DRAINAGE LETTER

HOPE PHYSICAL THERAPY

4850 Austin Bluffs Pkwy
Colorado Springs, CO 80918

PREPARED FOR:
Thirteen Outlaws, LLC
4850 Austin Bluffs Pkwy
Colorado Springs, CO 80918
Phone: (719) 439-9263
Contact: Adrian D. Hope
Adrian@hope4wellness.com

PREPARED BY:
Galloway & Company, Inc.
1155 Kelly Johnson Blvd., Suite 305
Greenwood Village, CO 80111
Phone: (719) 900-7220
Contact: Grant Dennis, PE
GrantDennis@GallowayUS.com

DATE:
March 31, 2023

Add "PCD File No. PPR235"

Design Engineer's Statement:

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

_____ _____

[Name, P.E. #_____] Date

ENG

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any liability caused by any negligent errors or omissions on my part in preparing this report.

_____ _____

Grant Dennis, PE 0051622 Date
For and on behalf of Galloway & Company, Inc.

DEVELOPER'S CERTIFICATION

Thirteen Outlaws, LLC hereby certifies that the drainage facilities for Hope Physical Therapy shall be constructed according to the design presented in this report. I understand that the City of Colorado Springs do
engineer a
Code; and
absolve Th
design. I fu
drainage de

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.

_____ _____

[Name, Title] Date
[Business Name]
[Address]

_____

Authorized

_____

Printed Name

_____

Title

_____

Address

Replace with:

CITY OF COLORADO SPRINGS

Field in accord *ed.*

_____

For City Engin
Conditions:

Galloway & Con

El Paso County:

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

_____ _____

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

Conditions:

TABLE OF CONTENTS

Appendices:

A. Exhibits and Figures
B. Hydrological Computations
C. Hydraulic Computations
D. Drainage Map

Drainage letter shall be based on El Paso County drainage criteria manual and engineering criteria manual. Please revise all calculations and narrative.

The City of COS has a drainage report and CDs for the existing box inlet. Please contact COS for a copy.

I. INTRODUCTIO

PURPOSE

This document is the Drainage Letter for Hope Physical Therapy. The purpose of this project is to build a parking lot on an empty site. Previously, all flows were captured by an existing pond located at the corner of Platinum Drive and Austin Bluffs Parkway. With the addition of the parking lot, some of the flows will now be conveyed by a concrete channel and will flow over riprap before flowing to the existing pond. This report will identify drainage patterns and drainage features to show proposed design meets City of Colorado Drainage Criteria Manual.

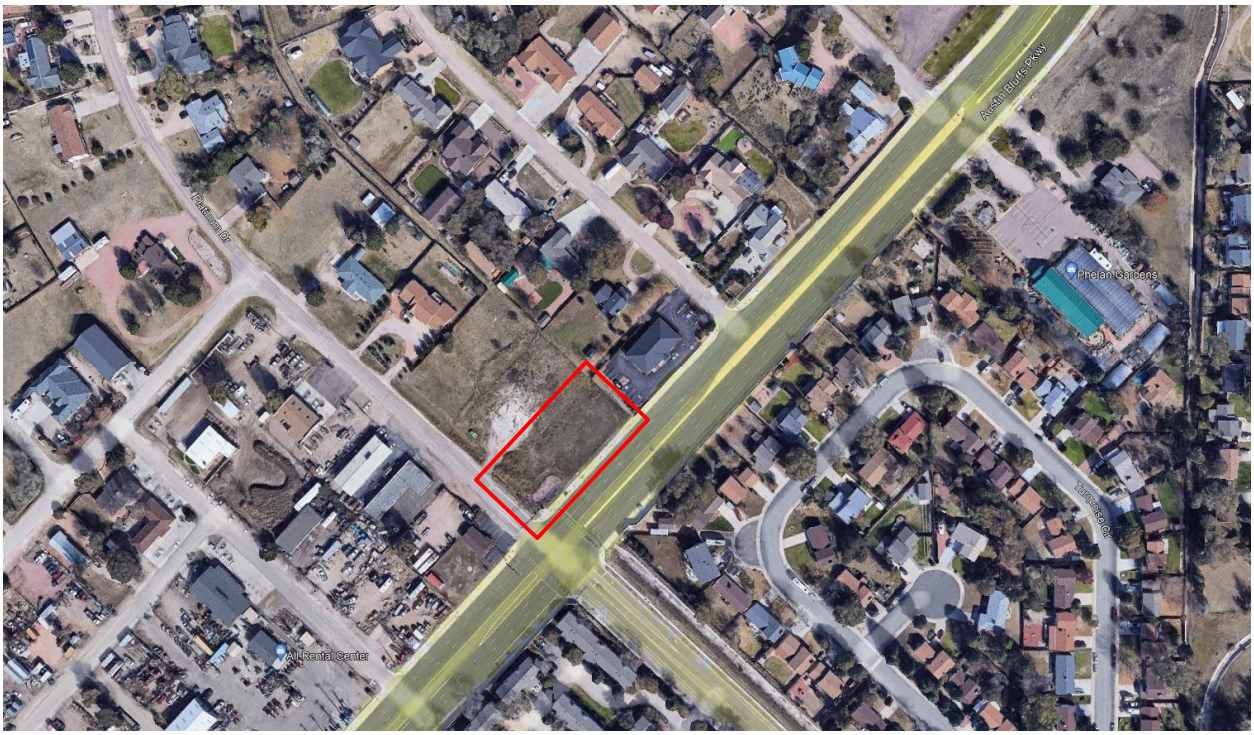
The project is currently located on 1 lot (Lot 14, Block 15, Vista Peaks Estates Addition) and will be exempt from a replat with the request of a waiver of a replat.

No approved drainage reports were found during research of the proposed site. A drainage letter is being provided rather than a full drainage report due to the total area of earth disturbance associated with this project is less than 1 acre (approximately 0.37 acres of disturbance) and it is not part of a larger common development or sale.

A replat request does not seem to be require. Please remove statement.

LOCATION

The development is located in a portion of the Southeast Quarter of Section 16, Township 13 South, Range 66 West of the 6th Principal Meridian in the City of Colorado Springs, El Paso County, Colorado. The development is located at 4850 Austin Bluffs Pkwy, Colorado Springs, CO 80918, situated on the north corner of Platinum Drive and Austin Bluffs Parkway. Refer to the image below and the Vicinity Map in Appendix A.



DESCRIPTION OF PROPERTY

The Hope Physical Therapy is bound by Platinum Drive to the southwest, Austin Bluffs Parkway to the southeast, Hope Physical Therapy to the northeast, and an empty lot to the northwest.

According to the U.S. Department of Agriculture Natural Resources Conservation Service Soil Survey of El Paso County, Colorado (See Appendix A) the primary soil found is Nunn clay loam. Nunn clay loam are classified as Soil Conservation Service (SCS) hydrologic soil group ”C”.

II. EXISTING DRAINAGE PATTERNS AND FEATURES

FLOODPLAIN INFORMATION

The proposed site is located within Zone X, as referenced from FEMA flood Insurance Rate Map (08041C0538G, with an effective date of December 7, 2018). Zone X is described as areas determined to be outside the 0.2% annual chance floodplain. See Appendix A for the Flood Insurance Rate Map Firmette and Panel.

EXISTING DRAINAGE PATTERNS

All runoff generated onsite is tributary to an existing pond located at the corner of Platinum Drive and Austin Bluffs Parkway.

Describe existing conditions of the site (i.e. vegetation etc.)

OFFSITE DRAINAGE PATTERNS

All runoff generated offsite is tributary to an existing pond located at the corner of Platinum Drive and Austin Bluffs Parkway.

Explain how offsite flows reach the existing pond.

III. DESIGN CRITERIA

DEVELOPMENT CRITERIA REFERENCE

The analysis and design of the stormwater management system for this project was prepared in accordance with the criteria set forth in the City of Colorado Springs Drainage Criteria Manual (DCM) Volume 1 rev. January 2021 and Volume 2 rev. December 2020.

The drainage calculations were based on the City of Colorado Springs drainage criteria manual Figure 6-5 and IDF equations to determine the intensity and are listed in Table 1 below.

