MASTER DEVELOPMENT DRAINAGE PLAN

FOR

FALCON TRUCKING FILING NO.1

June 2023

Prepared for:

Falcon Trucking Co.
8800 Dix Street
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Project #29-007

MASTER DEVELOPMENT DRAINAGE PLAN FOR FALCON TRUCKING FILING NO. 1

DRAINAGE REPORT STATEMENTS

ENGINEER'S STATEMENT

This report and plan for the drainage design of Falcon Trucking Filing No. 1 was prepared under my supervision and is correct to the best of my knowledge and belief. Said drainage report and plan has been prepared in accordance with the City of Colorado Springs Drainage Criteria Manual and is in conformity with the master plan of the drainage basin. I understand that the City of Colorado Springs does not and will not assume liability for drainage facilities designed by others. I accept responsibility for any liability caused by any negligent acts, errors or omissions on my part in preparing this report.

COLORADO REGISTERED VIRGIL A. SANCHEZ 37160 06-07-23 PROFESSIONAL ENGINEER

Virgil A. Sanchez, P.E. #37160
For and on Behalf of M&S Civil Consultants, Inc

DEVELOPER'S STATEMENT

Falcon Trucking Co. hereby certifies that the drainage facilities for Falcon Trucking Filing No. 1, shall be constructed according to the design presented in this report. I understand that the City of Colorado Springs does not and will not assume liability for the drainage facilities designed and/or certified by my engineer and that are submitted to the City of Colorado Springs pursuant to Section 7.7.906 of the City Code; and cannot, on behalf of the Falcon Trucking Filing No. 1, guarantee that final drainage design review will absolve Falcon Trucking Co. and/or their successors and/or assigns of future liability for improper design. I further understand that approval of the final plat does not imply approval of my engineer's drainage design.

BY: _____ DATE: 1/5/2023

TITLE: VICE PRESIDENT

ADDRESS: Falcon Trucking Co.
8800 Dix Street
Detroit, MI 48209

CITY OF COLORADO SPRINGS

Filed in accordance with Section 7.7.906 of the Code of the City of Colorado Springs} 2001, as amended,

BY: Heidi M. McMacken DATE: 06/12/2023

For the City Engineer Heidi McMacken

CONDITIONS: "The City of Colorado Springs approves these plans based upon the non-jurisdictional status of the facility. If upon State review the classification changes to jurisdictional, additional City review and approval will be necessary."

A final drainage report shall be required with a submittal of the final plat and an amendment to this document is likely upon determination of a site specific development plan.

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PURPOSE

This document is intended to serve as the Master Development Drainage Plan for Falcon Trucking Filing No. 1. A Zone Change, Master Plan Amendment and Concept Plan were approved in February 2022 to rezone the Falcon Trucking property from light industrial uses (PIP-1) to Planned Unit Development (PUD) to accommodate Medium-High Density Residential (3.5-7.99 du/ac) on 16.078 acres, Commercial/ High Density Residential (12-24.99 du/ac) on 14.309 acres, and Commercial uses on 5.34 acres.

The currently proposed Zone Change, Master Plan Amendment and Concept Plan will retain the PUD zoning but proposes to remove the Commercial uses and reallocate the residential uses/ densities. The revised plans will allow High Density Residential (12-24.99 du/ac) on the western 19.65 acres of the site and Residential Medium-High Density (8-11.99 du/ac) on the eastern 16.08 acres. The primary purpose of this report at this time is provide ample information of the support of the rezone and to ensure that post development runoff is routed through the site safely and in a manner that satisfies the requirements set forth by the El Paso County and City of Colorado Springs Drainage Criteria Manual. A final drainage report shall be required with a submittal of the final plat and an amendment to this document is likely upon determination of a site specific development plan.

It is important to note that at the time of the writing of this report, the preliminary designs for both Marksheffel Roadway and Barnes Roads were being evaluated by other consultants. As such the given the nature of this project being to seek a rezone the drainage analysis provided seeks only to match historic discharge at the boundary lines and determine that there is ample room for detention and water quality treatment.

GENERAL LOCATION AND DESCRIPTION

Falcon Trucking Filing No.1 is located northeast of the intersection of Marksheffel Road and Graphite Drive, in a portion of the southwest quarter of the southwest quarter (SW1/4, SW1/4) of Section 21, and a portion of the northwest quarter of the northwest quarter (NW1/4, NW1/4) of Township 13 South, Range 65 West of the 6th Principal Meridian, Colorado Springs, El Paso County, Colorado. The site is bound on the south by Graphite Drive, to the north by unplatted land owned by the City of Colorado Springs – Rec. No. 96020361 and by a track of land owned by BLH No. 2 LLC that was set aside for Barnes Roadway extension and to the west by Marksheffel Road Right of Way, and to the east by Enclaves at Mountain Vista Ranch, Filing No's 5 and 6 (Rec. No's – 220714464 and 220714464). The parcel is located within the Sand Creek Drainage Basin. Drainage flows from this site are tributary to Sand Creek.

Falcon Trucking Filing No. 1 consists of 35.731 acres and is presently undeveloped. Vegetation is sparse, consisting of native grasses. Existing site terrain generally slopes from north to south. More specifically, the west half of the site drains southwest, while the east half drains southeast. Grade rates across the site vary between 1 and 10%.

There are existing large overhead electric lines and an existing water line located along the northern boundary of the site. Existing underground gas lines are located within an easements and a right of way

that run north to south through the center of the parcel Existing gas, water and fiber optic water lines run along the west side of the site adjacent to existing Marksheffel Road. Existing sanitary sewer and water lines run under existing graphite drive along the west boundary of the site. Existing sanitary and waterline stubs are provided within the street terminus of the adjacent Enclaves at Mountain Vista Ranch Filings No. 5 and 6.

There are no irrigation facilities on site.

Anticipated concept plan improvements proposed for the site include paved streets, parking lots, sidewalks, townhomes, commercial buildings, full spectrum detention ponds, and wet/dry utilities as normally constructed for those developments.

Two (2) full spectrum detention ponds are anticipated to be necessary to provide water quality treatment and detention for the proposed development. The outlet structures from the western pond will discharge to the existing swale/ditch located along the west side of Marksheffel road, while the FSD planned for the east half of the development will tie into an existing storm sewer system along the north side of Graphite Drive that was constructed with Enclaves at MVR Filing No.3.

WETLANDS

There are no apparent wetlands within the boundary of this project.

CHANNEL IMPROVEMENTS

The proposed project is not adjacent to Sand Creek or any other significant drainageway. In accordance with the Sand Creek Drainage Basin Planning Study (DBPS) no channel improvements are required as a part of this project.

SOILS

Soils for this project are delineated by the map in the appendix as Truckton Sandy Loam (97) and have been characterized as Hydrologic Soil Types "A". Soils in the study area are shown as mapped by S.C.S. in the "Soils Survey of El Paso County Area". See Appendix for soils report.

HYDROLOGIC CALCULATIONS

Hydrologic calculations were performed using the City of Colorado Springs Storm Drainage Design Criteria manual and where applicable the Urban Storm Drainage Criteria Manual. The Rational Method was used to estimate storm water runoff anticipated from design storms with 5-year and 100-year recurrence intervals.

HYDRAULIC CALCULATIONS

Hydraulic calculations were estimated using the Manning's Formula and the methods described in the City of Colorado Springs Storm Drainage Design Criteria manual. The relevant data sheets are included in the Appendix of this report.

FLOODPLAIN STATEMENT

According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) Panel No. 08041C0543G, revised December 7, 2018, the subject site is NOT located within the 100 year floodplain. However, the subject site is located within the Other Areas Zone 'X' which is defined as an area determined to be outside the 0.2 annual chance floodplain and/or Other Areas Zone 'D' in which flood hazards are undetermined but possible. See Appendix.

DRAINAGE CRITERIA

This drainage analysis has been prepared in accordance with the current City of Colorado Springs Drainage Criteria Manual. Calculations were performed to determine runoff quantities for the 5-year and 100-year frequency storms for developed conditions using the Rational Method as required for basins having areas less than 100 acres. See Appendix for calculations.

EXISTING DRAINAGE CONDITIONS

The existing undeveloped parcel consists of sparsely vegetated native grassland consistent with common agricultural grazing land. The site is bisected by a ridgeline (which contains two private gas lines) that splits the parcel into an east and west halves. The western half of the parcel slopes to the west/southwest at grades that range between 2 and 10%. Runoff produced within the northern half of the west half of the site combines with sheet flows from a small undeveloped offsite area located north of the site at a localized depression along the west edge of existing Marksheffel Road some 600 feet to the south of Barnes Road. It is at this location, where an existing public 18" RCP culvert directs the drainage under the roadway to an existing earthen swale that parallels the west side of Marksheffel Road.

Runoff produced within majority of the south half of the western side of the parcel drains as sheet flow the existing roadside swale located along the eastern side of existing Marksheffel Road. At Granite Drive an existing public 24" RCP culvert conveys runoff, north to south, under the roadway.

Runoff produced along the southwestern boundary of the site, are collected within the curb and gutter of Graphite drive which drains to existing Marksheffel Road. This runoff combines with flows conveyed by the public 18" culvert south of the subject site within the eastern roadside ditch of Marksheffel road. A cross culvert located south 550' below the site at a low point collects and conveys drainage to the west half of existing Marksheffel Road.

The eastern half of the existing undeveloped parcel consists also consists of sparsely vegetated native grassland commonly associated with agricultural grazing land. The eastern half of the subject site slopes to the west/southwest at grades that range between 2 and 10%. Runoff produced within the eastern half of the site combines with sheet flows from undeveloped offsite areas located north of the subject site. In the existing condition runoff reaching the eastern boundary of the subject site is intersected and conveyed south within a temporary earthen swale and temporary grading and drainage easement constructed with Enclaves at Mountain Vista Ranch (Filings 5 and 6). The conveyed runoff is collected by a existing CDOT Type D inlet and which discharges via a private 30" RCP storm sewer into an existing Full Spectrum Detention Pond (Pond 1) within EMV Filing 5 located north of Granite Drive, see Existing Drainage Map in the appendix.

Existing Conditions Detailed Drainage Discussion

Basin A consists of approximately 2.37 acres of undeveloped offsite land with sparse, native grasses and vegetation located to the north of the western half of the subject site. Runoff from the basin (Q5=0.6 cfs, Q100=4.4 cfs) drains northeast to southwest and enters the northern boundary of the site as sheet flow.

Basin B consists of approximately 8.42 acres of undeveloped land with sparse, native grasses and vegetation. Runoff from the basin (Q5=2.2 cfs, Q100=16.1 cfs) combines with flows from **Basin A** at **Design Point 1** where it is discharged into to the existing right of way adjacent to the existing 18" RCP at the low point of Marksheffel Road. The existing combined peak flow calculated to cross the western property totals Q5=2.7 cfs, Q100=19.6 cfs.

Basin C consists of approximately 7.53 acres of undeveloped offsite land with sparse, native grasses and vegetation located along the southwestern side of the subject site. Runoff from the basin (Q5=1.8 cfs, Q100=13.2 cfs) is conveyed west as sheet flow to the western boundary just up-gradient from the cross culvert at Graphite Drive near **Design Point 2** (Q5=1.8 cfs, Q100=13.2 cfs).

Basin D consists of approximately 2.23 acres of undeveloped offsite land with sparse, native grasses and vegetation located adjacent to existing Graphite Drive. Runoff from the basin (Q5=0.6 cfs, Q100=4.1 cfs) continues west within the curb and gutter to Marksheffel Road (**Design Point 3**).

Basin E consists of approximately 12.97 acres of undeveloped offsite land with sparse, native grasses and vegetation located to the north of the eastern half of the subject site. Runoff from the basin (Q5=3.1 cfs, Q100=22.5 cfs) drains north to south/southeast and enters the northern boundary of the site as sheet flow.

Basin F consists of approximately 8.97 acres of undeveloped land with sparse, native grasses and vegetation located along the eastern half of the site. Runoff from the basin (Q5=2.0 cfs, Q100=15.0 cfs) combines with flows from **Basin E** at **Design Point 4**. The existing combined peak flow calculated to within the existing earthen swale totals Q5=4.0 cfs, Q100=29.6 cfs.

Basin G consists of approximately 7.78 acres of undeveloped land with sparse, native grasses and vegetation located along the southeastern portion of the site. Runoff from the basin (Q5=1.5 cfs, Q100=11.3 cfs) combines with flows from **DP4** at **Design Point 5**. The existing combined peak flow calculated to within the existing earthen swale totals Q5=4.6 cfs, Q100=33.6 cfs. Runoff conveyed by the swale is currently being conveyed to the FSD Pond 1 within Enclaves Filing No.5.

Basin H consists of approximately 0.79 acres of undeveloped offsite land with sparse, native grasses and vegetation located adjacent to existing Graphite Drive (**Design Point 6**). Runoff from the basin (Q5=0.2 cfs, Q100=1.5 cfs) continues east within the curb and gutter to inlets located within Graphite Drive.

FOUR STEP PROCESS

Step 1 Employ Runoff Reduction Practices. Whenever possible roof drains will be directed to vegetated landscaping buffer areas and islands prior to release to streets aiding in minimizing direct connection of impervious surfaces. The new Runoff Reduction criteria will need to be met with the submittal with future FDR's. This includes compliance with the Green Infrastructure Manual and Policy Clarification on

Green Infrastructure and corresponding calculations (UD-BMP v 3.07) and Runoff Reduction Exhibit showing that a10% reduction in the WQCV is being met.

Step 2 Implement BMPs that provide a water quality capture volume with slow release. – A Full Spectrum Detention basin is being proposed at the south end of the site to collect and treated developed runoff. This facility will restrict discharge rates to predevelopment rates and slowly release the Water Quality volume over 40 hours and the EURV storm event over 72 hours. Future FDR submittals will need to evaluate the area (in acres) and percent of the total disturbed area that will receive water quality treatment. A minimum of 95% of the total disturbed area must receive water quality treatment and the remaining 5% must not exceed 1 acre.

Step 3 Stabilize streams. – The runoff from the site will be directed to an existing stable underground storm sewer system that discharges into subsequent downstream conveys systems before discharge into the East Fork Sand Creek Sub-tributary and East Fork of the Sand Creek. All new and re-development projects are required to construct or participate in the funding of channel stabilization measures. Drainage basin fees paid, at the time of platting, go towards channel stabilization within the drainage basin.

Step 4 Implement site specific and other source control BMPs. – The proposed development will implement a Stormwater Management Plan including property housekeeping practices and spill containment procedures. Material storage (such as backfill stockpiles or landscape materials), during construction are to be located away from drainage facilities. Designated Fueling areas and trash enclosures are to be placed in locations where they can be easily source.

PROPOSED DRAINAGE CHARACTERISTICS

General Concept Drainage Discussion

The proposed drainage plan evaluates proposed flow patterns and recommends infrastructure and facility sizing for the parcel based upon conceptual grading and layouts for high and medium density residential development. The parcel upon development is anticipated to include asphalt and curb and guttered roadways, parking lots, retaining walls, and building structures consistent with higher density residential development. Water, wastewater and other subsurface utilities will be extended into the site as necessary to provides services. In addition to open space and landscaping two full spectrum detention and water quality ponds are anticipated to be constructed.

The proposed site will continue to mimic existing general drainage patterns with proposed drainage being directed to the southeast and southwest corners of the site. The ridgeline which holds the gas lines will remain intact coordination and concurrence from the utility companies will be required. Conceptual storm sewer main lines have been extended to areas for collection of runoff and directed to the aforementioned FSD ponds. Basins F, G, H and J will remain undeveloped and fully pervious, therefore, water quality is not required. **This is a conceptual layout to accurately size the detention facilities for future knowledge and planning. Therefore, the following calculations for pipe sizes, inlets, and detention pond sizing are irrelevant until a Development Plan is submitted to the City."**

Proposed Conditions Detailed Drainage Discussion

Basin A consists of approximately 0.95 acres offsite land located adjacent planned Barnes Road north of the subject site. The basin is a mixture of proposed roadway, landscaping and native grasses. Runoff from

the basin (Q5=1.1 cfs, Q100=3.7 cfs) drains northeast to southwest and enters the northern boundary of the site as sheet flow.

Basin B consists of approximately 4.50 acres of future medium density residential development and access roadways. Runoff from basin (Q5=8.9 cfs, Q100=19.0 cfs) flows toward the southwestern corner of the site after combining with flows from **Basin A**. A proposed private 36" storm sewer main (**PR1**) has been extended into the area to collect the flow at **Design Point 1** (Q5=11.0 cfs, Q100=24.6 cfs).

Basin C consists of approximately 5.07 acres of future medium density residential development and access roadways. Runoff from basin (Q5=9.0 cfs, Q100=19.1 cfs) is anticipated to be directed to the street side and conveyed to a low point. A proposed private 30" storm sewer main (**PR2**) has been extended into the area to collect the flow at **Design Point 2** (Q5=9.0 cfs, Q100=19.1 cfs).

Basin D consists of approximately 2.80 acres of future medium density residential development and access roadways. Runoff from basin (Q5=5.2 cfs, Q100=11.1 cfs) is anticipated to be directed to the street side and conveyed to a low point. A proposed private 24" storm sewer main (**PR3**) has been extended into the area to collect the flow at **Design Point 3** (Q5=5.2 cfs, Q100=11.1 cfs).

Basin D1 consists of approximately 0.46 acres of future medium density residential development and open space. Runoff from the basin (Q5=0.6 cfs, Q100=1.6 cfs) is anticipated to be directed overland to the adjacent tract **Design Point 4** (Q5=0.6 cfs, Q100=1.6 cfs).

Basin E is located at the southwest corner of the property and consists 3.41 acres of a Tract dedicated to house a Full Spectrum Detention and Water Quality Pond (**FSD Pond1**). Runoff from this basin (Q5=1.6 cfs, Q100=9.0 cfs) is captured within the pond and combines with the flows conveyed by **PR1**, **PR2**, **PR3** and sheet flow from **DP4**. The total peak runoff anticipated to reach **FSD Pond 1** at **Design Point 5** is Q5 = 23.3 cfs, Q100 = 50.9 cfs. The total peak acres contributing to **FSD Pond 1** is 16.73 acres. The private full spectrum detention pond will discharge to predevelopment flow rates and drain the water quality volume and excess urban runoff volume over 40 hours and 72 hours respectively. A private 24" storm sewer will be constructed at the southwest corner of the pond which will discharge to the westside of Marksheffel Road. The peak flows calculated to be released from the pond (**PR4**) total 2.3 cfs and 12.0 cfs in the 5-year and 100-year events respectively. Refer to drainage facility design section of the report for additional information regarding the facility.

Basin F consists of approximately 0.37 acres of offsite land likely a mixture of landscaping and native grasses located adjacent to planned Barnes Road. Runoff from the basin (Q5=0.2 cfs, Q100=1.0 cfs) drains northeast to southwest and enters the northern boundary of the site as sheet flow.

Basin G consists of approximately 1.44 acres of undeveloped offsite land with sparse, native grasses and vegetation. The area houses three easements for two underground waterlines and a gas line. Runoff from the basin (Q5=0.5 cfs, Q100=3.7 cfs) combines with flows from **Basin F** at **Design Point 6** where it is discharged into to the existing right of way adjacent to the existing public 18" RCP at the low point of Marksheffel Road. The combined peak flow calculated to cross the western property totals Q5=0.7 cfs, Q100=4.5 cfs.

Basin H consists of approximately 1.22 acres of undeveloped offsite land with sparse, native grasses and vegetation. The area houses three easements for two underground waterlines and a gas line. Runoff from the basin (Q5=0.4 cfs, Q100=3.0 cfs) combines with flows from **Basin F** at **Design Point 6** where it is discharged into to the existing right of way, up-gradient from the cross culvert at Graphite Drive near **Design Point 7** (Q5=0.4 cfs, Q100=3.0 cfs). The cumulative flows from DP6, DP7 and the **Pond 1**

Outfall at **DP9** are (Q5=2.9 cfs, Q100=16.5 cfs), outfall into an existing swale on the westside of Marksheffel Road.

Basin I consists of approximately 0.30 acres of development directly adjacent to existing Graphite Drive, which will consist likely a mixture of landscaping and native grasses. Runoff from the basin (Q5=0.3 cfs, Q100=1.2 cfs) drains south to the roadway.

Basin J consists of approximately 0.17 acres of development directly adjacent to existing Graphite Drive, which will consist likely a mixture of landscaping and native grasses. Runoff from the basin (Q5=0.1 cfs, Q100=0.4 cfs) drains south to the roadway. The combined flow from **Basin I** and **Basin J** reaching the west sloping portion of Graphite Drive is Q5=0.4 cfs, Q100=1.5 cfs (**Design Point 8**).

Basin K consists of approximately 0.97 acres offsite land located adjacent planned Barnes Road north of the subject site. The basin is a mixture of landscaping and native grasses. Runoff from the basin (Q5=0.5 cfs, Q100=2.7 cfs) drains northeast to southwest and enters the northern boundary of the site as sheet flow.

Basin L consists of approximately 4.76 acres of future high density residential development and roadways. Runoff from basin (Q5=8.6 cfs, Q100=18.2 cfs) combines with flows from **Basin K** at a low point located within the future residential streets. A proposed 30" storm sewer main (**PR5**) has been extended into the area to collect the flow at **Design Point 10** (Q5=9.0 cfs, Q100=20.6 cfs).

Basin M consists of approximately 5.84 acres of future high density residential development, open space and roadways. Runoff from basin (Q5=11.0 cfs, Q100=25.1 cfs) is collected within a low point located within the future residential streets. A proposed private 36" storm sewer main (**PR6**) will collect the flow at **Design Point 11** (Q5=11.0 cfs, Q100=25.1 cfs). A private proposed 42" sewer (**PR7**) will collect the combined runoff carried within **Pipes Runs 5** and **6**.

Basin N consists of approximately 2.49 acres of future high density residential development and roadways. Runoff from basin (Q5=5.0 cfs, Q100=10.7 cfs) is collected within a low point located within the future residential streets. A proposed 36" storm sewer main (**PR8**) has been extended into the area to collect the combined flow from **PR7** and **DP 12** (Q5=5.0 cfs, Q100=10.7 cfs).

Basin O is located at the southeast corner of the property and consists 0.9 acres of a Tract dedicated to house a Full Spectrum Detention and Water Quality Pond (**FSD Pond2**). Runoff from this basin (Q5=0.5 cfs, Q100=2.8 cfs) is captured within the pond and combines with the flows conveyed by **PR8**. The total peak runoff anticipated to reach **FSD Pond 2** at **Design Point 13** is Q5 = 23.0 cfs, Q100 = 53.2 cfs. The total peak acres contributing to **FSD Pond 2** is 15.37 acres. The private full spectrum detention pond will discharge to predevelopment flow rates and drain the water quality volume and excess urban runoff volume over 40 hours and 72 hours respectively. A private 18" storm sewer will be constructed at the southeast corner of the pond which will discharge an existing 24" stub provided within the rights of way of Granite Drive (Filing No. 5). The peak flows calculated to be released from the pond (**PR9**) total 0.6 cfs and 11.7 cfs in the 5-year and 100-year events respectively. Refer to drainage facility design section of the report for additional information regarding the facility.

Basin P consists of approximately 0.41 acres offsite land located adjacent planned Barnes Road north of the subject site. The basin is a mixture of landscaping and native grasses. Runoff from the basin (Q5=0.2 cfs, Q100=1.1 cfs) drains north to south and enters the northern boundary of the site as sheet flow.

Basin Q consists of approximately 0.08 acres of future high density residential development and roadway. Runoff from basin (Q5=0.7 cfs, Q100=1.6 cfs) combines with flows from **Basin P** within the proposed residential roadway connection with existing Talc Drive at **Design Point 14**. The cumulative flows from **DP14** are Q5=0.7 cfs, Q100=1.6 cfs.

Basin Q2 consists of approximately 0.08 acres of future high density residential development and roadway. Runoff from the basin (Q5=0.2 cfs, Q100=0.4 cfs) is carried within the curb and gutter of the future connection with Talc Drive where it enters existing Enclaves at Mountain Vista at Filing 6 at **Design Point 14A**. The cumulative flows from **DP14A** are Q5=0.2 cfs, Q100=0.4 cfs.

Basin R consists of approximately 0.40 acres of the rear lots of future high density residential development along the eastern boundary of the subject site. Runoff from the basin (Q5=0.8 cfs, Q100=2.0 cfs) will enter Enclaves at Mountain Vista Filing 6 and shall be distributed and conveyed down the adjacent lines. The total flow represented by **Design Point 15** totals Q5=0.8 cfs, Q100=2.0 cfs, which is less than 0.25 cfs/ lot line.

Basin R2 consists of approximately 0.22 acres of the rear lots of future high density residential development along the eastern boundary of the subject site. Runoff from the basin (Q5=0.5 cfs, Q100=1.1 cfs) will enter Enclaves at Mountain Vista Filing 6 and shall be distributed and conveyed down the adjacent lot lines. The total flow represented by **Design Point 15A** totals Q5=0.5 cfs, Q100=1.1 cfs which is less than 0.25 cfs/ lot line.

Basin S consists of approximately 0.11 acres of future high density residential development and roadway. Runoff from basin (Q5=0.5 cfs, Q100=0.9 cfs) is carried within the curb and gutter of the future connection with Basaltic Drive where it enters Enclaves at Mountain Vista Filling No. 5 at **Design Point 16**. The cumulative flows from **DP16** are Q5=0.5 cfs, Q100=0.9 cfs.

Basin S2 consists of approximately 0.08 acres of future high density residential development and roadway. Runoff from basin (Q5=0.4 cfs, Q100=0.6 cfs) is carried within the curb and gutter of the future connection with Basaltic Drive where it enters Enclaves at Mountain Vista Filling No. 5 at **Design Point 16A**. The cumulative flows from **DP16A** are Q5=0.4 cfs, Q100=0.6 cfs.

Basin T consists of approximately 0.33 acres of the rear lots of future high density residential development along the eastern boundary of the subject site. Runoff from the basin (Q5=0.7 cfs, Q100=1.6 cfs) will enter Enclaves at Mountain Vista Ranch Filing 5 and shall be distributed and conveyed down the adjacent lot lines at an average of less than 0.2 cfs per lot line. The cumulative flows from at **DP17** are (Q5=0.7 cfs, Q100=1.6 cfs).

It should be noted, that in previously approved drainage reports (EMVR Filing 5 and 6) the runoff reaching the western boundary of Enclaves at Mountain Vista Ranch Filing No. 5 and 6 from the subject site was to be conveyed south via swales located along the shared property line (Filing 5 FDR Map in appendix). This was largely done to protect the lots from the large undeveloped offsite watershed that naturally reached the property until upstream development could occur and the quantity of runoff and impact from drainage could be greatly reduced and controlled.

With the development of the subject site, the swale is no longer necessary and will be largely removed. A very limited amount of rear lot drainage from the Falcon Trucking site is now anticipated to enter the existing lots (within Filings 5 and 6) from the west as represented on the enclosed proposed drainage map.

To ensure that drainage would cause no negative effects to downstream property and existing downstream systems within Filing 5 and 6 the drainage analysis (hydrologic worksheets and inlet calculations, etc) for EMVR Filing 5/6 were re-evaluted to incorporate the additional runoff from **Basins P-T.** A second drainage map (sheet DM2) has been provided within the appendix which outlines the revised flow rates for these downstream systems.

In addition to the rational drainage calculations showing that the minor addition flow to the existing lots can be conveyed by the downstream storm systems without negative impacts, calculations showing that the exiting side lot property line swales are also adequate to convey this minor runoff to the streets, which contain the existing storm systems. Please refer to the hydraulic calculations provided in the appendix for additional details.

The existing 30" RCP (Pipe 12) leaving EMV Filing 6 (north of Basaltic Drive) was anticipated to convey 11.2 cfs and 20.1 cfs in the minor and major storm events per the approved Filling No. 6 FDR, based upon the current analysis the same 30" Pipe (12*) is anticipated to carry 11.3 cfs and 20.4 cfs in the relative events. These increases of 0.9% and 1.05% in the two storm events are considered negligible and are anticipated to have no notable effects on conveyance or water quality.

Similarly the existing 36" RCP (Pipe 12) entering the north east side of existing Pond 303 within Filing 5 was (per the approved Filing 5 FDR) anticipated to convey 24.7 cfs and 58.1 cfs in the minor and major storm events. Based upon the current analysis the same 36" Pipe (12**) is anticipated to carry 19.4 cfs and 46.9 cfs in the relative events. These decreases of 27.3% and 23.9% in the two storm events are not anticipated to have a negative impact to the existing system or to water quality. The primary cause for the decrease in actual flow rates vs. planned flow lies within the utilization of a shortened planned time of concentration, utilized as a measure of conservatism, within the Filing 5 FDR.

Therefore a concept design of similar density and grading patterns to the one shown within this MDDP does not negatively affect the existing downstream storm sewer facilities.

DRAINAGE FACILITY DESIGN

Based upon a concept layout a minimum of two new Full Spectrum Detention (FSD) will be required in order to reduce the fully developed flows from the site to pre-development levels and address water quality. The ponds have been sized utilizing MHFD v4.04 from Urban Drainage and Flood Control District (UDFCD).

The ponds are being modeled with an outlet control structure which limits the release rate of the pond through the use of orifices, weirs, and a restrictor plates placed before a proposed outlet pipes to store the WQCV, EURV, and the flood control volumes for the 2, 5, 10, 25, 50, and 100 year storm events. The WQCV will be slowly released over 40 hours. The 100 year will drain in less than 120 hours. Maintenance to the proposed private FSD Pond 1 and private FSD Pond 2 is by the Falcon Trucking Metro District.

A private Full Spectrum Detention Extended Detention Basin (**FSD Pond 1**) is being proposed for the west half of the site to address water quality from 16.73 acres at 54.0% imperviousness. . **FSD Pond 1** is being constructed with an outlet control structure and a proposed 24" RCP outlet pipe. An overflow emergency weir is proposed along the southwest embankment to safely convey flows to Marksheffel corridor in the event of outlet clogging. The 0.0' height (lowest orifice) stage was based upon an elevation of 6630.00.

FSD Pond 1	WQCV	EURV	5 Year	100 Year
Maximum Volume Stored (acre-ft)	0.337	1.109	1.236	2.081
Maximum WS Elevation	6632.47	6633.53	6633.68	6634.47
Peak Inflow (cfs)(calc)			21.7	47.7
Peak Outflow (cfs)	0.2	0.3	2.3	12.0

A second private Full Spectrum Detention Extended Detention Basin (**FSD Pond 2**) is being proposed for the east half of the site to address water quality from 15.37 acres at 60.0% imperviousness. . **FSD Pond 2** is being constructed with an outlet control structure and a proposed 18" RCP outlet pipe. An overflow emergency weir is proposed along the southern embankment to safely convey flows to Graphite Drive corridor in the event of outlet clogging. The 0.0' height (lowest orifice) stage was based upon an elevation of 6634.67.

FSD Pond 2	WQCV	EURV	5 Year	100 Year
Maximum Volume Stored (acre-ft)	0.304	1.004	1.085	1.766
Maximum WS Elevation	6637.09	6639.13	6639.33	6640.74
Peak Inflow (cfs)(calc)			21.1	44.6
Peak Outflow (cfs)	0.1	0.4	2.6	11.7

Some of the proposed runoff from Falcon Trucking site is planned to be directed to the existing streets and storm sewer systems located within EMVR Filings 5 and 6, ultimately outfalling into the existing Extended Detention Basin (**FSD Pond 303**). See Appendix for a letter from the Mountain Vista Metropolitan District (MVMD), which permits Falcon Trucking, to access and allow for modifications to the existing facility (**FSD Pond 303**), as required by future Final Drainage Reports and analysis. Based upon the concept layout and proposed drainage patterns the existing facility will now conceptually function to address water quality from 18.52 acres (east edge of proposed Falcon Trucking Filing No.1, Enclaves at Mountain Vista Ranch Filing No.6 and Enclaves at Mountain Vista Ranch Filing No.5) at approximately 53.3% imperviousness. Based upon the current concept design and discharge, the pond as constructed appears to be able to accept the runoff. In order to meet the various release rates it is anticipated that the outlet structure and north forebay will need to be modified. This may or may not include raising the outlet box elevation by approximately 24inches and removal, resizing and replacement of the trash screen and orifice plate. The forebay may or may not include raising the forebay walls an additional foot. The modifications should be addressed as with the Final Drainage Report. With this improvement a concept design of similar density and grading patterns to the one shown within this MDDP does not negatively affect the existing downstream storm sewer facilities or water quality. It should be noted that for all basins that will remain fully landscaped and are not directed to one of the three ponds, the basin will remain fully pervious, therefore, water quality treatment is not required.

EROSION CONTROL

It is the policy of the City of Colorado Springs that we submit an erosion control plan with the drainage report. At this time we respectfully request that the erosion control plan be submitted in conjunction with the final grading plan. Proposed straw bale check dams, silt fence, inlet protection, sediment basin, vehicle traffic control, and reseeding are proposed as erosion control measures.

DRAINAGE, BRIDGE, AND POND FEES

The project is located within the Sand Creek Drainage Basin. The "2023 Drainage, Bridge, and Pond Fees-City of Colorado Springs", table identifies the following fees associated with the basin. These fees have been applied and summarized here for this 35.731 acre site. Drainage fees are due prior to plat recordation.

