PRELIMINARY DRAINAGE REPORT

RISING MOON FILING NO. 1 & 2
(A Replat of Tract B, Morning Sun I)

FEBRUARY 2025

PCD Filing No.: SP243

Prepared for:
PIKES PEAK HABITAT FOR HUMANITY, INC.
2802 N. PROSPECT STREET
COLORADO SPRINGS, CO 80907
719-661-5527

Prepared by:
CLASSIC CONSULTING ENGINEERS & SURVEYORS
619 CASCADE AVENUE, SUITE 200
COLORADO SPRINGS, CO 80903
(719) 785-0790

Job no. 2506.03

DRAINAGE REPORT STATEMENT

DESIGN ENGINEER'S STATEMENT:

The attached drainage plan and report were prepared under my direction and supervision and are correct to the best of my knowledge and belief. Said drainage report has been prepared according to the criteria established by the County for drainage reports and said report is in conformity with the applicable master plan of the drainage basin. I accept responsibility for any liability caused by any negligent acts, errors, or omissions on my part in preparing this report.

KYLE R. CAMPBELL 29794 COLORADO LICENSED PROFESSIONAL ENGINEER

Kyle R. Campbell, Colorado P.E. #29794

02/05/2025
Date

OWNERS/DEVELOPER'S STATEMENT:

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

Business Name: Pikes Peak Habitat for Humanity, Inc.

2/5/2025
Date

Title: VICE PRESIDENT

Address: 2802 N. Prospect Street

Colorado Springs, CO 80907

EL PASO COUNTY:

Filed in accordance with the requirements of the Drainage Criteria Manual, Volumes 1 and 2, El Paso County Engineering Criteria Manual and Land Development Code, as amended.

Joshua Palmer, P.E.
County Engineer / ECM Administrator

Date

Conditions:

CLASSIC CONSULTING ENGINEERS & SURVEYORS

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PURPOSE

This document is the Preliminary Drainage Report for Rising Moon Filing No. 1 & 2. The purpose of this report is to identify general onsite and offsite drainage patterns, conceptual storm sewer, inlet locations, and areas tributary to the site, and to safely route developed storm water runoff to adequate stormwater facilities, in accordance with all applicable area drainage plans. This report is required to accompany the proposed Preliminary Plan that is proposed to replace the prior approved and platted Tract B, Morning Sun I (Book 44, Page 179 of The Records of El Paso County), a previously anticipated Elementary School.

A Final Drainage Report will be provided when the Final Plat and Construction Drawings details are processed for review.

GENERAL DESCRIPTION

The overall Rising Moon Filing No. 1 & 2 development is a 9.00-acre residential community within a portion of Section 3, Township 15 South, Range 65 West of the 6th Principal Meridian in El Paso County, Colorado. The site is generally located west of Shining Star Drive just north of Peaceful Meadow Street. The proposed City of Colorado Springs Meadoworks Residential Community sits directly west of the site. The development includes a total of 41 single-family residences that will be developed as a single phase for the Pikes Peak Habitat for Humanity.

The average soil condition of the entire site and tributary area to the proposed ponds reflects Hydrologic Group "B" (Ustic Torrifluveots) as determined by the "Soil Survey of El Paso County Area," prepared by the National Cooperative Soil Survey (see map in Appendix).

EXISTING DRAINAGE CONDITIONS

The site is located within the Jimmy Camp Drainage Basin. This site was previously studied in the "Drainage Report for Morning Sun Subdivision", by United Planning and Engineering, Co. (revised February 11, 1986) as found in Under PCD File SF86001. This currently proposed residential community

is proposed to replace the previously platted (Tract B) but not constructed previously anticipated elementary school site. This report and map will be used as a portion of the existing conditions reference material.

Per visual observation, the site is predominantly covered in native grasses. The existing ground slopes in a south and south westerly direction as depicted on the Existing Conditions Drainage Map in the Appendix. All existing site flows drain directly into the existing southwesterly Colorado Centre Metropolitan District (CCMD) drainage facilities (culverts and trapezoidal channel). Existing flows tributary to the southwest corner of the site include:

Basin EX-A: Q_5 = 3.3 cfs and Q_{100} = 7.3 cfs (off-site unconcentrated flows into the site)

Basin EX-B: Q_5 = 2.4 cfs and Q_{100} = 17.5 cfs (on-site existing flows).

The existing downstream trapezoidal CCMD channel is fully vegetated and maintained as needed by CCMD. This CCMD channel continues for 2900 linear feet in a south and easterly direction and releases directly into Jimmy Camp Creek.

DEVELOPED DRAINAGE CONDITIONS

Based upon City/County Drainage Criteria, the drainage approach for this development now reflects current criteria for stormwater quality (on-site) and Full Spectrum Detention requirements. The attached "Proposed Conditions Drainage Map" contains the preliminary, anticipated approach to drainage.

The majority of the site is comprised of Basin A (Q_5 = 17.6 cfs, Q_{100} = 40.5 cfs), 10.31-acres of existing off-site and proposed on-site public roadways, and single-family lots. At this preliminary stage of analysis, it is anticipated that all developed flows will be intercepted on-site in a proposed public storm system and then directed toward the proposed private Extended Detention Basin for detention and stormwater quality treatment. The ultimate release of all stormwater flows will be directly into the existing CCMD Storm Facilities as the flows currently do (Q_5 = 0.5 cfs and Q_{100} = 5.8 cfs from proposed pond). The released flows from the proposed pond will outfall to the west into the existing CCMD

trapezoidal channel and continue to Jimmy Camp Creek as described under Existing Drainage Conditions. Any emergency overflow from the pond will also continue west in Peaceful Meadow Street and a proposed offsite westerly low point in Peaceful Meadow Street will convey those flows into the previously discussed CCMD trapezoidal channel.

The subsequent Final Drainage Report will provide a much higher level of detail for this proposed storm system and facilities, including public street capacity analysis, inlet calculations and pipe sizing analysis.

All proposed storm facilities within the public street right-of way will be public with ownership and maintenance by El Paso County.

The proposed Full Spectrum Detention Facility will be privately owned and maintained by the proposed homeowner's association.

DETENTION FACILITY

A proposed private Extended Detention Basin (EDB) will provide full capture and detention of the on and off-site flows as reflected in the attached calculation sheets and reflect full compliance with DCM Criteria. Further construction drawing design details will be provided in the subsequent Final Drainage Report.

STORMWATER QUALITY

This site adheres to this **Four Step Process** as follows:

1. **Employ Runoff Reduction Practices:** Proposed impervious areas (roof tops, patios) will sheet flow across landscaped yards and through open space areas to slow runoff and increase time of concentration prior to being conveyed to the proposed public streets. This will minimize directly connected impervious areas within the project site.

2. **Stabilize Drainageways:** After developed flows utilize the runoff reduction practices through the yards, these flows will travel via curb and gutter within the public streets and eventually public storm systems. These collected flows are then routed directly to the proposed Full Spectrum Detention and stormwater quality facility on-site and ultimately released into existing CCMD storm facilities.

3. **Full Spectrum Detention and Provide Water Quality Capture Volume (WQCV):** Runoff from this development will be treated through capture and slow release of the WQCV in the proposed private on-site Full Spectrum Detention and water quality facility designed per current El Paso County drainage criteria.

4. **Consider need for Industrial and Commercial BMPs**: No industrial or commercial uses are proposed within this development. However, a site-specific storm water quality and erosion control plan and narrative will be submitted along with the grading and erosion control plan. Details such as site-specific source control construction BMP's as well as permanent BMP's were detailed in this plan and narrative to protect receiving waters. BMP's will be constructed and maintained as the development has been graded and erosion control methods employed.

Based upon the requirement to provide Full Spectrum Detention and stormwater quality capture volume for the development area, a proposed Extended Detention Basin is proposed in the south area of the site. Per the preliminary calculations in the Appendix, a 1.087 ac-ft capture volume is needed. The details of this stormwater facility will be provided in the subsequent Final Drainage Report, including treatment of all disturbed areas, less any excluded areas.

HYDROLOGIC CALCULATIONS

Hydrologic calculations were performed using the City of Colorado Springs/El Paso County Drainage Criteria Manual, as revised in November 1991 and 1994 with County adopted Chapter 6 and Section 3.2.1 of Chapter 13 of the City of Colorado Springs/El Paso County Drainage Criteria Manual as revised in May 2014. Individual on-site developed basin design used for inlet sizing and storm system routing

was calculated using the Rational Method. Full Spectrum Detention pond modeling developed using UD-Detention spreadsheet ver. 3.07, Urban Drainage and Flood Control District.

The City of Colorado Springs/El Paso County DCM requires the Four Step Process for receiving water protection that focuses on reducing runoff volumes, treating the water quality capture volume (WQCV), stabilizing drainage ways, and implementing long-term source controls. The Four Step Process pertains to management of smaller, frequently occurring storm events, as opposed to larger storms for which drainage and flood control infrastructure are sized. Implementation of these four steps helps to achieve storm water permit requirements.

FLOODPLAIN STATEMENT

A portion of this site is not located within a FEMA floodplain as determined by the Flood Insurance Rate Maps (F.I.R.M.) Map Number 08041C0769G, with effective dates of December 7, 2018 (See Appendix).

EROSION CONTROL PLAN

The Drainage Criteria Manual specifies an Erosion Control Plan and associated cost estimate be submitted with the Final Drainage Report. We respectfully request that the Erosion Control Plan and cost estimate be submitted in conjunction with the Overlot Grading Plan and construction assurances posted prior to obtaining a grading permit. Early grading is not being requested with this application.

DRAINAGE & BRIDGE FEES

This site lies within the Jimmy Camp Creek Drainage Basin. As this site was previously platted as Tract B, no drainage or bridge fees will be required to be paid. Confirmation of prior platting and inclusion or exclusion in the Drainage Basin Planning Study will be provided in the Final Drainage Report to justify that no fees are required.

SUMMARY

This proposed development remains consistent with the previously anticipated drainage patterns for the site. The proposed Full Spectrum Detention and stormwater quality facility meets current criteria. The proposed development will not adversely impact surrounding developments.

A future Final Plat application will include Construction Drawings and a Final Drainage Report to provide further Final Design details associated with the more detailed design.

PREPARED BY:
Classic Consulting

Kyle R. Campbell, P.E.
Division Manager

db/250603/REPORTS/ FDR/PDR

REFERENCES

1. City of Colorado Springs/County of El Paso Drainage Criteria Manual dated October 1991.*

2. "Drainage Report and Plan – Waterside Condominiums Subdivision", by Leigh Whitehead.

