EPC STORMWATER REVIEW COMMENTS
IN ORANGE BOXES WITH BLACK TEXT

PRELIMINARY DRAINAGE REPORT
FOR
MAYBERRY APARTMENTS & TOWNHOMES
A PORTION OF MAYBERRY,
COLORADO SPRINGS FILING NO. 1A
EL PASO COUNTY, COLORADO

Prepared for:

Mayberry Communities, LLC
3296 Divine Heights, #207
Colorado Springs, CO 80922

Prepared by:

R&R Engineers-Surveyors

1635 W. 13th Ave., Suite 310
Denver, CO 80204
Contact: Clif Dayton, P.E.
Phone: 303-753-6730
MC22068

March 21, 2023

Add PCD File No.
PUDSP233

Signature Page

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

SIGNATURE (Affix Seal): ________________________________
Clif Dayton, P.E.
Colorado P.E. No. 48189 Date

Developer's Statement:

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

By:

____

John Mick Date
Mayberry Communities, LLC
3296 Divine Heights, #207, Colorado Springs, CO 80922

El Paso County's Statement

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

____

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

Conditions:

TABLE OF CONTENTS

1 General Location and Description

1.1 Site Location

The proposed Mayberry Apartments & Townhomes project (hereafter, the Site) is located within a portion of Mayberry, Colorado Springs, Filing No. 1A, in the Northwest corner of Section 14, Township 14 South, Range 63 West of the 6th P.M., El Paso County, Colorado (see Vicinity Map in Appendix A). The Site is located at the Southeast corner of New Log Road and State Highway 94 and is approximately 8.31 acres in size.

The Site is bounded to the north by State Highway 94 and to the west, south, and east by Mayberry Filing No. 1 (residential).

1.2 Description of Property

The total area of the property is 8.31 acres, with a majority of the site being disturbed as a part of this development. The proposed development includes the construction of four apartment buildings, each having 27 units, 38 townhomes, a clubhouse, parking lot, drive aisles, and associated utilities.

The existing terrain of the Site generally slopes from the northwest to southeast at grades ranging from 1%-25%. The existing Site ground coverage consists of native grasses, brush, and vegetation where the site has not already been cleared due to the overlot grading being done as part of the overall development. Under existing conditions, the Site's stormwater runoff surface flows east to an existing 24" flared end section located at the southeast corner of the site and onto the adjacent street located east of the site.

The Soil Survey of El Paso County Area, Colorado, prepared by the U.S. Department of Agriculture Soil Conservation Service, shows the site is underlain by Blakeland loamy sand, 1 to 9 percent slopes, and Truckton-Bresser complex, eroded – both included in Hydrologic Soil Group A. The NRCS Soils Survey Report for this site is included in Appendix A.

The drainage for this site was analyzed as part of the master drainage study for the Mayberry Phase 1 PUD, titled "Preliminary Drainage Report Amendment for Mayberry, Colorado Springs – Phase 1 PUD" prepared by JPS Engineering, dated May 5, 2021, revised February 15, 2022. This report will be used for drainage conformance purposes.

There are no existing irrigation facilities or canals on the Site.

The current zoning is PUD.

2 Drainage Basins and Sub-Basins

2.1 Major Basin Descriptions

Existing available drainage studies that impact the site are:

- "Final Drainage Report for Mayberry, Colorado Springs – Filing No. 1A Replat" prepared by JPS Engineering, dated November 19, 2021, revised April 8, 2022, and El Paso County approved June 27, 2022.

- Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM), El Paso County, Colorado and Incorporated Areas, Panel 810 of 1300, Map No. 08041C0810G (December 2018).

2.2 Sub-basin Description

Historically, on-site stormwater sheet flows northwest to southeast and is captured by the existing 24” flared end section, built as part of Mayberry Filing No. 1A that conveys flows to existing Detention Pond C1 (see Drainage maps from Mayberry Filing No. 1A Drainage report in Appendix C). This project area is encompassed by Mayberry Filing No. 1A drainage basins C1.1 and C1.2. Basin C1.1 contained a norther portion of Tract K, which ultimately gets captured by the existing 10’ Type R inlet at design point C1.1. Basin C1.2 contains majority of Tract K, which ultimately gets captured by the existing 24” flared end section at design point C1.2C. Both basins are tributary to the existing detention pond, Pond C1, which has been sized adequately to treat this site in the proposed conditions.

Under proposed conditions, the majority of runoff will sheet flow from the parking areas and be directed to a series of storm inlets. All stormwater captured within the proposed storm network will tie into the existing Mayberry Filing 1A storm network at the southeast corner of the site.

3 Drainage Design Criteria

3.1 Development Criteria Reference

The Site’s drainage analysis is performed in accordance with the current El Paso County Drainage Criteria Manual (DCM) and Mile High Flood District (MHFD) “Urban Storm Drainage Criteria Manual” (USDCM).

The drainage design for the Site is influenced by the following previous study: • “Final Drainage Report for Mayberry, Colorado Springs – Filing No. 1A Replat” prepared by JPS Engineering, dated November 19, 2021, revised April 8, 2022.

The proposed site corresponds to basins C1.1 (Design Point C1.1) & C1.2 (Design Point C1.2) from the JPS report. Majority of the project site falls within basin C1.2, which had an allowance of 16.88 cfs for the 5-year storm and 35.87 cfs for the 100-year storm as determined by JPS. See Appendix B for the approved Drainage Report supporting calculations.

3.2 Hydrologic Criteria

Calculations were performed to determine the existing and proposed runoff quantities for the 5-yr (minor storm) and 100-yr (major storm) 1-hour storm events for developed conditions using the Rational Method as required by El Paso County for basins containing less than 100 acres. Percent imperviousness and runoff coefficients for different land uses were calculated using Eq 5-2 of the DCM. Times of concentration (t_c) were calculated as described in Section 5.2.3 of the DCM. Rainfall intensity (i) was calculated using the IDF equations in Figure 5-1. Figures and equations used are included in Appendix B. Flows will ultimately be routed to the existing Detention Pond C1, that has been sized for this developed site accordingly.

4 Drainage Facility Design

4.1 Existing Drainage Conditions

The Site is located within the Mayberry Colorado Springs development and is currently undeveloped. This site is located within the basins designated as C1.1 and C1.2 in the Filing No. 1A approved Drainage Report. See existing drainage map done by JPS in Appendix C.

Basin C1.1 is a total of 9.38 acres, which of that total 1.2 acres was designated as commercial with s 5-year and 100-year composite runoff coefficient of 0.49 and 0.62 respectively (Q_5 = 5.43 cfs, Q_{100} = 18.04 cfs). This basin is ultimately captured by the existing 10’ Type R inlet at design point C1.1 along Cattlemen Run. The proposed basin, OS.1 contains 0.57 acres, with a weighted 5-year and 100-year runoff coefficient of 0.41 and 0.59, respectively. Proposed Basin OS.1 will ultimately be captured by the existing 10’ type R inlet, which will remain in compliance with the Filing 1A Drainage Report as the total area, flow, and runoff coefficients remain below the allowable values.

37?

Basin C1.2 is a total of 7.97 acres, all designated as commercial (Q_5 = 16.88 cfs, Q_{100} = 35.87 cfs). The proposed design point, number 35, represents all the combined stormwater tying into the existing Filing No. 1A storm network in Market Place Drive which has a 5-year and 100-year combined flow of 15.10 cfs and 31.65 cfs respectively, which remains below and in compliance with he Filing No. 1A drainage report.

4.2 Proposed On-Site Basins

Refer to the Proposed Drainage Map located in Appendix C for drainage basin locations and boundaries.

design point?

<u>Parking Lot Basins</u>:

Basin A.1 (0.13 ac) is located near the northwest corner of the parking lot. Land use type is a mix of landscape and hardscape. Surface runoff (sheet flow) will be captured by proposed curb & gutter and will be conveyed to a proposed Type R Inlet in a sump. Should this inlet become clogged or otherwise nonfunctional, stormwater will overtop into Basin A.6. (Q_5=0.33 cfs, Q_{100}=0.80 cfs).

Basin A.2 (0.48 ac) is located near the north side of the parking lot. Land use type is a mix of landscape and hardscape. Surface runoff (sheet flow) will be captured by proposed curb & gutter and will be conveyed to a proposed Type R Curb Inlet in a sump. Should this inlet become clogged or otherwise nonfunctional, stormwater will overtop into Basin A.3. (Q_5=1.21 cfs, Q_{100}=3.0 cfs).

Basin A.3 (0.61 ac) is located near the northeast corner of the parking lot. Land use type is a mix of landscape and hardscape. Surface runoff (sheet flow) will be captured by proposed curb & gutter and concrete v-pans and will be conveyed to a proposed Type 13 Valley Inlet located at the center of the basin. Should this inlet become clogged or otherwise nonfunctional, stormwater will overtop into Basin A.4. (Q_5=1.80 cfs, Q_{100}=3.60 cfs).

include design point for all inlets

Basin A.4 (0.72 ac) is located near the center and east portions of the parking lot. Land use type is a mix of landscape, hardscape, and roofs. Surface runoff (sheet flow) will be captured by proposed curb & gutter and will be conveyed to a proposed Type C Inlet located in a low-point within the drive aisle. Should this inlet become clogged or otherwise nonfunctional, stormwater will overtop into Basin A.5. (Q_5=1.45 cfs, Q_{100}=3.30 cfs).

Basin A.5 (0.51 ac) is located near the center of the parking lot. Land use type is a mix of landscape and hardscape. Surface runoff (sheet flow) will be captured by proposed curb & gutter and will be conveyed to a proposed Type R Curb Inlet located at the southeast corner of the basin in a sump. Should this inlet become clogged or otherwise nonfunctional, stormwater will overtop into Basin A.10. (Q_5=1.39 cfs, Q_{100}=3.20 cfs).

Basin A.6 (0.43 ac) is located in the center and west portions of the parking lot. Land use type is hardscape, landscape, and roofs. Surface runoff (sheet flow) will be captured by proposed curb & gutter and will be conveyed to a proposed Type R inlet located at the west side of the basin in a sump. Should this inlet become clogged or otherwise nonfunctional, stormwater will overtop into basin A.7. (Q_5=1.29 cfs, Q_{100}=2.80 cfs).

Basin A.7 (0.42 ac) is located at the center of the parking lot. Land use type is roof coverage, hardscape, and landscape. Surface runoff (sheet flow) will be captured by proposed curb & gutter and will be conveyed to a proposed Type C inlet located at a low-point within the drive aisle. Should this inlet become clogged or otherwise nonfunctional, stormwater will overtop into basin A.6. (Q_5=1.18 cfs, Q_{100}=2.60 cfs).

Basin A.8 (0.67 ac) is located at the south side of the parking lot. Land use type is roof coverage, hardscape, and landscape. Surface runoff (sheet flow) will be captured by proposed curb & gutter and will be conveyed to a proposed Type R inlet located in a sump. Should this inlet become clogged or otherwise nonfunctional, stormwater will overtop into basin A.10. (Q_5=1.60 cfs, Q_{100}=3.70 cfs).

Basin A.9 (0.31 ac) is located at the center of the parking lot. Land use type is roof coverage, hardscape, and landscape. Surface runoff (sheet flow) will be captured by proposed curb & gutter and will be conveyed to a proposed Type R inlet located in a sump. Should this inlet become clogged or otherwise nonfunctional, stormwater will overtop into basin A.9. (Q_5=0.87 cfs, Q_{100}=1.90 cfs).

Basin A.10 (0.16 ac) is located in the southeast corner of the site. Land use type is roof coverage, hardscape, and landscape. Surface runoff (sheet flow) will be captured by proposed curb & gutter and a concrete pan and will be conveyed to a proposed Type C inlet located in a sump. Should this inlet become clogged or otherwise nonfunctional, stormwater will overtop into Village Main Street. (Q_5=0.97 cfs, Q_{100}=2.20 cfs).

where is the runoff conveyed to once on Village Main if overtopping occurs

Should this be basin A8?

__**Apartment Buildings**__:

Each apartment building has a roof drain system that will tie into the underground perimeter drain which will contain a series of Nyloplast grate inlets where necessary to obtain positive drainage away from the building. Below is a list with charts associated to each building apartment building:

It appears that the perimeter drains will tie into the main storm system throughout the site. Please state that.

