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Final Drainage Report

Hill Subdivision Filing No. 1

Project No. 61174

April 26, 2023

PCD File No. VR2313

Final Drainage Report

for

Hill Subdivision Filing No. 1

Project No. 61174

April 26, 2023

prepared for

Douglas E. Hill
6910 Alpaca Hts
Colorado Springs, CO 80921

prepared by

MVE, Inc.
1903 Lelaray Street, Suite 200
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719.635.5736

Statements and Acknowledgments

update to County signature block and statement

Engineer's Statement
This report and plan for the drainage design of Hill Subdivision Filing No. 1 was prepared by me (or under my direct supervision) in accordance with the provisions of The City of Colorado Springs Drainage Criteria Manual for the owners thereof. I understand that the City of Colorado Springs does not and will not assume liability for drainage facilities designed by others.

_____ _____
David R. Gorman, P.E. Colorado No. 31672 Date
For and on Behalf of MVE, Inc.

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

_____ _____
Douglas E. Hill, Owner Date

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

_____ _____
Joshua Palmer Date
County Engineer/ECM Administrator

Conditions:

Design Engineer's Statement:

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

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

Contents

Final Drainage Report

The purpose of this Final Drainage Report is to identify drainage patterns and quantities within and affecting the proposed subdivision for Hill Subdivision Filing No. 1 at 6910 Alpaca Hts, an existing rural residential lot in southern Colorado Springs. The report presents the stormwater management issues specific to this site and discusses the aspects of the drainage design that addresses those issues. The report and included maps present results of the final hydrologic and drainage facility sizing and analyses. The report recommends that no additional drainage improvements are needed for the site and identifies drainage requirements relative to the proposed subdivision. This report has been prepared and submitted in accordance with the requirements of the City of Colorado Springs Preliminary Plat and Final Plat approval process. An Appendix is included with this report with pertinent calculations and data used in the drainage analysis.

1 General Location and Description

1.1 Location

The Hill Subdivision Filing No. 1 site is located within the North ½ of the Southwest ¼ of the Northwest ¼ of Section 29, Township 11 South, Range 65 West, of the 6th Principal Meridian in Colorado Springs, Colorado. The site is situated on the east side of Black Forest Road, just south of Hodgen Road, and north of Shoup Road located northeast of Colorado Springs. The site is made up of an existing platted lot having El Paso County Tax Assessor's Schedule Numbers of 51290-04-018. A Vicinity Map is included in the **Appendix**. This report is submitted in connection with the application for a Minor Subdivision.

1.2 Description of Property

The Hill Subdivision Filing No. 1 site encompasses 14.693 ± acres of land across existing Lot 1 of "C and H Estates". Lot 1 has a dedicated future right-of-way with a curve starting from the southwest corner of Lot 1 and curves northeasterly with a chord length of approximately 773 feet from said corner of Lot 1.

Lot 1 is currently zoned RR-5 (Rural Residential 5 acres). This lot is utilized for rural residential and features a single-family residence, detached garage, a barn, two paved driveways, and a private road. There is minor grading around the buildings and driveways. The northern and western portion of the site exhibits slopes ranging from 3-8%. All ground cover is in fair to good condition. This site is not located within a streamside overlay zone. There are no utility lines that currently run in or through the site.

The majority of the storm runoff from the site and the offsite basin drains from the south to the north with the exception of the east and west basins. The west sub-basin drains offsite into Tract A of the same subdivision. Said tract contains a nearby roadside ditch and culverts found along Black Forest Road. The east sub-basins drain toward the east into adjacent properties.

There is a minor drainage area located northeast portion of existing Lot 1/proposed Lot 2. This area is subject to potentially low seasonal shallow groundwater availability. This area has average slopes of 3-6% that drains toward center north and northeast of existing Lot 1. This is supported by the Soil,

Discuss previous drainage reports for the area. Initial subdivision was under PCD File MS05004 Drainage Letter for C&H Estates March 2005

Geology, and Geohazard Study for Hill Subdivision, performed by Entech Engineering, Inc. on October 28, 2022[1] .

According to the National Resource Conservation Service, there are two soil types identified at the Hill Subdivision Filing No. 1 site. Peyton-Pring complex (map unit 68) makes up 91% of the site and is contained in Hydrologic Soil Group B. This soil is shallow to deep and is well drained. Permeability is high to rapid, surface runoff is low, and the hazard of erosion is moderate to high.

The secondary soil group is: Brusset loam (map unit 15) which is present on the northern and eastern portions of the site and is contained in Hydrologic Soil Group B. This soil is shallow to deep and well drained. Permeability is high to rapid, surface runoff is low, and the hazard of erosion is moderate to high. A portion of the Soil Map and data tables from the National Cooperative Soil Survey and relevant Official Soil Series Descriptions (OSD) are included in the **Appendix**.[2] [3]

2 Drainage Basins and Sub-Basins

2.1 Major Basin Descriptions

The Hill Subdivision Filing No. 1 site is located in the south portion of the East Cherry Creek Drainage Basin (CYCY0200), which is part of the Cherry Creek Major Drainage Basin. At this time, Cherry Creek Major Drainage Basin is not addressed in a Major Drainage Basin Planning Study. El Paso County determined that East Cherry Creek Basin is not a drainage fee basin.

The current Flood Insurance Study of the region includes a Flood Insurance Rate Map (FIRM), effective on December 7, 2018.[4] The proposed subdivision is included in Community Panel Numbers 08041C0305G of the Flood Insurance Rate Maps for El Paso County and Incorporated Areas. No portion of the site lies within FEMA designated Special Flood Hazard Areas (SFHA's). An excerpt of the current FEMA Flood Insurance Rate Maps with the site delineated is included in the **Appendix**.

2.2 Sub-Basin Description

The existing drainage patterns of the Hill Subdivision Filing No. 1 site are described by three off-site drainage sub-basins and six on-site drainage sub-basins. The majority of runoff flows from the offsite sub-basin into the onsite sub-basin A2 toward the north lot line. The easterly basins flows drain to the east and northeasterly directions into other adjacent lots. The west sub-basin flows toward the existing roadside ditches and culverts to the west and eventually into the adjacent lot. The drainage sub-basins are shown on the included **Existing Drainage Map**.

Existing offsite sub-basin OS-A1 is located south of the site and drains northerly into the onsite sub-basin EX-A2 located on the subject property. This runoff combines with flows from A2 at Design Point 1.

Existing offsite sub-basin OS-A5 is located northwest of the site and drains easterly into the onsite sub-basin EX-A2 located on the subject property. This runoff combines with flows from A2 at Design Point 1.

Existing offsite sub-basin OS-C is located west of the site and drains westerly to Black Forest Road. This sub-basin accepts flows from the on-site sub-basin EX-C and combines at an existing roadside culvert at Design Point 2.

Existing sub-basin EX-A2 is the largest sub-basin on the site. This basin collects flows from the developed and undeveloped areas of this sub-basin and accepts the flows from the offsite sub-basin OS-A1. This runoff combines with flows from OS-A1 at Design Point 1 and exits the site into the adjacent property to the north, eventually draining into East Cherry Creek.

1 Entech
2 WSS
3 OSD
4 FIRM

Existing sub-basin EX-A3 is located at the northeast corner of existing Lot 1.This sub-basin does not accept any offsite or adjacent flows from other basins. These flows drain to the northeast corner of the site and exits the site into the adjacent property to the north, eventually draining into East Cherry Creek.

Existing sub-basin EX-A4 is located at the northeast corner of existing Lot 1 and south of EX-A3.This sub-basin does not accept any offsite or adjacent flows from other basins. These flows drain to the east lot line and exits the site into the adjacent property to the east, eventually draining into East Cherry Creek.

Existing sub-basin EX-B1 is located at the southeast corner of existing Lot 1 and north of EX-B2.This sub-basin does not accept any offsite or adjacent flows from other basins. These flows drain to the east lot line and exits the site into the adjacent property to the east, eventually draining into East Cherry Creek.

Existing sub-basin EX-B2 is located at the southeast corner of existing Lot 1 and south of EX-B1.This sub-basin does not accept any offsite or adjacent flows from other basins. These flows drain to the east lot line and exits the site into the adjacent property to the east, eventually draining into East Cherry Creek.

Existing sub-basin EX-C is located in the southwest portion of the site and drains immediately offsite into OS-C. The flows exit the site and continue west into the adjacent roadside ditch and through the existing culverts into the adjacent property to the west of Black Forest Road.

3 Drainage Design Criteria

3.1 Development Criteria Reference

This *Final Drainage Report for Hill Subdivision Filing No. 1* has been prepared according to the report guidelines presented in the *El Paso County Drainage Criteria Manual* (DCM)[5]. The hydrologic analysis is based on a collection of data from the DCM, the NCSS Web Soil Survey[6], Topographic mapping, property boundary information and proposed site layout by Polaris Surveying, Inc.

3.2 Hydrologic Criteria

For this Final Drainage Report, the Rational Method as described in the *El Paso County Drainage Criteria Manual* has been used for all Storm Runoff calculations, as the development and all sub-basins are less than 130 acres in area. “Colorado Springs Rainfall Intensity Duration Frequency” curves, Figure 6-5 in the DCM, was used to obtain the design rainfall values; a copy is included in the **Appendix**. The “Overland (Initial) Flow Equation” (Eq. 6-8) in the DCM, and Manning's equation with estimated depths were used in time of concentration calculations. “Runoff Coefficients for Rational Method”, Table 6-6 in the DCM, was utilized as a guide in estimating runoff coefficient and Percent Impervious values; a copy is included in the **Appendix**. Peak runoff discharges were calculated for each drainage sub-basin for both the 5-year storm event and the 100-year storm event with the Rational Method formula, (Eq. 6-5) in the DCM.[7]

4 Drainage Facility Design

4.1 General Concept

The intent of the drainage concept presented in this Final Drainage Report is to provide adequate, safe and appropriate storm drainage, in accordance with El Paso County Drainage Criteria, within the proposed development and to the offsite discharge locations. The existing drainage conditions and the proposed drainage concept is described in more detail below. Input data and results for all

5 DCM Section 4.3 and Section 4.4
6 WSS
7 DCM

calculations are included in the **Appendix**. Drainage maps of existing and proposed conditions are also included in the **Appendix**.

4.2 Sub-Basin Specific Details

4.2.1 Existing Conditions

Existing sub-basin OS-A1 containing 2.79 ± acres to the south of the site. This sub-basin contains a portion of a developed RR-5 lot with half of the roof area and a majority of the lot's gravel driveway. This sub-basin features average slopes of 3-8% sloping to the north and enters the onsite sub-basin EX-A2. This sub-basin generates peak flow discharges of Q_5 = 1.6 cfs and Q_{100} = 6.3 cfs (existing flows). This runoff combines with flows from EX-A2 at Design Point 1.The flows from this sub-basin drain north into the adjacent properties and eventually drain into East Cherry Creek.

Existing sub-basin OS-A5 containing 0.24 ± acres at the northwest portion of the site. This sub-basin is located in the dedicated Right-of-way with no development. This sub-basin features average slopes of 1-3% sloping to the west and enters the onsite sub-basin EX-A2. This sub-basin generates peak flow discharges of Q_5 = 0.1 cfs and Q_{100} = 0.5 cfs (existing flows). This runoff combines with flows from EX-A2 at Design Point 1.The flows from this sub-basin drain north into the adjacent properties and eventually drain into East Cherry Creek.

Existing sub-basin OS-C containing 3.66 ± acres west of the site. This sub-basin contains Tract A and the majority of right-of-way dedication. This area is undeveloped pasture/meadow with a culvert that routes all runoff into an existing culvert that crosses Black Forest Road. This sub-basin features slopes of 3-8% sloping toward the west at Design Point 2. This sub-basin generates peak flow discharges of Q_5 = 1.7 cfs and Q_{100} = 8.4 cfs (existing flows). This sub-basin accepts flows from the on-site sub-basin EX-C and combines at Design Point 2.

Existing sub-basin EX-A2 makes up the majority of the subject subject site and contains 9.64 ± acres of mostly undeveloped land with some buildings and pavement. This sub-basin features average slopes of 2-5% sloping toward the north lot line. This sub-basin produces storm discharges of Q_5 = 3.5 cfs and Q_{100} = 18.9 cfs (existing flows). This sub-basins accepts flows from the offsite sub-basin OS-A1 and combines with this runoff at Design Point 1. The flows from this sub-basin drain north into the adjacent properties and eventually drain into East Cherry Creek.

Existing sub-basin EX-A3 is the smallest of the sub-basins and contains 0.56 ± acres of mostly undeveloped land. This sub-basin features average slopes of 3-6% sloping toward the northeast. This basin produces storm discharges of Q_5 = 0.2 cfs and Q_{100} = 1.1 cfs (existing flows) which drains overland to the north-east corner of Lot 1. The flows from the site drain northeast into the adjacent properties and eventually drain into East Cherry Creek.

Existing sub-basin EX-A4 is a small sub-basin of the subject subject site and contains 1.02 ± acres of mostly undeveloped land. This sub-basin features slopes of 3-4% sloping toward the east. This basin produces storm discharges of Q_5 = 0.3 cfs and Q_{100} = 2.1 cfs (existing flows) which drains overland to the east lot line. The flows from the site drain northeast into the adjacent properties and eventually drain into East Cherry Creek.

Existing sub-basin EX-B1 is a small sub-basin of the subject site and contains 1.06 ± acres of mostly undeveloped land. This sub-basin features slopes of 3-6% sloping toward the southeast. This basin produces storm discharges of Q_5 = 0.3 cfs and Q_{100} = 2.1 cfs (existing flows) which drains overland to the east lot line. The flows from the site drain southeast into the adjacent properties and eventually drain into East Cherry Creek.

Existing sub-basin EX-B2 is a small sub-basin of the subject site and contains 0.90 ± acres of mostly undeveloped land. This sub-basin features slopes of 3-8% sloping toward the southeast. This basin produces storm discharges of Q_5 = 0.3 cfs and Q_{100} = 2.0 cfs (existing flows)which drains overland to the east lot line. The flows from the site drain southeast into the adjacent property and eventually drain into East Cherry Creek.

Existing sub-basin EX-C is a small sub-basin of the subject site and contains 1.51 ± acres of mostly undeveloped land with some pavement which includes half of the existing Black Forest Road. This

this basin doesnt extend onto Black Forest Rd. did you mean the alpaca heights private drive? please revise accordingly

sub-basin features slopes of 3-5% sloping toward the west and drains into OS-C. This basin produces storm discharges of Q_5 = 0.7 cfs and Q_{100} = 3.6 cfs (existing flows) which drains overland and channelized to the west lot line. The flows from the site drain west into existing roadside ditches and culverts and eventually into the adjacent properties.

Existing Design Point 1 encompasses sub-basins OS-A1, OS-A5, and EX-A2 with a combined area of 12.67 ± acres of mostly undeveloped land and includes the existing three buildings and paved areas. These combined basins produce storm discharges of Q_5 = 4.7 cfs and Q_{100} = 24.0 cfs (existing flows) which drains overland and is channelized to the north lot line. The flows from this sub-basin drain north into the adjacent properties and eventually drains into East Cherry Creek.

Existing Design Point 2 encompasses sub-basins OS-C and EX-C with a combined area of 5.18 ± acres of mostly undeveloped land and includes a small portion of the private road. These combined basins produce storm discharges of Q_5 = 2.3 cfs and Q_{100} = 11.8 cfs (existing flows) which drains overland and is channelized to the west lot line of Tract A. The flows drain into the existing roadside culvert and drains west into the adjacent properties and eventually drains into East Cherry Creek.

4.2.2 Proposed Conditions

The proposed drainage patterns of the site are described by three off-site sub-basin and six on-site sub-basins. The drainage paths and sub-basin shapes shall remain the same as developed conditions and are not expected to change drastically. Calculations for the proposed development for each of the proposed lots included: a 5000 SF single-family residence, gravel driveways, and paved areas. The drainage sub-basins are shown on the included **Proposed Drainage Map**.

Off-site sub-basin OSA1 is located south of the site and proposed conditions does not apply for the purpose of this report. This sub-basin contains 2.79± acres which drains overland to the north and enters the site into sub-basin A2. This sub-basin contains a developed RR-5 lot with slopes of 3-8 % sloping to the north. Sub-basin OSA1 generates peak flow discharges of Q_5 = 1.6 cfs and Q_{100} = 6.3 cfs (existing/proposed flows). This runoff combines with flows from A2 at Design Point 1. The flows from this sub-basin drain north into the adjacent properties and eventually drain into East Cherry Creek.

