FINAL DRAINAGE REPORT FOR COLORADO CENTRE METROPOLITAN DISTRICT ADMINISTRATION BUILDING

PCD FILE # PPR-21-51

PREPARED BY

Richard Gallegos, P.E.
RESPEC
121 S. Tejon St., Suite 1110
Colorado Springs, CO 80903

PREPARED FOR

Colorado Centre Metropolitan District
4770 Horizonview Drive
Colorado Springs, CO 80925

April 2023

Project 247.07

ENGINEER'S STATEMENT

This report and plan for the drainage design of Colorado Centre Metropolitan District Administration Building, was prepared by me (or under my direct supervision) and is correct to the best of my knowledge and belief. Said report and plan has been prepared according to the criteria established by the County for drainage reports and said report is in conformity with the master plan of the drainage basin. I understand that El Paso County 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.

Richard Gallegos, P.E. Date
Registered Professional Engineer State of Colorado No. 36247

OWNER/DEVELOPER'S STATEMENT

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

1/4/2023
Date

Jackie McClintock, President
Colorado Centre Metropolitan District
4770 Horizonview Drive,
Colorado Springs, CO 80925

EL PASO COUNTY STATEMENT

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

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

APPROVED
Engineering Department
06/29/2023 3:01:22 PM
dotnijkamp
EPC Department of Public Works

TABLE OF CONTENTS

APPENDIX

1.0 PURPOSE

This drainage report is for the design of the Colorado Centre Metropolitan District Administration Building. The site is located at 9696 Flagstone Street, Colorado Springs, Colorado in central El Paso County. See Vicinity Map in the Appendix below for reference. It is further described as the Northeast One-Quarter of the Southwest One-Quarter of Section 3, Township 15 South, Range 65 West of the 6th P.M.

One County-approved Drainage Report was found within the County's files that included the project site:

- *Drainage Report for Colorado Centro Metropolitan District Water Treatment Facility* by JDS-Hydro Consultants Inc. approved in August 2015.

This 7.73-acre site is located within the Jimmy Camp Creek – FOFO2000 basin. Work will include the construction of a 4,542 square foot (sf) administration building, asphalt driveway, and a parking lot. In order to accommodate an area of disturbance greater than 1 acre, a 0.207-acre-foot detention basin will be constructed in the southwest portion of the site to detain all flows directed to the south. No portion of the site is located within a FEMA designated 100-year floodplain per Map No. 08041C0769G that was effective on December 7th, 2018.

2.0 SOIL CONDITIONS

According to the El Paso County Area Soil Survey, the soil on the site is classified as follows:

SOIL #	SOIL TYPE	HYDROLOGIC CLASSIFICATION	PERCENT OF SITE
28	Ellicot Loamy Coarse Sand, 0 to 5 Percent Slopes	A	0.0%
101	Ustic Torrifluvents, Loamy	B	100.0%

The Ustic Torrifluvents soil can be described as having a high permeability, low surface runoff, and slight hazard of erosion. The Ellicot soils is described as having very high permeability and very low surface runoff. The hydrologic soil classification used for this study is 'B'. See Soils Map in the Appendix for reference.

3.0 HYDROLOGIC CRITERIA

The methodology utilized for this report is in accordance with the *El Paso County Drainage Criteria Manual.* All references from the *El Paso County Drainage Criteria Manual* can be found in Appendix C. The Rational Method for computation of runoff was used.

Q = cia

Where
Q = maximum rate of runoff in cubic feet per second
c = runoff coefficient representing drainage area characteristics
i = average rainfall intensity, in inches per hour, for the duration required for the runoff to become established
a = drainage basin size in acres

The storm recurrence intervals used for this study were the 5-year storm and the 100-year storm. The detention discharge for the proposed 0.207-acre-foot Full Spectrum Extended Detention Basin is 0.5 cfs for the 5-year storm and 5.5 cfs for the 100-year storm. The Colorado Urban Hydrograph Procedure (CUHP) was used to route flows through the proposed private detention basin. This procedure is described in more detail in the *Mile High Flood District Urban Storm Drainage Criteria Manual Volume 1*, shown below in Appendix C – Colorado Urban Hydrograph Procedure Summary.

The Mile High Flood District – Detention Version 4.05 (January 2022) spreadsheet was used to determine the required detention basin storage volume and outlet structure design. ManningSolver Version 1.019, also, was used in this analysis to calculate the Manning's normal depth within the pond inlet channel.

4.0 EXISTING DRAINAGE CONDITIONS

The overall site consists of 7.73 acres. The site includes an existing 3725 sf water treatment plant and an asphalt driveway. The areas of the site not covered by the water treatment plant or asphalt driveway are covered with nearly bare ground. These undeveloped areas include slopes that range from 0.5% to 19.3%. The overall existing site is 4.6% impervious. See Existing Drainage Map for reference.

Flows from Sub-basin Aex through Sub-basin Dex are tributary to the Jimmy Camp Creek (FOFO2000) basin.

Sub-basin Aex contains 2.05 acres and drains south towards a grated inlet in the southwest corner of the site. This sub-basin produces existing flows of 0.6 cfs for the 5-year storm and 3.4 cfs for the 100-year storm. Flows from Aex are ultimately drained by flowing to an existing graged inlet near Flagstone Street, and discharged to the existing Flagstone Channel located to the east via a 24" CMP pipe. At the 24" CMP discharge point, a riprap pad was installed. Based on site observations, the existing riprap is adequate to protect the outfall point and can be considered scour stable. The scour stable assessment is based upon deposition of sediment at the outfall point, and the establishment of vegetation, both of which would not occur if the discharge point was unstable. A photograph showing the outfall point is included within the appendix of this report. As part of the project, the sediment and any excessive vegetation should be removed.

Sub-basin Bex contains 0.17 acres and drains south along East Anvil Drive. This sub-basin produces existing flows of 0.8 cfs for the 5-year storm and 1.5 cfs for the 100-year storm. These flows move south into and along curb and gutter as channelized flow.

Sub-basin Cex contains 2.87 acres and drains east towards Jimmy Camp Creek. This sub-basin produces existing flows of 1.0 cfs for the 5-year storm and 5.4 cfs for the 100-year storm. These flows sheetflow to the east.

Sub-basin Dex contains 0.71 acres and drains east towards Jimmy Camp Creek. It produces flows of 0.2 cfs for the 5-year storm and 1.5 cfs for the 100-year storm. These flows sheetflow to the east, ultimately ending up in Jimmy Camp Creek.

Sub-basin Eex contains 1.65 acres and drains east towards Jimmy Camp Creek. It produces flows of 0.4 cfs for the 5-year storm and 2.8 cfs for the 100-year storm. These flows sheetflow to the east into Jimmy Camp Creek.

Sub-basin Fex contains 0.09 acres and drains northeast into Jimmy Camp Creek. It produces flows of less than 0.1 cfs for the 5-year storm and 0.3 cfs for the 100-year storm. These flows sheetflow to the east into Jimmy Camp Creek.

Sub-basin Gex contains 0.07 acres and drains south towards Flagstone Street. It produces flows of less than 0.1 cfs for the 5-year storm and 0.2 cfs for the 100-year storm. These flows sheetflow to the south onto Flagstone Street.

Sub-basin OS1 contains 0.50 acres and drains southwest towards Sub-basin Aex. It produces flows of 0.1 cfs for the 5-year storm and 0.9 cfs for the 100-year storm. These flows sheetflow to the southwest into Sub-basin Aex.

Sub-basin OS2 contains 0.37 acres and drains southeast towards Sub-basin Eex. It produces flows of 0.1 cfs for the 5-year storm and 0.8 cfs for the 100-year storm. These flows sheetflow to the southeast into Sub-basin Eex.

Sub-basin OS3 contains 0.01 acres and drains east towards Sub-basin Aex. It produces flows of less than 0.1 cfs for the 5-year storm and less than 0.1 cfs for the 100-year storm. These flows sheetflow to the east into Sub-basin Aex.

The estimated runoff amounts produced for the project under Existing Conditions are shown in Table 1 below.

TABLE 1 – EXISTING CONDITIONS

Sub-basin	Q_5 (CFS)	Q_{100} (CFS)
Aex	0.6	3.4
Bex	0.8	1.5
Cex	1.0	5.4
Dex	0.2	1.5
Eex	0.4	2.8
Fex	<0.1	0.3
Gex	<0.1	0.2
OS1	0.1	0.9
OS2	0.1	0.8
OS3	<0.1	<0.1

5.0 DEVELOPED DRAINAGE CONDITIONS

The overall site consists of 7.73 acres, of which 2.65 acres will be disturbed as part of this project. A 4,542 sf administration building and asphalt driveway is proposed on the west side of the site. A 0.20-acre-foot Full Spectrum Extended Detention basin size will accommodate the area of disturbance greater than 1 acre. Proposed Conditions Map is located below in the Back Pocket for reference. Proposed site imperviousness is 19.6%, versus 4.6% in the existing conditions. Proposed flows are tributary to the Jimmy Camp Creek Basin (FOFO2000).

Sub-basin A contains 2.78 acres and south towards a 0.20-acre-foot Full Spectrum Extended Detention Basin located in the southwest corner of the site. It produces flows of 3.7 cfs for the 5-year storm and 9.1 cfs for the 100-year storm. These flows sheetflow to the south into the proposed 0.20-acre-foot Full Spectrum Extended Detention Basin. A portion of these flows drain through an existing 4' wide curb opening located on the along East Anvil Drive. A conservative approach was used in calculating the curb opening capacity and the total 100-year flow of 9.1 cfs was used. The 9.1 cfs accounts for 0.33 feet of depth, with minimum of 0.5' of freeboard. No flows will bypass the existing curb opening. More details on this calculation can be found in Appendix B below.

Sub-basin B contains 0.17 acres and drains south along East Anvil Drive. This sub-basin produces flows of 0.8 cfs for the 5-year storm and 1.5 cfs for the 100-year storm. These flows move south into and along curb and gutter as channelized flow. No water quality control measures are proposed within Sub-basin B per the El Paso County Engineering Criteria Manual (ECM) Section I.7.1.C.1., which allows for the County to exclude up to 20 percent when the County has determined that it is not practicable to capture runoff from portions of the site that will not drain towards control measures. Sub-basin B is to remain the same as existing conditions.

Sub-basin C contains 2.14 acres and drains east towards Jimmy Camp Creek. This sub-basin produces flows of 0.8 cfs for the 5-year storm and 4.2 cfs for the 100-year storm. These flows sheetflow to the east. No water quality control measures are proposed within Sub-basin C because the land is to remain undeveloped. Water quality is not required for this sub-basin per El Paso County ECM Section I.7.1.B.7.

Sub-basin D contains 0.65 acres and drains east towards Jimmy Camp Creek. It produces flows of 0.2 cfs for the 5-year storm and 1.4 cfs for the 100-year storm. These flows sheetflow to the east, draining into Jimmy Camp Creek. No water quality control measures are proposed within Sub-basin D because the land is to remain undeveloped. Water quality is not required for this sub-basin per El Paso County ECM Section I.7.1.B.7.

Sub-basin E contains 1.65 acres and drains east towards Jimmy Camp Creek. It produces flows of 0.4 cfs for the 5-year storm and 2.8 cfs for the 100-year storm. These flows sheetflow to the east into Jimmy Camp Creek. No water quality control measures are proposed within Sub-basin E because the land is to remain undeveloped. Water quality is not required for this sub-basin per El Paso County ECM Section I.7.1.B.7.

Sub-basin F contains 0.09 acres and drains northeast into Jimmy Camp Creek. It produces flows of less than 0.1 cfs for the 5-year storm and 0.3 cfs for the 100-year storm. These flows sheetflow to the

east into Jimmy Camp Creek. No water quality control measures are proposed within Sub-basin F because the land is to remain undeveloped. Water quality is not required for this sub-basin per El Paso County ECM Section I.7.1.B.7.

Sub-basin OS1 contains 0.50 acres and drains southwest towards Sub-basin A. It produces flows of 0.1 cfs for the 5-year storm and 0.9 cfs for the 100-year storm. These flows sheetflow to the southwest into Sub-basin A. Flows combine with flows from Sub-basin A at Design Point 1 (DP1) to produce total flows of 3.3 cfs for the 5-year storm and 8.8 cfs for the 100-year storm. Flows were computed at this point to determine the capacity and freeboard within the proposed swale and trickle channel.

Sub-basin OS2 contains 0.37 acres and drains southeast towards Sub-basin E. It produces flows of 0.1 cfs for the 5-year storm and 0.8 cfs for the 100-year storm. These flows sheetflow to the southeast into Sub-basin E.

Sub-basin OS3 contains 0.01 acres and drains east towards Sub-basin A. It produces flows of less than 0.1 cfs for the 5-year storm and less than 0.1 cfs for the 100-year storm. These flows sheetflow to the east into Sub-basin A.

One existing rock check dam is to be removed to allow for the installation of the concrete forebay. All other existing rock check dams are to remain onsite. The removal of all other rock check dams is deemed unnecessary, and therefore, should remain as to slow runoff.

The estimated runoff amounts produced for the project under Proposed Conditions are shown in Table 2 below. The proposed design point information for the project are shown in Table 3 below.

TABLE 2 – PROPOSED CONDITIONS		
Sub-basin	Q_5 (CFS)	Q_{100} (CFS)
A*	3.7	9.1
B	0.8	1.5
C	0.8	4.2
D	0.2	1.4
E	0.4	2.8
F	<0.1	0.3
OS1	0.1	0.9
OS2	0.1	0.8
OS3	<0.1	<0.1

*Note that detained flows are 0.6 cfs for the 5-year event and 5.0 cfs for the 100-year event

TABLE 3 – DESIGN POINTS		
DESIGN POINT	Q_5 (CFS)	Q_{100} (CFS)
DP1 (A + OS1)	3.3	8.8

6.0 FOUR STEP PROCESS

The proposed development follows the "Four Step Process" as mandated by the *El Paso County Drainage Criteria Manual* as follows:

Step 1: Reduce runoff by disconnecting impervious area, eliminating "unnecessary" impervious area and encouraging infiltration into soils that are suitable.

Runoff has been reduced by disconnecting impervious areas where possible, eliminating "unnecessary" impervious areas and encouraging infiltration into suitable soils. IRF Spreadsheets utilized for design.

Step 2: Treat and slowly release the WQCV.

- All new developed flows have been routed to the water quality basin with impervious area less than one acre.
- Drain time for the water quality basin is as follows: Full Spectrum Extended Detention Basin (EDB) is 40 hours.

Step 3: Stabilize stream channels.

Although Jimmy Camp Creek drainageway is adjacent to the project, no work will be done in the drainageway.

- Site flows from the project have been directed to the concrete curb and gutters along the roadways and transported to public drainage facilities which direct them into the water quality/detention facility.
- All new and re-developed 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 source controls.

Erosion control measures will be in place during initial construction to provide source control of sediment with landscaping placed within the proposed development and permanent seeding of all disturbed areas. No other potential pollutants are anticipated with this site post construction. The development of this site will have no adverse impact on downstream properties.

7.0 DETENTION BASIN

To accommodate the area of disturbance greater than 1 acre, a private 0.20-acre-foot Full Spectrum Detention Basin is proposed on the southwest corner of the site (See Proposed Drainage Plan in the Back Pocket). An proposed ditch beginning in the west end of Sub-basin A will direct flows towards the proposed private detention basin in the southwest corner of the site, as seen in Back Pocket – Proposed Drainage Plan. The detention basin, with a depth of 5.17ft and a volume of 0.20-acre-feet, will detain a flow of 3.3 cfs for the 5-year storm and 8.8 cfs for the 100-year storm in Sub-basin A (according to the CUHP procedure), seen below in Appendix B – Developed Detention for Colorado Centre.

A triangular channel located on the west end of the site discharges flows into the 0.20-acre-foot Full Spectrum Extended Detention Basin. These flows produce a velocity of 3.04 feet per second (fps) and a depth of 0.50 feet for the 5-year storm and a velocity of 3.89 fps and a depth of 0.72 feet for the 100-year storm within the channel. This is 1.95 feet of freeboard for the 5-year storm and 1.73 feet of freeboard for the 100-year storm within the channel. More details on the Manning's normal depth calculation for the inlet channel are provided below in Appendix B.

The detention basin will have post-detention peak flows of 0.6 cfs for the 5-year storm and 5.0 cfs for the 100-year storm. This detention basin will outlet 5-year flows through a series of orifices spaced at 0, 0.71, and 1.41 feet above the bottom of the basin. The detention basin will, conversely, outlet 100-year flows through a proposed Type OS2 outlet structure and tied into an existing 24" diameter CMP outlet pipe with a flow restrictor plate set at 6.0" above the pipe invert. More details can be found in the Appendix B – Outlet Structure Design. Basin drain times and stage versus volume figures are shown below in Appendix B – Developed Detention for Colorado Centre.

8.0 WATER QUALITY

Water quality for the site will be achieved through a 0.20-acre-foot proposed private Full Spectrum Extended Detention Basin (FS/EDB). A 2' wide trickle channel located in the detention basin will carry flows towards a private 'Type OS2' Outlet Structure tied into an existing private 24" corrugated metal pipe outlet (See *MHFD Detention Basin Stage-Storage Table Builder* in Appendix B for reference). The existing grated inlet located in Sub-basin Aex will be removed during construction. The outlet pipe to be tied into is in a stable and working condition, flowing and outfalling east into Flagstone Channel (See the Proposed Drainage Plan in the Back Pocket for reference). The outfall is protected with existing riprap and vegetation, which is seen below in a provided photo found in Appendix A. For these reasons, no improvements to the existing pipe are proposed. The private EDB drains an area of 3.28 acres that is 35.4% impervious and will have a volume of 0.20-acre-ft. The Water Quality capture volume will be 0.047 acre- ft. Calculations for the private EDB and outlet structure design are included in Appendix B of this report.

9.0 EROSION CONTROL PLAN

The site construction consists of constructing a new administration building and asphalt drive, disturbing 2.65 acres of area. This requires an Erosion and Stormwater Quality Control Permit. The Grading and Erosion Control Plan will be submitted in separate Construction Plans.

10.0 FLOODPLAIN STATEMENT

No portion of the developed site is located within a designated FEMA 100-year floodplain according to the information published in the Federal Emergency Management Agency Flood Plain Map No. 08041C0769G dated December 7th, 2018.

11.0 DRAINAGE BASIN FEES

The proposed development is located within the Jimmy Camp Creek Drainage Basin.

2022 Jimmy Camp Creek Drainage Fees

Drainage fees are waived because Colorado Centre Metropolitan District owns and maintains the drainage infrastructure within its boundaries.

2022 Jimmy Camp Creek Bridge Fees

Bridge fees are waived because Colorado Centre Metropolitan District owns and maintains the bridges within its boundaries.

12.0 CONSTRUCTION COST OPINION

The private, non-reimbursable Control Measures (CM) Financial Assurances costs of construction are as follows:

Description	Quantity	Unit Cost	Amount
OUTLET STRUCTURE	1 EA	$3,000	$3,000
CONCRETE FOREBAY	1 LS	$500	$500
2' CONC. PAN	120 LF	$20	$2,400
FSD/EDB GRADING	1350 CY	$10	$13,500
CONCRETE STILLING BASIN	1 EA	$2,500	$2,500
RETAINING WALL	90 SF	$20	$1,800
		Sub-Total	$23,700
		Engineering & Contingencies 10%	$2,370
		Total	$26,070

13.0 CONCLUSIONS

For this 7.73-acre site, work will include constructing a 4,542 sf administration building and asphalt driveway. In order to accommodate an area of disturbance greater than 1 acre, a 0.20-acre-foot Full Spectrum Extended Detention Basin is proposed that detains flows from Sub-basin A and releases 5-year storm and 100-year storm flows through a Type OS2 Outlet Structure that is tied into an existing 24" corrugated metal pipe.

Sediment and vegetation surrounding the existing 24" corrugated metal pipe outfall point in Flagstone Channel will be removed. Riprap pad will be re-established at this outfall point. The outfall point is currently scour stable. All areas disturbed by construction will be repaired, and erosion control measures will be installed during construction of the proposed site per the approved Grading and Erosion Control Plan to be submitted separately for review and approval. Site runoff, storm drains, and appurtenances associated with the development of the Colorado Centre Metropolitan District Administration building will not adversely affect the downstream and surrounding developments.

14.0 REFERENCES

Drainage Report for Colorado Centre Metropolitan District Water Treatment Facility, prepared by JDS-Hydro Consultants Inc in August 2015.

Flood Insurance Rate Map Number 08041C0769G, Federal Emergency Management Agency Floodplain Data, revised December 7, 2018

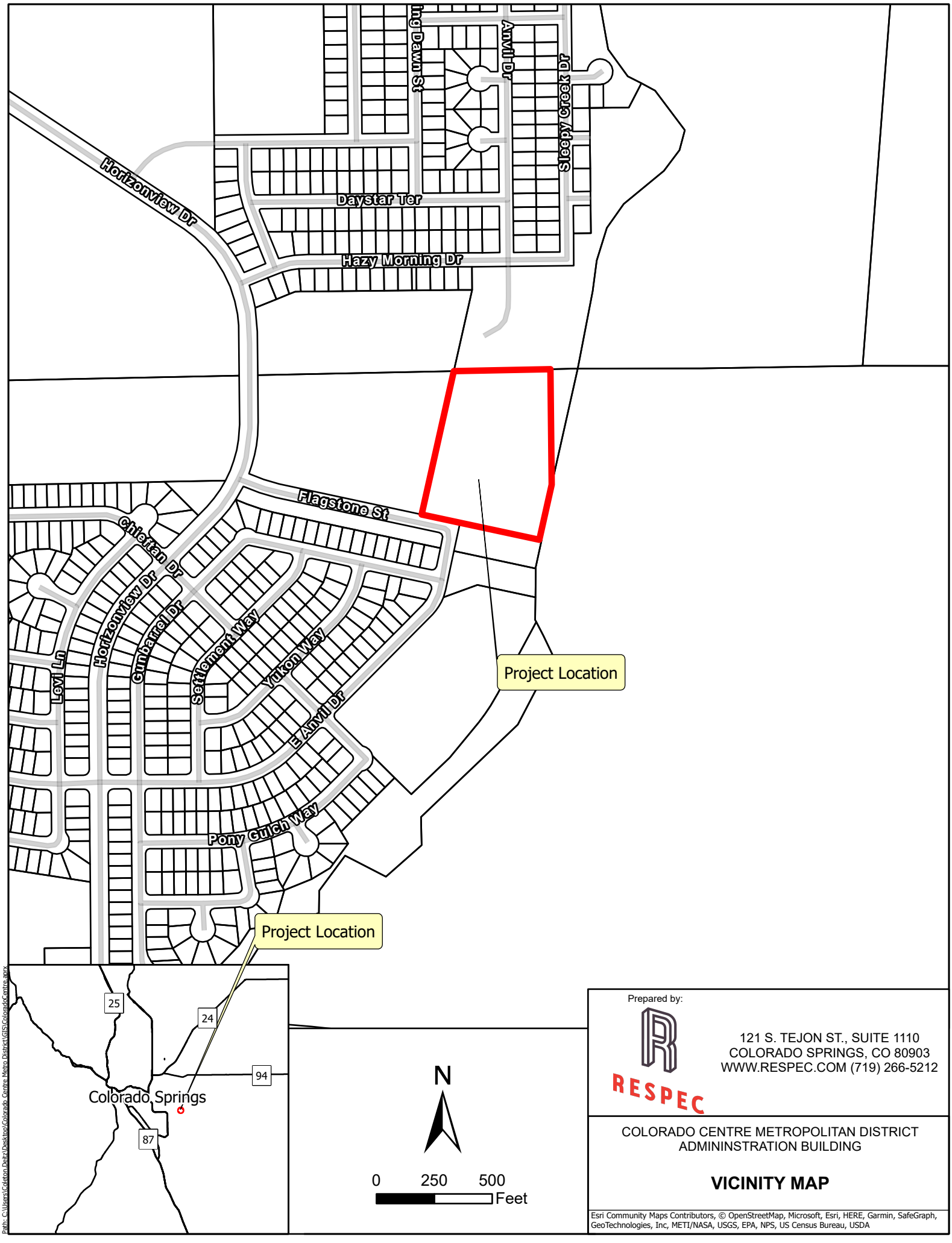
Municipal Code Corporation (2018). *Drainage Criteria Manual of El Paso County, Colorado (DPM)*

Urban Drainage and Flood Control District (June 2017). *Urban Storm Drainage Criteria Manual, Volume 1-3.*

USDA, NRCS. Soil Survey of El Paso County Area, Colorado.