Table 1 - Precipitation Data

Return Period	One Hour Depth (in).
5-year	1.50
100-year	2.52

*The intensities above are calculated using Tc=5 minutes

HYDROLOGIC CRITERIA

The rational method was used to calculate peak flows as the tributary areas are less than 100 acres. The rational method has been proven to be accurate for basins of this size and is based on the following formula from the City of Colorado Springs Drainage Criteria Manual Volume 1, Eq 6-5:

$$Q = CIA$$

Where:

Q = Peak Discharge (cfs)
C = Runoff Coefficient
I = Runoff intensity (inches/hour)
A = Drainage area (acres)

The runoff coefficients are calculated based on land use, percent imperviousness, and design storm for each basin. Composite percent impervious and composite C values were calculated using the streets, roofs, and lawn coefficients found in Table 6-6 of the DCM Vol. 1. The corresponding coefficients for the HSG A soils were used for the 5-year and 100-year storm event. The associated calculations can be found in Appendix D.

Time of Concentration

Time of concentrations have been adapted from the equation 6-7 of The City of Colorado Springs Drainage Criteria Manual, Volume 1 which are as follows:

$T_c = t_t + t_t$

Where:

T_c = time of concentration (min)
T_i = overland (initial) flow time (min)
T_t = travel time in the ditch, channel, gutter, storm sewer, etc. (min)

Overland (Initial) Flow Time: from equations 6-8 from the City of Colorado Springs Drainage Criteria Manual, Volume 1.

$$t_t = \frac{0.395(1.1 - C_5)\sqrt{L}}{S^{0.33}}$$

Where:

T_i = overland (initial) flow
C_5 = runoff coefficient for 5-year frequency
L = length of overland flow (300 ft maximum for non-urban land uses, 100 ft maximum for urban land uses)
S = average basin slope

Travel Time

$V = C_v * S_w^{0.5}$

Where:

V = Velocity (ft/s)
C_v = conveyance coefficient
S_w = watercourse slope (ft/ft)

The 100-year event was used as the major storm event for pipes and inlets. The 5-year event was used as the minor event. All of the flows in the Rational Method calculations were routed to account for time of concentration on the surface and travel time in the pipe. As the travel time across a basin or in a pipe increases, the peak flowrate also decreases.

HYDRAULIC CRITERIA

Hydraulic design and analysis for this report were performed through the usage of Bentley's Flowmaster and HY-8. Sizing for culvert, riprap, and concrete pan can be found in Appendix C.

IV. PROPOSED DRAINAGE PLAN

GENERAL CONCEPT

The proposed onsite improvements are all included within 3 basins. All basins will flow to the existing pond. Basin A1 and OS2 will flow to the concrete pan that will be conveyed to the existing pond. Basin OS1 will flow through an existing swale which will eventually flow to a proposed culvert which will flow to the existing pond. See Appendix C for typical analysis. All offsite drainage will continue to flow adjacent to the site following historic drainage patterns.

Basin A1 is approximately 0.48 acres comprised of a drive aisle, parking, grass, and pond. Runoff from this basin will result in peak flows of 1.0 cfs and 2.4 cfs in the minor and major storm events. Runoff from the parking lot will be conveyed by the concrete pan to the curb cut and will eventually flow to the existing pond.

The drainage map shows flows from OS2 flowing towards A1. Please state what the cumulative flows are.

Basin OS1 is approximately 10.07 acres comprised of various lots. Runoff from this basin will result in peak flows of 14.4 cfs and 38.6 cfs in the minor and major storm events. Runoff from this basin will flow in a historic pattern, south until eventually reaching the culvert. The culvert will convey u any excess flow will overtop the road and flow to the existing pond.

Culvert needs to be designed for 100-year flow. Address overtopping (See appendix)

Basin OS2 is approximately 0.76 acres comprised of various lots. Runoff from this basin will result in peak flows of 1.0 cfs and 2.5 cfs in the minor and major storm events. Runoff from this basin will flow in historic pattern, south to the parking lot, will be conveyed by the concrete pan to the curb cut, and will eventually flow to the existing pond.

Provide calculatio sizing of curb cut

The general concept above states flows will go through a swale before reaching the proposed culvert. Please clarify. Include the culvert designation (culvert 1?) and type/sizing.

V. CONCLUSION

This drainage letter for the Hope Physical Therapy project has been prepared using the criteria and methods set forth in the City of Colorado Springs Drainage Criteria Manual, Volumes 1 & 2. The runoff from this project will not adversely affect the surrounding and downstream developments.

VARIANCES

No variance(s) requested at this time.

How are flows from OS2 reaching A1?

How are flows exiting existing pond? Is outfall still adequate with increased flows? Discuss where final outfall of flows are.

The proposed improvements are <1ac of soil disturbance, so water quality treatment is not required. However, discuss the need (or lack there of) for detention and the suitability of the outfall per the following:

Per ECM Chap 3.2.8.B, "The proposed project or developed land use shall not change historical runoff values, cause downstream damage, or adversely impact adjacent properties." Increases from the historical flowrates are allowable (with or without full spectrum detention) if it is shown (via text and/or calcs) that the flow increase can be accommodated downstream (i.e., show that there is a suitable outfall, per ECM Chap 3.2.4). If applicable, reference the downstream facilities in a DBPS or MDDP.

What are the existing flows exiting the site? State existing flows and compare them to the proposed conditions. State the difference in flows. Describe if the existing inlet is adequate to handle the increase in flows. Provide calculations.

VI. REFERENCES

1. Drainage Criteria Manual Volume 1, City of Colorado Springs, rev. January 2021.

2. Drainage Criteria Manual Volume 2, City of Colorado Springs, rev. December 2020.

3. Green Infrastructure Guidance Manual, City of Colorado Springs, March 2022.

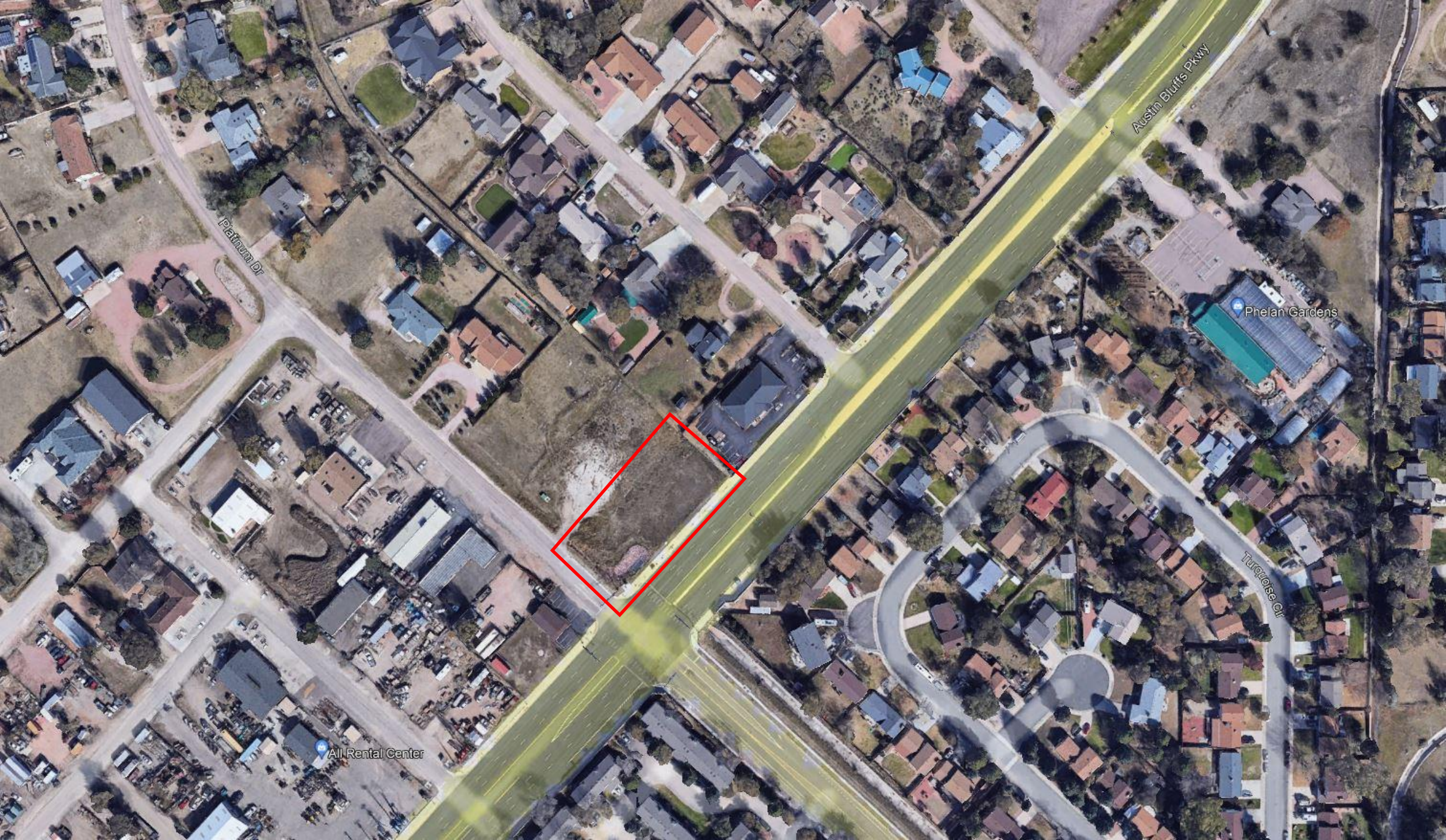
4. Urban Storm Drainage Criteria Manual, Urban Drainage and Flood Control District, January 2016 (with current revisions).

