment = 0.3 ft

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		4.1	4.1	17		0.000		
ISV	0.33		4.1	4.1	17		0.000	5	0.000
	0.60		4.1	4.1	17		0.000	10	0.000
	0.90		16.4	10.1	166		0.004	19	0.000
Floor	1.03		42.9	23.1	992		0.023	87	0.002
	1.20		45.7	25.2	1,150		0.026	274	0.006
	1.50		48.1	27.6	1,325		0.030	645	0.015
	1.80		50.5	30.0	1,513		0.035	1,070	0.025
	2.10		53.0	32.4	1,718		0.039	1,571	0.036
Zone 1 (WQCV)	2.28		54.4	33.9	1,843		0.042	1,891	0.043
	2.40		55.4	34.8	1,929		0.044	2,118	0.049
Zone 2 (EURV)	2.63		57.2	36.7	2,099		0.048	2,581	0.059
	2.70		57.8	37.2	2,151		0.049	2,729	0.063
	3.00		60.2	39.6	2,385		0.055	3,410	0.078
	3.30		62.6	42.0	2,630		0.060	4,162	0.096
	3.60		65.0	44.4	2,887		0.066	4,989	0.115
	3.90		67.4	46.8	3,156		0.072	5,895	0.135
	4.20		69.8	49.2	3,436		0.079	6,884	0.158
	4.50		72.2	51.6	3,727		0.086	7,958	0.183
	4.80		74.6	54.0	4,030		0.093	9,121	0.209
	5.10		77.0	56.4	4,344		0.100	10,377	0.238
	5.40		79.4	58.8	4,670		0.107	11,729	0.269
	5.70		81.8	61.2	5,008		0.115	13,180	0.303
Zone 3 (100-year)	5.99		84.1	63.6	5,345		0.123	14,681	0.337
	6.00		84.2	63.6	5,357		0.123	14,734	0.338
	6.30		86.6	66.0	5,717		0.131	16,395	0.376
	6.60		89.0	68.4	6,089		0.140	18,166	0.417
	6.90		91.4	70.8	6,473		0.149	20,050	0.460
	7.20		93.8	73.2	6,868		0.158	22,050	0.506
	7.50		96.2	75.6	7,274		0.167	24,171	0.555
	7.80		98.6	78.0	7,692		0.177	26,416	0.606
	8.10		101.0	80.4	8,122		0.186	28,788	0.661
	8.40		103.4	82.8	8,563		0.197	31,291	0.718
	8.70		105.8	85.2	9,016		0.207	33,927	0.779
	9.00		108.2	87.6	9,480		0.218	36,701	0.843
	9.30		110.6	90.0	9,956		0.229	39,616	0.909
	9.60		113.0	92.4	10,443		0.240	42,676	0.980
	9.90		115.4	94.8	10,942		0.251	45,883	1.053
	10.20		117.8	97.2	11,452		0.263	49,242	1.130
	10.50		120.2	99.6	11,974		0.275	52,756	1.211
	10.80		122.6	102.0	12,507		0.287	56,427	1.295
	11.10		125.0	104.4	13,052		0.300	60,261	1.383
	11.40		127.4	106.8	13,608		0.312	64,260	1.475
	11.70		129.8	109.2	14,176		0.325	68,427	1.571
	12.00		132.2	111.6	14,755		0.339	72,766	1.670
	12.30		134.6	114.0	15,346		0.352	77,281	1.774
	12.60		137.0	116.4	15,949		0.366	81,975	1.882
	12.90		139.4	118.8	16,563		0.380	86,852	1.994
	13.20		141.8	121.2	17,188		0.395	91,914	2.110
	13.50		144.2	123.6	17,825		0.409	97,166	2.231
	13.80		146.6	126.0	18,474		0.424	102,610	2.356
	14.10		149.0	128.4	19,134		0.439	108,251	2.485
	14.40		151.4	130.8	19,805		0.455	114,092	2.619
	14.70		153.8	133.2	20,488		0.470	120,135	2.758

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)



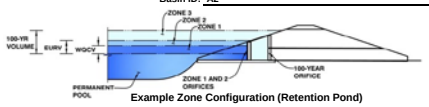


DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)

Project: Front Range - Midway Solar

Basin ID: A2



Example Zone Configuration (Retention Pond)

Required Volume Calculation

Selected BMP Type =	EDB		
Watershed Area =	77.33	acres	
Watershed Length =	2,282	ft	
Watershed Slope =	0.014	ft/ft	
Watershed Imperviousness =	6.80%	percent	
Percentage Hydrologic Soil Group A =	0.0%	percent	
Percentage Hydrologic Soil Group B =	0.0%	percent	
Percentage Hydrologic Soil Groups C/D =	100.0%	percent	
Desired WQCV Drain Time =	40.0	hours	
Location for 1-hr Rainfall Depths =	User Input		
Water Quality Capture Volume (WQCV) =	0.308	acre-feet	Optional User Override 1-hr Precipitation
Excess Urban Runoff Volume (EURV) =	0.424	acre-feet	
2-yr Runoff Volume (P1 = 1.19 in.) =	0.360	acre-feet	1.19 inches
5-yr Runoff Volume (P1 = 1.5 in.) =	0.995	acre-feet	1.50 inches
10-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet	inches
25-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet	inches
50-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet	inches
100-yr Runoff Volume (P1 = 2.52 in.) =	9.689	acre-feet	2.52 inches
500-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet	inches
Approximate 2-yr Detention Volume =	0.336	acre-feet	
Approximate 5-yr Detention Volume =	0.953	acre-feet	
Approximate 10-yr Detention Volume =	0.000	acre-feet	
Approximate 25-yr Detention Volume =	0.000	acre-feet	
Approximate 50-yr Detention Volume =	0.000	acre-feet	
Approximate 100-yr Detention Volume =	2.390	acre-feet	

Stage-Storage Calculation

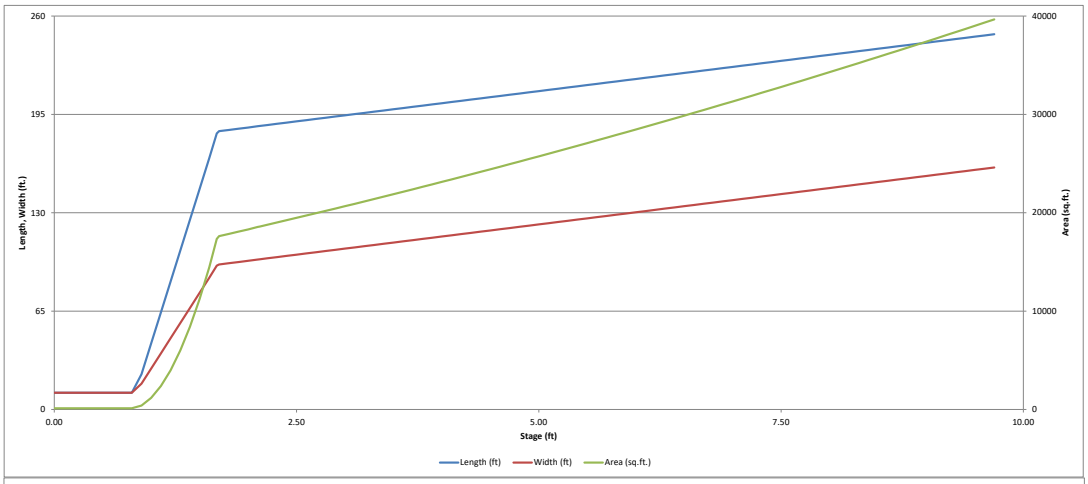
Zone 1 Volume (WQCV) =	0.308	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.116	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	1.966	acre-feet
Total Detention Basin Volume =	2.390	acre-feet
Initial Surcharge Volume (ISV) =	40	ft^3
Initial Surcharge Depth (ISD) =	0.33	ft
Total Available Detention Depth (H_{total}) =	6.00	ft
Depth of Trickle Channel (H_{TC}) =	0.50	ft
Slope of Trickle Channel (S_{TC}) =	0.005	ft/ft
Slopes of Main Basin Sides (S_{main}) =	4	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	2	
Initial Surcharge Area (A_{ISV}) =	122	ft^2
Surcharge Volume Length (L_{ISV}) =	11.0	ft
Surcharge Volume Width (W_{ISV}) =	11.0	ft
Depth of Basin Floor (H_{FLOOR}) =	0.85	ft
Length of Basin Floor (L_{FLOOR}) =	183.8	ft
Width of Basin Floor (W_{FLOOR}) =	95.7	ft
Area of Basin Floor (A_{FLOOR}) =	17,598	ft^2
Volume of Basin Floor (V_{FLOOR}) =	5,416	ft^3
Depth of Main Basin (H_{MAIN}) =	4.32	ft
Length of Main Basin (L_{MAIN}) =	218.4	ft
Width of Main Basin (W_{MAIN}) =	130.3	ft
Area of Main Basin (A_{MAIN}) =	28,462	ft^2
Volume of Main Basin (V_{MAIN}) =	98,625	ft^3
Calculated Total Basin Volume (V_{total}) =	**2.391**	acre-feet

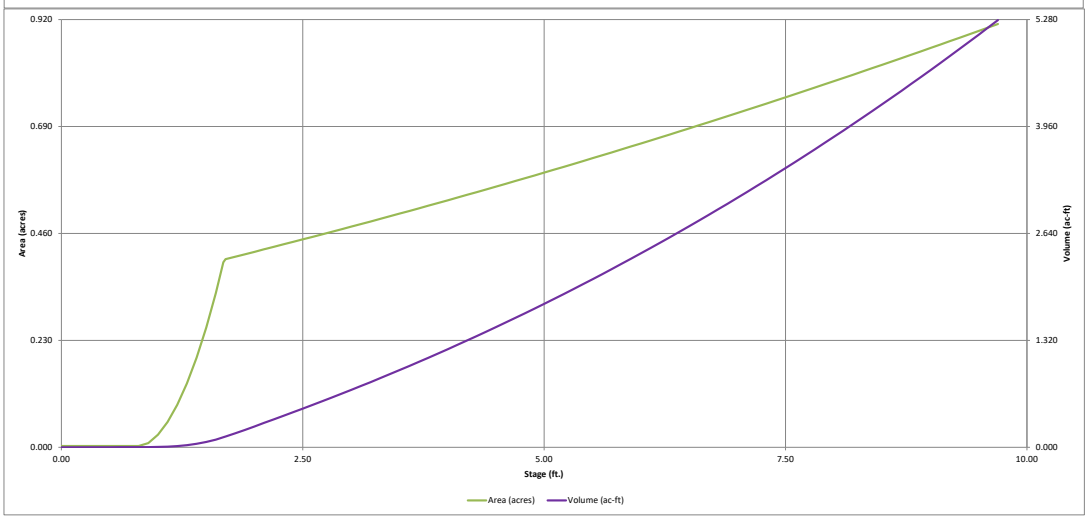
Depth Increment = 0.1 ft

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		11.0	11.0	122		0.003		
ISV	0.33		11.0	11.0	122		0.003	39	0.001
	0.40		11.0	11.0	122		0.003	48	0.001
	0.50		11.0	11.0	122		0.003	60	0.001
	0.60		11.0	11.0	122		0.003	72	0.002
	0.70		11.0	11.0	122		0.003	84	0.002
	0.80		11.0	11.0	122		0.003	96	0.002
	0.90		23.3	17.0	397		0.009	116	0.003
	1.00		43.7	27.0	1,182		0.027	192	0.004
	1.10		64.1	37.0	2,374		0.055	366	0.008
	1.20		84.5	47.0	3,975		0.091	680	0.016
	1.30		104.9	57.0	5,984		0.137	1,175	0.027
	1.40		125.3	67.0	8,400		0.193	1,890	0.043
	1.50		145.7	77.0	11,225		0.258	2,868	0.066
	1.60		166.1	87.0	14,457		0.332	4,149	0.095
Floor	1.68		182.4	95.0	17,337		0.398	5,419	0.124
	1.70		183.9	95.8	17,627		0.405	5,770	0.132
	1.80		184.7	96.6	17,852		0.410	7,544	0.173
	1.90		185.5	97.4	18,077		0.415	9,340	0.214
	2.00		186.3	98.2	18,304		0.420	11,159	0.256
	2.10		187.2	99.1	18,556		0.426	13,187	0.303
Zone 1 (WQCV)	2.12		187.4	99.3	18,601		0.427	13,558	0.311
	2.20		188.0	99.9	18,785		0.431	15,054	0.346
	2.30		188.8	100.7	19,016		0.437	16,944	0.389
Zone 2 (EURV)	2.39		189.5	101.4	19,225		0.441	18,665	0.428
	2.40		189.6	101.5	19,249		0.442	18,857	0.433
	2.50		190.4	102.3	19,482		0.447	20,793	0.477
	2.60		191.2	103.1	19,717		0.453	22,753	0.522
	2.70		192.0	103.9	19,953		0.458	24,737	0.568
	2.80		192.8	104.7	20,190		0.464	26,744	0.614
	2.90		193.6	105.5	20,429		0.469	28,775	0.661
	3.00		194.4	106.3	20,669		0.474	30,830	0.708
	3.10		195.2	107.1	20,910		0.480	32,909	0.755
	3.20		196.0	107.9	21,153		0.486	35,012	0.804
	3.30		196.8	108.7	21,396		0.491	37,139	0.853
	3.40		197.6	109.5	21,642		0.497	39,291	0.902
	3.50		198.4	110.3	21,888		0.502	41,468	0.952
	3.60		199.2	111.1	22,135		0.508	43,669	1.003
	3.70		200.0	111.9	22,384		0.514	45,895	1.054
	3.80		200.8	112.7	22,635		0.520	48,146	1.105
	3.90		201.6	113.5	22,886		0.525	50,422	1.158
	4.00		202.4	114.3	23,139		0.531	52,723	1.210
	4.10		203.2	115.1	23,393		0.537	55,050	1.264
	4.20		204.0	115.9	23,648		0.543	57,402	1.318
	4.30		204.8	116.7	23,905		0.549	59,779	1.372
	4.40		205.6	117.5	24,162		0.555	62,183	1.428
	4.50		206.4	118.3	24,422		0.561	64,612	1.483
	4.60		207.2	119.1	24,682		0.567	67,067	1.540
	4.70		208.0	119.9	24,944		0.573	69,548	1.597
	4.80		208.8	120.7	25,207		0.579	72,056	1.654
	4.90		209.6	121.5	25,471		0.585	74,590	1.712
	5.00		210.4	122.3	25,736		0.591	77,150	1.771
	5.10		211.2	123.1	26,003		0.597	79,737	1.831
	5.20		212.0	123.9	26,271		0.603	82,351	1.891
	5.30		212.8	124.7	26,541		0.609	84,991	1.951
	5.40		213.6	125.5	26,811		0.616	87,659	2.012
	5.50		214.4	126.3	27,083		0.622	90,354	2.074
	5.60		215.2	127.1	27,357		0.628	93,076	2.137
	5.70		216.0	127.9	27,631		0.634	95,825	2.200
	5.80		216.8	128.7	27,907		0.641	98,602	2.264
	5.90		217.6	129.5	28,184		0.647	101,406	2.328
Zone 3 (100-year)	6.00		218.4	130.3	28,462		0.653	104,239	2.393
	6.10		219.2	131.1	28,742		0.660	107,099	2.459
	6.20		220.0	131.9	29,023		0.666	109,987	2.525
	6.30		220.8	132.7	29,305		0.673	112,904	2.592
	6.40		221.6	133.5	29,588		0.679	115,848	2.660
	6.50		222.4	134.3	29,873		0.686	118,821	2.728
	6.60		223.2	135.1	30,159		0.692	121,823	2.797
	6.70		224.0	135.9	30,446		0.699	124,853	2.866
	6.80		224.8	136.7	30,735		0.706	127,912	2.936
	6.90		225.6	137.5	31,025		0.712	131,000	3.007
	7.00		226.4	138.3	31,316		0.719	134,117	3.079
	7.10		227.2	139.1	31,608		0.726	137,263	3.151
	7.20		228.0	139.9	31,902		0.732	140,439	3.224
	7.30		228.8	140.7	32,197		0.739	143,644	3.298
	7.40		229.6	141.5	32,493		0.746	146,878	3.372
	7.50		230.4	142.3	32,791		0.753	150,143	3.447
	7.60		231.2	143.1	33,090		0.760	153,437	3.522
	7.70		232.0	143.9	33,390		0.767	156,761	3.599
	7.80		232.8	144.7	33,691		0.773	160,115	3.676
	7.90		233.6	145.5	33,994		0.780	163,499	3.753
	8.00		234.4	146.3	34,298		0.787	166,913	3.832
	8.10		235.2	147.1	34,603		0.794	170,359	3.911
	8.20		236.0	147.9	34,910		0.801	173,834	3.991
	8.30		236.8	148.7	35,217		0.808	177,340	4.071
	8.40		237.6	149.5	35,526		0.816	180,878	4.152
	8.50		238.4	150.3	35,837		0.823	184,446	4.234
	8.60		239.2	151.1	36,148		0.830	188,045	4.317
	8.70		240.0	151.9	36,461		0.837	191,675	4.400
	8.80		240.8	152.7	36,775		0.844	195,337	4.484
	8.90		241.6	153.5	37,091		0.851	199,031	4.569
	9.00		242.4	154.3	37,408		0.859	202,756	4.655
	9.10		243.2	155.1	37,726		0.866	206,512	4.741
	9.20		244.0	155.9	38,045		0.873	210,301	4.828
	9.30		244.8	156.7	38,365		0.881	214,121	4.916
	9.40		245.6	157.5	38,687		0.888	217,974	5.004
	9.50		246.4	158.3	39,010		0.896	221,859	5.093
	9.60		247.2	159.1	39,335		0.903	225,776	5.183
	9.70		248.0	159.9	39,661		0.910	229,726	5.274

