DRAINAGE COMPLIANCE LETTER

Brakes Plus

El Paso County, Colorado

Prepared for:

Brakes Plus, LLC.

6951 South Blackhawk Street #700

Englewood, CO 80112

(720) 274-2629

Prepared by:

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Project #: 096908003
Prepared: May 14, 2021

PCD Filing No.: PPR-21-018

Brakes Plus

EL PASO COUNTY, COLORADO

DRAINAGE COMPLIANCE LETTER

MAY 14, 2021

Prepared by:

Kimley»Horn

TABLE OF CONTENTS

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.

_____

Emily Felton, P.E.
Registered Professional Engineer
State of Colorado No. 0054609

DEVELOPER'S STATEMENT

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

_____ _____

Dean Pisciotta
BPCO Properties, LLC
7076 S. Alton Way, Bldg D
Centennial, CO 80112

Date

EL PASO COUNTY

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.

_____ _____

Jennifer Irvine, P.E.
County Engineer / ECM Administrator

Date

Conditions:

INTRODUCTION

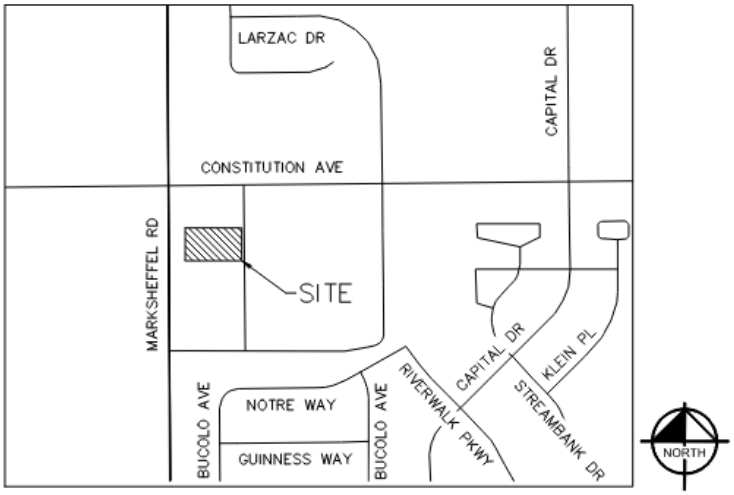
The purpose of this Drainage Compliance Letter is to outline the drainage design of the proposed Brakes Plus project ("the Project") located near the southeast corner of Constitution Avenue and Marksheffel Road in El Paso County, Colorado (the "Site"). This Drainage Letter has been developed in conformance with the *Final Drainage Report for SEC of Marksheffel Rd. & Constitution Ave.* prepared by Galloway & Company, Inc. dated September 14, 2015 (PCD File No. SF 1511), the *Drainage Conformance Letter* prepared by Galloway & Company, Inc. prepared October 12, 2018 and current City of Colorado Springs *Drainage Criteria Manual Volume 2*.

The Drainage Letter demonstrates the Project drainage, sub-basins, impervious area, and resulting stormwater runoff is consistent with assumptions within the *Final Drainage Report for SEC of Marksheffel Rd. & Constitution Ave.* as well as the *Drainage Conformance Letter* prepared by Galloway & Company, Inc. and will not cause negative impacts to downstream developments.

GENERAL LOCATION AND PROJECT DESCRIPTION

SITE LOCATION

The Site is located at the southeast corner of Marksheffel Road and Constitution Avenue and currently consists of the Claremont Ranch Filing No. 9C, Block 1. More specifically, the Site is located in the northwest quarter of Section 4, Township 14 South, Range 65 West of the of the Sixth Principal Meridian, County of El Paso, State of Colorado. A vicinity map is provided below for reference:



VICINITY MAP
NOT TO SCALE

DESCRIPTION OF PROPERTY

The Site consists of the Claremont Ranch Filing No. 9C Lot 1. The current site is approximately 0.77 acres of undeveloped vacant land. The Project is anticipated to consist of a new automotive service center of approximately 4,839 total square feet, drive aisles and parking, landscaping, and associated utility improvements. Project access will be obtained from the existing curb cuts off the property to the northeast and northwest of the site, and existing curb cut off the property to the southeast of the site. Parking and

drive aisles are proposed to loop around the building to provide internal traffic circulation as well as emergency access throughout the Project.

The Site is currently undeveloped. Existing ground cover consists of patches of sparse vegetation of native weeds and grasses. A review of the Natural Resource Conservation Service (NRCS) Web Soil Survey determined that the Site is made up of Blendon sandy loam, which has an NRCS Soil Type B. Soil Type B has been utilized for calculations included within this report. The NRCS study is found in **Appendix A** of the report.

The existing topography generally drains from the northeast to the southwest into the existing storm infrastructure. The overall site varies in elevation from a low of approximately 6444 feet to a high of approximately 6450 feet. Respective runoff sheet flows across the property from northeast to the southwest at slopes varying from 1.5% to 10%. No geologic hazards have been identified within the proposed project site.

DRAINAGE BASINS

MAJOR BASINS

The Site is located mostly within Basin D-2 and partly within D-3 according to the *Final Drainage Report*. Runoff from Basin D-2 was designed to be captured by a future storm sewer pipe system within the future development and connect to the existing storm sewer system which outfalls to the existing pond immediately west of the King Soopers building (an Extended Detention Basin located in Lot 1, Block 1 of Claremont Ranch Filing No. 9) as identified in the *Final Drainage Report*. The general design intent of the drainage basin (D-2/D-2A) shown in the *Final Drainage Report & Drainage Conformance Letter* has remained consistent with the Site design. Runoff from this basin was estimated in the *Drainage Conformance Letter*. The existing 18" storm sewer located at the southeast corner of Lot 2 was sized to convey the 100-year runoff from the Site of 3.31 CFS.

By scaled map location and graphical review of the Flood Insurance Rate Map (FIRM) Number 08041C0756G, dated December 7, 2018, the Site lies within as area classified as Zone X. Areas classified as Zone X are considered areas of minimal flood hazard, usually depicted by Flood Insurance Rate Maps as areas outside of the 500-year flood plain. The FIRM map is included in **Appendix A**.

MINOR BASINS

The proposed site improvements result in an on-site impervious value of 88%, which is below the maximum allowable of 95% per the approved *Drainage Conformance Letter*. The proposed development will not produce more runoff than accounted for in the *Final Drainage Report*; therefore, no pond improvements are proposed. The site is designed to convey runoff to proposed inlets which will convey stormwater to the existing storm sewer stub, installed with the Lot 2 Improvements at the southeast corner of the site. Flows from Sub-basin B reflect the existing flows that originally contributed to the storm existing storm manhole on the northeast corner of the site. A proposed inlet in Sub-basin B (a portion of existing basin D-1 from the *Drainage Conformance Letter*) will connect to this existing manhole to mimic the existing drainage pattern. The combined on-site 100-year runoff contributing to the existing storm sewer stub on the south side of the site is 3.31 CFS. This value of the Proposed Lot 1 runoff (3.31 CFS) is less than the estimated Total D-2 runoff in the Final Drainage Report (6.61 CFS) as well as the Drainage Conformance Letter for D-2A (3.43 CFS). Runoff calculations are provided in **Appendix B.**

The disturbed area with this site has been broken up into eight sub-basins, A, B, C, R1, R2, OS1, OS2, and OS3. These sub-basins have been delineated for appropriate sizing of the proposed storm sewer infrastructure.

Sub-basin A is tributary to Design Point A, a Type R inlet, located at the east side of the parking lot and includes runoff from the eastern parking lot, sidewalk, and landscaping areas. Stormwater is routed via the existing storm infrastructure via proposed storm sewer. This sub-basin is ±0.16 acres with an impervious value of 76%. Runoff is conveyed to the inlet via sheet flow and curb and gutter.

Sub-basin B is tributary to Design Point B, a Type R inlet, located at the north side of the property and includes runoff from the northern drive aisle and landscaping. Runoff is conveyed via sheet flow and curb & gutter to Design Point B. Existing Basin OS-2 (Drainage Letter for END Credit Union PCD File No. PPR-18-012) from the northern ENT property routes through this sub-basin and captured in Design Point B, mimicking existing conditions. The existing on-site temporary inlet is to be demolished and replaced by the curb inlet at Design Point B to capture these flows. The inlet at Design point B will convey the flows to the existing storm infrastructure located at the northeast corner of the site to mimic existing patterns where the previous inlet was connecting to. This sub-basin is ±0.15 acres with an impervious value of 76%.

Sub-basin C is tributary to Design Point C, a Type R inlet, located at the south side of the property and includes runoff from the west and southern sides of the parking lot and drive aisle, and includes the flows from sub basins R1 and R2. Runoff is captured in the inlet on the south side of the site and conveyed to the existing storm infrastructure via proposed storm sewer. This sub-basin is ±0.18 acres with an impervious value of 98%. Runoff is conveyed to the inlet via sheet flow and curb and gutter.

Sub-basin R1 is tributary to Design Point R1, which is a roof drain outfall from the building, located at the southern edge of the building. This sub-basin is ±0.10 acres with an impervious value of 90%. Runoff is conveyed into sub-basin C, where it is flows to Design Point C.