3. Drainage Criteria Manual (Volume 3) latest revision April 2008, Urban Drainage and Flood Criteria District.

4. El Paso County Engineering Criteria Manual, Resolution No. 20-222, June 23, 2020 (Supp. No.2).

*EPC Board Resolution NO. 15-042 (El Paso County adoption of Chapter 6 and Section 3.2.1 Chapter 13 of the City of Colorado Springs Drainage Criteria manual dated May 2014, hydrology and full-spectrum detention)

APPENDIX

VICINITY MAP

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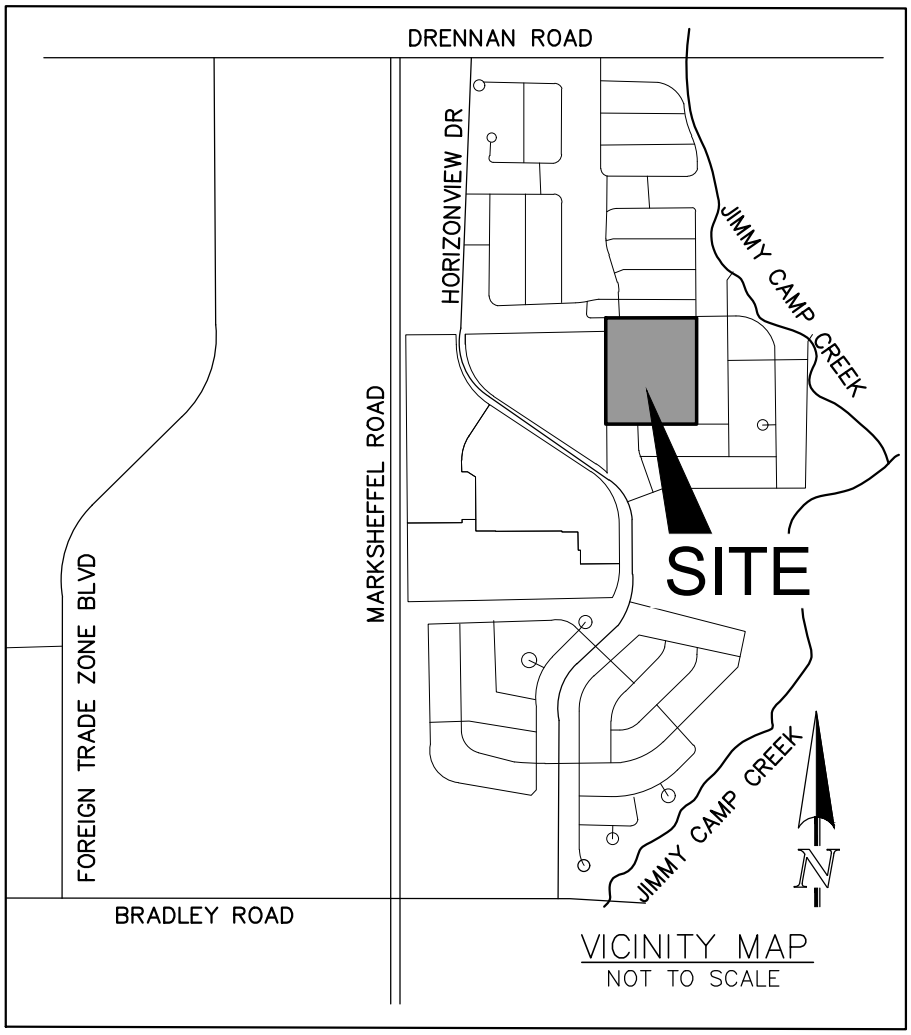
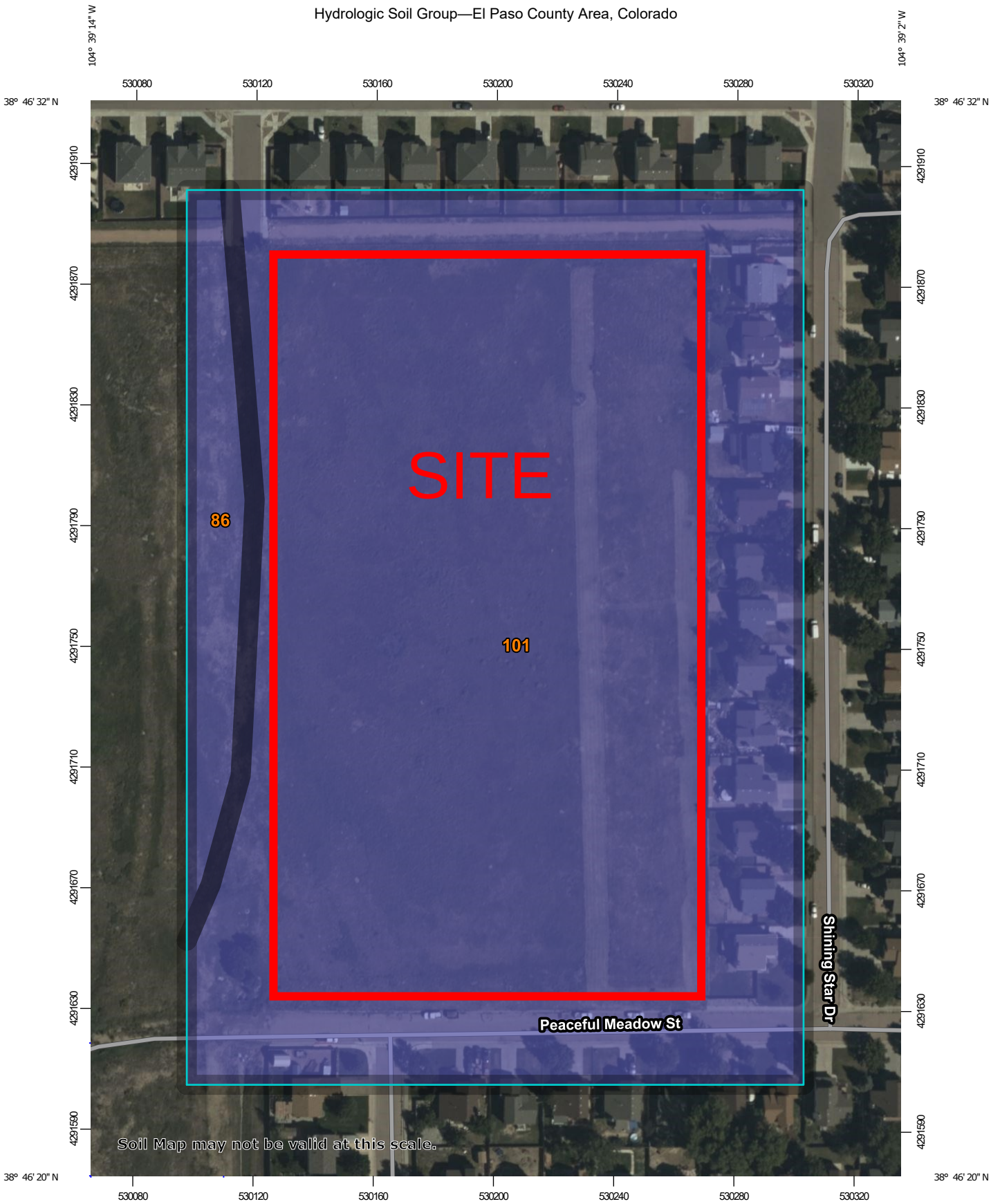

DRENNAN ROAD
HORIZONVIEW DR
JIMMY CAMP CREEK
MARKSHEFFEL ROAD
SITE
FOREIGN TRADE ZONE BLVD
JIMMY CAMP CREEK
N
BRADLEY ROAD
VICINITY MAP
NOT TO SCALE

SOILS MAP (S.C.S SURVEY)


104° 39' 14" W
104° 39' 2" W
530080
530120
530160
530200
530240
530280
530320
38° 46' 32" N
38° 46' 20" N
4291910
4291870
4291830
4291790
4291750
4291710
4291670
4291630
4291590
SITE
86
101
Peaceful Meadow St
Shining Star Dr
Soil Map may not be valid at this scale.
Map Scale: 1:1,740 if printed on A portrait (8.5" x 11") sheet.
N
Meters
0 25 50 100 150
Feet
0 50 100 200 300
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

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

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

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: El Paso County Area, Colorado
Survey Area Data: Version 21, Aug 24, 2023

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

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

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
86	Stoneham sandy loam, 3 to 8 percent slopes	B	1.1	7.0%
101	Ustic Torrifluvents, loamy	B	14.0	93.0%
Totals for Area of Interest			**15.1**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