Basin Fees 2023	Total area (acres)	Basin Fee (per acre)	Total Cost Basin Fee
Drainage Fee	35.731	$22,015	$786,617.97
Bridge Fee	35.731	$0.00	$0.00
Pond Fee – Land	35.731	$0.00	$0.00
Pond Fee - Facility	35.731	$0.00	$0.00
Surcharge	35.731	$0.00	$0.00
Total			$786,617.97

CONSTRUCTION COST ESTIMATE

(Private Storm Sewer System, Non-Reimbursable)

Item	Description	Quantity	Unit Cost	Cost
1.	18" RCP Storm Drain	220 LF	$75/LF	$ 16,500.00
2.	24" RCP Storm Drain	696 LF	$85/LF	$ 59,160.00
3.	30" RCP Storm Drain	332 LF	$105/LF	$ 34,860.00
4.	36" RCP Storm Drain	270 LF	$145/LF	$ 39,150.00
5.	42" RCP Storm Drain	410 LF	$190/LF	$ 77,900.00
			Subtotal	$ 227,570.00
			Contingency/(25%)	$ 56,892.50
			Total =	**$ 284,462.50**

(Private, Non-Reimbursable Ponds)

Pond 1 (Private facilities to be maintained by the Falcon Trucking Metro District)

1.	Forebay	LS	$6976/LS	$ 6,976.00
2.	FSD Pond Outlet Struc	LS	$11779/LS	$ 11,779.00
3.	2' Wide Trickle Channel	765 LF	$30/LF	$ 22,950.00
4.	11' Wide Access Rd. Cl 2	574 Ton	$20/Ton	$ 11,480.00
5.	Soil Riprap Type M	151 CY	$65/CY	$ 9,815.00
6.	Concrete Cutoff Wall	LS	$3410/LS	$ 3,410.00
7.	Signage	LS	$1000/LS	$ 1,000.00
			Total:	**$ 67,410.00**

Pond 2 (Private facilities to be maintained by the Falcon Trucking Metro District)

1.	Forebay	LS	$6976/LS	$ 6,976.00
2.	FSD Pond Outlet Struc	LS	$11779/LS	$ 11,779.00
3.	2' Wide Trickle Channel	262 LF	$30/LF	$ 7,860.00
4.	11' Wide Access Rd. Cl 2	269 Ton	$20/Ton	$ 5,380.00
5.	Soil Riprap Type M	85 CY	$65/CY	$ 5,525.00

6.	Concrete Cutoff Wall	LS	$1740/LS		$ 1,740.00
7.	Signage	LS	$1000/LS		$ 1,000.00
				Total:	**$ 35,260.00**

Pond 3 (Private facility maintained by the Mountain Vista Ranch Metro District)

1.	Replace Orifice Plate	LS	$800/LS		$ 800.00
2.	Replace Filter Screen	LS	$1000/LS		$ 1,000.00
3.	Outlet Box Modification	LS	$4500/LS$		$ 4,500.00
				Total:	**$ 6,300.00**

Subtotal (Ponds 1, 2 &3)	$ 108,970.00
Contingency (15%)	$ 16,345.50
Total =	**$ 125,315.50**

M & S Civil Consultants, Inc. (M & S) cannot and does not guarantee the construction cost will not vary from these opinions of probable costs. These opinions represent our best judgment as design professionals familiar with the construction industry and this development in particular. The above is only an estimate of the facility cost in 2021.

SUMMARY

Development of Falcon Trucking Filing No.1 will not adversely affect the surrounding development. The proposed concept drainage facilities will adequately convey, detain and route runoff from the onsite & offsite flows to existing facilities, as well as provide water quality treatment. Runoff and storm drain and appurtenances will not adversely affect the existing downstream infrastructure and surrounding developments. This MDDP is in general compliance with prior hydrologic studies affecting the site. All drainage facilities described herein and shown on the included Proposed Drainage Map (See Appendix) are subject to change being dependent upon individual lot development. However, this MDDP should be used as a guideline for release of flows offsite, and final Full Spectrum & Water Quality Detention Pond sizing. Care will be taken to accommodate overland emergency flow routes on site and temporary drainage conditions.

REFERENCES

1.) "El Paso County and City of Colorado Springs Drainage Criteria Manual".

2.) "Urban Storm Drainage Criteria Manual"

3.) Web Soil Survey, USDA NRCS Soils Map https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm

4.) FEMA flood Map Service Center, Federal Emergency Management Agency https://msc.fema.gov/portal/home

5.) "Master Development Drainage Plan for Enclaves at Mountain Vista", last revised May 12th, 2016, by Galloway and Company, Inc.

6.) "Sand Creek Drainage Basin Planning Study Preliminary Design Report" dated January 1993, Revised March 1996, by Kiowa Engineering Corporation.

7.) "Preliminary/Final Drainage Report for Enclaves at Mountain Vista Ranch Filing No. 6" dated June 2020 by M&S Civil Consultants, Inc.

8.) "Preliminary/Final Drainage Report for Enclaves at Mountain Vista Ranch Filing No. 5" dated October 2019 by M&S Civil Consultants, Inc.

9.) "Preliminary/Final Drainage Report Enclaves at Mountain Vista Filing No. 2" dated March 2016, Revised April 2017 by Galloway & Company, Inc.

APPENDIX

VICINITY MAP

SOILS MAP

FIRM PANELS

HYDROLOGIC CALCULATIONS

HYDRAULIC CALCULATIONS / POND CALCULATIONS

MARKSEFFEL ROAD FINAL DRAINAGE REPORT EXCERPTS

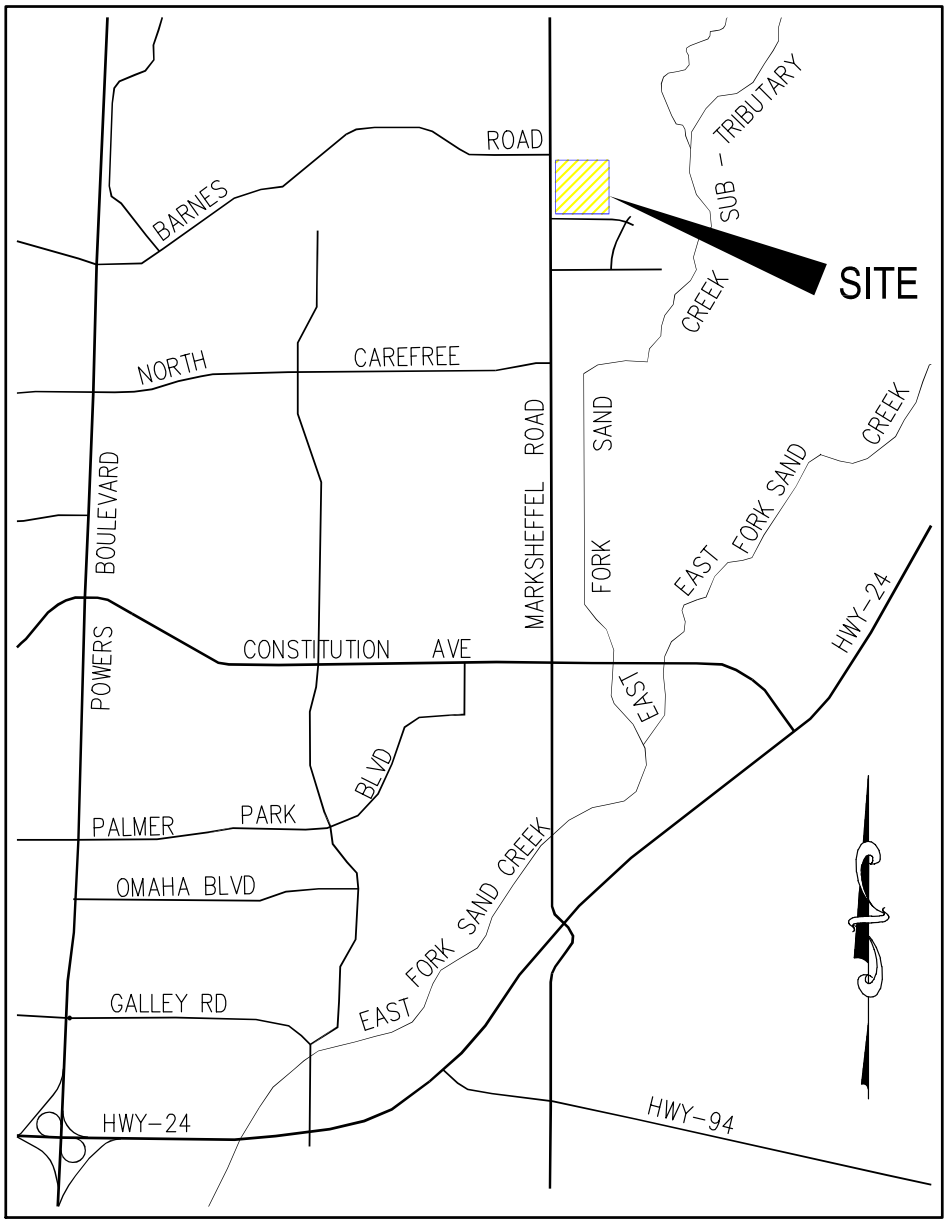
JIMMY CAMP CREEK DRAINAGE REPORT EXCERPTS

DRAINAGE MAPS

BACKGROUND INFORMATION

APPENDIX

VICINITY MAP



VICINITY MAP

N.T.S.

MOUNTAIN VISTA METROPOLITAN DISTRICT
ACCESS LETTER AGREEMENT

Mountain Vista Metropolitan District

February 7, 2022

City of Colorado Springs
Stormwater Enterprise
30 S. Nevada, Suite 401
Colorado Springs, CO 80903

RE: Falcon Trucking Drainage & Enclaves at Mountain Vista Ranch Pond Modification

The Falcon Trucking project is located northeast of the intersection of Marksheffel Road and Graphite Drive, in a portion of the southwest quarter of the southwest quarter (SW1/4, SW1/4) of Section 21, and a portion of the northwest quarter of the northwest quarter (NW1/4, NW1/4) of Township 13 South, Range 65 West of the 6th Principal Meridian, Colorado Springs, El Paso County, Colorado. The site is bound on the south by Graphite Drive, to the north by unplatted land owned by the City of Colorado Springs – Rec. No. 96020361 and by a tract of land owned by BLH No. 2 LLC that was set aside for Barnes Roadway extension and to the west by Marksheffel Road Right of Way, and to the east by Enclaves at Mountain Vista Ranch, Filing No's 5 and 6 (Rec. No's – 220714464 and 220714464). The site is approximately 35.7 acres.

The Falcon Trucking project will require the construction, ownership and maintenance of a full spectrum, water quality detention pond at its southeast corner. This pond will discharge into an existing pond (Pond 303) inside of Enclaves at Mountain Vista Ranch Filings 5. Pond 303 is currently owned and maintained by the Mountain Vista Metropolitan District. In order to meet the City's design criteria, minor modifications to Pond 303 will be required. These modifications are necessary to comply with the City's criteria for storm water discharge rates. The cost of the pond modifications, a two year warranty on the construction, any costs for fees for review or inspection, etc. will be 100% borne upon the owner/developer of the Falcon Trucking project. The maintenance of Pond 303 will remain the responsibility of the Mountain Vista Metropolitan District. The maintenance of the Falcon Trucking pond will remain the responsibility of the owner/developer of the Falcon Trucking project.

The below signature, by the representative of the district, agrees to permit access and allow for modification to the existing facility that are necessary to account for drainage as outlined within the approved drainage report for the Falcon Trucking site

By: 

Kevin Walker, District Manager

SOILS MAP

NOT TO SCALE

Tables — Hydrologic Soil Group — Summary By Map Unit

Summary by Map Unit — El Paso County Area, Colorado (CO625)

Summary by Map Unit — El Paso County Area, Colorado (CO625)

Map unit symbol	Map unit name	Rating
97	Truckton sandy loam, 3 to 9 percent slopes	A

FALCON TRUCKING FILING NO. 1 SOILS MAP

CIVIL CONSULTANTS, INC.

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.

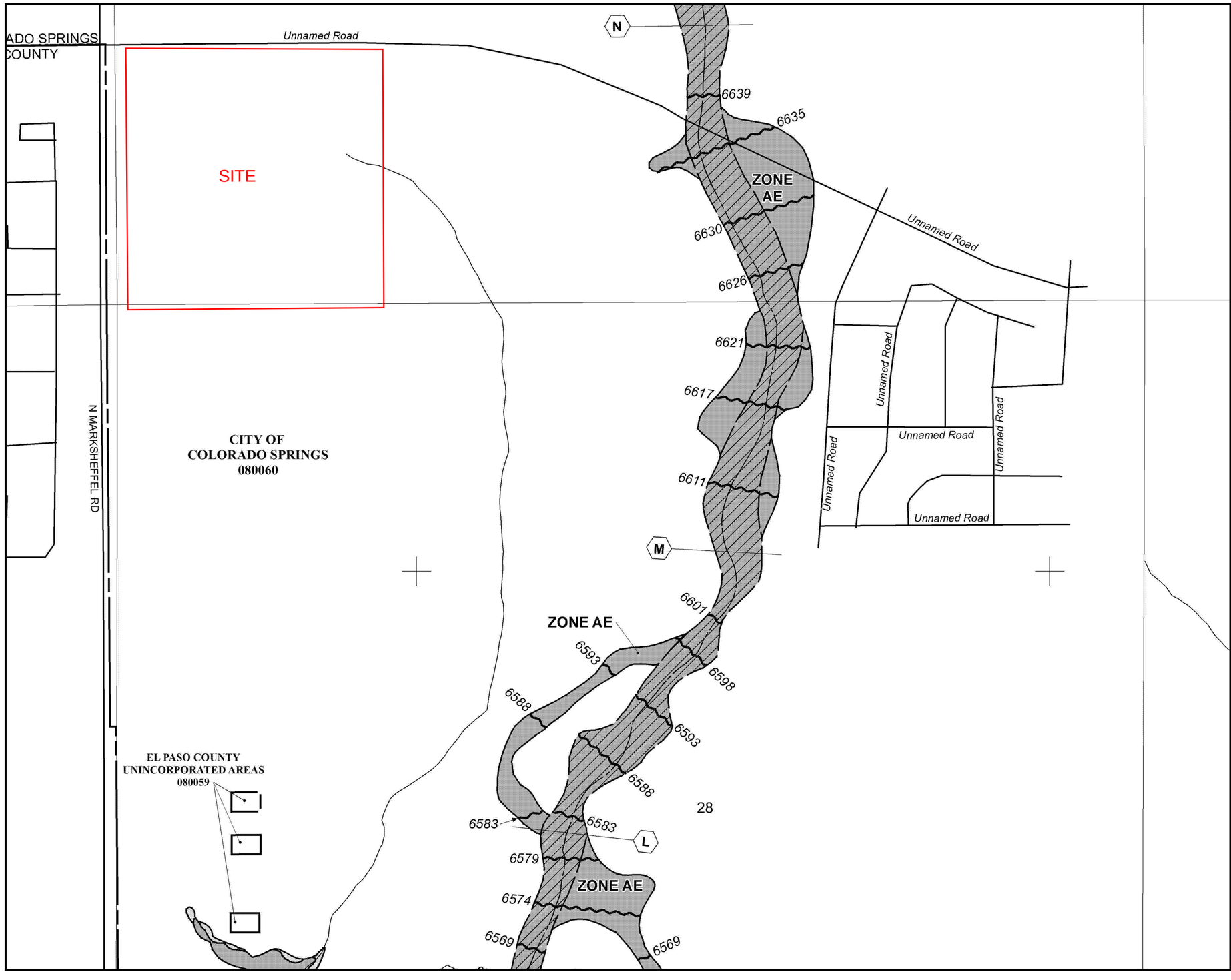
Soil Survey Area: El Paso County Area, Colorado
Survey Area Data: Version 18, Jun 5, 2020

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

Date(s) aerial images were photographed: Aug 19, 2018—Sep 23, 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.

FIRM PANELS



MAP SCALE 1" = 500'

250 0 500 1000 FEET

50 0 150 300 MET

NFIP

PANEL 0543G

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

EL PASO COUNTY, COLORADO AND INCORPORATED AREAS

PANEL 543 OF 1300

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
COLORADO SPRINGS, CITY OF	080060	0543	G
EL PASO COUNTY	080059	0543	G

Notice: This map was reissued on 05/15/2020 to make a correction.This version replaces any previous versions. See the Notice-to-User Letter that accompanied this correction for details.

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
08041C0543G

MAP REVISED
DECEMBER 7, 2018

Federal Emergency Management Agency

This is an official FIRMette showing a portion of the above-referenced flood map created from the MSC FIRMette Web tool. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For additional information about how to make sure the map is current, please see the Flood Hazard Mapping Updates Overview Fact Sheet available on the FEMA Flood Map Service Center home page at https://msc.fema.gov.

HYDROLOGIC CALCULATIONS

FALCON TRUCKING
EXISTING CONDITIONS DRAINAGE CALCULATIONS
(Area Runoff Coefficient Summary)

			STREETS/DEVELOPED			*NATURAL*			*RUNOFF COEFFICIENT*	
BASIN	**TOTAL AREA** *(SF)*	**TOTAL AREA** *(Acres)*	**AREA** *(Acres)*	**C_5**	**C_{100}**	**AREA** *(Acres)*	**C_5**	**C_{100}**	**C_5**	**C_{100}**
A	***103422.537***	2.37	0.00	0.90	0.96	2.37	0.08	0.35	**0.08**	**0.35**
B	***366973.3818***	8.42	0.00	0.90	0.96	8.42	0.08	0.35	**0.08**	**0.35**
C	***328181.7374***	7.53	0.00	0.90	0.96	7.53	0.08	0.35	**0.08**	**0.35**
D	***97021.0981***	2.23	0.00	0.90	0.96	2.23	0.08	0.35	**0.08**	**0.35**
E	***565052.7368***	12.97	0.00	0.90	0.96	12.97	0.08	0.35	**0.08**	**0.35**
F	***390740.069***	8.97	0.00	0.90	0.96	8.97	0.08	0.35	**0.08**	**0.35**
G	***338690.3842***	7.78	0.00	0.90	0.96	7.78	0.08	0.35	**0.08**	**0.35**
H	***34387.7952***	0.79	0.00	0.90	0.96	0.79	0.08	0.35	**0.08**	**0.35**

Calculated by: DLM
Date: 5/28/2021
Checked by: VAS

FALCON TRUCKING FILING NO. 1
PROPOSED DRAINAGE CALCULATIONS
(Area Drainage Summary)

From Area Runoff Coefficient Summary				*OVERLAND*				*STREET / CHANNEL FLOW*				*Time of Travel (T_t)*		*INTENSITY **		*TOTAL FLOWS*	
BASIN	**AREA TOTAL**	**C_5**	**C_{100}**	**C_5**	**Length**	**Height**	**T_C**	**Length**	**Slope**	**Velocity**	**T_t**	**TOTAL**	**CHECK**	**I_5**	**I_{100}**	**Q_5**	**Q_{100}**
	(Acres)	*From DCM Table 5-1*			*(ft)*	*(ft)*	*(min)*	*(ft)*	*(%)*	*(fps)*	*(min)*	*(min)*	*(min)*	*(in/hr)*	*(in/hr)*	*(c.f.s.)*	*(c.f.s.)*
A	0.95	0.23	0.47	0.23	75	8	6.2	0	0.0%	0.0	0.0	6.2	10.4	4.8	8.1	***1.1***	***3.7***
B	4.50	0.81	0.88	0.81	75	1.5	3.6	460	1.7%	2.6	2.9	6.5	13.0	4.8	8.0	***17.4***	***31.7***
C	5.07	0.49	0.62	0.49	140	1.7	12.2	575	1.4%	2.4	4.1	16.3	14.0	3.6	6.1	***9.0***	***19.1***
D	2.80	0.49	0.62	0.49	140	1.7	12.2	280	3.9%	4.0	1.2	13.4	12.3	3.8	6.4	***5.2***	***11.1***
D1	0.46	0.31	0.51	0.31	75	1.5	9.9	160	8.8%	5.9	0.5	10.3	11.3	4.1	6.8	***0.6***	***1.6***
E	3.41	0.12	0.39	0.12	50	16	4.0	570	0.5%	1.4	6.7	10.7	13.4	4.0	6.8	***1.6***	***9.0***
F	0.37	0.12	0.39	0.12	100	6	9.8	130	10.0%	6.3	0.3	10.1	11.3	4.1	6.9	***0.2***	***1.0***
G	1.44	0.08	0.35	0.08	100	10	8.6	0	0.0%	0.0	0.0	8.6	10.6	4.4	7.3	***0.5***	***3.7***
H	1.22	0.08	0.35	0.08	100	7.5	9.4	0	0.0%	0.0	0.0	9.4	10.6	4.2	7.1	***0.4***	***3.0***
I	0.30	0.20	0.45	0.20	20	0.6	5.1	0	0.0%	0.0	0.0	5.1	10.1	5.1	8.6	***0.3***	***1.2***
J	0.17	0.09	0.36	0.09	100	9	8.8	0	0.0%	0.0	0.0	8.8	10.6	4.3	7.2	***0.1***	***0.4***
K	0.97	0.12	0.39	0.12	100	8	8.9	0	0.0%	0.0	0.0	8.9	10.6	4.3	7.2	***0.5***	***2.7***
L	4.76	0.49	0.62	0.49	100	2	8.8	850	2.2%	3.0	4.7	13.5	15.3	3.7	6.2	***8.6***	***18.2***
M	5.84	0.42	0.58	0.42	100	18	4.7	650	2.3%	3.0	3.6	8.3	14.2	4.4	7.4	***11.0***	***25.1***
N	2.49	0.49	0.62	0.49	100	2	8.8	230	2.2%	2.9	1.3	10.1	11.8	4.1	6.9	***5.0***	***10.7***
O	0.90	0.12	0.39	0.12	50	16	4.0	250	0.5%	1.4	2.9	6.9	11.7	4.7	7.9	***0.5***	***2.8***
P	0.41	0.10	0.37	0.10	100	8	9.1	0	0.0%	0.0	0.0	9.1	10.6	4.3	7.2	***0.2***	***1.1***
Q	0.43	0.49	0.62	0.49	100	2	8.8	90	1.0%	2.0	0.8	9.5	11.1	4.2	7.1	***0.9***	***1.9***
R	0.63	0.40	0.56	0.40	50	3	4.9	0	0.0%	0.0	0.0	5.0	10.3	5.2	8.7	***1.3***	***3.0***
S	0.18	0.63	0.76	0.63	50	1	4.8	0	0.0%	0.0	0.0	5.0	10.3	5.2	8.7	***0.6***	***1.2***
T	0.33	0.40	0.56	0.40	50	3	4.9	0	0.0%	0.0	0.0	5.0	10.3	5.2	8.7	***0.7***	***1.6***

* Intensity equations assume a minimum travel time of 5 minutes.

Calculated by: DLM
Date: 5/28/2021
Checked by: _____

FALCON TRUCKING
EXISTING CONDITIONS DRAINAGE CALCULATIONS
(Basin Routing Summary)

From Area Runoff Coefficient Summary				*OVERLAND*				*PIPE / CHANNEL FLOW*				*Time of Travel (T_t)*	*INTENSITY **		*TOTAL FLOWS*		
DESIGN POINT	**CONTRIBUTING BASINS/PIPES**	**CA_5**	**CA_{100}**	**C_5**	**Length** *(ft)*	**Height** *(ft)*	**T_C** *(min)*	**Length** *(ft)*	**Slope** *(%)*	**Velocity** *(fps)*	**T_t** *(min)*	**TOTAL** *(min)*	**I_5** *(in/hr)*	**I_{100}** *(in/hr)*	**Q_5** *(c.f.s.)*	**Q_{100}** *(c.f.s.)*	COMMENTS
1	**A, B**	0.86	3.78				19.0	135	9.6%	2.2	1.0	20.0	3.1	5.2	***2.7***	***19.6***	*TO WEST SIDE OF MARKSHEFFEL (CULVERT UNDER MS)*
				Basin A Tc was used													
2	**C**	0.60	2.64				22.3					22.3	2.9	4.9	***1.8***	***13.0***	*TO EAST MARKSHEFFEL ROW (VIA CULVERT AT GRAPHITE)*
				Basin B Tc was used													
3	**D**	0.18	0.78				19.3					19.3	3.1	5.3	***0.6***	***4.1***	*TO EAST MARKSHEFFEL ROW (VIA GRAPHITE DRIVE)*
				Basin D Tc was used													
4	**E, F**	1.76	7.68				22.0	900	3.2%	1.3	11.9	33.9	2.3	3.9	***4.0***	***29.6***	*3' BOTTOM EARTHEN SWALE*
				Basin E Tc was used													
5	**DP4, G**	2.38	10.40				33.9	400	1.0%	0.7	9.5	43.4	1.9	3.2	***4.6***	***33.6***	*EX TYPE D INLET*
				DP4 Tc was used													
6	**H**	0.06	0.28				18.3					18.3	3.2	5.4	***0.2***	***1.5***	*TO ENCLAVES (VIA GRAPHITE DRIVE ROW)*
				Basin H Tc was used													

FALCON TRUCKING FILING NO. 1
PROPOSED DRAINAGE CALCULATIONS
(Area Runoff Coefficient Summary)

			STREETS / DEVELOPED			*DEVELOPED LOTS*			*DEVELOPED LANDSCAPING*			*RUNOFF COEFFICIENT*	
BASIN	**AREA**	**TOTAL AREA** *(Acres)*	**AREA** *(Acres)*	**C_5**	**C_{100}**	**AREA** *(Acres)*	**C_5**	**C_{100}**	**AREA** *(Acres)*	**C_5**	**C_{100}**	**C_5**	**C_{100}**
A	***41412.9359***	0.95	0.14	0.90	0.96	0.00	0.41	0.59	0.81	0.12	0.39	***0.23***	***0.47***
B	***196037.5092***	4.50	0.00	0.90	0.96	4.50	0.49	0.62	0.00	0.12	0.39	***0.49***	***0.62***
C	***220884.164***	5.07	0.00	0.90	0.96	5.07	0.49	0.62	0.00	0.12	0.39	***0.49***	***0.62***
D	***121982.6078***	2.80	0.00	0.90	0.96	2.80	0.49	0.62	0.00	0.12	0.39	***0.49***	***0.62***
D1	***19904.6983***	0.46	0.00	0.90	0.96	0.23	0.49	0.62	0.23	0.12	0.39	***0.31***	***0.51***
E	***148540.714***	3.41	0.00	0.90	0.96	0.00	0.41	0.59	3.41	0.12	0.39	***0.12***	***0.39***
F	***15980.5358***	0.37	0.00	0.90	0.96	0.00	0.41	0.59	0.37	0.12	0.39	***0.12***	***0.39***
G	***62573.1761***	1.44	0.00	0.90	0.96	0.00	0.41	0.59	1.44	0.08	0.35	***0.08***	***0.35***
H	***52997.6828***	1.22	0.00	0.90	0.96	0.12	0.12	0.39	1.09	0.08	0.35	***0.08***	***0.35***
I	***13240.8606***	0.30	0.03	0.90	0.96	0.00	0.41	0.59	0.27	0.12	0.39	***0.20***	***0.45***
J	***7253.9384***	0.17	0.00	0.90	0.96	0.04	0.12	0.39	0.12	0.08	0.35	***0.09***	***0.36***
K	***42071.6429***	0.97	0.00	0.90	0.96	0.00	0.41	0.59	0.97	0.12	0.39	***0.12***	***0.39***
L	***207398.1901***	4.76	0.00	0.90	0.96	4.76	0.49	0.62	0.00	0.12	0.39	***0.49***	***0.62***
M	***254291.867***	5.84	0.00	0.90	0.96	4.81	0.49	0.62	1.03	0.12	0.39	***0.42***	***0.58***
N	***108513.4307***	2.49	0.00	0.90	0.96	2.49	0.49	0.62	0.00	0.12	0.39	***0.49***	***0.62***
O	***77225.004***	0.90	0.00	0.90	0.96	0.00	0.81	0.88	0.90	0.12	0.39	***0.12***	***0.39***
P	***17954.8589***	0.41	0.00	0.90	0.96	0.00	0.41	0.59	0.41	0.10	0.37	***0.10***	***0.37***
Q	***15514.9657***	0.36	0.00	0.90	0.96	0.36	0.49	0.62	0.00	0.12	0.39	***0.49***	***0.62***
Q2	***3385.1025***	0.08	0.00	0.90	0.96	0.08	0.49	0.62	0.00	0.12	0.39	***0.49***	***0.62***
R	***17612.2726***	0.40	0.00	0.90	0.96	0.40	0.40	0.56	0.00	0.12	0.39	***0.40***	***0.56***
R2	***9575.7189***	0.22	0.00	0.90	0.96	0.22	0.40	0.56	0.00	0.12	0.39	***0.40***	***0.56***
S	***4812.5786***	0.11	0.11	0.90	0.96	0.00	0.41	0.59	0.00	0.12	0.39	***0.90***	***0.96***
S2	***3391.6752***	0.08	0.08	0.90	0.96	0.00	0.41	0.59	0.00	0.12	0.39	***0.90***	***0.96***
T	***14241.6721***	0.33	0.00	0.90	0.96	0.33	0.40	0.56	0.00	0.12	0.39	***0.40***	***0.56***
OS6		1.00	0.00	0.90	0.96	0.00	0.38	0.57	1.00	0.12	0.39	***0.12***	***0.39***
A1		1.40	0.00	0.90	0.96	0.00	0.38	0.57	1.40	0.09	0.36	***0.09***	***0.36***
A2		2.00	0.00	0.90	0.96	2.00	0.38	0.57	0.00	0.09	0.36	***0.38***	***0.57***
A3		0.40	0.00	0.90	0.96	0.40	0.38	0.57	0.00	0.09	0.36	***0.38***	***0.57***
A4		2.00	0.00	0.90	0.96	1.60	0.38	0.57	0.40	0.09	0.36	***0.32***	***0.53***
A5		1.30	0.00	0.90	0.96	1.30	0.38	0.57	0.00	0.09	0.36	***0.38***	***0.57***
A6		0.80	0.00	0.90	0.96	0.80	0.38	0.57	0.00	0.09	0.36	***0.38***	***0.57***
A7		0.70	0.00	0.90	0.96	0.70	0.38	0.57	0.00	0.09	0.36	***0.38***	***0.57***
A8		0.20	0.00	0.90	0.96	0.20	0.38	0.57	0.00	0.09	0.36	***0.38***	***0.57***
A9		1.10	0.00	0.90	0.96	1.10	0.38	0.57	0.00	0.09	0.36	***0.38***	***0.57***
A12		0.20	0.00	0.90	0.90	0.20	0.38	0.57	0.00	0.09	0.36	***0.38***	***0.57***
A13		0.40	0.00	0.90	0.96	0.40	0.38	0.57	0.00	0.09	0.36	***0.38***	***0.57***
A7*		1.23	0.00	0.90	0.96	1.23	0.45	0.59	0.00	0.09	0.36	***0.45***	***0.59***
A8*		0.93	0.00	0.90	0.96	0.93	0.45	0.59	0.00	0.09	0.36	***0.45***	***0.59***
A9*		0.82	0.00	0.90	0.96	0.82	0.45	0.59	0.00	0.09	0.36	***0.45***	***0.59***

Calculated by: DLM
Date: 12/11/2021
Checked by:

FALCON TRUCKING FILING NO. 1
PROPOSED DRAINAGE CALCULATIONS
(Area Drainage Summary)

From Area Runoff Coefficient Summary				*OVERLAND*				*STREET / CHANNEL FLOW*				*Time of Travel (T_t)*		*INTENSITY **		*TOTAL FLOWS*	
BASIN	**AREA TOTAL**	**C_5**	**C_{100}**	**C_5**	**Length**	**Height**	**T_C**	**Length**	**Slope**	**Velocity**	**T_t**	**TOTAL**	**CHECK**	**I_5**	**I_{100}**	**Q_5**	**Q_{100}**
	(Acres)	*From DCM Table 5-1*			*(ft)*	*(ft)*	*(min)*	*(ft)*	*(%)*	*(fps)*	*(min)*	*(min)*	*(min)*	*(in/hr)*	*(in/hr)*	*(c.f.s.)*	*(c.f.s.)*
A	0.95	0.23	0.47	0.23	75	8	6.2	0	0.0%	0.0	0.0	6.2	10.4	4.8	8.1	***1.1***	***3.7***
B	4.50	0.49	0.62	0.49	75	1.5	7.6	460	1.7%	2.6	2.9	10.5	13.0	4.1	6.8	***8.9***	***19.0***
C	5.07	0.49	0.62	0.49	140	1.7	12.2	575	1.4%	2.4	4.1	16.3	14.0	3.6	6.1	***9.0***	***19.1***
D	2.80	0.49	0.62	0.49	140	1.7	12.2	280	3.9%	4.0	1.2	13.4	12.3	3.8	6.4	***5.2***	***11.1***
D1	0.46	0.31	0.51	0.31	75	1.5	9.9	160	8.8%	5.9	0.5	10.3	11.3	4.1	6.8	***0.6***	***1.6***
E	3.41	0.12	0.39	0.12	50	16	4.0	570	0.5%	1.4	6.7	10.7	13.4	4.0	6.8	***1.6***	***9.0***
F	0.37	0.12	0.39	0.12	100	6	9.8	130	10.0%	6.3	0.3	10.1	11.3	4.1	6.9	***0.2***	***1.0***
G	1.44	0.08	0.35	0.08	100	10	8.6	0	0.0%	0.0	0.0	8.6	10.6	4.4	7.3	***0.5***	***3.7***
H	1.22	0.08	0.35	0.08	100	7.5	9.4	0	0.0%	0.0	0.0	9.4	10.6	4.2	7.1	***0.4***	***3.0***
I	0.30	0.20	0.45	0.20	20	0.6	5.1	0	0.0%	0.0	0.0	5.1	10.1	5.1	8.6	***0.3***	***1.2***
J	0.17	0.09	0.36	0.09	100	9	8.8	0	0.0%	0.0	0.0	8.8	10.6	4.3	7.2	***0.1***	***0.4***
K	0.97	0.12	0.39	0.12	100	8	8.9	0	0.0%	0.0	0.0	8.9	10.6	4.3	7.2	***0.5***	***2.7***
L	4.76	0.49	0.62	0.49	100	2	8.8	850	2.2%	3.0	4.7	13.5	15.3	3.7	6.2	***8.6***	***18.2***
M	5.84	0.42	0.58	0.42	100	18	4.7	650	2.3%	3.0	3.6	8.3	14.2	4.4	7.4	***11.0***	***25.1***
N	2.49	0.49	0.62	0.49	100	2	8.8	230	2.2%	2.9	1.3	10.1	11.8	4.1	6.9	***5.0***	***10.7***
O	0.90	0.12	0.39	0.12	50	16	4.0	250	0.5%	1.4	2.9	6.9	11.7	4.7	7.9	***0.5***	***2.8***
P	0.41	0.10	0.37	0.10	100	8	9.1	0	0.0%	0.0	0.0	9.1	10.6	4.3	7.2	***0.2***	***1.1***
Q	0.36	0.49	0.62	0.49	100	2	8.8	90	1.0%	2.0	0.8	9.5	11.1	4.2	7.1	***0.7***	***1.6***
Q2	0.08	0.49	0.62	0.49	25	1	3.5	0	0.0%	0.0	0.0	5.0	10.1	5.2	8.7	***0.2***	***0.4***
R	0.40	0.40	0.56	0.40	50	3	4.9	0	0.0%	0.0	0.0	5.0	10.3	5.2	8.7	***0.8***	***2.0***
R2	0.22	0.40	0.56	0.40	50	3	4.9	0	0.0%	0.0	0.0	5.0	10.3	5.2	8.7	***0.5***	***1.1***
S	0.11	0.90	0.96	0.90	25	1	1.1	0	0.0%	0.0	0.0	5.0	10.1	5.2	8.7	***0.5***	***0.9***
S2	0.08	0.90	0.96	0.90	25	1	1.1	0	0.0%	0.0	0.0	5.0	10.1	5.2	8.7	***0.4***	***0.6***
T	0.33	0.40	0.56	0.40	50	3	4.9	0	0.0%	0.0	0.0	5.0	10.3	5.2	8.7	***0.7***	***1.6***
OS6	1.00	0.12	0.39	0.12	50	2	7.9	5	4.0%	1.4	0.1	8.0	10.3	4.1	6.9	***0.5***	***2.7***
A1	1.40	0.09	0.36	0.09	75	4	9.1	0	1.4%	0.8	0.0	9.1	10.4	4.3	7.2	***0.5***	***3.6***
A2	2.00	0.38	0.57	0.38	110	3	9.8	500	1.4%	2.4	3.5	13.3	13.4	3.7	6.2	***2.8***	***7.1***
A3	0.40	0.38	0.57	0.38	70	2	7.7	370	1.4%	2.4	2.6	10.3	12.4	4.1	6.9	***0.6***	***1.6***
A4	2.00	0.32	0.53	0.32	100	5	8.3	250	2.9%	3.4	1.2	9.5	11.9	4.2	7.1	***2.7***	***7.5***
A5	1.30	0.38	0.57	0.38	70	3	6.7	340	3.6%	3.8	1.5	8.2	12.3	4.4	7.4	***2.2***	***5.5***
A6	0.80	0.38	0.57	0.38	120	4	9.6	170	3.5%	3.7	0.8	10.3	11.6	4.1	6.9	***1.2***	***3.1***
A7	0.70	0.38	0.57	0.38	100	4	8.2	250	3.5%	3.7	1.1	9.3	11.9	4.2	7.1	***1.1***	***2.8***
A8	0.20	0.38	0.57	0.38	35	1	5.4	60	4.0%	4.0	0.3	5.7	10.5	5.0	8.4	***0.4***	***1.0***
A9	1.10	0.38	0.57	0.38	70	3	6.7	520	2.9%	3.4	2.5	9.3	13.3	4.2	7.1	***1.8***	***4.5***
A12	0.20	0.38	0.57	0.38	70	2	7.7	520	4.0%	4.0	2.2	9.9	13.3	4.2	7.0	***0.3***	***0.8***
A13	0.40	0.38	0.57	0.38	70	2	7.7	300	4.0%	4.0	1.3	8.9	12.1	4.3	7.2	***0.7***	***1.6***
A7*	1.23	0.45	0.59	0.45	100	6	6.5	443	3.0%	3.5	2.1	8.6	13.0	4.4	7.3	***2.4***	***5.3***
A8*	0.93	0.45	0.59	0.45	60	1.2	7.2	329	2.5%	3.2	1.7	9.0	12.2	4.3	7.2	***1.8***	***4.0***
A9*	0.82	0.45	0.59	0.45	80	1.6	8.4	200	2.0%	2.8	1.2	9.5	11.6	4.2	7.1	***1.6***	***3.4***

* Intensity equations assume a minimum travel time of 5 minutes.

