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September 24, 2026

El Paso County Engineering Division
Department of Public Works
3275 Akers Drive
Colorado Springs, Colorado 80922

Re: Professional Engineer's Certification of Permanent Control Measure
Flying Horse North Filing No. 4, Pond A

This letter serves as a Pond Certification for the constructed Full Spectrum Detention Facility "Pond A" located in Flying Horse North Filing No. 4. The permanent control measure is located at the southeast area of the subdivision, near Black Forest Road and north of Rubble Drive.

The detention facility was designed by a Colorado Licensed Professional Engineer of HR Green Development, LLC. and the design is within the County approved Construction Drawings dated February 20, 2025 and is referred to as "Pond A" within Tract A of the development. A Colorado Licensed Professional Surveyor conducted an as-built survey of the facility in September of 2025 to verify the basin and infrastructure dimensions, elevations, materials, inverts, and slopes as required for determination of inflow and outflow hydraulics.

A Stormwater Preliminary Acceptance Punchlist was issued by El Paso County Stormwater Engineering staff and inspections dated 6/11/2026 for a 1st Walkthrough dated 6/11/2026 for ESQCP No. ESQ258 with the related PCD File Nos. SF2422, CON258, and ASB2616.

The as-built conditions of the basin and its infrastructure were assessed and compared to the approved Construction Drawings and design worksheets within the approved Final Drainage Report. As-built conditions were assessed and redlined plans and reports were issued for field adjustments and verification of as-built conditions for the pond and its infrastructure, per the ASB documentation.

Preliminary Acceptance Punchlist items included the following and were directly addressed as described:

- Inflow Riprap Upstream of Forebay
 - The riprap inflow is inundated with sediment and is not installed per the approved plans. Buried riprap is shown on the approved plans. Install per approved plans or consult the Engineer of Record. See Note 1. **All exposed rip-rap is now buried soil rip-rap with top soil and permanent seeding for stabilization.**
 - Also, the riprap has no low-flow conveyance, such that as it has accumulated sediment in the middle of the width, the flows have been pushed to the outside of the riprap and is eroding around the sides of the riprap. Installing riprap with a V shape (per plans) or U shape would better prevent flows from causing erosion of the swale side slopes, and/or install riprap on side slopes. **A more defined V-shaped swale has been constructed. The rip-rap pad is revised per the as-built redlines and the remaining channelized section is TRM lined with permanent seeding for stabilization.**
- Forebay
 - Remove sediment from the forebay. **Sediment removed.**
- Trickle Channel
 - Remove sediment from the trickle channel. **Sediment removed.**



- Outlet Structure
 - The distance between orifice holes is not installed per the approved plans. The holes are 12in apart and should be 10.8in apart. Install per approved plans or consult the Engineer of Record. See Note 1. ***As-built redlines supplied to reflect the revision to the orifice plate. MHFD Detention calculations supplied with the Pond Certification letter support the change.***
 - Gasket appears to be leaking. Ensure the gasket is watertight and does not allow water to leak out the sides. ***New gasket fittings installed to ensure watertight condition.***
 - Remove sediment and debris from the outlet structure. ***Sediment removed.***
 - Ladder steps missing in micro pool. Install per approved plans or consult the Engineer of Record. See Note 1. ***Ladder steps installed to match Construction Drawings.***
- Outfall Riprap
 - Outfall riprap is not installed per the approved plans. Plans show buried riprap and in the field it is installed as exposed riprap. Install per approved plans or consult the Engineer of Record. See Note 1. ***Outfall/spillway rip-rap is exposed rip-rap and is now reflected on the as-builts, as approved by the Engineer of Record.***
 - Also, the riprap apron is not shaped to convey flows. It is piled up such that there is no positive drainage and flows will just bypass the riprap and cause erosion. So please reconfigure riprap to properly convey flows. ***A more defined conveyance V-shape swale has been constructed.***
- Maintenance access road installed with crushed concrete, which per direction from CDPHE is not an acceptable means of Final Stabilization, nor was that material on the approved plans, so please remove and install access road material per plans. ***As-built plans and redlines now call out crushed concrete as approved by the Engineer of Record. This was discussed with Stormwater staff in July 2026 and is to be allowable for this filing.***



With the field adjustments and verification of as-built conditions as of September 18, 2026, the facility was found to be in general compliance with the design, and it is anticipated that the facility will function as intended with no negative impacts to surrounding and downstream developments, property, or infrastructure. General compliance allows for construction tolerances and is based on the information provided by the as-built survey.

