Per my phone call with Ryan on 11/14/2024, I recommended adding a disclaimer that the as-built CDs only reflect as-built conditions of the pond. While the overall drainage patterns follow the original design to the low point where runoff is conveyed into the pond, not all grading and ditches were installed per plan.

September 26, 2024

El Paso County
Planning and Community Development
2880 International Circle, Suite 110
Colorado Springs, CO 80910

Attn.: Mr. Brad Walters, Inspection Supervisor

RE: 2104 LLC SITE DEVELOPMENT PLAN (PPR-19-052) – POND CERTIFICATION

To whom it may concern,

This letter is intended to provide documentation with County Inspection Staff that the Pond facilities for the 2104 LLC Site Development Plan (ACR) have been constructed within reasonable conformance to the design. The Pond facilities for the 2104 LLC Site Development Plan consists of one individual privately owned Full Spectrum Extended Detention Basin.

All Terrain Engineering reviewed the final constructed facility and recently gathered survey as-built data confirming the appropriate size and design. Based upon this information and information gathered during periodic site visits to the project under construction, All Terrain Engineering is of the opinion that the stormwater BMPs have been constructed in general compliance with the approved Construction Plans, and Specifications as filed with El Paso County.

(See attached documents)

Statement Of Engineer In Responsible Charge:
To the best of my knowledge, information and belief, the referenced 2104 LLC Pond facility has been constructed in general compliance with the approved design plans and specifications as filed with El Paso County.

Respectfully submitted,

ALL TERRAIN ENGINEERING, LLC

COLORADO LICENSED RYAN BURNS R.E.B. 0054412 PROFESSIONAL ENGINEER

Ryan Burns, P.E.
Colorado No. 54412

Revise/provide Pond Certification Letter with required statements listed in ECM Section 5.10.6.B (something similar is even required for Runoff Reduction):

"The site and adjacent properties (as affected by work performed under the County permit) are stable with respect to settlement and subsidence, sloughing of cut and fill slopes, revegetation or other ground cover, and that the improvements (public improvements, common development improvements, site grading and paving) meet or exceed the minimum design requirements."

For sites including detention and/or water quality facilities, the certification letter shall include a statement that the facilities provide the required storage volume and will meet the required release rates (as documented by an attached MHFD design form submitted with the original application), the stage areas, elevations, and outlet dimensions.

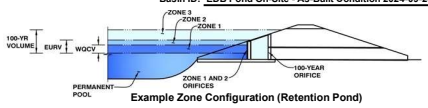
AS-BUILT MHFD DETENTION WORKBOOK CHECKS

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)

Project: ACR

Basin ID: EDB Pond On-Site - As-Built Condition 2024-09-26



Example Zone Configuration (Retention Pond)

Required Volume Calculation

Selected BMP Type =	EDB		
Watershed Area =	10.89	acres	
Watershed Length =	1,000	ft	
Watershed Slope =	0.011	ft/ft	
Watershed Imperviousness =	25.00%	percent	
Percentage Hydrologic Soil Group A =	19.9%	percent	
Percentage Hydrologic Soil Group B =	80.1%	percent	
Percentage Hydrologic Soil Groups C/D =	0.0%	percent	
Desired WQCV Drain Time =	40.0	hours	
Location for 1-hr Rainfall Depths =	User Input		
Water Quality Capture Volume (WQCV) =	0.122	acre-feet	
Excess Urban Runoff Volume (EURV) =	0.272	acre-feet	
2-yr Runoff Volume (P1 = 1.19 in.) =	0.200	acre-feet	
5-yr Runoff Volume (P1 = 1.5 in.) =	0.286	acre-feet	
10-yr Runoff Volume (P1 = 1.75 in.) =	0.444	acre-feet	
25-yr Runoff Volume (P1 = 2 in.) =	0.772	acre-feet	
50-yr Runoff Volume (P1 = 2.25 in.) =	1.005	acre-feet	
100-yr Runoff Volume (P1 = 2.52 in.) =	1.314	acre-feet	
500-yr Runoff Volume (P1 = 3 in.) =	1.856	acre-feet	
Approximate 2-yr Detention Volume =	0.187	acre-feet	
Approximate 5-yr Detention Volume =	0.268	acre-feet	
Approximate 10-yr Detention Volume =	0.397	acre-feet	
Approximate 25-yr Detention Volume =	0.478	acre-feet	
Approximate 50-yr Detention Volume =	0.513	acre-feet	
Approximate 100-yr Detention Volume =	0.622	acre-feet	

Optional User Override 1-hr Precipitation

1.19	inches
1.50	inches
1.75	inches
2.00	inches
2.25	inches
2.52	inches
3.00	inches