Apartment Building 1:
Basin B.1 (0.38 ac) is the entire roof coverage of Building 1 which will be collected by a series of roof drains that ultimately discharge into the perimeter drain. (Q_5=1.75 cfs, Q_{100}=2.70 cfs). There perimeter drain has basins as follows in the chart below:

Basin	Area (acres)	5-YR (cfs)	100-YR (cfs
C.11	0.13	0.010	0.298
C.12	0.09	0.050	0.292
C.14	0.05	0.022	0.152
C.21	0.02	0.002	0.052

Apartment Building 2:
Basin B.2 (0.38 ac) is the entire roof coverage of Building 1 which will be collected by a series of roof drains that ultimately discharge into the perimeter drain. (Q_5=1.75 cfs, Q_{100}=2.70 cfs). There perimeter drain has basins as follows in the chart below:

Basin	Area (acres)	5-YR (cfs)	100-YR (cfs)
C.13	0.01	0.006	0.035
C.15	0.04	0.004	0.107
C.16	0.18	0.039	0.426

Apartment Building 3:
Basin B.3 (0.38 ac) is the entire roof coverage of Building 1 which will be collected by a series of roof drains that ultimately discharge into the perimeter drain. (Q_5=1.75 cfs, Q_{100}=2.70 cfs). There perimeter drain has basins as follows in the chart below:

Basin	Area (acres)	5-YR (cfs)	100-YR (cfs)
C.17	0.01	0.001	0.030
C.18	0.18	0.065	0.468
C.20	0.03	0.003	0.075

Apartment Building 4:
Basin B.4 (0.38 ac) is the entire roof coverage of Building 1 which will be collected by a series of roof drains that ultimately discharge into the perimeter drain. (Q_5=1.75 cfs, Q_{100}=2.70 cfs). There perimeter drain has basins as follows in the chart below:

Basin	Area (acres)	5-YR (cfs)	100-YR (cfs)
C.19	0.15	0.346	0.881

Clubhouse:
Basin B.5 (0.14 ac) is the entire roof coverage of the clubhouse which will be collected by a series of roof drains that will ultimately discharge into the main storm network at design point 27.

Offsite Basins:

DP37 in the proposed conditions

Basin OS.1 (0.57 ac) is located along the north and east edges of the site. Land use type is a mix of hardscape, landscape, gravel, and roof coverage. Surface runoff (sheet flow) flows within grass swales and across asphalt until ultimately it is concentrated at the northern curb & gutter along Cattlemen Run. The stormwater will be collected by an existing 10' type R inlet at design point C1.1.

Basin OS.2 (0.62 ac) is located on the south side of the site. Land use type is hardscape, landscape, and roof coverage. Surface runoff will sheetflow across grass lawns until ultimately it becomes concentrated at the northern curb & gutter of Village Main Street. The stormwater will be collected by an existing 10' Type R inlet at design point C1.2.

discuss C basins.

5 Conclusion

Please include the Four-Step Process (ECM Appendix I.7.2.A.)

The Mayberry Apartments & Townhomes development site contains 8.31 acres and is proposed to be developed as a residential site containing four apartment buildings, 38 townhomes, and associated amenity areas. This Site and report are in conformance with the design standards of the El Paso County Drainage Criteria Manual, "Preliminary Drainage Report Amendment for Mayberry, Colorado Springs – Phase 1 PUD", and all other applicable reports. The run-off from this development will be collected via curb/gutter and storm inlets and will drain to Detention Pond C1. Runoff will be discharged from the extended detention basin to the southeast. The runoff from this development will have no adverse impacts on downstream facilities nor surrounding developments.

All drainage facilities described herein and shown on the included drainage plans are subject to change due to final design considerations. Any changes that are made after approval of this report will require an addendum to this report.

This drainage analysis has been prepared in accordance with the current El Paso County Drainage Criteria Manual and the Urban Storm Drainage Criteria Manual. Supporting information is included in the Appendix.

References

1. City of Colorado Springs & El Paso County "Drainage Criteria Manual," revised October 12, 1994.

2. City of Colorado Springs "Drainage Criteria Manual, Volumes 1 and 2," revised May, 2014.

3. El Paso County "Engineering Criteria Manual," January 9, 2006.

4. USDA/NRCS, "Soil Survey of El Paso County Area, Colorado," June, 1981.

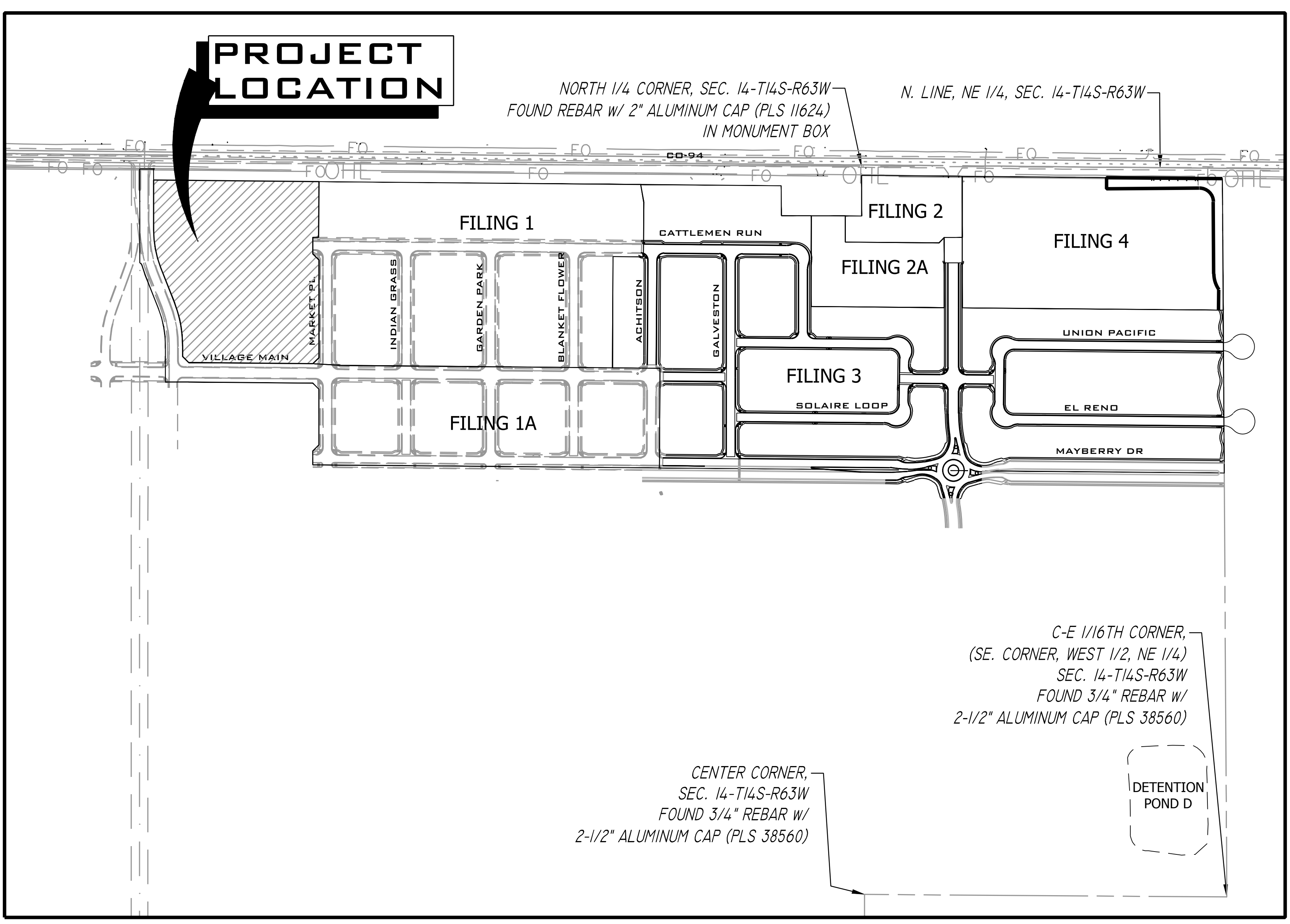
5. JPS Engineering, Inc., "Final Drainage Report for Mayberry, Colorado Springs – Filing No. 1A Replat", dated November 19, 2021, revised April 8, 2022, approved by EPC June 6, 2022.

APPENDIX A

VICINITY MAP
FEMA FIRM MAP
SOILS MAP

VICINITY MAP

SCALE 1" = 5,000'



SITE MAP

SCALE 1" = 500'

REVISIONS

R&R ENGINEERS SURVEYORS INC

WWW.RRENGINEERS.COM

SITE MAP

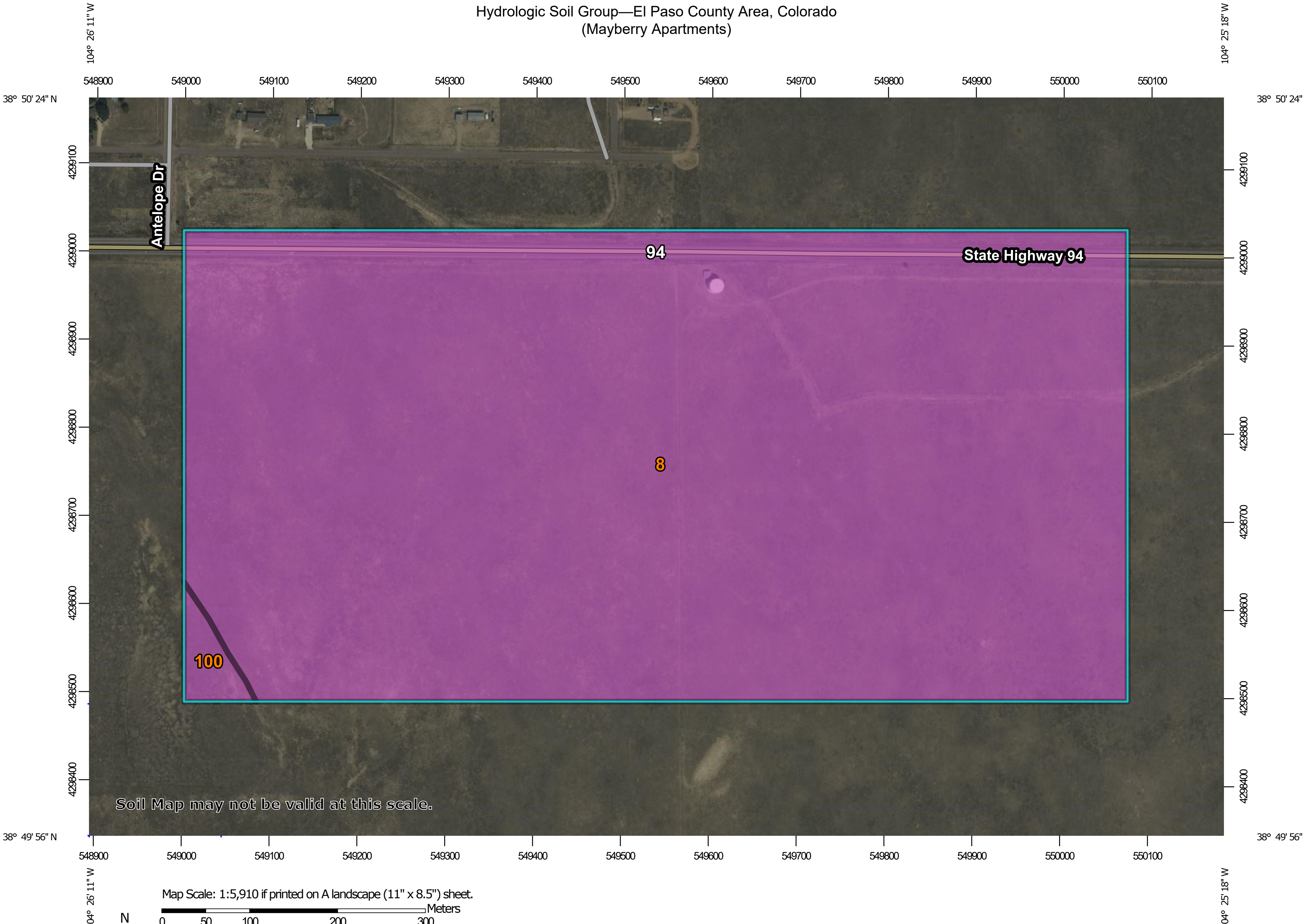
MAYBERRY APARTMENTS

3296 DEVINE HEIGHTS #208
COLORADO SPRINGS, CO 80922

JOB NO.	MC22068		
DATE	3-6-2023		
DRN	CJB	CHK	CD
EXHIBIT NAME	SITE MAP		
SHEET NO.	1 OF 1		

PATH: P:\MC22068 MAYBERRY APARTMENTS (SEC HWY 94 & NEW LOG RD)\ENGINEERING\4 DRAWINGS\PLANS\CDS - COVER & NOTES\MC22068 - CVR - CD.DWG, PLOT DATE:3/6/2023 4:07:15 PM, BY:CARLOS BARRIENTOS

Hydrologic Soil Group—El Paso County Area, Colorado
(Mayberry Apartments)



Map Scale: 1:5,910 if printed on A landscape (11" x 8.5") sheet.