5. Flood Insurance Rate Map – Jefferson County, Colorado and Incorporated Areas Community Panel No. 08041C0538G, Effective December 7, 2018.

6. Soil Map – Jefferson County Area, Colorado as available through the Natural Resources Conservation Service National Cooperative Soil Survey web site via Web Soil Survey 2.0.

APPENDIX A

Exhibits and Figures


Austin Bluffs Pkwy
Platinum Dr
Phelan Gardens
Turquoise Cir
All Rental Center

Hydrologic Soil Group—El Paso County Area, Colorado
(Hope Physical Therapy)

Map Scale: 1:694 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 10 20 40 60

Feet
0 30 60 120 180

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: El Paso County Area, Colorado
Survey Area Data: Version 20, Sep 2, 2022

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

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

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
59	Nunn clay loam, 0 to 3 percent slopes	C	0.8	100.0%
Totals for Area of Interest			**0.8**	**100.0%**

Description

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

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

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

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

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

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

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

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

NOTES TO USERS

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

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

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

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

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

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

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

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

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at (301) 713-3242 or visit its website at http://www.ngs.noaa.gov/.

Base Map information shown on this FIRM was provided in digital format by El Paso County, Colorado Springs Utilities, City of Fountain, Bureau of Land Management, National Oceanic and Atmospheric Administration, United States Geological Survey, and Anderson Consulting Engineers, Inc. These data are current as of 2006.

This map reflects more detailed and up-to-date **stream channel configurations and floodplain delineations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map. The profile baselines depicted on this map represent the hydraulic modeling baselines that match the flood profiles and Floodway Data Tables if applicable, in the FIS report. As a result, the profile baselines may deviate significantly from the new base map channel representation and may appear outside of the floodplain.

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

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

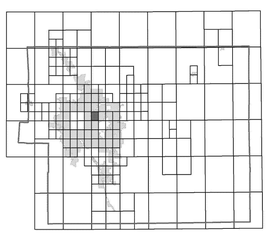
Contact **FEMA Map Service Center** (MSC) via the FEMA Map Information eXchange (FMIX) 1-877-336-2627 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. The MSC may also be reached by Fax at 1-800-358-9620 and its website at http://www.msc.fema.gov/.

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

El Paso County Vertical Datum Offset Table

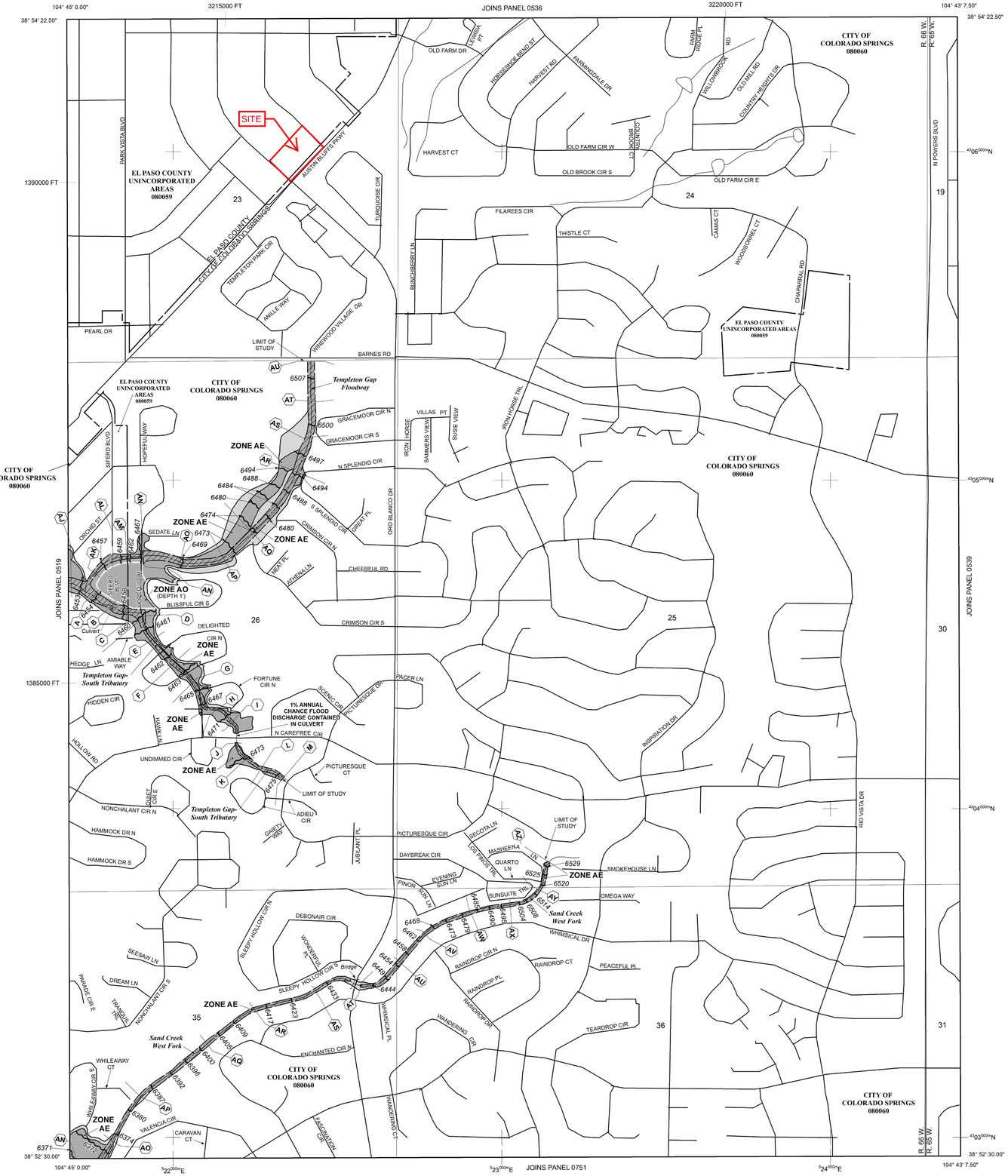
Flooding Source	Vertical Datum Offset (ft)
REFER TO SECTION 3.3 OF THE EL PASO COUNTY FLOOD INSURANCE STUDY FOR STREAM BY STREAM VERTICAL DATUM CONVERSION INFORMATION	

Panel Location Map



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

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



NOTE: MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN TOWNSHIP 13 SOUTH, RANGE 65 WEST, AND TOWNSHIP 13 SOUTH, RANGE 66 WEST.

LEGEND

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

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

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

FLOODWAY AREAS IN ZONE AE

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

OTHER FLOOD AREAS

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

OTHER AREAS

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

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

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

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

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

A — A Cross section line
23 — 23 Transect line
97° 07' 30.00" / 32° 22' 30.00" Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
4375000mN 1000-meter Universal Transverse Mercator grid ticks, zone 13
6000000 FT 5000-foot grid ticks: Colorado State Plane coordinate system, central zone (FIPSZONE 0502), Lambert Conformal Conic Projection
DX5510 Bench mark (see explanation in Notes to Users section of this FIRM panel)
M1.5 River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

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

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

For community map revision history prior to countywide mapping, refer to the Community Map History Table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

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

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0538G

FIRM
FLOOD INSURANCE RATE MAP
EL PASO COUNTY, COLORADO
AND INCORPORATED AREAS

PANEL 538 OF 1300
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
COLORADO SPRINGS, CITY OF	080060	0538	G
EL PASO COUNTY	080059	0538	G

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

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

MAP NUMBER
08041C0538G

MAP REVISED
DECEMBER 7, 2018

Federal Emergency Management Agency

APPENDIX B

Hydrological Computations

BASIN SUMMARY TABLE						
Tributary Sub-basin	Area (acres)	C_5	C_{100}	t_c (min)	Q_5 (cfs)	Q_{100} (cfs)
A1	0.48	0.41	0.61	5.98	1.0	2.4
OS-1	10.07	0.37	0.59	11.92	14.4	38.6
OS-2	0.76	0.37	0.59	16.43	1.0	2.5

