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Preliminary Drainage Report
Meadow Lake Industrial Phase 1
El Paso County, Colorado

November 2024

HR Green Project No: 2202774

Prepared For:

Meadowlake Developments, LLC

Contact: Kevin O'Neil

PO Box 1385

Colorado Springs, CO 80901

Prepared By:

HR Green Development, LLC

Contact: Colleen Monahan, P.E., LEED AP

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PCD File No. SP236

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.

_____

Colleen Monahan, P.E., LEED AP Date

State of Colorado No. 56067

For and on behalf of HR Green Development, LLC

Owner/Developer's Statement

I, the owner/developer have read and will comply with all of the requirements specified in this drainage report and plan.

By: _____ _____

Authorized Signature Date

Address: Meadowlake Developments, LLC

PO Box 1385

Colorado Springs, CO 80901

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.

_____

Joshua Palmer, P.E. Date

County Engineer/ECM Administrator

Conditions:

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APPENDICES

I. General Purpose, Location and Description

a. Purpose

The purpose of the Preliminary Drainage Report (PDR) for Meadow Lake Industrial Phase 1 is to describe the onsite and offsite drainage patterns, size drainage infrastructure to safely capture and convey developed runoff to water quality and detention facilities, and to safely route detained stormwater to adequate outfalls.

b. General Location

Meadow Lake Industrial is 254 acres of undeveloped land. Meadow Lake Industrial Phase 1, referred to as 'the site' herein, is a 51.3-acre portion of the overall 254 acres that is zoned for Industrial and will be developed as an industrial subdivision. The remaining area will be undeveloped.

The site lies within a part of the east half of Section 9, Township 13 South, Range 64 West of the 6th P.M., El Paso County, Colorado. The site is bound to the north and west by undeveloped unplatted land, to the east by Curtis Road, and to the south by Falcon Highway. There are A vicinity map is presented in Appendix A.

c. Description of Property

The property is currently undeveloped and unplatted. Meadow Lake Industrial Phase 1 will plat 27 industrial lots and two drainage tracts on approximately 51.3 acres. The overall site is generally bisected by a ridge that directs stormwater east towards Curtis Road and west towards an unnamed tributary. The unnamed tributary runs north-south through the overall site, however; all development will occur east of the tributary.

The Phase 1 site is part of two major drainage basins: Haegler Ranch Basin and Solberg Ranch Basin. The basins are depicted on the drainage maps in Appendix E.

There are no existing utilities and no known irrigation facilities on the site. Onsite vegetation consists primarily of native grasses and weeds. The topography is gently sloping with 2-4% grades. Per a NRCS web soil survey, the site's soil is comprised of Type A soils: Blakeland loamy sand, Truckton loamy sand and Columbine gravelly sandy loam, Type B soil Stapleton sandy loam, and Type D soil Fluvaquentic Haplaquolls. A NRCS soil survey is presented in Appendix A.

d. Floodplain Statement

Based on FEMA FIRM 08041C0558G & 08041C0566G, revised December 7, 2018, there are no floodplains (Zone A or Zone X) within the Phase 1 boundary. Zone A areas are determined to be within the 1.0% annual chance flood but do not have base flood elevations established. Zone X are areas determined to be outside the 0.2% annual chance flood. The FIRM is presented in Appendix A.

II. Drainage Design Criteria

a. Drainage Criteria

Hydrologic data and calculations were performed using the El Paso County Drainage Criteria Manual Volume 1 & 2 (EPCDCM), with current revisions.

Onsite drainage improvements are designed for the 5-year storm (minor event) and 100-year storm (major event) using rainfall values from CCSDCM Table 6-2. Runoff was calculated per CCSDCM Section 6.3.0 - Rational Method. Full spectrum pond design was completed using the latest version of Mile High Flood District's (MHFD) UD-Detention per CCSDCM Section 13.3.2.1. The detention pond allowable release rate will be limited to less than historic rates.

Table 6-2: Rainfall Depths for El Paso County		
Return Period (yr)	5	100
1-hr Rainfall Depth (in)	1.50	2.52

Inlets were sized per the methods described in EPCDCM Section III Chapter 7 – Street Drainage and Storm Water Inlets. Storm sewer was sized per the methods described in EPCDCM Section III Chapter 8 – Storm Drains and Appurtenances.

III. Drainage Basins and Subbasins

a. Major Basin Descriptions

The site is part of two major drainage basins: Haegler Ranch Basin and Solberg Ranch Basin. The basins are depicted on the drainage maps in Appendix E. Of the 51.3 acres of Meadow Lake Industrial Phase 1, approximately 8.75 acres of the north part of the site drains to an existing roadside swale in Curtis Road that then travels northerly as part of Haegler Ranch Basin, ultimately draining to Chico Creek. The remainder of the south side of site, 42.55 acres, lies within Solberg Ranch Drainage Basin and drains to the unnamed tributary on the site to a culvert on the north side of Falcon Highway to under Falcon Highway and ultimately to Chico Creek.

The Haegler Ranch drainage basin was studied in the "Haegler Ranch Basin Drainage Basin Planning Study" in May 2009. The Solberg Ranch Basin does not have an associated Drainage Basin Planning Study.

b. Previous Drainage Studies

A portion of the site was previously studied as part of the Haegler Ranch Basin Drainage Basin Planning Study (DBPS), dated May 2009, by URS. Haegler Ranch is an unnamed tributary, eventually tributary to Black Squirrel Creek. The overall Haegler Ranch Basin flows to the southeast from north of Eastonville Road to McDaniels Road with a total of 16.6 sq mi in El Paso County, Colorado. Much of the existing basin consists of 2- and 5- acre residential lots surrounded by open space range land with gently rolling topography used for agriculture and later parcels with homes. Some higher density residential is planned in the northern part of the basin. The study did not identify any drainage concerns or recommendations for the site.

A portion of the site lies within Solberg Ranch Basin. Solberg Ranch does not have a Drainage Basin Planning Study (DBPS) on file with El Paso County.

c. Existing Subbasin Description

Basin EX1 is 8.75 acres of undeveloped area and paved roadway. Stormwater (Q_5 = 3.4 cfs Q_{100} = 18.3 cfs) flows east offsite in a roadside ditch adjacent to Curtis Road to DP2. Flows from DP2 drain north offsite.

Basin EX2 is 30.77 acres of undeveloped area and paved roadway. Stormwater (Q_5 = 9.5 cfs Q_{100} = 57.8 cfs) flows south in a roadside ditch adjacent to Curtis Road to DP4. Flows from DP4 are then conveyed south through Basin EX3 to DP6.

Basin EX3 is 13.39 acres of undeveloped area and paved roadway. Stormwater (Q_5 = 4.5 cfs Q_{100} = 25.4 cfs) flows south in a roadside ditch adjacent to Curtis Road to DP6. Flows from DP6 are then conveyed south through Basin OS3 to DP7.

Basin EX4 is 7.03 acres of undeveloped area. Stormwater (Q_5 = 2.1 cfs Q_{100} = 14.3 cfs) flows west towards OS4 at DP8.

Basin OS1 is 2.83 acres of undeveloped area. Stormwater (Q_5 = 1.0 cfs Q_{100} = 6.7 cfs) flows east towards EX1 at DP1. Flows from DP1 are then conveyed east through Basin EX1, ultimately draining to DP2.

Basin OS2.1 is 5.34 acres of undeveloped area. Stormwater (Q_5 = 1.8 cfs Q_{100} = 11.9 cfs) flows southeast towards EX2 at DP3. Flows from DP3 are then conveyed southeast through Basin EX2 to DP4.

Basin OS2.2 is 0.37 acres of undeveloped area. Stormwater (Q_5 = 0.1 cfs Q_{100} = 0.9 cfs) flows southeast towards EX3 at DP5. Flows from DP5 are then conveyed southeast through Basin EX3 to DP6.

Basin OS3 is 3.96 acres of undeveloped area and paved roadway. Stormwater (Q_5 = 2.1 cfs Q_{100} = 9.2 cfs) flows south in a roadside ditch adjacent to Curtis Road to DP7. Flows from DP7 are then conveyed west through Basin OS4, ultimately draining to DP9.

Basin OS4 is 40.63 acres of undeveloped area and paved roadway. Stormwater (Q_5 = 10.7 cfs Q_{100} = 64.7 cfs) flows south towards an existing public box culvert and offsite at DP9.

Basin EROW4 is 1.48 acres of undeveloped area and paved roadway. Stormwater (Q_5 = 2.1 cfs Q_{100} =4.6 cfs) flows south in an existing roadside ditch adjacent to Curtis Road to DP10. Flows from DP10 continue south and are then conveyed west via an existing culvert underneath Curtis Road. The existing culvert (unknown size & material) outfalls into Basin OS4, ultimately draining to DP9.

d. Proposed Subbasin Description

Basin A is 5.78 acres of roadway and undeveloped area. Stormwater (Q_5 = 8.4 cfs Q_{100} = 19.9 cfs) is captured at DP1 in a public 10’ Type R sump inlet. In the event of inlet failure at DP1, an overflow path is provided in Sundrop View to Pond A. Basin A will be treated and detained in Pond A.

Basin B is 1.10 acres of roadway and lot area. Stormwater (Q_5 = 3.6 cfs Q_{100} = 6.6 cfs) is captured at DP2 in a public 5’ Type R sump inlet. In the event of inlet failure at DP2, an overflow path is provided in Sundrop View to Pond A. Basin B will be treated and detained in Pond A.

Basin C is 3.01 acres of industrial lots and roadway. Stormwater (Q_5 = 7.0 cfs Q_{100} = 13.9 cfs) is captured at DP3 in a private 20’ Type R on-grade inlet in Sundrop View. In the event of inlet failure at DP3, an overflow path is provided in Sundrop View to Pond A. Basin C will be treated and detained in Pond A.

Basin D is 3.05 acres of industrial lots and roadway. Stormwater (Q_5 = 7.3 cfs Q_{100} = 14.6 cfs) is captured at DP4 in a private 20’ Type R on-grade inlet in Sundrop View. In the event of inlet failure at DP4, an overflow path is provided in Sundrop View to Pond A. Basin D will be treated and detained in Pond A.

Basin E is 3.68 acres of industrial lots and roadway. Stormwater (Q_5 = 8.8 cfs Q_{100} = 17.5 cfs) is captured at DP5 in a private 15’ Type R sump inlet in Sundrop View. In the event of inlet failure at DP5, an overflow path is provided in Sundrop View to Pond A by overtopping the curb and gutter at the knuckle. Basin E will be treated and detained in Pond A.

Basin F is 1.10 acres of industrial lots and roadway. Stormwater (Q_5 = 2.8 cfs Q_{100} = 5.2 cfs) is captured at DP6 in a private 15’ Type R sump inlet in Sundrop View. In the event of inlet failure at DP6, an overflow path is provided in Sundrop View to Pond A by overtopping the curb and gutter at the knuckle. Basin F will be treated and detained in Pond A.

Basin G is 6.75 acres of industrial lots and undeveloped area. Stormwater (Q_5 = 2.0 cfs Q_{100} = 13.5 cfs) will remain undisturbed in this phase of development. Basin G will drain north offsite as part of the Haegler major drainage basin.

Basin H is 3.71 acres of industrial lots and undeveloped area. Stormwater (Q_5 = 7.7 cfs Q_{100} = 15.8 cfs) is conveyed southeast via sheet flow into a proposed swale. The proposed swale drains south to DP8, and continues to drain in the proposed swale south ultimately to the FES inlet at DP9 into Pond A. Basin H will be treated and detained in Pond A.

Basin I is 1.12 acres of industrial lots and undeveloped area. Stormwater (Q_5 = 2.1 cfs Q_{100} = 4.6 cfs) is conveyed southeast via sheet flow into a proposed swale. The proposed swale drains south to DP9, then into the FES inlet at DP9 into Pond A. Basin I will be treated and detained in Pond A.

Basin J is 3.14 acres and contains Pond A. Stormwater (Q_5 = 3.0 cfs Q_{100} = 9.6 cfs) sheet flows directly to Pond A. Basin J will be treated and detained in Pond A.

Basin K is 0.24 acres of roadway. Stormwater (Q_5 = 1.0 cfs Q_{100} = 1.9 cfs) is captured at DP11 in a public 10' Type R on grade inlet on Sagebrush Street. In the event of inlet failure at DP11, an overflow path is provided to Curtis Road. DP 11 drains south to DP 12, ultimately draining via a proposed swale to the FES inlet at DP 21.2. Basin K will be treated and detained in Pond B.

Basin L is 0.24 acres of roadway. Stormwater (Q_5 = 1.0 cfs Q_{100} = 1.9 cfs) is captured at DP12 in a public 10' Type R sump inlet in Sagebrush Street. In the event of inlet failure at DP12, an overflow path is provided to Curtis Road. DP 12 drains south to DP 12.1, ultimately draining via a proposed swale to the FES inlet at DP 21.2. Basin L will be treated and detained in Pond B.

Basin M and DP14 have been omitted as they are an old basin and design point that have been removed. In order to keep all calculations consistent within this report, the proceeding basin designations and design points have not changed and remain sequential.

Basin N1 is 2.07 acres of industrial lots and roadway. Stormwater (Q_5 = 4.9 cfs Q_{100} = 9.8 cfs) is captured at DP15 in a public 10' Type R on-grade inlet in Mariposa Lily Grove. In the event of inlet failure at DP15, an overflow path is provided within the adjacent public roadway and access road that drains south to Pond B. Basin N1 will be treated and detained in Pond B.

Basin N2 is 0.25 acres of industrial lots and roadway. Stormwater (Q_5 = 1.2 cfs Q_{100} = 2.1 cfs) is captured at DP15.1 in a public 5' Type R on-grade inlet in Mariposa Lily Grove. In the event of inlet failure at DP15.1, an overflow path is provided within the adjacent public roadway and access road that drains south to Pond B. Basin N1 will be treated and detained in Pond B.

Basin N3 is 1.84 acres of industrial lots and roadway. Stormwater (Q_5 = 4.8 cfs Q_{100} = 9.6 cfs) drains southwest onto Aspen Daisy Drive at DP15.2. Drainage then continues south on Aspen Daisy Drive in subbasin R to a public sump 10' Type R inlet at DP 19. See Basin N3 will be treated and detained in Pond B.

Basin O is 2.10 acres of industrial lots and roadway. Stormwater (Q_5 = 5.9 cfs Q_{100} = 11.8 cfs) is captured at DP16 in a private 10' Type R on-grade inlet in Zinnia Point. In the event of inlet failure at DP16, an overflow path is provided within the adjacent public roadway and access road that drains south to Pond B. Basin O will be treated and detained in Pond B.

Basin P1 is 0.25 acres of industrial lots and roadway. Stormwater (Q_5 = 1.2 cfs Q_{100} = 2.1 cfs) is captured at DP17 in a private 5' Type R on-grade inlet in Zinnia Point. In the event of inlet failure at DP17, an overflow

path is provided within the adjacent public roadway and access road that drains south to Pond B. Basin P1 will be treated and detained in Pond B.

Basin P2 is 2.05 acres of industrial lots and roadway. Stormwater (Q_5 = 2.4 cfs Q_{100} = 11.4 cfs) is captured at DP20.2 in a private Type C sump inlet at the southwest corner of the site. In the event of inlet failure at DP20.2, an overflow path is provided directly into Pond B. Basin P2 will be treated and detained in Pond B.

Basin Q is 1.02 acres of roadway. Stormwater (Q_5 = 3.2 cfs Q_{100} = 6.2 cfs) is captured at DP18 in a public 5' Type R sump inlet in Aspen Daisy Drive. In the event of inlet failure at DP18, flows will overtop the sump and flow to Pond B along the maintenance access road. Basin Q will be treated and detained in Pond B.

Basin R is 1.43 acres of roadway. Stormwater (Q_5 = 2.1 cfs Q_{100} = 6.8 cfs) is captured at DP19 in a public 10' Type R sump inlet in Aspen Daisy Drive. In the event of inlet failure at DP19, flows will overtop the sump and flow to Pond B along the maintenance access road. Basin R will be treated and detained in Pond B.

Basin S1 is 1.16 acres of industrial lots and grass swale. Stormwater (Q_5 = 2.9 cfs Q_{100} = 5.8 cfs) is captured by a proposed swale and conveyed south to DP21. Runoff will continue south in the proposed swale, ultimately draining to an FES inlet structure at DP 21.2 and into Pond B. Basin S1 will be treated and detained in Pond B.

Basin S2 is 2.32 acres of industrial lots and grass swale. Stormwater (Q_5 = 5.3 cfs Q_{100} = 10.6 cfs) is captured by a proposed swale and conveyed south to DP21.1. Runoff will continue south in the proposed swale, ultimately draining to an FES inlet structure [illegible]eated and detained in Pond B.

identify that analysis of the roadside ditch will be required for the FDR. How will the increase in flows be mitigated in the interim prior to development of lots 1 and 15 within basin G?

Basin S3 is 1.16 acres of industrial lots an[illegible] 9 cfs) is captured by a proposed swale and conveyed south t[illegible]ucture at DP 21.2 and into Pond B. Basin S3 will be treated a[illegible]

Basin T is 1.42 acres and contains Pond B[illegible]ows directly to Pond B. Basin T will be treated and detain[illegible]

Basin OS1 2.83 acres of undeveloped land. Stormwater (Q_5 = 1.0 cfs Q_{100} = 6.7 cfs) flows east into subbasin G at DP E1.

Basin ROW1 is 2.17 acres of right of way. Stormwater (Q_5 = 2.3 cfs Q_{100} = 6.5 cfs) flows north in a roadside ditch adjacent to Curtis Road to DP E2. An additional 6' paved shoulder and 2' gravel shoulder has been added to Curtis Road in proposed conditions and accounted for in drainage calculations. There is a small increase in flow to DP E2 from basin ROW1. The future detention basin(s) within subbasin G should account for this increase and restrict flow from the future stormwater detention basins back to historic rates at DP E2. WQ for the improvements within basin ROW1 will be excluded from treatment per ECM exclusion I.7.1.B.2. The additional pavement proposed in this basin is part of a total additional pavement draining untreated offsite of 0.67 acres. The total additional paved area is less than 1 acre per mile draining offsite untreated.

Basin ROW2 is 3.25 acres of right of way. Stormwater (Q_5 = 3.6 cfs Q_{100} = 9.6 cfs) flows south in a roadside ditch adjacent to Curtis Road to DP 13. A widening resulting from the northbound turn lane & 6' paved shoulder and 2' gravel shoulder has been added to Curtis Road in proposed conditions and accounted for in drainage calculations. Runoff is captured in a 18" FES inlet which drains to the 10' Type R inlet at DP 11. Runoff ultimately drains south via a proposed drainage swale to Pond B. Basin ROW2 will be treated and detained in Pond B.

Basin ROW3 is 6.85 acres of right of way. Stormwater (Q_5 = 5.2 cfs Q_{100} = 15.8 cfs) flows south in a roadside ditch adjacent to Curtis Road to DP E9. A widening for a northbound turn lane & 6' paved shoulder and 2' gravel shoulder has been added to Curtis Road in proposed conditions and accounted for in drainage calculations. WQ for the improvements within basin ROW1 will be excluded from treatment per ECM exclusion I.7.1.B.2. The additional pavement proposed in this basin is part of a total additional pavement draining untreated offsite of 0.67 acres. The total additional paved area is less than 1 acre per mile draining offsite untreated.

should this be Falcon Hwy?

Basin OS4 is 40.02 acres wa…ater (Q_5 = 10.5 cfs Q_{100} = 63.9 cfs) flows south in the unnamed tributary to DP E9.

Basin ROW4 is 1.48 acres of undeveloped area and paved roadway. Stormwater (Q_5 = 2.3 cfs Q_{100} = 4.9 cfs) drains south to via an existing roadside ditch along Curtis Road to DP E10. An additional 2' paved and gravel shoulder on the east side of Curtis Road has been accounted for in drainage calculations. The proposed peak flow from drainage basin ROW4 to design point E10 is higher than historic flow rates due to the paved roadway of Curtis Road being widened for the shoulder. An analysis of the existing swale at DP E10 will be provided with the FDR. Flows from DP E10 continue south and are then conveyed west via an existing culvert underneath Curtis Road. The existing culvert (unknown size & material) outfalls into Basin ROW2, ultimately draining to DP9. WQ for the improvements within basin ROW4 will be excluded from treatment per ECM exclusion I.7.1.B.2. The additional pavement proposed in this basin is part of a total additional pavement draining untreated offsite of 0.67 acres. The total addit…e draining offsite untreated.

Revise statement as E2 does increase as stated above and listed in the table

A total flow summary of existing vs. proposed design p…ll not be increased (Design points E2 & E9).

Table 1 – DP Flow Comparison

DESIGN POINT	EX Q_5 (cfs)	PR Q_5 (cfs)	EX Q_{100} (cfs)	PR Q_{100} (cfs)
E1	1.0	1.0	6.7	6.7
E2	**4.2**	**5.0**	**23.9**	**25.2**
E4	10.9	0.8	67.6	13.8
E7	15.0	6.0	81.2	29.6
E8	2.1	1.5	14.3	14.0
E9	**24.2**	**19.8**	**138.8**	**121.3**
E10	2.1	2.3	4.6	4.9

IV. Drainage Facility Design

a. General Concept

For all Meadow Lake Phase 1 lots draining to Solberg Ranch Drainage Basin, storm water will be collected and conveyed by a series of inlets, swales and storm sewer to two full spectrum water quality and detention ponds. The full spectrum water quality and detention ponds will discharge at less than historic rates.

For all Meadow Lake Phase 1 lots draining to Haegler Ranch Drainage Basin, onsite water quality and detention shall be the responsibility of the future property owner and shall be designed at the time of site development plan application.

b. Water Quality & Detention

Lots 1 & 15 (Basin G) - Haegler Ranch Drainage Basin - Lots 1 and 15 (Basin G on proposed conditions map) will provide their own detention and water quality treatment at time of Site Development Plan that will discharge to the Haegler Ranch Drainage Basin as it has gone historically. The future detention basin(s) within subbasin G should account for the increase in flow from basin ROW1 and restrict flow from the future stormwater detention basins to historic rates at DP E2.

Pond A - Solberg Ranch Drainage Basin

Water quality and detention for Basins A – F, and H - J is provided in a full spectrum water quality and detention pond: Pond A. Pond A is located in Tract A. A total of 25.69 acres at 65% imperviousness will be detained in the pond. The WQCV is 0.544 ac-ft, the EURV is 2.012 ac-ft, and the approximate 100-year detention volume is 3.050 ac-ft. The WQCV, EURV and 100-year storms are released in 41, 71 and 73 hours, respectively. A forebay is located at the outfall into the pond and a 40" trickle channel conveys flow towards the outlet structure. A 15' wide ramp at a slope no greater than 12% slope is provided to the bottom of the pond to facilitate future maintenance. A 45' emergency overflow spillway is provided that conveys the developed, peak 100-yr flow rate with 1.0' of freeboard towards Curtis Road. The spillway will be lined with Type L riprap. The outfall for the pond drains into a proposed roadside swale adjacent to Curtis Street. The total flow to this outfall point (DP E4) will remain at or less than existing flowrates for the minor and major storms. Analysis of the proposed roadside swale will be provided with the F[illegible]all. Pond design calculations are presented in Appendix D.

show spillway on the drainage plan and verify spillway location.