N

0 50 100 200 300 Meters

0 250 500 1000 1500 Feet

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

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

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

Background

- Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: El Paso County Area, Colorado
Survey Area Data: Version 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: Sep 11, 2018—Oct 20, 2018

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
8	Blakeland loamy sand, 1 to 9 percent slopes	A	141.2	99.0%
100	Truckton-Bresser complex, eroded	A	1.4	1.0%
Totals for Area of Interest			**142.6**	**100.0%**

Description

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

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

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

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

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

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

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

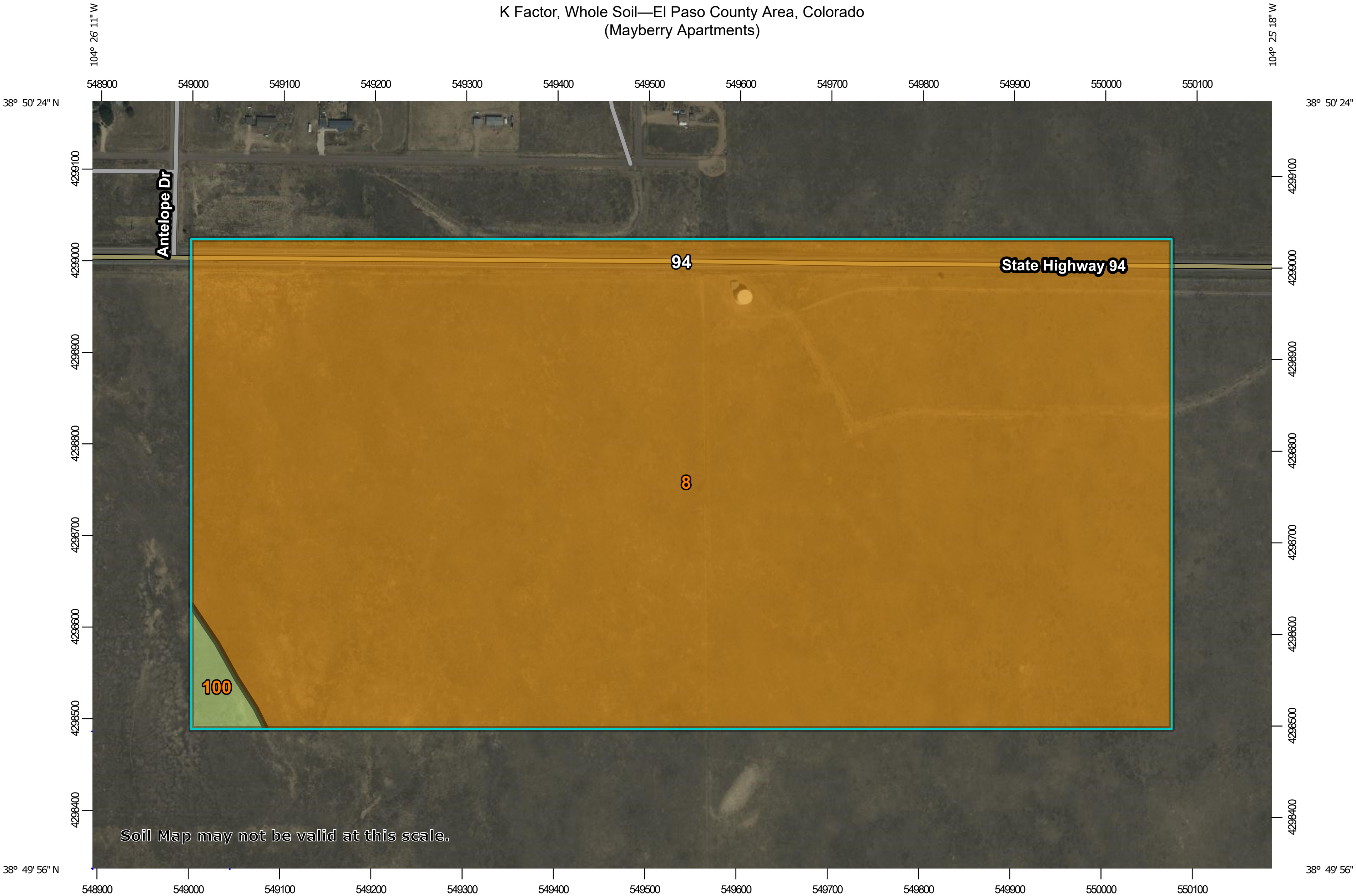
Rating Options

Aggregation Method: Dominant Condition

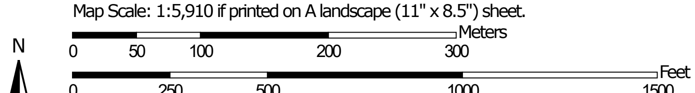
Component Percent Cutoff: None Specified

Tie-break Rule: Higher

K Factor, Whole Soil—El Paso County Area, Colorado
(Mayberry Apartments)



Map Scale: 1:5,910 if printed on A landscape (11" x 8.5") sheet.



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

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

.02
.05
.10
.15
.17
.20
.24
.28
.32
.37
.43
.49
.55
.64
Not rated or not available

Soil Rating Lines

.02
.05
.10
.15
.17
.20
.24
.28
.32
.37
.43
.49
.55
.64
Not rated or not available

Soil Rating Points

.02
.05
.10
.15
.17
.20
.24
.28
.32
.37
.43
.49
.55
.64
Not rated or not available

Water Features

Streams and Canals

Transportation

Rails
Interstate Highways
US Routes
Major Roads
Local Roads

Background

Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: El Paso County Area, Colorado
Survey Area Data: Version 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: Sep 11, 2018—Oct 20, 2018

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

K Factor, Whole Soil

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
8	Blakeland loamy sand, 1 to 9 percent slopes	.10	141.2	99.0%
100	Truckton-Bresser complex, eroded	.24	1.4	1.0%
Totals for Area of Interest			**142.6**	**100.0%**

Description

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and saturated hydraulic conductivity (Ksat). Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

"Erosion factor Kw (whole soil)" indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

Factor K does not apply to organic horizons and is not reported for those layers.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Layer Options (Horizon Aggregation Method): Surface Layer (Not applicable)

NOTES TO USERS

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

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

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

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

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

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

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

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

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

Base Map information shown on this FIRM was provided in digital format by El Paso County, Colorado Springs Utilities, and Anderson Consulting Engineers, Inc. These data are current as of 2008.

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

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

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

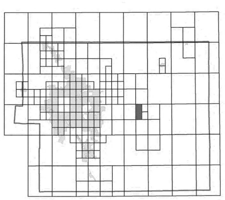
Contact **FEMA Map Service Center** (MSC) via the FEMA Map Information eXchange (FMIX) 1-877-336-2627 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this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

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

El Paso County Vertical Datum Offset Table

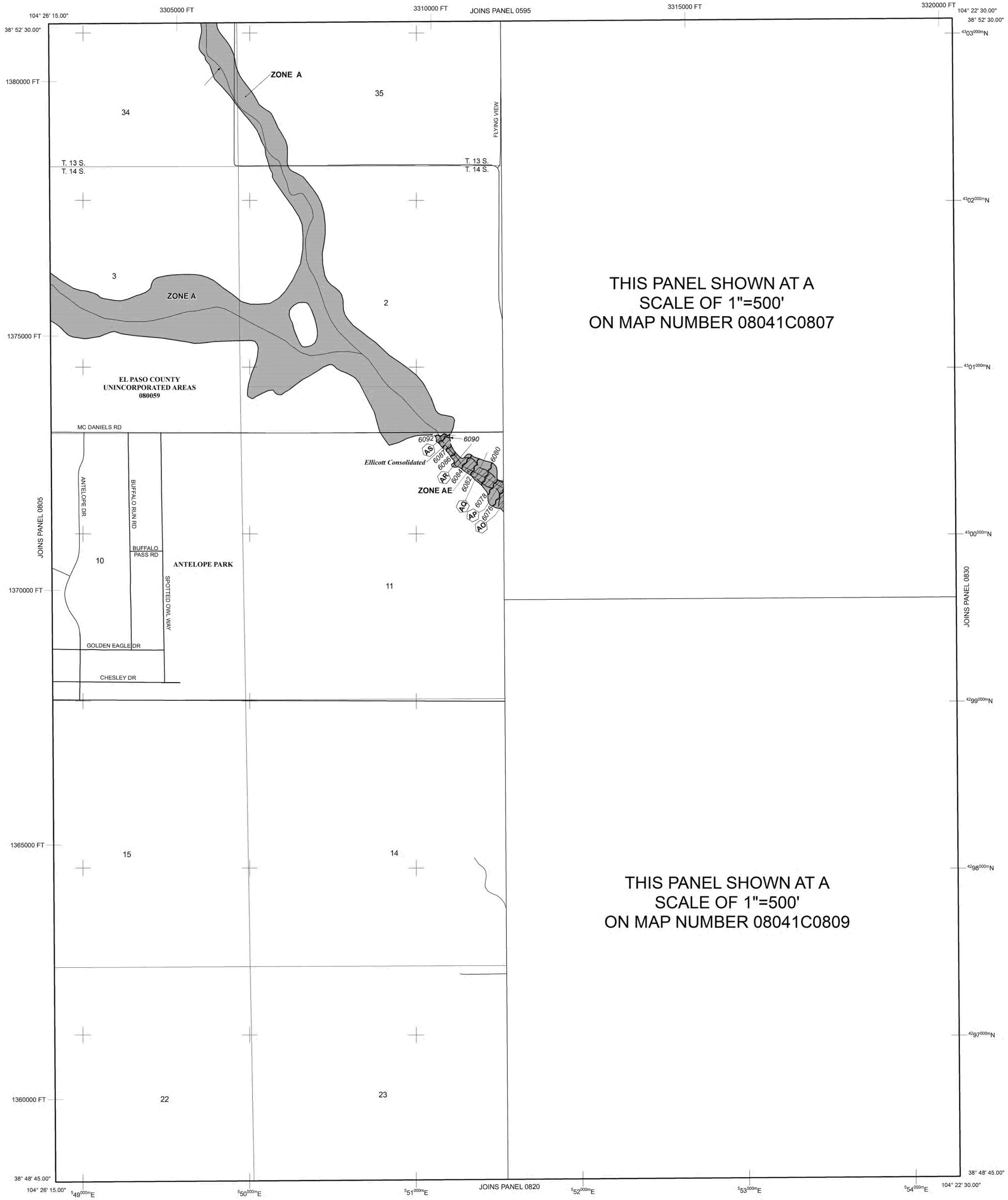
Flooding Source	Vertical Datum Offset (ft)
REFER TO SECTION 3.3 OF THE EL PASO COUNTY FLOOD INSURANCE STUDY FOR STREAM BY STREAM VERTICAL DATUM CONVERSION INFORMATION	

Panel Location Map



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

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



NOTE: MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN TOWNSHIP 13 SOUTH, RANGE 63 WEST, AND TOWNSHIP 14 SOUTH, RANGE 63 WEST.

LEGEND

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

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

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

FLOODWAY AREAS IN ZONE AE

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

OTHER FLOOD AREAS

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

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

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

Floodplain boundary

Floodway boundary

Zone D Boundary

CBRS and OPA boundary

Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.

