PYRAMID MOUNTAIN FILING NO. 1

FINALDRAINAGE REPORT

PCD FILE NO: SF-262
ALL TERRAIN ENGINEERING PROJECT NO: 25014
MARCH 2026

PREPARED FOR:
ANDY MULLET
1790 ALLEGHENY DR.
COLORADO SPRINGS, CO 80919

PREPARED BY:
ALL TERRAIN ENGINEERING LLC
CONTACT: RYAN BURNS
RBURNS@ALLTERRAINENG.COM
(203) 577-8656

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 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.

3/03/26

Ryan E. Burns, PE Date

State of Colorado No. 54412

For and on behalf of All Terrain Engineering LLC

DEVELOPER'S STATEMENT

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

Andy Mullet 03/03/2026

Andrew Mullet Date

845 Uintah Bluffs PL. Colorado Springs, CO 80904

EL PASO COUNTY ONLY

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.

Daniel Torres, P.E. Digitally signed by Daniel Torres, P.E. Reason: Authorized signatory as County Engineer designee Date: 2026.04.22 16:05:37-06'00' 4/22/2026

Joshua J. Palmer, P.E. Date

County Engineer/ECM Administrator

Conditions:

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Appendices

I. General Purpose, Location & Description

a. Purpose

The purpose of this Final Drainage Report (FDR) for PYRAMID MOUNTAIN FILING NO. 1 is to describe the site's onsite and offsite drainage patterns, existing and proposed storm infrastructure, and to safely route developed stormwater to adequate outfalls. Furthermore this report is intended to support the Final Plat of a (1) single-family residential lot, including the construction of a home, associated ADU, accessory structure and the required site improvements, including a driveway access & grading improvement.

b. Location

PYRAMID MOUNTAIN FILING NO. 1, referred to as 'the site' herein, is a portion of the East Half of the Southwest Quarter of Section 23, Township 13 South, Range 68 West of the 6th P.M. lying northeasterly of Pyramid Mountain Road and Southerly of Parcel A (Tract 4) described in Warranty Deed recorded November 15th, 2010 under Reception No. 210114996, County of El Paso, State of Colorado. The site is also known as El Paso County Parcel No. 832300026. The site is bound by Pyramid Mountain Road on the West & South. West of Pyramid Mountain Road is a mix of private unplated parcels & lots within the Cascade Pines Subdivision Filings No. 1 & 2. Private Parcels 8323000027 & 8323000034 border the site to the East & North respectively. A vicinity map is presented in Appendix A.

c. Description of Property

The site comprises an area of 15.8 acres per El Paso County Assessor data for parcel # 832300026 , although, it is proposed to be plated as 16.95 acres per the surveyor. The parcel is currently undeveloped land with the exception of an existing gravel access & associated 20' "Perpetual Water Line Inflow Easement BK. 6672, Pg. 918. Existing vegetation consists of native vegetation including scrub oak, other shrubs and bushes, grasses, and Pine trees including Ponderosa's that provide approximately 60% coverage.

In general, the parcel slopes southwest with slopes ranging from 5% to 75% and elevations range from 7,615' to 8,190'. Per a NRCS soil survey, the site is made up of Type B Peyton sandy loam, Type B Tecolote sandy loam & Type D Sphinx-Rock outcrop complex. The NRCS soil survey is presented in Appendix A.

The site is proposed to be plated as a Single Family Residential Lot, zoned PUD. Site improvements are anticipated to include a driveway access, a main residence, and accessory structures including a guest house/ADU & a barn/garage. Total disturbance is anticipated to be less than an acre and the associated imperviousness will be less than 10%.

The site was previously analyzed within the "*Master Development & Preliminary Drainage Report Pyramid Mountain Development"* by JDS-Hydro Consultants, Inc, Dated June 2007. However, this report was created to support a larger development. Applicable excerpts have been included in Appendix D.

d. Floodplain Statement

Based on FEMA Firm map 08041C0489G dated December 7, 2018, the site is Zone D, which are areas in which flood hazards are undetermined, but possible.

II. Drainage Basins

a. Major Basin Description

The site is located within the Fountain Creek major drainage basin, and more specifically part of the Williams Canyon sub-Basin (FOFO7200). Applicable excepts from the *"Fountain Creek Drainage Basin Planning Study"* by Muller Engineering Company, Dated July, 1994 are included in Appendix D. There is not an established basin and bridge fee for this part of the Fountain Creek Basin, known as "Williams Canyon FOFO7200" per the EPC Drainage Basin Map.

b. Existing Subbasin Description

The existing site's drainage patterns are relatively uniform. In general, the site lies below a ridge to the east. Runoff sheet flows south and west from the ridge, and across the site towards Pyramid Mountain Road in numerous drainage paths that distribute flows across the site's interface with Pyramid Mountain Road. Multiple site visits were conducted to better understand the site's drainage patterns and conditions. No evidence of erosion was observed, and the site was highly vegetated with mature trees, grasses, and bushes. Existing culverts showed no signs of over-topping, erosion, or needs for maintenance. It is believed the site's existing natural drainage systems are adequate, functioning, and stable. An existing drainage map is presented in Appendix E.

Basin EX-A is 21.3 acres of undeveloped, mountainous land spanning from the ridgeline on the east to Pyramid Mountain Road on the west. Runoff Q5 = 7.1 cfs, Q100 = 41.5 cfs, sheet flows west/southwest towards Pyramid Mountain Road. Flows continue to the road distributed in numerous faintly defined drainages, represented by DP1 on the Existing Conditions Drainage Map included in Appendix E. Flows continue to Fountain Creek per historic drainage paths.

Basin EX-B is 11.3 acres of undeveloped, mountainous land spanning from the ridgeline on the east to Pyramid Mountain Road on the west. Runoff Q5 = 3.7 cfs, Q100 = 21.6 cfs, sheet flows west towards Pyramid Mountain Road at DP2. Flows continue off-site at DP2, and enter an existing 24" ductile iron culvert pipe where they are piped under Pyramid Mountain Road and then continue to Fountain Creek per historic drainage patterns. The culvert is adequate and meets EPC criteria for conveying the 100-yr existing flows. See Appendix C for hydraulic calculations.

Basin EX-C is 2.2 acres of mainly undeveloped, mountainous land spanning from the ridgeline on the east to Pyramid Mountain Road on the west. An existing gravel access road, approximately 8' wide spans the length of this basin and is used to access an existing water tank above and east of the site. Runoff Q5 = 1.0 cfs, Q100 = 5.1 cfs, sheet flows west towards Pyramid Mountain Road. Flows leave the site, and enter the ROW at DP3 and continue west to Fountain Creek per historic drainage paths. An Existing Conditions Drainage Map included in Appendix E.

Basin EX-D is 3.3 acres of undeveloped, mountainous land spanning from the ridgeline on the east to Pyramid Mountain Road on the west. Runoff Q5 = 1.2 cfs, Q100 = 7.2 cfs, sheet flows west/southwest towards Pyramid Mountain Road. Flows continue to the road @ DP4, distributed across the site's interface with Pyramid Mountain Road. Flows continue west/southwest to Fountain Creek per historic drainage paths. An Existing Conditions Drainage Map included in Appendix E.

c. Proposed Subbasin Description

The proposed site will generally preserve all existing drainage patterns and paths. The majority of the site will remain undeveloped and existing vegetation will be preserved to the extent practical. The proposed conditions this report supports is:

- Platting a single-family residential lot, considered "large lot residential" per the EPC criteria and code
- Construction of multiple structures and associated grading, access, utility, and drainage improvements. (private well and septic)
- Disturbance and grading will be minimized by conforming to the existing grades and slopes with the proposed drive and structures to the extent practical

Basin A (same area as EX-A) is 21.3 acres of mountainous land spanning from the ridgeline on the east to Pyramid Mountain Road on the west. Three structures (single-family residential home, ADU, & accessory-

structure/barn) and associated gravel drive, grading, and utility services are proposed within this basin. Runoff Q5 = 7.78 cfs, Q100 = 42.3 cfs, sheet flows west/southwest towards Pyramid Mountain Road. Flows continue to the road distributed in numerous faintly defined drainages, represented by DP1 on the Proposed Conditions Drainage Map included in Appendix E. Flows continue to Fountain Creek per historic drainage paths.

Basin B1 is 7.0 acres of mountainous land spanning from the ridgeline on the east to Pyramid Mountain Road on the west. Existing Basin EX-B was split into two basins (B1 and B2) for the proposed conditions analysis. Basin B1 will remain largely undeveloped, except for a proposed 12' wide gravel access drive and associated grading. Runoff Q5 = 2.5 cfs, Q100 = 13.6 cfs, sheet flows west/southwest towards DP2.1(Q5 = 4.1cfs, Q100 = 22.7 cfs), where they combine with flows from Basin B2. Combined flows enter the existing 24" ductile iron culvert pipe where they are piped under Pyramid Mountain Road and then continue to Fountain Creek per historic drainage patterns. The culvert is adequate and meets EPC criteria for conveying the 100-yr proposed flows and the natural drainage below and above the culvert appears to be stable and in good condition. No channel improvements are necessary to accommodate the proposed flows, as is evident by the hydraulic calculations and photo provided in Appendix C.

Basin B2 is 4.3 acres of mountainous land spanning from the ridgeline on the east to the proposed 12' wide gravel access drive @ DP2. Basin B2 remains entirely undeveloped and represents the tributary area to the proposed 24" culvert at DP 2. Runoff Q5 = 2.0 cfs, Q100 = 11.1 cfs, sheet flows west/southwest towards DP2 where flows enter the proposed 24" culvert pipe where they are piped under the proposed gravel drive, and into Basin B1. The culvert is adequate and meets EPC criteria for conveying the 100-yr proposed flows. See Appendix C for hydraulic calculations. Flows continue per Basin B1 patterns and continue to and combine with Basin B1 flows at DP2.1. Combined flows then continue to Fountain Creek per historic drainage patterns.

Basin C is 2.2 acres of mainly undeveloped, mountainous land spanning from the ridgeline on the east to Pyramid Mountain Road on the west. An existing gravel access road, approximately 8' wide spans the length of this basin and is used to access an existing water tank above and east of the site. The on-site portions of this access drive will be utilized and widened from approximately 8' to 12', which minimizes the disturbance area and additional imperviousness. Runoff Q5 = 1.0 cfs, Q100 = 5.1 cfs, sheet flows west towards Pyramid Mountain Road. Flows leave the site and enter the ROW at DP3 and continue west to Fountain Creek per historic drainage paths. A Proposed Conditions Drainage Map included in Appendix E.

Basin D remains unchanged from its existing condition as described by basin EX-D above, is 3.3 acres of undeveloped, mountainous land spanning from the ridgeline on the east to Pyramid Mountain Road on the west. Runoff Q5 = 1.2 cfs, Q100 = 7.2 cfs, sheet flows west/southwest towards Pyramid Mountain Road. Flows continue to the road @ DP4, distributed across the site's interface with Pyramid Mountain Road. Flows continue west/southwest to Fountain Creek per historic drainage paths. A Proposed Conditions Drainage Map included in Appendix E.

Below is a design point flow comparison table between the existing and proposed conditions.

EXISTING VS. PROPOSED DESIGN POINT COMPARISON TABLE						
DP#	$Q_{5\text{-YR}}$			$Q_{100\text{-YR}}$		
	EX	PROP.	%Δ	EX	PROP.	%Δ
1	7.1	7.7	7.8%	41.5	42.3	1.9%
2/2.1	3.7	4.1	10.4%	21.6	22.7	5.0%
3	1.0	1.0	2.1%	5.1	5.1	-0.1%
4	1.2	1.2	0.0%	7.2	7.2	0.0%

The proposed condition flows remain generally consistent with the existing condition flows, as the overall imperviousness has been limited to less than 5% in all basins. The maximum increase in flow for the 100-year storm is seen at Design Point 2/2.1, and at only 5% and 1.1 cfs is anticipated to have no noticeable affects on-site or downstream on adjacent properties. Please see the hydraulic calculations included in Appendix C for the existing culvert and downstream channel at DP2.1. These calculations show that the channel will remain stable for the proposed 100-yr flows in its existing condition. Design point 1, basin A also saw a minor increase in flows for the 100-yr event (<2%), but this increase in flows will not cause any negative or undesirable affects on the site or surrounding properties. These flows are distributed across the basins width and interface with Pyramid Mountain Road resulting in shallow sheet flow conditions with undefined drainage paths. No evidence of erosion was observed on site or adjacent within this basin or any other basins. The existing drainage paths and infrastructure for all basins, including the existing 24" ductile iron culvert at DP2.1 and the associated existing downstream drainage are adequate and will remain stable with the development of this site.

III. Drainage Design Criteria

a. Development Criteria Reference

The drainage analysis follows the criteria from the "Drainage Criteria Manual County of El Paso, Colorado" Volumes 1 and 2," as amended.

b. Hydrologic Criteria

Hydrologic criteria and runoff calculations are per the "Drainage Criteria Manual County of El Paso, Colorado Volume 1 Update" – Chapter 6 Hydrology. Onsite drainage improvements are designed for the 5-year storm (minor event) and 100-year storm (major event).

c.

d. Hydraulic Criteria

Hydraulic criteria for storm sewer and open channel sizing were obtained from the "Drainage Criteria Manual County of El Paso, Colorado" Chapter 9 Culvert Design and Chapter 10 Open Channels and Structures. Culvert calculations were performed using Hydraflow Express AutoCAD extension.

IV. Drainage Facility Design

a. General Concept

The proposed site will generally preserve all existing drainage patterns and paths. The majority of the site will remain undeveloped and existing vegetation will be preserved to the practical extent. The proposed drive will follow existing grades and leave existing drainage patterns unchanged. One culvert is proposed in order to allow the proposed access drive to cross a natural drainage path at reasonable slopes for vehicular traffic. Proposed structures will confirm to the existing slopes and grades where possible, to minimize grading and disturbance areas.

b. Water Quality & Detention

The site is considered a "Large Lot single family home site", in excess of 2.5 acres with an overall imperviousness of less than 20% (proposed overall imperviousness = 1.4%). As detailed above, existing infrastructure and drainage paths are adequate to safely convey developed flows and will not cause any negative on-site or downstream affects. The site is excluded from water quality requirements per ECM Appendix I.7.1.B.5 "Large Lot Single Family Sites".

c. Major Drainageways

There are no major drainageways on-site or adjacent to the site.

d. Operations & Maintenance

There are no post construction permanent control measures proposed with the report. All required maintenance activities will be the responsibility of the property owner and limited to typical residential maintenance activities.

e. Grading & Erosion Control Plan

Due to the nature of the project being considered a "Large lot single family home construction" site, no ESQCP is required per ECM Section 5.6.3.

f. Four Step Method

Step 1 – Reducing Runoff Volumes: Overall imperviousness was limited to <2%. Where possible, the existing gravel access will be utilized as part of the new proposed driveway, which minimizes new imperviousness and new compaction and therefore minimizes runoff volumes. Surface treatments such as gravel instead of hardscapes were selected to further reduce runoff volumes and preserve the site's natural and existing conditions.

Step 2 – Treat and slowly release the WQCV: The site is excluded from water quality requirements per ECM Appendix I.7.1.B.5 "Large Lot Single Family Sites". However, It should be noted that proposed impervious areas are located far from any property line and upstream from naturally vegetated and stable areas that will help to slow water and promote infiltration and treatment through natural processes.

Step 3 – Stabilize stream channels: All new and re-development projects are required to construct or participate in the funding of channel stabilization measures. Drainage basin fees paid, at the time of platting, go towards channel stabilization with the drainage basin. No Fees are due in this basin, however, the existing onsite, downstream, and adjacent drainageways are stable and adequate and expected to remain stable and adequate in the proposed, developed condition. A 24" RCP culvert pipe has been proposed to maintain the existing drainage patterns on the site, post development. This pipe will allow the existing flows to by-pass the proposed driveway bench, unimpeded. This improvement helps to preserve the stability of the existing on-site channel.

Step 4 – Consider the need for source controls: No industrial or commercial uses are proposed within this development and therefore no source controls are proposed.

g. Drainage Basin & Bridge Fees

The site is located within the Fountain Creek Drainage Basin. There is not an established basin and bridge fee for this part of the Fountain Creek Basin, known as "Williams Canyon FOFO7200" per the EPC Drainage Basin Map.

h. Engineer's Opinion of Probable Cost

Provided within Appendix D.

Summary

PYRAMID MOUNTAIN FILING NO. 1 remains consistent with pre-development drainage conditions with the construction of the recommended drainage improvements. The proposed development will not adversely affect downstream stormwater infrastructure, properties, or surrounding developments. This report meets the latest EL Paso County criteria.

V. References

I. El Paso County – Drainage Criteria Manual, 2018 as amended.

II. Urban Storm Drainage Criteria Manual, Mile High Flood District, March 2024.

III. Federal Emergency Management Agency, Flood Map Service Center - https://msc.fema.gov/portal/home, September 2024.

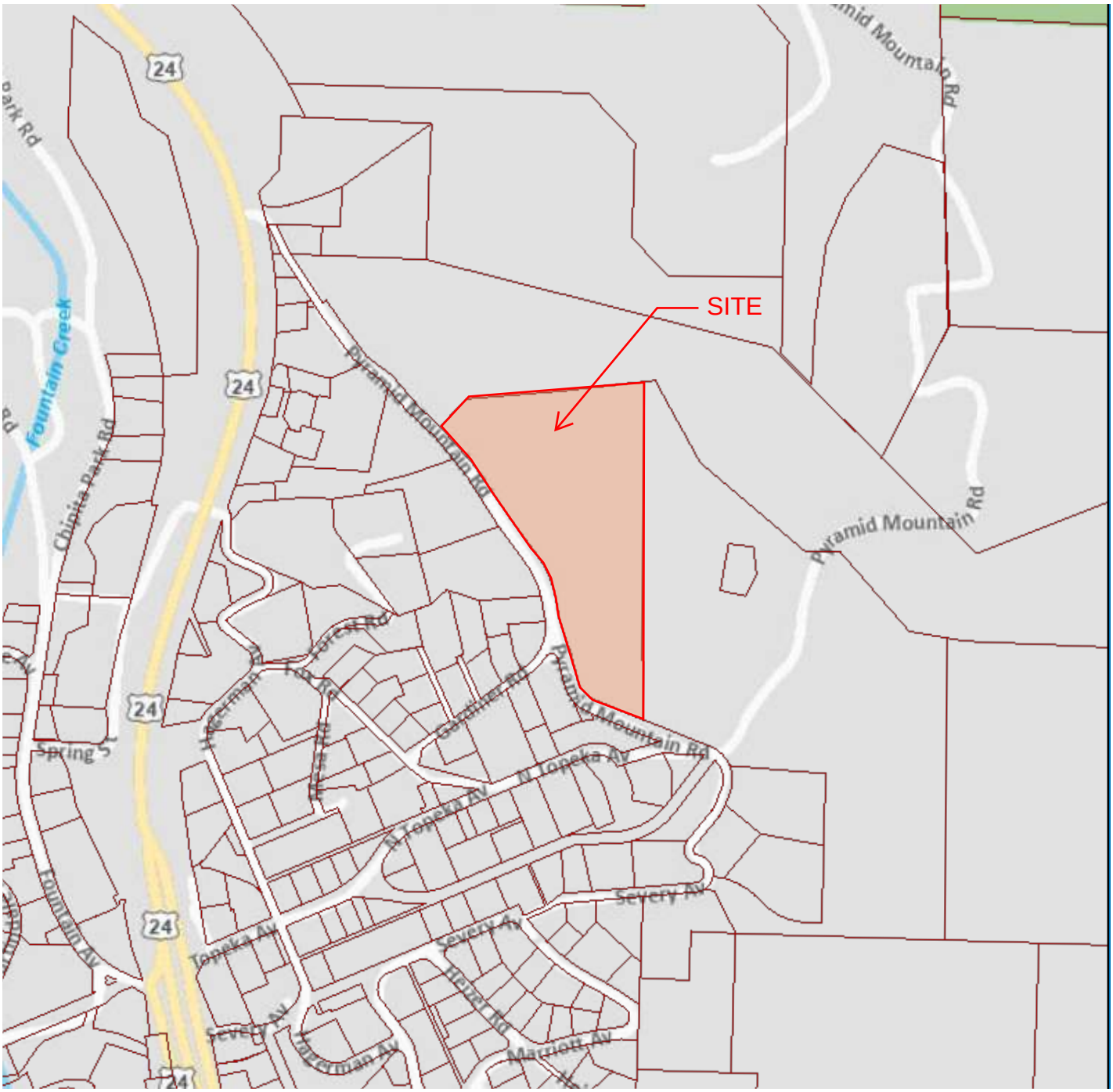
IV. Web Soil Survey, Natural Resources Conservation Service - https://websoilsurvey.nrcs.usda.gov/app/, September 2024.