Sub-basin R2 is tributary to Design Point R2, which is a roof drain outfall from the building, located at the northern edge of the building. This sub-basin is ±0.01 acres with an impervious value of 90%. Runoff is conveyed into sub-basin C, where it is flows to Design Point C.

Sub-basin OS1 follows existing drainage patterns and flows southwest off-site to the existing inlets located on Marksheffel Road to the west of the site via existing curb and gutter. This is consistent with what is shown for Basin OS-2 in the *Final Drainage Report*. This sub-basin is ±0.16 acres with an impervious value of 0%. Runoff is conveyed to the existing inlets via sheet flow and curb and gutter along Marksheffel Road.

Sub-basin OS2 flows off-site to Lot 2 where it then follows existing drainage patterns and sheet flows into the existing inlet installed with Lot 2. This sub-basin is ±0.02 acres with an impervious value of 42%. Due to the decrease in imperviousness of our site compared to the assumed values from the *Final Drainage Report* (i.e. decrease in flows), existing reports show this flow can be handled by the downstream infrastructure. Flows captured by this inlet are conveyed to the existing pond immediately west of the King Soopers building (an Extended Detention Basin located in Lot 1, Block 1 of Claremont Ranch Filing No. 9) as identified in the *Final Drainage Report*.

Sub-basin OS3 flows off-site to Lot 2 where it then follows existing drainage patterns and sheet flows into the existing inlet installed with Lot 2. This sub-basin is ±0.01 acres with an impervious value of 100%. Due to the decrease in imperviousness of our site compared to the assumed values from the *Final Drainage Report* (i.e. decrease in flows), existing reports show this flow can be handled by the downstream infrastructure. Flows captured by this inlet are conveyed to the existing pond immediately west of the King

Soopers building (an Extended Detention Basin located in Lot 1, Block 1 of Claremont Ranch Filing No. 9) as identified in the *Final Drainage Report*.

Please note, Sub-basin A is capturing greater off-site flows into the site than OS2 and OS3 are releasing off-site to Lot 2.

These sub-basins are illustrated in the Proposed Drainage Map in **Appendix E**.

FOUR STEP PROCESS

STEP 1: RUNOFF REDUCTION PRACTICES

Due to the site size of 0.77 acre, the implementation of grass buffers or swales is not practical. This site is compliant with the approved Final Drainage Report for SEC of Marksheffel Rd. & Constitution Ave. Every attempt was made to reduce impervious areas which also complying with the parking requirements set forth by El Paso County.

STEP 2: STABILIZE DRAINAGEWAYS

This step is not applicable. There are no drainageways located on this site.

STEP 3: PROVIDE WATER QUALITY CAPTURE VOLUME (WQCV)

Runoff from this site will be collected via proposed storm sewer and be routed via existing storm sewer to an existing water quality pond located southeast of the site. The existing condition of the pond has been evaluated through observation and site photos have been included in **Appendix D**. In summary, the pond is observed to be in working condition as originally intended with the design.

STEP 4: CONSIDER NEED FOR INDUSTRIAL AND COMMERCIAL BMPS

Due to the site being less than 1 acre and no water quality pond being proposed, this site does not fall under definition of “new development or significant redevelopment” per Appendix I Section 7.1.B. This step is not applicable. The onsite contaminants of corner would not be filtered out by specialized BMPs (sand filter basin or porous landscape detention), therefore they are not necessary.

Water quality and detention are being provided by an existing pond located on Lot 1 Block 1 Claremont Ranch Filing No. 9.

Brakes Plus does not change oil onsite and fluids are recycled as used. In the Colorado Springs market, the vendor, Envirovac, cleans out the sand/oil interceptor annually. Brakes Plus receives a report from the vendor detailing the amount of water, oil and solids that are removed from the interceptor. Envirovac is owned by Brian Tucker and they have serviced our stores for over 10 years.

CONCLUSION

COMPLIANCE WITH STANDARDS

The drainage design presented within this letter conforms to the *El Paso County Engineering Criteria Manual.* No drainage variances are requested with this Drainage Compliance Letter.

As stated earlier in this report, the proposed site coverage contributing to the existing storm system is 88% imperviousness which is less than what was assumed in the Final Drainage Report.

The on-site storm drainage presented in this letter will adequately convey the minor and major storm events from the proposed development to the existing storm sewer system provided off-site. Stormwater runoff from the minor and major storm events from the proposed development are consistent with stormwater runoff assumptions in the *Final Drainage Report for SEC of Marksheffel Rd. & Constitution Ave.* and the *Drainage Conformance Letter* prepared by Galloway & Company, Inc. used to evaluate conveyance downstream of the Site.

DRAINAGE FEE NOTE

Typically, drainage fees are paid with the final plat with no additional fees due with site plan applications. The drainage fees for this project have been paid under the submission of the original plat for the development of which the project is located within.

REFERENCES

Drainage Conformance Letter for Lot 1 and Lot 2, Block 1 – Claremont Ranch Filing No. 9C, Galloway & Company, Inc.; October 2018.

Drainage Letter for ENT Credit Union, Lot 1, Block 1, Claremont Ranch Filing No. 9B, Galloway & Company, Inc.; May 2018.

Final Drainage Report for SEC of Marksheffel Rd. & Constitution Ave., Galloway & Company, Inc.; September 2015.

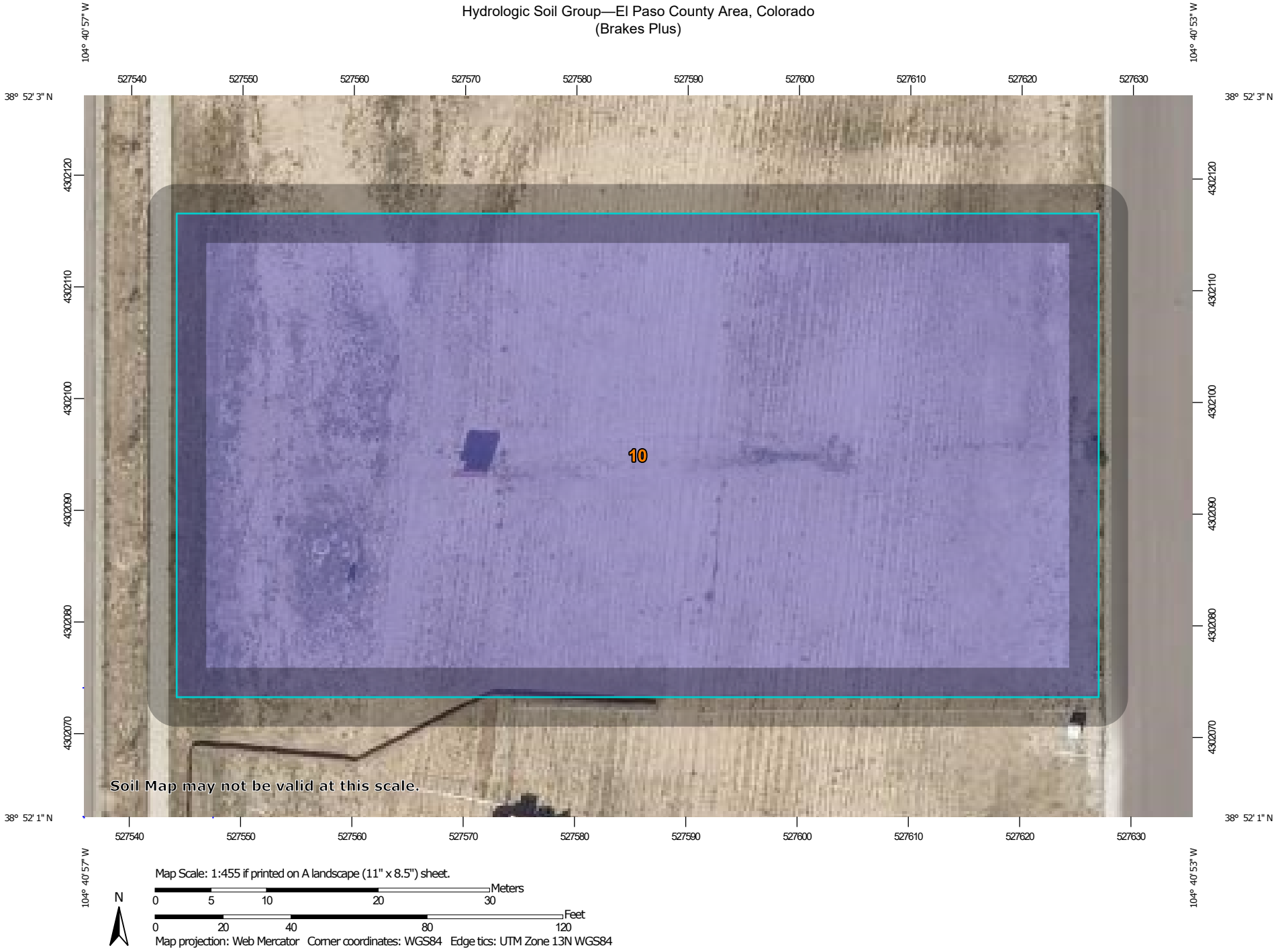
El Paso County Engineering Criteria Manual, El Paso County, CO.; latest editions.

Colorado Springs Drainage Criteria Manual, Volume 2, Colorado Springs, CO.; latest editions.

