ENTECH
ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, CO 80907
PHONE (719) 531-5599
FAX (719) 531-5238

August 9, 2023

El Paso County
3460 Marksheffel Road
Colorado Springs, Colorado 80922

Attn: Gilbert LaForce
Engineering

Subject: Utility Trench Backfill – Storm Sewer
Within the Public Streets Rights of Ways of:

Forest Lakes, Filing No. 7
El Paso County, Colorado
Job No. 220622

Dear Mr. LaForce:

Representatives of Entech Engineering, Inc. periodically visited the site and performed field density testing during the subject construction processes. Testing was performed in general compliance with the frequency indicated in the El Paso County Standard Specifications. Results of field density tests have previously been provided. Field density tests were taken by Entech Engineering, Inc. personnel with test results presented in reports dated July 25 and October 12, 2022. The results indicate densities which meet those specified in the El Paso County Standard Specifications.

If you have further questions regarding this letter, or the construction from a geotechnical point of view, please call.

Respectfully Submitted,

ENTECH ENGINEERING, INC.

Daniel P. Stegman

Reviewed by:

COLORADO LICENSED
AUSTIN M NOSSOKOFF
53477
8-8-23
PROFESSIONAL ENGINEER

Austin M. Nossokoff, P.E.

DPS/lu

Entech Job No. 220622
AA Projects/2022/220622 - filing 7 - utb-storm

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ENGINEERING, INC.

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COLORADO SPRINGS, CO 80907
PHONE (719) 531-5599
FAX (719) 531-5238

August 9, 2023

El Paso County
3460 Marksheffel Road
Colorado Springs, Colorado 80922

Attn: Gilbert LaForce
Engineering

Subject: Utility Trench Backfill, Curb and Gutter Sub-grade, CTS Preparation and Placement Testing.
Within the Public Streets Rights of Ways of:

Forest Lakes, Filing No. 7
El Paso County, Colorado
Job No. 220622

Dear Mr. LaForce:

Representatives of Entech Engineering, Inc. periodically visited the site and performed field density testing during the subject construction processes. Testing was performed in general compliance with the frequency indicated in the El Paso County Standard Specifications. Results of field density tests have previously been provided. Field density tests were taken by Entech Engineering, Inc. personnel with test results presented in reports dated May 26 through November 21, 2022. Results generally indicate densities, which meet those specified in the El Paso County Standard Specifications.

Representatives of Entech Engineering, Inc. also periodically observed the curb and gutter subgrade and the CTS preparation processes for the street improvements. These materials appeared to be in general compliance with the specifications presented in the El Paso County Standard Specifications and appeared to be consistent with the materials assumed in the pavement design for the project.

If you have further questions regarding this letter, or the construction from a geotechnical point of view, please call.

Respectfully Submitted,

ENTECH ENGINEERING, INC.

Daniel P. Stegman

Reviewed by:

COLORADO LICENSED
AUSTIN M NOSSOKOFF
53477
8-10-23
PROFESSIONAL ENGINEER

Austin M. Nossokoff, P.E.

DPS/lu

Entech Job Nos. 220622
AAprojects/2022/220622 – filing 7 - utb-cgs

August 15, 2023

El Paso County
Development Services Division
2880 International Circle
Colorado Springs, CO 80910

RE: Forest Lakes Filing No. 7 – Public & Private Storm Sewer

The public & private storm drainage facilities for Forest Lakes Filing No. 7 consist of:

- (3) 5' Type-R Inlet
- (5) 10' Type-R Inlet
- (8) 15' Type-R Inlet
- (2) CDOT Type C Inlet
- (3) CDOT Type D Inlet
- (21) Type 1 Storm Manholes
- (7) Type 2 Storm Manhole
- (1) Pond Outlet Box
- (318 LF) 18" RCP Storm Drain
- (883 LF) 24" RCP Storm Drain
- (923 LF) 30" RCP Storm Drain
- (591 LF) 36" RCP Storm Drain
- (864 LF) 42" RCP Storm Drain
- (1403 LF) 48" RCP Storm Drain

The above listed storm was recently installed by Forest Lakes Residential Development, LLC and per the approved drainage report, the system drains to (1) permanent detention/water quality facility.