Stage-Storage Calculation

Zone 1 Volume (WQCV) =	0.122	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.150	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	0.350	acre-feet
Total Detention Basin Volume =	0.622	acre-feet
Initial Surcharge Volume (ISV) =	user	ft^3
Initial Surcharge Depth (ISD) =	user	ft
Total Available Detention Depth (H_{total}) =	user	ft
Depth of Trickle Channel (H_{TC}) =	user	ft
Slope of Trickle Channel (S_{TC}) =	user	ft/ft
Slopes of Main Basin Sides (S_{main}) =	user	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	user	
Initial Surcharge Area (A_{ISV}) =	user	ft^2
Surcharge Volume Length (L_{ISV}) =	user	ft
Surcharge Volume Width (W_{ISV}) =	user	ft
Depth of Basin Floor (H_{FLOOR}) =	user	ft
Length of Basin Floor (L_{FLOOR}) =	user	ft
Width of Basin Floor (W_{FLOOR}) =	user	ft
Area of Basin Floor (A_{FLOOR}) =	user	ft^2
Volume of Basin Floor (V_{FLOOR}) =	user	ft^3
Depth of Main Basin (H_{MAIN}) =	user	ft
Length of Main Basin (L_{MAIN}) =	user	ft
Width of Main Basin (W_{MAIN}) =	user	ft
Area of Main Basin (A_{MAIN}) =	user	ft^2
Volume of Main Basin (V_{MAIN}) =	user	ft^3
Calculated Total Basin Volume (V_{total}) =	user	acre-feet

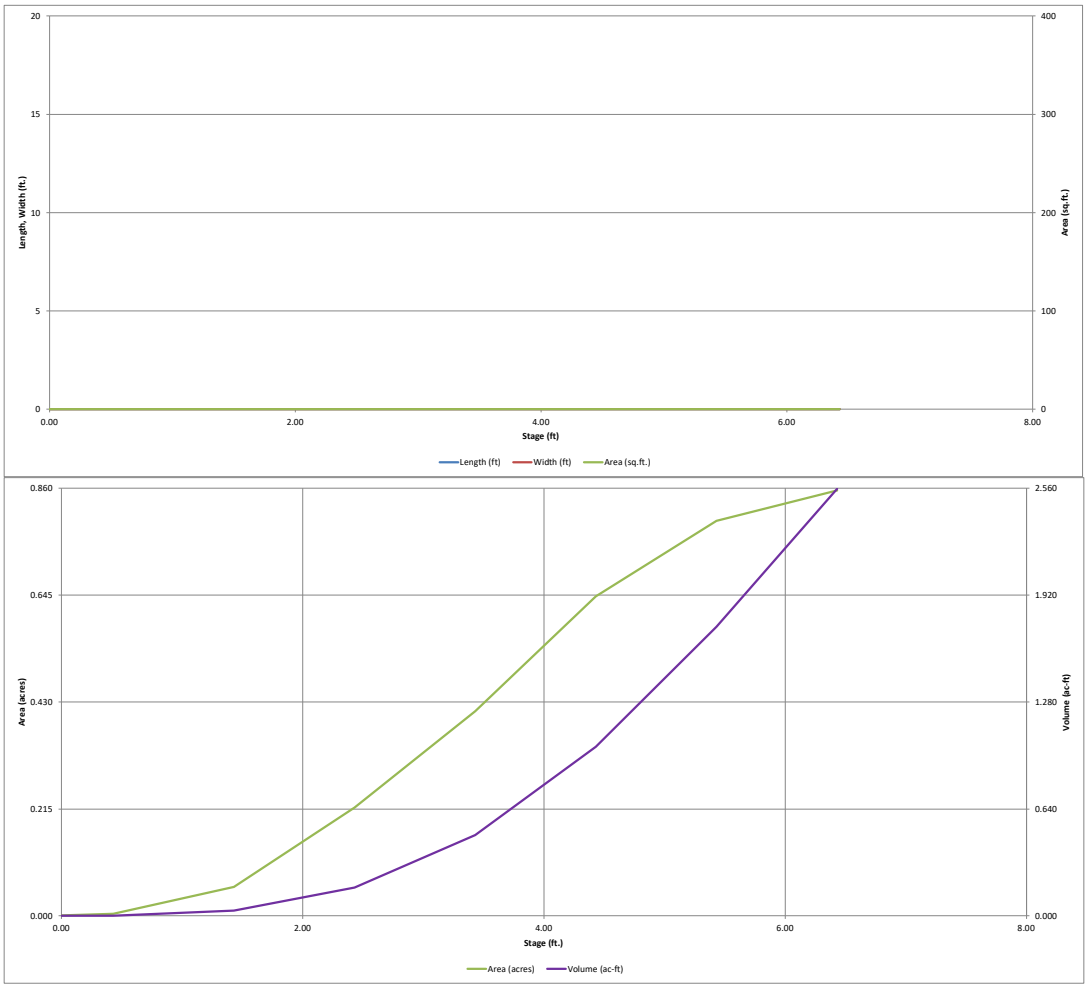
42.57

Depth Increment = 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	--	--	--	33	0.001		
5843	--	0.43	--	--	--	174	0.004	43	0.001
5844	--	1.43	--	--	--	2,546	0.058	1,379	0.032
5845	--	2.43	--	--	--	9,480	0.218	7,417	0.170
5846	--	3.43	--	--	--	17,926	0.412	21,120	0.485
5847	--	4.43	--	--	--	28,004	0.643	44,085	1.012
5848	--	5.43	--	--	--	34,615	0.795	75,395	1.731
5848.6	--	6.43	--	--	--	37,283	0.856	111,344	2.556

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)



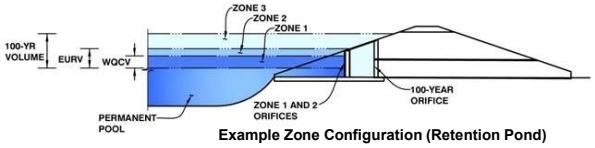
Please highlight all of the inputs that differ from the original design to the as-built condition as I have done below.