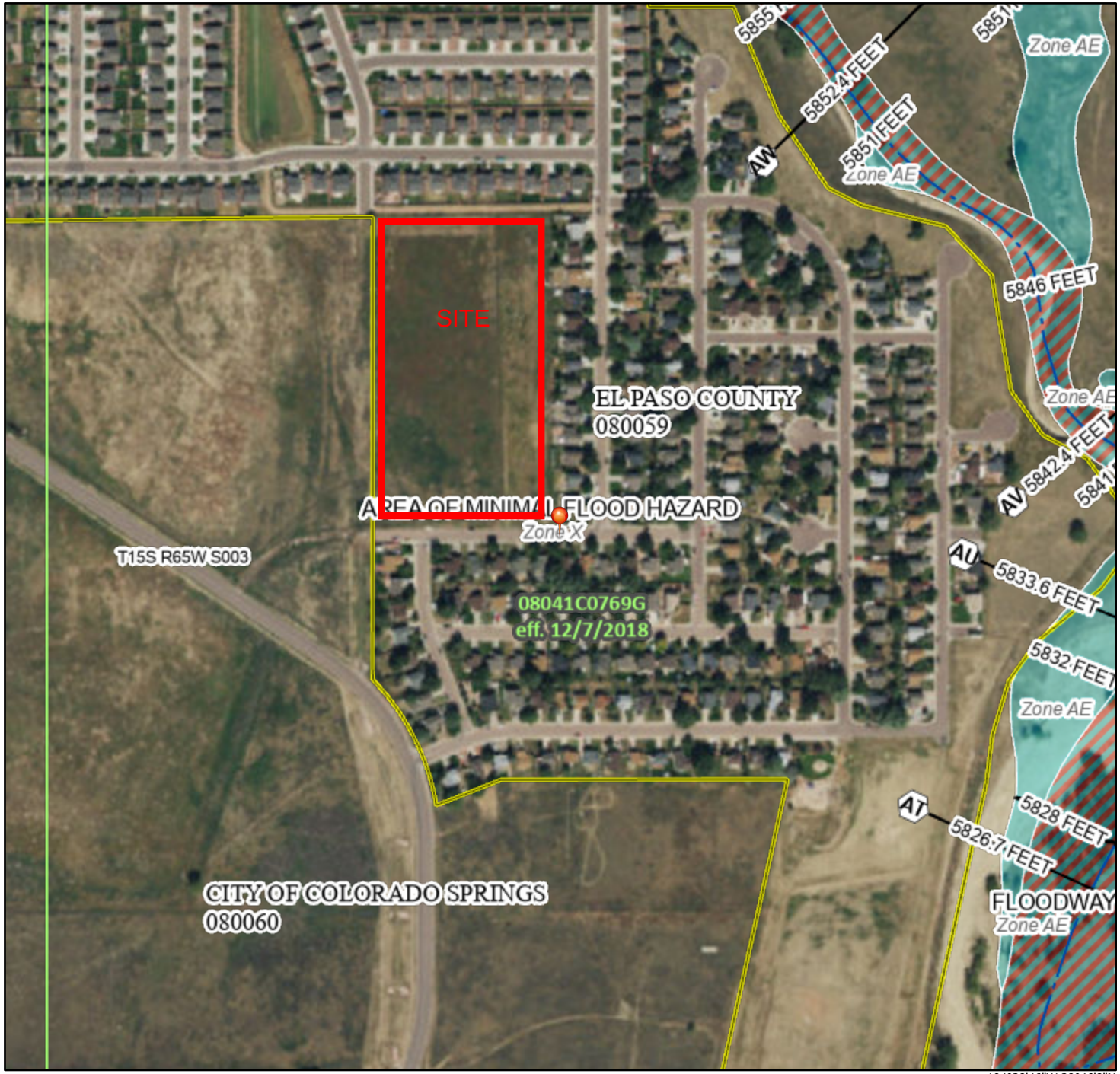
Tie-break Rule: Higher

F.E.M.A. MAP

National Flood Hazard Layer FIRMette

FEMA

104°39'24"W 38°46'36"N



0 250 500 1,000 1,500 2,000 Feet

1:6,000

104°38'46"W 38°46'8"N

Basemap Imagery Source: USGS National Map 2023

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 6/4/2024 at 8:43 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

HYDROLOGIC / HYDRAULIC CALCULATIONS

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JOB NAME: *HABITAT FOR HUMANITY*
JOB NUMBER: *2506.03*
DATE: *05/23/23*
CALCULATED BY: *MAL*

FINAL DRAINAGE REPORT ~ BASIN RUNOFF COEFFICIENT SUMMARY (EXISTING CONDITIONS)

		IMPERVIOUS AREA / STREETS			LOTS/LANDSCAPE/UNDEV. AREAS (NOT PAVEMENT)				WEIGHTED		WEIGHTED CA	
BASIN	TOTAL AREA (AC)	AREA (AC)	C(5)	C(100)	AREA (AC)	LAND USE	C(5)	C(100)	C(5)	C(100)	**CA(5)**	**CA(100)**
EX-A	1.63	1.63	0.45	0.59	0.00	OPEN	0.08	0.35	0.45	0.59	**0.73**	**0.96**
EX-B	9.00	0.00	0.90	0.96	9.00	OPEN	0.08	0.35	0.08	0.35	**0.72**	**3.15**

JOB NAME: **HABITAT FOR HUMANITY**
JOB NUMBER: **2506.03**
DATE: **5/23/2023**
CALC'D BY: **MAL**

FINAL DRAINAGE REPORT ~ BASIN RUNOFF SUMMARY (EXISTING CONDITIONS)

BASIN	WEIGHTED		OVERLAND				STREET / CHANNEL FLOW				Tc	INTENSITY		TOTAL FLOWS	
	CA(5)	CA(100)	C(5)	Length *(ft)*	Height *(ft)*	Tc *(min)*	Length *(ft)*	Slope *(%)*	Velocity *(fps)*	Tc *(min)*	TOTAL *(min)*	I(5) (in/hr)	I(100) (in/hr)	Q(5) *(cfs)*	Q(100) *(cfs)*
EX-A	0.73	0.96	0.45	70	1.5	7.6	50	2.0%	4.9	0.2	7.8	4.50	7.56	**3.3**	**7.3**
EX-B	0.72	3.15	0.08	100	2	14.7	700	1.5%	4.3	2.7	17.4	3.30	5.54	**2.4**	**17.5**

JOB NAME: ***HABITAT FOR HUMANITY***
JOB NUMBER: ***2506.03***
DATE: ***05/23/23***
CALCULATED BY: ***MAL***

FINAL DRAINAGE REPORT ~ BASIN RUNOFF COEFFICIENT SUMMARY (DEVELOPED CONDITIONS)

BASIN	TOTAL AREA (AC)	IMPERVIOUS AREA / DEV. AREA			LANDSCAPE/UNDEVELOPED AREAS				WEIGHTED		WEIGHTED CA	
		AREA (AC)	C(5)	C(100)	AREA (AC)	LAND USE	C(5)	C(100)	C(5)	C(100)	**CA(5)**	**CA(100)**
A	10.31	9.28	0.45	0.59	1.03	-	0.08	0.35	0.41	0.57	**4.26**	**5.84**

JOB NAME: **HABITAT FOR HUMANITY**
JOB NUMBER: **2506.03**
DATE: **5/23/2023**
CALC'D BY: **MAL**

FINAL DRAINAGE REPORT ~ BASIN RUNOFF SUMMARY (DEVELOPED CONDITIONS)

BASIN	WEIGHTED		OVERLAND				STREET / CHANNEL FLOW				Tc	INTENSITY		TOTAL FLOWS	
	CA(5)	CA(100)	C(5)	Length *(ft)*	Height *(ft)*	Tc *(min)*	Length *(ft)*	Slope *(%)*	Velocity *(fps)*	Tc *(min)*	TOTAL *(min)*	I(5) (in/hr)	I(100) (in/hr)	Q(5) *(cfs)*	Q(100) *(cfs)*
A	4.26	5.84	0.45	70	1.5	7.6	720	2.2%	5.2	2.3	9.9	4.14	6.95	**17.6**	**40.5**

FULL SPECTRUM DETENTION CALCULATIONS

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Design Procedure Form: Extended Detention Basin (EDB)

UD-BMP (Version 3.07, March 2018)

Designer: M. Larson
Company: Classic Consulting
Date: June 4, 2024
Project: Habitat for Humanity
Location: Pond - Prelim Design

1. Basin Storage Volume

A) Effective Imperviousness of Tributary Area, I_a — I_a = 58.7 %

B) Tributary Area's Imperviousness Ratio ($i = I_a / 100$) — i = 0.587

C) Contributing Watershed Area — Area = 10.310 ac

D) For Watersheds Outside of the Denver Region, Depth of Average Runoff Producing Storm — d_6 = 0.42 in

E) Design Concept (Select EURV when also designing for flood control)

Choose One
- ○ Water Quality Capture Volume (WQCV)
- ◉ Excess Urban Runoff Volume (EURV)

F) Design Volume (WQCV) Based on 40-hour Drain Time
($V_{DESIGN} = (1.0 * (0.91 * i^3 - 1.19 * i^2 + 0.78 * i) / 12 * Area$)
V_{DESIGN} = ac-ft

G) For Watersheds Outside of the Denver Region, Water Quality Capture Volume (WQCV) Design Volume
($V_{WQCV\ OTHER} = (d_6 * (V_{DESIGN} / 0.43))$)
$V_{DESIGN\ OTHER}$ = 0.195 ac-ft

H) User Input of Water Quality Capture Volume (WQCV) Design Volume (Only if a different WQCV Design Volume is desired)
$V_{DESIGN\ USER}$ = ac-ft

I) NRCS Hydrologic Soil Groups of Tributary Watershed
- i) Percentage of Watershed consisting of Type A Soils — HSG_A = 0 %
- ii) Percentage of Watershed consisting of Type B Soils — HSG_B = 100 %
- iii) Percentage of Watershed consisting of Type C/D Soils — $HSG_{C/D}$ = 0 %

J) Excess Urban Runoff Volume (EURV) Design Volume
For HSG A: $EURV_A = 1.68 * i^{1.28}$
For HSG B: $EURV_B = 1.36 * i^{1.08}$
For HSG C/D: $EURV_{C/D} = 1.20 * i^{1.08}$
$EURV_{DESIGN}$ = 0.657 ac-f t

K) User Input of Excess Urban Runoff Volume (EURV) Design Volume (Only if a different EURV Design Volume is desired)
$EURV_{DESIGN\ USER}$ = ac-f t

2. Basin Shape: Length to Width Ratio
(A basin length to width ratio of at least 2:1 will improve TSS reduction.)
L : W = 2.0 : 1

3. Basin Side Slopes

A) Basin Maximum Side Slopes
(Horizontal distance per unit vertical, 4:1 or flatter preferred)
Z = 4.00 ft / ft

4. Inlet

A) Describe means of providing energy dissipation at concentrated inflow locations:

5. Forebay

A) Minimum Forebay Volume
(V_{FMIN} = 3% of the WQCV)
V_{FMIN} = 0.006 ac-ft

B) Actual Forebay Volume
V_F = ac-ft

C) Forebay Depth
(D_F = 18 inch maximum)
D_F = in

D) Forebay Discharge

i) Undetained 100-year Peak Discharge
Q_{100} = cfs

ii) Forebay Discharge Design Flow
($Q_F = 0.02 * Q_{100}$)
Q_F = cfs

E) Forebay Discharge Design

Choose One
- ○ Berm With Pipe
- ○ Wall with Rect. Notch
- ○ Wall with V-Notch Weir

Flow too small for berm w/ pipe

F) Discharge Pipe Size (minimum 8-inches)
Calculated D_P = in

G) Rectangular Notch Width
Calculated W_N = in

Design Procedure Form: Extended Detention Basin (EDB)

Designer: M. Larson
Company: Classic Consulting
Date: June 4, 2024
Project: Habitat for Humanity
Location: Pond - Prelim Design

6. Trickle Channel	
A) Type of Trickle Channel	Choose One: (●) Concrete ( ) Soft Bottom
F) Slope of Trickle Channel	S = 0.0050 ft / ft
7. Micropool and Outlet Structure	
A) Depth of Micropool (2.5-feet minimum)	D_M = 2.5 ft
B) Surface Area of Micropool (10 ft^2 minimum)	A_M = 75 sq ft
C) Outlet Type	Choose One: (●) Orifice Plate ( ) Other (Describe):
D) Smallest Dimension of Orifice Opening Based on Hydrograph Routing (Use UD-Detention)	$D_{orifice}$ = 0.50 inches
E) Total Outlet Area	A_{ot} = 10.50 square inches
8. Initial Surcharge Volume	
A) Depth of Initial Surcharge Volume (Minimum recommended depth is 4 inches)	D_{IS} = 4 in
B) Minimum Initial Surcharge Volume (Minimum volume of 0.3% of the WQCV)	V_{IS} = 25 cu ft
C) Initial Surcharge Provided Above Micropool	V_s = 25.0 cu ft
9. Trash Rack	
A) Water Quality Screen Open Area: $A_t = A_{ni} * 38.5*(e^{-0.095D})$	A_t = 385 square inches
B) Type of Screen (If specifying an alternative to the materials recommended in the USDCM, indicate "other" and enter the ratio of the total open are to the total screen are for the material specified.)	*S.S. Well Screen with 60% Open Area*
Other (Y/N): N	
C) Ratio of Total Open Area to Total Area (only for type 'Other')	User Ratio =
D) Total Water Quality Screen Area (based on screen type)	A_{total} = 642 sq. in.
E) Depth of Design Volume (EURV or WQCV) (Based on design concept chosen under 1E)	H= 3.9 feet
F) Height of Water Quality Screen (H_{TR})	H_{TR}= 74.8 inches
G) Width of Water Quality Screen Opening ($W_{opening}$) (Minimum of 12 inches is recommended)	$W_{opening}$ = 12.0 inches **VALUE LESS THAN RECOMMENDED MIN. WIDTH. WIDTH HAS BEEN SET TO 12 INCHES.**