Classic Consulting Engineers & Surveyors has reviewed the attached letter from Entech Engineering, Inc. Based upon this information and information gathered during periodic site visits to the project during the installation of the storm sewer facilities, Classic Consulting Engineers & Surveyors is of the opinion that the storm drainage facilities have been constructed in general compliance with the approved design plans and specifications as filed with the County.

On behalf of Forest Lakes Residential Development LLC, Classic Consulting Engineers & Surveyors, LLC hereby requests probationary inspection of these facilities by County Engineering so that the warranty period can begin.

619 N. Cascade Avenue, Suite 200 • Colorado Springs, CO 80903 • www.classicconsulting.net
phone: (719) 785-0790 fax: (719) 785-0799

CLASSIC
CONSULTING
ENGINEERS & SURVEYORS

STATEMENT OF ENGINEER IN RESPONSIBLE CHARGE:

To the best of my knowledge, information and belief, the referenced public & private storm drainage facilities have been constructed in general compliance with the approved design plans and specifications as filed with the El Paso County.

Kyle R. Campbell, P.E.
Colorado No. 29794
Attachment: Entech Engineering, Inc. Certification

Seal & Signature of P.E.

ml/117570/Letters/CERT STORM – FILING 7 doc

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CLASSIC
CONSULTING
ENGINEERS & SURVEYORS

August 15, 2023

El Paso County
Development Services Division
2880 International Circle
Colorado Springs, CO 80910

RE: Forest Lakes Filing No. 7 – Street Improvements

The street improvements for Forest Lakes Filing 7 consist of curb and gutter, paving, cross pans, sidewalk, and pedestrian ramps. Classic Consulting Engineers & Surveyors, LLC has reviewed the attached letter from Entech Engineering. Based upon this information and information gathered during periodic site visits to the project during the construction of the street improvements, Classic Consulting Engineers & Surveyors, LLC is of the opinion that the street improvements have been constructed in general compliance with the approved design plans and specifications prepared by Classic Consulting, Engineering, and Surveying, as filed with the County.

On behalf of Forest Lakes Residential Development, LLC, Classic Consulting Engineers & Surveyors, LLC hereby requests probationary inspection of these facilities by County Engineering so that the warranty period can begin.

STATEMENT OF ENGINEER IN RESPONSIBLE CHARGE:

To the best of my knowledge, information and belief, the referenced public street improvements have been constructed in general compliance with the approved design plans and specifications as filed with the El Paso County.

Kyle R. Campbell, P.E.
Colorado No. 29794

Attachment: Entech Engineering, Inc. Certification

ml/117570/letters/CERT STREET- FILING 7.doc

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Revise/provide Pond Certification Letter with required statements listed in ECM Section 5.10.6.B:

"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.

August 15, 2023

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

ATTN: Inspections Staff
RE: Forest Lakes Filing 7 - Pond A

This letter is intended to provide documentation with the County Inspection Staff that the Pond A facility in Forest Lakes Filing 7 has been constructed per design. Classic Consulting has reviewed the final constructed facility and recently gathered survey as-builts confirming the appropriate size and design. Based upon this information and information gathered during periodic site visits to the project during construction, Classic Consulting is of the opinion that this stormwater BMP has been constructed in general compliance with the approved construction plans and specifications as filed with El Paso County.

STATEMENT OF ENGINEER IN RESPONSIBLE CHARGE:

To the best of my knowledge, information and belief, the referenced Forest Lakes Filing 7 - Pond A improvements have been constructed in general compliance with the approved design plans and specifications as filed with El Paso County.

Seal & Signature of P.E.