APPENDIX

APPENDIX A – SITE INFORMATION

Hydrologic Soil Group—El Paso County Area, Colorado
(Brakes Plus)



Map Scale: 1:455 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 5 10 20 30

Feet: 0 20 40 80 120

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 18, Jun 5, 2020

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

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

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
10	Blendon sandy loam, 0 to 3 percent slopes	B	0.9	100.0%
Totals for Area of Interest			**0.9**	**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

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.

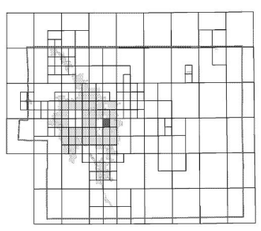
Contact **FEMA Map Service Center** (MSC) via the FEMA Map Information eXchange (FMIX) 1-877-336-2627 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this 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

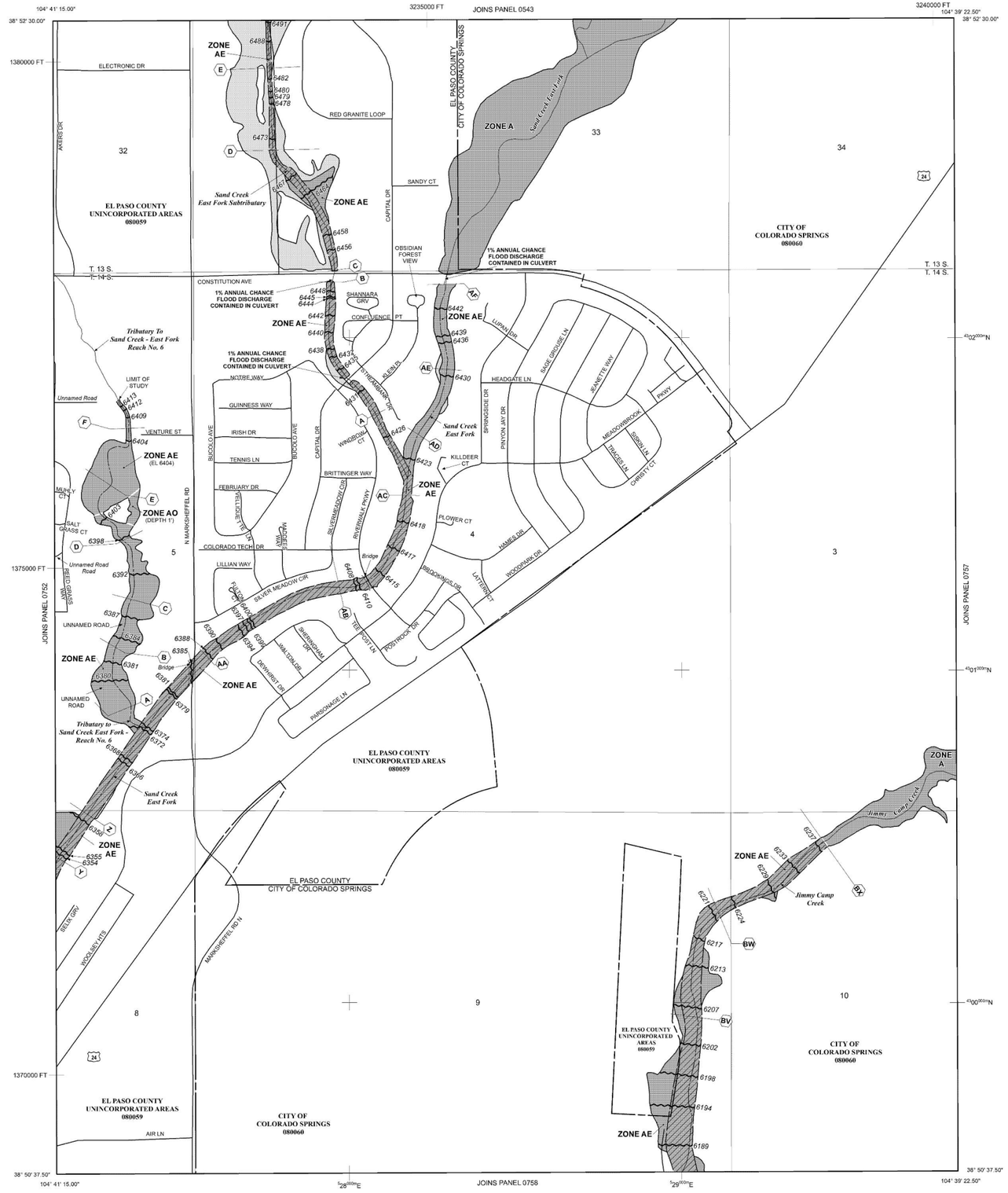
Flooding Source	Vertical Datum Offset (ft)
REFER TO SECTION 3.3 OF THE EL PASO COUNTY FLOOD INSURANCE STUDY FOR STREAM BY STREAM VERTICAL DATUM CONVERSION INFORMATION	

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 14 SOUTH, RANGE 65 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)
4275000mN	1000-meter Universal Transverse Mercator grid ticks, zone 13
6000000 FT	5000-foot grid ticks: Colorado State Plane coordinate system, central zone (FIPSZONE 0502), Lambert Conformal Conic Projection
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
• M1.5	River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

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

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

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 0756G

FIRM

FLOOD INSURANCE RATE MAP

EL PASO COUNTY, COLORADO AND INCORPORATED AREAS

PANEL 756 OF 1300

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
COLORADO SPRINGS, CITY OF	080060	0756	G
EL PASO COUNTY	080059	0756	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
08041C0756G

MAP REVISED
DECEMBER 7, 2018

Federal Emergency Management Agency

APPENDIX B – HYDROLOGIC COMPUTATIONS

Rainfall Intensity

$$I = \frac{28.5\ P_1}{(10+T_C)^{0.786}}$$

Where:

I = rainfall intensity (inches per hour)

P_1 = one-hour rainfall depth (inches) from Table 6-5 in the Colorado Springs DCM Volume 1

T_C = time of concentration (minutes)

	2-yr	5-yr	10-yr	100-yr
P_1 =	0.83	1.09	1.33	2.31

Time Intensity Frequency Tabulation

TIME	2 YR	5 YR	10 YR	100 YR
5	4.12	5.17	6.03	16.79
10	3.29	4.13	4.82	18.54
15	2.81	3.52	4.11	19.56
20	2.47	3.09	3.60	20.28
25	2.20	2.75	3.21	20.85
30	1.99	2.48	2.89	21.31
40	1.65	2.05	2.39	22.03
50	1.38	1.71	2.00	22.59
60	1.16	1.44	1.68	23.05
120	0.34	0.40	0.47	24.80

Composite Basin Calculations

Basin A	Area (sf)	Basin %	I	C_2	C_5	C_{10}	C_{100}
Landscaped Area	1,698	24%	0%	0.02	0.08	0.15	0.35
Roofs	0	0%	90%	0.71	0.73	0.75	0.81
Sidewalk/Hardscape	850	12%	100%	0.89	0.90	0.92	0.96
Streets (Paved)	4,573	64%	100%	0.89	0.90	0.92	0.96
	7,121	100%	76%	0.61	0.64	0.67	0.78

Basin B	Area (sf)	Basin %	I	C_2	C_5	C_{10}	C_{100}
Landscaped Area	1,579	24%	0%	0.02	0.08	0.15	0.35
Roofs	0	0%	90%	0.71	0.73	0.75	0.81
Sidewalk/Hardscape	0	0%	100%	0.89	0.90	0.92	0.96
Streets (Paved)	5,026	76%	100%	0.89	0.90	0.92	0.96
	6,605	100%	76%	0.61	0.64	0.67	0.78

Basin C	Area (sf)	Basin %	I	C_2	C_5	C_{10}	C_{100}
Landscaped Area	139	2%	0%	0.02	0.08	0.15	0.35
Roofs	0	0%	90%	0.71	0.73	0.75	0.81
Sidewalk/Hardscape	302	4%	100%	0.89	0.90	0.92	0.96
Streets (Paved)	7,605	95%	100%	0.89	0.90	0.92	0.96
	8,046	100%	98%	0.82	0.84	0.85	0.89

Basin R1	Area (sf)	Basin %	I	C_2	C_5	C_{10}	C_{100}
Landscaped Area	0	0%	0%	0.02	0.08	0.15	0.35
Roofs	4,263	100%	90%	0.71	0.73	0.75	0.81
Sidewalk/Hardscape	0	0%	90%	0.89	0.90	0.92	0.96
Streets (Paved)	0	0%	100%	0.89	0.90	0.92	0.96
	4,267	100%	90%	0.74	0.77	0.79	0.85

Basin R2	Area (sf)	Basin %	I	C_2	C_5	C_{10}	C_{100}
Landscaped Area	0	0%	0%	0.02	0.08	0.15	0.35
Roofs	572	100%	90%	0.71	0.73	0.75	0.81
Sidewalk/Hardscape	0	0%	100%	0.89	0.90	0.92	0.96
Streets (Paved)	0	0%	100%	0.89	0.90	0.92	0.96
	572	100%	90%	0.74	0.77	0.79	0.85