APPENDIX A

MAPS



Path: C:\Users\Colton.Pate\Desktop\Colorado Centre Metro District\GIS\Colorado Centre.aprx

Prepared by:

RESPEC

121 S. TEJON ST., SUITE 1110
COLORADO SPRINGS, CO 80903
WWW.RESPEC.COM (719) 266-5212

COLORADO CENTRE METROPOLITAN DISTRICT
ADMININSTRATION BUILDING

VICINITY MAP

Map Unit Symbol	Map Unit Name	Rating	Percent of Site, %
28	Ellicot loamy coarse sand, 0 to 5 percent slopes	A	0
101	Ustic Torrifluvents, loamy	B	100.0

N

0 100 200 Feet

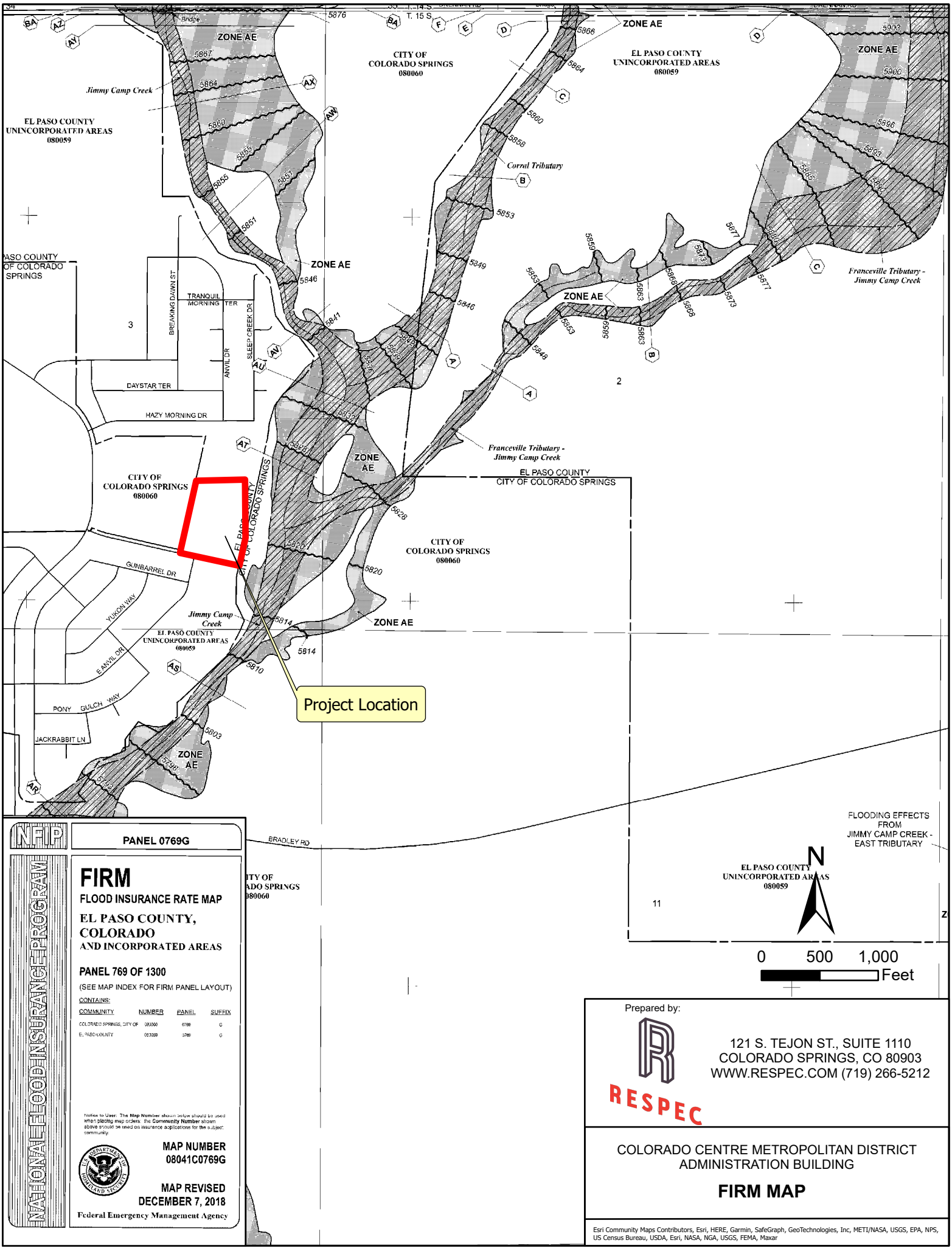
Prepared by:

RESPEC

121 S. TEJON ST., SUITE 1110
COLORADO SPRINGS, CO 80903
WWW.RESPEC.COM (719) 266-5212

COLORADO CENTRE METROPOLITAN DISTRICT
ADMINISTRATION BUILDING

SOILS MAP



NFIP

PANEL 0769G

FIRM

FLOOD INSURANCE RATE MAP

EL PASO COUNTY, COLORADO AND INCORPORATED AREAS

PANEL 769 OF 1300

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
COLORADO SPRINGS, CITY OF	080060	0769	G
EL PASO COUNTY	080059	0769	G

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

MAP NUMBER
08041C0769G

MAP REVISED
DECEMBER 7, 2018

Federal Emergency Management Agency

NATIONAL FLOOD INSURANCE PROGRAM

Prepared by:

RESPEC

121 S. TEJON ST., SUITE 1110
COLORADO SPRINGS, CO 80903
WWW.RESPEC.COM (719) 266-5212

COLORADO CENTRE METROPOLITAN DISTRICT
ADMINISTRATION BUILDING

FIRM MAP

APPENDIX B

CALCULATIONS

Colorado Centre Metropolitan District Adminstration Building

PROJ.247.07

C FACTOR CALCULATION SHEET

EXISTING CONDITIONS

RUNOFF COEFICIENT

TYPE A/B SOILS

LAND USE	**Imperv %**	**5 YR**	**100 YR**
UNDEV	0	0.08	0.35
GRAVEL ROAD	80	0.59	0.7
ASPHALT ROAD	100	0.9	0.96
ROOFS	90	0.73	0.81

EXISTING CONDITIONS

AREA DESIG.	TOTAL AREA (acre)	SURFACE CONDITION AREAS: UNDEV	GRAVEL ROAD	ASPHALT ROAD	ROOFS	CALCULATED C: 5 YR	100 YR	% IMPERVIOUS
Aex	2.05	2.01	0.00	0.04	0.00	**0.09**	**0.36**	**1.8**
Bex	0.17	0.00	0.00	0.17	0.00	**0.90**	**0.96**	**100.0**
Cex	2.87	2.72	0.00	0.07	0.08	**0.12**	**0.38**	**4.9**
Dex	0.71	0.71	0.00	0.00	0.00	**0.08**	**0.35**	**0.0**
Eex	1.65	1.65	0.00	0.00	0.00	**0.08**	**0.35**	**0.0**
Fex	0.09	0.09	0.00	0.00	0.00	**0.08**	**0.35**	**0.0**
Gex	0.07	0.07	0.00	0.00	0.00	**0.08**	**0.35**	**0.0**
OS1	0.50	0.50	0.00	0.00	0.00	**0.08**	**0.35**	**0.0**
OS2	0.37	0.37	0.00	0.00	0.00	**0.08**	**0.35**	**0.0**
OS3	0.01	0.01	0.00	0.00	0.00	**0.08**	**0.35**	**0.0**
Site Percent Impervious, %		4.6						

PROPOSED CONDITIONS									
RUNOFF COEFICIENT									
TYPE A/B SOILS									
LAND USE		**Imperv %**	**5 YR**	**100 YR**					
UNDEV		0	0.08	0.35					
GRAVEL ROAD		80	0.59	0.7					
ASPHALT ROAD		100	0.9	0.96					
ROOFS		90	0.73	0.81					

PROPOSED CONDITIONS

	TOTAL	SURFACE CONDITION AREAS				CALCULATED C			
AREA	AREA	UNDEV	GRAVEL	ASPHALT	ROOFS	5	100	% IMPERVIOUS	
DESIG.	(acre)		ROAD	ROAD		YR	YR		
A	2.78	1.61	0.00	1.05	0.12	**0.42**	**0.60**		**41.8**
B	0.17	0.00	0.00	0.17	0.00	**0.90**	**0.96**		**100.0**
C	2.14	1.99	0.00	0.07	0.08	**0.13**	**0.39**		**6.9**
D	0.65	0.65	0.00	0.00	0.00	**0.08**	**0.35**		**0.0**
E	1.65	1.65	0.00	0.00	0.00	**0.08**	**0.35**		**0.0**
F	0.09	0.09	0.00	0.00	0.00	**0.08**	**0.35**		**0.0**
G	0.07	0.07	0.00	0.00	0.00	**0.08**	**0.35**		**0.0**
OS1	0.50	0.50	0.00	0.00	0.00	**0.08**	**0.35**		**0.0**
OS2	0.37	0.37	0.00	0.00	0.00	**0.08**	**0.35**		**0.0**
OS3	0.01	0.01	0.00	0.00	0.00	**0.08**	**0.35**		**0.0**
Site Percent Impervious, %		19.6							

CCMD Admin Building
PROJ.247.07
DRAINAGE CALCULATION SHEET
file:Colorado Centre Admin Building.xlsx
MARCH 2023

							Initial Tci			Travel Time								
AREA DESIG.	AREA (acre)	C5 (5 yr)	C100 (100 yr)	C5 X A	C100 X A	L (ft)	Slope (%)	ti (min)	L (ft)	Slope (%)	V (fps)	Tt (min)	TC (min)	I5 (in/hr)	I100 (in/hr)	Q5 (cfs)	Q100 (cfs)	AREA DESIG.
EXISTING CONDITIONS																		
Aex	2.05	0.09	0.36	0.18	0.74	100	1.4	16.9	700	3.3	1.7	6.9	23.8	2.7	4.6	0.6	3.4	Aex
Bex	0.17	0.90	0.96	0.15	0.16	65	4.4	1.8	90	4.4	4.2	0.4	5.0	5.2	9.1	0.8	1.5	Bex
Cex	2.87	0.12	0.38	0.34	1.09	100	1.5	16.0	585	4.5	2.0	4.9	20.9	2.8	5.0	1.0	5.4	Cex
Dex	0.71	0.08	0.35	0.06	0.25	100	6.5	10.3	320	1.9	1.4	3.8	14.1	3.5	6.1	0.2	1.5	Dex
Eex	1.65	0.08	0.35	0.13	0.58	100	0.8	20.5	140	10.7	3.1	0.8	21.3	2.8	4.9	0.4	2.8	Eex
Fex	0.09	0.08	0.35	0.01	0.03	70	10.8	7.3	0	0.0	0.0	0.0	7.3	4.6	8.0	<0.1	0.3	Fex
Gex	0.07	0.08	0.35	0.01	0.02	55	10.5	6.5	0	0.0	0.0	0.0	6.5	4.8	8.3	<0.1	0.2	Gex
OS1	0.50	0.08	0.35	0.04	0.18	100	0.8	20.5	40	0.8	0.9	0.8	21.3	2.8	4.9	0.1	0.9	OS1
OS2	0.37	0.08	0.35	0.03	0.13	100	5.4	10.9	70	0.8	0.9	1.4	12.3	3.7	6.5	0.1	0.8	OS2
OS3	0.01	0.08	0.35	0.00	0.00	15	16.2	2.9	0	0.0	0.0	0.0	5.0	5.2	9.1	<0.1	<0.1	OS3
PROPOSED CONDITIONS																		
A	2.78	0.42	0.60	1.17	1.67	100	1.0	12.7	710	1.6	2.5	4.7	17.4	3.1	5.5	3.7	9.1	A
B	0.17	0.90	0.96	0.15	0.16	65	4.4	1.8	90	4.4	4.2	0.4	5.0	5.2	9.1	0.8	1.5	B
C	2.14	0.13	0.39	0.28	0.83	100	1.5	15.9	585	4.5	2.0	4.9	20.7	2.9	5.0	0.8	4.2	C
D	0.65	0.08	0.35	0.05	0.23	100	6.5	10.3	320	1.9	1.4	3.8	14.1	3.5	6.1	0.2	1.4	D
E	1.65	0.08	0.35	0.13	0.58	100	0.8	20.5	140	10.7	3.1	0.8	21.3	2.8	4.9	0.4	2.8	E
F	0.09	0.08	0.35	0.01	0.03	70	10.8	7.3	0	0.0	0.0	0.0	7.3	4.6	8.0	<0.1	0.3	F
OS1	0.50	0.08	0.35	0.04	0.18	100	0.8	20.5	40	0.8	0.9	0.8	21.3	2.8	4.9	0.1	0.9	OS1
OS2	0.37	0.08	0.35	0.03	0.13	100	5.4	10.9	70	0.8	0.9	1.4	12.3	3.7	6.5	0.1	0.8	OS2
OS3	0.01	0.08	0.35	0.00	0.00	15	16.2	2.9	0	0.0	0.0	0.0	5.0	5.2	9.1	<0.1	<0.1	OS3
DP1 (A + OS1)	3.28	0.37	0.56	1.21	1.84			21.3	580	2.8	1.6	1.0	22.3	2.7	4.8	3.3	8.8	DP1 (A + OS1)

Colorado Centre Metropolitan District
Proposed Full Spectrum Detention Basin
Stage-Area Curve

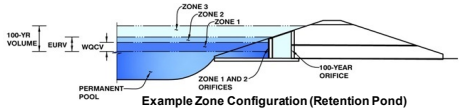
Elevation (ft)	Depth (ft)	Area (sf)	Area (ac)	Inc. Vol. (ac-ft)	Total Vol. (ac-ft)
5818.83	0	0	0	0.00	0.00
5819	5819	419	0.01	0.00	0.00
5820	5820	3075	0.07	0.04	0.04
5821	5821	4378	0.10	0.09	0.13
5822	5822	5338	0.12	0.11	0.24
5823	5823	6484	0.15	0.14	0.37
5824	5824	6940	0.16	0.15	0.53

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.05 (January 2022)

Project: **Colorado Centre Metro District Admin Building**

Basin ID: **D1**



Example Zone Configuration (Retention Pond)

Watershed Information

Selected BMP Type =	**EDB**	
Watershed Area =	3.28	acres
Watershed Length =	500	ft
Watershed Length to Centroid =	200	ft
Watershed Slope =	0.050	ft/ft
Watershed Imperviousness =	35.40%	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 =	Denver - Capitol Building	

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) =	0.046	acre-feet		acre-feet
Excess Urban Runoff Volume (EURV) =	0.121	acre-feet		acre-feet
2-yr Runoff Volume (P1 = 1.19 in.) =	0.114	acre-feet	1.19	inches
5-yr Runoff Volume (P1 = 1.5 in.) =	0.175	acre-feet	1.50	inches
10-yr Runoff Volume (P1 = 1.75 in.) =	0.232	acre-feet	1.75	inches
25-yr Runoff Volume (P1 = 2 in.) =	0.314	acre-feet	2.00	inches
50-yr Runoff Volume (P1 = 2.25 in.) =	0.378	acre-feet	2.25	inches
100-yr Runoff Volume (P1 = 2.52 in.) =	0.461	acre-feet	2.52	inches
500-yr Runoff Volume (P1 = 3.01 in.) =	0.590	acre-feet	3.01	inches
Approximate 2-yr Detention Volume =	0.088	acre-feet		
Approximate 5-yr Detention Volume =	0.124	acre-feet		
Approximate 10-yr Detention Volume =	0.175	acre-feet		
Approximate 25-yr Detention Volume =	0.198	acre-feet		
Approximate 50-yr Detention Volume =	0.208	acre-feet		
Approximate 100-yr Detention Volume =	0.242	acre-feet		

Define Zones and Basin Geometry

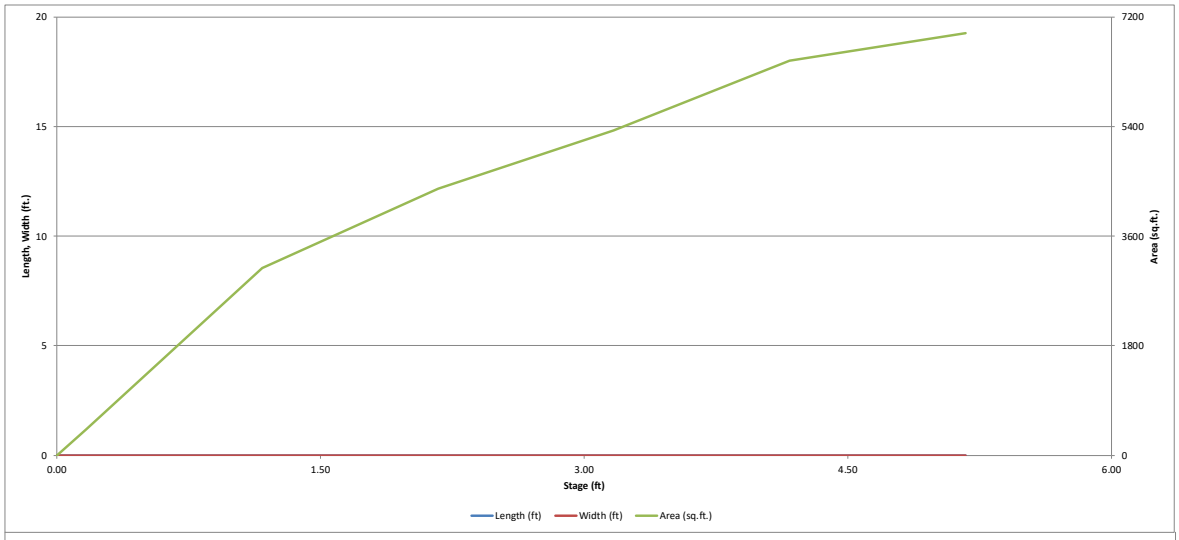
Zone 1 Volume (WQCV) =	0.046	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.075	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	0.121	acre-feet
Total Detention Basin Volume =	0.242	acre-feet
Initial Surcharge Volume (ISV) =	user	ft^3
Initial Surcharge Depth (ISD) =	user	ft
Total Available Detention Depth (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

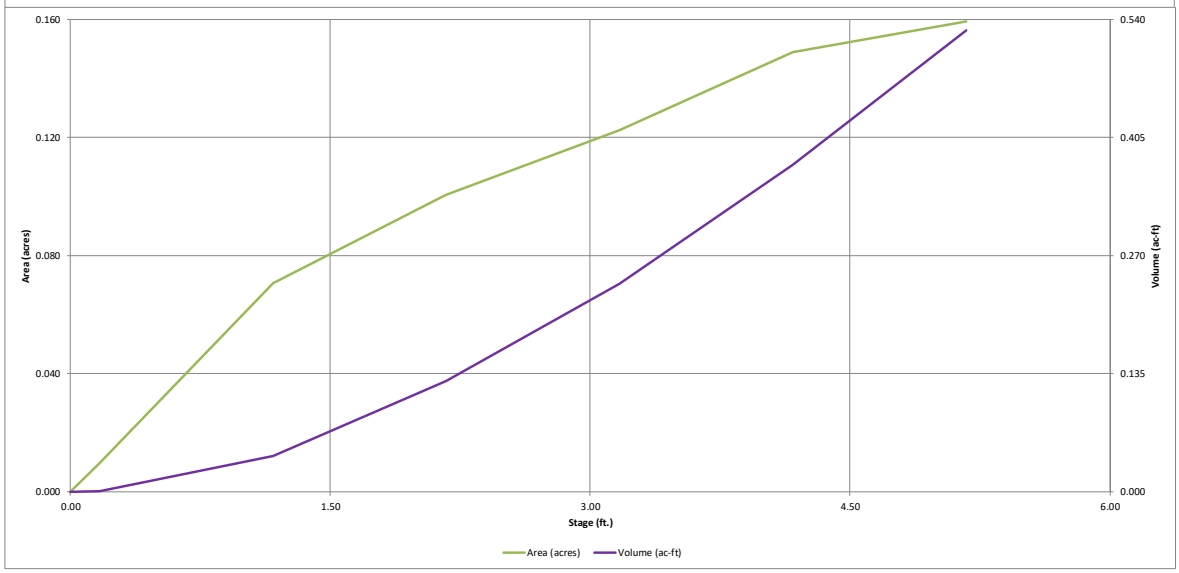
Depth Increment = 0.10 ft

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	--	--	--	0	0.000		
5819	--	0.17	--	--	--	419	0.010	36	0.001
5820	--	1.17	--	--	--	3,075	0.071	1,783	0.041
5821	--	2.17	--	--	--	4,378	0.101	5,509	0.126
5822	--	3.17	--	--	--	5,338	0.123	10,367	0.238
5823	--	4.17	--	--	--	6,484	0.149	16,278	0.374
5824	--	5.17	--	--	--	6,940	0.159	22,990	0.528

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.05 (January 2022)



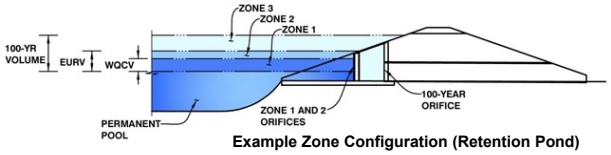


DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.05 (January 2022)

Project: Colorado Centre Metro District Admin Building

Basin ID: D1



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	1.24	0.046	Orifice Plate
Zone 2 (EURV)	2.12	0.075	Orifice Plate
Zone 3 (100-year)	3.21	0.121	Weir&Pipe (Restrict)
Total (all zones)		0.242	

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 Area =		ft^2
Underdrain Orifice Diameter =		inches	Underdrain Orifice Centroid =		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)

Centroid of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)	WQ Orifice Area per Row =	2.639E-03	ft^2
Depth at top of Zone using Orifice Plate =	2.12	ft (relative to basin bottom at Stage = 0 ft)	Elliptical Half-Width =	N/A	feet
Orifice Plate: Orifice Vertical Spacing =	8.50	inches	Elliptical Slot Centroid =	N/A	feet
Orifice Plate: Orifice Area per Row =	0.38	sq. inches (diameter = 11/16 inch)	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	0.71	1.41					
Orifice Area (sq. inches)	0.38	0.38	0.38					

	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	ft^2
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	feet
Vertical Orifice Diameter =	N/A	N/A	inches				

Calculated Parameters for Vertical Orifice

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 =	2.15	N/A	ft (relative to basin bottom at Stage = 0 ft)	Height of Grate Upper Edge, H_t =	2.15	N/A	feet
Overflow Weir Front Edge Length =	4.00	N/A	feet	Overflow Weir Slope Length =	0.00	N/A	feet
Overflow Weir Grate Slope =	0.00	N/A	H:V	Grate Open Area / 100-yr Orifice Area =	0.00	N/A	
Horiz. Length of Weir Sides =	0.00	N/A	feet	Overflow Grate Open Area w/o Debris =	0.00	N/A	ft^2
Overflow Grate Type =	Type C Grate	N/A		Overflow Grate Open Area w/ Debris =	0.00	N/A	ft^2
Debris Clogging % =	50%	N/A	%				

Calculated Parameters for Overflow Weir

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 =	0.61	N/A	ft^2
Outlet Pipe Diameter =	24.00	N/A	inches	Outlet Orifice Centroid =	0.29	N/A	feet
Restrictor Plate Height Above Pipe Invert =	6.00		inches	Half-Central Angle of Restrictor Plate on Pipe =	1.05	N/A	radians

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage=	3.35	ft (relative to basin bottom at Stage = 0 ft)	Spillway Design Flow Depth=	0.62	feet
Spillway Crest Length =	4.00	feet	Stage at Top of Freeboard =	4.97	feet
Spillway End Slopes =	4.00	H:V	Basin Area at Top of Freeboard =	0.16	acres
Freeboard above Max Water Surface =	1.00	feet	Basin Volume at Top of Freeboard =	0.50	acre-ft

Calculated Parameters for Spillway

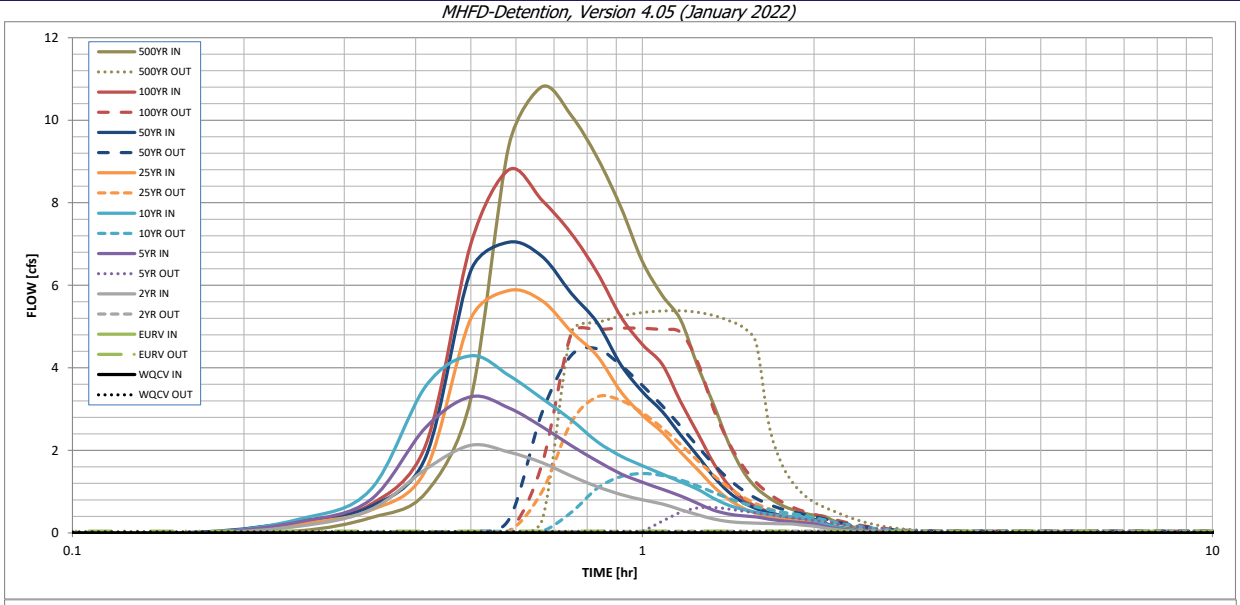
Routed Hydrograph Results

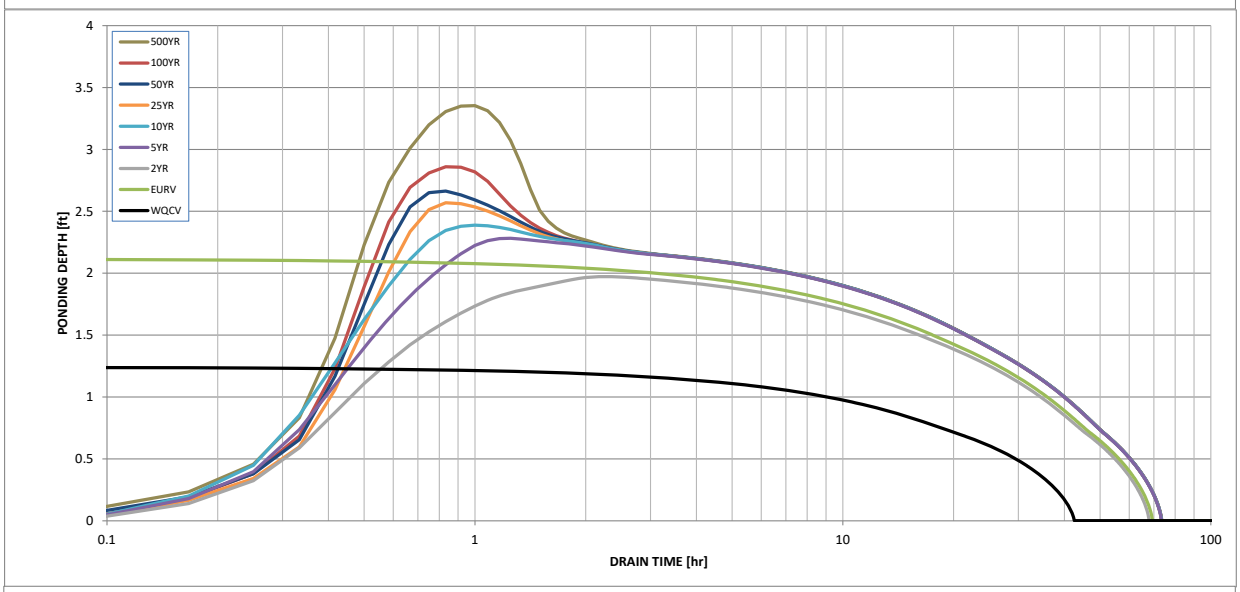
The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AF).