Provide existing calculations

COMPOSITE % IMPERVIOUS CALCULATIONS

Subdivision: Lot 14, Block 15, Vista Peaks Estates Addition
Location: CO, Colorado Springs

Project Name: Project Name
Project No.: HPT01
Calculated By: MRW
Checked By: MJP
Date: 3/31/23

		Paved Roads			Lawns			Multi Use			
Basin ID	Total Area (ac)	% Imp.	Area (ac)	Weighted % Imp.	% Imp.	Area (ac)	Weighted % Imp.	% Imp.	Area (ac)	Weighted % Imp.	Basins Total Weighted % Imp.
A1	0.48	100	0.25	52.1	2	0.23	1.0	45	0.00	0.00	53.1
OS-1	10.07	100	0.00	0.0	2	0.00	0.0	45	10.07	45.00	45.0
OS-2	0.76	100	0.00	0.0	2	0.00	0.0	45	0.76	45.00	45.0

Galloway

STANDARD FORM SF-2
TIME OF CONCENTRATION

Subdivision: Lot 14, Block 15, Vista Peaks Estates Addition
Location: CO, Colorado Springs

Project Name: Project Name
Project No.: HPT01
Calculated By: MRW
Checked By: MJP
Date: 3/31/23

SUB-BASIN DATA						INITIAL/OVERLAND (T_i)			TRAVEL TIME (T_t)					Tc CHECK (URBANIZED BASINS)			FINAL
BASIN ID	D.A. (AC)	Hydrologic Soils Group	Impervious (%)	C_{100}	C_5	L (FT)	S (%)	T_i (MIN)	L (FT)	S (%)	Cv	VEL. (FPS)	T_t (MIN)	COMP. T_c (MIN)	TOTAL LENGTH (FT)	Urbanized T_c (MIN)	T_c (MIN)
A1	0.48	C	53.1	0.61	0.41	35	2.7	5.4	142	3.7	20.0	3.8	0.6	6.0	177.0	11.0	6.0
OS-1	10.07	C	45.0	0.59	0.37	191	2.7	13.3	155	3.6	20.0	3.8	0.7	13.9	346.0	11.9	11.9
OS-2	0.76	C	45.0	0.59	0.37	629	3.7	21.7	529	1.6	20.0	2.5	3.5	25.2	1158.0	16.4	16.4

NOTES:
T_i = (0.395*(1.1 - C_5)*(L)^0.5)/((S)^0.33), S in ft/ft
T_t=L/60V (Velocity From Fig. 501)
Velocity V=Cv*S^0.5, S in ft/ft
Tc Check = 10+L/180
For Urbanized basins a minimum T_c of 5.0 minutes is required.
For non-urbanized basins a minimum T_c of 10.0 minutes is required

Please revise overland length calculations. Per El Paso County DCM, the max length of overland flow is 300ft for non-urban land uses and 100 ft for urban land uses.

3.2.1 Overland (Initial) Flow Time

The overland flow time, t_i, may be calculated using Equation 6-8.

$$t_i = \frac{0.395(1.1 - C_5)\sqrt{L}}{S^{0.33}} \qquad \text{(Eq. 6-8)}$$

Where:

t_i = overland (initial) flow time (min)
C_5 = runoff coefficient for 5-year frequency (see Table 6-6)
L = length of overland flow (300 ft maximum for non-urban land uses, 100 ft maximum for urban land uses)
S = average basin slope (ft/ft)

Note that in some urban watersheds, the overland flow time may be very small because flows quickly concentrate and channelize.

STANDARD FORM SF-3
STORM DRAINAGE SYSTEM DESIGN
(RATIONAL METHOD PROCEDURE)

Subdivision: Lot 14, Block 15, Vista Peaks Estates Addition
Location: CO, Colorado Springs
Design Storm: 5-Year

Project Name: Project Name
Project No.: HPT01
Calculated By: MRW
Checked By: MJP
Date: 3/31/23

STREET	Design Point	DIRECT RUNOFF							TOTAL RUNOFF				STREET		PIPE			TRAVEL TIME			REMARKS
		Basin ID	Area (Ac)	Runoff Coeff.	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Slope (%)	Street Flow (cfs)	Design Flow (cfs)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	Tt (min)	
	A1	A1	0.48	0.41	6.0	0.20	4.90	1.0													Flow through curb cut onsite
	OS1	OS-1	10.07	0.37	11.9	3.73	3.87	14.4							14.4	1.0	30	42	8.4	0.1	Flow to Culvert
	OS2	OS-2	0.76	0.37	16.4	0.28	3.38	0.9													Flow through curb cut offsite
									16.4	0.48	3.38	1.6									A1 + OS2

Label curb cut on plans

Needs to include OS1

State where the pipe size is being obtained. The culvert calculations show a 15in culvert.

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STANDARD FORM SF-3
STORM DRAINAGE SYSTEM DESIGN
(RATIONAL METHOD PROCEDURE)

Subdivision: Lot 14, Block 15, Vista Peaks Estates Addition
Location: CO, Colorado Springs
Design Storm: 100-Year

Project Name: Project Name
Project No.: HPT01
Calculated By: MRW
Checked By: MJP
Date: 3/31/23

		DIRECT RUNOFF							TOTAL RUNOFF				STREET		PIPE			TRAVEL TIME			
STREET	Design Point	Basin ID	Area (Ac)	Runoff Coeff.	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Slope (%)	Street Flow (cfs)	Design Flow (cfs)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	Tt (min)	REMARKS
	A1	A1	0.48	0.61	6.0	0.29	8.23	2.4													Flow through curb cut onsite
	OS1	OS-1	10.07	0.59	11.9	5.94	6.49	38.6							38.6	1.0	30	42	8.4	0.1	Flow to Culvert
	OS2	OS-2	0.76	0.59	16.4	0.45	5.68	2.6													Flow through curb cut offsite
									16.4	0.74	5.68	4.2									A1 + OS2

See comments on previous page

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APPENDIX C

Hydraulic Computations

Provide calculations for curb cuts

HY-8 Culvert Analysis Report

Crossing Discharge Data

Use 5-year flow to determine min velocity per ECM section 3.3.2.D

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 14.40 cfs

Design Flow: 14.40 cfs

Should be using OS1 100-year flow of 38.6 to design culvert

Maximum Flow: 14.40 cfs

What is depth of overtopping flow? Verify with DCM Table 6-4 Allowable Culvert Overtoppings

Table 1 - Summary of Culvert Flows at Crossing: Crossing 1

Headwater Elevation (ft)	Total Discharge (cfs)	Culvert 1 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
6656.42	14.40	7.85	6.54	6
6656.42	14.40	7.85	6.54	2
6656.42	14.40	7.85	6.54	2
6656.42	14.40	7.85	6.54	2
6656.42	14.40	7.85	6.54	2
6656.42	14.40	7.85	6.54	2
6656.42	14.40	7.85	6.54	2
6656.42	14.40	7.85	6.54	2
6656.42	14.40	7.85	6.54	2
6656.42	14.40	7.85	6.54	2
6656.42	14.40	7.85	6.54	2
6656.24	7.09	7.09	0.00	Overtopping

Culvert Data: Culvert 1

Culvert Data Summary - Culvert 1

Barrel Shape: Circular

Barrel Diameter: 1.25 ft

Min size culvert in ROW is 18" (ECM Section 3.3.2.C)

Barrel Material: Corrugated Steel

Embedment: 0.00 in

All pipes in ROW are to be RCP (ECM Section 3.3.1.J.1)