V. "*Master Development & Preliminary Drainage Report Pyramid Mountain Development"* by JDS-Hydro Consultants, Inc, Dated June 2007

VI. *"Fountain Creek Drainage Basin Planning Study"* by Muller Engineering Company, Dated July, 1994 are included in Appendix D.

APPENDIX A – VICINITY MAP, FEMA MAP, NRCS WEB SOIL SURVEY

PYRAMID MOUNTAIN FILING NO. 1



VICINITY MAP

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.

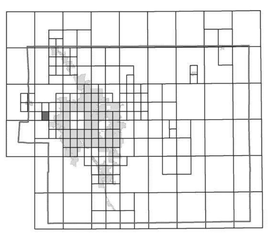
Contact **FEMA Map Service Center** (MSC) via the FEMA Map Information eXchange (FMIX) 1-877-336-2627 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this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

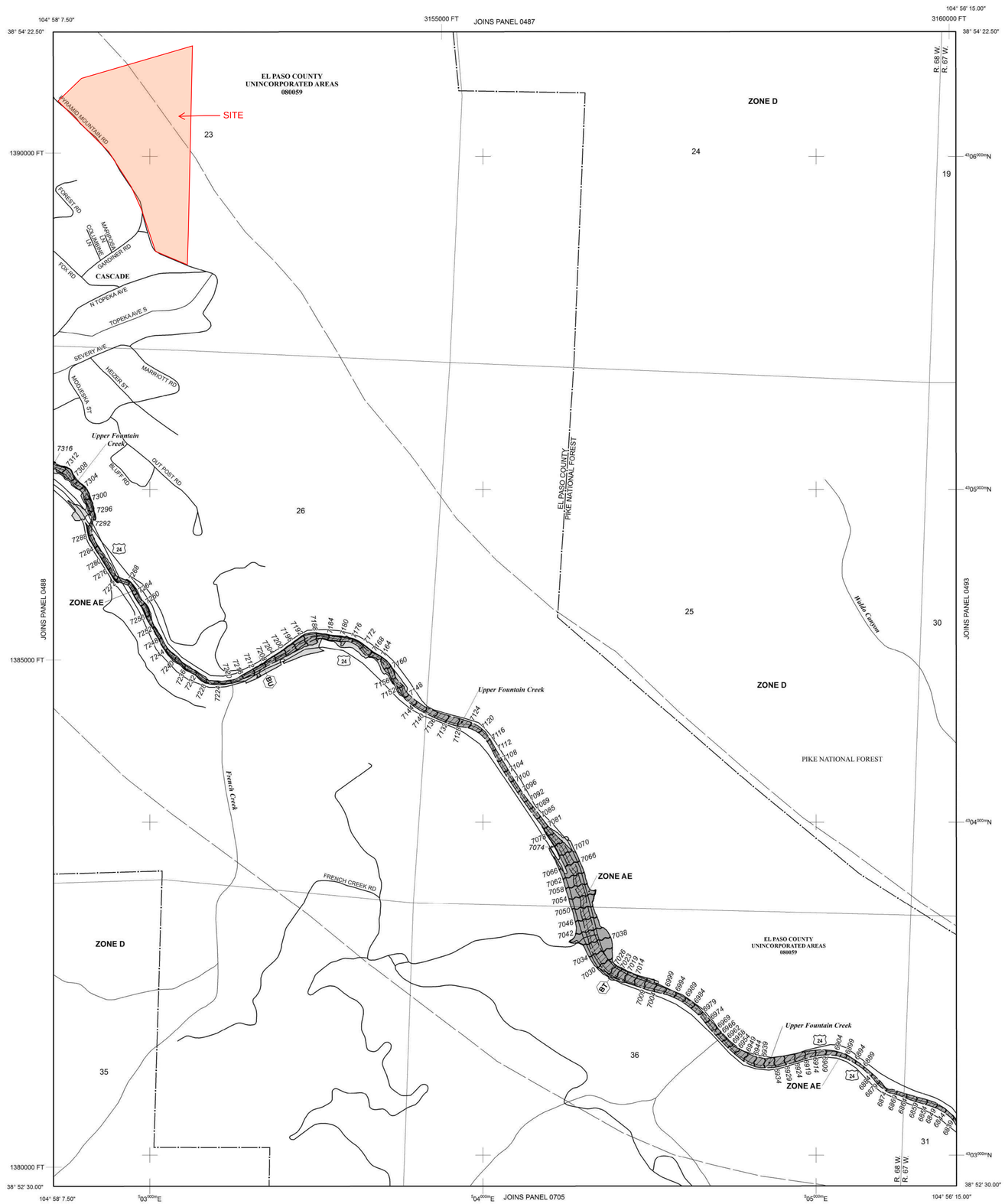
Flooding Source	Vertical Datum Offset (ft)
REFER TO SECTION 3.3 OF THE EL PASO COUNTY FLOOD INSURANCE STUDY FOR STREAM BY STREAM VERTICAL DATUM CONVERSION INFORMATION	

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 67 WEST, AND TOWNSHIP 13 SOUTH, RANGE 68 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

MAP NOT PRINTED

PANEL 0489G

FIRM

FLOOD INSURANCE RATE MAP

EL PASO COUNTY, COLORADO AND INCORPORATED AREAS

PANEL 489 OF 1300

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

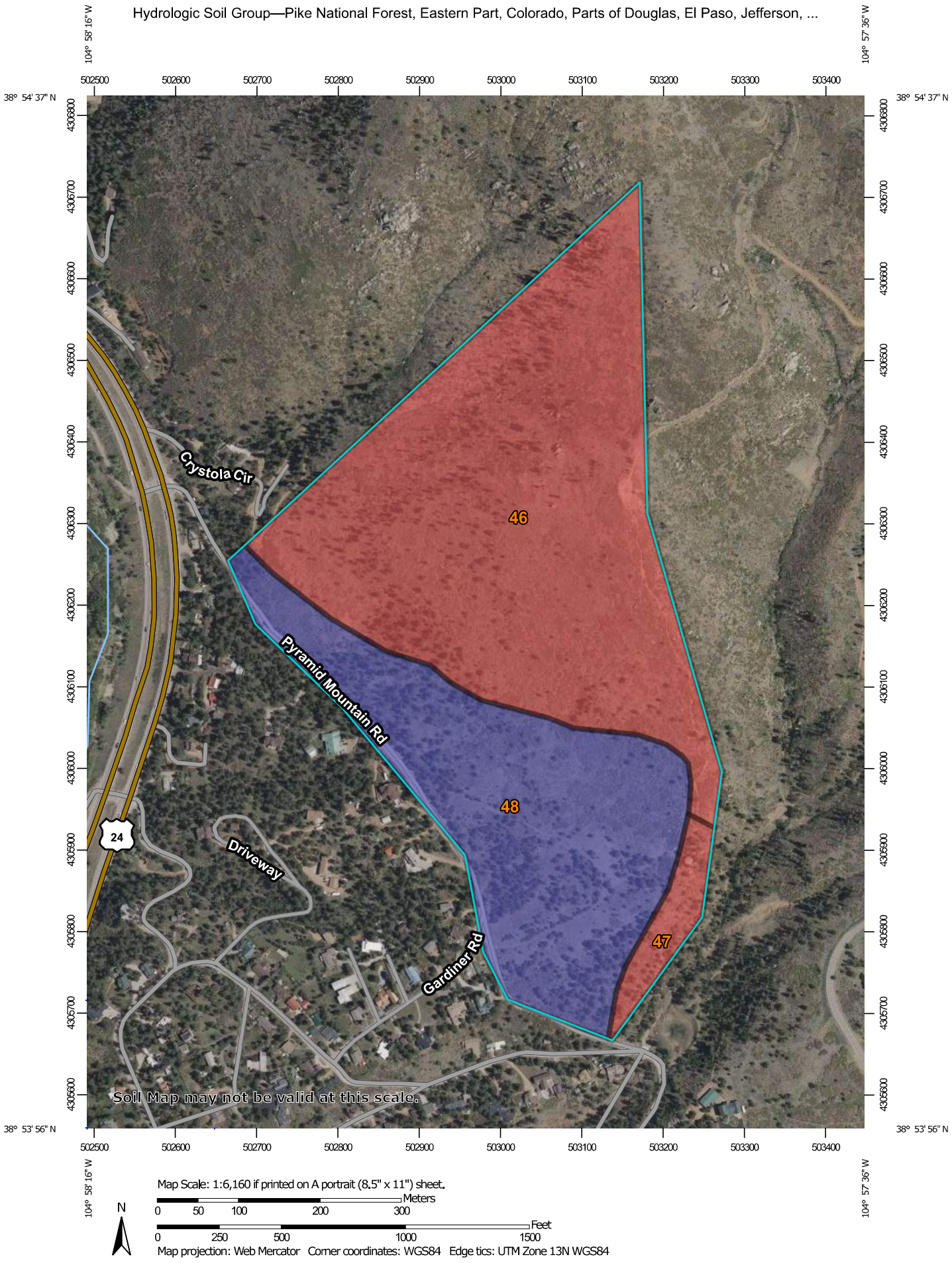
COMMUNITY	NUMBER	PANEL	SUFFIX
EL PASO COUNTY	080059	0489	G

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

MAP NUMBER
08041C0489G

MAP REVISED
DECEMBER 7, 2018

Federal Emergency Management Agency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104° 57' 36" W
38° 54' 37" N
38° 53' 56" N
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Crystola Cir
Pyramid Mountain Rd
Driveway
Gardiner Rd
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46
47
48
Soil Map may not be valid at this scale.
Map Scale: 1:6,160 if printed on A portrait (8.5" x 11") sheet.
Meters
0 50 100 200 300
Feet
0 250 500 1000 1500
N
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: Pike National Forest, Eastern Part, Colorado, Parts of Douglas, El Paso, Jefferson, and Teller Counties
Survey Area Data: Version 12, Aug 29, 2025

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

Date(s) aerial images were photographed: May 27, 2024—Jul 28, 2024

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
46	Sphinx-Rock outcrop complex, 15 to 80 percent slopes	D	49.7	60.9%
47	Sphinx, warm-Rock outcrop complex, 15 to 80 percent slopes	D	2.8	3.4%
48	Tecolote very gravelly sandy loam, 15 to 40 percent slopes, very stony	B	29.2	35.7%
Totals for Area of Interest			**81.6**	**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

APPENDIX B – HYDROLOGIC CALCULATIONS

Subdivision:	PYRAMID MOUNTAIN FILING NO. 1
Location:	El Paso County
Project Name:	PYRAMID MOUNTAIN FILING NO. 1
Project Number:	25014
Calculated By:	REB
Checked By:	
Date:	1/6/2025

EXISTING CONDITIONS - BASIN SUMMARY TABLE

Sub-basin	Area (ac)	Impervious	C_5	C_{100}	t_c (min)	$Q_{5\text{-YR}}$ (cfs)	$Q_{100\text{-YR}}$ (cfs)
EX-A	21.34	0%	0.13	0.45	28.1	7.1	41.5
EX-B	11.28	0%	0.13	0.45	28.9	3.7	21.6
EX-C	2.19	4%	0.15	0.46	21.3	1.0	5.1
EX-D	3.32	0%	0.13	0.45	23.3	1.2	7.2

EXISTING CONDITIONS - DESIGN POINT SUMMARY TABLE

DP#	$Q_{5\text{-YR}}$	$Q_{100\text{-YR}}$
1	7.1	41.5
2	3.7	21.6
3	1.0	5.1
4	1.2	7.2

COMPOSITE % IMPERVIOUS CALCULATIONS - EXISTING CONDITIONS

Subdivision: PYRAMID MOUNTAIN FILING N(
Location: El Paso County

Project Name: PYRAMID MOUNTAIN FILING NO. 1
Project No.: 25014.00
Calculated By: REB
Checked By:
Date: 1/6/25

Basin ID	Total Area (ac)	Gravel Drives[1]				Undeveloped/Forest/Meadow[1]				Weighted C_5 & C_{100}		Basins Total Weighte
		C_5	C_{100}	Area (ac)	% Imp.	C_5	C_{100}	Area (ac)	% Imp.	C_5	C_{100}	
EX-A	21.34	0.62	0.73	0.00	80.0%	0.13	0.45	21.34	0.0%	0.13	0.45	0.0%
EX-B	11.28	0.62	0.73	0.00	80.0%	0.13	0.45	11.28	0.0%	0.13	0.45	0.0%
EX-C	2.19	0.62	0.73	0.10	80.0%	0.13	0.45	2.09	0.0%	0.15	0.46	3.5%
EX-D	3.32	0.62	0.73	0.00	80.0%	0.13	0.45	3.32	0.0%	0.13	0.45	0.0%
Total	**38.13**											**0.2%**

1 - C values are a weighted average of the basins Hydrologic Soil types (B & D)

Table 6-6. Runoff Coefficients for Rational Method
(Source: UDFCD 2001)

Land Use or Surface Characteristics	Percent Impervious	Runoff Coefficients											
		2-year		5-year		10-year		25-year		50-year		100-year	
		HSG A&B	HSG C&D	HSG A&B	HSG C&D	HSG A&B	HSG C&D	HSG A&B	HSG C&D	HSG A&B	HSG C&D	HSG A&B	HSG C&D
Business													
Commercial Areas	95	0.79	0.80	0.81	0.82	0.83	0.84	0.85	0.87	0.87	0.88	0.88	0.89
Neighborhood Areas	70	0.45	0.49	0.49	0.53	0.53	0.57	0.58	0.62	0.60	0.65	0.62	0.68
Residential													
1/8 Acre or less	65	0.41	0.45	0.45	0.49	0.49	0.54	0.54	0.59	0.57	0.62	0.59	0.65
1/4 Acre	40	0.23	0.28	0.30	0.35	0.36	0.42	0.42	0.50	0.46	0.54	0.50	0.58
1/3 Acre	30	0.18	0.22	0.25	0.30	0.32	0.38	0.39	0.47	0.43	0.52	0.47	0.57
1/2 Acre	25	0.15	0.20	0.22	0.28	0.30	0.36	0.37	0.46	0.41	0.51	0.46	0.56
1 Acre	20	0.12	0.17	0.20	0.26	0.27	0.34	0.35	0.44	0.40	0.50	0.44	0.55
Industrial													
Light Areas	80	0.57	0.60	0.59	0.63	0.63	0.66	0.66	0.70	0.68	0.72	0.70	0.74
Heavy Areas	90	0.71	0.73	0.73	0.75	0.75	0.77	0.78	0.80	0.80	0.82	0.81	0.83
Parks and Cemeteries	7	0.05	0.09	0.12	0.19	0.20	0.29	0.30	0.40	0.34	0.46	0.39	0.52
Playgrounds	13	0.07	0.13	0.16	0.23	0.24	0.31	0.32	0.42	0.37	0.48	0.41	0.54
Railroad Yard Areas	40	0.23	0.28	0.30	0.35	0.36	0.42	0.42	0.50	0.46	0.54	0.50	0.58
Undeveloped Areas													
Historic Flow Analysis--Greenbelts, Agriculture	2	0.03	0.05	0.09	0.16	0.17	0.26	0.26	0.38	0.31	0.45	0.36	0.51
Pasture/Meadow	0	0.02	0.04	0.08	0.15	0.15	0.25	0.25	0.37	0.30	0.44	0.35	0.50
Forest	0	0.02	0.04	0.08	0.15	0.15	0.25	0.25	0.37	0.30	0.44	0.35	0.50
Exposed Rock	100	0.89	0.89	0.90	0.90	0.92	0.92	0.94	0.94	0.95	0.95	0.96	0.96
Offsite Flow Analysis (when landuse is undefined)	45	0.26	0.31	0.32	0.37	0.38	0.44	0.44	0.51	0.48	0.55	0.51	0.59
Streets													
Paved	100	0.89	0.89	0.90	0.90	0.92	0.92	0.94	0.94	0.95	0.95	0.96	0.96
Gravel	80	0.57	0.60	0.59	0.63	0.63	0.66	0.66	0.70	0.68	0.72	0.70	0.74
Drive and Walks	100	0.89	0.89	0.90	0.90	0.92	0.92	0.94	0.94	0.95	0.95	0.96	0.96
Roofs	90	0.71	0.73	0.73	0.75	0.75	0.77	0.78	0.80	0.80	0.82	0.81	0.83
Lawns	0	0.02	0.04	0.08	0.15	0.15	0.25	0.25	0.37	0.30	0.44	0.35	0.50

STANDARD FORM SF-2 - EXISTING CONDITIONS
TIME OF CONCENTRATION

Subdivision: PYRAMID MOUNTAIN FILING NO. 1
Location: El Paso County

Project Name: PYRAMID MOUNTAIN FILING NO. 1
Project No.: 25014.00
Calculated By: REB
Checked By:
Date: 1/6/25

SUB-BASIN DATA						INITIAL/OVERLAND (T_i)			TRAVEL TIME (T_t)					*tc* CHECK (URBANIZED BASINS)			FINAL
BASIN ID	D.A. (ac)	Hydrologic Soils Group[1]	Weighted C_5	Weighted C_{100}	Impervious (%)	L (ft)	S_o (%)	t_i (min)	L_t (ft)	S_t (%)	K	VEL. (ft/s)	t_t (min)	COMP. t_c (min)	TOTAL LENGTH (ft)	Urbanized t_c (min)	t_c (min)
EX-A	21.34	C	0.13	0.45	0.0%	275	30.0%	9.5	1535	30.0%	2.5	1.4	18.7	28.1	1810.0	31.2	28.1
EX-B	11.28	C	0.13	0.45	0.0%	275	29.5%	9.5	1465	25.4%	2.5	1.3	19.4	28.9	1740.0	31.4	28.9
EX-C	2.19	C	0.15	0.46	3.5%	250	14.0%	11.3	550	13.5%	2.5	0.9	10.0	21.3	800.0	28.0	21.3
EX-D	3.32	C	0.13	0.45	0.0%	250	14.0%	11.6	655	14.0%	2.5	0.9	11.7	23.3	905.0	29.2	23.3

NOTES: 1 - Hydrologic Soil Groups average to C. Basins are com

$$t_c = t_i + t_t$$

Where:

t_c = computed time of concentration (minutes)

t_i = overland (initial) flow time (minutes)

t_t = channelized flow time (minutes).