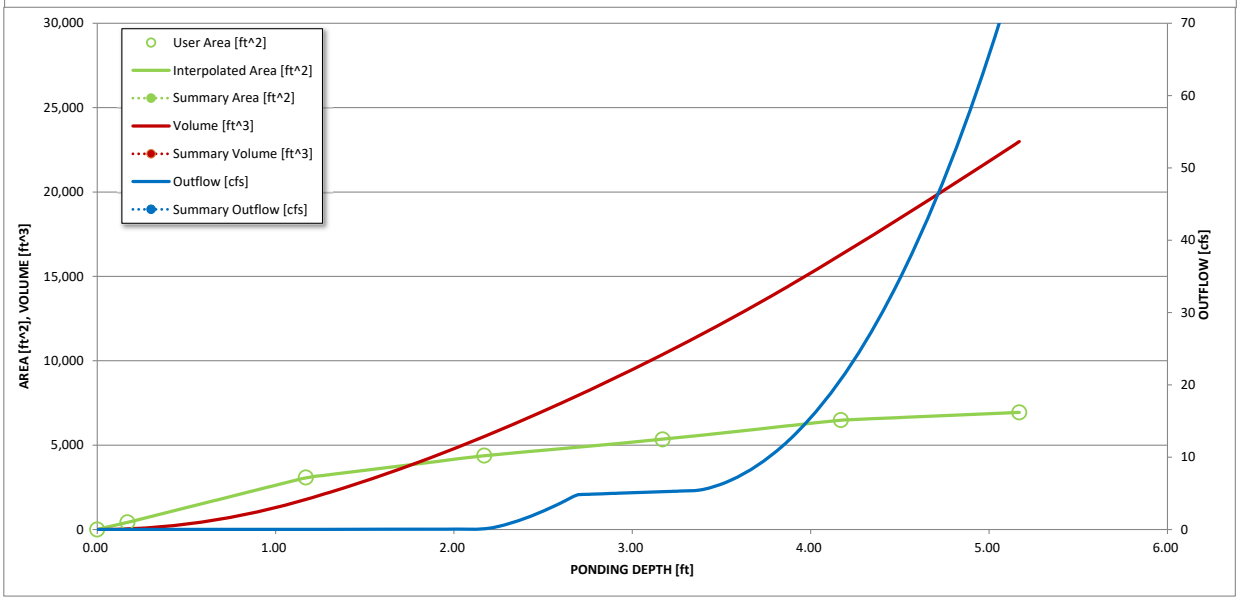
Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
One-Hour Rainfall Depth (in) =	N/A	N/A	1.19	1.50	1.75	2.00	2.25	2.52	3.01
CUHP Runoff Volume (acre-ft) =	0.046	0.121	0.114	0.175	0.232	0.314	0.378	0.461	0.590
User Override Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	0.114	0.175	0.232	0.314	0.378	0.461	0.590
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	0.5	1.4	2.1	3.6	4.5	5.6	7.3
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.16	0.42	0.64	1.10	1.37	1.72	2.24
Peak Inflow Q (cfs) =	N/A	N/A	2.1	3.3	4.3	5.9	7.0	8.8	10.8
Peak Outflow Q (cfs) =	0.0	0.0	0.0	0.6	1.4	3.3	4.5	5.0	5.4
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.4	0.7	0.9	1.0	0.9	0.7
Structure Controlling Flow =	Plate	Plate	Plate	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Outlet Plate 1	Spillway
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
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) =	39	62	61	63	61	58	55	52	49
Time to Drain 99% of Inflow Volume (hours) =	**41**	66	65	69	68	67	66	64	63
Maximum Ponding Depth (ft) =	1.25	2.12	1.97	2.28	2.39	2.57	2.66	2.86	3.35
Area at Maximum Ponding Depth (acres) =	0.07	0.10	0.09	0.10	0.11	0.11	0.11	0.12	0.13
Maximum Volume Stored (acre-ft) =	0.047	0.121	0.107	0.138	0.148	0.167	0.178	0.200	0.260

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.05 (January 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	USER	CUHP	CUHP	CUHP	USER	CUHP
Time Interval	TIME	WQCV [cfs]	EURV [cfs]	2 Year [cfs]	5 Year [cfs]	10 Year [cfs]	25 Year [cfs]	50 Year [cfs]	100 Year [cfs]	500 Year [cfs]
5.00 min	0:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.05
	0:15:00	0.00	0.00	0.16	0.27	0.33	0.22	0.28	0.28	0.37
	0:20:00	0.00	0.00	0.56	0.80	1.04	0.55	0.63	0.68	0.97
	0:25:00	0.00	0.00	1.54	2.56	3.55	1.53	1.84	2.13	3.25
	0:30:00	0.00	0.00	2.12	3.30	4.29	5.20	6.35	7.00	9.39
	0:35:00	0.00	0.00	1.96	3.03	3.82	5.87	7.04	8.80	10.81
	0:40:00	0.00	0.00	1.70	2.57	3.25	5.63	6.70	8.06	10.12
	0:45:00	0.00	0.00	1.38	2.12	2.74	4.88	5.81	7.26	9.09
	0:50:00	0.00	0.00	1.12	1.74	2.21	4.29	5.09	6.31	7.89
	0:55:00	0.00	0.00	0.93	1.43	1.86	3.42	4.07	5.24	6.58
	1:00:00	0.00	0.00	0.80	1.23	1.63	2.85	3.42	4.56	5.76
	1:05:00	0.00	0.00	0.70	1.06	1.43	2.44	2.94	4.08	5.16
	1:10:00	0.00	0.00	0.56	0.90	1.24	1.96	2.37	3.18	4.05
	1:15:00	0.00	0.00	0.44	0.72	1.06	1.54	1.87	2.42	3.11
	1:20:00	0.00	0.00	0.34	0.55	0.84	1.13	1.36	1.69	2.18
	1:25:00	0.00	0.00	0.28	0.46	0.67	0.81	0.99	1.15	1.51
	1:30:00	0.00	0.00	0.25	0.41	0.57	0.61	0.74	0.83	1.10
	1:35:00	0.00	0.00	0.23	0.39	0.50	0.48	0.59	0.64	0.85
	1:40:00	0.00	0.00	0.23	0.33	0.45	0.40	0.49	0.51	0.68
	1:45:00	0.00	0.00	0.22	0.30	0.42	0.34	0.42	0.42	0.56
	1:50:00	0.00	0.00	0.22	0.27	0.39	0.31	0.38	0.36	0.48
	1:55:00	0.00	0.00	0.19	0.25	0.36	0.28	0.35	0.32	0.43
	2:00:00	0.00	0.00	0.16	0.22	0.31	0.27	0.33	0.30	0.40
	2:05:00	0.00	0.00	0.12	0.16	0.22	0.19	0.24	0.22	0.29
	2:10:00	0.00	0.00	0.09	0.12	0.16	0.14	0.17	0.15	0.21
	2:15:00	0.00	0.00	0.06	0.08	0.11	0.10	0.12	0.11	0.15
	2:20:00	0.00	0.00	0.04	0.06	0.08	0.07	0.08	0.08	0.10
	2:25:00	0.00	0.00	0.03	0.04	0.05	0.05	0.06	0.05	0.07
	2:30:00	0.00	0.00	0.02	0.03	0.04	0.03	0.04	0.04	0.05
	2:35:00	0.00	0.00	0.01	0.02	0.02	0.02	0.03	0.02	0.03
	2:40:00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.02
	2:45:00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01
	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

Rock Chute Design Data

(Version WI-July-2010, Based on Design of Rock Chutes by Robinson, Rice, Kadavy, ASAE, 1998)

Project: Colorado Centre Admin Building **County:** El Paso, Colorado
Designer: CTD **Checked by:** RGG
Date: December 1, 2022 **Date:**

Input Geometry:

Upstream Channel	Chute		Downstream Channel
Bw = 4.0 ft.	Bw = 2.0 ft.		Bw = 2.0 ft.
Side slopes = 0.0 (m:1)	Factor of safety = 1.20 (F_s)	1.2 Min	Side slopes = 0.0 (m:1)
Velocity n-value = 0.013	Side slopes = 4.0 (m:1) →	2.0:1 max.	Velocity n-value = 0.013
Bed slope = 0.0200 ft./ft.	Bed slope (3:1) = 0.333 ft./ft →	3.0:1 max.	Bed slope = 0.0050 ft./ft.
Note: n value = a) velocity n from waterway program	Freeboard = 0.5 ft. →		
or b) computed mannings n for channel	Outlet apron depth, d = 1.0 ft.		Base flow = 0.0 cfs

Design Storm Data (Table 2, FOTG, WI-NRCS Grade Stabilization Structure No. 410):

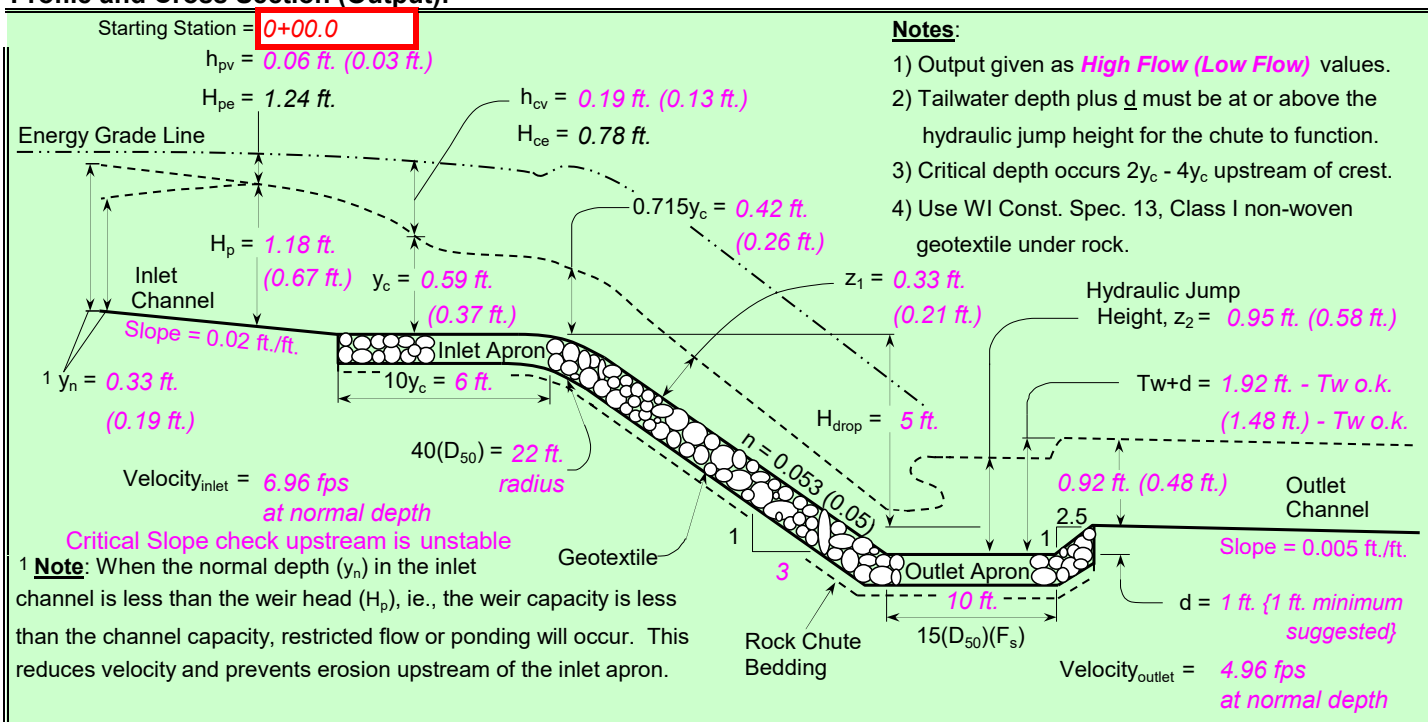
Apron elev. --- Inlet = 5826.0 ft. ------- Outlet = 5820.0 ft. --- (H_{drop} = 5 ft.)

Q_{high} = Runoff from design storm capacity from Table 2, FOTG Standard 410
Q_5 = Runofff from a 5-year,24-hour storm.

Q_{high} = 9.1 cfs High flow storm through chute → Tw (ft.) = Program
Q_5 = 3.7 cfs Low flow storm through chute → Tw (ft.) = Program

***Note**: The total required capacity is routed through the chute (principal spillway) or in combination with an auxiliary spillway.*
***Input tailwater (Tw)**:* 0.33 1.20

Profile and Cross Section (Output):

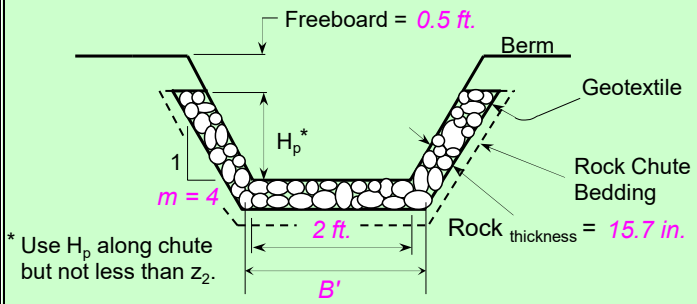


Notes:
1) Output given as ***High Flow (Low Flow)*** values.
2) Tailwater depth plus d must be at or above the hydraulic jump height for the chute to function.
3) Critical depth occurs 2y_c - 4y_c upstream of crest.
4) Use WI Const. Spec. 13, Class I non-woven geotextile under rock.

[1] **Note**: When the normal depth (y_n) in the inlet channel is less than the weir head (H_p), ie., the weir capacity is less than the channel capacity, restricted flow or ponding will occur. This reduces velocity and prevents erosion upstream of the inlet apron.

Profile Along Centerline of Chute

Typical Cross Section



* Use H_p along chute but not less than z_2.

	2.59 cfs/ft.	Equivalent unit discharge
F_S =	1.20	Factor of safety (multiplier)
z_1 =	0.33 ft.	Normal depth in chute
n-value =	0.053	Manning's roughness coefficient
$D_{50}(F_s)$ =	7.9 in.	Minimum Design D50*
$2(D_{50})(F_s)$ =	15.7 in.	Rock chute thickness
Tw + d =	1.92 ft.	Tailwater above outlet apron
z_2 =	0.95 ft.	Hydraulic jump height
*** ***The outlet***	***will***	***function adequately***

High Flow Storm Information

Project: Colorado Centre Admin Building

Water Quality Capture Volume (WQCV) Calculator

Drain Time (hrs)	40
Coefficient, a	1.0
Imperviousness, I	35.4%
WQCV (watershed inches)	0.17
WQCV (ft)	0.01
Watershed Area (ac)	3.3
WQCV (ac-ft)	0.046

Forebay Calculator

WQCV (ac-ft)	0.046
2% of WQCV (ac-ft)	0.0009
2% of WQCV (cf)	40
Depth (ft)	1.00
Width (ft)	6
Length (ft)	8
Volume (cf)	48
Is Volume greater than 2% of WQCV?	YES

Forebay Notch Calculator

Q_{100} (cfs)	8.8
2% of Q_{100} (cfs)	0.18
D (ft)	1
W (ft)	***0.06***

$$W = \frac{2\%\ of\ Q}{D^{1.5} * C}$$

RESPEC

Trickle Channel Calculator

Q_{100} (cfs)	8.8
2% of Q_{100} (cfs)	0.18
Slope (ft/ft)	0.005
Bottom Width (ft)	***2***
Side Slopes (Vertical)	0
Depth of Trickle Channel (ft)	***0.5***
Depth of 2% of 100-Year (ft)	0.07
Velocity (ft/s)	1.3
Froude Number	0.9
Type of Flow (Subcritcal/Supercritical)	Subcritical

Project: Colorado Centre Admin Building

Proposed Detention Basin Spillway

Slope (ft/ft)	0.1
Cf	2
Q_{100} (cfs)	8.8
Width (ft)	4.0
q (cfs/ft)	2.20
Calculated D_{50} (in)	5.3
D_{50} used (in)	6.0

Detention Basin Outlet

100-Year Peak Outflow (cfs)	5.6
Y_t (ft)	0.59
D_c (ft)	2.0
D_{50} (ft)	0.2
D_{50} Used (ft)	6.0

Manning Formula: Trickle Channel - 2% of 100 Year Flow

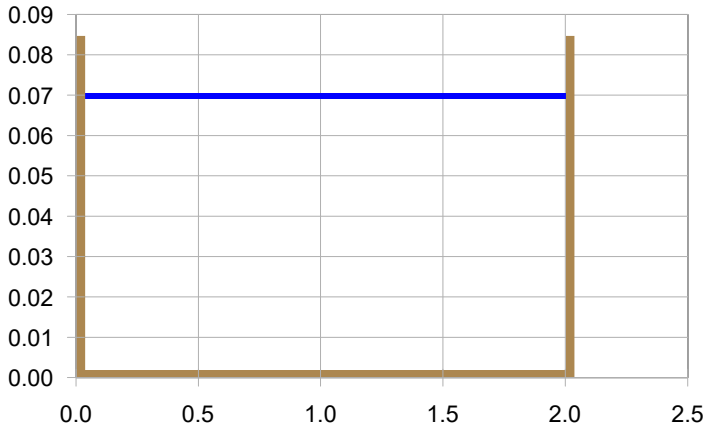
Rectangular Channel

Input

Flow	0.18 cfs
Slope	0.005 ft/ft
Manning's n	0.013
Base Width	2 ft
Right Side Slope	0:1
Left Side Slope	0:1

Output

Depth	0.069 ft
Flow Area	0.138 sf
Velocity	1.30 fps
Velocity Head	0.0263 ft
Top Width	2.00 ft
Froude Number	0.873
Critical Depth	0.063 ft
Critical Slope	0.00671 ft/ft



Manning Formula: Curb Opening - 100 Year Flow

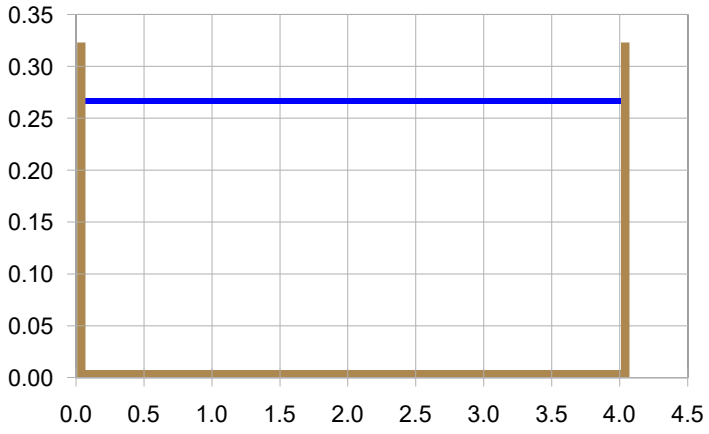
Rectangular Channel

Input

Flow	9.1 cfs
Slope	0.04 ft/ft
Manning's n	0.013
Base Width	4 ft
Right Side Slope	0:1
Left Side Slope	0:1

Output

Depth	0.263 ft
Flow Area	1.05 sf
Velocity	8.65 fps
Velocity Head	1.16 ft
Top Width	4.00 ft
Froude Number	2.97
Critical Depth	0.544 ft
Critical Slope	0.00416 ft/ft



Pond Inlet Channel - 5 Year Flow

Manning Formula:

Irregular Section

Input

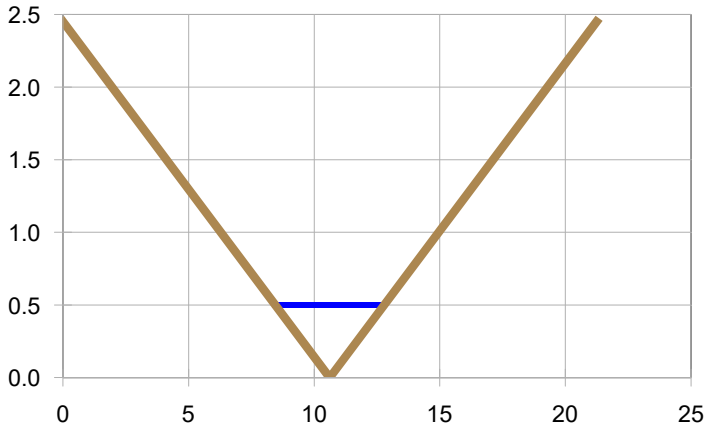
Flow	3.3 cfs
Slope	0.044 ft/ft

Sta	Elev	n	Sta	Elev	n	Sta	Elev	n	Sta	Elev	n
0	2.45	0.04	10.62	0	0.04	21.24	2.45	0.04			

Output

WSElev	0.500 ft
Flow Area	1.09 sf
Velocity	3.04 fps
Velocity Head	0.144 ft
Top Width	4.34 ft
Froude Number	1.07
Critical WSElev	0.514 ft
Critical Slope	ft/ft

Note: 1.95' of Freeboard.



Pond Inlet Channel - 100 Year Flow

Manning Formula:

Irregular Section

Input

Flow	8.8 cfs
Slope	0.044 ft/ft

Sta	Elev	n	Sta	Elev	n	Sta	Elev	n	Sta	Elev	n
0	2.45	0.04	10.62	0	0.04	21.24	2.45	0.04			

Output

WSElev	0.723 ft
Flow Area	2.26 sf
Velocity	3.89 fps
Velocity Head	0.235 ft
Top Width	6.27 ft
Froude Number	1.14
Critical WSElev	0.762 ft
Critical Slope	ft/ft

Note: 1.73' of Freeboard.

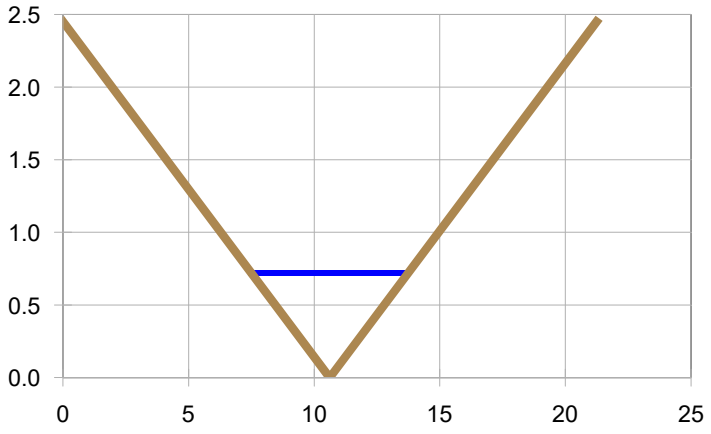


Image taken looking southeast at the existing outfall configuration of the 24" CMP storm sewer line beginning onsite and terminating in Flagstone Channel.

APPENDIX C

DESIGN CHARTS

3.1. - Rational Method Runoff Coefficient (C)

The runoff coefficient represents the integrated effects of infiltration, detention storage, evaporation, retention, flow routing, and interception, all of which affect the time distribution and peak rate of runoff. Runoff coefficients are based on the imperviousness of a particular land use and the hydrologic soil type of the area and are to be selected in accordance with Table 6-6.

The procedure for determining the runoff coefficient includes these steps:

1. Categorize the site area into one or more similar land uses, each with a representative imperviousness, according to the information in Table 6-6.
2. Based on the dominant hydrologic soil type in the area, use Table 6-6 to estimate the runoff coefficient for the particular land use category for the design storms of interest.
3. Calculate an area-weighted average runoff coefficient for the site based on the runoff coefficients from individual land use areas of the site.

When analyzing an area for design purposes, urbanization of the full watershed, including both on-site and off-site areas, shall be assumed.

Gravel parking areas, storage areas, and access drives proposed on Site Improvement Plans shall be analyzed based on an imperviousness of 80%. This is due to the potential for gravel areas being paved over time by property owners and the resulting adverse impacts on the stormwater management facilities and adjacent properties.

There are some circumstances where the selection of impervious percentage values may require additional investigation due to unique land characteristics (e.g., recent burn areas). When these circumstances arise, it is the designer's responsibility to verify that the correct land use assumptions are made.

When multiple sub-basins are delineated, the composite C value calculation is:

$$C_c = (C_1 A_1 + C_2 A_2 + C_3 A_3 + \ldots C_i A_i)/A_t \qquad \text{(Eq. 6-6)}$$

Where:

C_c = composite runoff coefficient for total area

C_i = runoff coefficient for subarea corresponding to surface type or land use

A_i = area of surface type corresponding to Ci (units must be the same as those used for total area)

A_t = total area of all subareas for which composite runoff coefficient applies

i = number of surface types in the drainage area

Table 6-6. Runoff Coefficients for Rational Method

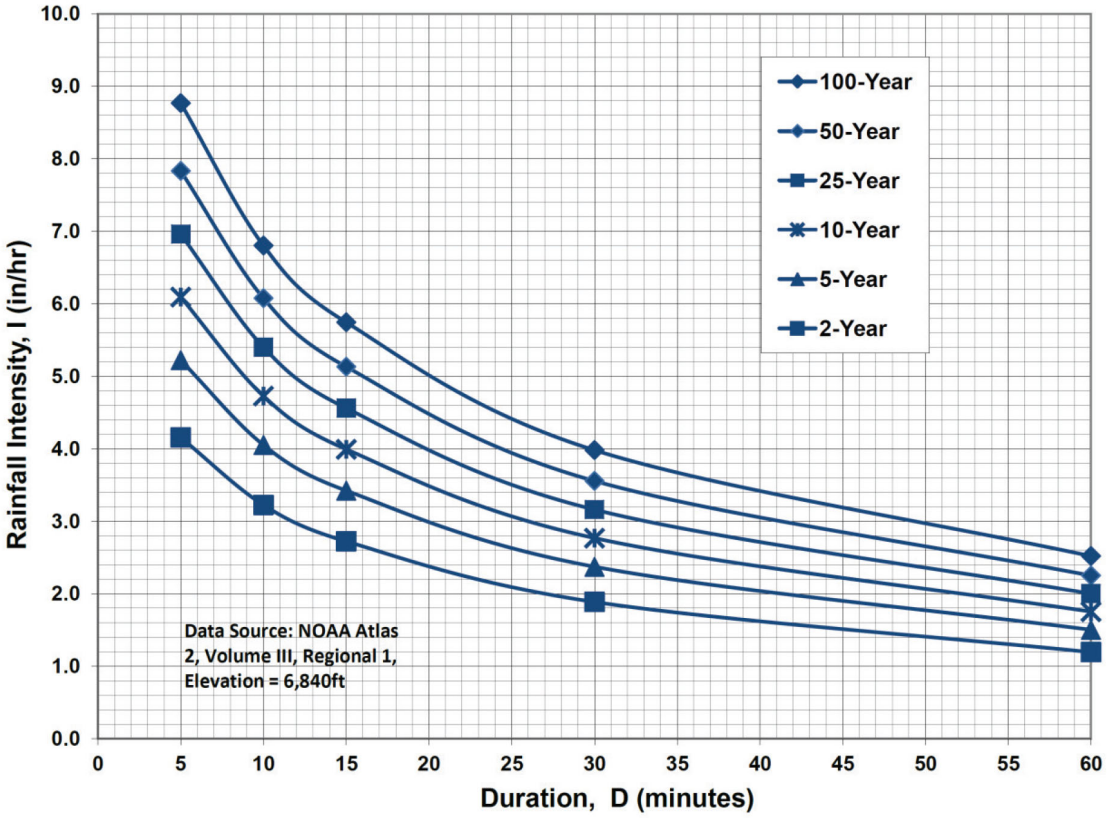
(Source: UDFCD 2001)

Land Use or Surface Characteristics	Percent Impervious	Runoff Coefficients					
		2-year	5-year	10-year	25-year	50-year	100-year

		HSG A&B	HSG C&D	HSG A&B	HSG C&D	HSG A&B	HSG C&D	HSG A&B	HSG C&D	HSG A&B	HSG C&D	HSG A&B	HSG C&D
Business													
Commercial Areas	95	0.79	0.80	0.81	0.82	0.83	0.84	0.85	0.87	0.87	0.88	0.88	0.89
Neighborhood Areas	70	0.45	0.49	0.49	0.53	0.53	0.57	0.58	0.62	0.60	0.65	0.62	0.68
Residential													
⅛ Acre or less	65	0.41	0.45	0.45	0.49	0.49	0.54	0.54	0.59	0.57	0.62	0.59	0.65
¼ Acre	40	0.23	0.28	0.30	0.35	0.36	0.42	0.42	0.50	0.46	0.54	0.50	0.58
⅓ Acre	30	0.18	0.22	0.25	0.30	0.32	0.38	0.39	0.47	0.43	0.52	0.47	0.57
½ Acre	25	0.15	0.20	0.22	0.28	0.30	0.36	0.37	0.46	0.41	0.51	0.46	0.56
1 Acre	20	0.12	0.17	0.20	0.26	0.27	0.34	0.35	0.44	0.40	0.50	0.44	0.55
Industrial													
Light Areas	80	0.57	0.60	0.59	0.63	0.63	0.66	0.66	0.70	0.68	0.72	0.70	0.74
Heavy Areas	90	0.71	0.73	0.73	0.75	0.75	0.77	0.78	0.80	0.80	0.82	0.81	0.83
Parks and Cemeteries	7	0.05	0.09	0.12	0.19	0.20	0.29	0.30	0.40	0.34	0.46	0.39	0.52
Playgrounds	13	0.07	0.13	0.16	0.23	0.24	0.31	0.32	0.42	0.37	0.48	0.41	0.54
Railroad Yard Areas	40	0.23	0.28	0.30	0.35	0.36	0.42	0.42	0.50	0.46	0.54	0.50	0.58
Undeveloped Areas													