513	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

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

A —— A	Cross section line
23 - - - - 23	Transect line
97° 07' 30.00" 32° 22' 30.00"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
4275000mN	1000-meter Universal Transverse Mercator grid ticks, zone 13
6000000 FT	5000-foot grid ticks: Colorado State Plane coordinate system, central zone (FIPSZONE 0502), Lambert Conformal Conic Projection
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
• M1.5	River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

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

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

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

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

MAP SCALE 1" = 1000'

500 0 1000 2000 FEET

300 0 300 600 METERS

NFIP

PANEL 0810G

NATIONAL FLOOD INSURANCE PROGRAM

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

PANEL 810 OF 1300

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
EL PASO COUNTY	080059	0810	G

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

MAP NUMBER 08041C0810G

MAP REVISED DECEMBER 7, 2018

Federal Emergency Management Agency

APPENDIX B

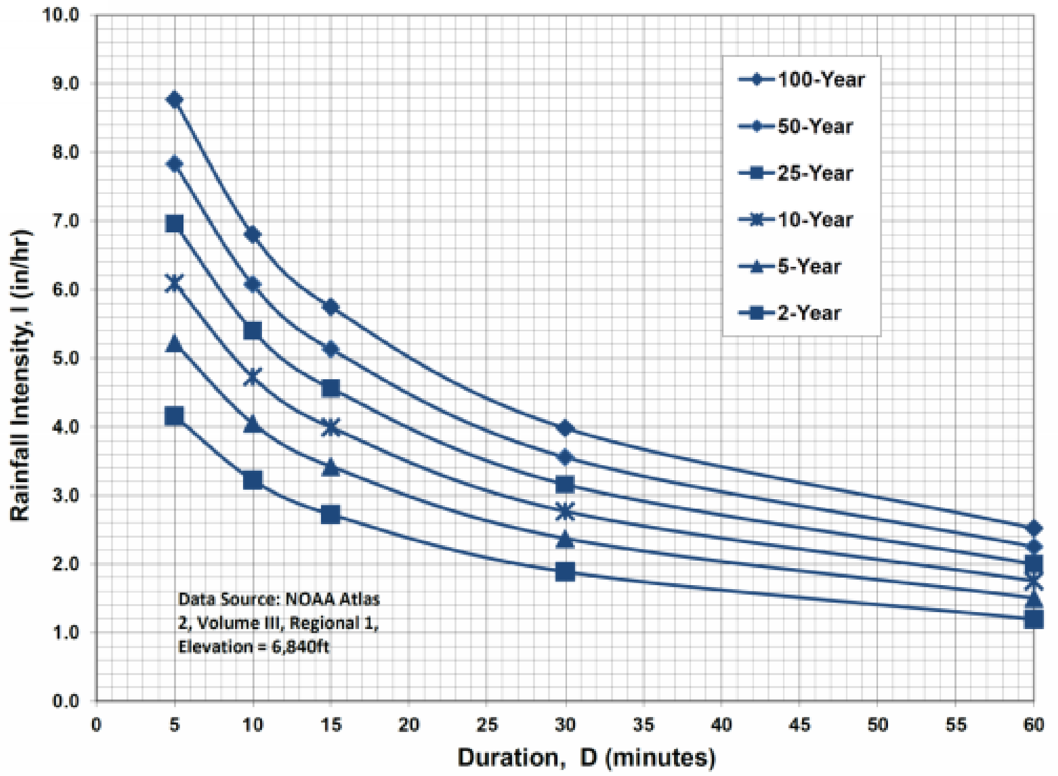
SITE HYDROLOGY CALCULATIONS

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.

MAYBERRY, COLORADO SPRINGS (ELLICOTT TOWN CENTER)
COMPOSITE RUNOFF COEFFICIENTS

DEVELOPED CONDITIONS
5-YEAR C VALUES

BASIN	TOTAL AREA (AC)	(AC)	SUB-AREA 1 DEVELOPMENT/ COVER	C	AREA (AC)	SUB-AREA 2 DEVELOPMENT/ COVER	C	(AC)	SUB-AREA 3 DEVELOPMENT/ COVER	C	WEIGHTED C VALUE
A1A	2.80	0.9	ROADWAY	0.9	1.9	GRASS	0.08				0.355
C1.2	7.97	8.0	COMMERCIAL	0.49							0.490
C1.7A	0.58	0.6	SF LOTS (1/6-AC)	0.375							0.375
C1.7B	4.34	4.3	COMMERCIAL	0.49							0.490
C1.7A,C1.7B	4.92										0.476
C1.2,C1.7	12.89										0.485
C1.3	3.02	3.0	SF LOTS (1/6-AC)	0.375							0.375
C1.2,C1.3,C1.7	15.91										0.464
C1.4	3.23	3.2	SF LOTS (1/6-AC)	0.375							0.375
C1.2-C1.4,C1.7	19.14										0.449
C1.5	3.18	3.2	SF LOTS (1/6-AC)	0.375							0.375
C1.2-C1.5,C1.7	22.32										0.438
C1.1	9.38	3.0	RESIDENTIAL	0.375	1.2	COMMERCIAL	0.49	5.2	OPEN SPACE	0.08	0.226
C1.6	3.01	3.0	SF LOTS (1/6-AC)	0.375							0.375
C1.1,C1.6	12.39										0.262
C1.1-C1.7	34.71										0.376
C1.8	3.89	3.9	SF LOTS (1/6-AC)	0.375							0.375
C1.9	4.39	4.4	SF LOTS (1/6-AC)	0.375							0.375
C1.8-C1.9	8.28										0.375
C1.1-C1.9	42.99										**0.375**
C1.10	1.82	1.8	SF LOTS (1/6-AC)	0.375							0.375
C1.1-C1.10	44.81										**0.375**
C2.1	2.55	1.6	RESIDENTIAL	0.375	1.0	OPEN SPACE	0.08				0.259
C2.2	1.99	2.0	SF LOTS (1/6-AC)	0.375							0.375
C2.1-C2.2	4.54										0.310
C2.3	3.01	3.0	SF LOTS (1/6-AC)	0.375							0.375
C2.5	6.43	6.4	SF LOTS (1/6-AC)	0.375							0.375
C2.1-C2.3,C2.5	13.98										0.354
C2.4	2.89	2.9	SF LOTS (1/6-AC)	0.375							0.375
C2.1-C2.5	16.87										0.358
C3	20.25	20.3	PARK / OS	0.08							0.080
C2.1-C2.5,C3	37.12										0.206

MAYBERRY, COLORADO SPRINGS (ELLICOTT TOWN CENTER)
COMPOSITE RUNOFF COEFFICIENTS

DEVELOPED CONDITIONS
100-YEAR C VALUES

BASIN	TOTAL AREA (AC)	(AC)	SUB-AREA 1 DEVELOPMENT/ COVER	C	AREA (AC)	SUB-AREA 2 DEVELOPMENT/ COVER	C	(AC)	SUB-AREA 3 DEVELOPMENT/ COVER	C	WEIGHTED C VALUE
A1A	2.80	0.9	ROADWAY	0.96	1.9	GRASS	0.35				0.555
C1.2	7.97	8.0	COMMERCIAL	0.62							0.620
C1.7A	0.58	0.6	SF LOTS (1/6-AC)	0.545							0.545
C1.7B	4.34	4.3	COMMERCIAL	0.62							0.620
C1.7A,C1.7B	4.92										0.611
C1.2,C1.7	12.89										0.617
C1.3	3.02	3.0	SF LOTS (1/6-AC)	0.545							0.545
C1.2,C1.3,C1.7	15.91										0.603
C1.4	3.23	3.2	SF LOTS (1/6-AC)	0.545							0.545
C1.2-C1.4,C1.7	19.14										0.593
C1.5	3.18	3.2	SF LOTS (1/6-AC)	0.545							0.545
C1.2-C1.5,C1.7	22.32										0.586
C1.1	9.38	3.0	RESIDENTIAL	0.545	1.2	COMMERCIAL	0.62	5.2	OPEN SPACE	0.35	0.447
C1.6	3.01	3.0	SF LOTS (1/6-AC)	0.545							0.545
C1.1,C1.6	12.39										0.471
C1.1-C1.7	34.71										0.545
C1.8	3.89	3.9	SF LOTS (1/6-AC)	0.545							0.545
C1.9	4.39	4.4	SF LOTS (1/6-AC)	0.545							0.545
C1.8-C1.9	8.28										0.545
C1.1-C1.9	42.99										**0.545**
C1.10	1.82	1.8	SF LOTS (1/6-AC)	0.545							0.545
C1.1-C1.10	44.81										**0.545**
C2.1	2.55	1.6	SF LOTS (1/6-AC)	0.545	1.0	OPEN SPACE	0.35				0.469
C2.2	1.99	2.0	SF LOTS (1/6-AC)	0.545							0.545
C2.1-C2.3	4.54										0.502
C2.3	3.01	3.0	SF LOTS (1/6-AC)	0.545							0.545
C2.5	6.43	6.4	SF LOTS (1/6-AC)	0.545							0.545
C2.1-C2.3,C2.5	13.98										0.531
C2.4	2.89	2.9	SF LOTS (1/6-AC)	0.545							0.545
C2.1-C2.5	16.87										0.533
C3	20.25	20.3	PARK / OS	0.35							0.350
C2.1-C2.5,C3	37.12										0.433

MAYBERRY, COLORADO SPRINGS (ELLICOTT TOWN CENTER)
RATIONAL METHOD - HYDROLOGIC CALCULATIONS

DEVELOPED FLOWS

BASIN	DESIGN POINT	AREA (AC)	C 5-YEAR	C 100-YEAR	Overland Flow LENGTH (FT)	Overland Flow SLOPE (FT/FT)	Overland Flow Tco [1] (MIN)	Channel flow CHANNEL LENGTH (FT)	Channel flow CONVEYANCE COEFFICIENT C	Channel flow SLOPE (FT/FT)	Channel flow SCS [2] VELOCITY (FT/S)	Channel flow Tt [3] (MIN)	TOTAL Tc [4] (MIN)	TOTAL Tc [4] (MIN)	INTENSITY [5] 5-YR (IN/HR)	INTENSITY [5] 100-YR (IN/HR)	PEAK FLOW Q5 [6] (CFS)	PEAK FLOW Q100 [6] (CFS)
FILING NO. 1																		
A1A	A1A	2.80	0.355	0.555	40	0.020	6.8	2035	15	0.011	1.57	21.6	28.4	28.4	2.56	4.30	2.55	6.68
C1.2	C1.2	7.97	0.490	0.620			0.0	1000	20	0.009	1.90	8.8	8.8	8.8	4.32	7.26	16.88	35.87
C1.7A	C1.7A	0.58	0.375	0.545			0.0	680	20	0.013	2.28	5.0	5.0	5.0	5.17	8.68	1.12	2.74
C1.7B	C1.7B	4.34	0.490	0.620	100	0.020	8.9	400	20	0.01	2.00	3.3	12.2	12.2	3.83	6.43	8.15	17.31
C1.7A,C1.7B	C1.7B1	4.92	0.476	0.611									12.2	12.2	3.83	6.43	8.97	19.33
C1.2,C1.7	C1.2D	12.89	0.485	0.617									12.2	12.2	3.83	6.43	23.95	51.15
C1.3		3.02	0.375	0.545			0.0	280	20	0.01	2.00	2.3	2.3	5.0	5.17	8.68	5.85	14.29
C1.2,C1.3,C1.7	C1.3A	15.91	0.464	0.603									14.5	14.5	3.57	5.99	26.34	57.47
C1.4		3.23	0.375	0.545			0.0	300	20	0.01	2.00	2.5	2.5	5.0	5.17	8.68	6.26	15.28
C1.2-C1.4,C1.7	C1.4A	19.14	0.449	0.593									17.0	17.0	3.33	5.59	28.62	63.45
C1.5		3.18	0.375	0.545			0.0	300	20	0.01	2.00	2.5	2.5	5.0	5.17	8.68	6.16	15.04
C1.2-C1.5,C1.7	C1.5A	22.32	0.438	0.586									19.5	19.5	3.12	5.25	30.55	68.61
C1.1	C1.1	9.38	0.226	0.447	100	0.017	13.4	1800	20	0.01	2.00	15.0	28.4	28.4	2.56	4.30	5.43	18.04
C1.6		3.01	0.375	0.545			0.0	450	20	0.01	2.00	3.8	3.8	5.0	5.17	8.68	5.83	14.24
C1.1,C1.6	C1.6C	12.39	0.262	0.471									32.2	32.2	2.38	3.99	7.72	23.28
C1.1-C1.7	C1.7C	34.71	0.376	0.545									32.2	32.2	2.38	3.99	31.02	75.46
C1.8		3.89	0.375	0.545			0.0	600	20	0.016	2.53	4.0	4.0	5.0	5.17	8.68	7.54	18.40
C1.9		4.39	0.375	0.545			0.0	580	20	0.012	2.19	4.4	4.4	5.0	5.17	8.68	8.51	20.77
C1.1-C1.7, C1.9	C1.9A	39.10	0.375	0.545				272	20	0.01	2.00	2.3	34.4	34.4	2.27	3.82	33.35	81.34
Tt C1.7C to Pond C1								450	20	0.01	2.00	3.8						
C1.1-C1.9	**C1.9B**	**42.99**	**0.375**	**0.545**									**35.9**	**35.9**	**2.21**	**3.71**	**35.65**	**86.95**
C1.10	C1.10	1.82	0.375	0.545	50	0.020	7.5	1500	20	0.01	2.00	12.5	20.0	20.0	3.09	5.19	2.11	5.15
C1.1-C1.10	**C1.10A**	**44.81**	**0.375**	**0.545**									**35.9**	**35.9**	**2.21**	**3.71**	**37.16**	**90.63**