Pond B - Solberg Ranch Drainage Basin

Water quality and detention for Basins K – T and ROW2 is provided in a full [illegible] detention pond: Pond B. Pond B is located in Tract B. A total of 20.80 acres at 68% imperviousness will be detained in the pond. The WQCV is 0.462 ac-ft, the EURV is 1.602 ac-ft, and the approximate 100-year detention volume is 2.496 ac-ft. The WQCV, EURV and 100-year storms are released in 40, 70, and 70 hours, respectively. A forebay is located at the outfall into the pond and a 40" trickle channel conveys flow towards the outlet structure. A 15' wide ramp at a slope no greater than 12% slope is provided to the bottom of the pond to facilitate future maintenance. A 85' emergency overflow spillway is provided that conveys the developed, peak 100-yr flow rate with 1.0' of freeboard towards Curtis Road. The spillway will be lined with Type L riprap. The outfall for Pond B will be into a level spreader at DP8. The level spreader has been designed to drain runoff discharging from Pond B the same as existing conditions. Runoff draining from Pond B will be restricted so that there is no increase in the total runoff discharging to design point E8. The ultimate outfall of the pond is to DP E9, the un-named tributary. Pond design calculations are presented in Appendix D.

c. Inspection and Maintenance

The private detention ponds are to be owned and maintained by a metropolitan district, to be established with the project. Maintenance access for the full spectrum detention facilities will be provided through private drainage easements and tracts. A maintenance agreement with the County is required and will be provided with Final Drainage Report for this project.

d. Four Step Method to Minimize Adverse Impacts of Urbanization

Step 1 – Reducing Runoff Volumes: Low impact development (LID) practices are utilized to reduce runoff at the source. In general, stormwater discharges are routed across pervious areas prior to capture in storm sewer. This practice promotes infiltration and reduces peak runoff rates.

Step 2 – Treat and slowly release the WQCV: This step utilizes full spectrum water quality and detention to capture the WQCV and slowly release runoff from the site. Two onsite full spectrum detention ponds provide water quality treatment for the majority of the site. The WQCV is released over a period of 40 hours.

Lots 1 and 15 (Basin G on proposed conditions map) will provide their own detention and water quality treatment at time of Site Development Plan that will discharge to the Haegler Ranch Drainage Basin as it has gone historically.

Step 3 – Stabilize stream channels: This step establishes practices to stabilize drainageways and provide scour protection at stormwater outfalls. Erosion protection is provided at all concentrated stormwater discharge points in the form of riprap pads.

Step 4 – Consider the need for source controls: This project has no need for specialized source controls.

e. Drainage and Bridge Fees

Solberg Ranch - 2024 Drainage Basin / Bridge Fees						
Drainage Fee/Impervious Acre	Bridge Fee/Impervious Acre	Site Acreage	Site Impervious	Impervious Acres	Drainage Fee	Bridge Fee
$24,832.00	$0	44.55	77%	34.30	$851,737.60	$0

Haegler Ranch - 2024 Drainage Basin / Bridge Fees						
Drainage Fee/Impervious Acre	Bridge Fee/Impervious Acre	Site Acreage	Site Impervious	Impervious Acres	Drainage Fee	Bridge Fee
$13,971.00	$2,062.00	6.75	77%	5.20	$72,649.20	$10,722.40

f. Opinion of Probable Cost

An engineer's opinion of probable cost is presented will be provided with the Final Drainage Report submittal.

g. Hydraulic Grade Line Analysis

A hydraulic grade line analysis of the proposed storm will be provided with the Final Drainage Report submittal.

V. Summary

Meadow Lake Industrial Phase 1 lies within the Solberg Ranch Drainage Basin and the Haegler Ranch Basin Drainage Basin. Water quality and detention for the site is provided in full spectrum water quality and detention ponds for all lots draining to the Solberg Ranch Drainage Basin in Ponds A and B. For Lots 1 and 15 draining to the Haegler Ranch Drainage Basin, they will provide their own detention and water quality treatment at time of Site Development Plan that will discharge to the Haegler Ranch Drainage Basin as it has gone historically. The water quality and detention ponds will be owned and maintained by a metropolitan district, to be established with the project. All drainage facilities were sized per the El Paso County Drainage Criteria Manuals. Offsite basins will not be affected by this project. The existing unnamed channel west of the proposed development will not be affected or its condition modified. The runoff release of the site is less than existing rates to the ultimate outfall point into the channel and with appropriate controls as described herein. Downstream and surrounding properties will not be adversely affected by this developments flows.

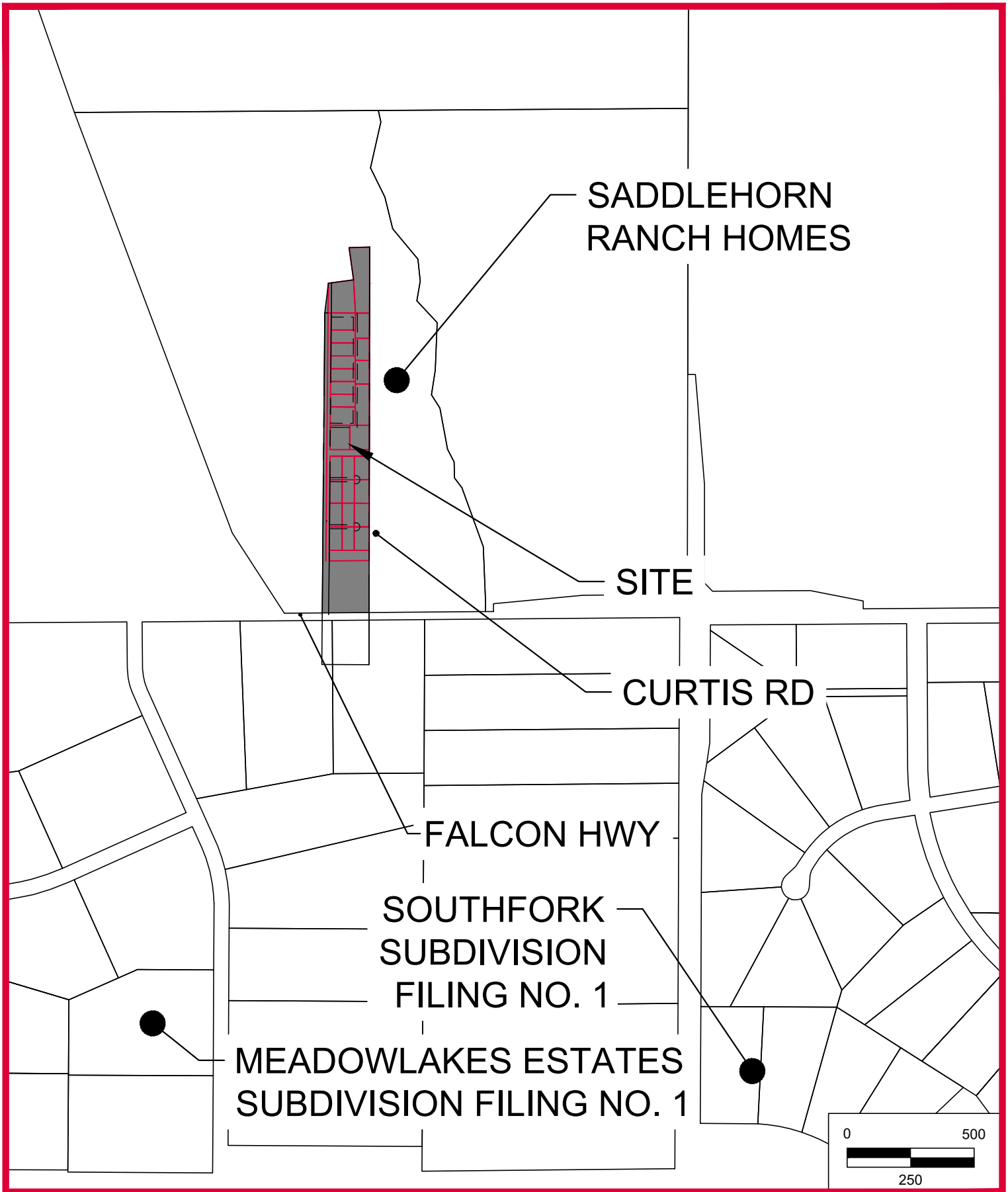
VI. Drawings

Please refer to the appendices for vicinity and drainage basin maps.

VII. References

1. Haegler Ranch Basin Drainage Basin Planning Study (DBPS), dated May 2009, by URS
2. City of Colorado Springs – Drainage Criteria Manual, May 2014, Revised January 2021.
3. Drainage Criteria Manual of El Paso, Colorado, October 2018.
4. Urban Storm Drainage Criteria Manual, Urban Drainage Flood Control District, January 2018.

APPENDIX A – VICINITY MAP, SOIL MAP, FEMA MAP



HRGreen

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NORTH

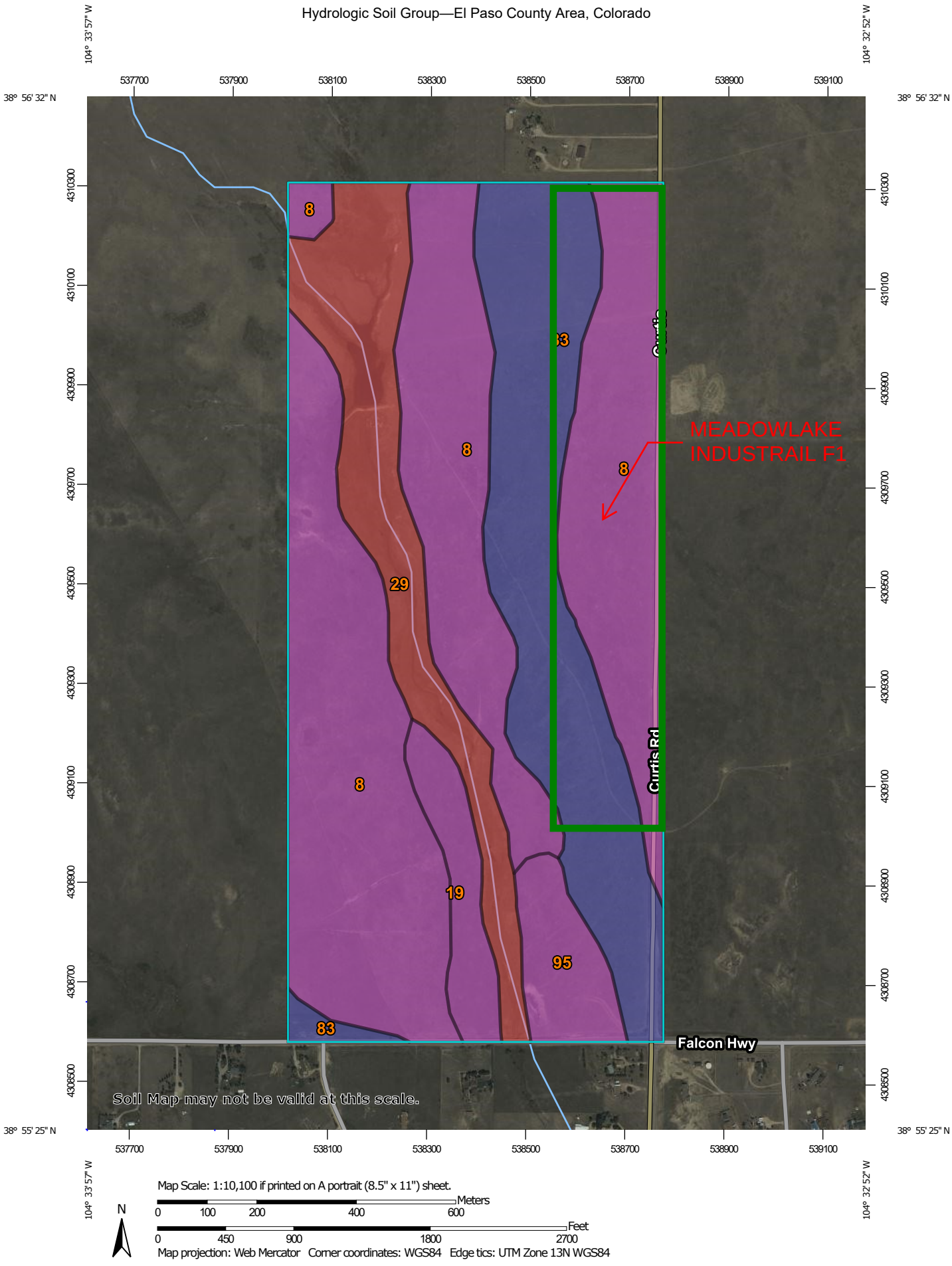
SHEET

VICINITY MAP

SCALE: 1"=500'

DATE: 06/08/2023

Xrefs: EPC_Parcels; 8.5x11_Titleblock


104° 33' 57" W
104° 32' 52" W
38° 56' 32" N
38° 55' 25" N
537700
537900
538100
538300
538500
538700
538900
539100
4310300
4310100
4309900
4309700
4309500
4309300
4309100
4308900
4308700
4308500
8
83
29
19
95
MEADOWLAKE INDUSTRAIL F1
Curtis Rd
Falcon Hwy
Soil Map may not be valid at this scale.
Map Scale: 1:10,100 if printed on A portrait (8.5" x 11") sheet.
N
Meters
0 100 200 400 600
Feet
0 450 900 1800 2700
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.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

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 20, Sep 2, 2022

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

Date(s) aerial images were photographed: Sep 11, 2018—Oct 20, 2018

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

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
8	Blakeland loamy sand, 1 to 9 percent slopes	A	174.3	53.7%
19	Columbine gravelly sandy loam, 0 to 3 percent slopes	A	13.3	4.1%
29	Fluvaquentic Haplaquolls, nearly level	D	47.2	14.5%
83	Stapleton sandy loam, 3 to 8 percent slopes	B	75.9	23.4%
95	Truckton loamy sand, 1 to 9 percent slopes	A	14.0	4.3%
Totals for Area of Interest			**324.7**	**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

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 13. The **horizontal datum** was NAD83, GRS80 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the **North American Vertical Datum of 1988 (NAVD88)**. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, MD 20910-3282

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Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

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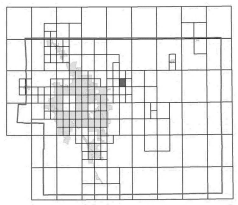
If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/business/nfip.

El Paso County Vertical Datum Offset Table

Flooding Source	Vertical Datum Offset (ft)

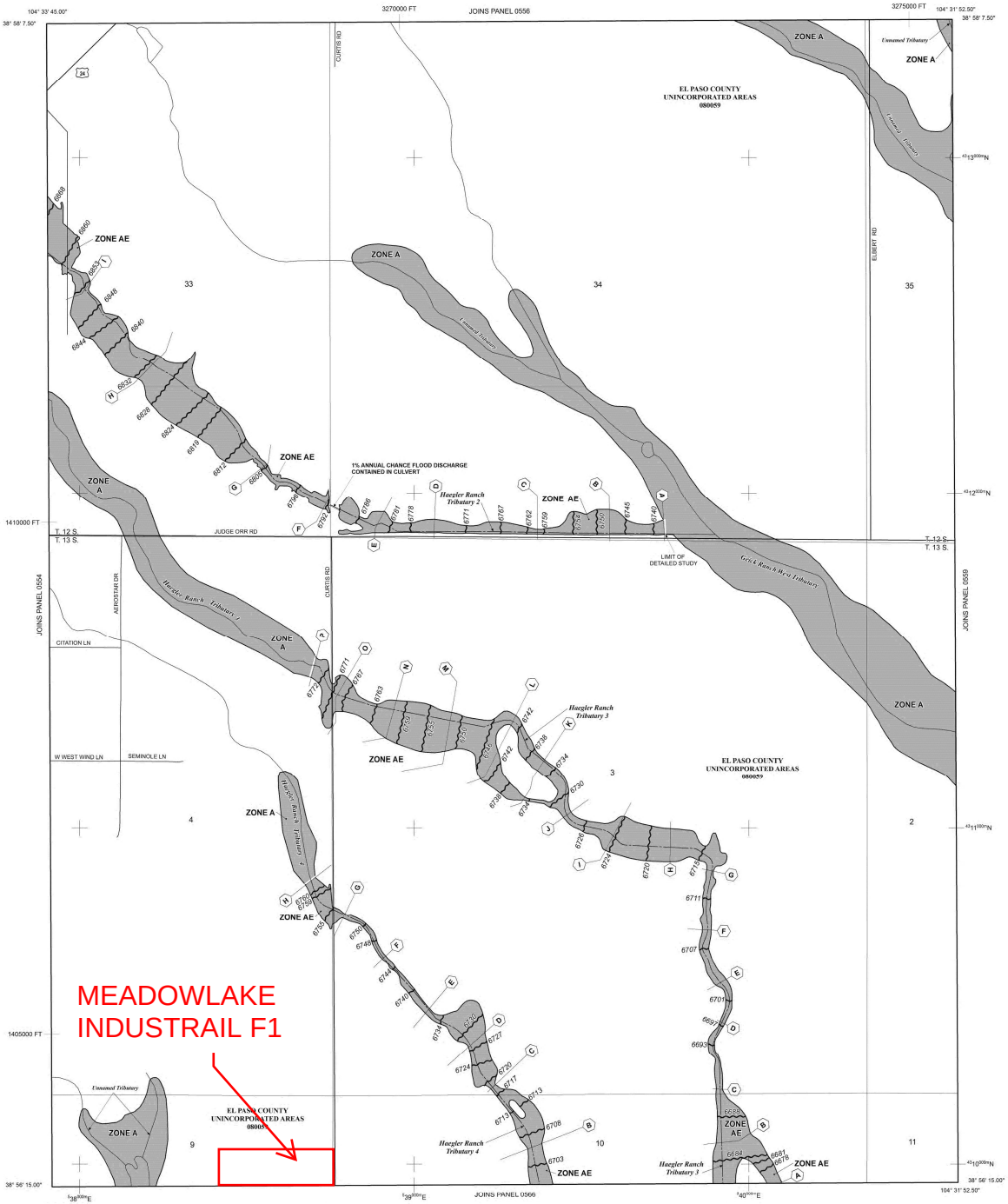
REFER TO SECTION 3.3 OF THE EL PASO COUNTY FLOOD INSURANCE STUDY FOR STREAM BY STREAM VERTICAL DATUM CONVERSION INFORMATION

Panel Location Map



This Digital Flood Insurance Rate Map (DFIRM) was produced through a Cooperating Technical Partner (CTP) agreement between the State of Colorado Water Conservation Board (CWCB) and the Federal Emergency Management Agency (FEMA).

Additional Flood Hazard information and resources are available from local communities and the Colorado Water Conservation Board.



NOTE: MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN TOWNSHIP 12 SOUTH, RANGE 64 WEST, AND TOWNSHIP 13 SOUTH, RANGE 64 WEST.

LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAS) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A No Base Flood Elevations determined.
ZONE AE Base Flood Elevations determined.
ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR Special Flood Hazard Area Formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99 Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachments so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

Floodplain boundary
Floodway boundary
Zone D Boundary
CBRS and OPA boundary
Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
513 — Base Flood Elevation line and value; elevation in feet*
(EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

A — A — Cross section line
23 — 23 — Transect line
97° 07' 30.00" / 32° 22' 30.00" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
4275000mN — 1000-meter Universal Transverse Mercator grid ticks, zone 13
6000000 FT — 5000-foot grid ticks: Colorado State Plane coordinate system, central zone (FIPSZONE 0502), Lambert Conformal Conic Projection
DX5510 — Bench mark (see explanation in Notes to Users section of this FIRM panel)
M1.5 — River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
MARCH 17, 1997

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
DECEMBER 7, 2018 - to update corporate limits, to change Base Flood Elevations and Special Flood Hazard Areas, to update map format, to add roads and road names, and to incorporate previously issued Letters of Map Revision.

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MAP SCALE 1" = 500'
250 0 500 1000 FEET
150 0 150 300 METERS

PANEL 0558G

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

EL PASO COUNTY, COLORADO AND INCORPORATED AREAS

PANEL 558 OF 1300

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
EL PASO COUNTY	080059	0558	G

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
08041C0558G

MAP REVISED
DECEMBER 7, 2018

Federal Emergency Management Agency

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

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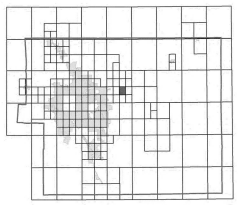

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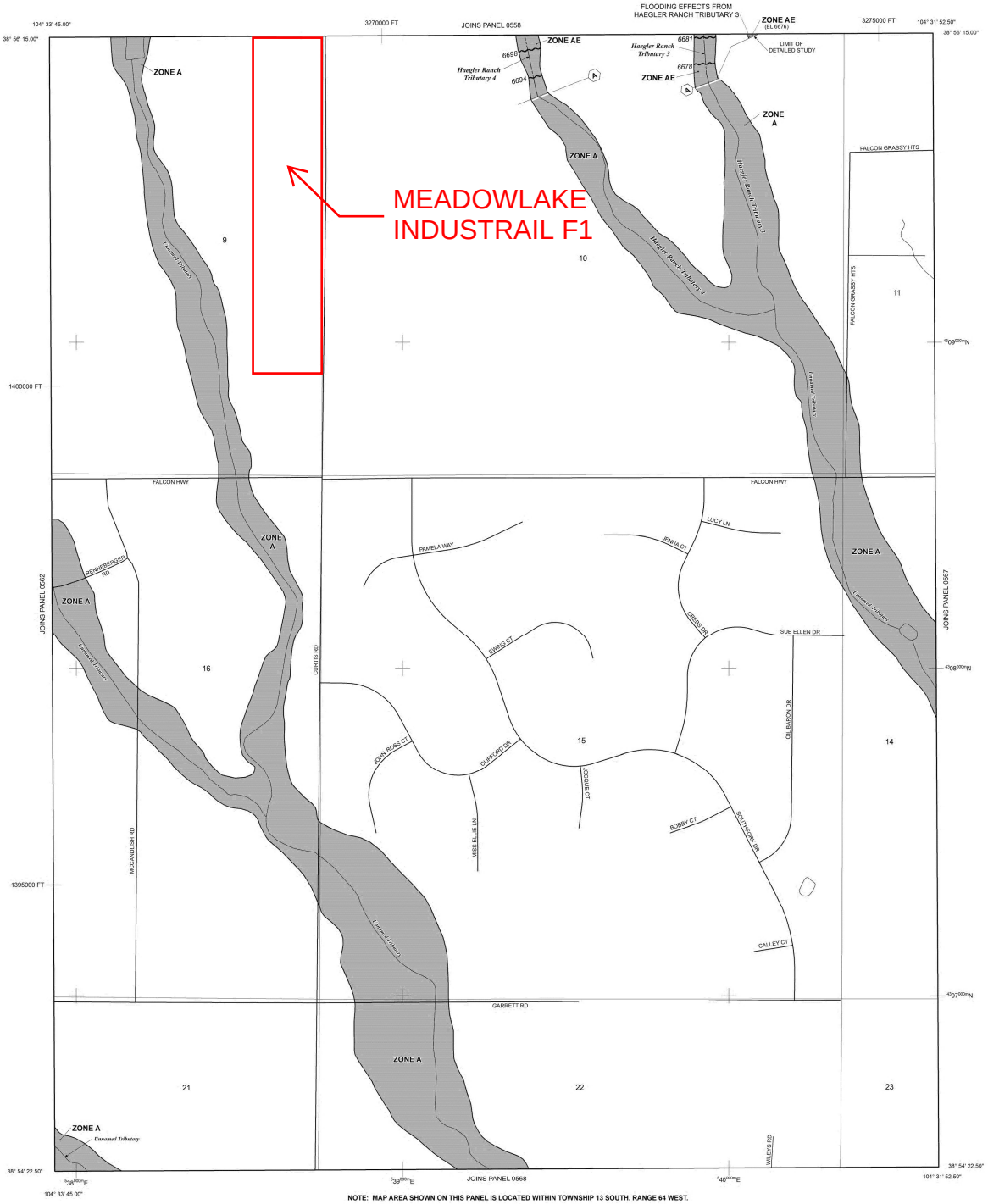

NOTE: MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN TOWNSHIP 13 SOUTH, RANGE 64 WEST.

LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAS) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

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FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachments so that the 1% annual chance flood can be carried without substantial increases in flood heights.

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OTHER AREAS

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OTHERWISE PROTECTED AREAS (OPAs)

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Floodplain boundary
Floodway boundary
Zone D Boundary
CBRS and OPA boundary
Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
513 — Base Flood Elevation line and value; elevation in feet*
(EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

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23 — 23 — Transect line
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4275000mN — 1000-meter Universal Transverse Mercator grid ticks, zone 13
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M1.5 — River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
MARCH 17, 1997

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
DECEMBER 7, 2018 - to update corporate limits, to change Base Flood Elevations and Special Flood Hazard Areas, to update map format, to add roads and road names, and to incorporate previously issued Letters of Map Revision.

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MAP SCALE 1" = 500'
250 0 500 1000 FEET
150 0 150 300 METERS

PANEL 0566G

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

EL PASO COUNTY, COLORADO AND INCORPORATED AREAS

PANEL 566 OF 1300

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
EL PASO COUNTY	080059	0566	G

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
08041C0566G

MAP REVISED
DECEMBER 7, 2018

Federal Emergency Management Agency

APPENDIX B – HYDROLOGIC CALCULATIONS

HRGreen	**MEADOWLAKE INDUSTRIAL**	**Calc'd by:**	**SPC**
	EXISTING CONDITIONS	**Checked by:**	**CM**
	EL PASO COUNTY, CO	**Date:**	**10/25/2024**

SUMMARY RUNOFF TABLE

BASIN	AREA (ac)	% IMPERVIOUS	Q_5 (cfs)	Q_{100} (cfs)
EX1	8.75	5	3.4	18.3
EX2	30.77	3	9.5	57.8
EX3	13.39	5	4.5	25.4
EX4	7.03	2	2.1	14.3
OS1	2.83	2	1.0	6.7
OS2.1	5.34	2	1.8	11.9
OS2.2	0.37	2	0.1	0.9
OS3	3.96	11	2.1	9.2
OS4	40.63	3	10.7	64.7
EROW4	1.48	53	2.1	4.6

DESIGN POINT SUMMARY TABLE

DESIGN POINT	CONTRIBUTING BASINS	ΣQ_5 (cfs)	ΣQ_{100} (cfs)
1	OS1	1.0	6.7
2	EX1, DP1	4.2	23.9
3	OS2.1	1.8	11.9
4	EX2, DP3	10.9	67.6
5	OS2.2	0.1	0.9
6	EX3, DP5	13.2	79.9
7	OS3, DP6, DP10	15.0	81.2
8	EX4	2.1	14.3
9	OS4, DP7, DP8	24.2	138.8
10	EROW4	2.1	4.6

MEADOWLAKE INDUSTRIAL
EXISTING CONDITIONS
EL PASO COUNTY, CO

Calc'd by: SPC

Checked by: CM

Date: 10/25/2024

SOIL TYPE: HSG A&B

COMPOSITE 'C' FACTORS

BASIN	LAND USE TYPE															TOTAL	COMPOSITE IMPERVIOUSNESS & C FACTOR			
	Historic Flow Analysis-- Greenbelts, Agriculture			Paved			Land Use Undefined			Land Use Undefined			Land Use Undefined							
	%I	C_5	C_{100}	%I	C_5	C_{100}	%I	C_5	C_{100}	%I	C_5	C_{100}	%I	C_5	C_{100}					
	2	0.09	0.36	100	0.90	0.96	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00					
	ACRES			ACRES			ACRES			ACRES			ACRES			ACRES	%I	C_5	C_{100}
EX1	8.46			0.29												8.75	5	0.12	0.38
EX2	30.35			0.42												30.77	3	0.10	0.37
EX3	13.04			0.35												13.39	5	0.11	0.38
EX4	7.03															7.03	2	0.09	0.36
OS1	2.83															2.83	2	0.09	0.36
OS2.1	5.34															5.34	2	0.09	0.36
OS2.2	0.37															0.37	2	0.09	0.36
OS3	3.61			0.35												3.96	11	0.16	0.41
OS4	40.03			0.60												40.63	3	0.10	0.37
EROW4	0.70			0.78												1.48	53	0.51	0.67

HRGreen	**MEADOWLAKE INDUSTRIAL**	**Calc'd by:**	**SPC**
	EXISTING CONDITIONS	**Checked by:**	**CM**
	EL PASO COUNTY, CO	**Date:**	**10/25/2024**

TIME OF CONCENTRATION

BASIN DATA			OVERLAND TIME (T_i)			TRAVEL TIME (T_t)					TOTAL	*tc=(L/180)+10*	Design tc
DESIGNATION	C_5	AREA (ac)	LENGTH (ft)	SLOPE %	t_i (min)	C_V	LENGTH (ft)	SLOPE %	V (ft/s)	t_t (min)	t_c (min)	*tc max*	*tc design (min)*
EX1	0.12	8.75	100	2.3	13.7	10	1270	3.0	1.7	12.2	25.9	17.6	17.6
EX2	0.10	30.77	100	2.2	14.1	10	1820	2.1	1.4	20.9	35.0	20.7	20.7
EX3	0.11	13.39	100	2.1	14.2	10	1889	1.9	1.4	22.8	37.0	21.1	21.1
EX4	0.09	7.03	100	2.4	13.8	10	1086	4.1	2.0	8.9	22.8	16.6	16.6
OS1	0.09	2.83	100	5.0	10.8	10	210	5.0	2.2	1.6	12.4	11.7	11.7
OS2.1	0.09	5.34	100	2.0	14.7	10	527	1.7	1.3	6.7	21.4	13.5	13.5
OS2.2	0.09	0.37	97	3.7	11.8	10	0	0.0	0.0	0.0	11.8	10.5	10.5
OS3	0.16	3.96	100	2.0	13.7	10	1160	2.0	1.4	13.7	27.3	17.0	17.0
OS4	0.10	40.63	100	5.5	10.4	10	3177	3.5	1.9	28.3	38.7	28.2	28.2
EROW4	0.51	1.48	25	9.8	2.5	15	2685	1.6	1.9	24.0	26.5	25.1	25.1

$$t_i = \frac{0.395(1.1 - C_5)\sqrt{L}}{S^{0.33}} \qquad V = C_v S_w^{0.5}$$

Table 6-7. Conveyance Coefficient, C_v

Type of Land Surface	C_v
Heavy meadow	2.5
Tillage/field	5
Riprap (not buried)*	6.5
Short pasture and lawns	7
Nearly bare ground	10
Grassed waterway	15
Paved areas and shallow paved swales	20

* For buried riprap, select C_v value based on type of vegetative cover.

HRGreen

MEADOWLAKE INDUSTRIAL
EXISTING CONDITIONS
DESIGN STORM: 5-YEAR

Calc'd by:	SPC
Checked by:	CM
Date:	10/25/2024

			DIRECT RUNOFF						TOTAL RUNOFF				STREET			PIPE				TRAVEL TIME			REMARKS
	DESIGN POINT	BASIN ID	AREA (ac)	C_5	t_c (min)	C_5*A (ac)	I (in./ hr.)	Q (cfs)	t_c (min)	C_5*A (ac)	I (in./ hr.)	Q (cfs)	Q_{street} (cfs)	C_5*A (ac)	SLOPE %	Q_{PIPE} (cfs)	C_5*A (ac)	SLOPE %	PIPE SIZE (ft)	LENGTH (FT)	VEL. (FPS)	TRAVEL TIME (min	
	1	OS1	2.83	0.09	11.7	0.25	3.89	1.0	11.7	0.25	3.89	**1.0**	1.0	0.25	3.0					940	3.5	4.52	BASIN OS1 DRAINS INTO EX1 VIA SHEET FLOW AT DP1
	2	EX1	8.75	0.12	17.6	1.02	3.28	3.4	17.6	1.28	3.28	**4.2**											BASIN EX1 DRAINS NORTH OFFSITE VIA CHANNLEIZED FLOW AT DP2
	3	OS2.1	5.34	0.09	13.5	0.48	3.68	1.8	13.5	0.48	3.68	**1.8**	1.8	0.48	3.0					832	3.5	4.00	BASIN OS2.1 DRAINS INTO EX2 VIA SHEET FLOW AT DP3
	4	EX2	30.77	0.10	20.7	3.11	3.04	9.5	20.7	3.59	3.04	**10.9**	10.9	3.59	1.7					1150	2.6	7.35	BASIN EX2 DRAINS INTO EX3 VIA CHANNELIZED FLOW AT DP4
	5	OS2.2	0.37	0.09	10.5	0.03	4.05	0.1	10.5	0.03	4.05	**0.1**	0.1	0.03	1.9					1285	2.8	7.77	BASIN OS3 DRAINS INTO OS4 VIA CHANNELIZED FLOW AT DP5
	6	EX3	13.39	0.11	21.1	1.49	3.01	4.5	28.0	5.11	2.58	**13.2**	13.2	5.11	2.1					1015	2.9	5.84	BASIN EX3 DRAINS INTO OS3 VIA CHANNELIZED FLOW AT DP6
	7	OS3	3.96	0.16	17.0	0.64	3.33	2.1	33.9	6.51	2.30	**15.0**	15.0	6.51	3.7					853	3.8	3.70	BASIN OS3 DRAINS INTO OS4 VIA CHANNELIZED FLOW AT DP7 (INCLUDES DP 10)
	8	EX4	7.03	0.09	16.6	0.63	3.37	2.1	16.6	0.63	3.37	**2.1**	2.1	0.63	1.4					1571	2.4	11.06	BASIN EX4 DRAINS INTO OS4 VIA SHEET FLOW AT DP8
	9	OS4	40.63	0.10	28.2	4.14	2.57	10.7	37.5	11.29	2.14	**24.2**											DP9 TOTAL FLOW OFFSITE AT EXISTING BOX CULVERTS (INCLUDES DP 10)
	10	EROW4	1.48	0.51	25.1	0.76	2.75	2.1	25.1	0.76	2.75	**2.1**											DP10 TOTAL FLOW OFFSITE AT EXISTNG SWALE

MEADOWLAKE INDUSTRIAL

EXISTING CONDITIONS

DESIGN STORM: 100-YEAR

Calc'd by:	SPC
Checked by:	CM
Date:	10/25/2024

			DIRECT RUNOFF						TOTAL RUNOFF				STREET			PIPE				TRAVEL TIME			REMARKS
	DESIGN POINT	BASIN ID	AREA (ac)	C_{100}	t_c (min)	C_{100}*A (ac)	I (in./ hr.)	Q (cfs)	t_c (min)	C_{100}*A (ac)	I (in./ hr.)	Q (cfs)	Q_{street} (cfs)	C_{100}*A (ac)	SLOPE %	Q_{PIPE} (cfs)	C_{100}*A (ac)	SLOPE %	PIPE SIZE (ft)	LENGTH (ft)	VEL. (ft/s)	TRAVEL TIME (min)	
	1	OS1	2.83	0.36	11.7	1.02	6.53	6.7	11.7	1.02	6.53	**6.7**	6.7	1.02	3.0					940	3.5	4.52	BASIN OS1 DRAINS INTO EX1 VIA SHEET FLOW AT DP1
	2	EX1	8.75	0.38	17.6	3.32	5.51	18.3	17.6	4.34	5.51	**23.9**											BASIN EX1 DRAINS NORTH OFFSITE VIA CHANNLEIZED FLOW AT DP2
	3	OS2.1	5.34	0.36	13.5	1.92	6.18	11.9	13.5	1.92	6.18	**11.9**	11.9	1.92	3.0					832	3.5	4.00	BASIN OS2.1 DRAINS INTO EX2 VIA SHEET FLOW AT DP3
	4	EX2	30.77	0.37	20.7	11.33	5.10	57.8	20.7	13.25	5.10	**67.6**	67.6	13.25	1.7					1150	2.6	7.35	BASIN EX2 DRAINS INTO EX3 VIA CHANNELIZED FLOW AT DP4
	5	OS2.2	0.37	0.36	10.5	0.13	6.80	0.9	10.5	0.13	6.80	**0.9**	0.9	0.13	1.9					1285	2.8	7.77	BASIN OS3 DRAINS INTO OS4 VIA CHANNELIZED FLOW AT DP5
	6	EX3	13.39	0.38	21.1	5.03	5.06	25.4	28.0	18.42	4.34	**79.9**	79.9	18.42	2.1					1015	2.9	5.84	BASIN EX3 DRAINS INTO OS3 VIA CHANNELIZED FLOW AT DP6
	7	OS3	3.96	0.41	17.0	1.64	5.60	9.2	33.9	21.05	3.86	**81.2**	81.2	21.05	3.7					853	3.8	3.70	BASIN OS3 DRAINS INTO OS4 VIA CHANNELIZED FLOW AT DP7 (INCLUDES DP 10)
	8	EX4	7.03	0.36	16.6	2.53	5.66	14.3	16.6	2.53	5.66	**14.3**	14.3	2.53	1.4					1571	2.4	11.06	BASIN EX4 DRAINS INTO OS4 VIA SHEET FLOW AT DP8
	9	OS4	40.63	0.37	28.2	14.99	4.32	64.7	37.5	38.57	3.60	**138.8**											DP9 TOTAL FLOW OFFSITE AT EXISTING BOX CULVERTS (INCLUDES DP 10)
	10	EROW4	1.48	0.67	25.1	1.00	4.62	4.6	25.1	1.00	4.62	**4.6**											DP9 TOTAL FLOW OFFSITE AT EXISTING BOX CULVERTS

MEADOWLAKE INDUSTRIAL	**Calc'd by:**	**DH/AB**
PROPOSED CONDITIONS	**Checked by:**	**NQJ**
EL PASO COUNTY, CO	**Date:**	**10/25/2024**

SUMMARY RUNOFF TABLE

BASIN	AREA (ac)	% IMPERVIOUS	Q_5 (cfs)	Q_{100} (cfs)
A	5.78	45	8.4	19.9
B	1.10	96	3.6	6.6
C	3.01	80	7.0	13.9
D	3.05	80	7.3	14.6
E	3.68	80	8.8	17.5
F	1.10	90	2.8	5.2
G	6.75	2	2.0	13.5
H	3.71	74	7.7	15.8
I	1.12	67	2.1	4.6
J	3.14	25	3.0	9.6
K	0.24	90	1.0	1.9
L	0.24	90	1.0	1.9
N1	2.07	80	4.9	9.8
N2	0.25	100	1.2	2.1
N3	1.84	80	4.8	9.6
O	2.10	80	5.9	11.8
P1	0.25	100	1.2	2.1
P2	2.05	80	2.4	11.4
Q	1.02	80	3.2	6.2
R	1.43	80	2.1	6.8
S1	1.16	80	2.9	5.8
S2	2.32	80	5.3	10.6
S3	1.16	80	3.0	5.9
T	1.42	3	0.5	3.2
OS1	2.83	2	1.0	6.7
ROW1	2.17	28	2.3	6.5
ROW2	3.25	33	3.6	9.6
ROW3	6.85	24	5.2	15.8
OS4	40.02	3	10.5	63.9
ROW4	1.48	59	2.3	4.9

DESIGN POINT SUMMARY TABLE

DESIGN POINT	CONTRIBUTING BASINS	ΣQ_5 (cfs)	ΣQ_{100} (cfs)
E1	OS1	1.0	6.7
7	G, DP E1	2.9	19.2
E2	ROW 1, DP 7	5.0	25.2
1	A	8.4	19.9
2	E	3.6	6.6
2.1	DP 1, DP 2	11.4	25.3
3	C	7.0	13.9
4	D	7.3	14.6
4.1	DP 3, DP 4	13.7	27.2
5	E	8.8	17.5
5.1	DP 2.1, DP5	18.0	38.3
5.2	DP 4.1, DP 5.1	29.3	60.8
6	F, DP 5.2	31.8	65.5
6.1	DP 6	31.8	65.5
8	H	7.7	15.8
9	I, DP 8	9.2	19.0
10	DP 6.1, DP 9	42.4	90.3
13	ROW2	3.6	9.6
E4	POND A RELEASE	0.8	13.8
11	K, DP 13	1.0	10.7
12	L, DP 11	2.0	11.9
12.1	DP 12	2.0	22.5
15	N1	4.9	9.8
15.1	N2	1.2	2.1
15.2	N3	4.8	9.6
16	O	5.9	11.8
17	P1	1.2	2.1
17.1	DP 16, DP 17	6.9	13.6
18	Q	3.2	6.2
19	R, DP 15.2	5.8	14.1
19.1	DP 18, DP 19	13.2	28.5
20.1	DP 17.1, DP 19.1	18.1	38.0
20.2	P2	2.4	11.4
20.3	DP 20.1, DP 20.2	19.2	44.9
21	S1, DP 12.1	4.6	25.3
21.1	S2, DP 21	9.2	30.8
21.2	S3, DP21.2	11.2	33.3
22	T, DP 20.3, DP 21.1	29.1	72.0
E7	ROW 2, DP E4	6.0	29.6
E8	POND B RELEASE	1.5	14.0
E9	OS4, DP E7, DP E8	19.8	110.9
E10	ROW4	2.3	4.9

HRGreen	**MEADOWLAKE INDUSTRIAL**							**Calc'd by:**				**DH/AB**					
	PROPOSED CONDITIONS							**Checked by:**				**NQJ**					
	EL PASO COUNTY, CO							**Date:**				**10/25/2024**					

COMPOSITE 'C' FACTORS

BASIN	UNDEVELOPED	INDUSTRIAL	PAVED	TOTAL	SOIL TYPE	UNDEVELOPED			INDUSTRIAL			PAVED			COMPOSITE IMPERVIOUSNESS & C		
	ACRES					%I	C_5	C_{100}	%I	C_5	C_{100}	%I	C_5	C_{100}	%I	C_5	C_{100}
A	3.27	0.00	2.51	5.78	A/B	2	0.09	0.36	80	0.59	0.70	100	0.90	0.96	45	0.44	0.62
B	0.00	0.23	0.87	1.10	A/B	2	0.09	0.36	80	0.59	0.70	100	0.90	0.96	96	0.84	0.91
C	0.00	3.01	0.00	3.01	A/B	2	0.09	0.36	80	0.59	0.70	100	0.90	0.96	80	0.59	0.70
D	0.00	3.05	0.00	3.05	A/B	2	0.09	0.36	80	0.59	0.70	100	0.90	0.96	80	0.59	0.70
E	0.00	3.68	0.00	3.68	A/B	2	0.09	0.36	80	0.59	0.70	100	0.90	0.96	80	0.59	0.70
F	0.00	0.57	0.53	1.10	A/B	2	0.09	0.36	80	0.59	0.70	100	0.90	0.96	90	0.74	0.83
G	6.75	0.00	0.00	6.75	A/B	2	0.09	0.36	80	0.59	0.70	100	0.90	0.96	2	0.09	0.36
H	0.30	3.41	0.00	3.71	A/B	2	0.09	0.36	80	0.59	0.70	100	0.90	0.96	74	0.55	0.67
I	0.19	0.93	0.00	1.12	A/B	2	0.09	0.36	80	0.59	0.70	100	0.90	0.96	67	0.51	0.64
J	2.20	0.94	0.00	3.14	A/B	2	0.09	0.36	80	0.59	0.70	100	0.90	0.96	25	0.24	0.46
K	0.02	0.00	0.22	0.24	A/B	2	0.09	0.36	80	0.59	0.70	100	0.90	0.96	90	0.82	0.90
L	0.02	0.00	0.22	0.24	A/B	2	0.09	0.36	80	0.59	0.70	100	0.90	0.96	90	0.82	0.90
N1	0.00	2.07	0.00	2.07	A/B	2	0.09	0.36	80	0.59	0.70	100	0.90	0.96	80	0.59	0.70
N2	0.00	0.00	0.25	0.25	A/B	2	0.09	0.36	80	0.59	0.70	100	0.90	0.96	100	0.90	0.96
N3	0.00	1.84	0.00	1.84	A/B	2	0.09	0.36	80	0.59	0.70	100	0.90	0.96	80	0.59	0.70
O	0.00	2.10	0.00	2.10	A/B	2	0.09	0.36	80	0.59	0.70	100	0.90	0.96	80	0.59	0.70
P1	0.00	0.00	0.25	0.25	A/B	2	0.09	0.36	80	0.59	0.70	100	0.90	0.96	100	0.90	0.96
P2	0.00	2.05	0.00	2.05	A/B	2	0.09	0.36	80	0.59	0.70	100	0.90	0.96	80	0.59	0.70
Q	0.20	0.00	0.82	1.02	A/B	2	0.09	0.36	80	0.59	0.70	100	0.90	0.96	80	0.74	0.84
R	0.29	0.00	1.14	1.43	A/B	2	0.09	0.36	80	0.59	0.70	100	0.90	0.96	80	0.74	0.84
S1	0.00	1.16	0.00	1.16	A/B	2	0.09	0.36	80	0.59	0.70	100	0.90	0.96	80	0.59	0.70
S2	0.00	2.32	0.00	2.32	A/B	2	0.09	0.36	80	0.59	0.70	100	0.90	0.96	80	0.59	0.70
S3	0.00	1.16	0.00	1.16	A/B	2	0.09	0.36	80	0.59	0.70	100	0.90	0.96	80	0.59	0.70
T	1.40	0.00	0.02	1.42	A/B	2	0.09	0.36	80	0.59	0.70	100	0.90	0.96	3	0.10	0.37
OS1	2.83	0.00	0.00	2.83	A/B	2	0.09	0.36	80	0.59	0.70	100	0.90	0.96	2	0.09	0.36
ROW1	1.60	0.00	0.57	2.17	A/B	2	0.09	0.36	80	0.59	0.70	100	0.90	0.96	28	0.30	0.52
ROW2	2.21	0.00	1.04	3.25	A/B	2	0.09	0.36	80	0.59	0.70	100	0.90	0.96	33	0.35	0.55
ROW3	5.32	0.00	1.53	6.85	A/B	2	0.09	0.36	80	0.59	0.70	100	0.90	0.96	24	0.27	0.49
ROW4	0.62	0.00	0.86	1.48	A/B	2	0.09	0.36	80	0.59	0.70	100	0.90	0.96	59	0.56	0.71
OS4	39.51	0.00	0.60	40.02	A/B	2	0.09	0.36	80	0.59	0.70	100	0.90	0.96	3	0.10	0.37
Pond A				25.69											65		
Pond B				20.80											68		

HRGreen	**MEADOWLAKE INDUSTRIAL**	**Calc'd by:**	**DH/AB**
	PROPOSED CONDITIONS	**Checked by:**	**NQJ**
	EL PASO COUNTY, CO	**Date:**	**10/25/2024**