Historic Flow Analysis—Greenbelts, Agriculture	2	0.03	0.05	0.09	0.16	0.17	0.26	0.26	0.38	0.31	0.45	0.36	0.51
Pasture/Meadow	0	0.02	0.04	0.08	0.15	0.15	0.25	0.25	0.37	0.30	0.44	0.35	0.50
Forest	0	0.02	0.04	0.08	0.15	0.15	0.25	0.25	0.37	0.30	0.44	0.35	0.50
Exposed Rock	100	0.89	0.89	0.90	0.90	0.92	0.92	0.94	0.94	0.95	0.95	0.96	0.96
Offsite Flow Analysis (when landuse is undefined)	45	0.26	0.31	0.32	0.37	0.38	0.44	0.44	0.51	0.48	0.55	0.51	0.59
Streets													
Paved	100	0.89	0.89	0.90	0.90	0.92	0.92	0.94	0.94	0.95	0.95	0.96	0.96
Gravel	80	0.57	0.60	0.59	0.63	0.63	0.66	0.66	0.70	0.68	0.72	0.70	0.74
Drive and Walks	100	0.89	0.89	0.90	0.90	0.92	0.92	0.94	0.94	0.95	0.95	0.96	0.96
Roofs	90	0.71	0.73	0.73	0.75	0.75	0.77	0.78	0.80	0.80	0.82	0.81	0.83
Lawns	0	0.02	0.04	0.08	0.15	0.15	0.25	0.25	0.37	0.30	0.44	0.35	0.50

Figure 6-5. Colorado Springs Rainfall Intensity Duration Frequency



IDF Equations

$I_{100} = -2.52 \ln(D) + 12.735$

$I_{50} = -2.25 \ln(D) + 11.375$

$I_{25} = -2.00 \ln(D) + 10.111$

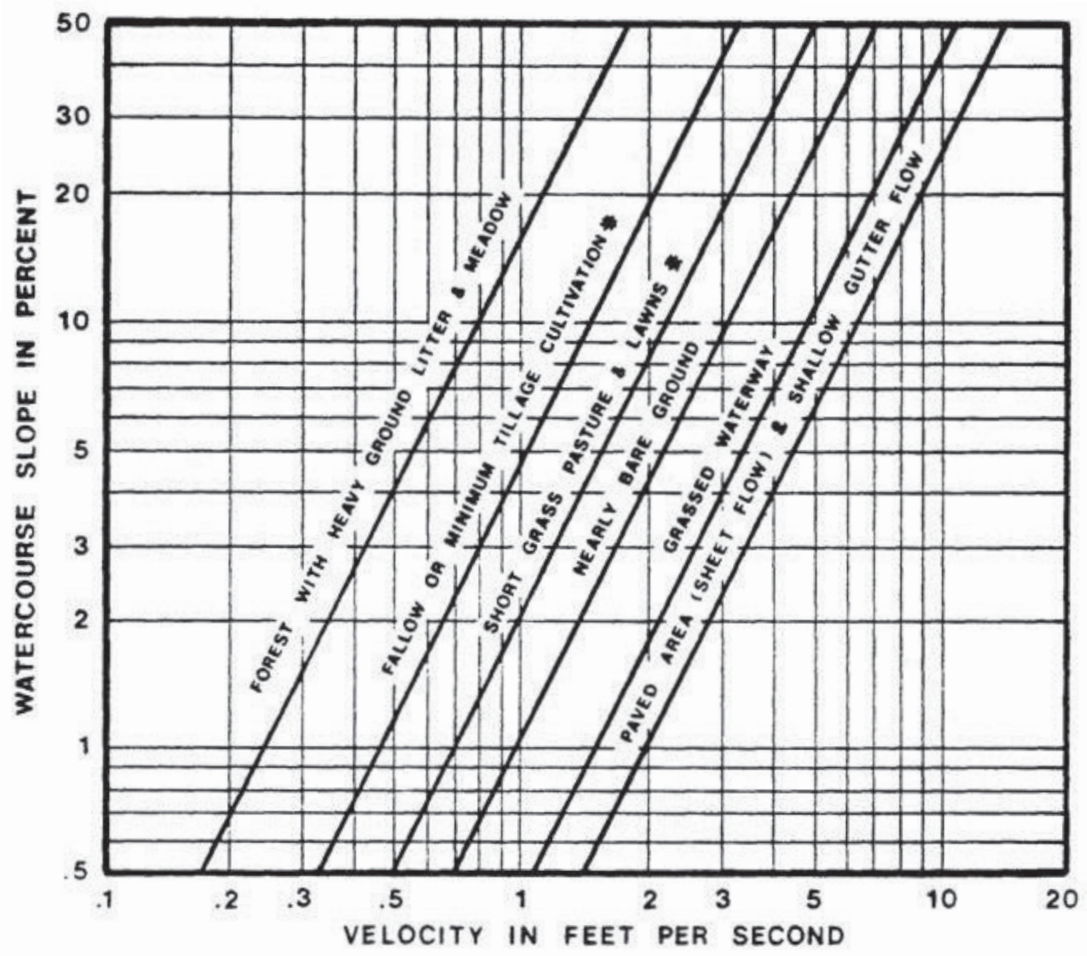
$I_{10} = -1.75 \ln(D) + 8.847$

$I_{5} = -1.50 \ln(D) + 7.583$

$I_{2} = -1.19 \ln(D) + 6.035$

Note: Values calculated by equations may not precisely duplicate values read from figure.

Figure 6-25. Estimate of Average Concentrated Shallow Flow



3.0 Colorado Urban Hydrograph Procedure

3.1 Background

The Colorado Urban Hydrograph Procedure (CUHP) is a method of hydrologic analysis based upon the unit hydrograph principle. A unit hydrograph is defined as the hydrograph of one inch of direct runoff from the tributary area resulting from a storm of a given duration. The unit hydrograph thus represents the integrated effects of factors such as tributary area, shape, street pattern, channel capacities, and street and land slopes. The basic premise of the unit hydrograph is that individual hydrographs resulting from the successive increments of excess rainfall that occur throughout a storm period will be proportional in discharge throughout their runoff period. Thus, the hydrograph of total storm discharge is obtained by summing the ordinates of the individual sub-hydrographs.

CUHP has been developed and calibrated using rainfall-runoff data collected in Colorado (mostly in the Denver/Boulder metropolitan area). This section provides a general background in the use of the computer version of CUHP to perform stormwater runoff calculations. A detailed description of the CUHP method and the assumptions and equations used, including a hand calculation example, are provided in the CUHP User Manual. The latest version of the CUHP 2005 macro-enabled Excel workbook and User Manual are available for download from www.udfcd.org.

3.2 Effective Rainfall for CUHP

Effective rainfall is that portion of precipitation during a storm event that runs off the land to streams. Those portions of precipitation that do not reach a stream are called abstractions and include interception by vegetation, evaporation, infiltration, storage in all surface depressions, and extended duration surface retention. The total design rainfall depth for use with CUHP should be obtained from the *Rainfall* chapter of the USDCM. This chapter illustrates a method for estimating the amount of rainfall that actually becomes surface runoff whenever a design rainstorm is used.

3.2.1 Pervious-Impervious Areas

As described in Section 2.5.1, the urban landscape is comprised of pervious and impervious surfaces. The degree of imperviousness is the primary variable that affects the volumes and rates of runoff calculated using CUHP. When analyzing a watershed for design purposes, the probable future percent of impervious area must first be estimated. A complete tabulation of recommended values of total percentage imperviousness is provided in Table 6-3 and Figures 6-1 through 6-3. References to impervious area and all calculations in this chapter are based on the input of total impervious areas. The pervious-impervious area relationship can be further refined for use in CUHP as follows:

- **DCIA**: Impervious area portion directly connected to the drainage system.
- **UIA:** Impervious area portion that drains onto or across pervious surfaces.
- **RPA**: The portion of pervious area receiving runoff from impervious portions.
- **SPA:** The separate pervious area portion not receiving runoff from impervious surfaces.

This further refinement is explained in more detail in the CUHP User Manual and in Chapter 3 of the USDCM Volume 3.

APPENDIX D

GEC PLANSET

EROSION CONTROL NOTES:

1. STORMWATER DISCHARGES FROM CONSTRUCTION SITES SHALL NOT CAUSE OR THREATEN TO CAUSE POLLUTION, CONTAMINATION, OR DEGRADATION OF STATE WATERS. ALL WORK AND EARTH DISTURBANCE SHALL BE DONE IN A MANNER THAT MINIMIZES POLLUTION OF ANY ON-SITE OR OFF-SITE WATERS, INCLUDING WETLANDS.
2. NOTWITHSTANDING ANYTHING DEPICTED IN THESE PLANS IN WORDS OR GRAPHIC REPRESENTATION, ALL DESIGN AND CONSTRUCTION RELATED TO ROADS, STORM DRAINAGE, AND EROSION CONTROL SHALL CONFORM TO THE STANDARDS AND REQUIREMENTS OF THE MOST RECENT VERSION OF THE RELEVANT ADOPTED EL PASO COUNTY STANDARDS, INCLUDING THE LAND DEVELOPMENT CODE, THE ENGINEERING CRITERIA MANUAL, THE DRAINAGE CRITERIA MANUAL, AND THE DRAINAGE CRITERIA MANUAL VOLUME 2. ANY DEVIATIONS FROM REGULATIONS AND STANDARDS MUST BE REQUESTED, AND APPROVED, IN WRITING.
3. A SEPARATE STORMWATER MANAGEMENT PLAN (SWMP) FOR THIS PROJECT SHALL BE COMPLETED AND AN EROSION AND STORMWATER QUALITY CONTROL PERMIT (ESQCP) ISSUED PRIOR TO COMMENCING CONSTRUCTION. MANAGEMENT OF THE SWMP DURING CONSTRUCTION IS THE RESPONSIBILITY OF THE DESIGNATED QUALIFIED STORMWATER MANAGER OR CERTIFIED EROSION CONTROL INSPECTOR. THE SWMP SHALL BE LOCATED ON SITE AT ALL TIMES DURING CONSTRUCTION AND SHALL BE KEPT UP TO DATE WITH WORK PROGRESS AND CHANGES IN THE FIELD.
4. ONCE THE ESQCP IS APPROVED AND A "NOTICE TO PROCEED" HAS BEEN ISSUED, THE CONTRACTOR MAY INSTALL THE INITIAL STAGE EROSION AND SEDIMENT CONTROL MEASURES AS INDICATED ON THE APPROVED GEC. A PRECONSTRUCTION MEETING BETWEEN THE CONTRACTOR, ENGINEER, AND EL PASO COUNTY WILL BE HELD PRIOR TO ANY CONSTRUCTION. IT IS THE RESPONSIBILITY OF THE APPLICANT TO COORDINATE THE MEETING TIME AND PLACE WITH COUNTY STAFF.
5. CONTROL MEASURES MUST BE INSTALLED PRIOR TO COMMENCEMENT OF ACTIVITIES THAT COULD CONTRIBUTE POLLUTANTS TO STORMWATER. CONTROL MEASURES FOR ALL SLOPES, CHANNELS, DITCHES, AND DISTURBED LAND AREAS SHALL BE INSTALLED IMMEDIATELY UPON COMPLETION OF THE DISTURBANCE.
6. ALL TEMPORARY SEDIMENT AND EROSION CONTROL MEASURES SHALL BE MAINTAINED AND REMAIN IN EFFECTIVE OPERATING CONDITION UNTIL PERMANENT SOIL EROSION CONTROL MEASURES ARE IMPLEMENTED AND FINAL STABILIZATION IS ESTABLISHED. ALL PERSONS ENGAGED IN LAND DISTURBANCE ACTIVITIES SHALL ASSESS THE ADEQUACY OF CONTROL MEASURES AT THE SITE AND IDENTIFY IF CHANGES TO THOSE CONTROL MEASURES ARE NEEDED TO ENSURE THE CONTINUED EFFECTIVE PERFORMANCE OF THE CONTROL MEASURES. ALL CHANGES TO TEMPORARY SEDIMENT AND EROSION CONTROL MEASURES MUST BE INCORPORATED INTO THE STORMWATER MANAGEMENT PLAN.
7. TEMPORARY STABILIZATION SHALL BE IMPLEMENTED ON DISTURBED AREAS AND STOCKPILES WHERE GROUND-DISTURBING CONSTRUCTION ACTIVITY HAS PERMANENTLY CEASED OR TEMPORARILY CEASED FOR LONGER THAN 14 DAYS.
8. FINAL STABILIZATION MUST BE IMPLEMENTED AT ALL APPLICABLE CONSTRUCTION SITES. FINAL STABILIZATION IS ACHIEVED WHEN ALL GROUND-DISTURBING ACTIVITIES ARE COMPLETE AND ALL DISTURBED AREAS EITHER HAVE A UNIFORM VEGETATIVE COVER WITH INDIVIDUAL PLANT DENSITY OF 70 PERCENT OF PRE-DISTURBANCE LEVELS ESTABLISHED OR EQUIVALENT PERMANENT ALTERNATIVE STABILIZATION METHOD IS IMPLEMENTED. ALL TEMPORARY SEDIMENT AND EROSION CONTROL MEASURES SHALL BE REMOVED UPON FINAL STABILIZATION AND BEFORE PERMIT CLOSURE.
9. ALL PERMANENT STORMWATER MANAGEMENT FACILITIES SHALL BE INSTALLED AS DESIGNED IN THE APPROVED PLANS. ANY PROPOSED CHANGES THAT EFFECT THE DESIGN OR FUNCTION OF PERMANENT STORMWATER MANAGEMENT STRUCTURES MUST BE APPROVED BY THE ECM ADMINISTRATOR PRIOR TO IMPLEMENTATION.
10. EARTH DISTURBANCES SHALL BE CONDUCTED IN SUCH A MANNER SO AS TO EFFECTIVELY MINIMIZE ACCELERATED SOIL EROSION AND RESULTING SEDIMENTATION. ALL DISTURBANCES SHALL BE DESIGNED, CONSTRUCTED, AND COMPLETED SO THAT THE EXPOSED AREA OF ANY DISTURBED LAND SHALL BE LIMITED TO THE SHORTEST PRACTICAL PERIOD OF TIME. PRE-EXISTING VEGETATION SHALL BE PROTECTED AND MAINTAINED WITHIN 50 HORIZONTAL FEET OF A WATERS OF THE STATE UNLESS SHOWN TO BE INFEASIBLE AND SPECIFICALLY REQUESTED AND APPROVED.
11. COMPACTION OF SOIL MUST BE PREVENTED IN AREAS DESIGNATED FOR INFILTRATION CONTROL MEASURES OR WHERE FINAL STABILIZATION WILL BE ACHIEVED BY VEGETATIVE COVER. AREAS DESIGNATED FOR INFILTRATION CONTROL MEASURES SHALL ALSO BE PROTECTED FROM SEDIMENTATION DURING CONSTRUCTION UNTIL FINAL STABILIZATION IS ACHIEVED. IF COMPACTION PREVENTION IS NOT FEASIBLE DUE TO SITE CONSTRAINTS, ALL AREAS DESIGNATED FOR INFILTRATION AND VEGETATION CONTROL MEASURES MUST BE LOOSENED PRIOR TO INSTALLATION OF THE CONTROL MEASURE(S).
12. ANY TEMPORARY OR PERMANENT FACILITY DESIGNED AND CONSTRUCTED FOR THE CONVEYANCE OF STORMWATER AROUND, THROUGH, OR FROM THE EARTH DISTURBANCE AREA SHALL BE A STABILIZED CONVEYANCE DESIGNED TO MINIMIZE EROSION AND THE DISCHARGE OF SEDIMENT OFF SITE.
13. CONCRETE WASH WATER SHALL BE CONTAINED AND DISPOSED OF IN ACCORDANCE WITH THE SWMP. NO WASH WATER SHALL BE DISCHARGE TO OR ALLOWED TO ENTER STATE WATERS, INCLUDING ANY SURFACE OR SUBSURFACE STORM DRAINAGE SYSTEM OR FACILITIES. CONCRETE WASHOUTS SHALL NOT BE LOCATED IN AN AREA WHERE SHALLOW GROUNDWATER MAY BE PRESENT, OR WITHIN 50 FEET OF A SURFACE WATER BODY, CREEK, OR STREAM.
14. DURING DEWATERING OPERATIONS OF UNCONTAMINATED GROUND WATER MAY BE DISCHARGED ON SITE, BUT SHALL NOT LEAVE THE SITE IN THE FORM OF SURFACE RUNOFF UNLESS AN APPROVED STATE DEWATERING PERMIT IS IN PLACE.
15. EROSION CONTROL BLANKETING OR OTHER PROTECTIVE COVERING SHALL BE USED ON SLOPES 3:1 AND STEEPER.
16. CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL OF ALL WASTES FROM THE CONSTRUCTION SITE FOR DISPOSAL IN ACCORDANCE WITH LOCAL AND STATE REGULATORY REQUIREMENTS. NO CONSTRUCTION DEBRIS, TREE SLASH, BUILDING MATERIAL WASTES, OR UNUSED BUILDING MATERIALS SHALL BE BURIED, DUMPED, OR DISCHARGED AT THE SITE.
17. WASTE MATERIALS SHALL NOT BE TEMPORARILY PLACED OR STORED IN THE STREET, ALLEY, OR OTHER PUBLIC WAY, UNLESS IN ACCORDANCE WITH AN APPROVED TRAFFIC CONTROL PLAN. CONTROL MEASURES MAY BE REQUIRED BY EL PASO COUNTY ENGINEERING IF DEEMED NECESSARY, BASED ON SPECIFIC CONDITIONS AND CIRCUMSTANCES.
18. TRACKING OF SOILS AND CONSTRUCTION DEBRIS OFF SITE SHALL BE MINIMIZED. MATERIALS TRACKED OFF SITE SHALL BE CLEANED UP AND PROPERLY DISPOSED OF IMMEDIATELY.
19. THE OWNER/DEVELOPER SHALL BE RESPONSIBLE FOR THE REMOVAL OF ALL CONSTRUCTION DEBRIS, DIRT, TRASH, ROCK, SEDIMENT, SOIL, AND SAND THAT MAY ACCUMULATE IN ROADS, STORM DRAINS, AND OTHER DRAINAGE CONVEYANCE SYSTEMS AND STORMWATER APPURTENANCES AS A RESULT OF SITE DEVELOPMENT.
20. THE QUANTITY OF MATERIALS STORED ON THE PROJECT SITE SHALL BE LIMITED, AS MUCH AS PRACTICAL, TO THAT QUANTITY REQUIRED TO PERFORM THE WORK IN AN ORDERLY SEQUENCE. ALL MATERIALS STORED ON SITE SHALL BE STORED IN A NEAT, ORDERLY MANNER, IN THEIR ORIGINAL CONTAINERS, AND WITH ORIGINAL MANUFACTURER'S LABELS.
21. NO CHEMICAL(S) HAVING THE POTENTIAL TO BE RELEASED IN STORMWATER ARE TO BE STORED OR USED ON SITE UNLESS PERMISSION FOR THE USE OF SUCH CHEMICAL(S) IS GRANTED IN WRITING BY THE ECM ADMINISTRATOR. IN GRANTING APPROVAL FOR THE USE OF SUCH CHEMICAL(S), SPECIAL CONDITIONS AND MONITORING MAY BE REQUIRED.
22. BULK STORAGE OF ALLOWED PETROLEUM PRODUCTS OR OTHER ALLOWED LIQUID CHEMICALS IN EXCESS OF 55 GALLONS SHALL REQUIRE ADEQUATE SECONDARY CONTAINMENT PROTECTION TO CONTAIN ALL SPILLS ON SITE AND TO PREVENT ANY SPILLED MATERIALS FROM ENTERING STATE WATERS, ANY SURFACE OR SUBSURFACE STORM DRAINAGE SYSTEM, OR OTHER FACILITIES.
23. NO PERSON SHALL CAUSE THE IMPEDIMENT OF STORMWATER FLOW IN THE CURB AND GUTTER OR DITCH EXCEPT WITH APPROVED SEDIMENT CONTROL MEASURES.
24. OWNER/DEVELOPER AND THEIR AGENTS SHALL COMPLY WITH THE "COLORADO WATER QUALITY CONTROL ACT" (TITLE 25, ARTICLE 8, CRS) AND THE "CLEAN WATER ACT" (33 USC 1344), IN ADDITION TO THE REQUIREMENTS OF THE LAND DEVELOPMENT CODE, DCM VOLUME II AND THE ECM APPENDIX I. ALL APPROPRIATE PERMITS MUST BE OBTAINED BY THE CONTRACTOR PRIOR TO CONSTRUCTION (1041, NPDES, FLOODPLAIN, 404, FUGITIVE DUST, ETC.). IN THE EVENT OF CONFLICTS BETWEEN THESE REQUIREMENTS AND OTHER LAWS, RULES, OR REGULATIONS OF OTHER FEDERAL, STATE, LOCAL, OR COUNTY AGENCIES, THE MOST RESTRICTIVE LAWS, RULES, OR REGULATIONS SHALL APPLY.
25. ALL CONSTRUCTION TRAFFIC MUST ENTER/EXIT THE SITE ONLY AT APPROVED CONSTRUCTION ACCESS POINTS.
26. PRIOR TO CONSTRUCTION, THE PERMITTEE SHALL VERIFY THE LOCATION OF EXISTING UTILITIES.
27. A WATER SOURCE SHALL BE AVAILABLE ON SITE DURING EARTHWORK OPERATIONS AND SHALL BE UTILIZED AS REQUIRED TO MINIMIZE DUST FROM EARTHWORK EQUIPMENT AND WIND.
28. THE SOILS REPORT FOR THIS SITE WAS PREPARED BY EARTH ENGINEERING CONSULTANTS, LLC (DATED 09/08/14) AND SHALL BE CONSIDERED A PART OF THESE PLANS.
29. AT LEAST TEN (10) DAYS PRIOR TO THE ANTICIPATED START OF CONSTRUCTION, FOR PROJECTS THAT WILL DISTURB ONE (1) ACRE OR MORE, THE OWNER OR OPERATOR OF CONSTRUCTION ACTIVITY SHALL SUBMIT A PERMIT APPLICATION FOR STORMWATER DISCHARGE TO THE COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT, WATER QUALITY DIVISION. THE APPLICATION CONTAINS CERTIFICATION OF COMPLETION OF A STORMWATER MANAGEMENT PLAN (SWMP), OF WHICH THIS GRADING AND EROSION CONTROL PLAN MAY BE A PART. FOR INFORMATION OR APPLICATIONS MATERIALS, CONTACT:

    COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT
    WATER QUALITY CONTROL DIVISION
    WQCD - PERMITS
    4300 CHERRY CREEK DRIVE SOUTH
    DENVER, CO 80246-1530
    ATTN: PERMITS UNIT

EROSION CONTROL NOTES (CONT'D):

30. SEED AND MULCH ALL DISTURBED AREAS THAT WILL NOT HAVE IMPROVEMENTS (I.E. PAVED ROADS, RIPRAP, ETC.).
31. NO BATCH PLANTS ARE PROPOSED AS A PART OF THIS PROJECT.
32. THERE ARE NO STREAM CROSSINGS WITHIN THE LIMITS OF THIS PROJECT.
33. BMPs MUST BE INSTALLED PRIOR TO LAND DISTURBANCE. SEE LEGEND FOR PHASED BMPs (INITIAL/INTERIM/FINAL) FOR THIS PROJECT.
34. PROPOSED BUILDING SITE/LANDSCAPING IS LOCATED OUTSIDE OF FLOODPLAIN.
35. J-HOOKS TO BE INSTALLED WHEREVER SILT FENCE IS INSTALLED PERPENDICULAR TO CONTOURS.
36. THE PARTIES RESPONSIBLE FOR THIS PLAN HAVE FAMILIARIZED THEMSELVES WITH ALL CURRENT ACCESSIBILITY CRITERIA AND SPECIFICATIONS AND THE PROPOSED PLAN REFLECTS ALL SITE ELEMENTS REQUIRED BY THE APPLICABLE ADA DESIGN STANDARDS AND GUIDELINES AS PUBLISHED BY THE UNITED STATES DEPARTMENT OF JUSTICE. APPROVAL OF THIS PLAN BY EL PASO COUNTY DOES NOT ASSURE COMPLIANCE WITH THE ADA OR ANY REGULATIONS OR GUIDELINES ENACTED OR PROMULGATED UNDER OR WITH RESPECT TO SUCH LAWS.
37. EXISTING VEGETATION CONSISTS OF NATIVE GRASSES/WEEDS WITH APPROXIMATELY 75% GROUND COVER.

TIMING, CONSTRUCTION STAGING, AND SEQUENCING:

EXPECTED START DATE: FALL 2022
INSTALL TEMPORARY EROSION CONTROL: 2-4 DAYS
- PERIMETER SILT FENCING
- VEHICLE TRACKING CONTROL PAD
- CONCRETE WASHOUT
- CURB SOCK

ROUGH GRADING - 5 DAYS
INSTALL FINAL SITE IMPROVEMENTS - 10 MONTHS
REMOVE TEMPORARY EROSION CONTROL - 5 DAYS

EARTHWORK SUMMARY:

PROPOSED SITE:
CUT - 3,855.2 CY
FILL - 1,688.6 (*1.15) = 1,941.9 CY
NET - 1,913.3 CY CUT

DISTURBED AREA - 152,246 SF, 3.50 AC

EROSION CONTROL FACILITIES:

SILT FENCE - 1337 LF
VEHICLE TRACKING PAD (VT) - 1
CURB SOCK LOCATIONS - 1
ROCK CHECK DAMS - 4
CONCRETE WASHOUT - 1
EROSION CONTROL BLANKET - 884 SY
TEMPORARY SEDIMENT BASIN - 1

OVERALL LOT COVERAGE	
AREA OF TRACT	336,719
AREA OF BUILDING (EXISTING TREATMENT FACILITY)	3,727±
AREA OF BUILDING (PROPOSED ADMIN. BLDG.)	4,542
% TRACT COVERAGE WITH IMPROVEMENTS (INCLUDING PROPOSED ADMIN. BLDG.)	15%
TOTAL IMPERVIOUS AREA (PROPOSED IMPROVEMENTS)	36,376

MINIMUM BEST MANAGEMENT PRACTICES ELEMENTS:

STEP 1- EROSION AND SEDIMENT CONTROL
INSTALL SEDIMENT TRAPPING DEVICES (PERIMETER CONTROLS) PRIOR TO THE START OF CONSTRUCTION.
STEP 2- SPILL PREVENTION AND RESPONSE
STEP 3- MATERIAL MANAGEMENT
MATERIAL AND EQUIPMENT STORAGE AREAS SHALL BE SECURE AND CONTAINED TO PREVENT DISCHARGE OF ANY MATERIAL IN RUNOFF. WASTE SHALL BE CONTAINED AND DISPOSED OF PROPERLY. MAINTAIN BMP'S DURING BUILDING AND UTILITY CONSTRUCTION.
STEP 4- INSPECTION AND MAINTENANCE (SEE EROSION CONTROL NOTES)
STEP 5- INSTALL FINAL STABILIZATION - PAVEMENT, LANDSCAPING, EROSION CONTROL BLANKETS, AND SEEDING.
STEP 6- REMOVE TEMPORARY CONTROLS - SILT FENCING, CURB SOCK AFTER PERMANENT FEATURES ARE INSTALLED.