Design Procedure Form: Extended Detention Basin (EDB)

Designer: M. Larson
Company: Classic Consulting
Date: June 4, 2024
Project: Habitat for Humanity
Location: Pond - Prelim Design

10. Overflow Embankment

A) Describe embankment protection for 100-year and greater overtopping: BURIED RIPRAP SPILLWAY

B) Slope of Overflow Embankment
(Horizontal distance per unit vertical, 4:1 or flatter preferred)

Ze = 4.00 ft / ft

11. Vegetation

Choose One
- (•) Irrigated
- ( ) Not Irrigated

AVOID PLACING IRRIGATION HEADS IN THE BOTTOM OF THE BASIN

12. Access

A) Describe Sediment Removal Procedures: ROAD TO BOTTOM AND ALL STRUCTURES

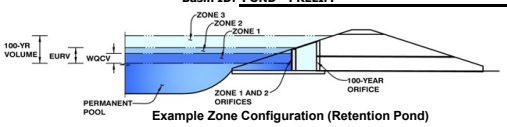
Notes:

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.06 (July 2022)

Project: **HABITAT FOR HUMANITY**

Basin ID: **POND - PRELIM**



Example Zone Configuration (Retention Pond)

Watershed Information

Selected BMP Type =	**EDB**	
Watershed Area =	10.31	acres
Watershed Length =	850	ft
Watershed Length to Centroid =	400	ft
Watershed Slope =	0.040	ft/ft
Watershed Imperviousness =	58.70%	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) =	0.199	acre-feet		acre-feet
Excess Urban Runoff Volume (EURV) =	0.655	acre-feet		acre-feet
2-yr Runoff Volume (P1 = 1.19 in.) =	0.582	acre-feet	1.19	inches
5-yr Runoff Volume (P1 = 1.5 in.) =	0.808	acre-feet	1.50	inches
10-yr Runoff Volume (P1 = 1.75 in.) =	1.002	acre-feet	1.75	inches
25-yr Runoff Volume (P1 = 2 in.) =	1.250	acre-feet	2.00	inches
50-yr Runoff Volume (P1 = 2.25 in.) =	1.458	acre-feet	2.25	inches
100-yr Runoff Volume (P1 = 2.52 in.) =	1.715	acre-feet	2.52	inches
500-yr Runoff Volume (P1 = 3.1 in.) =	2.212	acre-feet	3.10	inches
Approximate 2-yr Detention Volume =	0.503	acre-feet		
Approximate 5-yr Detention Volume =	0.680	acre-feet		
Approximate 10-yr Detention Volume =	0.879	acre-feet		
Approximate 25-yr Detention Volume =	0.952	acre-feet		
Approximate 50-yr Detention Volume =	0.993	acre-feet		
Approximate 100-yr Detention Volume =	1.087	acre-feet		

Define Zones and Basin Geometry

Zone 1 Volume (WQCV) =	0.199	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.456	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	0.431	acre-feet
Total Detention Basin Volume =	1.087	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	

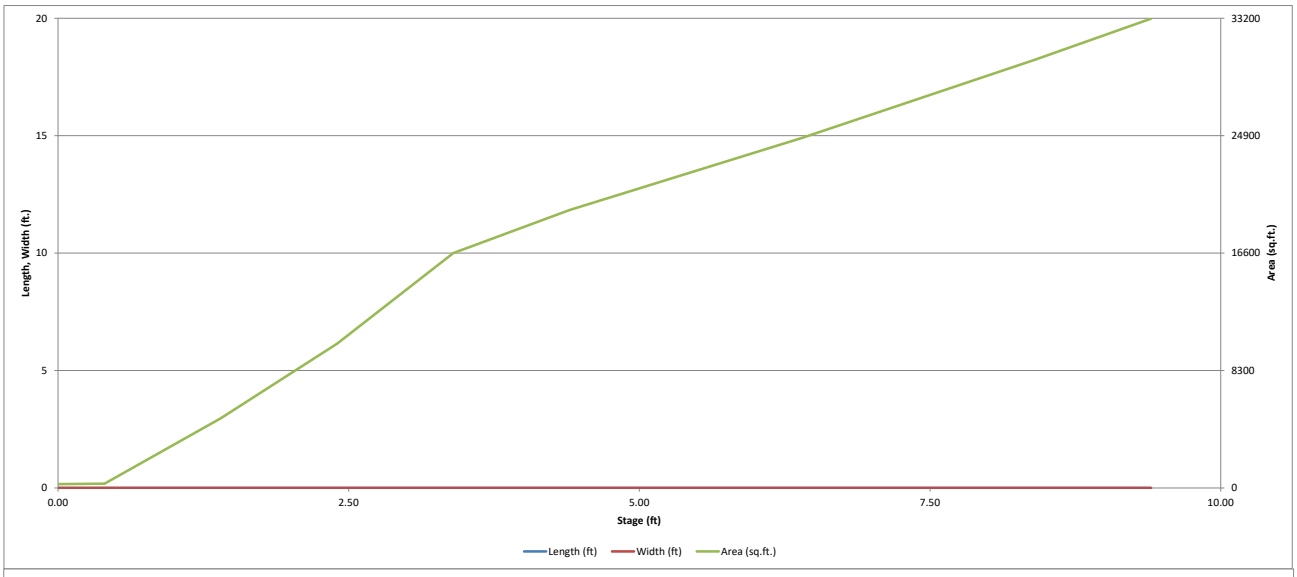
Initial Surcharge Area (A_{ISV}) =	user	ft^2
Surcharge Volume Length (L_{ISV}) =	user	ft
Surcharge Volume Width (W_{ISV}) =	user	ft
Depth of Basin Floor (H_{FLOOR}) =	user	ft
Length of Basin Floor (L_{FLOOR}) =	user	ft
Width of Basin Floor (W_{FLOOR}) =	user	ft
Area of Basin Floor (A_{FLOOR}) =	user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

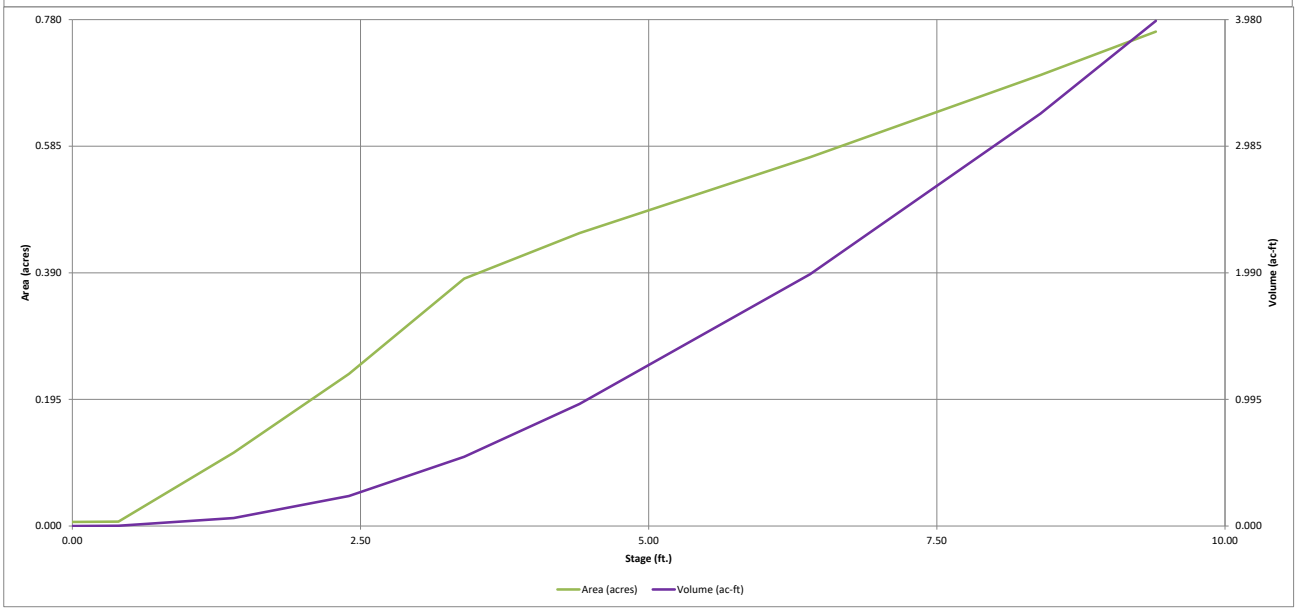
Depth Increment = 0.25 ft

Stage - Storage Description	Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft^2)	Optional Override Area (ft^2)	Area (acre)	Volume (ft^3)	Volume (ac-ft)
Top of Micropool	--	0.00	--	--	--	273	0.006		
	--	0.40	--	--	--	300	0.007	115	0.003
	--	1.40	--	--	--	4,926	0.113	2,728	0.063
	--	2.40	--	--	--	10,203	0.234	10,292	0.236
	--	3.40	--	--	--	16,599	0.381	23,693	0.544
	--	4.40	--	--	--	19,652	0.451	41,819	0.960
	--	6.40	--	--	--	24,746	0.568	86,217	1.979
	--	8.40	--	--	--	30,260	0.695	141,223	3.242
	--	9.40	--	--	--	33,171	0.762	172,938	3.970

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.06 (July 2022)



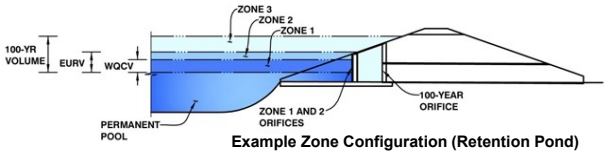


DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

Project: HABITAT FOR HUMANITY

Basin ID: POND - PRELIM



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	2.24	0.199	Orifice Plate
Zone 2 (EURV)	3.69	0.456	Orifice Plate
Zone 3 (100-year)	4.68	0.431	Weir&Pipe (Circular)
Total (all zones)		1.087	

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)

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

Depth at top of Zone using Orifice Plate = 3.90 ft (relative to basin bottom at Stage = 0 ft)