POST-DEVELOPMENT C VALUES

Designer: LAO
Company: R&R Engineers-Surveyors
Date: 3/14/2023
Project: MAYBERRY TRACT K APARTMENTS
Location: EL PASO COUNTY, COLORADO

Global Parameters[1]			
Land Use	% Imp.	C_5	C_{100}
Lawns	0	0.02	0.35
Paved	100	0.89	0.96
Roof	90	0.71	0.81
Gravel	80	0.57	0.7

Summary	
Total Area (ac)	8.36
Composite Impervious	71.6%

Cells of this color are for required user-input
Cells of this color are for optional user-input

[1] From Table 6-3 in MHFD Volume 1
[2] From Table 6-4 in MHFD Volume 1

Basin Name	Area (ac)	NRCS Hydrologic Soil Group	Lawns		Paved		Roof		Gravel		% Check	Percent Imperviousness	Runoff Coefficient, C[2]			
			Area (ac)	%	Area (ac)	%	Area (ac)	%	Area (ac)	%			2-yr	5-yr	10-yr	100-yr
A.1	0.14	A	0.04	28.6%	0.10	71.4%	0.00	0.0%	0.00	0.0%	100.00%	71.4%		0.51		0.79
A.2	0.48	A	0.09	18.8%	0.39	81.3%	0.00	0.0%	0.00	0.0%	100.00%	81.3%		0.58		0.85
A.3	0.61	A	0.09	14.8%	0.28	45.9%	0.24	39.3%	0.00	0.0%	100.00%	81.3%		0.68		0.81
A.4	0.72	A	0.18	25.0%	0.38	52.8%	0.16	22.2%	0.00	0.0%	100.00%	72.8%		0.58		0.77
A.5	0.51	A	0.05	9.8%	0.42	82.4%	0.04	7.8%	0.00	0.0%	100.00%	89.4%		0.66		0.89
A.6	0.43	A	0.04	9.3%	0.32	74.4%	0.07	16.3%	0.00	0.0%	100.00%	89.1%		0.68		0.88
A.7	0.42	A	0.06	14.3%	0.27	64.3%	0.09	21.4%	0.00	0.0%	100.00%	83.6%		0.65		0.84
A.8	0.67	A	0.13	19.4%	0.47	70.1%	0.07	10.4%	0.00	0.0%	100.00%	79.6%		0.59		0.83
A.9	0.31	A	0.03	9.7%	0.24	77.4%	0.04	12.9%	0.00	0.0%	100.00%	89.0%		0.67		0.88
A.10	0.33	A	0.04	12.1%	0.24	72.7%	0.05	15.2%	0.00	0.0%	100.00%	86.4%		0.65		0.86
B.1	0.38	A	0.00	0.0%	0.00	0.0%	0.38	100.0%	0.00	0.0%	100.00%	90.0%		0.89		0.81
B.2	0.38	A	0.00	0.0%	0.00	0.0%	0.38	100.0%	0.00	0.0%	100.00%	90.0%		0.89		0.81
B.3	0.38	A	0.00	0.0%	0.00	0.0%	0.38	100.0%	0.00	0.0%	100.00%	90.0%		0.89		0.81
B.4	0.38	A	0.00	0.0%	0.00	0.0%	0.38	100.0%	0.00	0.0%	100.00%	90.0%		0.89		0.81
B.5	0.14	A	0.00	0.0%	0.00	0.0%	0.14	100.0%	0.00	0.0%	100.00%	90.0%		0.89		0.81
C.11	0.13	A	0.13	100.0%	0.00	0.0%	0.00	0.0%	0.00	0.0%	100.00%	.0%		0.02		0.35
C.12	0.09	A	0.08	83.3%	0.01	7.8%	0.00	0.0%	0.01	8.9%	100.00%	14.9%		0.12		0.43
C.13	0.01	A	0.01	80.0%	0.00	0.0%	0.00	0.0%	0.00	20.0%	100.00%	16.0%		0.13		0.42
C.14	0.05	A	0.04	88.0%	0.01	12.0%	0.00	0.0%	0.00	0.0%	100.00%	12.0%		0.10		0.42
C.15	0.04	A	0.04	100.0%	0.00	0.0%	0.00	0.0%	0.00	0.0%	100.00%	.0%		0.02		0.35
C.16	0.18	A	0.17	94.4%	0.01	5.6%	0.00	0.0%	0.00	0.0%	100.00%	5.6%		0.06		0.38
C.17	0.01	A	0.01	100.0%	0.00	0.0%	0.00	0.0%	0.00	0.0%	100.00%	.0%		0.02		0.35
C.18	0.18	A	0.16	88.9%	0.02	11.1%	0.00	0.0%	0.00	0.0%	100.00%	11.1%		0.10		0.42
C.19	0.15	A	0.04	26.7%	0.11	73.3%	0.00	0.0%	0.00	0.0%	100.00%	73.3%		0.53		0.80
C.20	0.03	A	0.03	100.0%	0.00	0.0%	0.00	0.0%	0.00	0.0%	100.00%	.0%		0.02		0.35
C.21	0.02	A	0.02	100.0%	0.00	0.0%	0.00	0.0%	0.00	0.0%	100.00%	.0%		0.02		0.35
OS.1	0.57	A	0.26	45.6%	0.06	10.5%	0.14	24.6%	0.11	19.3%	100.00%	48.1%		0.41		0.59
OS.2	0.62	A	0.34	54.8%	0.11	17.7%	0.17	27.4%	0.00	0.0%	100.00%	42.4%		0.38		0.58

TIME OF CONCENTRATION

Designer:	LAO
Company:	R&R Engineers-Surveyors
Date:	3/14/2023
Project:	MAYBERRY TRACT K APARTMENTS
Location:	EL PASO COUNTY, COLORADO

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

$$\text{Computed } t_c = t_i + t_t$$

$t_{minimum} = 5$ (urban)
$t_{minimum} = 10$ (non-urban)

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

$$\text{Selected } t_c = \max\{t_{minimum}, \min(\text{Computed } t_c, \text{Regional } t_c)\}$$

$$\text{Regional } t_c = (26 - 17i) + \frac{L_t}{60(14i + 9)\sqrt{S_t}}$$

Cells of this color are for required user-input

ENGINEERS SURVEYORS INC

Subbasin Data				Overland (Initial) Flow Time			Channelized (Travel) Flow Time					Time of Concentration			
Basin	Area	% Impervious	C5	Overland Flow Length L_i (ft)	Overland Flow Slope S_i (ft/ft)	Overland Flow Time t_i (min)	Channelized Flow Length L_t (ft)	Channelized Flow Slope S_t (ft/ft)	NRCS Conveyance Factor K	Channelized Flow Velocity V_t (ft/sec)	Channelized Flow Time t_t (min)	Computed t_c (min)	Regional t_c (min)	Selected t_c (min)	Remarks
A.1	0.14	71.4%	0.51	65.00	0.020	6.80	60.00	0.005	20	1.41	0.71	7.51	14.60	7.51	
A.2	0.48	81.3%	0.58	50.00	0.010	6.63	170.00	0.005	20	1.41	2.00	8.63	14.15	8.63	
A.3	0.61	81.3%	0.68	80.00	0.010	6.80	160.00	0.005	20	1.41	1.89	8.68	14.03	8.68	
A.4	0.72	72.8%	0.58	215.00	0.010	13.83	130.00	0.005	20	1.41	1.53	15.36	15.22	15.22	
A.5	0.51	89.4%	0.66	100.00	0.010	8.01	150.00	0.005	20	1.41	1.77	9.78	12.44	9.78	
A.6	0.43	89.1%	0.68	65.00	0.010	6.18	160.00	0.005	20	1.41	1.89	8.07	12.61	8.07	
A.7	0.42	83.6%	0.65	65.00	0.010	6.55	193.00	0.005	20	1.41	2.27	8.82	13.99	8.82	
A.8	0.67	79.6%	0.59	75.00	0.010	7.90	250.00	0.005	20	1.41	2.95	10.84	15.40	10.84	
A.9	0.31	89.0%	0.67	100.00	0.010	7.83	140.00	0.005	20	1.41	1.65	9.48	12.40	9.48	
A.10	0.33	86.4%	0.65	52.00	0.010	5.81	167.00	0.005	20	1.41	1.97	7.78	13.18	7.78	
B.1	0.38	90.0%	0.89	50.00	0.100	1.25	95.00	0.005	20	1.41	1.12	2.37	11.74	5.00	
B.2	0.38	90.0%	0.89	50.00	0.100	1.25	95.00	0.005	20	1.41	1.12	2.37	11.74	5.00	
B.3	0.38	90.0%	0.89	50.00	0.100	1.25	95.00	0.005	20	1.41	1.12	2.37	11.74	5.00	
B.4	0.38	90.0%	0.89	50.00	0.100	1.25	95.00	0.005	20	1.41	1.12	2.37	11.74	5.00	
B.5	0.14	90.0%	0.89	35.00	0.100	1.05	60.00	0.005	20	1.41	0.71	1.76	11.35	5.00	
C.11	0.13	.0%	0.02	36.00	0.020	9.31	137.00	0.020	7	0.99	2.31	11.61	27.79	11.61	
C.12	0.09	14.9%	0.12	21.00	0.020	6.43	78.00	0.020	7	0.99	1.31	7.75	24.30	7.75	
C.13	0.01	16.0%	0.13	16.00	0.020	5.57	16.00	0.020	7	0.99	0.27	5.84	23.45	5.84	
C.14	0.05	12.0%	0.10	35.00	0.020	8.47	36.00	0.020	7	0.99	0.61	9.08	24.36	9.08	
C.15	0.04	.0%	0.02	18.00	0.020	6.58	54.00	0.020	7	0.99	0.91	7.49	26.71	7.49	
C.16	0.18	5.6%	0.06	30.00	0.020	8.19	225.00	0.010	7	0.70	5.36	13.55	28.89	13.55	
C.17	0.01	.0%	0.02	10.00	0.020	4.91	25.00	0.020	7	0.99	0.42	5.33	26.33	5.33	
C.18	0.18	11.1%	0.10	30.00	0.020	7.89	225.00	0.010	7	0.70	5.36	13.25	27.66	13.25	
C.19	0.15	73.3%	0.53	57.00	0.010	7.82	35.00	0.020	7	0.99	0.59	8.41	13.75	8.41	
C.20	0.03	.0%	0.02	30.00	0.020	8.50	32.00	0.020	7	0.99	0.54	9.04	26.42	9.04	
C.21	0.02	.0%	0.02	25.00	0.020	7.76	27.00	0.020	7	0.99	0.45	8.21	26.35	8.21	
OS.1	0.57	48.1%	0.41	110.00	0.020	10.36	1330.00	0.010	20	2.00	11.08	21.44	31.92	21.44	
OS.2	0.62	42.4%	0.38	70.00	0.020	8.64	520.00	0.010	20	2.00	4.33	12.97	24.59	12.97	