The facility is in a stabilized condition and there are no proposed modifications required at this time.

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. The PCM(s) provide the required storage volume and meet the required release rates, stage areas, elevations, and outlet dimensions, as documented by the attached revised MHFD-Detention spreadsheet that shows the as-built conditions.

Sincerely,

Richard D. Lyon

Richard D. Lyon, PE (No. 53921)
Senior Project Manager, Civil Engineer
HR Green Development, LLC.

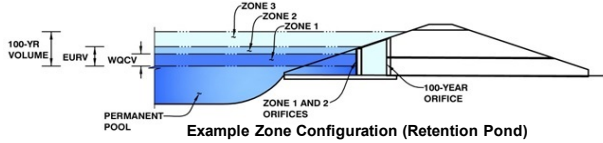


DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.06 (July 2022)

Project: FLYING HORSE NORTH FILING NO. 4

Basin ID: POND A



Watershed Information

Selected BMP Type =	EDB	
Watershed Area =	128.48	acres
Watershed Length =	3,560	ft
Length to Centroid =	1,400	ft
Watershed Slope =	0.040	ft/ft
Imperviousness =	8.96%	percent
Hydrologic Soil Group A =	0.0%	percent
Hydrologic Soil Group B =	100.0%	percent
Hydrologic Soil Groups C/D =	0.0%	percent
Detention WQCV Drain Time =	40.0	hours
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.

Water Quality Capture Volume (WQCV) =	0.653	acre-feet
Excess Urban Runoff Volume (EURV) =	1.073	acre-feet
2-yr Runoff Volume (P1 = 1.19 in.) =	1.617	acre-feet
5-yr Runoff Volume (P1 = 1.5 in.) =	3.665	acre-feet
10-yr Runoff Volume (P1 = 1.75 in.) =	5.721	acre-feet
25-yr Runoff Volume (P1 = 2 in.) =	9.429	acre-feet
50-yr Runoff Volume (P1 = 2.25 in.) =	11.939	acre-feet
100-yr Runoff Volume (P1 = 2.52 in.) =	15.571	acre-feet
500-yr Runoff Volume (P1 = 3.14 in.) =	22.164	acre-feet
Approximate 2-yr Detention Volume =	0.677	acre-feet
Approximate 5-yr Detention Volume =	1.072	acre-feet
Approximate 10-yr Detention Volume =	2.337	acre-feet
Approximate 25-yr Detention Volume =	3.321	acre-feet
Approximate 50-yr Detention Volume =	3.463	acre-feet
Approximate 100-yr Detention Volume =	4.504	acre-feet

Define Zones and Basin Geometry

Zone 1 Volume (WQCV) =	0.653	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.420	acre-feet
Zone 3 Volume (User Defined - Zones 1 & 2) =	1.760	acre-feet
Total Detention Basin Volume =	2.833	acre-feet

Optional User Overrides

	acre-feet
	acre-feet
1.19	inches
1.50	inches
1.75	inches
2.00	inches
2.25	inches
2.52	inches
	inches

Total detention volume is less than 100-year volume.