Detention Basin Outlet Structure Design

UD-Detention, Version 3.07 (February 2017)

Project: ACR

Basin ID: EDB Pond On-Site - As-Built Check



Example Zone Configuration (Retention Pond)

	Stage (ft)	Zone Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	2.19	0.122	Orifice Plate
Zone 2 (EURV)	2.83	0.150	Orifice Plate
Zone 3 (100-year)	3.74	0.350	Weir&Pipe (Restrict)
		0.622	Total

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

			Calculated Parameters for Underdrain		
Underdrain Orifice Invert Depth =	N/A	ft (distance below the filtration media surface)	Underdrain Orifice Area =	N/A	ft^2
Underdrain Orifice Diameter =	N/A	inches	Underdrain Orifice Centroid =	N/A	feet

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

			Calculated Parameters for Plate		
Invert of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)	WQ Orifice Area per Row =	N/A	ft^2
Depth at top of Zone using Orifice Plate =	2.83	ft (relative to basin bottom at Stage = 0 ft)	Elliptical Half-Width =	N/A	feet
Orifice Plate: Orifice Vertical Spacing =	N/A	inches	Elliptical Slot Centroid =	N/A	feet
Orifice Plate: Orifice Area per Row =	N/A	inches	Elliptical Slot Area =	N/A	ft^2

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

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	0.76	1.88					
Orifice Area (sq. inches)	0.47	0.47	0.47					

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

User Input: Vertical Orifice (Circular or Rectangular)

	Not Selected	Not Selected		**Calculated Parameters for Vertical Orifice**	Not Selected	Not Selected	
Invert of Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Area =	N/A	N/A	ft^2
Depth at top of Zone using Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Centroid =	N/A	N/A	feet
Vertical Orifice Diameter =	N/A	N/A	inches				

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

	Zone 3 Weir	Not Selected		**Calculated Parameters for Overflow Weir**	Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, Ho =	3.03	N/A	ft (relative to basin bottom at Stage = 0 ft)	Height of Grate Upper Edge, H_t =	3.03	N/A	feet
Overflow Weir Front Edge Length =	3.00	N/A	feet	Over Flow Weir Slope Length =	3.00	N/A	feet
Overflow Weir Slope =	0.00	N/A	H:V (enter zero for flat grate)	Grate Open Area / 100-yr Orifice Area =	7.38	N/A	should be ≥ 4
Horiz. Length of Weir Sides =	3.00	N/A	feet	Overflow Grate Open Area w/o Debris =	6.30	N/A	ft^2
Overflow Grate Open Area % =	70%	N/A	%, grate open area/total area	Overflow Grate Open Area w/ Debris =	3.15	N/A	ft^2
Debris Clogging % =	50%	N/A	%				

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

	Zone 3 Restrictor	Not Selected		**Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate**	Zone 3 Restrictor	Not Selected	
Depth to Invert of Outlet Pipe =	2.57	N/A	ft (distance below basin bottom at Stage = 0 ft)	Outlet Orifice Area =	0.85	N/A	ft^2
Outlet Pipe Diameter =	18.00	N/A	inches	Outlet Orifice Centroid =	0.42	N/A	feet
Restrictor Plate Height Above Pipe Invert =	8.76		inches	Half-Central Angle of Restrictor Plate on Pipe =	1.54	N/A	radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

			Calculated Parameters for Spillway		
Spillway Invert Stage=	6.70	ft (relative to basin bottom at Stage = 0 ft)	Spillway Design Flow Depth=	0.53	feet
Spillway Crest Length =	15.00	feet	Stage at Top of Freeboard =	8.23	feet
Spillway End Slopes =	4.00	H:V	Basin Area at Top of Freeboard =	0.86	acres
Freeboard above Max Water Surface =	1.00	feet			

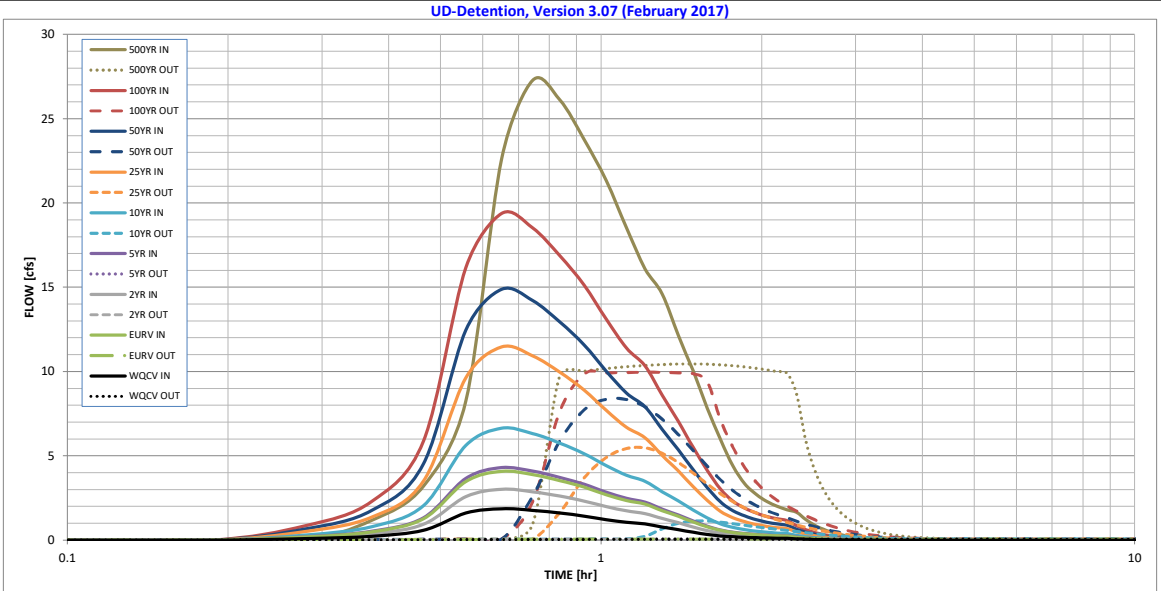
5:1 shown on plans. Revise to remove discrepancy.

