

MEMORANDUM

DATE: November 30, 2021

TO: Kari Parsons, PCD-Project Manager

FROM: Jeff Rice, PCD-Engineering
719-520-7877

SUBJECT: SF-21-032– Sterling Ranch Filing No. 3
First Submittal

Engineering Division

Planning and Community Development (PCD)-Engineering reviews plans and reports to ensure general conformance with El Paso County standards and criteria. The project engineer is responsible for compliance with all applicable criteria, including other governmental regulations. Notwithstanding anything depicted in the plans in words or graphic representation, all design and construction related to roads, storm drainage and erosion control shall conform to the standards and requirements of the most recent version of the relevant adopted El Paso County standards, including the Land Development Code (LDC), the Engineering Criteria Manual (ECM), the Drainage Criteria Manual (DCM), and the Drainage Criteria Manual Volume 2 (DCM2). Any deviations from regulations and standards must be requested, and approved by the ECM Administrator, in writing. Any modifications necessary to meet overlooked criteria after-the-fact will be entirely the developer's responsibility to rectify.

A written response to all comments and redlines is required for review of the re-submittal. Please arrange a meeting between the developer's team and County staff to review and discuss these comments and prepared revisions/responses prior to the next submittal. Additional comments may be generated on items added or revised after the original comments.

Note: see associated comments and approvals on SP-20-003:

<https://epcdevplanreview.com/Public/ProjectComments/162868>

This project: <https://epcdevplanreview.com/Public/ProjectComments/174777>

Sand Creek Channel CDR-20-004:

<https://epcdevplanreview.com/Public/ProjectComments/152502>

Marksheffel, Vollmer, and Sterling Ranch Roads:

<https://epcdevplanreview.com/Public/ProjectComments/152663>

General / Letter of Intent

1. See minor LOI redlines.
2. Note: a channel maintenance agreement will be needed for Tract B. Staff will provide a draft agreement.
3. Note: This final plat is dependent on approval and construction of Sterling Ranch Filing No. 2 and CDR-20-005. Conditions of approval will be written accordingly, such as this draft condition: "Access to Sterling Ranch Filing No. 3 requires construction of Sterling Ranch Road and the other roads within and associated with Sterling Ranch Filing No. 2, which construction shall be complete or collateral provided for the incomplete portions prior to recording the Sterling Ranch Filing No. 3 final plat."

Final Plat

1. See final plat redlines.
JR Response: Addressed
2. Add a plat note addressing the retaining wall easement along the rear lot lines of Lots 31 and 38-43 including the responsible maintenance entity and access.
JR Response: Wall removed

Transportation / Traffic Impact Study

1. Address Table 4, items 7 and 9 from the Sterling Ranch Filing No. 2 and Sterling Ranch Phase 2 TIS.
2. Add the following or equivalent statement to the Recommended Improvements section: "An eastbound right-turn deceleration lane will not be required on Sterling Ranch Road approaching Dines Boulevard per TIS dated June 23, 2021 (SF-20-015 and SP-19-001)."

Final Drainage Report / Drainage Plans

1. See FDR redlines.
JR Response: Noted
2. Grading is proposed in the floodplain at the northeast corner of the site (and would be required to protect lots east of Dines Blvd. Provide bank stabilization in this area and along the proposed access road next to Sand Creek. An alternative would be not to plat lots or grade next to Sand Creek east of Dines Blvd. until bridge and channel construction has begun.
JR Response: Grading along the floodplain was revised .
3. Address drainage over or along the retaining wall along the rear lot lines of Lots 31 and 38-43 (drainage from these lots and upstream areas). Provide detailed grading and retaining wall details.
JR Response: Wall removed
4. Provide drainage easements over the proposed storm drain system on the southeast side of the plat.
JR Response: Added
5. Provide a Water Quality treatment plan (map) highlighting the areas contributing to each water quality facility.
JR Response : Map provided in Appendix E
6. Provide discussion of maintenance access to the channel.
JR Response: See BMP step 4
7. The drainage fee narrative will need additional information regarding improvements that have been constructed or collateralized with other filings to offset drainage fees, if applicable.
JR Response: Addressed

Construction Plans / Geotechnical Issues / Grading and Erosion Control Plan / SWMP

1. Clearly show and label all required offsite easements. Provide permission/easement documentation or reception numbers.
JR Response: Addressed
2. Revise pipe size/slope or provide a deviation request with adequate justification and specifications for watertight pressure pipe (ECM 3.3.1.D - exceeding short runs with a pressure head) where applicable.
JR Response: Pipe size enlarged
3. Clearly show and label all maintenance access roads and trails on the plans.
JR Response: Addressed

4. Geotechnical issues:
 - a. Provide the necessary additional geotechnical study for final design.
 - b. Address channel improvements and fill along the creek.
 - c. Note: a pavement design will be required once roads have been rough graded.

JR Response: Addressed, latest geotech study referenced.
5. If there will be USPS mail kiosk/cluster(s) in this subdivision provide location(s) and details.

JR Response: Addressed, mail kiosk added to street signage plan.
6. Provide easements and details for proposed retaining walls.

JR Response: Addressed
7. Provide cross-sections for the trails/maintenance access roads along Sand Creek

JR Response: Addressed
8. Ensure that road design and grades will meet ECM Chapter 6 criteria at pedestrian crossings at stop conditions. At least one location of concern has been redlined on the CDs.

JR Response: Addressed
9. See CD and GEC Plan redlines.

JR Response: Addressed
10. Note: Per the Marksheffel Road IGA: The District shall construct the Marksheffel Road Segment M2 between Sterling Ranch Road and the City boundary within three (3) years of recording of the final plat for Sterling Ranch Filing No. 2 or within twelve (12) months of recording of a final plat for the property adjacent to that portion of the Marksheffel Road Segment, whichever occurs sooner. It is recommended that construction plans for that segment of Marksheffel Road be submitted for review to allow time for the review process prior to the required construction date.

JR Response: Noted
11. Provide an informational profile along the gas main through the plat area showing cover and crossings.
12. JR Response: Addressed, gas profile added

Forms / SIA / Surety Estimate Form

1. Note: FAE quantities and costs will be reviewed in detail with the next submittal. Cursory comments:
 - a. Provide temporary sediment basins (at least one appears to be needed).
 - b. Provide channel bank stabilization in Section 1 (per GEC plan)
 - c. Provide trails, open space sidewalk (4" if not used for traffic), and maintenance roads.
 - d. Provide grass-lined channel quantity for the temporary swale.

JR Response: Noted, a temporary sediment basin should not be needed as it drains to pond W-5, erosion control blanket added, FAE updated.
2. See attached Engineering Final Submittal Checklist for reference.

JR Response: Addressed

Attachments/Electronic Files

1. Letter of Intent redlines
2. Final Plat redlines
3. Final Drainage Report redlines
4. CD redlines
5. GEC Plan redlines
6. ESQCP redlines
7. Engineering Final Submittal Checklist

Engineering Final Submittal Checklist	
Check Box	Item: Report/Form
<input type="checkbox"/>	Drainage Report (signed)
<input type="checkbox"/>	PBMP Applicability Form
<input type="checkbox"/>	Traffic Impact Study (signed)
<input type="checkbox"/>	Grading & Erosion Control Plan and checklist (signed)
<input type="checkbox"/>	Street Construction Plans (signed)
<input checked="" type="checkbox"/>	Deviation Request (signed)
<input checked="" type="checkbox"/>	MS4 Post Construction Form and SDI worksheet
<input checked="" type="checkbox"/>	Proof of embankment/pond submittal to State Engineer
<input type="checkbox"/>	ESQCP (signed)
<input type="checkbox"/>	* Financial Assurance Estimate, SIA (signed)
<input checked="" type="checkbox"/>	* Pond/BMP and Channel Maint. Agreements and Easement (signed)
<input checked="" type="checkbox"/>	* Operation & Maintenance Manual
<input type="checkbox"/>	AutoCAD base drawing (submitted to DPW)
<input type="checkbox"/>	Pre-Development Site Grading Acknowledgement and Right of Access Form (signed)
<input type="checkbox"/>	Other: <u>Offsite Easements, Other Permits (FEMA LOMR, USACE, Floodplain...), Conditions of Approval, Street light license agreement, etc.</u>
Pre-Construction Checklist:	
<input type="checkbox"/>	Driveway/Access Permit (Temporary access permits to be obtained from EPC DPW)
<input type="checkbox"/>	Work Within the ROW Permit (DPW or CDOT)
<input type="checkbox"/>	* Stormwater Management Plan (SWMP) and checklist Submit to PCD-Inspections 2 weeks prior to precon.
<input type="checkbox"/>	* Colorado Discharge Permit (COR: _____)
<input type="checkbox"/>	* County Construction Activity Permit
<input type="checkbox"/>	* CDPHE APEN – (if over 25 ac. or 6 mos.)
<input type="checkbox"/>	* Financial Surety (Letter of Credit/Bond/Collateral/Check)
<input type="checkbox"/>	Construction Permit Fee: <i>Major Final Plat (CO and/or PBMPs and/or offsite impvts.)</i> \$ _____ (Verify fees with Inspections Supervisor at time of scheduling)
<input type="checkbox"/>	Other: <u>Dewatering Permit, _____</u>

* - required items to obtain an ESQCP

Permit Fee and Collateral must be separate checks

Post Construction Submittal Checklist: (ECM 5.10.6)	
<input type="checkbox"/>	As-Built Drawings
<input type="checkbox"/>	Pond Certification Letter
<input type="checkbox"/>	Acceptance Letter for wet utilities

- ☐ = Need final / signed version

- ☒ = complete, in file

- ☐ = PCD Staff to provide

- ☐ = Undetermined at this time

- ☐ = Need later

**FINAL DRAINAGE REPORT
FOR
STERLING RANCH FILING 3**

Engineering Review

11/24/2021 2:17:29 PM

dsdrice

JeffRice@elpasoco.com

(719) 520-7877

**EPC Planning & Community
Development Department**

See comment letter also

Prepared For:

**SR Land, LLC
20 Boulder Crescent, Suite 200
Colorado Springs, CO 80903
(719) 491-3024**

**June 2021
Project No. 25188.02
SP-20-003**

**Prepared By:
JR Engineering, LLC
5475 Tech Center Drive, Suite 235
Colorado Springs, CO 80919
719-593-2593**

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 El Paso County for drainage reports and said report is in conformity with the master plan of the drainage basin. I accept responsibility for any liability caused by any negligent acts, errors, or omissions on my part in preparing this report.