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)



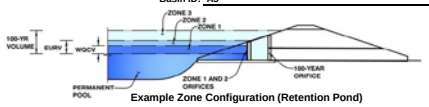


DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)

Project: Front Range - Midway Solar

Basin ID: A5



Example Zone Configuration (Retention Pond)

Required Volume Calculation

Selected BMP Type =	EDB		
Watershed Area =	199.14	acres	
Watershed Length =	4,884	ft	
Watershed Slope =	0.014	ft/ft	
Watershed Imperviousness =	3.10%	percent	
Percentage Hydrologic Soil Group A =	0.0%	percent	
Percentage Hydrologic Soil Group B =	0.0%	percent	
Percentage Hydrologic Soil Groups C/D =	100.0%	percent	
Desired WQCV Drain Time =	40.0	hours	
Location for 1-hr Rainfall Depths =	User Input		
Water Quality Capture Volume (WQCV) =	0.383	acre-feet	
Excess Urban Runoff Volume (EURV) =	0.468	acre-feet	
2-yr Runoff Volume (P1 = 1.19 in.) =	0.381	acre-feet	1.19 inches
5-yr Runoff Volume (P1 = 1.5 in.) =	1.655	acre-feet	1.50 inches
10-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet	inches
25-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet	inches
50-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet	inches
100-yr Runoff Volume (P1 = 2.52 in.) =	24.208	acre-feet	2.52 inches
500-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet	inches
Approximate 2-yr Detention Volume =	0.355	acre-feet	
Approximate 5-yr Detention Volume =	1.604	acre-feet	
Approximate 10-yr Detention Volume =	0.000	acre-feet	
Approximate 25-yr Detention Volume =	0.000	acre-feet	
Approximate 50-yr Detention Volume =	0.000	acre-feet	
Approximate 100-yr Detention Volume =	4.400	acre-feet	

Optional User Override 1-hr Precipitation

Stage-Storage Calculation

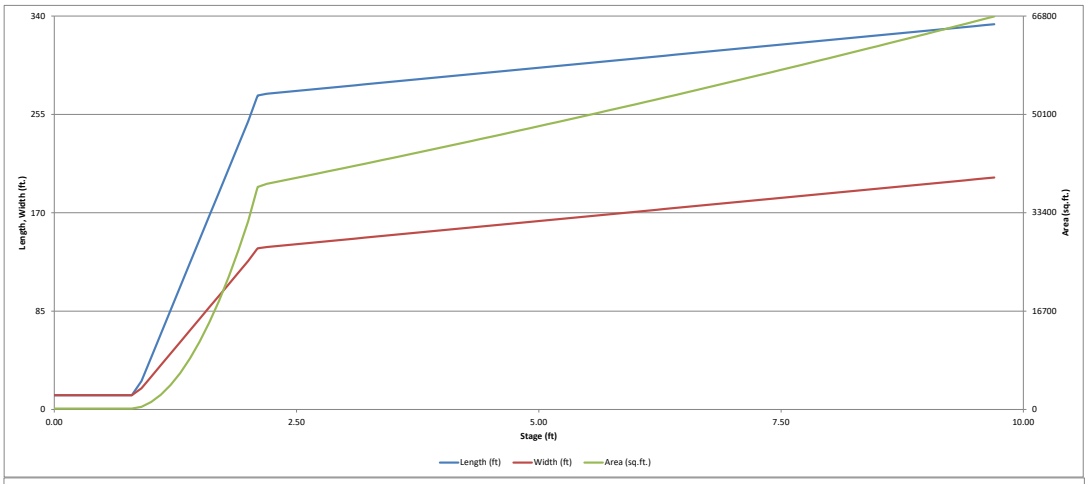
Zone 1 Volume (WQCV) =	0.383	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.085	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	3.933	acre-feet
Total Detention Basin Volume =	4.400	acre-feet
Initial Surcharge Volume (ISV) =	50	ft^3
Initial Surcharge Depth (ISD) =	0.33	ft
Total Available Detention Depth (H_{total}) =	6.00	ft
Depth of Trickle Channel (H_{TC}) =	0.50	ft
Slope of Trickle Channel (S_{TC}) =	0.005	ft/ft
Slopes of Main Basin Sides (S_{main}) =	4	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	2	
Initial Surcharge Area (A_{ISV}) =	152	ft^2
Surcharge Volume Length (L_{ISV}) =	12.3	ft
Surcharge Volume Width (W_{ISV}) =	12.3	ft
Depth of Basin Floor (H_{FLOOR}) =	1.27	ft
Length of Basin Floor (L_{FLOOR}) =	272.2	ft
Width of Basin Floor (W_{FLOOR}) =	139.7	ft
Area of Basin Floor (A_{FLOOR}) =	38,019	ft^2
Volume of Basin Floor (V_{FLOOR}) =	17,227	ft^3
Depth of Main Basin (H_{MAIN}) =	3.90	ft
Length of Main Basin (L_{MAIN}) =	303.3	ft
Width of Main Basin (W_{MAIN}) =	170.9	ft
Area of Main Basin (A_{MAIN}) =	51,828	ft^2
Volume of Main Basin (V_{MAIN}) =	174,339	ft^3
Calculated Total Basin Volume (V_{total}) =	**4.401**	acre-feet

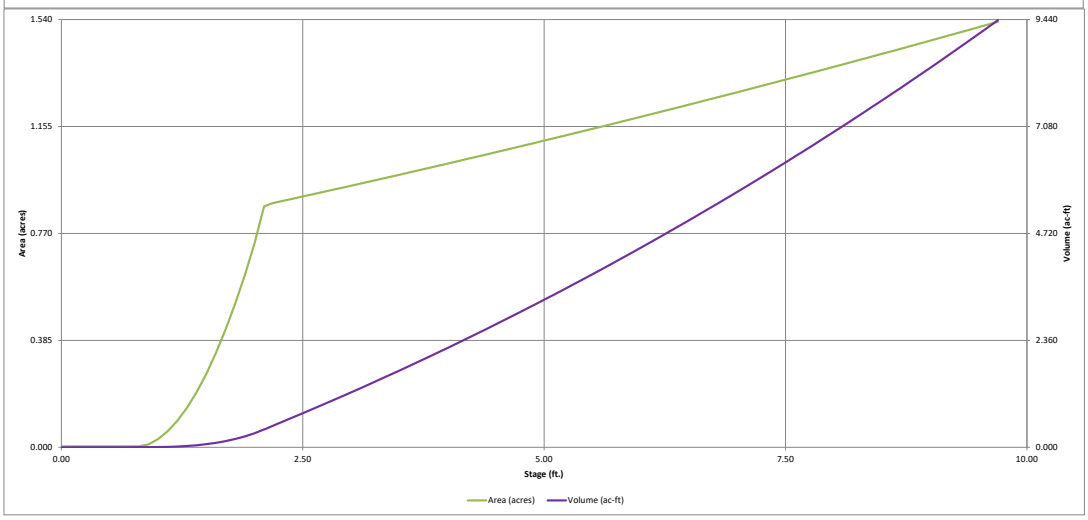
Depth Increment = 0.1 ft

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		12.3	12.3	152		0.003		
ISV	0.33		12.3	12.3	152		0.003	49	0.001
	0.40		12.3	12.3	152		0.003	59	0.001
	0.50		12.3	12.3	152		0.003	74	0.002
	0.60		12.3	12.3	152		0.003	89	0.002
	0.70		12.3	12.3	152		0.003	105	0.002
	0.80		12.3	12.3	152		0.003	120	0.003
	0.90		24.6	18.3	450		0.010	143	0.003
	1.00		45.0	28.3	1,273		0.029	226	0.005
	1.10		65.4	38.3	2,504		0.057	411	0.009
	1.20		85.8	48.3	4,143		0.095	740	0.017
	1.30		106.2	58.3	6,190		0.142	1,253	0.029
	1.40		126.6	68.3	8,645		0.198	1,992	0.046
	1.50		147.0	78.3	11,508		0.264	2,996	0.069
	1.60		167.4	88.3	14,779		0.339	4,307	0.099
	1.70		187.8	98.3	18,458		0.424	5,965	0.137
	1.80		208.2	108.3	22,545		0.518	8,012	0.184
	1.90		228.6	118.3	27,040		0.621	10,488	0.241
	2.00		249.0	128.3	31,943		0.733	13,434	0.308
Zone 1 (WQCV)	2.09		269.4	138.3	37,254		0.855	16,890	0.388
	2.10		271.4	139.3	37,808		0.868	17,266	0.396
Floor	2.10		271.4	139.3	37,808		0.868	17,266	0.396
Zone 2 (EURV)	2.19		272.9	140.4	38,304		0.879	20,698	0.475
	2.20		272.9	140.5	38,337		0.880	21,082	0.484
	2.30		273.7	141.3	38,668		0.888	24,932	0.572
	2.40		274.5	142.1	39,001		0.895	28,815	0.662
	2.50		275.3	142.9	39,335		0.903	32,732	0.751
	2.60		276.1	143.7	39,670		0.911	36,682	0.842
	2.70		276.9	144.5	40,006		0.918	40,666	0.934
	2.80		277.7	145.3	40,344		0.926	44,684	1.026
	2.90		278.5	146.1	40,683		0.934	48,735	1.119
	3.00		279.3	146.9	41,023		0.942	52,820	1.213
	3.10		280.1	147.7	41,365		0.950	56,940	1.307
	3.20		280.9	148.5	41,708		0.957	61,093	1.403
	3.30		281.7	149.3	42,052		0.965	65,281	1.499
	3.40		282.5	150.1	42,398		0.973	69,504	1.596
	3.50		283.3	150.9	42,744		0.981	73,761	1.693
	3.60		284.1	151.7	43,092		0.989	78,053	1.792
	3.70		284.9	152.5	43,442		0.997	82,379	1.891
	3.80		285.7	153.3	43,792		1.005	86,741	1.991
	3.90		286.5	154.1	44,144		1.013	91,138	2.092
	4.00		287.3	154.9	44,497		1.022	95,570	2.194
	4.10		288.1	155.7	44,851		1.030	100,037	2.297
	4.20		288.9	156.5	45,207		1.038	104,540	2.400
	4.30		289.7	157.3	45,564		1.046	109,079	2.504
	4.40		290.5	158.1	45,922		1.054	113,653	2.609
	4.50		291.3	158.9	46,282		1.062	118,263	2.715
	4.60		292.1	159.7	46,643		1.071	122,910	2.822
	4.70		292.9	160.5	47,005		1.079	127,592	2.929
	4.80		293.7	161.3	47,368		1.087	132,311	3.037
	4.90		294.5	162.1	47,733		1.096	137,066	3.147
	5.00		295.3	162.9	48,099		1.104	141,857	3.257
	5.10		296.1	163.7	48,466		1.113	146,685	3.367
	5.20		296.9	164.5	48,834		1.121	151,550	3.479
	5.30		297.7	165.3	49,204		1.130	156,452	3.592
	5.40		298.5	166.1	49,575		1.138	161,391	3.705
	5.50		299.3	166.9	49,947		1.147	166,367	3.819
	5.60		300.1	167.7	50,321		1.155	171,381	3.934
	5.70		300.9	168.5	50,696		1.164	176,432	4.050
	5.80		301.7	169.3	51,072		1.172	181,520	4.167
	5.90		302.5	170.1	51,449		1.181	186,646	4.285
Zone 3 (100-year)	6.00		303.3	170.9	51,828		1.190	191,810	4.403
	6.10		304.1	171.7	52,208		1.199	197,012	4.523
	6.20		304.9	172.5	52,589		1.207	202,252	4.643
	6.30		305.7	173.3	52,972		1.216	207,530	4.764
	6.40		306.5	174.1	53,356		1.225	212,846	4.886
	6.50		307.3	174.9	53,741		1.234	218,201	5.009
	6.60		308.1	175.7	54,127		1.243	223,594	5.133
	6.70		308.9	176.5	54,515		1.251	229,026	5.258
	6.80		309.7	177.3	54,904		1.260	234,497	5.383
	6.90		310.5	178.1	55,294		1.269	240,007	5.510
	7.00		311.3	178.9	55,686		1.278	245,556	5.637
	7.10		312.1	179.7	56,079		1.287	251,144	5.765
	7.20		312.9	180.5	56,473		1.296	256,772	5.895
	7.30		313.7	181.3	56,868		1.306	262,439	6.025
	7.40		314.5	182.1	57,265		1.315	268,146	6.156
	7.50		315.3	182.9	57,663		1.324	273,892	6.288
	7.60		316.1	183.7	58,062		1.333	279,678	6.421
	7.70		316.9	184.5	58,462		1.342	285,504	6.554
	7.80		317.7	185.3	58,864		1.351	291,371	6.689
	7.90		318.5	186.1	59,267		1.361	297,277	6.825
	8.00		319.3	186.9	59,671		1.370	303,224	6.961
	8.10		320.1	187.7	60,077		1.379	309,212	7.099
	8.20		320.9	188.5	60,484		1.389	315,240	7.237
	8.30		321.7	189.3	60,892		1.398	321,308	7.376
	8.40		322.5	190.1	61,301		1.407	327,418	7.516
	8.50		323.3	190.9	61,712		1.417	333,569	7.658
	8.60		324.1	191.7	62,124		1.426	339,760	7.800
	8.70		324.9	192.5	62,537		1.436	345,994	7.943
	8.80		325.7	193.3	62,952		1.445	352,268	8.087
	8.90		326.5	194.1	63,368		1.455	358,584	8.232
	9.00		327.3	194.9	63,785		1.464	364,942	8.378
	9.10		328.1	195.7	64,203		1.474	371,341	8.525
	9.20		328.9	196.5	64,623		1.484	377,782	8.673
	9.30		329.7	197.3	65,044		1.493	384,266	8.822
	9.40		330.5	198.1	65,466		1.503	390,791	8.971
	9.50		331.3	198.9	65,890		1.513	397,359	9.122
	9.60		332.1	199.7	66,315		1.522	403,969	9.274
	9.70		332.9	200.5	66,741		1.532	410,622	9.427

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)



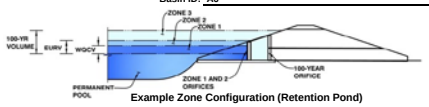


DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)

Project: Front Range - Midway Solar

Basin ID: A6



Example Zone Configuration (Retention Pond)

Required Volume Calculation

Selected BMP Type =	EDB		
Watershed Area =	47.98	acres	
Watershed Length =	1,777	ft	
Watershed Slope =	0.014	ft/ft	
Watershed Imperviousness =	3.50%	percent	
Percentage Hydrologic Soil Group A =	5.0%	percent	
Percentage Hydrologic Soil Group B =	0.0%	percent	
Percentage Hydrologic Soil Groups C/D =	95.0%	percent	
Desired WQCV Drain Time =	40.0	hours	
Location for 1-hr Rainfall Depths =	User Input		
Water Quality Capture Volume (WQCV) =	0.103	acre-feet	Optional User Override 1-hr Precipitation
Excess Urban Runoff Volume (EURV) =	0.127	acre-feet	
2-yr Runoff Volume (P1 = 1.19 in.) =	0.103	acre-feet	1.19 inches
5-yr Runoff Volume (P1 = 1.5 in.) =	0.405	acre-feet	1.50 inches
10-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet	inches
25-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet	inches
50-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet	inches
100-yr Runoff Volume (P1 = 2.52 in.) =	5.636	acre-feet	2.52 inches
500-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet	inches
Approximate 2-yr Detention Volume =	0.096	acre-feet	
Approximate 5-yr Detention Volume =	0.392	acre-feet	
Approximate 10-yr Detention Volume =	0.000	acre-feet	
Approximate 25-yr Detention Volume =	0.000	acre-feet	
Approximate 50-yr Detention Volume =	0.000	acre-feet	
Approximate 100-yr Detention Volume =	1.092	acre-feet	