Offsite sub-basin OS-A5 is located at the northwest portion offsite containing 0.24 ± acres. This sub-basin is located in the dedicated Right-of-way with no development. This sub-basin features average slopes of 1-3% sloping to the west and enters the onsite sub-basin A2. This sub-basin generates peak flow discharges of Q_5 = 0.1 cfs and Q_{100} = 0.5 cfs (existing/developed flows). This runoff combines with flows from A2 and OS-A5 at Design Point 1. The flows from this sub-basin drain north into the adjacent properties and eventually drain into East Cherry Creek.

Offsite sub-basin OS-C is located west of the site containing 3.66 ± acres. This sub-basin contains Tract A and the majority of right-of-way dedication. This area is undeveloped pasture/meadow with a culvert that routes all runoff into an existing culvert that crosses Black Forest Road. This sub-basin features slopes of 3-8% sloping toward the west at Design Point 2. This sub-basin generates peak flow discharges of Q_5 = 1.7 cfs and Q_{100} = 8.4 cfs (existing flows). This sub-basin accepts flows from the on-site sub-basin C and combines at Design Point 2.

Developed sub-basin A2 is the largest of the sub-basins and is contained in the center of the site by the north and south property lines. This sub-basin is 9.64 ± acres in area and drains overland to the north in a swale located east of the existing buildings. This sub-basin features slopes of 2-4% sloping toward the north. This sub-basin currently contains three buildings, a paved driveway, and a gravel driveway. For proposed conditions, it is expected that new residential development will be added to sub-basin A2 as the proposed Lot 2 is located within this sub-basin. For sub-basin A2, the existing flows are Q_5 = 3.5 cfs and Q_{100} = 18.9 cfs and the proposed flows are Q_5 = 4.3 cfs and Q_{100} = 20.0 cfs. The negligible flow increases in the developed condition at DP2 are 0.8 cfs for the 5-year storm and 1.1 cfs for the 100-year storm. This increase will not affect the adjacent neighbors to the north. The flows from proposed sub-basin A2 combine with the flows from sub-basin OSA1 and OSA5 at DP1.

Developed sub-basin A3 makes up the north-east corner of the lot and is the smallest of all the sub-basins. This sub-basin is 0.56 ± acres in area and drains overland to the north. It features grades of 3-6% sloping toward the northeast. It is located adjacent to the north and east lot line and east of sub-basin A2. This sub-basin is currently vacant and the ground cover is pasture/meadows. For proposed conditions, there are no major additions expected for this sub-basin. Sub-basin A3 generates peak flow discharges of Q_5 = 0.2 cfs and Q_{100} = 1.1 cfs (existing/proposed flows). There is no expected increase in flows within this sub-basin as was not assumed to have large development.

Developed sub-basin A4 is located south of A3 and east of A2. This sub-basin is 1.02 ± acres in area and drains overland to the east. It features grades of 3-4% sloping toward the east. This sub-basin is currently vacant and the ground cover is pasture/meadows. For proposed conditions, there are no major additions expected for this sub-basin. Sub-basin A4 generates peak flow discharges of Q_5 = 0.3 cfs and Q_{100} = 2.1 cfs (existing/proposed flows). This flow will travel into the adjacent lot located east of the property line. There is no expected increase in flows within this sub-basin as was not assumed to have large development due to setback requirements.

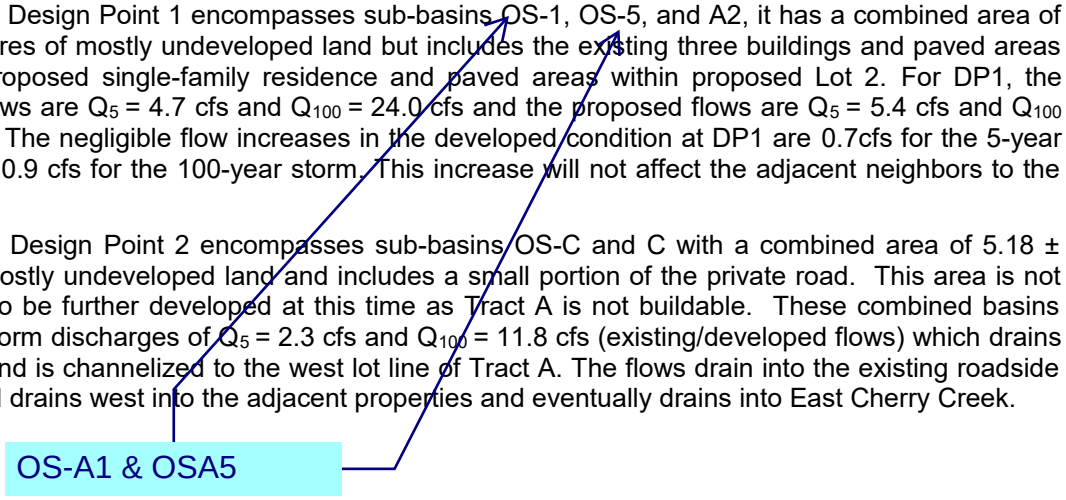
Developed sub-basin B1 is located south of A4 and east of A2. This sub-basin is 1.06 ± acres in area and drains overland to the east. This sub-basin features slopes of 3-6% sloping toward the southeast. This sub-basin is currently vacant and the ground cover is pasture/meadows. The proposed sub-basin B1 will contain one (1) single family residence and paved driveway for proposed Lot 3. For sub-basin B1, the existing flows are Q_5 = 0.3 cfs and Q_{100} = 2.1 cfs and the proposed flows are Q_5 = 0.6 cfs and Q_{100} = 2.6 cfs. The negligible flow increases in the developed condition at DP1 are 0.3 cfs for the 5-year storm and 0.5 cfs for the 100-year storm. This increase will not affect the adjacent neighbors to the east.

Developed sub-basin B2 is located in the southeast portion of the site. This sub-basin is 0.90± acres in area and drains channelized to the southeast. This sub-basin features slopes of 3-8% sloping toward the southeast. This sub-basin is currently vacant and the ground cover is pasture/meadows. The proposed sub-basin B2 will contain one gravel driveway for proposed Lot 3. For sub-basin B2, the existing flows are Q_5 = 0.3 cfs and Q_{100} = 2.0 cfs and the proposed flows are Q_5 = 0.4 cfs and Q_{100} = 2.2 cfs. The negligible flow increases in the developed condition at DP1 are 0.1 cfs for the 5-year storm and 0.2 cfs for the 100-year storm. This increase will not affect the adjacent neighbors to the east.

Developed sub-basin C makes up a small area in the southwest portion of Lot 1 and is located west of sub-basin A2. This sub-basin features slopes of 3-7% sloping toward the northwest. This sub-basin is 1.51 ± acres in area and drains to the west lot line of existing Tract A. The flow is then channelized and flows toward the west into Design Point 2. Currently, this sub-basin contains an existing asphalt right-of-way (Black Forest Road) and asphalt driveway at the south portion of this sub-basin. It is not expected that this area to have any further development at this time as it already contains a small portion of the existing development. For sub-basin C, the existing/developed flows are Q_5 = 0.7 cfs and Q_{100} = 3.6 cfs and combines with flows from OS-C at Design Point 2.

Developed Design Point 1 encompasses sub-basins OS-1, OS-5, and A2, it has a combined area of 12.67 ± acres of mostly undeveloped land but includes the existing three buildings and paved areas and the proposed single-family residence and paved areas within proposed Lot 2. For DP1, the existing flows are Q_5 = 4.7 cfs and Q_{100} = 24.0 cfs and the proposed flows are Q_5 = 5.4 cfs and Q_{100} = 24.9 cfs. The negligible flow increases in the developed condition at DP1 are 0.7cfs for the 5-year storm and 0.9 cfs for the 100-year storm. This increase will not affect the adjacent neighbors to the north.

Developed Design Point 2 encompasses sub-basins OS-C and C with a combined area of 5.18 ± acres of mostly undeveloped land and includes a small portion of the private road. This area is not expected to be further developed at this time as Tract A is not buildable. These combined basins produce storm discharges of Q_5 = 2.3 cfs and Q_{100} = 11.8 cfs (existing/developed flows) which drains overland and is channelized to the west lot line of Tract A. The flows drain into the existing roadside culvert and drains west into the adjacent properties and eventually drains into East Cherry Creek.



4.3 Water Quality Enhancement Best Management Practices

The El Paso County Engineering Criteria Manual (Appendix I, Section I.7.2) requires the consideration of a "Four Step Process for receiving water protection that focuses on reducing runoff volumes, treating the water quality capture volume (WQCV), stabilizing drainage ways, and implementing long term source controls". The Four Step Process is incorporated in this project and the elements are discussed below.

The entire site is consists of 5-acre single family residential lots which are excluded from Post Construction Stormwater Management requirements by ECM 1.7.1.B.5 due to the low development density as 5-acre lots. There is no public roadway being dedicated or constructed as part of this project. The site is not subject to Post Construction Stormwater Treatment requirements.

1) Runoff Reduction Practices are employed in this project. Impervious surfaces have been reduced as much as practically possible. There is only minimal concrete or other hard surfaces proposed. Minimized Directly Connected Impervious Areas (MDCIA) is employed on the project because runoff passes through an open space meadow area before leaving the site.

2) There are no drainage paths on the site that are required to be stabilized as they are well vegetated with no visual erosion.

3) The project contains no potentially hazardous uses. The site is exempted from the use of WQCV BMPs by ECM 1.7.1.B.5 by virtue of the large lot rural residential nature of the site having percent imperiousness of less than 10%.

4) The rural residential lot is not anticipated to contain storage of potentially harmful substances or use of potentially harmful substances. No site specific or other source control BMPs are required.

5 Drainage Fees

The Hill Subdivision Filing No. 1 site is located within the East Cherry Creek Drainage Basin which is not a fee basin. Therefore, no drainage fees are required at this time.

6 Conclusion

This Final Drainage Report presents existing and proposed drainage conditions for the proposed Hill Subdivision Filing No. 1 project. The development will have negligible and inconsequential effects on the existing site drainage and drainage conditions downstream. The site is exempted from the use of WQCV BMPs by ECM 1.7.1.B.5 by virtue of the large lot rural residential nature of the site having percent imperviousness of less than 10%. The entire site is consists of 5-acre single family residential lots which are excluded from Post Construction Stormwater Management requirements due to the low development density as 5-acre lots. The site is not subject to Post Construction Stormwater Treatment requirements. The combined flows from the site are expected to increase by less than 1% during the 100 yr storm event. With such a negligible increase in stormwater flows from the site detention will not be necessary for the proposed development and will not be provided. The proposed project will not, with respect to stormwater runoff, negatively impact the adjacent properties and downstream properties.

References

Soil, Geology, and Geologic Hazard Study Hill Subdivision. Entech Engineering, Inc. (: , 2022).

NRCS Web Soil Survey. United States Department of Agriculture, Natural Resources Conservation Service ("http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx", accessed October 2016).

NRCS Official Soil Series Descriptions. United States Department of Agriculture, Natural Resources Conservation Service ("http://soils.usda.gov/technical/classification/osd/index.html", accessed October 20165).

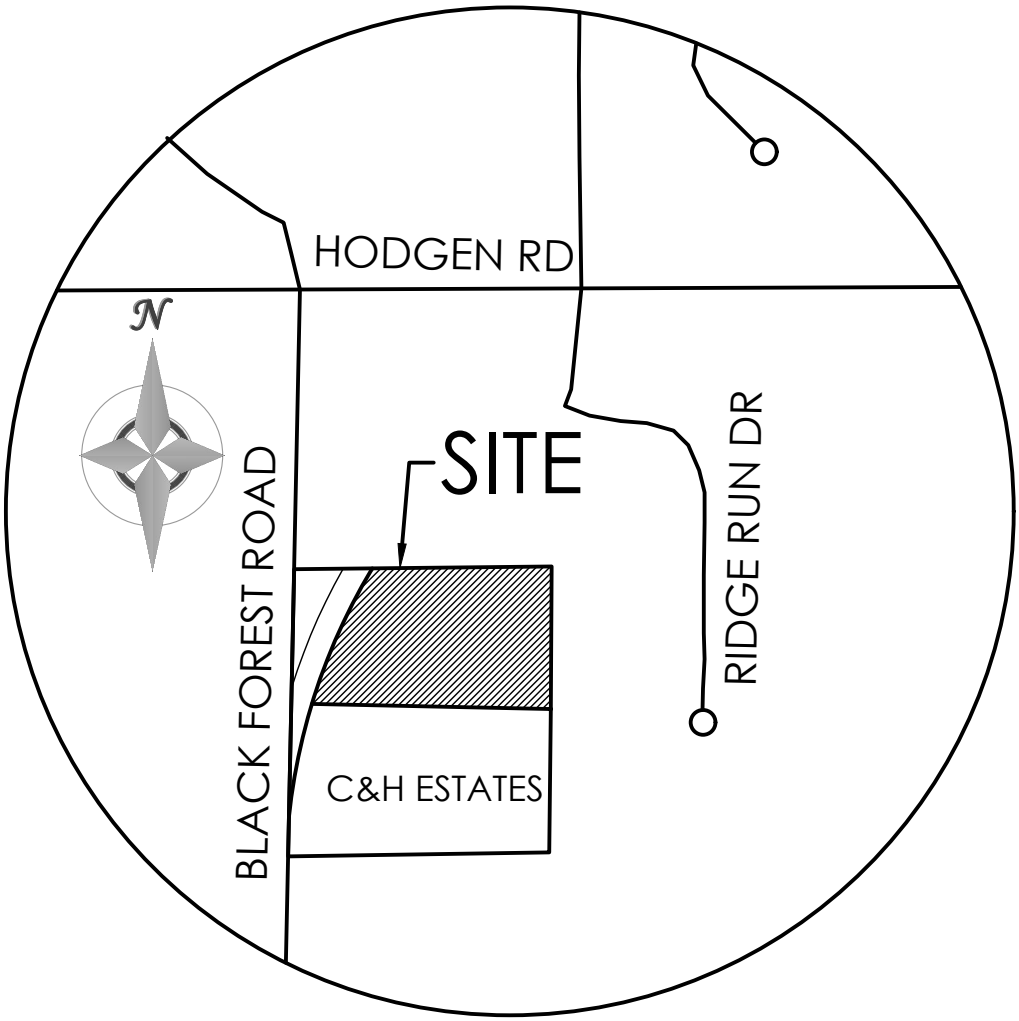
Flood Insurance Rate Map. Federal Emergency Management Agency, National Flood Insurance Program (Washington D.C.: FEMA, December 7, 2018).

City of Colorado Springs Drainage Criteria Manual Volume 1. City of Colorado Springs Engineering Division with Matrix Design Group and Wright Water Engineers (Colorado Springs, Colorado: , May 2014).