STORM DRAINAGE SYSTEM DESIGN - 5-YEAR DESIGN STORM

Designer: LAO
Company: R&R Engineers-Surveyors
Date: 3/14/2023
Project: MAYBERRY TRACT K APARTMENTS
Location: EL PASO COUNTY, COLORADO

Cells of this color are for required user-input
Cells of this color are for optional user-input

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

R&R ENGINEERS SURVEYORS INC

		DIRECT RUNOFF							TOTAL RUNOFF					STREET BYPASS				PIPE			TRAVEL TIME			
DESGIN POINT	STREET/ CONTRIBUTING BASINS	Basin Name	Area (ac)	Coeff C	Tc (min)	C*A (ac)	I	Q (cfs)	Tc (min)	Sum Area (ac)	Sum C*A (ac)	I in/hr	Q cfs	Street Q cfs	Street Slope %	Length ft	Street Tt min	Design Q cfs	Slope %	PIPE SIZE	L ft	VEL ft/sec	Tt min	Remarks
		B.2	0.38	0.89	5.0	0.34	5.17	1.7																
1	B.2								5.0	0.4	0.338	5.17	1.7					1.7			112	5	0.4	
		C.15	0.04	0.02	7.5	0.00	4.56	0.004																
2	DP1, C.15								7.5	0.4	0.339	4.56	1.5					1.5			82	5	0.3	
		C.13	0.01	0.13	5.8	0.00	4.94	0.0										0.0						
3	DP3, C.13								7.8	0.4	0.340	4.51	1.5					1.5			184	5	0.6	
		C.16	0.18	0.06	13.6	0.01	3.67	0.0										0.0						
4	C.16								13.6	0.2	0.011	3.67	0.0					0.0			129	5	0.4	
5	DP4, DP3								14.0	0.6	0.35	3.63	1.3					1.3			12	5	0.04	
		A.1	0.14	0.51	7.5	0.07	4.56	0.3										0.3						
6	DP5, A.1								14.0	0.8	0.42	3.62	1.5					1.5			193	5	0.64	
		B.1	0.38	0.89	5.0	0.34	5.17	1.7										1.7						
7	B.1								5.0	0.4	0.338	5.17	1.7					1.7			144	5	0.48	
		C.11	0.13	0.02	11.6	0.00	3.90	0.0										0.0						
8	DP7, C.11								11.6	0.5	0.341	3.90	1.3					1.3			95	5	0.32	
		C.21	0.02	0.02	8.2	0.00	4.42	0.0										0.0						
9	DP8, C.21								11.9	0.5	0.341	3.86	1.3					1.3			75	5	0.25	
		C.12	0.09	0.12	7.7	0.01	4.51	0.0										0.0						
10	C.12								7.7	0.1	0.011	4.51	0.0					0.0			91	5	0.30	
		C.14	0.05	0.10	9.1	0.01	4.27	0.0										0.0						
11	DP10, C.14								12.2	0.6	0.35	3.83	1.4					1.4			162	5	0.54	
12	DP11, DP9								12.7	0.7	0.36	3.77	1.4					1.4			15	5	0.05	
		A.2	0.48	0.58	8.6	0.28	4.35	1.2										1.2						
13	DP12, A.2								12.8	1.2	0.64	3.76	2.4					2.4			32	5	0.11	
14	DP13, DP6								14.7	1.9	1.06	3.55	3.8					3.8			205	5	0.68	
		A.3	0.61	0.68	8.7	0.41	4.34	1.8										1.8						
15	DP14, A.3								15.3	2.6	1.48	3.49	5.2					5.2			193	5	0.64	
		A.4	0.72	0.58	15.2	0.42	3.50	1.455										1.5						
16	DP15, A.4								16.0	3.3	1.89	3.42	6.5					6.5			132	5	0.44	
		A.5	0.51	0.66	9.8	0.33	4.16	1.394										1.4						
17	DP16, A.5								16.4	3.8	2.23	3.38	7.5					7.5			32	5	0.11	
		B.3	0.38	0.89	5.0	0.34	5.17	1.748										1.7						
18	B.3								5.0	0.4	0.338	5.17	1.7					1.7			32	5	0.11	
		C.20	0.03	0.02	9.0	0.00	4.28	0.003										0.0						
19	DP18, C.20								9.0	0.4	0.339	4.28	1.5					1.5			76	5	0.25	
		C.17	0.01	0.02	5.3	0.00	5.07	0.001										0.0						
20	DP19, C.17								9.3	0.4	0.339	4.24	1.4					1.4			110	5	0.37	
		C.18	0.18	0.10	13.3	0.02	3.71	0.065										0.1						
21	C.18								13.3	0.2	0.017	3.71	0.1					0.1			224	5	0.75	
22	DP21, DP20								14.0	0.6	0.36	3.62	1.3					1.3			8	5	0.03	
		A.6	0.43	0.68	8.1	0.29	4.45	1.3										1.3						
23	DP22, A.6								14.0	1.0	0.65	3.62	2.3					2.3			22	5	0.07	
		A.7	0.42	0.65	8.8	0.27	4.32	1.2										1.2						
24	A.7								8.8	0.4	0.273	4.32	1.2								85	5	0.28	
25	DP23, DP24								14.1	1.5	0.920	3.61	3.3								136	5	0.45	
		B.5	0.14	0.89	5.0	0.12	5.17	0.6																
26	B.5								5.0	0.1	0.125	5.17	0.6					0.6			210	5	0.70	

27	DP26, DP24								14.6	1.6	1.0	3.57	3.7					3.7			167	5	0.56	
		B.4	0.38	0.89	5.0	0.34	5.17	1.7										1.7						
28	B.4								5.0	0.4	0.338	5.17	1.7					1.7			204	5	0.68	
		C.19	0.15	0.53	8.4	0.08	4.39	0.3										0.3						
29	DP 28, C.19								8.4	0.5	0.417	4.39	1.8					1.8			162	5	0.54	
30	DP29								8.4	0.5	0.4	4.39	1.8					1.8			19	5	0.06	
		A.8	0.67	0.59	10.8	0.40	4.01	1.6										1.6						
31	DP29, A.8								10.8	1.2	0.816	4.01	3.3					3.3			23	5	0.08	
		A.9	0.31	0.67	9.5	0.21	4.21	0.9										0.9						
32	A.9								9.5	0.3	0.207	4.21	0.9					0.9			32	5	0.11	
33	DP32, DP31, DP27								15.1	3.1	2.1	3.51	7.3					7.3			85	5	0.28	
34	DP33, DP17								16.5	6.9	4.3	3.37	14.5					14.5			93	5	0.31	
		A.10	0.33	0.65	7.8	0.22	4.51	1.0										1.0						
35	DP34, A.10								16.8	7.2	4.51	3.35	15.1					15.1			132	5	0.44	
		OS.1	0.57	0.41	21.4	0.24	2.84	0.7										0.7						
36	OS.1								21.4	0.6	0.235	2.99	0.7					0.7						
		OS.2	0.62	0.38	13.0	0.24	3.64	0.9										0.9						
37	OS.2								13.0	0.6	0.236	3.74	0.9					0.9						

STORM DRAINAGE SYSTEM DESIGN - 100-YEAR DESIGN STORM

Designer: LAO
Company: R&R Engineers-Surveyors
Date: 3/14/2023
Project: MAYBERRY TRACT K APARTMENTS
Location: EL PASO COUNTY, COLORADO

Cells of this color are for required user-input
Cells of this color are for optional user-input

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

ENGINEERS SURVEYORS INC

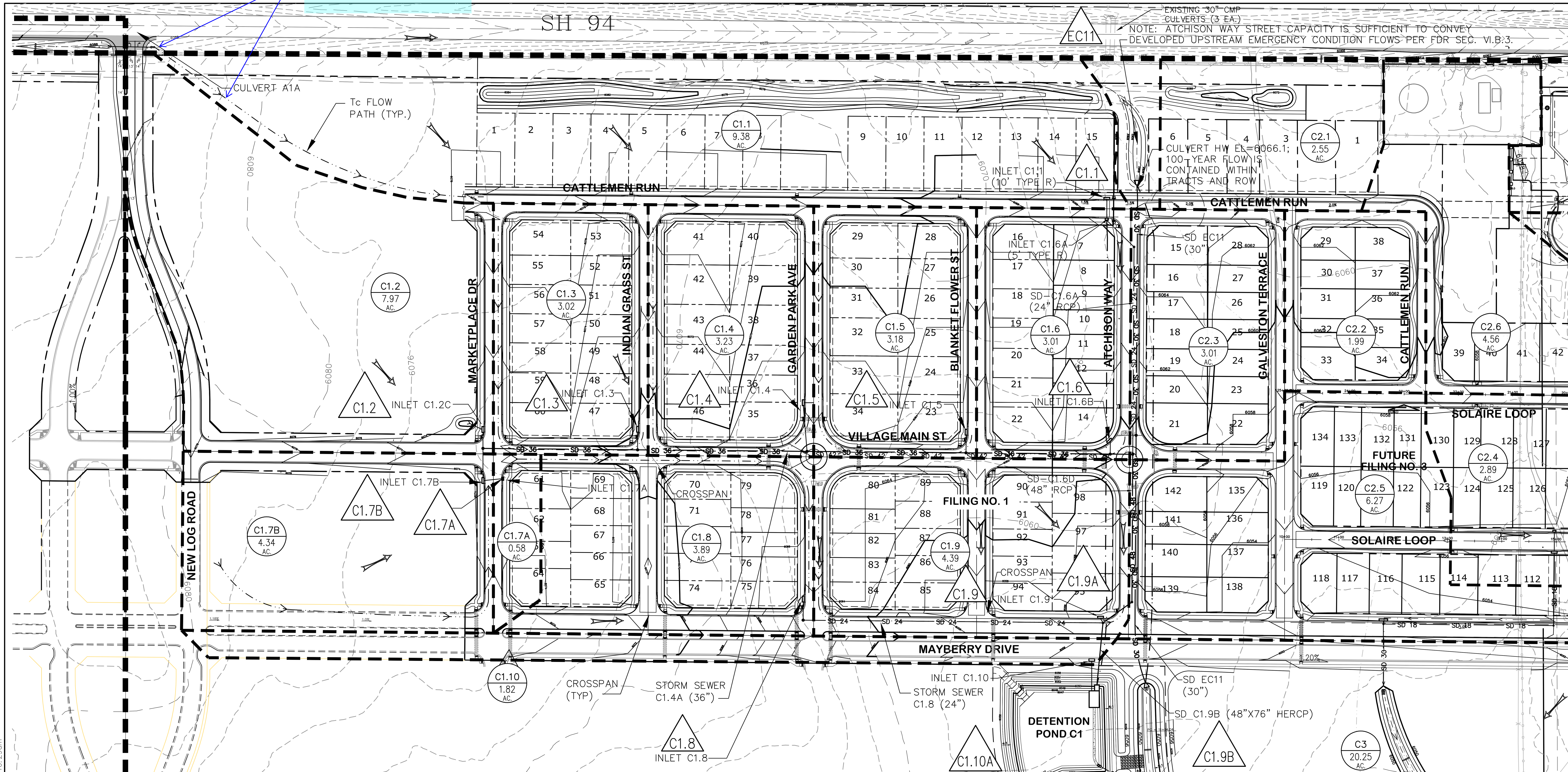
		DIRECT RUNOFF							TOTAL RUNOFF					STREET BYPASS				PIPE			TRAVEL TIME			
DESGIN POINT	STREET/ CONTRIBUTING BASINS	Basin Name	Area (ac)	Coeff C	Tc (min)	C*A (ac)	I	Q (cfs)	Tc (min)	Sum Area (ac)	Sum C*A (ac)	I in/hr	Q cfs	Street Q cfs	Street Slope %	Length ft	Street Tt min	Design Q cfs	Slope %	PIPE SIZE	L ft	VEL ft/sec	Tt min	Remarks
		B.2	0.38	0.81	5.0	0.31	8.68	2.7										2.7						
1	B.2								5.0	0.4	0.308	8.68	2.7					2.7			112	5	0.4	
		C.15	0.04	0.35	7.5	0.01	7.66	0.1										0.1						
2	DP1, C.15								7.5	0.4	0.322	7.66	2.5					2.5			82	5	0.3	
		C.13	0.01	0.42	5.8	0.00	8.29	0.0										0.0						
3	DP3, C.13								7.8	0.4	0.326	7.57	2.5					2.5			184	5	0.6	
		C.16	0.18	0.38	13.6	0.07	6.17	0.4										0.4						
4	C.16								13.6	0.2	0.069	6.17	0.4					0.4			129	5	0.4	
5	DP4, DP3								14.0	0.6	0.40	6.09	2.4					2.4			12	5	0.04	
		A.1	0.14	0.79	7.5	0.11	7.66	0.8										0.8						
6	DP5, A.1								14.0	0.8	0.51	6.08	3.1					3.1			193	5	0.64	
		B.1	0.38	0.81	5.0	0.31	8.68	2.7										2.7						
7	B.1								5.0	0.4	0.308	8.68	2.7					2.7			144	5	0.48	
		C.11	0.13	0.35	11.6	0.05	6.56	0.3										0.3						
8	DP7, C.11								11.6	0.5	0.353	6.56	2.3					2.3			95	5	0.32	
		C.21	0.02	0.35	8.2	0.01	7.43	0.1										0.1						
9	DP8, C.21								11.9	0.5	0.360	6.49	2.3					2.3			75	5	0.25	
		C.12	0.09	0.43	7.7	0.04	7.58	0.3										0.3						
10	C.12								7.7	0.1	0.039	7.58	0.3					0.3			91	5	0.30	
		C.14	0.05	0.42	9.1	0.02	7.18	0.2										0.2						
11	DP10, C.14								12.2	0.6	0.40	6.44	2.6					2.6			162	5	0.54	
12	DP11, DP9								12.7	0.7	0.44	6.33	2.8					2.8			15	5	0.05	
		A.2	0.48	0.85	8.6	0.41	7.30	3.0										3.0						
13	DP12, A.2								12.8	1.2	0.84	6.32	5.3					5.3			32	5	0.11	
14	DP13, DP6								14.7	1.9	1.35	5.97	8.0					8.0			205	5	0.68	
		A.3	0.61	0.81	8.7	0.49	7.29	3.6										3.6						
15	DP14, A.3								15.3	2.6	1.84	5.85	10.8					10.8			193	5	0.64	
		A.4	0.72	0.77	15.2	0.56	5.87	3.27										3.3						
16	DP15, A.4								16.0	3.3	2.40	5.75	13.8					13.8			132	5	0.44	
		A.5	0.51	0.89	9.8	0.45	6.99	3.17										3.2						
17	DP16, A.5								16.4	3.8	2.85	5.68	16.2					16.2			32	5	0.11	
		B.3	0.38	0.81	5.0	0.31	8.68	2.67										2.7						
18	B.3								5.0	0.4	0.308	8.68	2.7					2.7			32	5	0.11	
		C.20	0.03	0.35	9.0	0.01	7.19	0.08										0.1						
19	DP18, C.20								9.0	0.4	0.318	7.19	2.3					2.3			76	5	0.25	
		C.17	0.01	0.35	5.3	0.00	8.52	0.03										0.0						
20	DP19, C.17								9.3	0.4	0.322	7.12	2.3					2.3			110	5	0.37	
		C.18	0.18	0.42	13.3	0.08	6.22	0.47										0.5						
21	C.18								13.3	0.2	0.075	6.22	0.5					0.5			224	5	0.75	
22	DP21, DP20								14.0	0.6	0.40	6.09	2.4					2.4			8	5	0.03	
		A.6	0.43	0.88	8.1	0.38	7.47	2.82										2.8						
23	DP22, A.6								14.0	1.0	0.77	6.08	4.7					4.7			22	5	0.07	
		A.7	0.42	0.84	8.8	0.35	7.25	2.56										2.6						
24	A.7								8.8	0.4	0.353	7.25	2.6					2.6			85	5	0.28	
25	DP23, DP24								14.1	1.5	1.128	6.07	6.8					6.8			136	5	0.45	
		B.5	0.14	0.81	5.0	0.11	8.68	1.0										1.0						
26	B.5								5.0	0.1	0.113	8.68	1.0					1.0			210	5	0.70	