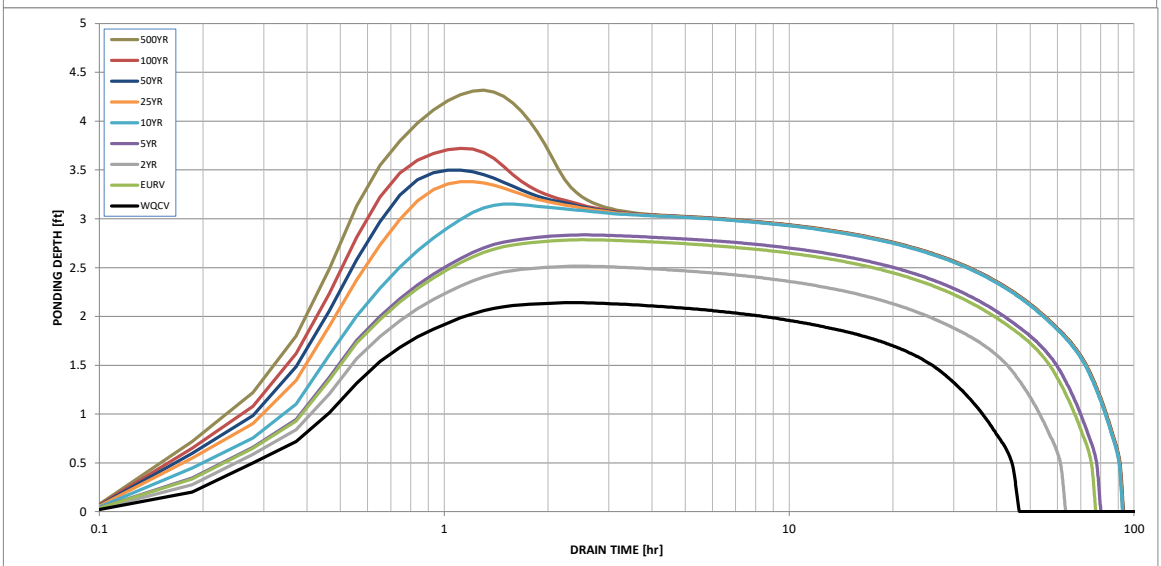
Routed Hydrograph Results

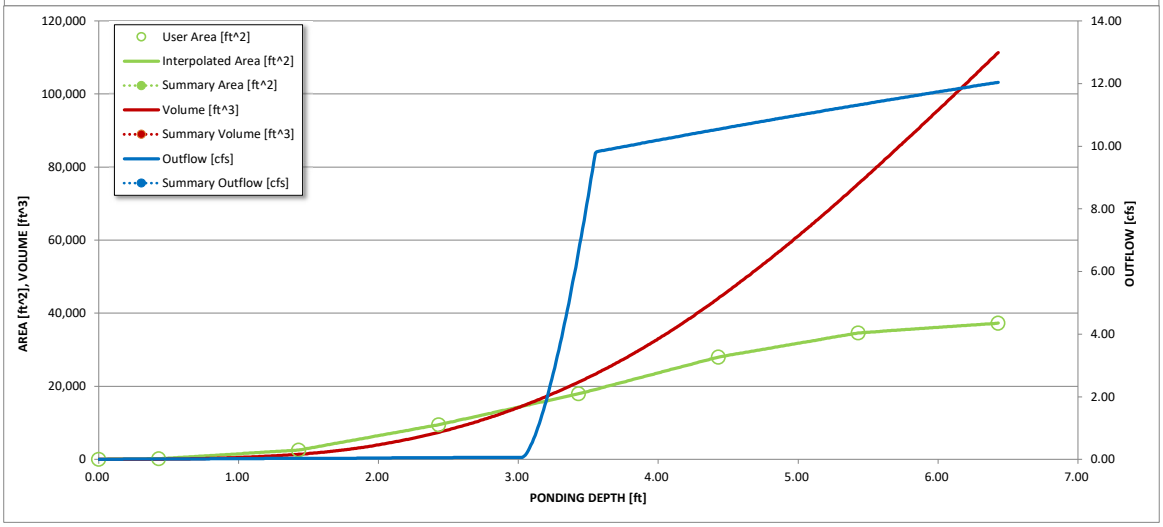
Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
One-Hour Rainfall Depth (in) =	0.53	1.07	1.19	1.50	1.75	2.00	2.25	2.52	3.00
Calculated Runoff Volume (acre-ft) =	0.122	0.272	0.200	0.286	0.444	0.772	1.005	1.314	1.856
OPTIONAL Override Runoff Volume (acre-ft) =									
Inflow Hydrograph Volume (acre-ft) =	0.122	0.271	0.200	0.286	0.444	0.771	1.005	1.313	1.856
Predevelopment Unit Peak Flow, q (cfs/acre) =	0.00	0.00	0.01	0.02	0.14	0.47	0.68	0.96	1.42
Predevelopment Peak Q (cfs) =	0.0	0.0	0.1	0.2	1.5	5.2	7.5	10.5	15.5
Peak Inflow Q (cfs) =	1.9	4.1	3.0	4.3	6.6	11.5	14.9	19.4	27.3
Peak Outflow Q (cfs) =	0.0	0.1	0.1	0.1	1.1	5.5	8.4	10.0	10.5
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.4	0.7	1.1	1.1	1.0	0.7
Structure Controlling Flow =	Plate	Plate	Plate	Plate	Overflow Grate 1	Overflow Grate 1	Overflow Grate 1	Outlet Plate 1	Outlet Plate 1
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	N/A	0.2	0.9	1.3	1.6	1.6
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	42	70	57	72	82	78	75	72	66
Time to Drain 99% of Inflow Volume (hours) =	45	74	61	76	88	85	84	83	80
Maximum Ponding Depth (ft) =	2.14	2.79	2.51	2.83	3.15	3.38	3.50	3.72	4.32
Area at Maximum Ponding Depth (acres) =	0.17	0.29	0.23	0.30	0.36	0.40	0.43	0.48	0.62
Maximum Volume Stored (acre-ft) =	0.114	0.258	0.188	0.273	0.374	0.465	0.510	0.614	0.937