Barrel Manning's n: 0.0240

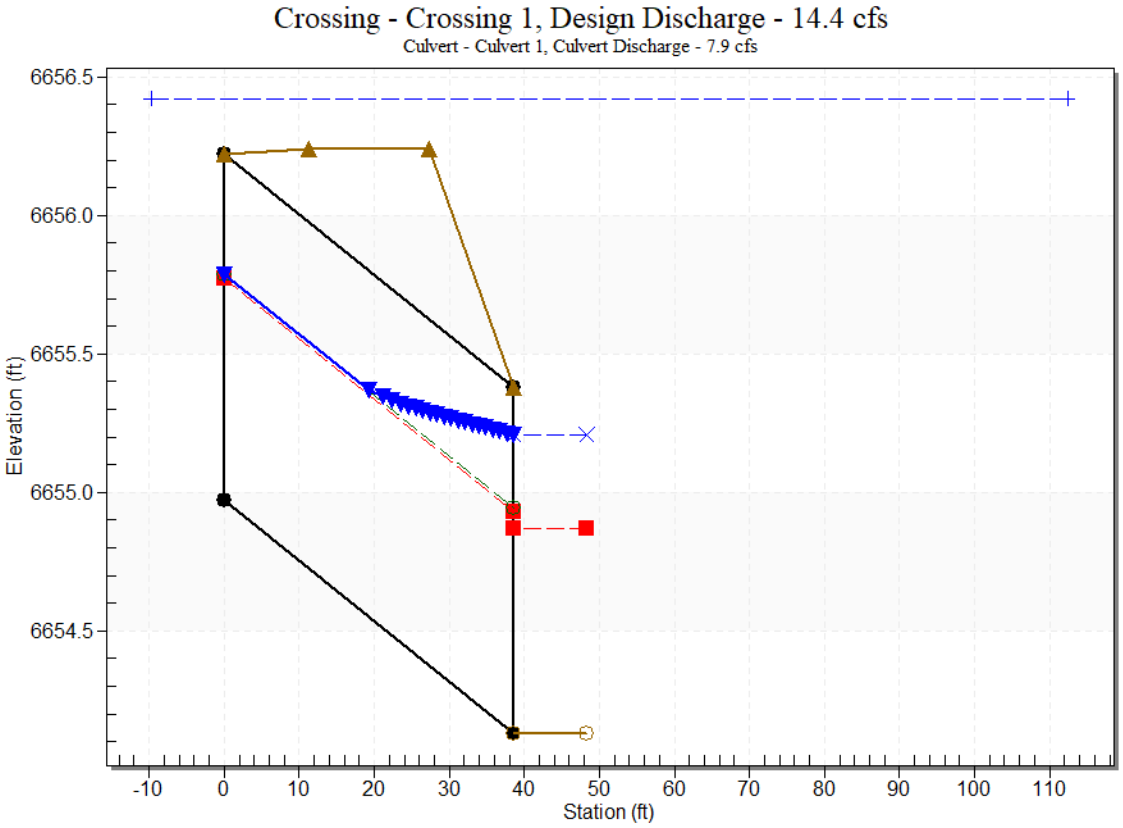
Culvert Type: Straight

Provide slope and velocity

Inlet Configuration: Thin Edge Projecting (Ke=0.9)

Inlet Depression: None

Water Surface Profile Plot for Culvert: Culvert 1



PIPE OUTFALL RIPRAP SIZING CALCULATIONS

Subdivision: Lot 14, Block 15, Vista Peaks Estates Addition
Location: CO, Colorado Springs

Project Name: Project Name
Project No.: HPT01
Calculated By: MRW
Checked By: MJP
Date: 3/31/23

See ECM Section 2.6.9.G - Parallel culvert not permitted

Culvert Rip Rap Sizing

	STORM DRAIN SYSTEM			
Q100 (cfs)	19.3			Flows are the greater of proposed vs. future
D or H (in)	15			
W (ft)				
Slope (%)	2.00			
Yn (in)	10.00			
Yt (ft)	0.50			If "unknown" Yt/D=0.4
Yt/D, Yt/H	0.40			Per section 11-3
Supercritical	Yes			
Q/D^2.5, Q/WH^1.5	11.05			
Q/D^1.5, Q/WH^0.5				
Da, Ha (in) *	12.50			Da=0.5(D+Yn), Ha=0.5(H+Yn)
Q/Da^1.5, Q/WHa^0.5 *	18.15			
d50 (in), Required	15.70			
Required Riprap Size	H			Fig. 8-34
Use Riprap Size	H			
d50 (in)	18			Fig. 8-34
1/(2 tan q)	6.00			Fig. 9-35 OR Fig 9-36
Erosive Soils	Yes			
At	3.51			At=Q/5.5
L	34.6			L=(1/(2 tan q))(At/Yt - D)
Min L	3.8			Min L=3D or 3H
Max L	12.5			Max L=10D or 10H
Length (ft)	12.5			
Bottom Width (ft)	3.8			Width=3D (Minimum)
Riprap Depth (in)	36			Depth=2(d50)
Type II Base Depth (in)	8			Table 8-34 fine grained soils)
Cutoff Wall	No			
Cutoff Wall Depth (ft)				Depth of Riprap and Base
Cutoff Wall Width (ft)				

Must only use 1 of the (2) 15" CMP to calculate Rip Rap

38.6 / 2 = 19.3 CFS

Double L and W for the (2) 15" CMP Culverts

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Worksheet for Concrete Pan

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	4.32000	%
Left Side Slope	5.56	%
Right Side Slope	5.56	%
Discharge	4.20	ft³/s

Results

Normal Depth	0.21	ft
Flow Area	0.79	ft²
Wetted Perimeter	7.57	ft
Hydraulic Radius	0.10	ft
Top Width	7.56	ft
Critical Depth	0.32	ft
Critical Slope	0.00454	ft/ft
Velocity	5.28	ft/s
Velocity Head	0.43	ft
Specific Energy	0.64	ft
Froude Number	2.87	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.21	ft
Critical Depth	0.32	ft
Channel Slope	4.32000	%
Critical Slope	0.00454	ft/ft

Design Point A1 - Rip Rap Rock Sizing

This needs to be shown and labeled on drainage plan & GEC set

Rock Chute Design Data

(Version 4.02 - 11/04/09, Based on Design of Rock Chutes by Robinson, Rice, Kadavy, ASA

Project: HPT01 **County:**
Designer: M. Pepin **Checked by:**
Date: 03/31/23 **Date:**

Input Channel Geometry

Inlet Channel	Chute	Outlet Channel
Bw = 6.0 ft.	Bw = 6.0 ft.	Bw = 18.0 ft.
Side slopes = 18.0 (m:1	Factor of safety = 1.20 (F_s	Side slopes = 5.0 (m:1
n-value = 0.016	Side slopes = 5.0 (m:1 → 2.0:1 max.	n-value = 0.045
Bed slope = 0.0060 ft./ft	Bed slope (5:1) = 0.200 ft./ft → 2.5:1 max.	Bed slope = 0.0050 ft./ft
Freeboard = 0.5 ft.	Outlet apron depth, d = 1.0 ft.	Base flow = 0.0 cfs

Design Storm Data (Table 2, NHCP, NRCS Grade Stabilization Structure No. 410)

Drainage area = 450.0 acre Rainfall = ○ 0 - 3 in. ◉ 3 - 5 in. ○ 5+ in.

Apron elev. --- Inlet = 3.5 ft. --- Outlet = 0.0 ft. --- (H_{drop} = 2.5 ft.)

Chute capacity = Q5-year
Total capacity = Q10-year
Minimum capacity (based on a 5-year, 24-hour storm with a 3 - 5 inch rainfall)

Q_{high} = 4.2 cfs High flow storm through chute → Tw (ft.) = Program

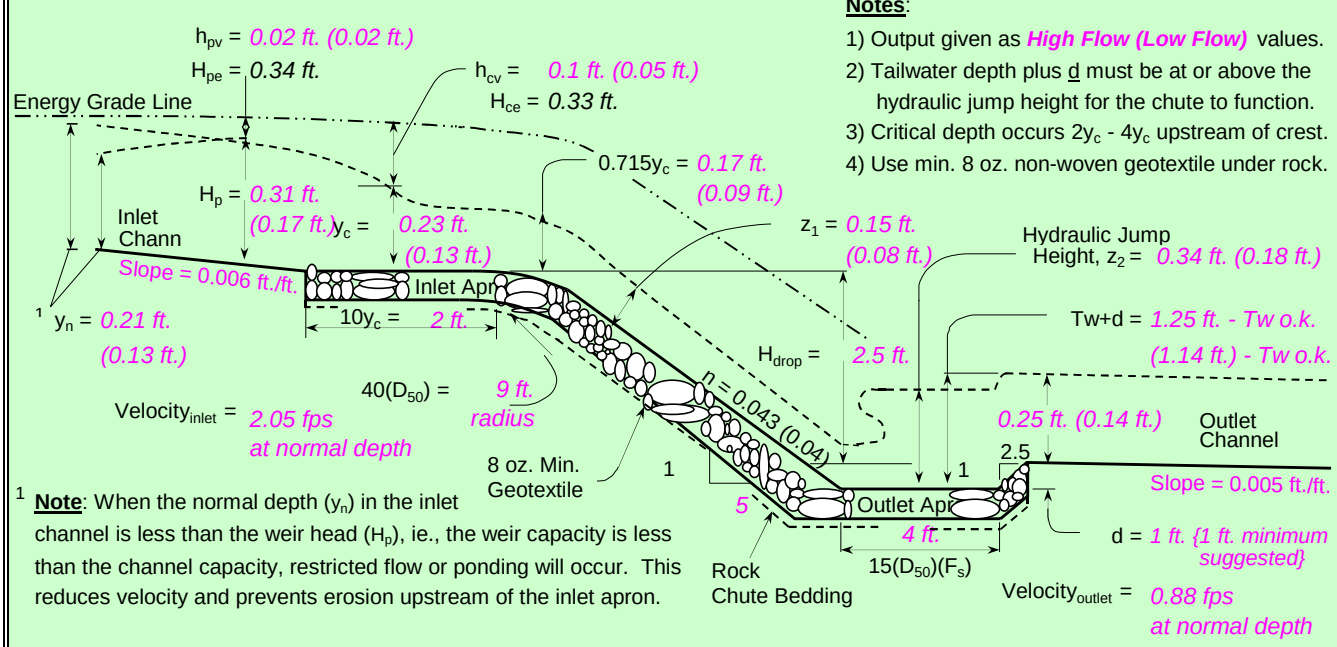
Q_{low} = 1.6 cfs Low flow storm through chute → Tw (ft.) = Program