27	DP26, DP24								14.6	1.6	1.2	5.99	7.4					7.4			167	5	0.56	
		B.4	0.38	0.81	5.0	0.31	8.68	2.7										2.7						
28	B.4								5.0	0.4	0.308	8.68	2.7					2.7			204	5	0.68	
		C.19	0.15	0.80	8.4	0.12	7.37	0.9										0.9						
29	DP 28, C.19								8.4	0.5	0.427	7.37	3.1					3.1			162	5	0.54	
30	DP29								8.4	0.5	0.4	7.37	3.1					3.1			19	5	0.06	
		A.8	0.67	0.83	10.8	0.55	6.73	3.7										3.7						
31	DP29, A.8								10.8	1.2	0.981	6.73	6.6					6.6			23	5	0.08	
		A.9	0.31	0.88	9.5	0.27	7.07	1.9										1.9						
32	A.9								9.5	0.3	0.273	7.07	1.9					1.9			32	5	0.11	
33	DP32, DP31, DP27								15.1	3.1	2.5	5.89	14.7					14.7			85	5	0.28	
34	DP33, DP17								16.5	6.9	5.3	5.66	30.3					30.3			93	5	0.31	
		A.10	0.33	0.86	7.8	0.28	7.57	2.2										2.2						
35	DP34, A.10								16.8	7.2	5.63	5.62	31.7					31.7			132	5	0.44	
		OS.1	0.57	0.59	21.4	0.34	5.01	1.7										1.7						
36	OS.1								21.4	0.6	0.339	5.01	1.7					1.7						
		OS.2	0.62	0.58	13.0	0.36	6.28	2.3										2.3						
37	OS.2								13.0	0.6	0.362	6.28	2.3					2.3						

APPENDIX C

DRAINAGE MAPS

please clarify whether upstream flow from this culvert will continue into basin C1.1. or will travel eastward in the existing highway 94 ditch



LEGEND:

PROPERTY LINES

DRAINAGE BASIN BOUNDARY

SUB-BASIN BOUNDARY

PROPOSED FLOW DIRECTION ARROW

DESIGN POINT

DEVELOPED BASIN DESIGNATION

BASIN AREA (ACRES)

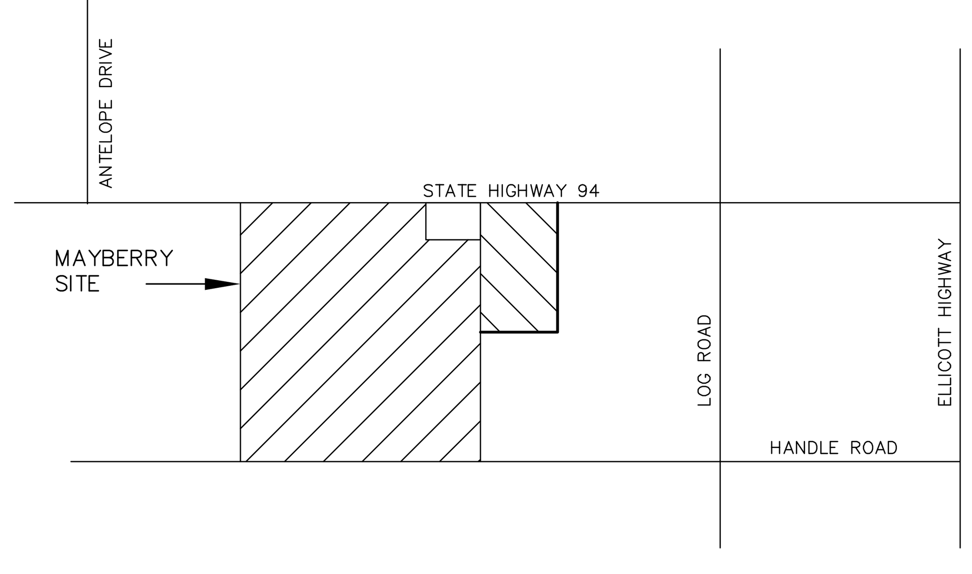
EXISTING CONTOURS

PROPOSED CONTOURS

PROPOSED STREET PROFILE GRADE

SUMMARY HYDROLOGY TABLE

DESIGN POINT	Q5 (CFS)	Q100 (CFS)
EC11	24.4	149.5
C1.1	5.4	18.0
C1.2	16.9	35.9
C1.3	5.9	14.3
C1.4	6.3	15.3
C1.5	6.2	15.6
C1.6	3.8	9.4
C1.7A	1.1	2.7
C1.7B	8.2	17.3
C1.8	7.5	18.4
C1.9A	13.7	33.3
C1.9B	35.7	87.0
C1.10A	37.2	90.6



VICINITY MAP
NTS

N

ORIGINAL SCALE: 1"=100'

100' 0 100' 200'

CONTOUR INTERVAL: 2 FEET

MAYBERRY, COLORADO SPRINGS - FILING NO. 1

JPS ENGINEERING
19 E. Willamette Ave.
Colorado Springs, CO 80903
PH: 719-477-9429
FAX: 719-471-0766
www.jpsengr.com

CALL UTILITY NOTIFICATION CENTER OF COLORADO
1-800-922-1987
CALL 2-BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE, OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES.

No.	REVISION	BY	DATE

FILING NO. 1
DEVELOPED DRAINAGE PLAN

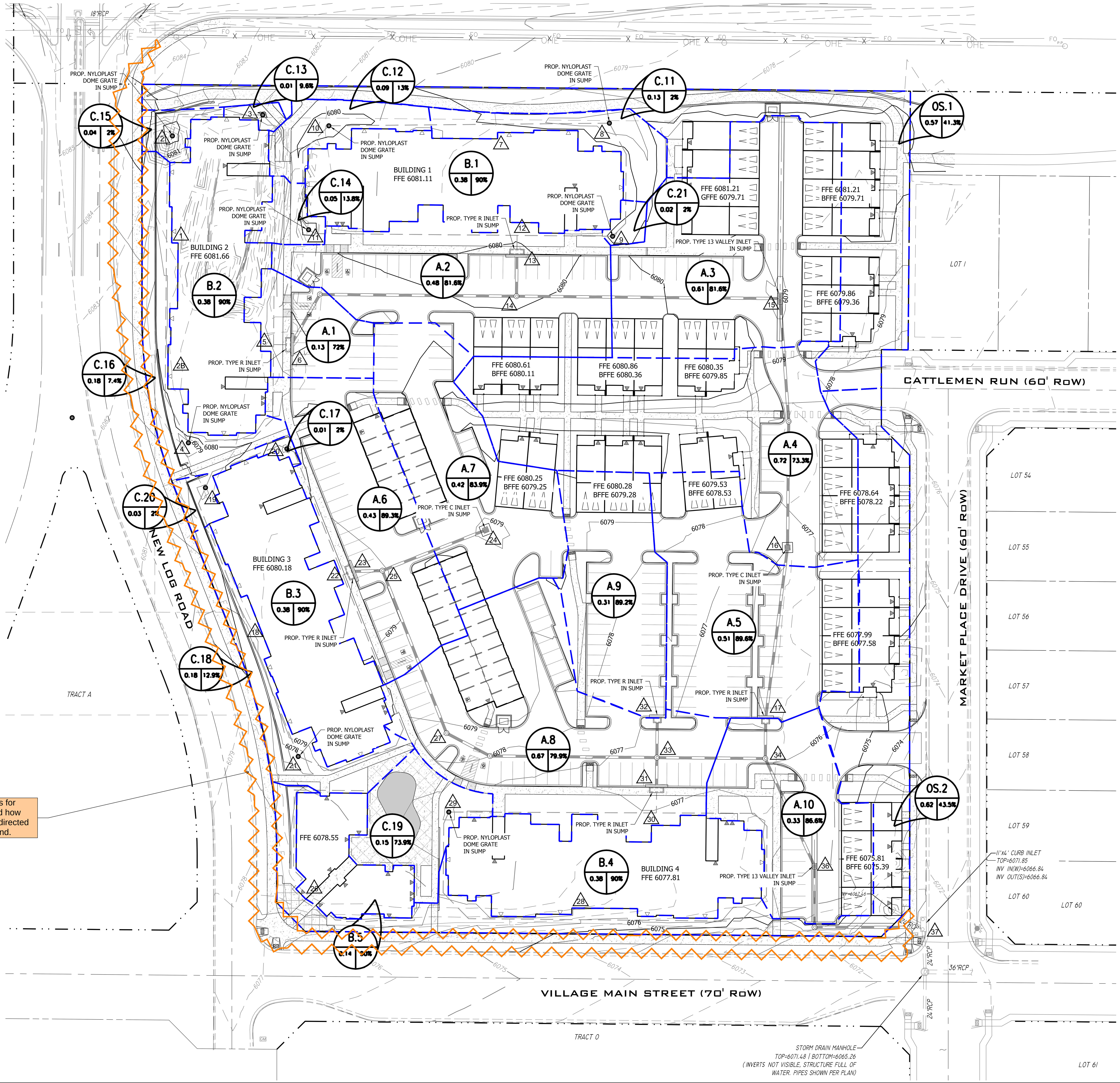
HORZ. SCALE:	1"=100'	DRAWN:	BJJ
VERT. SCALE:	N/A	DESIGNED:	JPS
SURVEYED:	RAMPART	CHECKED:	JPS
CREATED:	12/03/00	LAST MODIFIED:	4/7/22
PROJECT NO:	090001	MODIFIED BY:	JPS
SHEET:		D2.1	