Orifice Plate: Orifice Vertical Spacing = 14.80 inches

Orifice Plate: Orifice Area per Row = N/A sq. 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	1.30	2.60					
Orifice Area (sq. inches)	0.50	4.00	6.00					

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

User Input: Vertical Orifice (Circular or Rectangular)

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

Calculated Parameters for Vertical Orifice

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

User Input: Overflow Weir (Dropbox 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 =	3.90	N/A	ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length =	4.00	N/A	feet
Overflow Weir Grate Slope =	3.00	N/A	H:V
Horiz. Length of Weir Sides =	4.00	N/A	feet
Overflow Grate Type =	Type C Grate	N/A	
Debris Clogging % =	50%	N/A	%

Calculated Parameters for Overflow Weir

	Zone 3 Weir	Not Selected	
Height of Grate Upper Edge, H_t =	5.23	N/A	feet
Overflow Weir Slope Length =	4.22	N/A	feet
Grate Open Area / 100-yr Orifice Area =	6.64	N/A	
Overflow Grate Open Area w/o Debris =	11.74	N/A	ft^2
Overflow Grate Open Area w/ Debris =	5.87	N/A	ft^2

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

	Zone 3 Circular	Not Selected	
Depth to Invert of Outlet Pipe =	0.25	N/A	ft (distance below basin bottom at Stage = 0 ft)
Circular Orifice Diameter =	18.00	N/A	inches

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

	Zone 3 Circular	Not Selected	
Outlet Orifice Area =	1.77	N/A	ft^2
Outlet Orifice Centroid =	0.75	N/A	feet
Half-Central Angle of Restrictor Plate on Pipe =	N/A	N/A	radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage= 7.40 ft (relative to basin bottom at Stage = 0 ft)

Spillway Crest Length = 10.00 feet

Spillway End Slopes = 4.00 H:V

Freeboard above Max Water Surface = 1.00 feet

Calculated Parameters for Spillway

Spillway Design Flow Depth= 0.93 feet

Stage at Top of Freeboard = 9.33 feet

Basin Area at Top of Freeboard = 0.76 acres

Basin Volume at Top of Freeboard = 3.92 acre-ft

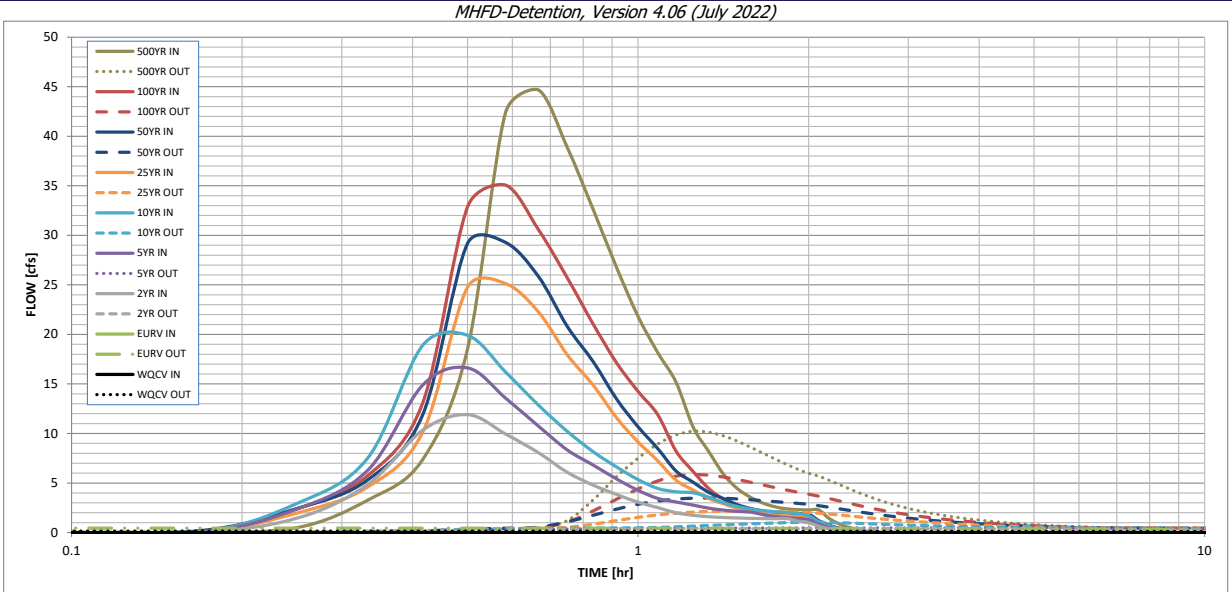
Routed Hydrograph Results

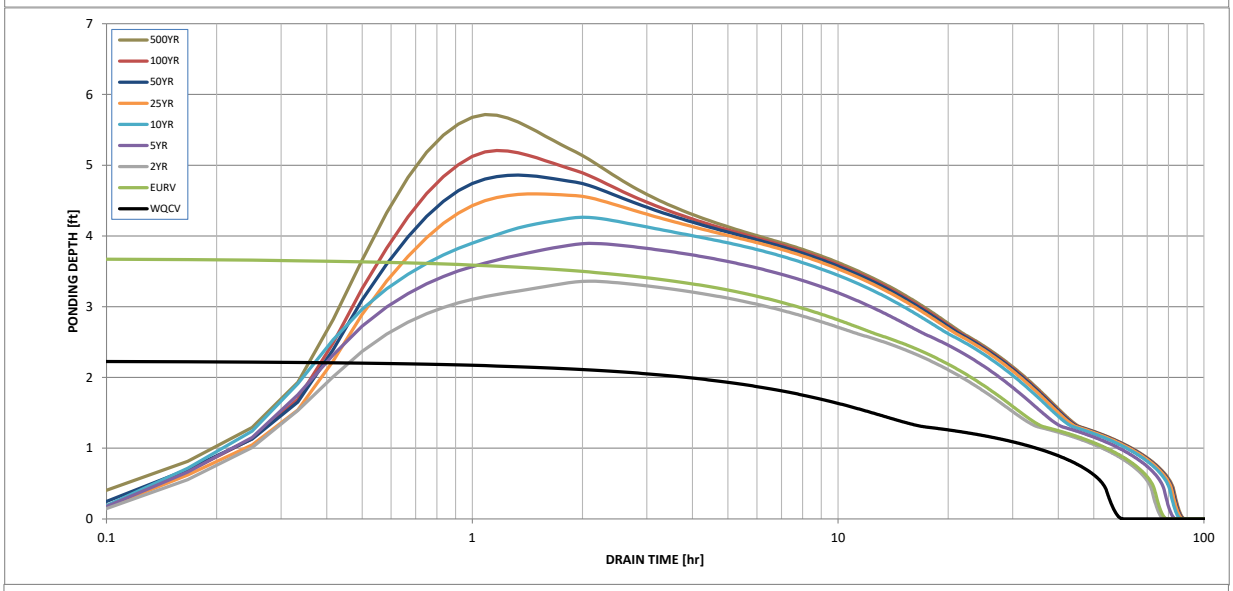
The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AF).

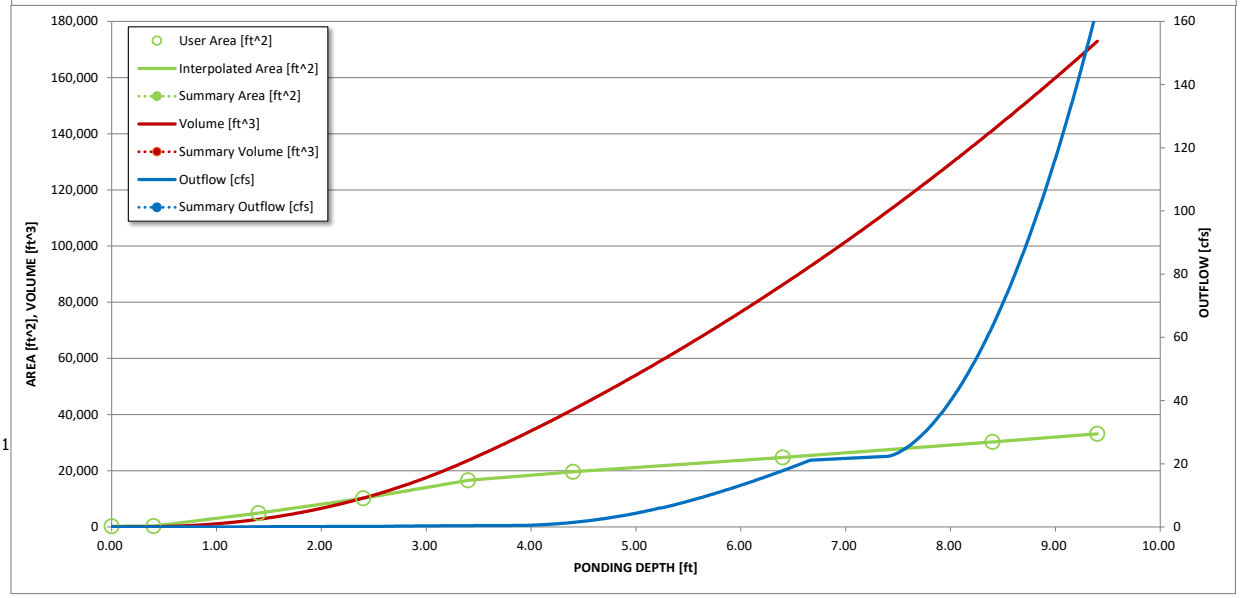
Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
One-Hour Rainfall Depth (in) =	N/A	N/A	1.19	1.50	1.75	2.00	2.25	2.52	3.10
CUHP Runoff Volume (acre-ft) =	0.199	0.655	0.582	0.808	1.002	1.250	1.458	1.715	2.212
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	0.582	0.808	1.002	1.250	1.458	1.715	2.212
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	1.5	4.1	6.0	10.7	13.4	16.7	22.8
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.14	0.39	0.59	1.04	1.30	1.62	2.21
Peak Inflow Q (cfs) =	N/A	N/A	11.9	16.6	19.9	25.1	29.3	35.1	44.7
Peak Outflow Q (cfs) =	0.2	0.4	0.4	0.5	1.0	2.2	3.5	5.8	10.2
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.1	0.2	0.2	0.3	0.3	0.4
Structure Controlling Flow =	Plate	Plate	Plate	Plate	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	N/A	0.0	0.1	0.2	0.4	0.8
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	51	59	59	60	59	54	51	46	42
Time to Drain 99% of Inflow Volume (hours) =	**55**	70	69	73	74	73	72	70	66
Maximum Ponding Depth (ft) =	2.24	3.69	3.36	3.89	4.26	4.59	4.86	5.21	5.72
Area at Maximum Ponding Depth (acres) =	0.21	0.40	0.38	0.42	0.44	0.46	0.48	0.50	0.53
Maximum Volume Stored (acre-ft) =	0.200	0.657	0.529	0.739	0.898	1.047	1.169	1.340	1.601