Detention Basin Outlet Structure Design

UD-Detention, Version 3.07 (February 2017)







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

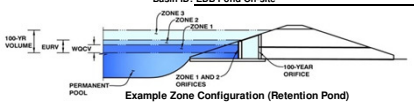
REFERENCE INFORMATION

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)

Project: ACR

Basin ID: EDB Pond On-site



Example Zone Configuration (Retention Pond)

Required Volume Calculation

Selected BMP Type =	EDB	
Watershed Area =	10.89	acres
Watershed Length =	1,000	ft
Watershed Slope =	0.011	ft/ft
Watershed Imperviousness =	25.00%	percent
Percentage Hydrologic Soil Group A =	19.9%	percent
Percentage Hydrologic Soil Group B =	80.1%	percent
Percentage Hydrologic Soil Groups C/D =	0.0%	percent
Desired WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	User Input	
Water Quality Capture Volume (WQCV) =	0.122	acre-feet
Excess Urban Runoff Volume (EURV) =	0.272	acre-feet
2-yr Runoff Volume (P1 = 1.19 in.) =	0.200	acre-feet
5-yr Runoff Volume (P1 = 1.5 in.) =	0.286	acre-feet
10-yr Runoff Volume (P1 = 1.75 in.) =	0.444	acre-feet
25-yr Runoff Volume (P1 = 2 in.) =	0.772	acre-feet
50-yr Runoff Volume (P1 = 2.25 in.) =	1.005	acre-feet
100-yr Runoff Volume (P1 = 2.52 in.) =	1.314	acre-feet
500-yr Runoff Volume (P1 = 3 in.) =	1.856	acre-feet
Approximate 2-yr Detention Volume =	0.187	acre-feet
Approximate 5-yr Detention Volume =	0.268	acre-feet
Approximate 10-yr Detention Volume =	0.397	acre-feet
Approximate 25-yr Detention Volume =	0.478	acre-feet
Approximate 50-yr Detention Volume =	0.513	acre-feet
Approximate 100-yr Detention Volume =	0.622	acre-feet

Optional User Override 1-hr Precipitation

1.19	inches
1.50	inches
1.75	inches
2.00	inches
2.25	inches
2.52	inches
3.00	inches