show proposed stormwater flow arrows

DRAINAGE MAP
MAYBERRY, COLORADO - TRACT K APARTMENTS

A REPLAT OF PART OF TRACT M AND ALL OF TRACT P, MAYBERRY, COLORADO SPRINGS FILING NO. 1, AND ALL OF TRACTS A, B, C AND D, MAYBERR, COLORADO SPRINGS FILING NO. 2,
AND THAT PART OF SPRINGS ROAD RIGHT-OF-WAY LYING SOUTH OF SAID TRACT A AND THAT PART OF VILLAGE MAIN STREET RIGHT-OF-WAY LYING EAST OF ATCHISON WAY
ALL LOCATED IN THE NORTH HALF OF SECTION 14, TOWNSHIP 14 SOUTH, RANGE 63 WEST OF THE 6TH PRINCIPAL MERIDIAN
COUNTY OF EL PASO (UNINCORPORATED), STATE OF COLORADO

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



include basins for sidewalks and how water will be directed to existing pond.

LEGEND

BASIN ID
BASIN AREA (ACRES)
PERCENT IMPERVIOUS
DRAINAGE BASIN BOUNDARY
FLOW DIRECTION & SLOPE
DESIGN POINT

BASIN SUMMARY TABLE			
Basin	Area (acres)	5-yr (cfs)	100-yr (cfs)
A.1	0.14	0.33	0.5
A.2	0.48	1.21	1.8
A.3	0.61	1.80	2.1
A.4	0.72	1.45	2.0
A.5	0.51	1.39	1.9
A.6	0.43	1.29	1.7
A.7	0.42	1.18	1.5
A.8	0.67	1.60	2.2
A.9	0.31	0.87	1.2
A.10	0.33	0.97	2.1
B.1	0.38	1.75	1.6
B.2	0.38	1.75	1.6
B.3	0.38	1.75	1.6
B.4	0.38	1.75	1.6
B.5	0.14	0.64	0.6
C.11	0.13	0.01	0.2
C.12	0.09	0.05	0.2
C.13	0.01	0.01	0.0
C.14	0.05	0.02	0.1
C.15	0.04	0.00	0.1
C.16	0.18	0.04	0.3
C.17	0.01	0.00	0.0
C.18	0.18	0.06	0.3
C.19	0.15	0.35	0.5
C.20	0.03	0.00	0.0
C.21	0.02	0.00	0.0
OS.1	0.57	0.67	1.6
OS.2	0.62	0.86	2.2

DESIGN POINT SUMMARY TABLE				
Design Point	Contributing Basins	Area (acres)	5-yr (cfs)	100-yr (cfs)
1	B.2	0.38	1.72	2.63
2	DP1, C.15	0.42	1.53	2.44
3	DP3, C.13	0.43	1.52	2.44
4	C.16	0.18	0.04	0.41
5	DP4, DP3	0.61	1.23	2.34
6	DP5, A.1	0.75	1.48	2.98
7	B.1	0.38	1.72	2.63
8	DP7, C.11	0.51	1.30	2.27
9	DP8, C.21	0.53	1.29	2.28
10	C.12	0.09	0.05	0.29
11	DP10, C.14	0.62	1.32	2.51
12	DP11, DP9	0.71	1.33	2.70
13	DP12, A.2	1.19	2.35	5.19
14	DP13, DP6	1.94	3.66	7.80
15	DP14, A.3	2.55	4.98	10.43
16	DP15, A.4	3.27	6.26	13.32
17	DP16, A.5	3.78	7.27	15.63
18	B.3	0.38	1.72	2.63
19	DP18, C.20	0.41	1.43	2.26
20	DP19, C.17	0.42	1.42	2.26
21	C.18	0.18	0.06	0.46
22	DP21, DP20	0.60	1.25	2.35
23	DP22, A.6	1.03	2.27	4.57
24	A.7	0.42	1.16	2.52
26	B.5	0.14	0.63	0.97
27	DP26, DP24	1.59	3.61	7.20
28	B.4	0.38	1.72	2.63
29	DP 28, C.19	0.53	1.81	3.11
30	DP29	0.53	1.81	3.11
31	DP29, A.8	1.20	3.20	6.47
32	A.9	0.31	0.86	1.90
33	DP32, DP31, DP27	3.10	7.01	14.23
34	DP33, DP17	6.88	13.96	29.20
35	DP34, A.10	7.21	14.53	30.47
36	OS.1	0.57	0.67	1.62
37	OS.2	0.62	0.86	2.22

NO. REVISION BY DATE

R&R ENGINEERS SURVEYORS INC

R&R ENGINEERS-SURVEYORS, INC.
1635 WEST 13TH AVENUE, SUITE 310
DENVER, COLORADO 80204
PHONE: 303-753-6730
WWW.RRENGINEERS.COM

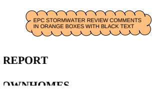
MAYBERRY - TRACT K APARTMENTS
SITE ADDRESS: MAYBERRY, COLORADO SPRINGS EL PASO COUNTY
PREPARED FOR: MAYBERRY COMMUNITIES, LLC 3296 DIVINE HEIGHTS #208 COLORADO SPRINGS, CO 80922

DRAINAGE MAP
JOB NO. MC22068
ORG. SUBM. DATE 03/21/2023
DWN: LAO CHKD: CJD
NAME
PROPOSED DRAINAGE MAP
NO.
DR-1

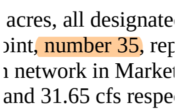
PATH:P:\MC22068 MAYBERRY APARTMENTS (SEC HWY 94 & NEW LOG RD)\ENGINEERING\3 DOCUMENTS\DRAINAGE MAPS\PROPOSED DRAINAGE MAP (03.08.23).DWG PLOT DATE: 3/14/2023 8:24:13 AM BY: LYNN O'GRADY

V1_Drainage Report - Preliminary.pdf Markup Summary 11-7-2023

Christina Prete (12)

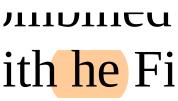


Author: Christina Prete
Subject: Stormwater Comments Color
Page Label: 1
Date: 11/6/2023 3:35:49 PM
Status:
Color:
Layer:
Space:



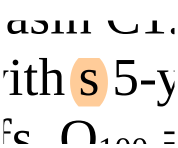
Author: Christina Prete
Subject: Highlight
Page Label: 6
Date: 11/6/2023 2:23:27 PM
Status:
Color:
Layer:
Space:

number 35



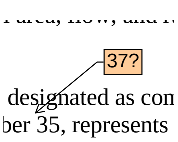
Author: Christina Prete
Subject: Highlight
Page Label: 6
Date: 11/6/2023 2:23:45 PM
Status:
Color:
Layer:
Space:

he



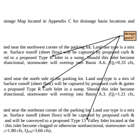
Author: Christina Prete
Subject: Highlight
Page Label: 6
Date: 11/6/2023 2:24:03 PM
Status:
Color:
Layer:
Space:

s



Author: Christina Prete
Subject: Contractor
Page Label: 6
Date: 11/6/2023 2:26:14 PM
Status:
Color:
Layer:
Space:

37?



Author: Christina Prete
Subject: Contractor
Page Label: 6
Date: 11/6/2023 2:29:35 PM
Status:
Color:
Layer:
Space:

design point?

Author: Christina Prete
Subject: Contractor
Page Label: 7
Date: 11/6/2023 2:29:53 PM
Status:
Color:
Layer:
Space:

include design point for all inlets

Author: Christina Prete
Subject: Contractor
Page Label: 9
Date: 11/6/2023 3:24:30 PM
Status:
Color:
Layer:
Space:

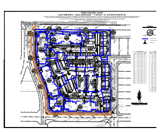
discuss C basins.

Author: Christina Prete
Subject: Contractor
Page Label: 9
Date: 11/6/2023 3:48:02 PM
Status:
Color:
Layer:
Space:

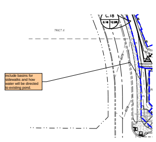
Please include the Four-Step Process (ECM Appendix I.7.2.A.)

Author: Christina Prete
Subject: Contractor
Page Label: [1] 24x36 Sheet
Date: 11/6/2023 3:35:14 PM
Status:
Color:
Layer:
Space:

show proposed stormwater flow arrows



Author: Christina Prete
Subject: PolyLine
Page Label: [1] 24x36 Sheet
Date: 11/6/2023 3:35:30 PM
Status:
Color:
Layer:
Space:



Author: Christina Prete
Subject: Contractor
Page Label: [1] 24x36 Sheet
Date: 11/6/2023 3:31:48 PM
Status:
Color:
Layer:
Space:

include basins for sidewalks and how water will be directed to existing pond.

Daniel Torres (8)

Author: Daniel Torres
Subject: Highlight
Page Label: 7
Date: 11/6/2023 8:44:29 PM
Status:
Color:
Layer:
Space:

Author: Daniel Torres
Subject: Highlight
Page Label: 7
Date: 11/6/2023 8:44:34 PM
Status:
Color:
Layer:
Space:

Author: Daniel Torres
Subject: Callout
Page Label: 7
Date: 11/6/2023 8:46:12 PM
Status:
Color:
Layer:
Space:

Should this be basin A8?

Author: Daniel Torres
Subject: Callout
Page Label: 7
Date: 11/6/2023 8:48:24 PM
Status:
Color:
Layer:
Space:

where is the runoff conveyed to once on Village Main if overtopping occurs

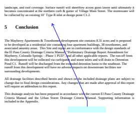
---

Author: Daniel Torres
Subject: Callout
Page Label: 7
Date: 11/6/2023 8:51:57 PM
Status:
Color:
Layer:
Space:

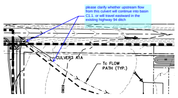
It appears that the perimeter drains will tie into the main storm system throughout the site. Please state that.

Author: Daniel Torres
Subject: Callout
Page Label: 9
Date: 11/6/2023 8:58:51 PM
Status:
Color:
Layer:
Space:

DP37 in the proposed conditions



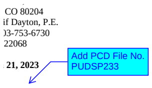
Author: Daniel Torres
Subject: Callout
Page Label: 9
Date: 11/6/2023 9:02:01 PM
Status:
Color:
Layer:
Space:



Author: Daniel Torres
Subject: Callout
Page Label: 26
Date: 11/6/2023 8:43:01 PM
Status:
Color:
Layer:
Space:

please clarify whether upstream flow from this culvert will continue into basin C1.1. or will travel eastward in the existing highway 94 ditch

lpackman (1)



Author: lpackman
Subject: Callout
Page Label: 1
Date: 10/30/2023 5:04:44 PM
Status:
Color:
Layer:
Space:

Add PCD File No. PUDSP233