Kyle R. Campbell, P.E.
Colorado No. #29794
For an on behalf of Classic Consulting Engineers and Surveyors, LLC

mal/117570/PE CERT POND A-FILING 7.doc

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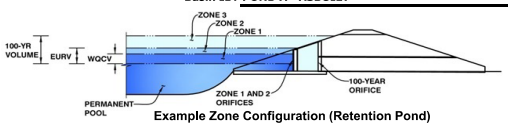
phone: (719) 785-0790 fax: (719) 785-0799

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.04 (February 2021)

Project: FOREST LAKES FILING 7

Basin ID: POND A - ASBUILT



Example Zone Configuration (Retention Pond)

Watershed Information

Selected BMP Type =	EDB	
Watershed Area =	38.29	acres
Watershed Length =	2,063	ft
Watershed Length to Centroid =	800	ft
Watershed Slope =	0.028	ft/ft
Watershed Imperviousness =	43.20%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	100.0%	percent
Percentage Hydrologic Soil Groups C/D =	0.0%	percent
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) =	0.601	acre-feet	acre-feet
Excess Urban Runoff Volume (EURV) =	1.748	acre-feet	acre-feet
2-yr Runoff Volume (P1 = 1.19 in.) =	1.696	acre-feet	1.19 inches
5-yr Runoff Volume (P1 = 1.5 in.) =	2.495	acre-feet	1.50 inches
10-yr Runoff Volume (P1 = 1.75 in.) =	3.208	acre-feet	1.75 inches
25-yr Runoff Volume (P1 = 2 in.) =	4.210	acre-feet	2.00 inches
50-yr Runoff Volume (P1 = 2.25 in.) =	5.000	acre-feet	2.25 inches
100-yr Runoff Volume (P1 = 2.52 in.) =	6.021	acre-feet	2.52 inches
500-yr Runoff Volume (P1 = 3.1 in.) =	7.930	acre-feet	3.10 inches
Approximate 2-yr Detention Volume =	1.299	acre-feet	
Approximate 5-yr Detention Volume =	1.802	acre-feet	
Approximate 10-yr Detention Volume =	2.446	acre-feet	
Approximate 25-yr Detention Volume =	2.713	acre-feet	
Approximate 50-yr Detention Volume =	2.843	acre-feet	
Approximate 100-yr Detention Volume =	3.229	acre-feet	

Define Zones and Basin Geometry

Zone 1 Volume (WQCV) =	0.601	acre-feet
Zone 2 Volume (EURV - Zone 1) =	1.147	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	1.481	acre-feet
Total Detention Basin Volume =	3.229	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

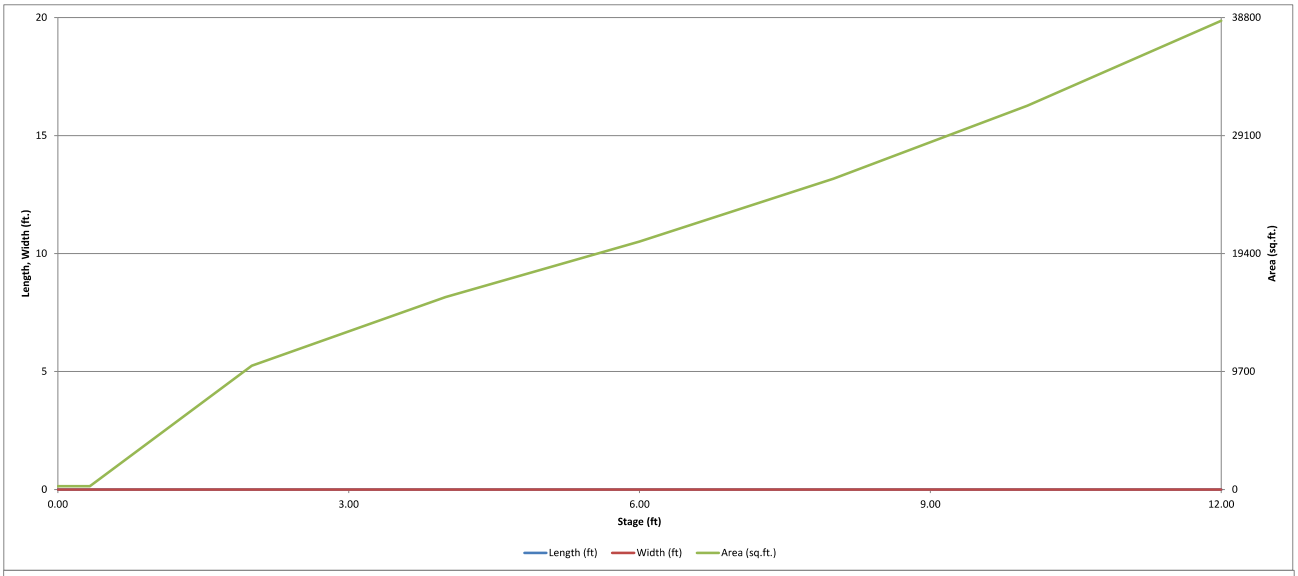
AS-BUILTS POND 'A'
FOREST LAKES FILING 7
SF-21-49