Appendices

1 General Maps and Supporting Data

Vicinity Map
Portion of Flood Insurance Rate Map
Soil Type map and Tables
Official Soil Series Descriptions
Hydrologic Soil Group Map and Tables



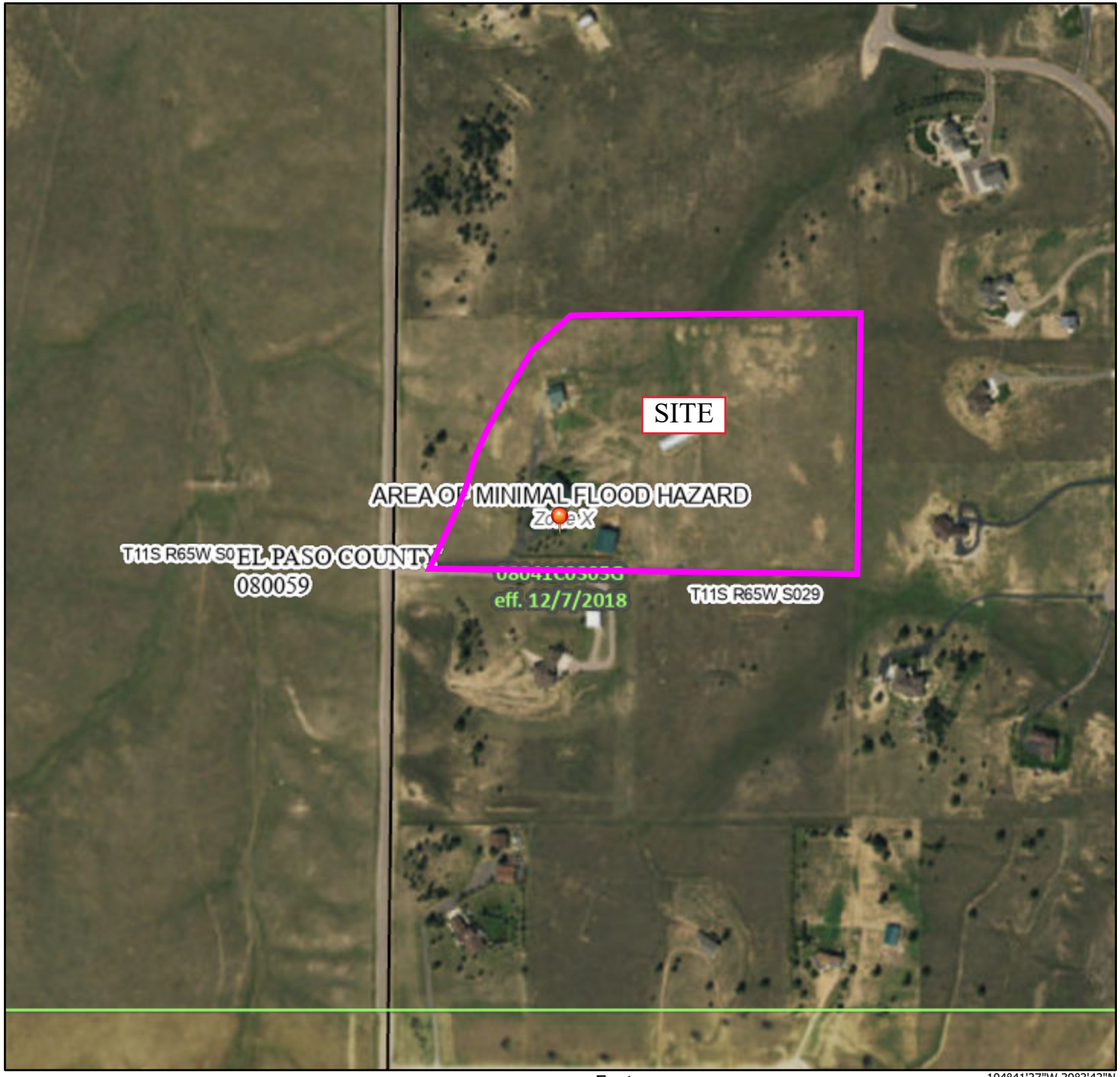
VICINITY MAP

NOT TO SCALE

National Flood Hazard Layer FIRMette

FEMA

104°42'14"W 39°4'11"N



104°41'37"W 39°3'43"N

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

1:6,000

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

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

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

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

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

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

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

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

N

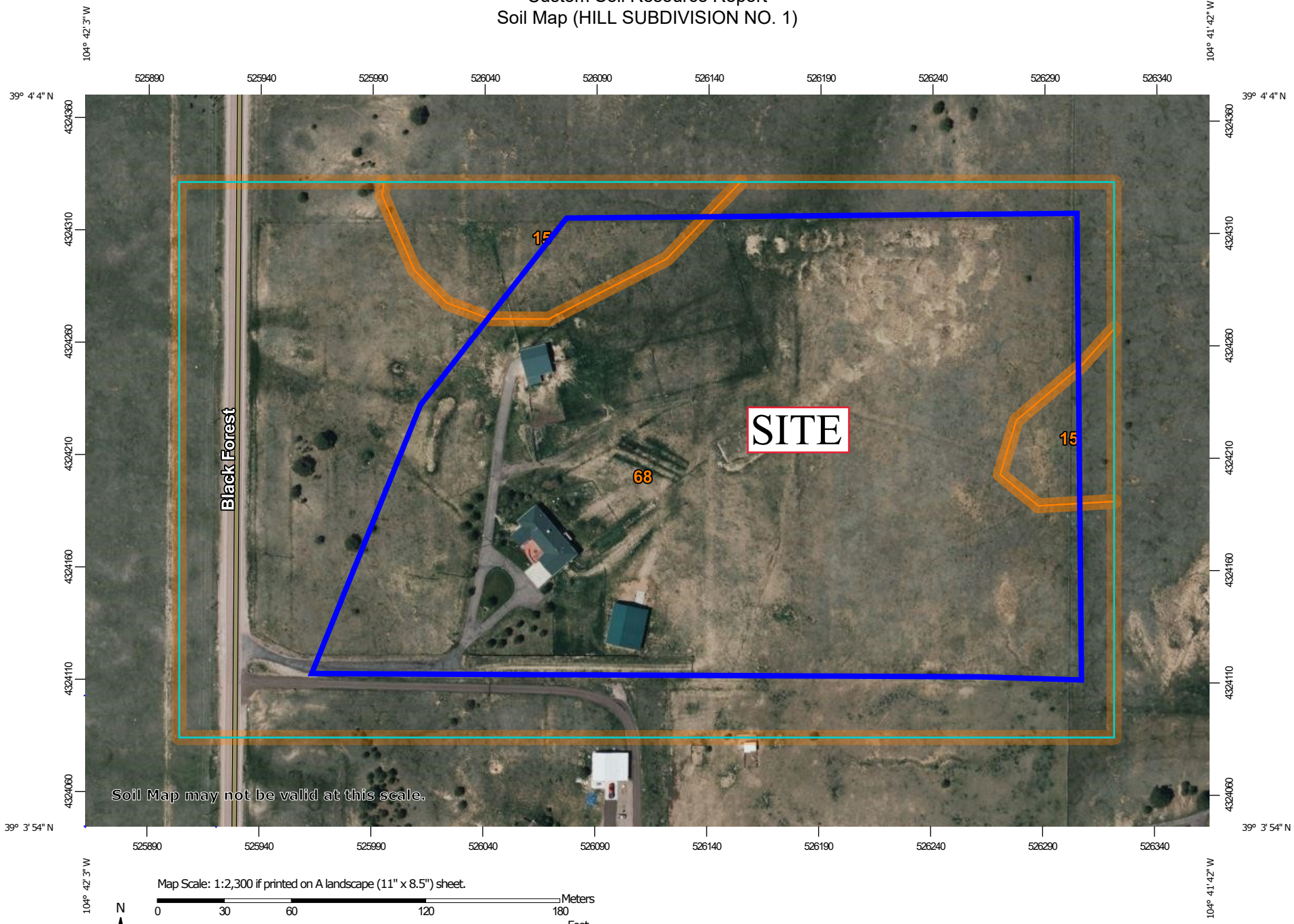
The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

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

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 7/1/2022 at 12:57 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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

Custom Soil Resource Report
Soil Map (HILL SUBDIVISION NO. 1)



MAP LEGEND

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

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: El Paso County Area, Colorado
Survey Area Data: Version 19, Aug 31, 2021

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

Date(s) aerial images were photographed: Jun 9, 2021—Jun 12, 2021

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.

Map Unit Legend (HILL SUBDIVISION NO. 1)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
15	Brussett loam, 3 to 5 percent slopes	2.3	9.0%
68	Peyton-Pring complex, 3 to 8 percent slopes	23.3	91.0%
Totals for Area of Interest		**25.6**	**100.0%**

Map Unit Descriptions (HILL SUBDIVISION NO. 1)

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate

pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

El Paso County Area, Colorado

15—Brussett loam, 3 to 5 percent slopes

Map Unit Setting

National map unit symbol: 367k
Elevation: 7,200 to 7,500 feet
Frost-free period: 115 to 125 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Brussett and similar soils: 85 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Brussett

Setting

Landform: Hills
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Eolian deposits

Typical profile

A - 0 to 8 inches: loam
BA - 8 to 12 inches: loam
Bt - 12 to 26 inches: clay loam
Bk - 26 to 60 inches: silt loam

Properties and qualities

Slope: 3 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 9.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: R048AY222CO - Loamy Park
Hydric soil rating: No

Minor Components

Other soils

Percent of map unit:
Hydric soil rating: No

68—Peyton-Pring complex, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 369f
Elevation: 6,800 to 7,600 feet
Farmland classification: Not prime farmland

Map Unit Composition

Peyton and similar soils: 40 percent
Pring and similar soils: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Peyton

Setting

Landform: Hills
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Arkosic alluvium derived from sedimentary rock and/or arkosic residuum weathered from sedimentary rock

Typical profile

A - 0 to 12 inches: sandy loam
Bt - 12 to 25 inches: sandy clay loam
BC - 25 to 35 inches: sandy loam
C - 35 to 60 inches: sandy loam

Properties and qualities

Slope: 3 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4c
Hydrologic Soil Group: B
Ecological site: R049XY216CO - Sandy Divide
Hydric soil rating: No

Description of Pring

Setting

Landform: Hills
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Arkosic alluvium derived from sedimentary rock

Typical profile

A - 0 to 14 inches: coarse sandy loam
C - 14 to 60 inches: gravelly sandy loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 6.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: R048AY222CO - Loamy Park
Hydric soil rating: No

Minor Components

Other soils

Percent of map unit:
Hydric soil rating: No

Pleasant

Percent of map unit:
Landform: Depressions
Hydric soil rating: Yes

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

mental irrigation may be needed when planting and during dry periods. Trees that are best suited and have good survival are Rocky Mountain juniper, eastern redcedar, ponderosa pine, Siberian elm, Russian-olive, and hackberry. Shrubs that are best suited are skunkbush sumac, lilac, and Siberian peashrub.

This soil is suited to wildlife habitat. It is best suited to habitat for openland and rangeland wildlife. In cropland areas, habitat favorable for ring-necked pheasant, mourning dove, and many nongame species can be developed by establishing areas for nesting and escape cover. For pheasant, undisturbed nesting cover is vital and should be provided for in plans for habitat development. This is especially true in areas of intensive farming. Rangeland wildlife, such as pronghorn antelope, can be encouraged by developing livestock watering facilities, properly managing livestock grazing, and reseeding range where needed.

This soil has good potential for homesites. Practices are needed to control surface runoff and keep soil losses to a minimum. Limiting the disturbance of the soil and the removal of existing plant cover during construction helps to control erosion. Capability subclass IVe.

14—Brussett loam, 1 to 3 percent slopes. This deep, well drained soil formed in eolian silt and sand on uplands. Elevation ranges from 7,200 to 7,500 feet. The average annual precipitation is about 18 inches, and the average annual air temperature is about 43 degrees F.

Typically, the surface layer is dark grayish brown loam about 8 inches thick. The subsoil is grayish brown and brown clay loam about 26 inches thick. The substratum is pale brown silt loam. Mycelia and soft masses of lime are common in the substratum.

Included with this soil in mapping are small areas of Peyton sandy loam, 1 to 5 percent slopes.

Permeability of this Brussett soil is moderate. Effective rooting depth is 60 inches or more. Available water capacity is high. Surface runoff is slow, and the hazard of erosion is moderate.

Nearly all the acreage of this soil is used for nonirrigated winter wheat, spring oats, and improved pasture that is grazed by cattle and sheep. The chief pasture grasses are smooth brome, intermediate wheatgrass, and pubescent wheatgrass. Winter wheat is grown under a wheat-fallow system. Stubble mulching is the most important conservation practice. Application of fertilizer generally is not needed in the wheat-fallow system. Other crops respond to application of nitrogen. The growing season is too short for warm-season field crops. Management of the plant cover is needed to control erosion.

Rangeland vegetation consists of mountain muhly, little bluestem, needleandthread, Parry oatgrass, and junegrass.

Deferment of grazing in spring helps to maintain the vigor and reproduction of the cool-season bunchgrasses. Fencing and properly distributing livestock watering facilities may be needed to control grazing. Locating salt blocks in areas not generally grazed increases the amount of forage that is used on this soil.

Windbreaks and environmental plantings are generally well suited to this soil. Summer fallow a year prior to planting and continued cultivation for weed control are needed to insure the establishment and survival of plantings. Trees that are best suited and have good survival potential are Rocky Mountain juniper, eastern redcedar, ponderosa pine, Siberian elm, Russian-olive, and hackberry. Shrubs that are best suited are skunkbush sumac, lilac, Siberian peashrub, and American plum.

This soil is suited to wildlife habitat. It is best suited to habitat for openland and rangeland wildlife. In cropland areas, habitat favorable for ring-necked pheasant, mourning dove, and many nongame species can be developed by establishing areas for nesting and escape cover. For pheasant, undisturbed nesting cover is vital and should be provided for in plans for habitat development. This is especially true in areas of intensive farming. Rangeland wildlife, such as pronghorn antelope, can be encouraged by developing livestock watering facilities, properly managing livestock grazing, and reseeding range where needed.

The main limitations for urban development are moderate shrink-swell potential and frost action potential. Dwellings and roads can be designed to overcome these limitations. Permeability adversely affects the performance of septic tank absorption fields. Capability subclass IIIc.

15—Brussett loam, 3 to 5 percent slopes. This deep, well drained soil formed in eolian silt and sand on uplands. Elevation ranges from 7,200 to 7,500 feet. The average annual precipitation is about 18 inches, and the average annual air temperature is about 43 degrees F.

Typically, the surface layer is dark grayish brown loam about 8 inches thick. The subsoil is grayish brown and brown clay loam about 26 inches thick. The substratum is pale brown silt loam. Mycelia and soft masses of lime are common in the substratum.

Included with this soil in mapping are small areas of Peyton sandy lom, 1 to 5 percent slopes, and Peyton-Pring complex, 3 to 8 percent slopes.

Permeability of this Brussett soil is moderate. Effective rooting depth is 60 inches or more. Available water capacity is high. Surface runoff is medium to rapid. The hazard of erosion is moderate, especially when snow melts in spring while the ground is frozen. Some gullies are present.

Nearly all the acreage of this soil is used for nonirrigated winter wheat, spring oats, and improved pasture that is grazed by cattle and sheep. The chief pasture grasses are smooth brome, intermediate wheatgrass, and pubescent wheatgrass. Winter wheat is grown under a wheat-fallow system. Stubble mulching is the most important conservation practice. Application of fertilizer generally is not needed in the wheat-fallow system. Other crops respond to application of nitrogen. The growing season is too short for warm-season field crops. Management of plant cover is needed to control erosion.

Rangeland vegetation consists of mountain muhly, little bluestem, needleandthread, Parry oatgrass, and junegrass.

Deferment of grazing in spring helps to maintain the vigor and production of the cool-season bunchgrasses. Fencing and properly distributing livestock watering facilities may be needed to control grazing. Locating salt blocks in areas not generally grazed increases the amount of forage that is used on this soil.

Windbreaks and environmental plantings are generally well suited to this soil. Summer fallow a year prior to planting and continued cultivation for weed control are needed to insure the establishment and survival of plantings. Trees that are best suited and have good survival potential are Rocky Mountain juniper, eastern redcedar, ponderosa pine, Siberian elm, Russian-olive, and hackberry. Shrubs that are best suited are skunkbush sumac, lilac, Siberian peashrub, and American plum.

This soil is suited to wildlife habitat. It is best suited to habitat for openland and rangeland wildlife. In cropland areas, habitat favorable for ring-necked pheasant, mourning dove, and many nongame species can be developed by establishing areas for nesting and escape cover. For pheasant, undisturbed nesting cover is vital and should be provided for in plans for habitat development. This is especially true in areas of intensive farming. Rangeland wildlife, such as pronghorn antelope, can be encouraged by developing livestock watering facilities, properly managing livestock grazing, and reseeding range where needed.

The main limitations for urban development are moderate shrink-swell potential and frost action potential. Dwellings and roads can be designed to overcome these limitations. Capability subclass IVe.

16—Chaseville gravelly sandy loam, 1 to 8 percent slopes. This deep, somewhat excessively drained soil formed in arkosic alluvial sediment on alluvial fans, terraces, and side slopes. Elevation ranges from 6,100 to 7,000 feet. Average annual precipitation is about 17 inches, average annual air temperature is about 47 degrees F, and the average frost-free season is about 135 days.

Typically, the surface layer is dark grayish brown gravelly sandy loam about 6 inches thick. The next layer is dark grayish brown very gravelly sandy loam about 13 inches thick. The substratum is reddish gray extremely gravelly loamy coarse sand and brown very gravelly loamy sand. The lower part of the subtratum, below a depth of 40 inches, is about 10 percent cobbles.

Included with this soil in mapping are small areas of Jarre gravelly sandy loam, 1 to 8 percent slopes; Bresser sandy loam; Truckton sandy loam; and Ascalon sandy loam.

Permeability of this Chaseville soil is rapid. Effective rooting depth is 60 inches or more. Available water capacity is low. Surface runoff is slow, and the hazard of erosion is moderate.