FINAL STABILIZATION AND LONG-TERM STORMWATER MANAGEMENT:

FINAL STABILIZATION MEASURES INCLUDE PAVEMENT, PARTIAL LANDSCAPE, AND REVEGETATION.

ALL AREAS DISTURBED BY EARTHWORK SHALL BE PERMANENTLY REVEGETATED WITH GRASS MIX BY DRILL SEEDING. SEED MIX FOR THIS PROJECT SHALL BE AS FOLLOWS (SEE BELOW):

TYPE: SHOTGUN MIX			
COMMON NAME	RECOMMENDED VARIETY	% OF SEED MIX	PLS RATE PER ACRE, DOUBLE IF BROADCAST
BLUESTEM, BIG	KAW, BISON, CHAMP	20.0%	1.08
GRAMA, BLUE	LOVINGTON, HACHITA, ALMA	10.0%	0.12
GREEN NEEDLEGRASS	LODORM	10.0%	0.48
WHEATGRASS, WESTERN	ARRIBA, BARTON	20.0%	1.60
GRAMA, SIDEOATS	VAUGHN, BUTTE, EL RENO, NINER	10.0%	0.46
SWITCHGRASS	BLACKWELL, GREENVILLE	10.0%	0.20
PRAIRIE SANDREED	GOSHEN, PRONGHORN	10.0%	0.32
YELLOW INDIANGRASS	CHEYENNE, HOLT, LLANO	10.0%	0.51

GENERAL GRASS SEEDING NOTES:

1. AN ESTABLISHED STAND OF GRASS IN THIS COLORADO CLIMATE IS DEFINED AS 2 TO 3 PLANTS IN A SQUARE FOOT AREA.
2. GRASSES MUST BE PLANTED IN A FIRM, WEED-FREE SEEDBED, PRIMARILY BECAUSE SUCCESS DEPENDS UPON GOOD SOIL-TO-SEED CONTACT. IF YOU ARE BROADCASTING SEED, IT MUST BE RAKED INTO THE SOIL. NATIVE GRASS SEED IS PLANTED ONLY 1/4 TO 1/2 INCHES DEEP. LOOSE SOIL DRIES OUT QUICKLY AT THE SURFACE COMPARED TO FIRM SOIL.
3. MOST GRASSES SHOULD BE PLANTED WITH A GRASS DRILL, BUT BROADCASTING CAN ALSO BE USED. A DOUBLE DISC DRILL WITH AN AGITATOR IS RECOMMENDED FOR SEEDING. IF USING A GRASS DRILL, THE AMOUNT OF SEED NEEDED WILL BE CUT IN HALF SINCE THE METHOD OF PLANTING IS MORE EFFICIENT.
4. IN MOST CASES, A GRASS SEEDLING NEEDS NO FERTILIZER DURING ESTABLISHMENT. HOWEVER, ON DISTURBED SITES, SUCH AS AREAS AROUND A NEW HOUSE, WATER LINES, TRENCHING, ETC., SOIL AMENDMENTS MAY BE REQUIRED TO MAINTAIN THE VIGOR OF THE GRASSES.
5. RECOMMENDED SEEDING DATES FOR COLORADO ARE NOVEMBER 1 TO MAY 1, WHEN THE SOIL IS NOT FROZEN. GRASSES SHOULD BE SEEDED WHEN SOIL MOISTURE AND TEMPERATURE ARE OPTIMUM FOR GERMINATION. GRASSES ARE DESIGNATED EITHER 'COOL' OR 'WARM' SEASON BASED ON THEIR GROWTH CYCLE. COOL-SEASON GRASSES CAN BE PLANTED WHEN TEMPERATURES ARE COOLER AND DAY LENGTHS ARE SHORT. WARM-SEASON GRASSES NEED WARMER TEMPERATURES AND LONGER DAY LENGTHS TO GROW.
6. A PROPER SEEDBED IS FIRM AND FREE OF COMPETING VEGETATION. CORRECT FIRMNESS IS WHEN AN ADULT FOOTPRINT IS ONLY SLIGHTLY VISIBLE ON THE PREPARED BED PRIOR TO THE SEEDING OPERATION. THE SEEDBED CAN BE FIRMED, IF NEEDED, BY PULLING A COMMERCIAL OR HOMEMADE PACKER OR ROLLER. A FIRM SEEDBED IS ESSENTIAL FOR PROPER SEEDING DEPTH. A LOOSE, FLUFFY BED WILL PLACE SEEDS TOO DEEP FOR PROPER GERMINATION.
7. SEEDING NATIVE GRASSES IN A SUITABLE COVER CROP IS RECOMMENDED. A SUITABLE COVER CROP DECREASES EVAPORATION TO RETAIN SOIL MOISTURE, AND KEEPS SOIL TEMPERATURES LOWER BECAUSE OF SHADING. IT PROTECTS YOUNG GRASS SEEDLINGS FROM STRONG WINDS, COLLECTS SNOW DURING WINTER, AND MINIMIZES THE WEED PROBLEM. THE COVER CROP SHOULD BE PLANTED IN THE SPRING MAY 15 THROUGH JULY 15 BUT PREFERABLY BEFORE JUNE 15. GRASS IS SEEDED DIRECTLY INTO THE STANDING STUBBLE IN THE FALL. IF YOU ARE HAYING THE COVER CROP, LEAVE 18 INCHES ON SANDY SOIL AND 12 INCHES ON LOAMY OR HEAVIER SOILS. RECOMMENDED COVER CROPS ARE STERILE FORAGE SORGHUM, LONG-SEASON MILO, MILLET, OATS, SUDAN GRASS, ETC.
8. MOST GROWERS OF NATIVE GRASSES ARE CONVINCED THEY HAVE A FAILURE THE FIRST YEAR. MOST OF THE TIME THEY ACTUALLY HAVE A GOOD STAND. NATIVE GRASSES GROW DOWN, NOT UP, DURING THE ESTABLISHMENT YEAR. THE TOP GROWTH NORMALLY AMOUNTS TO A NARROW, STRAIGHT LEAF UNTIL LATE SUMMER. THESE SEEDLINGS CAN BE HARD TO SEE, EVEN FOR THE EXPERIENCED GROWER. BE PATIENT. DO NOT GRAZE FOR AT LEAST 2 TO 3 GROWING SEASONS AND AFTER THE GRASS IS ESTABLISHED.

PCD File No. PPR-21-51

JDS-HYDRO a Division of RESPEC
5540 TECH CENTER DR., SUITE 100
COLORADO SPRINGS, COLORADO 80919
(719) 227-0072

COLORADO CENTRE METROPOLITAN DISTRICT
ADMINISTRATIVE BUILDING - SITE DEVELOPMENT PLAN

GRADING & EROSION CONTROL NOTES

REVISIONS

NO.	DESCRIPTION	BY	APP.	DATE
1				
2				
3				
4				
5				
6				
7				

100% DESIGN

Project No.: 247.07
Date: 01/03/23
Design: RMM
Drawn: GGM
Check: RMM

C1
SHEET 1 OF 15

ADJACENT PROPERTY
SCHEDULE: 5503400001
OWNER: BLH NO 2 LLC
AREA: 427,324 SF (9.81 AC)
LOCATION: HORIZONVIEW DR
ZONING: R1-6/CR AO
LAND USE: VACANT LAND

PROPOSED 6-FT WIDE SIDEWALK

FLAGSTONE ST.

635.54'
S12° 40' 27"W

5' SIDE BUILDING SETBACK

ADJACENT PROPERTY
SCHEDULE: 5500000189
OWNER: BLH NO 2 LLC
AREA: 3,787,542 SF (86.95 AC)
LOCATION: S MARKSHEFFEL RD
ZONING: R1-6/CR
PBC/CR AO AP
LAND USE: VACANT LAND

E. ANVIL DR.

FLAGSTONE ST.

DRAINAGE/DETENTION IMPROVEMENTS (SEE ADDITIONAL SHEETS)

PEDESTRIAN RAMP IMPROVEMENTS PART OF THIS PROJECT (SEE ADDITIONAL SHEETS)

SURFACE IMPROVEMENTS AREA INCLUDES:
- ASPHALT ROADWAY/DRIVEWAY
- CURB/GUTTER
- SIDEWALKS
- LANDSCAPING
- PROPOSED BUILDING
- ETC.

PROPOSED GRADING AREA INCLUDES:
- GRADING
- DRAINAGE CHANNELS
- DETENTION POND
- ETC.

(TO BE REVEGETATED)

25' REAR BUILDING SETBACK

VICINITY MAP
SCALE: N.T.S.

ADJACENT PROPERTY
SCHEDULE: 5503400005
OWNER: COLORADO CENTRE METRO DIST
AREA: 601,128 SF (13.8 AC)
LOCATION: HAZING MORNING DR
ZONING: RS-5000 CAD-O
LAND USE: POLITICAL SUBDIVISION

S89° 24' 57"W
416.33'

ALL AREAS NOT LABELED OR HIGHLIGHTED ARE EXISTING

A SEARCH OF COUNTY RECORDS DID NOT REVEAL ANY EXISTING EASEMENTS. THIS TRACT IS NOT PLATTED. IT IS OWNED BY COLORADO CENTRE METRO DISTRICT, AND ALL INFRA-STRUCTURE WITHIN THE TRACT IS OWNED BY CCMD.

PROJECT PROPERTY
SCHEDULE: 5503400003
AREA: 336,719 (7.73 AC)
ZONING: RS-5000 CAD-O
LAND USE: POLITICAL SUBDIVISION
OWNER: COLORADO CENTRE METRO DIST
ADDRESS: 9696 FLAGSTONE ST
COLO SPRINGS, CO 80925
MAILING ADDRESS: 4770 HORIZONVIEW DR
COLO SPRINGS, CO 80925
BUILDING SETBACKS: EXEMPT PER PREVIOUSLY APPROVED 1041

ADJACENT PROPERTY
SCHEDULE: 5503417002
OWNER: COLORADO CENTRE METRO DIST
AREA: 103,237 SF (2.37 AC)
LOCATION: 4307 ANVIL DR
ZONING: PUD CAD-O
LAND USE: POLITICAL SUBDIVISION

520.00'
S77° 19' 33"E

25' FRONT BUILDING SETBACK

STAGING AREA
(TO BE REVEGETATED)

N0° 35' 03"W
500.45'

ADJACENT PROPERTY
SCHEDULE: 5503400004
OWNER: COLORADO CENTRE METRO DIST
AREA: 29,504 SF (.67 AC)
LOCATION: 03-15-65
ZONING: RS-5000 CAD-O
LAND USE: POLITICAL SUBDIVISION

5' SIDE BUILDING SETBACK

N12° 40' 27"E
243.91'

ADJACENT PROPERTY
SCHEDULE: 5500000224
OWNER: BLH NO 2 LLC
AREA: 15,224,220 SF (349.5 AC)
LOCATION: S MARKSEFFEL RD
ZONING: OC/CR R5/CR R1-6 SS
LAND USE: AG GRAZING

0' 30' 60'
SCALE 11x17: 1" = 60'
SCALE 24x36: 1" = 30'

PCD File No. PPR-21-51

2023/03/13 11:53 AM By: Ryan Mangino N:\Projects\247 Colorado Centre MD\247.07 Admin Building Support\Drawings\Working\24707_Civil.dwg

JDS-HYDRO a Division of RESPEC
5540 TECH CENTER DR., SUITE 100
COLORADO SPRINGS, COLORADO 80919
(719) 227-0072

COLORADO CENTRE METROPOLITAN DISTRICT

ADMINISTRATIVE BUILDING - SITE DEVELOPMENT PLAN

ADJACENT PROPERTY OWNERSHIP & PROPOSED IMPROVEMENTS EXHIBIT

REVISIONS			
NO.	DESCRIPTION	BY	APP.	DATE
1				
2				
3				
4				
5				
6				
7				

100% DESIGN

Project No.:	247.07
Date:	01/03/23
Design:	RMM
Drawn:	GGM
Check:	RMM

C2

LEGEND

- EX PROPERTY LINE
- EX RIGHT-OF-WAY
- EX BARBED WIRE FENCE
- EX SPLIT RAIL FENCE
- EX CHAIN LINK FENCE
- 5830 EX CONTOURS-MAJOR
- EX CONTOURS-MINOR
- EX FIRE HYDRANT
- EX WATER LINE
- EX SANITARY SEWER LINE
- EX FIRE HYDRANT
- 5900 CONTOURS-MAJOR
- CONTOURS-MINOR
- SF SILT FENCE (INITIAL/INTERIM)
- EX VEGETATION (SIZE VARIES)
- PARKING LOT ISLAND LIGHT POLE
- VT VEHICLE TRACKING PAD (INITIAL/INTERIM)
- CHECK DAM (FINAL)
- EROSION CONTROL BLANKET (FINAL)
- CURB SOCK (INTERIM)
- STAGING AREA (INITIAL/INTERIM)
- CONCRETE WASHOUT (INITIAL/INTERIM)
- RIPRAP (FINAL)
- AREA OF CUT
- AREA OF FILL
- PRE-DEVELOPED FLOW DIRECTION
- DEVELOPED FLOW DIRECTION

VICINITY MAP
SCALE: N.T.S.

INSTALL EROSION CONTROL BLANKETS ON SLOPES 3:1 & STEEPER
REMOVE ROCK CHECK DAM TO INSTALL FOREBAY
EX. ROCK CHECK DAM (TO REMAIN)
SEE ADDITIONAL SHEETS FOR CHANNEL DETAILS
FLAGSTONE CHANNEL
FLAGSTONE ST. (NON-ARTERIAL, 60' R.O.W.)
EX 3-STRAND BARBED WIRE FENCE ALONG PROP. LINE (NOT SHOWN FOR CLARITY)
DET. POND (SEE ADDITIONAL SHEETS FOR DETAILS)
EX SPLIT RAIL FENCE (EA. SIDE)
EX. CURB CUT/PAN TO RIPRAP RUNDOWN
CURB SOCK (SEE SHEET C10)
DRAINAGE DISCHARGE LOCATION
EX SPLIT RAIL FENCE TRANSITIONS TO BARBED WIRE FENCE
EMERGENCY SPILLWAY LOCATION (SEE ADDITIONAL SHEETS FOR DETAILS)
E. ANVIL DR. (NON-ARTERIAL, 60' ROW)
FLAGSTONE ST.
EAST-WEST PEDESTRIAN CURB RAMP AT EX ENTRANCE. SEE SHEETS C11 & C12
ADJACENT EX BOOSTER STATION
EX WATER TREATMENT PLANT
520.00' S77° 19' 33"E
635.54' S12° 40' 27"W
NEW ADMINISTRATION BUILDING (4542 SF) FF EL = 5,835.5'
ROCK CHECK DAM (TYP.) (SEE ADDITIONAL SHEETS FOR DETAILS)
LIMITS OF CONSTRUCTION/DISTURBANCE. THIS AREA SHALL INCLUDE REVEGETATION EXCEPT FOR AREAS OF SURFACE IMPROVEMENTS (CONCRETE, ASPHALT, ETC.) (SEEDING NOT SHOWN VIA HATCH FOR CLARITY PURPOSES)
S89° 24' 57"W 416.33'
PROPERTY LINE
PROPOSED STAGING & STOCKPILE AREA
CONCRETE WASHOUT
ADJACENT EX CENTRE BARKWAY
EX CCMD EQUIPMENT YARD ACCESS/DIRT RD ALONG SOUTH AND EAST PROPERTY LINES TO REMAIN
JIMMY CAMP CREEK CREEK (SEE INSET)
N0° 35' 03"W 500.45'

0' 30' 60'
SCALE 11x17: 1" = 60'
SCALE 24x36: 1" = 30'

PCD File No. PPR-21-51

JDS-HYDRO a Division of RESPEC
5540 TECH CENTER DR., SUITE 100
COLORADO SPRINGS, COLORADO 80919
(719) 227-0072

COLORADO CENTRE METROPOLITAN DISTRICT
ADMINISTRATIVE BUILDING - SITE DEVELOPMENT PLAN
GRADING & EROSION CONTROL PLAN

REVISIONS				
NO.	DESCRIPTION	BY	APP.	DATE
1				
2				
3				
4				
5				
6				
7				

100% DESIGN

Project No.:	247.07
Date:	01/03/23
Design:	RMM
Drawn:	GGM
Check:	RMM

C3
SHEET 3 OF 15

2023/03/13 11:53 AM By: Ryan Mangino N:\Projects\247 Colorado Centre MD\247.07 Admin Building Support\Drawings\Working\24707_Civil.dwg

LEGEND

- EX PROPERTY LINE
- EX RIGHT-OF-WAY
- EX BARBED WIRE FENCE
- EX SPLIT RAIL FENCE
- EX CHAIN LINK FENCE
- 5830 EX CONTOURS-MAJOR
- EX CONTOURS-MINOR
- EX FIRE HYDRANT
- EX WATER LINE
- EX SANITARY SEWER LINE
- EX FIRE HYDRANT
- 5900 CONTOURS-MAJOR
- CONTOURS-MINOR
- SILT FENCE (INITIAL/INTERIM)
- EX VEGETATION (SIZE VARIES)
- PARKING LOT ISLAND LIGHT POLE
- VT VEHICLE TRACKING PAD (INITIAL/INTERIM)
- CHECK DAM (FINAL)
- EROSION CONTROL BLANKET (FINAL)
- CURB SOCK (INTERIM)
- STAGING AREA (INITIAL/INTERIM)
- CONCRETE WASHOUT (INITIAL/INTERIM)
- RIPRAP (FINAL)
- AREA OF CUT
- AREA OF FILL
- PRE-DEVELOPED FLOW DIRECTION
- DEVELOPED FLOW DIRECTION

VICINITY MAP
SCALE: N.T.S.

0' 10' 20'
SCALE 11x17: 1" = 20'
SCALE 24x36: 1" = 10'

FLAGSTONE CHANNEL

DETENTION POND MAINTENANCE ROAD NOT REQUIRED AS ENTIRETY OF POND CAN BE ACCESSED BY EXCAVATION/MAINTENANCE EQUIPMENT AROUND TOP OF POND

UPSTREAM CHANNEL (SEE SHEET C7 FOR TYPICAL CROSS-SECTION)

5828
5830
5825
5821
5820
5819
5823
5818

PROPOSED TRICKLE CHANNEL (SEE ADDITIONAL SHEETS FOR DETAILS)

EXISTING 24" RCP CULVERT OUTLET (DRAINAGE DISCHARGE POINT)

EXISTING 24" RCP OUTFALL PIPE (TO REMAIN)

EMERGENCY SPILLWAY (SEE ADDITIONAL SHEETS FOR DETAILS)

PROPOSED BLOCK RETAINING WALL (HEIGHT VAIRES, MAX. 4' TALL)

REMOVE EXISTING ROCK CHECK DAM AND REPLACE W/ NEW FOREBAY (SEE ADDITIONAL SHEETS FOR DETAILS)

EXISTING CURB CUT/ TO RIPRAP RUNDOWN (SEE ADDITIONAL SHEETS FOR DETAILS)

REPLACE EXISTING RIPRAP CHUTE W/ NEW RIPRAP CHUTE (SEE ADDITIONAL SHEETS FOR DETAILS)

REPLACE EXISTING OUTLET STRUTURE W/ NEW OUTLET STRUCTURE (SEE ADDITIONAL SHEETS FOR DETAILS)

CONNECT NEW OUTLET STRUCTURE TO EXISTING 24" RCP OUTFALL PIPE

PCD File No. PPR-21-51

JDS-HYDRO a Division of RESPEC
5540 TECH CENTER DR., SUITE 100
COLORADO SPRINGS, COLORADO 80919
(719) 227-0072

COLORADO CENTRE METROPOLITAN DISTRICT
ADMINISTRATIVE BUILDING - SITE DEVELOPMENT PLAN

DETENTION POND PLAN

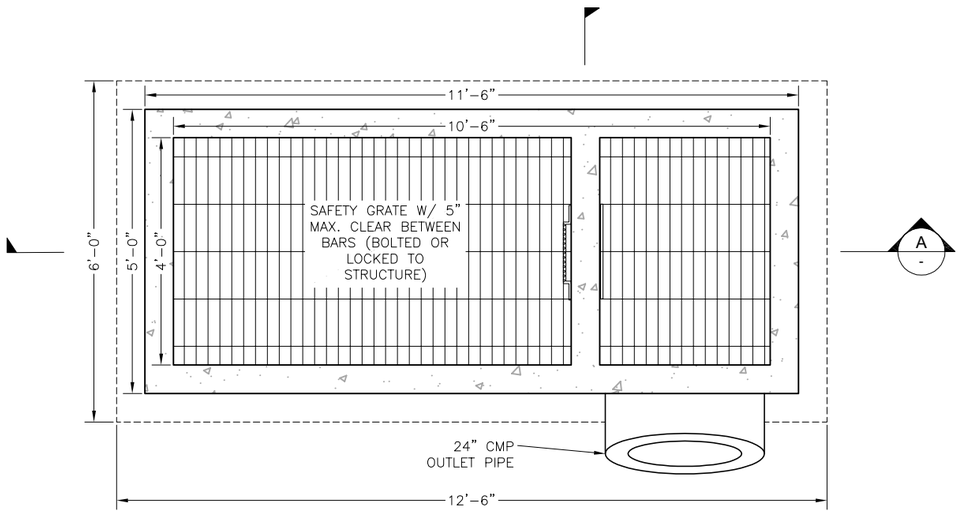
REVISIONS NO.	DESCRIPTION	BY	APP.	DATE
1				
2				
3				
4				
5				
6				
7				

100% DESIGN

Project No.:	247.07
Date:	01/03/23
Design:	RMM
Drawn:	GGM
Check:	RMM

C4
SHEET 4 OF 15

2023/03/13 11:53 AM By: Ryan Mangino N:\Projects\247 Colorado Centre MD\247.07 Admin Building Support\Drawings\Working\24707_Civil.dwg



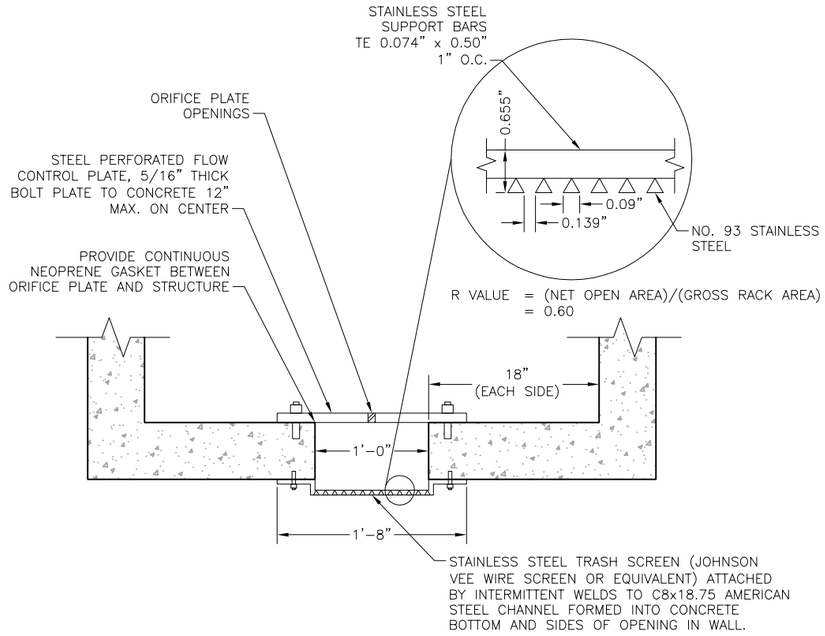
OUTLET STRUCTURE – TOP VIEW
11x17 SCALE: 3/8"=1'-0"
24x36 SCALE: 3/4"=1'-0"

EURV AND WQCV TRASH RACK NOTES:

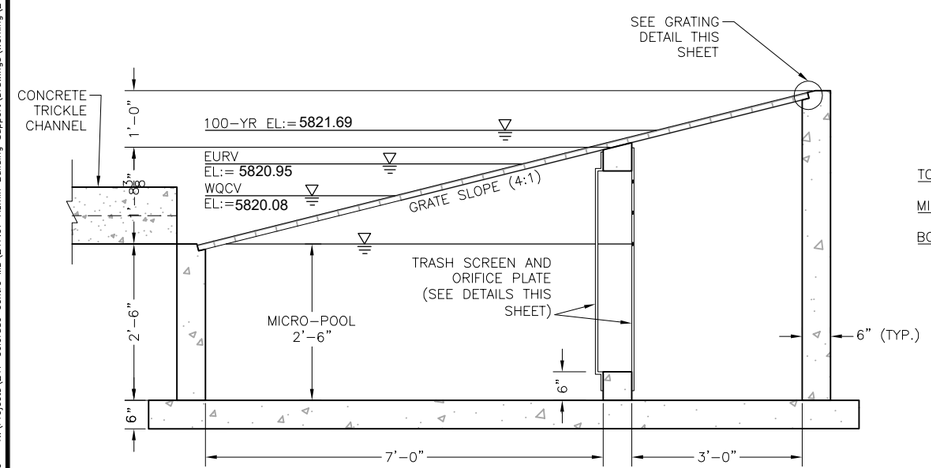
1. WELL-SCREEN TRASH RACKS SHALL BE STAINLESS STEEL AND SHALL BE ATTACHED BY INTERMITTENT WELDS ALONG THE EDGE OF THE MOUNTING FRAME.
2. BAR GATE TRASH RACKS SHALL BE ALUMINUM AND SHALL BE BOLTED USING STAINLESS STEEL HARDWARE.
3. TRASH RACK OPEN AREAS ARE FOR SPECIFIED TRASH RACK MATERIALS. TOTAL TRASH RACK SIZE MAY NEED TO BE ADJUSTED FOR MATERIALS HAVING DIFFERENT OPEN AREA/GROSS AREA RATIO (R VALUE).
4. STRUCTURAL DESIGN OF TRASH RACKS SHALL BE BASED ON FULL HYDROSTATIC HEAD WITH ZERO HEAD DOWNSTREAM OF THE RACK.

OVERFLOW SAFETY GRATE NOTES:

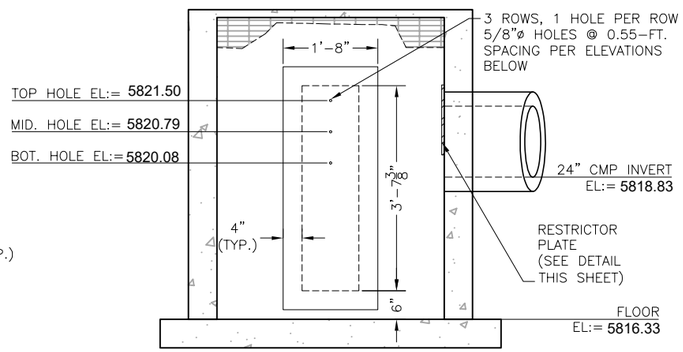
1. ALL SAFETY GRATES SHALL BE MOUNTED USING STAINLESS STEEL HARDWARE AND PROVIDED WITH HINGED AND LOCKABLE OR BOLTABLE ACCESS PANELS.
2. SAFETY GRATES SHALL BE STAINLESS STEEL, ALUMINUM, OR STEEL. STEEL GRATES SHALL BE HOT DIP GALVANIZED AND MAY BE HOT POWDER COATED AFTER GALVANIZING.
3. SAFETY GRATES SHALL BE DESIGNED SUCH THAT THE DIAGONAL DIMENSION OF EACH OPENING IS SMALLER THAN THE DIAMETER OF THE OUTLET PIPE.
4. STRUCTURAL DESIGN OF SAFETY GRATES SHALL BE BASED ON FULL HYDROSTATIC HEAD WITH ZERO HEAD DOWNSTREAM OF THE RACK.