Stage-Storage Calculation

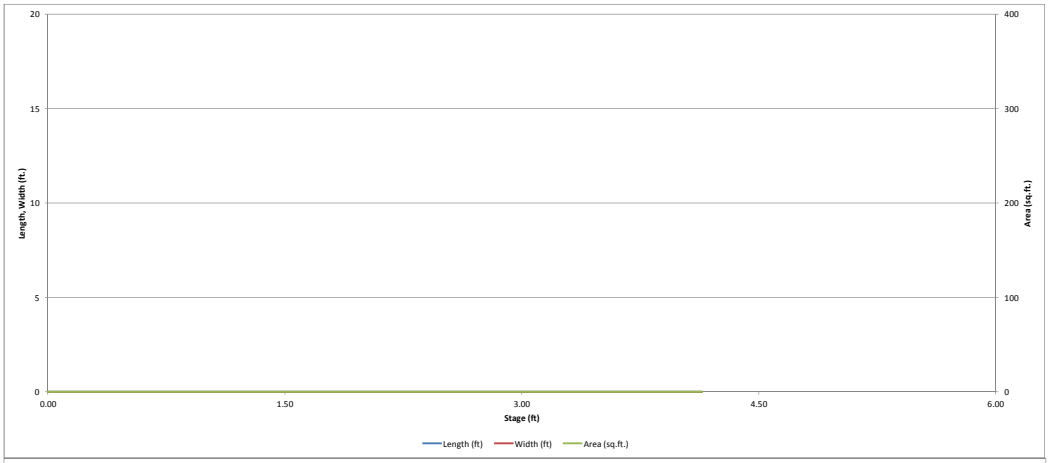
Zone 1 Volume (WQCV) =	0.122	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.150	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	0.350	acre-feet
Total Detention Basin Volume =	0.622	acre-feet
Initial Surcharge Volume (ISV) =	user	ft^3
Initial Surcharge Depth (ISD) =	user	ft
Total Available Detention Depth (H_{total}) =	user	ft
Depth of Trickle Channel (H_{TC}) =	user	ft
Slope of Trickle Channel (S_{TC}) =	user	ft/ft
Slopes of Main Basin Sides (S_{main}) =	user	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	user	
Initial Surcharge Area (A_{ISV}) =	user	ft^2
Surcharge Volume Length (L_{ISV}) =	user	ft
Surcharge Volume Width (W_{ISV}) =	user	ft
Depth of Basin Floor (H_{FLOOR}) =	user	ft
Length of Basin Floor (L_{FLOOR}) =	user	ft
Width of Basin Floor (W_{FLOOR}) =	user	ft
Area of Basin Floor (A_{FLOOR}) =	user	ft^2
Volume of Basin Floor (V_{FLOOR}) =	user	ft^3
Depth of Main Basin (H_{MAIN}) =	user	ft
Length of Main Basin (L_{MAIN}) =	user	ft
Width of Main Basin (W_{MAIN}) =	user	ft
Area of Main Basin (A_{MAIN}) =	user	ft^2
Volume of Main Basin (V_{MAIN}) =	user	ft^3
Calculated Total Basin Volume (V_{total}) =	user	acre-feet

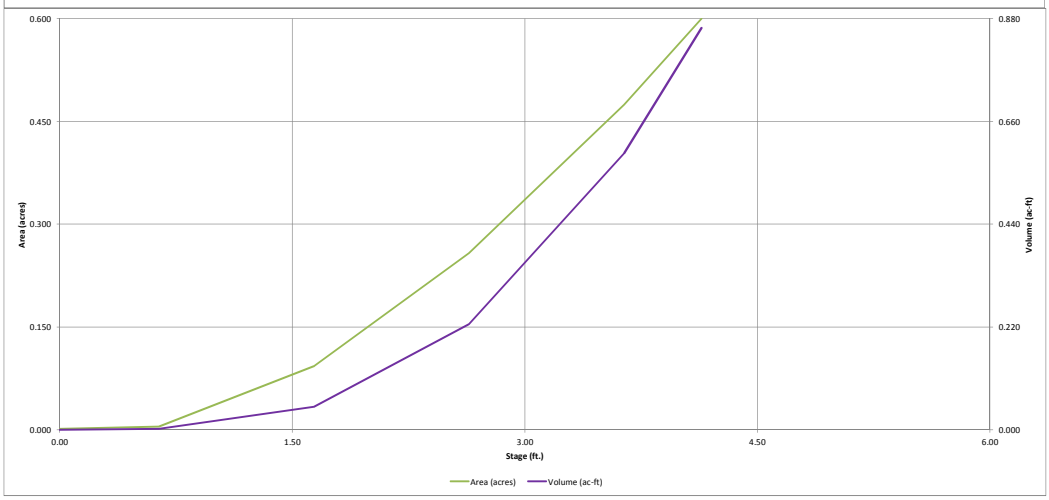
Depth Increment = 1 ft

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	--	--	--	50	0.001		
5844	--	0.64	--	--	--	192	0.004	76	0.002
5845	--	1.64	--	--	--	4,043	0.093	2,155	0.049
5846	--	2.64	--	--	--	11,236	0.258	9,834	0.226
5847	--	3.64	--	--	--	20,665	0.474	25,785	0.592
5847.5	--	4.14	--	--	--	26,131	0.600	37,484	0.861

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)



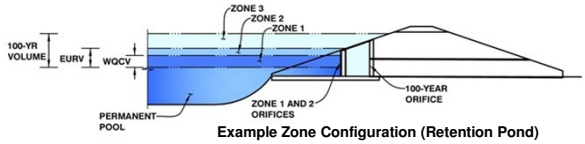


Detention Basin Outlet Structure Design

UD-Detention, Version 3.07 (February 2017)

Project: ACR

Basin ID: EDB Pond On-site



Example Zone Configuration (Retention Pond)

	Stage (ft)	Zone Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	2.17	0.122	Orifice Plate
Zone 2 (EURV)	2.81	0.150	Orifice Plate
Zone 3 (100-year)	3.71	0.350	Weir&Pipe (Restrict)
		0.622	Total

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

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

Calculated Parameters for Underdrain

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

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

Invert of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Orifice Plate =	2.72	ft (relative to basin bottom at Stage = 0 ft)
Orifice Plate: Orifice Vertical Spacing =	N/A	inches
Orifice Plate: Orifice Area per Row =	0.47	sq. inches (diameter = 3/4 inch)

Calculated Parameters for Plate

WQ Orifice Area per Row =	3.264E-03	ft^2
Elliptical Half-Width =	N/A	feet
Elliptical Slot Centroid =	N/A	feet
Elliptical Slot Area =	N/A	ft^2