Calculated by: DLM
Date: 12/11/2021
Checked by: _____

FALCON TRUCKING FILING NO. 1
PROPOSED DRAINAGE CALCULATIONS
(Basin Routing Summary)

From Area Runoff Coefficient Summary				*OVERLAND*				*PIPE / CHANNEL FLOW*				*Time of Travel (T_t)*	*INTENSITY **		*TOTAL FLOWS*		
DESIGN POINT	**CONTRIBUTING BASINS**	**CA_5**	**CA_{100}**	**C_5**	**Length** *(ft)*	**Height** *(ft)*	**T_C** *(min)*	**Length** *(ft)*	**Slope** *(%)*	**Velocity** *(fps)*	**T_t** *(min)*	**TOTAL** *(min)*	**I_5** *(in/hr)*	**I_{100}** *(in/hr)*	**Q_5** *(c.f.s.)*	**Q_{100}** *(c.f.s.)*	COMMENTS
1	**A, B**	2.43	3.24				6.2	300	2.7%	3.3	1.5	7.7	4.5	7.6	***11.0***	***24.6***	Prop 36" Storm Sewer
				Basin A Tc Was Used													
2	**C**	2.48	3.14				14.0					14.0	3.6	6.1	***9.0***	***19.1***	Prop 36" Storm Sewer
				Basin C Tc Was Used													
3	**D**	1.37	1.74				12.3					12.3	3.8	6.4	***5.2***	***11.1***	Prop 24" Storm Sewer
				Basin D Tc Was Used													
4	**D1**	0.14	0.23				10.3					10.3	4.1	6.8	***0.6***	***1.6***	
				Basin D1 Tc Was Used													
5	**PR1, PR2, PR3, DP4, E**	6.42	8.35				14.0					14.0	3.6	6.1	***23.3***	***50.9***	FSD Pond 1
				Design Point 2 Tc Was Used													
6	**F, G**	0.16	0.65				10.1					10.1	4.1	6.9	***0.7***	***4.5***	
				Basin F Tc Was Used													
7	**H**	0.10	0.43				9.4					9.4	4.2	7.1	***0.4***	***3.0***	
				Basin H Tc Was Used													
8	**I, J**	0.08	0.20				6.9					6.9	4.7	7.8	***0.4***	***1.5***	Grafite Drive
				Avg Tc Was Used													
9	**DP6**	0.16	0.65				10.1					10.1	4.1	6.9	***0.7***	***4.5***	West Side of Marksheffel
	POND OUTFALL	0.55	1.74												***2.3***	***12.0***	
	(POND 1)	0.71	2.39	DP6 Tc Used											***2.9***	***16.5***	
10	**K, L**	2.45	3.33				13.5					13.5	3.7	6.2	***9.0***	***20.6***	Prop 30" Storm Sewer
				Basin L Tc Was Used													
11	**M**	2.48	3.38				8.3					8.3	4.4	7.4	***11.0***	***25.1***	Prop 36" Storm Sewer
				Basin M Tc Was Used													
12	**N**	1.22	1.54				10.1					10.1	4.1	6.9	***5.0***	***10.7***	Prop 42" Storm Sewer
				Basin N Tc Was Used													
13	**PR8, O**	6.26	8.61				13.5					13.5	3.7	6.2	***23.0***	***53.2***	FSD Pond 2
				PR8 Tc Was Used													
14	**P, Q**	0.22	0.37				9.5					9.5	4.2	7.1	***0.9***	***2.6***	Discharges to Talc Drive
				Basin Q Tc Was Used													
14A	**Q2**	0.04	0.05				5.0					5.0	5.2	8.7	***0.2***	***0.4***	Discharges to Talc Drive
				Basin Q2 Tc Was Used													
15	**R**	0.16	0.23				5.0					5.0	5.2	8.7	***0.8***	***2.0***	Discharges to EMVR Filing 6
				Basin R Tc Was Used													
15A	**R2**	0.09	0.12				5.0					5.0	5.2	8.7	***0.5***	***1.1***	Discharges to EMVR Filing 6
				Basin R2 Tc Was Used													
16	**S**	0.10	0.11				5.0					5.0	5.2	8.7	***0.5***	***0.9***	Discharges to Basaltic Drive
				Basin S Tc Was Used													
16A	**S2**	0.07	0.07				5.0					5.0	5.2	8.7	***0.4***	***0.6***	Discharges to Basaltic Drive
				Basin S2 Tc Was Used													
17	**T**	0.13	0.18				5.0					5.0	5.2	8.7	***0.7***	***1.6***	Discharges to EMVR Filing 5
				Basin T Tc Was Used													

Calculated by: DLM
Date: 12/11/2021
Checked by: VAS

FALCON TRUCKING FILING NO. 1
FINAL DRAINAGE REPORT
(Surface Routing Summary- surface runoff)

From Area Runoff Coefficient Summary				*OVERLAND*				*PIPE / CHANNEL FLOW*				*Time of Travel (T_t)*	*INTENSITY **		*TOTAL FLOWS*		
DESIGN POINT	**CONTRIBUTING BASINS**	**CA_5**	**CA_{100}**	**C_5**	**Length** *(ft)*	**Height** *(ft)*	**T_C** *(min)*	**Length** *(ft)*	**Slope** *(%)*	**Velocity** *(fps)*	**T_t** *(min)*	**TOTAL** *(min)*	**I_5** *(in/hr)*	**I_{100}** *(in/hr)*	**Q_5** *(c.f.s.)*	**Q_{100}** *(c.f.s.)*	COMMENTS
2*	**DP14, A1, A2, OS6**	1.22	2.41	See Area Drainage Sheet for Input								13.3	3.7	6.2	***4.5***	***15.0***	EX CROSS PAN
3*	**DP2, A3**	1.37	2.64	See Area Drainage Sheet for Input								13.3	3.7	6.2	***5.1***	***16.4***	EX 4' AT GRADE INLET 2.3/3.7 intercepted 2.8/12.7 flowby
4*	**DP14A, DP15, A5**	0.69	1.02	See Area Drainage Sheet for Input								8.2	4.4	7.4	***3.1***	***7.5***	EX 4' AT GRADE INLET 1.9/2.7 intercepted 1.2/4.8 flowby
5*	**FB DP3, A4**	1.40	3.10	See Area Drainage Sheet for Input								14.8	3.5	5.9	***4.9***	***18.4***	EX 4' AT GRADE INLET 2.2/3.7 intercepted 2.4/13.7 flowby
6*	**A6**	0.30	0.46	See Area Drainage Sheet for Input								10.3	4.1	6.9	***1.2***	***3.1***	EX 4' AT GRADE INLET 1.1/1.9 intercepted 0.1/1.2 flowby
7*	**FB DP4, A7, 15A**	0.62	1.17	See Area Drainage Sheet for Input								9.4	4.2	7.1	***2.6***	***8.3***	EX 4' AT GRADE INLET 1.7/2.8 intercepted 0.9/5.5 flowby
8*	**FB DP5, FB DP6, FB DP7, A8, A12**	1.10	3.55	See Area Drainage Sheet for Input								9.5	4.2	7.1	***4.6***	***25.0***	EX 8' AT GRADE INLET 3.8/8.7 intercepted 0.5/15.1 flowby
9*	**DP16, A9, A13, FB DP8**	0.87	3.27	See Area Drainage Sheet for Input								15.5	3.5	5.8	***3.0***	***19.1***	EX 16' AT GRADE INLET 2.7/14.5 intercepted 0.0/3.6 flowby
7**	**A8***	0.42	0.55	See Area Drainage Sheet for Input								9.0	4.3	7.2	***1.8***	***4.0***	EX 8' SUMP INLET 1.8/4.0 intercepted
8**	**DP16A, DP17, A7*, A9***	1.12	1.47	See Area Drainage Sheet for Input								9.5	4.2	7.1	***4.7***	***10.4***	EX 10' SUMP INLET 4.7/10.4 intercepted

FALCON TRUCKING FILING NO. 1
PROPOSED DRAINAGE CALCULATIONS
(Storm Sewer Routing Summary)

PIPE RUN	*Contributing Pipes/Design Points*	*Equivalent CA_5*	*Equivalent CA_{100}*	*Maximum T_C*	*Intensity**		*Flow*		PIPE SIZE
					I_5	I_{100}	Q_5	Q_{100}	
1	**DP1**	2.43	3.24	7.7	4.5	7.6	***11.0***	***24.6***	36" RCP*
2	**DP2**	2.48	3.14	14.0	3.6	6.1	***9.0***	***19.1***	30" RCP*
3	**DP3**	1.37	1.74	12.3	3.8	6.4	***5.2***	***11.1***	24" RCP*
4	**POND 1 OUTFALL**	0.55	1.74	10.1	4.1	6.9	***2.3***	***12.0***	24" RCP*
5	**DP10**	2.45	3.33	13.5	3.7	6.2	***9.0***	***20.6***	30" RCP*
6	**DP11**	2.48	3.38	8.3	4.4	7.4	***11.0***	***25.1***	36" RCP*
7	**PR5, PR6**	4.93	6.71	13.5	3.7	6.2	***18.1***	***41.5***	42" RCP*
8	**PR7, DP12**	6.15	8.26	13.5	3.7	6.2	***22.6***	***51.0***	42" RCP*
9	**POND 2 OUTFALL**	0.15	1.90	13.5	3.7	6.2	***0.6***	***11.7***	18" RCP*
*1**	**INLET 4***	0.43	0.36	8.2	4.4	7.4	***1.9***	***2.7***	18" RCP
*2**	**PR1***	0.43	0.36	8.2	4.4	7.4	***1.9***	***2.7***	18" RCP
*3**	**PR2***	0.43	0.36	8.2	4.4	7.4	***1.9***	***2.7***	18" RCP
*4**	**INLET 7***	0.40	0.40	9.4	4.2	7.1	***1.7***	***2.8***	18" RCP
*4A**	**INLET 6***	0.27	0.28	10.3	4.1	6.9	***1.1***	***1.9***	18" RCP
*5**	**PR3*, PR4*, PR4A***	1.10	1.04	10.3	4.1	6.9	***4.5***	***7.1***	18" RCP
*5A**	**INLET 3***	0.62	0.60	13.3	3.7	6.2	***2.3***	***3.7***	18" RCP
*6**	**PR5A***	0.62	0.60	13.3	3.7	6.2	***2.3***	***3.7***	18" RCP
*7**	**PR6***	0.62	0.60	13.3	3.7	6.2	***2.3***	***3.7***	18" RCP
*8**	**INLET 5***	0.62	0.62	14.8	3.5	5.9	***2.2***	***3.7***	18" RCP
*9**	**PR7*, PR8***	1.24	1.22	14.8	3.5	5.9	***4.4***	***7.2***	18" RCP
*10**	**PR5*, PR9***	2.34	2.25	14.8	3.5	5.9	***8.3***	***13.4***	24" RCP
*11**	**INLET 8***	0.90	1.23	9.5	4.2	7.1	***3.8***	***8.7***	18" RCP
*12**	**PR10*, PR11***	3.25	3.49	14.8	3.5	5.9	***11.5***	***20.7***	30" RCP
*13**	**INLET 9**	0.78	2.49	15.5	3.5	5.8	***2.7***	***14.5***	18" RCP
*9***	**PR12*, PR13***	4.02	5.97	14.8	3.5	5.9	***14.3***	***35.5***	36" RCP
*10***	**INLET 7****	0.42	0.55	9.0	4.3	7.2	***1.8***	***4.0***	18" RCP
*11***	**PR9**, PR10****	4.44	6.52	15.0	3.5	5.9	***15.6***	***38.5***	36" RCP
*12***	**PR11, INLET 8****	5.57	7.99	15.0	3.5	5.9	***19.6***	***47.2***	36" RCP

* Intensity equations assume a minimum travel time of 5 minutes.

DP - Design Point
EX - Existing Design Point
FB- Flow By from Design Point
INT- Intercepted Flow from Design Point

Calculated by: DLM
Date: 12/11/2021
Checked by: VAS

HYDRAULIC CALCULATIONS / POND CALCULATIONS

Total Weighted Percent Imperviousness (Pond 1)				
Contributing Basins	***Area (Acres)***	***C_5***	***Impervious % (I)***	***(Acres)*(I)***
A	0.95	0.23	0.13	0.12
B	4.50	0.49	0.70	3.15
C	5.07	0.49	0.70	3.55
D	2.80	0.49	0.70	1.96
E	3.41	0.12	0.07	0.24
Totals	***16.73***			***9.02***
Total Imperviousness	***54%***			

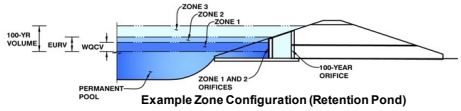
Weighted Percent Imperviousness (Pond 2)				
Contributing Basins	***Area (Acres)***	***C_5***	***Impervious % (I)***	***(Acres)*(I)***
Column1	**Column2**	**Column3**	**Column4**	**Column5**
K	0.97	0.12	0.07	0.07
L	4.76	0.49	0.70	3.33
M	5.84	0.42	0.60	3.50
N	2.49	0.49	0.70	1.74
O	0.41	0.10	0.04	0.02
Totals	***15.37***			***9.25***
Total Imperviousness	***60%***			

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.04 (February 2021)

Project: Falcon Trucking Filing No. 1

Basin ID: FSD Pond 1



Example Zone Configuration (Retention Pond)

Watershed Information

Selected BMP Type =	**EDB**	
Watershed Area =	16.73	acres
Watershed Length =	1,375	ft
Watershed Length to Centroid =	740	ft
Watershed Slope =	0.043	ft/ft
Watershed Imperviousness =	54.00%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	100.0%	percent
Percentage Hydrologic Soil Groups C/D =	0.0%	percent
Target WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	User Input	

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

			Optional User Overrides	
Water Quality Capture Volume (WQCV) =	0.303	acre-feet		acre-feet
Excess Urban Runoff Volume (EURV) =	0.972	acre-feet		acre-feet
2-yr Runoff Volume (P1 = 1.19 in.) =	0.902	acre-feet	1.19	inches
5-yr Runoff Volume (P1 = 1.5 in.) =	1.270	acre-feet	1.50	inches
10-yr Runoff Volume (P1 = 1.75 in.) =	1.591	acre-feet	1.75	inches
25-yr Runoff Volume (P1 = 2 in.) =	2.011	acre-feet	2.00	inches
50-yr Runoff Volume (P1 = 2.25 in.) =	2.356	acre-feet	2.25	inches
100-yr Runoff Volume (P1 = 2.52 in.) =	2.791	acre-feet	2.52	inches
500-yr Runoff Volume (P1 = 3.14 in.) =	3.680	acre-feet		inches
Approximate 2-yr Detention Volume =	0.739	acre-feet		
Approximate 5-yr Detention Volume =	1.007	acre-feet		
Approximate 10-yr Detention Volume =	1.317	acre-feet		
Approximate 25-yr Detention Volume =	1.434	acre-feet		
Approximate 50-yr Detention Volume =	1.497	acre-feet		
Approximate 100-yr Detention Volume =	1.656	acre-feet		

Define Zones and Basin Geometry

Zone 1 Volume (WQCV) =	0.303	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.669	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	0.684	acre-feet
Total Detention Basin Volume =	1.656	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	

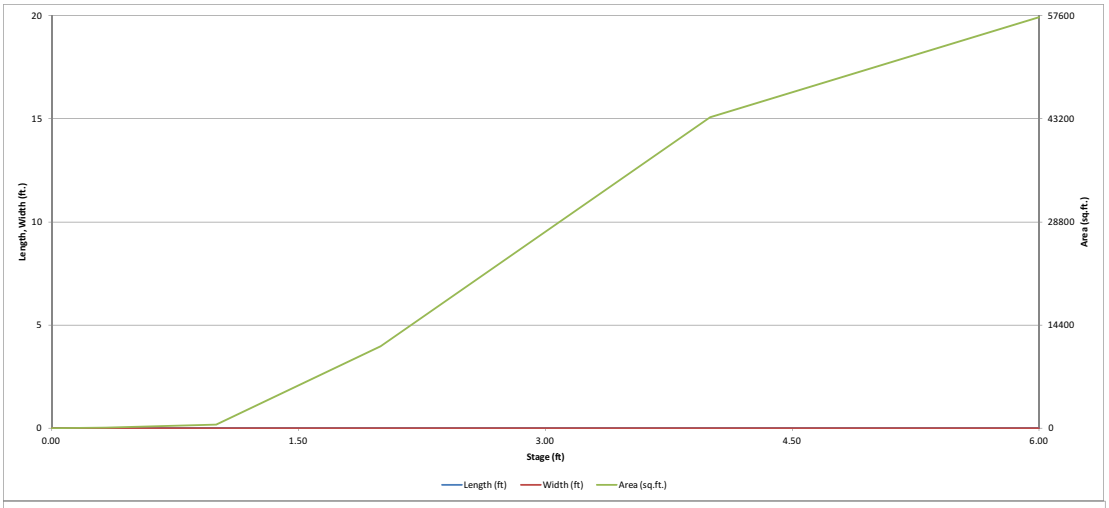
Initial Surcharge Area (A_{ISV}) =	user	ft^2
Surcharge Volume Length (L_{ISV}) =	user	ft
Surcharge Volume Width (W_{ISV}) =	user	ft
Depth of Basin Floor (H_{FLOOR}) =	user	ft
Length of Basin Floor (L_{FLOOR}) =	user	ft
Width of Basin Floor (W_{FLOOR}) =	user	ft
Area of Basin Floor (A_{FLOOR}) =	user	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

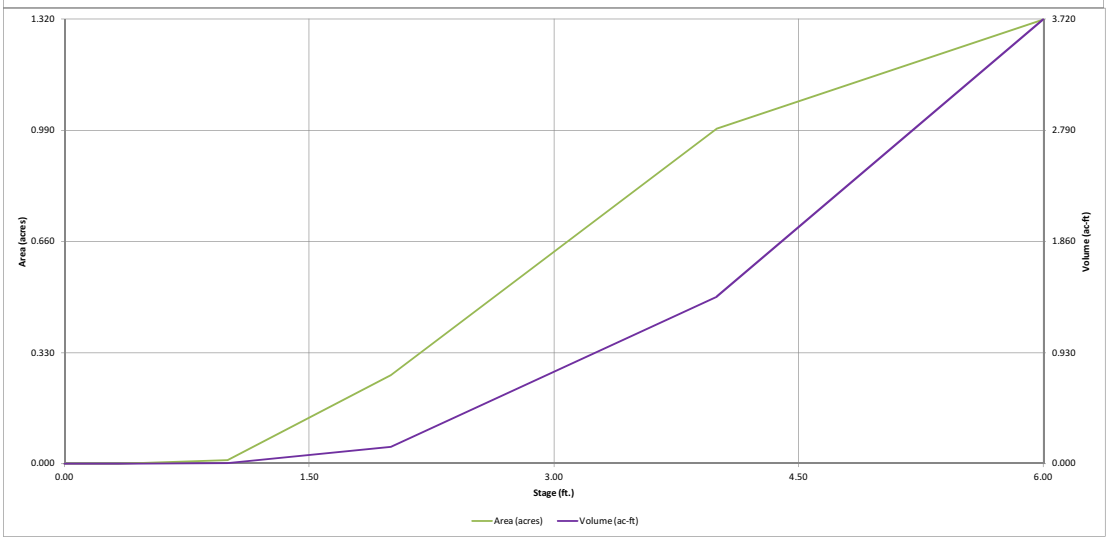
Depth Increment = ft

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)
6630 **Top of Micropool**	--	0.00	--	--	--	0	0.000		
	--	0.33	--	--	--	40	0.001	7	0.000
	--	1.00	--	--	--	500	0.011	187	0.004
	--	2.00	--	--	--	11,458	0.263	6,166	0.142
	--	4.00	--	--	--	43,369	0.996	60,993	1.400
	--	6.00	--	--	--	57,403	1.318	161,765	3.714

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.04 (February 2021)



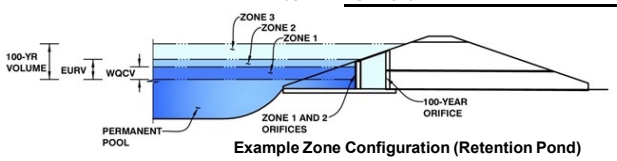


DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.04 (February 2021)

Project: Falcon Trucking Filing No. 1

Basin ID: FSD Pond 1



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	2.47	0.303	Orifice Plate
Zone 2 (EURV)	3.53	0.669	Orifice Plate
Zone 3 (100-year)	4.26	0.684	Weir&Pipe (Restrict)
Total (all zones)		1.656	

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

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

Underdrain Orifice Diameter = inches

Calculated Parameters for Underdrain

Underdrain Orifice Area = ft^2

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)

Invert of Lowest Orifice = 0.00 ft (relative to basin bottom at Stage = 0 ft)

Depth at top of Zone using Orifice Plate = 3.53 ft (relative to basin bottom at Stage = 0 ft)

Orifice Plate: Orifice Vertical Spacing = 14.10 inches

Orifice Plate: Orifice Area per Row = N/A inches

Calculated Parameters for Plate

WQ Orifice Area per Row = N/A 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	1.18	2.35					
Orifice Area (sq. inches)	1.20	1.29	4.00					

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

User Input: Vertical Orifice (Circular or Rectangular)

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

Calculated Parameters for Vertical Orif

	Not Selected	Not Selected
Vertical Orifice Area =	N/A	N/A
Vertical Orifice Centroid =	N/A	N/A

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 =	3.54	N/A	ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length =	6.50	N/A	feet
Overflow Weir Grate Slope =	0.00	N/A	H:V
Horiz. Length of Weir Sides =	5.00	N/A	feet
Overflow Grate Type =	Type C Grate	N/A	
Debris Clogging % =	50%	N/A	%

Calculated Parameters for Overflow W

	Zone 3 Weir	Not Selected
Height of Grate Upper Edge, H_t =	3.54	N/A
Overflow Weir Slope Length =	5.00	N/A
Grate Open Area / 100-yr Orifice Area =	18.75	N/A
Overflow Grate Open Area w/o Debris =	22.62	N/A
Overflow Grate Open Area w/ Debris =	11.31	N/A

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 =	0.25	N/A	ft (distance below basin bottom at Stage = 0 ft)
Outlet Pipe Diameter =	24.00	N/A	inches
Restrictor Plate Height Above Pipe Invert =	9.80		inches

Calculated Parameters for Outlet Pipe w/ Flow Restriction Pla

	Zone 3 Restrictor	Not Selected
Outlet Orifice Area =	1.21	N/A
Outlet Orifice Centroid =	0.47	N/A
Half-Central Angle of Restrictor Plate on Pipe =	1.39	N/A

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage= 4.50 ft (relative to basin bottom at Stage = 0 ft)

Spillway Crest Length = 24.00 feet

Spillway End Slopes = 4.00 H:V

Freeboard above Max Water Surface = 1.00 feet

Calculated Parameters for Spillway

Spillway Design Flow Depth= 0.71 feet

Stage at Top of Freeboard = 6.21 feet

Basin Area at Top of Freeboard = 1.32 acres

Basin Volume at Top of Freeboard = 3.71 acre-ft

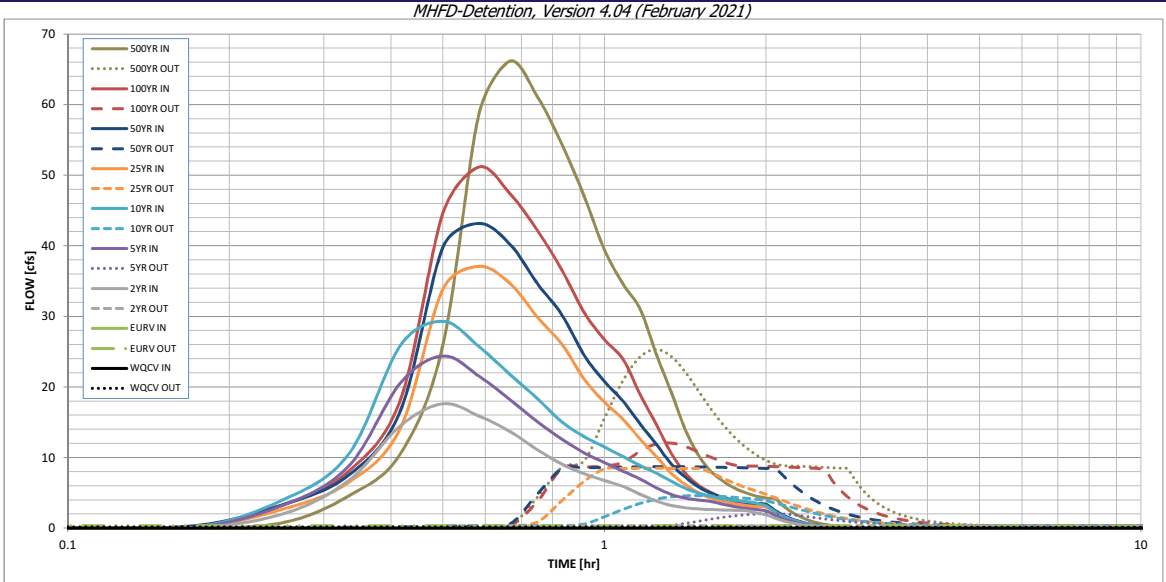
Routed Hydrograph Results

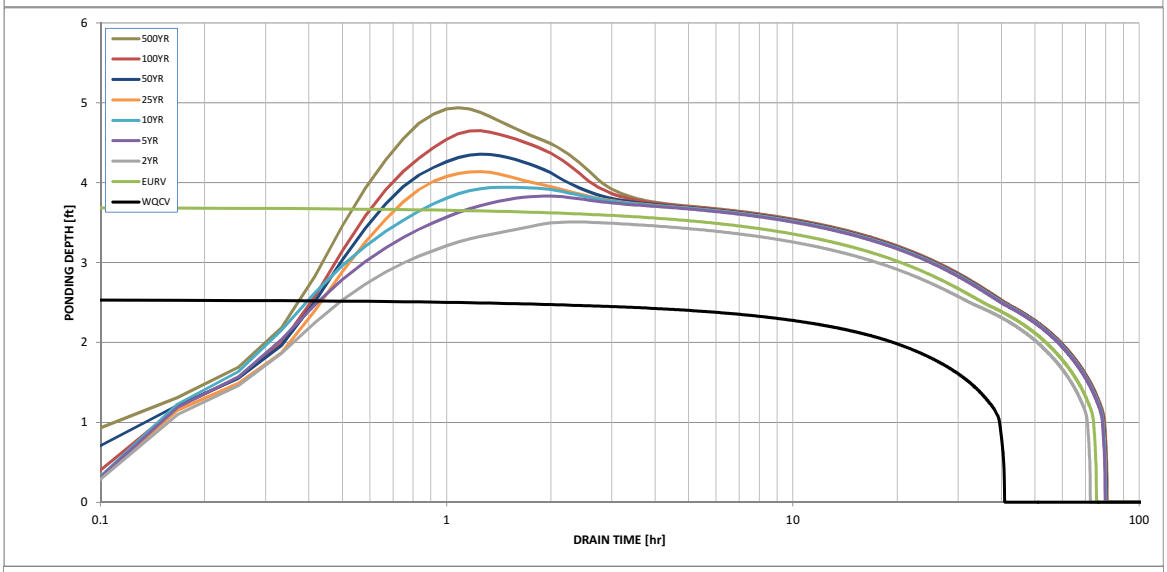
The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AI

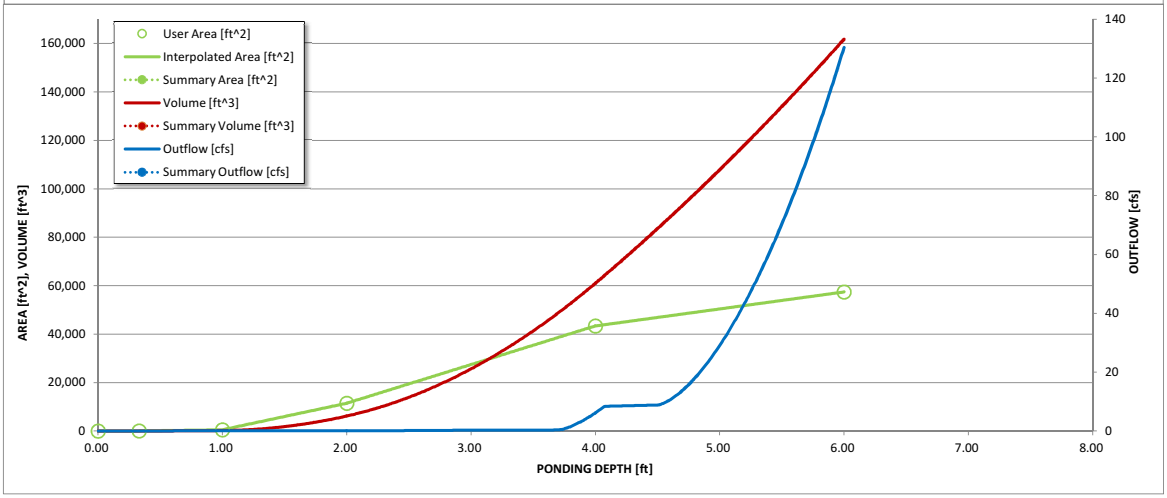
Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
One-Hour Rainfall Depth (in) =	N/A	N/A	1.19	1.50	1.75	2.00	2.25	2.52
CUHP Runoff Volume (acre-ft) =	0.303	0.972	0.902	1.270	1.591	2.011	2.356	2.791
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	0.902	1.270	1.591	2.011	2.356	2.791
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	1.8	5.2	7.9	13.9	17.4	22.2
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A						
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.11	0.31	0.47	0.83	1.04	1.33
Peak Inflow Q (cfs) =	N/A	N/A	15.2	21.7	26.4	34.2	40.1	47.7
Peak Outflow Q (cfs) =	0.2	0.3	0.3	2.3	5.2	11.0	11.5	12.0
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.4	0.7	0.8	0.7	0.5
Structure Controlling Flow =	Plate	Plate	Plate	Overflow Weir 1	Overflow Weir 1	Outlet Plate 1	Outlet Plate 1	Outlet Plate 1
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	0.1	0.2	0.5	0.5	0.5
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	38	69	67	72	70	68	67	65
Time to Drain 99% of Inflow Volume (hours) =	**40**	73	71	77	76	75	75	74
Maximum Ponding Depth (ft) =	2.47	3.53	3.38	3.68	3.80	3.98	4.15	4.47
Area at Maximum Ponding Depth (acres) =	0.44	0.82	0.77	0.88	0.92	0.98	1.02	1.07
Maximum Volume Stored (acre-ft) =	0.306	0.973	0.853	1.100	1.199	1.371	1.541	1.875