Stage-Storage Calculation

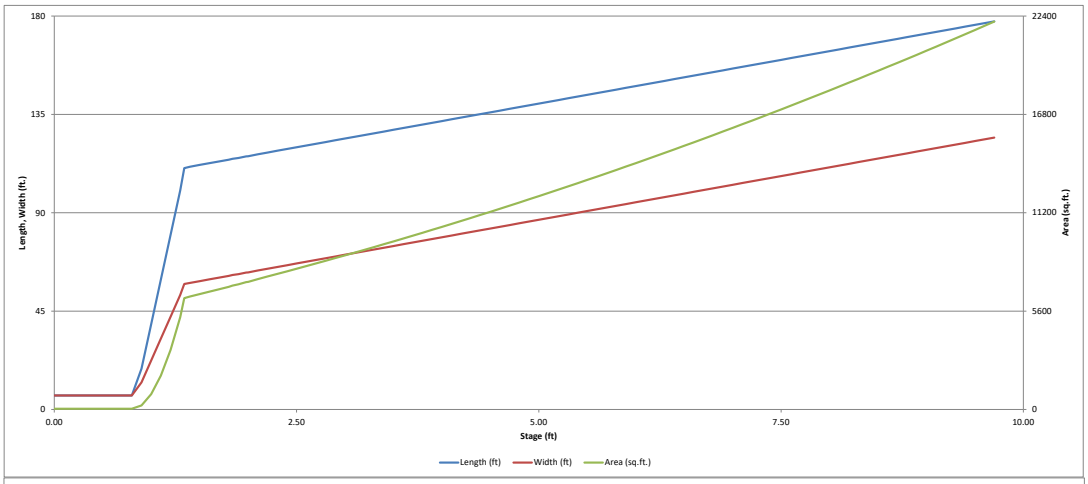
Zone 1 Volume (WQCV) =	0.103	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.023	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	0.965	acre-feet
Total Detention Basin Volume =	1.092	acre-feet
Initial Surcharge Volume (ISV) =	14	ft^3
Initial Surcharge Depth (ISD) =	0.33	ft
Total Available Detention Depth (H_{total}) =	6.00	ft
Depth of Trickle Channel (H_{TC}) =	0.50	ft
Slope of Trickle Channel (S_{TC}) =	0.005	ft/ft
Slopes of Main Basin Sides (S_{main}) =	4	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	2	
Initial Surcharge Area (A_{ISV}) =	41	ft^2
Surcharge Volume Length (L_{ISV}) =	6.4	ft
Surcharge Volume Width (W_{ISV}) =	6.4	ft
Depth of Basin Floor (H_{FLOOR}) =	0.51	ft
Length of Basin Floor (L_{FLOOR}) =	110.7	ft
Width of Basin Floor (W_{FLOOR}) =	57.5	ft
Area of Basin Floor (A_{FLOOR}) =	6,367	ft^2
Volume of Basin Floor (V_{FLOOR}) =	1,179	ft^3
Depth of Main Basin (H_{MAIN}) =	4.66	ft
Length of Main Basin (L_{MAIN}) =	148.0	ft
Width of Main Basin (W_{MAIN}) =	94.8	ft
Area of Main Basin (A_{MAIN}) =	14,025	ft^2
Volume of Main Basin (V_{MAIN}) =	46,342	ft^3
Calculated Total Basin Volume (V_{total}) =	**1.092**	acre-feet

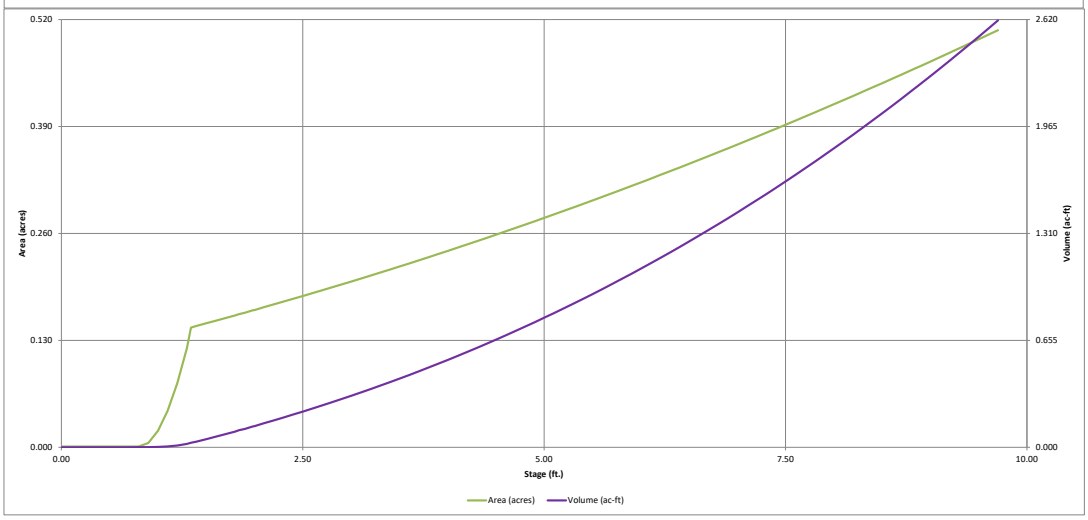
Depth Increment = 0.1 ft

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		6.4	6.4	41		0.001		
ISV	0.33		6.4	6.4	41		0.001	13	0.000
	0.40		6.4	6.4	41		0.001	16	0.000
	0.50		6.4	6.4	41		0.001	20	0.000
	0.60		6.4	6.4	41		0.001	24	0.001
	0.70		6.4	6.4	41		0.001	28	0.001
	0.80		6.4	6.4	41		0.001	32	0.001
	0.90		18.6	12.4	231		0.005	41	0.001
	1.00		39.0	22.4	875		0.020	93	0.002
	1.10		59.4	32.4	1,926		0.044	230	0.005
	1.20		79.8	42.4	3,385		0.078	492	0.011
	1.30		100.2	52.4	5,253		0.121	921	0.021
Floor	1.34		110.4	57.4	6,340		0.146	1,210	0.028
	1.40		111.1	57.9	6,433		0.148	1,530	0.035
	1.50		111.9	58.7	6,568		0.151	2,180	0.050
	1.60		112.7	59.5	6,706		0.154	2,844	0.065
	1.70		113.5	60.3	6,844		0.157	3,521	0.081
	1.80		114.3	61.1	6,984		0.160	4,212	0.097
Zone 1 (WQCV)	1.84		114.7	61.5	7,054		0.162	4,563	0.105
	1.90		115.1	61.9	7,125		0.164	4,918	0.113
Zone 2 (EURV)	1.98		115.8	62.6	7,253		0.166	5,565	0.128
	2.00		115.9	62.7	7,267		0.167	5,637	0.129
	2.10		116.8	63.6	7,425		0.170	6,445	0.148
	2.20		117.6	64.4	7,570		0.174	7,195	0.165
	2.30		118.4	65.2	7,716		0.177	7,959	0.183
	2.40		119.2	66.0	7,863		0.181	8,738	0.201
	2.50		120.0	66.8	8,012		0.184	9,532	0.219
	2.60		120.8	67.6	8,162		0.187	10,341	0.237
	2.70		121.6	68.4	8,313		0.191	11,165	0.256
	2.80		122.4	69.2	8,466		0.194	12,004	0.276
	2.90		123.2	70.0	8,620		0.198	12,858	0.295
	3.00		124.0	70.8	8,775		0.201	13,728	0.315
	3.10		124.8	71.6	8,932		0.205	14,613	0.335
	3.20		125.6	72.4	9,089		0.209	15,514	0.356
	3.30		126.4	73.2	9,248		0.212	16,431	0.377
	3.40		127.2	74.0	9,409		0.216	17,364	0.399
	3.50		128.0	74.8	9,570		0.220	18,313	0.420
	3.60		128.8	75.6	9,733		0.223	19,278	0.443
	3.70		129.6	76.4	9,897		0.227	20,259	0.465
	3.80		130.4	77.2	10,062		0.231	21,257	0.488
	3.90		131.2	78.0	10,229		0.235	22,272	0.511
	4.00		132.0	78.8	10,397		0.239	23,303	0.535
	4.10		132.8	79.6	10,566		0.243	24,351	0.559
	4.20		133.6	80.4	10,737		0.246	25,416	0.583
	4.30		134.4	81.2	10,909		0.250	26,499	0.608
	4.40		135.2	82.0	11,082		0.254	27,598	0.634
	4.50		136.0	82.8	11,256		0.258	28,715	0.659
	4.60		136.8	83.6	11,432		0.262	29,849	0.685
	4.70		137.6	84.4	11,609		0.266	31,001	0.712
	4.80		138.4	85.2	11,787		0.271	32,171	0.739
	4.90		139.2	86.0	11,966		0.275	33,359	0.766
	5.00		140.0	86.8	12,147		0.279	34,564	0.793
	5.10		140.8	87.6	12,329		0.283	35,788	0.822
	5.20		141.6	88.4	12,512		0.287	37,030	0.850
	5.30		142.4	89.2	12,697		0.291	38,291	0.879
	5.40		143.2	90.0	12,883		0.296	39,570	0.908
	5.50		144.0	90.8	13,070		0.300	40,867	0.938
	5.60		144.8	91.6	13,259		0.304	42,184	0.968
	5.70		145.6	92.4	13,448		0.309	43,519	0.999
	5.80		146.4	93.2	13,639		0.313	44,874	1.030
	5.90		147.2	94.0	13,832		0.318	46,247	1.062
Zone 3 (100-year)	6.00		148.0	94.8	14,025		0.322	47,640	1.094
	6.10		148.8	95.6	14,220		0.326	49,052	1.126
	6.20		149.6	96.4	14,416		0.331	50,484	1.159
	6.30		150.4	97.2	14,613		0.335	51,935	1.192
	6.40		151.2	98.0	14,812		0.340	53,407	1.226
	6.50		152.0	98.8	15,012		0.345	54,898	1.260
	6.60		152.8	99.6	15,213		0.349	56,409	1.295
	6.70		153.6	100.4	15,416		0.354	57,941	1.330
	6.80		154.4	101.2	15,620		0.359	59,492	1.366
	6.90		155.2	102.0	15,825		0.363	61,065	1.402
	7.00		156.0	102.8	16,031		0.368	62,657	1.438
	7.10		156.8	103.6	16,239		0.373	64,271	1.475
	7.20		157.6	104.4	16,448		0.378	65,905	1.513
	7.30		158.4	105.2	16,658		0.382	67,560	1.551
	7.40		159.2	106.0	16,869		0.387	69,237	1.589
	7.50		160.0	106.8	17,082		0.392	70,934	1.628
	7.60		160.8	107.6	17,296		0.397	72,653	1.668
	7.70		161.6	108.4	17,511		0.402	74,394	1.708
	7.80		162.4	109.2	17,728		0.407	76,156	1.748
	7.90		163.2	110.0	17,946		0.412	77,939	1.789
	8.00		164.0	110.8	18,165		0.417	79,745	1.831
	8.10		164.8	111.6	18,386		0.422	81,572	1.873
	8.20		165.6	112.4	18,607		0.427	83,422	1.915
	8.30		166.4	113.2	18,830		0.432	85,294	1.958
	8.40		167.2	114.0	19,055		0.437	87,188	2.002
	8.50		168.0	114.8	19,280		0.443	89,105	2.046
	8.60		168.8	115.6	19,507		0.448	91,044	2.090
	8.70		169.6	116.4	19,735		0.453	93,006	2.135
	8.80		170.4	117.2	19,964		0.458	94,991	2.181
	8.90		171.2	118.0	20,195		0.464	96,999	2.227
	9.00		172.0	118.8	20,427		0.469	99,030	2.273
	9.10		172.8	119.6	20,660		0.474	101,084	2.321
	9.20		173.6	120.4	20,895		0.480	103,162	2.368
	9.30		174.4	121.2	21,131		0.485	105,263	2.417
	9.40		175.2	122.0	21,368		0.491	107,388	2.465
	9.50		176.0	122.8	21,606		0.496	109,537	2.515
	9.60		176.8	123.6	21,846		0.502	111,710	2.565
	9.70		177.6	124.4	22,087		0.507	113,906	2.615

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)



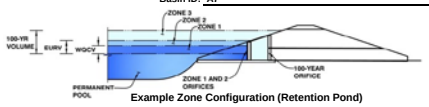


DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)

Project: Front Range - Midway Solar

Basin ID: A7



Example Zone Configuration (Retention Pond)

Required Volume Calculation

Selected BMP Type =	EDB		
Watershed Area =	59.68	acres	
Watershed Length =	2,133	ft	
Watershed Slope =	0.013	ft/ft	
Watershed Imperviousness =	4.20%	percent	
Percentage Hydrologic Soil Group A =	0.0%	percent	
Percentage Hydrologic Soil Group B =	0.0%	percent	
Percentage Hydrologic Soil Groups C/D =	100.0%	percent	
Desired WQCV Drain Time =	40.0	hours	
Location for 1-hr Rainfall Depths =	User Input		
Water Quality Capture Volume (WQCV) =	0.153	acre-feet	Optional User Override 1-hr Precipitation
Excess Urban Runoff Volume (EURV) =	0.195	acre-feet	
2-yr Runoff Volume (P1 = 1.19 in.) =	0.161	acre-feet	1.19 inches
5-yr Runoff Volume (P1 = 1.5 in.) =	0.577	acre-feet	1.50 inches
10-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet	inches
25-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet	inches
50-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet	inches
100-yr Runoff Volume (P1 = 2.52 in.) =	7.321	acre-feet	2.52 inches
500-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet	inches
Approximate 2-yr Detention Volume =	0.150	acre-feet	
Approximate 5-yr Detention Volume =	0.556	acre-feet	
Approximate 10-yr Detention Volume =	0.000	acre-feet	
Approximate 25-yr Detention Volume =	0.000	acre-feet	
Approximate 50-yr Detention Volume =	0.000	acre-feet	
Approximate 100-yr Detention Volume =	1.498	acre-feet	

Stage-Storage Calculation

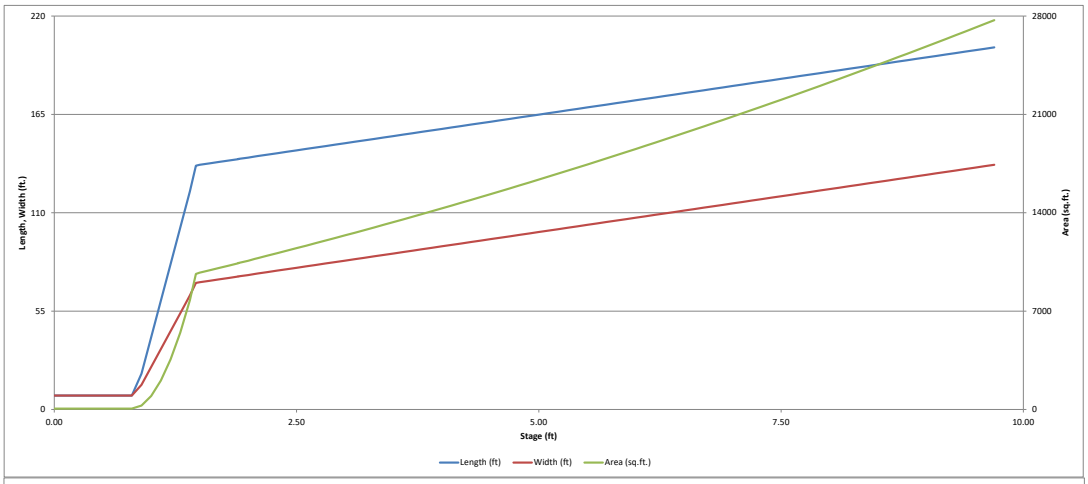
Zone 1 Volume (WQCV) =	0.153	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.042	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	1.303	acre-feet
Total Detention Basin Volume =	1.498	acre-feet
Initial Surcharge Volume (ISV) =	20	ft^3
Initial Surcharge Depth (ISD) =	0.33	ft
Total Available Detention Depth (H_{total}) =	6.00	ft
Depth of Trickle Channel (H_{TC}) =	0.50	ft
Slope of Trickle Channel (S_{TC}) =	0.005	ft/ft
Slopes of Main Basin Sides (S_{main}) =	4	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	2	
Initial Surcharge Area (A_{ISV}) =	61	ft^2
Surcharge Volume Length (L_{ISV}) =	7.8	ft
Surcharge Volume Width (W_{ISV}) =	7.8	ft
Depth of Basin Floor (H_{FLOOR}) =	0.63	ft
Length of Basin Floor (L_{FLOOR}) =	136.6	ft
Width of Basin Floor (W_{FLOOR}) =	70.9	ft
Area of Basin Floor (A_{FLOOR}) =	9,687	ft^2
Volume of Basin Floor (V_{FLOOR}) =	2,213	ft^3
Depth of Main Basin (H_{MAIN}) =	4.54	ft
Length of Main Basin (L_{MAIN}) =	172.9	ft
Width of Main Basin (W_{MAIN}) =	107.2	ft
Area of Main Basin (A_{MAIN}) =	18,539	ft^2
Volume of Main Basin (V_{MAIN}) =	62,975	ft^3
Calculated Total Basin Volume (V_{total}) =	**1.498**	acre-feet