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

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	0.75	1.83					
Orifice Area (sq. inches)	0.47	0.47	0.47					

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

User Input: Vertical Orifice (Circular or Rectangular)

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

Calculated Parameters for Vertical Orifice

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

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

	Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, Ho =	3.03	N/A	ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length =	3.00	N/A	feet
Overflow Weir Slope =	0.00	N/A	H:V (enter zero for flat grate)
Horiz. Length of Weir Sides =	3.00	N/A	feet
Overflow Grate Open Area % =	70%	N/A	%, grate open area/total area
Debris Clogging % =	50%	N/A	%

Calculated Parameters for Overflow Weir

	Zone 3 Weir	Not Selected	
Height of Grate Upper Edge, H_t =	3.03	N/A	feet
Over Flow Weir Slope Length =	3.00	N/A	feet
Grate Open Area / 100-yr Orifice Area =	7.67	N/A	should be ≥ 4
Overflow Grate Open Area w/o Debris =	6.30	N/A	ft^2
Overflow Grate Open Area w/ Debris =	3.15	N/A	ft^2

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

	Zone 3 Restrictor	Not Selected	
Depth to Invert of Outlet Pipe =	2.50	N/A	ft (distance below basin bottom at Stage = 0 ft)
Outlet Pipe Diameter =	18.00	N/A	inches
Restrictor Plate Height Above Pipe Invert =	8.50		inches

Q100

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

	Zone 3 Restrictor	Not Selected	
Outlet Orifice Area =	0.82	N/A	ft^2
Outlet Orifice Centroid =	0.41	N/A	feet
Half-Central Angle of Restrictor Plate on Pipe =	1.52	N/A	radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage=	4.14	ft (relative to basin bottom at Stage = 0 ft)
Spillway Crest Length =	15.00	feet
Spillway End Slopes =	0.17	H:V
Freeboard above Max Water Surface =	1.00	feet

Calculated Parameters for Spillway

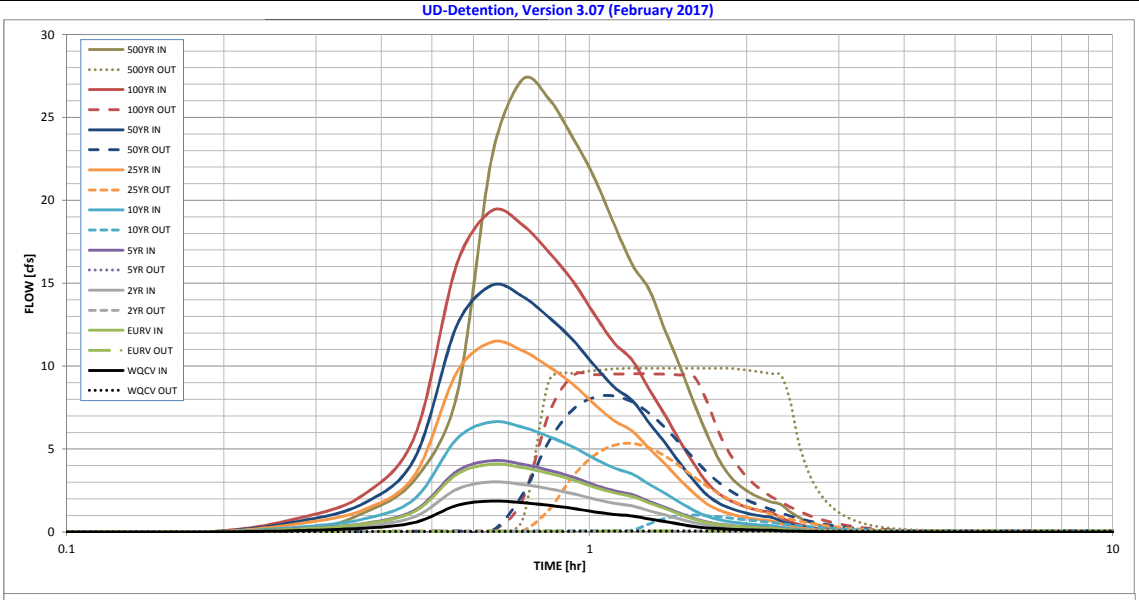
Spillway Design Flow Depth=	0.56	feet
Stage at Top of Freeboard =	5.70	feet
Basin Area at Top of Freeboard =	0.60	acres