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

***Input tailwater (Tw)**:*

0.20

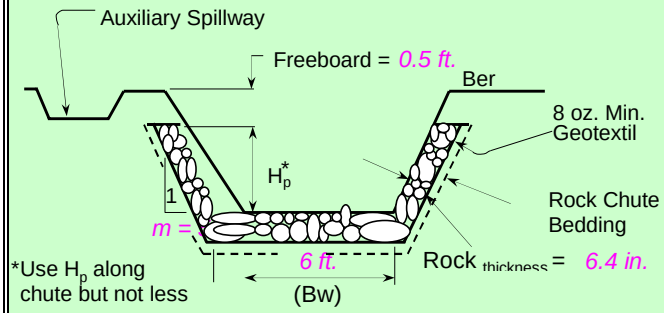
Profile and Cross Section (Output)



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 min. 8 oz. 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

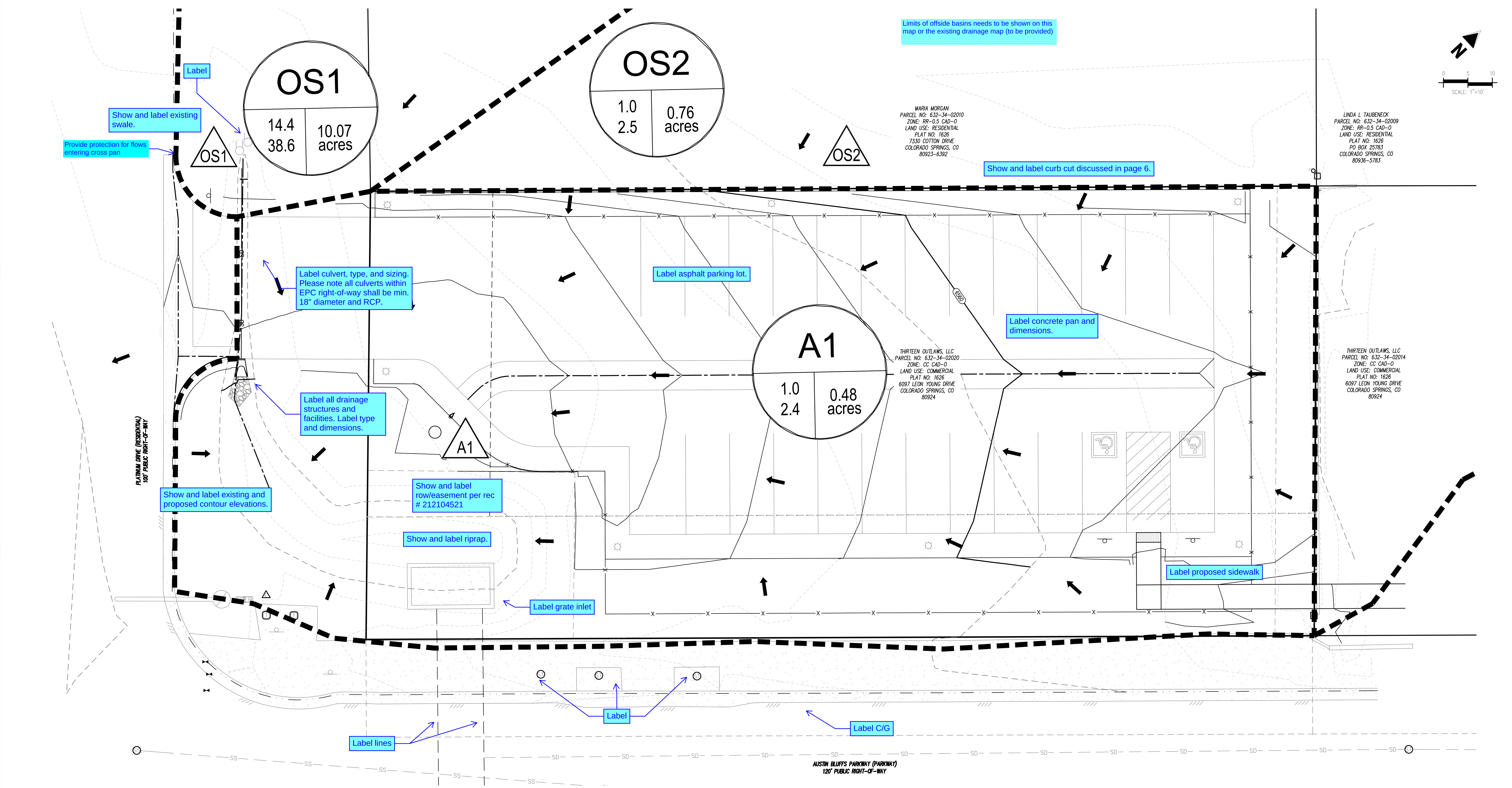
q_t =	0.63 cfs/ft.	Equivalent unit discharge
F_S =	1.20	Factor of safety (multiplier)
z_1 =	0.15 ft.	Normal depth in chute
n-value =	0.043	Manning's roughness coefficient
D_{50}(F_s) =	3.2 in. (2 lbs. - 50% round / 50% angular)	
2(D_{50})(F_s) =	6.4 in.	Rock chute thickness
Tw + d =	1.25 ft.	Tailwater above outlet apron
z_2 =	0.34 ft.	Hydraulic jump height
*** ***The outlet***	***will***	***function adequately***

High Flow Storm Information

APPENDIX D

Drainage Map

Provide existing drainage map



LEGEND

- EXISTING PROPERTY LINE
- 6940 — EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- 6940 — PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- -SD- EXISTING STORM DRAIN PIPE
- -SD- PROPOSED STORM DRAIN PIPE
- BASIN BOUNDARY
- A — BASIN DESIGNATION
- 0.13 — 5-YEAR RUNOFF IN CUBIC FEET PER SECOND
- 4.21 acres — BASIN AREA IN ACRES
- 0.41 — 100-YEAR RUNOFF IN CUBIC FEET PER SECOND
- 1 — DESIGN POINT
- PROPOSED FLOW DIRECTION ARROW

BASIN SUMMARY TABLE

Tributary Sub-basin	Area (acres)	C_5	C_{100}	t_c (min)	Q_5 (cfs)	Q_{100} (cfs)
A1	0.48	0.41	0.61	5.98	1.0	2.4
OS-1	10.07	0.37	0.59	11.92	14.4	38.6
OS-2	0.76	0.37	0.59	16.43	1.0	2.5

BASIS OF BEARINGS

BEARINGS ARE BASED ON THE SOUTHEASTERLY LINES OF LOTS 14 & 15, BLOCK 15, VISTA PEAK ESTATES ADDITION, AND A PART OF THE NORTHWESTERLY R.O.W. OF AUSTIN BLUFFS PARKWAY, MONUMENTED ON THE SOUTHERLY END WITH A NO. 5 REBAR WITH 1.5" ALUMINUM CAP, PLS 34977, AND ON THE NORTHERLY END WITH A NAIL AND 1.5" WASHER, PLS 34977, AND IS ASSUMED TO BEAR N42°44'14"E A MEASURED DISTANCE OF 457.20 FEET.