Mike Bramlett, Colorado P.E. 38861
For and On Behalf of JR Engineering, LLC

DEVELOPER'S STATEMENT:

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

Business Name: SR Land, LLC

By: _____

Title: _____

Address: 20 Boulder Crescent, Suite 200
Colorado Springs, CO 80903

El Paso County:

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.

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

Date

Conditions:



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APPENDIX

- Appendix A – Vicinity Map, Soil Descriptions, FEMA Floodplain Map
- Appendix B – Hydrologic and Hydraulic Calculations
- Appendix C – Reference Material
- Appendix D – Drainage Maps

PURPOSE

This document is the Final Drainage Report for Sterling Ranch Filing 3. The purpose of this report is to identify on-site and off-site drainage patterns, storm sewer, culvert and inlet locations, areas tributary to the site, and to safely route developed storm water to adequate outfall facilities.

GENERAL SITE DESCRIPTION

GENERAL LOCATION

Sterling Ranch Filing 3 (hereby referred to as the “site”) is a proposed development within the Sterling Ranch master planned community with a total area of approximately 19.5 acres that are presently undeveloped.

The site is located in portions of the southwest quarter of Section 33, Township 12 South, Range 65 West of the Sixth Principal Meridian in El Paso County, State of Colorado. The site is bounded by Un-platted land to the south and west, Sterling Ranch Road to the north, and Sand Creek borders the site to east. Refer to the vicinity map in Appendix A for additional information.

DESCRIPTION OF PROPERTY

The property will be primarily be single-family residential development (approximately 12 acres), as well as open space and drainage tracts (approximately 7.5 acres). The site is comprised of variable sloping grasslands that generally slope(s) downward to the southeast at 3 to 8% towards the Sand Creek tributary basin.

Pawnee
Rancheros Filing 2
and southwest toward existing Pond W-5
(constructed with Sterling Ranch Filing No. 2)

JR Response: Updated

Soil characteristics are comprised of Type A and B hydrologic Soil groups. Refer to the soil survey map in Appendix A for additional information.

JR Response: Text added

There are no major drainage ways running through the site, although a tributary to the Sand Creek basin is immediately to the east of the site. Currently, JR Engineering is performing studies and plans to address Sand Creek stabilization.

There are no known irrigation facilities located on the project site.

FLOODPLAIN STATEMENT

Based on the FEMA FIRM Maps number 08041C0533G, dated December 7, 2018, the far eastern portion of the project site that is adjacent to the existing drainage way lies within Zone AE. Zone AE is defined as area subject to inundation by the 1-percent-annual-chance flood event. The majority of the proposed development lies within Zone X. Zone X is defined as area outside the Special Flood Hazard Area (SFHA) and higher than the elevation of the 0.2-percent-annual-chance (or 500-year)



flood. No grading operations are proposed within the Zone AE at this time. FIRM Maps have been presented in Appendix A.

GEC Plan shows grading

JR Response: Text added "Grading is proposed in the floodplain at the northeast corner of the site to protect lots east of Dines Blvd". Lots within tract C will be platted after construction of the bridge and channel are complete

EXISTING DRAINAGE CONDITIONS

MAJOR BASIN DESCRIPTIONS

The site lies within the Sand Creek Drainage Basin based on the "Sand Creek Drainage Basin Planning Study" (DBPS) completed by Kiowa Engineering Corporation in January 1993, revised March 1996. The Sand Creek Drainage Basin covers approximately 54 square miles and is divided into major sub-basins. The site is within the respective sub-basin is shown in Appendix E.

The Sand Creek DBPS assumed the Sterling Ranch Phase 2 property to have a "large lot residential" use for the majority of the site. The Sterling Ranch MDDP assumed a mix of commercial and single family residential lots ranging in size from 0.2 to 0.3 acres for the Sterling Ranch Phase 2 site. The proposed Sterling Ranch master plan is a mix of, school, multi-family, single-family, and commercial land uses, resulting in higher runoff. Any additional runoff will be provided for with the extended detention basin located at the southern edge of the site. The site generally drains from north to south consisting of rolling hills. Currently, the site is used as pasture land for cattle. Sand Creek is located east of the site running north to south. This reach of drainage conveyance is not currently improved. There are a few stock ponds within the creek channel used for cattle watering. Currently, JR Engineering is performing studies and plans to address Sand Creek stabilization adjacent to the site.

The proposed drainage on the site closely follows the approved "Master Development Drainage Plan for Sterling Ranch", (MDDP) prepared by M&S Civil Consultants, Inc., dated October 24, 2018. The site is tributary to Pond W5 and full-spectrum detention for the site was previously analyzed and can be found in the Final Drainage Report for Sterling Ranch Filing 2.

EXISTING SUB-BASIN DRAINAGE

The existing / predeveloped condition of the site was broken into two major basins: Basin A (western portion) and Basin B (Eastern Portion), as well as an offsite basin. The basin and sub-basin delineation is shown in the existing drainage map in Appendix E and is described as follows:

Sub-basin A1($Q_5 = 1.1\text{cfs}$, $Q_{100} = 8.0\text{cfs}$) is 5.17 acres and 0 percent impervious consists of the eastern portion of Sterling Ranch phase 2. Runoff from the existing storm sewer built with Filing 2 just east of the site. Collected runoff is piped south to the existing detention pond built with Filing 2 and outfalls to Sand Creek.

JR Response: "this basin is east of the Sterling Ranch Filing 3 site"



Sub-basin A2 ($Q_5 = 4.6\text{cfs}$, $Q_{100} = 33.6\text{cfs}$) is 27.48 acres and 0 percent impervious and consists the central portion of Sterling Ranch Phase 2. Runoff from this basin drains south onsite into the assumed existing storm sewer built with Filing 2 located at design point 2. Collected runoff is piped south to the existing detention pond built with Filing 2 and outfalls to Sand Creek.

Sub-basin B1 ($Q_5 = 2.6\text{cfs}$, $Q_{100} = 19.0\text{cfs}$) is 11.78 and is 0 percent impervious and is located on the eastern portion of the site portion of the site. Runoff from this basin drains to the southeast into Sand Creek at design point 4.

Sub-basin OS1 ($Q_5 = 13.4\text{cfs}$, $Q_{100} = 29.8\text{cfs}$) is 9.27 acres is 30.7 percent impervious and is located to the east of the site. Runoff from this basin drains into the Sterling Ranch Filing 2 detention Pond in confluence with upstream flows from the eastern portion of Sub-basin A2. Collected runoff is piped south to the

JR Response: "This basin is located south of the Sterling Ranch Filing 3 site"

and outfalls to Sand Creek.

PROPOSED DRAINAGE CONDITIONS

PROPOSED SUB-BASIN DRAINAGE

The proposed site was broken into three major basins: Basin A and I (western-portion), Basin B (eastern-portion) and Basin D (offsite eastern-portion) of the site. The proposed basin (and sub-basin) delineation is shown on the drainage basin map within Appendix E and is described as follows.

Basin A1 ($Q_5 = 8.1\text{cfs}$, $Q_{100} = 17.4\text{cfs}$) is 4.31 acres and 63 percent impervious and is comprised of single-family residential lots, and a local road. Runoff from this basin drains to design point 15, a type R on grade inlet at the southwest corner of the basin.

JR Response: Text updated

Basin A5 ($Q_5 = 1.4\text{cfs}$, $Q_{100} = 2.9\text{cfs}$) is 0.45 acres and 78 percent impervious is comprised of single-family residential lots and a local road. Runoff from this basin drains to design point 16, an on grade inlet at design point 16.

JR Response: Inlet sizes provided

provide sizes of all inlets

Basin B1 ($Q_5 = 6.2\text{cfs}$, $Q_{100} = 12.0\text{cfs}$) is 2.44 acres and 80 percent impervious is comprised of single-family residential lots, local roads, two urban knuckles, and a cul-de-sac. The runoff from basin B1 drains to a type R sump inlet located at design point 13.

Basin B2 ($Q_5 = 9.1\text{cfs}$, $Q_{100} = 18.7\text{cfs}$) is 4.33 acres and 73 percent impervious is comprised of single family residential lots. Runoff from basin B2 drains to a type R sump inlet located at design point 12.

Basin B3 ($Q_5 = 1.4\text{cfs}$, $Q_{100} = 2.8\text{cfs}$) is 0.66 acres and 63 percent impervious is comprised of open space and sidewalk. Runoff from basin B3 drains to a 15' type R on grade inlet located at design



Discuss here or in the Water Quality section the acreage of disturbed areas that will not be captured by the PBMP (the existing pond) and which exclusions apply to these two basins and others that may be applicable. Complete a PBMP Form to further document.

point 9 in existing Sterling Ranch Road. All of the runoff is captured in the 100 year event. Runoff from this sump inlet is piped and outfalls into pond W-5.

Basin B4 ($Q_5 = 2.1\text{cfs}$, $Q_{100} = 5.0\text{cfs}$) is 1.55 acres and 57 percent impervious is comprised of single family residential lots and open space. Runoff from basin B4 drains to a rear lot area inlet at DP 10.