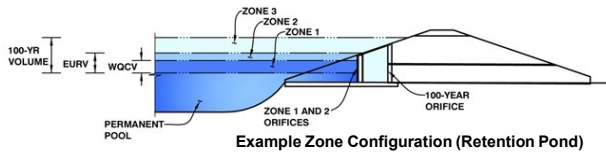
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DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

Project: **FLYING HORSE NORTH FILING NO. 4**

Basin ID: **POND A**



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	2.86	0.65	Orifice Plate
Zone 2 (EURV)	3.38	0.42	Circular Orifice
Zone 3 (User)	4.98	1.76	Weir&Pipe (Restrict)
Total (all zones)		2.83	

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

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

Calculated Parameters for Underdrain
Underdrain Orifice Area = ft²
Underdrain Orifice Centroid = 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)

Centroid of Lowest Orifice = ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Orifice Plate = ft (relative to basin bottom at Stage = 0 ft)
Orifice Plate: Orifice Vertical Spacing = inches
Orifice Plate: Orifice Area per Row = sq. inches (diameter = 1-5/8 inches)

Calculated Parameters for Plate
WQ Orifice Area per Row = ft²
Elliptical Half-Width = feet
Elliptical Slot Centroid = feet
Elliptical Slot Area = ft²

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

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	1.00	2.00					
Orifice Area (sq. inches)	2.11	2.11	2.11					

	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)

Invert of Vertical Orifice = ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Vertical Orifice = ft (relative to basin bottom at Stage = 0 ft)
Vertical Orifice Diameter = inches

Calculated Parameters for Vertical Orif
Zone 2 Circular = ft²
Not Selected = ft²
Vertical Orifice Centroid = feet
Not Selected = feet

User Input: Overflow Weir (Dropbox with Flat or Sloped Grate and Outlet Pipe OR Rectangular/Trapezoidal Weir and No Outlet Pipe)

Overflow Weir Front Edge Height, Ho = ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length = feet
Overflow Weir Grate Slope = H:V
Horiz. Length of Weir Sides = feet
Overflow Grate Type =
Debris Clogging % = %

Calculated Parameters for Overflow W
Zone 3 Weir = ft
Not Selected = ft
Overflow Weir Slope Length = feet
Grate Open Area / 100-yr Orifice Area =
Overflow Grate Open Area w/o Debris = ft²
Overflow Grate Open Area w/ Debris = ft²

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

Depth to Invert of Outlet Pipe = ft (distance below basin bottom at Stage = 0 ft)
Outlet Pipe Diameter = inches
Restrictor Plate Height Above Pipe Invert = inches

Calculated Parameters for Outlet Pipe w/ Flow Restriction Pl
Zone 3 Restrictor = ft²
Not Selected = ft²
Outlet Orifice Area = ft²
Outlet Orifice Centroid = feet
Half-Central Angle of Restrictor Plate on Pipe = degrees

User Input: Emergency Spillway (Rectangular or Trapezoidal)

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

Calculated Parameters for Spillway
Spillway Design Flow Depth = feet
Stage at Top of Freeboard = feet
Basin Area at Top of Freeboard = acres
Basin Volume at Top of Freeboard = acre-ft