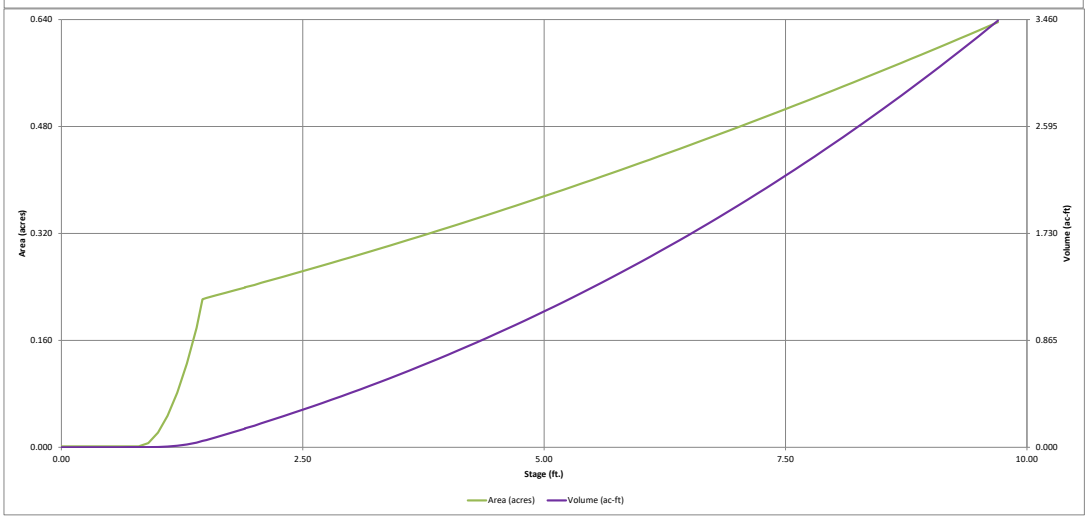
Depth Increment = 0.1 ft

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		7.8	7.8	61		0.001		
ISV	0.33		7.8	7.8	61		0.001	19	0.000
	0.40		7.8	7.8	61		0.001	24	0.001
	0.50		7.8	7.8	61		0.001	30	0.001
	0.60		7.8	7.8	61		0.001	36	0.001
	0.70		7.8	7.8	61		0.001	42	0.001
	0.80		7.8	7.8	61		0.001	48	0.001
	0.90		20.0	13.8	276		0.006	60	0.001
	1.00		40.4	23.8	961		0.022	118	0.003
	1.10		60.8	33.8	2,054		0.047	265	0.006
	1.20		81.2	43.8	3,556		0.082	543	0.012
	1.30		101.6	53.8	5,465		0.125	990	0.023
	1.40		122.0	63.8	7,782		0.179	1,649	0.038
Floor	1.46		136.3	70.8	9,647		0.221	2,258	0.052
	1.50		136.8	71.1	9,734		0.223	2,549	0.059
	1.60		137.6	71.9	9,901		0.227	3,531	0.081
	1.70		138.4	72.7	10,069		0.231	4,529	0.104
	1.80		139.2	73.5	10,239		0.235	5,545	0.127
	1.90		140.0	74.3	10,410		0.239	6,577	0.151
Zone 1 (WQCV)	1.90		140.1	74.4	10,427		0.239	6,681	0.153
	2.00		140.8	75.1	10,582		0.243	7,627	0.175
Zone 2 (EURV)	2.07		141.5	75.8	10,721		0.246	8,479	0.195
	2.10		141.7	76.0	10,773		0.247	8,801	0.202
	2.20		142.5	76.8	10,948		0.251	9,887	0.227
	2.30		143.3	77.6	11,124		0.255	10,991	0.252
	2.40		144.1	78.4	11,301		0.259	12,112	0.278
	2.50		144.9	79.2	11,480		0.264	13,251	0.304
	2.60		145.7	80.0	11,660		0.268	14,408	0.331
	2.70		146.5	80.8	11,841		0.272	15,583	0.358
	2.80		147.3	81.6	12,023		0.276	16,776	0.385
	2.90		148.1	82.4	12,207		0.280	17,988	0.413
	3.00		148.9	83.2	12,392		0.284	19,218	0.441
	3.10		149.7	84.0	12,578		0.289	20,466	0.470
	3.20		150.5	84.8	12,766		0.293	21,733	0.499
	3.30		151.3	85.6	12,955		0.297	23,019	0.528
	3.40		152.1	86.4	13,145		0.302	24,324	0.558
	3.50		152.9	87.2	13,337		0.306	25,648	0.589
	3.60		153.7	88.0	13,529		0.311	26,992	0.620
	3.70		154.5	88.8	13,723		0.315	28,354	0.651
	3.80		155.3	89.6	13,919		0.320	29,736	0.683
	3.90		156.1	90.4	14,115		0.324	31,138	0.715
	4.00		156.9	91.2	14,313		0.329	32,560	0.747
	4.10		157.7	92.0	14,512		0.333	34,001	0.781
	4.20		158.5	92.8	14,713		0.338	35,462	0.814
	4.30		159.3	93.6	14,914		0.342	36,943	0.848
	4.40		160.1	94.4	15,117		0.347	38,445	0.883
	4.50		160.9	95.2	15,322		0.352	39,967	0.918
	4.60		161.7	96.0	15,527		0.356	41,509	0.953
	4.70		162.5	96.8	15,734		0.361	43,072	0.989
	4.80		163.3	97.6	15,942		0.366	44,656	1.025
	4.90		164.1	98.4	16,151		0.371	46,261	1.062
	5.00		164.9	99.2	16,362		0.376	47,887	1.099
	5.10		165.7	100.0	16,574		0.380	49,533	1.137
	5.20		166.5	100.8	16,787		0.385	51,201	1.175
	5.30		167.3	101.6	17,002		0.390	52,891	1.214
	5.40		168.1	102.4	17,218		0.395	54,602	1.253
	5.50		168.9	103.2	17,435		0.400	56,334	1.293
	5.60		169.7	104.0	17,653		0.405	58,089	1.334
	5.70		170.5	104.8	17,873		0.410	59,865	1.374
	5.80		171.3	105.6	18,093		0.415	61,663	1.416
	5.90		172.1	106.4	18,316		0.420	63,484	1.457
Zone 3 (100-year)	6.00		172.9	107.2	18,539		0.426	65,326	1.500
	6.10		173.7	108.0	18,764		0.431	67,192	1.543
	6.20		174.5	108.8	18,990		0.436	69,079	1.586
	6.30		175.3	109.6	19,217		0.441	70,990	1.630
	6.40		176.1	110.4	19,446		0.446	72,923	1.674
	6.50		176.9	111.2	19,676		0.452	74,879	1.719
	6.60		177.7	112.0	19,907		0.457	76,858	1.764
	6.70		178.5	112.8	20,139		0.462	78,860	1.810
	6.80		179.3	113.6	20,373		0.468	80,886	1.857
	6.90		180.1	114.4	20,608		0.473	82,935	1.904
	7.00		180.9	115.2	20,844		0.479	85,007	1.951
	7.10		181.7	116.0	21,082		0.484	87,104	2.000
	7.20		182.5	116.8	21,320		0.489	89,224	2.048
	7.30		183.3	117.6	21,560		0.495	91,368	2.098
	7.40		184.1	118.4	21,802		0.501	93,536	2.147
	7.50		184.9	119.2	22,045		0.506	95,728	2.198
	7.60		185.7	120.0	22,288		0.512	97,945	2.249
	7.70		186.5	120.8	22,534		0.517	100,186	2.300
	7.80		187.3	121.6	22,780		0.523	102,452	2.352
	7.90		188.1	122.4	23,028		0.529	104,742	2.405
	8.00		188.9	123.2	23,277		0.534	107,057	2.458
	8.10		189.7	124.0	23,527		0.540	109,397	2.511
	8.20		190.5	124.8	23,779		0.546	111,763	2.566
	8.30		191.3	125.6	24,032		0.552	114,153	2.621
	8.40		192.1	126.4	24,286		0.558	116,569	2.676
	8.50		192.9	127.2	24,541		0.563	119,010	2.732
	8.60		193.7	128.0	24,798		0.569	121,477	2.789
	8.70		194.5	128.8	25,056		0.575	123,970	2.846
	8.80		195.3	129.6	25,316		0.581	126,489	2.904
	8.90		196.1	130.4	25,576		0.587	129,033	2.962
	9.00		196.9	131.2	25,838		0.593	131,604	3.021
	9.10		197.7	132.0	26,101		0.599	134,201	3.081
	9.20		198.5	132.8	26,366		0.605	136,824	3.141
	9.30		199.3	133.6	26,631		0.611	139,474	3.202
	9.40		200.1	134.4	26,898		0.617	142,151	3.263
	9.50		200.9	135.2	27,166		0.624	144,854	3.325
	9.60		201.7	136.0	27,436		0.630	147,584	3.388
	9.70		202.5	136.8	27,707		0.636	150,341	3.451

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)



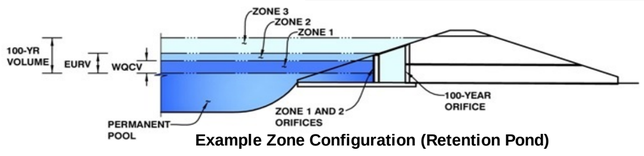


DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)

Project: Front Range - Midway Solar

Basin ID: A8



Example Zone Configuration (Retention Pond)

Required Volume Calculation

Selected BMP Type =	EDB	
Watershed Area =	87.81	acres
Watershed Length =	2,421	ft
Watershed Slope =	0.024	ft/ft
Watershed Imperviousness =	3.90%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	0.0%	percent
Percentage Hydrologic Soil Groups C/D =	100.0%	percent
Desired WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	User Input	
Water Quality Capture Volume (WQCV) =	0.210	acre-feet
Excess Urban Runoff Volume (EURV) =	0.264	acre-feet
2-yr Runoff Volume (P1 = 1.19 in.) =	0.218	acre-feet
5-yr Runoff Volume (P1 = 1.5 in.) =	0.816	acre-feet
10-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet
25-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet
50-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet
100-yr Runoff Volume (P1 = 2.52 in.) =	10.745	acre-feet
500-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet
Approximate 2-yr Detention Volume =	0.203	acre-feet
Approximate 5-yr Detention Volume =	0.788	acre-feet
Approximate 10-yr Detention Volume =	0.000	acre-feet
Approximate 25-yr Detention Volume =	0.000	acre-feet
Approximate 50-yr Detention Volume =	0.000	acre-feet
Approximate 100-yr Detention Volume =	2.136	acre-feet

Optional User Override 1-hr Precipitation

1.19	inches
1.50	inches
	inches
	inches
	inches
2.52	inches
	inches

Stage-Storage Calculation

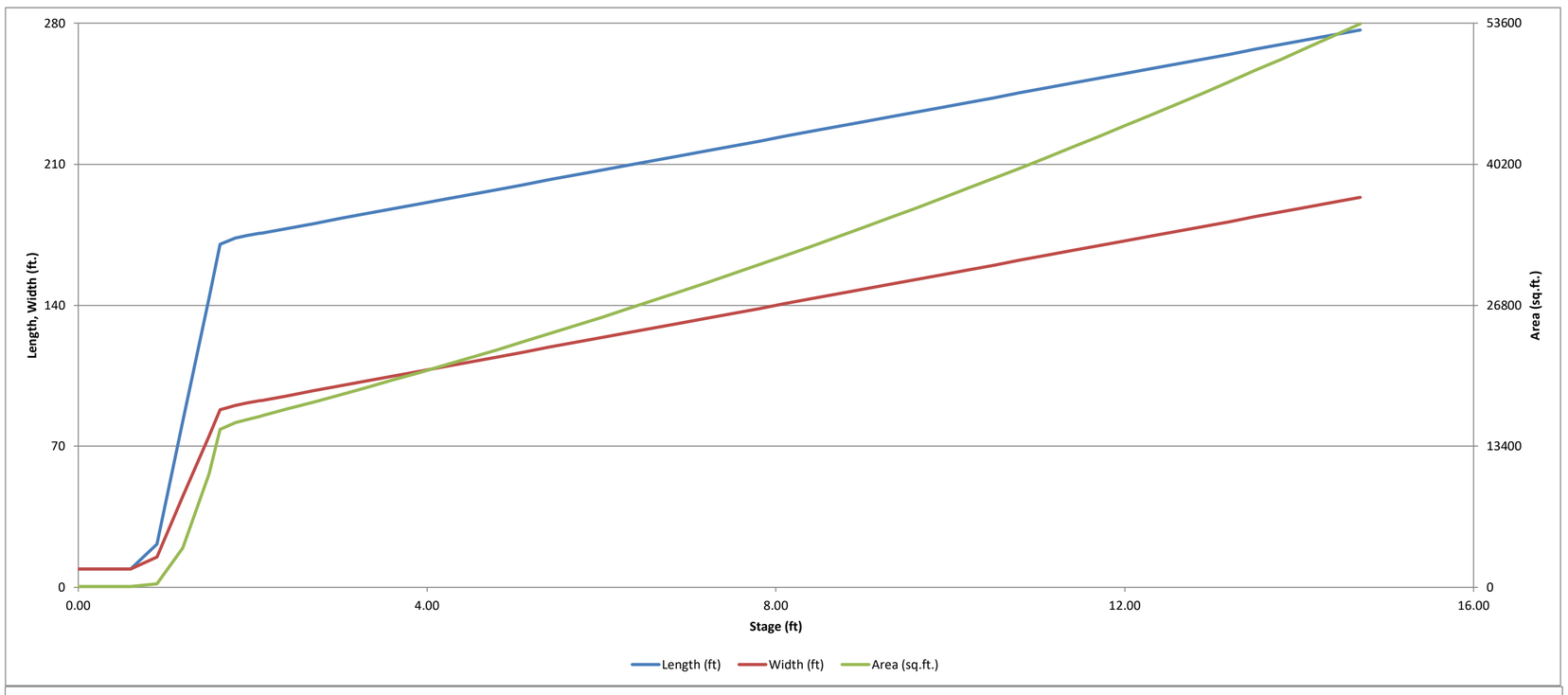
Zone 1 Volume (WQCV) =	0.210	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.054	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	1.871	acre-feet
Total Detention Basin Volume =	2.136	acre-feet
Initial Surcharge Volume (ISV) =	27	ft^3
Initial Surcharge Depth (ISD) =	0.33	ft
Total Available Detention Depth (H_{total}) =	6.00	ft
Depth of Trickle Channel (H_{TC}) =	0.50	ft
Slope of Trickle Channel (S_{TC}) =	0.005	ft/ft
Slopes of Main Basin Sides (S_{main}) =	4	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	2	
Initial Surcharge Area (A_{ISV}) =	83	ft^2
Surcharge Volume Length (L_{ISV}) =	9.1	ft
Surcharge Volume Width (W_{ISV}) =	9.1	ft
Depth of Basin Floor (H_{FLOOR}) =	0.80	ft
Length of Basin Floor (L_{FLOOR}) =	172.0	ft
Width of Basin Floor (W_{FLOOR}) =	89.0	ft
Area of Basin Floor (A_{FLOOR}) =	15,306	ft^2
Volume of Basin Floor (V_{FLOOR}) =	4,397	ft^3
Depth of Main Basin (H_{MAIN}) =	4.37	ft
Length of Main Basin (L_{MAIN}) =	207.0	ft
Width of Main Basin (W_{MAIN}) =	123.9	ft
Area of Main Basin (A_{MAIN}) =	25,657	ft^2
Volume of Main Basin (V_{MAIN}) =	88,563	ft^3
Calculated Total Basin Volume (V_{total}) =	**2.136**	acre-feet