JR Response:
Text Updated

more than 1?

Basin B5 ($Q_5 = 0.7\text{cfs}$, $Q_{100} = 1.7\text{cfs}$) is 0.45 acres and 51 percent impervious is comprised of single family residential lots and open space. Runoff from basin B4 drains to a rear lot area inlet at DP 11.

Basin B6 ($Q_5 = 0.8\text{cfs}$, $Q_{100} =$ ent impervious is comprised of single family residential lots and open space. Runoff from basin B4 drains to a rear lot area inlet at DP 14.

JR Response: Size provided

provide inlet sizes

Basin D1 ($Q_5 = 0.3\text{cfs}$, $Q_{100} = 1.9\text{cfs}$) is 0.77 acres and 0 percent impervious is comprised of open space area. Runoff from basin D1 sheet flow to the, so the historic condition. Flows generated from this

JR Response: Impervious
values updated

address outfall design

Basin D2 ($Q_5 = 1.4\text{cfs}$, $Q_{100} = 10.2\text{ cfs}$) is 3.92 acres and 0 percent impervious is comprised of open space area. Runoff from basin D1 sheet flow to the condition. Flows generated from this basin have been

JR Response: Impervious
values updated

and trail/access roads

Basin I1 ($Q_5 = 4.4\text{ cfs}$, $Q_{100} =$ ent impervious is comprised of open space. The runoff from this basin sheet flows generally to the south and east into a temporary drainage channel where it is conveyed to an existing storm stub at design point I1.

JR Response: Text updated

JR Response:
Text added " the
runoff is not
treated and
drains directly
into Sand Creek"

Basin I2 ($Q_5 = 0.7\text{cfs}$, $Q_{100} = 4.9\text{cfs}$) 3.47 acres and 0 percent impervious is comprised of open space. The runoff from this basin sheet flows to the south and east into an existing drainage swale where it eventually enters an existing storm stub provided from the Sterling Ranch Filing No 2. Project.

DRAINAGE DESIGN CRITERIA

DEVELOPMENT CRITERIA REFERENCE

Storm drainage analysis and design criteria for this project were taken from the "City of Colorado Springs/El Paso County Drainage Criteria Manual" Volumes 1 and 2 (EPCDCM), dated October 12, 1994, the "Urban Storm Drainage Criteria Manual" Volumes 1 to 3 (USDCM) and Chapter 6 and Section 3.2.1 of Chapter 13 of the "Colorado Springs Drainage Criteria Manual" (CSDCM), dated May 2014, as adopted by El Paso County.



HYDROLOGIC CRITERIA

All hydrologic data was obtained from the “*El Paso Drainage Criteria Manual*” Volumes 1 and 2, and the “*Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual*” Volumes 1, 2, and 3. Onsite drainage improvements were designed based on the 5 year (minor) storm event and the 100-year (major) storm event. Runoff was calculated using the Rational Method, and rainfall intensities for the 5-year and the 100-year storm return frequencies were obtained from Table 6-2 of the EPCSDCM. One hour point rainfall data for the storm events is identified in the chart below. Runoff coefficients were determined based on proposed land use and from data in Table 6-6 from the EPCSDCM. Time of concentrations were developed using equations from EPCSDCM. All runoff calculations and applicable charts and graphs are included in the Appendices.

Table 2 - 1-hr Point Rainfall Data

Storm	Rainfall (in.)
5-year	1.50
100-year	2.52

HYDRAULIC CRITERIA

The Rational Method and USDCM’s SF-2 and SF-3 forms were used to calculate runoff from the minor and major storms on the site. Sump and on-grade inlets were sized using UDFCD UD-Inlet v4.05. Autodesk Hydraflow express was used to size the **overflow channel** and an interim swale. Using StormCAD V8i, a modeling program for stormwater drainage, the hydraulic grade lines and energy grade lines were determined for the storm sewer network. Manhole and pipe losses for the model were obtained from the *Modeling Hydraulic and Energy Gradients in Storm Sewers: A Comparison of Computation Methods*, by AMEC Earth & Environmental, Inc. The manhole loss coefficients used in the model can be seen in Table 2. StormCAD results along with street and inlet capacities are presented in Appendix C.

JR Response: Calculation added see Appendix C

Table 2 - StormCAD Standard Method Conversions

StormCAD Conversion Table			
Bend Loss	Bend Angle	K coefficient Conversion	
	0	0.05	
	22.5	0.1	
	45	0.4	
	60	0.64	
	90	1.32	
Lateral Loss	1 Lateral K coefficient Conversion		
	Bend Angle	Non Surcharged	Surcharged
	45	0.27	0.47
	60	0.52	0.9
	90	1.02	1.77
	2 Laterals K coefficient Conversion		
	45	0.96	
	60	1.16	
	90	1.52	



See comment
letter.

DRAINAGE FACILITY DESIGN

GENERAL CONCEPT

The proposed stormwater conveyance system was designed to convey the developed Sterling Ranch Filing 3 runoff to an existing (Filing 2) full spectrum water quality and detention pond via storm sewer and swale. The proposed pond was designed to release at less than historic rates to minimize adverse impacts downstream. Treated water will outfall directly into the Sand Creek Drainage way, where it will eventually outfall into Fountain Creek. A proposed drainage map is presented in Appendix E showing locations of the pond. JR Engineering is working on a separate plan to stabilize Sand Creek directly adjacent to the site.

Revise section headings and subsequent headings per ECM Section I.7.2 BMP Selection)

FOUR STEP PROCESS TO MINIMIZE ADVERSE IMPACTS OF URBANIZATION

In accordance with the El Paso County Drainage Criteria Manual Volume 2, this site has implemented the four step process to minimize adverse impacts of urbanization. The four step process includes reducing runoff volumes, treating the water quality capture volume (WQCV), stabilizing drainage ways, and implementing long-term source controls.

Step 1 – Reducing Runoff Volumes: The site consists of single-family homes with open spaces and areas that which helps disconnect impervious areas and reduce runoff. Measures will discharge to lawn areas, where feasible, to allow for infiltration and runoff volume reduction.

JR Response: The text has been updated with the current heading within the Engineering Manual County of El Paso, Colorado Appendix I, Section 7.2

Step 2 – Stabilize Drainageways: The site lies within the Sand Creek Drainage Basin. Basin and bridge fees will be due at time of platting. These funds will be used for the channel stabilization being designed by JR Engineering adjacent to the site and on future projects within the basin to stabilize drainageways. The site does not discharge directly into the open drainageway of Sand Creek, therefore no downstream stabilization will be accomplished with this project.

Step 3 – Treat the WQCV: Water Quality treatment for this site is provided in an existing full spectrum water quality detention pond (W5). The runoff from this site will be collected within inlets and conveyed to the proposed ponds via storm sewer and swale. Upon entrance to the ponds, flows will be captured in a forebay designed to promote settlement of suspended solids. A trickle channel is also incorporated into the ponds to minimize the amount of standing water. The outlet structure has been designed to detain the water quality capture volume (WQCV) for 40 hours, and the extended urban runoff volume (EURV) for 72 hours. All flows released from the ponds will be reduced to less than historic rates.

Step 4 –BMPs will be utilized to minimize off-site contaminants and to protect the downstream receiving waters. The permanent erosion control BMPs include asphalt drives and parking, storm



inlets and storm pipe, the full spectrum detention pond W-5 and permanent vegetation. Maintenance responsibilities and plans will be defined at the time of final platting.

for Pond W5 were provided with Filing 2. A channel maintenance

WATER QUALITY agreement for Sand Creek will be provided with Filing 3.

In accordance with Section 13.3.2.1 of the CCS/EPCDCM, full **JR Response: Text updated** tion are provided for all developed basins. This site will drain into an existing Full Spectrum Drainage Pond W5 developed during the Sterling Ranch Filing No. 2 Project. Further details as well as all pond volume, water quality, and outfall calculations are included in the Sterling Ranch Filing 2 Final Drainage Report. Pond W5 corresponds to pond FSD6 from the Master Development Drainage Plan for Sterling Ranch", (MMDP) prepared by M&S Civil Consultants, Inc., dated October 24, 2018. ($Q_5=7.6$ cfs, $Q_{100}=149.7$ cfs) and is releasing less than the MDDP values in the proposed design. A summary of Pond W-5 has been included below for reference.

Table 3. Pond Volumes & Release Rates

	REQUIRED VOLUME (AC-FT)	VOLUME PROVIDED (AC-FT)	WQCV (AC-FT)	EURV (AC-FT)	5-YEAR RELEASE (CFS)	100-YEAR RELEASE (CFS)
POND W5	18.217	18.441	3.29	11.71	2.7	137.1

~~EROSION CONTROL PLAN~~

We respectfully request that the Erosion Control Plan and Cost Estimate be submitted in conjunction with the grading and erosion control plan and construction assurances posted prior to obtaining a grading permit.

OPERATION & MAINTENANCE

State that these have been submitted

In order to ensure the function and effectiveness of the **JR Response: Text updated** maintenance activities such as inspection, routine maintenance, restorative maintenance, rehabilitation and repair, are required. The district shall be responsible for the inspection, maintenance, rehabilitation and repair of stormwater and erosion control facilities located on the property unless another party accepts such responsibility in writing and responsibility is properly assigned through legal documentation. Access is provided from onsite facilities and easements for proposed infrastructure located offsite. We respectfully request that the Operation & Maintenance Manual be submitted in conjunction with the construction documents, prior to obtaining a grading permit. A maintenance road was provided for the existing pond W5 and information on the road can be found in the Final Drainage Report for Sterling Ranch Filing No. 2. The maintenance road access is off of Marksheffel Road and wraps around the top of the pond providing access to the inflow pipe wingwalls and outlet structure for the pond.

delete?