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.04 (February 2021)







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

DETENTION BASIN OUTLET STRUCTURE DESIGN

Outflow Hydrograph Workbook Filename:

Inflow Hydrographs

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

	SOURCE	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP
Time Interval	TIME	WQCV [cfs]	EURV [cfs]	2 Year [cfs]	5 Year [cfs]	10 Year [cfs]	25 Year [cfs]	50 Year [cfs]	100 Year [cfs]	500 Year [cfs]
5.00 min	0:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.22	0.02	0.70
	0:15:00	0.00	0.00	1.94	3.16	3.91	2.62	3.25	3.19	4.52
	0:20:00	0.00	0.00	6.71	8.76	10.45	6.45	7.49	8.05	10.53
	0:25:00	0.00	0.00	14.51	20.59	25.90	14.22	16.65	18.22	25.97
	0:30:00	0.00	0.00	17.60	24.40	29.29	33.89	39.82	44.67	58.61
	0:35:00	0.00	0.00	15.86	21.55	25.71	37.10	43.18	51.16	66.18
	0:40:00	0.00	0.00	13.66	18.19	21.76	34.67	40.21	47.37	61.13
	0:45:00	0.00	0.00	11.08	15.08	18.34	29.87	34.64	42.16	54.36
	0:50:00	0.00	0.00	9.04	12.59	15.02	26.06	30.19	36.52	47.01
	0:55:00	0.00	0.00	7.67	10.66	12.95	21.09	24.47	30.52	39.41
	1:00:00	0.00	0.00	6.73	9.29	11.47	17.85	20.77	26.70	34.55
	1:05:00	0.00	0.00	5.88	8.06	10.11	15.40	17.96	23.89	30.94
	1:10:00	0.00	0.00	4.76	6.94	8.84	12.58	14.69	18.87	24.56
	1:15:00	0.00	0.00	3.82	5.71	7.77	10.12	11.84	14.62	19.16
	1:20:00	0.00	0.00	3.19	4.75	6.63	7.73	9.03	10.54	13.82
	1:25:00	0.00	0.00	2.86	4.24	5.61	6.14	7.17	7.74	10.18
	1:30:00	0.00	0.00	2.69	3.95	4.94	4.97	5.78	6.03	7.95
	1:35:00	0.00	0.00	2.60	3.76	4.47	4.23	4.90	5.00	6.58
	1:40:00	0.00	0.00	2.55	3.34	4.14	3.74	4.30	4.28	5.61
	1:45:00	0.00	0.00	2.50	3.03	3.91	3.42	3.91	3.80	4.98
	1:50:00	0.00	0.00	2.47	2.81	3.75	3.21	3.64	3.46	4.52
	1:55:00	0.00	0.00	2.13	2.64	3.52	3.06	3.47	3.24	4.23
	2:00:00	0.00	0.00	1.87	2.44	3.16	2.97	3.36	3.15	4.10
	2:05:00	0.00	0.00	1.36	1.77	2.27	2.15	2.43	2.29	2.96
	2:10:00	0.00	0.00	0.96	1.25	1.60	1.52	1.71	1.62	2.10
	2:15:00	0.00	0.00	0.67	0.87	1.12	1.07	1.20	1.15	1.49
	2:20:00	0.00	0.00	0.47	0.59	0.77	0.74	0.83	0.79	1.03
	2:25:00	0.00	0.00	0.31	0.39	0.52	0.50	0.56	0.53	0.69
	2:30:00	0.00	0.00	0.20	0.26	0.35	0.34	0.38	0.36	0.47
	2:35:00	0.00	0.00	0.12	0.16	0.21	0.21	0.24	0.23	0.29
	2:40:00	0.00	0.00	0.06	0.09	0.11	0.12	0.13	0.12	0.16
	2:45:00	0.00	0.00	0.02	0.04	0.04	0.05	0.05	0.05	0.07
	2:50:00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01
	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
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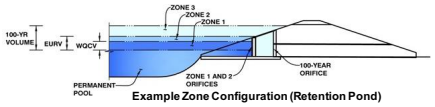
	5:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.04 (February 2021)

Project: Falcon Trucking Filing No. 1

Basin ID: FSD Pond 2



Example Zone Configuration (Retention Pond)

Watershed Information

Selected BMP Type =	EDB	
Watershed Area =	15.37	acres
Watershed Length =	1,380	ft
Watershed Length to Centroid =	680	ft
Watershed Slope =	0.030	ft/ft
Watershed Imperviousness =	60.00%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	100.0%	percent
Percentage Hydrologic Soil Groups C/D =	0.0%	percent
Target WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	User Input	

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

			Optional User Overrides
Water Quality Capture Volume (WQCV) =	0.302	acre-feet	acre-feet
Excess Urban Runoff Volume (EURV) =	1.000	acre-feet	acre-feet
2-yr Runoff Volume (P1 = 1.19 in.) =	0.919	acre-feet	1.19 inches
5-yr Runoff Volume (P1 = 1.5 in.) =	1.269	acre-feet	1.50 inches
10-yr Runoff Volume (P1 = 1.75 in.) =	1.570	acre-feet	1.75 inches
25-yr Runoff Volume (P1 = 2 in.) =	1.951	acre-feet	2.00 inches
50-yr Runoff Volume (P1 = 2.25 in.) =	2.273	acre-feet	2.25 inches
100-yr Runoff Volume (P1 = 2.52 in.) =	2.669	acre-feet	2.52 inches
500-yr Runoff Volume (P1 = 3.14 in.) =	3.491	acre-feet	inches
Approximate 2-yr Detention Volume =	0.769	acre-feet	
Approximate 5-yr Detention Volume =	1.038	acre-feet	
Approximate 10-yr Detention Volume =	1.338	acre-feet	
Approximate 25-yr Detention Volume =	1.447	acre-feet	
Approximate 50-yr Detention Volume =	1.509	acre-feet	
Approximate 100-yr Detention Volume =	1.647	acre-feet	

Define Zones and Basin Geometry

Zone 1 Volume (WQCV) =	0.302	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.698	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	0.647	acre-feet
Total Detention Basin Volume =	1.647	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	

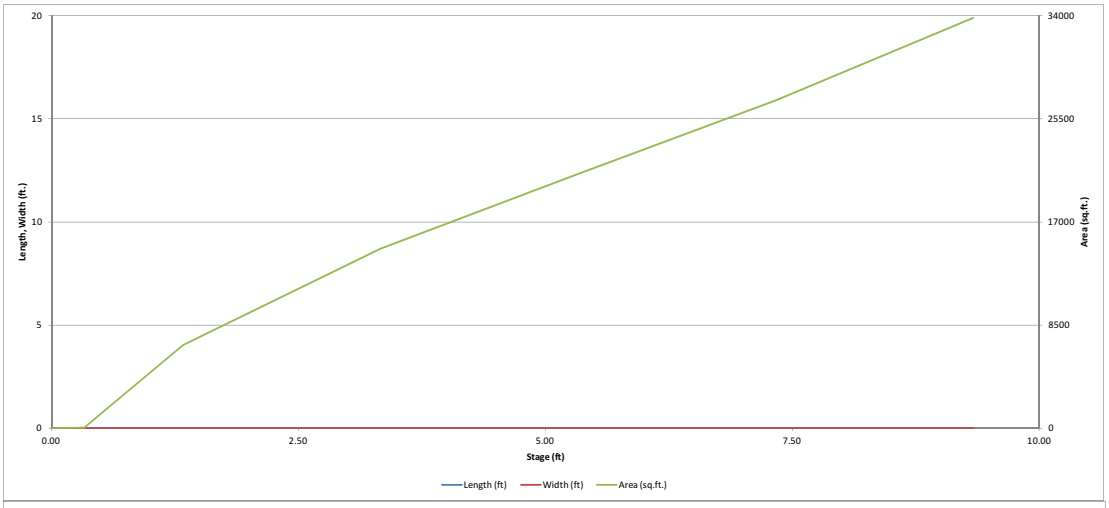
Initial Surcharge Area (A_{ISV}) =	user	ft^2
Surcharge Volume Length (L_{ISV}) =	user	ft
Surcharge Volume Width (W_{ISV}) =	user	ft
Depth of Basin Floor (H_{FLOOR}) =	user	ft
Length of Basin Floor (L_{FLOOR}) =	user	ft
Width of Basin Floor (W_{FLOOR}) =	user	ft
Area of Basin Floor (A_{FLOOR}) =	user	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

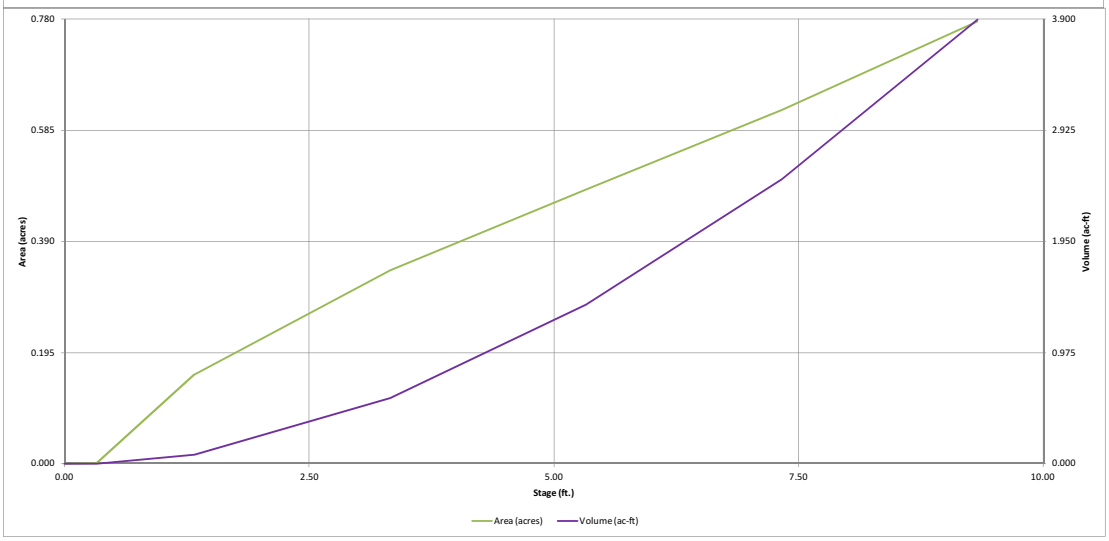
Depth Increment = ft

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)
6634.67 **Top of Micropool**	--	0.00	--	--	--	0	0.000		
6635	--	0.33	--	--	--	40	0.001	7	0.000
6636	--	1.33	--	--	--	6,840	0.157	3,446	0.079
6638	--	3.33	--	--	--	14,772	0.339	25,058	0.575
6640	--	5.33	--	--	--	20,969	0.481	60,799	1.396
6642	--	7.33	--	--	--	27,017	0.620	108,785	2.497
6644	--	9.33	--	--	--	33,813	0.776	169,615	3.894

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.04 (February 2021)



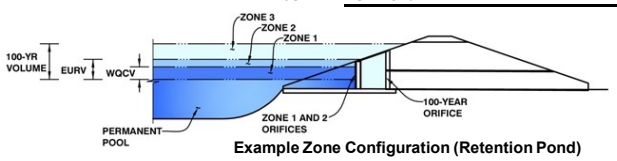


DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.04 (February 2021)

Project: Falcon Trucking Filing No. 1

Basin ID: FSD Pond 2



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	2.42	0.302	Orifice Plate
Zone 2 (EURV)	4.46	0.698	Orifice Plate
Zone 3 (100-year)	5.84	0.647	Weir&Pipe (Restrict)
Total (all zones)		1.647	

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

Calculated Parameters for Underdrain

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

Invert of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)	WQ Orifice Area per Row =	N/A	ft^2
Depth at top of Zone using Orifice Plate =	4.46	ft (relative to basin bottom at Stage = 0 ft)	Elliptical Half-Width =	N/A	feet
Orifice Plate: Orifice Vertical Spacing =	17.80	inches	Elliptical Slot Centroid =	N/A	feet
Orifice Plate: Orifice Area per Row =	N/A	inches	Elliptical Slot Area =	N/A	ft^2

Calculated Parameters for Plate

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

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	1.49	2.97					
Orifice Area (sq. inches)	1.78	1.78	3.50					

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

User Input: Vertical Orifice (Circular or Rectangular)

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

Calculated Parameters for Vertical Orif

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 =	4.50	N/A	ft (relative to basin bottom at Stage = 0 ft)	Height of Grate Upper Edge, H_t =	4.50	N/A
Overflow Weir Front Edge Length =	8.00	N/A	feet	Overflow Weir Slope Length =	2.91	N/A
Overflow Weir Grate Slope =	0.00	N/A	H:V	Grate Open Area / 100-yr Orifice Area =	16.07	N/A
Horiz. Length of Weir Sides =	2.91	N/A	feet	Overflow Grate Open Area w/o Debris =	16.20	N/A
Overflow Grate Type =	Type C Grate	N/A		Overflow Grate Open Area w/ Debris =	8.10	N/A
Debris Clogging % =	50%	N/A	%			

Calculated Parameters for Overflow W

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 =	0.25	N/A	ft (distance below basin bottom at Stage = 0 ft)	Outlet Orifice Area =	1.01	N/A
Outlet Pipe Diameter =	18.00	N/A	inches	Outlet Orifice Centroid =	0.48	N/A
Restrictor Plate Height Above Pipe Invert =	10.00		inches	Half-Central Angle of Restrictor Plate on Pipe =	1.68	N/A

Calculated Parameters for Outlet Pipe w/ Flow Restriction Pla

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage=	6.07	ft (relative to basin bottom at Stage = 0 ft)	Spillway Design Flow Depth=	0.60	feet
Spillway Crest Length =	30.00	feet	Stage at Top of Freeboard =	7.67	feet
Spillway End Slopes =	4.00	H:V	Basin Area at Top of Freeboard =	0.65	acres
Freeboard above Max Water Surface =	1.00	feet	Basin Volume at Top of Freeboard =	2.71	acre-ft

Calculated Parameters for Spillway

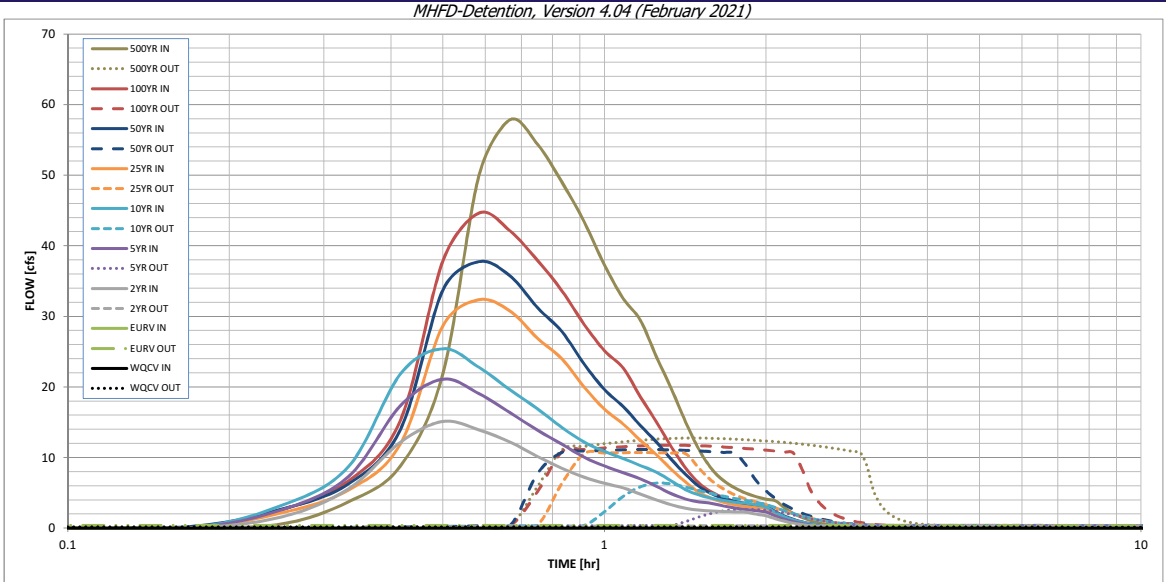
Routed Hydrograph Results

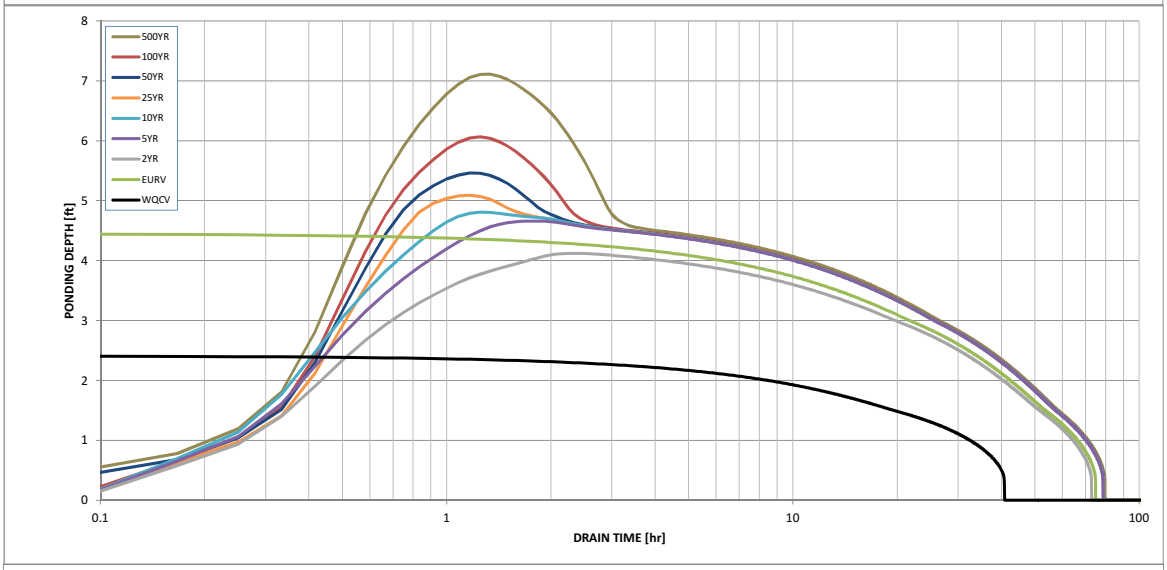
The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AI

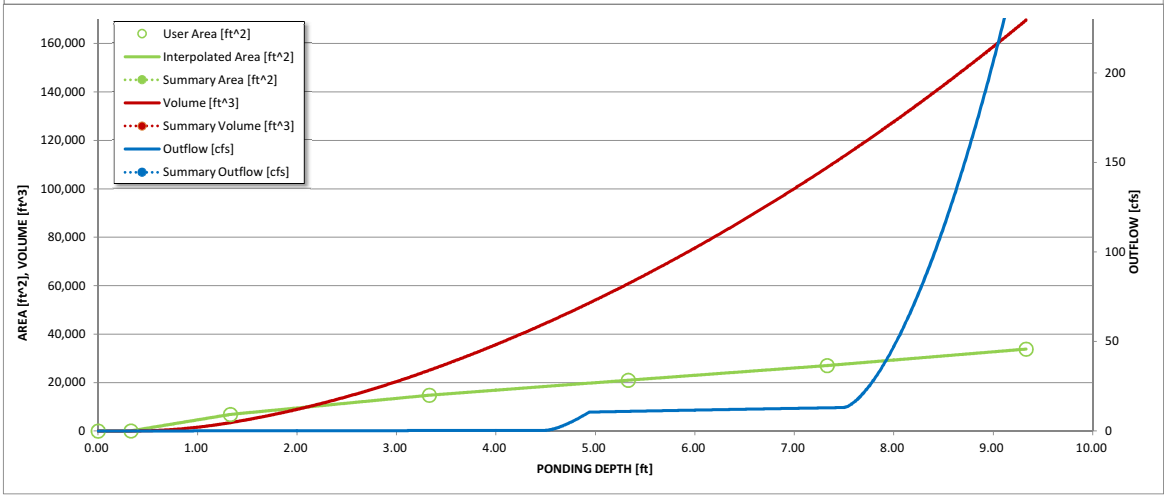
Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
One-Hour Rainfall Depth (in) =	N/A	N/A	1.19	1.50	1.75	2.00	2.25	2.52
CUHP Runoff Volume (acre-ft) =	0.302	1.000	0.919	1.269	1.570	1.951	2.273	2.669
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	0.919	1.269	1.570	1.951	2.273	2.669
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	1.6	4.4	6.7	12.0	15.0	19.2
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A						
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.10	0.29	0.43	0.78	0.98	1.25
Peak Inflow Q (cfs) =	N/A	N/A	15.1	21.1	25.4	32.4	37.7	44.6
Peak Outflow Q (cfs) =	0.1	0.4	0.3	2.6	6.4	10.7	11.1	11.7
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.6	1.0	0.9	0.7	0.6
Structure Controlling Flow =	Plate	Plate	Plate	Overflow Weir 1	Overflow Weir 1	Outlet Plate 1	Outlet Plate 1	Outlet Plate 1
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	0.1	0.4	0.6	0.7	0.7
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	38	68	66	70	68	66	64	62
Time to Drain 99% of Inflow Volume (hours) =	**40**	72	70	75	75	74	73	73
Maximum Ponding Depth (ft) =	2.42	4.46	4.12	4.66	4.81	5.09	5.46	6.06
Area at Maximum Ponding Depth (acres) =	0.26	0.42	0.40	0.43	0.44	0.46	0.49	0.53
Maximum Volume Stored (acre-ft) =	0.304	1.004	0.865	1.085	1.151	1.282	1.459	1.766

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.04 (February 2021)







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

DETENTION BASIN OUTLET STRUCTURE DESIGN

Outflow Hydrograph Workbook Filename:

Inflow Hydrographs

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

	SOURCE	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP
Time Interval	TIME	WQCV [cfs]	EURV [cfs]	2 Year [cfs]	5 Year [cfs]	10 Year [cfs]	25 Year [cfs]	50 Year [cfs]	100 Year [cfs]	500 Year [cfs]
5.00 min	0:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.18	0.02	0.58
	0:15:00	0.00	0.00	1.58	2.59	3.20	2.15	2.67	2.62	3.73
	0:20:00	0.00	0.00	5.57	7.30	8.71	5.39	6.27	6.72	8.81
	0:25:00	0.00	0.00	12.18	17.33	21.84	11.94	14.00	15.33	21.91
	0:30:00	0.00	0.00	15.12	21.08	25.41	28.71	33.78	37.91	49.92
	0:35:00	0.00	0.00	13.92	19.03	22.78	32.37	37.75	44.63	57.88
	0:40:00	0.00	0.00	12.20	16.35	19.59	30.76	35.72	42.10	54.41
	0:45:00	0.00	0.00	10.16	13.87	16.89	26.91	31.24	37.93	49.01
	0:50:00	0.00	0.00	8.48	11.87	14.24	23.97	27.82	33.60	43.39
	0:55:00	0.00	0.00	7.20	10.03	12.17	19.99	23.23	28.83	37.27
	1:00:00	0.00	0.00	6.35	8.79	10.87	16.85	19.63	25.12	32.56
	1:05:00	0.00	0.00	5.70	7.85	9.84	14.75	17.22	22.68	29.44
	1:10:00	0.00	0.00	4.81	6.97	8.85	12.44	14.54	18.60	24.26
	1:15:00	0.00	0.00	4.00	5.91	7.91	10.40	12.18	15.03	19.72
	1:20:00	0.00	0.00	3.30	4.86	6.64	8.29	9.69	11.47	15.02
	1:25:00	0.00	0.00	2.81	4.12	5.42	6.52	7.61	8.51	11.13
	1:30:00	0.00	0.00	2.54	3.72	4.69	5.07	5.90	6.39	8.39
	1:35:00	0.00	0.00	2.42	3.51	4.23	4.20	4.87	5.12	6.74
	1:40:00	0.00	0.00	2.35	3.13	3.90	3.65	4.21	4.33	5.69
	1:45:00	0.00	0.00	2.31	2.84	3.67	3.29	3.77	3.78	4.96
	1:50:00	0.00	0.00	2.27	2.63	3.50	3.05	3.48	3.40	4.45
	1:55:00	0.00	0.00	1.98	2.47	3.30	2.88	3.28	3.13	4.09
	2:00:00	0.00	0.00	1.74	2.28	2.97	2.77	3.14	2.95	3.85
	2:05:00	0.00	0.00	1.31	1.71	2.21	2.07	2.34	2.19	2.85
	2:10:00	0.00	0.00	0.96	1.24	1.59	1.50	1.69	1.59	2.06
	2:15:00	0.00	0.00	0.70	0.90	1.15	1.09	1.22	1.16	1.50
	2:20:00	0.00	0.00	0.50	0.64	0.82	0.78	0.88	0.84	1.09
	2:25:00	0.00	0.00	0.35	0.45	0.58	0.55	0.62	0.59	0.77
	2:30:00	0.00	0.00	0.24	0.30	0.40	0.39	0.43	0.41	0.54
	2:35:00	0.00	0.00	0.16	0.21	0.28	0.27	0.30	0.29	0.37
	2:40:00	0.00	0.00	0.10	0.13	0.17	0.17	0.19	0.18	0.24
	2:45:00	0.00	0.00	0.05	0.07	0.09	0.10	0.11	0.10	0.13
	2:50:00	0.00	0.00	0.02	0.03	0.04	0.04	0.05	0.05	0.06
	2:55:00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01
	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

Final Drainage Report
Falcon Trucking Filing No.1
(Pond Volume Calculation)

***FSD POND** 1*

	Elevation	SF	CF	Storage AF	Storage Sum
6630	0.00	0.00			0
6630.33	0.33	40.00	6.60	0.00	0.00
6631	1.00	500.00	180.90	0.00	0.00
6632	2.00	11,458.00	5,979.00	0.14	0.14
6634	4.00	43,369.00	54,827.00	1.26	1.40
6636	6.00	57,403.00	100,772.00	2.31	3.71

Provided Total = 161,766 CF

Total = 3.7 Ac-ft

At Elevation 1.5, the Storage is 0.073 Ac-ft.
At Elevation 3.5, the Storage is 1.09 Ac-ft.

Calculated by: GT

Date: 10/7/2019

Checked by:

Final Drainage Report
Falcon Trucking Filing No.1
(Pond Volume Calculation)

FSD POND 2

	Elevation	SF	CF	Storage AF	Storage Sum
6634.67	0.00	0.00			0
6635	0.33	40.00	6.60	0.00	0.00
6636	1.33	6,840.00	3,440.00	0.08	0.08
6638	3.33	14,772.00	21,612.00	0.50	0.58
6640	5.33	20,696.00	35,468.00	0.81	1.39
6642	7.33	27,017.00	47,713.00	1.10	2.48
6644	9.33	33,813.00	60,830.00	1.40	3.88

Total = 169,070 CF

Total = 3.9 Ac-ft

At Elevation 3, the Storage is 0.493 Ac-ft.
At Elevation 4, the Storage is 0.85 Ac-ft.

Calculated by: DLM
Date: 6/21/2016
Checked by:

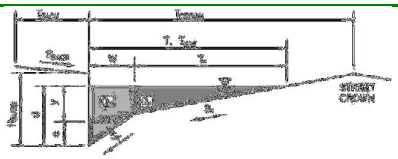
MHFD-Inlet, Version 5.01 (April 2021)

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project:

Inlet ID: **Ex Inlet 3**



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.040	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	14.8	ft
Gutter Width	W =	1.20	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.107	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.042	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.012	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	14.8	14.8	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	4.4	7.7	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	

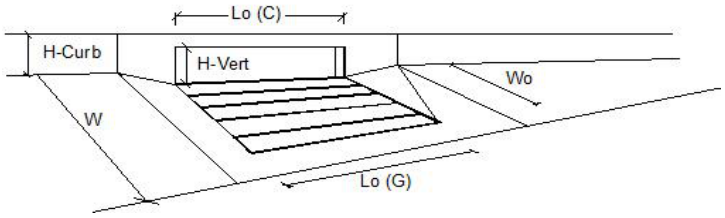
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	**Q_{allow} =**	**14.6**	**19.9**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.01 (April 2021)



Design Information (Input)		MINOR	MAJOR	
Type of Inlet (Colorado Springs D-10-R)	Type =	Colorado Springs D-10-R		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	4.0	4.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	4.00	4.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**2.3**	**3.7**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**2.8**	**12.7**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**46**	**22**	**%**

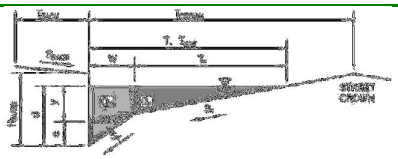
MHFD-Inlet, Version 5.01 (April 2021)

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project:

Inlet ID: **Ex Inlet 4**



Gutter Geometry:			
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.040	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	14.8	ft
Gutter Width	W =	1.20	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.107	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.036	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.012	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	14.8	14.8	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	4.4	7.7	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	

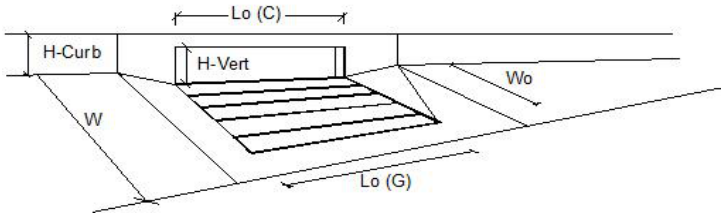
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	**Q_{allow} =**	**13.6**	**18.4**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.01 (April 2021)



Design Information (Input)		MINOR	MAJOR	
Type of Inlet (Colorado Springs D-10-R)	Type =	Colorado Springs D-10-R		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	4.0	4.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	4.00	4.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**1.9**	**2.7**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**1.2**	**4.8**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**61**	**36**	**%**

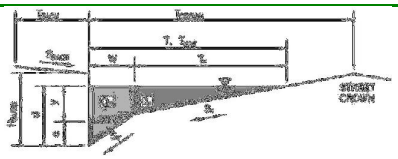
MHFD-Inlet, Version 5.01 (April 2021)

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project:

Inlet ID: **Ex Inlet 5**



Gutter Geometry:			
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.040	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	14.8	ft
Gutter Width	W =	1.20	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.107	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.029	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.012	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	14.8	14.8	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	4.4	7.7	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	

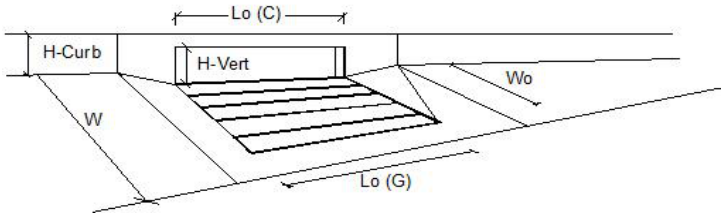
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	**Q_{allow} =**	**12.2**	**16.5**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

WARNING: MAJOR STORM max. allowable capacity is less than the design flow given on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.01 (April 2021)



Design Information (Input)		MINOR	MAJOR	
Type of Inlet (Colorado Springs D-10-R)	Type =	Colorado Springs D-10-R		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	4.0	4.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	4.00	4.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: WARNING: Q > ALLOWABLE Q FOR MAJOR STORM		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**2.2**	**3.7**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**2.4**	**13.7**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**48**	**21**	**%**

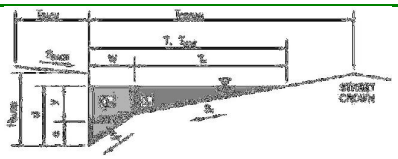
MHFD-Inlet, Version 5.01 (April 2021)

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project:

Inlet ID: **Ex Inlet 6**



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.040	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	14.8	ft
Gutter Width	W =	1.20	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.107	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.036	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.012	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	14.8	14.8	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	4.4	7.7	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	

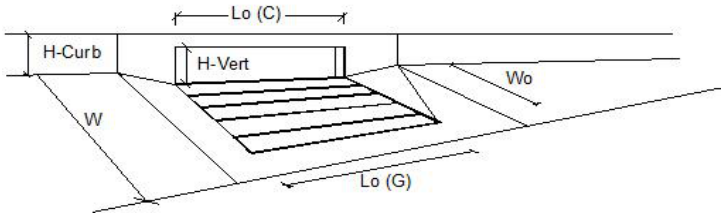
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion MAJOR STORM Allowable Capacity is based on Spread Criterion	Q_{allow} =	**13.6**	**18.4**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.01 (April 2021)



Design Information (Input)		MINOR	MAJOR	
Type of Inlet (Colorado Springs D-10-R)	Type =	Colorado Springs D-10-R		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	4.0	4.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	4.00	4.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**1.1**	**1.9**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.1**	**1.2**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**93**	**61**	**%**

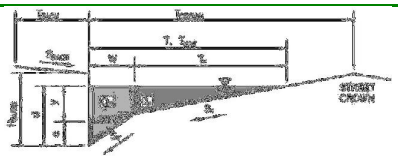
MHFD-Inlet, Version 5.01 (April 2021)

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project:

Inlet ID: **Ex Inlet 7**



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.040	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	14.8	ft
Gutter Width	W =	1.20	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.107	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.036	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.012	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	14.8	14.8	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	4.4	7.7	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	