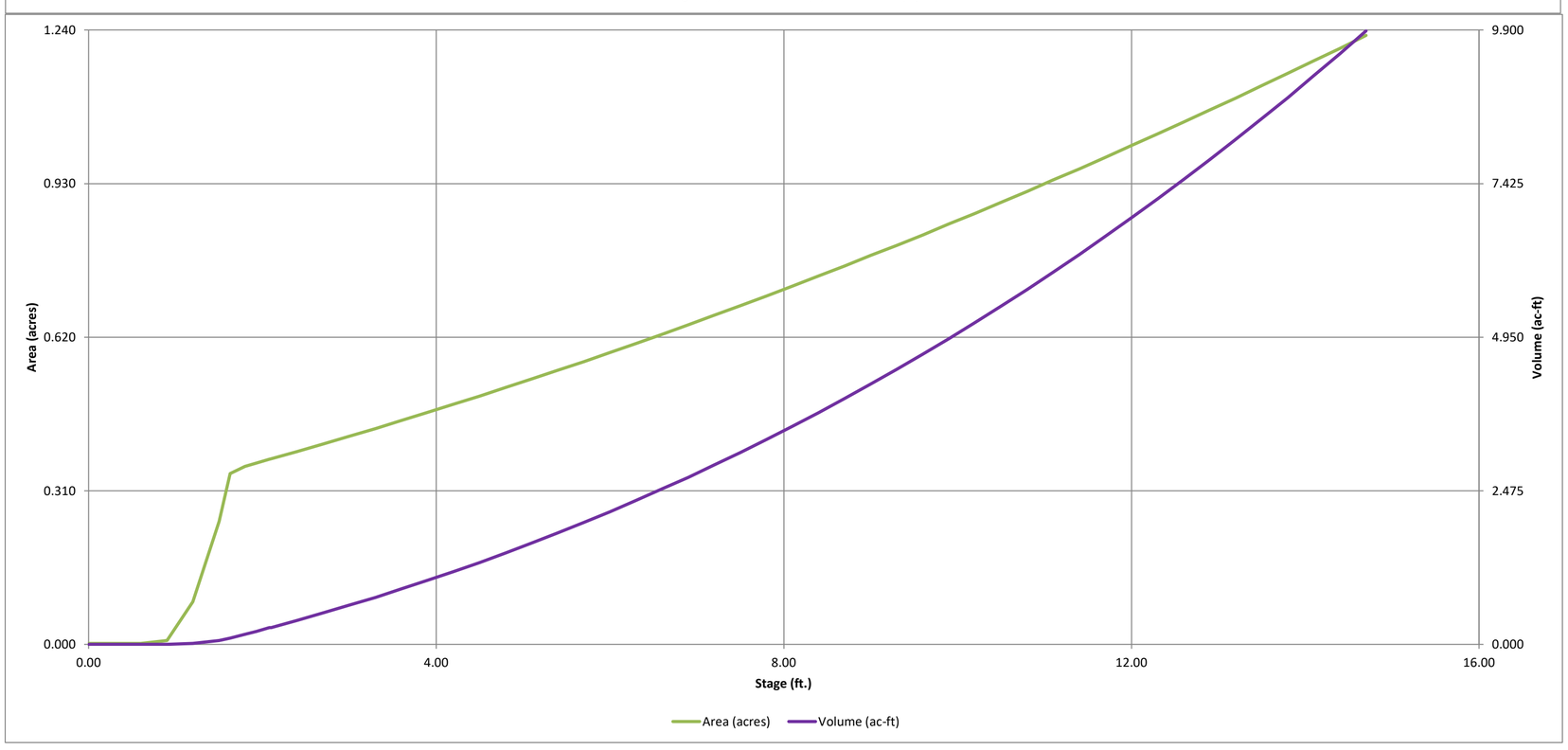
Depth Increment = 0.3 ft

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		9.1	9.1	83		0.002		
ISV	0.33		9.1	9.1	83		0.002	27	0.001
	0.60		9.1	9.1	83		0.002	49	0.001
	0.90		21.4	15.1	323		0.007	80	0.002
	1.20		82.6	45.1	3,724		0.085	596	0.014
	1.50		143.8	75.1	10,798		0.248	2,682	0.062
Floor	1.63		170.3	88.1	15,003		0.344	4,352	0.100
	1.80		173.3	90.3	15,645		0.359	6,980	0.160
Zone 1 (WQCV)	1.93		174.4	91.4	15,941		0.366	9,191	0.211
Zone 2 (EURV)	2.08		175.6	92.6	16,262		0.373	11,606	0.266
	2.10		175.8	92.7	16,305		0.374	11,931	0.274
	2.40		178.2	95.1	16,955		0.389	16,920	0.388
	2.70		180.6	97.5	17,617		0.404	22,105	0.507
	3.00		183.0	99.9	18,290		0.420	27,491	0.631
	3.30		185.4	102.3	18,975		0.436	33,080	0.759
	3.60		187.8	104.7	19,671		0.452	38,877	0.892
	3.90		190.2	107.1	20,379		0.468	44,884	1.030
	4.20		192.6	109.5	21,098		0.484	51,106	1.173
	4.50		195.0	111.9	21,829		0.501	57,544	1.321
	4.80		197.4	114.3	22,572		0.518	64,204	1.474
	5.10		199.8	116.7	23,326		0.535	71,088	1.632
	5.40		202.2	119.1	24,091		0.553	78,201	1.795
	5.70		204.6	121.5	24,868		0.571	85,544	1.964
Zone 3 (100-year)	6.00		207.0	123.9	25,657		0.589	93,123	2.138
	6.30		209.4	126.3	26,457		0.607	100,939	2.317
	6.60		211.8	128.7	27,268		0.626	108,998	2.502
	6.90		214.2	131.1	28,091		0.645	117,301	2.693
	7.20		216.6	133.5	28,926		0.664	125,854	2.889
	7.50		219.0	135.9	29,772		0.683	134,658	3.091
	7.80		221.4	138.3	30,629		0.703	143,718	3.299
	8.10		223.8	140.7	31,499		0.723	153,037	3.513
	8.40		226.2	143.1	32,379		0.743	162,618	3.733
	8.70		228.6	145.5	33,271		0.764	172,466	3.959
	9.00		231.0	147.9	34,175		0.785	182,582	4.192
	9.30		233.4	150.3	35,090		0.806	192,972	4.430
	9.60		235.8	152.7	36,017		0.827	203,638	4.675
	9.90		238.2	155.1	36,955		0.848	214,583	4.926
	10.20		240.6	157.5	37,905		0.870	225,812	5.184
	10.50		243.0	159.9	38,867		0.892	237,328	5.448
	10.80		245.4	162.3	39,839		0.915	249,133	5.719
	11.10		247.8	164.7	40,824		0.937	261,232	5.997
	11.40		250.2	167.1	41,820		0.960	273,628	6.282
	11.70		252.6	169.5	42,827		0.983	286,325	6.573
	12.00		255.0	171.9	43,846		1.007	299,326	6.872
	12.30		257.4	174.3	44,876		1.030	312,634	7.177
	12.60		259.8	176.7	45,918		1.054	326,253	7.490
	12.90		262.2	179.1	46,972		1.078	340,186	7.810
	13.20		264.6	181.5	48,037		1.103	354,437	8.137
	13.50		267.0	183.9	49,113		1.127	369,009	8.471
	13.80		269.4	186.3	50,201		1.152	383,906	8.813
	14.10		271.8	188.7	51,301		1.178	399,131	9.163
	14.40		274.2	191.1	52,412		1.203	414,688	9.520
	14.70		276.6	193.5	53,534		1.229	430,579	9.885

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)



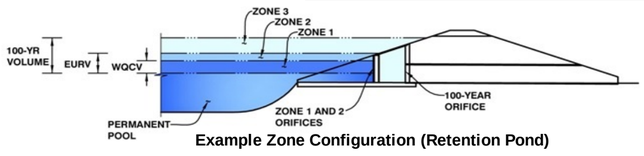


DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)

Project: Front Range - Midway Solar

Basin ID: A9



Example Zone Configuration (Retention Pond)

Required Volume Calculation

Selected BMP Type =	EDB	
Watershed Area =	32.86	acres
Watershed Length =	1,854	ft
Watershed Slope =	0.038	ft/ft
Watershed Imperviousness =	5.20%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	0.0%	percent
Percentage Hydrologic Soil Groups C/D =	100.0%	percent
Desired WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	User Input	
Water Quality Capture Volume (WQCV) =	0.103	acre-feet
Excess Urban Runoff Volume (EURV) =	0.135	acre-feet
2-yr Runoff Volume (P1 = 1.19 in.) =	0.113	acre-feet
5-yr Runoff Volume (P1 = 1.5 in.) =	0.358	acre-feet
10-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet
25-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet
50-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet
100-yr Runoff Volume (P1 = 2.52 in.) =	4.064	acre-feet
500-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet
Approximate 2-yr Detention Volume =	0.105	acre-feet
Approximate 5-yr Detention Volume =	0.344	acre-feet
Approximate 10-yr Detention Volume =	0.000	acre-feet
Approximate 25-yr Detention Volume =	0.000	acre-feet
Approximate 50-yr Detention Volume =	0.000	acre-feet
Approximate 100-yr Detention Volume =	0.903	acre-feet

Optional User Override 1-hr Precipitation

1.19	inches
1.50	inches
	inches
	inches
	inches
2.52	inches
	inches

Stage-Storage Calculation

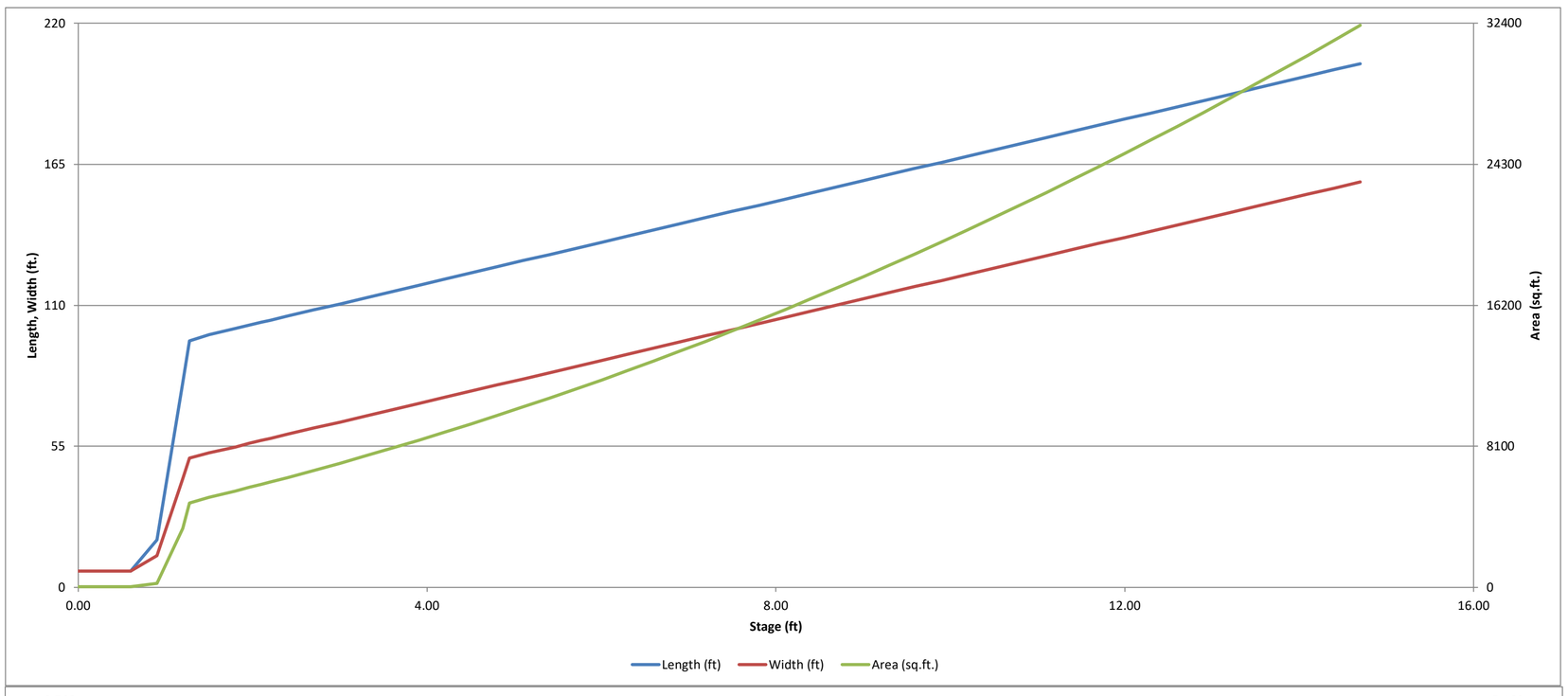
Zone 1 Volume (WQCV) =	0.103	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.032	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	0.768	acre-feet
Total Detention Basin Volume =	0.903	acre-feet
Initial Surcharge Volume (ISV) =	13	ft^3
Initial Surcharge Depth (ISD) =	0.33	ft
Total Available Detention Depth (H_{total}) =	6.00	ft
Depth of Trickle Channel (H_{TC}) =	0.50	ft
Slope of Trickle Channel (S_{TC}) =	0.005	ft/ft
Slopes of Main Basin Sides (S_{main}) =	4	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	2	
Initial Surcharge Area (A_{ISV}) =	41	ft^2
Surcharge Volume Length (L_{ISV}) =	6.4	ft
Surcharge Volume Width (W_{ISV}) =	6.4	ft
Depth of Basin Floor (H_{FLOOR}) =	0.44	ft
Length of Basin Floor (L_{FLOOR}) =	96.7	ft
Width of Basin Floor (W_{FLOOR}) =	50.7	ft
Area of Basin Floor (A_{FLOOR}) =	4,903	ft^2
Volume of Basin Floor (V_{FLOOR}) =	796	ft^3
Depth of Main Basin (H_{MAIN}) =	4.73	ft
Length of Main Basin (L_{MAIN}) =	134.6	ft
Width of Main Basin (W_{MAIN}) =	88.5	ft
Area of Main Basin (A_{MAIN}) =	11,907	ft^2
Volume of Main Basin (V_{MAIN}) =	38,526	ft^3
Calculated Total Basin Volume (V_{total}) =	**0.903**	acre-feet

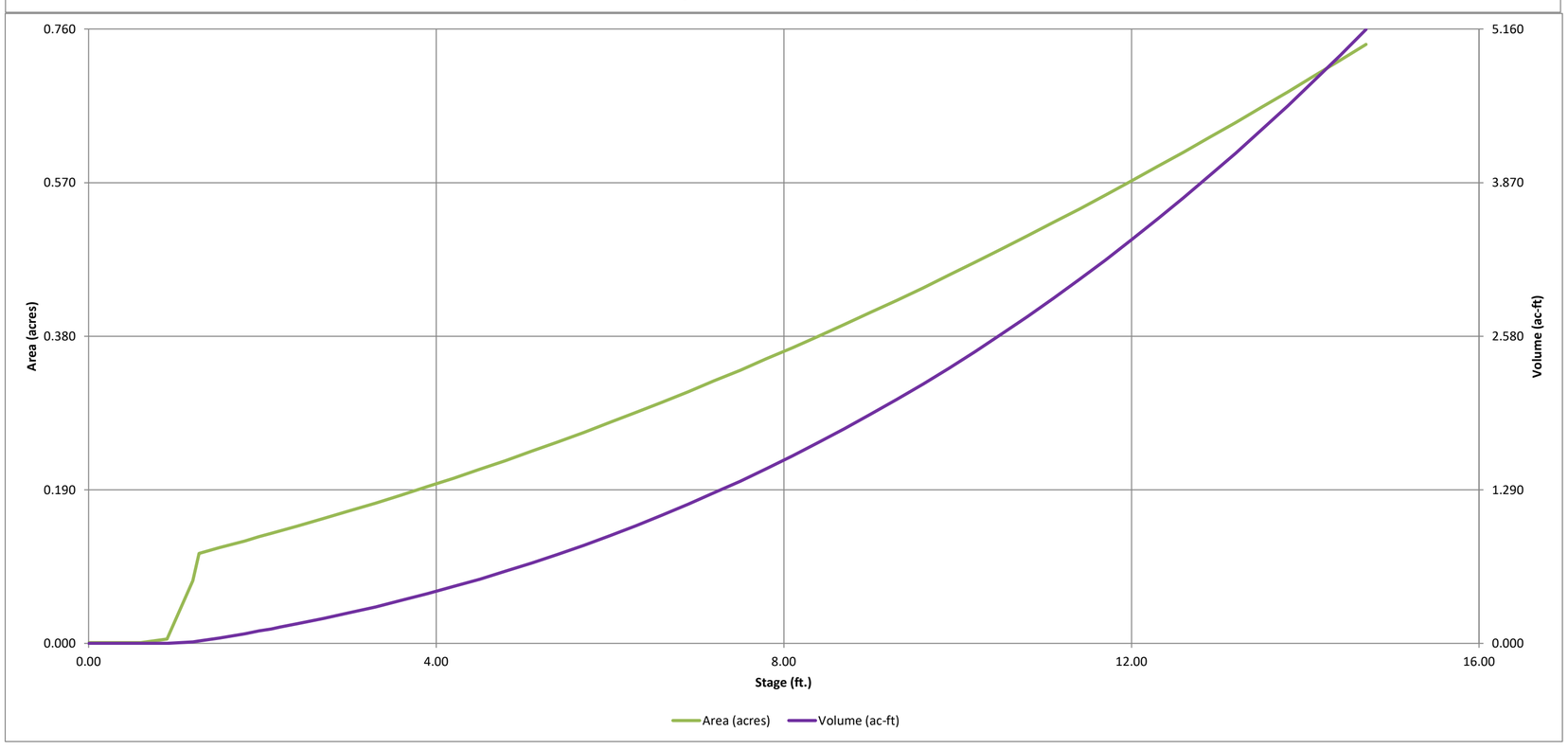
Depth Increment = 0.3 ft

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		6.4	6.4	41		0.001		
ISV	0.33		6.4	6.4	41		0.001	13	0.000
	0.60		6.4	6.4	41		0.001	24	0.001
	0.90		18.6	12.4	230		0.005	41	0.001
	1.20		79.8	42.4	3,382		0.078	491	0.011
Floor	1.27		96.1	50.4	4,843		0.111	818	0.019
	1.50		98.5	52.4	5,161		0.118	1,925	0.044
	1.80		100.9	54.8	5,529		0.127	3,528	0.081
Zone 1 (WQCV)	1.96		102.2	56.2	5,743		0.132	4,486	0.103
	2.10		103.4	57.3	5,922		0.136	5,303	0.122
Zone 2 (EURV)	2.20		104.2	58.1	6,051		0.139	5,901	0.135
	2.40		105.8	59.7	6,313		0.145	7,138	0.164
	2.70		108.2	62.1	6,716		0.154	9,092	0.209
	3.00		110.6	64.5	7,130		0.164	11,168	0.256
	3.30		113.0	66.9	7,556		0.173	13,371	0.307
	3.60		115.4	69.3	7,993		0.184	15,703	0.360
	3.90		117.8	71.7	8,442		0.194	18,168	0.417
	4.20		120.2	74.1	8,903		0.204	20,770	0.477
	4.50		122.6	76.5	9,375		0.215	23,511	0.540
	4.80		125.0	78.9	9,858		0.226	26,396	0.606
	5.10		127.4	81.3	10,353		0.238	29,427	0.676
	5.40		129.8	83.7	10,860		0.249	32,609	0.749
	5.70		132.2	86.1	11,378		0.261	35,944	0.825
Zone 3 (100-year)	6.00		134.6	88.5	11,907		0.273	39,437	0.905
	6.30		137.0	90.9	12,449		0.286	43,090	0.989
	6.60		139.4	93.3	13,001		0.298	46,907	1.077
	6.90		141.8	95.7	13,565		0.311	50,892	1.168
	7.20		144.2	98.1	14,141		0.325	55,047	1.264
	7.50		146.6	100.5	14,728		0.338	59,377	1.363
	7.80		149.0	102.9	15,327		0.352	63,885	1.467
	8.10		151.4	105.3	15,937		0.366	68,575	1.574
	8.40		153.8	107.7	16,559		0.380	73,449	1.686
	8.70		156.2	110.1	17,192		0.395	78,511	1.802
	9.00		158.6	112.5	17,837		0.409	83,765	1.923
	9.30		161.0	114.9	18,493		0.425	89,214	2.048
	9.60		163.4	117.3	19,161		0.440	94,862	2.178
	9.90		165.8	119.7	19,840		0.455	100,712	2.312
	10.20		168.2	122.1	20,531		0.471	106,767	2.451
	10.50		170.6	124.5	21,233		0.487	113,032	2.595
	10.80		173.0	126.9	21,947		0.504	119,508	2.744
	11.10		175.4	129.3	22,673		0.520	126,201	2.897
	11.40		177.8	131.7	23,410		0.537	133,113	3.056
	11.70		180.2	134.1	24,158		0.555	140,248	3.220
	12.00		182.6	136.5	24,918		0.572	147,609	3.389
	12.30		185.0	138.9	25,689		0.590	155,200	3.563
	12.60		187.4	141.3	26,472		0.608	163,024	3.743
	12.90		189.8	143.7	27,267		0.626	171,085	3.928
	13.20		192.2	146.1	28,073		0.644	179,385	4.118
	13.50		194.6	148.5	28,891		0.663	187,929	4.314
	13.80		197.0	150.9	29,720		0.682	196,721	4.516
	14.10		199.4	153.3	30,560		0.702	205,762	4.724
	14.40		201.8	155.7	31,412		0.721	215,058	4.937
	14.70		204.2	158.1	32,276		0.741	224,611	5.156