JR Response: Text deleted



DRAINAGE AND BRIDGE FEES

The site lies within the Sand Creek Drainage Basin. Anticipated drainage and bridge fees are presented below and will be due at time of platting (depending on date of plat submittal):.

2021 DRAINAGE AND BRIDGE FEES – STERLING RANCH FILING 3				
Impervious Acres (ac)	Drainage Fee (Per Imp. Acre)	Bridge Fee (Per Imp. Acre)	Sterling Ranch Drainage Fee	Sterling Ranch Bridge Fee
10	\$20,387	\$8,339	\$203,870	\$83,390

SUMMARY

The proposed Sterling Ranch development does not exceed the El Paso County Drainage Criteria. The proposed development will not adversely affect the offsite drainageways or surrounding development. This report is in conformance and meets the latest El Paso County Storm Drainage Criteria requirements for this site.

JR Response: Text added " The developed condition of tract C was used to calculate the overall impervious area. The total area used was 19.7 Acres and the net impervious value is 53.1.%"

Please state whether or not Tract C is being included as developed or not. Provide the overall imperviousness used for the calculation.



REFERENCES

1. "El Paso County and City of Colorado Springs Drainage Criteria Manual, Vol I & II".
2. Sand Creek Channel Design Report, prepared by JR Engineering, May 19, 2021 (not yet approved)
3. "Master Development Drainage Plan for Sterling Ranch", (MMDP) prepared by M&S Civil Consultants, Inc., dated October 24, 2018.
4. Sand Creek Drainage Basin Planning Study, prepared Kiowa Engineering Corporation, January 1993, revised March 1996.
5. "Sterling Ranch Filing 2 Final Drainage Report", prepared by JR Engineering, dated May 2020 (not yet approved)
6. Urban Storm Drainage Criteria Manual (Volumes 1, 2, and 3), Urban Drainage and Flood Control District, June 2001.
7. Sand Creek Stabilization at Aspen Meadows Subdivision Filing No. 1 – 100% Design Plans, April 2020

← Updated MDDP (under review)

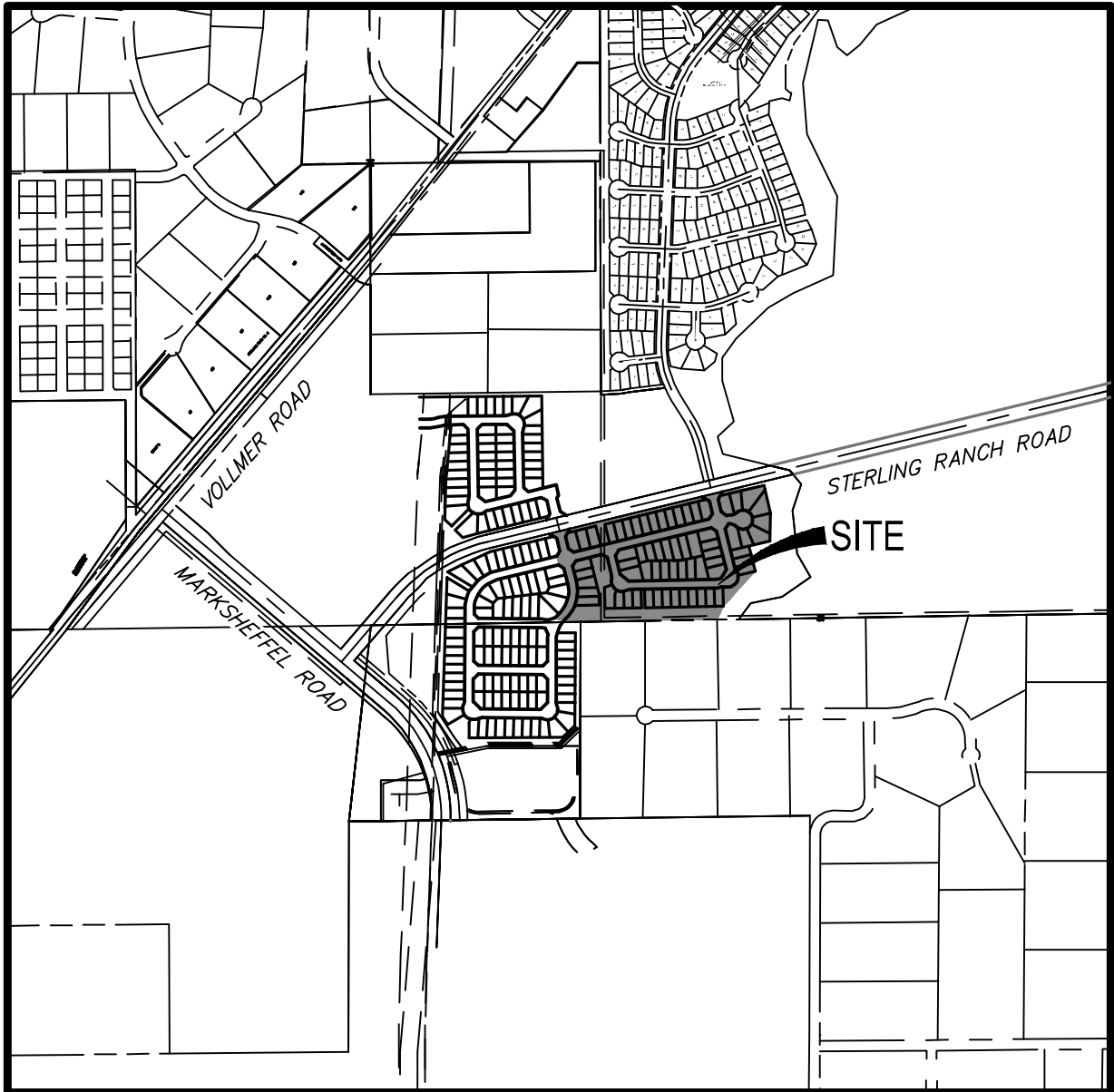
JR Response: Updated

and DCM Update

JR Response: Updated



Appendix A
Vicinity Map, Soil Descriptions, FEMA Floodplain Map



VICINITY MAP

SCALE: 1" = 1000'

VICINITY MAP
STERLING RANCH FILING 3
JOB NO. 25188.02
06/09/21
SHEET 1 OF 1

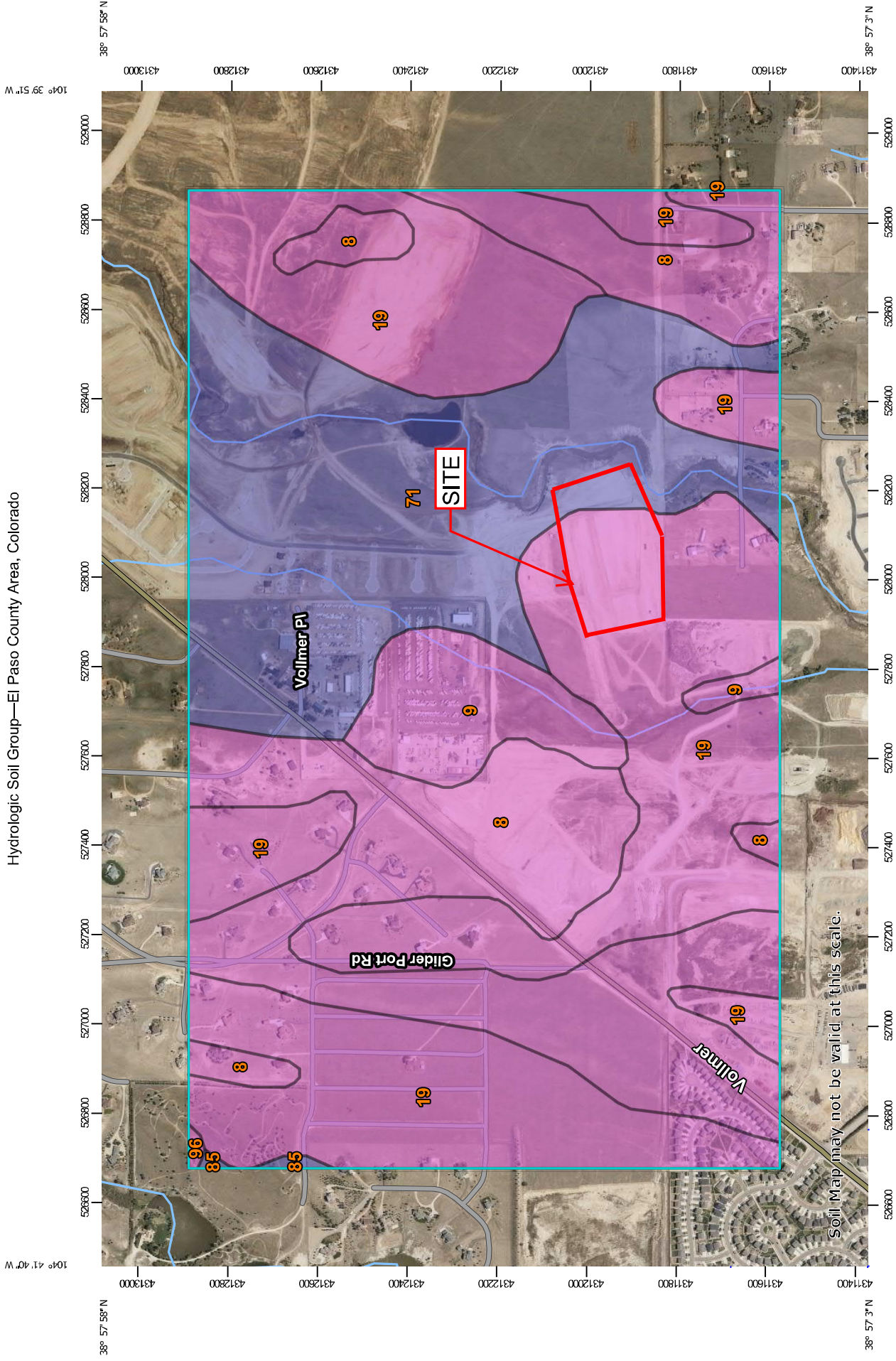


J-R ENGINEERING

A Westrian Company

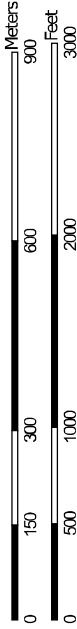
Centennial 303-740-9993 • Colorado Springs 719-593-2593
Fort Collins 970-491-9888 • www.jrengineering.com

Hydrologic Soil Group—El Paso County Area, Colorado



Soil Map may not be valid at this scale.