This soil is used mainly as native rangeland. It is also used as homesites and for wildlife habitat.

Rangeland vegetation is mainly western wheatgrass, side-oats grama, needleandthread, and little bluestem. The main shrub on this site is true mountainmahogany.

Proper location of livestock watering facilities helps to control grazing.

Windbreaks and environmental plantings are suited to this soil. Low available water capacity is the main limitation to the establishment of tree and shrub plantings. Summer fallow a year in advance and continued cultivation for weed control are needed to insure the establishment and survival of plantings. Supplemental irrigation may be needed to insure survival. Trees that are best suited and have good survival are Rocky Mountain juniper, eastern redcedar, ponderosa pine, and Siberian elm. Shrubs that are best suited are skunkbush sumac and lilac.

This soil is suited to wildlife habitat. It is best suited to habitat for openland and rangeland wildlife. Rangeland wildlife, such as pronghorn antelope, can be encouraged by developing livestock watering facilities, properly managing livestock grazing, and reseeding range where needed.

This soil has good potential for homesites. Because of its high gravel content, problems with excavations may arise because cut banks cave in. A surface dressing of topsoil is needed where the very gravelly subsoil is exposed or where vegetation has been removed during site preparation. Caution should be exercised when locating septic tank absorption fields because of possible pollution of water supplies as a result of the rapid permeability of this soil. Capability subclass VIe.

17—Chaseville gravelly sandy loam, 8 to 40 percent slopes. This deep, somewhat excessively drained soil formed in arkosic alluvial sediment on alluvial fans, terraces, and side slopes. Elevation ranges from 6,100 to 7,000 feet. The average annual precipitation is about 17 inches, the average annual air temperature is about 47 degrees F, and the average frost-free season is about 135 days.

Typically, the surface layer is dark grayish brown gravelly sandy loam about 6 inches thick. The subsurface layer is dark grayish brown very gravelly sandy loam about 13 inches thick. The substratum is reddish gray extremely gravelly loamy coarse sand and brown very gravelly loamy sand. The part of the substratum below a depth of 40 inches is about 10 percent cobbles.

Included with this soil in mapping are small areas of Jarre gravelly sandy loam, 1 to 8 percent slopes; Nederland cobbly sandy loam, 9 to 25 percent slopes; and Bresser sandy loam, 5 to 9 percent slopes.

Permeability of this Chaseville soil is rapid. Effective rooting depth is 60 inches or more. Available water capacity is low. Surface runoff is slow to medium, and the hazard of erosion is moderate to high.

This soil is used mainly as rangeland. It is also used for recreation, wildlife habitat, and homesites.

Native vegetation is mainly western wheatgrass, side-oats grama, needleandthread, and little bluestem. The prominent shrub on this site is true mountainmahogany. Yucca is present in some places.

Proper location of livestock watering facilities helps to control grazing.

support a load and potential frost action on roads and streets. Roads and buildings can be designed to overcome these limitations. Capability subclass IVe.

67—Peyton sandy loam, 5 to 9 percent slopes. This deep, noncalcareous, well drained soil formed in alluvium and residuum derived from weathered arkosic sedimentary rock on uplands. Elevation ranges from 6,800 to 7,600 feet.

Typically, the surface layer is grayish brown sandy loam about 12 inches thick. The subsoil, about 23 inches thick, is pale brown sandy clay loam in the upper 13 inches and pale brown sandy loam in the lower 10 inches. The substratum is pale brown sandy loam to a depth of 60 inches.

Included with this soil in mapping are small areas of Holderness loam, 5 to 8 percent slopes; Pring coarse sandy loam, 3 to 8 percent slopes; and Tomah-Crowfoot loamy sands, 3 to 8 percent slopes.

Permeability of this soil is moderate. Effective rooting depth is 60 inches or more. Available water capacity is high. Surface runoff is medium, and the hazard of erosion is moderate. Gullies and rills are common.

Most of the acreage of this Peyton soil is used as rangeland. Some areas are used for wheat and oats. Stubble mulching or other crop residue management practices are needed to control water erosion. Wildlife habitat is also an important use.

This soil is well suited to the production of native vegetation suitable for grazing. The native vegetation is mainly mountain muhly, bluestem, mountain brome, needleandthread, and blue grama. This soil is subject to invasion by Kentucky bluegrass and Gambel oak. Minor amounts of forbs such as hairy goldenrod, geranium, milkvetch, low larkspur, fringed sage, and buckwheat are in the stand.

Proper location of livestock watering facilities helps to control grazing. Timely deferment of grazing is needed to protect the plant cover.

Windbreaks and environmental plantings generally are suited to this soil. Soil blowing is the main limitation to the establishment of trees and shrubs. This limitation can be overcome by cultivating only in the tree rows and leaving a strip of vegetation between the rows. Supplemental irrigation may be necessary when planting and during dry periods. Trees that are best suited and have good survival are Rocky Mountain juniper, eastern redcedar, ponderosa pine, Siberian elm, Russian-olive, and hackberry. Shrubs that are best suited are skunkbush sumac, lilac, and Siberian peashrub.

This soil is suited to habitat for openland and rangeland wildlife. Rangeland wildife, such as pronghorn antelope, can be encouraged by developing livestock watering facilities, properly managing livestock grazing, and reseeding range where needed.

This soil has good potential for homesites. The main limitation is the limited ability to support a load and potential frost action. Buildings and roads can be designed to overcome these limitations. Capability subclass IVe.

68—Peyton-Pring complex, 3 to 8 percent slopes. These gently sloping to moderately sloping soils are on valley side slopes and on uplands. Elevation ranges from 6,800 to 7,600 feet. The average annual precipitation is about 17 inches, the average annual air temperature is about 43 degrees F, and the average frost-free period is about 120 days.

The Peyton soil makes up about 40 percent of the complex, the Pring soil about 30 percent, and other soils about 30 percent.

Included with these soils in mapping are areas of Holderness loam, 1 to 5 percent slopes; Holderness loam, 5 to 8 percent slopes; and Tomah-Crowfoot loamy sands, 3 to 8 percent slopes. In some places arkosic beds of sandstone and shale are at a depth of 0 to 40 inches.

The Peyton soil is commonly on the less sloping part of the landscape. It is deep, noncalcareous, and well drained. It formed in alluvium and residuum derived from weathered arkosic sedimentary rock. Typically, the surface layer is grayish brown sandy loam about 12 inches thick. The subsoil, about 23 inches thick, is pale brown sandy clay loam in the upper 13 inches and pale brown sandy loam in the lower 10 inches. The substratum is pale brown sandy loam to a depth of 60 inches or more.

Permeability of the Peyton soil is moderate. Effective rooting depth is 60 inches or more. Available water capacity is high. Surface runoff is medium, and the hazard of erosion is moderate.

The Pring soil is deep, noncalcareous, and well drained. It formed in sandy sediment derived from weathered arkosic sedimentary rock. Typically, the surface layer is dark grayish brown coarse sandy loam about 4 inches thick. The substratum is dark grayish brown coarse sandy loam about 10 inches thick over pale brown gravelly sandy loam that extends to a depth of 60 inches or more.

Permeability of the Pring soil is rapid. Effective rooting depth is 60 inches or more. Available water capacity is moderate. Surface runoff is medium, and the hazard of erosion is moderate.

These soils are used as rangeland, for wildlife habitat, and for homesites.

These soils are well suited to the production of native vegetation suitable for grazing. The dominant native species are mountain muhly, bluestem, needleandthread, and blue grama. These soils are subject to invasion of Kentucky bluegrass and Gambel oak. Common forbs are hairy goldenrod, geranium, milkvetch, low larkspur, fringed sage, and buckwheat.

Properly locating livestock watering facilities helps to control grazing. Timely deferment of grazing is needed to protect the plant cover.

Windbreaks and environmental plantings generally are suited to these soils. Soil blowing is the main limitation to the establishment of trees and shrubs. This limitation can be overcome by cultivating only in the tree rows and leaving a strip of vegetation between the rows. Supplemental irrigation may be needed when planting and during dry periods. Trees that are best suited and have good

survival are Rocky Mountain juniper, eastern redcedar, ponderosa pine, Siberian elm, Russian-olive, and hackberry. Shrubs that are best suited are skunkbush sumac, lilac, and Siberian peashrub.

These soils are suited to habitat for openland and rangeland wildlife. Rangeland wildlife, such as pronghorn antelope, can be encouraged by developing livestock watering facilities, properly managing livestock grazing, and reseeding range where needed.

These soils have a good potential for homesites. The main limitations, especially on the Peyton soil, are low bearing strength and frost-action potential. Buildings and roads can be designed to overcome these limitations. Access roads should have adequate cut-slope grade and be provided with drains to control surface runoff and keep soil losses to a minimum. Capability subclass VIe.

69—Peyton-Pring complex, 8 to 15 percent slopes. These gently to moderately sloping soils are on valley side slopes and on uplands. Elevation ranges from 6,800 to 7,600 feet. The average annual precipitation is about 17 inches, the average annual air temperature is about 43 degrees F, and the average frost-free period is about 120 days.

The Peyton soil makes up about 40 percent of the complex, the Pring soil about 30 percent, and other soils about 30 percent.

Included with these soils in mapping are areas of Holderness loam, 8 to 15 percent slopes; Tomah-Crowfoot loamy sands, 8 to 15 percent slopes; Kettle gravelly loamy sand, 8 to 40 percent slopes; and a few areas of Rock outcrop.

The Peyton soil is commonly on the less sloping part of the landscape. It is deep, noncalcareous, and well drained. It formed in alluvium and residuum derived from weathered, arkosic, sedimentary rock. Typically, the surface layer is grayish brown sandy loam about 12 inches thick. The subsoil, about 23 inches thick, is pale brown sandy clay loam in the upper 13 inches and pale brown sandy loam in the lower 10 inches. The substratum is pale brown sandy loam to a depth of 60 inches or more.

Permeability of the Peyton soil is moderate. Effective rooting depth is 60 inches or more. Available water capacity is high. Surface runoff is medium to rapid, and the hazard of erosion is moderate to high. Some gullies have developed along drainageways and livestock trails.

The Pring soil is deep, noncalcareous, and well drained. It formed in sandy sediment derived from weathered, arkosic, sedimentary rock. Typically, the surface layer is dark grayish brown coarse sandy loam about 4 inches thick. The substratum is dark grayish brown coarse sandy loam about 10 inches thick over pale brown gravelly sandy loam that extends to a depth of 60 inches or more.

Permeability of the Pring soil is rapid. Effective rooting depth is 60 inches or more. Available water capacity is moderate. Surface runoff is medium to rapid, and the hazard of erosion is moderate to high. Some gullies have developed along drainageways and livestock trails.

The soils in this complex are used as rangeland, for wildlife habitat, and for homesites.

These soils are well suited to the production of native vegetation suitable for grazing. The dominant native species are mountain muhly, bluestem grasses, needleandthread, and blue grama. These soils are subject to invasion of Kentucky bluegrass and Gambel oak. Common forbs are hairy goldenrod, geranium, milkvetch, low larkspur, fringed sage, and buckwheat.

Properly locating livestock watering facilities helps to control grazing. Timely deferment of grazing is needed to protect the plant cover.

Windbreaks and environmental plantings generally are suited to these soils. Soil blowing is the main limitation to the establishment of trees and shrubs. This limitation can be overcome by cultivating only in the tree rows and leaving a strip of vegetation between the rows. Supplemental irrigation may be needed when planting and during dry periods. Trees that are best suited and have good survival are Rocky Mountain juniper, eastern redcedar, ponderosa pine, Siberian elm, Russian-olive, and hackberry. Shrubs that are best suited are skunkbush sumac, lilac, and Siberian peashrub.

These soils are well suited to wildlife habitat. They are best suited to habitat for openland and rangeland wildlife. Rangeland wildlife, such as pronghorn antelope, can be encouraged by developing livestock watering facilities, properly managing livestock grazing, and reseeding range where needed.

These soils have good potential for use as homesites. The main limitations are steepness of slope, limited ability to support a load, and frost-action potential. Buildings and roads can be designed to overcome these limitations. These soils also require special site or building designs because of the slope. Access roads should have adequate cut-slope grade, and drains should be provided to control surface runoff and keep soil losses to a minimum. Capability subclass VIe.

70—Pits, gravel. Gravel pits are in nearly level to rolling areas. They are open excavations several feet deep and commonly 5 acres or less in size.

Gravel pits are very low in natural fertility and are highly susceptible to soil blowing. A cover of weeds or straw helps to control erosion.

Windbreaks and environmental plantings generally are not suited to these areas. Onsite investigation is needed to determine if plantings are feasible. Capability subclass VIIIs.

71—Pring coarse sandy loam, 3 to 8 percent slopes. This deep, noncalcareous, well drained soil formed in sandy sediment derived from arkosic sedimentary rock on valley side slopes and on uplands. Elevation ranges from 6,800 to 7,600 feet. The average annual precipitation is about 17 inches, the average annual air temperature is about 43 degrees F, and the average frost-free period is about 120 days.

Typically, the surface layer is dark grayish brown coarse sandy loam about 4 inches thick. The substratum is dark grayish brown coarse sandy loam about 10 inches thick over pale brown gravelly sandy loam that extends to a depth of 60 inches or more.

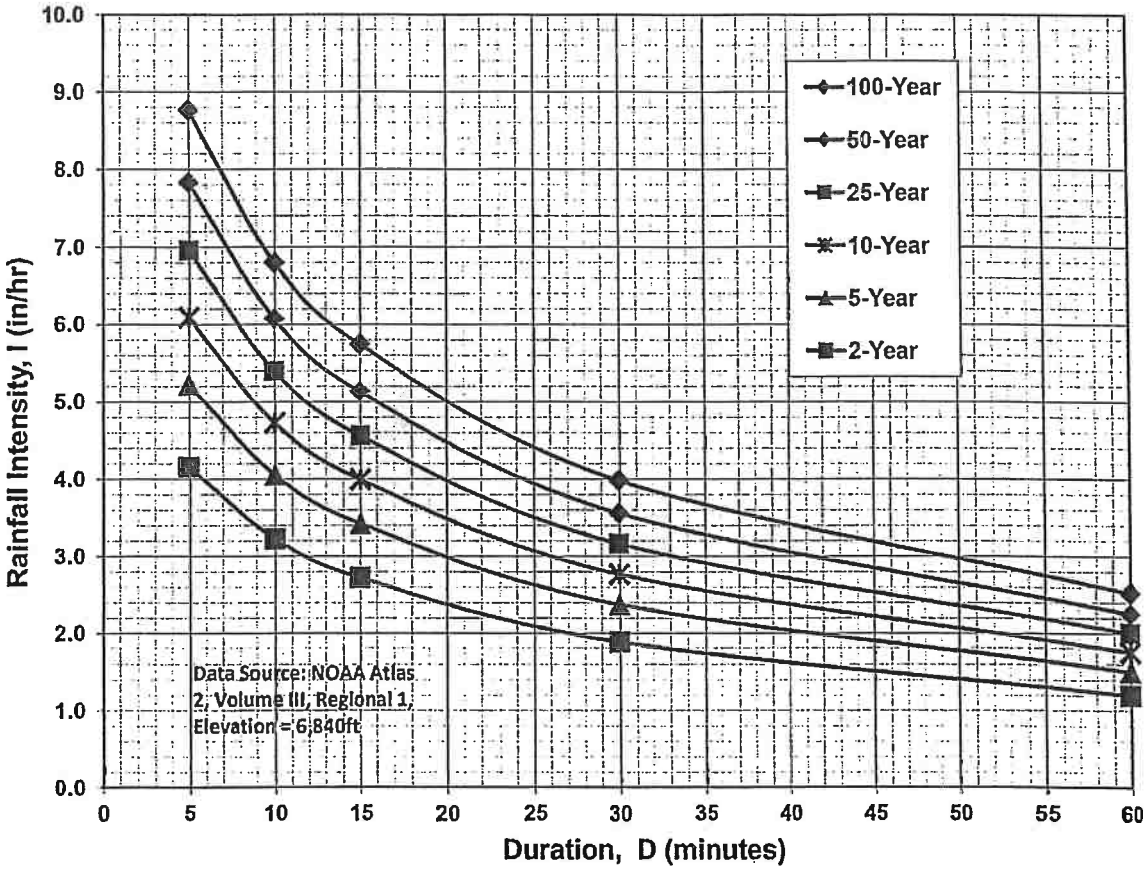
2 Hydrologic Calculations

City of Colorado Springs DCM Runoff Coefficients – Table 6-6
Colorado Springs DCM Rainfall Intensity Duration Frequency – Figure 6-5
Sub-Basin Time of Concentration – Form SF-1
5-yr Sub-Basin and Combined Flows – Form SF-2
100-yr Sub-Basin and Combined Flows – Form SF-2