TIME OF CONCENTRATION

BASIN DATA			OVERLAND TIME (T_i)			TRAVEL TIME (T_t)					TOTAL	*tc=(L/180)+10*	Design tc
DESIGNATION	C_5	AREA (ac)	LENGTH (ft)	SLOPE %	t_i (min)	C_V	LENGTH (ft)	SLOPE %	V (ft/s)	t_t (min)	t_c (min)	*tc max*	*tc design (min)*
A	0.44	5.78	100	1.9	9.7	20	1360	2.2	3.0	7.6	17.4	18.1	17.4
B	0.84	1.10	100	1.9	3.9	20	1330	2.2	3.0	7.5	11.4	17.9	11.4
C	0.59	3.01	100	2.0	7.4	20	665	1.9	2.8	4.0	11.4	14.3	11.4
D	0.59	3.05	100	2.0	7.4	20	425	1.5	2.4	2.9	10.3	12.9	10.3
E	0.59	3.68	100	2.0	7.4	20	470	1.6	2.5	3.1	10.5	13.2	10.5
F	0.74	1.10	100	1.9	5.3	20	1680	1.7	2.6	10.7	16.1	19.9	16.1
G	0.09	6.75	100	4.0	11.7	10	1200	0.4	0.7	30.2	41.8	17.2	17.2
H	0.55	3.71	100	2.0	8.0	15	665	2.4	2.3	4.7	12.7	14.3	12.7
I	0.51	1.12	100	2.0	8.7	15	360	1.1	1.6	3.8	12.5	12.6	12.5
J	0.24	3.14	100	2.0	12.5	20	140	0.9	1.9	1.2	13.7	11.3	11.3
K	0.82	0.24	15	2.0	1.6	20	390	1.5	2.4	2.7	5.0	12.3	5.0
L	0.82	0.24	15	2.0	1.6	20	390	1.5	2.4	2.7	5.0	12.3	5.0
N1	0.59	2.07	100	2.0	7.4	20	460	1.5	2.4	3.1	10.6	13.1	10.6
N2	0.90	0.25	10	2.0	0.9	20	300	2.1	2.9	1.7	5.0	11.7	5.0
N3	0.59	1.84	100	2.0	7.4	20	167	4.0	4.0	0.7	8.1	11.5	8.1
O	0.59	2.10	100	4.5	5.7	20	215	4.5	4.2	0.8	6.5	11.8	6.5
P1	0.90	0.25	10	2.0	0.9	20	327	4.0	4.0	1.4	5.0	11.9	5.0
P2	0.59	2.05	100	4.6	5.6	20	279	4.6	4.3	1.1	6.7	12.1	6.7
Q	0.74	1.02	100	2.0	5.3	20	550	1.5	2.4	3.7	9.0	13.6	9.0
R	0.74	1.43	17	25.0	0.9	10	1160	1.5	1.2	15.8	16.7	16.5	16.5
S1	0.59	1.16	100	2.0	7.4	15	216	2.0	2.1	1.7	9.1	11.8	9.1
S2	0.59	2.32	100	2.0	7.4	15	491	1.7	2.0	4.2	11.6	13.3	11.6
S3	0.59	1.16	100	2.0	7.4	15	176	2.0	2.1	1.4	8.8	11.5	8.8
T	0.10	1.42	100	2.0	14.5	20	540	2.5	3.2	2.8	17.4	13.6	13.6
OS1	0.09	2.83	100	5.0	10.8	10	210	5.0	2.2	1.6	12.4	11.7	11.7
ROW1	0.30	2.17	81	6.4	7.1	15	1012	0.5	1.1	15.9	23.0	16.1	16.1
ROW2	0.35	3.25	81	6.4	6.7	15	1494	1.9	2.1	12.0	18.7	18.8	18.7
ROW3	0.27	6.85	81	3.4	9.1	15	2515	1.2	1.6	25.5	34.6	24.4	24.4
ROW4	0.56	1.48	25	9.8	2.3	15	2685	1.6	1.9	24.0	26.3	25.1	25.1
OS4	0.10	40.02	300	5.5	17.9	15	2977	3.5	2.8	17.7	35.6	28.2	28.2

FORMULAS:

$$t_i = \frac{0.395(1.1 - C_5)\sqrt{L}}{S^{0.33}} \qquad V = C_v S_w^{0.5}$$

Table 6-7. Conveyance Coefficient, C_v

Type of Land Surface	C_v
Heavy meadow	2.5
Tillage/field	5
Riprap (not buried)*	6.5
Short pasture and lawns	7
Nearly bare ground	10
Grassed waterway	15
Paved areas and shallow paved swales	20

* For buried riprap, select C_v value based on type of vegetative cover.

MEADOWLAKE INDUSTRIAL
PROPOSED CONDITIONS
DESIGN STORM: 5-YEAR

HRGreen

Calc'd by:	DH/AB
Checked by:	NQJ
Date:	10/25/2024

			DIRECT RUNOFF						TOTAL RUNOFF				STREET			PIPE				TRAVEL TIME			REMARKS
STREET	DESIGN POINT	BASIN ID	AREA (ac)	C_5	t_c (min)	C_5*A (ac)	I (in./ hr.)	Q (cfs)	t_c (min)	C_5*A (ac)	I (in./ hr.)	Q (cfs)	Q_{street} (cfs)	C_5*A (ac)	SLOPE %	Q_{PIPE} (cfs)	C_5*A (ac)	SLOPE %	PIPE SIZE (FT)	LENGTH (FT)	VEL. (FPS)	TRAVEL TIME (min)	
	E1	OS1	2.83	0.09	11.7	0.25	3.89	1.0	11.7	0.25	3.89	**0.99**	1.0	0.25	4.8					228	4.4	0.87	DP E1 DRAINS VIA SHEETFLOW INTO BASIN G TO DP 7
	7	G	6.75	0.09	17.2	0.61	3.31	2.0	17.2	0.86	3.31	**2.86**	2.9	0.86	4.0					81	4.0	0.34	DP7 DRAINS VIA SHEETFLOW INTO BASIN ROW1 TO DP E2
	E2	ROW1	2.175	0.30	16.1	0.66	3.42	2.3	17.6	1.52	3.28	**5.00**	5.0	1.52	4.0					81	4.0	0.34	**DP E2 DRAINS NORTH OFFSITE**
	1	A	5.78	0.44	17.4	2.55	3.30	8.4	17.4	2.55	3.30	**8.42**				8.4	2.55	1.2	1.5	40	6.5	0.10	DP1 CAPTURED W/ 10' TYPE R SUMP INELT, PIPE TO DP2.1
	2	B	1.1	0.84	11.4	0.92	3.93	3.6	11.4	0.92	3.93	**3.61**				3.6	0.92	0.5	1.5	89	4.2	0.35	DP2 CAPTURED W/ 5' TYPE R SUMP INLET, PIPE TO DP2.1
	2.1								17.5	3.47	3.29	**11.43**				11.4	3.47	0.5	1.5	305	4.2	1.21	DP2.1 FLOW, PIPE TO DP5.1
	3	C	3.01	0.59	11.4	1.78	3.93	7.0	11.4	1.78	3.93	**6.97**				7.0	1.78	2.0	1.5	427	8.4	0.85	DP3 CPATURED W/ 20' TYPE R INLET, PIPE TO DP4.1
	4	D	3.05	0.59	10.3	1.80	4.08	7.3	10.3	1.80	4.08	**7.35**				7.3	1.80	1.0	1.5	6	5.9	0.02	DP4 CAPTURED W/ 20' TYPE R INLET, PIPE TO DP4.1
	4.1								12.3	3.58	3.82	**13.66**				13.7	3.58	2.0	1.5	500	8.4	0.99	DP4.1 FLOW, PIPE TO DP5.1
	5	E	3.68	0.59	10.5	2.17	4.05	8.8	10.5	2.17	4.05	**8.80**				8.8	2.17	3.0	1.5	6	10.3	0.01	DP5 CAPTURED W/ 15' TYPE R SUMP INLET, PIPE TO DP5.1
	5.1								18.7	5.64	3.19	**18.00**				18.0	5.64	0.4	2.0	50	4.6	0.18	DP5.1 FLOW, PIPE TO DP5.2
	5.2								18.9	9.22	3.18	**29.28**				29.3	9.22	0.8	2.0	36	6.2	0.10	DP5.2 FLOW, PIPE TO DP6.1
	6	F	1.1	0.74	16.1	0.81	3.42	2.8	19.0	10.03	3.17	**31.78**				31.8	0.81	1.0	2.0	12	7.2	0.03	DP6 CAPTURED IN 15' TYPE R SUMP INLET , PIPE TO DP6.1
	6.1								19.0	10.03	3.17	**31.78**											DP6.1, PIPE TO POND A
	8	H	3.71	0.55	12.7	2.04	3.76	7.7	12.7	2.04	3.76	**7.68**	7.7	2.04	1.7					360	2.6	2.30	SWALE TO BASIN I
	9	I	1.12	0.51	12.5	0.57	3.80	2.1	15.1	2.60	3.52	**9.16**				9.2	2.60	0.5	1.5	40	4.2	0.16	SWALE TO DET POND A
	10	J	3.14	0.24	11.3	0.75	3.94	3.0	19.0	13.39	3.17	**42.42**											**DP10 FLOW, TOTAL FLOW ENTERING POND A**
	13	ROW2	3.25	0.35	18.7	1.14	3.19	3.6	18.7	1.14	3.19	**3.63**				3.6	1.14	0.5	1.5	56	4.2	0.22	DP13 FLOW, TOTAL FLOW TO INLET AT DP 11
	E4											**0.80**	0.8	0.00	1.4					2477	2.4	17.45	**DP E4 FLOW, TOTAL FLOW TO ROADSIDE SWALE = POND A RELEASE**

HRGreen

MEADOWLAKE INDUSTRIAL
PROPOSED CONDITIONS
DESIGN STORM: 5-YEAR

Calc'd by:	DH/AB
Checked by:	NQJ
Date:	10/25/2024

			DIRECT RUNOFF						TOTAL RUNOFF				STREET			PIPE				TRAVEL TIME			REMARKS
STREET	DESIGN POINT	BASIN ID	AREA (ac)	C_5	t_c (min)	C_5*A (ac)	I (in./ hr.)	Q (cfs)	t_c (min)	C_5*A (ac)	I (in./ hr.)	Q (cfs)	Q_{street} (cfs)	C_5*A (ac)	SLOPE %	Q_{PIPE} (cfs)	C_5*A (ac)	SLOPE %	PIPE SIZE (FT)	LENGTH (FT)	VEL. (FPS)	TRAVEL TIME (min)	
	11	K	0.24	0.82	5.0	0.20	5.17	1.0	5.0	0.20	5.17	**1.02**				1.0	0.20	2.0	1.5	25	8.4	0.05	DP11 CAPTURED W/ 5' TYPE R SUMP INLET, PIPE TO DP12.1
	12	L	0.24	0.82	5.0	0.20	5.17	1.0	5.0	0.39	5.15	**2.03**				2.0	0.20	2.0	1.5	25	8.4	0.05	DP12 CAPTURED W/ 5' TYPE R SUMP INELT, PIPE TO DP12.1
	12.1								5.0	0.39	5.15	**2.03**	2.0	0.39	1.0					289	2.0	2.41	DP12.1 SWALE FLOW TO DP21
	15	N1	2.07	0.59	10.6	1.22	4.05	4.9	10.6	1.22	4.05	**4.94**				4.9	1.22	0.5	1.5	606	4.2	2.40	DP15 CAPTURED IN 10' TYPE R INLET, PIPE TO DP19.1
	15.1	N2	0.25	0.90	5.0	0.23	5.17	1.2	5.0	0.23	5.17	**1.16**				1.2	0.23	0.5	1.5	626	4.2	2.48	DP15.1 CAPTURED IN 5' TYPE R INLET, PIPE TO DP19.1
	15.2	N3	1.84	0.59	8.1	1.09	4.44	4.8	8.1	1.09	4.44	**4.82**	4.8	1.09	3.4					255	3.7	1.15	DP15.2 DRAINS INTO BASIN R, DRAINS TO DP 19
	16	O	2.1	0.59	6.5	1.24	4.77	5.9	6.5	1.24	4.77	**5.91**				5.9	1.24	1.0	1.5	45	5.9	0.13	DP16 CAPTURED IN 10' TYPE R INLET, PIPE TO DP17.1
	17	P1	0.25	0.90	5.0	0.23	5.17	1.2	5.0	0.23	5.17	**1.16**				1.2	0.23	2.0	1.5	27	8.4	0.05	DP17 CAPTURED IN 5' TYPE R INLET, PIPE TO DP17.1
	17.1								6.6	1.46	4.74	**6.95**				6.9	1.46	3.6	2.0	42	13.7	0.05	DP17.1 FLOW, PIPE TO DP20.1
	18	Q	1.02	0.74	9.0	0.75	4.29	3.2	9.0	0.75	4.29	**3.23**				3.2	0.75	0.5	1.5	50	4.2	0.20	DP18 CAPTURED IN 5' TYPE R INLET, PIPE TO DP19.1
	19	R	0.85	0.74	16.5	0.63	3.37	2.1	16.5	1.71	3.37	**5.78**				5.8	0.63	1.0	1.5	6	5.9	0.02	DP19 CAPTURED IN 10' TYPE R SUMP INLET, PIPE TO DP19.1
	19.1								16.6	3.91	3.37	**13.19**				13.2	3.91	0.5	2.0	42	5.1	0.14	DP19.1 FLOW, PIPE TO DP20.1
	20.1								16.7	5.38	3.36	**18.07**				18.1	5.38	0.5	2.5	370	5.9	1.04	DP20.1 PIPE FLOW TO POND B
	20.2	P2	0.85	0.59	6.7	0.50	4.73	2.4	6.7	0.50	4.73	**2.37**				2.4	0.50	0.5	1.0	15	3.2	0.08	DP20.1 PIPE FLOW TO POND B
	20.3								17.7	5.88	3.27	**19.22**				19.2	5.88	0.5	2.5	370	5.9	1.04	DP20.1 PIPE FLOW TO POND B
	21	S1	1.16	0.59	9.1	0.68	4.27	2.9	9.1	1.08	4.27	**4.60**	4.6	1.08	1.7					580	2.6	3.71	DP21 SWALE FLOW TO DP21.1
	21.1	S2	2.32	0.59	11.6	1.37	3.91	5.3	12.8	2.45	3.76	**9.19**	9.2	2.45	2.0					282	2.8	1.66	DP21 SWALE FLOW TO DP21.2
	21.2	S3	1.16	0.59	8.8	0.68	4.32	3.0	14.5	3.13	3.57	**11.19**				11.2	3.13	5.0	2.0	45	16.1	0.05	DP21 SWALE FLOW TO POND B
	22	T	1.42	0.10	13.6	0.14	3.67	0.5	18.8	9.15	3.18	**29.14**											**TOTAL FLOW ENTERING POND B**
	E7	ROW3	6.848	0.27	24.4	1.85	2.79	5.2	24.4	1.85	2.79	**5.97**	6.0	1.85	4.2					865	4.1	3.52	DP E7 SWALE FLOW TO DP E9
	E8											**1.50**											DP E8 FLOW TO DP E9 (POND B RELEASE)
	E9	OS4	40.02	0.10	28.2	4.10	2.57	10.5	28.2	6.78	2.57	**19.76**											**DP E9 TOTAL FLOW OFFSITE**
	E10	ROW4	1.48	0.56	25.1	0.83	2.75	2.3	25.1	0.83	2.75	**2.29**											**DP E10 TOTAL FLOW OFFSITE**

MEADOWLAKE INDUSTRIAL

PROPOSED CONDITIONS

DESIGN STORM: 100-YEAR

Calc'd by:	**DH/AB**
Checked by:	**NQJ**
Date:	**10/25/2024**

			DIRECT RUNOFF						TOTAL RUNOFF				STREET			PIPE				TRAVEL TIME			REMARKS
STREET	DESIGN POINT	BASIN ID	AREA (ac)	C_{100}	t_c (min)	C_{100}*A (ac)	I (in./ hr.)	Q (cfs)	t_c (min)	C_{100}*A (ac)	I (in./ hr.)	Q (cfs)	Q_{street} (cfs)	C_{100}*A (ac)	SLOPE %	Q_{PIPE} (cfs)	C_{100}*A (ac)	SLOPE %	PIPE SIZE (ft)	LENGTH (ft)	VEL. (ft/s)	TRAVEL TIME (min)	
	E1	OS1	2.83	0.36	11.7	1.02	6.53	6.7	11.7	1.02	6.53	**6.7**	6.7	1.02	4.8					228	4.4	0.87	DP E1 DRAINS VIA SHEETFLOW INTO BASIN G TO DP 7
	7	G	6.75	0.36	17.2	2.43	5.56	13.5	17.2	3.45	5.56	**19.2**	19.2	3.45	4.0					81	4.0	0.34	DP7 DRAINS VIA SHEETFLOW INTO BASIN ROW1 TO DP E2
	E2	ROW1	2.1745	0.52	16.1	1.13	5.74	6.5	17.6	4.58	5.51	**25.2**	25.2	4.58	4.0					81	4.0	0.34	**DP E2 DRAINS NORTH OFFSITE**
	1	A	5.78	0.62	17.4	3.59	5.54	19.9	17.4	3.59	5.54	**19.9**				19.9	3.59	1.2	1.5	40	6.5	0.10	DP1 CAPTURED W/ 10' TYPE R SUMP INELT, PIPE TO DP2.1
	2	B	1.1	0.91	11.4	1.00	6.60	6.6	11.4	1.00	6.60	**6.6**				6.6	1.00	0.5	1.5	89	4.2	0.35	DP2 CAPTURED W/ 5' TYPE R SUMP INLET, PIPE TO DP2.1
	2.1								17.5	4.58	5.52	**25.3**				25.3	4.58	0.5	1.5	305	4.2	1.21	DP2.1 FLOW, PIPE TO DP5.1
	3	C	3.01	0.70	11.4	2.11	6.59	13.9	11.4	2.11	6.59	**13.9**				13.9	2.11	2.0	1.5	427	8.4	0.85	DP3 CPATURED W/ 20' TYPE R INLET, PIPE TO DP4.1
	4	D	3.05	0.70	10.3	2.14	6.85	14.6	10.3	2.14	6.85	**14.6**				14.6	2.14	1.0	1.5	6	5.9	0.02	DP4 CAPTURED W/ 20' TYPE R INLET, PIPE TO DP4.1
	4.1								12.3	4.24	6.41	**27.2**				27.2	4.24	2.0	1.5	500	8.4	0.99	DP4.1 FLOW, PIPE TO DP5.1
	5	E	3.68	0.70	10.5	2.58	6.81	17.5	10.5	2.58	6.81	**17.5**				17.5	2.58	3.0	1.5	6	10.3	0.01	DP5 CAPTURED W/ 15' TYPE R SUMP INLET, PIPE TO DP5.1
	5.1								18.7	7.16	5.36	**38.3**				38.3	7.16	0.4	2.0	50	4.6	0.18	DP5.1 FLOW, PIPE TO DP5.2
	5.2								18.9	11.40	5.33	**60.8**				60.8	11.40	0.8	2.0	36	6.2	0.10	DP5.2 FLOW, PIPE TO DP6.1
	6	F	1.1	0.83	16.1	0.91	5.74	5.2	19.0	12.31	5.32	**65.5**				65.5	0.91	1.0	2.0	12	7.2	0.03	DP6 CAPTURED IN 15' TYPE R SUMP INLET , PIPE TO DP6.1
	6.1								19.0	12.31	5.32	**65.5**											DP6.1, PIPE TO POND A
	8	H	3.71	0.67	12.7	2.50	6.32	15.8	12.7	2.50	6.32	**15.8**	15.8	2.50	1.7					360	2.6	2.30	SWALE TO BASIN I
	9	I	1.12	0.64	12.5	0.72	6.38	4.6	15.1	3.21	5.90	**19.0**				19.0	3.21	0.5	1.5	40	4.2	0.16	SWALE TO DET POND A
	10	J	3.14	0.46	11.3	1.45	6.62	9.6	19.0	16.97	5.32	**90.3**											**DP10 FLOW, TOTAL FLOW ENTERING POND A**
	13	ROW2	3.25	0.55	18.7	1.80	5.35	9.6	18.7	1.80	5.35	**9.6**				9.6	1.80	0.5	1.5	56	4.2	0.22	DP13 FLOW, TOTAL FLOW TO INLET AT DP 11
	E4											**13.8**	13.8	0.00	1.4					2477	2.4	17.45	**DP E4 FLOW, TOTAL FLOW TO ROADSIDE SWALE = POND A RELEASE**