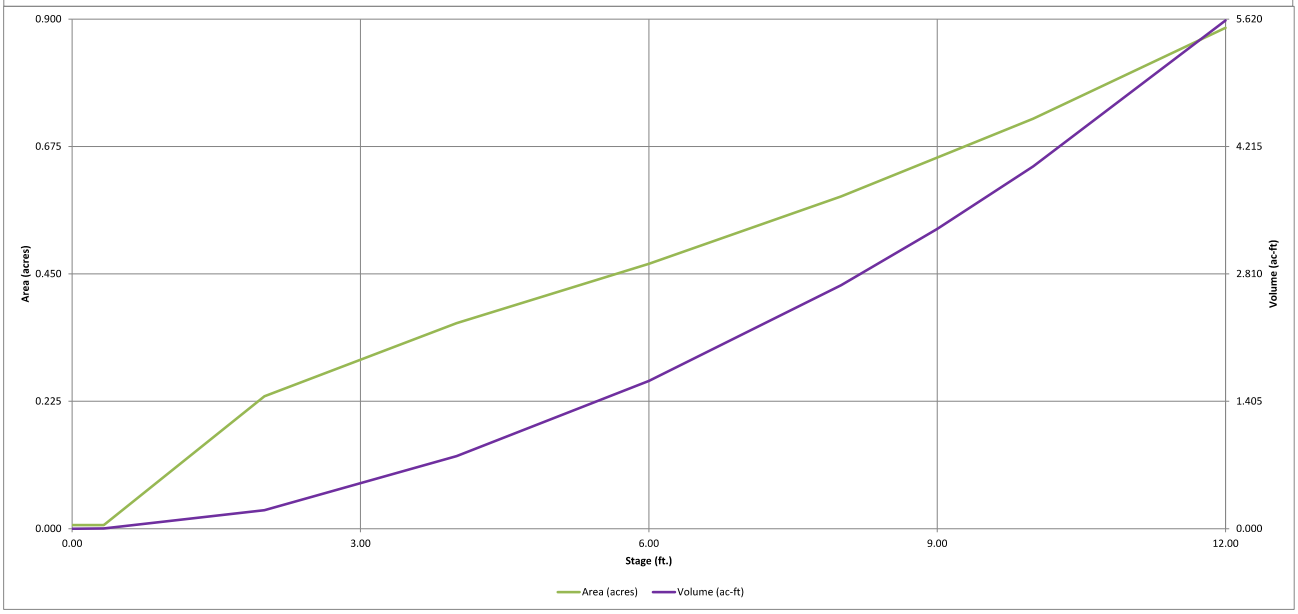
Depth Increment = ft

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	–	–	–	274	0.006		
	–	0.33	–	–	–	274	0.006	90	0.002
	–	2.00	–	–	–	10,178	0.234	8,818	0.202
	–	4.00	–	–	–	15,818	0.363	34,814	0.799
	–	6.00	–	–	–	20,380	0.468	71,012	1.630
	–	8.00	–	–	–	25,558	0.587	116,950	2.685
	–	9.00	–	–	–	28,551	0.655	144,004	3.306
	–	10.00	–	–	–	31,544	0.724	174,052	3.996
	–	12.00	–	–	–	38,533	0.885	244,129	5.604

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.04 (February 2021)