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

Figure 6-5. Colorado Springs Rainfall Intensity Duration Frequency



IDF Equations

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

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

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

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

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

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

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

Job No.: **61174** Date: **04/26/2023 17:32**

Project: **Hill Subdivision Filing No.1** Calcs By: **JO**

Checked By:

Time of Concentration (Modified from Standard Form SF-1)

Sub-Basin	Sub-Basin Data				Overland			Shallow Channel				Channelized				t_c Check		t_c
	Area (Acres)	C_5	C_{100}/CN	% Imp.	L_0 (ft)	S_0 (%)	t_i (min)	L_{0t} (ft)	S_{0t} (ft/ft)	v_{0sc} (ft/s)	t_t (min)	L_{0c} (ft)	S_{0c} (ft/ft)	v_{0c} (ft/s)	t_c (min)	L (min)	$t_{c,alt}$ (min)	(min)
OFFSITE																		
OS-A1	2.79	0.17	0.41	13%	100	2%	14.7	120	0.029	1.2	1.7	166	0.030	2.3	1.2	386	N/A	17.6
OS-A5	0.24	0.08	0.35	0%	98.07	3%	12.6	0	0.000	0.0	0.0	0	0.000	0.0	0.0	98.07	N/A	12.6
OS-C	3.66	0.13	0.39	6%	100	3%	12.2	120	0.033	1.3	1.6	290	0.069	3.7	1.3	510	N/A	15.1
EXISTING ONSITE																		
EX-A2	9.64	0.11	0.38	4%	100	3%	12.5	492	0.035	1.3	6.3	133.5	0.022	2.8	0.8	725.5	N/A	19.6
EX-A3	0.56	0.08	0.35	0%	100	2%	13.8	167.3	0.028	1.2	2.4	0	0.000	0.0	0.0	267.3	N/A	16.2
EX-A4	1.02	0.08	0.35	0%	100	2%	13.8	129.2	0.026	1.1	1.9	0	0.000	0.0	0.0	229.2	N/A	15.7
EX-B1	1.06	0.08	0.35	0%	100	2%	13.7	173.7	0.042	1.4	2.0	0	0.000	0.0	0.0	273.7	N/A	15.7
EX-B2	0.90	0.08	0.35	0%	100	5%	10.6	60	0.077	1.9	0.5	167.1	0.054	2.6	1.1	327.1	N/A	12.2
EX-C	1.51	0.13	0.38	6%	109	4%	11.9	127.5	0.055	1.6	1.3	0	0.000	0.0	0.0	236.5	N/A	13.2
PROPOSED ONSITE																		
A2	9.64	0.14	0.39	8%	100	3%	12.2	492	0.035	1.3	6.3	133.5	0.022	2.8	0.8	725.5	N/A	19.3
A3	0.56	0.08	0.35	0%	100	2%	13.8	167.3	0.028	1.2	2.4	0	0.000	0.0	0.0	267.3	N/A	16.2
A4	1.02	0.08	0.35	0%	100	2%	13.8	129.2	0.026	1.1	1.9	0	0.000	0.0	0.0	229.2	N/A	15.7
B1	1.06	0.17	0.41	12%	100	2%	12.5	173.7	0.042	1.4	2.0	0	0.000	0.0	0.0	273.7	N/A	14.5
B2	0.90	0.11	0.37	5%	100	5%	10.3	60	0.077	1.9	0.5	167.1	0.054	2.6	1.1	327.1	N/A	11.8
C	1.51	0.13	0.38	6%	109	4%	11.9	127.5	0.055	1.6	1.3	0	0.000	0.0	0.0	236.5	N/A	13.2

Job No.: **61174**
Project: **Hill Subdivision Filing No.1**
Design Storm: **5-Year Storm** *(20% Probability)*
Jurisdiction: **DCM**

Date: **04/26/2023 17:32**
Calcs By: **JO**
Checked By:

Sub-Basin and Combined Flows (Modified from Standard Form SF-2)

				Direct Runoff				Combined Runoff				Streetflow			Pipe Flow					Travel Time		
DP	Sub-Basin	Area (Acres)	C5	t_c (min)	CA (Acres)	I5 (in/hr)	Q5 (cfs)	t_c (min)	CA (Acres)	I5 (in/hr)	Q5 (cfs)	Slope (%)	Length (ft)	Q (cfs)	Q (cfs)	Slope (%)	Mnngs n	Length (ft)	D_{Pipe} (in)	Length (ft)	v_{0sc} (ft/s)	t_t (min)
OFFSITE SUB-BASINS																						
	OS-A1	2.79	0.17	17.6	0.47	3.28	1.6															
	OS-A5	0.24	0.08	12.6	0.02	3.78	0.1															
	OS-C	3.66	0.13	15.1	0.48	3.52	1.7															
EXISTING ONSITE																					#####	#####
	EX-A2	9.64	0.11	19.6	1.11	3.12	3.5															
	EX-A3	0.56	0.08	16.2	0.04	3.41	0.2															
	EX-A4	1.02	0.08	15.7	0.08	3.45	0.3															
	EX-B1	1.06	0.08	15.7	0.08	3.45	0.3															
	EX-B2	0.90	0.08	12.2	0.07	3.83	0.3															
	EX-C	1.51	0.13	13.2	0.19	3.71	0.7															
EX-DP1		12.67	0.13					22.0	1.60	2.95	4.7											
	OS-A1	2.79	0.17	17.6	0.47	3.28	1.6															
	OS-A5	0.24	0.08	12.6	0.02	3.78	0.1															
	EX-A2	9.64	0.11	19.6	1.11	3.12	3.5															
EX-DP2		5.18	0.13					15.2	0.67	3.50	2.3											
	OS-C	3.66	0.13	15.1	0.48	3.52	1.7															
	EX-C	1.51	0.13	13.2	0.19	3.71	0.7															
PROPOSED ONSITE																						
	A2	9.64	0.14	19.3	1.35	3.14	4.3															
	A3	0.56	0.08	16.2	0.04	3.41	0.2															
	A4	1.02	0.08	15.7	0.08	3.45	0.3															
	B1	1.06	0.17	14.5	0.18	3.57	0.6															
	B2	0.90	0.11	11.8	0.10	3.88	0.4															
	C	1.51	0.13	13.2	0.19	3.71	0.7															
DP1		12.67	0.15					22.0	1.85	2.95	5.4											
	OS-A1	2.79	0.17	17.6	0.47	3.28	1.6															
	OS-A5	0.24	0.08	12.6	0.02	3.78	0.1															
	A2	9.64	0.14	19.3	1.35	3.14	4.3															
DP2		5.18	0.13					15.2	0.67	3.50	2.3											
	OS-C	3.66	0.13	15.1	0.48	3.52	1.7															
	C	1.51	0.13	13.2	0.19	3.71	0.7															

DCM: I = C1 * ln (tc) + C2
C1: 1.5
C1: 7.583

Job No.: **61174**
Project: **Hill Subdivision Filing No.1**
Design Storm: **100-Year Storm** *(1% Probability)*
Jurisdiction: **DCM**

Date: **04/26/2023 17:32**
Calcs By: **JO**
Checked By:

Sub-Basin and Combined Flows (Modified from Standard Form SF-2)

				Direct Runoff				Combined Runoff				Streetflow			Pipe Flow					Travel Time		
DP	Sub-Basin	Area (Acres)	C100	t_c (min)	CA (Acres)	I100 (in/hr)	Q100 (cfs)	t_c (min)	CA (Acres)	I100 (in/hr)	Q100 (cfs)	Slope (%)	Length (ft)	Q (cfs)	Q (cfs)	Slope (%)	Mnngs n	Length (ft)	D_{Pipe} (in)	Length (ft)	v_{0sc} (ft/s)	t_t (min)
OFFSITE SUB-BASINS																						
	OS-A1	2.79	0.41	17.6	1.15	5.51	6.3															
	OS-A5	0.24	0.35	12.6	0.09	6.35	0.5															
	OS-C	3.66	0.39	15.1	1.42	5.90	8.4															
EXISTING ONSITE																					#####	#####
	EX-A2	9.64	0.38	19.6	3.62	5.23	18.9															
	EX-A3	0.56	0.35	16.2	0.20	5.72	1.1															
	EX-A4	1.02	0.35	15.7	0.36	5.80	2.1															
	EX-B1	1.06	0.35	15.7	0.37	5.80	2.1															
	EX-B2	0.90	0.35	12.2	0.31	6.44	2.0															
	EX-C	1.51	0.38	13.2	0.58	6.22	3.6															
EX-DP1		12.67	0.38					22.0	4.86	4.95	24.0											
	OS-A1	2.79	0.41	17.6	1.15	5.51	6.3															
	OS-A5	0.24	0.35	12.6	0.09	6.35	0.5															
	EX-A2	9.64	0.38	19.6	3.62	5.23	18.9															
EX-DP2		5.18	0.39					15.2	2.00	5.88	11.8											
	OS-C	3.66	0.39	15.1	1.42	5.90	8.4															
	EX-C	1.51	0.38	13.2	0.58	6.22	3.6															
PROPOSED ONSITE																					#####	#####
	A2	9.64	0.39	19.3	3.79	5.28	20.0															
	A3	0.56	0.35	16.2	0.20	5.72	1.1															
	A4	1.02	0.35	15.7	0.36	5.80	2.1															
	B1	1.06	0.41	14.5	0.44	5.99	2.6															
	B2	0.90	0.37	11.8	0.33	6.51	2.2															
	C	1.51	0.38	13.2	0.58	6.22	3.6															
DP1		12.67	0.40					22.0	5.03	4.95	24.9											
	OS-A1	2.79	0.41	17.6	1.15	5.51	6.3															
	OS-A5	0.24	0.35	12.6	0.09	6.35	0.5															
	A2	9.64	0.39	19.3	3.79	5.28	20.0															
DP2		5.18	0.39					15.2	2.00	5.88	11.8											
	OS-C	3.66	0.39	15.1	1.42	5.90	8.4															
	C	1.51	0.38	13.2	0.58	6.22	3.6															

DCM: I = C1 * ln (tc) + C2
C1: 2.52
C1: 12.735

Sub-Basin OS-A1 Runoff Calculations

Job No.:	**61174**	Date:	**04/26/2023 17:32**
Project:	**Hill Subdivision Filing No.1**	Calcs by:	**JO**
		Checked by:	
Jurisdiction	**DCM**	Soil Type	**B**
Runoff Coefficient	**Surface Type**	Urbanization	**Non-Urban**

Basin Land Use Characteristics

	Area		Runoff Coefficient						%
Surface	**(SF)**	**(Acres)**	**C2**	**C5**	**C10**	**C25**	**C50**	**C100**	**Imperv.**
Pasture/Meadow	103,249	2.37	0.02	0.08	0.15	0.25	0.3	0.35	0%
Paved	4,412	0.10	0.89	0.9	0.92	0.94	0.95	0.96	100%
Roofs	2,295	0.05	0.71	0.73	0.75	0.78	0.8	0.81	90%
Gravel	11,248	0.26	0.57	0.59	0.63	0.66	0.68	0.7	80%
Landscaping	142	0.00	0.03	0.09	0.17	0.26	0.31	0.36	2%
Combined	**121,345**	**2.79**	**0.12**	**0.17**	**0.23**	**0.32**	**0.37**	**0.41**	**12.8%**
	121345								

Basin Travel Time

Shallow Channel Ground Cover: Short Pasture/Lawns

$L_{max,Overland}$: 100 ft C_v: 7

	L (ft)	ΔZ_0 (ft)	S_0 (ft/ft)	v (ft/s)	t (min)	t_{Alt} (min)	
Total	386	10	-	-	-	-	
Initial Time	100	2	0.015	-	14.7	N/A	DCM Eq. 6-8
Shallow Channel	120	4	0.029	1.2	1.7	-	DCM Eq. 6-9
Channelized	166	5	0.030	2.3	1.2	-	V-Ditch
				t_c	**17.6**	**min.**	

Rainfall Intensity & Runoff

	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
Intensity (in/hr)	2.6	3.3	3.8	4.4	4.9	5.5
Runoff (cfs)	0.8	**1.6**	2.5	3.9	5.1	**6.3**
Release Rates (cfs/ac)	-	-	-	-	-	-
Allowed Release (cfs)	0.8	**1.6**	2.5	3.9	5.1	**6.3**
DCM: I = C1 * ln (tc) + C2						
C1	1.19	1.5	1.75	2	2.25	2.52
C2	6.035	7.583	8.847	10.111	11.375	12.735

Notes

Sub-Basin OS-A5 Runoff Calculations

Job No.:	**61174**	Date:	**04/26/2023 17:32**
Project:	**Hill Subdivision Filing No.1**	Calcs by:	**JO**
		Checked by:	
Jurisdiction	**DCM**	Soil Type	**B**
Runoff Coefficient	**Surface Type**	Urbanization	**Non-Urban**

Basin Land Use Characteristics

	Area		Runoff Coefficient						%
Surface	**(SF)**	**(Acres)**	**C2**	**C5**	**C10**	**C25**	**C50**	**C100**	**Imperv.**
Pasture/Meadow	10,650	0.24	0.02	0.08	0.15	0.25	0.3	0.35	0%
Combined	**10,650**	**0.24**	**0.02**	**0.08**	**0.15**	**0.25**	**0.30**	**0.35**	**0.0%**
	10650								

Basin Travel Time

Shallow Channel Ground Cover: Short Pasture/Lawns

$L_{max,Overland}$: 100 ft C_v: 7

	L (ft)	ΔZ_0 (ft)	S_0 (ft/ft)	v (ft/s)	t (min)	t_{Alt} (min)	
Total	98	3	-	-	-	-	
Initial Time	98	3	0.031	-	12.6	N/A	DCM Eq. 6-8
Shallow Channel			0.000	0.0	0.0	-	DCM Eq. 6-9
Channelized			0.000	0.0	0.0	-	V-Ditch
				t_c	**12.6**	**min.**	

Rainfall Intensity & Runoff

	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
Intensity (in/hr)	3.0	3.8	4.4	5.0	5.7	6.3
Runoff (cfs)	0.0	**0.1**	0.2	0.3	0.4	**0.5**
Release Rates (cfs/ac)	-	-	-	-	-	-
Allowed Release (cfs)	0.0	**0.1**	0.2	0.3	0.4	**0.5**

DCM: I = C1 * ln (tc) + C2

C1	1.19	1.5	1.75	2	2.25	2.52
C2	6.035	7.583	8.847	10.111	11.375	12.735

Notes

Sub-Basin OS-C Runoff Calculations

Job No.:	**61174**	Date:	**04/26/2023 17:32**
Project:	**Hill Subdivision Filing No.1**	Calcs by:	**JO**
		Checked by:	
Jurisdiction	**DCM**	Soil Type	**B**
Runoff Coefficient	**Surface Type**	Urbanization	**Non-Urban**

Basin Land Use Characteristics

	Area		Runoff Coefficient						%
Surface	**(SF)**	**(Acres)**	**C2**	**C5**	**C10**	**C25**	**C50**	**C100**	**Imperv.**
Pasture/Meadow	149,932	3.44	0.02	0.08	0.15	0.25	0.3	0.35	0%
Paved	9,700	0.22	0.89	0.9	0.92	0.94	0.95	0.96	100%
Combined	**159,632**	**3.66**	**0.07**	**0.13**	**0.20**	**0.29**	**0.34**	**0.39**	**6.1%**
	159632								

Basin Travel Time

Shallow Channel Ground Cover: Short Pasture/Lawns

$L_{max,Overland}$: 100 ft C_v: 7

	L (ft)	ΔZ_0 (ft)	S_0 (ft/ft)	v (ft/s)	t (min)	t_{Alt} (min)	
Total	510	27	-	-	-	-	
Initial Time	100	3	0.030	-	12.2	N/A	DCM Eq. 6-8
Shallow Channel	120	4	0.033	1.3	1.6	-	DCM Eq. 6-9
Channelized	290	20	0.069	3.7	1.3	-	V-Ditch
				t_c	**15.1**	**min.**	