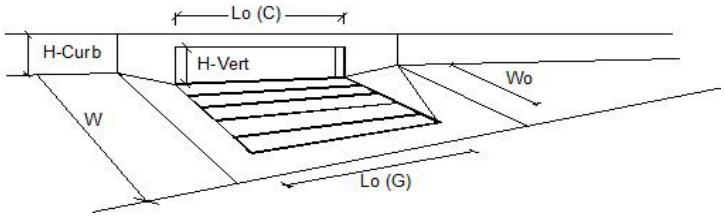
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion MAJOR STORM Allowable Capacity is based on Spread Criterion	**Q_{allow} =**	**13.6**	**18.4**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.01 (April 2021)



Design Information (Input)		MINOR	MAJOR	
Type of Inlet (Colorado Springs D-10-R)	Type =	Colorado Springs D-10-R		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	4.0	4.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	4.00	4.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**1.7**	**2.8**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.9**	**5.5**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**67**	**34**	**%**

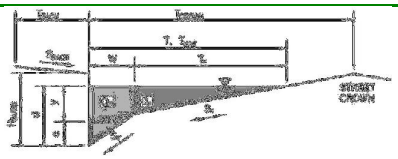
MHFD-Inlet, Version 5.01 (April 2021)

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project:

Inlet ID: **Inlet 5-5**



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.5	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.012	
Height of Curb at Gutter Flow Line	H_{CURB} =	8.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.020	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	5.1	7.8	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	

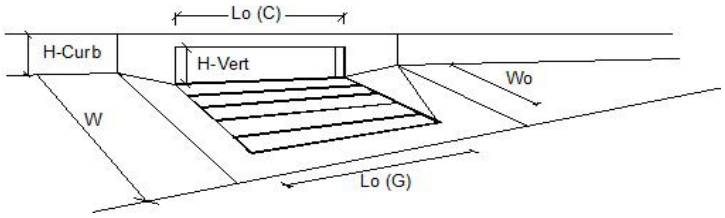
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	**Q_{allow} =**	**11.2**	**15.4**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

WARNING: MAJOR STORM max. allowable capacity is less than the design flow given on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.01 (April 2021)



Design Information (Input)		MINOR	MAJOR	
Type of Inlet (Colorado Springs D-10-R)	Type =	Colorado Springs D-10-R		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	4.0	4.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	16.00	16.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: WARNING: Q > ALLOWABLE Q FOR MAJOR STORM		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**2.7**	**14.5**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**3.6**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**100**	**80**	**%**

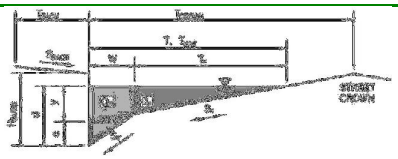
MHFD-Inlet, Version 5.01 (April 2021)

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project:

Inlet ID: **Inlet 5-7**



Gutter Geometry:

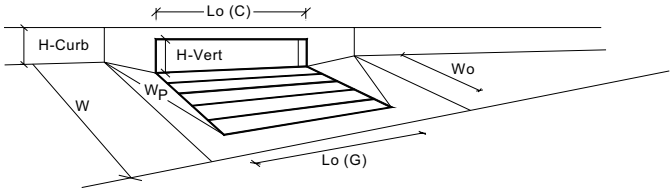
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.5	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.012	
Height of Curb at Gutter Flow Line	H_{CURB} =	8.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	5.1	7.8	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

MHFD-Inlet, Version 5.01 (April 2021)



Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	Colorado Springs D-10-R		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	4.00	4.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	5.1	7.7	inches
Grate Information		MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate	L_o (G) =	N/A	N/A	feet
Width of a Unit Grate	W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	4.00	4.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	8.00	8.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	8.00	8.00	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	81.00	81.00	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.26	0.48	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.72	1.00	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	1.00	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**3.2**	**7.9**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	1.8	4.0	cfs

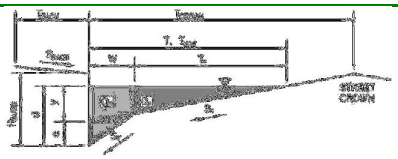
MHFD-Inlet, Version 5.01 (April 2021)

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project:

Inlet ID: **Inlet 5-8**



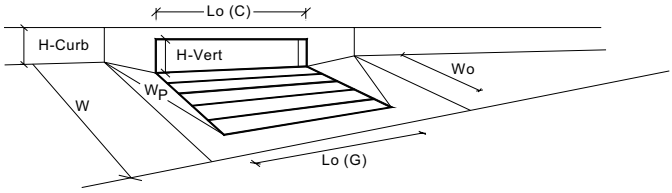
Gutter Geometry:			
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.5	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.012	
Height of Curb at Gutter Flow Line	H_{CURB} =	8.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	5.1	7.8	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

MHFD-Inlet, Version 5.01 (April 2021)



Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	Colorado Springs D-10-R		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	4.00	4.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	5.1	7.7	inches
Grate Information		MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate	L_o (G) =	N/A	N/A	feet
Width of a Unit Grate	W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	10.00	10.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	8.00	8.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	8.00	8.00	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	81.00	81.00	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.26	0.48	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.48	0.73	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	0.88	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**5.3**	**15.1**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	4.7	10.4	cfs

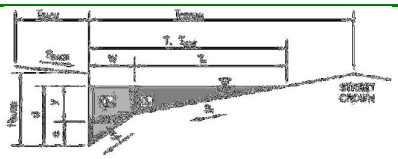
MHFD-Inlet, Version 5.01 (April 2021)

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project:

Inlet ID: **Ex Inlet 8**



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.040	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	14.8	ft
Gutter Width	W =	1.20	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.107	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.029	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.012	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	14.8	14.8	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	4.4	7.7	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	

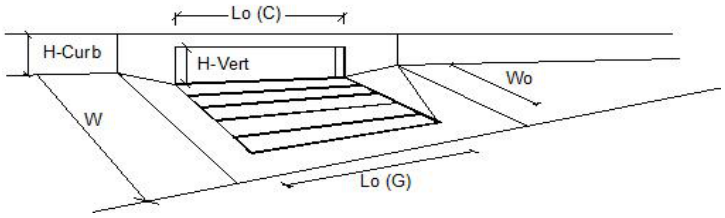
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	**Q_{allow} =**	**12.2**	**16.5**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

WARNING: MAJOR STORM max. allowable capacity is less than the design flow given on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.01 (April 2021)



Design Information (Input)		MINOR	MAJOR	
Type of Inlet (Colorado Springs D-10-R)	Type =	Colorado Springs D-10-R		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	4.0	4.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	2	2	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	4.00	4.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: WARNING: Q > ALLOWABLE Q FOR MAJOR STORM		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**3.8**	**8.7**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.5**	**15.1**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**89**	**36**	**%**

Falcon Trucking/Enclaves Filing No. 5
Drainage Report Drainage Plan
Water Quality Control Volume Sizing Worksheet

Ex Pond A (303)

CONTRUBUTING BASINS	AC	C100	CORRESPONDING IMPERVIOUS %
P~	0.41	0.37	3
Q~	0.36	0.62	70
Q2~	0.08	0.62	70
R~	0.40	0.56	57
R2~	0.22	0.56	57
S~	0.11	0.96	100
S2~	0.08	0.96	100
T~	0.33	0.56	57
OS6#	1.00	0.39	7
A1#	1.40	0.36	2
A2#	2.00	0.57	59
A3#	0.40	0.57	59
A4#	2.00	0.53	48
A5#	1.30	0.57	59
A6#	0.80	0.57	59
A7#	0.70	0.57	59
A8#	0.20	0.57	59
A9#	1.10	0.57	59
A12#	0.20	0.57	59
A13#	0.40	0.57	59
A7*	1.23	0.59	65
A8*	0.93	0.59	65
A9*	0.82	0.59	65
B*	2.05	0.42	15
			from COS DCM Table 6-6
COMBINED ACREAGE	18.52		
COMB. % IMPERVIOUS			53.3%

~ Falcon Trucking Fil 1

Enclaves at Mountain Vista Fil 6

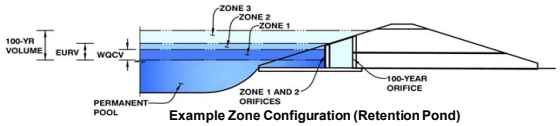
* Enclaves at Mountain Vista Fil 5

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.04 (February 2021)

Project: Falcon Trucking

Basin ID: EX Pond 303 w/proposed Falcon Trucking drainage basins (revised acreage and imperviousness) and existing outlet structure height.



Example Zone Configuration (Retention Pond)

Watershed Information

Selected BMP Type =	EDB	
Watershed Area =	18.52	acres
Watershed Length =	1,750	ft
Watershed Length to Centroid =	925	ft
Watershed Slope =	0.031	ft/ft
Watershed Imperviousness =	53.30%	percent
Percentage Hydrologic Soil Group A =	100.0%	percent
Percentage Hydrologic Soil Group B =	0.0%	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) =	0.333	acre-feet		acre-feet
Excess Urban Runoff Volume (EURV) =	1.159	acre-feet		acre-feet
2-yr Runoff Volume (P1 = 1.19 in.) =	0.865	acre-feet	1.19	inches
5-yr Runoff Volume (P1 = 1.5 in.) =	1.145	acre-feet	1.50	inches
10-yr Runoff Volume (P1 = 1.75 in.) =	1.370	acre-feet	1.75	inches
25-yr Runoff Volume (P1 = 2 in.) =	1.709	acre-feet	2.00	inches
50-yr Runoff Volume (P1 = 2.25 in.) =	2.040	acre-feet	2.25	inches
100-yr Runoff Volume (P1 = 2.52 in.) =	2.456	acre-feet	2.52	inches
500-yr Runoff Volume (P1 = 3.14 in.) =	3.359	acre-feet		inches
Approximate 2-yr Detention Volume =	0.747	acre-feet		
Approximate 5-yr Detention Volume =	0.982	acre-feet		
Approximate 10-yr Detention Volume =	1.195	acre-feet		
Approximate 25-yr Detention Volume =	1.456	acre-feet		
Approximate 50-yr Detention Volume =	1.619	acre-feet		
Approximate 100-yr Detention Volume =	1.811	acre-feet		

Define Zones and Basin Geometry

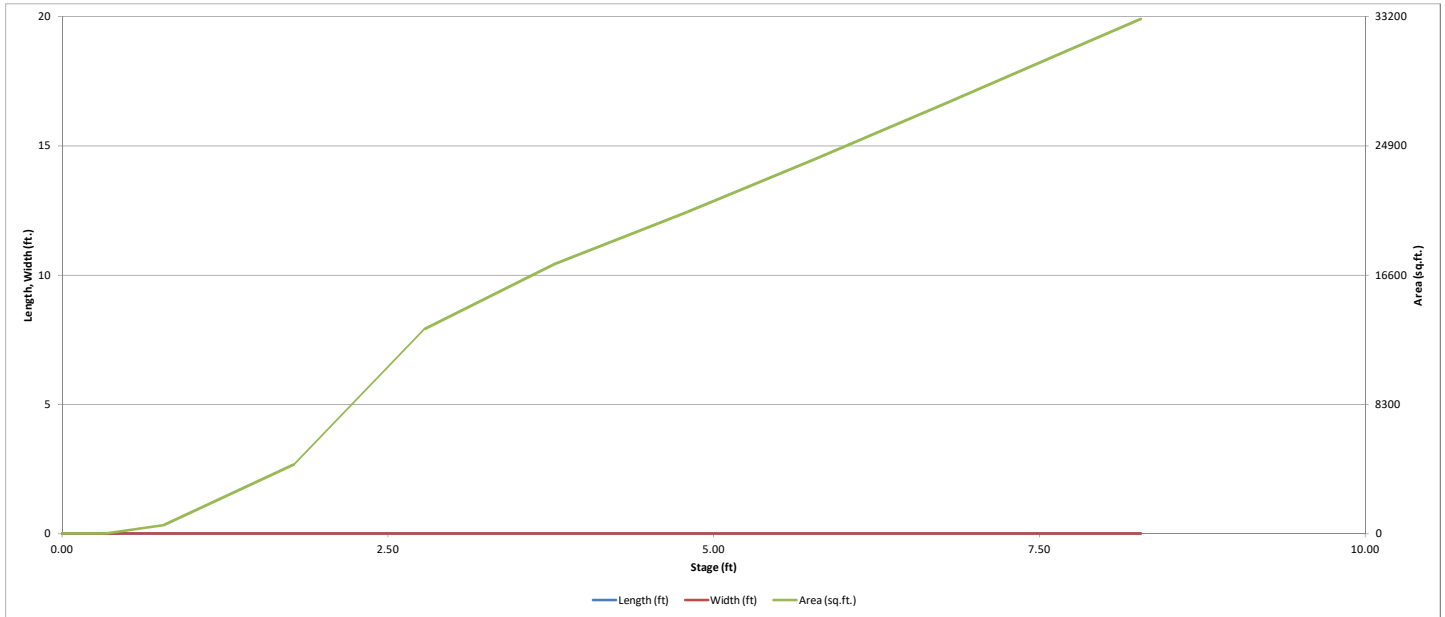
Zone 1 Volume (WQCV) =	0.333	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.826	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	0.652	acre-feet
Total Detention Basin Volume =	1.811	acre-feet
Initial Surcharge Volume (ISV) =	user	ft^3
Initial Surcharge Depth (ISD) =	user	ft
Total Available Detention Depth (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

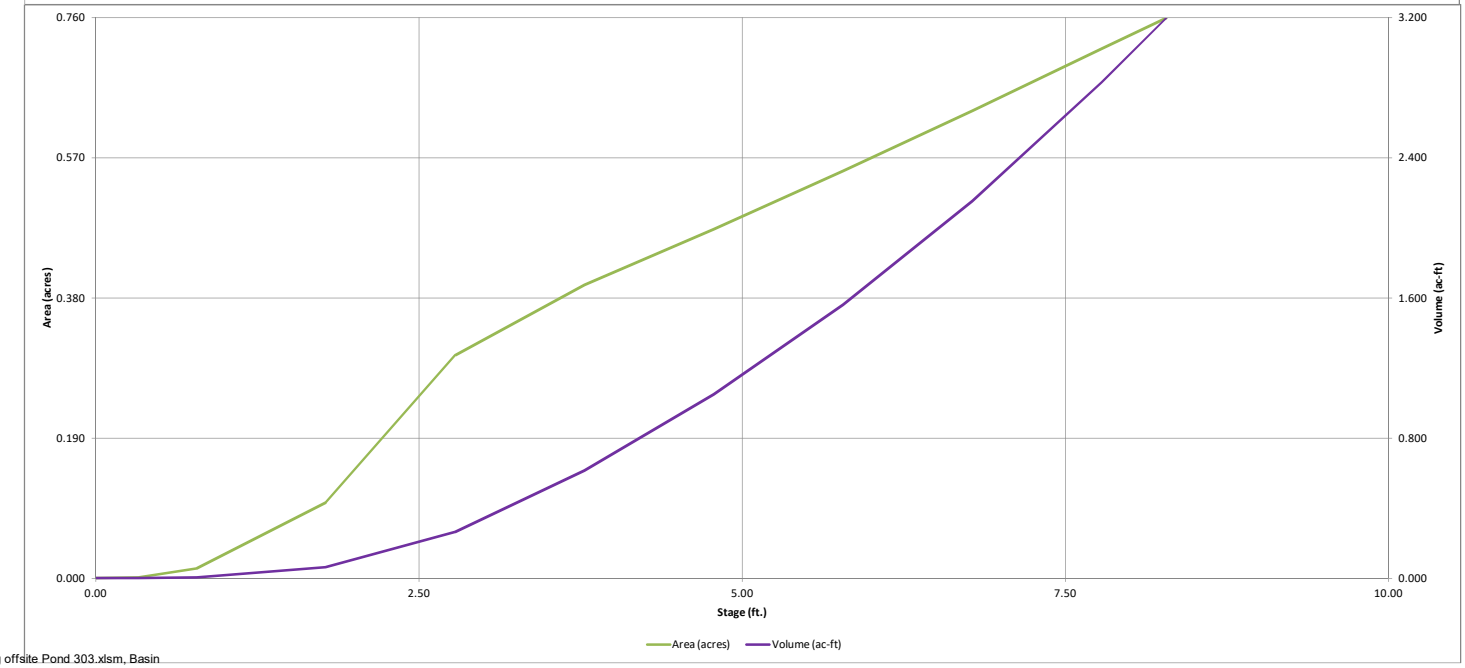
Depth Increment = ft

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	6618.22	0.00	--	--	--	0	0.000		
	--	0.33	--	--	--	32	0.001	5	0.000
	--	0.78	--	--	--	557	0.013	138	0.003
	--	1.78	--	--	--	4,458	0.102	2,645	0.061
	--	2.78	--	--	--	13,151	0.302	11,450	0.263
	--	3.78	--	--	--	17,337	0.398	26,694	0.613
	--	4.78	--	--	--	20,620	0.473	45,672	1.048
	--	5.78	--	--	--	24,045	0.552	68,005	1.561
	--	6.78	--	--	--	27,624	0.634	93,839	2.154
	--	7.78	--	--	--	31,256	0.718	123,279	2.830
	--	8.28	--	--	--	33,072	0.759	139,361	3.199

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.04 (February 2021)



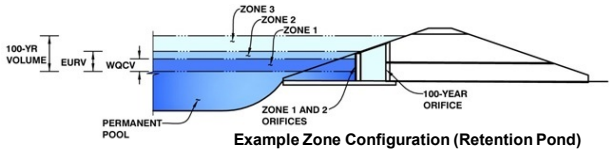


DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.04 (February 2021)

Project: Falcon Trucking

Basin ID: EX Pond 303 w/proposed Falcon Trucking drainage basins (revised acreage and imperviousness) and existing outlet structure height.



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	3.01	0.333	Orifice Plate
Zone 2 (EURV)	5.01	0.826	Orifice Plate
Zone 3 (100-year)	6.22	0.652	Weir&Pipe (Restrict)
Total (all zones)		1.811	

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 Area =	N/A	ft²
Underdrain Orifice Diameter =	N/A	inches	Underdrain Orifice Centroid =	N/A	feet

Calculated Parameters for Underdrain

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

Invert of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)	WQ Orifice Area per Row =	N/A	ft²
Depth at top of Zone using Orifice Plate =	4.27	ft (relative to basin bottom at Stage = 0 ft)	Elliptical Half-Width =	N/A	feet
Orifice Plate: Orifice Vertical Spacing =	N/A	inches	Elliptical Slot Centroid =	N/A	feet
Orifice Plate: Orifice Area per Row =	N/A	inches	Elliptical Slot Area =	N/A	ft²

Calculated Parameters for Plate

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	0.92	3.60					
Orifice Area (sq. inches)	1.63	0.94	0.12					

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

User Input: Vertical Orifice (Circular or Rectangular)

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

Calculated Parameters for Vertical Orif

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			Zone 3 Weir	Not Selected
Overflow Weir Front Edge Height, Ho =	4.27	N/A	ft (relative to basin bottom at Stage = 0 ft)	Height of Grate Upper Edge, H_t =	4.27	N/A
Overflow Weir Front Edge Length =	4.00	N/A	feet	Overflow Weir Slope Length =	2.91	N/A
Overflow Weir Grate Slope =	0.00	N/A	H:V	Grate Open Area / 100-yr Orifice Area =	11.30	N/A
Horiz. Length of Weir Sides =	2.91	N/A	feet	Overflow Grate Open Area w/o Debris =	8.10	N/A
Overflow Grate Type =	Type C Grate	N/A		Overflow Grate Open Area w/ Debris =	4.05	N/A
Debris Clogging % =	50%	N/A	%			

Calculated Parameters for Overflow W

Existing structure height

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

	Zone 3 Restrictor	Not Selected			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 =	0.72	N/A
Outlet Pipe Diameter =	24.00	N/A	inches	Outlet Orifice Centroid =	0.33	N/A
Restrictor Plate Height Above Pipe Invert =	6.70		inches	Half-Central Angle of Restrictor Plate on Pipe =	1.11	N/A

Calculated Parameters for Outlet Pipe w/ Flow Restriction Pla

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage=	8.28	ft (relative to basin bottom at Stage = 0 ft)	Spillway Design Flow Depth=	0.31	feet
Spillway Crest Length =	65.00	feet	Stage at Top of Freeboard =	9.09	feet
Spillway End Slopes =	10.00	H:V	Basin Area at Top of Freeboard =	0.76	acres
Freeboard above Max Water Surface =	0.50	feet	Basin Volume at Top of Freeboard =	3.20	acre-ft

Calculated Parameters for Spillway

Routed Hydrograph Results

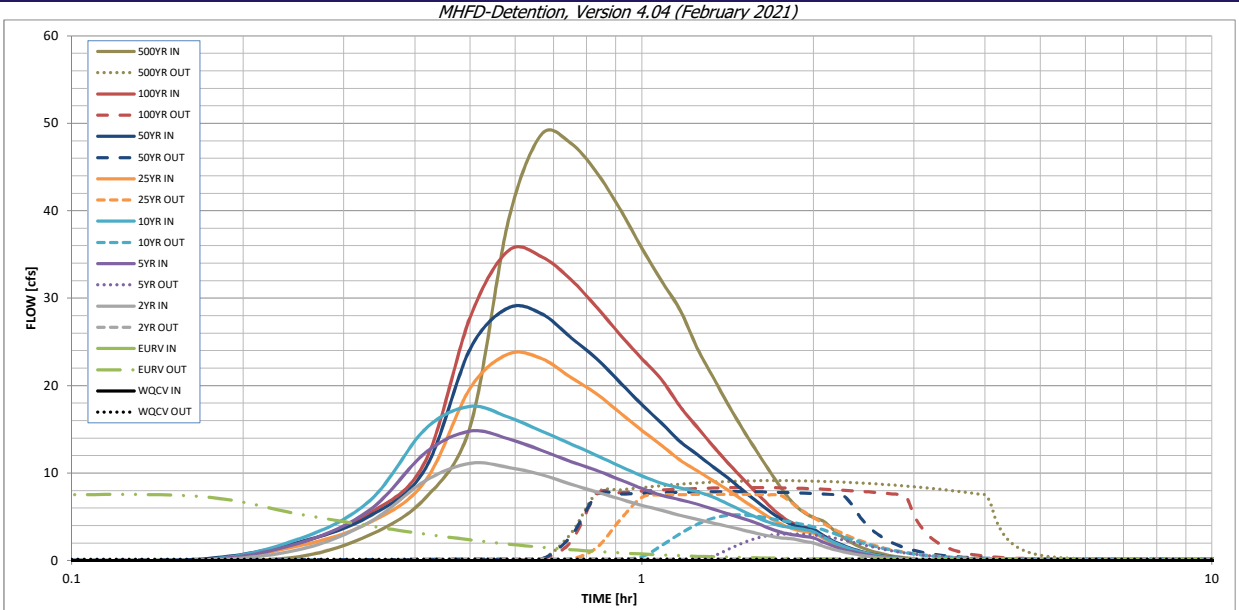
The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AI

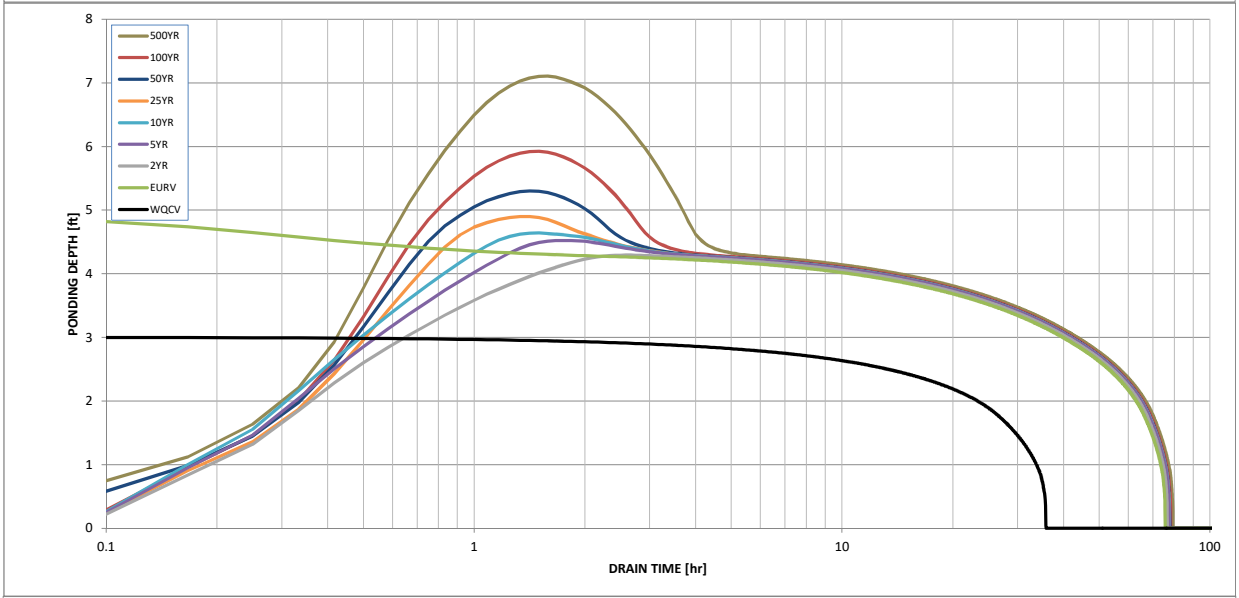
Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
One-Hour Rainfall Depth (in) =	N/A	N/A	1.19	1.50	1.75	2.00	2.25	2.52
CUHP Runoff Volume (acre-ft) =	0.333	1.159	0.865	1.145	1.370	1.709	2.040	2.456
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	0.865	1.145	1.370	1.709	2.040	2.456
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	0.1	0.2	0.3	2.7	5.5	9.1
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	0.02	0.15	0.30	0.49
Peak Inflow Q (cfs) =	N/A	N/A	11.1	14.8	17.6	23.6	28.9	35.4
Peak Outflow Q (cfs) =	0.1	7.6	0.3	3.0	5.2	7.6	7.9	8.3
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	14.1	17.3	2.8	1.4	0.9
Structure Controlling Flow =	Plate	Outlet Plate 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Outlet Plate 1	Outlet Plate 1	Outlet Plate 1
Max Velocity through Grate 1 (fps) =	N/A	0.92	0.01	0.3	0.6	0.9	0.9	1.0
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	34	70	72	72	71	69	68	67
Time to Drain 99% of Inflow Volume (hours) =	**35**	73	75	75	75	74	74	74
Maximum Ponding Depth (ft) =	3.01	5.01	4.29	4.52	4.64	4.90	5.30	5.92
Area at Maximum Ponding Depth (acres) =	0.32	0.49	0.44	0.45	0.46	0.48	0.51	0.56
Maximum Volume Stored (acre-ft) =	0.335	1.159	0.826	0.928	0.983	1.101	1.305	1.639

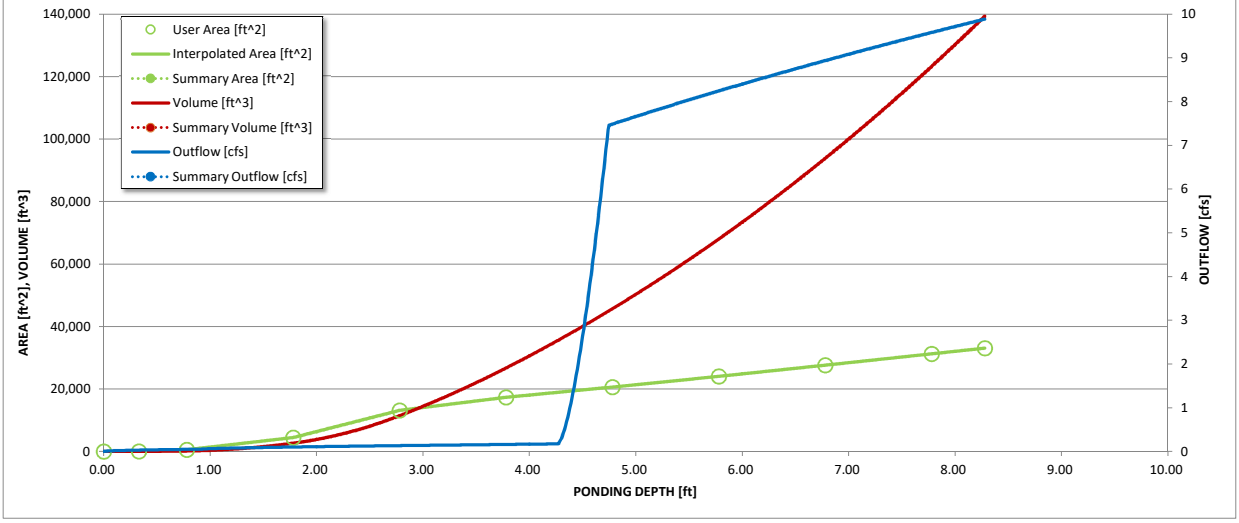
This sheet provided to demonstrate existing structure height does not work.

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.04 (February 2021)







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

DETENTION BASIN OUTLET STRUCTURE DESIGN

Outflow Hydrograph Workbook Filename:

Inflow Hydrographs

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

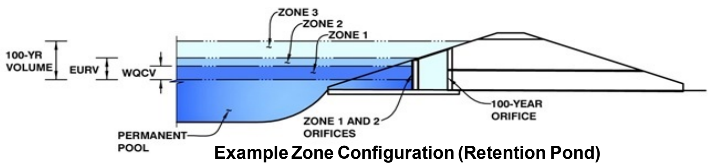
	SOURCE	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP
Time Interval	TIME	WQCV [cfs]	EURV [cfs]	2 Year [cfs]	5 Year [cfs]	10 Year [cfs]	25 Year [cfs]	50 Year [cfs]	100 Year [cfs]	500 Year [cfs]
5.00 min	0:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.01	0.45
	0:15:00	0.00	0.00	1.22	1.98	2.46	1.66	2.08	2.03	2.95
	0:20:00	0.00	0.00	4.41	5.81	6.85	4.34	5.08	5.43	7.12
	0:25:00	0.00	0.00	9.10	12.32	15.03	9.05	10.44	11.32	15.33
	0:30:00	0.00	0.00	11.10	14.82	17.64	19.70	24.22	27.86	38.85
	0:35:00	0.00	0.00	10.64	13.93	16.41	23.61	28.89	35.43	48.72
	0:40:00	0.00	0.00	9.80	12.62	14.82	23.10	28.23	34.75	47.72
	0:45:00	0.00	0.00	8.73	11.34	13.35	20.96	25.52	32.16	44.35
	0:50:00	0.00	0.00	7.82	10.31	12.02	19.05	23.07	28.95	40.13
	0:55:00	0.00	0.00	7.02	9.24	10.79	16.87	20.33	25.79	35.72
	1:00:00	0.00	0.00	6.30	8.25	9.70	14.88	17.83	23.08	31.94
	1:05:00	0.00	0.00	5.74	7.47	8.84	13.15	15.68	20.67	28.67
	1:10:00	0.00	0.00	5.16	6.97	8.31	11.47	13.60	17.62	24.33
	1:15:00	0.00	0.00	4.69	6.46	7.89	10.27	12.13	15.27	20.96
	1:20:00	0.00	0.00	4.27	5.89	7.27	9.11	10.71	13.09	17.86
	1:25:00	0.00	0.00	3.88	5.35	6.47	8.05	9.42	11.15	15.11
	1:30:00	0.00	0.00	3.50	4.83	5.70	6.95	8.09	9.43	12.69
	1:35:00	0.00	0.00	3.13	4.34	4.99	5.92	6.85	7.84	10.45
	1:40:00	0.00	0.00	2.81	3.73	4.40	4.99	5.73	6.40	8.43
	1:45:00	0.00	0.00	2.59	3.26	3.99	4.20	4.77	5.16	6.71
	1:50:00	0.00	0.00	2.48	2.98	3.77	3.65	4.12	4.33	5.59
	1:55:00	0.00	0.00	2.22	2.79	3.57	3.33	3.75	3.84	4.92
	2:00:00	0.00	0.00	1.99	2.60	3.29	3.14	3.53	3.54	4.49
	2:05:00	0.00	0.00	1.61	2.11	2.67	2.52	2.84	2.80	3.53
	2:10:00	0.00	0.00	1.27	1.66	2.11	1.97	2.21	2.15	2.70
	2:15:00	0.00	0.00	1.00	1.31	1.66	1.54	1.73	1.65	2.05
	2:20:00	0.00	0.00	0.78	1.02	1.29	1.20	1.34	1.26	1.56
	2:25:00	0.00	0.00	0.61	0.80	1.00	0.93	1.04	0.97	1.19
	2:30:00	0.00	0.00	0.47	0.61	0.76	0.71	0.79	0.74	0.91
	2:35:00	0.00	0.00	0.36	0.46	0.57	0.53	0.59	0.56	0.69
	2:40:00	0.00	0.00	0.27	0.34	0.44	0.40	0.45	0.43	0.53
	2:45:00	0.00	0.00	0.20	0.26	0.33	0.31	0.34	0.33	0.40
	2:50:00	0.00	0.00	0.14	0.18	0.24	0.23	0.25	0.24	0.29
	2:55:00	0.00	0.00	0.10	0.13	0.16	0.16	0.17	0.16	0.20
	3:00:00	0.00	0.00	0.06	0.08	0.10	0.10	0.11	0.10	0.12
	3:05:00	0.00	0.00	0.03	0.05	0.06	0.06	0.06	0.06	0.07
	3:10:00	0.00	0.00	0.01	0.02	0.02	0.02	0.03	0.02	0.03
	3:15:00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01
	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 STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.04 (February 2021)

Project: Falcon Trucking

Basin ID: EX Pond 303 w/proposed Falcon Trucking drainage basins (revised acreage and imperviousness) and revised outlet structure height.