Basin OS1	Area (sf)	Basin %	I	C_2	C_5	C_{10}	C_{100}
Landscaped Area	7,045	100%	0%	0.02	0.08	0.15	0.35
Roofs	0	0%	90%	0.71	0.73	0.75	0.81
Sidewalk/Hardscape	0	0%	100%	0.89	0.90	0.92	0.96
Streets (Paved)	0	0%	100%	0.89	0.90	0.92	0.96
	7,045	100%	0%	0.00	0.00	0.06	0.43

Basin OS2	Area (sf)	Basin %	I	C_2	C_5	C_{10}	C_{100}
Landscaped Area	563	58%	0%	0.02	0.08	0.15	0.35
Roofs	0	0%	90%	0.71	0.73	0.75	0.81
Sidewalk/Hardscape	0	0%	100%	0.89	0.90	0.92	0.96
Streets (Paved)	415	42%	100%	0.89	0.90	0.92	0.96
	978	100%	42%	0.31	0.34	0.40	0.63

Basin OS3	Area (sf)	Basin %	I	C_2	C_5	C_{10}	C_{100}
Landscaped Area	0	0%	0%	0.02	0.08	0.15	0.35
Roofs	0	0%	90%	0.71	0.73	0.75	0.81
Sidewalk/Hardscape	0	0%	100%	0.89	0.90	0.92	0.96
Streets (Paved)	523	100%	100%	0.89	0.90	0.92	0.96
	523	100%	100%	0.84	0.86	0.87	0.90

Total to On-site Storm Sewer System (Basins A, C, R1 & R2)	Area (sf)	Basin %	I	C_2	C_5	C_{10}	C_{100}
Landscaped Area	1,837	9%	0%	0.02	0.08	0.15	0.35
Roofs	4,835	24%	90%	0.71	0.73	0.75	0.81
Sidewalk/Hardscape	1,152	6%	100%	0.89	0.90	0.92	0.96
Streets (Paved)	12,178	61%	100%	0.89	0.90	0.92	0.96
	20,006	100%	88%	0.73	0.75	0.77	0.84

Total Drainage (All Basins)	Area (sf)	Basin %	I	C_2	C_5	C_{10}	C_{100}
Landscaped Area	11,024	31%	0%	0.02	0.08	0.15	0.35
Roofs	4,835	14%	90%	0.71	0.73	0.75	0.81
Sidewalk/Hardscape	1,152	3%	100%	0.89	0.90	0.92	0.96
Streets (Paved)	18,142	52%	100%	0.89	0.90	0.92	0.96
	35,157	100%	67%	0.53	0.56	0.60	0.74

Time of Concentration

SUB-BASIN DATA					RUNOFF COEFFICIENT SUMMARY					INITIAL / OVERLAND TIME T_I			TRAVEL TIME T_T					URBANIZED BASIN CHECK T_C			DESIGN T_C (MIN)
DESIGN POINT	DRAIN BASIN	AREA (SF)	AREA (AC)	SOIL TYPE	I (%)	C_2	C_5	C_{10}	C_{100}	LENGTH (FT)	Slope (%)	T_I	LENGTH (FT)	Slope (%)	C	Velocity (FPS)	T_T	T_C	LENGTH (FT)	L/180+10	
A	A	7,121	0.16	B	76%	0.61	0.64	0.67	0.78	25	2.5%	3.1	75	0.75%	20	1.7	0.7	5.0	100	10.6	5.0
B	B	6,605	0.15	B	76%	0.61	0.64	0.67	0.78	25	2.5%	3.1	250	1.00%	20	2.0	2.1	5.2	275	11.5	5.2
C	C	8,046	0.18	B	98%	0.82	0.84	0.85	0.89	40	3.5%	2.0	100	1.00%	20	2.0	0.8	5.0	140	10.8	5.0
R1	R1	4,267	0.10	B	90%	0.74	0.77	0.79	0.85	20	1.0%	2.7						5.0	20	10.1	5.0
R2	R2	572	0.01	B	90%	0.74	0.77	0.79	0.85	55	1.0%	4.5						5.0	55	10.3	5.0
OS1	OS1	7,045	0.16	B	0%	0.00	0.00	0.06	0.43	100	3.5%	13.3						13.3	100	10.6	10.6
OS2	OS2	978	0.02	B	42%	0.31	0.34	0.40	0.63	5	20.0%	1.1						5.0	5	10.0	5.0
OS3	OS3	523	0.01	B	100%	0.84	0.86	0.87	0.90	20	3.0%	1.4						5.0	20	10.1	5.0
TOTAL TO ON-SITE STORM SEWER		20,006	0.46																		
TOTAL DRAINAGE		35,157	0.81																		

Watercourse Coefficient

Forest & Meadow	2.5
Fallow or Cultivation	5.0
Short Grass Pasture & Lawns	7.0
Nearly Bare Ground	10.0
Grassed Waterway	15.0
Paved Area and Shallow Gutter	20.0

CIA Runoff Calculations

2-Year Design Storm Runoff Calculations

(Rational Method Procedure)

BASIN INFORMATON				DIRECT RUNOFF				TOTAL RUNOFF				
DESIGN POINT	DRAIN BASIN	AREA (AC)	C_2	T_C	∑ C*A	I (IN/HR)	Q (CFS)	T_C	∑ C*A	I (IN/HR)	Q (CFS)	REMARKS
A	A	0.16	0.61	5.0	0.10	4.04	0.40					
B	B	0.15	0.61	5.2	0.09	4.00	0.37					
C	C	0.18	0.82	5.0	0.15	4.04	0.61	5.0	0.23	3.29	0.77	Includes Basins C, R1, R2
R1	R1	0.10	0.74	5.0	0.07	4.04	0.29					
R2	R2	0.01	0.74	5.0	0.01	4.04	0.04					
OS1	OS1	0.16	0.00	10.6	0.00	3.15	0.00					
OS1	OS1	0.02	0.31	5.0	0.01	4.04	0.03					
OS3	OS3	0.01	0.84	5.0	0.01	4.04	0.04					

CIA Runoff Calculations

5-Year Design Storm Runoff Calculations

(Rational Method Procedure)

BASIN INFORMATON				DIRECT RUNOFF				TOTAL RUNOFF				REMARKS
DESIGN POINT	DRAIN BASIN	AREA (AC)	C_5	T_C	∑ C*A	I (IN/HR)	Q (CFS)	T_C	∑ C*A	I (IN/HR)	Q (CFS)	
A	A	0.16	0.64	5.0	0.10	5.09	0.53					
B	B	0.15	0.64	5.2	0.10	5.04	0.49					
C	C	0.18	0.84	5.0	0.16	5.09	0.79	5.0	0.24	3.29	0.79	Includes Basins C, R1, R2
R1	R1	0.10	0.77	5.0	0.08	5.09	0.38					
R2	R2	0.01	0.77	5.0	0.01	5.09	0.05					
OS1	OS1	0.16	0.00	10.6	0.00	3.96	0.00					
OS2	OS2	0.02	0.34	5.0	0.01	5.09	0.04					
OS3	OS3	0.01	0.86	5.0	0.01	5.09	0.05					

CIA Runoff Calculations

10-Year Design Storm Runoff Calculations

(Rational Method Procedure)

BASIN INFORMATON				DIRECT RUNOFF				TOTAL RUNOFF				
DESIGN POINT	DRAIN BASIN	AREA (AC)	C_{10}	T_C	∑ C*A	I (IN/HR)	Q (CFS)	T_C	∑ C*A	I (IN/HR)	Q (CFS)	REMARKS
A	A	0.16	0.67	5.0	0.11	5.94	0.65					
B	B	0.15	0.67	5.2	0.10	5.88	0.60					
C	C	0.18	0.85	5.0	0.16	5.94	0.94	5.0	0.24	3.29	0.81	Includes Basins C, R1 & R2
R1	R1	0.10	0.79	5.0	0.08	5.94	0.46					
R2	R2	0.01	0.79	5.0	0.01	5.94	0.06					
OS1	OS1	0.16	0.06	10.6	0.01	4.63	0.04					
OS2	OS2	0.02	0.40	5.0	0.01	5.94	0.05					
OS3	OS3	0.01	0.87	5.0	0.01	5.94	0.06					