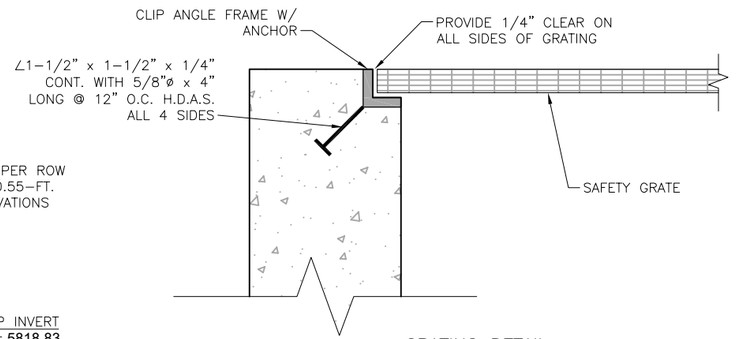
TRASH SCREEN & ORIFICE PLATE PLAN VIEW
N.T.S.



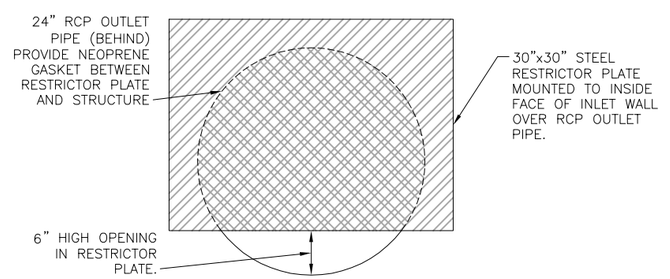
OUTLET STRUCTURE – SECTION A
11x17 SCALE: 3/8"=1'-0"
24x36 SCALE: 3/4"=1'-0"



OUTLET STRUCTURE – SECTION B
11x17 SCALE: 3/8"=1'-0"
24x36 SCALE: 3/4"=1'-0"



GRATING DETAIL
N.T.S.



RESTRICTOR PLATE DETAIL
N.T.S.

PCD File No. PPR-21-51

JDS-HYDRO a Division of RESPEC
5540 TECH CENTER DR., SUITE 100
COLORADO SPRINGS, COLORADO 80919
(719) 227-0072

COLORADO CENTRE METROPOLITAN DISTRICT
ADMINISTRATIVE BUILDING – SITE DEVELOPMENT PLAN

OUTLET STRUCTURE DETAILS

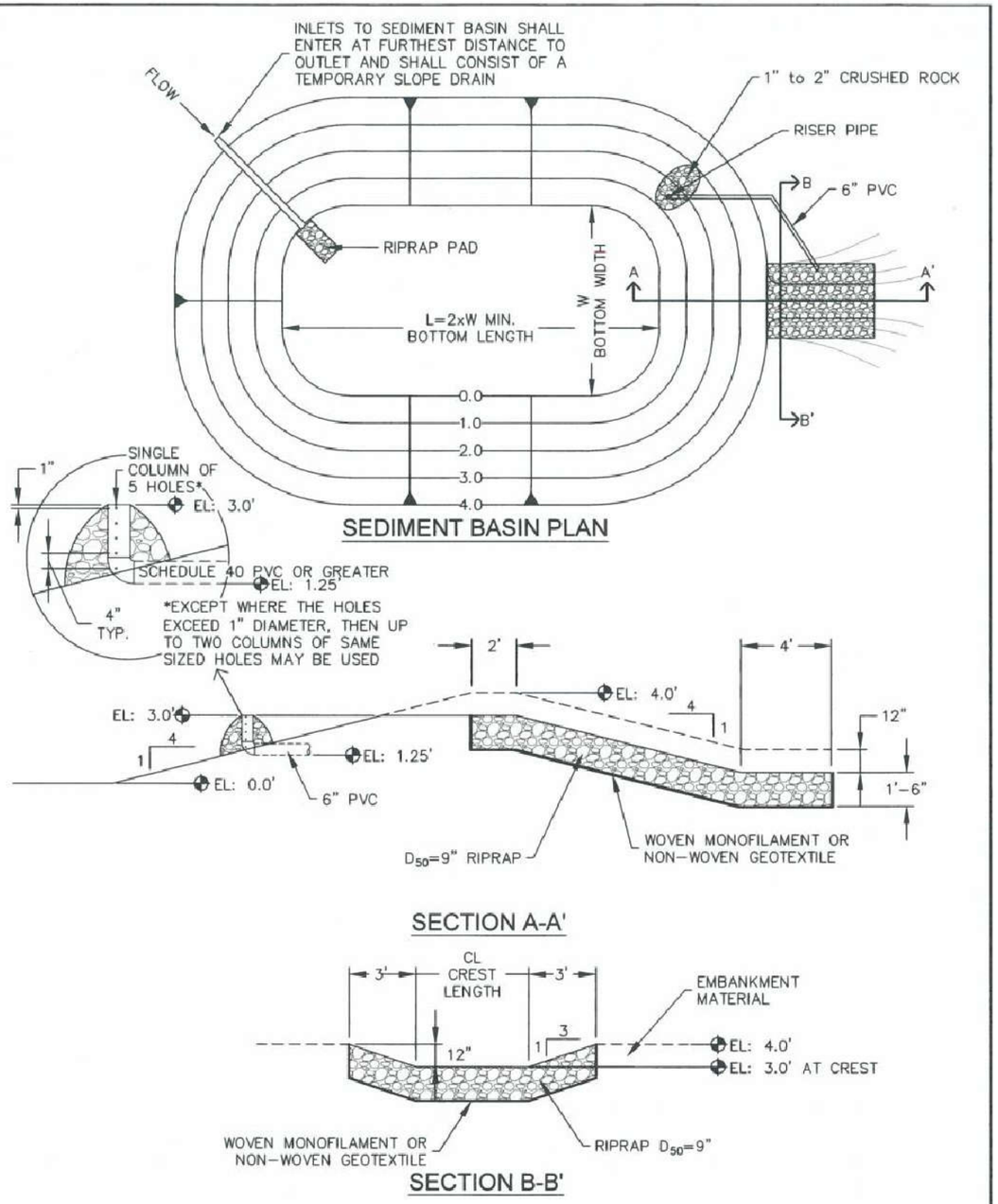
REVISIONS			
NO.	DESCRIPTION	BY	APP.	DATE
1				
2				
3				
4				
5				
6				
7				

100% DESIGN

Project No.:	247.07
Date:	01/03/23
Design:	RMM
Drawn:	GGM
Check:	RMM

C5
SHEET 5 OF 15

2023/03/13 11:53 AM By: Ryan Mangino N:\Projects\247 Colorado Centre MD\247.07 Admin Building Support\Drawings\Working\24707_Civil.dwg



SEDIMENT BASIN PLAN

SECTION A-A'

SECTION B-B'

TSB

STORMWATER ENTERPRISE

TEMPORARY SEDIMENT BASIN

APPROVED: SWENT MANAGER		
ISSUED: 10/7/19	REVISED: 8/19/2020	DRAWING NO. 900-TSB-1

TABLE SB-1, SIZING INFORMATION FOR STANDARD SEDIMENT BASIN

UPSTREAM DRAINAGE AREA (ROUNDED TO NEAREST ACRE), (AC)	BASIN BOTTOM WIDTH (W), (FT)	SPILLWAY CREST LENGTH (CL), (FT)	HOLE DIAMETER (HD), (IN)
1	12½"	2	9/32
2	21	3	13/16
3	28	5	½
4	33½	6	9/16
5	38½	8	21/32
6	43	9	21/32
7	47¼	11	25/32
8	51	12	27/32
9	55	13	⅞
10	58¼	15	15/16
11	61	16	31/32
12	64	18	1
13	67½	19	1 1/16
14	70½	21	1⅛
15	73¼	22	1 3/16

INSTALLATION NOTES

1. FOR STANDARD BASIN, BOTTOM DIMENSION MAY BE MODIFIED AS LONG AS BOTTOM AREA IS NOT REDUCED.
2. EMBANKMENT MATERIAL SHALL CONSIST OF SOIL FREE OF DEBRIS, ORGANIC MATERIAL, AND ROCKS OR CONCRETE GREATER THAN 3 INCHES, AND SHALL HAVE A MINIMUM OF 15 PERCENT BY WEIGHT PASSING THE No. 200 SIEVE
3. EMBANKMENT MATERIAL SHALL BE COMPACTED TO AT LEAST 95 PERCENT OF MAXIMUM DENSITY IN ACCORDANCE WITH ASTM D-698.
4. PIPE SCHEDULE 40 OR GREATER SHALL BE USED.
5. THE DETAILS SHOWN ON THESE SHEETS PERTAIN TO STANDARD SEDIMENT BASIN(S) FOR DRAINAGE AREAS LESS THAN 15 ACRES. SEE CONSTRUCTION DRAWINGS FOR EMBANKMENT, STORAGE VOLUME, SPILLWAY, OUTLET, AND OUTLET PROTECTION DETAILS FOR ANY SEDIMENT BASIN(S) THAT HAVE BEEN INDIVIDUALLY DESIGNED FOR DRAINAGE AREAS LARGER THAN 15 ACRES. DESIGN CALCULATIONS MUST BE APPROVED PRIOR TO IMPLEMENTATION.

MAINTENANCE NOTES

1. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN CONTROL MEASURES IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.
2. SEDIMENT ACCUMULATED IN BASIN SHALL BE REMOVED AS NEEDED TO MAINTAIN CONTROL MEASURE EFFECTIVENESS, TYPICALLY WHEN SEDIMENT DEPTH REACHES ONE FOOT (I.E. TWO FEET BELOW SPILLWAY CREST).
3. SEDIMENT BASINS ARE TO REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS PERMANENTLY STABILIZED.
4. PERMANENTLY STABILIZE AREA AFTER SEDIMENT BASIN REMOVAL.

TSB

STORMWATER ENTERPRISE

TEMPORARY SEDIMENT BASIN

APPROVED: SWENT MANAGER		
ISSUED: 10/7/19	REVISED: 8/19/2020	DRAWING NO. 900-TSB-2

PCD File No. PPR-21-51

JDS-HYDRO a Division of RESPEC
5540 TECH CENTER DR., SUITE 100
COLORADO SPRINGS, COLORADO 80919
(719) 227-0072

COLORADO CENTRE METROPOLITAN DISTRICT
ADMINISTRATIVE BUILDING - SITE DEVELOPMENT PLAN
TEMPORARY SEDIMENTATION BASIN DETAILS

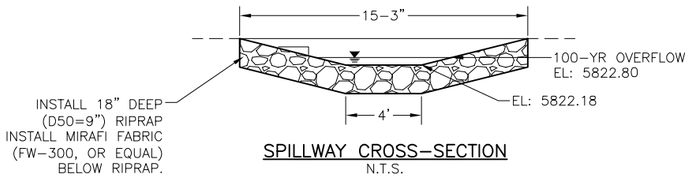
REVISIONS NO.	DESCRIPTION	BY	APP.	DATE
1				
2				
3				
4				
5				
6				
7				

100% DESIGN

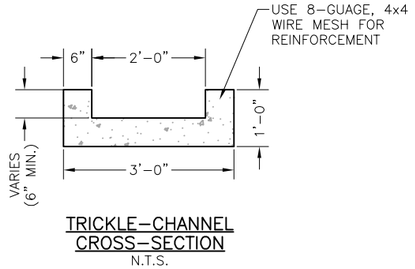
Project No.:	247.07
Date:	01/03/23
Design:	RMM
Drawn:	GGM
Check:	RMM

C6

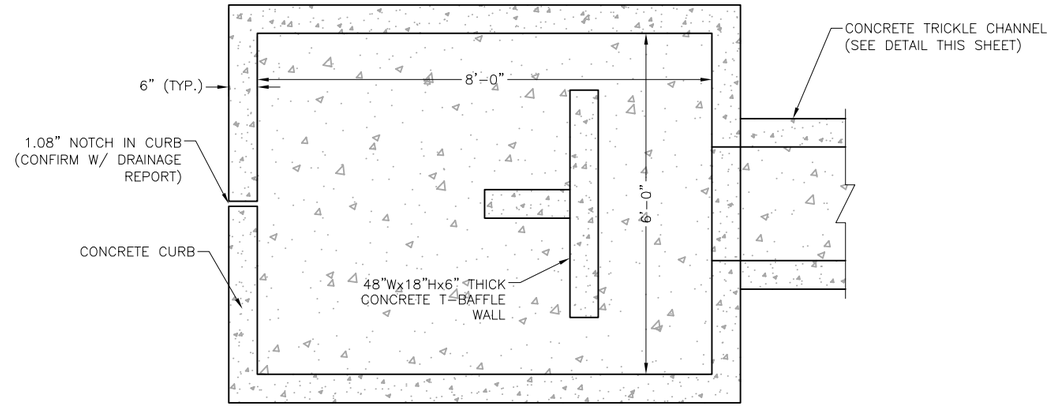
SHEET 6 OF 15



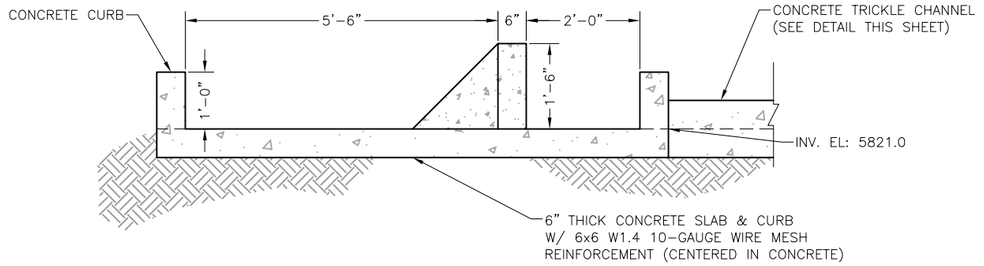
SPILLWAY CROSS–SECTION
N.T.S.



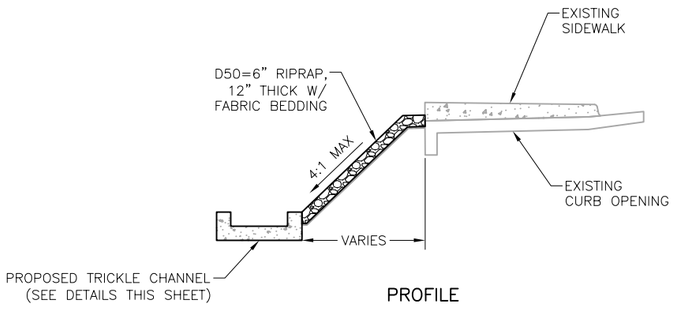
TRICKLE–CHANNEL
CROSS–SECTION
N.T.S.



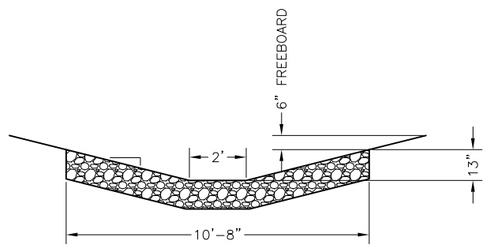
FOREBAY DETAIL
N.T.S.



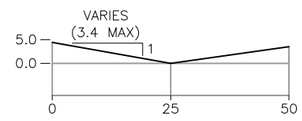
FOREBAY CROSS–SECTION
N.T.S.



PROFILE



SECTION



TYPICAL UPSTREAM
CHANNEL SECTION
N.T.S.

ROCK CHUTE DETAILS
N.T.S.

PCD File No. PPR-21-51

JDS-HYDRO a Division of RESPEC
5540 TECH CENTER DR., SUITE 100
COLORADO SPRINGS, COLORADO 80919
(719) 227-0072

COLORADO CENTRE METROPOLITAN DISTRICT
ADMINISTRATIVE BUILDING – SITE DEVELOPMENT PLAN

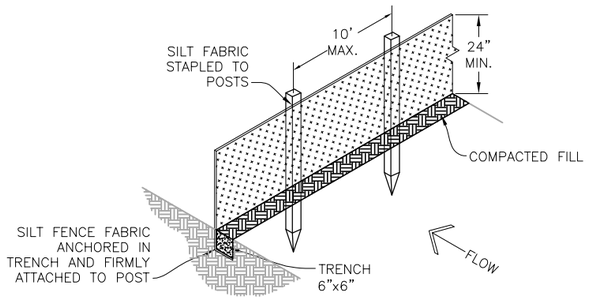
DRAINAGE DETAILS

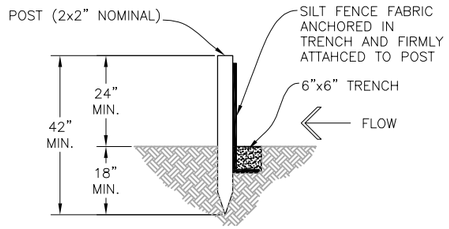
REVISIONS				
NO.	DESCRIPTION	BY	APP.	DATE
1				
2				
3				
4				
5				
6				
7				

100% DESIGN

Project No.:	247.07
Date:	01/03/23
Design:	RMM
Drawn:	GGM
Check:	RMM

C7
SHEET 7 OF 15





SILT FENCE DETAIL

INSTALLATION REQUIREMENTS:

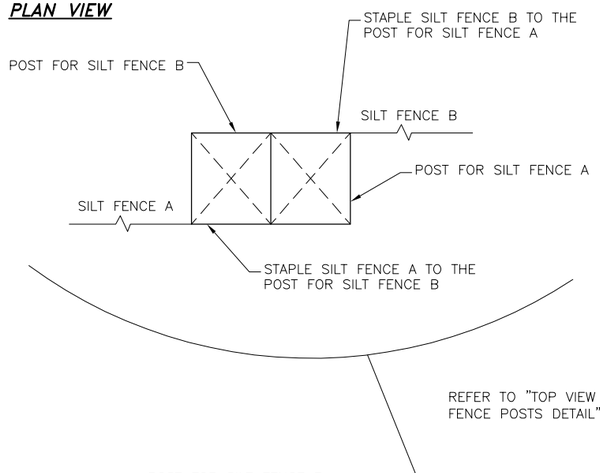
1. SILT FENCES SHALL BE INSTALLED PRIOR TO ANY LAND DISTURBING ACTIVITIES.
2. WHEN JOINTS ARE NECESSARY, SILT FENCE GEOTEXTILE SHALL BE SPLICED TOGETHER ONLY AT SUPPORT POST AND SECURELY SEALED.
3. METAL POSTS SHALL BE "STUDDED TEE" OR "U" TYPE WITH MINIMUM WEIGHT OF 1.33 POUNDS PER LINEAR FOOT. WOOD POSTS SHALL HAVE A MINIMUM DIAMETER OR CROSS SECTION DIMENSION OF 2 INCHES.
4. THE FILTER MATERIAL SHALL BE FASTENED SECURELY TO METAL POSTS USING WIRE TIES, OR TO WOOD POSTS WITH 3/4" LONG #9 HEAVY-DUTY STAPLES. THE SILT FENCE GEOTEXTILE SHALL NOT BE STAPLED TO EXISTING TREES.
5. WHILE NOT REQUIRED, WIRE MESH FENCE MAY BE USED TO SUPPORT THE GEOTEXTILE. WIRE FENCE SHALL BE FASTENED SECURELY TO THE UPSLOPE SIDE OF THE POSTS USING HEAVY-DUTY WIRE STAPLES AT LEAST 3/4" LONG, TIE WIRES OR HOG RINGS. THE WIRE SHALL EXTEND INTO THE TRENCH A MINIMUM OF 6 INCHES AND SHALL NOT EXTEND MORE THAN 3 FEET ABOVE THE ORIGINAL GROUND SURFACE.
6. ALONG THE TOE OF FILLS, INSTALL THE SILT FENCE ALONG A LEVEL CONTOUR AND PROVIDE AN AREA BEHIND THE FENCE FOR RUNOFF TO POND AND SEDIMENT TO SETTLE. A MINIMUM DISTANCE OF 5 FEET FROM THE TOE OF THE FILL IS RECOMMENDED.
7. THE HEIGHT OF THE SILT FENCE FROM THE GROUND SURFACE SHALL BE MINIMUM OF 24 INCHES AND SHALL NOT EXCEED 36 INCHES. HIGHER FENCES MAY IMPOUND VOLUMES OF WATER SUFFICIENT TO CAUSE FAILURE OF THE STRUCTURE.

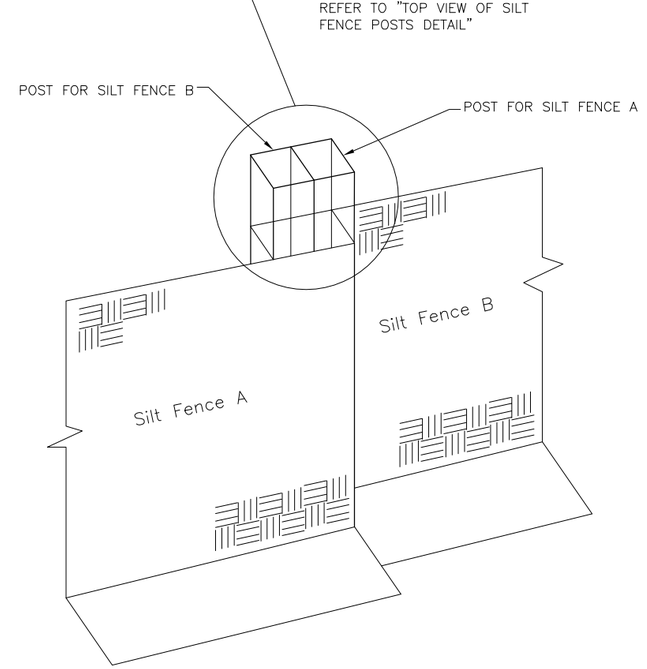
MAINTENANCE REQUIREMENTS:

1. CONTRACTOR SHALL INSPECT SILT FENCES IMMEDIATELY AFTER EACH RAINFALL, AT LEAST DAILY DURING PROLONGED RAINFALL, AND WEEKLY DURING PERIODS OF NO RAINFALL. DAMAGED, COLLAPSED, UNENTRENCHED OR INEFFECTIVE SILT FENCES SHALL BE PROMPTLY REPAIRED OR REPLACED.
2. SEDIMENT SHALL BE REMOVED FROM BEHIND SILT FENCE WHEN IT ACCUMULATES TO HALF THE EXPOSED GEOTEXTILE HEIGHT.
3. SILT FENCES SHALL BE REMOVED WHEN ADEQUATE VEGETATIVE COVER IS ATTAINED.

A / C8 **SILT FENCE DETAIL**
SCALE: N.T.S.

PLAN VIEW





B / C8 **SILT FENCE POSTS DETAIL**
SCALE: N.T.S.

PCD File No. PPR-21-51

JDS-HYDRO a Division of RESPEC
5540 TECH CENTER DR., SUITE 100
COLORADO SPRINGS, COLORADO 80919
(719) 227-0072

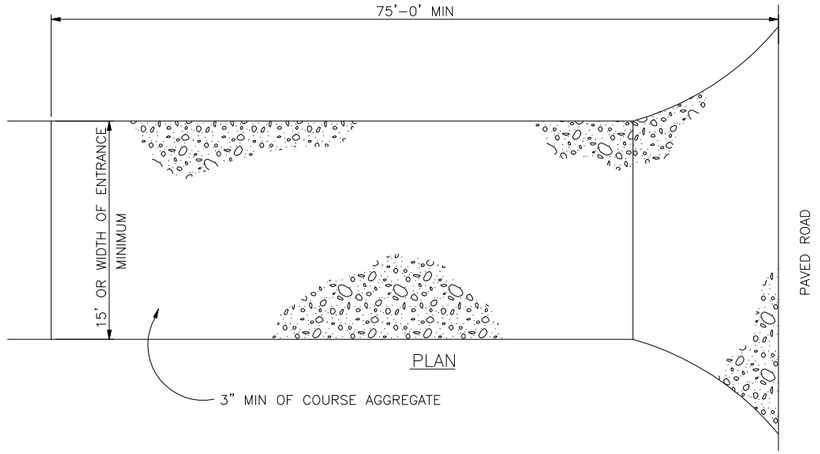
COLORADO CENTRE METROPOLITAN DISTRICT
ADMINISTRATIVE BUILDING - SITE DEVELOPMENT PLAN
GRADING & EROSION CONTROL DETAILS 1

REVISIONS NO.	DESCRIPTION	BY	APP.	DATE
1				
2				
3				
4				
5				
6				
7				

100% DESIGN

Project No.:	247.07
Date:	01/03/23
Design:	RMM
Drawn:	GGM
Check:	RMM

C8
SHEET 8 OF 15



VEHICLE TRACKING PAD DETAIL

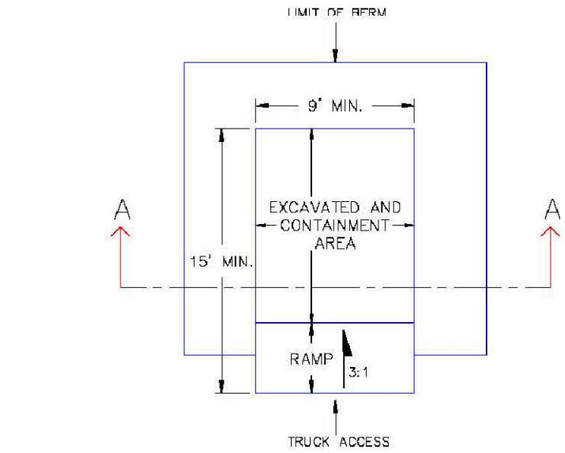
INSTALLATION REQUIREMENTS:

1. ALL ENTRANCES TO THE CONSTRUCTION SITE ARE TO BE STABILIZED PRIOR TO COMMENCEMENT OF CONSTRUCTION.
2. CONSTRUCTION ENTRANCES ARE TO BE BUILT WITH AN APRON TO ALLOW FOR TURNING TRAFFIC, BUT SHOULD NOT BE BUILT OVER EXISTING PAVEMENT EXCEPT FOR A SLIGHT OVERLAP.
3. AREAS TO BE STABILIZED ARE TO BE PROPERLY GRADED AND COMPACTED.
4. CONSTRUCTION ROADS, PARKING AREAS, LOADING/UNLOADING ZONES, STORAGE AREAS, AND STAGING AREAS ARE TO BE STABILIZED.
5. CONSTRUCTION ROADS ARE TO BE BUILT TO CONFORM TO SITE GRADES, BUT SHOULD NOT HAVE SIDE SLOPES OR ROAD GRADES THAT ARE EXCESSIVELY STEEP.