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)







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

DETENTION BASIN OUTLET STRUCTURE DESIGN

Outflow Hydrograph Workbook Filename:

Inflow Hydrographs

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

	SOURCE	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP
Time Interval	TIME	WQCV [cfs]	EURV [cfs]	2 Year [cfs]	5 Year [cfs]	10 Year [cfs]	25 Year [cfs]	50 Year [cfs]	100 Year [cfs]	500 Year [cfs]
5.00 min	0:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.02	0.50
	0:15:00	0.00	0.00	1.45	2.37	2.94	1.97	2.42	2.40	3.27
	0:20:00	0.00	0.00	4.86	6.29	7.52	4.61	5.32	5.75	7.37
	0:25:00	0.00	0.00	10.33	14.88	18.89	10.13	11.88	13.07	18.52
	0:30:00	0.00	0.00	11.90	16.62	19.91	24.76	29.18	32.87	42.37
	0:35:00	0.00	0.00	9.95	13.58	16.22	25.13	29.29	35.07	44.69
	0:40:00	0.00	0.00	8.07	10.75	12.88	22.29	25.87	30.60	38.87
	0:45:00	0.00	0.00	6.08	8.33	10.21	17.93	20.80	25.71	32.61
	0:50:00	0.00	0.00	4.79	6.81	8.16	14.88	17.25	21.03	26.74
	0:55:00	0.00	0.00	3.84	5.40	6.62	11.57	13.47	17.12	21.81
	1:00:00	0.00	0.00	3.06	4.26	5.34	9.14	10.68	14.25	18.16
	1:05:00	0.00	0.00	2.52	3.45	4.45	7.24	8.48	11.90	15.19
	1:10:00	0.00	0.00	2.00	3.09	4.12	5.28	6.22	8.23	10.68
	1:15:00	0.00	0.00	1.74	2.77	4.02	4.30	5.10	6.18	8.16
	1:20:00	0.00	0.00	1.60	2.46	3.57	3.43	4.05	4.44	5.85
	1:25:00	0.00	0.00	1.52	2.26	3.00	2.90	3.42	3.35	4.40
	1:30:00	0.00	0.00	1.47	2.14	2.62	2.40	2.80	2.70	3.53
	1:35:00	0.00	0.00	1.43	2.06	2.37	2.09	2.41	2.26	2.94
	1:40:00	0.00	0.00	1.41	1.79	2.21	1.90	2.17	1.99	2.58
	1:45:00	0.00	0.00	1.40	1.61	2.10	1.77	2.01	1.84	2.38
	1:50:00	0.00	0.00	1.40	1.49	2.02	1.71	1.93	1.80	2.31
	1:55:00	0.00	0.00	1.16	1.42	1.91	1.67	1.88	1.78	2.28
	2:00:00	0.00	0.00	0.99	1.32	1.70	1.65	1.86	1.78	2.28
	2:05:00	0.00	0.00	0.64	0.85	1.10	1.07	1.21	1.16	1.48
	2:10:00	0.00	0.00	0.40	0.53	0.70	0.69	0.77	0.74	0.95
	2:15:00	0.00	0.00	0.25	0.33	0.43	0.43	0.48	0.46	0.59
	2:20:00	0.00	0.00	0.14	0.20	0.26	0.26	0.29	0.27	0.35
	2:25:00	0.00	0.00	0.07	0.11	0.14	0.15	0.17	0.16	0.20
	2:30:00	0.00	0.00	0.03	0.05	0.06	0.07	0.08	0.07	0.09
	2:35:00	0.00	0.00	0.01	0.02	0.02	0.02	0.02	0.02	0.03
	2:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

Summary Stage-Area-Volume-Discharge Relationships

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

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

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

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

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

JOB NAME: HABITAT
JOB NUMBER: 2506.03
DATE: 06/04/24
CALCULATED BY: MAL

TOTAL POND VOLUME

POND SIZING WITH PONDPACK EQUATION:
INSERT POND DESIGN SIZE INFO: (RED)

POND ELEVATION : (from lowest to highest)	**AREA (BTM to TOP):**		
5831.60	273	0.01	acres
5831.60	273	0.01	acres
5831.93	273	0.01	acres
5832.00	300	0.01	acres
5833.00	4,926	0.11	acres
5834.00	10,203	0.23	acres
5835.00	16,599	0.38	acres
5836.00	19,652	0.45	acres
5838.00	24,746	0.57	acres
5840.00	30,260	0.69	acres
5841.00	33,171	0.76	acres
		-	acres

PRELIMINARY SIZE:

VOLUME = 1/3{(EL2-EL1)*(A1+A2+((A1*A2)^.5))}

							CUMMULATIVE VOLUME:
-	AC-FT	from	5,832	to	5,832		
0.00	AC-FT	from	5,832	to	5,832		0.00
0.00	AC-FT	from	5,832	to	5,832		0.00
0.05	AC-FT	from	5,832	to	5,833		0.05
0.17	AC-FT	from	5,833	to	5,834		0.22
0.30	AC-FT	from	5,834	to	5,835		0.52
0.41	AC-FT	from	5,835	to	5,836		0.93
1.01	AC-FT	from	5,836	to	5,838		1.94
1.25	AC-FT	from	5,838	to	5,840		3.19
0.72	AC-FT	from	5,840	to	5,841		3.91
-	AC-FT	from	5,841	to	-		3.91

*SIZING IS FOR PRELIMINARY PURPOSES ONLY.

VOLUME = 3.91 AC-FT

APPROXIMATE SURFACE AREA REQUIREMENT

POND DEPTH (FT)	**POND VOLUME** AC-FT		CF	**SURFACE AREA** (SF)
4	3.91	=	######	42,560
6	3.91	=	######	28,373
8	3.91	=	######	21,280
10	3.91	=	######	17,024

JOB NAME: HABITAT
JOB NUMBER: 2506.03
DATE: 06/04/24
CALCULATED BY: MAL

TOTAL EURV

POND SIZING WITH PONDPACK EQUATION:
INSERT POND DESIGN SIZE INFO: (RED)

POND ELEVATION : (from lowest to highest)	**AREA (BTM to TOP):**		
5831.60	273	0.01	acres
5831.60	273	0.01	acres
5831.93	273	0.01	acres
5832.00	300	0.01	acres
5833.00	4,926	0.11	acres
5834.00	10,203	0.23	acres
5835.00	16,599	0.38	acres
5835.50	18,462	0.42	acres
		-	acres
		-	acres
		-	acres
		-	acres

PRELIMINARY SIZE:

VOLUME = 1/3{(EL2-EL1)*(A1+A2+((A1*A2)^.5))}

						CUMMULATIVE VOLUME:
-	AC-FT	from	5,832	to	5,832	
0.00	AC-FT	from	5,832	to	5,832	0.00
0.00	AC-FT	from	5,832	to	5,832	0.00
0.05	AC-FT	from	5,832	to	5,833	0.05
0.17	AC-FT	from	5,833	to	5,834	0.22
0.30	AC-FT	from	5,834	to	5,835	0.52
0.20	AC-FT	from	5,835	to	5,836	0.72
-	AC-FT	from	5,836	to	-	0.72
-	AC-FT	from	-	to	-	0.72
-	AC-FT	from	-	to	-	0.72
-	AC-FT	from	-	to	-	0.72

*SIZING IS FOR PRELIMINARY PURPOSES ONLY.

VOLUME = 0.72 AC-FT

APPROXIMATE SURFACE AREA REQUIREMENT

POND DEPTH (FT)	**POND VOLUME** AC-FT		CF	**SURFACE AREA** (SF)
4	0.72	=	31,380	7,845
6	0.72	=	31,380	5,230
8	0.72	=	31,380	3,922
10	0.72	=	31,380	3,138

JOB NAME: HABITAT
JOB NUMBER: 2506.03
DATE: 06/04/24
CALCULATED BY: MAL

TO SPILLWAY

POND SIZING WITH PONDPACK EQUATION:
INSERT POND DESIGN SIZE INFO: (RED)

POND ELEVATION : (from lowest to highest)	AREA (BTM to TOP):		
5831.60	273	0.01	acres
5831.60	273	0.01	acres
5831.93	273	0.01	acres
5832.00	300	0.01	acres
5833.00	4,926	0.11	acres
5834.00	10,203	0.23	acres
5835.00	16,599	0.38	acres
5836.00	19,652	0.45	acres
5838.00	24,746	0.57	acres
5839.00	27,450	0.63	acres
		-	acres
		-	acres

PRELIMINARY SIZE:

VOLUME = 1/3{(EL2-EL1)*(A1+A2+((A1*A2)^.5))}

						CUMMULATIVE VOLUME:
-	AC-FT	from	5,832	to	5,832	
0.00	AC-FT	from	5,832	to	5,832	0.00
0.00	AC-FT	from	5,832	to	5,832	0.00
0.05	AC-FT	from	5,832	to	5,833	0.05
0.17	AC-FT	from	5,833	to	5,834	0.22
0.30	AC-FT	from	5,834	to	5,835	0.52
0.41	AC-FT	from	5,835	to	5,836	0.93
1.01	AC-FT	from	5,836	to	5,838	1.94
0.59	AC-FT	from	5,838	to	5,839	2.53
-	AC-FT	from	5,839	to	-	2.53
-	AC-FT	from	-	to	-	2.53

*SIZING IS FOR PRELIMINARY PURPOSES ONLY.