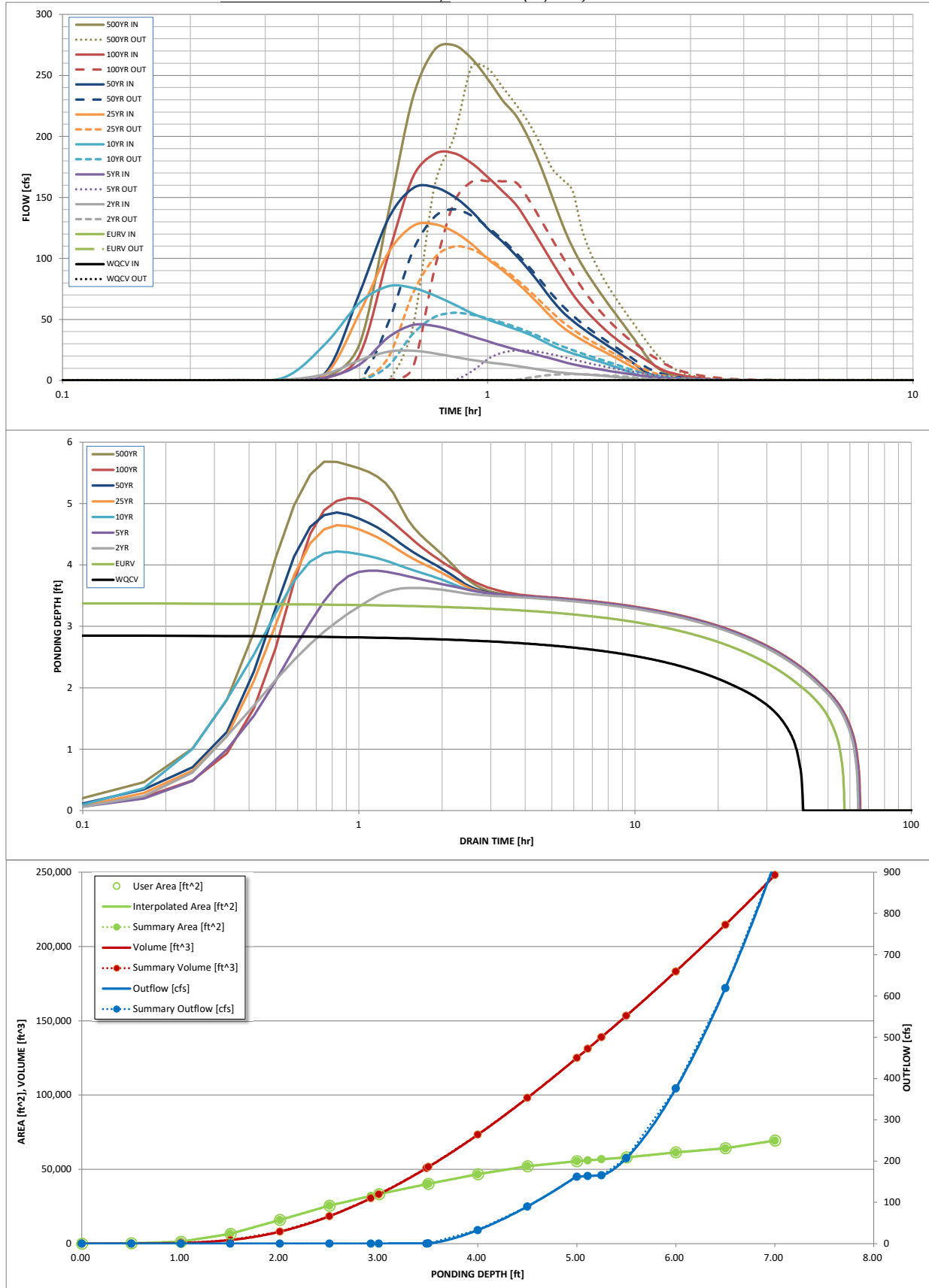
Routed Hydrograph Results

The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AV)

	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
Design Storm Return Period	N/A	N/A	1.19	1.50	1.75	2.00	2.25	2.52
One-Hour Rainfall Depth (in)	N/A	N/A	1.19	1.50	1.75	2.00	2.25	2.52
CUHP Runoff Volume (acre-ft)	0.653	1.073	1.617	3.665	5.721	9.429	11.939	15.571
User Override Inflow Hydrograph Volume (acre-ft)	N/A	N/A	1.617	3.257	5.721	9.429	11.939	15.120
CUHP Predevelopment Peak Q (cfs)	N/A	N/A	16.2	44.9	67.6	120.7	151.3	192.2
OPTIONAL Override Predevelopment Peak Q (cfs)	N/A	N/A						160
Predevelopment Unit Peak Flow, q (cfs/acre)	N/A	N/A	0.13	0.35	0.53	0.94	1.18	1.25
Peak Inflow Q (cfs)	N/A	N/A	24.4	45.5	77.1	128.1	158.4	186.3
Peak Outflow Q (cfs)	0.3	0.3	5.1	24.5	55.4	109.7	140.3	163
Ratio Peak Outflow to Predevelopment Q	N/A	N/A	N/A	0.5	0.8	0.9	0.9	1.0
Structure Controlling Flow	Plate	Vertical Orifice 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Outlet Plate 1
Max Velocity through Grate 1 (fps)	N/A	N/A	0.06	0.3	0.7	1.4	1.8	2.1
Max Velocity through Grate 2 (fps)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours)	37	53	58	55	49	42	38	34
Time to Drain 99% of Inflow Volume (hours)	39	55	61	60	58	55	53	51
Maximum Ponding Depth (ft)	2.86	3.38	3.62	3.91	4.22	4.64	4.85	5.09
Area at Maximum Ponding Depth (acres)	0.72	0.89	0.96	1.04	1.12	1.22	1.25	1.28
Maximum Volume Stored (acre-ft)	0.66	1.08	1.30	1.58	1.91	2.42	2.68	2.97
Elevation (ft)	7534.86	7535.38		7535.91				7537.09
Pond Bottom (ft)	7532.00							