Example Zone Configuration (Retention Pond)

Watershed Information

Selected BMP Type =	**EDB**	
Watershed Area =	18.52	acres
Watershed Length =	1,750	ft
Watershed Length to Centroid =	925	ft
Watershed Slope =	0.031	ft/ft
Watershed Imperviousness =	53.30%	percent
Percentage Hydrologic Soil Group A =	100.0%	percent
Percentage Hydrologic Soil Group B =	0.0%	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) =	0.333	acre-feet		acre-feet
Excess Urban Runoff Volume (EURV) =	1.159	acre-feet		acre-feet
2-yr Runoff Volume (P1 = 1.19 in.) =	0.865	acre-feet	1.19	inches
5-yr Runoff Volume (P1 = 1.5 in.) =	1.145	acre-feet	1.50	inches
10-yr Runoff Volume (P1 = 1.75 in.) =	1.370	acre-feet	1.75	inches
25-yr Runoff Volume (P1 = 2 in.) =	1.709	acre-feet	2.00	inches
50-yr Runoff Volume (P1 = 2.25 in.) =	2.040	acre-feet	2.25	inches
100-yr Runoff Volume (P1 = 2.52 in.) =	2.456	acre-feet	2.52	inches
500-yr Runoff Volume (P1 = 3.14 in.) =	3.359	acre-feet		inches
Approximate 2-yr Detention Volume =	0.747	acre-feet		
Approximate 5-yr Detention Volume =	0.982	acre-feet		
Approximate 10-yr Detention Volume =	1.195	acre-feet		
Approximate 25-yr Detention Volume =	1.456	acre-feet		
Approximate 50-yr Detention Volume =	1.619	acre-feet		
Approximate 100-yr Detention Volume =	1.811	acre-feet		

Define Zones and Basin Geometry

Zone 1 Volume (WQCV) =	0.333	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.826	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	0.652	acre-feet
Total Detention Basin Volume =	1.811	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	

Depth Increment = ft

6618.22

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	--	--	--	0	0.000		
	--	0.33	--	--	--	32	0.001	5	0.000
	--	0.78	--	--	--	557	0.013	138	0.003
	--	1.78	--	--	--	4,458	0.102	2,645	0.061
	--	2.78	--	--	--	13,151	0.302	11,450	0.263
	--	3.78	--	--	--	17,337	0.398	26,694	0.613
	--	4.78	--	--	--	20,620	0.473	45,672	1.048
	--	5.78	--	--	--	24,045	0.552	68,005	1.561
	--	6.78	--	--	--	27,624	0.634	93,839	2.154
	--	7.78	--	--	--	31,256	0.718	123,279	2.830
	--	8.28	--	--	--	33,072	0.759	139,361	3.199
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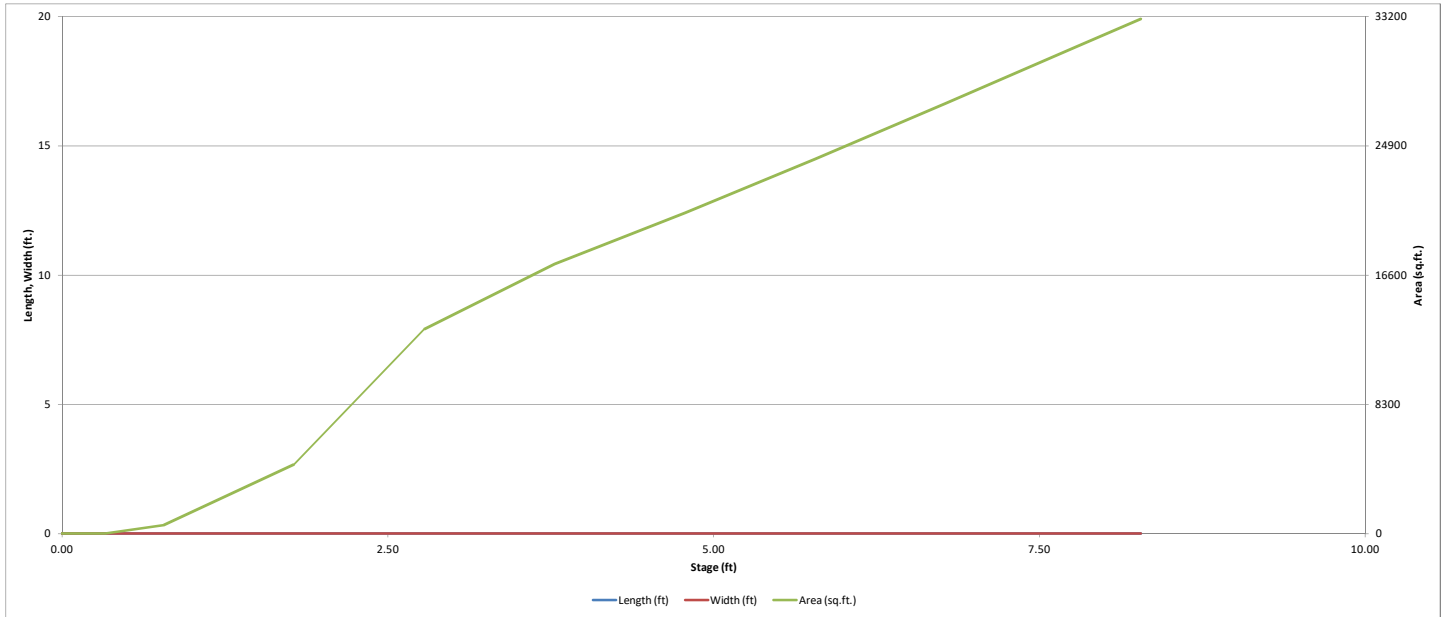
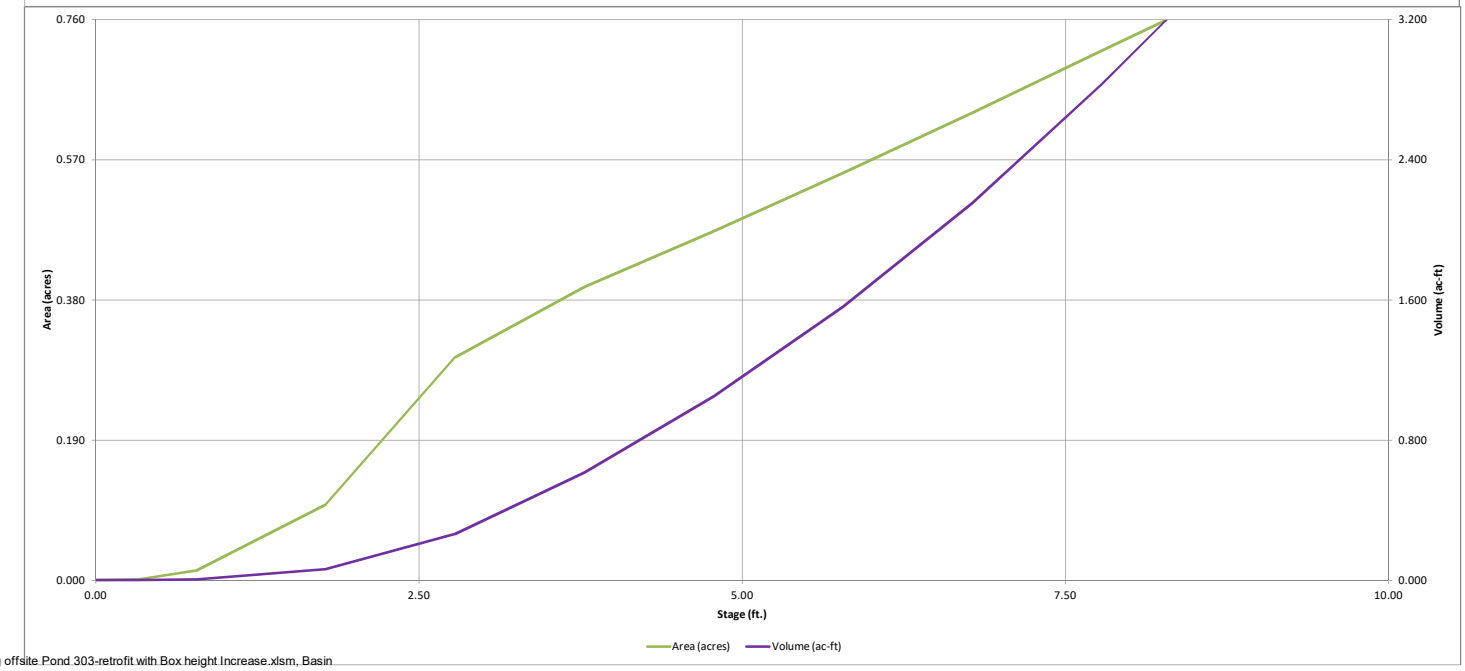
DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.04 (February 2021)



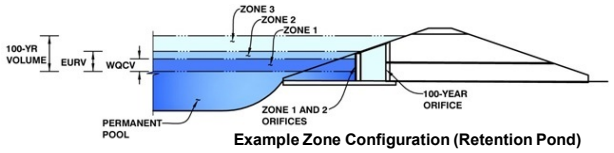


DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.04 (February 2021)

Project: Falcon Trucking

Basin ID: EX Pond 303 w/proposed Falcon Trucking drainage basins (revised acreage and imperviousness) and revised outlet structure height.



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	3.01	0.333	Orifice Plate
Zone 2 (EURV)	5.01	0.826	Orifice Plate
Zone 3 (100-year)	6.22	0.652	Weir&Pipe (Restrict)
Total (all zones)		1.811	

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

Calculated Parameters for Underdrain

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

Invert of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)	WQ Orifice Area per Row =	N/A	ft^2
Depth at top of Zone using Orifice Plate =	5.01	ft (relative to basin bottom at Stage = 0 ft)	Elliptical Half-Width =	N/A	feet
Orifice Plate: Orifice Vertical Spacing =	20.00	inches	Elliptical Slot Centroid =	N/A	feet
Orifice Plate: Orifice Area per Row =	N/A	inches	Elliptical Slot Area =	N/A	ft^2

Calculated Parameters for Plate

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

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	1.67	3.34					
Orifice Area (sq. inches)	1.45	1.45	4.40					

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

User Input: Vertical Orifice (Circular or Rectangular)

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

Calculated Parameters for Vertical Orif

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 =	6.27	N/A	ft (relative to basin bottom at Stage = 0 ft)	Height of Grate Upper Edge, H_t =	6.27	N/A
Overflow Weir Front Edge Length =	4.00	N/A	feet	Overflow Weir Slope Length =	2.91	N/A
Overflow Weir Grate Slope =	0.00	N/A	H:V	Grate Open Area / 100-yr Orifice Area =	35.74	N/A
Horiz. Length of Weir Sides =	2.91	N/A	feet	Overflow Grate Open Area w/o Debris =	8.10	N/A
Overflow Grate Type =	Type C Grate	N/A		Overflow Grate Open Area w/ Debris =	2.43	N/A
Debris Clogging % =	70%	N/A	%			

Calculated Parameters for Overflow W

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 =	0.25	N/A	ft (distance below basin bottom at Stage = 0 ft)	Outlet Orifice Area =	0.23	N/A
Outlet Pipe Diameter =	24.00	N/A	inches	Outlet Orifice Centroid =	0.15	N/A
Restrictor Plate Height Above Pipe Invert =	3.00		inches	Half-Central Angle of Restrictor Plate on Pipe =	0.72	N/A

Calculated Parameters for Outlet Pipe w/ Flow Restriction Pla

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage=	8.28	ft (relative to basin bottom at Stage = 0 ft)	Spillway Design Flow Depth=	0.31	feet
Spillway Crest Length =	65.00	feet	Stage at Top of Freeboard =	9.09	feet
Spillway End Slopes =	10.00	H:V	Basin Area at Top of Freeboard =	0.76	acres
Freeboard above Max Water Surface =	0.50	feet	Basin Volume at Top of Freeboard =	3.20	acre-ft

Calculated Parameters for Spillway

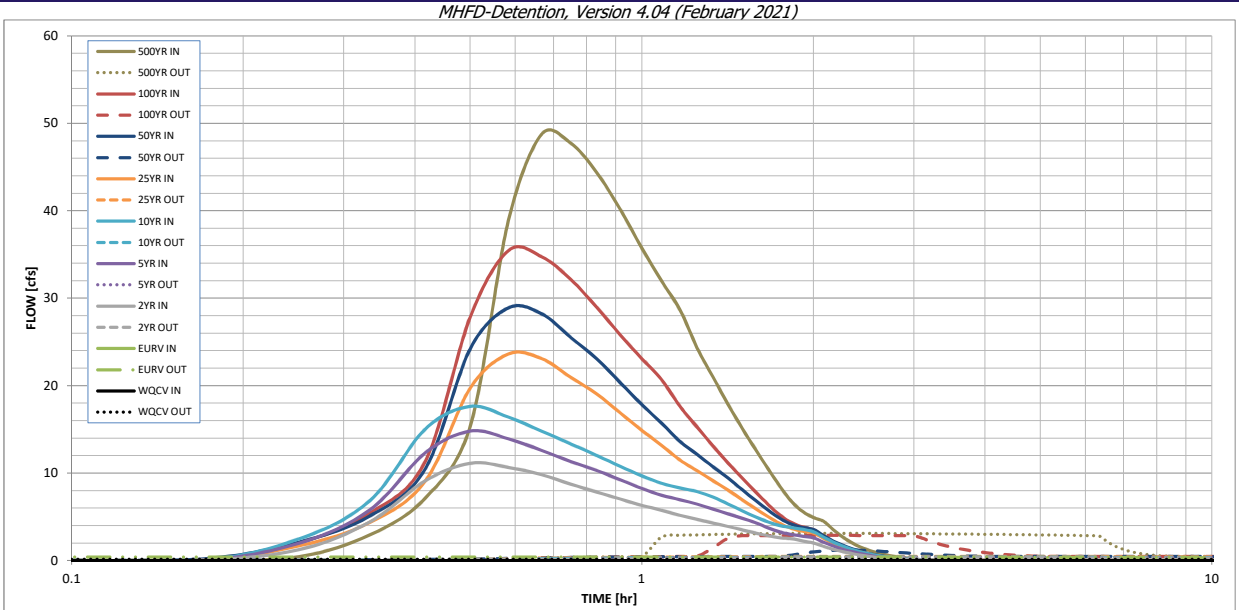
Routed Hydrograph Results

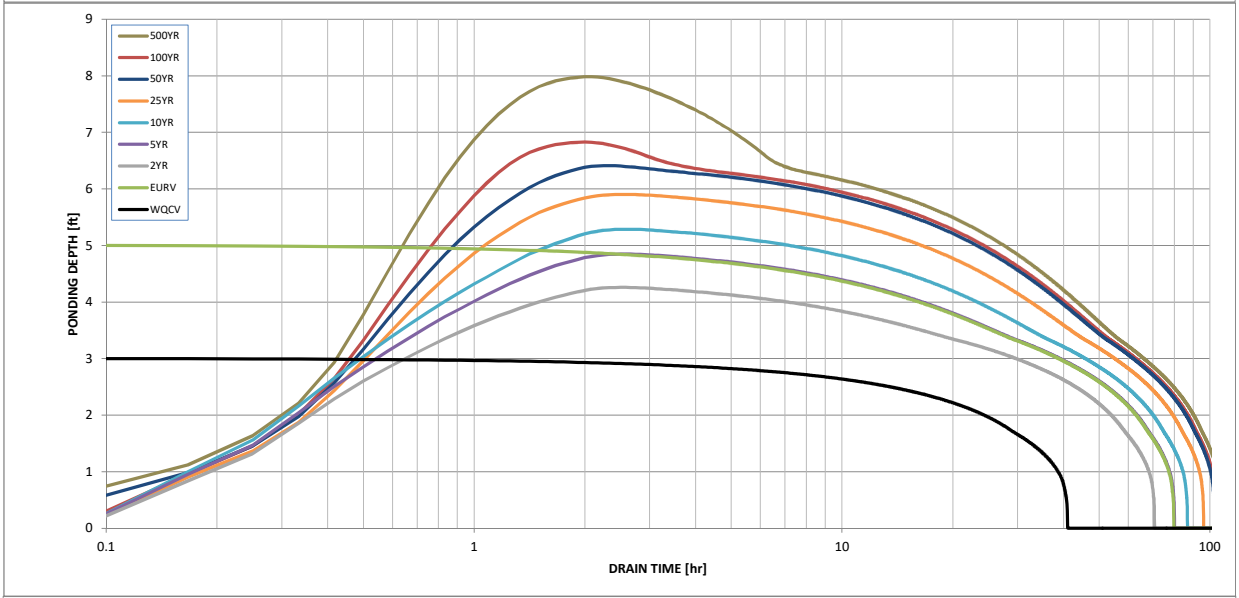
The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AI

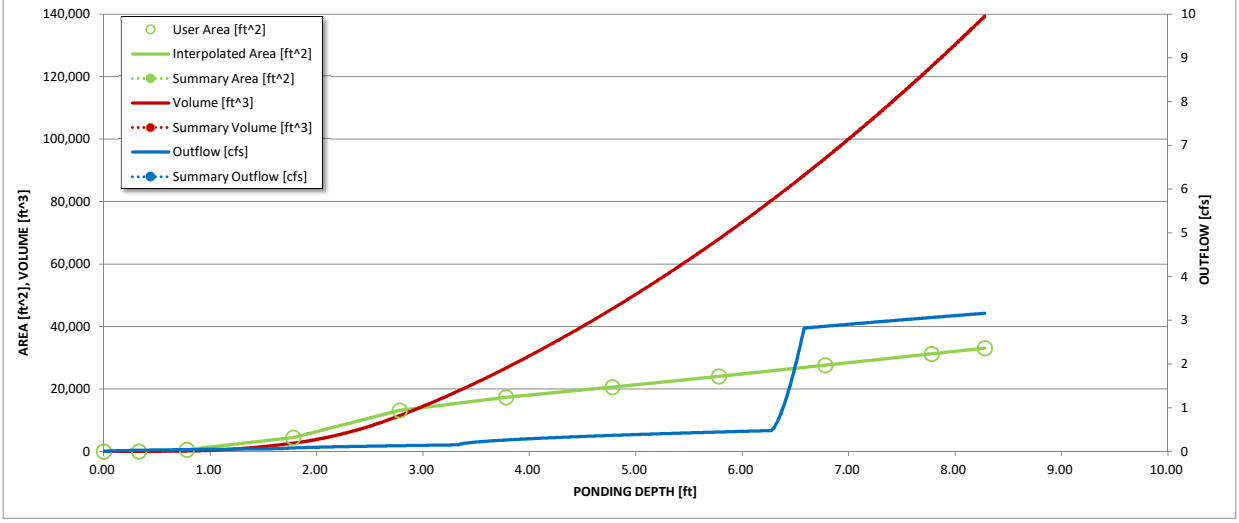
Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
One-Hour Rainfall Depth (in) =	N/A	N/A	1.19	1.50	1.75	2.00	2.25	2.52
CUHP Runoff Volume (acre-ft) =	0.333	1.159	0.865	1.145	1.370	1.709	2.040	2.456
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	0.865	1.145	1.370	1.709	2.040	2.456
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	0.1	0.2	0.3	2.7	5.5	9.1
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	0.02	0.15	0.30	0.49
Peak Inflow Q (cfs) =	N/A	N/A	11.1	14.8	17.6	23.6	28.9	35.4
Peak Outflow Q (cfs) =	0.1	0.4	0.3	0.4	0.4	0.5	1.2	2.9
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	1.7	1.4	0.2	0.2	0.3
Structure Controlling Flow =	Plate	Plate	Plate	Plate	Plate	Plate	Overflow Weir 1	Outlet Plate 1
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	0.1	0.3
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	38	72	64	72	77	85	90	89
Time to Drain 99% of Inflow Volume (hours) =	**40**	77	68	77	83	92	98	98
Maximum Ponding Depth (ft) =	3.01	5.01	4.26	4.85	5.29	5.90	6.41	6.83
Area at Maximum Ponding Depth (acres) =	0.32	0.49	0.43	0.48	0.51	0.56	0.60	0.64
Maximum Volume Stored (acre-ft) =	0.335	1.159	0.808	1.077	1.295	1.628	1.925	2.180

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.04 (February 2021)







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

DETENTION BASIN OUTLET STRUCTURE DESIGN

Outflow Hydrograph Workbook Filename:

Inflow Hydrographs

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

	SOURCE	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP
Time Interval	TIME	WQCV [cfs]	EURV [cfs]	2 Year [cfs]	5 Year [cfs]	10 Year [cfs]	25 Year [cfs]	50 Year [cfs]	100 Year [cfs]	500 Year [cfs]
5.00 min	0:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.01	0.45
	0:15:00	0.00	0.00	1.22	1.98	2.46	1.66	2.08	2.03	2.95
	0:20:00	0.00	0.00	4.41	5.81	6.85	4.34	5.08	5.43	7.12
	0:25:00	0.00	0.00	9.10	12.32	15.03	9.05	10.44	11.32	15.33
	0:30:00	0.00	0.00	11.10	14.82	17.64	19.70	24.22	27.86	38.85
	0:35:00	0.00	0.00	10.64	13.93	16.41	23.61	28.89	35.43	48.72
	0:40:00	0.00	0.00	9.80	12.62	14.82	23.10	28.23	34.75	47.72
	0:45:00	0.00	0.00	8.73	11.34	13.35	20.96	25.52	32.16	44.35
	0:50:00	0.00	0.00	7.82	10.31	12.02	19.05	23.07	28.95	40.13
	0:55:00	0.00	0.00	7.02	9.24	10.79	16.87	20.33	25.79	35.72
	1:00:00	0.00	0.00	6.30	8.25	9.70	14.88	17.83	23.08	31.94
	1:05:00	0.00	0.00	5.74	7.47	8.84	13.15	15.68	20.67	28.67
	1:10:00	0.00	0.00	5.16	6.97	8.31	11.47	13.60	17.62	24.33
	1:15:00	0.00	0.00	4.69	6.46	7.89	10.27	12.13	15.27	20.96
	1:20:00	0.00	0.00	4.27	5.89	7.27	9.11	10.71	13.09	17.86
	1:25:00	0.00	0.00	3.88	5.35	6.47	8.05	9.42	11.15	15.11
	1:30:00	0.00	0.00	3.50	4.83	5.70	6.95	8.09	9.43	12.69
	1:35:00	0.00	0.00	3.13	4.34	4.99	5.92	6.85	7.84	10.45
	1:40:00	0.00	0.00	2.81	3.73	4.40	4.99	5.73	6.40	8.43
	1:45:00	0.00	0.00	2.59	3.26	3.99	4.20	4.77	5.16	6.71
	1:50:00	0.00	0.00	2.48	2.98	3.77	3.65	4.12	4.33	5.59
	1:55:00	0.00	0.00	2.22	2.79	3.57	3.33	3.75	3.84	4.92
	2:00:00	0.00	0.00	1.99	2.60	3.29	3.14	3.53	3.54	4.49
	2:05:00	0.00	0.00	1.61	2.11	2.67	2.52	2.84	2.80	3.53
	2:10:00	0.00	0.00	1.27	1.66	2.11	1.97	2.21	2.15	2.70
	2:15:00	0.00	0.00	1.00	1.31	1.66	1.54	1.73	1.65	2.05
	2:20:00	0.00	0.00	0.78	1.02	1.29	1.20	1.34	1.26	1.56
	2:25:00	0.00	0.00	0.61	0.80	1.00	0.93	1.04	0.97	1.19
	2:30:00	0.00	0.00	0.47	0.61	0.76	0.71	0.79	0.74	0.91
	2:35:00	0.00	0.00	0.36	0.46	0.57	0.53	0.59	0.56	0.69
	2:40:00	0.00	0.00	0.27	0.34	0.44	0.40	0.45	0.43	0.53
	2:45:00	0.00	0.00	0.20	0.26	0.33	0.31	0.34	0.33	0.40
	2:50:00	0.00	0.00	0.14	0.18	0.24	0.23	0.25	0.24	0.29
	2:55:00	0.00	0.00	0.10	0.13	0.16	0.16	0.17	0.16	0.20
	3:00:00	0.00	0.00	0.06	0.08	0.10	0.10	0.11	0.10	0.12
	3:05:00	0.00	0.00	0.03	0.05	0.06	0.06	0.06	0.06	0.07
	3:10:00	0.00	0.00	0.01	0.02	0.02	0.02	0.03	0.02	0.03
	3:15:00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01
	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

CIVIL CONSULTANTS, INC.

212 N. Wahsatch Ave., Ste. 305
Colorado Springs, CO
719.955.5485

Project: FALCON TRUCKING FILING No. 1

Date: 02-04-2022

MINIMUM FOREBAY VOLUME POND 303

ENCLAVES AT MOUNTAIN VISTA FILING No 6 (EMV6)

3% OF WQCV = 3% x 0.335 AC-FT (43560 $\frac{CU FT}{AC FT}$) = 437.8 CU FT ≅ 438 CU FT DESIGN

WEST FOREBAY NON APPLICABLE FLOWS DIVERTED TO EMV6.

NORTH FOREBAY = 180 SF x 1.5' = 270 CU FT PER EMV6 BMP PLANS

180 SF x 2.5' = 450 CU FT ≥ 438 CU FT DESIGN

NORTH FOREBAY WILL HAVE TO BE MODIFIED.

FOREBAY RELEASE AND CONFIGURATION

2% OF 100YR PEAK DISCHARGE

2% x 47.2 CFS = 0.944 CFS ≤ 3.05 CFS FOR 3" DIA ORIFICE

SEE BROADCRESTED WEIR FOREBAY NOTCH CALCULATION IN APPENDIX.

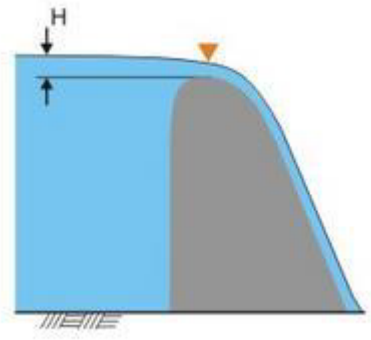
SEE OPENCHANNEL FLOW CALCULATOR IN APPENDIX FOR CAPACITY 2' x 6" @ 0.5% = 4.39 CFS > 3.05 CFS NOTCH

SPILLWAY CALC

47.2 CFS + BASIN B 5.3 CFS EMV6 = 52.5 CFS

52.5 CFS ≤ 73.19 CFS EMV6 BMP PLANS & FDR

onlinechannel14.php: Discharge over a broad-crested weir



The broad-crested weir

Formulas:

$$C = (2/3)^{3/2} (g)^{1/2}$$

$$Q = CLH^{3/2}$$

INPUT DATA:

Select: SI units (metric) / U.S. Customary units

Hydraulic head H: 2.5 ft

Weir length L: .25 ft

INTERMEDIATE CALCS:

Units selected: U.S. Customary

Gravitational acceleration g: 32.17 ft s^{-2}

Discharge coefficient C: 3.087 $ft^{1/2}$ s^{-1}

OUTPUT:

Discharge Q: 3.050 cfs

Calculate Reset

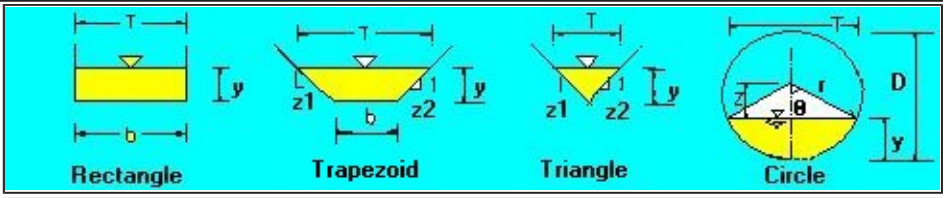
Your request was processed at 03:03:58 pm on February 4th, 2022 [220204 15:03:58].

Thank you for running onlinechannel14.php. Please call again. [140618]

EX POND 303 FOREBAY NOTCH CALCULATION

The open channel flow calculator

Select Channel Type: Rectangle



Velocity(V)&Discharge(Q) | Select unit system: Feet(ft)

Channel slope: 0.005 ft/ft	Water depth(y): 0.5 ft	Bottom W(b) 2 ft
Flow velocity 4.3926 ft/s	LeftSlope (Z1): 0 to 1 (H:'	RightSlope (Z2): 0 to 1 (H:V
Flow discharge 4.3926 ft^3/s	Input n value 0.0115 or select r	
Calculate!	Status: Calculation finished	Reset
Wetted perimeter 3 ft	Flow area 1 ft^2	Top width(T) 2 ft
Specific energy 0.8 ft	Froude number 1.09	Flow status Supercritical flow
Critical depth 0.53 ft	Critical slope 0.0042 ft/ft	Velocity head 0.3 ft

EX POND 303 TRICKLE CHANNEL

ENCLAVES AT MOUNTAIN VISTA FILING NO.5
EMERGENCY SPILLWAY CALCULATIONS FSD POND A

Horizontal Broad-Crested Weir (Eqn 12-20 UDFCD)						
Variable				*Solve For*		
C	**3.00**			L (ft)	H (ft)	Q (cfs)
L	**65.00**	ft		**0.0**	**0.0**	**68.9**
H	**0.50**	ft				
Q		cfs				

Total Q	**73.19**

Equation 12-20

$$Q = C_{BCW} L H^{1.5}$$

Sloping Broad-Crested Weir (Eqn 12-21 UDFCD)						
Variable				*Solve For*		
C	**3.00**			Z (ft)	H (ft)	Q (cfs)
Z	**10.00**	ft		**0.0**	**0.0**	**2.1**
H	**0.50**	ft				
Q		cfs				

Equation 12-21

$$Q = \left(\frac{2}{5}\right) C_{BCW} Z H^{2.5}$$

Where:

Q = discharge (cfs)

C_{BCW} = broad-crested weir coefficient (This ranges from 2.6 to 3.0. A value of 3.0 is often used in practice.) See Hydraulic Engineering Circular No. 22 for additional information.

L = broad-crested weir length (ft)

H = head above weir crest (ft)

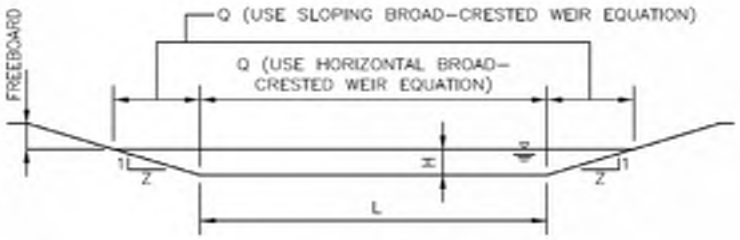


Figure 12-20. Sloping broad-crest weir

MS CIVIL CONSULTANTS, INC.

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(719) 955-5485

PROJECT: FALCON TRUCKING MDDP

DATE: 2/15/23 BASINS R & R2

DETERMINE IF EXISTING SWALES IN ENCLAVES @ MVR 5&6 HAVE CAPACITY FOR ADDTL RUNOFF.

R = 0.4 ACRES Q_{R100} = 2.0 CFS

R2 = 0.2 ACRES Q_{R2100} = 1.1 CFS

TOTAL RUNOFF DIRECTED TO LOTS WITHIN ENCLAVES FILING No. 6 (FROM F.T)

$Q_{R100} + Q_{R2100}$ = 2.0 + 1.1 CFS = 3.1 CFS

TOTAL LOT LINES IMPACTED BY RUNOFF (SIDE LOT SWALES)

13 LOT LINES

RUNOFF INCREASE PER LOT LINE = 3.1 CFS / 13 LOT LINES

= 0.23 CFS / LINE (SWALE)

EXISTING RUNOFF CONVEYED BY 13 LOT LINES (PORTION BASIN A5)

Area = 53094 sf = 1.21 Acres C = 0.57

Q_{100} = C I A ASSUME 5 MIN T_c = I_{100} = 8.7

0.57 x 8.7 x 1.21 = 6.0 CFS / 13 LOT LINES

= 0.46 CFS

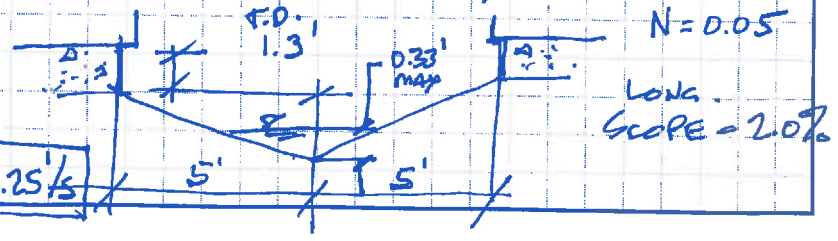
EXIST. SWALES ARE ADEQUATE

0.23 CFS + 0.46 CFS = 0.69 CFS / LOT

CHECK CROSS SECTION.

PER FLOWMASTER

D_{100} = 4 INCHES V_{100} = 1.25 f/s



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(719) 955-5485

PROJECT: FALCON TRUCKING

DATE: 2/15/23 / BASIN T

DETERMINE IF EXISTING SWALES IN ENCLAVES @ MVR 5 HAVE CAPACITY FOR ADDTL RUNOFF.

T = 0.3 ACRES Q_{T100} = 1.6 CFS

TOTAL RUNOFF DIRECTED TO LOTS WITHIN ENCLAVE FILING No. 5 (FROM F.T.)