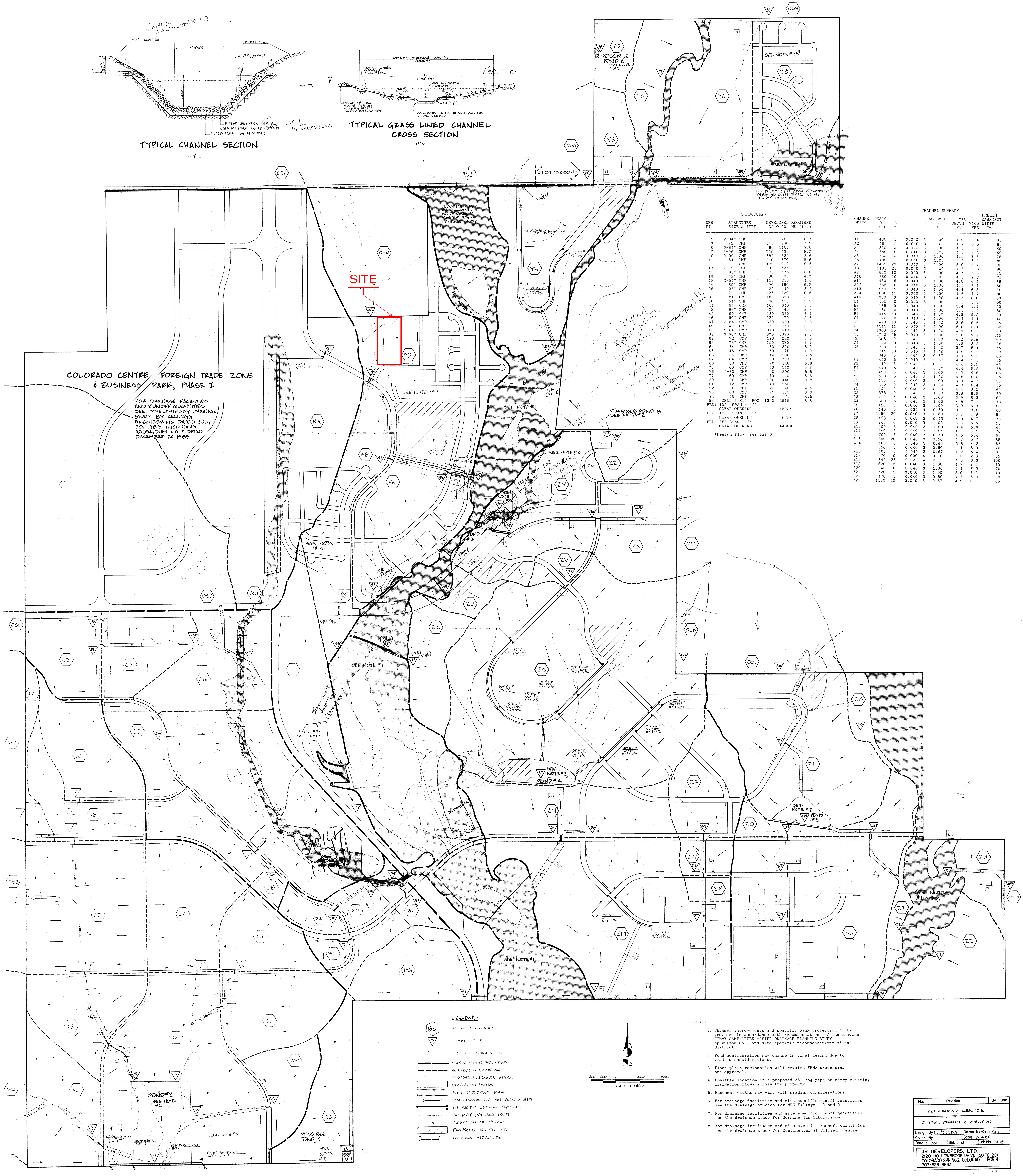
VOLUME = 2.53 AC-FT

APPROXIMATE SURFACE AREA REQUIREMENT

POND DEPTH (FT)	POND VOLUME AC-FT		CF	SURFACE AREA (SF)
4	2.53	=	######	27,578
6	2.53	=	######	18,385
8	2.53	=	######	13,789
10	2.53	=	######	11,031

REFERENCE MATERIAL FROM PRIOR STUDIES

MORNING SUN SUBDIVISION
AT COLORADO CENTRE
DEVELOPED BY:
KEITH DEVELOPMENT COMPANY
5040 CORPORATE PLAZA DRIVE
COLORADO SPRINGS, CO 80919
VICINITY MAP COLO. CENTRE
SITE
JIMMY CAMP CREEK (OPEN SPACE)
SLEEPY CREEK DR
COOL SHADOW CT
BRISK BREEZE CT
EARLY MORNING CT
PRAIRE MIST DR
TRANQUIL TER
DEW DROP CT
SETTING MOON CT
BREAKING DAWN ST
DAYSTAR TER
SHINING STAR DR
PEACEFUL MEADOW ST
HAZEY MORNING DR
HARVEST SUN TER
HORIZONVIEW DRIVE
WARM SUN TER
Q=587
Q=213
Q=22.4
Q=15.1
Q=15.5
Q=16.8
Q=18.2
Q=21.5
Q=2.1 (OFFSITE FLOW)
10' TYPE "R" INLET
OWNER: TONY CUCHARES 9265 DRENNAN RD COLO. SPGS., CO 80909
FUTURE VEHICULAR ACCESS TO ADJACENT PROPERTY
OWNER: LP ASSOCIATES 3300 E. FIRST AVE. DENVER, CO. 80206
ELEMENTARY SCHOOL SITE 9 AC.
JUNIOR HIGH SCHOOL SITE 20 AC.
20' PEDESTRIAN ACCESS
FUTURE 60' ROW
℄ FUTURE DRAINAGE FACILITY TO JIMMY CAMP CK (SEE TEXT)
TEMPORARY ACCESS RD.
24' WIDE, TO HORIZON VIEW
LEGEND
DESIGN FLOWS (CFS)
BASIN DESIGNATION
AREA - SQ. MILES
SUBDIVISION BOUNDARY
BASIN BOUNDARY
STORM SEWER
FLOW ARROWS
6' WIDE CROSSPAN
A 0.0140
B 0.0156
C 0.0175
D 0.0211
E 0.0138
F 0.0190
G 0.0170
LINE BEARING DISTANCE
1 S 89°24'59"W 89.84
2 N 49°41'21"E 40.00
3 S 62°33'26"E 98.30
4 S 14°54'51"W 89.01
CURVE DELTA RADIUS ARC
1 9°29'08" 624.36 103.36
DRAINAGE PLAN
NORTH
SCALE: 1"=100'
UNITED PLANNING AND ENGINEERING
5040 CORPORATE PLAZA DRIVE
COLORADO SPRINGS, CO 80919
JOB NO.
REV: 2/10/86
DATE: 10/15/85



STRUCTURES

DES. PT.	STRUCTURE SIZE & TYPE	DEVELOPED Q5	DEVELOPED Q100	REQUIRED HW (ft.)
2	2-84" CMP	375	760	8.7
3	72" CMP	145	260	7.5
6	3-84" CMP	560	1180	9.0
7	3-96" CMP	730	1435	9.0
9	2-90" CMP	385	830	8.6
11	84" CMP	210	370	8.6
12	72" CMP	120	210	6.5
13	2-72" CMP	295	525	7.7
15	66" CMP	95	175	6.0
18	42" CMP	30	65	4.7
19	2-54" CMP	115	210	4.6
24	60" CMP	90	160	6.3
26	36" CMP	20	40	3.5
27	72" CMP	125	220	6.5
33	84" CMP	180	350	8.8
36	54" CMP	60	130	5.9
41	84" CMP	160	340	8.3
42	96" CMP	220	440	9.8
45	90" CMP	180	380	8.7
46	90" CMP	220	470	9.8
47	2-84" CMP	330	680	8.6
49	42" CMP	30	70	6.6
60	2-84" CMP	310	640	8.3
61	3-90" CMP	670	1390	9.3
62	72" CMP	120	220	7.0
63	78" CMP	150	270	7.7
64	84" CMP	160	300	8.2
65	48" CMP	50	75	4.9
66	66" CMP	110	200	6.5
67	84" CMP	190	350	8.4
68	60" CMP	70	140	5.8
75	60" CMP	80	140	5.8
76	2-60" CMP	140	300	5.8
77	60" CMP	70	140	5.8
80	96" CMP	220	440	9.8
91	72" CMP	140	250	7.7
92	36" CMP	20	40	4.5
93	60" CMP	95	165	6.3
94	48" CMP	40	75	4.5
96	4 CELL 8'X10' BOX	1320	2915	8.8
BRD1	100' SPAN - 12' CLEAR OPENING		11800*	
BRD2	120' SPAN - 12' CLEAR OPENING		14625*	
BRD3	65' SPAN - 8' CLEAR OPENING		4400*	

*Design flow per REF 3

CHANNEL SUMMARY

CHANNEL DESIG.	DESIG. Q CFS	B Ft	N	Z	ASSUMED S %	NORMAL DEPTH Ft	V100 FPS	PRELIM. EASEMENT WIDTH Ft
A1	430	5	0.040	3	1.00	4.0	6.4	65
A2	485	5	0.040	3	1.00	4.2	6.5	65
A3	320	0	0.040	3	1.00	4.3	6.0	60
A4	380	0	0.040	3	1.00	4.6	6.3	60
A5	760	10	0.040	3	1.00	4.5	7.3	75
A6	1180	15	0.040	3	1.00	5.0	8.1	80
A7	1435	20	0.040	3	1.00	5.0	8.4	90
A8	1485	25	0.040	3	1.00	4.6	8.3	90
A9	830	10	0.040	3	1.00	4.7	7.5	75
A10	880	10	0.040	3	1.00	4.8	7.6	75
A11	430	5	0.040	3	1.00	4.0	6.4	65
A12	365	0	0.040	3	1.00	4.5	6.1	60
A13	550	5	0.040	3	1.00	4.4	6.8	65
A14	1030	15	0.040	3	1.00	4.6	7.7	80
A16	330	0	0.040	3	1.00	4.3	6.0	60
B1	155	0	0.040	3	1.00	3.3	5.0	50
B2	165	0	0.040	3	1.00	3.4	5.1	50
B3	180	0	0.040	3	1.00	3.5	5.2	50
B4	2915	50	0.040	3	1.00	4.9	9.2	120
C1	70	0	0.040	3	1.00	2.4	4.1	40
C2	470	10	0.040	3	1.00	3.6	6.5	65
C3	1215	15	0.040	3	1.00	5.0	8.1	80
C4	1360	20	0.040	3	1.00	4.9	8.3	90
C5	2750	45	0.040	3	1.00	5.0	9.2	115
C6	305	0	0.040	3	1.00	4.2	5.9	60
C7	40	0	0.040	3	1.00	1.9	3.5	35
C8	220	0	0.040	3	1.00	3.7	5.4	55
C9	2915	50	0.040	3	1.00	4.9	9.2	120
F1	340	5	0.040	3	0.67	3.9	5.2	60
F2	440	5	0.040	3	0.67	4.4	5.5	65
F3	440	5	0.040	3	0.67	4.4	5.5	65
F4	440	5	0.040	3	0.67	4.4	5.5	65
R1	490	5	0.040	3	1.00	4.2	6.6	65
Y2	560	5	0.040	3	1.00	4.5	6.8	65
Y3	130	0	0.040	3	1.00	3.0	4.7	50
Y4	430	5	0.040	3	1.00	4.0	6.4	65
Y5	500	5	0.040	3	0.83	4.4	6.2	60
Z2	575	10	0.040	3	1.00	3.9	6.8	70
Z3	410	5	0.040	3	1.00	3.9	6.3	60
Z4	660	5	0.040	3	1.00	4.8	7.1	70
Z5	420	5	0.040	3	1.00	3.9	6.3	60
Z6	140	0	0.030	4	0.30	3.1	3.6	60
Z7	1390	20	0.040	3	0.89	5.0	7.9	85
Z8	450	5	0.040	3	0.43	4.9	4.7	70
Z9	245	0	0.040	3	1.00	3.8	5.5	55
Z10	300	5	0.040	3	1.00	3.4	5.8	60
Z11	340	5	0.040	3	0.65	4.0	5.1	70
Z12	700	15	0.040	3	0.50	4.5	5.4	80
Z13	890	20	0.040	3	0.50	4.6	5.7	85
Z14	180	0	0.040	3	0.60	3.8	4.2	55
Z15	350	5	0.040	3	0.60	4.1	5.0	70
Z16	400	5	0.040	3	0.67	4.2	5.4	65
Z17	70	0	0.030	4	0.10	3.0	2.0	55
Z18	640	25	0.030	4	0.10	4.5	3.3	100
Z19	620	5	0.040	3	1.00	4.7	7.0	70
Z20	640	10	0.040	3	1.00	4.1	6.9	70
Z21	720	5	0.040	3	1.00	5.0	7.2	70
Z22	470	5	0.040	3	0.50	4.8	5.0	60
Z23	1130	20	0.040	3	0.67	4.9	6.8	85