Rainfall Intensity & Runoff

	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
Intensity (in/hr)	2.8	3.5	4.1	4.7	5.3	5.9
Runoff (cfs)	0.7	**1.7**	3.0	5.0	6.6	**8.4**
Release Rates (cfs/ac)	-	-	-	-	-	-
Allowed Release (cfs)	0.7	**1.7**	3.0	5.0	6.6	**8.4**
DCM: I = C1 * ln (tc) + C2						
C1	1.19	1.5	1.75	2	2.25	2.52
C2	6.035	7.583	8.847	10.111	11.375	12.735

Notes

Sub-Basin EX-A2 Runoff Calculations

Job No.:	**61174**	Date:	**04/26/2023 17:32**
Project:	**Hill Subdivision Filing No.1**	Calcs by:	**JO**
		Checked by:	
Jurisdiction	**DCM**	Soil Type	**B**
Runoff Coefficient	**Surface Type**	Urbanization	**Non-Urban**

Basin Land Use Characteristics

	Area		Runoff Coefficient						%
Surface	**(SF)**	**(Acres)**	**C2**	**C5**	**C10**	**C25**	**C50**	**C100**	**Imperv.**
Pasture/Meadow	400,481	9.19	0.02	0.08	0.15	0.25	0.3	0.35	0%
Paved	11,651	0.27	0.89	0.9	0.92	0.94	0.95	0.96	100%
Roofs	7,815	0.18	0.71	0.73	0.75	0.78	0.8	0.81	90%
Combined	**419,947**	**9.64**	**0.06**	**0.11**	**0.18**	**0.28**	**0.33**	**0.38**	**4.4%**
	419947								

Basin Travel Time

Shallow Channel Ground Cover: Short Pasture/Lawns

$L_{max,Overland}$: 100 ft C_v: 7

	L (ft)	ΔZ_0 (ft)	S_0 (ft/ft)	v (ft/s)	t (min)	t_{Alt} (min)	
Total	726	23	-	-	-	-	
Initial Time	100	3	0.029	-	12.5	N/A	DCM Eq. 6-8
Shallow Channel	492	17	0.035	1.3	6.3	-	DCM Eq. 6-9
Channelized	134	3	0.022	2.8	0.8	-	V-Ditch
				t_c	**19.6**	**min.**	

Rainfall Intensity & Runoff

	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
Intensity (in/hr)	2.5	3.1	3.6	4.2	4.7	5.2
Runoff (cfs)	1.4	**3.5**	6.4	11.2	14.8	**18.9**
Release Rates (cfs/ac)	-	-	-	-	-	-
Allowed Release (cfs)	1.4	**3.5**	6.4	11.2	14.8	**18.9**

DCM: I = C1 * ln (tc) + C2

C1	1.19	1.5	1.75	2	2.25	2.52
C2	6.035	7.583	8.847	10.111	11.375	12.735

Notes

Sub-Basin EX-A3 Runoff Calculations

Job No.:	**61174**	Date:	**04/26/2023 17:32**
Project:	**Hill Subdivision Filing No.1**	Calcs by:	**JO**
		Checked by:	
Jurisdiction	**DCM**	Soil Type	**B**
Runoff Coefficient	**Surface Type**	Urbanization	**Non-Urban**

Basin Land Use Characteristics

	Area		Runoff Coefficient						%
Surface	**(SF)**	**(Acres)**	**C2**	**C5**	**C10**	**C25**	**C50**	**C100**	**Imperv.**
Pasture/Meadow	24,330	0.56	0.02	0.08	0.15	0.25	0.3	0.35	0%
Combined	**24,330**	**0.56**	**0.02**	**0.08**	**0.15**	**0.25**	**0.30**	**0.35**	**0.0%**
	24330								

Basin Travel Time

Shallow Channel Ground Cover: Short Pasture/Lawns

$L_{max,Overland}$: 100 ft C_v: 7

	L (ft)	ΔZ_0 (ft)	S_0 (ft/ft)	v (ft/s)	t (min)	t_{Alt} (min)	
Total	267	7	-	-	-	-	
Initial Time	100	2	0.024	-	13.8	N/A	DCM Eq. 6-8
Shallow Channel	167	5	0.028	1.2	2.4	-	DCM Eq. 6-9
Channelized			0.000	0.0	0.0	-	V-Ditch
				t_c	**16.2**	**min.**	

Rainfall Intensity & Runoff

	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
Intensity (in/hr)	2.7	3.4	4.0	4.5	5.1	5.7
Runoff (cfs)	0.0	**0.2**	0.3	0.6	0.9	**1.1**
Release Rates (cfs/ac)	-	-	-	-	-	-
Allowed Release (cfs)	0.0	**0.2**	0.3	0.6	0.9	**1.1**

DCM: I = C1 * ln (tc) + C2

C1	1.19	1.5	1.75	2	2.25	2.52
C2	6.035	7.583	8.847	10.111	11.375	12.735

Notes

Sub-Basin EX-A4 Runoff Calculations

Job No.:	**61174**	Date:	**04/26/2023 17:32**
Project:	**Hill Subdivision Filing No.1**	Calcs by:	**JO**
		Checked by:	
Jurisdiction	**DCM**	Soil Type	**B**
Runoff Coefficient	**Surface Type**	Urbanization	**Non-Urban**

Basin Land Use Characteristics

	Area		Runoff Coefficient						%
Surface	**(SF)**	**(Acres)**	**C2**	**C5**	**C10**	**C25**	**C50**	**C100**	**Imperv.**
Pasture/Meadow	44,296	1.02	0.02	0.08	0.15	0.25	0.3	0.35	0%
Combined	**44,296**	**1.02**	**0.02**	**0.08**	**0.15**	**0.25**	**0.30**	**0.35**	**0.0%**
	44296								

Basin Travel Time

Shallow Channel Ground Cover: Short Pasture/Lawns

$L_{max,Overland}$: 100 ft C_v: 7

	L (ft)	ΔZ_0 (ft)	S_0 (ft/ft)	v (ft/s)	t (min)	t_{Alt} (min)	
Total	229	6	-	-	-	-	
Initial Time	100	2	0.024	-	13.8	N/A	DCM Eq. 6-8
Shallow Channel	129	3	0.026	1.1	1.9	-	DCM Eq. 6-9
Channelized			0.000	0.0	0.0	-	V-Ditch
				t_c	**15.7**	**min.**	

Rainfall Intensity & Runoff

	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
Intensity (in/hr)	2.8	3.5	4.0	4.6	5.2	5.8
Runoff (cfs)	0.1	**0.3**	0.6	1.2	1.6	**2.1**
Release Rates (cfs/ac)	-	-	-	-	-	-
Allowed Release (cfs)	0.1	**0.3**	0.6	1.2	1.6	**2.1**

DCM: I = C1 * ln (tc) + C2

C1	1.19	1.5	1.75	2	2.25	2.52
C2	6.035	7.583	8.847	10.111	11.375	12.735

Notes

Sub-Basin EX-B1 Runoff Calculations

Job No.:	**61174**	Date:	**04/26/2023 17:32**
Project:	**Hill Subdivision Filing No.1**	Calcs by:	**JO**
		Checked by:	
Jurisdiction	**DCM**	Soil Type	**B**
Runoff Coefficient	**Surface Type**	Urbanization	**Non-Urban**

Basin Land Use Characteristics

	Area		Runoff Coefficient						%
Surface	**(SF)**	**(Acres)**	**C2**	**C5**	**C10**	**C25**	**C50**	**C100**	**Imperv.**
Pasture/Meadow	46,107	1.06	0.02	0.08	0.15	0.25	0.3	0.35	0%
Combined	**46,107**	**1.06**	**0.02**	**0.08**	**0.15**	**0.25**	**0.30**	**0.35**	**0.0%**
	46107								

Basin Travel Time

Shallow Channel Ground Cover: Short Pasture/Lawns

$L_{max,Overland}$: 100 ft C_v: 7

	L (ft)	ΔZ_0 (ft)	S_0 (ft/ft)	v (ft/s)	t (min)	t_{Alt} (min)	
Total	274	10	-	-	-	-	
Initial Time	100	2	0.025	-	13.7	N/A	DCM Eq. 6-8
Shallow Channel	174	7	0.042	1.4	2.0	-	DCM Eq. 6-9
Channelized			0.000	0.0	0.0	-	V-Ditch
				t_c	**15.7**	**min.**	

Rainfall Intensity & Runoff

	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
Intensity (in/hr)	2.8	3.5	4.0	4.6	5.2	5.8
Runoff (cfs)	0.1	**0.3**	0.6	1.2	1.6	**2.1**
Release Rates (cfs/ac)	-	-	-	-	-	-
Allowed Release (cfs)	0.1	**0.3**	0.6	1.2	1.6	**2.1**

DCM: I = C1 * ln (tc) + C2

C1	1.19	1.5	1.75	2	2.25	2.52
C2	6.035	7.583	8.847	10.111	11.375	12.735

Notes

Sub-Basin EX-B2 Runoff Calculations

Job No.:	**61174**	Date:	**04/26/2023 17:32**
Project:	**Hill Subdivision Filing No.1**	Calcs by:	**JO**
		Checked by:	
Jurisdiction	**DCM**	Soil Type	**B**
Runoff Coefficient	**Surface Type**	Urbanization	**Non-Urban**

Basin Land Use Characteristics

	Area		Runoff Coefficient						%
Surface	**(SF)**	**(Acres)**	**C2**	**C5**	**C10**	**C25**	**C50**	**C100**	**Imperv.**
Pasture/Meadow	39,129	0.90	0.02	0.08	0.15	0.25	0.3	0.35	0%
Combined	**39,129**	**0.90**	**0.02**	**0.08**	**0.15**	**0.25**	**0.30**	**0.35**	**0.0%**
	39129								

Basin Travel Time

Shallow Channel Ground Cover: Short Pasture/Lawns

$L_{max,Overland}$: 100 ft C_v: 7

	L (ft)	ΔZ_0 (ft)	S_0 (ft/ft)	v (ft/s)	t (min)	t_{Alt} (min)	
Total	327	19	-	-	-	-	
Initial Time	100	5	0.054	-	10.6	N/A	DCM Eq. 6-8
Shallow Channel	60	5	0.077	1.9	0.5	-	DCM Eq. 6-9
Channelized	167	9	0.054	2.6	1.1	-	V-Ditch
				t_c	**12.2 min.**		

Rainfall Intensity & Runoff

	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
Intensity (in/hr)	3.1	3.8	4.5	5.1	5.8	6.4
Runoff (cfs)	0.1	**0.3**	0.6	1.1	1.5	**2.0**
Release Rates (cfs/ac)	-	-	-	-	-	-
Allowed Release (cfs)	0.1	**0.3**	0.6	1.1	1.5	**2.0**

DCM: I = C1 * ln (tc) + C2

C1	1.19	1.5	1.75	2	2.25	2.52
C2	6.035	7.583	8.847	10.111	11.375	12.735

Notes

Sub-Basin EX-C Runoff Calculations

Job No.:	**61174**	Date:	**04/26/2023 17:32**
Project:	**Hill Subdivision Filing No.1**	Calcs by:	**JO**
		Checked by:	
Jurisdiction	**DCM**	Soil Type	**B**
Runoff Coefficient	**Surface Type**	Urbanization	**Non-Urban**

Basin Land Use Characteristics

	Area		Runoff Coefficient						%
Surface	**(SF)**	**(Acres)**	**C2**	**C5**	**C10**	**C25**	**C50**	**C100**	**Imperv.**
Pasture/Meadow	62,162	1.43	0.02	0.08	0.15	0.25	0.3	0.35	0%
Paved	3,747	0.09	0.89	0.9	0.92	0.94	0.95	0.96	100%
Combined	**65,910**	**1.51**	**0.07**	**0.13**	**0.19**	**0.29**	**0.34**	**0.38**	**5.7%**
	65910								

Basin Travel Time

Shallow Channel Ground Cover: Short Pasture/Lawns

$L_{max,Overland}$: 100 ft C_v: 7

	L (ft)	ΔZ_0 (ft)	S_0 (ft/ft)	v (ft/s)	t (min)	t_{Alt} (min)	
Total	237	11	-	-	-	-	
Initial Time	109	4	0.037	-	11.9	N/A	DCM Eq. 6-8
Shallow Channel	127	7	0.055	1.6	1.3	-	DCM Eq. 6-9
Channelized			0.000	0.0	0.0	-	V-Ditch
				t_c	**13.2**	**min.**	

Rainfall Intensity & Runoff

	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
Intensity (in/hr)	3.0	3.7	4.3	4.9	5.6	6.2
Runoff (cfs)	0.3	**0.7**	1.3	2.2	2.8	**3.6**
Release Rates (cfs/ac)	-	-	-	-	-	-
Allowed Release (cfs)	0.3	**0.7**	1.3	2.2	2.8	**3.6**

DCM: I = C1 * ln (tc) + C2

C1	1.19	1.5	1.75	2	2.25	2.52
C2	6.035	7.583	8.847	10.111	11.375	12.735

Notes

Combined Existing Sub-Basin Runoff Calculations (EX-DP1)

Includes Basins OS-A1 OS-A5 EX-A2

Job No.:	**61174**	Date:	**04/26/2023 17:32**
Project:	**Hill Subdivision Filing No.1**	Calcs by:	**JO**
		Checked by:	
Jurisdiction	**DCM**	Soil Type	**B**
Runoff Coefficient	**Surface Type**	Urbanization	**Non-Urban**

Basin Land Use Characteristics

	Area		Runoff Coefficient						%
Surface	**(SF)**	**(Acres)**	**C2**	**C5**	**C10**	**C25**	**C50**	**C100**	**Imperv.**
Pasture/Meadow	514,380	11.81	0.02	0.08	0.15	0.25	0.3	0.35	0%
Paved	16,062	0.37	0.89	0.9	0.92	0.94	0.95	0.96	100%
Roofs	10,110	0.23	0.71	0.73	0.75	0.78	0.8	0.81	90%
Gravel	11,248	0.26	0.57	0.59	0.63	0.66	0.68	0.7	80%
Landscaping	142	0.00	0.03	0.09	0.17	0.26	0.31	0.36	2%
Combined	**551,941**	**12.67**	**0.07**	**0.13**	**0.19**	**0.29**	**0.34**	**0.38**	**6.2%**

Basin Travel Time

	Sub-basin or Channel Type	Material Type	L (ft)	Elev. ΔZ_0 (ft)	Q_i (cfs)	Base or Dia (ft)	Sides z:1 (ft/ft)	v (ft/s)	t (min)
Furthest Reach	OS-A1	-	386	10	-	-	-	-	17.6
Channelized-1	V-Ditch	2	643	21	6	0	10	2.4	4.4
Channelized-2									
Channelized-3									
Total			1,029	31					

2 = Natural, Winding, minimal vegetation/shallow grass

t_c (min) **22.0**

Contributing Offsite Flows (Added to Runoff and Allowed Release, below.)

Contributing Basins/Areas

Q_{Minor} (cfs) - 5-year Storm

Q_{Major} (cfs) - 100-year Storm

Rainfall Intensity & Runoff

	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
Intensity (in/hr)	2.4	2.9	3.4	3.9	4.4	4.9
Site Runoff (cfs)	2.1	**4.7**	8.4	14.4	18.8	**24.0**
Release Rates (cfs/ac)	-	-	-	-	-	-
Allowed Release (cfs)	-	**4.7**	-	-	-	**24.0**
DCM: I = C1 * ln (tc) + C2						
C1	1.19	1.5	1.75	2	2.25	2.52
C2	6.035	7.583	8.847	10.111	11.375	12.735

Notes

Runoff from Offsite basins have been assumed constant, despite additional times of concentration.

Combined Proposed Sub-Basin Runoff Calculations (EX-DP2)

Includes Basins OS-C EX-C

Job No.:	**61174**	Date:	**04/26/2023 17:32**
Project:	**Hill Subdivision Filing No.1**	Calcs by:	**JO**
		Checked by:	
Jurisdiction	**DCM**	Soil Type	**B**
Runoff Coefficient	**Surface Type**	Urbanization	**Non-Urban**

Basin Land Use Characteristics

	Area		Runoff Coefficient						%
Surface	**(SF)**	**(Acres)**	**C2**	**C5**	**C10**	**C25**	**C50**	**C100**	**Imperv.**
Pasture/Meadow	212,094	4.87	0.02	0.08	0.15	0.25	0.3	0.35	0%
Paved	13,447	0.31	0.89	0.9	0.92	0.94	0.95	0.96	100%
Combined	**225,542**	**5.18**	**0.07**	**0.13**	**0.20**	**0.29**	**0.34**	**0.39**	**6.0%**

Basin Travel Time

	Sub-basin or Channel Type	Material Type	L (ft)	Elev. ΔZ_0 (ft)	Q_i (cfs)	Base or Dia (ft)	Sides z:1 (ft/ft)	v (ft/s)	t (min)
Furthest Reach	EX-C	-	237	11	-	-	-	-	13.2
Channelized-1	V-Ditch	2	303	18	4	0	10	2.6	1.9
Channelized-2									
Channelized-3									
Total			540	29					

2 = Natural, Winding, minimal vegetation/shallow grass

t_c (min) **15.2**

Contributing Offsite Flows (Added to Runoff and Allowed Release, below.)