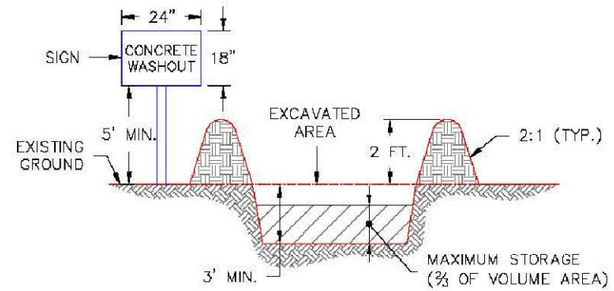
MAINTENANCE REQUIREMENTS

1. REGULAR INSPECTIONS ARE TO BE MADE OF ALL STABILIZED AREAS, ESPECIALLY AFTER STORM EVENTS.
2. STONES ARE TO BE REAPPLIED PERIODICALLY AND WHEN REPAIR IS NECESSARY.
3. SEDIMENT TRACKED ONTO PAVED ROADS IS TO BE REMOVED DAILY BY SHOVELING OR SWEEPING. SEDIMENT IS NOT TO BE WASHED DOWN STORM SEWER DRAINS.
4. OTHER ASSOCIATED SEDIMENT CONTROL MEASURES ARE TO BE INSPECTED TO ENSURE GOOD WORKING CONDITION.
5. TO BE REMOVED JUST PRIOR TO FINAL SURFACING AND STABILIZATION.

A / C9 **VEHICLE TRACKING PAD DETAIL**
SCALE: N.T.S.



PLAN VIEW



SECTION A-A

NOTES:
1. SIGN MATERIAL, EXCAVATION, AND RESTORATION ARE INCLUDED IN THE COST OF THE CONCRETE WASHOUT STRUCTURE.
2. EROSION BALES MAY BE USED AS AN ALTERNATIVE FOR THE BERM.

1/1/08 DATE APPROVED: John A. McCarty DEPARTMENT OF TRANSPORTATION	Concrete Washout Structure Standard Drawing REVISION DATE: 7/17/07 FILE NAME: SD_3-84	EL PASO COUNTY DEPARTMENT OF TRANSPORTATION

B / C9 **CONCRETE WASHOUT STRUCTURE DETAIL**
SCALE: N.T.S.

PCD File No. PPR-21-51

JDS-HYDRO a Division of RESPEC
5540 TECH CENTER DR., SUITE 100
COLORADO SPRINGS, COLORADO 80919
(719) 227-0072

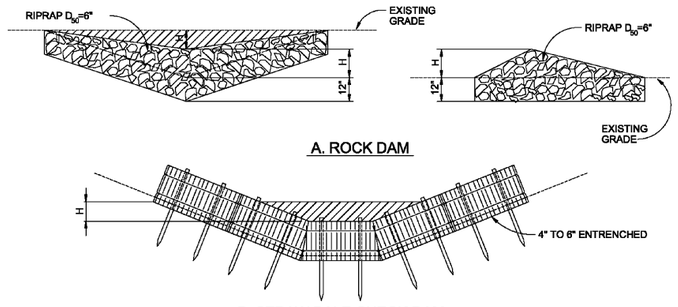
COLORADO CENTRE METROPOLITAN DISTRICT
ADMINISTRATIVE BUILDING - SITE DEVELOPMENT PLAN
GRADING & EROSION CONTROL DETAILS 2

REVISIONS			
NO.	DESCRIPTION	BY	APP.	DATE
1				
2				
3				
4				
5				
6				
7				

100% DESIGN

Project No.: 247.07
Date: 01/03/23
Design: RMM
Drawn: GGM
Check: RMM

C9
SHEET 9 OF 15



CHECK DAM
NTS

CHECK DAM NOTES

INSTALLATION REQUIREMENTS

1. STRAW BALES USED AS CHECK DAMS ARE TO MEET THE REQUIREMENTS STATED IN FIGURE SBB-2.

2. THE "H" DIMENSION SHALL BE SELECTED TO PROVIDE WEIR FLOW CONVEYANCE FOR 2-YEAR FLOW OR GREATER.

MAINTENANCE REQUIREMENTS

1. REGULAR INSPECTIONS ARE TO BE MADE OF ALL CHECK DAMS, ESPECIALLY AFTER STORM EVENTS.

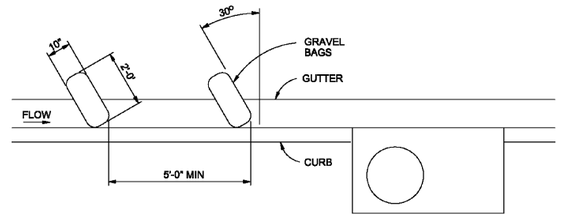
2. REPLACE STONE AS NECESSARY TO MAINTAIN THE CORRECT HEIGHT OF THE DAM.

3. ACCUMULATED SEDIMENT AND DEBRIS IS TO BE REMOVED FROM BEHIND THE DAMS AFTER EACH STORM OR WHEN 1/2 OF THE ORIGINAL HEIGHT OF THE DAM IS REACHED.

3. CHECK DAMS ARE TO REMAIN IN PLACE AND OPERATIONAL UNTIL THE DRAINAGE AREA AND CHANNEL ARE PERMANENTLY STABILIZED.

4. WHEN CHECK DAMS ARE REMOVED THE CHANNEL LINING OR VEGETATION IS TO BE RESTORED.

City of Colorado Springs Stormwater Quality	Figure CD-1 Check Dam Construction Detail and Maintenance Requirements



CURB SOCK INLET PROTECTION
NTS

CURB SOCK INLET PROTECTION NOTES

INSTALLATION REQUIREMENTS

1. INLET PROTECTION SHALL BE INSTALLED IMMEDIATELY AFTER CONSTRUCTION OF INLET.

2. SOCK IS TO BE MADE OF 1/4 INCH WIRE MESH (USED WITH GRAVEL ONLY) OR GEOTEXTILE.

3. WASHED SAND OR GRAVEL 3/4 INCH TO 4 INCHES IN DIAMETER IS PLACED INSIDE THE SOCK.

4. PLACEMENT OF THE SOCK IS TO BE 30 DEGREES FROM PERPENDICULAR IN THE OPPOSITE DIRECTION OF FLOW.

5. SOCKS ARE TO BE FLUSH WITH THE CURB AND SPACED AT A MINIMUM 5 FEET APART.

6. AT LEAST 2 CURB SOCKS IN SERIES IS REQUIRED.

MAINTENANCE REQUIREMENTS

1. CONTRACTOR SHALL INSPECT INLET PROTECTION IMMEDIATELY AFTER EACH RAINFALL, AT LEAST DAILY DURING PROLONGED RAINFALL AND WEEKLY DURING PERIODS NO RAINFALL.

2. DAMAGED OR INEFFECTIVE INLET PROTECTION SHALL PROMPTLY BE REPAIRED OR REPLACED.

3. SEDIMENT SHALL BE REMOVED FROM BEHIND THE SOCK WHEN GUTTER WIDTH IS FILLED.

4. INLET PROTECTION SHALL BE REMOVED WHEN ADEQUATE VEGETATIVE COVER IS ATTAINED WITHIN THE DRAINAGE AREA AS APPROVED BY THE CITY.

City of Colorado Springs Stormwater Quality	Figure IP-4 Curb Sock Inlet Protection Construction Detail and Maintenance Requirements

A / C10 CHECK DAM AND CURB SOCK INLET PROTECTION
SCALE: N.T.S.

PCD File No. PPR-21-51

JDS-HYDRO a Division of RESPEC
5540 TECH CENTER DR., SUITE 100
COLORADO SPRINGS, COLORADO 80919
(719) 227-0072

COLORADO CENTRE METROPOLITAN DISTRICT
ADMINISTRATIVE BUILDING – SITE DEVELOPMENT PLAN
GRADING & EROSION CONTROL DETAILS 3

REVISIONS

NO.	DESCRIPTION	BY	APP.	DATE
1				
2				
3				
4				
5				
6				
7				

100% DESIGN

Project No.: 247.07
Date: 01/03/23
Design: RMM
Drawn: GGM
Check: RMM

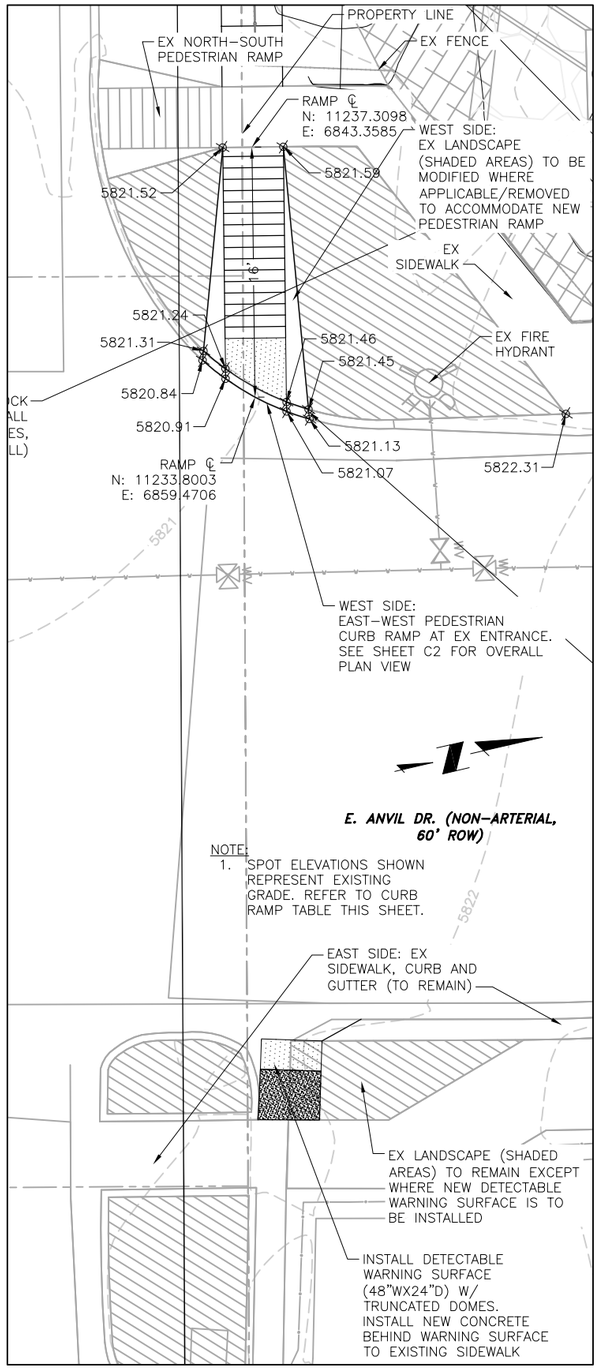
C10
SHEET 10 OF 15

0' 5' 10'
SCALE 11x17: 1" = 10'
SCALE 24x36: 1" = 5'

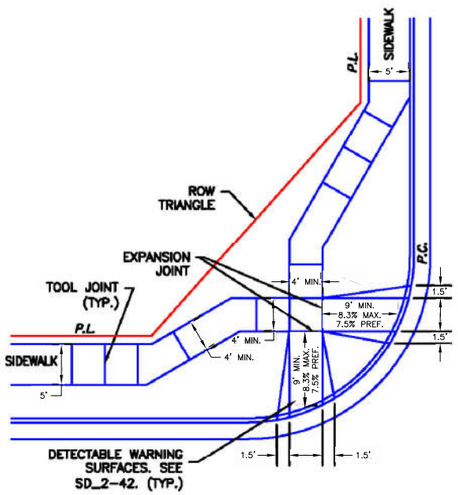
NOTES:
1. ALL UTILITIES NOT SHOWN FOR CLARITY. SEE SHEET C3 FOR ADDITIONAL UTILITIES.
2. RAMP JOINTS AND GRADE BREAKS SHALL BE FLUSH (1/8"). THE JOINT BETWEEN ROADWAY SURFACE AND GUTTER PAN SHALL BE FLUSH.

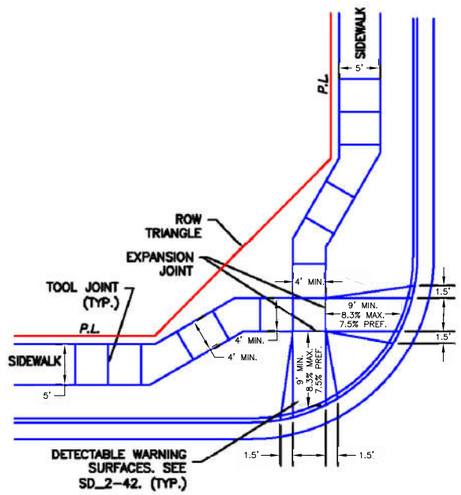
A / C11 PEDESTRIAN CURB RAMP AT E. ANVIL DR.

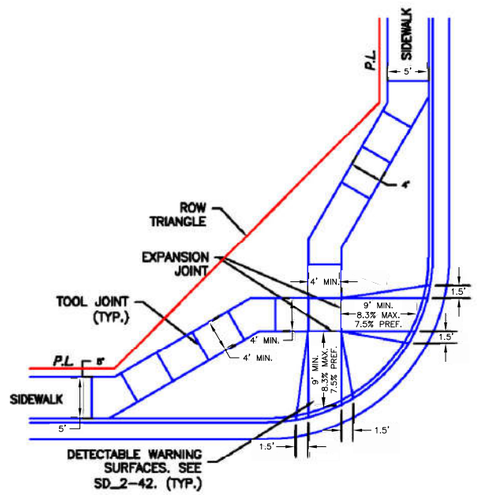
SCALE:



EAST-WEST PEDESTRIAN CURB RAMP	
EXISTING EL	PROPOSED EL
5821.59	
5821.46	5821.04
5821.45	5821.40
5821.13	5821.40
5821.07	
5820.91	
5820.84	5821.24
5821.31	5821.24
5821.24	5821.04
5821.52	







SCALE: NOT TO SCALE

6/23/20
DATE APPROVED:

Jennifer E. Irvine
DEPARTMENT OF PUBLIC WORKS

Pedestrian Curb Ramp Detail
Standard Drawing

REVISION DATE: 6/23/20
FILE NAME: SD_2-40

DEPARTMENT OF EL PASO COUNTY PUBLIC WORKS EST. 1861

B / C11 PEDESTRIAN CURB RAMP STANDARD
SCALE: N.T.S.

PCD File No. PPR-21-51

JDS-HYDRO a Division of RESPEC
5540 TECH CENTER DR., SUITE 100
COLORADO SPRINGS, COLORADO 80919
(719) 227-0072

COLORADO CENTRE METROPOLITAN DISTRICT
ADMINISTRATIVE BUILDING – SITE DEVELOPMENT PLAN
GRADING & EROSION CONTROL DETAILS 4

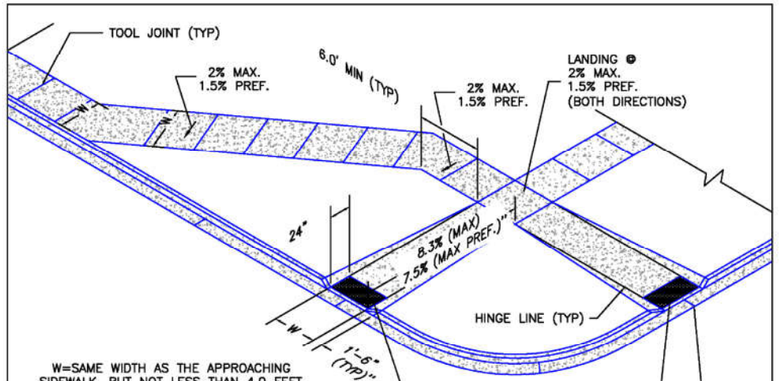
REVISIONS

NO.	DESCRIPTION	BY	APP.	DATE
1				
2				
3				
4				
5				
6				
7				

100% DESIGN

Project No.: 247.07
Date: 01/03/23
Design: RMM
Drawn: GGM
Check: RMM

C11
SHEET 11 OF 15



PEDESTRIAN RAMP NOTES

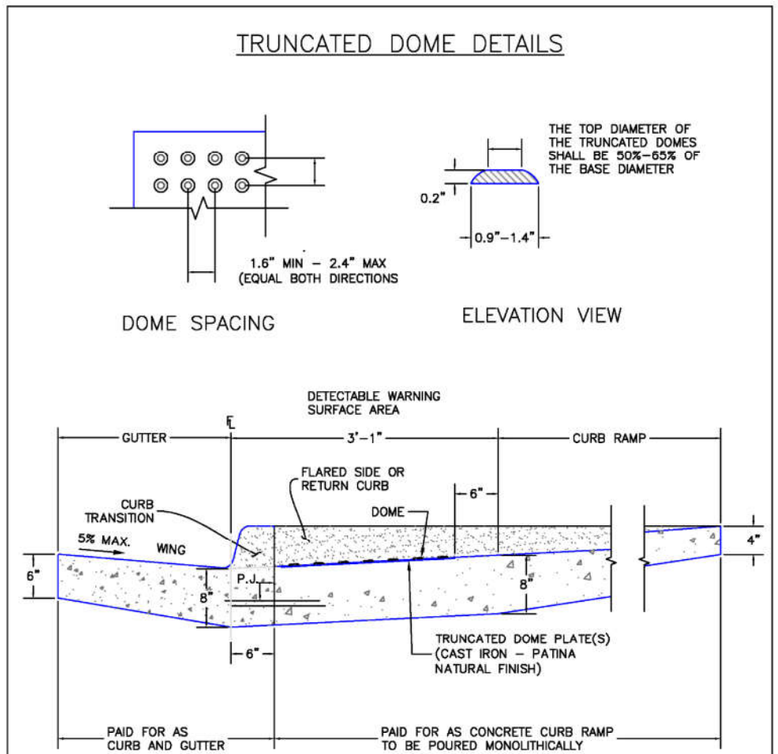
1. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE CURRENT ENGINEERING CRITERIA MANUAL AND ADA REQUIREMENTS.
2. CONTRACTOR TO NOTIFY ENGINEERING DIVISION INSPECTION STAFF 48 HOURS PRIOR TO CONCRETE PLACEMENT.
3. PEDESTRIAN CURB RAMP CONSTRUCTION SHALL BE A MINIMUM 4,500 PSI CONCRETE, MINIMUM 4" THICK, NON-COLORED, NON-SCORED, COARSE BROOM FINISH.
4. PEDESTRIAN CURB RAMP LOCATION AND LENGTH MAY REQUIRE MODIFICATION TO MAINTAIN THE 8.3% MAXIMUM RUNNING RAMP SLOPE DUE TO STREET INTERSECTION GRADES AND/OR ALIGNMENTS. SEE ECM SECTION 6.3.6 FOR PEDESTRIAN PUSHBUTTON LOCATION REQUIREMENTS.
5. DETECTABLE WARNING SURFACE SHALL START A MINIMUM OF 6" BUT NOT MORE THAN 8" FROM THE FLOWLINE OF THE CURB AT ANY POINT.
6. DETECTABLE WARNING SURFACE SHALL BE PREFABRICATED, CAST IRON (PATINA NATURAL FINISH) AND IN ACCORDANCE WITH ECM CHAPTER 6 AND SD_2-42. THERMOPLASTIC TRUNCATED DOMES AND PAVERS WILL NOT BE ACCEPTED.
7. THE DETECTABLE WARNING SURFACE SHALL BE 24" IN LENGTH AND THE FULL WIDTH OF THE RAMP.
8. PEDESTRIAN CURB RAMP WIDTH REQUIRED IS SAME AS APPROACHING SIDEWALK; 4' MINIMUM.
9. ALL PEDESTRIAN CURB RAMPS WILL BE PERPENDICULAR TO TRAFFIC WITH THE EXCEPTION OF MID-BLOCK OR TERMINAL RAMPS WHICH MAY BE PARALLEL SUBJECT TO APPROVAL.
10. DRAINAGE STRUCTURES, TRAFFIC SIGNAL/SIGNAGE, UTILITIES/JUNCTION BOXES, OR OTHER OBSTRUCTIONS WITHIN PROPOSED PEDESTRIAN CURB RAMP AREAS AND LANDINGS ARE PROHIBITED.
11. THE COUNTER SLOPE OF THE GUTTER OR ROAD AT THE FOOT OF A RAMP SHALL NOT EXCEED 5%.

GENERAL NOTES

1. WHERE THE 1'-6" FLARED SIDE(S) OF A PERPENDICULAR CURB RAMP IS (ARE) CONTIGUOUS WITH A PEDESTRIAN OR HARD SURFACE AREA (PEDESTRIAN CIRCULATION PATH), THE MAXIMUM FLARE SLOPE SHALL NOT EXCEED 10:1.
2. PEDESTRIAN WALKWAY (PEDESTRIAN ACCESS ROUTE) AND/OR LOCATION OF EXISTING OR FUTURE PEDESTRIAN RAMPS ON OPPOSITE CORNERS SHALL BE REVIEWED BEFORE CONSTRUCTING NEW RAMPS.
3. AT MARKED PEDESTRIAN CROSSINGS, THE BOTTOM OF THE RAMPS, EXCLUSIVE OF THE FLARE SIDES, SHALL BE TOTALLY CONTAINED WITHIN THE MARKINGS.

6/23/20	Pedestrian Curb Ramp Detail	
DATE APPROVED:	Standard Drawing	
Jennifer E. Irvine	REVISION DATE: 6/23/20	FILE NAME: SD_2-41
DEPARTMENT OF PUBLIC WORKS		

A C12 PEDESTRIAN CURB RAMP
SCALE: N.T.S.



P.J.= PERMISSABLE JOINT WITH EPOXY-COATED DEFORMED NO. 4 BARS CONFORMING TO AASHTO M 284 AT 18 IN. SPACING

SIDE CROSS SECTION VIEW OF
DETECTABLE WARNING SURFACE, CURB AND GUTTER

6/23/20	Detectable Warning Surface Details	
DATE APPROVED:	Standard Drawing	
Jennifer E. Irvine	REVISION DATE: 6/23/20	FILE NAME: SD_2-42
DEPARTMENT OF PUBLIC WORKS		

B C12 DETECTABLE WARNING SURFACE
SCALE: N.T.S.

PCD File No. PPR-21-51

JDS-HYDRO a Division of RESPEC
5540 TECH CENTER DR., SUITE 100
COLORADO SPRINGS, COLORADO 80919
(719) 227-0072

COLORADO CENTRE METROPOLITAN DISTRICT
ADMINISTRATIVE BUILDING - SITE DEVELOPMENT PLAN
GRADING & EROSION CONTROL DETAILS 5

REVISIONS			
NO.	DESCRIPTION	BY	APP.	DATE
1				
2				
3				
4				
5				
6				
7				

100% DESIGN

Project No.: 247.07
Date: 01/03/23
Design: RMM
Drawn: GGM
Check: RMM

C12
SHEET 12 OF 15

Temporary and Permanent Seeding (TS/PS) EC-2

Description

Temporary seeding can be used to stabilize disturbed areas that will be inactive for an extended period. Permanent seeding should be used to stabilize areas at final grade that will not be otherwise stabilized. Effective seeding includes preparation of a seedbed, selection of an appropriate seed mixture, proper planting techniques, and protection of the seeded area with mulch, geotextiles, or other appropriate measures.

Photograph TS/PS -1. Equipment used to drill seed. Photo courtesy of Douglas County.

Appropriate Uses

When the soil surface is disturbed and will remain inactive for an extended period (typically 30 days or longer), proactive stabilization measures should be implemented. If the inactive period is short-lived (on the order of two weeks), techniques such as surface roughening may be appropriate. For longer periods of inactivity, temporary seeding and mulching can provide effective erosion control. Permanent seeding should be used on finished areas that have not been otherwise stabilized.

Typically, local governments have their own seed mixes and timelines for seeding. Check jurisdictional requirements for seeding and temporary stabilization.

Design and Installation

Effective seeding requires proper seedbed preparation, selection of an appropriate seed mixture, use of appropriate seeding equipment to ensure proper coverage and density, and protection with mulch or fabric until plants are established.

The USDCM Volume 2 *Revegetation* Chapter contains detailed seed mix, soil preparations, and seeding and mulching recommendations that may be referenced to supplement this Fact Sheet.

Drill seeding is the preferred seeding method. Hydroseeding is not recommended except in areas where steep slopes prevent use of drill seeding equipment, and even in these instances it is preferable to hand seed and mulch. Some jurisdictions do not allow hydroseeding or hydromulching.

Seedbed Preparation

Prior to seeding, ensure that areas to be revegetated have soil conditions capable of supporting vegetation. Overlot grading can result in loss of topsoil, resulting in poor quality subsoils at the ground surface that have low nutrient value, little organic matter content, few soil microorganisms, rooting restrictions, and conditions less conducive to infiltration of precipitation. As a result, it is typically necessary to provide stockpiled topsoil, compost, or other

Temporary and Permanent Seeding	
Functions	
Erosion Control	Yes
Sediment Control	No
Site/Material Management	No

soil amendments and rototill them into the soil to a depth of 6 inches or more.

Topsoil should be salvaged during grading operations for use and spread on areas to be revegetated later. Topsoil should be viewed as an important resource to be utilized for vegetation establishment, due to its water-holding capacity, structure, texture, organic matter content, biological activity, and nutrient content. The rooting depth of most native grasses in the semi-arid Denver metropolitan area is 6 to 18 inches. At a minimum, the upper 6 inches of topsoil should be stripped, stockpiled, and ultimately respread across areas that will be revegetated.

Where topsoil is not available, subsoils should be amended to provide an appropriate plant-growth medium. Organic matter, such as well digested compost, can be added to improve soil characteristics conducive to plant growth. Other treatments can be used to adjust soil pH conditions when needed. Soil testing, which is typically inexpensive, should be completed to determine and optimize the types and amounts of amendments that are required.

If the disturbed ground surface is compacted, rip or rototill the surface prior to placing topsoil. If adding compost to the existing soil surface, rototilling is necessary. Surface roughening will assist in placement of a stable topsoil layer on steeper slopes, and allow infiltration and root penetration to greater depth.

Prior to seeding, the soil surface should be rough and the seedbed should be firm, but neither too loose nor compacted. The upper layer of soil should be in a condition suitable for seeding at the proper depth and conducive to plant growth. Seed-to-soil contact is the key to good germination.

Seed Mix for Temporary Vegetation

To provide temporary vegetative cover on disturbed areas which will not be paved, built upon, or fully landscaped or worked for an extended period (typically 30 days or more), plant an annual grass appropriate for the time of planting and mulch the planted areas. Annual grasses suitable for the Denver metropolitan area are listed in Table TS/PS-1. These are to be considered only as general recommendations when specific design guidance for a particular site is not available. Local governments typically specify seed mixes appropriate for their jurisdiction.

Seed Mix for Permanent Revegetation

To provide vegetative cover on disturbed areas that have reached final grade, a perennial grass mix should be established. Permanent seeding should be performed promptly (typically within 14 days) after reaching final grade. Each site will have different characteristics and a landscape professional or the local jurisdiction should be contacted to determine the most suitable seed mix for a specific site. In lieu of a specific recommendation, one of the perennial grass mixes appropriate for site conditions and growth season listed in Table TS/PS-2 can be used. The pure live seed (PLS) rates of application recommended in these tables are considered to be absolute minimum rates for seed applied using proper drill-seeding equipment.

If desired for wildlife habitat or landscape diversity, shrubs such as rubber rabbitbrush (*Chrysothamnus nauseosus*), fourwing saltbush (*Atriplex canescens*) and skunkbrush sumac (*Rhus trilobata*) could be added to the upland seedmixes at 0.25, 0.5 and 1 pound PLS/acre, respectively. In riparian zones, planting root stock of such species as American plum (*Prunus americana*), woods rose (*Rosa woodsii*), plains cottonwood (*Populus sargentii*), and willow (*Populus spp.*) may be considered. On non-topsoiled upland sites, a legume such as Ladak alfalfa at 1 pound PLS/acre can be included as a source of nitrogen for perennial grasses.