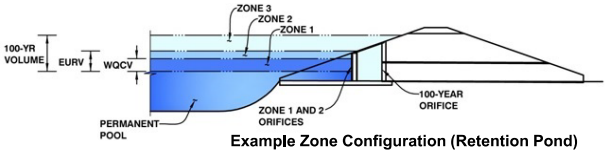


DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.04 (February 2021)

Project: FOREST LAKES FILING 7

Basin ID: POND A - ASBUILT



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	3.43	0.601	Orifice Plate
Zone 2 (EURV)	6.25	1.147	Orifice Plate
Zone 3 (100-year)	8.89	1.481	Weir&Pipe (Circular)
Total (all zones)		3.229	

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

Invert of Lowest Orifice =	0.00	ft (relative to basin bottom
Depth at top of Zone using Orifice Plate =	6.23	ft (relative to basin bottom
Orifice Plate: Orifice Vertical Spacing =	24.90	inches
Orifice Plate: Orifice Area per Row =	N/A	inches

Calculated Parameters for Plate

=	N/A	ft^2
=	N/A	feet
=	N/A	feet
=	N/A	ft^2

This was 2.13 & 4.27. Why was it changed? Per Sht 25 of the as-builts, all 3 orifice were installed 0.16 lower than the original design so this spacing would not be different.

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	2.08	4.15					
Orifice Area (sq. inches)	2.00	6.00	6.00					

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

This was 6.40, but Sht 25 of as-builts shows that it was installed 0.17ft lower, which would be 6.23. However, this input is supposed to be relative to Stage=0ft, which is the top of micropool, which was installed 0.16 lower than design. So the differential for this value should actually be -0.01 or at 6.39ft above Stage=0ft.

User Input: Vertical Orifice (Circular or Rectangular)

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

User Input: Overflow Weir (Dropbox with Flat or Sloped Grate and Outlet Pipe OR Rectangular/Trap

	Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, Ho =	6.23	N/A	ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length =	8.00	N/A	feet
Overflow Weir Grate Slope =	4.00	N/A	H:V
Horiz. Length of Weir Sides =	4.00	N/A	feet
Overflow Grate Type =	Type C Grate	N/A	
Debris Clogging % =	50%	N/A	%

	Zone 3 Weir	Not Selected	
Height of Grate Upper Edge, H_t =	7.23	N/A	feet
Overflow Weir Slope Length =	4.12	N/A	feet
Grate Open Area / 100-yr Orifice Area =	4.68	N/A	
Overflow Grate Open Area w/o Debris =	22.96	N/A	ft^2
Overflow Grate Open Area w/ Debris =	11.48	N/A	ft^2

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

	Zone 3 Circular	Not Selected	
Depth to Invert of Outlet Pipe =	0.20	N/A	ft (distance below basin bottom at Stage = 0 ft)
Circular Orifice Diameter =	30.00	N/A	inches

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

	Zone 3 Circular	Not Selected	
Outlet Orifice Area =	4.91	N/A	ft^2
		N/A	feet
		N/A	radians

For similar reasons as above, this is actually 9.07 (micropool went down 0.16 and spillway only went down 0.09, for a total difference of +0.07)

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage=	8.91	ft (relative to basin bottom at Stage = 0 ft)
Spillway Crest Length =	36.00	feet
Spillway End Slopes =	4.00	H:V
Freeboard above Max Water Surface =	1.00	feet

ers for Spillway

		feet
		feet
Basin Area at Top of Freeboard =	0.79	acres
Basin Volume at Top of Freeboard =	4.59	acre-ft