CIA Runoff Calculations

100-Year Design Storm Runoff Calculations

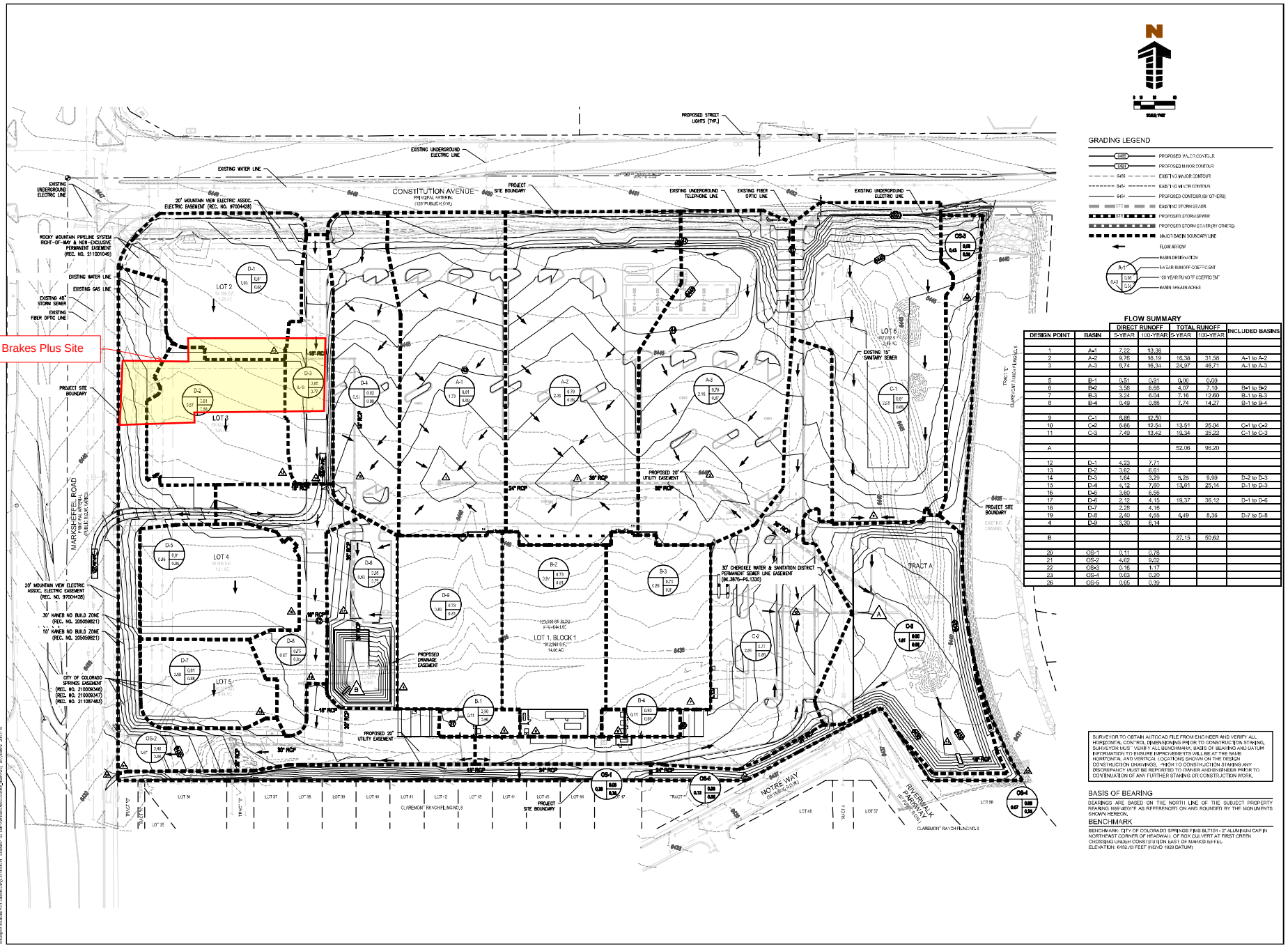
(Rational Method Procedure)

BASIN INFORMATON				DIRECT RUNOFF				TOTAL RUNOFF				REMARKS
DESIGN POINT	DRAIN BASIN	AREA (AC)	C_{100}	T_C	∑ C*A	I (IN/HR)	Q (CFS)	T_C	∑ C*A	I (IN/HR)	Q (CFS)	
A	A	0.16	0.78	5.0	0.13	8.55	1.10					
B	B	0.15	0.78	5.2	0.12	8.47	1.01					
C	C	0.18	0.89	5.0	0.16	8.55	1.40	5.0	0.26	3.29	0.85	Includes Basins C, R1 & R2
R1	R1	0.10	0.85	5.0	0.08	8.55	0.71					
R2	R2	0.01	0.85	5.0	0.01	8.55	0.10					
OS1	OS1	0.16	0.43	10.6	0.07	6.66	0.46					
OS2	OS2	0.02	0.63	5.0	0.01	8.55	0.12					
OS3	OS3	0.01	0.90	5.0	0.01	8.55	0.09					

Design Point Summary

DESIGN POINT	DRAIN BASIN	AREA (AC)	I (%)	Q_2 (CFS)	Q_5 (CFS)	Q_{10} (CFS)	Q_{100} (CFS)
A	A	0.16	76%	0.40	0.53	0.65	1.10
B	B	0.15	76%	0.37	0.49	0.60	1.01
C	C	0.18	98%	0.61	0.79	0.94	1.40
R1	R1	0.10	90%	0.29	0.38	0.46	0.71
R2	R2	0.01	90%	0.04	0.05	0.06	0.10
OS1	OS1	0.16	0%	0.00	0.00	0.04	0.46
OS2	OS2	0.02	42%	0.04	0.04	0.05	0.12
OS3	OS3	0.01	100%	0.00	0.05	0.06	0.09
TOTAL TO ON-SITE STORM SEWER SYSTEM (BASINS A, C, R1 & R2)		0.46	88%	1.34	1.75	2.11	3.31
TOTAL DRAINAGE .(ALL BASINS)		0.81	0.67	1.75	2.33	2.86	4.99

APPENDIX C – EXCERPTS FROM EXISTING DRAINAGE REPORTS



N

SCALE: 1"=60'

GRADING LEGEND

- 6445 — PROPOSED MAJOR CONTOUR
- 6447 — PROPOSED MINOR CONTOUR
- 6458 — EXISTING MAJOR CONTOUR
- 6456 — EXISTING MINOR CONTOUR
- 6454 — PROPOSED CONTOUR (BY OTHERS)
- STS — EXISTING STORM SEWER
- STS — PROPOSED STORM SEWER
- PROPOSED STORM SEWER (BY OTHERS)
- MAJOR BASIN BOUNDARY LINE
- FLOW ARROW
- A-1 — BASIN DESIGNATION
- 0.63 — 5-YEAR RUNOFF COEFFICIENT
- 0.73 — 100-YEAR RUNOFF COEFFICIENT
- 8.43 — BASIN AREA IN ACRES

FLOW SUMMARY

DESIGN POINT	BASIN	DIRECT RUNOFF 5-YEAR	DIRECT RUNOFF 100-YEAR	TOTAL RUNOFF 5-YEAR	TOTAL RUNOFF 100-YEAR	INCLUDED BASINS
1	A-1	7.22	13.36			
2	A-2	9.76	18.19	16.38	31.58	A-1 to A-2
3	A-3	8.74	16.34	24.97	46.71	A-1 to A-3
5	B-1	0.51	0.91	0.00	0.00	
6	B-2	3.38	6.66	4.07	7.19	B-1 to B-2
7	B-3	3.24	6.04	7.16	12.60	B-1 to B-3
8	B-4	0.49	0.88	7.74	14.27	B-1 to B-4
9	C-1	6.86	12.50			
10	C-2	6.66	12.54	13.51	25.04	C-1 to C-2
11	C-3	7.49	13.42	19.34	35.22	C-1 to C-3
A				52.06	96.20	
12	D-1	4.23	7.71			
13	D-2	3.62	6.61			
14	D-3	1.64	3.29	5.28	9.99	D-2 to D-3
15	D-4	4.32	7.60	13.81	25.14	D-1 to D-3
16	D-5	3.60	6.56			
17	D-6	2.12	4.15	19.37	36.12	D-1 to D-6
18	D-7	2.28	4.16			
19	D-8	2.40	4.55	4.49	8.36	D-7 to D-8
4	D-9	3.32	6.14			
B				27.13	50.62	
20	OS-1	0.11	0.78			
21	OS-2	4.02	9.02			
22	OS-3	0.16	1.17			
23	OS-4	0.03	0.20			
26	OS-5	0.05	0.39			

SURVEYOR TO OBTAIN AUTOCAD FILE FROM ENGINEER AND VERIFY ALL HORIZONTAL CONTROL DIMENSIONING PRIOR TO CONSTRUCTION STAKING. SURVEYOR MUST VERIFY ALL BENCHMARK, BASIS OF BEARING AND DATUM INFORMATION TO ENSURE IMPROVEMENTS WILL BE AT THE SAME HORIZONTAL AND VERTICAL LOCATIONS SHOWN ON THE DESIGN CONSTRUCTION DRAWINGS. PRIOR TO CONSTRUCTION STAKING ANY DISCREPANCY MUST BE REPORTED TO OWNER AND ENGINEER PRIOR TO CONTINUATION OF ANY FURTHER STAKING OR CONSTRUCTION WORK.

BASIS OF BEARING

BEARINGS ARE BASED ON THE NORTH LINE OF THE SUBJECT PROPERTY BEARING N89°48'20"E AS REFERENCED ON AND ROUNDED BY THE MONUMENTS SHOWN HEREON.