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)



DETENTION BASIN OUTLET STRUCTURE DESIGN

Outflow Hydrograph Workbook Filename: _____

Inflow Hydrographs

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

	SOURCE	CUHP	CUHP	CUHP	USER	CUHP	CUHP	CUHP	USER	CUHP
Time Interval	TIME	WQCV [cfs]	EURV [cfs]	2 Year [cfs]	5 Year [cfs]	10 Year [cfs]	25 Year [cfs]	50 Year [cfs]	100 Year [cfs]	500 Year [cfs]
5.00 min	0:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:10:00	0.00	0.00	0.00	0.01	0.00	0.00	0.02	0.02	0.05
	0:15:00	0.00	0.00	0.13	0.10	0.27	0.18	0.24	0.11	0.36
	0:20:00	0.00	0.00	0.57	0.30	2.62	0.59	0.71	0.29	2.52
	0:25:00	0.00	0.00	5.36	2.41	30.47	5.12	6.71	1.88	29.80
	0:30:00	0.00	0.00	16.52	13.05	63.62	55.17	71.61	20.97	135.59
	0:35:00	0.00	0.00	23.52	35.13	77.06	104.24	131.89	101.89	231.36
	0:40:00	0.00	0.00	24.39	45.45	75.83	126.55	157.48	166.39	270.75
	0:45:00	0.00	0.00	22.19	44.62	69.58	128.06	158.42	185.68	274.76
	0:50:00	0.00	0.00	19.35	40.59	62.34	121.87	150.62	186.26	263.84
	0:55:00	0.00	0.00	16.90	36.20	55.25	111.77	138.68	178.12	247.25
	1:00:00	0.00	0.00	14.86	32.09	49.89	99.68	124.46	166.72	229.77
	1:05:00	0.00	0.00	13.41	28.35	45.72	90.36	113.74	155.23	216.91
	1:10:00	0.00	0.00	11.90	25.28	41.81	80.69	102.30	143.95	198.12
	1:15:00	0.00	0.00	10.32	22.68	37.94	70.85	90.47	128.32	175.41
	1:20:00	0.00	0.00	8.74	20.23	33.22	60.95	78.14	112.28	151.11
	1:25:00	0.00	0.00	7.33	17.78	28.60	51.51	66.12	97.19	127.77
	1:30:00	0.00	0.00	6.33	15.39	25.05	43.75	56.32	83.19	109.01
	1:35:00	0.00	0.00	5.65	13.34	22.22	37.92	48.97	70.84	94.69
	1:40:00	0.00	0.00	5.07	11.76	19.74	33.24	43.00	60.91	83.00
	1:45:00	0.00	0.00	4.52	10.39	17.46	29.12	37.73	52.90	72.60
	1:50:00	0.00	0.00	3.97	9.08	15.33	25.41	32.98	45.89	63.18
	1:55:00	0.00	0.00	3.42	7.91	13.19	21.93	28.52	39.70	54.39
	2:00:00	0.00	0.00	2.86	6.89	10.99	18.58	24.25	34.29	46.15
	2:05:00	0.00	0.00	2.28	6.00	8.77	15.28	20.00	29.57	38.16
	2:10:00	0.00	0.00	1.71	5.15	6.60	12.00	15.77	25.32	30.31
	2:15:00	0.00	0.00	1.15	4.35	4.57	8.75	11.60	21.47	22.62
	2:20:00	0.00	0.00	0.67	3.59	3.11	5.62	7.60	17.84	15.56
	2:25:00	0.00	0.00	0.41	2.88	2.30	3.47	4.89	14.39	10.60
	2:30:00	0.00	0.00	0.29	2.22	1.79	2.21	3.28	11.19	7.41
	2:35:00	0.00	0.00	0.23	1.72	1.40	1.44	2.24	8.60	5.16
	2:40:00	0.00	0.00	0.18	1.38	1.09	0.93	1.52	6.79	3.50
	2:45:00	0.00	0.00	0.14	1.16	0.83	0.61	1.04	5.51	2.29
	2:50:00	0.00	0.00	0.10	0.99	0.62	0.40	0.70	4.50	1.41
	2:55:00	0.00	0.00	0.08	0.85	0.45	0.25	0.46	3.69	0.83
	3:00:00	0.00	0.00	0.06	0.72	0.31	0.17	0.32	3.02	0.54
	3:05:00	0.00	0.00	0.05	0.60	0.22	0.12	0.23	2.46	0.39
	3:10:00	0.00	0.00	0.04	0.50	0.16	0.09	0.17	1.99	0.31
	3:15:00	0.00	0.00	0.03	0.40	0.12	0.07	0.13	1.60	0.24
	3:20:00	0.00	0.00	0.02	0.31	0.09	0.05	0.10	1.26	0.18
	3:25:00	0.00	0.00	0.02	0.23	0.06	0.04	0.07	0.94	0.13
	3:30:00	0.00	0.00	0.01	0.17	0.04	0.02	0.05	0.65	0.09
	3:35:00	0.00	0.00	0.01	0.12	0.02	0.02	0.03	0.46	0.06
	3:40:00	0.00	0.00	0.00	0.10	0.01	0.01	0.02	0.33	0.03
	3:45:00	0.00	0.00	0.00	0.08	0.00	0.00	0.01	0.24	0.01
	3:50:00	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.17	0.00
	3:55:00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.12	0.00
	4:00:00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.09	0.00
	4:05:00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.06	0.00
	4:10:00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.04	0.00
	4:15:00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.03	0.00
	4:20:00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.03	0.00
	4:25:00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.02	0.00
	4:30:00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.02	0.00
	4:35:00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.00
	4:40:00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.00
	4:45:00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.00
	4:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
	4:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
	5:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