Map Scale: 1:12,000 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

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

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

C

C/D

D

Not rated or not available

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 17, Sep 13, 2019

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

Date(s) aerial images were photographed: Aug 19, 2018—May 26, 2019

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	182.3	25.4%
9	Blakeland-Fluvaquentic Haplaquolls	A	36.8	5.1%
19	Columbine gravelly sandy loam, 0 to 3 percent slopes	A	307.5	42.9%
71	Pring coarse sandy loam, 3 to 8 percent slopes	B	188.4	26.3%
85	Stapleton-Bernal sandy loams, 3 to 20 percent slopes	B	1.2	0.2%
96	Truckton sandy loam, 0 to 3 percent slopes	A	0.6	0.1%
Totals for Area of Interest			716.9	100.0%

Description

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

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

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

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

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

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

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

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

NOTES TO USERS

To obtain more detailed information in areas where **Base Flood Elevations (BFEs)** are not available, or **base 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. Base BFEs are rounded down and floodway elevations are rounded up. Users should be aware that the purpose of 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 (NAVD83)). Users of this FIRM should be aware that the FEMA Flood Insurance Study (FIS) for this jurisdiction, Flood Insurance Elevations table in the Flood Insurance Study for this jurisdiction, Flood Insurance Elevations table 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.

The projection used in the preparation of this map was Universal Transverse Mercator (UTM) zone 13. The horizontal datum was NAD83, GRS90 spheroid. Differences in datum, spheroid, projection or UTM zones exist in the published maps of the area; adjacent jurisdictions may have different projections or datum. These differences may result in slight positional errors at the boundary between 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 Survey datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at <http://www.nga.noaa.gov> or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, NINGS12
National Geodetic Survey
SSM-C-3, #9202
1315 East-West Highway
Silver Spring, MD 20910-3282

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

Base Map: Information shown on this FIRN 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 cross-sections that differ from what is shown on this map. The profile breaklines depicted

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to renovations or de-rennovations may have occurred since the map was published, the corporate limits shown on this map may not reflect the current corporate limits. Corporate limits shown 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.

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 (NFIP) data for each community as well as a listing of the panels on which each community is

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 FIRN. 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.nsc.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/info>.

REFER TO SECTION 3.3 OF THE EL PASO COUNTY FLOOD INSURANCE STUDY FOR STREAM BY STREAM VERTICAL DATUM CONVERSION INFORMATION

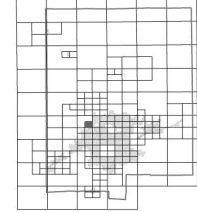
[illegible]

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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This Digital Flood Insurance Rate Map (DFIRM) was produced through a Cooperating Technical Partner (CTP) agreement between the State of Colorado Water Conservation Board (CWCBS) and the Federal Emergency Management Agency (FEMA).

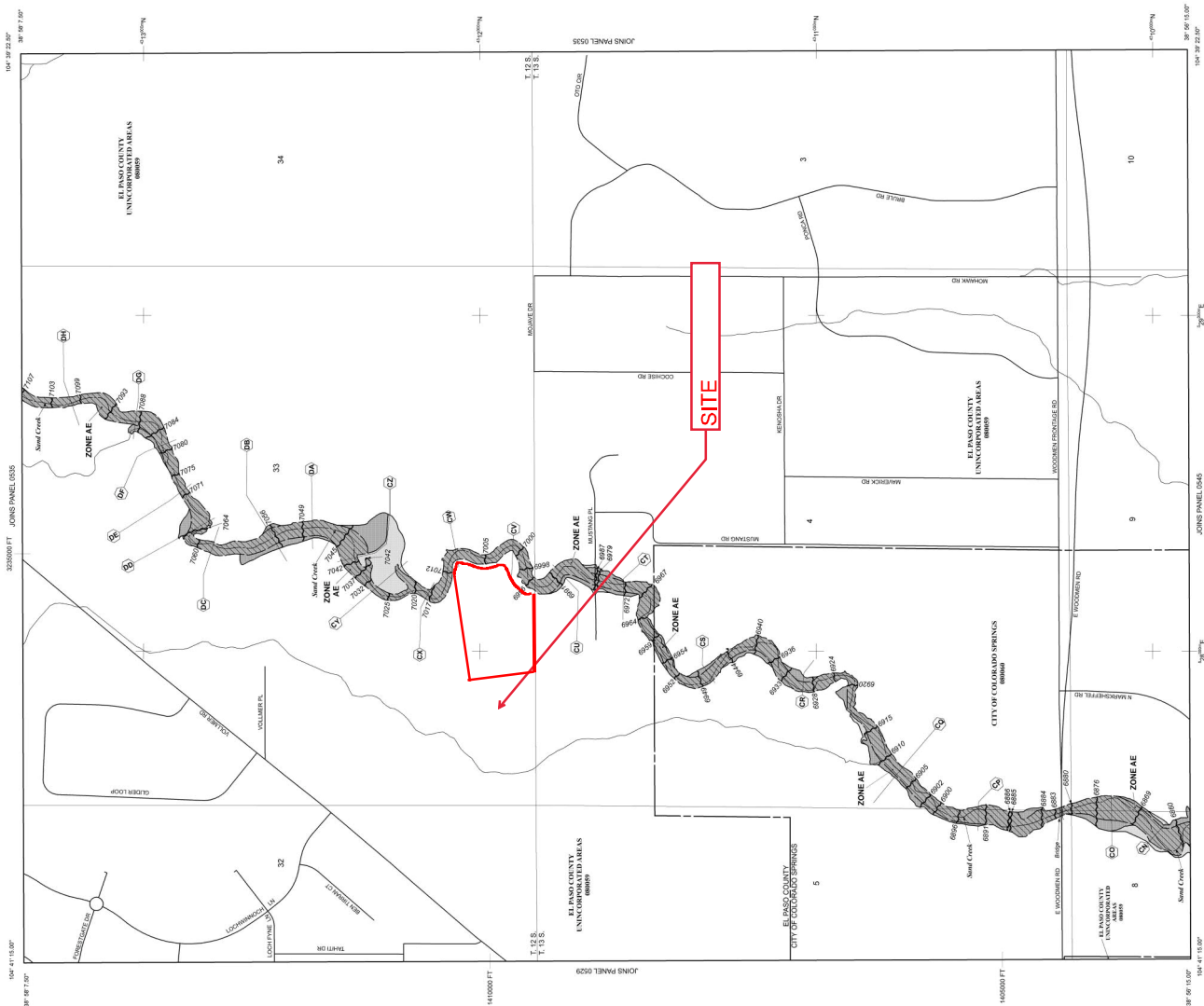


Additional Flood Hazard information and resources are available from local communities and the Colorado Water Conservation Board.



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





NOTE: MAD AREA SHOWN ON THIS DAME! IS LOCATED WITHIN TOWNSHIP 12 SOUTH RANGE 66 WEST AND TOWNSHIP 13 SOUTH RANGE 66 WEST

LEGEND

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. Special Flood Hazard Areas (SFHAS) are the areas that are subject to inundation by the 1% annual chance flood. Special Flood Hazard include Zones A, AE, AH, AR, A99, V and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

	Zone A	Zone AE	Zone AH	Zone AO	Zone AF
No Base Flood Elevations determined.					
Base Flood Elevations determined.					
Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.					
Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. Areas of structural flood proofing, vehicles also determined.					

General Flood Hazard Area Boundary contained from FEMA National Flood Insurance Program maps.

ZONE A09	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

ZONE VE		FLOODWAY AREAS IN ZONE AE
<p>Unfloodable determined.</p> <p>Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.</p>	<p>The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept unencumbered so that the 2% annual chance flood can be carried without undue damage to life and property in flood-hazard areas.</p>	

OTHER FLOOD AREAS

Area of 0.24% annual chance flood: areas of 1% annual chance flood with average depths of less than 1 foot or with average depths less than 1 square meter; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X
ZONE D

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

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

 OTHERWISE PROTECTED AREAS (OPAs)

OPAs are normally located within or adjacent to Special Flood Hazard Areas

_____ Floodplain boundary

_____ Floodway boundary

_____ Zone D boundary


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

 Base Flood Elevation line and value; elevation in feet

 Base Flood Elevation value where uniform within zone; elevation in feet

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

 Cross section line

 Transect line

Geographic coordinates referenced to the North American Datum of 1983 (NAD 83):

37° 07' 30.00"
 105° 22' 30.00"
 105° 22' 30.00"

6000000 FT	5000-foot grid ticks: Colorado State Plane coordinate system, central zone (FIPSZONE 5002), Lambert Conformal Conic Projection
4751100	1000-meter Transverse Mercator grid ticks, zone 13

● M1.5 River Mile

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
DECEMBER 7, 2018 - Update corporate limits, to change Base Flood Elevation and Special Flood Hazard Areas, to update map format, to add roads and road names, and incorporate previously issued Letters of Map Revision.
 MARCH 17, 1997

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6610.