BENCHMARK

BENCHMARK: CITY OF COLORADO SPRINGS FIRS BLT101 - 2" ALUMINUM CAP IN NORTHEAST CORNER OF HEADWALL OF BOX CULVERT AT FIRST CREEK CROSSING UNDER CONSTITUTION EAST OF MARKSHEFFEL
ELEVATION: 6152.13 FEET (NGVD 1929 DATUM)

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CLAREMONT RANCH FILING NO. 9

CONSTITUTION AND MARKSHEFFL EL PASO COUNTY, COLORADO

#	Date	Issue / Description	Init.
1	7/20/15	2nd Submittal	JPR
2	8/20/15	3rd Submittal	JPR
3	9/14/15	4th Submittal	JPR

Project No:	ED008
Drawn By:	CVR
Checked By:	JJR
Date:	05/30/15

SHEET TITLE:
DRAINAGE PLAN

DR2

PROJECT: Marksheffel/Constitution Project Site
LOCATION: Marksheffel Rd. and Constitution Ave

Project No.: EDI8.01
Date: September 14, 2015
Engineer: Gary Iwata

100-YR RUNOFF COMPUTATIONS (RATIONAL METHOD)

BASIN INFORMATION				DIRECT RUNOFF				TOTAL RUNOFF				PIPE			TRAVEL TIME			REMARKS
DESIGN PT.	BASIN	AREA (acres)	RUNOFF COEFF.	Tc (min)	C x A (acres)	I (in/hr)	Q (cfs)	Tc (min)	∑C x A (acres)	I (in/hr)	Q (cfs)	DESIGN FLOW (cfs)	SLOPE (%)	PIPE SIZE (in)	LENGTH (ft)	VELOCITY (ft/s)	t_t (min)	
1	A-1	1.73	0.89	5.00	1.54	8.68	13.38					13.38	0.50%	24	193	4.26	0.76	
2	A-2	2.39	0.88	5.00	2.10	8.68	18.19	5.00	3.64	8.68	31.58	31.58	0.50%	36	193	7.15	0.45	
3	A-3	2.16	0.87	5.00	1.88	8.68	16.34	5.45	5.52	8.46	46.71	46.71	0.50%	36	261	7.60	0.57	
5	B-1	0.11	0.96	5.00	0.10	8.68	0.91					0.91	0.40%	18	48.00	0.51	1.57	
6	B-2	0.97	0.81	5.36	0.78	8.50	6.66	6.57	0.89	7.99	7.10	7.10	0.40%	24	120.00	1.35	1.48	
7	B-3	0.88	0.81	5.36	0.71	8.50	6.04	6.84	1.60	7.89	12.60	12.60	0.40%	24	37.80	2.69	0.23	
8	B-4	0.11	0.96	5.00	0.10	8.68	0.88	5.60	1.70	8.40	14.27	14.27	0.40%	24	336.00	4.61	1.21	
9	C-1	2.05	0.88	9.96	1.80	6.94	12.50					12.50						
10	C-2	2.09	0.86	9.96	1.81	6.94	12.54	9.96	3.61	6.94	25.04	25.04	0.40%	24	53.10	2.02	0.44	
11	C-3	1.61	0.96	5.00	1.55	8.68	13.42	10.39	5.15	6.84	35.22	35.22						
A		**14.09**									**96.20**	96.20						**TOTAL TO SE POND**
12	D-1	1.03	0.88	5.44	0.91	8.47	7.71					7.71	1.50%	18	257	4.36	0.98	
13	D-2	0.87	0.88	5.00	0.76	8.68	6.61					6.61	0.70%	18	13.2	3.74	0.06	
14	D-3	0.49	0.77	5.00	0.38	8.68	3.29	5.00	1.14	8.68	9.90	9.90	1.90%	18	61.9	5.60	0.18	
15	D-4	0.97	0.90	5.00	0.88	8.68	7.60	5.18	2.93	8.59	25.14	25.14	1.50%	24	198	8.09	0.41	
16	D-5	0.86	0.88	5.00	0.76	8.68	6.56				-	6.56	2.00%	18	71.00	3.71	0.32	
17	D-6	0.63	0.75	5.00	0.48	8.68	4.15	5.00	4.16	8.68	36.12	36.12	1.50%	30	31.80	7.36	0.07	
18	D-7	0.55	0.88	5.00	0.48	8.68	4.16				-	4.16	2.00%	18	8.00	2.35	0.06	
19	D-8	0.67	0.85	6.70	0.57	7.94	4.55	6.70	1.05	7.94	8.36	8.36	2.00%	18	60.00	4.73	0.21	
	D-9	0.89	0.81	5.36	0.72	8.50	6.14					6.14	2.00%	12	24.00	9.48	0.04	
B		**6.97**									**50.62**	50.62						**TOTAL TO SW POND**
20	OS-1	0.38	0.35	15.36	0.13	5.85	0.78											
21	OS-2	1.67	0.66	6.02	1.10	8.21	9.02											
22	OS-3	0.43	0.35	7.17	0.15	7.77	1.17											
23	OS-4	0.07	0.35	5.70	0.02	8.35	0.20											
26	OS-5	0.13	0.35	5.00	0.04	8.68	0.39											
24	H-1	1.35	0.35	7.93	0.47	7.52	3.55											
25	H-2	22.15	0.35	19.00	7.75	5.32	41.20											

Use minimum Time of Concentration = 5 minutes
Use composite coefficients

PROJECT: Lot 2, Claremont Ranch Filing No. 9B
LOCATION: Marksheffel Rd. and Constitution Ave
Colorado Springs, El Paso County

Project No.: EDI0040
Date: January 24, 2018
Engineer: Jenny Romano

*PERCENT IMPERVIOUS VALUES	
LANDSCAPE	0
PAVING	100
ROOFING	90
COMMERCIAL	95

* RUNOFF COEFFICIENTS USED	2-Year	5-Year	10-year	100-Year
LANDSCAPE	0.02	0.08	0.15	0.35
PAVING	0.89	0.90	0.92	0.96
ROOFING	0.71	0.73	0.75	0.81
COMMERCIAL	0.79	0.81	0.83	0.88

* Table 6-6 in CO Springs, Drainage Criteria Manual Revised May 2014

Composite Runoff Coefficients and Percent Imperviousness for Developed Drainage Basins

BASIN DESIG.	OVERALL AREA (sf)	LANDSCAPE AREA (sf)	PAVED AREA (sf)	ROOF AREA (sf)	COMMERCIAL AREA (sf)	2-YEAR COEFF.	5-YEAR COEFF.	10-YEAR COEFF.	100-YEAR COEFF.	PERCENT IMPERVIOUS
D-2A	19,537	0	0	0	19,537	0.79	0.81	0.83	0.88	95%
D-2B	13,785	1,372	12,413	0	0	0.80	0.82	0.84	0.90	90%
D-2C	2,303	0	0	2,303	0	0.71	0.73	0.75	0.81	90%
D-2D	8,949	2,242	6,707	0	0	0.67	0.69	0.73	0.81	75%
D-3	19,164	5,033	14,131	0	0	0.66	0.68	0.72	0.80	74%
TOTAL D	**63,738**	**8,647**	**33,251**	**2,303**	**19,537**					**85%**
OS-1	696	377	319	0	0	0.42	0.46	0.50	0.63	46%
OS-2A	9,820	6,687	3,133	0	0	0.30	0.34	0.40	0.54	32%
OS-3	1,324	792	532	0	0	0.37	0.41	0.46	0.60	40%
TOTAL OS	**11,840**	**7,856**	**3,984**	**0**	**0**					**34%**
TOTAL LOT 2B	**75,578**	**16,503**	**37,235**	**2,303**	**19,537**					**77%**

PROJECT: Lot 2, Claremont Ranch Filing No. 9B
LOCATION: Marksheffel Rd. and Constitution Ave

Project No.: EDI0040
Date: January 24, 2018
Engineer: Jenny Romano

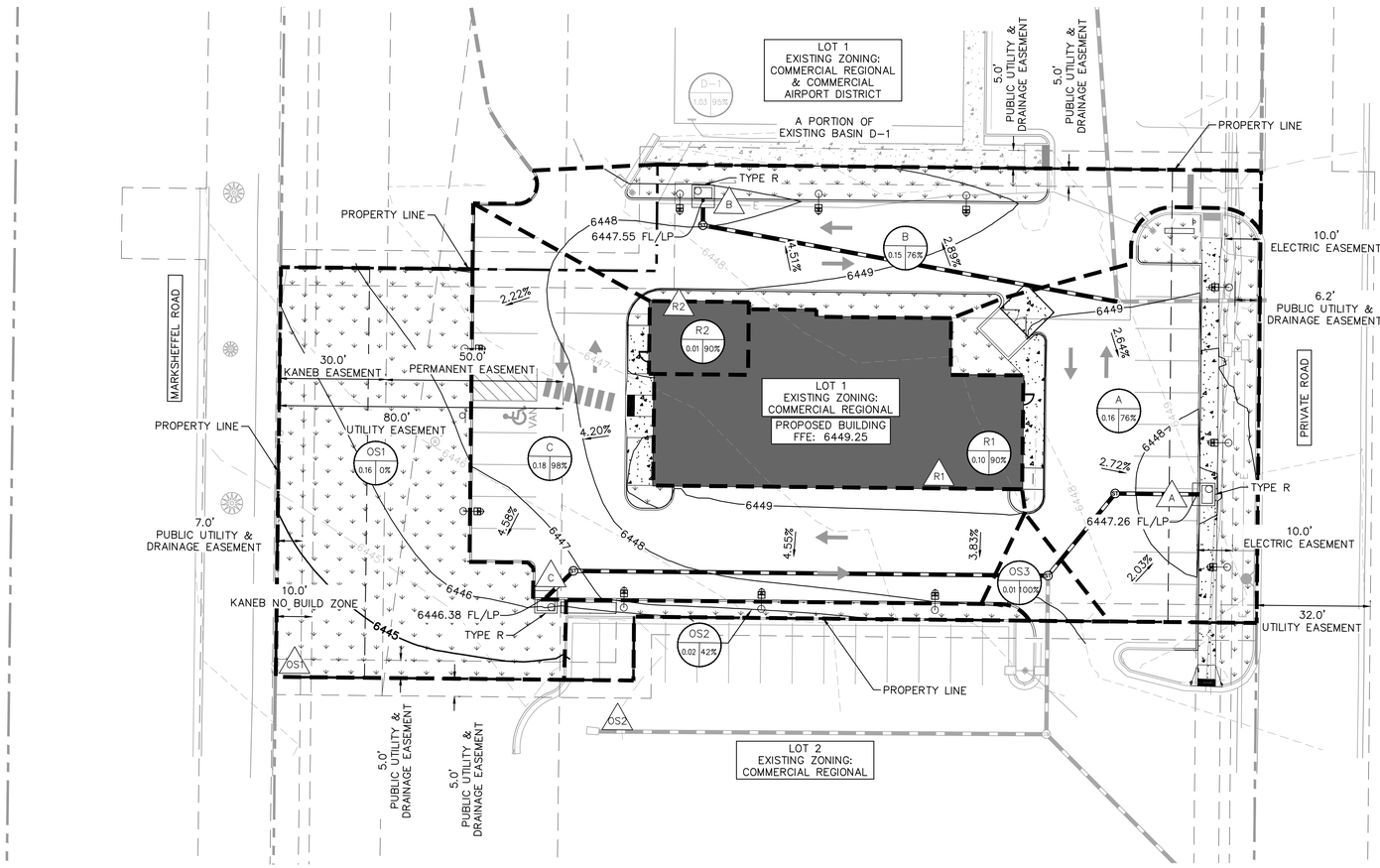
100-YR RUNOFF COMPUTATIONS (RATIONAL METHOD)