MEADOWLAKE INDUSTRIAL

PROPOSED CONDITIONS

DESIGN STORM: 100-YEAR

Calc'd by:	**DH/AB**
Checked by:	**NQJ**
Date:	**10/25/2024**

			DIRECT RUNOFF						TOTAL RUNOFF				STREET			PIPE				TRAVEL TIME			REMARKS
STREET	DESIGN POINT	BASIN ID	AREA (ac)	C_{100}	t_c (min)	C_{100}*A (ac)	I (in./ hr.)	Q (cfs)	t_c (min)	C_{100}*A (ac)	I (in./ hr.)	Q (cfs)	Q_{street} (cfs)	C_{100}*A (ac)	SLOPE %	Q_{PIPE} (cfs)	C_{100}*A (ac)	SLOPE %	PIPE SIZE (ft)	LENGTH (ft)	VEL. (ft/s)	TRAVEL TIME (min)	
	11	K	0.24	0.90	5.0	0.22	8.68	1.9	18.9	2.01	5.32	**10.7**				10.7	2.01	2.0	1.5	25	8.4	0.05	DP11 CAPTURED W/ 5' TYPE R SUMP INLET, PIPE TO DP12.1
	12	L	0.24	0.90	5.0	0.22	8.68	1.9	19.0	2.23	5.32	**11.9**				11.9	2.23	2.0	1.5	25	8.4	0.05	DP12 CAPTURED W/ 5' TYPE R SUMP INELT, PIPE TO DP12.1
	12.1								19.0	4.24	5.31	**22.5**	22.5	0.43	1.0					289	2.0	2.41	DP12.1 SWALE FLOW TO DP21
	15	N1	2.07	0.70	10.6	1.45	6.80	9.8	10.6	1.45	6.80	**9.8**				9.8	1.45	0.5	1.5	606	4.2	2.40	DP15 CAPTURED IN 10' TYPE R INLET, PIPE TO DP19.1
	15.1	N2	0.25	0.96	5.0	0.24	8.68	2.1	5.0	0.24	8.68	**2.1**				2.1	0.24	0.5	1.5	626	4.2	2.48	DP15.1 CAPTURED IN 5' TYPE R INLET, PIPE TO DP19.1
	15.2	N3	1.84	0.70	8.1	1.29	7.46	9.6	8.1	1.29	7.46	**9.6**	9.6	1.29	3.4					255	3.7	1.15	DP15.2 DRAINS INTO BASIN R, DRAINS TO DP 19
	16	O	2.1	0.70	6.5	1.47	8.01	11.8	6.5	1.47	8.01	**11.8**				11.8	1.47	1.0	1.5	45	5.9	0.13	DP16 CAPTURED IN 10' TYPE R INLET, PIPE TO DP17.1
	17	P1	0.25	0.96	5.0	0.24	8.68	2.1	5.0	0.24	8.68	**2.1**				2.1	0.24	2.0	1.5	27	8.4	0.05	DP17 CAPTURED IN 5' TYPE R INLET, PIPE TO DP17.1
	17.1								6.6	1.71	7.97	13.6				13.6	1.71	3.6	2.0	42	13.7	0.05	DP17.1 FLOW, PIPE TO DP20.1
	18	Q	1.02	0.84	9.0	0.86	7.20	6.2	9.0	0.86	7.20	**6.2**				6.2	0.86	0.5	1.5	50	4.2	0.20	DP18 CAPTURED IN 5' TYPE R INLET, PIPE TO DP19.1
	19	R	1.43	0.84	16.5	1.20	5.66	6.8	16.5	2.49	5.66	**14.1**				14.1	1.20	1.0	1.5	6	5.9	0.02	DP19 CAPTURED IN 10' TYPE R SUMP INLET, PIPE TO DP19.1
	19.1								16.6	5.04	5.66	**28.5**				28.5	5.04	0.5	2.0	42	5.1	0.14	DP19.1 FLOW, PIPE TO DP20.1
	20.1								16.7	6.75	5.64	**38.0**				38.0	6.75	0.5	2.5	370	5.9	1.04	DP20.1 PIPE FLOW TO POND B
	20.2	P2	2.05	0.70	6.7	1.44	7.94	11.4	6.7	1.44	7.94	**11.4**				11.4	1.44	0.5	1.0	15	3.2	0.08	DP20.1 PIPE FLOW TO POND B
	20.3								17.7	8.18	5.49	**44.9**				44.9	8.18	0.5	2.5	370	5.9	1.04	DP20.1 PIPE FLOW TO POND B
	21	S1	1.16	0.70	9.1	0.81	7.17	5.8	21.4	5.06	5.01	**25.3**	25.3	1.24	1.7					580	2.6	3.71	DP21 SWALE FLOW TO DP21.1
	21.1	S2	2.32	0.70	11.6	1.62	6.56	10.6	25.1	6.68	4.61	**30.8**	30.8	2.87	2.0					282	2.8	1.66	DP21 SWALE FLOW TO DP21.2
	21.2	S3	1.16	0.70	8.8	0.81	7.25	5.9	26.8	7.49	4.45	**33.3**				33.3	3.68	5.0	2.0	45	16.1	0.05	DP21 SWALE FLOW TO POND B
	22	T	1.42	0.37	13.6	0.52	6.17	3.2	26.9	16.20	4.44	**72.0**											**TOTAL FLOW ENTERING POND B**
	E7	ROW3	6.8478	0.49	24.4	3.38	4.68	15.8	24.4	3.38	4.68	**29.6**	29.6	3.38	4.2					865	4.1	3.52	DP E7 SWALE FLOW TO DP E9
	E8											**14.0**											DP E8 FLOW TO DP E9 (POND B RELEASE)
	E9	OS4	40.02	0.37	28.2	14.80	4.32	63.9	28.2	19.23	4.32	**110.9**											**DP E9 TOTAL FLOW OFFSITE**
	E10	ROW4	1.48	0.71	25.1	1.05	4.62	4.9	25.1	1.05	4.62	**4.9**											**DP E10 TOTAL FLOW OFFSITE**

APPENDIX C – HYDRAULIC CALCULATIONS

TO BE PROVIDED WITH THE FDR

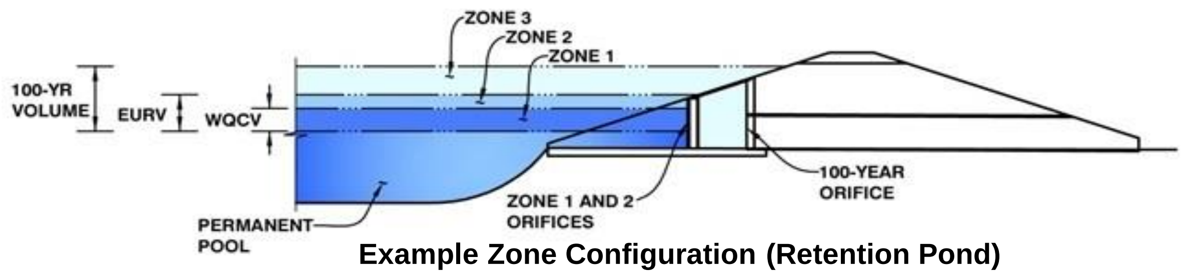
APPENDIX D – WATER QUALITY & DETENTION

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.06 (July 2022)

Project: **Meadowlake Industrial F1**

Basin ID: **Pond A**



Example Zone Configuration (Retention Pond)

Watershed Information

Selected BMP Type =	**EDB**			
Watershed Area =	25.69	acres		
Watershed Length =	2,185	ft		
Watershed Length to Centroid =	1,100	ft		
Watershed Slope =	0.015	ft/ft		
Watershed Imperviousness =	65.00%	percent		
Percentage Hydrologic Soil Group A =	76.0%	percent		
Percentage Hydrologic Soil Group B =	24.0%	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) =	0.544	acre-feet		acre-feet
Excess Urban Runoff Volume (EURV) =	2.012	acre-feet		acre-feet
2-yr Runoff Volume (P1 = 1.19 in.) =	1.564	acre-feet	1.19	inches
5-yr Runoff Volume (P1 = 1.5 in.) =	2.044	acre-feet	1.50	inches
10-yr Runoff Volume (P1 = 1.75 in.) =	2.462	acre-feet	1.75	inches
25-yr Runoff Volume (P1 = 2 in.) =	3.059	acre-feet	2.00	inches
50-yr Runoff Volume (P1 = 2.25 in.) =	3.570	acre-feet	2.25	inches
100-yr Runoff Volume (P1 = 2.52 in.) =	4.212	acre-feet	2.52	inches
500-yr Runoff Volume (P1 = 3.14 in.) =	5.571	acre-feet		inches
Approximate 2-yr Detention Volume =	1.364	acre-feet		
Approximate 5-yr Detention Volume =	1.794	acre-feet		
Approximate 10-yr Detention Volume =	2.194	acre-feet		
Approximate 25-yr Detention Volume =	2.567	acre-feet		
Approximate 50-yr Detention Volume =	2.791	acre-feet		
Approximate 100-yr Detention Volume =	3.050	acre-feet		

Define Zones and Basin Geometry

Zone 1 Volume (WQCV) =	0.544	acre-feet
Zone 2 Volume (EURV - Zone 1) =	1.468	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	1.038	acre-feet
Total Detention Basin Volume =	3.050	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 Increement = ft

6761.5

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	--	--	--	10	0.000		
6762	--	0.50	--	--	--	400	0.009	102	0.002
	--	1.50	--	--	--	9,930	0.228	5,267	0.121
	--	2.50	--	--	--	22,794	0.523	21,629	0.497
6,765.00	--	3.50	--	--	--	30,703	0.705	48,378	1.111
	--	4.50	--	--	--	37,312	0.857	82,385	1.891
	--	5.50	--	--	--	41,510	0.953	121,796	2.796
	--	6.50	--	--	--	45,283	1.040	165,193	3.792
6,769.00	--	7.50	--	--	--	49,171	1.129	212,420	4.876
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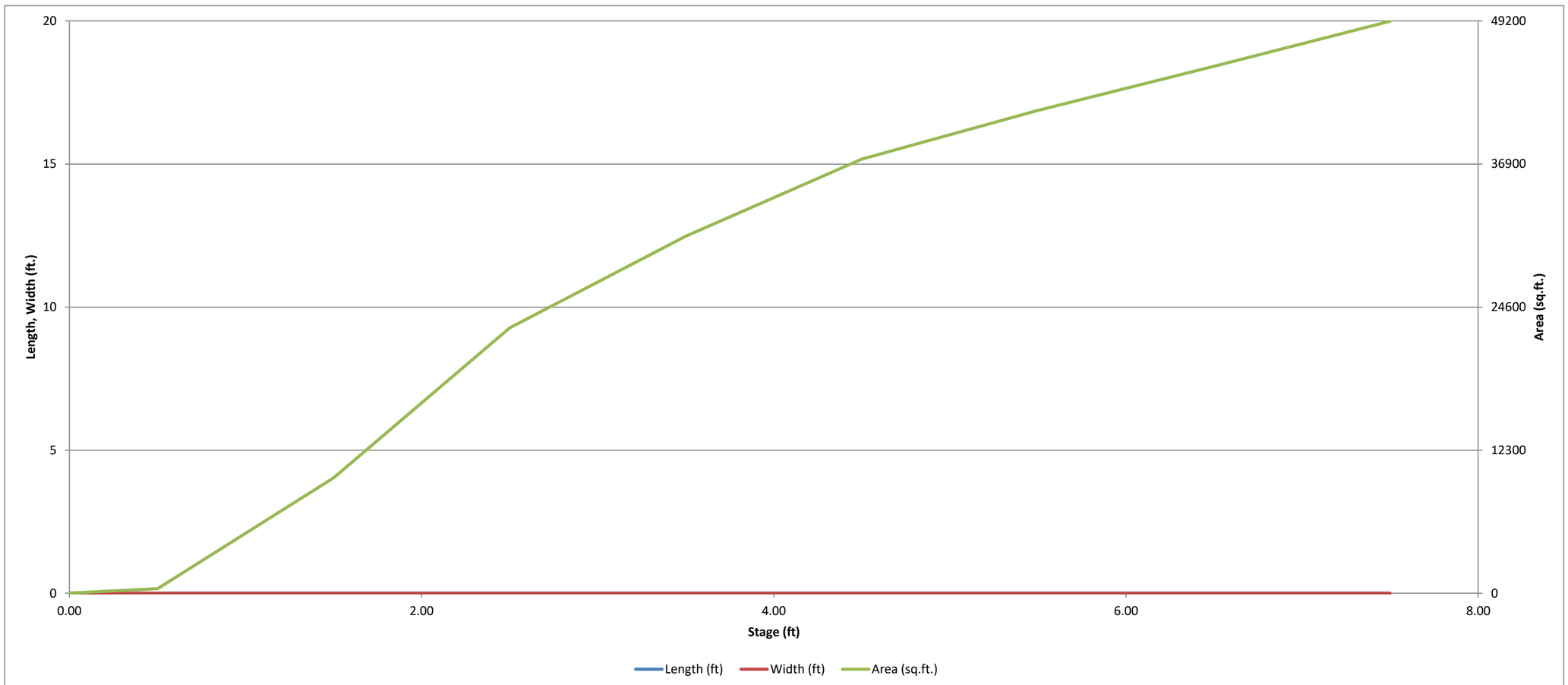
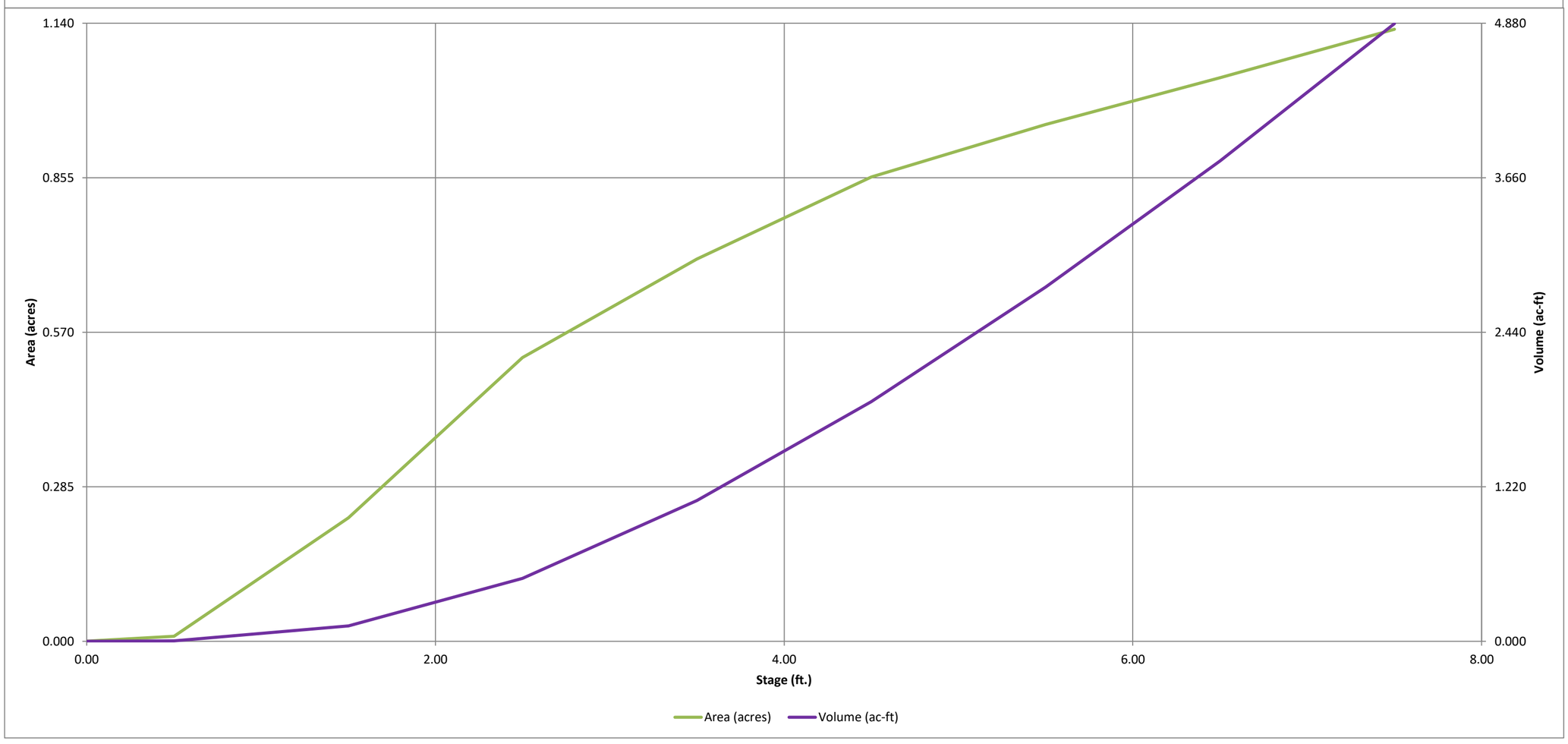
DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.06 (July 2022)



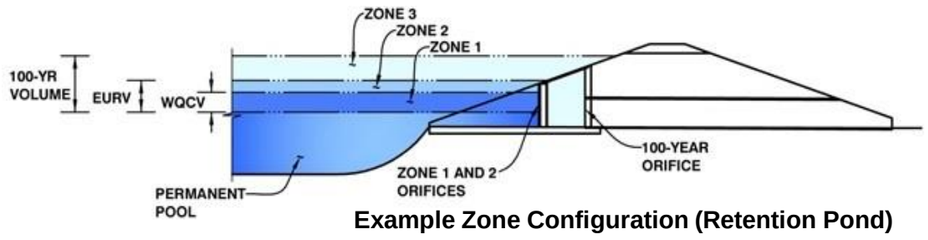


DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

Project: **Meadowlake Industrial F1**

Basin ID: **Pond A**



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	2.59	0.544	Orifice Plate
Zone 2 (EURV)	4.65	1.468	Circular Orifice
Zone 3 (100-year)	5.77	1.038	Weir&Pipe (Restrict)
Total (all zones)		3.050	

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)

Centroid of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Orifice Plate =	2.56	ft (relative to basin bottom at Stage = 0 ft)
Orifice Plate: Orifice Vertical Spacing =	N/A	inches
Orifice Plate: Orifice Area per Row =	1.90	sq. inches (diameter = 1-9/16 inches)

Calculated Parameters for Plate

WQ Orifice Area per Row =	1.319E-02	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	0.83	1.66					
Orifice Area (sq. inches)	1.90	1.90	1.90					

	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 =	2.60	N/A	ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Vertical Orifice =	4.64	N/A	ft (relative to basin bottom at Stage = 0 ft)
Vertical Orifice Diameter =	3.33	N/A	inches

Calculated Parameters for Vertical Orifice

	Zone 2 Circular	Not Selected	
Vertical Orifice Area =	0.06	N/A	ft^2
Vertical Orifice Centroid =	0.14	N/A	feet

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, Ho =	4.67	N/A	ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length =	2.92	N/A	feet
Overflow Weir Grate Slope =	0.00	N/A	H:V
Horiz. Length of Weir Sides =	5.67	N/A	feet
Overflow Grate Type =	Type C Grate	N/A	
Debris Clogging % =	50%	N/A	%

Calculated Parameters for Overflow Weir

	Zone 3 Weir	Not Selected	
Height of Grate Upper Edge, H_t =	4.67	N/A	feet
Overflow Weir Slope Length =	5.67	N/A	feet
Grate Open Area / 100-yr Orifice Area =	9.21	N/A	
Overflow Grate Open Area w/o Debris =	11.52	N/A	ft^2
Overflow Grate Open Area w/ Debris =	5.76	N/A	ft^2

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

	Zone 3 Restrictor	Not Selected	
Depth to Invert of Outlet Pipe =	0.10	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 =	12.00		inches

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

	Zone 3 Restrictor	Not Selected	
Outlet Orifice Area =	1.25	N/A	ft^2
Outlet Orifice Centroid =	0.56	N/A	feet
Half-Central Angle of Restrictor Plate on Pipe =	1.91	N/A	radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage=	6.00	ft (relative to basin bottom at Stage = 0 ft)
Spillway Crest Length =	45.00	feet
Spillway End Slopes =	4.00	H:V
Freeboard above Max Water Surface =	1.00	feet

Calculated Parameters for Spillway

Spillway Design Flow Depth=	0.50	feet
Stage at Top of Freeboard =	7.50	feet
Basin Area at Top of Freeboard =	1.13	acres
Basin Volume at Top of Freeboard =	4.88	acre-ft

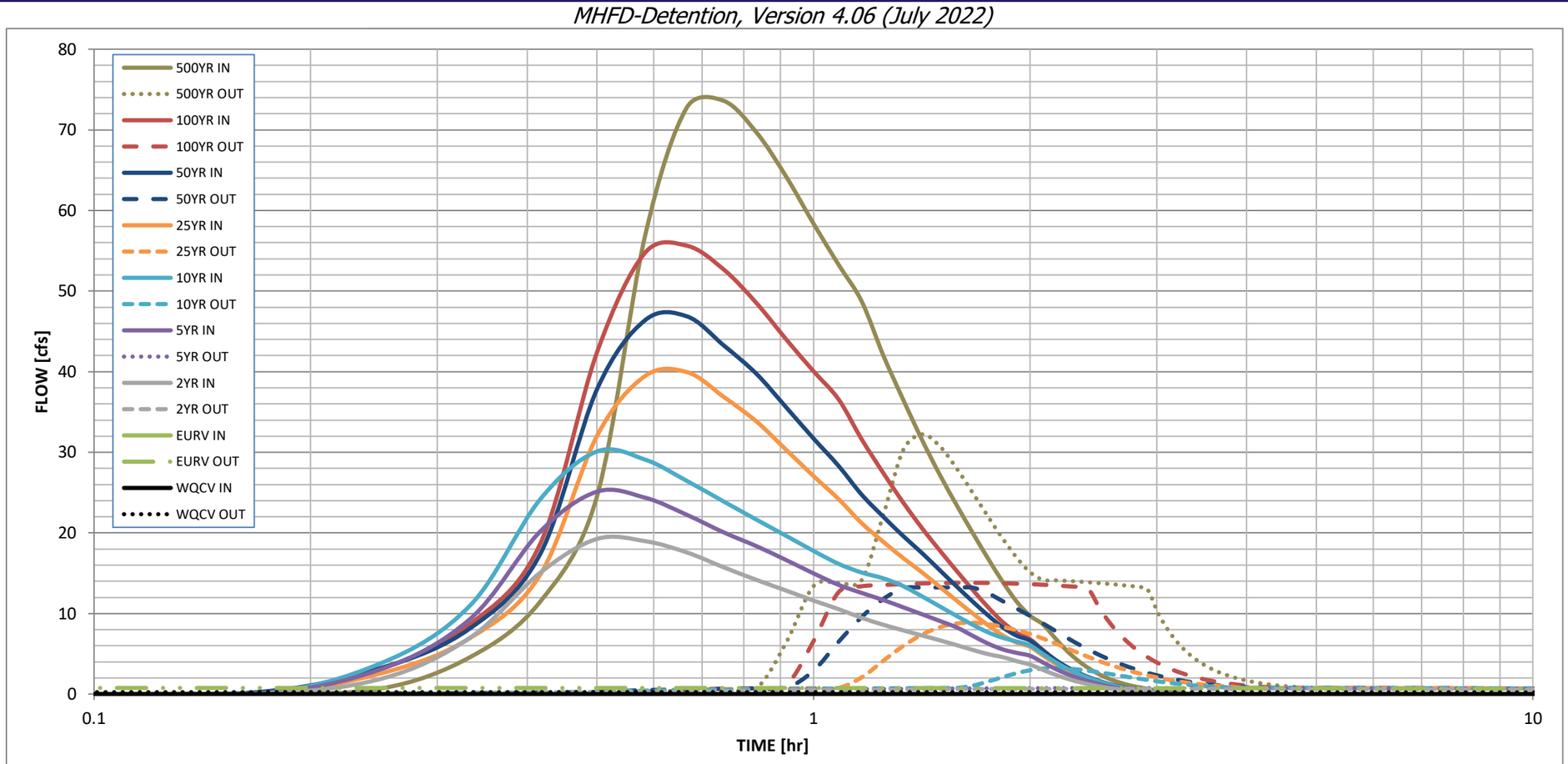
Routed Hydrograph Results

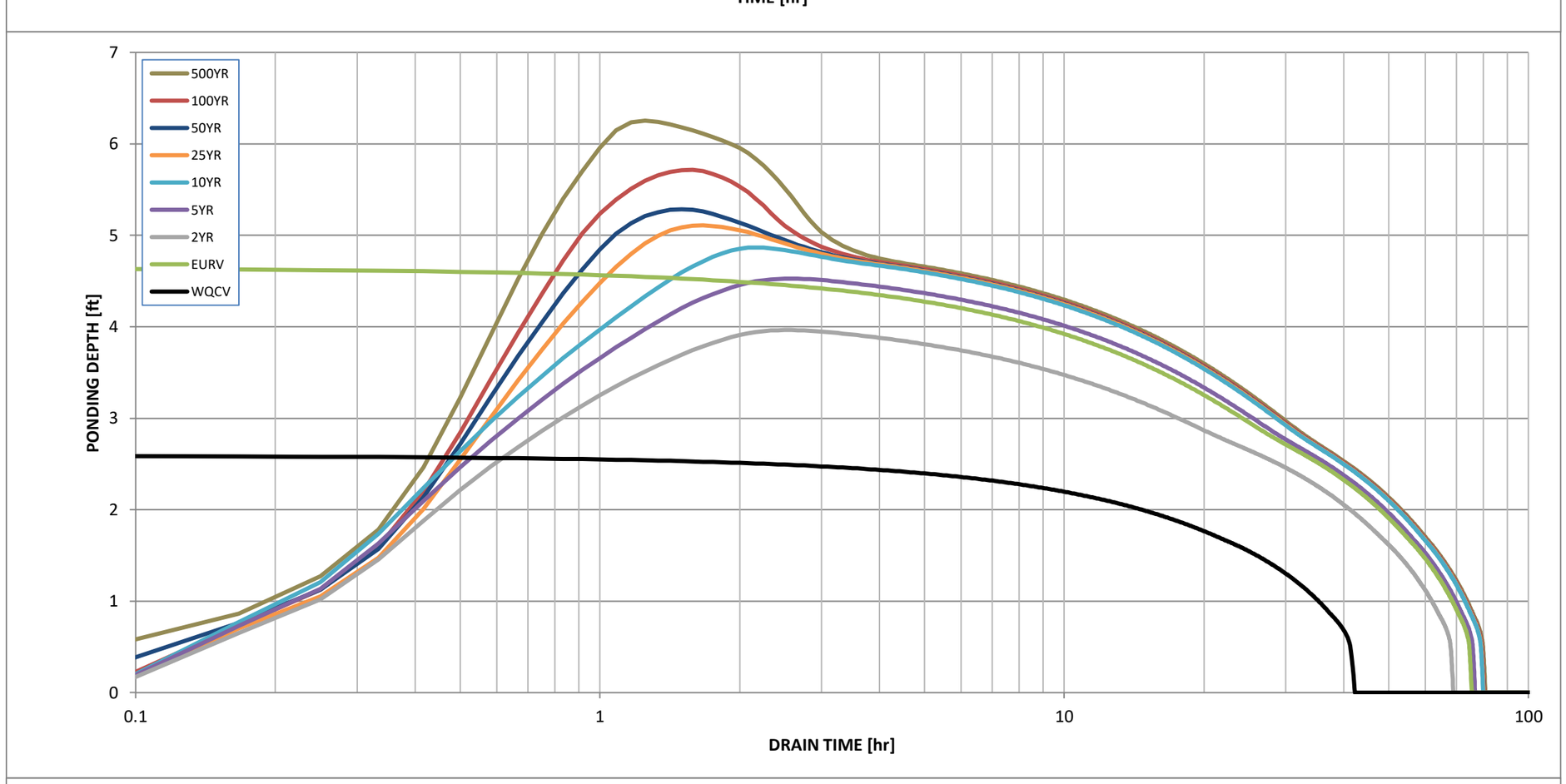
The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AF).