Q_{T100} = 1.6 CFS

TOTAL LOT LINES IMPACTED BY RUNOFF (SIDELOT SWALES)

8 LOT LINES

RUNOFF INCREASE PER LOT LINE = 1.6 CFS / 8 LOT LINES

= 0.2 CFS / LINE (SWALE)

EXISTING RUNOFF CONVEYED BY 8 LOT LINES (PORTION OF BASIN T)

Area = 29412 sq ft = 0.675 ACRES C = 0.56

Q_{100} = CIA Assume T_C = 5.0 MIN → I_{100} = 8.7

0.56 x 8.7 x 0.675 = 3.3 CFS / 8 LOT LINES

= 0.41 CFS

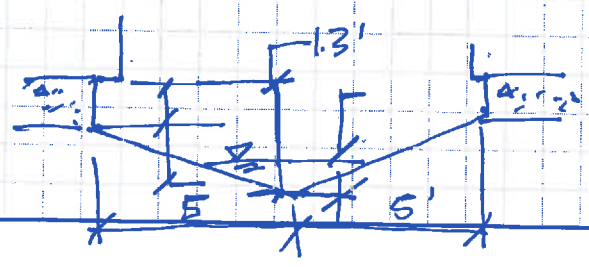
0.2 CFS + 0.41 CFS = $Q_{(MAX)100}$ = 0.61 CFS

CHECK CROSS SECTION

ADEQUATE

PER FLOWMASTER

D_{100} = 3.8" V_{100} = 1.21 f/s



N = 0.05

LONG SLOPE = 2.0%

GREEN AREA
(PORTION OF A5)
1.21 ACRES
Q100=6.0CFS

BLUE AREA
(PORTION OF A7)
0.68 ACRES
Q100=3.3 CFS

SUBDIVISION BOUNDARY
KOALIN COURT
KOALIN CT
ARKOSE LOOP
SUB BNDY
ENCLAVES AT MOUNTAIN VISTA FILING NO. 5
EX. AT-GRADE 4'D-10R INLETS
EX. AT-GRADE 8'D-10R INLET
EX. 36" STORM SEWER
EX 8' D-10R SUMP INLET
EX MH
EX. SWALE
EX. WALL
EX. CDOT TYPE D AREA INLET
L.P.
(3.6)%

R: 0.4 | .40 | .56
A5: 1.3 | .38 | .57
A3: 0.4 | .38 | .57
A4: 2.0 | .3 | .5
R2: 0.2 | .40 | .56
A6: 0.8 | .38 | .57
A7: 0.7 | .38 | .57
A13: 0.4 | .38 | .57
S: 0.1 | .63 | .76
S2: 0.1 | .63 | .76
A7*: 1.23 | .45 | .59
A8: 0.2 | .38 | .57
A8*: 0.93 | .45 | .59
T: 0.3 | .40 | .56
B: 2.05 | .19

Worksheet for Common Side Lot Swale - Filing 6 - 0.69 cfs

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.050
Channel Slope	0.020 ft/ft
Left Side Slope	5.000 H:V
Right Side Slope	5.000 H:V
Discharge	0.69 cfs

Results	
Normal Depth	4.0 in
Flow Area	0.6 ft²
Wetted Perimeter	3.4 ft
Hydraulic Radius	2.0 in
Top Width	3.32 ft
Critical Depth	3.1 in
Critical Slope	0.074 ft/ft
Velocity	1.25 ft/s
Velocity Head	0.02 ft
Specific Energy	0.36 ft
Froude Number	0.542
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	4.0 in
Critical Depth	3.1 in
Channel Slope	0.020 ft/ft
Critical Slope	0.074 ft/ft

Worksheet for Common Side Lot Swale - Filing 5 - 0.61 cfs

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.050
Channel Slope	0.020 ft/ft
Left Side Slope	5.000 H:V
Right Side Slope	5.000 H:V
Discharge	0.61 cfs

Results	
Normal Depth	3.8 in
Flow Area	0.5 ft²
Wetted Perimeter	3.2 ft
Hydraulic Radius	1.9 in
Top Width	3.17 ft
Critical Depth	3.0 in
Critical Slope	0.075 ft/ft
Velocity	1.21 ft/s
Velocity Head	0.02 ft
Specific Energy	0.34 ft
Froude Number	0.538
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	3.8 in
Critical Depth	3.0 in
Channel Slope	0.020 ft/ft
Critical Slope	0.075 ft/ft

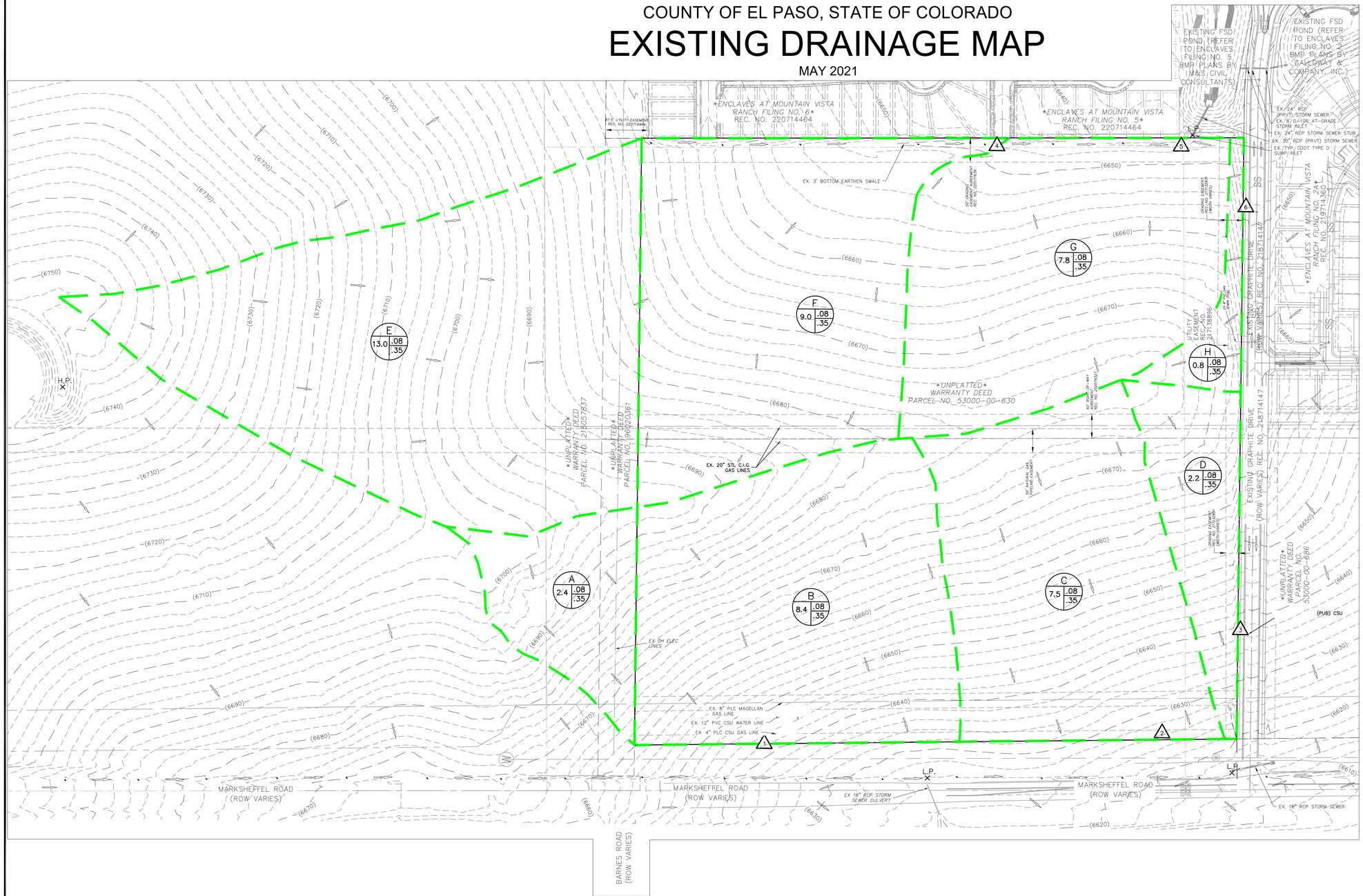
DRAINAGE MAPS

FALCON TRUCKING

COUNTY OF EL PASO, STATE OF COLORADO

EXISTING DRAINAGE MAP

MAY 2021



BASIN SUMMARY			
BASIN	AREA (ACRES)	Q_5	Q_{100}
A	2.37	0.6	4.4
B	8.42	2.2	16.1
C	7.53	1.8	13.0
D	2.23	0.6	4.1
E	12.97	3.1	22.5
F	8.97	2.0	15.0
G	7.78	1.5	11.3
H	0.79	0.2	1.5

DESIGN POINT SUMMARY				
DESIGN POINT	Q_5	Q_{100}	BASIN	STRUCTURE
1	2.7	19.6	A, B	TO MS ROW (MS CULVERT)
2	1.8	13.0	C	TO MS ROW (GRAPHITE CULVERT)
3	0.6	4.1	D	TO GRAPHITE DR ROW (W)
4	4.0	29.6	E, F	3' EARTHEN SWALE
5	4.6	33.6	DP4, G	EX TYPE D INLET
6	0.2	1.5	H	TO GRAPHITE DR ROW (E)

LEGEND

BASIN DESIGNATION — Z — 25 .25 .35 — C5 / C100 — ACRES

1 SURFACE DESIGN POINT

BASIN BOUNDARY

EX. WATER VALVE

EX. SANITARY MANHOLE

EXIST MAJ CONT

EXIST MIN CONT

EXISTING FLOW DIRECTION ARROW

H.P. HIGH POINT

L.P. LOW POINT

EXISTING ROADSIDE DITCH

SITE BOUNDARY

R.O.W./EASEMENT

LOT LINE

1" = 100'

0 50 100 200

Scale in Feet

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FALCON TRUCKING

EXISTING DRAINAGE MAP

PROJECT NO. 29-007A	SCALE: HORIZONTAL: 1"=100' VERTICAL: N/A	DATE: 05/20/21	
DESIGNED BY: DLM		SHEET 1 OF 1	PDM
DRAWN BY: DLM			
CHECKED BY: VAS			

File: Q:\29007A-Falcon Trucking\[Site Layout\Drainage\29007 Existing Drainage Map.dwg Plotstamp: 6/3/2021 10:46 AM

FALCON TRUCKING FILING NO. 1

COUNTY OF EL PASO, STATE OF COLORADO

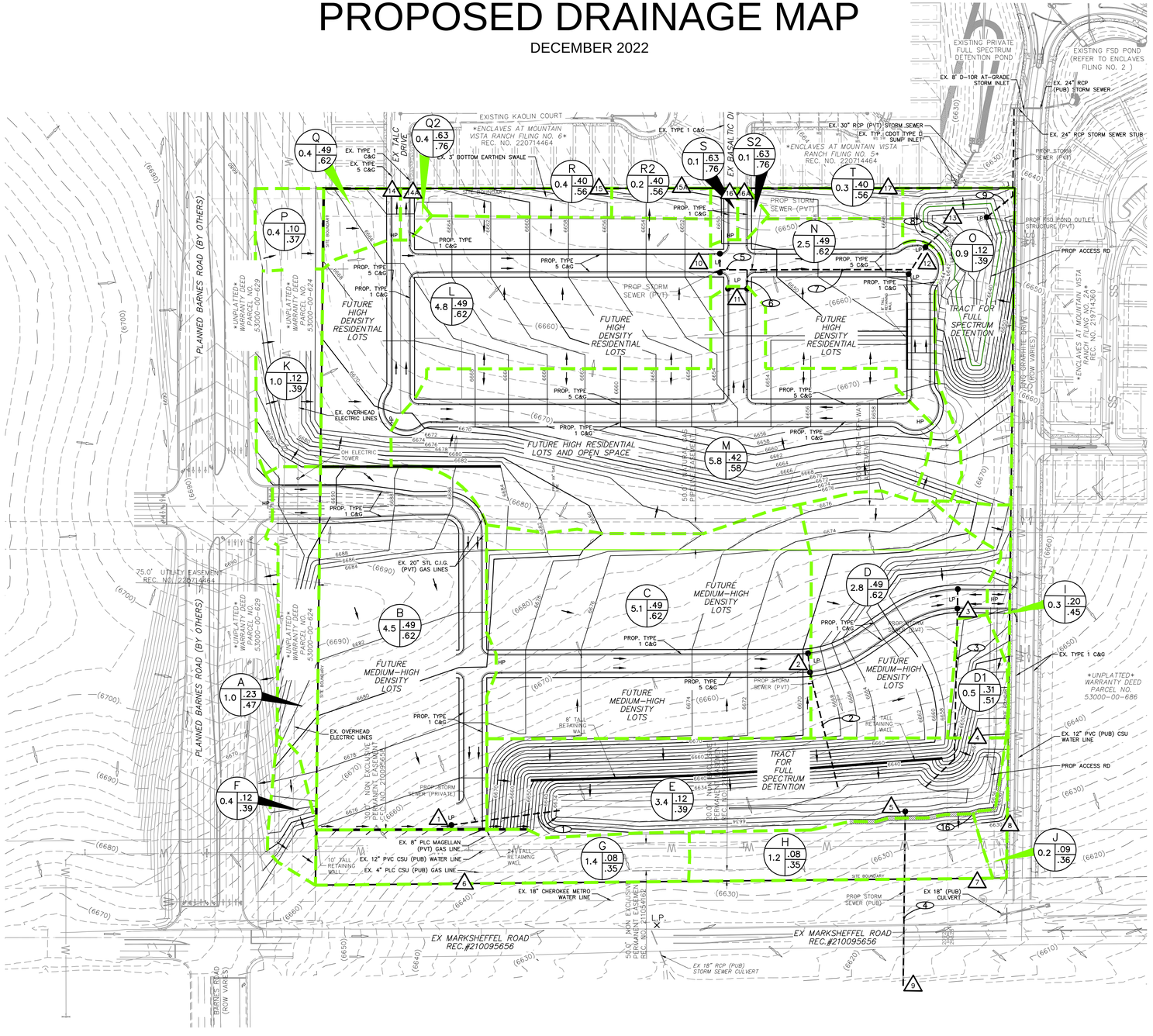
PROPOSED DRAINAGE MAP

DECEMBER 2022

BASIN SUMMARY			
BASIN	AREA (ACRES)	Q_5	Q_{100}
A	0.95	1.1	3.7
B	4.50	8.9	19.0
C	5.07	9.0	19.1
D	2.80	5.2	11.1
D1	0.46	0.6	1.6
E	3.41	1.6	9.0
F	0.37	0.2	1.0
G	1.44	0.5	3.7
H	1.22	0.4	3.0
I	0.30	0.3	1.2
J	0.17	0.1	0.4
K	0.97	0.5	2.7
L	4.76	8.6	18.2
M	5.84	11.0	25.1
N	2.49	5.0	10.7
O	0.90	0.5	2.8
P	0.41	0.2	1.1
Q	0.36	0.7	1.6
Q2	0.08	0.2	0.4
R	0.40	0.8	2.0
R2	0.22	0.5	1.1
S	0.11	0.5	0.9
S2	0.08	0.4	0.6
T	0.33	0.7	1.6

DESIGN POINT SUMMARY				
DESIGN POINT	Q_5	Q_{100}	BASIN	STRUCTURE
1	11.0	24.6	A, B	PROP 36" RCP*
2	9.0	19.1	C	PROP 30" RCP*
3	5.2	11.1	D	PROP 24" RCP*
4	0.6	1.6	D1	
5	28.5	58.0	PR1–PR3, DP4, E	FSD POND 1
6	0.7	4.5	F, G	
7	0.4	3.0	H	
8	0.4	1.5	I, J	GRAPHITE DRIVE
9	2.7	16.5	DP6, POND 1	EARTHEN SWALE
10	9.0	20.6	K, L	PROP 30" RCP*
11	11.0	25.1	M	PROP 36" RCP*
12	5.0	10.7	N	PROP 42" RCP*
13	23.0	53.2	PR8, O	FSD POND 2
14	0.9	2.6	P, Q	EX TALC DRIVE
14A	0.2	0.4	Q2	EX TALC DRIVE
15	0.8	2.0	R	FILING 6 BOUNDARY
15A	0.5	1.1	R2	FILING 6 BOUNDARY
16	0.5	0.9	S	EX BASALTIC DRIVE
16A	0.4	0.6	S2	EX BASALTIC DRIVE
17	0.7	1.6	T	FILING 5 BOUNDARY

STORM SEWER SUMMARY				
PIPE RUN	Q_5	Q_{100}	PIPE SIZE	CONTRIBUTING PIPES & DESIGN POINTS
1	11.0	24.6	36" RCP*	DP1
2	9.0	19.1	30" RCP*	DP2
3	5.2	11.1	24" RCP*	DP3
4	2.1	12.0	24" RCP*	FSD POND 1 OUTFALL
5	9.0	20.6	30" RCP*	DP10
6	11.0	25.1	36" RCP*	DP11
7	18.1	41.5	42" RCP*	PR5, PR6
8	22.6	51.0	42" RCP*	PR7, DP12
9	0.6	11.7	18" RCP*	FSD POND 2 OUTFALL



LEGEND

BASIN DESIGNATION: Z | 25 ACRES | .25 C5 | .35 C100

1 — SURFACE DESIGN POINT

BASIN BOUNDARY

EX. WATER VALVE

EX. SANITARY MANHOLE

(7070) EXIST MAJ CONT

(7072) EXIST MIN CONT

EXISTING FLOW DIRECTION ARROW

H.P. HIGH POINT

L.P. LOW POINT

PROP STORM SEWER

1" = 100'

0 50 100 200

Scale in Feet

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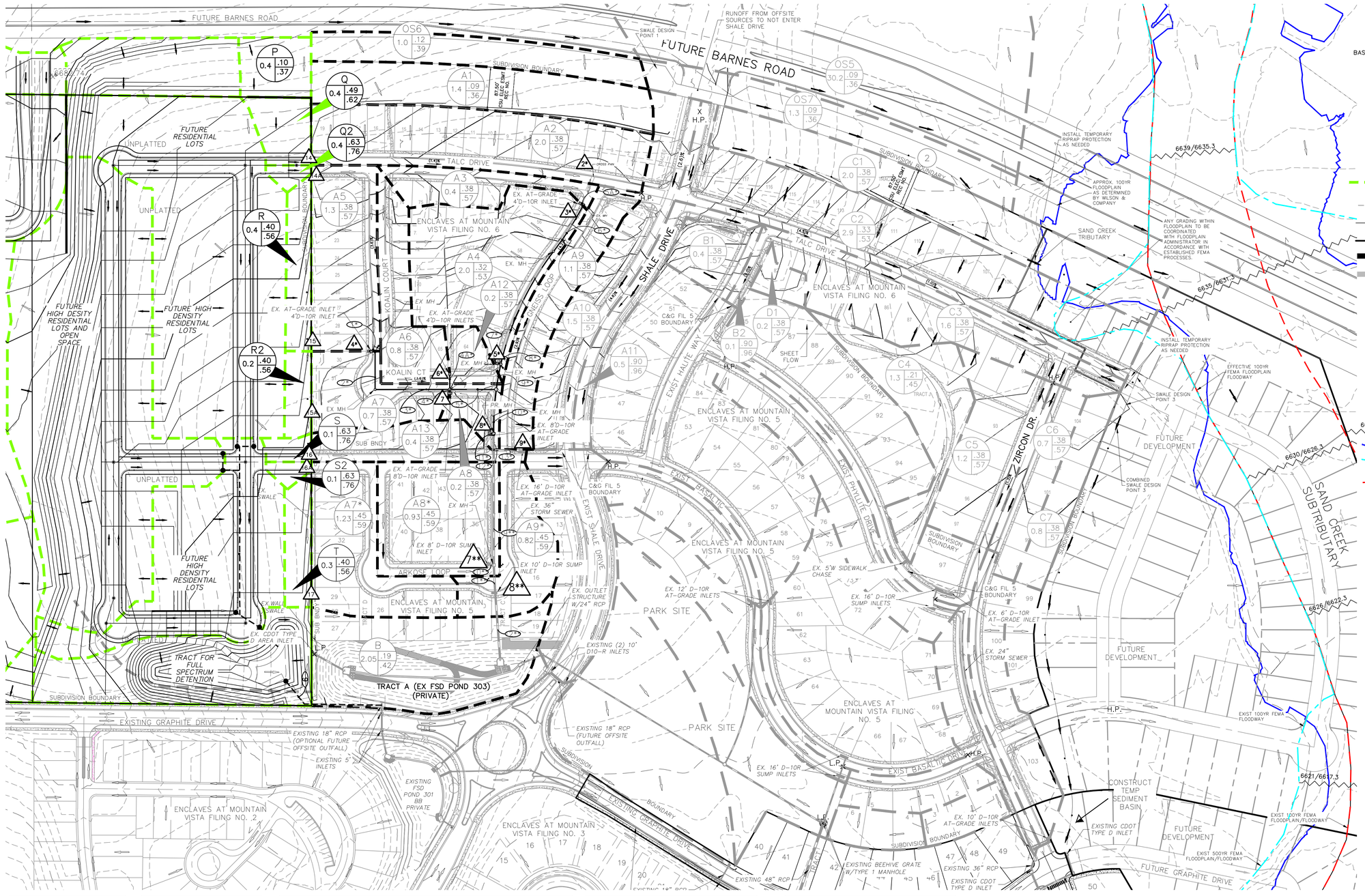
CIVIL CONSULTANTS, INC.

FALCON TRUCKING FILING NO. 1

PROPOSED DRAINAGE MAP

PROJECT NO. 29-007A	SCALE: HORIZONTAL: 1"=100' VERTICAL: N/A	DATE: 12/02/22	
DESIGNED BY: CVW		SHEET 1 OF 2	PDM
DRAWN BY: CVW			
CHECKED BY: VAS			

File: O:\29007A-Falcon Trucking\Edw Levy\Drainage\29007 Proposed Drainage Map-12-1-22.dwg Plotstamp: 12/2/2022 10:36 AM



BASIN SUMMARY			
BASIN	AREA (ACRES)	Q_5	Q_{100}
P	0.4	0.2	1.1
Q	0.4	0.7	1.6
Q2	0.1	0.2	0.4
R	0.4	0.8	2.0
R2	0.2	0.5	1.1
S	0.1	0.5	0.9
S2	0.1	0.4	0.6
T	0.3	0.7	1.6
OS6	1.0	0.5	2.7
A1	1.4	0.5	3.6
A2	2.0	2.8	7.1
A3	0.4	0.6	1.6
A4	2.0	2.7	7.5
A5	1.3	2.2	5.5
A6	0.8	1.2	3.1

BASIN SUMMARY			
BASIN	AREA (ACRES)	Q_5	Q_{100}
A7	0.7	1.1	2.8
A8	0.2	0.4	1.0
A9	1.1	1.8	4.5
A12	0.2	0.3	0.8
A13	0.4	0.7	1.6
A7*	1.2	2.4	5.3
A8*	0.9	1.8	4.0
A9*	0.8	1.6	3.4

DESIGN POINT SUMMARY				
DESIGN POINT	Q_5	Q_{100}	BASIN	STRUCTURE
14	0.9	2.6	P, Q	WROADWAY
14A	0.2	0.4	Q2	ROADWAY
15	0.8	2.0	R	
15A	0.5	1.1	R2	
16	0.5	0.9	S	ROADWAY
16A	0.4	0.6	S2	ROADWAY
17	0.7	1.6	T	
2*	4.5	15.0	DP14, A1, A2, OS6	CROSSPAN
3*	5.1	16.4	DP2, A3	EX 4' D10-R AT-GRADE INLET
4*	3.1	7.5	DP14A, DP15, A5	EX 4' D10-R AT-GRADE INLET
5*	4.9	18.4	FB DP3, A4	EX 4' D10-R AT-GRADE INLET
6*	1.2	3.1	A6	EX 4' D10-R AT-GRADE INLET
7*	2.6	8.3	FB DP4, A7, 15A	EX 4' D10-R AT-GRADE INLET
8*	4.6	25.0	FB DP5, FB DP6, FB DP7, A8, A12	EX 8' D10-R AT-GRADE INLET
9*	3.0	19.1	DP16, A9, A13, FB DP8	EX 16' D10-R AT-GRADE INLET
7**	1.8	4.0	A8*	EX 8' D10-R SUMP INLET
8**	4.7	10.4	DP16A, DP17, A7*, A9*	EX 10' D10-R SUMP INLET

STORM SEWER SUMMARY				
PIPE RUN	Q_5	Q_{100}	PIPE SIZE	CONTRIBUTING PIPES/DESIGN POINTS
1*	1.9	2.7	18" RCP	INLET DP4*
2*	1.9	2.7	18" RCP	PR1*
3*	1.9	2.7	18" RCP	PR2*
4*	1.7	2.8	18" RCP	INLET DP7*
4A*	1.1	1.9	18" RCP	INLET DP6*
5*	4.5	7.1	18" RCP	PR4*, PR4A*
5A*	2.3	3.7	18" RCP	INLET DP3*
6*	2.3	3.7	18" RCP	PR5A*
7*	2.3	3.7	18" RCP	PR6*
8*	2.2	3.7	18" RCP	INLET DP5*
9*	4.4	7.2	18" RCP	PR7*, PR8*
10*	8.3	13.4	24" RCP	PR5*, PR9*
11*	3.8	8.7	18" RCP	INLET DP8*
12*	11.5	20.7	30" RCP	PR10*, PR11*
13*	2.7	14.5	18" RCP	PR12*, PR13*

STORM SEWER SUMMARY				
PIPE RUN	Q_5	Q_{100}	PIPE SIZE	CONTRIBUTING PIPES/DESIGN POINTS
9**	14.3	35.5	36" RCP	PR12*, PR13*
10**	1.8	4.0	18" RCP	DP7**
11**	15.6	38.5	36" RCP	PR9**, PR10**
12**	19.6	47.2	36" RCP	PR11, DP8**

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PHONE: 719.955.5485

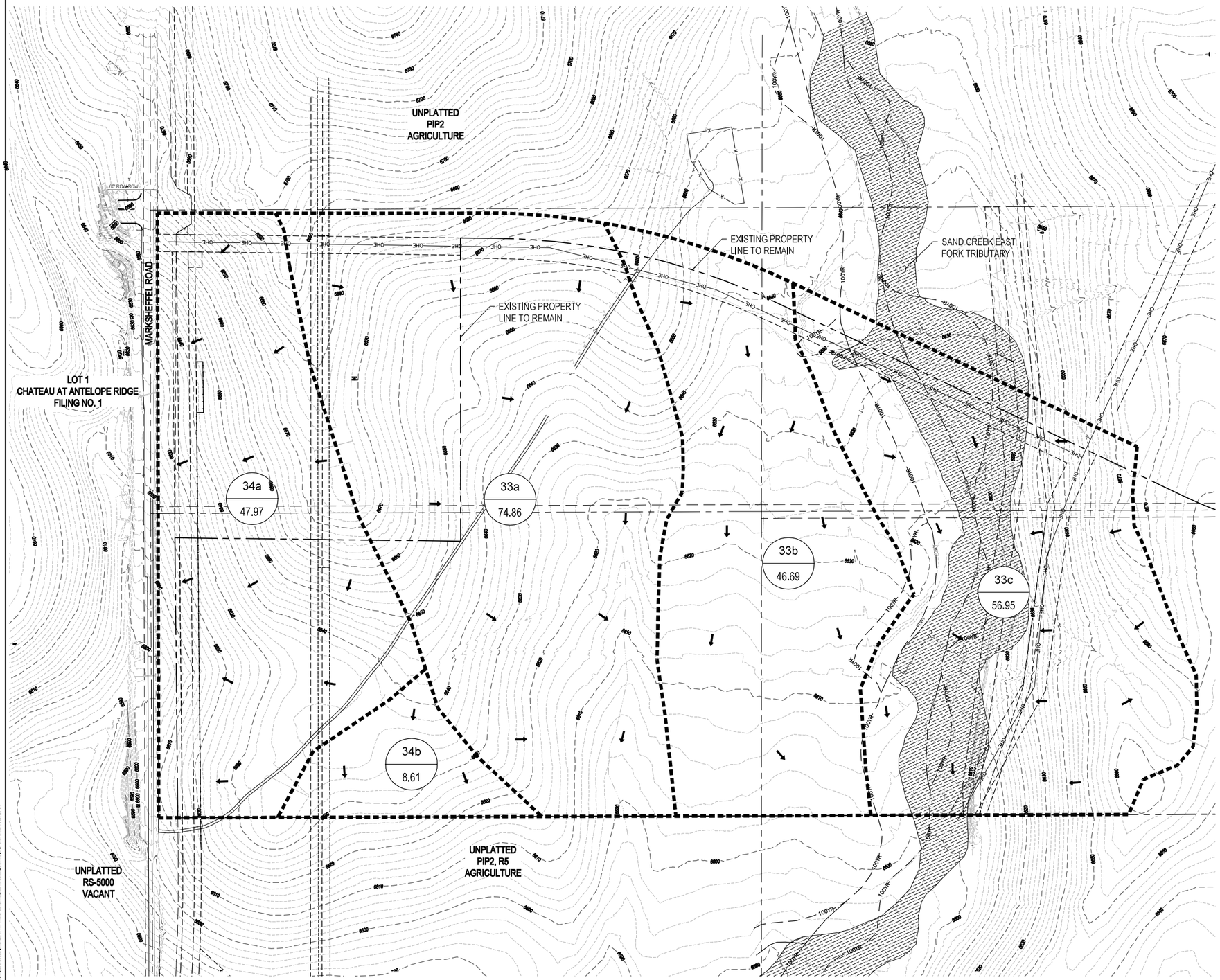
FALCON TRUCKING FILING NO.1

FINAL DRAINAGE MAP

PROJECT NO. 29-007	SCALE: HORIZONTAL: 1"=100' VERTICAL: N/A	DATE: 12-02-2022	
DESIGNED BY: VAS		SHEET 2 OF 2	DM2
DRAWN BY: CLP DCV			
CHECKED BY: VAS			

File: O:\29007A-Falcon Trucking\Edw Levy\Drainage\29007 Proposed Drainage Map-Enclaves.dwg Plotstamp: 12/2/2022 10:37 AM

BACKGROUND INFORMATION



N

0 50 100 200

SCALE: 1"=200'

DRAINAGE LEGEND

- 4685 — EXISTING MAJOR CONTOUR
- 4684 — EXISTING MINOR CONTOUR
- MAJOR BASIN BOUNDARY LINE
- 33c / 56.95 — BASIN DESIGNATION / AREA (ACRES)
- STST — EXISTING STORM SEWER
- DIRECTION OF RUNOFF

EXISTING CONDITIONS DRAINAGE CALCULATIONS			
BASIN	AREA (ACRES)	5 YEAR EVENT	100 YEAR EVENT
33A	74.86 ACRES	7.85 CFS	18.42 CFS
33B	46.69 ACRES	4.85 CFS	10.69 CFS
33C	56.95 ACRES	5.88 CFS	12.68 CFS
34A	47.97 ACRES	5.06 CFS	9.58 CFS
34B	8.61 ACRES	0.91 CFS	1.79 CFS
TOTAL DISCHARGE	OUTFALL 33	18.58 CFS	41.79 CFS
TOTAL DISCHARGE	OUTFALL 34	5.97 CFS	11.37 CFS
	TOTAL COMBINED	24.55 CFS	53.16 CFS

HISTORIC DRAINAGE PLAN

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Colorado Springs, CO 80920
719.900.7220 Office
www.gallowayUS.com

FINAL DRAINAGE PLAN
ENCLAVES AT MOUNTAIN VISTAS
COLORADO SPRINGS, CO

#	Date	Issue / Description	Init.

Project No:	CLH000007.01
Drawn By:	RAL
Checked By:	JCA
Date:	MARCH 18, 2016

HISTORIC DRAINAGE PLAN

DR-1
Sheet 1 of 4

MASTER DEVELOPMENT DRAINAGE CALCULATIONS			
BASIN	AREA (ACRES)	5 YEAR EVENT	100 YEAR EVENT
A1	4.42 ACRES	12.62 CFS	23.72 CFS
A2	8.15 ACRES	21.65 CFS	41.19 CFS
A3a	1.91 ACRES	4.90 CFS	9.17 CFS
A3b	2.80 ACRES	7.21 CFS	13.80 CFS
A4	1.57 ACRES	4.65 CFS	8.70 CFS
A5	1.96 ACRES	6.05 CFS	11.29 CFS
B1	2.07 ACRES	2.40 CFS	6.80 CFS
B2	2.54 ACRES	1.70 CFS	5.10 CFS
B3	5.42 ACRES	1.36 CFS	4.42 CFS
B4	1.82 ACRES	3.08 CFS	8.06 CFS
C1	5.86 ACRES	15.20 CFS	29.05 CFS
C2	3.21 ACRES	8.09 CFS	15.55 CFS
C5	5.35 ACRES	2.41 CFS	10.11 CFS
C6	5.00 ACRES	3.09 CFS	8.58 CFS
D1	5.38 ACRES	2.73 CFS	8.33 CFS
D2	8.02 ACRES	3.78 CFS	14.29 CFS
D3	1.88 ACRES	1.83 CFS	5.16 CFS
E1	3.24 ACRES	1.66 CFS	5.02 CFS
E2	4.06 ACRES	2.26 CFS	6.80 CFS
E3	3.68 ACRES	2.86 CFS	8.80 CFS
E4	3.50 ACRES	3.19 CFS	9.78 CFS
F1	2.06 ACRES	3.00 CFS	8.39 CFS
F2	1.68 ACRES	2.45 CFS	6.50 CFS
F3	5.55 ACRES	2.83 CFS	8.48 CFS
F4	3.34 ACRES	1.48 CFS	4.48 CFS
F5	0.92 ACRES	1.04 CFS	2.87 CFS
F6	2.99 ACRES	1.78 CFS	5.28 CFS
F7	2.37 ACRES	0.11 CFS	1.13 CFS
OS1	17.00 ACRES	1.85 CFS	11.45 CFS
OS2	4.73 ACRES	1.25 CFS	2.63 CFS
OS3	13.04 ACRES	1.32 CFS	2.52 CFS
OS4	55.64 ACRES	19.78 CFS	41.45 CFS