BASIN INFORMATION				DIRECT RUNOFF				TOTAL RUNOFF				REMARKS
DESIGN PT.	BASIN	AREA (acres)	RUNOFF COEFF.	Tc (min)	C x A (acres)	I (in/hr)	Q (cfs)	Tc (min)	∑C x A (acres)	I (in/hr)	Q (cfs)	
1	D-2A	0.45	0.88	5.00	0.39	8.68	3.43					
2	D-2B	0.32	0.90	5.00	0.28	8.68	2.47					
3	D-2C	0.05	0.81	5.00	0.04	8.68	0.37	5.00	0.33	8.68	2.84	Basins D-2B, D-2C
4	D-2D	0.21	0.81	5.00	0.17	8.68	1.44					
Total D-2 Basins								5.00	0.89	8.68	7.71	Basins D-2A, D-2B, D-2C, D-2D
5	OS-1	0.02	0.63	5.00	0.01	8.68	0.09					
6	OS-2A	0.23	0.54	9.49	0.12	7.06	0.87					
7	OS-3	0.03	0.60	5.00	0.02	8.68	0.16					
14	D-3	0.44	0.80	5.00	0.35	8.68	3.05					
Total Lot 2B								9.49	1.04	7.06	7.34	All D-2 Basins and OS Basins

Use minimum Time of Concentration = 5 minutes
Use composite coefficients

APPENDIX D – PHOTOS OF EXISTING DETENTION & WATER QUALITY POND

APPENDIX E – PROPOSED & EXISTING DRAINAGE MAPS



LEGEND

- PROPERTY LINE
- EXISTING EASEMENT
- PROPOSED EASEMENT
- PROPOSED BASIN BOUNDARY
- # – BASIN DESIGNATION
  AC – AREA IN ACRES
  I – IMPERVIOUSNESS PERCENTAGE
- DESIGN POINT
- PROPOSED STORM SEWER
- PROPOSED STORM INLET
- EX. MAJOR CONTOUR
- EX. MINOR CONTOUR
- PROP. MAJOR CONTOUR
- PROP. MINOR CONTOUR
- PROPOSED BUILDING

Design Point Summary

DESIGN POINT	DRAIN BASIN	AREA (AC)	I (%)	Q_2 (CFS)	Q_5 (CFS)	Q_{10} (CFS)	Q_{100} (CFS)
A	A	0.16	76%	0.40	0.53	0.65	1.10
B	B	0.15	76%	0.37	0.49	0.60	1.01
C	C	0.18	98%	0.61	0.79	0.94	1.40
R1	R1	0.10	90%	0.29	0.38	0.46	0.71
R2	R2	0.01	90%	0.04	0.05	0.06	0.10
OS1	OS1	0.16	0%	0.00	0.00	0.04	0.46
OS2	OS2	0.02	42%	0.04	0.04	0.05	0.12
OS3	OS3	0.01	100%	0.00	0.05	0.06	0.09
TOTAL TO ON-SITE STORM SEWER SYSTEM (BASINS A, C, R1 & R2)		0.46	88%	1.34	1.75	2.11	3.31
TOTAL DRAINAGE .(ALL BASINS)		0.81	0.67	1.75	2.33	2.86	4.99

NORTH

GRAPHIC SCALE IN FEET
0 10 20 40

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

NO.	DESCRIPTION	BY	DATE	APPR.

Kimley»Horn

4582 South Ulster Street, Suite 1500
Denver, Colorado 80237 (303) 228-2300

DESIGNED BY: EPF
DRAWN BY: DEK
CHECKED BY: RET
DATE: 03/10/21

BRAKES PLUS - EL PASO
2467 MARKSHEFFEL RD, COLORADO SPRINGS
CONSTRUCTION DOCUMENTS
PROPOSED CONDITION DRAINAGE MAP

PRELIMINARY
FOR REVIEW ONLY
NOT FOR CONSTRUCTION
Kimley»Horn
Kimley-Horn and Associates, Inc.

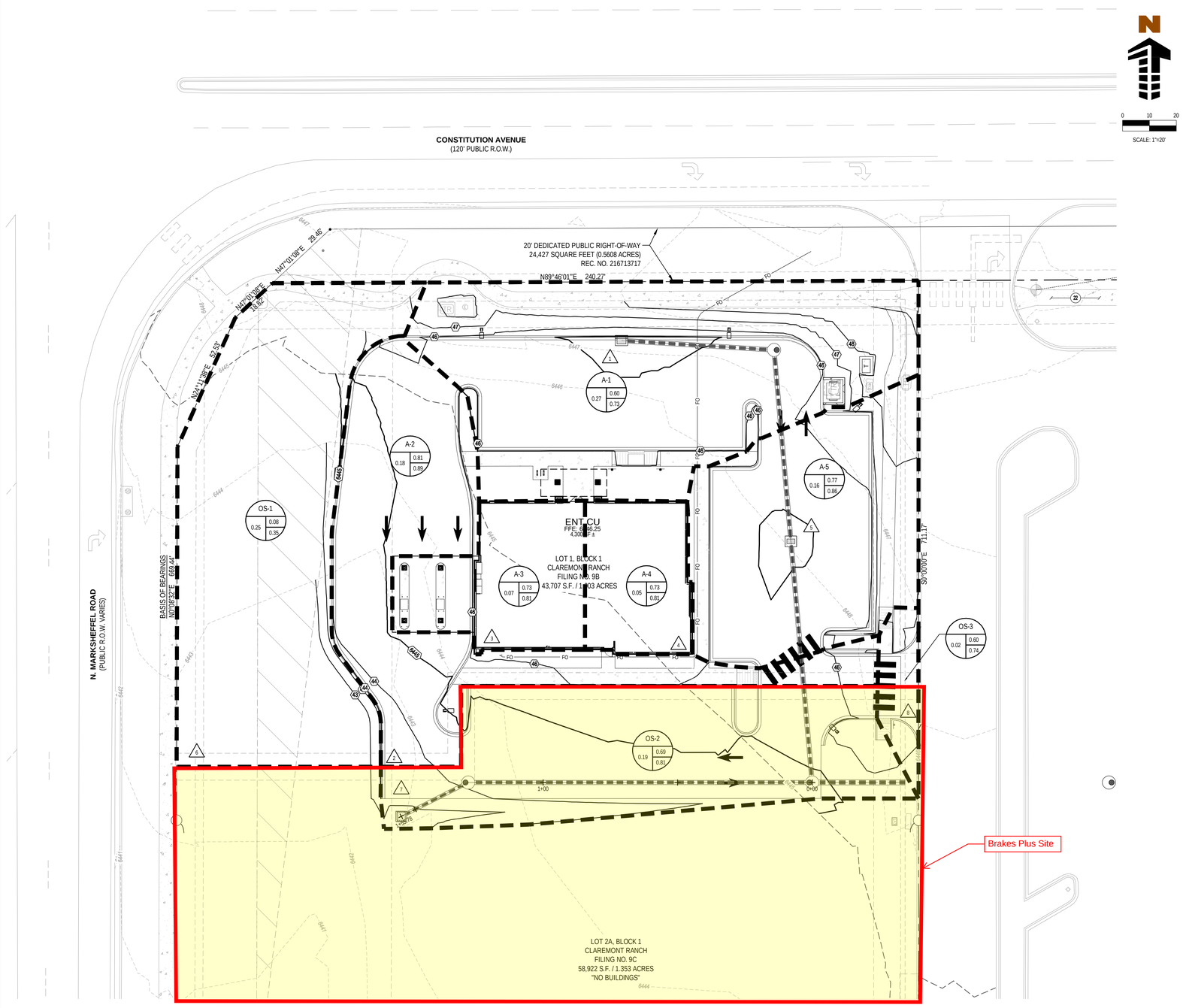
PROJECT NO.
096908003

SHEET NO.