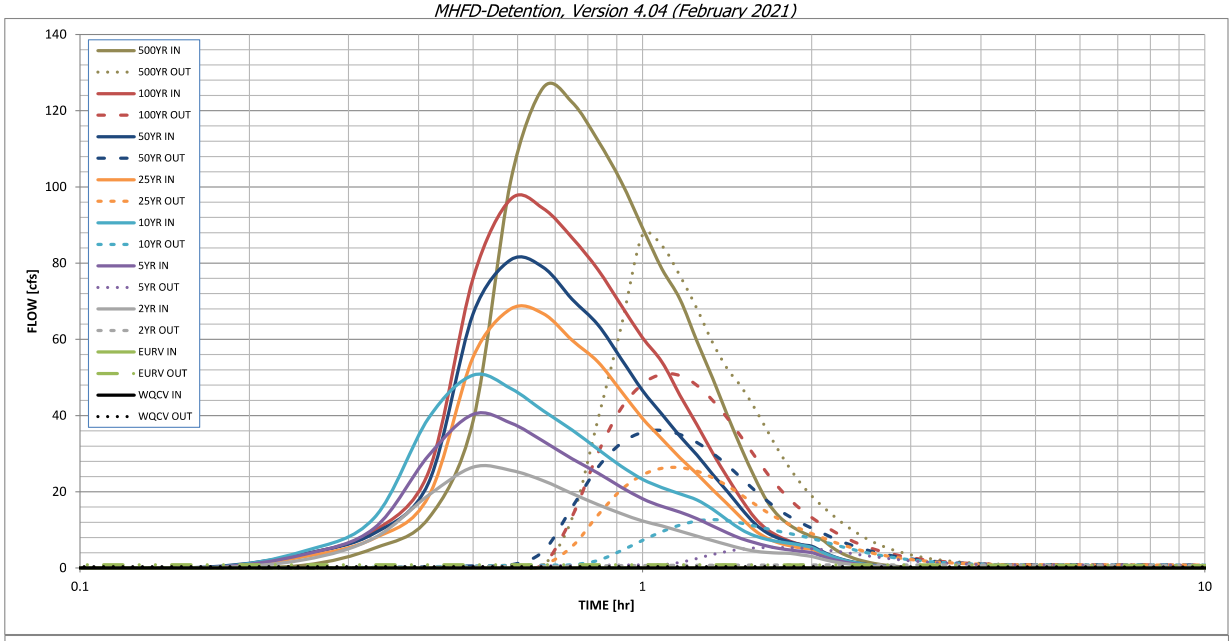
Routed Hydrograph Results

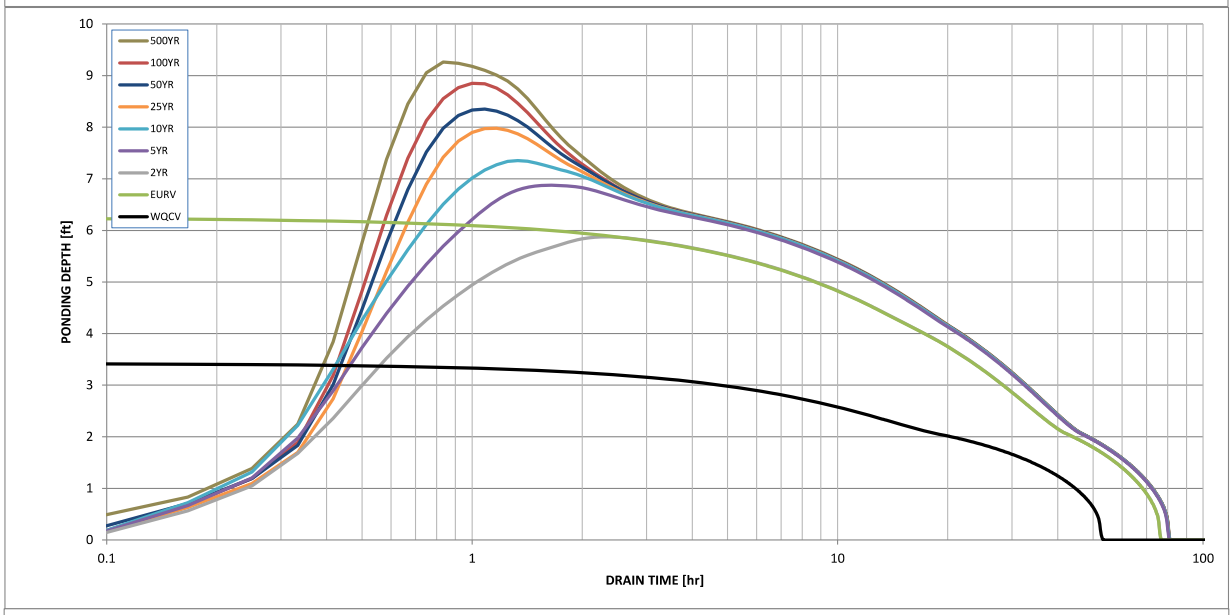
The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AF).