Seeding dates for the highest success probability of perennial species along the Front Range are generally in the spring from April through early May and in the fall after the first of September until the ground freezes. If the area is irrigated, seeding may occur in summer months, as well. See Table TS/PS-3 for appropriate seeding dates.

Table TS/PS-1. Minimum Drill Seeding Rates for Various Temporary Annual Grasses

Species[a] (Common name)	Growth Season[b]	Pounds of Pure Live Seed (PLS)/acre[c]	Planting Depth (inches)
1. Oats	Cool	35 - 50	1 - 2
2. Spring wheat	Cool	25 - 35	1 - 2
3. Spring barley	Cool	25 - 35	1 - 2
4. Annual ryegrass	Cool	10 - 15	½
5. Millet	Warm	3 - 15	½ - ¾
6. Sudangrass	Warm	5–10	½ - ¾
7. Sorghum	Warm	5–10	½ - ¾
8. Winter wheat	Cool	20–35	1 - 2
9. Winter barley	Cool	20–35	1 - 2
10. Winter rye	Cool	20–35	1 - 2
11. Triticale	Cool	25–40	1 - 2

[a] Successful seeding of annual grass resulting in adequate plant growth will usually produce enough dead-plant residue to provide protection from wind and water erosion for an additional year. This assumes that the cover is not disturbed or mowed closer than 8 inches.

Hydraulic seeding may be substituted for drilling only where slopes are steeper than 3:1 or where access limitations exist. When hydraulic seeding is used, hydraulic mulching should be applied as a separate operation, when practical, to prevent the seeds from being encapsulated in the mulch.

[b] See Table TS/PS-3 for seeding dates. Irrigation, if consistently applied, may extend the use of cool season species during the summer months.

[c] Seeding rates should be doubled if seed is broadcast, or increased by 50 percent if done using a Brillion Drill or by hydraulic seeding.

JDS-HYDRO a Division of RESPEC
5540 TECH CENTER DR., SUITE 100
COLORADO SPRINGS, COLORADO 80919
(719) 227-0072

COLORADO CENTRE METROPOLITAN DISTRICT
ADMINISTRATIVE BUILDING – SITE DEVELOPMENT PLAN
GRADING & EROSION CONTROL DETAILS 6

REVISIONS			
NO.	DESCRIPTION	BY	APP.	DATE
1				
2				
3				
4				
5				
6				
7				

100% DESIGN

Project No.:	247.07
Date:	01/03/23
Design:	RMM
Drawn:	GGM
Check:	RMM

C13
SHEET 13 OF 15

PCD File No. PPR-21-51

Table TS/PS-2. Minimum Drill Seeding Rates for Perennial Grasses

Common[a] Name	Botanical Name	Growth Season[b]	Growth Form	Seeds/ Pound	Pounds of PLS/acre
Alakali Soil Seed Mix					
Alkali sacaton	*Sporobolus airoides*	Cool	Bunch	1,750,000	0.25
Basin wildrye	*Elymus cinereus*	Cool	Bunch	165,000	2.5
Sodar streambank wheatgrass	*Agropyron riparium 'Sodar'*	Cool	Sod	170,000	2.5
Jose tall wheatgrass	*Agropyron elongatum 'Jose'*	Cool	Bunch	79,000	7.0
Arriba western wheatgrass	*Agropyron smithii 'Arriba'*	Cool	Sod	110,000	5.5
Total					**17.75**
Fertile Loamy Soil Seed Mix					
Ephriam crested wheatgrass	*Agropyron cristatum 'Ephriam'*	Cool	Sod	175,000	2.0
Dural hard fescue	*Festuca ovina 'duriuscula'*	Cool	Bunch	565,000	1.0
Lincoln smooth brome	*Bromus inermis leyss 'Lincoln'*	Cool	Sod	130,000	3.0
Sodar streambank wheatgrass	*Agropyron riparium 'Sodar'*	Cool	Sod	170,000	2.5
Arriba western wheatgrass	*Agropyron smithii 'Arriba'*	Cool	Sod	110,000	7.0
Total					**15.5**
High Water Table Soil Seed Mix					
Meadow foxtail	*Alopecurus pratensis*	Cool	Sod	900,000	0.5
Redtop	*Agrostis alba*	Warm	Open sod	5,000,000	0.25
Reed canarygrass	*Phalaris arundinacea*	Cool	Sod	68,000	0.5
Lincoln smooth brome	*Bromus inermis leyss 'Lincoln'*	Cool	Sod	130,000	3.0
Pathfinder switchgrass	*Panicum virgatum 'Pathfinder'*	Warm	Sod	389,000	1.0
Alkar tall wheatgrass	*Agropyron elongatum 'Alkar'*	Cool	Bunch	79,000	5.5
Total					**10.75**
Transition Turf Seed Mix[c]					
Ruebens Canadian bluegrass	*Poa compressa 'Ruebens'*	Cool	Sod	2,500,000	0.5
Dural hard fescue	*Festuca ovina 'duriuscula'*	Cool	Bunch	565,000	1.0
Citation perennial ryegrass	*Lolium perenne 'Citation'*	Cool	Sod	247,000	3.0
Lincoln smooth brome	*Bromus inermis leyss 'Lincoln'*	Cool	Sod	130,000	3.0
Total					**7.5**

Table TS/PS-2. Minimum Drill Seeding Rates for Perennial Grasses (cont.)

Common Name	Botanical Name	Growth Season[b]	Growth Form	Seeds/ Pound	Pounds of PLS/acre
Sandy Soil Seed Mix					
Blue grama	*Bouteloua gracilis*	Warm	Sod-forming bunchgrass	825,000	0.5
Camper little bluestem	*Schizachyrium scoparium 'Camper'*	Warm	Bunch	240,000	1.0
Prairie sandreed	*Calamovilfa longifolia*	Warm	Open sod	274,000	1.0
Sand dropseed	*Sporobolus cryptandrus*	Cool	Bunch	5,298,000	0.25
Vaughn sideoats grama	*Bouteloua curtipendula 'Vaughn'*	Warm	Sod	191,000	2.0
Arriba western wheatgrass	*Agropyron smithii 'Arriba'*	Cool	Sod	110,000	5.5
Total					**10.25**
Heavy Clay, Rocky Foothill Seed Mix					
Ephriam crested wheatgrass[d]	*Agropyron cristatum 'Ephriam'*	Cool	Sod	175,000	1.5
Oahe Intermediate wheatgrass	*Agropyron intermedium 'Oahe'*	Cool	Sod	115,000	5.5
Vaughn sideoats grama[e]	*Bouteloua curtipendula 'Vaughn'*	Warm	Sod	191,000	2.0
Lincoln smooth brome	*Bromus inermis leyss 'Lincoln'*	Cool	Sod	130,000	3.0
Arriba western wheatgrass	*Agropyron smithii 'Arriba'*	Cool	Sod	110,000	5.5
Total					**17.5**

[a] All of the above seeding mixes and rates are based on drill seeding followed by crimped straw mulch. These rates should be doubled if seed is broadcast and should be increased by 50 percent if the seeding is done using a Brillion Drill or is applied through hydraulic seeding. Hydraulic seeding may be substituted for drilling only where slopes are steeper than 3:1. If hydraulic seeding is used, hydraulic mulching should be done as a separate operation.

[b] See Table TS/PS-3 for seeding dates.

[c] If site is to be irrigated, the transition turf seed rates should be doubled.

[d] Crested wheatgrass should not be used on slopes steeper than 6H to 1V.

[e] Can substitute 0.5 lbs PLS of blue grama for the 2.0 lbs PLS of Vaughn sideoats grama.

Table TS/PS-3. Seeding Dates for Annual and Perennial Grasses

	Annual Grasses (Numbers in table reference species in Table TS/PS-1)		Perennial Grasses	
Seeding Dates	**Warm**	**Cool**	**Warm**	**Cool**
January 1–March 15			✓	✓
March 16–April 30	4	1,2,3	✓	✓
May 1–May 15	4		✓	
May 16–June 30	4,5,6,7			
July 1–July 15	5,6,7			
July 16–August 31				
September 1–September 30		8,9,10,11		
October 1–December 31			✓	✓

Mulch

Cover seeded areas with mulch or an appropriate rolled erosion control product to promote establishment of vegetation. Anchor mulch by crimping, netting or use of a non-toxic tackifier. See the Mulching BMP Fact Sheet for additional guidance.

Maintenance and Removal

Monitor and observe seeded areas to identify areas of poor growth or areas that fail to germinate. Reseed and mulch these areas, as needed.

An area that has been permanently seeded should have a good stand of vegetation within one growing season if irrigated and within three growing seasons without irrigation in Colorado. Reseed portions of the site that fail to germinate or remain bare after the first growing season.

Seeded areas may require irrigation, particularly during extended dry periods. Targeted weed control may also be necessary.

Protect seeded areas from construction equipment and vehicle access.

JDS-HYDRO a Division of RESPEC
5540 TECH CENTER DR., SUITE 100
COLORADO SPRINGS, COLORADO 80919
(719) 227-0072

COLORADO CENTRE METROPOLITAN DISTRICT
ADMINISTRATIVE BUILDING – SITE DEVELOPMENT PLAN
GRADING & EROSION CONTROL DETAILS 7

REVISIONS NO.	DESCRIPTION	BY	APP.	DATE
1				
2				
3				
4				
5				
6				
7				

100% DESIGN

Project No.: 247.07
Date: 01/03/23
Design: RMM
Drawn: GGM
Check: RMM

C14
SHEET 14 OF 15

PCD File No. PPR-21-51

Mulching (MU) EC-4

Description

Mulching consists of evenly applying straw, hay, shredded wood mulch, rock, bark or compost to disturbed soils and securing the mulch by crimping, tackifiers, netting or other measures. Mulching helps reduce erosion by protecting bare soil from rainfall impact, increasing infiltration, and reducing runoff. Although often applied in conjunction with temporary or permanent seeding, it can also be used for temporary stabilization of areas that cannot be reseeded due to seasonal constraints.

Mulch can be applied either using standard mechanical dry application methods or using hydromulching equipment that hydraulically applies a slurry of water, wood fiber mulch, and often a tackifier.

Photograph MU-1. An area that was recently seeded, mulched, and crimped.

Appropriate Uses

Use mulch in conjunction with seeding to help protect the seedbed and stabilize the soil. Mulch can also be used as a temporary cover on low to mild slopes to help temporarily stabilize disturbed areas where growing season constraints prevent effective reseeding. Disturbed areas should be properly mulched and tacked, or seeded, mulched and tacked promptly after final grade is reached (typically within no longer than 14 days) on portions of the site not otherwise permanently stabilized.

Standard dry mulching is encouraged in most jurisdictions; however, hydromulching may not be allowed in certain jurisdictions or may not be allowed near waterways.

Do not apply mulch during windy conditions.

Design and Installation

Prior to mulching, surface-roughen areas by rolling with a crimping or punching type roller or by track walking. Track walking should only be used where other methods are impractical because track walking with heavy equipment typically compacts the soil.

A variety of mulches can be used effectively at construction sites. Consider the following:

Mulch	
Functions	
Erosion Control	Yes
Sediment Control	Moderate
Site/Material Management	No

- Clean, weed-free and seed-free cereal grain straw should be applied evenly at a rate of 2 tons per acre and must be tacked or fastened by a method suitable for the condition of the site. Straw mulch must be anchored (and not merely placed) on the surface. This can be accomplished mechanically by crimping or with the aid of tackifiers or nets. Anchoring with a crimping implement is preferred, and is the recommended method for areas flatter than 3:1. Mechanical crimpers must be capable of tucking the long mulch fibers into the soil to a depth of 3 inches without cutting them. An agricultural disk, while not an ideal substitute, may work if the disk blades are dull or blunted and set vertically; however, the frame may have to be weighted to afford proper soil penetration.
- Grass hay may be used in place of straw; however, because hay is comprised of the entire plant including seed, mulching with hay may seed the site with non-native grass species which might in turn out-compete the native seed. Alternatively, native species of grass hay may be purchased, but can be difficult to find and are more expensive than straw. Purchasing and utilizing a certified weed-free straw is an easier and less costly mulching method. When using grass hay, follow the same guidelines as for straw (provided above).
- On small areas sheltered from the wind and heavy runoff, spraying a tackifier on the mulch is satisfactory for holding it in place. For steep slopes and special situations where greater control is needed, erosion control blankets anchored with stakes should be used instead of mulch.
- Hydraulic mulching consists of wood cellulose fibers mixed with water and a tackifying agent and should be applied at a rate of no less than 1,500 pounds per acre (1,425 lbs of fibers mixed with at least 75 lbs of tackifier) with a hydraulic mulcher. For steeper slopes, up to 2000 pounds per acre may be required for effective hydroseeding. Hydromulch typically requires up to 24 hours to dry; therefore, it should not be applied immediately prior to inclement weather. Application to roads, waterways and existing vegetation should be avoided.
- Erosion control mats, blankets, or nets are recommended to help stabilize steep slopes (generally 3:1 and steeper) and waterways. Depending on the product, these may be used alone or in conjunction with grass or straw mulch. Normally, use of these products will be restricted to relatively small areas. Biodegradable mats made of straw and jute, straw-coconut, coconut fiber, or excelsior can be used instead of mulch. (See the ECM/TRM BMP for more information.)
- Some tackifiers or binders may be used to anchor mulch. Check with the local jurisdiction for allowed tackifiers. Manufacturer's recommendations should be followed at all times. (See the Soil Binder BMP for more information on general types of tackifiers.)
- Rock can also be used as mulch. It provides protection of exposed soils to wind and water erosion and allows infiltration of precipitation. An aggregate base course can be spread on disturbed areas for temporary or permanent stabilization. The rock mulch layer should be thick enough to provide full coverage of exposed soil on the area it is applied.

Maintenance and Removal

After mulching, the bare ground surface should not be more than 10 percent exposed. Reapply mulch, as needed, to cover bare areas.

JDS-HYDRO a Division of RESPEC
5540 TECH CENTER DR., SUITE 100
COLORADO SPRINGS, COLORADO 80919
(719) 227-0072

COLORADO CENTRE METROPOLITAN DISTRICT
ADMINISTRATIVE BUILDING – SITE DEVELOPMENT PLAN
GRADING & EROSION CONTROL DETAILS 8

REVISIONS			
NO.	DESCRIPTION	BY	APP.	DATE
1				
2				
3				
4				
5				
6				
7				

100% DESIGN

Project No.: 247.07
Date: 01/03/23
Design: RMM
Drawn: GGM
Check: RMM

C15
SHEET 15 OF 15

PCD File No. PPR-21-51

BACK POCKET

UNPLATTED
OWNER: COLORADO CENTRE METROPOLITAN DISTRICT
REC NO.: 5503400004

PROPERTY BOUNDARY

UNPLATTED
OWNER: BLH NO 2 LLC
REC NO.: 5500000473

JIMMY CAMP CREEK
FLOODPLAIN ZONE "AE"
PER MAP NO. 08041C0769G

9696 FLAGSTONE STREET
COLORADO SPRINGS, CO 80925
REC NO.: 5503400003

PROPERTY BOUNDARY

UNPLATTED
OWNER: BLH NO 2 LLC
REC NO.: 5503400001

PROPERTY BOUNDARY

OS2 | 0.37 | 0.1 | 0.8
Eex | 1.65 | 0.4 | 2.8
Dex | 0.71 | 0.2 | 1.5
Fex | 0.09 | <0.1 | 0.3
Cex | 2.87 | 1.0 | 5.4
OS1 | 0.50 | 0.1 | 0.9
Aex | 2.05 | 0.6 | 3.4
Bex | 0.17 | 0.8 | 1.5
Gex | 0.07 | <0.1 | 0.2
OS3 | 0.01 | <0.1 | <0.1

EX WATER TREATMENT PLANT
EX 8" WATER LINE
EX 8" SANITARY SEWER LINE
EX CURB AND GUTTER EPC TYPE C
EX 5' SIDEWALK
EX CURB OPENING
EX CROSS PAN
EX UNDERGROUND COMMUNICATIONS LINE
EX UNDERGROUND ELECTRICAL LINE
EX CHECK DAMS
EX ROCK CHUTE
EX GRATED INLET
EX TRANSFORMER
EX 24" CMP STORM SEWER LINE
EX FLARED END SECTION (FES)
FLAGSTONE CHANNEL
FLAGSTONE STREET
E ANVIL DRIVE
36'

0 40 80
SCALE: 1" = 40'

VICINITY MAP
N.T.S.

BENCHMARKS

1. SURVEY CONTROL POINT AS SHOWN HERON. ELEVATIONS ARE BASED UPON CITY OF COLORADO SPRINGS "FIMS" VERTICAL DATUM, FIMS MONUMENT "TM_5" ELEVATION = 5824.02' (NGVD 29).
   "FIMS" ALUMINUM CAP STAMPED "TM-5" IN A ROAD BOX ON THE EAST SIDE OF MARKSHEFFEL ROAD, ABOUT 1/2 MILE SOUTH OF DRENNAN ROAD.
2. SURVEY CONTROL POINT AS SHOWN HERON. ELEVATIONS ARE BASED UPON CITY OF COLORADO SPRINGS "FIMS" VERTICAL DATUM, FIMS MONUMENT "TM_4" ELEVATION = 5856.50' (NGVD 29).
   "FIMS" ALUMINUM CAP STAMPED "TM-4" IN A ROAD BOX 26 FEET NORTH OF A FENCE CORNER AT THE SOUTHEAST CORNER OF MARKSHEFFEL ROAD AND DRENNAN ROAD.

LEGEND

- A1A / XX — EXIST BASIN DESIGNATION / EXIST BASIN AREA, ACRES — EXIST BASIN CALLOUT
- XX / XX — EXIST 5 YEAR STORM, CFS / EXIST 100 YEAR STORM, CFS — EXIST BASIN INFORMATION
- EXIST DESIGN POINT — XX | XX.X / XX.X — EXIST 5 YEAR ACCUMULATED FLOW, CFS / EXIST 100 YEAR ACCUMULATED FLOW, CFS
- EXISTING DIRECTION OF DRAINAGE FLOW
- EXISTING SUB-BASIN BOUNDARY
- 7290 — EXISTING MAJOR CONTOUR
- 7291 — EXISTING MINOR CONTOUR
- EXISTING TIME OF CONCENTRATION PATH
- W — EXISTING WATER MAIN
- SS — EXISTING SANITARY MAIN SEWER
- RAW — EXISTING NON-POTABLE WATERLINE
- UGE — EXISTING UNDERGROUND ELECTRIC
- COM — EXISTING TELECOMMUNICATION LINE
- EXISTING FENCE
- EXISTING PROPERTY BOUNDARY

NOTE:

1. THERE IS NO FEMA FLOODPLAIN WITHIN THE PROPOSED SITE.
   FEMA MAP: 08041C0769G
   EFFECTIVE: 12/7/2018

EXISTING CONDITIONS

SUB-BASIN	ACRES	Q5(CFS)	Q100(CFS)
Aex	2.05	0.6	3.4
Bex	0.17	0.8	1.5
Cex	2.87	1.0	5.4
Dex	0.71	0.2	1.5
Eex	1.65	0.4	2.8
Fex	0.09	<0.1	0.3
Gex	0.07	<0.1	0.2
OS1	0.50	0.1	0.9
OS2	0.37	0.1	0.8
OS3	0.01	<0.1	<0.1

JDS-HYDRO a Division of RESPEC
5540 TECH CENTER DR., SUITE 100
COLORADO SPRINGS, COLORADO 80919
(719) 227-0072

COLORADO CENTRE METROPOLITAN DISTRICT
ADMINISTRATION BUILDING

EXISTING DRAINAGE PLAN

REVISIONS

NO.	DESCRIPTION	BY	APP.	DATE
1				
2				
3				
4				
5				
6				
7				

Project No.: 247.07
Date: 09/2022
Design: CTD
Drawn: CTD
Check: RGG

DR1

SHEET 1 OF 2

2023/04/11 4:29 PM By: Rebecka McConnell N:\Projects\247 Colorado Centre MD\247.07 Admin Building Support\Drawings\Working\Drainage\DWG\Existing Drainage Plan.dwg

UNPLATTED
OWNER: COLORADO CENTRE METROPOLITAN DISTRICT
REC NO.: 5503400004

JIMMY CAMP CREEK
FLOODPLAIN ZONE "AE"
PER MAP NO. 08041C0769G

UNPLATTED
OWNER: BLH NO 2 LLC
REC NO.: 5500000473

PROPERTY BOUNDARY

9696 FLAGSTONE STREET
COLORADO SPRINGS, CO 80925
REC NO.: 5503400003

PROPERTY BOUNDARY

UNPLATTED
OWNER: BLH NO 2 LLC
REC NO.: 5503400001

PROPERTY BOUNDARY

PROP PARKING LOT

PROP 5400SF ADMIN BUILDING

PROP CURB AND GUTTER EPC TYPE C

PROP CURB OPENING

EX CURB AND GUTTER

PROP CURB AND GUTTER EPC TYPE C

EX CURB AND GUTTER EPC TYPE C

EX WATER TREATMENT PLANT

FLAGSTONE CHANNEL

REMOVE Ex. INLET & REPLACE WITH PROP PRIVATE TYPE 'OS2' OUTLET STRUCTURE

EX 4' CURB OPENING (SEE CITY OF COLORADO SPRINGS CURB OPENING STANDARD DETAIL)

EX 5' SIDEWALK

EX CURB AND GUTTER EPC TYPE C

EX RIPRAP (TO BE REMOVED)

EX CROSS PAN

ANVIL DRIVE

EX CURB AND GUTTER EPC TYPE C

EX FLARED END SECTION (FES)

FLAGSTONE STREET

EX 24" STORM SEWER LINE (TO REMAIN)

10' WIDE EMERGENCY SPILLWAY

PROP 0.5% SLOPE TRICKLE CHANNEL (SEE DETAIL ON SHEET DR2)

PROP 0.235 AC-FT FULL SPECTRUM EXTENDED DETENTION BASIN

EX TRANSFORMER

EX 8" WATER LINE

EX 8" SANITARY SEWER LINE

EX UNDERGROUND COMMUNICATIONS LINE

EX UNDERGROUND ELECTRICAL LINE

EX CHECK DAM (TO REMAIN)

EX CHECK DAM (TO BE REMOVED)

PROP 1'x6'x8' FOREBAY

EX ROCK CHUTE (TO BE REINSTALLED)

EX UNDERGROUND ELECTRICAL LINE (TO BE RELOCATED)

PROP TRIANGULAR CHANNEL (SEE DETAIL ON SHEET DR2)

OS2 | 0.37 | 0.1 | 0.8

E | 1.65 | 0.4 | 2.8

D | 0.65 | 0.2 | 1.4

C | 2.14 | 0.8 | 4.2

OS1 | 0.50 | 0.1 | 0.9

A | 2.78 | 3.7 | 9.1

B | 0.17 | 0.8 | 1.5

1 | 3.3 | 8.8

Fex | 0.09 | <0.1 | 0.3

OS3 | 0.01 | <0.1 | <0.1

4.10%

4.10%

PROPOSED CONDITIONS			
SUB-BASIN	ACRES	Q5 (CFS)	Q100 (CFS)
A*	2.78	3.7	9.1
B	0.17	0.8	1.5
C	2.14	0.8	4.2
D	0.65	0.2	1.4
E	1.65	0.4	2.8
F	0.09	<0.1	0.3
OS1	0.50	0.1	0.9
OS2	0.37	0.1	0.8
OS3	0.01	<0.1	<0.1

*Note that detained flows are 0.6 cfs for the 5-year storm and 5.0 cfs for the 100-year storm from Sub-basin A.

NOTE:

1. THERE IS NO FEMA FLOODPLAIN WITHIN THE PROPOSED SITE.
   FEMA MAP: 08041C0769G
   EFFECTIVE: 12/7/2018

0 40 80
SCALE: 1" = 40'

DESIGN POINTS			
DESIGN POINTS	TOTAL AREA (ACRES)	Q5 (CFS)	Q100 (CFS)
DP1 (A + OS1)	3.28	3.3	8.8

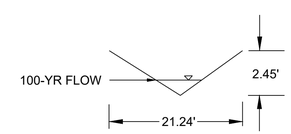
VICINITY MAP
N.T.S.

BENCHMARKS

1. SURVEY CONTROL POINT AS SHOWN HERON. ELEVATIONS ARE BASED UPON CITY OF COLORADO SPRINGS "FIMS" VERTICAL DATUM, FIMS MONUMENT "TM_5" ELEVATION = 5824.02' (NGVD 29).
   "FIMS" ALUMINUM CAP STAMPED "TM-5" IN A ROAD BOX ON THE EAST SIDE OF MARKSHEFFEL ROAD, ABOUT 1/2 MILE SOUTH OF DRENNAN ROAD.
2. SURVEY CONTROL POINT AS SHOWN HERON. ELEVATIONS ARE BASED UPON CITY OF COLORADO SPRINGS "FIMS" VERTICAL DATUM, FIMS MONUMENT "TM_4" ELEVATION = 5856.50' (NGVD 29).
   "FIMS" ALUMINUM CAP STAMPED "TM-4" IN A ROAD BOX 26 FEET NORTH OF A FENCE CORNER AT THE SOUTHEAST CORNER OF MARKSHEFFEL ROAD AND DRENNAN ROAD.

LEGEND

- A1A / XX — PROPOSED BASIN DESIGNATION; PROPOSED BASIN AREA, ACRES — PROPOSED BASIN CALLOUT
- XX / XX — PROPOSED 5 YEAR STORM, CFS; PROPOSED 100 YEAR STORM, CFS — PROPOSED BASIN INFORMATION
- PROPOSED DESIGN POINT — XX / XX.X / XX.X — PROPOSED 5 YEAR ACCUMULATED FLOW, CFS; PROPOSED 100 YEAR ACCUMULATED FLOW, CFS
- PROPOSED DIRECTION OF DRAINAGE FLOW
- PROPOSED SUB-BASIN BOUNDARY
- 7290 — PROPOSED MAJOR CONTOUR
- 7291 — PROPOSED MINOR CONTOUR
- 7290 — EXISTING MAJOR CONTOUR
- 7291 — EXISTING MINOR CONTOUR
- PROPOSED TIME OF CONCENTRATION PATH
- PROPOSED CHANNEL FLOWLINE
- RAW — RAW — PROPOSED NON-POTABLE WATERLINE
- W — W — W — EXISTING WATER MAIN
- SS — SS — SS — EXISTING SANITARY MAIN SEWER
- RAW — RAW — RAW — RAW — EXISTING NON-POTABLE WATERLINE
- UGE — EXISTING UNDERGROUND ELECTRIC
- COM — EXISTING TELECOMMUNICATION LINE
- EXISTING FENCE
- EXISTING PROPERTY BOUNDARY



TRIANGULAR CHANNEL
NOT TO SCALE

JDS-HYDRO a Division of RESPEC
5540 TECH CENTER DR., SUITE 100
COLORADO SPRINGS, COLORADO 80919
(719) 227-0072

COLORADO CENTRE METROPOLITAN DISTRICT
ADMINISTRATION BUILDING

PROPOSED DRAINAGE PLAN

REVISIONS				
NO.	DESCRIPTION	BY	APP.	DATE
1				
2				
3				
4				
5				
6				
7				

Project No.: 247.07
Date: 09/2022
Design: CTD
Drawn: CTD
Check: RGG

DR2
SHEET 2 OF 2

2023/04/11 4:28 PM By: Rebecka McConnell N:\Projects\247 Colorado Centre MD\247.07 Admin Building Support\Drawings\Working\Drainage\DWG\Proposed Drainage Plan.dwg