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)



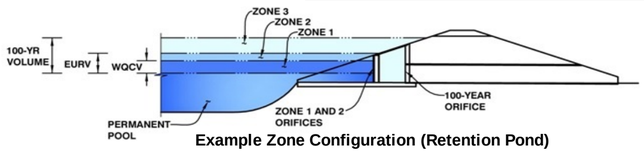


DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)

Project: Front Range - Midway Solar

Basin ID: A10



Example Zone Configuration (Retention Pond)

Required Volume Calculation

Selected BMP Type =	EDB	
Watershed Area =	263.34	acres
Watershed Length =	7,992	ft
Watershed Slope =	0.014	ft/ft
Watershed Imperviousness =	3.50%	percent
Percentage Hydrologic Soil Group A =	5.0%	percent
Percentage Hydrologic Soil Group B =	0.0%	percent
Percentage Hydrologic Soil Groups C/D =	95.0%	percent
Desired WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	User Input	
Water Quality Capture Volume (WQCV) =	0.568	acre-feet
Excess Urban Runoff Volume (EURV) =	0.695	acre-feet
2-yr Runoff Volume (P1 = 1.19 in.) =	0.565	acre-feet
5-yr Runoff Volume (P1 = 1.5 in.) =	2.225	acre-feet
10-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet
25-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet
50-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet
100-yr Runoff Volume (P1 = 2.52 in.) =	30.934	acre-feet
500-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet
Approximate 2-yr Detention Volume =	0.526	acre-feet
Approximate 5-yr Detention Volume =	2.150	acre-feet
Approximate 10-yr Detention Volume =	0.000	acre-feet
Approximate 25-yr Detention Volume =	0.000	acre-feet
Approximate 50-yr Detention Volume =	0.000	acre-feet
Approximate 100-yr Detention Volume =	5.991	acre-feet

Optional User Override 1-hr Precipitation

1.19	inches
1.50	inches
	inches
	inches
	inches
2.52	inches
	inches

Stage-Storage Calculation

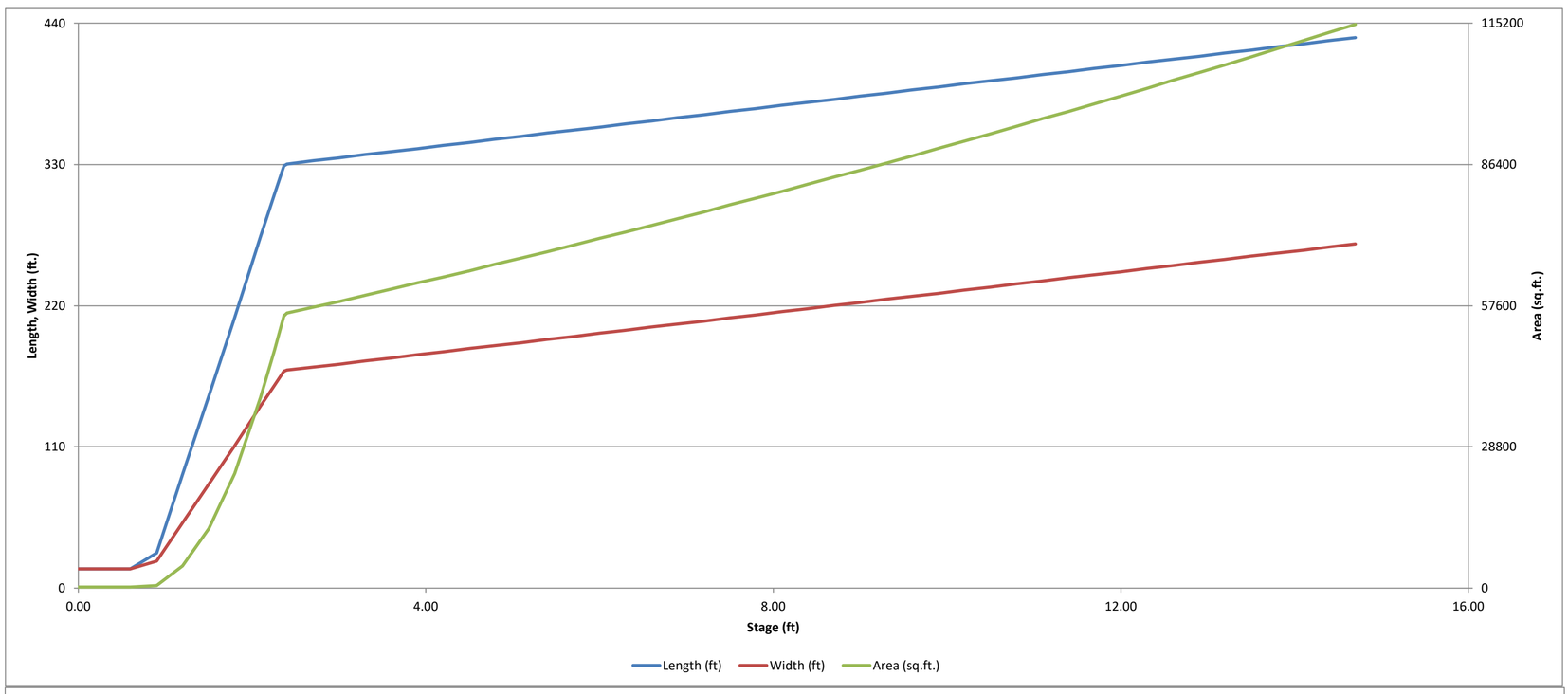
Zone 1 Volume (WQCV) =	0.568	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.127	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	5.297	acre-feet
Total Detention Basin Volume =	5.991	acre-feet
Initial Surcharge Volume (ISV) =	74	ft^3
Initial Surcharge Depth (ISD) =	0.33	ft
Total Available Detention Depth (H_{total}) =	6.00	ft
Depth of Trickle Channel (H_{TC}) =	0.50	ft
Slope of Trickle Channel (S_{TC}) =	0.005	ft/ft
Slopes of Main Basin Sides (S_{main}) =	4	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	2	
Initial Surcharge Area (A_{ISV}) =	225	ft^2
Surcharge Volume Length (L_{ISV}) =	15.0	ft
Surcharge Volume Width (W_{ISV}) =	15.0	ft
Depth of Basin Floor (H_{FLOOR}) =	1.54	ft
Length of Basin Floor (L_{FLOOR}) =	330.1	ft
Width of Basin Floor (W_{FLOOR}) =	169.5	ft
Area of Basin Floor (A_{FLOOR}) =	55,951	ft^2
Volume of Basin Floor (V_{FLOOR}) =	30,753	ft^3
Depth of Main Basin (H_{MAIN}) =	3.63	ft
Length of Main Basin (L_{MAIN}) =	359.1	ft
Width of Main Basin (W_{MAIN}) =	198.5	ft
Area of Main Basin (A_{MAIN}) =	71,281	ft^2
Volume of Main Basin (V_{MAIN}) =	230,060	ft^3
Calculated Total Basin Volume (V_{total}) =	**5.992**	acre-feet

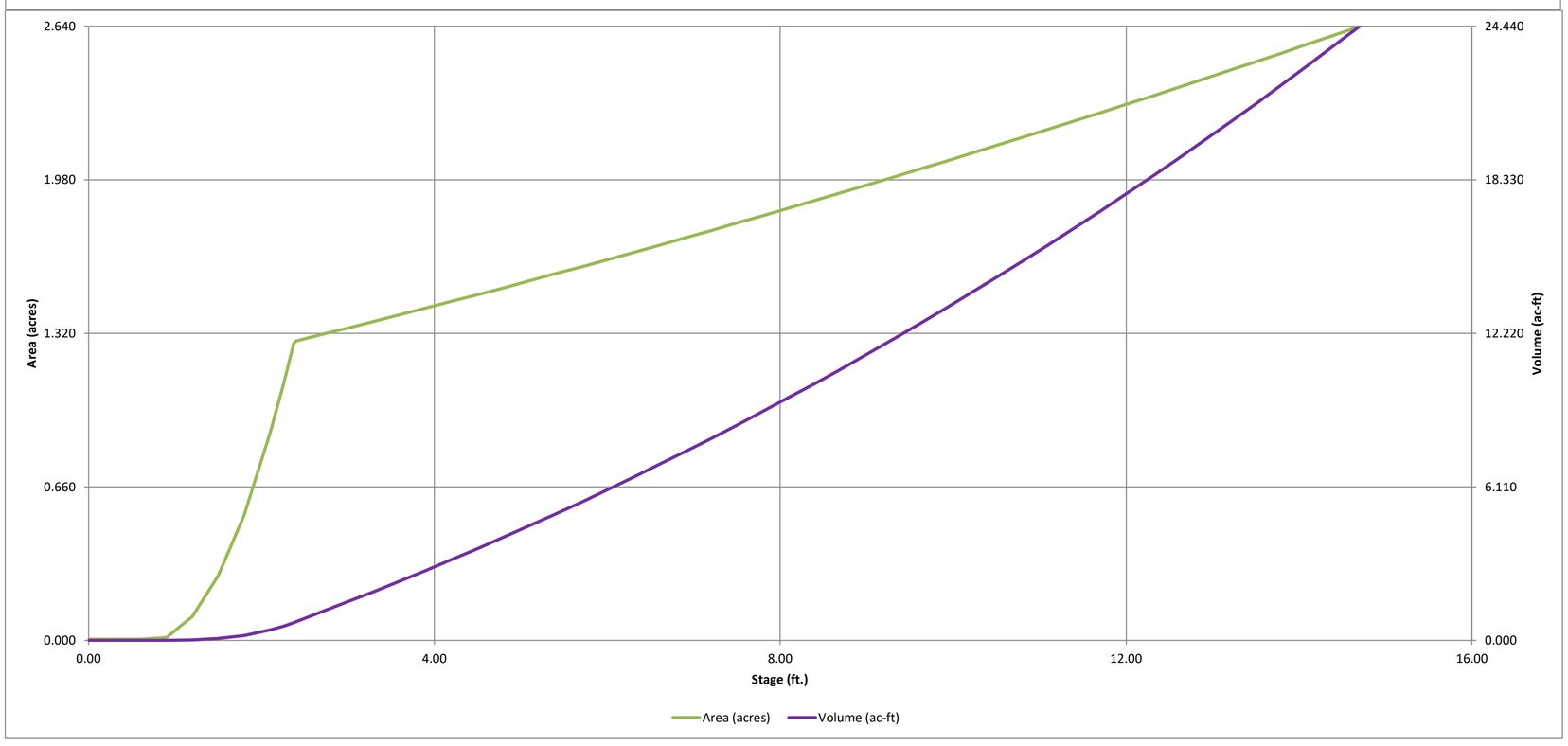
Depth Increment = 0.3 ft

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		15.0	15.0	225		0.005		
ISV	0.33		15.0	15.0	225		0.005	72	0.002
	0.60		15.0	15.0	225		0.005	133	0.003
	0.90		27.2	21.0	572		0.013	210	0.005
	1.20		88.4	51.0	4,510		0.104	880	0.020
	1.50		149.6	81.0	12,120		0.278	3,283	0.075
	1.80		210.8	111.0	23,402		0.537	8,520	0.196
	2.10		274.1	142.0	38,918		0.893	18,078	0.415
Zone 1 (WQCV)	2.26		306.7	158.0	48,460		1.112	25,054	0.575
Zone 2 (EURV)	2.37		329.2	169.0	55,627		1.277	30,775	0.706
Floor	2.37		329.2	169.0	55,627		1.277	30,775	0.706
	2.40		330.3	169.7	56,051		1.287	32,453	0.745
	2.70		332.7	172.1	57,257		1.314	49,449	1.135
	3.00		335.1	174.5	58,474		1.342	66,808	1.534
	3.30		337.5	176.9	59,703		1.371	84,535	1.941
	3.60		339.9	179.3	60,944		1.399	102,631	2.356
	3.90		342.3	181.7	62,196		1.428	121,102	2.780
	4.20		344.7	184.1	63,459		1.457	139,950	3.213
	4.50		347.1	186.5	64,734		1.486	159,178	3.654
	4.80		349.5	188.9	66,020		1.516	178,791	4.104
	5.10		351.9	191.3	67,318		1.545	198,792	4.564
	5.40		354.3	193.7	68,628		1.575	219,183	5.032
	5.70		356.7	196.1	69,949		1.606	239,970	5.509
Zone 3 (100-year)	6.00		359.1	198.5	71,281		1.636	261,154	5.995
	6.30		361.5	200.9	72,625		1.667	282,739	6.491
	6.60		363.9	203.3	73,981		1.698	304,730	6.996
	6.90		366.3	205.7	75,348		1.730	327,129	7.510
	7.20		368.7	208.1	76,727		1.761	349,940	8.034
	7.50		371.1	210.5	78,117		1.793	373,166	8.567
	7.80		373.5	212.9	79,518		1.825	396,811	9.110
	8.10		375.9	215.3	80,931		1.858	420,878	9.662
	8.40		378.3	217.7	82,356		1.891	445,371	10.224
	8.70		380.7	220.1	83,792		1.924	470,293	10.796
	9.00		383.1	222.5	85,240		1.957	495,648	11.379
	9.30		385.5	224.9	86,699		1.990	521,438	11.971
	9.60		387.9	227.3	88,170		2.024	547,668	12.573
	9.90		390.3	229.7	89,652		2.058	574,342	13.185
	10.20		392.7	232.1	91,146		2.092	601,461	13.808
	10.50		395.1	234.5	92,651		2.127	629,030	14.441
	10.80		397.5	236.9	94,168		2.162	657,053	15.084
	11.10		399.9	239.3	95,697		2.197	685,532	15.738
	11.40		402.3	241.7	97,237		2.232	714,472	16.402
	11.70		404.7	244.1	98,788		2.268	743,876	17.077
	12.00		407.1	246.5	100,351		2.304	773,746	17.763
	12.30		409.5	248.9	101,925		2.340	804,087	18.459
	12.60		411.9	251.3	103,511		2.376	834,902	19.167
	12.90		414.3	253.7	105,109		2.413	866,195	19.885
	13.20		416.7	256.1	106,718		2.450	897,969	20.615
	13.50		419.1	258.5	108,338		2.487	930,227	21.355
	13.80		421.5	260.9	109,970		2.525	962,973	22.107
	14.10		423.9	263.3	111,614		2.562	996,210	22.870
	14.40		426.3	265.7	113,269		2.600	1,029,942	23.644
	14.70		428.7	268.1	114,936		2.639	1,064,173	24.430

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)



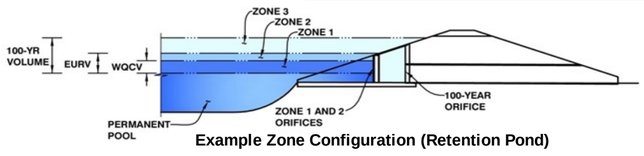


DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)