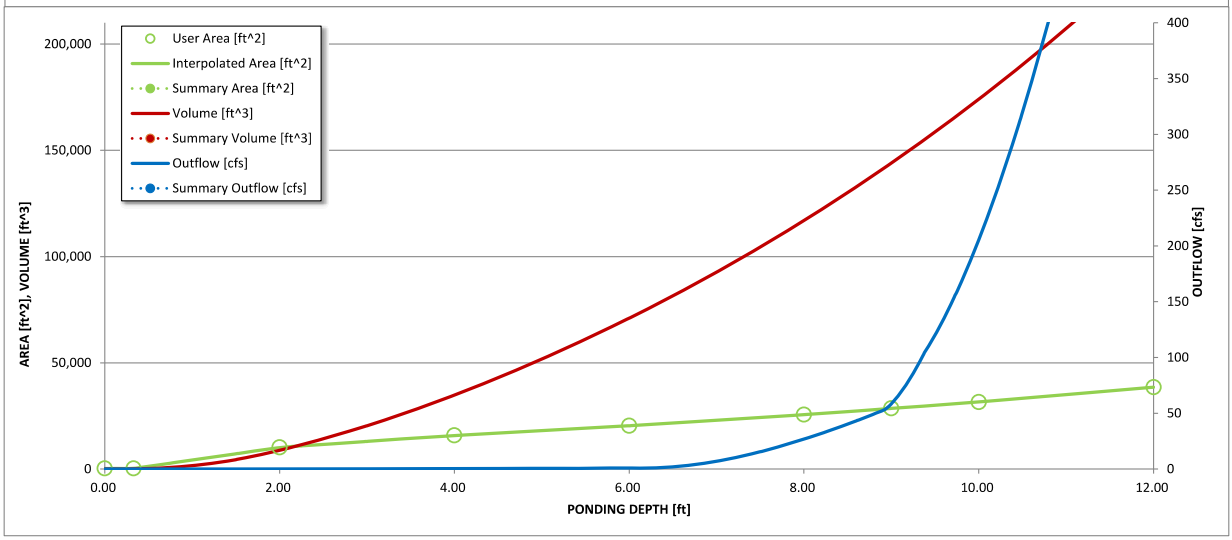
Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
One-Hour Rainfall Depth (in) =	N/A	N/A	1.19	1.50	1.75	2.00	2.25	2.52	3.10
CUHP Runoff Volume (acre-ft) =	0.601	1.748	1.696	2.495	3.208	4.210	5.000	6.021	7.930
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	1.696	2.495	3.208	4.210	5.000	6.021	7.930
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	4.4	12.3	18.6	32.9	41.3	52.8	72.2
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.12	0.32	0.49	0.86	1.08	1.38	1.88
Peak Inflow Q (cfs) =	N/A	N/A	26.5	40.3	50.6	68.0	80.9	96.8	126.1
Peak Outflow Q (cfs) =	0.4	0.9	0.8	5.4	12.7	26.3	36.1	50.8	87.3
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.4	0.7	0.8	0.9	1.0	1.2
Structure Controlling Flow =	Plate	Overflow Weir 1	Plate	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Spillway
Max Velocity through Grate 1 (fps) =	N/A	0.00	N/A	0.2	0.5	1.1	1.5	2.2	2.7
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) =	48	66	66	66	63	59	55	51	45
Time to Drain 99% of Inflow Volume (hours) =	**51**	72	72	75	74	72	70	69	66
Maximum Ponding Depth (ft) =	3.43	6.25	5.87	6.87	7.35	7.98	8.35	8.85	9.26
Area at Maximum Ponding Depth (acres) =	0.33	0.48	0.46	0.52	0.55	0.58	0.61	0.64	0.67
Maximum Volume Stored (acre-ft) =	0.603	1.749	1.570	2.060	2.316	2.667	2.894	3.202	3.479