MAP SCALE 1" = 500'

0 500 1000
FEET

0 150 300
METERS

ANFEL 05230

FIRM
FLOOD INSURANCE RATE MAP

EL PASO COUNTY,
COLORADO
AND INCORPORATED ARE
PANEL 533 OF 1300

CONTAINS	COMMUNITY	NUMBER	PANEL
COLORADO SPRINGS CITY OF	SN000	0203	
EL PASO COUNTY	RR050	0633	

[illegible]

Notice to User: The **Map Number** shown below should be used to identify the map in the County Number chart above should not be used for insurance applications subject community.

MAP REVISED
DECEMBER 7, 2003
Federal Emergency Management Agency

183

Appendix B

Hydrologic Calculations

COMPOSITE % IMPERVIOUS & COMPOSITE EXISTING RUNOFF COEFFICIENT CALCULATIONS

Subdivision: Sterling Ranch Subdivision- Existing
Location: El Paso County

Project Name: Sterling Ranch Filing 3
Project No.: 25188.02
Calculated By: CJD
Checked By:
Date: 6/9/21

Basin ID	Total Area (ac)	Streets (100% Impervious)				Residential (65% Impervious) Neighborhood Area (70% Impervious)				1 Acre lot Residential (20% Impervious) Light Commercial (80% Impervious)				Lawns (0% Impervious) (55% Impervious)				School		Basins Total Weighted C Values		Basins Total Weighted % Imp.		
		C ₅	C ₁₀₀	Area (ac)	Weighted % Imp.	C ₅	C ₁₀₀	Area (ac)	Weighted % Imp.	C ₅	C ₁₀₀	Area (ac)	Weighted % Imp.	C ₅	C ₁₀₀	Area (ac)	Weighted % Imp.	C ₅	C ₁₀₀					
A1	5.17	0.90	0.96	0.00	0.0%	0.45	0.59	0.00	0.0%	0.59	0.70	0.00	0.0%	0.59	0.70	0.00	0.0%	0.08	0.35	5.17	2.0%	0.08	0.35	2.0%
A2	27.48	0.90	0.96	0.00	0.0%	0.45	0.59	0.00	0.0%	0.45	0.59	0.00	0.0%	0.59	0.70	0.00	0.0%	0.08	0.35	27.48	0.0%	0.08	0.35	0.0%
B1	11.78	0.90	0.96	0.00	0.0%	0.45	0.59	0.00	0.0%	0.45	0.59	0.00	0.0%	0.59	0.70	0.00	0.0%	0.08	0.35	11.78	0.0%	0.08	0.35	0.0%
OS1	9.27	0.90	0.96	2.85	30.7%	0.45	0.59	0.00	0.0%	0.45	0.59	2.85	6.1%	0.30	0.40	3.57	0.0%	0.08	0.35	3.57	0.0%	0.40	0.55	36.9%
TOTAL (A1-B1)	44.43																							0.2%
TOTAL	53.70																							6.6%

EXISTING
STANDARD FORM SF-2
TIME OF CONCENTRATION

Subdivision: Sterling Ranch Subdivision- Existing
Location: El Paso County

Project Name: Sterling Ranch Filing 3
Project No.: 25188.02
Calculated By: CJD
Checked By: _____
Date: 6/9/21

SUB-BASIN						INITIAL/OVERLAND			TRAVEL TIME					t _c CHECK				FINAL
DATA						(T _i)			(T _t)					(URBANIZED BASINS)				
BASIN ID	D.A. (ac)	Hydrologic Soils Group	Impervious (%)	C ₅	C ₁₀₀	L (ft)	S _o (%)	t _i (min)	L _t (ft)	S _t (%)	K	VEL. (ft/s)	t _t (min)	COMP. t _c (min)	TOTAL LENGTH (ft)	Urbanized t _c (min)	t _c (min)	
A1	5.17	A	2%	0.08	0.35	212	2.0%	21.4	517	2.1%	10.0	1.4	6.0	27.4	729.0	32.1	27.4	
A2	27.48	A	0%	0.08	0.35	297	2.5%	23.4	1475	2.4%	10.0	1.6	15.7	39.1	1772.0	43.5	39.1	
B1	11.78	A	0%	0.08	0.35	297	2.9%	22.4	380	5.2%	10.0	2.3	2.8	25.2	677.0	29.1	25.2	
OS1	9.27	A	37%	0.40	0.55	298	2.7%	15.7	737	2.4%	10.0	1.5	8.0	23.7	1035.0	25.4	23.7	

NOTES:

$$t_c = t_i + t_t$$

Where:

t_c = computed time of concentration (minutes)

t_i = overland (initial) flow time (minutes)

t_t = channelized flow time (minutes).

Equation 6-2

$$t_i = \frac{0.395(1.1 - C_3)\sqrt{L_i}}{S_o^{0.33}}$$

Where:

t_i = overland (initial) flow time (minutes)

C_3 = runoff coefficient for 5-year frequency (from Table 6-4)

L_i = length of overland flow (ft)

S_o = average slope along the overland flow path (ft/ft).

Equation 6-3

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

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

Where:

t_t = channelized flow time (travel time, min)

L_t = waterway length (ft)

S_o = waterway slope (ft/ft)

P_t = travel time velocity (ft/sec) = K'/S_o

K = NRCS conveyance factor (see Table 6-2).

Equation 6-4

$$t_c = (26 - 17t) + \frac{L_c}{60(14 + 9\sqrt{S_o})}$$

Where:

t_c = minimum time of concentration for first design point when less than t_c from Equation 6-1.

L_c = length of channelized flow path (ft)

t = imperviousness (expressed as a decimal)

S_o = slope of the channelized flow path (ft/ft).

Equation 6-5

Table 6-2. NRCS Conveyance factors, K

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

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

Subdivision: Sterling Ranch Subdivision- Existing Location: El Paso County Design Storm: 5-Year	Project Name: Sterling Ranch Filing 3 Project No.: 25188.02 Calculated By: CID Checked By: Date: 6/9/21
--	--

STREET	Design Point	DIRECT RUNOFF						TOTAL RUNOFF			STREET/SWALE			PIPE			TRAVEL TIME			REMARKS		
		Basin ID	Area (Ac)	Runoff Coeff.	t_c (min)	C^*A (Ac)	I (in/hr)	Q (cfs)	t_c (min)	C^*A (ac)	I (in/hr)	Q (cfs)	$Q_{street/swale}$ (cfs)	C^*A (ac)	Slope (%)	Q_{pipe} (cfs)	C^*A (ac)	Slope (%)	Pipe Size (inches)		Length (ft)	Velocity (fps)
	1	A1	5.17	0.08	27.4	0.41	2.62	1.1														
	2	A2	27.48	0.08	39.1	2.20	2.08	4.6														Basin A2
	3	OS1	9.27	0.40	23.7	3.71	2.83	10.5														Basin A1
	4	B1	11.78	0.08	25.2	0.94	2.74	2.6														Basin OS1

Notes:
 Street and Pipe C^*A values are determined by Q/I using the catchment's intensity value.
 All pipes are private and RCP unless otherwise noted. Pipe size shown in table column.

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

Subdivision: Sterling Ranch Subdivision- Existing Location: El Paso County Design Storm: 100-Year	Project Name: Sterling Ranch Filing 3 Project No.: 25188.02 Calculated By: CID Checked By: Date: 6/9/21
--	--

Description	Design Point	DIRECT RUNOFF						TOTAL RUNOFF				STREET/SWALE			PIPE				TRAVEL TIME			REMARKS
		Basin ID	Area (ac)	Runoff Coeff.	t_c (min)	C^*A (ac)	I (in/hr)	Q (cfs)	t_c (min)	C^*A (ac)	I (in/hr)	Q (cfs)	$Q_{Street/Swale}$ (cfs)	C^*A (ac)	Slope (%)	Q_{Pipe} (cfs)	C^*A (ac)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	
	1	A1	5.17	0.35	27.4	1.81	4.39	8.0														
	2	A2	27.48	0.35	39.1	9.62	3.49	33.6														Basin A2
	3	OS1	9.27	0.55	23.7	5.13	4.76	24.4														Basin A1
	4	B1	11.78	0.35	25.2	4.12	4.60	19.0														Basin OS1

Notes:
 Street and Pipe C^*A values are determined by Q/I using the catchment's intensity value.
 All pipes are private and RCP unless otherwise noted. Pipe size shown in table column.

COMPOSITE % IMPERVIOUS & COMPOSITE PROPOSED RUNOFF COEFFICIENT CALCULATIONS

Subdivision: Sterling Ranch Subdivision
Location: El Paso County

Project Name: Sterling Ranch Filing 3
Project No.: 25188.02
Calculated By: CID
Checked By:
Date: 6/9/21