Equ

$$t_i = \frac{0.395(1.1 - C_5)\sqrt{L_i}}{S_o^{0.33}}$$

Where:

t_i = overland (initial) flow time (minutes)
C_5 = runoff coefficient for 5-year frequency (from Table 6-4)
L_i = length of overland flow (ft)
S_o = average slope along the overland flow path (ft/ft).

Equation 6-

Table 6-2. NRCS Conveyance factors, K

Type of Land Surface	Conveyance Factor, K
Heavy meadow	2.5
Tillage/field	5
Short pasture and lawns	7
Nearly bare ground	10
Grassed waterway	15
Paved areas and shallow paved swales	20

$$t_t = \frac{L_t}{60K\sqrt{S_o}} = \frac{L_t}{60V_t}$$

Where:

t_t = channelized flow time (travel time, min)
L_t = waterway length (ft)
S_o = waterway slope (ft/ft)
V_t = travel time velocity (ft/sec) = $K\sqrt{S_o}$
K = NRCS conveyance factor (see Table 6-2).

Equation 6-4 $26 - 17i) + \frac{L_t}{60(14i + 9)\sqrt{S_t}}$

t:

t_c = minimum time of concentration for first design point when less than t_c from Equation 6-1.
L_t = length of channelized flow path (ft)
i = imperviousness (expressed as a decimal)
S_t = slope of the channelized flow path (ft/ft).

Equation 6-5

Use a minimum t_c value of 5 minutes for urbanized areas and a minimum t_c value of 10 minutes for areas that are not considered urban. Use minimum values even when calculations result in a lesser time of concentration.

STANDARD FORM SF-3 - EXISTING CONDITIONS

STORM DRAINAGE SYSTEM DESIGN

(RATIONAL METHOD PROCEDURE)

Subdivision: PYRAMID MOUNTAIN FILING NO. 1
Location: El Paso County
Design Storm: 5-Year

Project Name: PYRAMID MOUNTAIN FILING NO. 1
Project No.: 25014.00
Calculated By: REB
Checked By:
Date: 1/6/25

DESCRIPTION	Design Point	DIRECT RUNOFF							TOTAL RUNOFF				STREET			PIPE				TRAVEL TIME			REMARKS
		Basin ID	Area (Ac)	Runoff Coeff.	t_c (min)	C*A (Ac)	I (in/hr)	Q (cfs)	tc (min)	C*A (ac)	I (in/hr)	Q (cfs)	Q_{street} (cfs)	C*A (ac)	Slope (%)	Q_{pipe} (cfs)	C*A (ac)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	t_t (min)	
	1	EX-A	21.34	0.13	28.1	2.77	2.58	7.1															Runoff sheet flows from the ridgeline southwest towards DP1 @ Pyramid Mountain Road. Flows continue per histroic drainage paths to Fountain Creek
	2	EX-B	11.28	0.13	28.9	1.47	2.54	3.7															Runoff sheet flows from the ridgeline southwest towards DP2, flows cross under Pyramid Mountain Road in a 24" DIP Culvert and continue west to Fountain Creek per histroic drainage paths.
	3	EX-C	2.19	0.15	21.3	0.33	2.99	1.0															Runoff sheet flows from the ridgeline west towards DP3, flows crosses Pyramid Mountain Road and continues to Fountain Creek per historic drainage patterns.
	3	EX-D	3.32	0.13	23.3	0.43	2.86	1.2															Runoff sheet flows from the ridgeline southwest towards DP4, flows travel along Pyramid Mountain Road southeast and continue to Fountain Creek per historic drainage patterns.

Notes:
Street and Pipe C*A values are determined by Q/i using the catchment's intensity value.

IDF Equations

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

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

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

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

$I_5 = -1.50 \ln(D) + 7.583$

$I_2 = -1.19 \ln(D) + 6.035$

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

STANDARD FORM SF-3 - EXISTING CONDITIONS

STORM DRAINAGE SYSTEM DESIGN

(RATIONAL METHOD PROCEDURE)

Subdivision: PYRAMID MOUNTAIN FILING NO. 1
Location: El Paso County
Design Storm: 100-Year

Project Name: PYRAMID MOUNTAIN FILING NO. 1
Project No.: 25014.00
Calculated By: REB
Checked By:
Date: 1/6/25

STREET	Design Point	DIRECT RUNOFF							TOTAL RUNOFF				STREET			PIPE				TRAVEL TIME			REMARKS
		Basin ID	Area (ac)	Runoff Coeff.	t_c (min)	C*A (ac)	I (in/hr)	Q (cfs)	t_c (min)	C*A (ac)	I (in/hr)	Q (cfs)	Q_{street} (cfs)	C*A (ac)	Slope (%)	Q_{pipe} (cfs)	C*A (ac)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	t_t (min)	
	1	EX-A	21.34	0.45	28.1	9.60	4.33	41.5															Runoff sheet flows from the ridgeline southwest towards DP1 @ Pyramid Mountain Road. Flows continue per histroic drainage paths to Fountain Creek
	2	EX-B	11.28	0.45	28.9	5.08	4.26	21.6															Runoff sheet flows from the ridgeline southwest towards DP2, flows cross under Pyramid Mountain Road in a 24" DIP Culvert and continue west to Fountain Creek per histroic drainage paths.
	3	EX-C	2.19	0.46	21.3	1.01	5.03	5.1															Runoff sheet flows from the ridgeline west towards DP3, flows crosses Pyramid Mountain Road and continues to Fountain Creek per historic drainage patterns.
	4	EX-D	3.32	0.45	23.3	1.49	4.81	7.2															Runoff sheet flows from the ridgeline southwest towards DP4, flows travel along Pyramid Mountain Road southeast and continue to Fountain Creek per historic drainage patterns.

Notes:
Street and Pipe C*A values are determined by Q/i using the catchment's intensity value.

IDF Equations

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

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

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

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

$I_5 = -1.50 \ln(D) + 7.583$

$I_2 = -1.19 \ln(D) + 6.035$

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

Subdivision: PYRAMID MOUNTAIN FILING NO. 1
Location: El Paso County
Project Name: PYRAMID MOUNTAIN FILING NO. 1
Project Number: 25014
Calculated By: REB
Checked By:
Date: 1/6/2025

RPOPOSED CONDITIONS - BASIN SUMMARY TABLE

Sub-basin	Area (ac)	Impervious	C_5	C_{100}	t_c (min)	$Q_{5\text{-YR}}$ (cfs)	$Q_{100\text{-YR}}$ (cfs)
A	21.34	1.5%	0.13	0.45	28.1	7.7	42.3
B1	7.02	1.6%	0.13	0.45	28.9	2.5	13.6
B2	4.26	0.0%	0.15	0.50	19.9	2.0	11.1
C	2.19	4.2%	0.13	0.45	21.6	1.0	5.1
D	3.32	0.0%	0.13	0.45	23.3	1.2	7.2

PROPOSED CONDITIONS - DESIGN POINT SUMMARY TABLE

DP#	$Q_{5\text{-YR}}$	$Q_{100\text{-YR}}$
1	7.7	42.3
2.1	4.1	22.7
2	2.0	11.1
3	1.0	5.1
4	1.2	7.2

EXISTING VS. PROPOSED DESIGN POINT COMPARISON TABLE

DP#	$Q_{5\text{-YR}}$			$Q_{100\text{-YR}}$		
	EX	PROP.	%Δ	EX	PROP.	%Δ
1	7.1	7.7	7.8%	41.5	42.3	1.9%
2/2.1	3.7	4.1	10.4%	21.6	22.7	5.0%
3	1.0	1.0	2.1%	5.1	5.1	-0.1%
4	1.2	1.2	0.0%	7.2	7.2	0.0%

COMPOSITE % IMPERVIOUS CALCULATIONS - PROPOSED CONDITIONS

Subdivision: PYRAMID MOUNTAIN FILING N
Location: El Paso County

Project Name: PYRAMID MOUNTAIN FILING NO. 1
Project No.: 25014.00
Calculated By: REB
Checked By:
Date: 1/6/25

Basin ID	Total Area (ac)	Gravel Drives[1]				Roofs[1]				Undeveloped/Forest/Meadow[1]				Weighted C_5 & C_{100}		Basins Total Weighte
		C_5	C_{100}	Area (ac)	% Imp.	C_5	C_{100}	Area (ac)	% Imp.	C_5	C_{100}	Area (ac)	% Imp.	C_5	C_{100}	
A	21.34	0.59	0.70	0.21	80.0%	0.73	0.81	0.16	90.0%	0.13	0.45	21.12	0.0%	0.14	0.46	1.5%
B1	7.02	0.62	0.73	0.14	80.0%	0.74	0.82	0.00	90.0%	0.13	0.45	6.88	0.0%	0.14	0.46	1.6%
B2	4.26	0.62	0.73	0.00	80.0%	0.75	0.83	0.00	90.0%	0.15	0.50	4.26	0.0%	0.15	0.50	0.0%
C	2.19	0.62	0.73	0.11	80.0%	0.74	0.82	0.00	90.0%	0.13	0.45	2.08	0.0%	0.16	0.46	4.2%
D	3.32	0.62	0.73	0.00	80.0%	0.74	0.82	0.00	90.0%	0.13	0.45	3.32	0.0%	0.13	0.45	0.0%
Total	**38.13**															**1.4%**

1 - C values are a weighted average of the basins Hydrologic Soil types (B & D)

Table 6-6. Runoff Coefficients for Rational Method

(Source: UDFCD 2001)

Land Use or Surface Characteristics	Percent Impervious	Runoff Coefficients											
		2-year		5-year		10-year		25-year		50-year		100-year	
		HSG A&B	HSG C&D	HSG A&B	HSG C&D	HSG A&B	HSG C&D	HSG A&B	HSG C&D	HSG A&B	HSG C&D	HSG A&B	HSG C&D
Business													
Commercial Areas	95	0.79	0.80	0.81	0.82	0.83	0.84	0.85	0.87	0.87	0.88	0.88	0.89
Neighborhood Areas	70	0.45	0.49	0.49	0.53	0.53	0.57	0.58	0.62	0.60	0.65	0.62	0.68
Residential													
1/8 Acre or less	65	0.41	0.45	0.45	0.49	0.49	0.54	0.54	0.59	0.57	0.62	0.59	0.65
1/4 Acre	40	0.23	0.28	0.30	0.35	0.36	0.42	0.42	0.50	0.46	0.54	0.50	0.58
1/3 Acre	30	0.18	0.22	0.25	0.30	0.32	0.38	0.39	0.47	0.43	0.52	0.47	0.57
1/2 Acre	25	0.15	0.20	0.22	0.28	0.30	0.36	0.37	0.46	0.41	0.51	0.46	0.56
1 Acre	20	0.12	0.17	0.20	0.26	0.27	0.34	0.35	0.44	0.40	0.50	0.44	0.55
Industrial													
Light Areas	80	0.57	0.60	0.59	0.63	0.63	0.66	0.66	0.70	0.68	0.72	0.70	0.74
Heavy Areas	90	0.71	0.73	0.73	0.75	0.75	0.77	0.78	0.80	0.80	0.82	0.81	0.83
Parks and Cemeteries	7	0.05	0.09	0.12	0.19	0.20	0.29	0.30	0.40	0.34	0.46	0.39	0.52
Playgrounds	13	0.07	0.13	0.16	0.23	0.24	0.31	0.32	0.42	0.37	0.48	0.41	0.54
Railroad Yard Areas	40	0.23	0.28	0.30	0.35	0.36	0.42	0.42	0.50	0.46	0.54	0.50	0.58
Undeveloped Areas													
Historic Flow Analysis--Greenbelts, Agriculture	2	0.03	0.05	0.09	0.16	0.17	0.26	0.26	0.38	0.31	0.45	0.36	0.51
Pasture/Meadow	0	0.02	0.04	0.08	0.15	0.15	0.25	0.25	0.37	0.30	0.44	0.35	0.50
Forest	0	0.02	0.04	0.08	0.15	0.15	0.25	0.25	0.37	0.30	0.44	0.35	0.50
Exposed Rock	100	0.89	0.89	0.90	0.90	0.92	0.92	0.94	0.94	0.95	0.95	0.96	0.96
Offsite Flow Analysis (when landuse is undefined)	45	0.26	0.31	0.32	0.37	0.38	0.44	0.44	0.51	0.48	0.55	0.51	0.59
Streets													
Paved	100	0.89	0.89	0.90	0.90	0.92	0.92	0.94	0.94	0.95	0.95	0.96	0.96
Gravel	80	0.57	0.60	0.59	0.63	0.63	0.66	0.66	0.70	0.68	0.72	0.70	0.74
Drive and Walks	100	0.89	0.89	0.90	0.90	0.92	0.92	0.94	0.94	0.95	0.95	0.96	0.96
Roofs	90	0.71	0.73	0.73	0.75	0.75	0.77	0.78	0.80	0.80	0.82	0.81	0.83
Lawns	0	0.02	0.04	0.08	0.15	0.15	0.25	0.25	0.37	0.30	0.44	0.35	0.50

STANDARD FORM SF-2 - PROPOSED CONDITIONS
TIME OF CONCENTRATION

Subdivision: PYRAMID MOUNTAIN FILING NO. 1
Location: El Paso County

Project Name: PYRAMID MOUNTAIN FILING NO. 1
Project No.: 25014.00
Calculated By: REB
Checked By:
Date: 1/6/25

SUB-BASIN DATA						INITIAL/OVERLAND (T_i)			TRAVEL TIME (T_t)					*tc* CHECK (URBANIZED BASINS)			FINAL
BASIN ID	D.A. (ac)	Hydrologic Soils Group[1]	Weighted C_5	Weighted C_{100}	Impervious (%)	L (ft)	S_o (%)	t_i (min)	L_t (ft)	S_t (%)	K	VEL. (ft/s)	t_t (min)	COMP. t_c (min)	TOTAL LENGTH (ft)	Urbanized t_c (min)	t_c (min)
A	21.34	C	0.13	0.45	1.5%	275	30.0%	9.5	1535	30.0%	2.5	1.4	18.7	28.1	1810.0	30.8	28.1
B1	7.02	C	0.13	0.45	1.6%	275	29.5%	9.5	1465	25.4%	2.5	1.3	19.4	28.9	1740.0	31.0	28.9
B2	4.26	D	0.15	0.50	0.0%	275	29.4%	9.3	805	25.6%	2.5	1.3	10.6	19.9	1080.0	28.9	19.9
C	2.19	C	0.13	0.45	4.2%	250	14.0%	11.6	550	13.5%	2.5	0.9	10.0	21.6	800.0	27.9	21.6
D	3.32	C	0.13	0.45	0.0%	250	14.0%	11.6	655	14.0%	2.5	0.9	11.7	23.3	905.0	29.2	23.3

NOTES: 1 - Hydrologic Soil Groups average to C. Basins are com

$$t_c = t_i + t_t$$

Where:

t_c = computed time of concentration (minutes)

t_i = overland (initial) flow time (minutes)

t_t = channelized flow time (minutes).

Equ

$$t_i = \frac{0.395(1.1 - C_5)\sqrt{L_i}}{S_o^{0.33}}$$

Where:

t_i = overland (initial) flow time (minutes)
C_5 = runoff coefficient for 5-year frequency (from Table 6-4)
L_i = length of overland flow (ft)
S_o = average slope along the overland flow path (ft/ft).

Equation 6-

Table 6-2. NRCS Conveyance factors, K

Type of Land Surface	Conveyance Factor, K
Heavy meadow	2.5
Tillage/field	5
Short pasture and lawns	7
Nearly bare ground	10
Grassed waterway	15
Paved areas and shallow paved swales	20

$$t_t = \frac{L_t}{60K\sqrt{S_o}} = \frac{L_t}{60V_t}$$

Where:

t_t = channelized flow time (travel time, min)
L_t = waterway length (ft)
S_o = waterway slope (ft/ft)
V_t = travel time velocity (ft/sec) = $K\sqrt{S_o}$
K = NRCS conveyance factor (see Table 6-2).

Equation 6-4

$$\frac{26 - 17i}{60(14i + 9)\sqrt{S_t}}$$

Equation 6-5

Use a minimum t_c value of 5 minutes for urbanized areas and a minimum t_c value of 10 minutes for areas that are not considered urban. Use minimum values even when calculations result in a lesser time of concentration.

:

t_c = minimum time of concentration for first design point when less than t_c from Equation 6-1.
L_t = length of channelized flow path (ft)
i = imperviousness (expressed as a decimal)
S_t = slope of the channelized flow path (ft/ft).