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.04 (February 2021)







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

DETENTION BASIN OUTLET STRUCTURE DESIGN

Outflow Hydrograph Workbook Filename:

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	CUHP	CUHP	CUHP	CUHP	CUHP	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	0.00	0.00	0.00	0.25	0.02	0.75
	0:15:00	0.00	0.00	2.17	3.56	4.42	2.97	3.73	3.63	5.17
	0:20:00	0.00	0.00	7.87	10.44	13.12	7.78	9.08	9.72	13.07
	0:25:00	0.00	0.00	19.13	29.54	39.38	18.81	22.41	25.25	38.59
	0:30:00	0.00	0.00	26.48	40.33	50.59	55.34	66.71	76.07	101.60
	0:35:00	0.00	0.00	25.65	38.07	47.11	67.97	80.89	96.81	126.12
	0:40:00	0.00	0.00	22.91	33.25	41.24	66.73	78.86	94.31	122.21
	0:45:00	0.00	0.00	19.53	28.64	36.19	59.75	70.53	86.65	112.19
	0:50:00	0.00	0.00	16.66	24.93	31.18	54.08	63.85	78.30	101.41
	0:55:00	0.00	0.00	14.27	21.23	26.72	46.40	54.91	68.95	89.33
	1:00:00	0.00	0.00	12.36	18.18	23.29	39.28	46.60	60.47	78.50
	1:05:00	0.00	0.00	11.05	16.16	21.11	33.87	40.35	54.07	70.49
	1:10:00	0.00	0.00	9.65	14.68	19.44	28.90	34.55	45.30	59.50
	1:15:00	0.00	0.00	8.37	12.94	17.86	24.72	29.64	37.60	49.80
	1:20:00	0.00	0.00	7.20	11.02	15.43	20.54	24.60	30.22	40.00
	1:25:00	0.00	0.00	6.10	9.23	12.57	16.78	20.04	23.75	31.34
	1:30:00	0.00	0.00	5.13	7.70	10.08	13.11	15.57	18.05	23.75
	1:35:00	0.00	0.00	4.44	6.66	8.45	9.88	11.67	13.19	17.47
	1:40:00	0.00	0.00	4.09	5.76	7.50	7.81	9.23	10.11	13.55
	1:45:00	0.00	0.00	3.93	5.13	6.89	6.58	7.75	8.27	11.15
	1:50:00	0.00	0.00	3.84	4.70	6.45	5.80	6.80	7.01	9.49
	1:55:00	0.00	0.00	3.41	4.38	6.00	5.26	6.14	6.13	8.33
	2:00:00	0.00	0.00	3.02	4.03	5.40	4.92	5.71	5.50	7.49
	2:05:00	0.00	0.00	2.36	3.15	4.19	3.82	4.41	4.12	5.61
	2:10:00	0.00	0.00	1.80	2.37	3.13	2.83	3.25	2.96	4.03
	2:15:00	0.00	0.00	1.36	1.78	2.33	2.11	2.42	2.20	2.98
	2:20:00	0.00	0.00	1.03	1.33	1.72	1.57	1.80	1.64	2.22
	2:25:00	0.00	0.00	0.77	0.98	1.26	1.16	1.32	1.22	1.65
	2:30:00	0.00	0.00	0.56	0.70	0.92	0.84	0.95	0.89	1.20
	2:35:00	0.00	0.00	0.41	0.50	0.67	0.61	0.69	0.65	0.88
	2:40:00	0.00	0.00	0.29	0.35	0.48	0.44	0.50	0.47	0.63
	2:45:00	0.00	0.00	0.19	0.24	0.32	0.30	0.34	0.32	0.43
	2:50:00	0.00	0.00	0.11	0.15	0.19	0.19	0.21	0.20	0.26
	2:55:00	0.00	0.00	0.05	0.08	0.10	0.10	0.11	0.10	0.14
	3:00:00	0.00	0.00	0.02	0.03	0.04	0.04	0.04	0.04	0.05
	3:05:00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01
	3:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.04 (February 2021)

Summary Stage-Area-Volume-Discharge Relationships

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

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

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

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

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