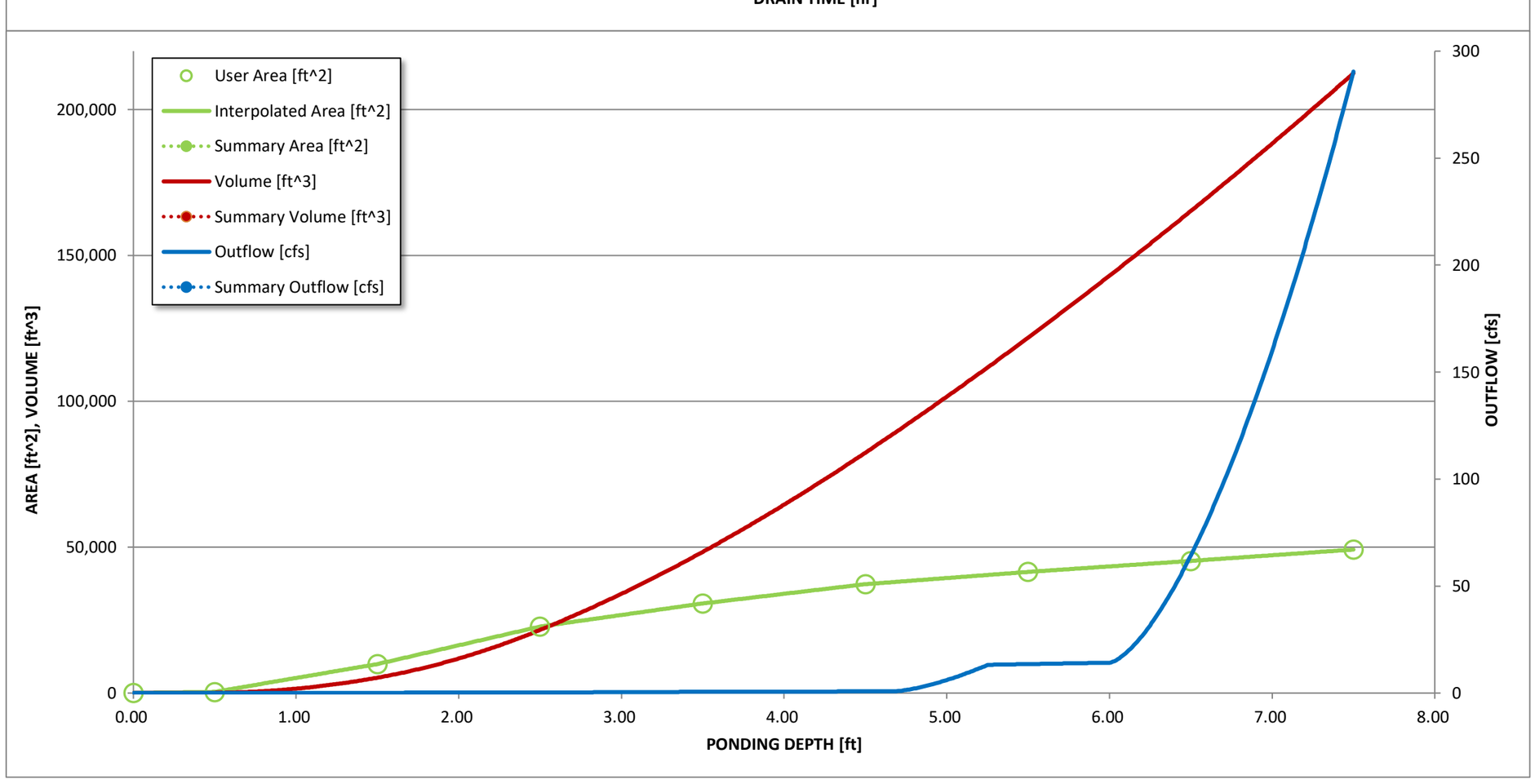
Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
One-Hour Rainfall Depth (in) =	N/A	N/A	1.19	1.50	1.75	2.00	2.25	2.52	3.14
CUHP Runoff Volume (acre-ft) =	0.544	2.012	1.564	2.044	2.462	3.059	3.570	4.212	5.571
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	1.564	2.044	2.462	3.059	3.570	4.212	5.571
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	0.2	0.3	1.5	6.7	10.0	14.9	24.7
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.01	0.01	0.06	0.26	0.39	0.58	0.96
Peak Inflow Q (cfs) =	N/A	N/A	19.3	25.1	30.1	40.0	46.9	55.6	73.6
Peak Outflow Q (cfs) =	0.2	0.8	0.7	0.8	3.2	8.9	13.2	13.8	32.2
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	2.4	2.1	1.3	1.3	0.9	1.3
Structure Controlling Flow =	Plate	Vertical Orifice 1	Vertical Orifice 1	Vertical Orifice 1	Overflow Weir 1	Overflow Weir 1	Outlet Plate 1	Outlet Plate 1	Spillway
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	N/A	0.2	0.7	1.1	1.1	1.2
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) =	38	65	60	67	68	67	65	64	60
Time to Drain 99% of Inflow Volume (hours) =	**41**	71	65	72	74	74	73	73	71
Maximum Ponding Depth (ft) =	2.59	4.64	3.96	4.53	4.87	5.11	5.29	5.71	6.26
Area at Maximum Ponding Depth (acres) =	0.54	0.87	0.77	0.86	0.89	0.91	0.93	0.97	1.02
Maximum Volume Stored (acre-ft) =	0.544	2.012	1.451	1.908	2.206	2.423	2.589	2.998	3.535

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)







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	0.21	0.02	0.69
	0:15:00	0.00	0.00	1.88	3.07	3.80	2.56	3.23	3.12	4.60
	0:20:00	0.00	0.00	7.01	9.34	11.01	6.97	8.17	8.69	11.43
	0:25:00	0.00	0.00	15.04	20.14	24.13	14.76	17.31	18.57	24.49
	0:30:00	0.00	0.00	19.25	25.11	30.10	32.01	37.78	42.36	56.85
	0:35:00	0.00	0.00	18.98	24.37	29.09	39.46	46.38	54.75	72.76
	0:40:00	0.00	0.00	17.58	22.25	26.46	39.95	46.87	55.63	73.61
	0:45:00	0.00	0.00	15.74	20.08	23.90	36.89	43.28	52.69	69.67
	0:50:00	0.00	0.00	14.17	18.35	21.64	33.82	39.73	48.50	64.18
	0:55:00	0.00	0.00	12.84	16.63	19.63	30.29	35.57	44.00	58.38
	1:00:00	0.00	0.00	11.61	14.98	17.77	27.06	31.72	40.07	53.29
	1:05:00	0.00	0.00	10.55	13.56	16.17	24.21	28.33	36.59	48.74
	1:10:00	0.00	0.00	9.47	12.56	15.08	21.22	24.76	31.63	42.06
	1:15:00	0.00	0.00	8.61	11.68	14.37	18.91	22.03	27.45	36.48
	1:20:00	0.00	0.00	7.91	10.77	13.39	16.87	19.60	23.75	31.48
	1:25:00	0.00	0.00	7.27	9.89	12.11	15.09	17.47	20.55	27.13
	1:30:00	0.00	0.00	6.67	9.06	10.86	13.27	15.33	17.77	23.36
	1:35:00	0.00	0.00	6.06	8.26	9.67	11.56	13.31	15.23	19.93
	1:40:00	0.00	0.00	5.48	7.22	8.58	9.97	11.44	12.88	16.76
	1:45:00	0.00	0.00	4.96	6.26	7.65	8.53	9.74	10.75	13.90
	1:50:00	0.00	0.00	4.59	5.54	6.99	7.28	8.28	8.93	11.47
	1:55:00	0.00	0.00	4.09	5.12	6.53	6.39	7.24	7.61	9.73
	2:00:00	0.00	0.00	3.67	4.76	6.03	5.87	6.64	6.82	8.68
	2:05:00	0.00	0.00	3.02	3.95	5.00	4.80	5.43	5.49	6.96
	2:10:00	0.00	0.00	2.42	3.15	4.01	3.80	4.28	4.26	5.39
	2:15:00	0.00	0.00	1.93	2.51	3.19	2.99	3.37	3.29	4.14
	2:20:00	0.00	0.00	1.53	1.99	2.53	2.35	2.65	2.53	3.17
	2:25:00	0.00	0.00	1.21	1.57	1.99	1.85	2.07	1.95	2.43
	2:30:00	0.00	0.00	0.95	1.22	1.54	1.43	1.61	1.50	1.86
	2:35:00	0.00	0.00	0.74	0.94	1.18	1.10	1.23	1.15	1.43
	2:40:00	0.00	0.00	0.57	0.71	0.90	0.84	0.94	0.88	1.10
	2:45:00	0.00	0.00	0.44	0.54	0.70	0.65	0.72	0.69	0.85
	2:50:00	0.00	0.00	0.33	0.41	0.53	0.49	0.55	0.53	0.65
	2:55:00	0.00	0.00	0.23	0.29	0.38	0.36	0.41	0.39	0.48
	3:00:00	0.00	0.00	0.16	0.20	0.26	0.25	0.28	0.27	0.33
	3:05:00	0.00	0.00	0.09	0.13	0.16	0.16	0.18	0.17	0.21
	3:10:00	0.00	0.00	0.05	0.07	0.09	0.09	0.10	0.10	0.12
	3:15:00	0.00	0.00	0.02	0.03	0.04	0.04	0.05	0.04	0.05
	3:20:00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01
	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 4.06 (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.

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'.

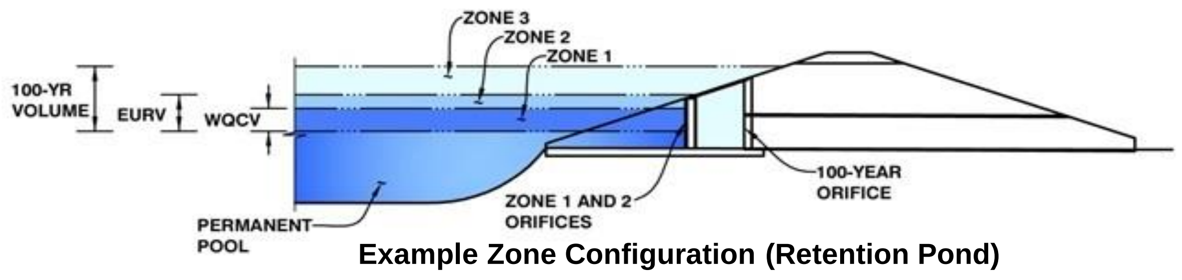
Also include the inverts of all outlets (e.g. vertical orifice, overflow grate, and spillway, where applicable).

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.06 (July 2022)

Project: Meadowlake Industrial F1

Basin ID: Pond B



Example Zone Configuration (Retention Pond)

Watershed Information

Selected BMP Type =	**EDB**	
Watershed Area =	20.80	acres
Watershed Length =	1,280	ft
Watershed Length to Centroid =	640	ft
Watershed Slope =	0.020	ft/ft
Watershed Imperviousness =	68.00%	percent
Percentage Hydrologic Soil Group A =	23.0%	percent
Percentage Hydrologic Soil Group B =	77.0%	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) =	0.462	acre-feet		acre-feet
Excess Urban Runoff Volume (EURV) =	1.602	acre-feet		acre-feet
2-yr Runoff Volume (P1 = 1.19 in.) =	1.338	acre-feet	1.19	inches
5-yr Runoff Volume (P1 = 1.5 in.) =	1.813	acre-feet	1.50	inches
10-yr Runoff Volume (P1 = 1.75 in.) =	2.208	acre-feet	1.75	inches
25-yr Runoff Volume (P1 = 2 in.) =	2.708	acre-feet	2.00	inches
50-yr Runoff Volume (P1 = 2.25 in.) =	3.140	acre-feet	2.25	inches
100-yr Runoff Volume (P1 = 2.52 in.) =	3.668	acre-feet	2.52	inches
500-yr Runoff Volume (P1 = 3.14 in.) =	4.756	acre-feet		inches
Approximate 2-yr Detention Volume =	1.196	acre-feet		
Approximate 5-yr Detention Volume =	1.590	acre-feet		
Approximate 10-yr Detention Volume =	1.992	acre-feet		
Approximate 25-yr Detention Volume =	2.194	acre-feet		
Approximate 50-yr Detention Volume =	2.313	acre-feet		
Approximate 100-yr Detention Volume =	2.496	acre-feet		

Define Zones and Basin Geometry

Zone 1 Volume (WQCV) =	0.462	acre-feet
Zone 2 Volume (EURV - Zone 1) =	1.141	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	0.894	acre-feet
Total Detention Basin Volume =	2.496	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 = ft

6732.5

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	--	--	--	10	0.000		
6733	--	0.50	--	--	--	2,433	0.056	611	0.014
	--	1.50	--	--	--	11,642	0.267	7,648	0.176
6735	--	2.50	--	--	--	18,245	0.419	22,592	0.519
	--	3.50	--	--	--	21,975	0.504	42,702	0.980
	--	4.50	--	--	--	25,977	0.596	66,678	1.531
	--	5.50	--	--	--	30,252	0.694	94,792	2.176
	--	6.50	--	--	--	34,801	0.799	127,319	2.923
6740	--	7.50	--	--	--	39,622	0.910	164,530	3.777
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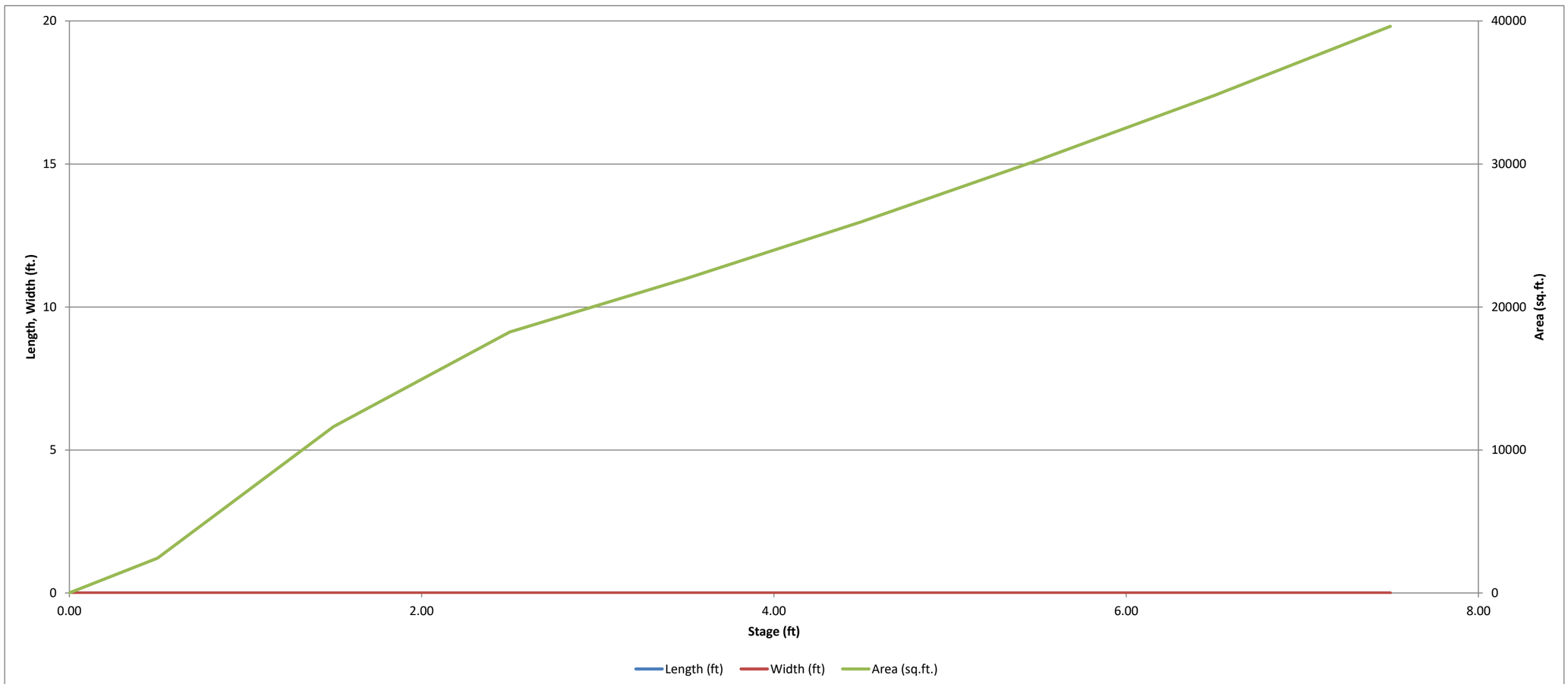
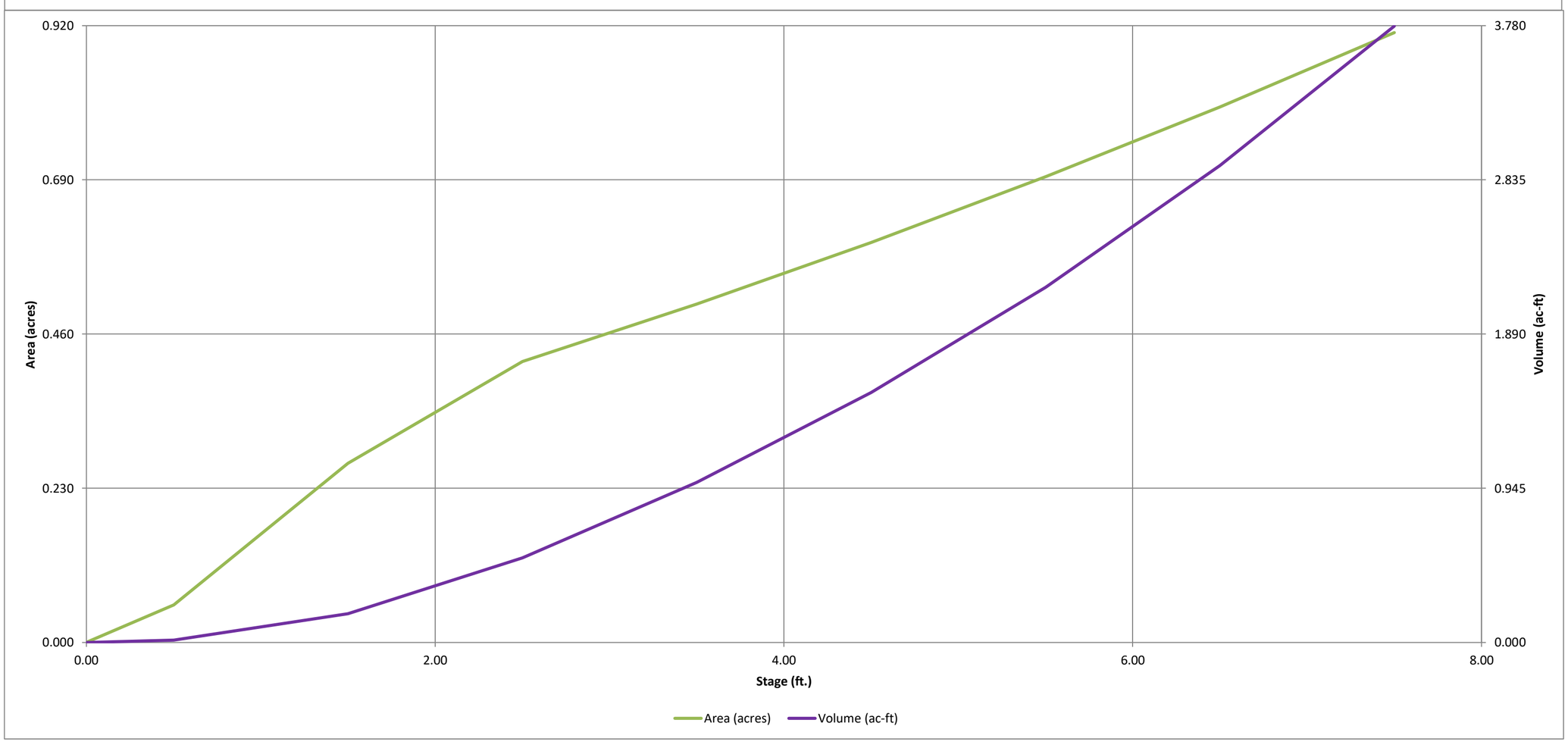
DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.06 (July 2022)



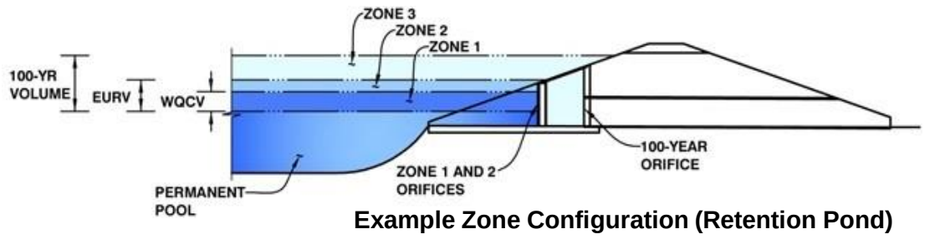


DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

Project: **Meadowlake Industrial F1**

Basin ID: **Pond B**



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	2.37	0.462	Orifice Plate
Zone 2 (EURV)	4.62	1.141	Circular Orifice
Zone 3 (100-year)	5.95	0.894	Weir&Pipe (Restrict)
Total (all zones)		2.496	