STANDARD FORM SF-3 - PROPOSED CONDITIONS

STORM DRAINAGE SYSTEM DESIGN

(RATIONAL METHOD PROCEDURE)

Subdivision: PYRAMID MOUNTAIN FILING NO. 1
Location: El Paso County
Design Storm: 5-Year

Project Name: PYRAMID MOUNTAIN FILING NO. 1
Project No.: 25014.00
Calculated By: REB
Checked By:
Date: 1/6/25

DESCRIPTION	Design Point	DIRECT RUNOFF							TOTAL RUNOFF				STREET/SWALE			PIPE				TRAVEL TIME			REMARKS
		Basin ID	Area (Ac)	Runoff Coeff.	t_c (min)	C*A (Ac)	I (in/hr)	Q (cfs)	tc (min)	C*A (ac)	I (in/hr)	Q (cfs)	Q_{street} (cfs)	C*A (ac)	Slope (%)	Q_{pipe} (cfs)	C*A (ac)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	t_t (min)	
	1	A	21.34	0.14	28.1	2.99	2.58	7.7															Runoff sheet flows from the ridgeline southwest towards DP1 @ Pyramid Mountain Road. Flows continue per histroic drainage paths to Fountain Creek
	2.1	B1	7.02	0.14	28.9	0.98	2.54	2.5	28.9	1.62	2.54	4.1											Runoff sheet flows from the ridgeline southwest towards ex 24" DIP culvert at DP2.1, where flows combine with flows from DP2. Combined flows enter culvert and continue to Fountain Creek.
	2	B2	4.26	0.15	19.9	0.64	3.09	2.0					2.0	0.64	25.4%					360	1.3	4.8	Runoff sheet flows southwest towards proposed 18" culvert @ DP2. Flows are piped under driveway into Basin B1, and continue to DP2.1 where they combine with runoff from Basin B1.
	3	C	2.19	0.16	21.6	0.34	2.98	1.0															Runoff sheet flows from the ridgeline west towards DP3, flows crosses Pyramid Mountain Road and continues to Fountain Creek per historic drainage patterns.
	4	D	3.32	0.13	23.3	0.43	2.86	1.2															Runoff sheet flows from the ridgeline southwest towards DP4, flows travel along Pyramid Mountain Road southeast and continue to Fountain Creek per historic drainage patterns.

Notes:
Street and Pipe C*A values are determined by Q/i using the catchment's intensity value.

IDF Equations

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

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

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

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

$I_5 = -1.50 \ln(D) + 7.583$

$I_2 = -1.19 \ln(D) + 6.035$

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

STANDARD FORM SF-3 - PROPOSED CONDITIONS

STORM DRAINAGE SYSTEM DESIGN

(RATIONAL METHOD PROCEDURE)

Subdivision: PYRAMID MOUNTAIN FILING NO. 1
Location: El Paso County
Design Storm: 100-Year

Project Name: PYRAMID MOUNTAIN FILING NO. 1
Project No.: 25014.00
Calculated By: REB
Checked By:
Date: 1/6/25

		DIRECT RUNOFF							TOTAL RUNOFF				STREET			PIPE				TRAVEL TIME			
STREET	Design Point	Basin ID	Area (ac)	Runoff Coeff.	t_c (min)	C*A (ac)	I (in/hr)	Q (cfs)	tc (min)	C*A (ac)	I (in/hr)	Q (cfs)	Q_{street} (cfs)	C*A (ac)	Slope (%)	Q_{pipe} (cfs)	C*A (ac)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	t_t (min)	REMARKS
	1	A	21.34	0.46	28.1	9.79	4.33	42.3															Runoff sheet flows from the ridgeline southwest towards DP1 @ Pyramid Mountain Road. Flows continue per histroic drainage paths to Fountain Creek
	2.1	B1	7.02	0.46	28.9	3.20	4.26	13.6	28.9	5.33	4.26	22.7											Runoff sheet flows from the ridgeline southwest towards ex 24" DIP culvert at DP2.1, where flows combine with flows from DP2. Combined flows enter culvert and continue to Fountain Creek.
	2	B2	4.26	0.50	19.9	2.13	5.19	11.1					11.1	2.13	25.4%					360	1.3	4.8	Runoff sheet flows southwest towards proposed 18" culvert @ DP2. Flows are piped under driveway into Basin B1, and continue to DP2.1 where they combine with runoff from Basin B1.
	3	C	2.19	0.46	21.6	1.02	5.00	5.1															Runoff sheet flows from the ridgeline west towards DP3, flows crosses Pyramid Mountain Road and continues to Fountain Creek per historic drainage patterns.
	4	D	3.32	0.45	23.3	1.49	4.81	7.2															Runoff sheet flows from the ridgeline southwest towards DP4, flows travel along Pyramid Mountain Road southeast and continue to Fountain Creek per historic drainage patterns.

Notes:
Street and Pipe C*A values are determined by Q/i using the catchment's intensity value.

IDF Equations

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

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

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

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

$I_5 = -1.50 \ln(D) + 7.583$

$I_2 = -1.19 \ln(D) + 6.035$

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

APPENDIX C – HYDRAULIC CALCULATIONS

Culvert Report

EX 24 INCH DIP CULVERT

Invert Elev Dn (ft)	=	1.00
Pipe Length (ft)	=	55.00
Slope (%)	=	2.00
Invert Elev Up (ft)	=	2.10
Rise (in)	=	24.0
Shape	=	Circular
Span (in)	=	24.0
No. Barrels	=	1
n-Value	=	0.013
Culvert Type	=	Circular Culvert
Culvert Entrance	=	Smooth tapered inlet throat
Coeff. K,M,c,Y,k	=	0.534, 0.555, 0.0196, 0.9, 0.2

Embankment

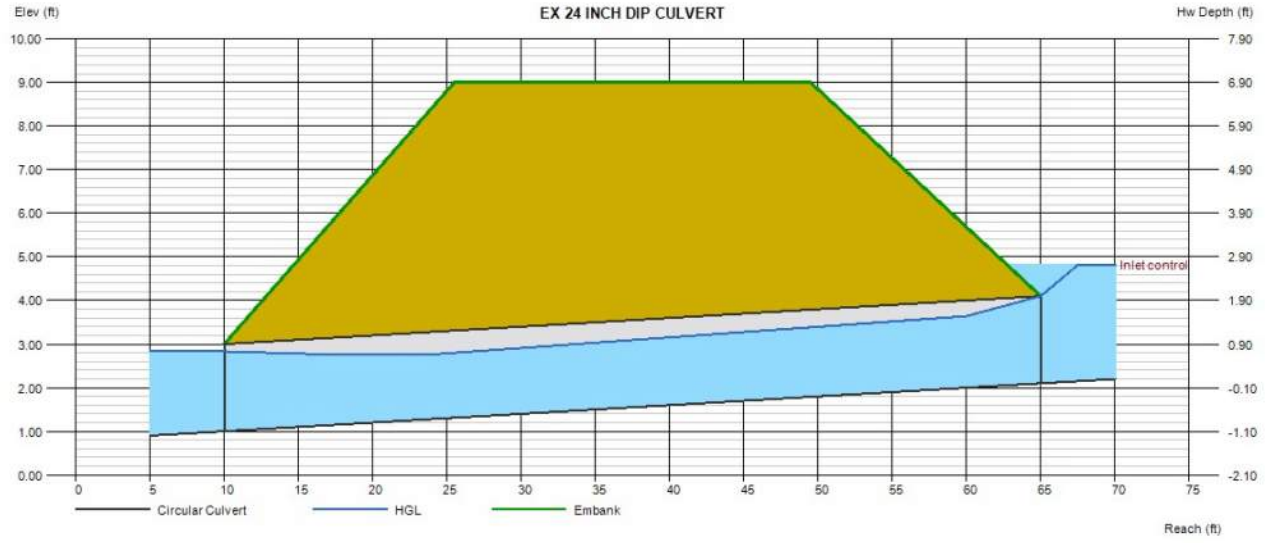
Top Elevation (ft)	=	9.00
Top Width (ft)	=	24.00
Crest Width (ft)	=	50.00

Calculations

Qmin (cfs)	=	21.70
Qmax (cfs)	=	21.70
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	21.70
Qpipe (cfs)	=	21.70
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	7.20
Veloc Up (ft/s)	=	7.77
HGL Dn (ft)	=	2.83
HGL Up (ft)	=	3.76
Hw Elev (ft)	=	4.82
Hw/D (ft)	=	1.36
Flow Regime	=	Inlet Control



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Tuesday, Mar 3 2026

EXISTING NATURAL CHANNEL DOWNSTREAM OF DP2 (Q100 EXISTING)

User-defined

Invert Elev (ft)	= 7615.65
Slope (%)	= 16.11
N-Value	= 0.050

Calculations

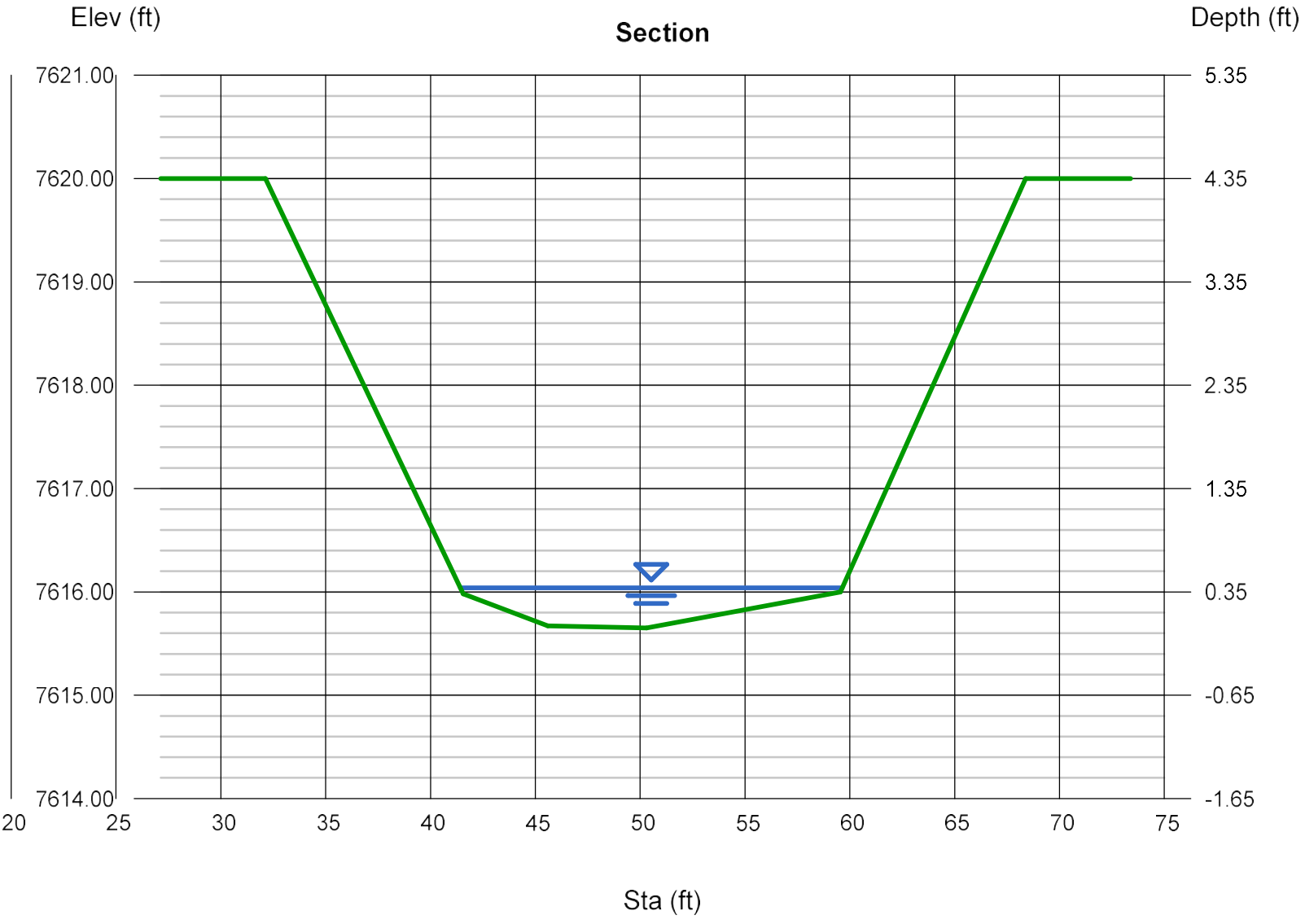
Compute by:	Known Q
Known Q (cfs)	= 21.60

Highlighted

Depth (ft)	= 0.39
Q (cfs)	= 21.60
Area (sqft)	= 4.65
Velocity (ft/s)	= 4.64
Wetted Perim (ft)	= 18.26
Crit Depth, Yc (ft)	= 0.49
Top Width (ft)	= 18.22
EGL (ft)	= 0.73

(Sta, El, n)-(Sta, El, n)...

(32.13, 7620.00)-(41.56, 7615.98, 0.050)-(45.60, 7615.67, 0.050)-(50.31, 7615.65, 0.050)-(59.55, 7616.00, 0.050)-(68.39, 7620.00, 0.050)



Culvert Report

DRIVEWAY CULVERT DP2 (100-YR)

Invert Elev Dn (ft)	=	1.00
Pipe Length (ft)	=	30.00
Slope (%)	=	2.00
Invert Elev Up (ft)	=	1.60
Rise (in)	=	24.0
Shape	=	Circular
Span (in)	=	24.0
No. Barrels	=	1
n-Value	=	0.013
Culvert Type	=	Circular Concrete
Culvert Entrance	=	Groove end projecting (C)
Coeff. K,M,c,Y,k	=	0.0045, 2, 0.0317, 0.69, 0.2

Embankment

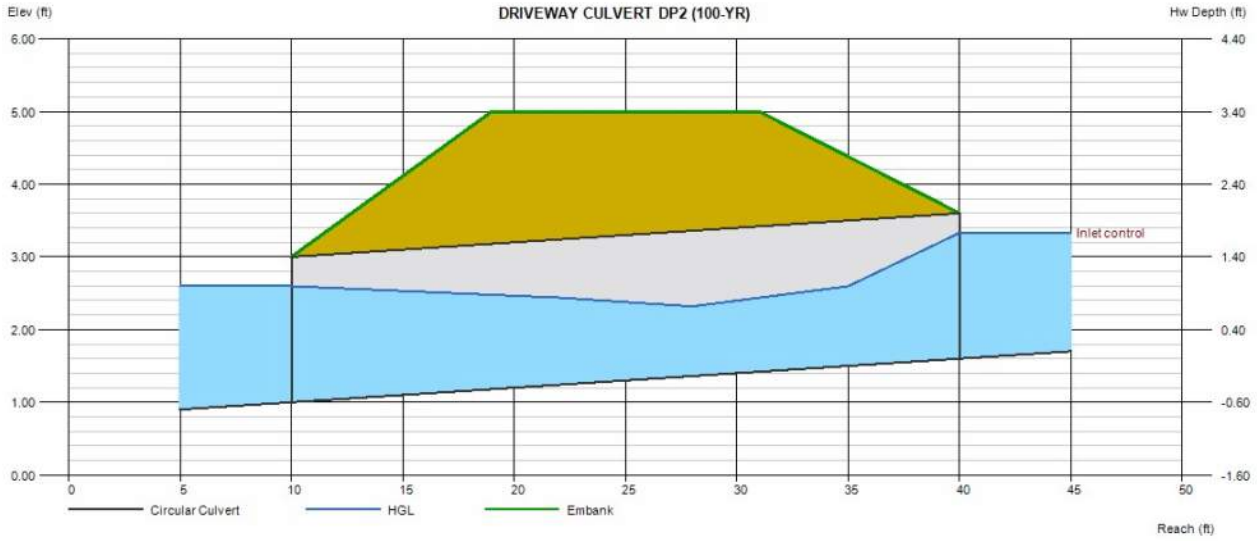
Top Elevation (ft)	=	5.00
Top Width (ft)	=	12.00
Crest Width (ft)	=	30.00

Calculations

Qmin (cfs)	=	11.10
Qmax (cfs)	=	11.10
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	11.10
Qpipe (cfs)	=	11.10
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	4.13
Veloc Up (ft/s)	=	5.67
HGL Dn (ft)	=	2.60
HGL Up (ft)	=	2.79
Hw Elev (ft)	=	3.33
Hw/D (ft)	=	0.87
Flow Regime	=	Inlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Tuesday, Jan 13 2026

EX 24 INCH DIP CULVERT DP2.1 (100-YR)

Invert Elev Dn (ft)	=	1.00
Pipe Length (ft)	=	55.00
Slope (%)	=	2.00
Invert Elev Up (ft)	=	2.10
Rise (in)	=	24.0
Shape	=	Circular
Span (in)	=	24.0
No. Barrels	=	1
n-Value	=	0.013
Culvert Type	=	Circular Culvert
Culvert Entrance	=	Smooth tapered inlet throat
Coeff. K,M,c,Y,k	=	0.534, 0.555, 0.0196, 0.9, 0.2

Embankment

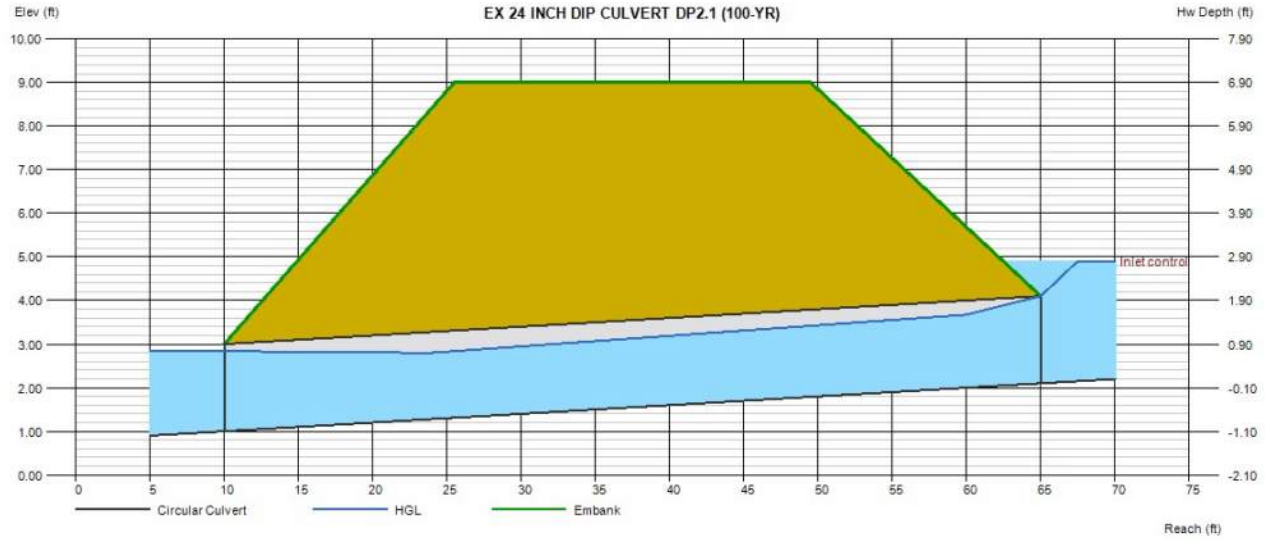
Top Elevation (ft)	=	9.00
Top Width (ft)	=	24.00
Crest Width (ft)	=	50.00

Calculations

Qmin (cfs)	=	22.70
Qmax (cfs)	=	22.70
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	22.70
Qpipe (cfs)	=	22.70
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	7.49
Veloc Up (ft/s)	=	7.99
HGL Dn (ft)	=	2.85
HGL Up (ft)	=	3.80
Hw Elev (ft)	=	4.90
Hw/D (ft)	=	1.40
Flow Regime	=	Inlet Control



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Tuesday, Mar 3 2026

EXISTING NATURAL CHANNEL DOWNSTREAM OF DP2.1 (Q100 PROPOSED)

User-defined

Invert Elev (ft)	= 7615.65
Slope (%)	= 16.11
N-Value	= 0.050

Calculations

Compute by:	Known Q
Known Q (cfs)	= 22.70

Highlighted

Depth (ft)	= 0.40
Q (cfs)	= 22.70
Area (sqft)	= 4.83
Velocity (ft/s)	= 4.70
Wetted Perim (ft)	= 18.31
Crit Depth, Yc (ft)	= 0.51
Top Width (ft)	= 18.26
EGL (ft)	= 0.74

(Sta, El, n)-(Sta, El, n)...