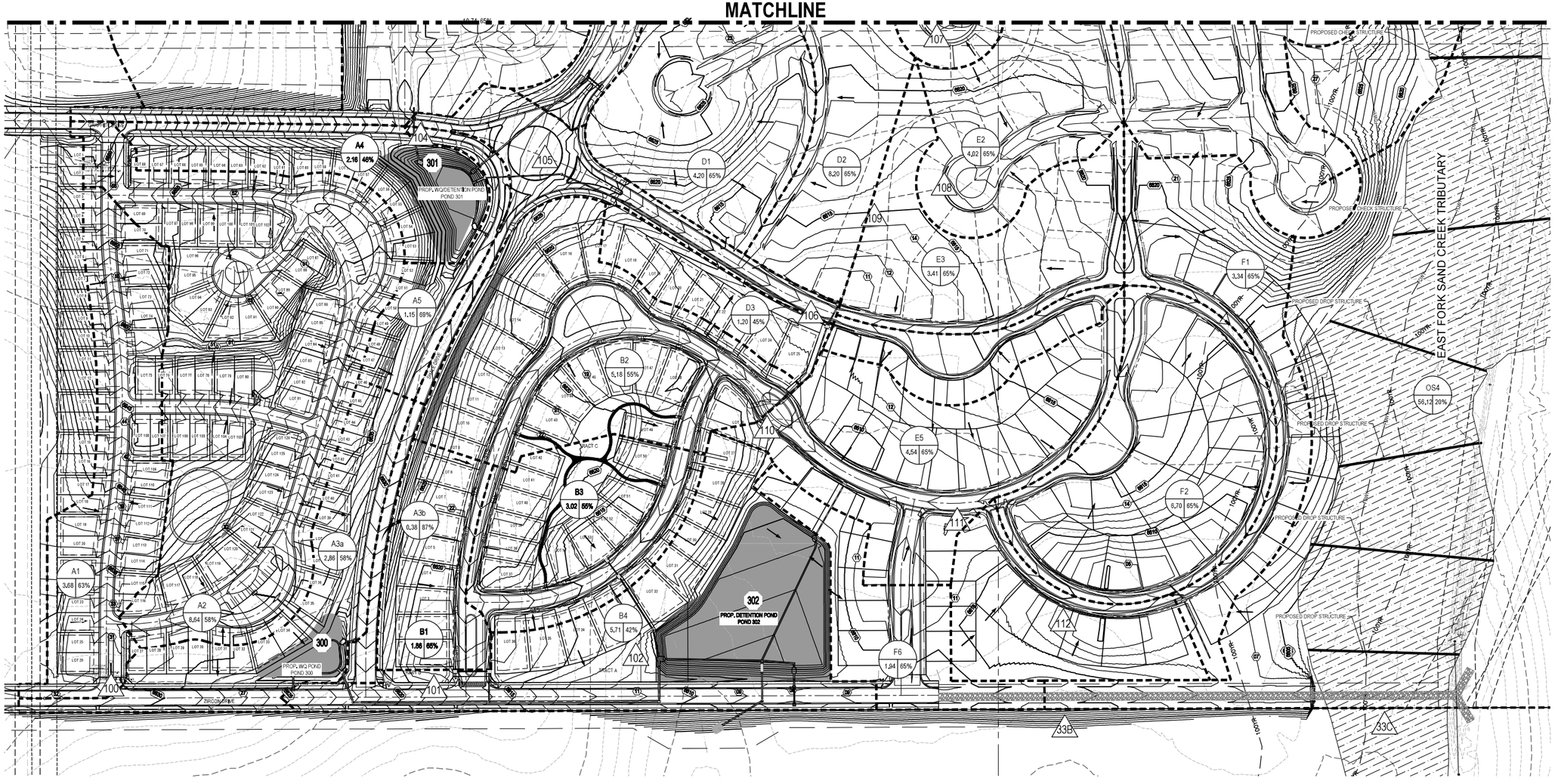
DRAINAGE LEGEND

- 4850 — EXISTING CONTOUR
- 6485 — PROPOSED CONTOUR
- MAJOR BASIN BOUNDARY LINE
- E3 / 3.68 / 65% — BASIN DESIGNATION; BASIN PERCENT IMPERVIOUS; BASIN AREA IN ACRES
- PROPOSED STORM SEWER
- 1 — DESIGN POINT — NODE/DESIGN POINT LABEL
- 302 — POND — PROPOSED POND DESIGNATOR
- DRAINAGE ARROW — PROPOSED FLOW DIRECTION ARROW
- EXISTING 100-YR FLOODPLAIN

N

0 50 100 200
SCALE: 1"=200'

MATCHLINE



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PRELIMINARY DRAINAGE PLAN
ENCLAVES AT MOUNTAIN VISTAS
-
-
- COLORADO SPRINGS, CO

#	Date	Issue / Description	Init.

Project No:	CLH000007.01
Drawn By:	RAL
Checked By:	JCA
Date:	MARCH 18, 2016

MASTER DEVELOPMENT DRAINAGE PLAN

DR-2
Sheet 2 of 4

MASTER DEVELOPMENT DRAINAGE CALCULATIONS			
BASIN	AREA (ACRES)	5 YEAR EVENT	100 YEAR EVENT
A1	4.42 ACRES	12.62 CFS	23.72 CFS
A2	8.15 ACRES	21.65 CFS	41.19 CFS
A3a	1.91 ACRES	4.90 CFS	9.17 CFS
A3b	2.80 ACRES	7.21 CFS	13.80 CFS
A4	1.57 ACRES	4.65 CFS	8.70 CFS
A5	1.96 ACRES	6.05 CFS	11.29 CFS
B1	2.07 ACRES	2.40 CFS	6.80 CFS
B2	2.54 ACRES	1.70 CFS	5.10 CFS
B3	5.42 ACRES	1.36 CFS	4.42 CFS
B4	1.82 ACRES	3.08 CFS	8.06 CFS
C1	5.86 ACRES	15.20 CFS	29.05 CFS
C2	3.21 ACRES	8.09 CFS	15.55 CFS
C5	5.35 ACRES	2.41 CFS	10.11 CFS
C6	5.00 ACRES	3.09 CFS	8.58 CFS
D1	5.38 ACRES	2.73 CFS	8.33 CFS
D2	8.02 ACRES	3.78 CFS	14.29 CFS
D3	1.88 ACRES	1.83 CFS	5.16 CFS
E1	3.24 ACRES	1.66 CFS	5.02 CFS
E2	4.06 ACRES	2.26 CFS	6.80 CFS
E3	3.68 ACRES	2.86 CFS	8.80 CFS
E4	3.50 ACRES	3.19 CFS	9.78 CFS
F1	2.06 ACRES	3.00 CFS	8.39 CFS
F2	1.68 ACRES	2.45 CFS	6.50 CFS
F3	5.55 ACRES	2.83 CFS	8.48 CFS
F4	3.34 ACRES	1.48 CFS	4.48 CFS
F5	0.92 ACRES	1.04 CFS	2.87 CFS
F6	2.99 ACRES	1.78 CFS	5.28 CFS
F7	2.37 ACRES	0.11 CFS	1.13 CFS
OS1	17.00 ACRES	1.85 CFS	11.45 CFS
OS2	4.73 ACRES	1.25 CFS	2.63 CFS
OS3	13.04 ACRES	1.32 CFS	2.52 CFS
OS4	55.64 ACRES	19.78 CFS	41.45 CFS

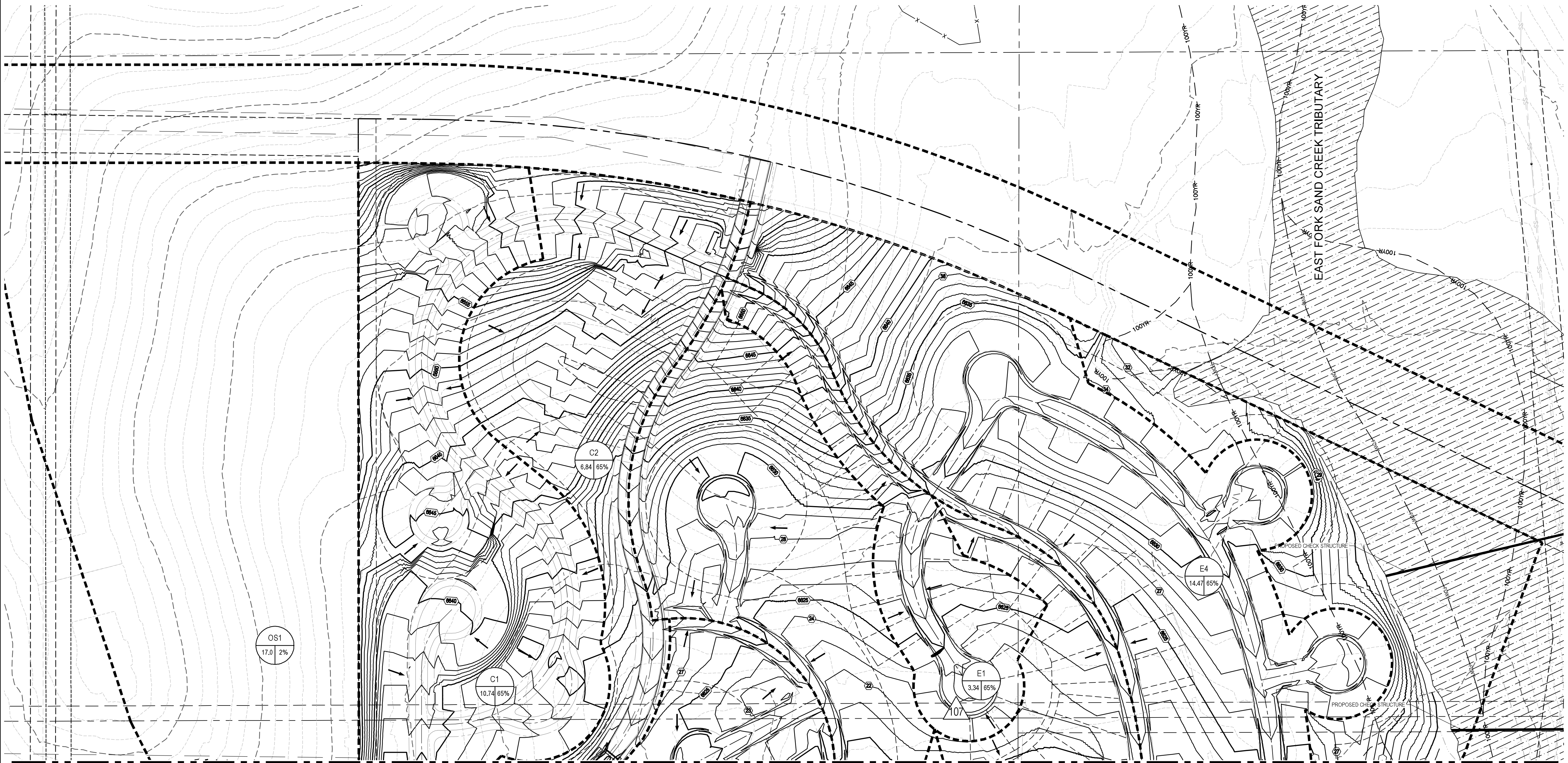
DRAINAGE LEGEND

- 4850 — EXISTING CONTOUR
- 6485 — PROPOSED CONTOUR
- MAJOR BASIN BOUNDARY LINE
- E3 / 3.68 / 65% — BASIN DESIGNATION; BASIN PERCENT IMPERVIOUS; BASIN AREA IN ACRES
- PROPOSED STORM SEWER
- 1 — DESIGN POINT — NODE/DESIGN POINT LABEL
- 302 — POND — PROPOSED POND DESIGNATOR
- DRAINAGE ARROW — PROPOSED FLOW DIRECTION ARROW
- EXISTING 100-YR FLOODPLAIN

N

0 50 100 200

SCALE: 1"=200'



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PRELIMINARY DRAINAGE PLAN
ENCLAVES AT MOUNTAIN VISTAS

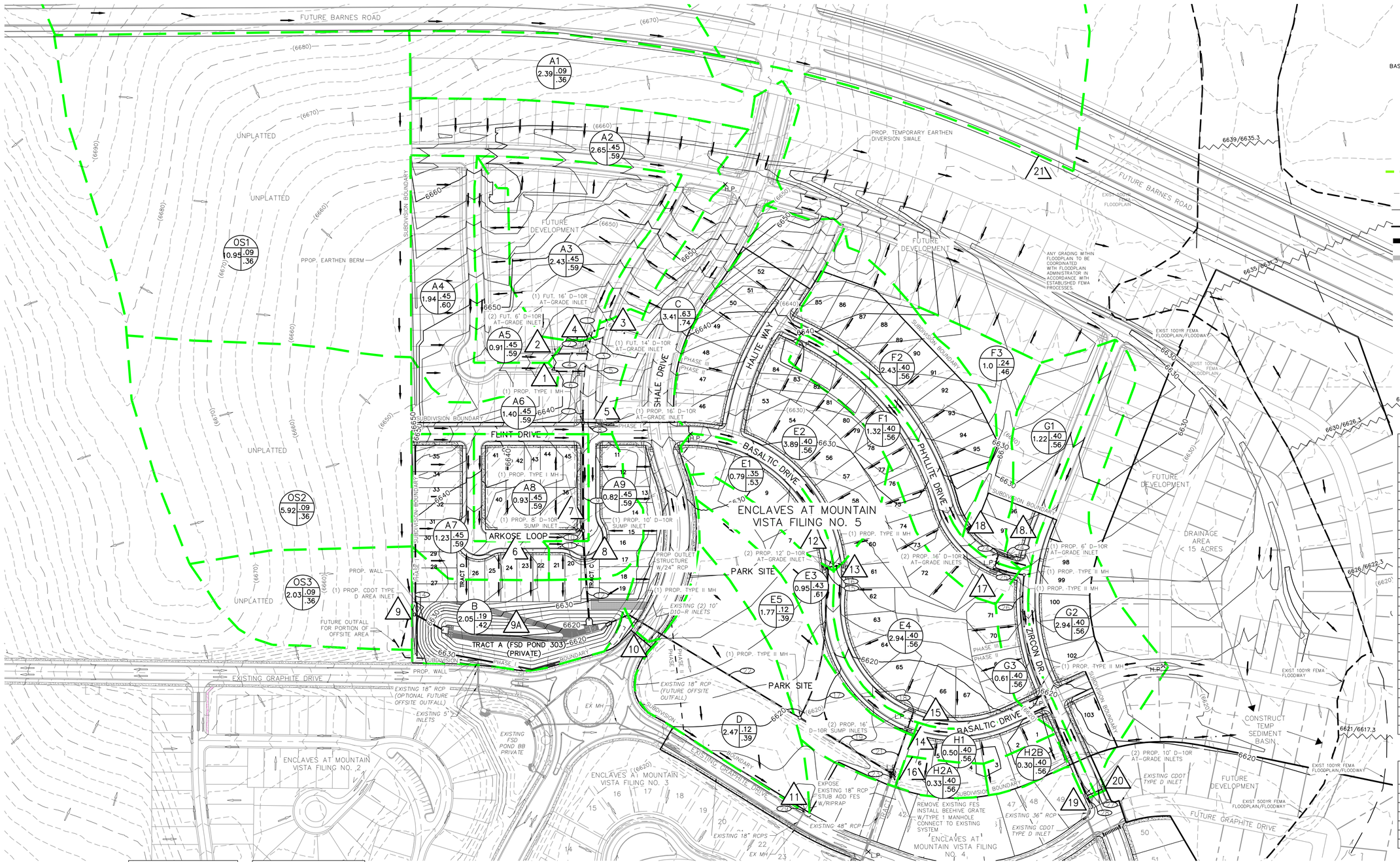
COLORADO SPRINGS, CO

#	Date	Issue / Description	Init.

Project No:	CLH000007.01
Drawn By:	RAL
Checked By:	JCA
Date:	MARCH 18, 2016

MASTER DEVELOPMENT DRAINAGE PLAN

DR-3



LEGEND

- BASIN DESIGNATION: G1 — 2.35 (ACRES) — .53 (C5) — .66 (C100)
- 4 — PIPE RUN REFERENCE LABEL
- 6 — SURFACE DESIGN POINT
- BASIN BOUNDARY
- (6920) — EXISTING CONTOUR
- 6920 — PROP CONTOUR
- SUBDIVISION BOUNDARY
- PROPOSED STORM SEWER PIPE
- EXISTING STORM SEWER PIPE
- CROSSPAN
- INLET
- MANHOLE
- EXISTING FLOW DIRECTION ARROW
- PROPOSED FLOW DIRECTION ARROW
- FLARED END SECTION
- H.P. — HIGH POINT
- L.P. — LOW POINT
- 6652/6648.3 — 100 YEAR BFE (NAVD88/NGVD29)

STORM SEWER SUMMARY

PIPE RUN	Q_5	Q_{100}	PIPE SIZE	CONTRIBUTING PIPES/DESIGN POINTS
1	5.0	12.7	24" RCP	DP3
2	4.2	8.8	18" RCP	DP4
3	8.9	20.8	24" RCP	PR1, PR2
4	1.6	3.7	18" RCP	DP2
5	10.3	24.0	30" RCP	PR3, PR4
6	2.9	3.8	18" RCP	DP1
7	12.7	27.0	30" RCP	PR5, PR6
8	2.9	10.4	18" RCP	DP5
9	15.5	37.3	30" RCP	PR7, PR8
10	1.8	6.4	18" RCP	DP7
11	20.7	51.7	36" RCP	PR9, PR10
12	24.7	58.1	36" RCP	DP8, PR11
14	4.7	31.5	30" RCP	DP9
15	1.1	7.5	18" RCP	DP12
16	5.8	7.5	18" RCP	DP13
17	6.7	14.7	24" RCP	PR15, PR16
18	4.3	8.4	18" RCP	DP15
19	6.7	22.8	30" RCP	PR17, PR22
21	6.4	16.5	24" RCP	DP14, PR18
22	0.2	8.6	24" RCP	POND 303
23	13.9	43.5	48" RCP	DP16, PR19, PR21
24.1	1.7	3.2	18" RCP	DP18.1
24	6.1	11.3	18" RCP	DP18, PR24.1
25	1.9	8.3	18" RCP	DP17
26	7.7	18.9	24" RCP	PR24, PR25
27	4.7	6.0	18" RCP	DP20
28	12.7	30.6	36" RCP	DP19, PR26, PR27
29	1.1	6.0	18" RCP	DP11

FULL SPECTRUM DETENTION INTERIM POND 303 (PRIVATE)

WQ VOLUME	0.368 AC-FT
EURV VOLUME	0.782 AC-FT
100 YR STORAGE VOLUME	1.853 AC-FT
100 YR WATER SURFACE EL	6624.51
SPILLWAY CREST EL	6626.50
TOP OF EMBANKMENT EL	6628.00
SPILLWAY DESIGN FLOW DEPTH	0.5 FT

BASIN SUMMARY

BASIN	AREA (ACRES)	Q_5	Q_{100}
A1	2.39	0.7	4.6
A2	2.65	4.3	9.4
A3	2.43	4.2	9.3
A4	1.94	3.6	7.8
A5	0.91	1.7	3.7
A6	1.40	2.6	5.7
A7	1.23	2.4	5.3
A8	0.93	1.8	4.0
A9	0.82	1.6	3.4
B	2.05	1.4	5.3
C	3.41	7.9	15.5
D	2.47	1.1	6.0
E1	0.79	1.1	2.7
E2	3.89	6.2	14.5
E3	0.95	1.5	3.5

BASIN SUMMARY

BASIN	AREA (ACRES)	Q_5	Q_{100}
E4	2.94	4.3	10.1
E5	1.77	0.8	4.2
F1	1.32	2.0	4.8
F2	2.43	3.8	8.9
F3	1.0	0.8	2.7
G1	1.22	1.7	4.1
G2	2.94	4.7	11.1
G3	0.61	1.0	2.3
H1	0.50	0.9	2.0
H2A	0.33	0.6	1.4
H2B	0.30	0.5	1.2
OS1	10.95	2.7	18.3
OS2	5.92	1.5	10.1
OS3	2.03	0.6	3.8
OS4	23.89	5.5	37.1
OS5	30.02	5.9	39.7

DESIGN POINT SUMMARY

DESIGN POINT	Q_5	Q_{100}	BASIN	STRUCTURE
1	3.5	5.7	A4	FUTURE 6' AT-GRADE INLET
2	1.7	5.7	A5	FUTURE 6' AT-GRADE INLET
3	5.0	14.5	A1, A2	FUTURE 16' AT-GRADE INLET
4	4.2	9.3	A3	FUTURE 14' AT-GRADE INLET
5	2.9	10.8	A6, FBDP1,FBDP2,FBDP3 FBDP4	PROP. 16' AT-GRADE INLET
6	2.4	5.3	A7	
7	1.8	6.3	A8	PROP. 8' SUMP INLET
8	4.0	6.3	A9, DP6	PROP. 10' SUMP INLET
9	4.7	31.5	OS1, OS2, OS3	CDOT TYPE D INLET
9A	21.6	72.9	B, PR12, PR14	TRACT A/POND A (303)
10	7.9	15.9	C, FBDP5	EX. 2-10' AT-GRADE INLETS
11	1.1	6.0	D	EX 18" SD/PROP 18" FES
12	1.1	8.3	E1	PROP. 12' AT-GRADE INLET
13	5.9	8.3	E2	PROP. 12' AT-GRADE INLET

DESIGN POINT SUMMARY

DESIGN POINT	Q_5	Q_{100}	BASIN	STRUCTURE
14	2.2	8.4	E3, H1, FBDP12	PROP. 16' SUMP INLET
15	4.3	8.4	E4, FBDP13	PROP. 16' SUMP INLET
16	0.8	4.2	E5	PROP NEENAH BEEHIVE GRATE INLET
17	1.9	8.3	F1	PROP. 16' SUMP INLET
18	4.4	8.3	F2, F3, FBDP18.1	PROP. 16' SUMP INLET
18.1	1.7	4.1	DP G1	PROP. 6' AT-GRADE INLET
19	1.0	6.0	G3	PROP. 10' AT-GRADE INLET
20	4.2	6.0	G2	PROP. 10' AT-GRADE INLET
21	10.6	71.2	OS4, OS5	10'W EARTHEN DIVERSION SWALE

ALL PROPOSED STORM SEWER FACILITIES WITHIN ENCLAVES FILING 5 ARE PUBLICLY OWNED AND MAINTAINED WITH THE EXCEPTION OF POND 303 WITHIN TRACT X WHICH IS A PRIVATE FACILITY AND SHALL BE OWNED AND MAINTAINED BY THE MOUNTAIN VISTA RANCH METROPOLITAN DISTRICT.

1" = 100'

0 25 50 100 200

Scale in Feet

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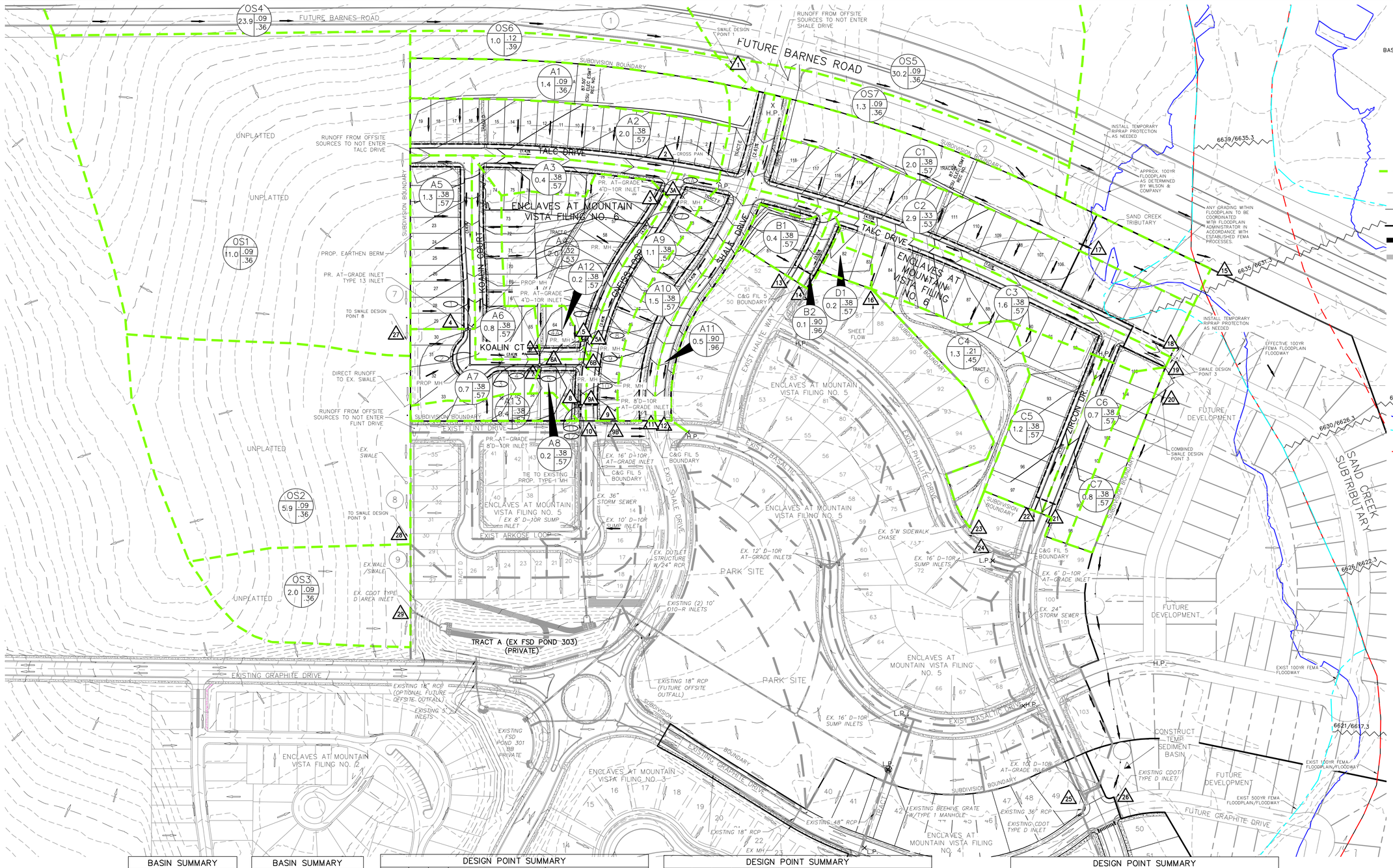
ENCLAVES AT MOUNTAIN VISTA FIL NO. 5

FINAL DRAINAGE MAP

PROJECT NO. 29-004
DESIGNED BY: VAS
DRAWN BY: CLP
CHECKED BY: VAS
SCALE: HORIZONTAL: 1"=100' VERTICAL: N/A
DATE: 10-9-19
SHEET 1 OF 3
DM

File: G:\29004A-Enclaves 5\Enclaves at MVR 5\Drainage\ENCLAVES 5- FDR-DM.dwg Plotstamp: 11/22/2019 10:34 AM



LEGEND

- BASIN DESIGNATION: G1 — 2.35 (ACRES) — .53 (C5) — .66 (C100)
- 4 — PIPE RUN REFERENCE LABEL
- 6 — SURFACE DESIGN POINT
- 3 — SWALE DESIGN POINT
- BASIN BOUNDARY
- (6920) — EXISTING CONTOUR
- 6920 — PROP CONTOUR
- SUBDIVISION BOUNDARY
- PROPOSED STORM SEWER PIPE
- EXISTING STORM SEWER PIPE
- CROSSPAN
- INLET
- MANHOLE
- EXISTING FLOW DIRECTION ARROW
- PROPOSED FLOW DIRECTION ARROW
- FLARED END SECTION
- H.P. — HIGH POINT
- L.P. — LOW POINT
- 6652/6648.3 — 100 YEAR BFE (NAVD88/NGVD29)
- APPRX. 100 YEAR FLOODPLAIN
- EFFECTIVE 100 YEAR FLOODPLAIN
- EFFECTIVE 100 YEAR FLOODWAY

STORM SEWER SUMMARY

PIPE RUN	Q_5	Q_{100}	PIPE SIZE	CONTRIBUTING PIPES/DESIGN POINTS
1	1.1	1.7	18" RCP	DP4
2	1.1	1.7	18" RCP	DP4
3	1.1	1.7	18" RCP	6A
4	2.1	4.8	18" RCP	DP1
4A	1.1	1.9	18" RCP	6A
5	4.3	8.4	18" RCP	6B
5A	1.2	1.7	18" RCP	3A
6	NOT	USED	NA	NA
7	1.2	1.7	18" RCP	5A
8	1.2	1.7	18" RCP	5A
9	2.4	3.4	18" RCP	6B
10	6.7	11.8	24" RCP	9A
11	4.5	8.3	18" RCP	9A
12	11.2	20.1	30" RCP	EXIST 30" RCP FILING 5

NOTES:

1. HIGH DENSITY POLYETHYLENE (HDPE) PIPE WILL BE ACCEPTABLE.
2. POND TO BE DESIGNED WITH THE FINAL DESIGN OF THE STORM SEWER SYSTEM FOR FILING 6.

BASIN SUMMARY

BASIN	AREA (ACRES)	Q_5	Q_{100}
A1, OS6	2.4	0.7	4.9
A2	2.0	2.8	7.1
A3	0.4	0.6	1.6
A4	2.0	2.7	7.5
A5	1.3	2.2	5.5
A6	0.8	1.2	3.1
A7	0.7	1.1	2.8
A8	0.2	0.4	1.0
A9	1.1	1.8	4.5
A10	1.5	2.5	6.2
A11	0.5	2.2	3.9
A12	0.2	0.3	0.8
A13	0.4	0.7	1.6
B1	0.4	0.7	1.5
B2	0.1	0.6	1.1

BASIN SUMMARY

BASIN	AREA (ACRES)	Q_5	Q_{100}
C1	2.0	3.2	8.2
C2	2.9	3.3	9.0
C3	1.6	2.3	5.8
C4	1.3	1.1	3.8
C5	1.2	1.9	4.7
C6	0.7	1.2	3.0
C7	0.8	1.2	3.1
D1	0.2	0.3	0.8
OS1	11.0	2.9	19.7
OS2	5.9	1.6	10.8
OS3	2.0	0.6	3.8
OS4	23.9	5.5	37.1
OS5	30.0	5.9	39.7
OS6	1.0	0.5	2.7
OS7	1.3	0.6	3.1

DESIGN POINT SUMMARY

DESIGN POINT	Q_5	Q_{100}	BASIN	STRUCTURE
1	5.5	37.1	OS4	SWALE 1
2	2.8	7.1	A1, A2	CROSSPAN
3	4.2	13.9	OS6, A1, A2, A3	PROP 4' D10-R AT-GRADE INLET
3A	NA	NA	NA	MANHOLE
4	2.2	5.5	A5	PROP TYPE 13 AT-GRADE INLET
5	6.3	19.5	OS6, A1, A2, A3, A4	PROP 4' D10-R AT-GRADE INLET
5A	NA	NA	NA	MANHOLE
6	1.2	3.1	A6	PROP 4' D10-R AT-GRADE INLET
6A	NA	NA	NA	MANHOLE
6B	NA	NA	NA	MANHOLE
7	3.2	8.1	A5, A7	PROP 8' D10-R AT-GRADE INLET
8	12.2	35.3	OS6, A1-A8	PROP 8' D10-R AT-GRADE INLET
9	1.5	3.7	A9	C & G AT FILING 5 BOUNDARY
9A	NA	NA	NA	MANHOLE
9B	NA	NA	NA	EXIST 16' D10-R AT-GRADE INLET
10	12.6	36.1	NA	C & G AT FILING 5 BOUNDARY

DESIGN POINT SUMMARY

DESIGN POINT	Q_5	Q_{100}	BASIN	STRUCTURE
11	2.5	6.2	A10	C & G AT FILING 5 BOUNDARY
12	1.9	3.5	A11	C & G AT FILING 5 BOUNDARY
13	0.8	2.0	B1	C & G AT FILING 5 BOUNDARY
14	0.5	0.8	B2	C & G AT FILING 5 BOUNDARY
15	–	–	NOT USED	
16	1.4	3.5	D1	SHEET FLOW ONTO FILING 5 LOTS
17	3.8	11.3	OS5	DISCHARGE AT SAND CREEK TRIB.
18	5.8	15.3	C1, C2	SWALE DESIGN POINT 3
19	2.3	5.8	C3	SWALE DESIGN POINT 3
20	7.9	20.5	C1, C2, C3	COMBINED SWALE DESIGN POINT 3
21	1.2	3.0	C6	C & G AT FILING 5 BOUNDARY
22	1.9	4.7	C5	C & G AT FILING 5 BOUNDARY
23	1.1	3.8	C4	C & G AT FILING 5 BOUNDARY
24	2.8	8.3	C4, C5	EXIST 16' D10-R SUMP INLETS
25	NA	NA	NOT USED	EXIST 10' D-10R INLET

DESIGN POINT SUMMARY

DESIGN POINT	Q_5	Q_{100}	BASIN	STRUCTURE
26	NA	NA	NOT USED	EXISTING TYPE D INLET FILING 4
27	2.9	19.7	NA	SWALE 7 IN OS1
28	4.5	30.5	NA	SWALE 7 IN OS1
29	5.1	34.3	NA	EXIST. CDOT TYPE D INLET FIL 5

NOTES:

ALL PROPOSED STORM SEWER FACILITIES WITHIN ENCLAVES FILING 6 ARE PUBLICLY OWNED AND MAINTAINED.

INFORMATION REGARDING FILING 4 AND 5 ARE DUPLICATED FROM THE PERTINENT FINAL DRAINAGE MAPS INCLUDED IN THE REPORT. THE NOTES AND SYMBOLS HAVE BEEN FADED TO DELINEATED FROM THE INFORMATION INCLUDED FROM FILING 6.

1" = 100'

0 25 50 100 200

Scale in Feet

FOR LOCATING & MARKING GAS, ELECTRIC, WATER & TELEPHONE LINES

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PHONE: 719.955.5485

ENCLAVES AT M.V.R. FIL NO. 6

FINAL DRAINAGE MAP

PROJECT NO. 29-006	SCALE: HORIZONTAL: 1"=100' VERTICAL: N/A	DATE: 06-3-2020	
DESIGNED BY: VAS		SHEET 1 OF 2	DM
DRAWN BY: CLP DCV			
CHECKED BY: VAS			

File: Q:\29006\4-Endaves 6\Endaves 6\dwg\Eng Exhibits\ENCLAVES 6 - PDR-FDR-DM-1.dwg Plotstamp: 6/18/2020 3:12 PM