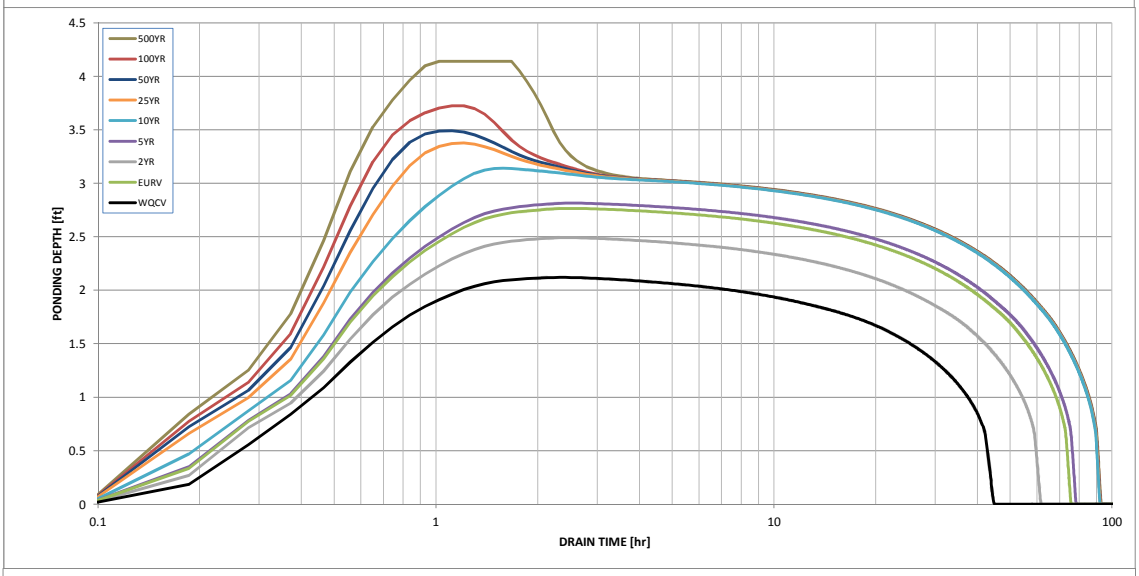
Routed Hydrograph Results

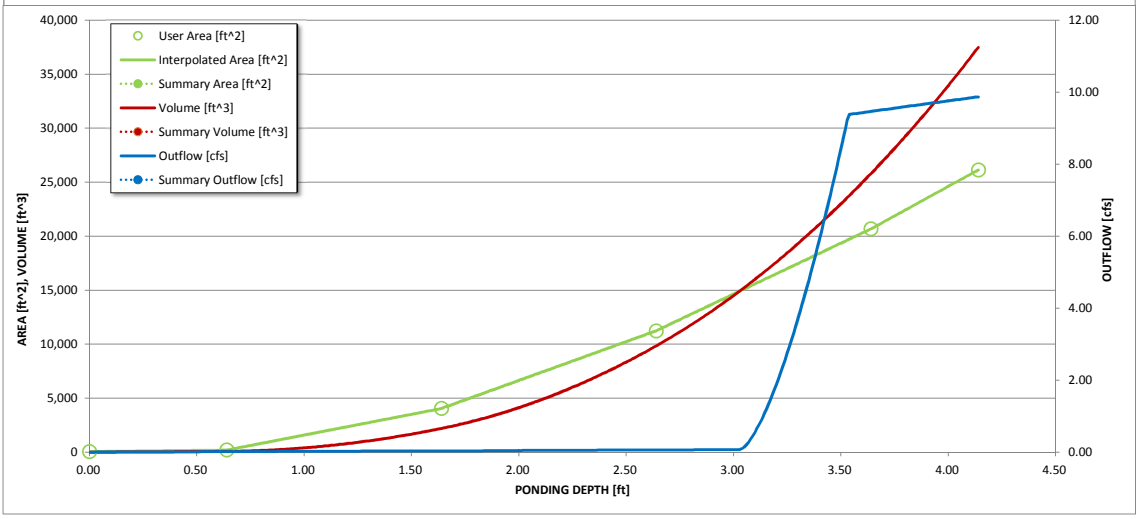
Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
One-Hour Rainfall Depth (in) =	0.53	1.07	1.19	1.50	1.75	2.00	2.25	2.52	3.00
Calculated Runoff Volume (acre-ft) =	0.122	0.272	0.200	0.286	0.444	0.772	1.005	1.314	1.856
OPTIONAL Override Runoff Volume (acre-ft) =									
Inflow Hydrograph Volume (acre-ft) =	0.122	0.271	0.200	0.286	0.444	0.771	1.005	1.313	1.856
Predevelopment Unit Peak Flow, q (cfs/acre) =	0.00	0.00	0.01	0.02	0.14	0.47	0.68	0.96	1.43
Predevelopment Peak Q (cfs) =	0.0	0.0	0.1	0.2	1.5	5.2	7.5	10.5	15.5
Peak Inflow Q (cfs) =	1.9	4.1	3.0	4.3	6.6	11.5	14.9	19.4	27.3
Peak Outflow Q (cfs) =	0.0	0.1	0.1	0.1	1.0	5.3	8.2	9.5	9.9
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.4	0.7	1.0	1.1	0.9	0.6
Structure Controlling Flow =	Plate	Plate	Plate	Plate	Overflow Grate 1	Overflow Grate 1	Overflow Grate 1	Outlet Plate 1	N/A
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	N/A	0.1	0.9	1.3	1.5	1.6
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	41	69	56	71	83	79	76	73	67
Time to Drain 99% of Inflow Volume (hours) =	**43**	72	59	75	88	86	85	83	81
Maximum Ponding Depth (ft) =	2.12	2.77	2.49	2.81	3.14	3.38	3.49	3.72	4.14
Area at Maximum Ponding Depth (acres) =	0.17	0.28	0.23	0.29	0.37	0.42	0.44	0.49	0.60
Maximum Volume Stored (acre-ft) =	0.112	0.258	0.189	0.273	0.382	0.472	0.523	0.631	0.861

Detention Basin Outlet Structure Design

UD-Detention, Version 3.07 (February 2017)







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