NOTE:

1. Channel improvements and specific bank protection to be provided in accordance with recommendations of the ongoing JIMMY CAMP CREEK MASTER DRAINAGE PLANNING STUDY, by Wilson Co., and site specific recommendations of the District.
2. Pond configuration may change in final design due to grading considerations.
3. Flood plain reclamation will require FEMA processing and approval.
4. Possible location of a proposed 36" sag pipe to carry existing irrigation flows across the property.
5. Easement widths may vary with grading considerations.
6. For drainage facilities and site specific runoff quantities see the drainage studies for MDC Filings 1,2 and 3.
7. For drainage facilities and site specific runoff quantities see the drainage study for Morning Sun Subdivision.
8. For drainage facilities and site specific runnoff quantities see the drainage study for Continental at Colorado Centre.

No.	Revision	By	Date
	COLORADO CENTRE		
	OVERALL DRAINAGE & DETENTION		

Design By T.L./J.D./B.J. | Drawn By T.K./K.M.
Check By | Scale 1"=400'
Date 1-86 | Sht. 1 of 1 | Job No. 7008

JR DEVELOPERS, LTD.
2120 HOLLOWBROOK DRIVE SUITE 201
COLORADO SPRINGS, COLORADO 80918
303-528-8833

EXISTING CONDITIONS

DRAINAGE MAP

CLASSIC SM
CONSULTING
ENGINEERS & SURVEYORS

LEGEND

- EXISTING GROUND CONTOUR — 5849
- EXISTING BASIN BOUNDARY
- DIRECTION OF DRAINAGE
- BASIN IDENTIFIER — EX-A
- AREA IN ACRES — 1.30

BASIN RUNOFF SUMMARY			
BASIN	AREA (AC)	Q5 (CFS)	Q100 (CFS)
EX-A	1.63	3.3	7.3
EX-B	9.00	2.4	17.5

NOTE:

DESIGN POINT NOTATIONS NOT USED FOR THIS PDR, RATHER BASIN IDENTIFIERS ARE REFLECTED IN CALCULATIONS AND EXHIBITS.

N

50 25 0 50 100

SCALE: 1" = 50'

CLASSIC CONSULTING SM
619 N. Cascade Avenue, Suite 200
Colorado Springs, Colorado 80903
(719)785-0790

RISING MOON FILING NO. 1

EXISTING CONDITIONS MAP

CLASSIC CONSULTING

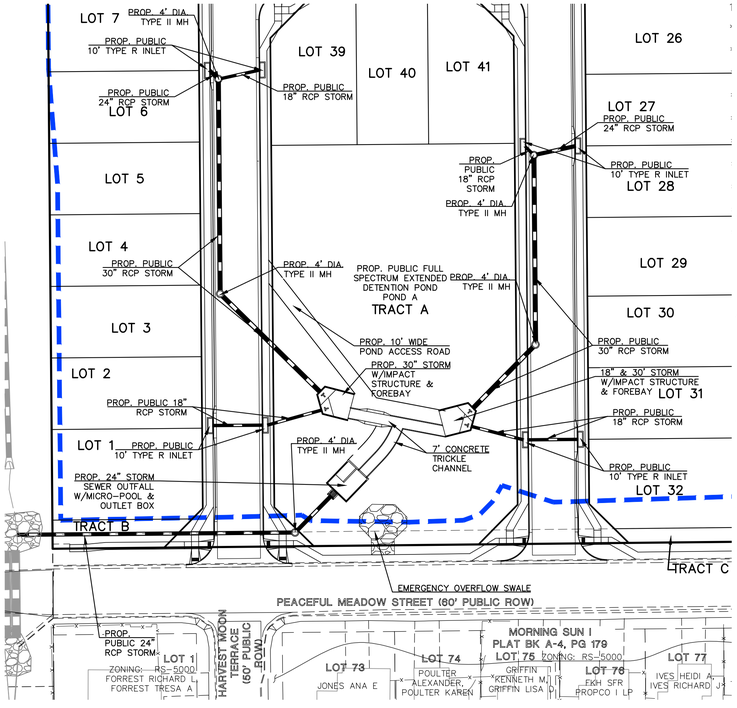
DESIGNED BY	JDP	SCALE		DATE	8/28/24
DRAWN BY	JDP	(H) 1"=	50'	SHEET	1 OF 1
CHECKED BY	KRC	(V) 1"=	N/A	JOB NO.	2506.03

N:\2506\03\DRAWINGS\EXHIBITS\DRAINAGE MAPS\250603-EX.DWG PRINTED BY: KSULLIVAN 8:28:24 @ 7:38 AM LAST SAVED BY: KSULLIVAN

PROPOSED CONDITIONS

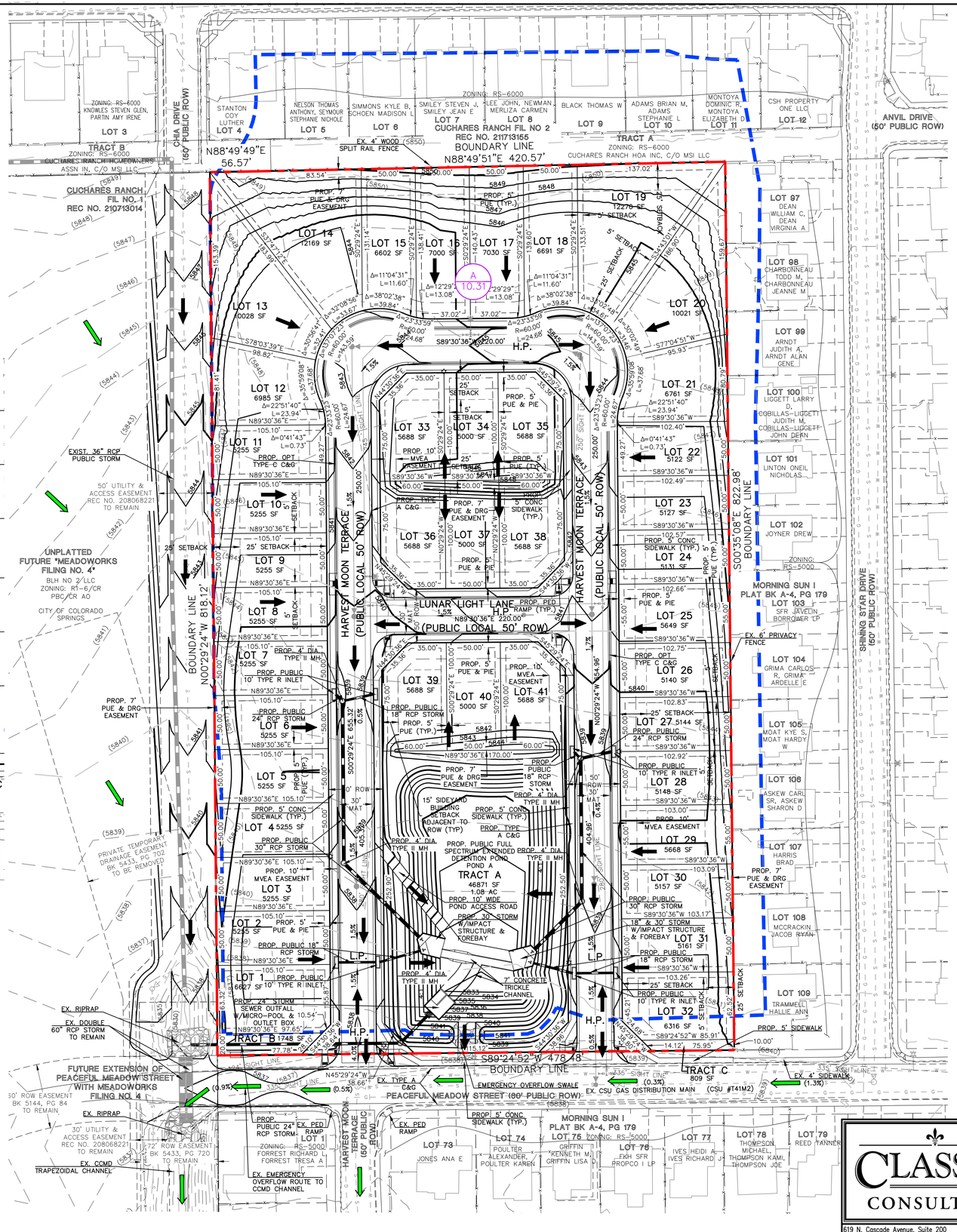
DRAINAGE MAP

CLASSIC SM
CONSULTING
ENGINEERS & SURVEYORS



PROPOSED STORM SEWER

SCALE: 1" = 50'



LEGEND

- EXISTING GROUND CONTOUR — 5910
- PROPOSED CONTOUR — 5910
- PROPERTY LINE/LOT LINE
- PROPOSED BASIN BOUNDARY
- EXISTING DIRECTION OF DRAINAGE
- PROPOSED DIRECTION OF DRAINAGE
- BASIN IDENTIFIER / AREA IN ACRES — A 1.30
- PROPOSED HIGH POINT — H.P.
- PROPOSED LOW POINT — L.P.

BASIN RUNOFF SUMMARY			
BASIN	AREA (AC)	Q5 (CFS)	Q100 (CFS)
A	10.31	17.6	40.5

NOTE:

DESIGN POINT NOTATIONS NOT USED FOR THIS PDR, RATHER BASIN IDENTIFIERS ARE REFLECTED IN CALCULATIONS AND EXHIBITS.

N

50 25 0 50 100

SCALE: 1" = 50'

CLASSIC CONSULTING SM

619 N. Cascade Avenue, Suite 200
Colorado Springs, Colorado 80903
(719)785-0790

RISING MOON FILING NO. 1

PROPOSED CONDITIONS MAP

DESIGNED BY	JDP	SCALE		DATE	8/28/24
DRAWN BY	JDP	(H) 1"=	50'	SHEET	1 OF 1
CHECKED BY	KRC	(V) 1"=	N/A	JOB NO.	2506.03

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