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

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

			Calculated Parameters for Plate		
Centroid of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)	WQ Orifice Area per Row =	1.440E-02	ft^2
Depth at top of Zone using Orifice Plate =	2.37	ft (relative to basin bottom at Stage = 0 ft)	Elliptical Half-Width =	N/A	feet
Orifice Plate: Orifice Vertical Spacing =	10.00	inches	Elliptical Slot Centroid =	N/A	feet
Orifice Plate: Orifice Area per Row =	2.07	sq. inches (diameter = 1-5/8 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	0.80	1.60					
Orifice Area (sq. inches)	2.07	2.07	2.07					

	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		Calculated Parameters for Vertical Orifice	Zone 2 Circular	Not Selected	
Invert of Vertical Orifice =	2.50	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Area =	0.02	N/A	ft^2
Depth at top of Zone using Vertical Orifice =	4.78	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Centroid =	0.08	N/A	feet
Vertical Orifice Diameter =	2.00	N/A	inches				

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		Calculated Parameters for Overflow Weir	Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, Ho =	4.67	N/A	ft (relative to basin bottom at Stage = 0 ft)	Height of Grate Upper Edge, H_t =	4.67	N/A	feet
Overflow Weir Front Edge Length =	2.92	N/A	feet	Overflow Weir Slope Length =	5.67	N/A	feet
Overflow Weir Grate Slope =	0.00	N/A	H:V	Grate Open Area / 100-yr Orifice Area =	9.62	N/A	
Horiz. Length of Weir Sides =	5.67	N/A	feet	Overflow Grate Open Area w/o Debris =	11.52	N/A	ft^2
Overflow Grate Type =	Type C Grate	N/A		Overflow Grate Open Area w/ Debris =	5.76	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 =	0.25	N/A	ft (distance below basin bottom at Stage = 0 ft)	Outlet Orifice Area =	1.20	N/A	ft^2
Outlet Pipe Diameter =	24.00	N/A	inches	Outlet Orifice Centroid =	0.47	N/A	feet
Restrictor Plate Height Above Pipe Invert =	9.75		inches	Half-Central Angle of Restrictor Plate on Pipe =	1.38	N/A	radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

			Calculated Parameters for Spillway		
Spillway Invert Stage=	6.10	ft (relative to basin bottom at Stage = 0 ft)	Spillway Design Flow Depth=	0.40	feet
Spillway Crest Length =	85.00	feet	Stage at Top of Freeboard =	7.50	feet
Spillway End Slopes =	4.00	H:V	Basin Area at Top of Freeboard =	0.91	acres
Freeboard above Max Water Surface =	1.00	feet	Basin Volume at Top of Freeboard =	3.78	acre-ft

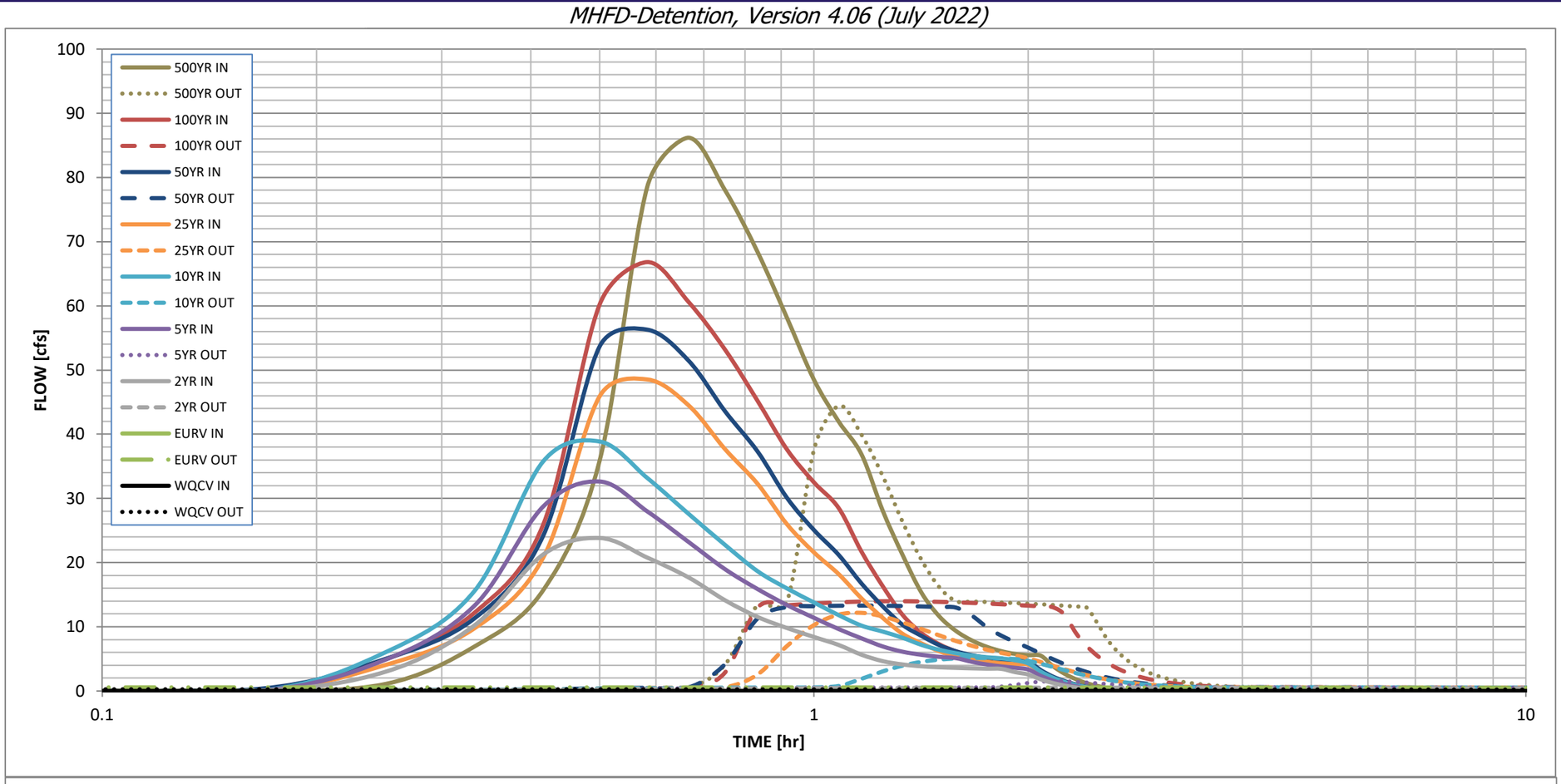
Routed Hydrograph Results

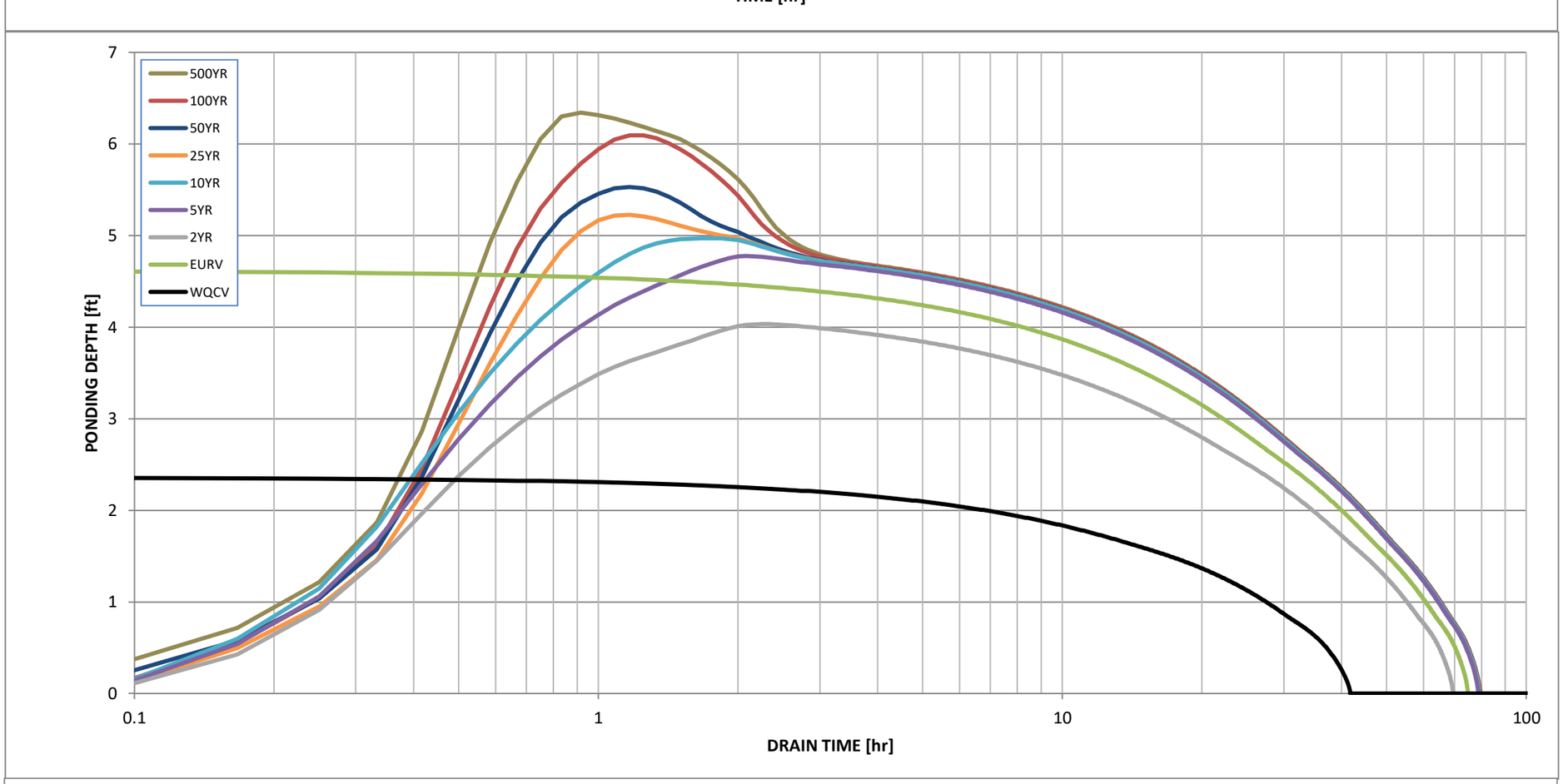
The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AF).

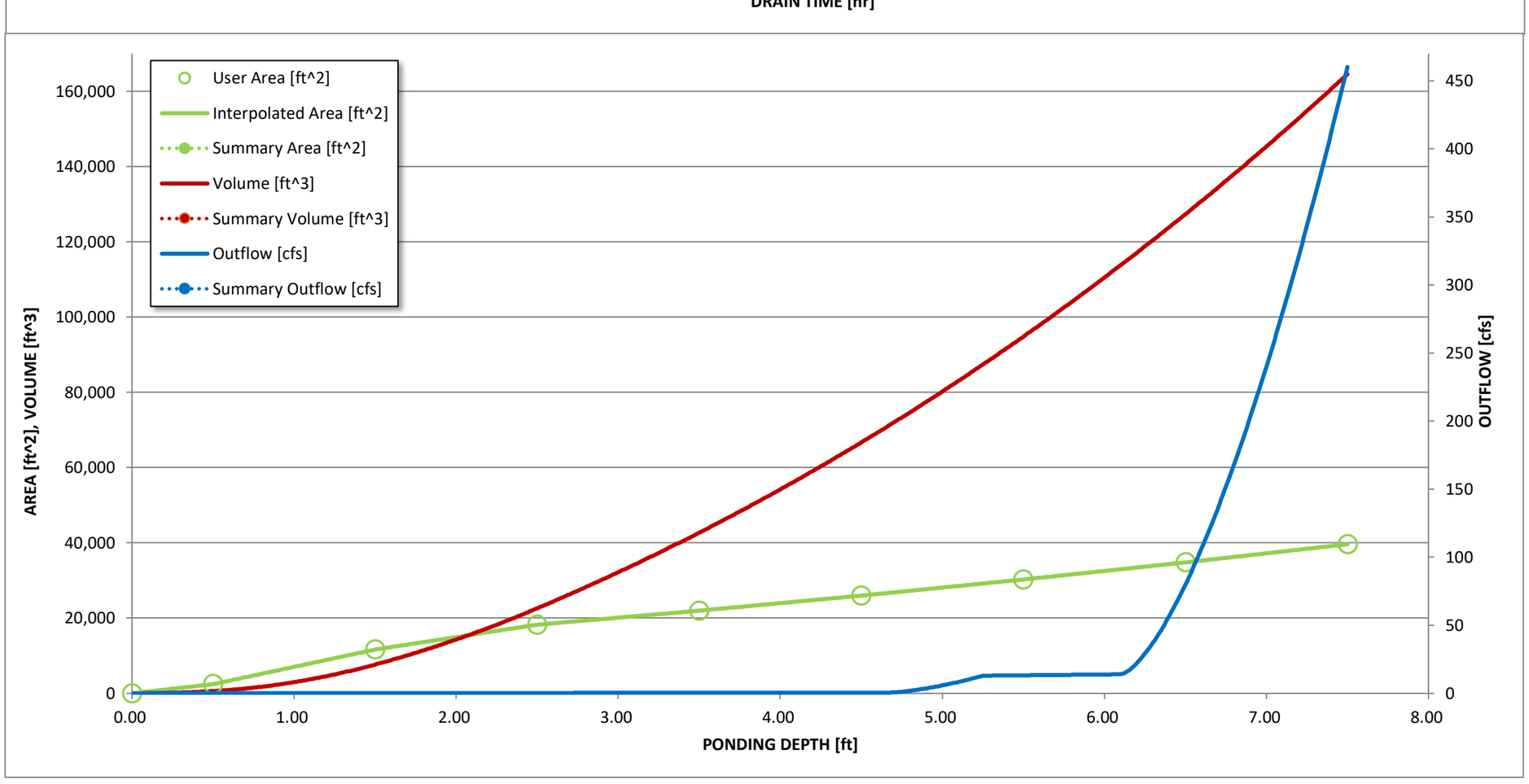
Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
One-Hour Rainfall Depth (in) =	N/A	N/A	1.19	1.50	1.75	2.00	2.25	2.52	3.14
CUHP Runoff Volume (acre-ft) =	0.462	1.602	1.338	1.813	2.208	2.708	3.140	3.668	4.756
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	1.338	1.813	2.208	2.708	3.140	3.668	4.756
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	0.4	4.7	7.9	15.3	19.8	25.8	36.8
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.02	0.22	0.38	0.74	0.95	1.24	1.77
Peak Inflow Q (cfs) =	N/A	N/A	23.8	32.6	38.9	48.5	56.3	66.8	86.2
Peak Outflow Q (cfs) =	0.3	0.6	0.5	1.5	5.1	12.2	13.3	14.0	44.4
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.3	0.7	0.8	0.7	0.5	1.2
Structure Controlling Flow =	Plate	Vertical Orifice 1	Vertical Orifice 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Outlet Plate 1	Outlet Plate 1	Spillway
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	0.1	0.4	1.0	1.1	1.2	1.2
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) =	37	63	59	66	65	64	62	61	58
Time to Drain 99% of Inflow Volume (hours) =	**40**	70	65	73	73	72	71	70	68
Maximum Ponding Depth (ft) =	2.37	4.62	4.03	4.78	4.97	5.23	5.53	6.09	6.34
Area at Maximum Ponding Depth (acres) =	0.40	0.61	0.55	0.62	0.64	0.67	0.70	0.76	0.78
Maximum Volume Stored (acre-ft) =	0.465	1.603	1.261	1.695	1.815	1.986	2.197	2.604	2.789

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)







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	0.34	0.03	1.08
	0:15:00	0.00	0.00	2.98	4.86	6.02	4.04	4.99	4.91	6.90
	0:20:00	0.00	0.00	10.18	13.25	15.54	9.74	11.29	12.15	15.71
	0:25:00	0.00	0.00	21.27	28.75	35.77	20.78	24.21	25.93	35.87
	0:30:00	0.00	0.00	23.82	32.63	38.86	45.91	53.67	60.20	78.55
	0:35:00	0.00	0.00	20.77	27.97	33.18	48.53	56.28	66.81	86.19
	0:40:00	0.00	0.00	17.68	23.21	27.59	44.49	51.46	60.60	78.04
	0:45:00	0.00	0.00	14.13	18.97	22.76	37.68	43.59	53.19	68.40
	0:50:00	0.00	0.00	11.53	15.87	18.66	32.28	37.32	45.20	58.13
	0:55:00	0.00	0.00	9.80	13.38	15.97	25.96	30.08	37.62	48.50
	1:00:00	0.00	0.00	8.41	11.40	13.79	21.59	25.08	32.50	41.98
	1:05:00	0.00	0.00	7.16	9.64	11.81	18.21	21.20	28.50	36.84
	1:10:00	0.00	0.00	5.64	8.19	10.17	14.41	16.73	21.68	28.02
	1:15:00	0.00	0.00	4.64	6.92	9.24	11.36	13.15	16.28	21.11
	1:20:00	0.00	0.00	4.12	6.10	8.27	8.87	10.27	11.80	15.28
	1:25:00	0.00	0.00	3.84	5.63	7.17	7.40	8.56	9.00	11.62
	1:30:00	0.00	0.00	3.68	5.32	6.41	6.19	7.13	7.27	9.34
	1:35:00	0.00	0.00	3.59	5.11	5.88	5.40	6.18	6.16	7.87
	1:40:00	0.00	0.00	3.52	4.54	5.50	4.89	5.57	5.41	6.87
	1:45:00	0.00	0.00	3.47	4.12	5.25	4.55	5.16	4.90	6.20
	1:50:00	0.00	0.00	3.44	3.82	5.06	4.32	4.88	4.58	5.76
	1:55:00	0.00	0.00	2.93	3.60	4.78	4.19	4.72	4.43	5.57
	2:00:00	0.00	0.00	2.56	3.34	4.29	4.10	4.62	4.37	5.49
	2:05:00	0.00	0.00	1.80	2.34	3.00	2.88	3.24	3.08	3.87
	2:10:00	0.00	0.00	1.23	1.61	2.06	1.98	2.23	2.13	2.67
	2:15:00	0.00	0.00	0.83	1.08	1.40	1.36	1.53	1.46	1.83
	2:20:00	0.00	0.00	0.55	0.70	0.92	0.90	1.01	0.96	1.21
	2:25:00	0.00	0.00	0.34	0.45	0.59	0.58	0.65	0.62	0.78
	2:30:00	0.00	0.00	0.20	0.28	0.36	0.37	0.41	0.39	0.49
	2:35:00	0.00	0.00	0.10	0.15	0.19	0.20	0.23	0.22	0.27
	2:40:00	0.00	0.00	0.04	0.06	0.08	0.09	0.10	0.09	0.11
	2:45:00	0.00	0.00	0.01	0.01	0.02	0.02	0.02	0.02	0.02
	2:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	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 4.06 (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.

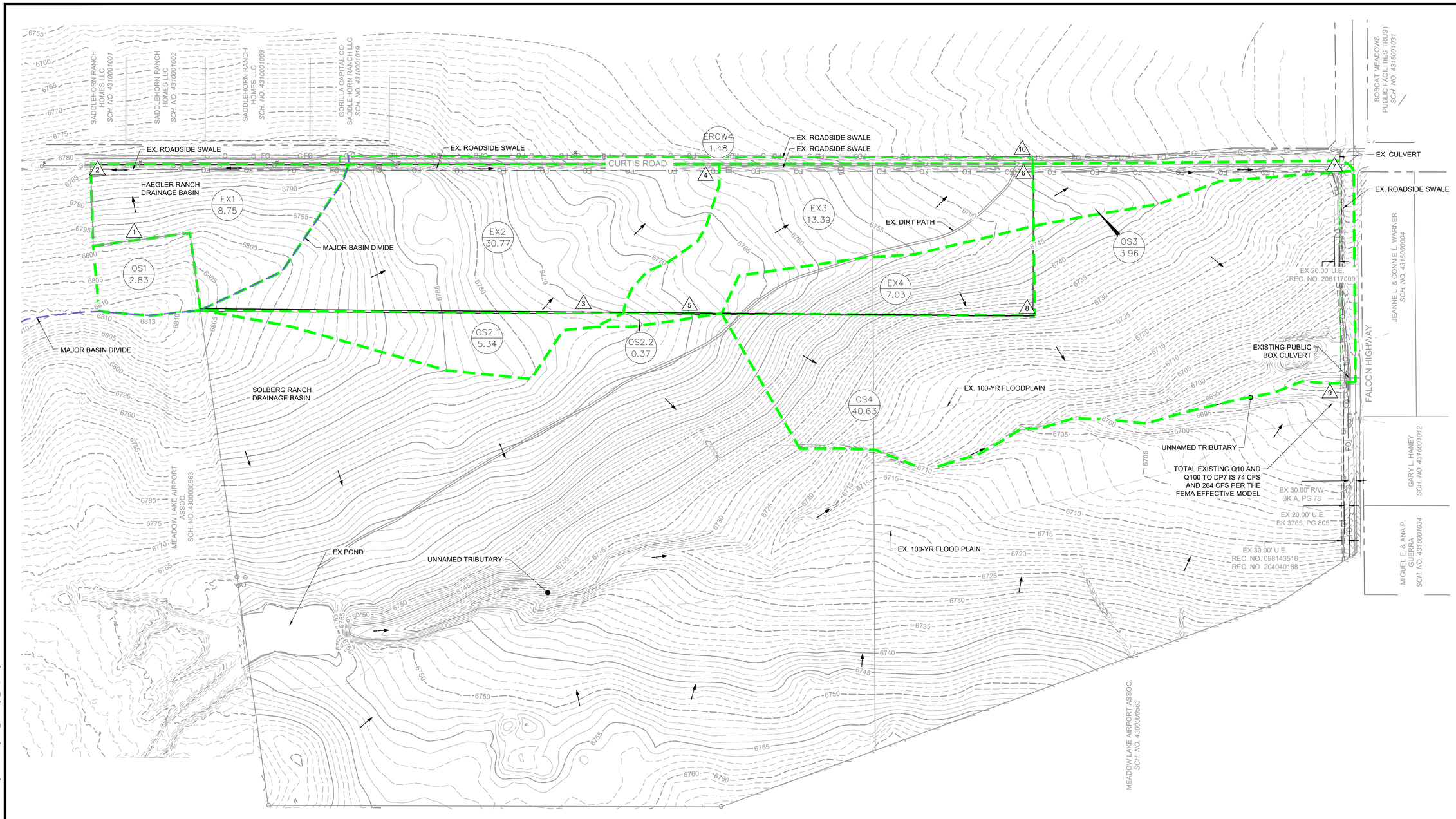
Stage - Storage Description	Stage [ft]	Area [ft ^{2}]	Area [acres]	Volume [ft ^{3}]	Volume [ac-ft]	Total Outflow [cfs]

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).

APPENDIX E – DRAINAGE MAPS

CALLAHAN, SEAN, 10/25/2024 3:24 PM



LEGEND:

EXISTING MAJOR CONTOUR — 5250

EXISTING MINOR CONTOUR

FLOW DIRECTION

DRAINAGE BASIN

DESIGN POINT

EXISTING BASIN LABEL

11 / 1.25 — BASIN DESIGNATION / AREA (AC.)