Project: Front Range - Midway Solar

Basin ID: A11



Example Zone Configuration (Retention Pond)

Required Volume Calculation

Selected BMP Type =	EDB	
Watershed Area =	224.01	acres
Watershed Length =	8,048	ft
Watershed Slope =	0.019	ft/ft
Watershed Imperviousness =	3.70%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	0.0%	percent
Percentage Hydrologic Soil Groups C/D =	100.0%	percent
Desired WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	User Input	
Water Quality Capture Volume (WQCV) =	0.509	acre-feet
Excess Urban Runoff Volume (EURV) =	0.637	acre-feet
2-yr Runoff Volume (P1 = 1.19 in.) =	0.523	acre-feet
5-yr Runoff Volume (P1 = 1.5 in.) =	2.028	acre-feet
10-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet
25-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet
50-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet
100-yr Runoff Volume (P1 = 2.52 in.) =	27.367	acre-feet
500-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet
Approximate 2-yr Detention Volume =	0.488	acre-feet
Approximate 5-yr Detention Volume =	1.959	acre-feet
Approximate 10-yr Detention Volume =	0.000	acre-feet
Approximate 25-yr Detention Volume =	0.000	acre-feet
Approximate 50-yr Detention Volume =	0.000	acre-feet
Approximate 100-yr Detention Volume =	5.329	acre-feet

Optional User Override 1-hr Precipitation

1.19	inches
1.50	inches
	inches
	inches
	inches
2.52	inches
	inches

Stage-Storage Calculation

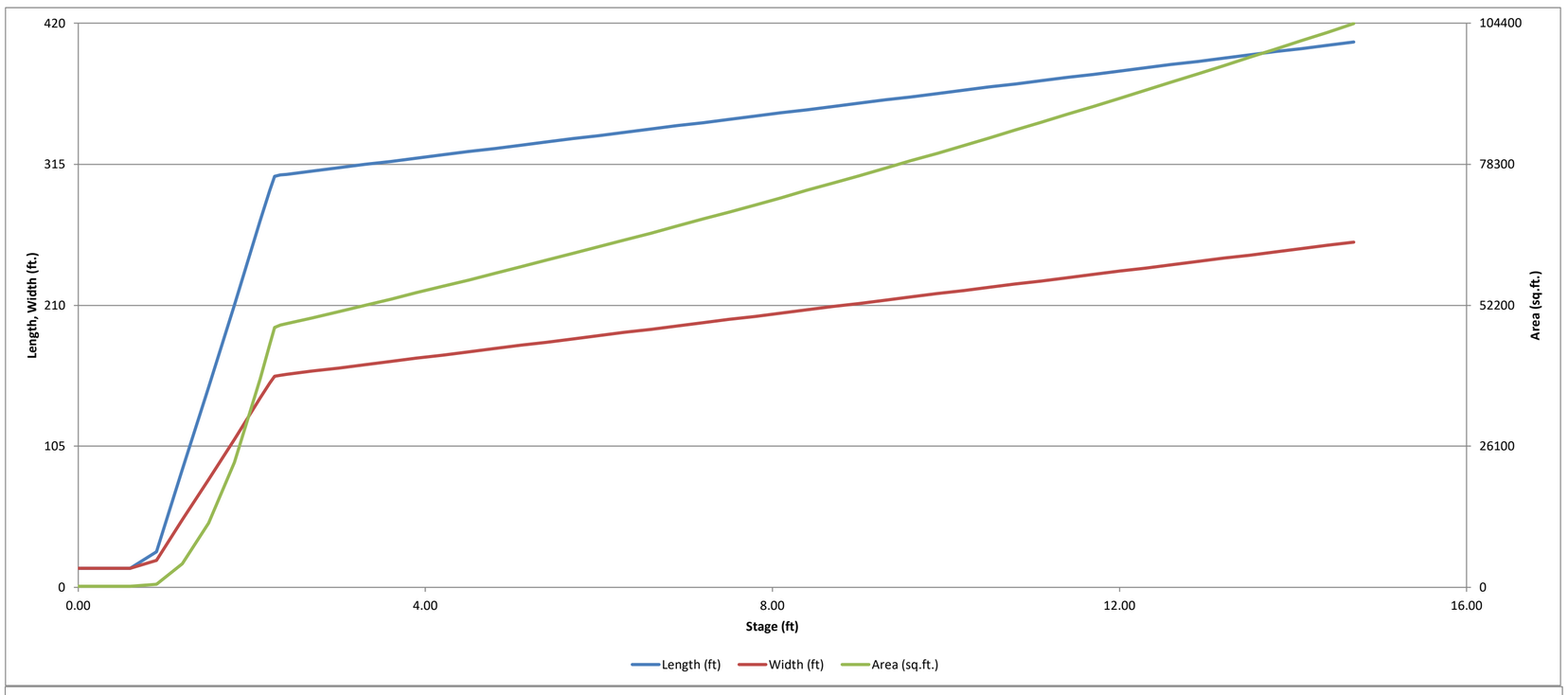
Zone 1 Volume (WQCV) =	0.509	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.127	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	4.692	acre-feet
Total Detention Basin Volume =	5.329	acre-feet
Initial Surcharge Volume (ISV) =	67	ft^3
Initial Surcharge Depth (ISD) =	0.33	ft
Total Available Detention Depth (H_{total}) =	6.00	ft
Depth of Trickle Channel (H_{TC}) =	0.50	ft
Slope of Trickle Channel (S_{TC}) =	0.005	ft/ft
Slopes of Main Basin Sides (S_{main}) =	4	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	2	
Initial Surcharge Area (A_{ISV}) =	202	ft^2
Surcharge Volume Length (L_{ISV}) =	14.2	ft
Surcharge Volume Width (W_{ISV}) =	14.2	ft
Depth of Basin Floor (H_{FLOOR}) =	1.43	ft
Length of Basin Floor (L_{FLOOR}) =	306.5	ft
Width of Basin Floor (W_{FLOOR}) =	157.5	ft
Area of Basin Floor (A_{FLOOR}) =	48,260	ft^2
Volume of Basin Floor (V_{FLOOR}) =	24,633	ft^3
Depth of Main Basin (H_{MAIN}) =	3.74	ft
Length of Main Basin (L_{MAIN}) =	336.4	ft
Width of Main Basin (W_{MAIN}) =	187.4	ft
Area of Main Basin (A_{MAIN}) =	63,025	ft^2
Volume of Main Basin (V_{MAIN}) =	207,340	ft^3
Calculated Total Basin Volume (V_{total}) =	**5.329**	acre-feet

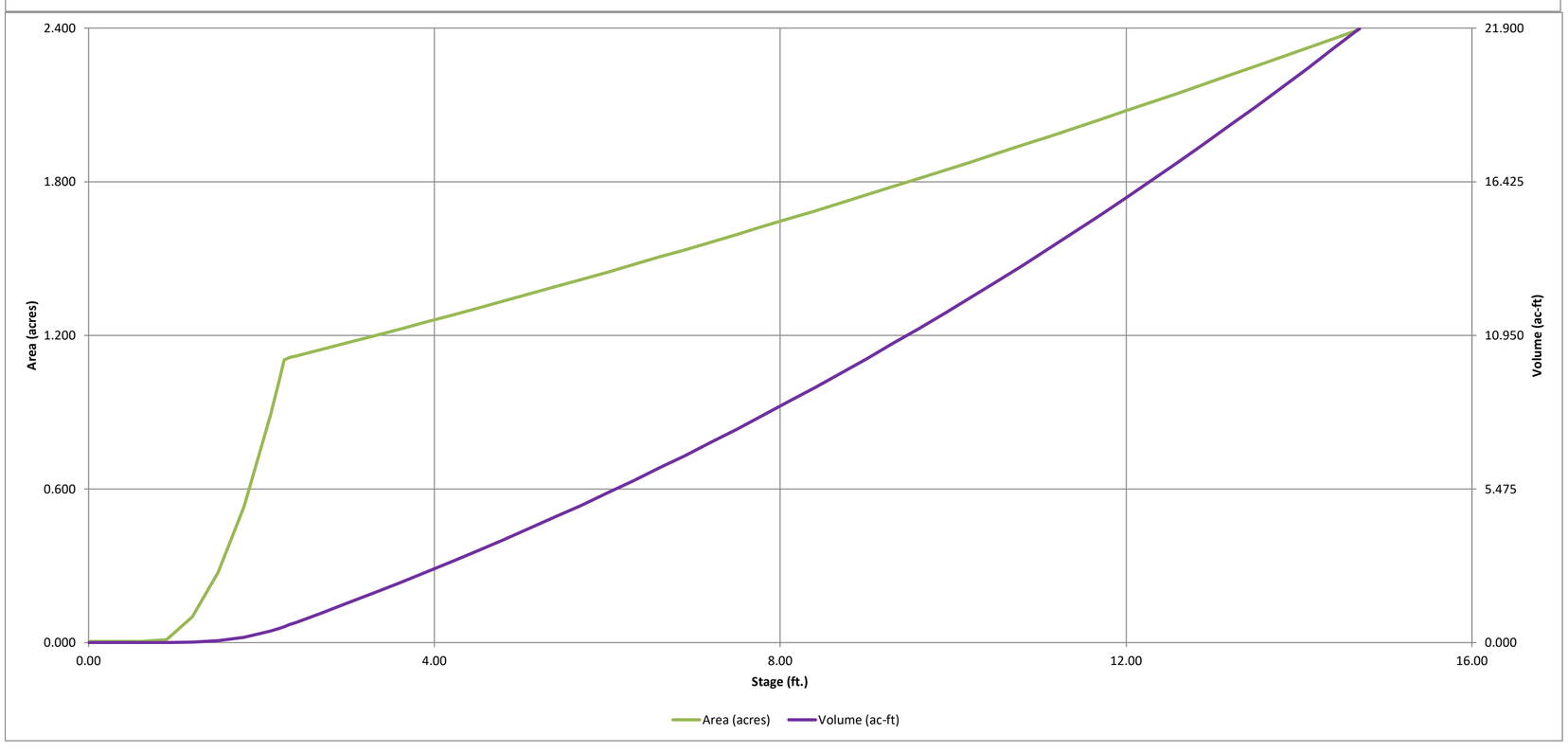
Depth Increment = 0.3 ft

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		14.2	14.2	202		0.005		
ISV	0.33		14.2	14.2	202		0.005	65	0.001
	0.60		14.2	14.2	202		0.005	119	0.003
	0.90		26.4	20.2	534		0.012	189	0.004
	1.20		87.6	50.2	4,400		0.101	837	0.019
	1.50		148.8	80.2	11,937		0.274	3,196	0.073
	1.80		210.0	110.2	23,146		0.531	8,366	0.192
	2.10		273.3	141.2	38,587		0.886	17,834	0.409
Zone 1 (WQCV)	2.21		295.7	152.2	45,009		1.033	22,427	0.515
Floor	2.26		305.9	157.2	48,091		1.104	24,754	0.568
Zone 2 (EURV)	2.33		307.0	158.0	48,510		1.114	28,140	0.646
	2.40		307.6	158.6	48,771		1.120	31,545	0.724
	2.70		310.0	161.0	49,895		1.145	46,344	1.064
	3.00		312.4	163.4	51,031		1.172	61,483	1.411
	3.30		314.8	165.8	52,179		1.198	76,964	1.767
	3.60		317.2	168.2	53,338		1.224	92,791	2.130
	3.90		319.6	170.6	54,508		1.251	108,968	2.502
	4.20		322.0	173.0	55,691		1.278	125,498	2.881
	4.50		324.4	175.4	56,884		1.306	142,383	3.269
	4.80		326.8	177.8	58,089		1.334	159,629	3.665
	5.10		329.2	180.2	59,306		1.361	177,238	4.069
	5.40		331.6	182.6	60,534		1.390	195,214	4.481
	5.70		334.0	185.0	61,774		1.418	213,560	4.903
Zone 3 (100-year)	6.00		336.4	187.4	63,025		1.447	232,279	5.332
	6.30		338.8	189.8	64,288		1.476	251,376	5.771
	6.60		341.2	192.2	65,562		1.505	270,853	6.218
	6.90		343.6	194.6	66,848		1.535	290,714	6.674
	7.20		346.0	197.0	68,145		1.564	310,963	7.139
	7.50		348.4	199.4	69,454		1.594	331,602	7.613
	7.80		350.8	201.8	70,774		1.625	352,636	8.095
	8.10		353.2	204.2	72,106		1.655	374,068	8.587
	8.40		355.6	206.6	73,449		1.686	395,901	9.089
	8.70		358.0	209.0	74,804		1.717	418,139	9.599
	9.00		360.4	211.4	76,171		1.749	440,785	10.119
	9.30		362.8	213.8	77,549		1.780	463,842	10.648
	9.60		365.2	216.2	78,938		1.812	487,315	11.187
	9.90		367.6	218.6	80,339		1.844	511,206	11.736
	10.20		370.0	221.0	81,752		1.877	535,520	12.294
	10.50		372.4	223.4	83,176		1.909	560,258	12.862
	10.80		374.8	225.8	84,611		1.942	585,426	13.440
	11.10		377.2	228.2	86,058		1.976	611,026	14.027
	11.40		379.6	230.6	87,517		2.009	637,062	14.625
	11.70		382.0	233.0	88,987		2.043	663,537	15.233
	12.00		384.4	235.4	90,468		2.077	690,455	15.851
	12.30		386.8	237.8	91,962		2.111	717,820	16.479
	12.60		389.2	240.2	93,466		2.146	745,633	17.117
	12.90		391.6	242.6	94,982		2.180	773,900	17.766
	13.20		394.0	245.0	96,510		2.216	802,624	18.426
	13.50		396.4	247.4	98,049		2.251	831,808	19.096
	13.80		398.8	249.8	99,600		2.287	861,455	19.776
	14.10		401.2	252.2	101,162		2.322	891,569	20.468
	14.40		403.6	254.6	102,736		2.358	922,153	21.170
	14.70		406.0	257.0	104,321		2.395	953,211	21.883

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)



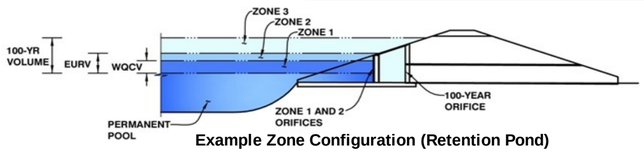


DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)

Project: Front Range - Midway Solar

Basin ID: A12



Example Zone Configuration (Retention Pond)

Required Volume Calculation

Selected BMP Type =	EDB		
Watershed Area =	10.97	acres	**Note: L / W Ratio < 1**
Watershed Length =	444	ft	**L / W Ratio = 0.4**
Watershed Slope =	0.040	ft/ft	
Watershed Imperviousness =	6.70%	percent	
Percentage Hydrologic Soil Group A =	0.0%	percent	
Percentage Hydrologic Soil Group B =	0.0%	percent	
Percentage Hydrologic Soil Groups C/D =	100.0%	percent	
Desired WQCV Drain Time =	40.0	hours	
Location for 1-hr Rainfall Depths =	User Input		
Water Quality Capture Volume (WQCV) =	0.043	acre-feet	Optional User Override 1-hr Precipitation
Excess Urban Runoff Volume (EURV) =	0.059	acre-feet	
2-yr Runoff Volume (P1 = 1.19 in.) =	0.050	acre-feet	1.19 inches
5-yr Runoff Volume (P1 = 1.5 in.) =	0.140	acre-feet	1.50 inches
10-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet	inches
25-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet	inches
50-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet	inches
100-yr Runoff Volume (P1 = 2.52 in.) =	1.373	acre-feet	2.52 inches
500-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet	inches
Approximate 2-yr Detention Volume =	0.047	acre-feet	
Approximate 5-yr Detention Volume =	0.134	acre-feet	
Approximate 10-yr Detention Volume =	0.000	acre-feet	
Approximate 25-yr Detention Volume =	0.000	acre-feet	
Approximate 50-yr Detention Volume =	0.000	acre-feet	
Approximate 100-yr Detention Volume =	0.337	acre-feet	