BENCHMARK

ELEVATIONS ARE BASED ON SITE BENCHMARK AS NOTED WITH A COMPUTED OPUS SOLUTION USING GEOID18 (ELEVATION = 6,557.77' NAVD88)

CAUTION – NOTICE TO CONTRACTOR

1. ALL UTILITY LOCATIONS SHOWN ARE BASED ON MAPS PROVIDED BY THE APPROPRIATE UTILITY COMPANY AND FIELD SURFACE EVIDENCE AT THE TIME OF SURVEY AND IS TO BE CONSIDERED AN APPROXIMATE LOCATION ONLY. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FIELD VERIFY THE LOCATION OF ALL UTILITIES, PUBLIC OR PRIVATE, WHETHER SHOWN ON THE PLANS OR NOT, PRIOR TO CONSTRUCTION. REPORT ANY DISCREPANCIESTO THE ENGINEER PRIOR TO CONSTRUCTION.

811 Know what's below. Call before you dig.

2. WHERE A PROPOSED UTILITY CROSSES AN EXISTING UTILITY, IT IS THE CONTRACTOR'S RESPONSIBILITY TO FIELD VERIFY THE HORIZONTAL AND VERTICAL LOCATION OF SUCH EXISTING UTILITY, EITHER THROUGH POTHOLING OR ALTERNATIVE METHOD. REPORT INFORMATION TO THE ENGINEER PRIOR TO CONSTRUCTION.

Galloway
6162 S. Willow Drive, Suite 320
Greenwood Village, CO 80111
303.770.8884
GallowayUS.com

PRELIMINARY
NOT FOR BIDDING
NOT FOR CONSTRUCTION

SITE DEVELOPMENT PLAN
HOPE PHYSICAL THERAPY-PARKING LOT

THIRTEEN OUTLAWS, LLC

4850 AUSTIN BLUFFS PKWY
COLORADO SPRINGS, CO 80918

#	Date	Issue / Description	Init.

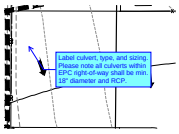
Project No:	HPT01
Drawn By:	MRW
Checked By:	MJP
Date:	MARCH 2023

DRAINAGE MAP

DR

V1_Drainage Letter.pdf Markup Summary

Callout (19)



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Page Label: 29
Author: Carlos
Date: 9/26/2023 5:25:00 PM
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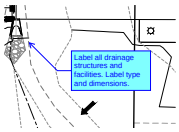
Label culvert, type, and sizing. Please note all culverts within EPC right-of-way shall be min. 18" diameter and RCP.



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Date: 10/2/2023 4:25:26 PM
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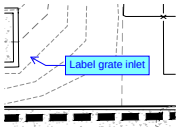
Label all drainage structures and facilities. Label type and dimensions.



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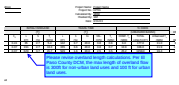
Label grate inlet



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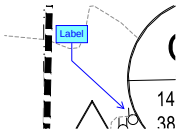
Please revise overland length calculations. Per El Paso County DCM, the max length of overland flow is 300ft for non-urban land uses and 100 ft for urban land uses.



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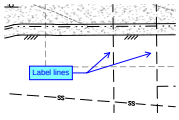

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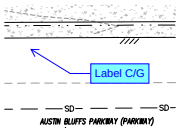
Label lines



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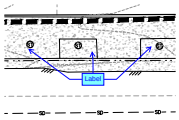
Label C/G



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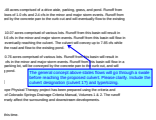

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Author: Carlos
Date: 10/2/2023 4:45:55 PM
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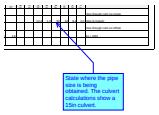
The general concept above states flows will go through a swale before reaching the proposed culvert. Please clarify. Include the culvert designation (culvert 1?) and type/sizing.



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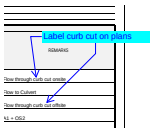
State where the pipe size is being obtained. The culvert calculations show a 15in culvert.



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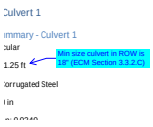
Label curb cut on plans



Subject: Callout
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Date: 10/3/2023 3:20:18 PM
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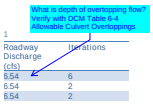
Space:

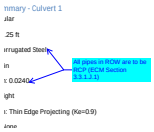
Min size culvert in ROW is 18" (ECM Section 3.3.2.C)



Subject: Callout
Page Label: 23
Author: CDurham
Date: 10/3/2023 3:33:57 PM
Status:
Color:
Layer:
Space:

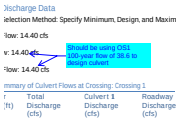
What is depth of overtopping flow? Verify with DCM Table 6-4 Allowable Culvert Overtoppings

---



Subject: Callout
Page Label: 23
Author: CDurham
Date: 10/3/2023 3:32:06 PM
Status:
Color:
Layer:
Space:

All pipes in ROW are to be RCP (ECM Section 3.3.1.J.1)

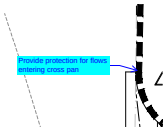


Subject: Callout
Page Label: 23
Author: CDurham
Date: 10/3/2023 3:35:54 PM
Status:
Color:
Layer:
Space:

Should be using OS1 100-year flow of 38.6 to design culvert

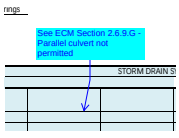
Subject: Callout
Page Label: 23
Author: CDurham
Date: 10/3/2023 3:38:40 PM
Status:
Color:
Layer:
Space:

Use 5-year flow to determine min velocity per ECM section 3.3.2.D



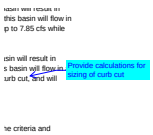
Subject: Callout
Page Label: 29
Author: CDurham
Date: 10/3/2023 3:40:18 PM
Status:
Color:
Layer:
Space:

Provide protection for flows entering cross pan



Subject: Callout
Page Label: 25
Author: CDurham
Date: 10/3/2023 3:42:28 PM
Status:
Color:
Layer:
Space:

See ECM Section 2.6.9.G - Parallel culvert not permitted



Subject: Callout
Page Label: 7
Author: CDurham
Date: 10/3/2023 3:55:18 PM
Status:
Color:
Layer:
Space:

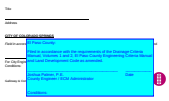
Provide calculations for sizing of curb cut

Cloud+ (1)

Subject: Cloud+
Page Label: 4
Author: Carlos
Date: 10/2/2023 4:15:04 PM
Status:
Color:
Layer:
Space:

A replat request does not seem to be require. Please remove statement.

Drainage Report - County (1)



Subject: Drainage Report - County
Page Label: 2
Author: Carlos
Date: 9/26/2023 4:01:38 PM
Status:
Color:
Layer:
Space:

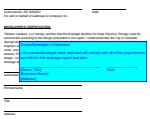
El Paso County:

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

_____
_ _____
Joshua Palmer, P.E.
Date
County Engineer / ECM Administrator

Conditions:

Drainage Report: Developer (1)



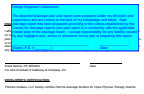
Subject: Drainage Report: Developer
Page Label: 2
Author: Carlos
Date: 9/26/2023 4:02:28 PM
Status:
Color:
Layer:
Space:

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.

_____
_____
[Name, Title]
Date
[Business Name]
[Address]

Drainage Report-Engineer (1)



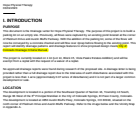
Subject: Drainage Report-Engineer
Page Label: 2
Author: Carlos
Date: 9/26/2023 4:02:52 PM
Status:
Color:
Layer:
Space:

Design Engineer's Statement:

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

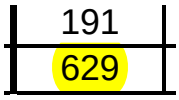
_____
_____
[Name, P.E. #_____]
Date

Highlight (5)



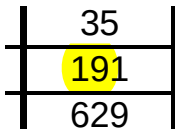
Subject: Highlight
Page Label: 4
Author: Carlos
Date: 9/26/2023 4:33:31 PM
Status:
Color:
Layer:
Space:

City of
Colorado Drainage Criteria Manual.