(32.13, 7620.00)-(41.56, 7615.98, 0.050)-(45.60, 7615.67, 0.050)-(50.31, 7615.65, 0.050)-(59.55, 7616.00, 0.050)-(68.39, 7620.00, 0.050)

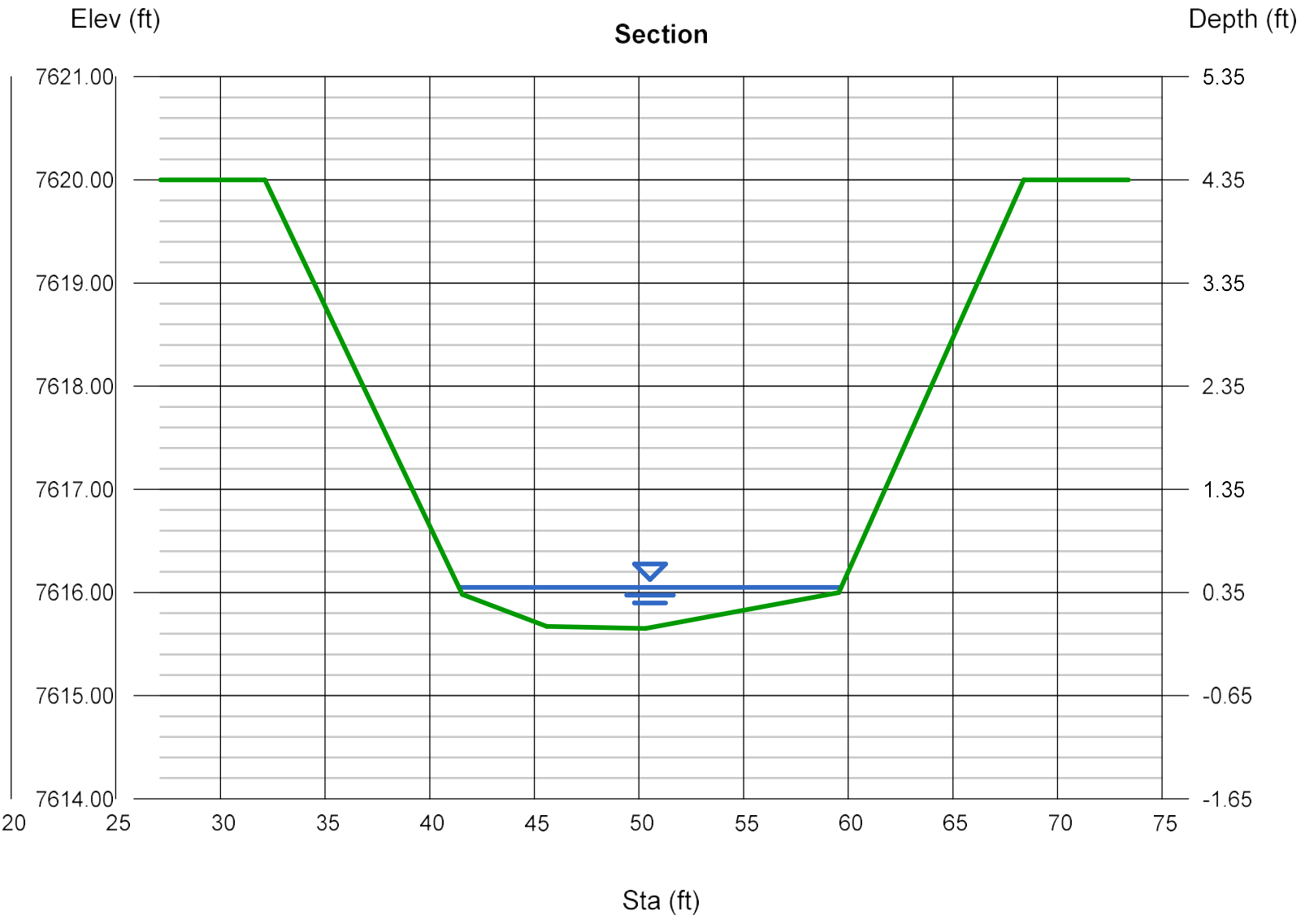


TABLE 10-1

COMPOSITE ROUGHNESS COEFFICIENTS FOR UNLINED OPEN CHANNELS (Reference: Chow, Ven Te, 1959:Open-Channel Hydraulics)

	Channel Conditions	Value
Material Type	Earth	0.020
n_o	Fine Gravel	0.024
	Coarse Gravel	0.028
Degree of Irregularity	Smooth	0.000
	Minor	0.005
n_1	Moderate	0.010
	Severe	0.020
Variation of Channel	Gradual	0.000
Cross Section	Alternating	
n_2	Occasionally	0.005
	Alternating	
	Frequently	0.010 - 0.015
Relative Effect	Negligible	0.000
of Obstructions	Minor	0.010 - 0.015
n_3	Appreciable	0.020 - 0.030
	Severe	0.040 - 0.060
Vegetation	Low	0.005 - 0.010
	Medium	0.010 - 0.025
n_4	High	0.025 - 0.050
	Very High	0.050 - 0.100
Degree of Meandering	Minor	1.000 - 1.200
	Appreciable	1.200 - 1.500
m	Severe	1.500

N = (0.02 + 0.005 + 0.005 + 0.015 + 0.025)* 1 = 0.07

N = 0.05 USED FOR MANNINGS OPEN CHANNEL CALCULATIONS

TYPICAL CHANNEL

TABLE 10-2

TYPICAL ROUGHNESS COEFFICIENTS FOR OPEN CHANNELS

(Reference: Chow, Ven Te, 1959;Open-Channel Hydraulics)

Type of Channel and Description	Minimum	Normal	Maximum
EXCAVATED OR DREDGED			
a. Earth, straight and uniform			
1. Clean, recently completed	0.016	0.018	0.020
2. Clean, after weathering	0.018	0.022	0.025
3. Gravel, uniform section, clean	0.022	0.025	0.030
4. With short grass, few weeds	0.022	0.027	0.033
b. Earth, winding and sluggish			
1. No vegetation	0.023	0.025	0.030
2. Grass, some weeds	0.025	0.030	0.033
3. Dense weeds or aquatic plants in deep channels	0.030	0.035	0.040
4. Earth bottom and rubble sides	0.028	0.030	0.035
5. Stony bottom and weedy banks	0.025	0.035	0.040
6. Cobble bottom and clean sides	0.030	0.040	0.050
c.Dragline-excavated or dredged			
1. No vegetation	0.025	0.028	0.033
2. Light brush on banks	0.035	0.050	0.060
d. Rock cuts			
1. Smooth and uniform	0.025	0.035	0.040
2. Jagged and irregular	0.035	0.040	0.050
e. Channels not maintained, weeds and brush uncut			
1. Dense weeds, high as flow depth	0.050	0.080	0.120
2. Clean bottom, brush on sides	0.040	0.050	0.080
3. Same, highest stage of flow	0.045	0.070	0.110
4. Dense brush, high stage	0.080	0.100	0.140
NATURAL STREAMS			
Minor streams (top width at flood stage 100 ft)			
a. Streams on plain			
1. Clean, straight, full stage, no rifts or deep pools	0.025	0.030	0.033
2. Same as above, but more stones and weeds	0.030	0.035	0.040
3. Clean, winding, some pools and shoals	0.033	0.040	0.045
4. Same as above, but some weeds and stones	0.035	0.045	0.050
5. Same as above, lower stages, more ineffective slopes and sections	0.040	0.048	0.055
6. Same as 4, but more stones	0.045	0.050	0.060
7. Sluggish reaches, weedy, deep pools	0.050	0.070	0.080
8. Very weedy reaches, deep pools, or floodways with heavy stand of timber and underbrush	0.075	0.100	0.150
LINED OR BUILT-UP CHANNELS			
a. Corrugated Metal	0.021	0.025	0.030
b. Concrete			
1. Trowel finish	0.011	0.013	0.015
2. Float finish	0.013	0.015	0.016
3. Finished, with gravel on bottom	0.015	0.017	0.020
4. Unfinished	0.014	0.017	0.020
5. Gunite, good section	0.016	0.019	0.023
6. Gunite, wavy section	0.018	0.022	0.025
7. On good excavated rock	0.017	0.020	
8. On irregular excavated rock	0.022	0.027	
c. Concrete bottom float finished with sides of			
1. Dressed stone in mortar	0.015	0.017	0.020
2. Random stone in mortar	0.017	0.020	0.024
3. Cement rubble masonry, plastered	0.016	0.020	0.024
4. Cement rubble masonry	0.020	0.025	0.030
5. Dry rubble or riprap	0.020	0.030	0.035
d. Gravel bottom with sides of			
1. Formed concrete	0.017	0.020	0.025
2. Random stone in mortar	0.020	0.023	0.026
3. Dry rubble or riprap	0.023	0.033	0.036
e. Asphalt			
1. Smooth		0.013	
2. Rough		0.016	
f. Grassed	0.030	0.040	0.050

COMPOSITE N CALCULATION
N = (0.02 + 0.005 + 0.005 + 0.015 + 0.025)* 1
= 0.07

N = 0.05 USED FOR MANNINGS OPEN CHANNEL CALCULATIONS

APPENDIX D – REFERENCE MATERIAL

Drainage Basins

El Paso County
Colorado

Legend

- Drainage Basins Source: Muller Engineering Company (1988)
- US Interstate Highways
- US Highways
- Colorado State Highways
- Major Roadways
- Local Streets & Roads

Creeks

- Perennial
- Intermittent
- Lakes & Reservoirs
- Summits
- Unincorporated Urban Areas
- Incorporated Cities
- Military
- Forest
- County Lines

N W E S

Miles

0 0.5 1 2 3 4 5

Douglas County
Elbert County
Teller County
Lincoln County
Fremont County
Pueblo County

SITE

USAF Academy
Fort Carson
Pike National Forest
Schriever AFB
COLORADO SPRINGS
MANITOU SPRINGS
FOUNTAIN
Cascade
Chipita Park
Cripple Creek
Victor
Green Mountain Falls
Crystola
Monument
Palmer Lake
Woodmoor
Peyton
Falcon
Calhan
Ellicott
Yoder
Rush
Truckton
Simla
Ramah

Upper Monument Creek FOMO5800
Dirty Woman Creek FOMO5200
West Cherry Creek CYCY0400
East Cherry Creek CYCY0200
West Kiowa Creek KIKI0200
East Kiowa Creek KIKI0400
Bijou Creek BIBI0200
Upper Big Sandy Creek BGBG1400
Lenard BGBG1200
Antelope Creek BGBG0800
Simla BGBG0400
Ramah BGBG0600
Calhan BGBG1000
Mustang Creek BGBG0200
Monument Rock FOMO5000
Jackson Creek FOMO4400
Black Forest FOMO4200
Beaver Creek FOMO4600
Monument Branch FOMO3800
Black Squirrel Creek FOMO3600
Upper Black Squirrel CHBS2000
Upper Bracket Creek CHBR0600
North Fork HOHO0400
Air Force Academy FOMO3200
Kettle Creek FOMO3000
Bennett Ranch CHWS1200
Geick Ranch CHMS0400
La Vega Ranch CHBR0400
Horse Creek HOHO0600
Pine Creek FOMO2800
South Pine Creek FOMO2600
Dry Creek FOMO2400
Upper Fountain FOFO7600
Falcon CHWS1400
Hook And Line Ranch CHBS1800
Little Horse Creek HOHO0200
Cottonwood Creek FOMO2200
Baggett CHBR0200
Steels Fork HOPO1000
Camp Creek FOFO5800
Douglas Creek FOMO1000
Templeton Gap FOMO1200
Solbers Ranch CHWS0800
Haegler Ranch CHMS0200
West Big Springs Creek CHBG0200
Upper Big Springs Creek CHBG0400
Williams Canyon FOFO7200
Curtis Ranch CHWS1000
Sand Creek FOFO4000
Rush HOPO0800
Manitou Reservoir FOFO7400
Shooks Run FOFO4400
Livestock Company CHWS0400
West Squirrel CHWS0600
Telephone Exchange CHWS0200
Ellicott Consolidated CHBS1200
Ellicott CHBS1600
Lower Big Springs Creek CHBS1400
Upper Pond Creek HOPO0600
Ruxton Creek FOFO7000
Sutherland Creek FOFO6400
Upper Beaver Creek BEBE0400
Bear Creek FOFO4800
Peterson Field FOFO3400
Jimmy Camp Creek FOFO2000
Upper East Chico CHEC0400
Lower Pond Creek HOPO0400
Windmill Gulch FOFO3000
Fishers Canyon FOFO3600
Crows Roost CHBS1000
Drennan CHBS0400
Middle East Chico CHEC0200
Southwest Area FOFO4600
Big Johnson FOFO2600
Upper Williams Creek FOWI0600
Upper Chico Creek CHCH1600
Upper Dry Squirrel CHDS0200
Fort Carson FOFO2200
Upper Williams Tributary FOWI0400
West Chico Tributary CHCH1200
Haynes Creek HAHA0600
St.lukes HOPO0200
Lower Black Squirrel CHBS0600
Squirrel Creek CHBS0200
Little Fountain Creek FOFO1800
Chico Creek CHCH1400
Calhan Reservoir FOFO1400
Lower Williams Creek FOFO1000
Lower Williams Tributary FOWI0200
Lower Dry Squirrel CHBS0400
East Kramer KRKR0600
Sand Canyon FOFO1600
Lower East Chico CHCH0800
Kramer Creek KRKR0400
Turkey Creek TUTU0200
East Haynes HAHA0400
Hammer Ranch CHCH0600
Finch Ranch CHCH0400
Windmill CHCH0200
West Haynes HAHA0200
Sand Creek FOFO0600
Williams Ranch FOFO0400
Midway Ranch FOFO0800
West Kramer KRKR0200
Red Creek BEBE0200
West Chico Creek CHCH0600
Young Hollow FOFO0200

FOUNTAIN CREEK DRAINAGE BASIN
PLANNING STUDY

VOLUME I

Prepared For:

THE CITY OF COLORADO SPRINGS
P.O. Box 1575
Colorado Springs, Colorado 80901

Prepared By:

MULLER ENGINEERING COMPANY, INC.
Irongate 2, Suite 100
777 South Wadsworth Boulevard
Lakewood, Colorado 80226
MEC Project No. 9117

July, 1994

TABLE 4.7-1
REGIONAL SUB-BASINS ABBREVIATIONS AND
NUMERIC RANGES

Drainage Basin	Basin Abbreviation	Basin Number Series
Bear Creek	BRC	1210 - 1214
Beckers Lane	BL	3410
Black Canyon	BKC	3310
Camp Creek	CPC	3610 - 3616
Cascade Basin	CB	3010 - 3012
Catamount Creek	CTC	2410 - 2417
Chipita Park	CP	2210
Crystal Creek	CLC	2310 - 2312
Crystola Creek	CRC	2510 - 2513
Columbia Road	CR	3510
Englemann Canyon	EC	1710 - 1718
Fischers Canyon	FHC	4110
French Creek	FRC	2010 - 2015
Indian Trail	IT	1910 - 1911
Lofland Gulch	LG	2710
Manitou Springs	MS	1810
Misc. Basin	MSC	4210
Palmer Trail	PT	1510
Sand Gulch	SG	2810
Severy Creek	SVC	2110 - 2115
Shooks Run	SR	3910 - 3916
Southwest Area	SW	1100 - 1118
Spring Crek	SPC	4010 - 4016
Sutherland Creek	SC	1610 - 1614
Talcott Gulch	TG	2610 - 2611
Villa De Mesa	VM	1310 - 1311
Waldo Canon	WLC	3110 - 3111
Wellington Gulch	WG	2910
Westside	WS	3810 - 3813
Williams Canyon	WC	3210 - 3211
19th Street	19S	3710
21st Street	21S	1410

TABLE 4.7-2
EXISTING LAND USE CN VALUES (Cont.)