Basin ID	Total Area (ac)	Streets (100% Impervious)			Residential (65% Impervious)			Light Industrial (80% Impervious) Commercial (95% Impervious)			Lawns (0% Impervious) (55% Impervious)			School Weighted % Imp.		Basins Total Weighted C Values		Basins Total Weighted % Imp.
		C ₅	C ₁₀₀	Area (ac)	Weighted % Imp.	C ₅	C ₁₀₀	Area (ac)	Weighted % Imp.	C ₅	C ₁₀₀	Area (ac)	Weighted % Imp.	Weighted % Imp.	Weighted % Imp.	C ₅	C ₁₀₀	
A1	4.31	0.90	0.96	0.92	21.3%	0.45	0.59	2.79	42.1%	0.59	0.70	0.00	0.0%	0.0%	0.0%	0.49	0.64	53.4%
A5	0.45	0.90	0.96	0.17	37.8%	0.45	0.59	0.28	40.4%	0.59	0.70	0.00	0.0%	0.0%	0.0%	0.62	0.73	78.2%
I1	21.99	0.90	0.96	0.12	0.5%	0.45	0.59	0.00	0.0%	0.59	0.70	0.00	0.0%	0.0%	0.0%	0.08	0.35	0.5%
I2	3.47	0.90	0.96	0.00	0.0%	0.45	0.59	0.00	0.0%	0.59	0.70	0.00	0.0%	0.0%	0.0%	0.08	0.35	0.0%
B1	2.44	0.90	0.96	1.04	42.6%	0.45	0.59	1.40	37.3%	0.59	0.70	0.00	0.0%	0.0%	0.0%	0.64	0.75	79.9%
B2	4.33	0.90	0.96	0.94	21.7%	0.45	0.59	3.39	50.9%	0.59	0.70	0.00	0.0%	0.0%	0.0%	0.55	0.67	72.6%
B6	0.78	0.90	0.96	0.00	0.0%	0.45	0.59	0.53	44.2%	0.59	0.70	0.00	0.0%	0.0%	0.0%	0.33	0.51	44.2%
B5	0.45	0.90	0.96	0.00	0.0%	0.45	0.59	0.35	50.6%	0.59	0.70	0.00	0.0%	0.0%	0.0%	0.37	0.54	50.6%
B4	1.55	0.90	0.96	0.00	0.0%	0.45	0.59	1.35	56.6%	0.59	0.70	0.00	0.0%	0.0%	0.0%	0.40	0.56	56.6%
B3	0.66	0.90	0.96	0.34	51.5%	0.45	0.59	0.12	11.8%	0.59	0.70	0.00	0.0%	0.0%	0.0%	0.57	0.71	63.3%
D1	0.77	0.90	0.96	0.00	0.0%	0.45	0.59	0.00	0.0%	0.59	0.70	0.00	0.0%	0.0%	0.0%	0.08	0.35	0.0%
D2	3.92	0.90	0.96	0.00	0.0%	0.45	0.59	0.00	0.0%	0.59	0.70	0.00	0.0%	0.0%	0.0%	0.08	0.35	0.0%
Basin A&B TOTAL	14.97																	67.1%
TOTAL	45.12																	22.5%

PROPOSED
STANDARD FORM SF-2
TIME OF CONCENTRATION

Subdivision: Sterling Ranch Subdivision
Location: El Paso County

Project Name: Sterling Ranch Filing 3
Project No.: 25188.02
Calculated By: CID
Checked By:
Date: 6/9/21

SUB-BASIN DATA				INITIAL/OVERLAND (T _i)			TRAVEL TIME (T _t)				t _c CHECK (URBANIZED BASINS)			FINAL		
BASIN ID	D.A. (ac)	Hydrologic Soils Group	Imperious (%)	C ₁₀₀	L (ft)	S _o (%)	t _i (min)	L _t (ft)	S _t (%)	K	VEL. (ft/s)	t _t (min)	COMP. t _c (min)	TOTAL LENGTH (ft)	Urbanized t _c (min)	t _c (min)
A1	4.31	A	63%	0.49	79	1.7%	8.2	1007	3.7%	20.0	3.8	4.4	12.5	1086.0	20.1	12.5
A5	0.45	A	78%	0.62	0.73	54	3.7%	4.1	217	3.9%	20.0	4.0	0.9	5.0	271.0	13.6
I1	21.99	A	1%	0.08	0.35	793	3.1%	35.5	627	3.7%	10.0	1.9	5.4	41.0	1420.0	31.9
I2	3.47	A	0%	0.08	0.35	383	3.2%	24.6	394	1.0%	10.0	1.0	6.6	31.1	777.0	33.3
B1	2.44	A	80%	0.64	0.75	50	2.5%	4.3	1066	1.6%	20.0	2.5	7.1	11.4	1116.0	19.4
B2	4.33	A	73%	0.55	0.67	226	4.9%	8.8	346	0.7%	20.0	1.7	3.4	12.2	572.0	17.2
B6	0.78	A	44%	0.33	0.51	246	1.5%	19.1	0	1.0%	20.0	2.0	0.0	19.1	246.0	18.5
B5	0.45	A	51%	0.37	0.54	129	5.0%	8.8	0	1.0%	20.0	2.0	0.0	8.8	129.0	17.4
B4	1.55	B	57%	0.40	0.56	222	11.0%	8.5	914	1.1%	20.0	2.1	7.4	15.9	1136.0	25.1
B3	0.66	A	63%	0.57	0.71	165	3.4%	8.2	612	2.7%	10.0	1.6	6.2	14.4	777.0	18.7
D1	0.77	A	0%	0.08	0.35	16	2.0%	5.9	570	6.0%	10.0	2.4	3.9	9.7	586.0	30.3
D2	3.92	A	0%	0.08	0.35	105	25.0%	6.5	975	50.0%	15.0	10.6	1.5	8.1	1080.0	28.6

NOTES:

$t_c = t_i + t_t$

Where:

t_i = computed time of concentration (minutes)

n = overland (initial) flow time (minutes)

n_c = channelized flow time (minutes)

$t_c = \frac{L}{60K\sqrt{S_o}} = \frac{L}{60K\sqrt{S_o}}$

Where:

t_c = channelized flow time (travel time, min)

L = travel distance (ft)

K = NRCS conveyance factor (see Table 6-2)

S_o = watershed slope (ft/ft)

V = travel time velocity (ft/sec) = 4.48

n = NRCS conveyance factor (see Table 6-2)

n_c = NRCS conveyance factor (see Table 6-2)

n = NRCS conveyance factor (see Table 6-2)

n_c = NRCS conveyance factor (see Table 6-2)

n = NRCS conveyance factor (see Table 6-2)

n_c = NRCS conveyance factor (see Table 6-2)

n = NRCS conveyance factor (see Table 6-2)

n_c = NRCS conveyance factor (see Table 6-2)

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n = NRCS conveyance factor (see Table 6-2)

n_c = NRCS conveyance factor (see Table 6-2)

n = NRCS conveyance factor (see Table 6-2)

n_c = NRCS conveyance factor (see Table 6-2)

n = NRCS conveyance factor (see Table 6-2)

n_c = NRCS conveyance factor (see Table 6-2)

Equation 6-2

$t_i = \frac{0.395(1.1 - C_1)\sqrt{L}}{S_o^{0.77}}$

Where:

t_i = overland (initial) flow time (minutes)

C_1 = runoff coefficient for 1-year frequency (from Table 6-4)

L = travel distance (ft)

S_o = average slope along the overland flow path (ft/ft)

$n = (26 - 17) + \frac{L}{600H + 9\sqrt{S_o}}$

Where:

n = minimum time of concentration for first design point when less than t_c from Equation 6-1.

C_1 = runoff coefficient for 1-year frequency (from Table 6-4)

L = travel distance (ft)

S_o = average slope along the overland flow path (ft/ft)

n = minimum time of concentration for first design point when less than t_c from Equation 6-1.

C_1 = runoff coefficient for 1-year frequency (from Table 6-4)

L = travel distance (ft)

S_o = average slope along the overland flow path (ft/ft)

n = minimum time of concentration for first design point when less than t_c from Equation 6-1.

C_1 = runoff coefficient for 1-year frequency (from Table 6-4)

L = travel distance (ft)

S_o = average slope along the overland flow path (ft/ft)

n = minimum time of concentration for first design point when less than t_c from Equation 6-1.

C_1 = runoff coefficient for 1-year frequency (from Table 6-4)

L = travel distance (ft)

S_o = average slope along the overland flow path (ft/ft)

n = minimum time of concentration for first design point when less than t_c from Equation 6-1.

C_1 = runoff coefficient for 1-year frequency (from Table 6-4)

L = travel distance (ft)

S_o = average slope along the overland flow path (ft/ft)

n = minimum time of concentration for first design point when less than t_c from Equation 6-1.

C_1 = runoff coefficient for 1-year frequency (from Table 6-4)

L = travel distance (ft)

S_o = average slope along the overland flow path (ft/ft)

n = minimum time of concentration for first design point when less than t_c from Equation 6-1.

C_1 = runoff coefficient for 1-year frequency (from Table 6-4)

L = travel distance (ft)

S_o = average slope along the overland flow path (ft/ft)

n = minimum time of concentration for first design point when less than t_c from Equation 6-1.

C_1 = runoff coefficient for 1-year frequency (from Table 6-4)

L = travel distance (ft)

S_o = average slope along the overland flow path (ft/ft)

n = minimum time of concentration for first design point when less than t_c from Equation 6-1.

C_1 = runoff coefficient for 1-year frequency (from Table 6-4)

L = travel distance (ft)

S_o = average slope along the overland flow path (ft/ft)

n = minimum time of concentration for first design point when less than t_c from Equation 6-1.

C_1 = runoff coefficient for 1-year frequency (from Table 6-4)

L = travel distance (ft)

S_o = average slope along the overland flow path (ft/ft)

n = minimum time of concentration for first design point when less than t_c from Equation 6-1.

C_1 = runoff coefficient for 1-year frequency (from Table 6-4)

L = travel distance (ft)

S_o = average slope along the overland flow path (ft/ft)

n = minimum time of concentration for first design point when less than t_c from Equation 6-1.

Equation 6-3

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

Equation 6-5

$n = (26 - 17) + \frac{L}{600H + 9\sqrt{S_o}}$

Where:

n = minimum time of concentration for first design point when less than t_c from Equation 6-1.

C_1 = runoff coefficient for 1-year frequency (from Table 6-4)

L = travel distance (ft)

S_o = average slope along the overland flow path (ft/ft)

n = minimum time of concentration for first design point when less than t_c from Equation 6-1.

C_1 = runoff coefficient for 1-year frequency (from Table 6-4)

L = travel distance (ft)

S_o = average slope along the overland flow path (ft/ft)

n = minimum time of concentration for first design point when less than t_c from Equation 6-1.