Contributing Basins/Areas

Q_{Minor} (cfs) - 5-year Storm

Q_{Major} (cfs) - 100-year Storm

Rainfall Intensity & Runoff

	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
Intensity (in/hr)	2.8	3.5	4.1	4.7	5.3	5.9
Site Runoff (cfs)	1.0	**2.3**	4.1	7.0	9.2	**11.8**
Release Rates (cfs/ac)	-	-	-	-	-	-
Allowed Release (cfs)	-	**2.3**	-	-	-	**11.8**
DCM: I = C1 * ln (tc) + C2						
C1	1.19	1.5	1.75	2	2.25	2.52
C2	6.035	7.583	8.847	10.111	11.375	12.735

Notes

Runoff from Offsite basins have been assumed constant, despite additional times of concentration.

Sub-Basin A2 Runoff Calculations

Job No.:	**61174**	Date:	**04/26/2023 17:32**
Project:	**Hill Subdivision Filing No.1**	Calcs by:	**JO**
		Checked by:	
Jurisdiction	**DCM**	Soil Type	**B**
Runoff Coefficient	**Surface Type**	Urbanization	**Non-Urban**

Basin Land Use Characteristics

	Area		Runoff Coefficient						%
Surface	**(SF)**	**(Acres)**	**C2**	**C5**	**C10**	**C25**	**C50**	**C100**	**Imperv.**
Pasture/Meadow	381,331	8.75	0.02	0.08	0.15	0.25	0.3	0.35	0%
Paved	12,651	0.29	0.89	0.9	0.92	0.94	0.95	0.96	100%
Roofs	12,815	0.29	0.71	0.73	0.75	0.78	0.8	0.81	90%
Gravel	13,150	0.30	0.57	0.59	0.63	0.66	0.68	0.7	80%
Combined	**419,947**	**9.64**	**0.08**	**0.14**	**0.21**	**0.30**	**0.35**	**0.39**	**8.3%**
	419947								

Basin Travel Time

Shallow Channel Ground Cover: Short Pasture/Lawns

$L_{max,Overland}$: 100 ft C_v: 7

	L (ft)	ΔZ_0 (ft)	S_0 (ft/ft)	v (ft/s)	t (min)	t_{Alt} (min)	
Total	726	23	-	-	-	-	
Initial Time	100	3	0.029	-	12.2	N/A	DCM Eq. 6-8
Shallow Channel	492	17	0.035	1.3	6.3	-	DCM Eq. 6-9
Channelized	134	3	0.022	2.8	0.8	-	V-Ditch
				t_c	**19.3**	**min.**	

Rainfall Intensity & Runoff

	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
Intensity (in/hr)	2.5	3.1	3.7	4.2	4.7	5.3
Runoff (cfs)	2.0	**4.3**	7.3	12.1	15.8	**20.0**
Release Rates (cfs/ac)	-	-	-	-	-	-
Allowed Release (cfs)	2.0	**4.3**	7.3	12.1	15.8	**20.0**
DCM: I = C1 * ln (tc) + C2						
C1	1.19	1.5	1.75	2	2.25	2.52
C2	6.035	7.583	8.847	10.111	11.375	12.735

Notes

Sub-Basin A3 Runoff Calculations

Job No.:	**61174**	Date:	**04/26/2023 17:32**
Project:	**Hill Subdivision Filing No.1**	Calcs by:	**JO**
		Checked by:	
Jurisdiction	**DCM**	Soil Type	**B**
Runoff Coefficient	**Surface Type**	Urbanization	**Non-Urban**

Basin Land Use Characteristics

	Area		Runoff Coefficient						%
Surface	**(SF)**	**(Acres)**	**C2**	**C5**	**C10**	**C25**	**C50**	**C100**	**Imperv.**
Pasture/Meadow	24,330	0.56	0.02	0.08	0.15	0.25	0.3	0.35	0%
Combined	**24,330**	**0.56**	**0.02**	**0.08**	**0.15**	**0.25**	**0.30**	**0.35**	**0.0%**
	24330								

Basin Travel Time

Shallow Channel Ground Cover: Short Pasture/Lawns

$L_{max,Overland}$: 100 ft C_v: 7

	L (ft)	ΔZ_0 (ft)	S_0 (ft/ft)	v (ft/s)	t (min)	t_{Alt} (min)	
Total	267	7	-	-	-	-	
Initial Time	100	2	0.024	-	13.8	N/A	DCM Eq. 6-8
Shallow Channel	167	5	0.028	1.2	2.4	-	DCM Eq. 6-9
Channelized			0.000	0.0	0.0	-	V-Ditch
				t_c	**16.2**	**min.**	

Rainfall Intensity & Runoff

	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
Intensity (in/hr)	2.7	3.4	4.0	4.5	5.1	5.7
Runoff (cfs)	0.0	**0.2**	0.3	0.6	0.9	**1.1**
Release Rates (cfs/ac)	-	-	-	-	-	-
Allowed Release (cfs)	0.0	**0.2**	0.3	0.6	0.9	**1.1**

DCM: I = C1 * ln (tc) + C2

C1	1.19	1.5	1.75	2	2.25	2.52
C2	6.035	7.583	8.847	10.111	11.375	12.735

Notes

Sub-Basin A4 Runoff Calculations

Job No.:	**61174**	Date:	**04/26/2023 17:32**
Project:	**Hill Subdivision Filing No.1**	Calcs by:	**JO**
		Checked by:	
Jurisdiction	**DCM**	Soil Type	**B**
Runoff Coefficient	**Surface Type**	Urbanization	**Non-Urban**

Basin Land Use Characteristics

	Area		Runoff Coefficient						%
Surface	**(SF)**	**(Acres)**	**C2**	**C5**	**C10**	**C25**	**C50**	**C100**	**Imperv.**
Pasture/Meadow	44,296	1.02	0.02	0.08	0.15	0.25	0.3	0.35	0%
Combined	**44,296**	**1.02**	**0.02**	**0.08**	**0.15**	**0.25**	**0.30**	**0.35**	**0.0%**
	44296								

Basin Travel Time

Shallow Channel Ground Cover: Short Pasture/Lawns

$L_{max,Overland}$: 100 ft C_v: 7

	L (ft)	ΔZ_0 (ft)	S_0 (ft/ft)	v (ft/s)	t (min)	t_{Alt} (min)	
Total	229	6	-	-	-	-	
Initial Time	100	2	0.024	-	13.8	N/A	DCM Eq. 6-8
Shallow Channel	129	3	0.026	1.1	1.9	-	DCM Eq. 6-9
Channelized			0.000	0.0	0.0	-	V-Ditch
				t_c	**15.7**	**min.**	

Rainfall Intensity & Runoff

	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
Intensity (in/hr)	2.8	3.5	4.0	4.6	5.2	5.8
Runoff (cfs)	0.1	**0.3**	0.6	1.2	1.6	**2.1**
Release Rates (cfs/ac)	-	-	-	-	-	-
Allowed Release (cfs)	0.1	**0.3**	0.6	1.2	1.6	**2.1**

DCM: I = C1 * ln (tc) + C2

C1	1.19	1.5	1.75	2	2.25	2.52
C2	6.035	7.583	8.847	10.111	11.375	12.735

Notes

Sub-Basin B1 Runoff Calculations

Job No.:	**61174**	Date:	**04/26/2023 17:32**
Project:	**Hill Subdivision Filing No.1**	Calcs by:	**JO**
		Checked by:	
Jurisdiction	**DCM**	Soil Type	**B**
Runoff Coefficient	**Surface Type**	Urbanization	**Non-Urban**

Basin Land Use Characteristics

	Area		Runoff Coefficient						%
Surface	**(SF)**	**(Acres)**	**C2**	**C5**	**C10**	**C25**	**C50**	**C100**	**Imperv.**
Pasture/Meadow	40,107	0.92	0.02	0.08	0.15	0.25	0.3	0.35	0%
Paved	1,000	0.02	0.89	0.9	0.92	0.94	0.95	0.96	100%
Roofs	5,000	0.11	0.71	0.73	0.75	0.78	0.8	0.81	90%
Combined	**46,107**	**1.06**	**0.11**	**0.17**	**0.23**	**0.32**	**0.37**	**0.41**	**11.9%**
	46107								

Basin Travel Time

Shallow Channel Ground Cover: Short Pasture/Lawns

$L_{max,Overland}$: 100 ft C_v: 7

	L (ft)	ΔZ_0 (ft)	S_0 (ft/ft)	v (ft/s)	t (min)	t_{Alt} (min)	
Total	274	10	-	-	-	-	
Initial Time	100	2	0.025	-	12.5	N/A	DCM Eq. 6-8
Shallow Channel	174	7	0.042	1.4	2.0	-	DCM Eq. 6-9
Channelized			0.000	0.0	0.0	-	V-Ditch
				t_c	**14.5**	**min.**	

Rainfall Intensity & Runoff

	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
Intensity (in/hr)	2.9	3.6	4.2	4.8	5.4	6.0
Runoff (cfs)	0.3	**0.6**	1.0	1.6	2.1	**2.6**
Release Rates (cfs/ac)	-	-	-	-	-	-
Allowed Release (cfs)	0.3	**0.6**	1.0	1.6	2.1	**2.6**
DCM: I = C1 * ln (tc) + C2						
C1	1.19	1.5	1.75	2	2.25	2.52
C2	6.035	7.583	8.847	10.111	11.375	12.735

Notes

Sub-Basin B2 Runoff Calculations

Job No.:	**61174**	Date:	**04/26/2023 17:32**
Project:	**Hill Subdivision Filing No.1**	Calcs by:	**JO**
		Checked by:	
Jurisdiction	**DCM**	Soil Type	**B**
Runoff Coefficient	**Surface Type**	Urbanization	**Non-Urban**

Basin Land Use Characteristics

	Area		Runoff Coefficient						%
Surface	**(SF)**	**(Acres)**	**C2**	**C5**	**C10**	**C25**	**C50**	**C100**	**Imperv.**
Pasture/Meadow	36,729	0.84	0.02	0.08	0.15	0.25	0.3	0.35	0%
Gravel	2,400	0.06	0.57	0.59	0.63	0.66	0.68	0.7	80%
Combined	**39,129**	**0.90**	**0.05**	**0.11**	**0.18**	**0.28**	**0.32**	**0.37**	**4.9%**
	39129								

Basin Travel Time

Shallow Channel Ground Cover: Short Pasture/Lawns

$L_{max,Overland}$: 100 ft C_v: 7

	L (ft)	ΔZ_0 (ft)	S_0 (ft/ft)	v (ft/s)	t (min)	t_{Alt} (min)	
Total	327	19	-	-	-	-	
Initial Time	100	5	0.054	-	10.3	N/A	DCM Eq. 6-8
Shallow Channel	60	5	0.077	1.9	0.5	-	DCM Eq. 6-9
Channelized	167	9	0.054	2.6	1.1	-	V-Ditch
				t_c	**11.8**	**min.**	

Rainfall Intensity & Runoff

	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
Intensity (in/hr)	3.1	3.9	4.5	5.2	5.8	6.5
Runoff (cfs)	0.1	**0.4**	0.7	1.3	1.7	**2.2**
Release Rates (cfs/ac)	-	-	-	-	-	-
Allowed Release (cfs)	0.1	**0.4**	0.7	1.3	1.7	**2.2**
DCM: I = C1 * ln (tc) + C2						
C1	1.19	1.5	1.75	2	2.25	2.52
C2	6.035	7.583	8.847	10.111	11.375	12.735

Notes

Sub-Basin C Runoff Calculations

Job No.:	**61174**	Date:	**04/26/2023 17:32**
Project:	**Hill Subdivision Filing No.1**	Calcs by:	**JO**
		Checked by:	
Jurisdiction	**DCM**	Soil Type	**B**
Runoff Coefficient	**Surface Type**	Urbanization	**Non-Urban**

Basin Land Use Characteristics

	Area		Runoff Coefficient						%
Surface	**(SF)**	**(Acres)**	**C2**	**C5**	**C10**	**C25**	**C50**	**C100**	**Imperv.**
Pasture/Meadow	62,162	1.43	0.02	0.08	0.15	0.25	0.3	0.35	0%
Paved	3,747	0.09	0.89	0.9	0.92	0.94	0.95	0.96	100%
Combined	**65,910**	**1.51**	**0.07**	**0.13**	**0.19**	**0.29**	**0.34**	**0.38**	**5.7%**
	65910								

Basin Travel Time

Shallow Channel Ground Cover: Short Pasture/Lawns

$L_{max,Overland}$: 100 ft C_v: 7

	L (ft)	ΔZ_0 (ft)	S_0 (ft/ft)	v (ft/s)	t (min)	t_{Alt} (min)	
Total	237	11	-	-	-	-	
Initial Time	109	4	0.037	-	11.9	N/A	DCM Eq. 6-8
Shallow Channel	127	7	0.055	1.6	1.3	-	DCM Eq. 6-9
Channelized			0.000	0.0	0.0	-	V-Ditch
				t_c	**13.2**	**min.**	

Rainfall Intensity & Runoff

	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
Intensity (in/hr)	3.0	3.7	4.3	4.9	5.6	6.2
Runoff (cfs)	0.3	**0.7**	1.3	2.2	2.8	**3.6**
Release Rates (cfs/ac)	-	-	-	-	-	-
Allowed Release (cfs)	0.3	**0.7**	1.3	2.2	2.8	**3.6**

DCM: I = C1 * ln (tc) + C2

C1	1.19	1.5	1.75	2	2.25	2.52
C2	6.035	7.583	8.847	10.111	11.375	12.735

Notes

Combined Proposed Sub-Basin Runoff Calculations (DP1)

Includes Basins OS-A1 OS-A5 A2

Job No.:	**61174**	Date:	**04/26/2023 17:32**
Project:	**Hill Subdivision Filing No.1**	Calcs by:	**JO**
		Checked by:	
Jurisdiction	**DCM**	Soil Type	**B**
Runoff Coefficient	**Surface Type**	Urbanization	**Non-Urban**

Basin Land Use Characteristics

	Area		Runoff Coefficient						%
Surface	**(SF)**	**(Acres)**	**C2**	**C5**	**C10**	**C25**	**C50**	**C100**	**Imperv.**
Pasture/Meadow	495,230	11.37	0.02	0.08	0.15	0.25	0.3	0.35	0%
Paved	17,062	0.39	0.89	0.9	0.92	0.94	0.95	0.96	100%
Roofs	15,110	0.35	0.71	0.73	0.75	0.78	0.8	0.81	90%
Gravel	24,398	0.56	0.57	0.59	0.63	0.66	0.68	0.7	80%
Landscaping	142	0.00	0.03	0.09	0.17	0.26	0.31	0.36	2%
Combined	**551,941**	**12.67**	**0.09**	**0.15**	**0.21**	**0.30**	**0.35**	**0.40**	**9.1%**

Basin Travel Time

	Sub-basin or Channel Type	Material Type	L (ft)	Elev. ΔZ_0 (ft)	Q_i (cfs)	Base or Dia (ft)	Sides z:1 (ft/ft)	v (ft/s)	t (min)
Furthest Reach	OS-A1	-	386	10	-	-	-	-	17.6
Channelized-1	V-Ditch	2	643	21	6	0	10	2.4	4.4
Channelized-2									
Channelized-3									
Total			1,029	31					

2 = Natural, Winding, minimal vegetation/shallow grass

t_c (min) **22.0**

Contributing Offsite Flows (Added to Runoff and Allowed Release, below.)

Contributing Basins/Areas

Q_{Minor} (cfs) - 5-year Storm

Q_{Major} (cfs) - 100-year Storm

Rainfall Intensity & Runoff

	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
Intensity (in/hr)	2.4	2.9	3.4	3.9	4.4	4.9
Site Runoff (cfs)	2.7	**5.4**	9.2	15.1	19.6	**24.9**
Release Rates (cfs/ac)	-	-	-	-	-	-
Allowed Release (cfs)	-	**5.4**	-	-	-	**24.9**
DCM: I = C1 * ln (tc) + C2						
C1	1.19	1.5	1.75	2	2.25	2.52
C2	6.035	7.583	8.847	10.111	11.375	12.735

Notes

Runoff from Offsite basins have been assumed constant, despite additional times of concentration.