SUMMARY RUNOFF TABLE

BASIN	AREA (ac)	% IMPERVIOUS	Q5 (cfs)	Q100 (cfs)
EX1	8.75	5	3.4	18.3
EX2	30.77	3	9.5	57.8
EX3	13.39	5	4.5	25.4
EX4	7.03	2	2.1	14.3
OS1	2.83	2	1.0	6.7
OS2.1	5.34	2	1.8	11.9
OS2.2	0.37	2	0.1	0.9
OS3	3.96	11	2.1	9.2
OS4	40.63	3	10.7	64.7
EROW4	1.48	53	2.1	4.6

DESIGN POINT SUMMARY TABLE

DESIGN POINT	CONTRIBUTING BASINS	SQ5 (cfs)	SQ100 (cfs)
1	OS1	1.0	6.7
2	EX1, DP1	4.2	23.9
3	OS2.1	1.8	11.9
4	EX2, DP3	10.9	67.6
5	OS2.2	0.1	0.9
6	EX3, DP5	13.2	79.9
7	OS3, DP6, DP10	15.0	81.2
8	EX4	2.1	14.3
9	OS4, DP7, DP8	24.2	138.8
10	EROW4	2.1	4.6

NORTH

0 200 100

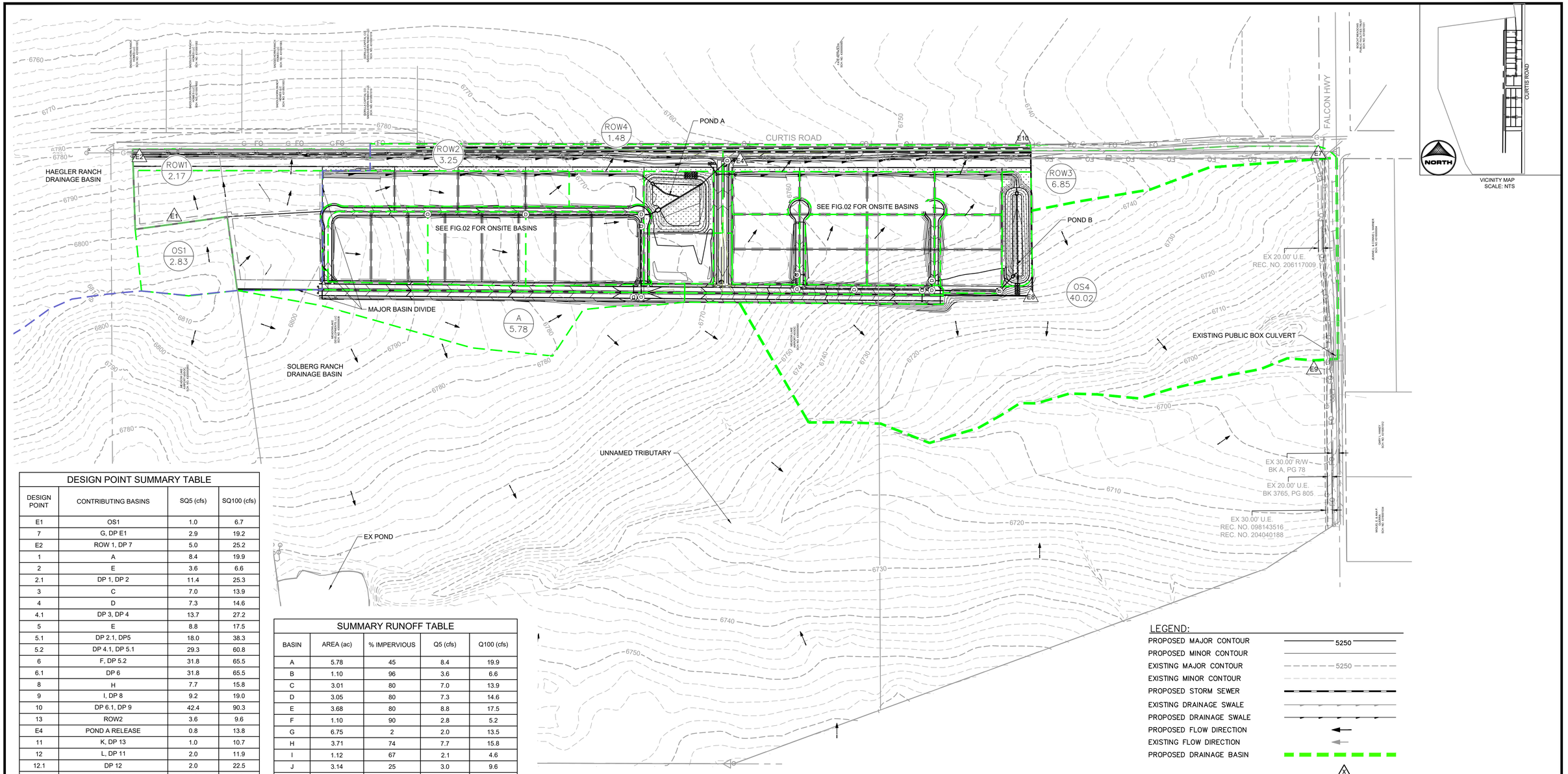
HRGreen

Job No.:	2202774
Prepared By:	AB
Date:	10/25/2024

MEADOWLAKE INDUSTRIAL
EXISTING DRAINAGE MAP

FIG.01

HR GREEN DRAWING PATH: J:\2022\2202774\CAD\Dwgs\C\Drainage\Ex_Drainage_Map.dwg



VICINITY MAP
SCALE: NTS

DESIGN POINT SUMMARY TABLE			
DESIGN POINT	CONTRIBUTING BASINS	SQ5 (cfs)	SQ100 (cfs)
E1	OS1	1.0	6.7
7	G, DP E1	2.9	19.2
E2	ROW 1, DP 7	5.0	25.2
1	A	8.4	19.9
2	E	3.6	6.6
2.1	DP 1, DP 2	11.4	25.3
3	C	7.0	13.9
4	D	7.3	14.6
4.1	DP 3, DP 4	13.7	27.2
5	E	8.8	17.5
5.1	DP 2.1, DP5	18.0	38.3
5.2	DP 4.1, DP 5.1	29.3	60.8
6	F, DP 5.2	31.8	65.5
6.1	DP 6	31.8	65.5
8	H	7.7	15.8
9	I, DP 8	9.2	19.0
10	DP 6.1, DP 9	42.4	90.3
13	ROW2	3.6	9.6
E4	POND A RELEASE	0.8	13.8
11	K, DP 13	1.0	10.7
12	L, DP 11	2.0	11.9
12.1	DP 12	2.0	22.5
15	N1	4.9	9.8
15.1	N2	1.2	2.1
15.2	N3	4.8	9.6
16	O	5.9	11.8
17	P1	1.2	2.1
17.1	DP 16, DP 17	6.9	13.6
18	Q	3.2	6.2
19	R, DP 15.2	5.8	14.1
19.1	DP 18, DP 19	13.2	28.5
20.1	DP 17.1, DP 19.1	18.1	38.0
20.2	P2	2.4	11.4
20.3	DP 20.1, DP 20.2	19.2	44.9
21	S1, DP 12.1	4.6	25.3
21.1	S2, DP 21	9.2	30.8
21.2	S3, DP21.2	11.2	33.3
22	T, DP 20.3, DP 21.1	29.1	72.0
E7	ROW 2, DP E4	6.0	29.6
E8	POND B RELEASE	1.5	14.0
E9	OS4, DP E7, DP E8	19.8	110.9
E10	ROW4	2.3	4.9

SUMMARY RUNOFF TABLE				
BASIN	AREA (ac)	% IMPERVIOUS	Q5 (cfs)	Q100 (cfs)
A	5.78	45	8.4	19.9
B	1.10	96	3.6	6.6
C	3.01	80	7.0	13.9
D	3.05	80	7.3	14.6
E	3.68	80	8.8	17.5
F	1.10	90	2.8	5.2
G	6.75	2	2.0	13.5
H	3.71	74	7.7	15.8
I	1.12	67	2.1	4.6
J	3.14	25	3.0	9.6
K	0.24	90	1.0	1.9
L	0.24	90	1.0	1.9
N1	2.07	80	4.9	9.8
N2	0.25	100	1.2	2.1
N3	1.84	80	4.8	9.6
O	2.10	80	5.9	11.8
P1	0.25	100	1.2	2.1
P2	2.05	80	2.4	11.4
Q	1.02	80	3.2	6.2
R	1.43	80	2.1	6.8
S1	1.16	80	2.9	5.8
S2	2.32	80	5.3	10.6
S3	1.16	80	3.0	5.9
T	1.42	3	0.5	3.2
OS1	2.83	2	1.0	6.7
ROW1	2.17	28	2.3	6.5
ROW2	3.25	33	3.6	9.6
ROW3	6.85	24	5.2	15.8
OS4	40.02	3	10.5	63.9
ROW4	1.48	59	2.3	4.9

LEGEND:

PROPOSED MAJOR CONTOUR	5250
PROPOSED MINOR CONTOUR	
EXISTING MAJOR CONTOUR	5250
EXISTING MINOR CONTOUR	
PROPOSED STORM SEWER	
EXISTING DRAINAGE SWALE	
PROPOSED DRAINAGE SWALE	
PROPOSED FLOW DIRECTION	
EXISTING FLOW DIRECTION	
PROPOSED DRAINAGE BASIN	
PROPOSED BASIN LABEL	BASIN DESIGNATION
DESIGN POINT	AREA (AC.)

0 200
100

NOTE:
ON-SITE CONTOURS PER FIELD SURVEY. OFFSITE CONTOURS PER USGS ONLINE DATA.

EPC EDARP FILE NO. SP236

DRAWN BY: AB/DH JOB DATE: 11/15/2024
APPROVED: CM JOB NUMBER: 2202774
CAD DATE: 11/15/2024
CAD FILE: J:\2022\2202774\CAD\Dwgs\C\Drainage\Pr_Drainage_Map

BAR IS ONE INCH ON OFFICIAL DRAWINGS. 0 1" IF NOT ONE INCH, ADJUST SCALE ACCORDINGLY.

NO.	DATE	BY	REVISION DESCRIPTION

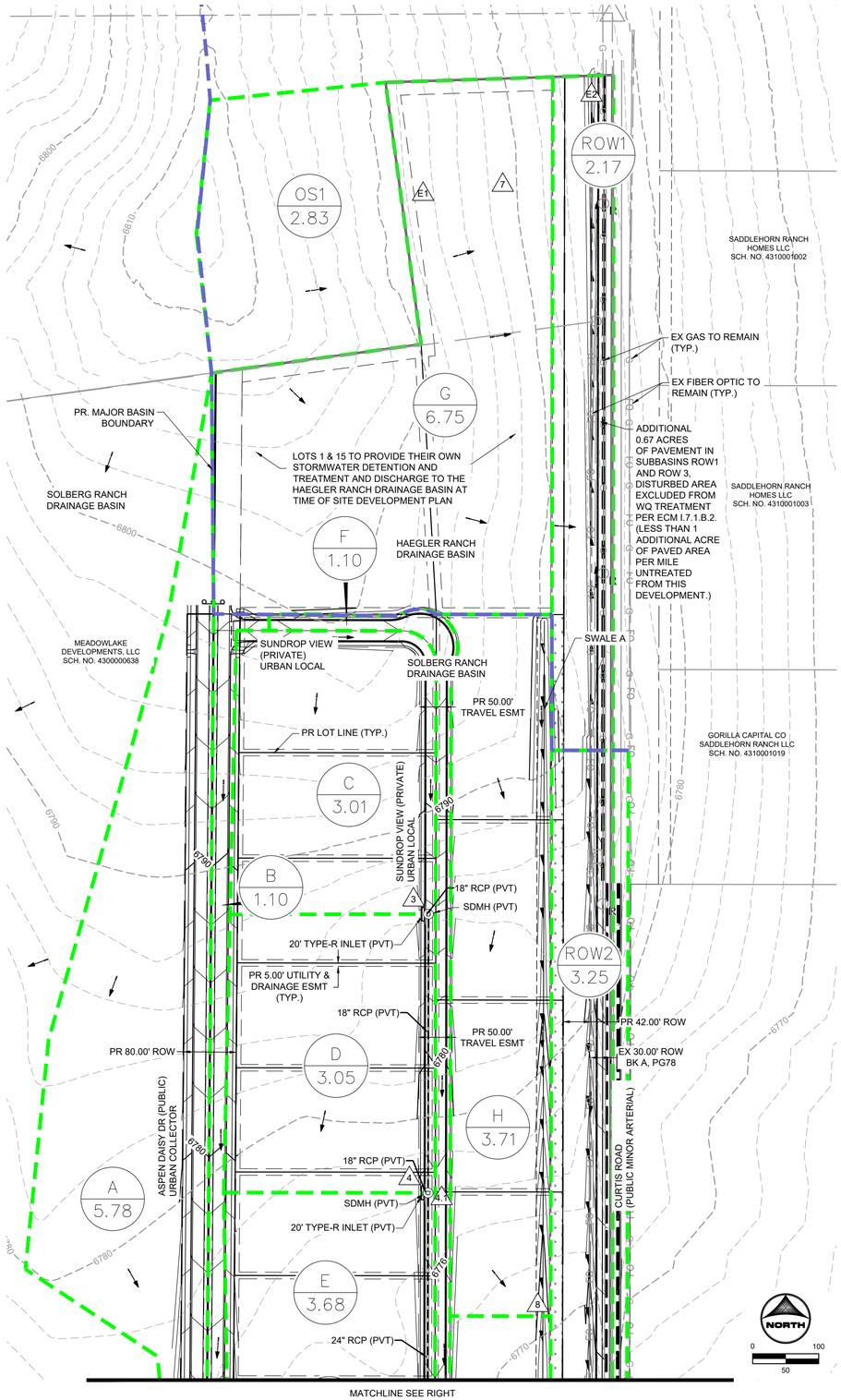
HRGreen
HR GREEN - COLORADO SPRINGS
1975 RESEARCH PARKWAY SUITE 230
COLORADO SPRINGS, CO 80920
PHONE: 719.394.2440
FAX: 713.965.0044

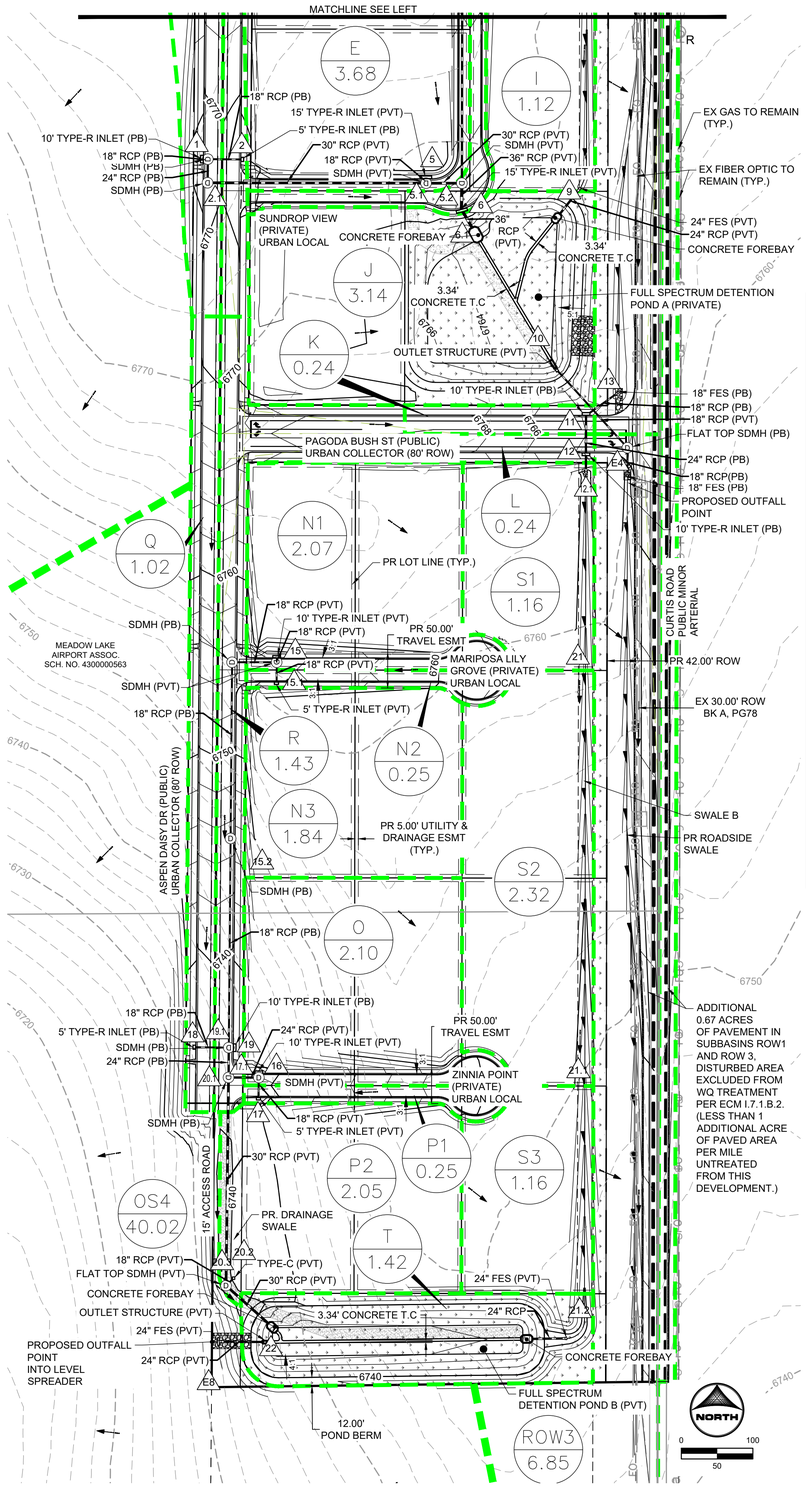
MEADOW LAKE INDUSTRIAL PHASE 1
MEADOWLAKE DEVELOPMENTS, LLC
EL PASO COUNTY, CO

DRAINAGE MAPS
PROPOSED DRAINAGE MAP

SHEET DR 2

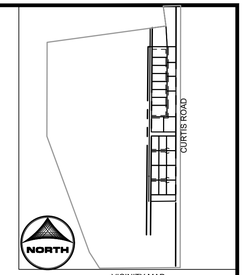
VAN SCOY, SEAN, 11/15/2024 11:29 AM





LEGEND:

- PROPOSED MAJOR CONTOUR — 5250
- PROPOSED MINOR CONTOUR
- EXISTING MAJOR CONTOUR — 5250
- EXISTING MINOR CONTOUR
- PROPOSED STORM SEWER
- EXISTING DRAINAGE SWALE
- PROPOSED DRAINAGE SWALE
- PROPOSED FLOW DIRECTION
- EXISTING FLOW DIRECTION
- PROPOSED DRAINAGE BASIN
- PROPOSED BASIN LABEL — X
- DESIGN POINT
- BASIN DESIGNATION — X
- AREA (AC.) — 1.25



SUMMARY RUNOFF TABLE

BASIN	AREA (ac)	% IMPERVIOUS	Q5 (cfs)	Q100 (cfs)
A	5.78	45	8.4	19.9
B	1.10	96	3.6	6.6
C	3.01	80	7.0	13.9
D	3.05	80	7.3	14.6
E	3.68	80	8.8	17.5
F	1.10	90	2.8	5.2
G	6.75	2	2.0	13.5
H	3.71	74	7.7	15.8
I	1.12	67	2.1	4.6
J	3.14	25	3.0	9.6
K	0.24	90	1.0	1.9
L	0.24	90	1.0	1.9
N1	2.07	80	4.9	9.8
N2	0.25	100	1.2	2.1
N3	1.84	80	4.8	9.6
O	2.10	80	5.9	11.8
P1	0.25	100	1.2	2.1
P2	2.05	80	2.4	11.4
Q	1.02	80	3.2	6.2
R	1.43	80	2.1	6.8
S1	1.16	80	2.9	5.8
S2	2.32	80	5.3	10.6
S3	1.16	80	3.0	5.9
T	1.42	3	0.5	3.2
OS1	2.83	2	1.0	6.7
ROW1	2.17	28	2.3	6.5
ROW2	3.25	33	3.6	9.6
ROW3	6.85	24	5.2	15.8
OS4	40.02	3	10.5	63.9
ROW4	1.48	59	2.3	4.9

DESIGN POINT SUMMARY TABLE

DESIGN POINT	CONTRIBUTING BASINS	SQ5 (cfs)	SQ100 (cfs)
E1	OS1	1.0	6.7
7	G, DP E1	2.9	19.2
E2	ROW 1, DP 7	5.0	25.2
1	A	8.4	19.9
2	E	3.6	6.6
2.1	DP 1, DP 2	11.4	25.3
3	C	7.0	13.9
4	D	7.3	14.6
4.1	DP 3, DP 4	13.7	27.2
5	E	8.8	17.5
5.1	DP 2.1, DP5	18.0	38.3
5.2	DP 4.1, DP 5.1	29.3	60.8
6	F, DP 5.2	31.8	65.5
6.1	DP 6	31.8	65.5
8	H	7.7	15.8
9	I, DP 8	9.2	19.0
10	DP 6.1, DP 9	42.4	90.3
13	ROW2	3.6	9.6
E4	POND A RELEASE	0.8	13.8
11	K, DP 13	1.0	10.7
12	L, DP 11	2.0	11.9
12.1	DP 12	2.0	22.5
15	N1	4.9	9.8
15.1	N2	1.2	2.1
15.2	N3	4.8	9.6
16	O	5.9	11.8
17	P1	1.2	2.1
17.1	DP 16, DP 17	6.9	13.6
18	Q	3.2	6.2
19	R, DP 15.2	5.8	14.1
19.1	DP 18, DP 19	13.2	28.5
20.1	DP 17.1, DP 19.1	18.1	38.0
20.2	P2	2.4	11.4
20.3	DP 20.1, DP 20.2	19.2	44.9
21	S1, DP 12.1	4.6	25.3
21.1	S2, DP 21	9.2	30.8
21.2	S3, DP21.2	11.2	33.3
22	T, DP 20.3, DP 21.1	29.1	72.0
E7	ROW 2, DP E4	6.0	29.6
E8	POND B RELEASE	1.5	14.0
E9	OS4, DP E7, DP E8	19.8	110.9
E10	ROW4	2.3	4.9

DRAWN BY: AB/DH JOB DATE: 11/15/2024
APPROVED: CM JOB NUMBER: 2202774
CAD DATE: 11/15/2024
CAD FILE: J:\2022\2202774\CAD\Dwgs\C\Drainage\Pr_Drainage_Map

BAR IS ONE INCH ON OFFICIAL DRAWINGS.
0 1"
IF NOT ONE INCH, ADJUST SCALE ACCORDINGLY.

NO.	DATE	BY	REVISION DESCRIPTION

HRGreen
HR GREEN - COLORADO SPRINGS
1975 RESEARCH PARKWAY SUITE 230
COLORADO SPRINGS, CO 80920
PHONE: 719.394.2440
FAX: 713.965.0044

MEADOW LAKE INDUSTRIAL PHASE 1
MEADOWLAKE DEVELOPMENTS, LLC
EL PASO COUNTY, CO

DRAINAGE MAPS
PROPOSED DRAINAGE MAP

SHEET DR 2

HR GREEN Xrefs: xv-utb-2774; xv-dsgn-2774; xc-row-2774; xv-dsgn-2774; xv-row-2774; xg-t-utb-l-2774; Key_Map; Legend_FDR_Map; Ex_Drainage_Map