MHFD-Detention, Version 4.06 (July 2022)

Summary Stage-Area-Volume-Discharge Relationships

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

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

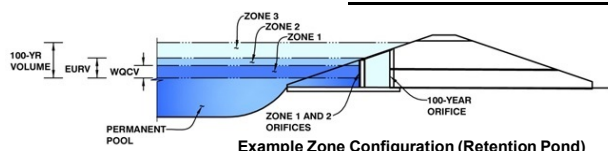
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DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

Project: FLYING HORSE NORTH FILING NO. 4

Basin ID: POND A



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	2.86	0.65	Orifice Plate
Zone 2 (EURV)	3.38	0.42	Circular Orifice
Zone 3 (User)	4.98	1.76	Weir&Pipe (Restrict)
Total (all zones)		2.83	

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

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

Calculated Parameters for Underdrain
 Underdrain Orifice Area = ft²
 Underdrain Orifice Centroid = 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)

Centroid of Lowest Orifice = ft (relative to basin bottom at Stage = 0 ft)
 Depth at top of Zone using Orifice Plate = ft (relative to basin bottom at Stage = 0 ft)
 Orifice Plate: Orifice Vertical Spacing = inches
 Orifice Plate: Orifice Area per Row = sq. inches (diameter = 1-5/8 inches)

Calculated Parameters for Plate
 WQ Orifice Area per Row = ft²
 Elliptical Half-Width = feet
 Elliptical Slot Centroid = feet
 Elliptical Slot Area = ft²

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

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	1.00	2.00					
Orifice Area (sq. inches)	2.08	2.08	2.08					
	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)