Combined Proposed Sub-Basin Runoff Calculations (DP2)

Includes Basins OS-C C

Job No.:	**61174**	Date:	**04/26/2023 17:32**
Project:	**Hill Subdivision Filing No.1**	Calcs by:	**JO**
		Checked by:	
Jurisdiction	**DCM**	Soil Type	**B**
Runoff Coefficient	**Surface Type**	Urbanization	**Non-Urban**

Basin Land Use Characteristics

	Area		Runoff Coefficient						%
Surface	**(SF)**	**(Acres)**	**C2**	**C5**	**C10**	**C25**	**C50**	**C100**	**Imperv.**
Pasture/Meadow	212,094	4.87	0.02	0.08	0.15	0.25	0.3	0.35	0%
Paved	13,447	0.31	0.89	0.9	0.92	0.94	0.95	0.96	100%
Combined	**225,542**	**5.18**	**0.07**	**0.13**	**0.20**	**0.29**	**0.34**	**0.39**	**6.0%**

Basin Travel Time

	Sub-basin or Channel Type	Material Type	L (ft)	Elev. ΔZ_0 (ft)	Q_i (cfs)	Base or Dia (ft)	Sides z:1 (ft/ft)	v (ft/s)	t (min)
Furthest Reach	EX-C	-	237	11	-	-	-	-	13.2
Channelized-1	V-Ditch	2	303	18	4	0	10	2.6	1.9
Channelized-2									
Channelized-3									
Total			540	29					

2 = Natural, Winding, minimal vegetation/shallow grass

t_c (min) **15.2**

Contributing Offsite Flows (Added to Runoff and Allowed Release, below.)

Contributing Basins/Areas

Q_{Minor} (cfs) - 5-year Storm

Q_{Major} (cfs) - 100-year Storm

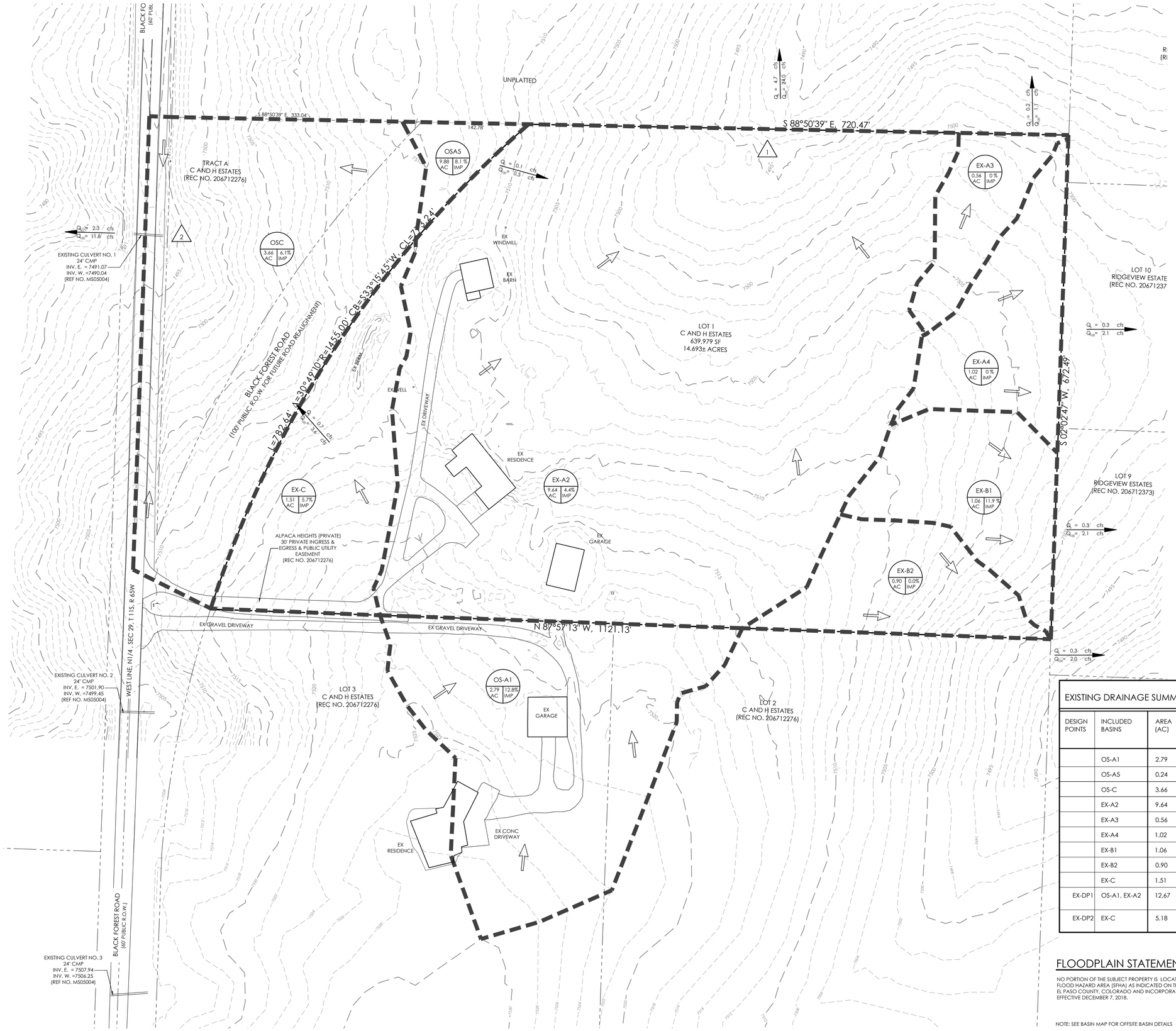
Rainfall Intensity & Runoff

	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
Intensity (in/hr)	2.8	3.5	4.1	4.7	5.3	5.9
Site Runoff (cfs)	1.0	**2.3**	4.1	7.0	9.2	**11.8**
Release Rates (cfs/ac)	-	-	-	-	-	-
Allowed Release (cfs)	-	**2.3**	-	-	-	**11.8**
DCM: I = C1 * ln (tc) + C2						
C1	1.19	1.5	1.75	2	2.25	2.52
C2	6.035	7.583	8.847	10.111	11.375	12.735

Notes

Runoff from Offsite basins have been assumed constant, despite additional times of concentration.

3 Drainage Maps



LEGEND

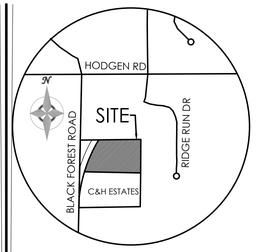
- PROPERTY LINE
- EASEMENT LINE
- LOT LINE

EXISTING

- 5985 — INDEX CONTOUR
- 84 — INTERMEDIATE CONTOUR

PROPOSED

- 5985 — INDEX CONTOUR
- 84 — INTERMEDIATE CONTOUR
- BASIN BOUNDARY
- Q = 19.0 cfs, Q100 = 60.0 cfs — GENERAL FLOW/DIRECTION
- A1: 1.0 AC, 50% IMP — SLOPE DIRECTION AND GRADE
- BASIN LABEL: AREA IN ACRES, PERCENT IMPERVIOUS
- 1 — DESIGN POINT
- T_C — TIME OF CONCENTRATION



BENCHMARK

10 0 20 60 120

1" = 60' 1:720

EXISTING DRAINAGE SUMMARY TABLE

DESIGN POINTS	INCLUDED BASINS	AREA (AC)	Tc (MIN.)	RUNOFF Q5 (CFS)	RUNOFF Q100 (CFS)	METHOD
	OS-A1	2.79	17.6	1.6	6.3	RATIONAL
	OS-A5	0.24	12.6	0.1	0.5	RATIONAL
	OS-C	3.66	15.1	1.7	8.4	RATIONAL
	EX-A2	9.64	19.6	3.5	18.9	RATIONAL
	EX-A3	0.56	16.2	0.2	1.1	RATIONAL
	EX-A4	1.02	15.7	0.3	2.1	RATIONAL
	EX-B1	1.06	15.7	0.3	2.1	RATIONAL
	EX-B2	0.90	12.2	0.3	2.0	RATIONAL
	EX-C	1.51	13.2	0.7	3.6	RATIONAL
EX-DP1	OS-A1, EX-A2	12.67	22.0	4.7	24.0	RATIONAL
EX-DP2	EX-C	5.18	15.1	2.3	11.8	RATIONAL

FLOODPLAIN STATEMENT

NO PORTION OF THE SUBJECT PROPERTY IS LOCATED WITHIN A FEMA DESIGNATED SPECIAL FLOOD HAZARD AREA (SFHA) AS INDICATED ON THE FLOOD INSURANCE RATE MAPS (FIRM) FOR EL PASO COUNTY, COLORADO AND INCORPORATED AREAS - MAP NUMBERS 08041C0305G, EFFECTIVE DECEMBER 7, 2018.

NOTE: SEE BASIN MAP FOR OFFSITE BASIN DETAILS

MVE, INC.
ENGINEERS / SURVEYORS
1903 lelaray street, suite 200 colorado springs co 80909 719.635.5736

REVISIONS

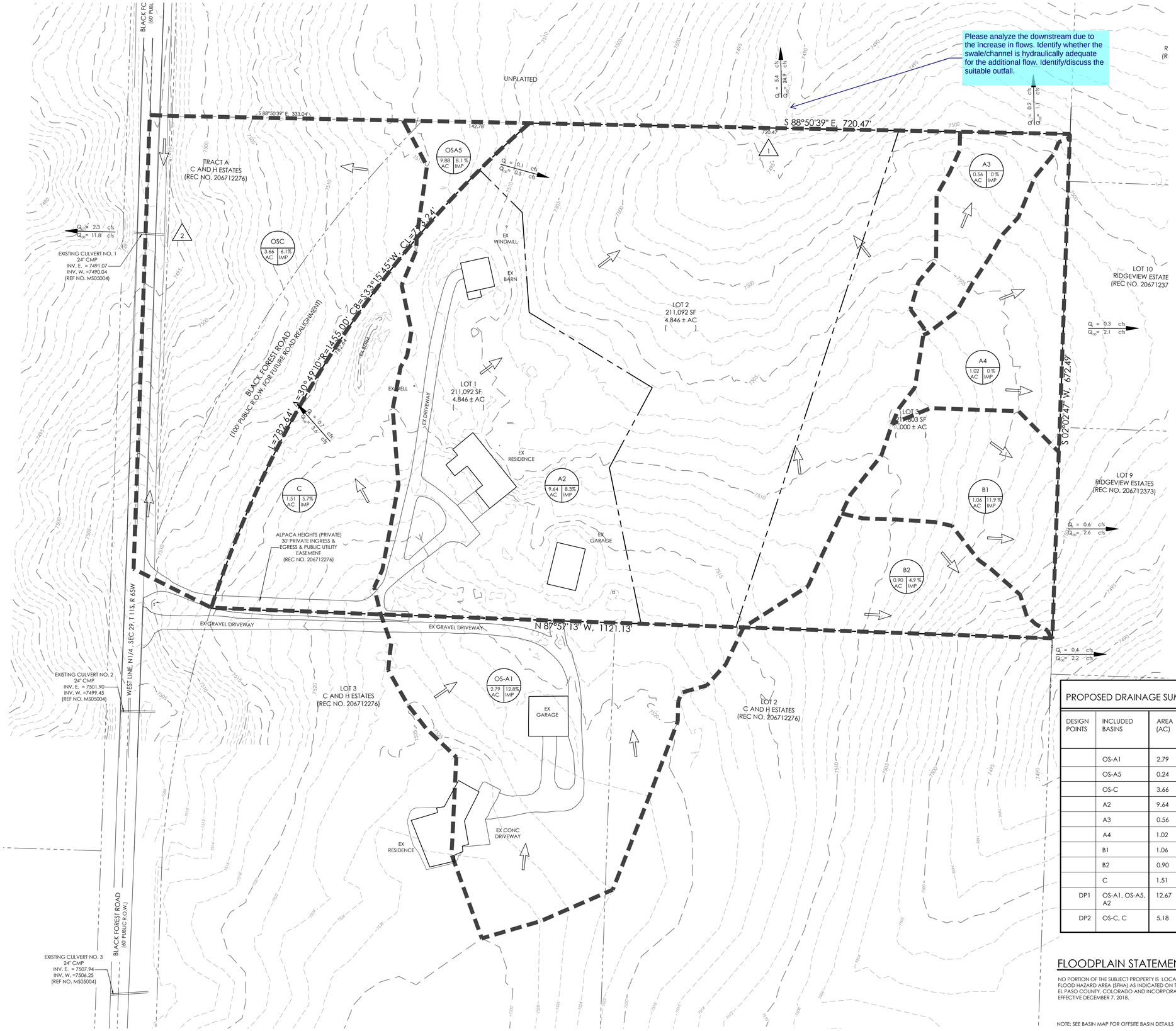
DESIGNED BY
DRAWN BY
CHECKED BY
AS-BUILTS BY
CHECKED BY

HILL SUBDIVISION NO. 1

EXISTING DRAINAGE MAP

MVE PROJECT **61174**
MVE DRAWING **EX-DRN**

APRIL 26, 2023
SHEET 1 OF 1



LEGEND

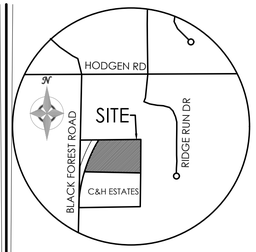
- PROPERTY LINE
- EASEMENT LINE
- LOT LINE

EXISTING

- 5985 — INDEX CONTOUR
- 84 — INTERMEDIATE CONTOUR

PROPOSED

- 5985 — INDEX CONTOUR
- 84 — INTERMEDIATE CONTOUR
- BASIN BOUNDARY
- Q = 19.0 cfs, Q100 = 60.0 cfs — GENERAL FLOW/DIRECTION
- SLOPE DIRECTION AND GRADE
- A1: 1.0 AC, 50% IMP — BASIN LABEL: AREA IN ACRES, PERCENT IMPERVIOUS
- 1 — DESIGN POINT
- T_C — TIME OF CONCENTRATION



BENCHMARK

N

10 0 20 60 120

1" = 60' 1:720

PROPOSED DRAINAGE SUMMARY TABLE

DESIGN POINTS	INCLUDED BASINS	AREA (AC)	Tc (MIN.)	RUNOFF Q5 (CFS)	RUNOFF Q100 (CFS)	METHOD
	OS-A1	2.79	17.6	1.6	6.3	RATIONAL
	OS-A5	0.24	12.6	0.1	0.5	RATIONAL
	OS-C	3.66	15.1	1.7	8.4	RATIONAL
	A2	9.64	19.3	4.3	20.0	RATIONAL
	A3	0.56	16.2	0.2	1.1	RATIONAL
	A4	1.02	15.7	0.3	2.1	RATIONAL
	B1	1.06	14.5	0.6	2.6	RATIONAL
	B2	0.90	11.8	0.4	2.2	RATIONAL
	C	1.51	13.2	0.7	3.6	RATIONAL
DP1	OS-A1, OS-A5, A2	12.67	22.0	5.4	24.9	RATIONAL
DP2	OS-C, C	5.18	15.2	2.3	11.8	RATIONAL

FLOODPLAIN STATEMENT

NO PORTION OF THE SUBJECT PROPERTY IS LOCATED WITHIN A FEMA DESIGNATED SPECIAL FLOOD HAZARD AREA (SFHA) AS INDICATED ON THE FLOOD INSURANCE RATE MAPS (FIRM) FOR EL PASO COUNTY, COLORADO AND INCORPORATED AREAS - MAP NUMBERS 08041C0305G, EFFECTIVE DECEMBER 7, 2018.

NOTE: SEE BASIN MAP FOR OFFSITE BASIN DETAILS

MVE, INC. ENGINEERS / SURVEYORS
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REVISIONS

DESIGNED BY
DRAWN BY
CHECKED BY
AS-BUILTS BY
CHECKED BY

HILL SUBDIVISION NO. 1

PROPOSED DRAINAGE MAP

MVE PROJECT **61174**
MVE DRAWING **PP-DRN**

APRIL 26, 2023
SHEET 1 OF 1