BASIN DESCRIPTION		HYDROLOGIC SOIL GROUP (PERCENT)				AVERAGE HSG	LAND USE DISTRIBUTION (PERCENT IMPERVIOUS)					CN	WEIGHTED PUBLISHED CN	COMMENTS
		A	B	C	D		0-5%	5-15%	15-40%	40-70%	70-100%			
FRC	2010	0	0	80	20	C	100	0	0	0	0	70	N/A	UNSTUDIED REGION OF TELLER COUNTY
	2011	0	0	100	0	C	100	0	0	0	0	70	N/A	UNSTUDIED REGION OF TELLER COUNTY
	2012	0	0	100	0	C	100	0	0	0	0	70	N/A	UNSTUDIED REGION OF TELLER COUNTY
	2013	0	0	80	20	C	100	0	0	0	0	70	N/A	UNSTUDIED REGION OF TELLER COUNTY
	2014	0	0	100	0	C	100	0	0	0	0	70	N/A	UNSTUDIED REGION OF TELLER COUNTY
	2015	0	100	0	0	B	100	0	0	0	0	70	N/A	UNSTUDIED REGION OF TELLER COUNTY
SVC	2110	0	0	100	0	C	100	0	0	0	0	70	N/A	UNSTUDIED REGION OF TELLER COUNTY
	2111	0	0	100	0	C	100	0	0	0	0	70	N/A	UNSTUDIED REGION OF TELLER COUNTY
	2112	0	0	100	0	C	100	0	0	0	0	70	N/A	UNSTUDIED REGION OF TELLER COUNTY
	2113	0	0	100	0	C	100	0	0	0	0	70	N/A	UNSTUDIED REGION OF TELLER COUNTY
	2114	0	0	100	0	C	100	0	0	0	0	70	N/A	UNSTUDIED REGION OF TELLER COUNTY
	2115	0	100	0	0	B	98	0	2	0	0	72	N/A	UNSTUDIED REGION OF TELLER COUNTY
CP	2210	0	0	80	20	C	70	0	30	0	0	72	N/A	UNSTUDIED REGION OF TELLER COUNTY
CLC	2310	0	0	80	20	C	100	0	0	0	0	72	N/A	UNSTUDIED REGION OF TELLER COUNTY
	2311	0	0	100	0	C	100	0	0	0	0	70	N/A	UNSTUDIED REGION OF TELLER COUNTY
	2312	0	0	100	0	C	100	0	0	0	0	72	N/A	UNSTUDIED REGION OF TELLER COUNTY
CTC	2410	0	0	0	100	D	100	0	0	0	0	74	N/A	
	2411	0	0	0	100	D	100	0	0	0	0	74	N/A	
	2412	0	0	0	100	D	100	0	0	0	0	74	N/A	
	2413	0	0	0	100	D	100	0	0	0	0	74	N/A	PRELIMINARY SOILS INFORMATION FROM
	2414	0	0	0	100	D	100	0	0	0	0	74	N/A	THE SCS FOR THE WOODLAND PARK AREA
	2415	0	0	100	0	C	100	0	0	0	0	70	N/A	
	2416	0	0	100	0	C	90	0	10	0	0	70	N/A	
	2417	0	0	100	0	C	100	0	0	0	0	70	N/A	
CRC	2510	0	0	20	80	D	70	0	30	0	0	74	N/A	
	2511	0	0	100	0	C	60	0	40	0	0	72	N/A	PRELIMINARY SOILS INFORMATION FROM
	2512	0	70	30	0	B	10	5	85	0	0	72	N/A	THE SCS FOR THE WOODLAND PARK AREA
	2513	0	0	100	0	C	100	0	0	0	0	70	N/A	
TG	2610	0	80	20	0	B	98	0	2	0	0	66	N/A	UNSTUDIED REGION OF TELLER COUNTY
	2611	0	75	25	0	B	50	0	50	0	0	66	N/A	UNSTUDIED REGION OF TELLER COUNTY
LG	2710	0	0	100	0	C	10	5	80	5	0	72	N/A	UNSTUDIED REGION OF TELLER COUNTY
SG	2810	0	0	100	0	C	95	0	5	0	0	70	N/A	UNSTUDIED REGION OF TELLER COUNTY
WG	2910	0	0	100	0	C	98	0	2	0	0	70	N/A	UNSTUDIED REGION OF TELLER COUNTY
CB	3010	0	0	100	0	C	95	0	5	0	0	72	N/A	UNSTUDIED REGION OF TELLER COUNTY
	3011	0	0	100	0	C	90	0	10	0	0	72	N/A	UNSTUDIED REGION OF TELLER COUNTY
	3012	0	0	100	0	C	100	0	0	0	0	70	N/A	UNSTUDIED REGION OF TELLER COUNTY

TABLE 4.7-3 (Cont.)
FUTURE LAND USE CN VALUES

BASIN DESCRIPTION		HYDROLOGIC SOIL GROUP (PERCENT)				AVERAGE HSG	LAND USE DISTRIBUTION (PERCENT IMPERVIOUS)					CN	WEIGHTED PUBLISHED CN	COMMENTS
		A	B	C	D		0-5%	5-15%	15-40%	40-70%	70-100%			
FRC	2010	0	0	80	20	C	100	0	0	0	0	70	N/A	UNSTUDIED REGION OF TELLER COUNTY
	2011	0	0	100	0	C	100	0	0	0	0	70	N/A	UNSTUDIED REGION OF TELLER COUNTY
	2012	0	0	100	0	C	100	0	0	0	0	70	N/A	UNSTUDIED REGION OF TELLER COUNTY
	2013	0	0	80	20	C	100	0	0	0	0	70	N/A	UNSTUDIED REGION OF TELLER COUNTY
	2014	0	0	100	0	C	100	0	0	0	0	72	N/A	UNSTUDIED REGION OF TELLER COUNTY
	2015	0	100	0	0	B	50	0	50	0	0	72		
SVC	2110	0	0	100	0	C	100	0	0	0	0	70	N/A	UNSTUDIED REGION OF TELLER COUNTY
	2111	0	0	100	0	C	100	0	0	0	0	70	N/A	UNSTUDIED REGION OF TELLER COUNTY
	2112	0	0	100	0	C	100	0	0	0	0	70	N/A	UNSTUDIED REGION OF TELLER COUNTY
	2113	0	0	100	0	C	100	0	0	0	0	70	N/A	UNSTUDIED REGION OF TELLER COUNTY
	2114	0	0	100	0	C	100	0	0	0	0	70	N/A	UNSTUDIED REGION OF TELLER COUNTY
	2115	0	100	0	0	B	98	0	2	0	0	72	N/A	UNSTUDIED REGION OF TELLER COUNTY
CP	2210	0	0	80	20	C	50	0	50	0	0	74	N/A	UNSTUDIED REGION OF TELLER COUNTY
CLC	2310	0	0	80	20	C	100	0	0	0	0	72	N/A	UNSTUDIED REGION OF TELLER COUNTY
	2311	0	0	100	0	C	100	0	0	0	0	70	N/A	UNSTUDIED REGION OF TELLER COUNTY
	2312	0	0	100	0	C	5	0	95	0	0	74	N/A	UNSTUDIED REGION OF TELLER COUNTY
CTC	2410	0	0	0	100	D	100	0	0	0	0	74	N/A	
	2411	0	0	0	100	D	100	0	0	0	0	74	N/A	
	2412	0	0	0	100	D	100	0	0	0	0	74	N/A	
	2413	0	0	0	100	D	100	0	0	0	0	74	N/A	PRELIMINARY SOILS INFORMATION FROM
	2414	0	0	0	100	D	100	0	0	0	0	74	N/A	THE SCS FOR THE WOODLAND PARK AREA
	2415	0	0	100	0	C	100	0	0	0	0	70	N/A	
	2416	0	0	100	0	C	10	0	90	0	0	74	N/A	
	2417	0	0	100	0	C	0	0	100	0	0	74	N/A	
CRC	2510	0	0	20	80	D	70	0	30	0	0	74	N/A	
	2511	0	0	100	0	C	60	0	40	0	0	72	N/A	PRELIMINARY SOILS INFORMATION FROM
	2512	0	70	30	0	B	10	5	85	0	0	72	N/A	THE SCS FOR THE WOODLAND PARK AREA
	2513	0	0	100	0	C	100	0	0	0	0	70	N/A	
TG	2610	0	80	20	0	B	98	0	2	0	0	66	N/A	UNSTUDIED REGION OF TELLER COUNTY
	2611	0	75	25	0	B	50	0	50	0	0	66	N/A	UNSTUDIED REGION OF TELLER COUNTY
LG	2710	0	0	100	0	C	10	5	80	5	0	72	N/A	UNSTUDIED REGION OF TELLER COUNTY
SG	2810	0	0	100	0	C	85	0	15	0	0	72	N/A	UNSTUDIED REGION OF TELLER COUNTY
WG	2910	0	0	100	0	C	90	0	10	0	0	72	N/A	UNSTUDIED REGION OF TELLER COUNTY
CB	3010	0	0	100	0	C	30	0	70	0	0	74	N/A	UNSTUDIED REGION OF TELLER COUNTY
	3011	0	0	100	0	C	15	5	75	5	0	74	N/A	UNSTUDIED REGION OF TELLER COUNTY
	3012	0	0	100	0	C	100	0	0	0	0	70	N/A	UNSTUDIED REGION OF TELLER COUNTY

FIGURE 4.3-1

MULLER ENGINEERING CO., INC. CONSULTING ENGINEERS 550 SOUTH WADSWORTH BLVD. SUITE 500 LAKEWOOD, COLORADO 80226-3118 (303) 937-3500	Thomas & Thomas Obering, Wurth & Associates Aquatic & Wetland Consultants CTL Thompson	0 4000 8000 Scale in Feet	FOUNTAIN CREEK DRAINAGE BASIN PLANNING STUDY	CITY OF COLORADO SPRINGS PLANNING, DEVELOPMENT AND FINANCE DEPARTMENT	FOUNTAIN CREEK DBPS WATERSHED MAP	SHEET 1 OF 1

NEW DOC

RECEIVED
JUN 0 6 2007
EPC DEVELOPMENT SERVICES

MASTER DEVELOPMENT
&
PRELIMINARY DRAINAGE REPORT

PYRAMID MOUNTAIN DEVELOPMENT
CASCADE, COLORADO

VERSION #3
DATE 6/6/07

PERPARED FOR:

Cascade Resort Communities Inc.

June 2007

Prepared By:

JDS-HYDRO CONSULTANTS, INC

545 EAST PIKES PEAK AVENUE • COLORADO SPRINGS CO • 80903 • (719) 227 0072 FAX (719) 471 3401

MASTER DEVELOPMENT & PRELIMINARY DRAINAGE REPORT

PYRAMID MOUNTAIN DEVELOPMENT
CASCADE, COLORADO

June 2007

JDS-Hydro Project Number 127 02

Prepared For

Cascade Resort Communities, Inc
4455 Fountain Avenue
Cascade, CO 80809

Prepared By

JDS-Hydro Consultants, Inc
545 East Pikes Peak Avenue, Suite 300
Colorado Springs, Colorado 80903
(719) 227-0072

Appendix F All of these factors were combined to determine a weighted SCS curve number of 66 The curve number calculations are included in Appendices D and E

Flow rates for drainage basins smaller than 100 acres were estimated by using the Rational Method Recurrence interval of 5 year and 100 year design storms were evaluated Runoff coefficients were established based on Table 5-1 of the *City of Colorado Springs and El Paso County, Drainage Criteria Manual* Three surface characteristics were identified - rock outcrops, woods in good condition and meadow within two soil groups – B and D A weighted runoff coefficient was determined for the each soil group based on surface characteristics No adjustment was made to the amount of D group because it is treated the same as soil group C in the rational method A weighted runoff coefficient was determined for each individual basin based on the soil group composition in that basin Runoff coefficients ranged from 0 27 to 0 34 Further discussion can be found in the drainage sections

Time of Concentration (Tc) for individual basins was calculated using TR-55 methodology for both historic and developed flows The TR-55 method recommends limiting overland flow to a maximum of 300 foot in suburban areas, however the maximum of 1,000 feet was used because of the significant amount of rural upstream area Formulation of these Tc's appear to produce flows more representative of basins with similar size and terrain, and personal observation of the local citizens Specific Tc information can be found in the appendices for the historic and developed drainage conditions

All basins have been modeled with Hydraflow software which models watersheds with either the SCS or the rational method The software generates hydrographs that can be routed through the watershed, channels and detention ponds Detention pond storage is determined by the average end area method The Water Quality Capture Volume was calculated according to the new Volume 2 of the Drainage Criteria Manual. The software allows customization for the SCS Type IIa storm distribution, and IDF curves were created with the rainfall data presented earlier in this section A printout of the IDF curves can be found in Appendix F

V. Historic Drainage Patterns

The majority of the subject site slopes from the northeast to southwest with slopes ranging from 6 to 70 percent Existing development in Cascade is on the downstream side of the proposed residential development Pyramid Mountain Road is a clear dividing line between the existing residential areas and the proposed residential sites in Pyramid Mountain Subdivision The site is divided between nine historic drainage basins, designated A through I Refer to Appendix D for the historic drainage plan contained within a pocket and all of the detailed hydrologic calculations

Basin A contains 35 0 acres, and is located adjacent to the middle portion of the western boundary of the site It abuts the eastern edge of Pyramid Mountain Road, extending from Highway 24 at the north end to a high point about 330 feet north of Gardiner at the south end There are no off-site flows entering Basin A Most of the basin is covered with native grasses

and scrub oak, with small ponderosa pine communities scattered along the minor drainage-ways at the top of the basin The basin consists of two soil groups – B and D A weighted runoff coefficient of 0 31 was determined for the basin based on these characteristics

Basin A generates Q_5=15 4 cfs and Q_{100}=26 9 cfs Drainage generated by Basin A sheet flows southwesterly where it is intercepted by Pyramid Mountain Road at **Design Point 1** Pyramid Mountain Road is paved and varies in width from 15 feet to 24 feet The road section varies from standard crown with asphalt curbing to inverted crown with no curb, with slopes ranging from 1 5% to 15% The road section was evaluated at two conditions – inverted crown at the south end and standard section at the north end Both conditions adequately convey the flows as shown on Capacity Evaluations in Appendix F

The flows continue northwest in Pyramid Mountain Road to intersect with Highway 24 where flows continue to the south along the edge of the highway in a swale There is an existing plugged CMP (possible 18") under Pyramid Mountain Road Some portions of the swale are filled with sediment which appears to come from many of the upstream unpaved private streets and driveways abutting the right-of-way Approximately 400 feet south of the intersection is a culvert which intercepts flow in the swale and discharges into Upper Fountain Creek to the west

Basin B contains 15 8 acres, and is located adjacent to the middle portion of the western boundary of the site It abuts the eastern edge of Pyramid Mountain Road, extending from a high point about 330 feet north of Gardiner to a high point about 150 feet south of Gardiner There are no off-site flows entering Basin B The basin contains an existing Cascade Metropolitan District water tank, water lines and service road Most of the basin is covered with native grasses and scrub oak, with small ponderosa pine communities scattered throughout the basin The basin consists of two soil groups – B and D A weighted runoff coefficient of 0 28 was determined for the basin based on these characteristics

Basin B generates Q_5=5 7 cfs and Q_{100}=10 0 cfs The basin currently flows to a natural drainage-way leading southwesterly to **Design Point 2** on the north side of Pyramid Mountain Road Pyramid Mountain Road has asphalt curb along most of the road There is an existing 18" (likely) CMP culvert under the low point of Pyramid Mountain Road at DP2 which is plugged, and the pipe invert sets above the natural flow line creating a detention area upstream An 18" culvert would have adequate capacity if unplugged as shown on Figure 9 37 of the DCM included in Appendix F Currently the water will backup at the plugged culvert until the water overtops the road at the low spot, and continues on its historic path in a natural drainageway across residential lots below the site The drainage way is deep, appears stable and has adequate capacity as shown on Capacity Evaluations in Appendix F Generally there are no dedicated drainage easements across the downstream residential lots, and actual road locations may not occur within dedicated right-of-ways There appear to be existing culverts (sizes unknown) at Forest Road and Hagerman Avenue that are plugged with forest debris and trash, and operate in the same manner as the culvert at DP2 There were no signs of problems from the plugged culverts but El Paso County should add these areas to their maintenance

project list The drainage way continues southwesterly and intersects with Highway 24 where an existing 24" CMP intercepts flows and outlets into the grass swale in the Highway 24 median

Basin C contains 4 4 acres, and is located adjacent to the middle portion of the western boundary of the site It abuts the eastern edge of Pyramid Mountain Road, extending from a high point about 150 feet south of Gardiner to Topeka Avenue at the south end There are no off-site flows entering Basin C The basin is covered with native grasses, scrub oak, and ponderosa pines The basin consists of one soil group – B A weighted runoff coefficient of 0 27 was determined for the basin based on these characteristics

Basin C generates Q_5=1 6 cfs, Q_{100}= 2 8 cfs which currently sheet flows to Pyramid Mountain Road, **Design Point 3**, and continues to flow southeasterly The road has asphalt curbs, and ranges in width from 17 feet to 19 feet wide with an average slope of 8% The road section is adequate to convey these flows as shown on Capacity Evaluations in Appendix F The runoff combines with flow from Basins D and F at Design Point 10 Refer to the discussion under Basin D concerning the combined flows

Basin D contains 439 6 acres, and contains the northern and eastern portion of the site It extends from the intersection of Pyramid Mountain Road and Topeka Avenue approximately 1 2 miles north to United States forest There are numerous old wagon trails in the basin that are gravel and have been used for site access including the historic route to the top of Pyramid Mountain There are a couple of existing 18" CMP culverts on the access roads at the major drainage way crossings Basin D is a large basin with well-defined natural drainage channels that converge to one channel at the lower end of the basin A weighted curve number of 66 was determined for the basin based on the analysis explained in *Section IV Hydrology*

There are approximately 291 3 acres of off-site area which generates flows of Q_5=19 9 cfs, Q_{100}=94 0 cfs which enter Basin D These flows consist of sheet flow and very minor concentrated flow in numerous natural drainage ways along the northern and eastern edges of the site Basin D generates Q_5=28 7 cfs, Q_{100}=135 1 cfs at **Design Point 4** which is located on the north side of a low spot in Pyramid Mountain Road There are no drainage structures at this design point Storm water from Basin D combines with flows from Basins C and E at Design Point 10 in Pyramid Mountain Road and flow across the road

The flows at **Design Point 10** of Q_5=28 9 cfs, Q_{100}=135 7 cfs flow across Pyramid Mountain Road in a low spot The low spot acts as a wide swale with an approximate depth of 5 5 inches as shown on Capacity Evaluations in Appendix F The flow splits at the intersection of Pyramid Mountain Road and Topeka Avenue There are several openings in the asphalt curbing along the south side of Pyramid Mountain Road which allow runoff to continue down into a natural drainage way The low spot in Pyramid extends towards Topeka Avenue which allows a smaller portion of the flow to continue down Topeka Avenue In discussions with the residents living at 7705 N Topeka and review of the area, approximately 90% of the flow Q_5=26 cfs, Q_{100}=122 1 cfs continue in the natural drainage way, and 10% of the flow Q_5=2 9 cfs, Q_{100}=13 6 cfs continue down Topeka Avenue

TR55 Tc Worksheet

Hydraflow Hydrographs by Intelisolve

Hyd. No. 1

Basin A HISTORIC

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0 800	0 400	0 400	
Flow length (ft)	= 300 0	200 0	0 0	
Two-year 24-hr precip (in)	= 2 00	2 00	0 00	
Land slope (%)	= 43 20	43 20	0 00	
Travel Time (min)	**= 33.32**	**+ 13.84**	**+ 0.00**	**= 47.16**
Shallow Concentrated Flow				
Flow length (ft)	= 0 00	0 00	0 00	
Watercourse slope (%)	= 0 00	0 00	0 00	
Surface description	= Unpaved	Paved	Paved	
Average velocity (ft/s)	= 0 00	0 00	0 00	
Travel Time (min)	**= 0.00**	**+ 0.00**	**+ 0.00**	**= 0.00**
Channel Flow				
X sectional flow area (sqft)	= 6 10	2 40	0 00	
Wetted perimeter (ft)	= 12 90	15 80	0 00	
Channel slope (%)	= 42 70	33 60	0 00	
Manning's n-value	= 0 400	0 050	0 015	
Velocity (ft/s)	= 1 47	4 89	0 00	
Flow length (ft)	= 750 0	250 0	0 0	
Travel Time (min)	**= 8.48**	**+ 0.85**	**+ 0.00**	**= 9.33**