Zone 2 Circular Not Selected
 Invert of Vertical Orifice = ft (relative to basin bottom at Stage = 0 ft)
 Depth at top of Zone using Vertical Orifice = ft (relative to basin bottom at Stage = 0 ft)
 Vertical Orifice Diameter = inches

Calculated Parameters for Vertical Orif
 Zone 2 Circular Not Selected
 Vertical Orifice Area =
 Vertical Orifice Centroid =

User Input: Overflow Weir (Dropbox with Flat or Sloped Grate and Outlet Pipe OR Rectangular/Trapezoidal Weir and No Outlet Pipe)

Zone 3 Weir Not Selected
 Overflow Weir Front Edge Height, H_o = ft (relative to basin bottom at Stage = 0 ft)
 Overflow Weir Front Edge Length = feet
 Overflow Weir Grate Slope = H:V
 Horiz. Length of Weir Sides = feet
 Overflow Grate Type =
 Debris Clogging % = %

Calculated Parameters for Overflow W
 Zone 3 Weir Not Selected
 Height of Grate Upper Edge, H_g =
 Overflow Weir Slope Length =
 Grate Open Area / 100-yr Orifice Area =
 Overflow Grate Open Area w/o Debris =
 Overflow Grate Open Area w/ Debris =

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 = ft (distance below basin bottom at Stage = 0 ft)
 Outlet Pipe Diameter = inches
 Restrictor Plate Height Above Pipe Invert = inches

Calculated Parameters for Outlet Pipe w/ Flow Restriction Pl
 Zone 3 Restrictor Not Selected
 Outlet Orifice Area =
 Outlet Orifice Centroid =
 Half-Central Angle of Restrictor Plate on Pipe =

User Input: Emergency Spillway (Rectangular or Trapezoidal)

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

Calculated Parameters for Spillway
 Spillway Design Flow Depth = feet
 Stage at Top of Freeboard = feet
 Basin Area at Top of Freeboard = acres
 Basin Volume at Top of Freeboard = acre-ft

Routed Hydrograph Results

The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AU)

	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
Design Storm Return Period	N/A	N/A	1.19	1.50	1.75	2.00	2.25	2.52
One-Hour Rainfall Depth (in)	N/A	N/A	1.617	3.665	5.721	9.429	11.939	15.571
CUHP Runoff Volume (acre-ft)	0.653	1.073	1.617	3.665	5.721	9.429	11.939	15.571
User Override Inflow Hydrograph Volume (acre-ft)	N/A	N/A	1.617	3.257	5.721	9.429	11.939	15.120
CUHP Predevelopment Peak Q (cfs)	N/A	N/A	16.2	44.9	67.6	120.7	151.3	192.2
OPTIONAL Override Predevelopment Peak Q (cfs)	N/A	N/A						160
Predevelopment Unit Peak Flow, q (cfs/acre)	N/A	N/A	0.13	0.35	0.53	0.94	1.18	1.25
Peak Inflow Q (cfs)	N/A	N/A	24.4	45.5	77.1	128.1	158.4	186.3
Peak Outflow Q (cfs)	0.3	0.3	5.1	24.5	55.4	109.7	140.3	163
Ratio Peak Outflow to Predevelopment Q	N/A	N/A	N/A	0.5	0.8	0.9	0.9	1.0
Structure Controlling Flow	Plate	Vertical Orifice 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Outlet Plate 1
Max Velocity through Grate 1 (fps)	N/A	N/A	0.06	0.3	0.7	1.4	1.8	2.1
Max Velocity through Grate 2 (fps)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours)	38	54	59	55	50	43	39	34
Time to Drain 99% of Inflow Volume (hours)	40	56	62	61	59	55	54	52
Maximum Ponding Depth (ft)	2.86	3.38	3.62	3.91	4.22	4.64	4.85	5.09
Area at Maximum Ponding Depth (acres)	0.72	0.89	0.96	1.04	1.12	1.22	1.25	1.28
Maximum Volume Stored (acre-ft)	0.66	1.08	1.30	1.58	1.91	2.42	2.68	2.97
Elevation (ft)	7534.86	7535.38		7535.91				7537.09
Pond Bottom (ft)	7532.00							