ENT CREDIT UNION

SITE DEVELOPMENT PLAN

LOT 1, BLOCK 1, CLAREMONT RANCH FILING NO. 9B
PART OF THE NORTHWEST 1/4 OF SECTION 4, TOWNSHIP 14 SOUTH, RANGE 65 WEST OF THE 6TH P.M.,
CITY OF COLORADO SPRINGS, COUNTY OF EL PASO, STATE OF COLORADO



DRAINAGE LEGEND

- PROPERTY BOUNDARY LINE
- ADJACENT PROPERTY BOUNDARY LINE
- EASEMENT BOUNDARY LINE
- PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- EXISTING STORM SEWER
- PROPOSED STORM SEWER
- EXISTING MANHOLE
- PROPOSED MANHOLE
- PROPOSED INLETS
- EXISTING BASIN BOUNDARY
- PROPOSED BASIN BOUNDARY

A-1 0.43 0.08 0.35

- PROPOSED BASIN DESIGNATION
- 5-YEAR RUNOFF COEFFICIENT
- 100-YEAR RUNOFF COEFFICIENT
- BASIN AREA IN ACRES

RUNOFF COEFFICIENT TABLE

	EXISTING COEFFICIENTS		PROPOSED COEFFICIENTS	
	5-YEAR	100-YEAR	5-YEAR	100-YEAR
COMPOSITE COEFFICIENT	0.65	0.77	0.55	0.70

FLOW SUMMARY

DESIGN POINT	BASIN	DIRECT RUNOFF 5-YEAR	DIRECT RUNOFF 100-YEAR	TOTAL RUNOFF 5-YEAR	TOTAL RUNOFF 100-YEAR	INCLUDED BASINS
1	A-1	0.83	1.72			
2	A-2	0.77	1.43			
3	A-3	0.27	0.50			
4	A-4	0.27	0.36			
5	A-5	0.65	1.22			
Total A Basins				2.79	5.23	Basins A-1, A-2, A-3, A-4, A-5
6	OS-1	0.11	0.77			
7	OS-2	0.67	1.31			
8	OS-3	0.06	0.12			
Total ALL Basins				3.63	7.43	All A Basins and OS Basins

PCD FILE NO. PPR-18-012

Galloway
Planning. Architecture. Engineering.
6162 S. Willow Drive, Suite 320
Greenwood Village, CO 80111
303.770.8884 O
www.gallowayUS.com

ENT CREDIT UNION
SITE DEVELOPMENT PLAN
LOT 1, BLOCK 1,
CLAREMONT RANCH FILING NO. 9B

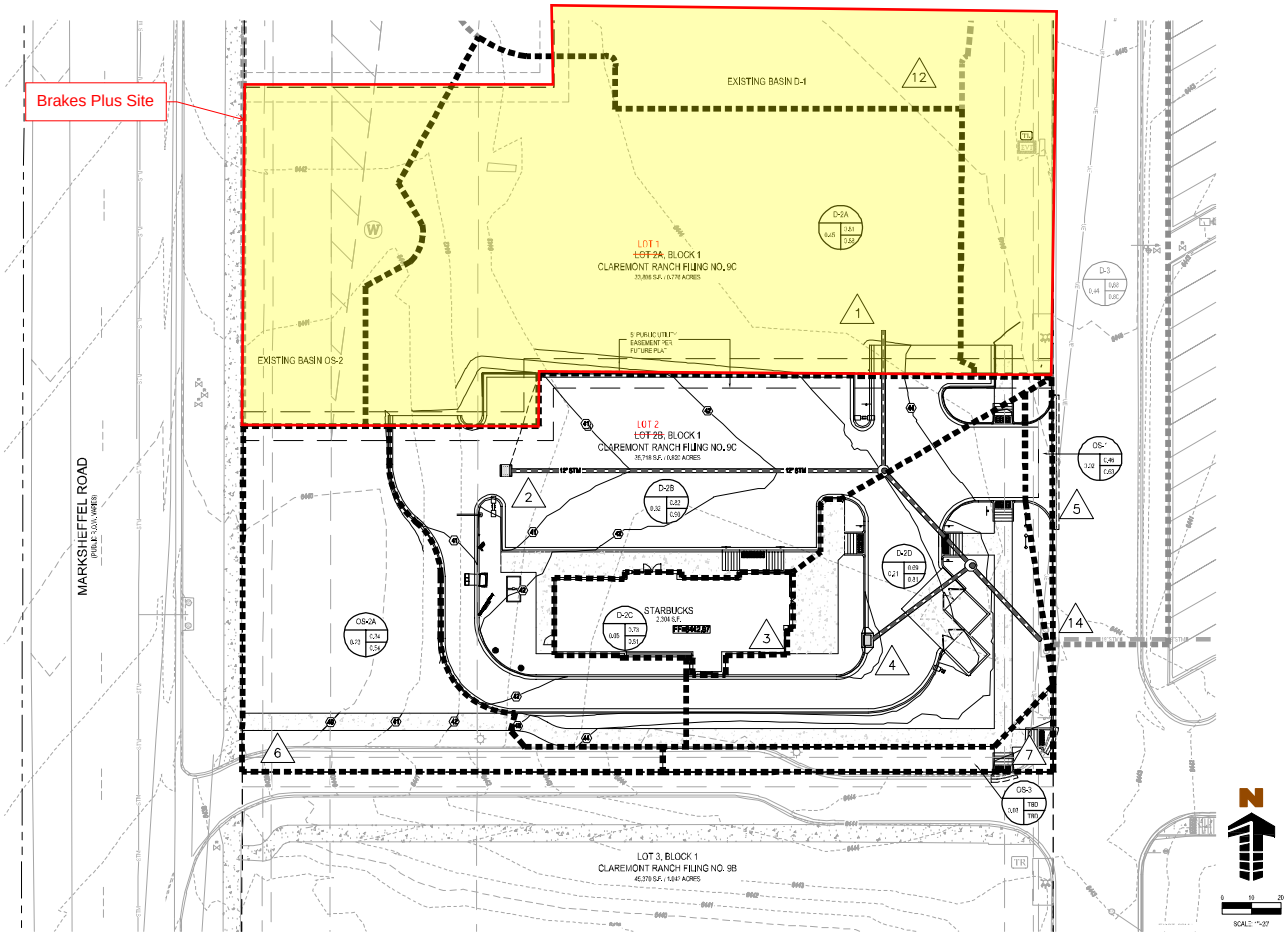
MARKSHEFFEL RD. AND CONSTITUTION AVE
COLORADO SPRINGS, COLORADO

#	Date	Issue / Description	Init.

Project No:	ECU007
Drawn By:	JSB
Checked By:	JRR
Date:	03/02/18

Existing Conditions
Drainage Map

EXHIBIT



DRAINAGE LEGEND

- PROPERTY BOUNDARY LINE
- ADJACENT PROPERTY BOUNDARY LINE
- EASEMENT BOUNDARY LINE
- PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- EXISTING 8" DRY SEWER
- PROPOSED STORM SEWER
- EXISTING MANHOLE
- PROPOSED MANHOLE
- PROPOSED INLETS
- EXISTING BASIN BOUNDARY
- PROPOSED BASIN DESIGNATION
- 5-YEAR RUNOFF COEFFICIENT
- 100-YEAR RUNOFF COEFFICIENT
- BASIN AREA IN ACRES
- EXISTING BASIN DESIGNATION
- 5-YEAR RUNOFF COEFFICIENT
- 100-YEAR RUNOFF COEFFICIENT
- BASIN AREA IN ACRES

FLOW SUMMARY

DESIGN POINT	BASIN	DIRECT RUNOFF 5-YEAR	DIRECT RUNOFF 100-YEAR	TOTAL RUNOFF 5-YEAR	TOTAL RUNOFF 100-YEAR	INCLUDED BASINS
1	D-2A	1.88	3.43			
2	D-2B	1.34	2.47			
3	D-2C	0.20	0.37	1.54	2.84	Basins D-2B, D-2C
4	D-2D	0.74	1.44			
Total D-2 Basins				4.15	7.71	Basins D-2A, D-2B, D-2C, D-2D
5	OS-1	0.04	0.09			
6	OS-2A	0.32	0.87			
7	OS-3	0.06	0.16			
14	D-3	1.98	3.05			
Total Lot 2B				3.79	7.34	All D-2 Basins and OS Basins

SCALE: 1"=20'

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CLAREMONT RANCH FILING NO. 9C
~~LOT 2B~~, BLOCK 1
LOT 2

CONSTITUTION AND MARKSHEFFEL
EL PASO COUNTY, COLORADO

#	Date	Issue / Description	Init.
1	12/22/2017	2nd SUBMITTAL	RDG

Project No:	EDP00040
Drawn By:	RDG
Checked By:	BMR
Date:	11/17/17

Existing Conditions Drainage Map