Total Travel Time, Tc ..... 56.00 min

TR55 Tc Worksheet

Hydraflow Hydrographs by Intelisolve

Hyd. No. 2

Basin B HISTORIC

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0 800	0 400	0 400	
Flow length (ft)	= 300 0	200 0	0 0	
Two-year 24-hr precip (in)	= 2 00	2 00	0 00	
Land slope (%)	= 28 00	28 00	0 00	
Travel Time (min)	**= 39.63**	**+ 16.46**	**+ 0.00**	**= 56.09**
Shallow Concentrated Flow				
Flow length (ft)	= 0 00	0 00	0 00	
Watercourse slope (%)	= 0 00	0 00	0 00	
Surface description	= Unpaved	Paved	Paved	
Average velocity (ft/s)	= 0 00	0 00	0 00	
Travel Time (min)	**= 0.00**	**+ 0.00**	**+ 0.00**	**= 0.00**
Channel Flow				
X sectional flow area (sqft)	= 5 10	1 30	0 00	
Wetted perimeter (ft)	= 21 30	6 20	0 00	
Channel slope (%)	= 17 30	15 40	0 00	
Manning's n-value	= 0 400	0 050	0 015	
Velocity (ft/s)	= 0 59	4 11	0 00	
Flow length (ft)	= 220 0	480 0	0 0	
Travel Time (min)	**= 6.17**	**+ 1.95**	**+ 0.00**	**= 8.12**

Total Travel Time, Tc ..... 64.00 min

TR55 Tc Worksheet

Hyd. No. 3

Basin C HISTORIC

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0 400		0 400		0 011		
Flow length (ft)	= 300 0		200 0		0 0		
Two-year 24-hr precip (in)	= 2 00		2 00		0 00		
Land slope (%)	= 12 80		12 80		0 00		
Travel Time (min)	**= 31.13**	**+**	**22.51**	**+**	**0.00**	**=**	**53.64**
Shallow Concentrated Flow							
Flow length (ft)	= 500 00		0 00		0 00		
Watercourse slope (%)	= 8 00		0 00		0 00		
Surface description	= Paved		Paved		Paved		
Average velocity (ft/s)	= 5 75		0 00		0 00		
Travel Time (min)	**= 1.45**	**+**	**0.00**	**+**	**0.00**	**=**	**1.45**
Channel Flow							
X sectional flow area (sqft)	= 1 30		0 00		0 00		
Wetted perimeter (ft)	= 50 10		0 00		0 00		
Channel slope (%)	= 14 50		0 00		0 00		
Manning's n-value	= 0 050		0 015		0 015		
Velocity (ft/s)	= 0 98		0 00		0 00		
Flow length (ft)	= 330 0		0 0		0 0		
Travel Time (min)	**= 5.60**	**+**	**0 00**	**+**	**0 00**	**=**	**5 60**

Total Travel Time, Tc ..... **61.00 min**

FLOW SUMMARY

HISTORIC DRAINAGE BASINS

Pyramid Mountain Subdivision

Design Point	Basin	Area Acres	c_{100} or CN	Tc min	I_5 in/hr	Q_5 cfs	I_{100} in/hr	Q_{100} cfs
	Offsite to D	291 3 ac	66	165 7		19 9 cfs		94 0 cfs
	Offsite to I	18 0 ac	0 34	64 0	1 29	7 9 cfs	2 3	13 8 cfs
DP 1	A	35 0 ac	0 31	56 0	1 42	15 4 cfs	2 5	26 9 cfs
DP 2	B	15 8 ac	0 28	64 0	1 30	5 7 cfs	2 3	10 0 cfs
DP 3	C	4 4 ac	0 27	61 0	1 34	1 6 cfs	2 3	2 8 cfs
DP 4	D	439 6 ac	66	176 3		28 7 cfs		135 1 cfs
DP 5	E	0 8 ac	0 34	6 0	4 46	1 2 cfs	7 8	2 1 cfs
DP 6	F	18 9 ac	0 28	67 0	1 25	6 6 cfs	2 2	11 6 cfs
DP 7	G	11 8 ac	0 28	57 0	1 40	4 6 cfs	2 4	8 1 cfs
DP 8	H	39 6 ac	0 30	74 0	1 16	13 8 cfs	2 0	24 2 cfs
DP 9	I	59 3 ac	0 34	72 0	1 19	23 9 cfs	2 1	41 8 cfs
DP10	C+D+E	444 8 ac	66			28 9 cfs		135 7 cfs
DP10 into channel						26 0 cfs		122 1 cfs
DP10 into Topeka						2 9 cfs		13 6 cfs
	DS1	40 2 ac	72	30 3		18 2 cfs		65 1 cfs
DP11	C+D+E+DS1	485 0 ac				30 8 cfs		140 5 cfs

WEIGHTED CURVE NUMBERS / RUNOFF COEFFICIENT

HISTORIC DRAINAGE BASINS

Pyramid Mountain Subdivision

WEIGHTED CURVE NUMBERS

Basin	Area SF	Area AC	Area (AC) Soil B	Soil C	Soil D	Curve Number Soil B	Soil C	Soil D
D	19,147,004 sf	439 6 ac	9 6 ac	306 9 ac	123 1 ac			
Rock Outcrop	3 0%	13 2 ac			13 2 ac			98
Forest/Range*	72 0%	316 5 ac	9 6 ac	306 9 ac		43	62	
Woods	25 0%	109 9 ac			109 9 ac			77
							Weighted CN	66

*Curve numbers taken from Table 5-4 of DCM & *=FIG 9-2 National Engineering Handbook*

WEIGHTED RUNOFF COEFFICIENTS

Land Use	Percentage	Runoff Coefficient Soil B	Soil D
Rock Outcrop	2 0%	0 95	0 95
Meadow	50 0%	0 35	0 45
Woods	48 0%	0 15	0 20
	Weighted c	0 27	0 34

Basin	Area SF	Area AC	Area (AC) Soil B (27)	Soil D (34)	Runoff Coeff
A	1,525,989 sf	35 0 ac	15 0 ac	20 1 ac	0 31
B	689,138 sf	15 8 ac	13 0 ac	2 9 ac	0 28
C	192,579 sf	4 4 ac	4 4 ac	0 0 ac	0 27
E	33,951 sf	0 8 ac	0 0 ac	0 8 ac	0 34
F*	825,340 sf	18 9 ac	18 3 ac	0 6 ac	0 28
G	512,490 sf	11 8 ac	9 9 ac	1 9 ac	0 28
H	1,725,778 sf	39 6 ac	21 3 ac	18 4 ac	0 30
I	2,582,491 sf	59 3 ac	0 0 ac	59 3 ac	0 34

** Basin F includes offsite developed areas with two homesites*

Runoff coefficients taken from Table 5-1 of DCM for 100 year frequency

CASCADE RESORT COMMUNITIES, INC.

PYRAMID MOUNTAIN SUBDIVISION

PRELIMINARY HISTORIC DRAINAGE BASIN DELINEATIONS

Design Point	Basin	Area Acres	c100 or CN	Tc min	Is in/hr	Qs cfs	Iso in/hr	Qroe cfs
	Offsite to D	291.3 ac	66	165.7		19.9 cfs		94.0 cfs
	Offsite to I	18.0 ac	0.34	64.0	1.29	7.9 cfs	2.3	13.8 cfs
DP 1	A	35.0 ac	0.31	59.0	1.42	15.4 cfs	2.5	26.9 cfs
DP 2	B	15.6 ac	0.28	64.0	1.30	5.7 cfs	2.3	10.0 cfs
DP 3	C	4.4 ac	0.27	61.0	1.34	1.6 cfs	2.3	2.8 cfs
DP 4	D	439.6 ac	66	176.3		28.7 cfs		135.1 cfs
DP 5	E	0.8 ac	0.34	5.0	4.45	1.2 cfs	7.8	2.1 cfs
DP 6	F	18.9 ac	0.28	67.0	1.25	6.6 cfs	2.2	11.6 cfs
DP 7	G	11.8 ac	0.28	57.0	1.40	4.6 cfs	2.4	8.1 cfs
DP 8	H	39.6 ac	0.30	74.0	1.16	13.8 cfs	2.0	24.2 cfs
DP 9	I	39.3 ac	0.34	72.0	1.19	23.9 cfs	2.1	41.8 cfs
DP10	C+D+E	444.8 ac	66			28.9 cfs		135.7 cfs
DP 10 into channel						26.0 cfs		122.1 cfs
DP10 into Topeka						2.9 cfs		13.6 cfs
	DS1	40.2 ac	72	30.3		18.2 cfs		65.1 cfs
DP11	C+D+E+DS1	485.0 ac				30.8 cfs		140.5 cfs

LEGEND

- F — MAJOR DRAINAGE BASIN BOUNDARY
- DP2 — DESIGN POINT
- MAJOR DRAINAGE BASIN BOUNDARY
- TIME OF CONCENTRATION PATH

FOREST

QUAIL SUB.

LAND SURVEY PLAT

UNPLATTED

DP9

I

D

DP1

A

B

DP2

C

DP4

E

DP3

DP10

DP5

F

DS1

DP6

DP7

DP8

DP11

G

H

MARGREEN SUB

PYRAMID MOUNTAIN SUBDIVISION BOUNDARY

CASCADE PINES SUB

CASCADE ADD #1

STIRRING M RANCH SUB

GRATED INLET

PLUGGED CMP

18" CMP

EX 18" CMP

EX 15" CMP

DAMAGE ENCROACHMENT WITH 15" CMP

30" CMP

5'X5' GRATED INLET WITH 24" CMP

0' 200' 400'
SCALE: 1"=200'

CASCADE RESORT COMMUNITIES, INC.
PYRAMID MOUNTAIN SUBDIVISION
HISTORIC DRAINAGE BASIN DELINEATIONS
PRELIMINARY

Project No. 127.02
Scale: 1"=220'
Date: 09/01/07
Design: CAB
Drawn: RMM
Check: JPM
Revised:

D1

JDS-HYDRO CONSULTANTS, INC.
545 EAST PIKES PEAK AVENUE, SUITE 300
COLORADO SPRINGS, COLORADO 80903
(719) 227-0072

2026 Financial Assurance Estimate Form
(with pre-plat construction)

Updated: 2/2026

PROJECT INFORMATION		
Project Name:Pyramid Mountain Filing No. 1	**Date:3/3/2026**	**PCD File No.SF262**

Description	Quantity	Units	Unit Cost		Total	(with Pre-Plat Construction) % Complete	Remaining	
SECTION 1 - GRADING AND EROSION CONTROL (Construction and Permanent BMPs)								
Earthwork								*
less than 5,000; $8,000 min	499.	CY	$ 7.50	=	$ 8,000.00		$ 8,000.00	*
5,001-20,000; $30,000 min		CY	$ 6.50	=	$ -		$ -	*
20,001-50,000; $100,000 min		CY	$ 4.50	=	$ -		$ -	*
50,001-200,000; $175,000 min		CY	$ 3.00	=	$ -		$ -	*
greater than 200,000; $500,000 min		CY	$ 2.50	=	$ -		$ -	*
Erosion Control Blanket	1000.	SY	$ 6.00	=	$ 6,000.00		$ 6,000.00	*
Seeding (inc. noxious weed mgmnt.) & Mulching	1.	AC	$ 2,037.00	=	$ 2,037.00		$ 2,037.00	*
Permanent Pond/PCM (provide engineer's estimate)		EA		=	$ -		$ -	*
					$ -		$ -	*
					$ -		$ -	*
[insert items not listed but part of construction plans]					$ -		$ -	*
Safety Fence		LF	$ 5.00	=	$ -		$ -	
Inlet Protection		EA	$ 322.00	=	$ -		$ -	
Rock Check Dam		EA	$ 908.00	=	$ -		$ -	
Concrete Washout Basin	1.	EA	$ 1,790.00	=	$ 1,790.00		$ 1,790.00	
Sediment Basin		EA	$ 3,483.00	=	$ -		$ -	
Sediment Trap		EA	$ 877.00	=	$ -		$ -	
Silt Fence		LF	$ 3.00	=	$ -		$ -	
Slope Drain		LF	$ 30.00	=	$ -		$ -	
Straw Bale		EA	$ 56.00	=	$ -		$ -	
Straw Wattle/Rock Sock		LF	$ 11.00	=	$ -		$ -	
Surface Roughening		AC	$ 507.00	=	$ -		$ -	
Vehicle Tracking Control	1.	EA	$ 3,840.00	=	$ 3,840.00		$ 3,840.00	
				=	$ -		$ -	
				=	$ -		$ -	
				=	$ -		$ -	
[insert items not listed but part of construction plans]				=	$ -		$ -	
MAINTENANCE (35% of Construction BMPs)				=	$ 1,970.50		$ 1,970.50	
* - Subject to defect warranty financial assurance. A minimum of 20% shall be retained until final acceptance (MAXIMUM OF 80% COMPLETE ALLOWED)		**Section 1 Subtotal**		**=**	**$ 23,637.50**		**$ 23,637.50**	
SECTION 2 - PUBLIC IMPROVEMENTS *								
ROADWAY IMPROVEMENTS								*
Construction Traffic Control		LS		=	$ -		$ -	*
Aggregate Base Course (135 lbs/cf)		Tons	$ 42.00	=	$ -		$ -	*
Aggregate Base Course (135 lbs/cf)		CY	$ 81.00	=	$ -		$ -	*
Asphalt Pavement (3" thick)		SY	$ 22.00	=	$ -		$ -	*
Asphalt Pavement (4" thick)		SY	$ 31.00	=	$ -		$ -	*
Asphalt Pavement (6" thick)		SY	$ 47.00	=	$ -		$ -	*
Asphalt Pavement (147 lbs/cf) __" thick		Tons	$ 140.00	=	$ -		$ -	*
Raised Median, Paved		SF	$ 15.00	=	$ -		$ -	*
Signs (regulatory/advisory/guide/street)		EA	$ 293.00	=	$ -		$ -	*
Epoxy Pavement Marking		SF	$ 19.00	=	$ -		$ -	*
Thermoplastic Pavement Marking		SF	$ 29.00	=	$ -		$ -	*
Barricade - Type 3		EA	$ 380.00	=	$ -		$ -	*
Delineator - Type I		EA	$ 38.00	=	$ -		$ -	*
Curb and Gutter, Type A (6" Vertical)		LF	$ 49.00	=	$ -		$ -	*
Curb and Gutter, Type B (Median)		LF	$ 50.00	=	$ -		$ -	*
Curb and Gutter, Type C (Ramp)		LF	$ 51.00	=	$ -		$ -	*
4" Sidewalk (common areas only)		SY	$ 69.00	=	$ -		$ -	*
5" Sidewalk		SY	$ 85.00	=	$ -		$ -	*
6" Sidewalk		SY	$ 113.00	=	$ -		$ -	*
8" Sidewalk		SY	$ 141.00	=	$ -		$ -	*
Pedestrian Ramp		EA	$ 1,961.00	=	$ -		$ -	*
Cross Pan, local (8" thick, 6' wide to include return)		LF	$ 87.00	=	$ -		$ -	*
Cross Pan, collector (9" thick, 8' wide to include return)		LF	$ 131.00	=	$ -		$ -	*
Curb Opening with Drainage Chase		EA	$ 2,341.00	=	$ -		$ -	*
Guardrail Type 3 (W-Beam)		LF	$ 87.00	=	$ -		$ -	*
Guardrail Type 7 (Concrete)		LF	$ 104.00	=	$ -		$ -	*
Guardrail End Anchorage		EA	$ 2,485.00	=	$ -		$ -	*
Guardrail Impact Attenuator		EA	$ 22,568.00	=	$ -		$ -	*
Sound Barrier Fence (CMU block, 6' high)		LF	$ 113.00	=	$ -		$ -	*
Sound Barrier Fence (panels, 6' high)		LF	$ 115.00	=	$ -		$ -	*
Electrical Conduit, Size =		LF	$ 33.00	=	$ -		$ -	*
Traffic Signal, (provide engineer's estimate)		EA		=	$ -		$ -	*
Survey Monumentation		EA	$ 638.00	=	$ -		$ -	*
				=	$ -		$ -	*

PROJECT INFORMATION		
Project Name:Pyramid Mountain Filing No. 1	**Date:3/3/2026**	**PCD File No.SF262**

Description	Quantity	Units	Unit Cost		Total	(with Pre-Plat Construction) % Complete	Remaining	
				=	$ -		$ -	*
				=	$ -		$ -	*
[insert items not listed but part of construction plans]				=	$ -		$ -	*
STORM DRAIN IMPROVEMENTS								*
Concrete Box Culvert (M Standard), Size (W x H)		LF		=	$ -		$ -	*
18" Reinforced Concrete Pipe		LF	$ 111.00	=	$ -		$ -	*
24" Reinforced Concrete Pipe		LF	$ 161.00	=	$ -		$ -	*
30" Reinforced Concrete Pipe		LF	$ 167.00	=	$ -		$ -	*
36" Reinforced Concrete Pipe		LF	$ 191.00	=	$ -		$ -	*
42" Reinforced Concrete Pipe		LF	$ 275.00	=	$ -		$ -	*
48" Reinforced Concrete Pipe		LF	$ 349.00	=	$ -		$ -	*
54" Reinforced Concrete Pipe		LF	$ 465.00	=	$ -		$ -	*
60" Reinforced Concrete Pipe		LF	$ 476.00	=	$ -		$ -	*
66" Reinforced Concrete Pipe		LF	$ 550.00	=	$ -		$ -	*
72" Reinforced Concrete Pipe		LF	$ 616.00	=	$ -		$ -	*
18" Corrugated Steel Pipe		LF	$ 136.00	=	$ -		$ -	*
24" Corrugated Steel Pipe		LF	$ 229.00	=	$ -		$ -	*
30" Corrugated Steel Pipe		LF	$ 244.00	=	$ -		$ -	*
36" Corrugated Steel Pipe		LF	$ 244.00	=	$ -		$ -	*
42" Corrugated Steel Pipe		LF	$ 226.00	=	$ -		$ -	*
48" Corrugated Steel Pipe		LF	$ 465.00	=	$ -		$ -	*
54" Corrugated Steel Pipe		LF	$ 459.00	=	$ -		$ -	*
60" Corrugated Steel Pipe		LF	$ 501.00	=	$ -		$ -	*
66" Corrugated Steel Pipe		LF	$ 580.00	=	$ -		$ -	*
72" Corrugated Steel Pipe		LF	$ 654.00	=	$ -		$ -	*
78" Corrugated Steel Pipe		LF	$ 728.00	=	$ -		$ -	*
84" Corrugated Steel Pipe		LF	$ 901.00	=	$ -		$ -	*
Flared End Section (FES) RCP Size = (unit cost = 6x pipe unit cost)		EA		=	$ -		$ -	*
Flared End Section (FES) CSP Size = (unit cost = 6x pipe unit cost)		EA		=	$ -		$ -	*
				=	$ -		$ -	*
[insert items not listed but part of construction plans]				=	$ -		$ -	*
End Treatment- Headwall		EA		=	$ -		$ -	*
End Treatment- Wingwall		EA		=	$ -		$ -	*
End Treatment - Cutoff Wall		EA		=	$ -		$ -	*
Curb Inlet (Type R) L=5', Depth < 5'		EA	$ 8,814.00	=	$ -		$ -	*
Curb Inlet (Type R) L=5', 5' ≤ Depth < 10'		EA	$ 10,835.00	=	$ -		$ -	*
Curb Inlet (Type R) L =5', 10' ≤ Depth < 15'		EA	$ 12,206.00	=	$ -		$ -	*
Curb Inlet (Type R) L =10', Depth < 5'		EA	$ 11,438.00	=	$ -		$ -	*
Curb Inlet (Type R) L =10', 5' ≤ Depth < 10'		EA	$ 12,689.00	=	$ -		$ -	*
Curb Inlet (Type R) L =10', 10' ≤ Depth < 15'		EA	$ 16,174.00	=	$ -		$ -	*
Curb Inlet (Type R) L =15', Depth < 5'		EA	$ 14,452.00	=	$ -		$ -	*
Curb Inlet (Type R) L =15', 5' ≤ Depth < 10'		EA	$ 17,237.00	=	$ -		$ -	*
Curb Inlet (Type R) L =15', 10' ≤ Depth < 15'		EA	$ 21,610.00	=	$ -		$ -	*
Curb Inlet (Type R) L =20', Depth < 5'		EA	$ 16,499.00	=	$ -		$ -	*
Curb Inlet (Type R) L =20', 5' ≤ Depth < 10'		EA	$ 20,012.00	=	$ -		$ -	*
Grated Inlet (Type C), Depth < 5'		EA	$ 8,156.00	=	$ -		$ -	*
Grated Inlet (Type D), Depth < 5'		EA	$ 11,435.00	=	$ -		$ -	*
Storm Sewer Manhole, Box Base		EA	$ 18,950.00	=	$ -		$ -	*
Storm Sewer Manhole, Slab Base		EA	$ 9,314.00	=	$ -		$ -	*
Geotextile (Erosion Control)		SY	$ 6.00	=	$ -		$ -	*
Rip Rap, d50 size from 6" to 24"		Tons	$ 102.00	=	$ -		$ -	*
Rip Rap, Grouted		Tons	$ 136.00	=	$ -		$ -	*
Drainage Channel Construction, Size (W x H)		LF		=	$ -		$ -	*
Drainage Channel Lining, Concrete		CY	$ 815.00	=	$ -		$ -	*
Drainage Channel Lining, Rip Rap		CY	$ 234.00	=	$ -		$ -	*
Drainage Channel Lining, Grass		AC	$ 2,100.00	=	$ -		$ -	*
Permanent Drainage Channel Lining or Roadside Ditch TRM		SY	$ 13.00	=	$ -		$ -	*
				=	$ -		$ -	*
				=	$ -		$ -	*
				=	$ -		$ -	*
[insert items not listed but part of construction plans]				=	$ -		$ -	*
* - Subject to defect warranty financial assurance. A minimum of 20% shall be retained until final acceptance (MAXIMUM OF 80% COMPLETE ALLOWED)		**Section 2 Subtotal**		**=**	**$ -**		**$ -**	*