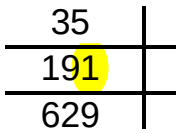
Subject: Highlight
Page Label: 19
Author: Carlos
Date: 10/2/2023 4:24:31 PM
Status:
Color:
Layer:
Space:

629



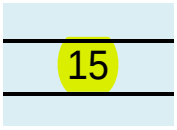
Subject: Highlight
Page Label: 19
Author: Carlos
Date: 10/2/2023 4:24:32 PM
Status:
Color:
Layer:
Space:

19



Subject: Highlight
Page Label: 19
Author: Carlos
Date: 10/2/2023 4:24:33 PM
Status:
Color:
Layer:
Space:

1



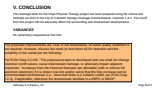
Subject: Highlight
Page Label: 25
Author: CDurham
Date: 10/3/2023 3:37:27 PM
Status:
Color:
Layer:
Space:

15

Image (1)

Subject: Image
Page Label: 19
Author: Carlos
Date: 10/2/2023 4:23:27 PM
Status:
Color:
Layer:
Space:

SW - Textbox (1)

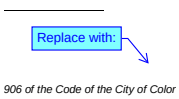


Subject: SW - Textbox
Page Label: 7
Author: Glenn Reese - EPC Stormwater
Date: 9/25/2023 7:10:40 AM
Status:
Color:
Layer:
Space:

The proposed improvements are <1ac of soil disturbance, so water quality treatment is not required. However, discuss the need (or lack there of) for detention and the suitability of the outfall per the following:

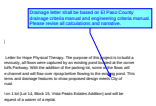
Per ECM Chap 3.2.8.B, “The proposed project or developed land use shall not change historical runoff values, cause downstream damage, or adversely impact adjacent properties.” Increases from the historical flowrates are allowable (with or without full spectrum detention) if it is shown (via text and/or calcs) that the flow increase can be accommodated downstream (i.e., show that there is a suitable outfall, per ECM Chap 3.2.4). If applicable, reference the downstream facilities in a DBPS or MDDP.

Text Box (27)



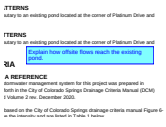
Subject: Text Box
Page Label: 2
Author: Carlos
Date: 9/26/2023 4:01:49 PM
Status:
Color:
Layer:
Space:

Replace with:



Subject: Text Box
Page Label: 4
Author: Carlos
Date: 10/2/2023 5:24:25 PM
Status:
Color:
Layer:
Space:

Drainage letter shall be based on El Paso County drainage criteria manual and engineering criteria manual. Please revise all calculations and narrative.



Subject: Text Box
Page Label: 5
Author: Carlos
Date: 9/26/2023 5:05:43 PM
Status:
Color:
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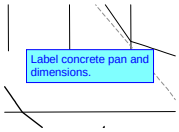
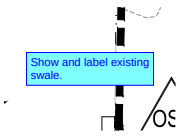
Space:

Explain how offsite flows reach the existing pond.



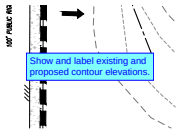
Subject: Text Box
Page Label: 29
Author: Carlos
Date: 10/2/2023 4:46:28 PM
Status:
Color:
Layer:
Space:

Label concrete pan and dimensions.



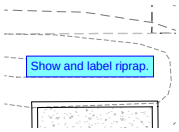
Subject: Text Box
Page Label: 29
Author: Carlos
Date: 9/26/2023 5:22:52 PM
Status:
Color:
Layer:
Space:

Show and label existing swale.



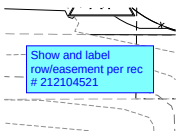
Subject: Text Box
Page Label: 29
Author: Carlos
Date: 10/2/2023 4:26:06 PM
Status:
Color:
Layer:
Space:

Show and label existing and proposed contour elevations.



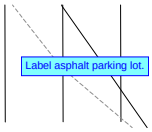
Subject: Text Box
Page Label: 29
Author: Carlos
Date: 9/26/2023 5:29:46 PM
Status:
Color:
Layer:
Space:

Show and label riprap.



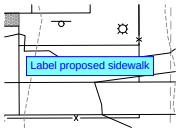
Subject: Text Box
Page Label: 29
Author: Carlos
Date: 9/26/2023 5:30:16 PM
Status:
Color:
Layer:
Space:

Show and label row/easement per rec # 212104521



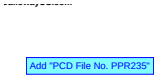
Subject: Text Box
Page Label: 29
Author: Carlos
Date: 9/26/2023 5:30:44 PM
Status:
Color:
Layer:
Space:

Label asphalt parking lot.



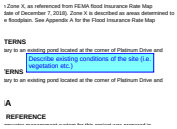
Subject: Text Box
Page Label: 29
Author: Carlos
Date: 9/26/2023 5:31:09 PM
Status:
Color:
Layer:
Space:

Label proposed sidewalk



Subject: Text Box
Page Label: 1
Author: Carlos
Date: 10/2/2023 1:27:27 PM
Status:
Color:
Layer:
Space:

Add "PCD File No. PPR235"



Subject: Text Box
Page Label: 5
Author: Carlos
Date: 10/2/2023 4:43:53 PM
Status:
Color:
Layer:
Space:

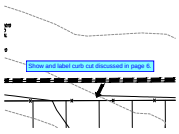
Describe existing conditions of the site (i.e. vegetation etc.)

Subject: Text Box
Page Label: 8
Author: Carlos
Date: 10/2/2023 4:21:51 PM
Status:
Color:
Layer:
Space:

What are the existing flows exiting the site? State existing flows and compare them to the proposed conditions. State the difference in flows. Describe if the existing inlet is adequate to handle the increase in flows. Provide calculations.

Subject: Text Box
Page Label: 7
Author: Carlos
Date: 10/2/2023 4:28:59 PM
Status:
Color:
Layer:
Space:

The drainage map shows flows from OS2 flowing towards A1. Please state what the cumulative flows are.



Subject: Text Box
Page Label: 29
Author: Carlos
Date: 10/2/2023 4:29:38 PM
Status:
Color:
Layer:
Space:

Show and label curb cut discussed in page 6.

Subject: Text Box
Page Label: 7
Author: Carlos
Date: 10/2/2023 4:47:07 PM
Status:
Color:
Layer:
Space:

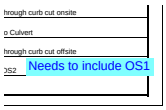
How are flows from OS2 reaching A1?

Subject: Text Box
Page Label: 4
Author: Carlos
Date: 10/2/2023 5:24:35 PM
Status:
Color:
Layer:
Space:

The City of COS has a drainage report and CDs for the existing box inlet. Please contact COS for a copy.

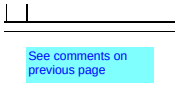
Subject: Text Box
Page Label: 17
Author: CDurham
Date: 10/3/2023 3:08:52 PM
Status:
Color:
Layer:
Space:

Provide existing calculations



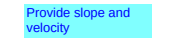
Subject: Text Box
Page Label: 20
Author: CDurham
Date: 10/3/2023 3:15:30 PM
Status:
Color:
Layer:
Space:

Needs to include OS1



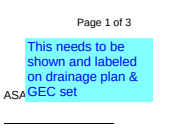
Subject: Text Box
Page Label: 21
Author: CDurham
Date: 10/3/2023 3:16:32 PM
Status:
Color:
Layer:
Space:

See comments on previous page



Subject: Text Box
Page Label: 23
Author: CDurham
Date: 10/3/2023 3:20:30 PM
Status:
Color:
Layer:
Space:

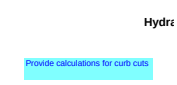
Provide slope and velocity



Subject: Text Box
Page Label: 27
Author: CDurham
Date: 10/3/2023 3:48:16 PM
Status:
Color:
Layer:
Space:

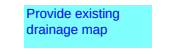
This needs to be shown and labeled on drainage plan & GEC set

---



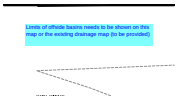
Subject: Text Box
Page Label: 22
Author: CDurham
Date: 10/3/2023 3:48:55 PM
Status:
Color:
Layer:
Space:

Provide calculations for curb cuts



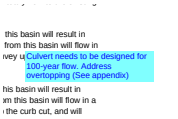
Subject: Text Box
Page Label: 28
Author: CDurham
Date: 10/3/2023 3:49:24 PM
Status:
Color:
Layer:
Space:

Provide existing drainage map



Subject: Text Box
Page Label: 29
Author: CDurham
Date: 10/3/2023 3:50:05 PM
Status:
Color:
Layer:
Space:

Limits of offside basins needs to be shown on this map or the existing drainage map (to be provided)



Subject: Text Box
Page Label: 7
Author: CDurham
Date: 10/3/2023 3:54:50 PM
Status:
Color:
Layer:
Space:

Culvert needs to be designed for 100-year flow. Address overtopping (See appendix)

How are flows exiting existing pond? Is outfall still adequate with increased flows? Discuss where final outfall of flows are.

Subject: Text Box
Page Label: 7
Author: CDurham
Date: 10/3/2023 3:56:39 PM
Status:
Color:
Layer:
Space:

How are flows exiting existing pond? Is outfall still adequate with increased flows? Discuss where final outfall of flows are.