Stage-Storage Calculation

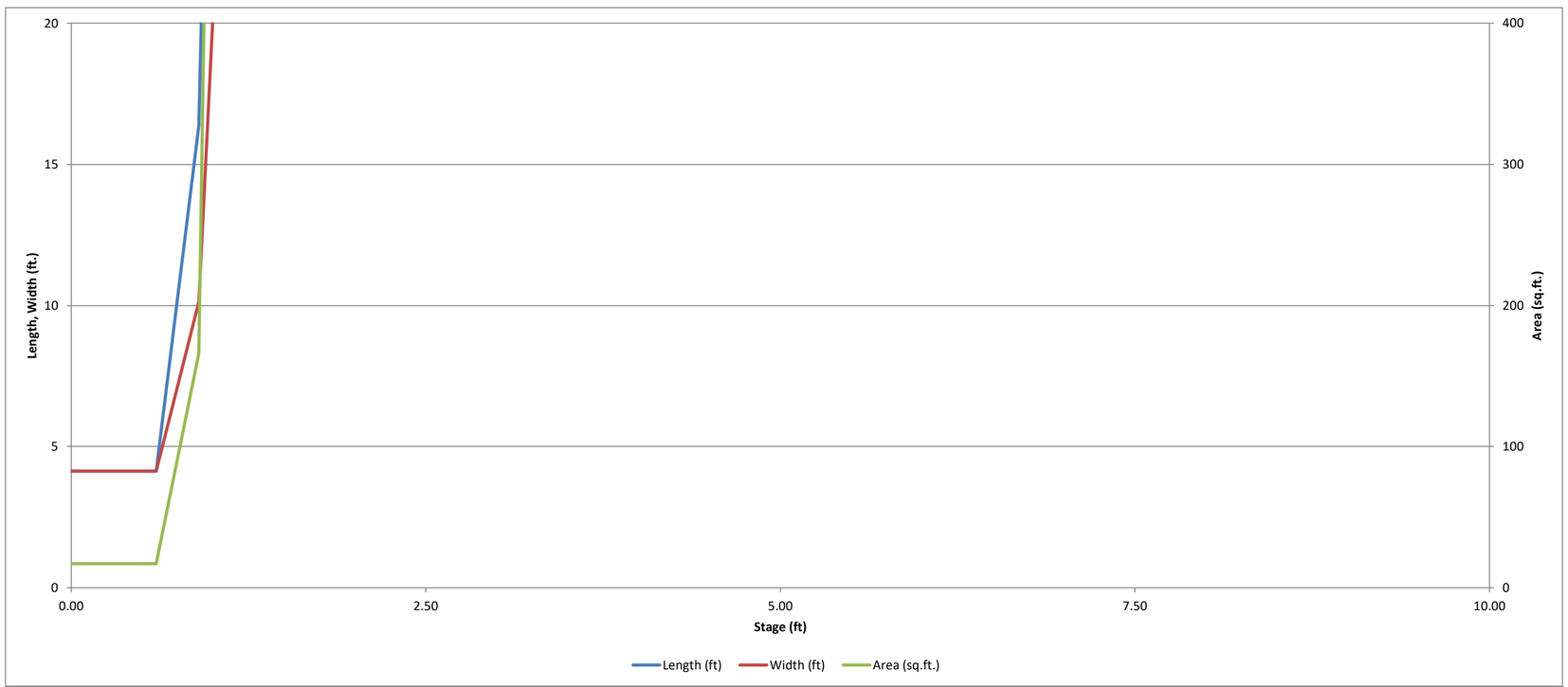
Zone 1 Volume (WQCV) =	0.043	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.016	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	0.278	acre-feet
Total Detention Basin Volume =	0.337	acre-feet
Initial Surcharge Volume (ISV) =	6	ft^3
Initial Surcharge Depth (ISD) =	0.33	ft
Total Available Detention Depth (H_{total}) =	6.00	ft
Depth of Trickle Channel (H_{TC}) =	0.50	ft
Slope of Trickle Channel (S_{TC}) =	0.005	ft/ft
Slopes of Main Basin Sides (S_{main}) =	4	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	2	
Initial Surcharge Area (A_{ISV}) =	17	ft^2
Surcharge Volume Length (L_{ISV}) =	4.1	ft
Surcharge Volume Width (W_{ISV}) =	4.1	ft
Depth of Basin Floor (H_{FLOOR}) =	0.20	ft
Length of Basin Floor (L_{FLOOR}) =	44.4	ft
Width of Basin Floor (W_{FLOOR}) =	23.9	ft
Area of Basin Floor (A_{FLOOR}) =	1,059	ft^2
Volume of Basin Floor (V_{FLOOR}) =	80	ft^3
Depth of Main Basin (H_{MAIN}) =	4.97	ft
Length of Main Basin (L_{MAIN}) =	84.2	ft
Width of Main Basin (W_{MAIN}) =	63.6	ft
Area of Main Basin (A_{MAIN}) =	5,357	ft^2
Volume of Main Basin (V_{MAIN}) =	14,583	ft^3
Calculated Total Basin Volume (V_{total}) =	**0.337**	acre-feet

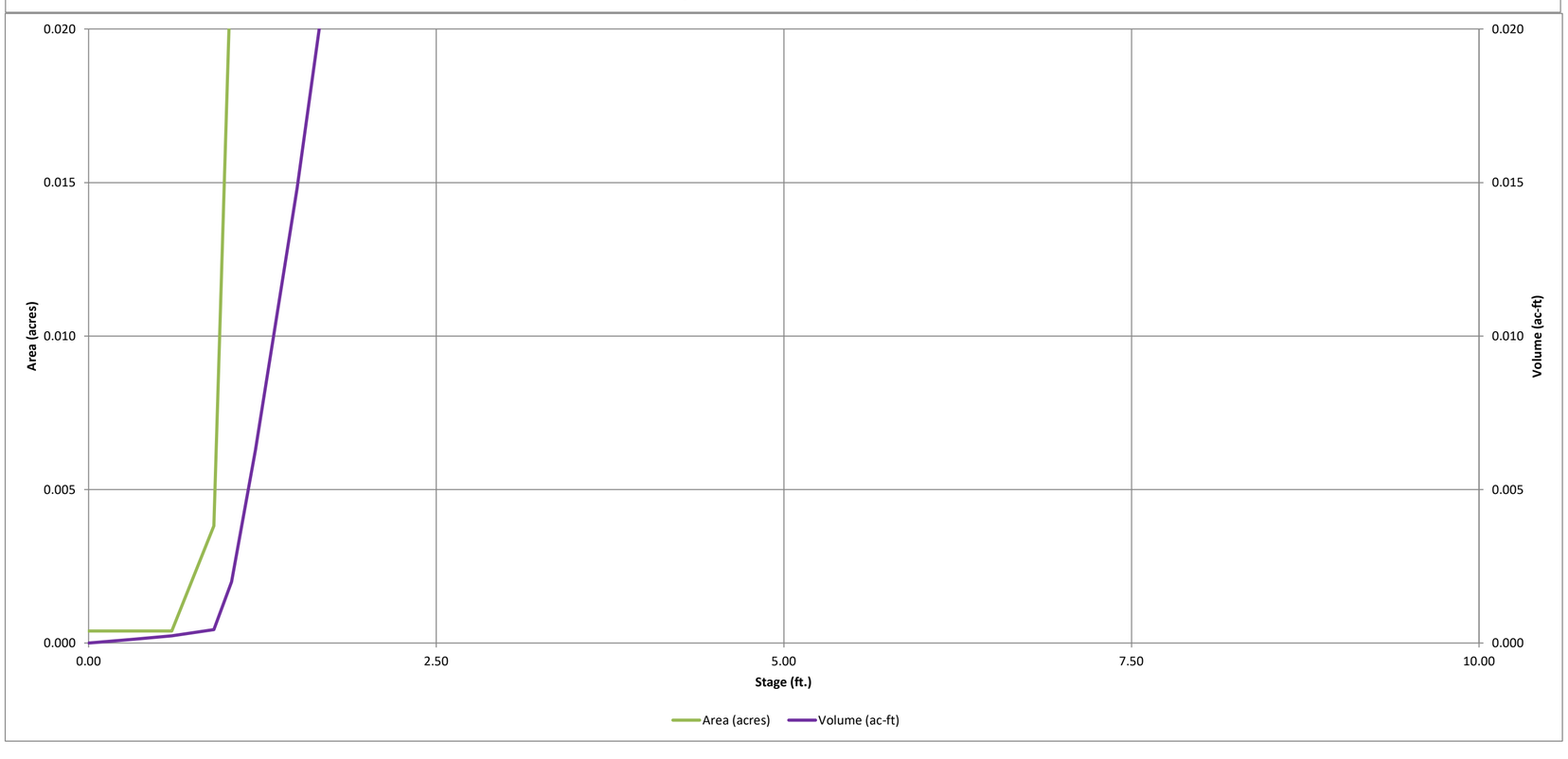
Depth Increment = 0.3 ft

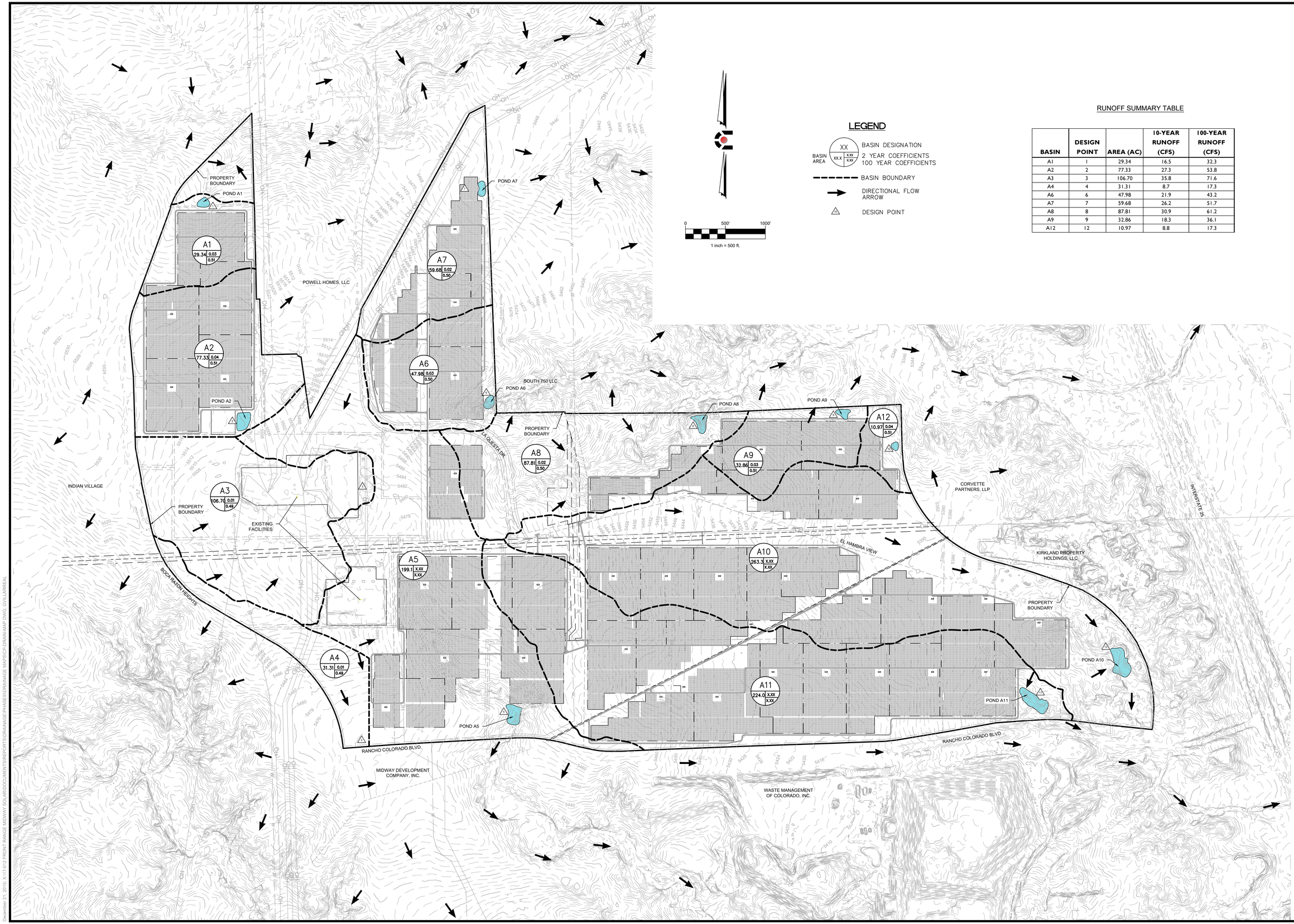
Stage - Storage Description	Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft^2)	Optional Override Area (ft^2)	Area (acre)	Volume (ft^3)	Volume (ac-ft)
Top of Micropool	0.00		4.1	4.1	17		0.000		
ISV	0.33		4.1	4.1	17		0.000	5	0.000
	0.60		4.1	4.1	17		0.000	10	0.000
	0.90		16.4	10.1	166		0.004	19	0.000
Floor	1.03		42.9	23.1	992		0.023	87	0.002
	1.20		45.7	25.2	1,150		0.026	274	0.006
	1.50		48.1	27.6	1,325		0.030	645	0.015
	1.80		50.5	30.0	1,513		0.035	1,070	0.025
	2.10		53.0	32.4	1,718		0.039	1,571	0.036
Zone 1 (WQCV)	2.28		54.4	33.9	1,843		0.042	1,891	0.043
	2.40		55.4	34.8	1,929		0.044	2,118	0.049
Zone 2 (EURV)	2.63		57.2	36.7	2,099		0.048	2,581	0.059
	2.70		57.8	37.2	2,151		0.049	2,729	0.063
	3.00		60.2	39.6	2,385		0.055	3,410	0.078
	3.30		62.6	42.0	2,630		0.060	4,162	0.096
	3.60		65.0	44.4	2,887		0.066	4,989	0.115
	3.90		67.4	46.8	3,156		0.072	5,895	0.135
	4.20		69.8	49.2	3,436		0.079	6,884	0.158
	4.50		72.2	51.6	3,727		0.086	7,958	0.183
	4.80		74.6	54.0	4,030		0.093	9,121	0.209
	5.10		77.0	56.4	4,344		0.100	10,377	0.238
	5.40		79.4	58.8	4,670		0.107	11,729	0.269
	5.70		81.8	61.2	5,008		0.115	13,180	0.303
Zone 3 (100-year)	5.99		84.1	63.6	5,345		0.123	14,681	0.337
	6.00		84.2	63.6	5,357		0.123	14,734	0.338
	6.30		86.6	66.0	5,717		0.131	16,395	0.376
	6.60		89.0	68.4	6,089		0.140	18,166	0.417
	6.90		91.4	70.8	6,473		0.149	20,050	0.460
	7.20		93.8	73.2	6,868		0.158	22,050	0.506
	7.50		96.2	75.6	7,274		0.167	24,171	0.555
	7.80		98.6	78.0	7,692		0.177	26,416	0.606
	8.10		101.0	80.4	8,122		0.186	28,788	0.661
	8.40		103.4	82.8	8,563		0.197	31,291	0.718
	8.70		105.8	85.2	9,016		0.207	33,927	0.779
	9.00		108.2	87.6	9,480		0.218	36,701	0.843
	9.30		110.6	90.0	9,956		0.229	39,616	0.909
	9.60		113.0	92.4	10,443		0.240	42,676	0.980
	9.90		115.4	94.8	10,942		0.251	45,883	1.053
	10.20		117.8	97.2	11,452		0.263	49,242	1.130
	10.50		120.2	99.6	11,974		0.275	52,756	1.211
	10.80		122.6	102.0	12,507		0.287	56,427	1.295
	11.10		125.0	104.4	13,052		0.300	60,261	1.383
	11.40		127.4	106.8	13,608		0.312	64,260	1.475
	11.70		129.8	109.2	14,176		0.325	68,427	1.571
	12.00		132.2	111.6	14,755		0.339	72,766	1.670
	12.30		134.6	114.0	15,346		0.352	77,281	1.774
	12.60		137.0	116.4	15,949		0.366	81,975	1.882
	12.90		139.4	118.8	16,563		0.380	86,852	1.994
	13.20		141.8	121.2	17,188		0.395	91,914	2.110
	13.50		144.2	123.6	17,825		0.409	97,166	2.231
	13.80		146.6	126.0	18,474		0.424	102,610	2.356
	14.10		149.0	128.4	19,134		0.439	108,251	2.485
	14.40		151.4	130.8	19,805		0.455	114,092	2.619
	14.70		153.8	133.2	20,488		0.470	120,135	2.758

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)







LEGEND

- BASIN DESIGNATION (XX)
- BASIN AREA (XX.X) | 2 YEAR COEFFICIENTS (X.XX) | 100 YEAR COEFFICIENTS (X.XX)
- BASIN BOUNDARY
- DIRECTIONAL FLOW ARROW
- DESIGN POINT

RUNOFF SUMMARY TABLE

BASIN	DESIGN POINT	AREA (AC)	10-YEAR RUNOFF (CFS)	100-YEAR RUNOFF (CFS)
A1	1	29.34	16.5	32.3
A2	2	77.33	27.3	53.8
A3	3	106.70	35.8	71.6
A4	4	31.31	8.7	17.3
A6	6	47.98	21.9	43.2
A7	7	59.68	26.2	51.7
A8	8	87.81	30.9	61.2
A9	9	32.86	18.3	36.1
A12	12	10.97	8.8	17.3

CIVIL ENGINEERING
DEVELOPMENT CONSULTING
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CORE CONSULTANTS

REVISIONS

#	DESCRIPTION	DATE	BY

FRONT RANGE MIDWAY SOLAR
OVERALL DRAINAGE MAP
FOUNTAIN, CO

INITIAL PLAN
RELEASE: 12/12/2017
DESIGNED BY: GMV
DRAWN BY: GMV
CHECKED BY: DB

JOB NO. 17-012

SHEET 1 OF 1

December 21, 2015, X:\17-012 FRONT RANGE MIDWAY SOLAR\DOCUMENTS\REPORTS\DRAINAGE\PHASE III\DRAINAGE MAPS\CP-DRAIN-MAP.DWG, GWILLARREAL