PROJECT INFORMATION		
Project Name:Pyramid Mountain Filing No. 1	**Date:3/3/2026**	**PCD File No.SF262**

Description	Quantity	Units	Unit Cost		Total	(with Pre-Plat Construction) % Complete	Remaining
SECTION 3 - COMMON DEVELOPMENT IMPROVEMENTS (Private or District and NOT Maintained by EPC)**							
ROADWAY IMPROVEMENTS							
Aggregate Base Course (135 lbs/cf)	325.	CY	$ 71.00	=	$ 23,075.00		$ 23,075.00
				=	$ -		$ -
				=	$ -		$ -
				=	$ -		$ -
				=	$ -		$ -
				=	$ -		$ -
STORM DRAIN IMPROVEMENTS (Exception: Permanent Pond/BMP shall be itemized under Section 1)							
24" Reinforced Concrete Pipe	30.	LF	$ 105.00	=	$ 3,150.00		$ 3,150.00
				=	$ -		$ -
				=	$ -		$ -
				=	$ -		$ -
				=	$ -		$ -
				=	$ -		$ -
WATER SYSTEM IMPROVEMENTS							
Water Main Pipe (PVC), Size 8"		LF	$ 90.00	=	$ -		$ -
Water Main Pipe (Ductile Iron), Size 8"		LF	$ 105.00	=	$ -		$ -
Gate Valves, 8"		EA	$ 2,599.00	=	$ -		$ -
Fire Hydrant Assembly, w/ all valves		EA	$ 9,228.00	=	$ -		$ -
Water Service Line Installation, inc. tap and valves		EA	$ 1,852.00	=	$ -		$ -
Fire Cistern Installation, complete		EA		=	$ -		$ -
				=	$ -		$ -
[insert items not listed but part of construction plans]				=	$ -		$ -
SANITARY SEWER IMPROVEMENTS							
Sewer Main Pipe (PVC), Size 8"		LF	$ 90.00	=	$ -		$ -
Sanitary Sewer Manhole, Depth < 15 feet		EA	$ 6,136.00	=	$ -		$ -
Sanitary Service Line Installation, complete		EA	$ 1,962.00	=	$ -		$ -
Sanitary Sewer Lift Station, complete		EA		=	$ -		$ -
				=	$ -		$ -
[insert items not listed but part of construction plans]				=	$ -		$ -
LANDSCAPING IMPROVEMENTS (For subdivision specific condition of approval, or PUD)							
		EA		=	$ -		$ -
		EA		=	$ -		$ -
		EA		=	$ -		$ -
		EA		=	$ -		$ -
		EA		=	$ -		$ -
** - Section 3 is not subject to defect warranty requirements		**Section 3 Subtotal**		**=**	**$ 26,225.00**		**$ 26,225.00**
AS-BUILT PLANS (Public Improvements inc. Permanent WQCV BMPs)		LS		=	$ -		$ -
POND/BMP CERTIFICATION (inc. elevations and volume calculations)		LS		=	$ -		$ -

Total Construction Financial Assurance **$ 49,862.50**
(Sum of all section subtotals plus as-builts and pond/BMP certification)

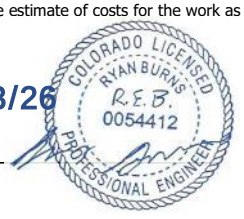
Total Remaining Construction Financial Assurance (with Pre-Plat Construction) **$ 49,862.50**
(Sum of all section totals less credit for items complete plus as-builts and pond/BMP certification)

Total Defect Warranty Financial Assurance **$ 3,207.40**
(20% of all items identified as (*). To be collateralized at time of preliminary acceptance)

Approvals

I hereby certify that this is an accurate and complete estimate of costs for the work as shown on the Grading and Erosion Control Plan and Construction Drawings associated with the Project.

3/03/26



Engineer (P.E. Seal Required)

Approved by Owner / Applicant — Date

Approved by El Paso County Engineer / ECM Administrator — Date

APPENDIX E – DRAINAGE MAPS

PYRAMID MOUNTAIN FILING NO. 1

EX CONDITION DRAINAGE MAP

LEGEND

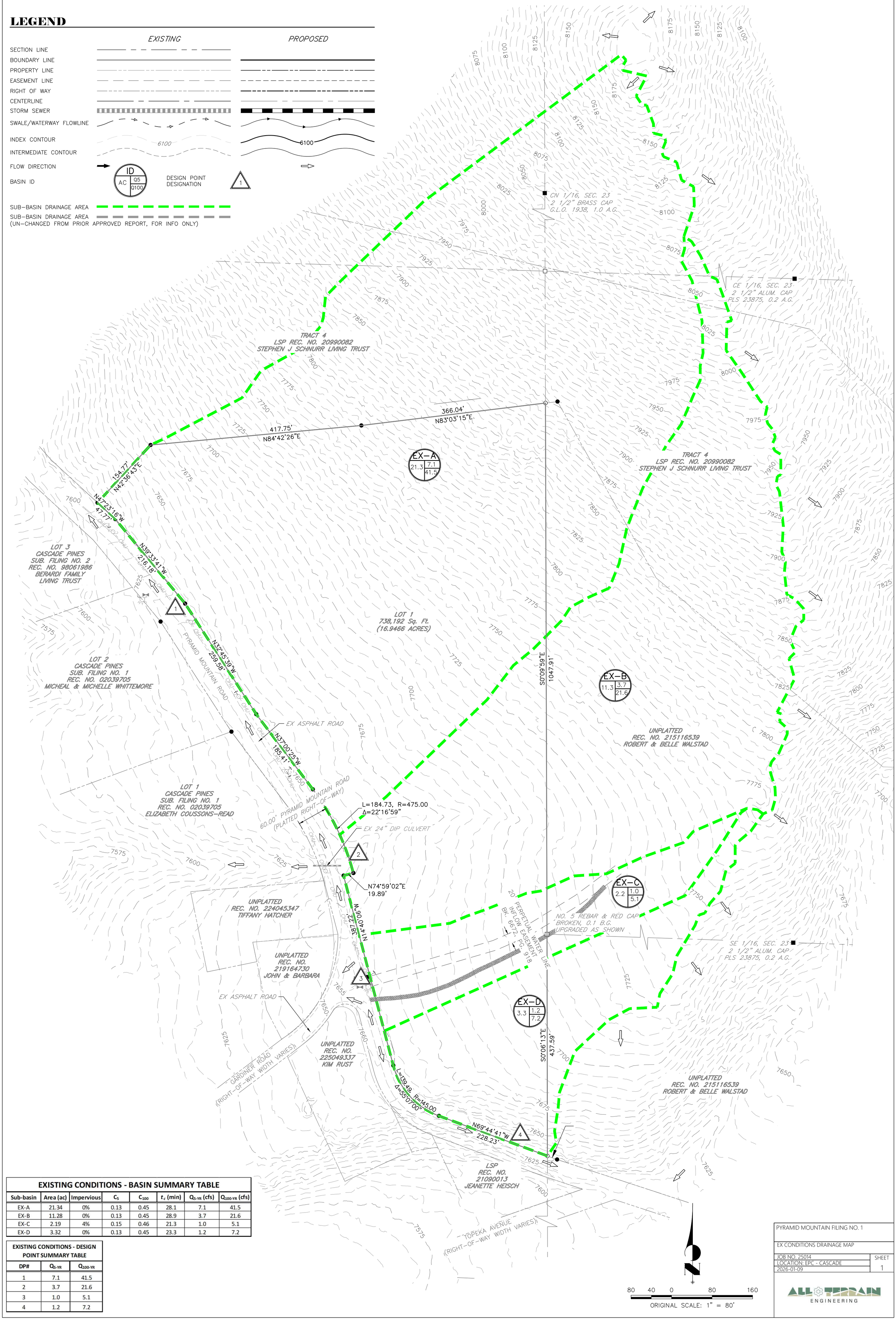
	EXISTING	PROPOSED
SECTION LINE		
BOUNDARY LINE		
PROPERTY LINE		
EASEMENT LINE		
RIGHT OF WAY		
CENTERLINE		
STORM SEWER		
SWALE/WATERWAY FLOWLINE		
INDEX CONTOUR	6100	6100
INTERMEDIATE CONTOUR		
FLOW DIRECTION		

BASIN ID — ID / AC / Q5 / Q100

DESIGN POINT DESIGNATION — 1

SUB-BASIN DRAINAGE AREA

SUB-BASIN DRAINAGE AREA (UN-CHANGED FROM PRIOR APPROVED REPORT, FOR INFO ONLY)



EXISTING CONDITIONS - BASIN SUMMARY TABLE

Sub-basin	Area (ac)	Impervious	C_5	C_{100}	t_c (min)	$Q_{5\text{-YR}}$ (cfs)	$Q_{100\text{-YR}}$ (cfs)
EX-A	21.34	0%	0.13	0.45	28.1	7.1	41.5
EX-B	11.28	0%	0.13	0.45	28.9	3.7	21.6
EX-C	2.19	4%	0.15	0.46	21.3	1.0	5.1
EX-D	3.32	0%	0.13	0.45	23.3	1.2	7.2

EXISTING CONDITIONS - DESIGN POINT SUMMARY TABLE

DP#	$Q_{5\text{-YR}}$	$Q_{100\text{-YR}}$
1	7.1	41.5
2	3.7	21.6
3	1.0	5.1
4	1.2	7.2

PYRAMID MOUNTAIN FILING NO. 1

EX CONDITIONS DRAINAGE MAP

JOB NO. 25014 | SHEET 1

LOCATION: EPC - CASCADE

2026-01-09

ALL TERRAIN ENGINEERING

PYRAMID MOUNTAIN FILING NO. 1

PROP. CONDITIONS DRAINAGE MAP

LEGEND

	EXISTING	PROPOSED
SECTION LINE		
BOUNDARY LINE		
PROPERTY LINE		
EASEMENT LINE		
RIGHT OF WAY		
CENTERLINE		
STORM SEWER		
SWALE/WATERWAY FLOWLINE		
INDEX CONTOUR	6100	6100
INTERMEDIATE CONTOUR		
FLOW DIRECTION		

BASIN ID — ID / AC / Q5 / Q100

DESIGN POINT DESIGNATION — 1

SUB–BASIN DRAINAGE AREA

SUB–BASIN DRAINAGE AREA (UN–CHANGED FROM PRIOR APPROVED REPORT, FOR INFO ONLY)

CN 1/16, SEC. 23
2 1/2" BRASS CAP
G.L.O. 1938, 1.0 A.G.

CE 1/16, SEC. 23
2 1/2" ALUM. CAP
PLS 23875, 0.2 A.G.

SE 1/16, SEC. 23
2 1/2" ALUM. CAP
PLS 23875, 0.2 A.G.

NO. 5 REBAR & RED CAP
BROKEN, 0.1 B.G.
UPGRADED AS SHOWN

TRACT 4
LSP REC. NO. 20990082
STEPHEN J SCHNURR LIVING TRUST

366.04'
N83°03'15"E

417.75'
N84°42'26"E

154.77'
N42°36'43"E

47.77'
N47°23'16"W

216.18'
N39°33'41"W

259.58'
N32°45'39"W

185.41'
N37°00'25"W

S0°09'59"E
1047.91'

S0°06'13"E
437.59'

L=184.73, R=475.00
Δ=22°16'59"

N74°59'02"E
19.89'

N14°40'06"W
387.22'

L=139.49, R=145.00
Δ=55°07'00"

N69°44'41"W
228.23'

NO–BUILD AREA
SLOPE EASEMENT

A: 21.3 | 7.7 | 42.3

B1: 7.0 | 2.5 | 13.6

B2: 4.3 | 2.0 | 11.1

C: 2.2 | 1.0 | 5.1

D: 3.3 | 1.2 | 7.2

PROP. ~1,350 SF ADU

PROP. ~2,500 SF BARN

PROP. GRAVEL DRIVE/PARKING AREAS

PROP. ~3,000 SF HOME

LOT 1
738,192 Sq. Ft.
(16.95 ACRES)

PROP. 24" RCP CULVERT

EX 24" DIP CULVERT

EX ASPHALT ROAD

EX NATURAL CHANNEL DP2.1
SEE X–SECTION THIS SHEET

-16.11%

12.00' PROPOSED GRAVEL DRIVEWAY

60.00' ACCESS EASEMENT

20' PERPETUAL WATER INFLOW EASEMENT
BK. 6672, PG. 918

20.00' R.O.W. PRESERVATION EASEMENT

60' PUBLIC R.O.W.

60.00' PYRAMID MOUNTAIN ROAD
(PLATTED RIGHT–OF–WAY)

PYRAMID MOUNTAIN ROAD

GARDINER ROAD
(RIGHT–OF–WAY WIDTH VARIES)

TOPEKA AVENUE
(RIGHT–OF–WAY WIDTH VARIES)

LOT 3
CASCADE PINES
SUB. FILING NO. 2
REC. NO. 98061986
BERARDI FAMILY
LIVING TRUST

LOT 2
CASCADE PINES
SUB. FILING NO. 1
REC. NO. 02039705
MICHEAL & MICHELLE WHITTEMORE

LOT 1
CASCADE PINES
SUB. FILING NO. 1
REC. NO. 02039705
ELIZABETH COUSSONS–READ

UNPLATTED
REC. NO. 224045347
TIFFANY HATCHER

UNPLATTED
REC. NO.
219164730
JOHN & BARBARA

UNPLATTED
REC. NO.
225049337
KIM RUST

UNPLATTED
REC. NO. 215116539
ROBERT & BELLE WALSTAD

LSP
REC. NO.
21090013
JEANETTE HEISCH

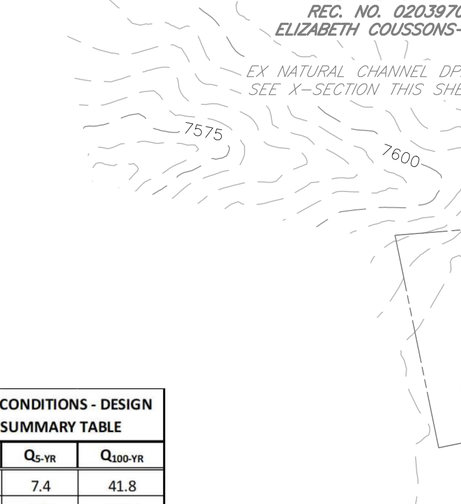
PROPOSED CONDITIONS - DESIGN POINT SUMMARY TABLE

DP#	$Q_{5\text{-YR}}$	$Q_{100\text{-YR}}$
1	7.4	41.8
2.1	4.1	22.7
2	2.0	11.1
3	1.0	5.1
4	1.2	7.2

EXISTING VS. PROPOSED DESIGN POINT COMPARISON TABLE

DP#	$Q_{5\text{-YR}}$			$Q_{100\text{-YR}}$		
	EX	PROP.	%Δ	EX	PROP.	%Δ
1	7.1	7.7	7.8%	41.5	42.3	1.9%
2/2.1	3.7	4.1	10.4%	21.6	22.7	5.0%
3	1.0	1.0	2.1%	5.1	5.1	-0.1%
4	1.2	1.2	0.0%	7.2	7.2	0.0%

EXISTING NATURAL CHANNEL DP2.1
STA 0+00.00 TO 0+95.95



RPOPOSED CONDITIONS - BASIN SUMMARY TABLE

Sub-basin	Area (ac)	Impervious	C_5	C_{100}	t_c (min)	$Q_{5\text{-YR}}$ (cfs)	$Q_{100\text{-YR}}$ (cfs)
A	21.34	1.5%	0.13	0.45	28.1	7.4	41.8
B1	7.02	1.6%	0.13	0.45	28.9	2.5	13.6
B2	4.26	0.0%	0.15	0.50	19.9	2.0	11.1
C	2.19	4.2%	0.13	0.45	21.6	1.0	5.1
D	3.32	0.0%	0.13	0.45	23.3	1.2	7.2

80 40 0 80 160

ORIGINAL SCALE: 1" = 80'

PYRAMID MOUNTAIN FILING NO. 1

PROP. CONDITIONS DRAINAGE MAP

JOB NO. 25014

LOCATION: EPC - CASCADE

2026-03-03

SHEET 1

ALL TERRAIN ENGINEERING