C_1 = runoff coefficient for 1-year frequency (from Table 6-4)

L = travel distance (ft)

S_o = average slope along the overland flow path (ft/ft)

n = minimum time of concentration for first design point when less than t_c from Equation 6-1.

C_1 = runoff coefficient for 1-year frequency (from Table 6-4)

L = travel distance (ft)

S_o = average slope along the overland flow path (ft/ft)

n = minimum time of concentration for first design point when less than t_c from Equation 6-1.

C_1 = runoff coefficient for 1-year frequency (from Table 6-4)

L = travel distance (ft)

S_o = average slope along the overland flow path (ft/ft)

n = minimum time of concentration for first design point when less than t_c from Equation 6-1.

C_1 = runoff coefficient for 1-year frequency (from Table 6-4)

L = travel distance (ft)

S_o = average slope along the overland flow path (ft/ft)

n = minimum time of concentration for first design point when less than t_c from Equation 6-1.

C_1 = runoff coefficient for 1-year frequency (from Table 6-4)

L = travel distance (ft)

S_o = average slope along the overland flow path (ft/ft)

n = minimum time of concentration for first design point when less than t_c from Equation 6-1.

C_1 = runoff coefficient for 1-year frequency (from Table 6-4)

L = travel distance (ft)

S_o = average slope along the overland flow path (ft/ft)

n = minimum time of concentration for first design point when less than t_c from Equation 6-1.

C_1 = runoff coefficient for 1-year frequency (from Table 6-4)

L = travel distance (ft)

S_o = average slope along the overland flow path (ft/ft)

n = minimum time of concentration for first design point when less than t_c from Equation 6-1.

C_1 = runoff coefficient for 1-year frequency (from Table 6-4)

L = travel distance (ft)

S_o = average slope along the overland flow path (ft/ft)

n = minimum time of concentration for first design point when less than t_c from Equation 6-1.

C_1 = runoff coefficient for 1-year frequency (from Table 6-4)

L = travel distance (ft)

S_o = average slope along the overland flow path (ft/ft)

n = minimum time of concentration for first design point when less than t_c from Equation 6-1.

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

Subdivision: Sterling Ranch Subdivision Location: El Paso County Design Storm: 5-Year	Project Name: Sterling Ranch Filing 3 Project No.: 25188.02 Calculated By: CJD Checked By: _____ Date: 6/9/21
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STREET	Design Point	DIRECT RUNOFF						TOTAL RUNOFF				STREET/SWALE		PIPE				TRAVEL TIME			REMARKS	
		Basin ID	Area (Ac)	Runoff Coeff.	t_c (min)	C^*A (Ac)	I (in/hr)	Q (cfs)	t_c (min)	C^*A (ac)	I (in/hr)	Q (cfs)	$Q_{street/swale}$ (cfs)	C^*A (ac)	Slope (%)	Q_{pipe} (cfs)	C^*A (ac)	Slope (%)	Length (ft)	Velocity (fps)		t_t (min)
	9	B3	0.66	0.57	14.4	0.38	3.58	1.4													Offsite flow to existing inlet in Sterling Ranch Road Piped to existing storm sewer in Sterling Ranch Road	
	10	B4	1.55	0.40	15.9	0.62	3.43	2.1							2.1	0.62	1.0	12	380	4.7	1.3	Rear lot and area inlets Piped to DP 11.1
	11	B5	0.45	0.37	8.8	0.17	4.31	0.7													Area Inlet Piped to DP 14.1	
	11.1								17.3	0.79	3.31	2.6			2.6	0.79	1.0	18	357	4.9	1.2	Piped to DP 14.1
	12	B2	4.33	0.55	12.2	2.37	3.83	9.1							9.1	2.37	1.0	18	38	6.7	0.1	Sump Inlet Piped to DP 13.1
	13	B1	2.44	0.64	11.4	1.57	3.93	6.2													Sump Inlet Piped to DP 13.1	
	13.1								12.3	3.94	3.82	15.0			15.0	3.94	1.0	24	125	7.7	0.3	Piped to DP 14.1
	14	B6	0.78	0.33	18.5	0.26	3.21	0.8													Area Inlet Piped to DP 14.1	
	14.1								18.5	4.99	3.21	16.0			16.0	4.99	1.0	24	415	7.8	0.9	Piped to DP 15.1
	15	A1	4.31	0.49	12.5	2.13	3.79	8.1					0.7	0.18	1.6	7.4			230	2.5	1.5	On-grade Inlet Captured Flows piped to DP 15.1, Bypass flow to DP 17
	15.1								19.4	7.12	3.14	22.3			22.3	7.12	1.0	24	45	8.2	0.1	On-grade Inlet Captured Flows piped to DP 16.1
	16	A5	0.45	0.62	5.0	0.28	5.16	1.4													On-grade Inlet Captured Flows piped to DP 16.1	
	16.1								19.5	7.40	3.13	23.2			23.2	7.40	1.0	24	125	8.2	0.3	FES release to drainage channel
	I1	I1	21.99	0.08	31.9	1.86	2.39	4.4													FES	
	11.1								31.9	9.26	2.39	22.1			22.1	9.26	0.4	42	62	6.1	0.2	Combined flow from DPI1 & DP16.1 Piped to Existing 84" RCP
	I2	I2	3.47	0.08	31.1	0.28	2.43	0.7														Piped to Existing 84" RCP
	28	D1	0.77	0.08	9.7	0.06	4.17	0.3														Sheet flow to Sand Creek
	29	D2	3.92	0.08	8.1	0.31	4.45	1.4														Sheet flow to Sand Creek

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

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

Subdivision: Sterling Ranch Subdivision Location: El Paso County Design Storm: 100-Year	Project Name: Sterling Ranch Filing 3 Project No.: 25188.02 Calculated By: CJD Checked By: Date: 6/9/21
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Description	Design Point	DIRECT RUNOFF						TOTAL RUNOFF			STREET/SWALE			PIPE				TRAVEL TIME			REMARKS	
		Basin ID	Area (ac)	Runoff Coeff.	t _c (min)	C*A (ac)	V (in/hr)	Q (cfs)	tc (min)	C*A (ac)	V (in/hr)	Q (cfs)	Q _{street/swale} (cfs)	C*A (ac)	Slope (%)	Q _{pipe} (cfs)	C*A (ac)	Slope (%)	Pipe Size (inches)	Length (ft)		Velocity (fps)
	9	B3	0.66	0.71	14.4	0.47	6.01	2.8														Offsite flow to existing inlet in Sterling Ranch Road Piped to existing storm sewer in Sterling Ranch Road
	10	B4	1.55	0.56	15.9	0.87	5.76	5.0							5.0	0.87	1.0	12	380	6.4	1.0	Rear lot and area inlets Piped to DP 11.1
	11	B5	0.45	0.54	8.8	0.24	7.24	1.7														Area Inlet Piped to DP 14.1
	11.1								16.9	1.11	5.61	6.2			6.2	1.11	1.0	18	357	6.2	1.0	Piped to DP 14.1
	12	B2	4.33	0.67	12.2	2.90	6.43	18.7							18.7	2.90	1.0	18	38	10.6	0.1	Sump Inlet Piped to DP 13.1
	13	B1	2.44	0.75	11.4	1.82	6.60	12.0														Sump Inlet Piped to DP 13.1
	13.1								12.3	4.72	6.42	30.3			30.3	4.72	1.0	24	125	9.7	0.2	Piped to DP 14.1
	14	B6	0.78	0.51	18.5	0.40	5.38	2.2														Area Inlet Piped to DP 14.1
	14.1								18.5	6.23	5.38	33.5			33.5	6.23	1.0	24	415	10.7	0.6	Piped to DP 15.1
	15	A1	4.31	0.64	12.5	2.74	6.37	17.4				10.0	1.5777	1.6	7.4				230	2.5	1.5	On-grade Inlet Captured Flows piped to DP 15.1, Bypass flow to DP 17
	15.1								19.1	8.97	5.30	47.5			47.5	8.97	1.0	24	45	15.1	0.0	On-grade Inlet Captured Flows piped to DP 16.1
	16	A5	0.45	0.73	5.0	0.33	8.66	2.9														On-grade Inlet Captured Flows piped to DP 16.1
	16.1								19.2	9.30	5.29	49.2			49.2	9.30	1.0	24	125	15.7	0.1	FES release to drainage channel
	17	I1	21.99	0.35	31.9	7.77	4.01	31.2														FES
	17.1								31.9	17.07	4.01	68.4			68.4	17.07	0.4	42	62	7.7	0.1	Combined flow from DP11 & DP16.1 Piped to Existing 84" RCP
	18	I2	3.47	0.35	31.1	1.21	4.07	4.9														Piped to Existing 84" RCP
	28	D1	0.77	0.35	9.7	0.27	7.00	1.9														Sheet flow to Sand Creek
	29	D2	3.92	0.35	8.1	1.37	7.48	10.2														Sheet flow to Sand Creek

Notes:
Street and Pipe C*A values are determined by Q/i using the catchment's intensity value.
All pipes are private and RCP unless otherwise noted. Pipe size shown in table column.

Appendix C

Hydraulic Calculations

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

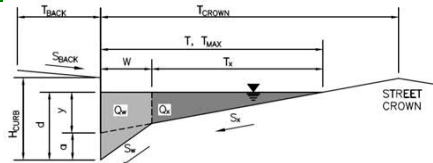
(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project:

Sterling Ranch Phase 2

Inlet ID:

A1 - DP15

**Gutter Geometry (Enter data in the blue cells)**

Maximum Allowable Width for Spread Behind Curb

 $T_{BACK} = 5.5$ ft

Side Slope Behind Curb (leave blank for no conveyance credit behind curb)

 $S_{BACK} = 0.020$ ft/ft

Manning's Roughness Behind Curb (typically between 0.012 and 0.020)

 $n_{BACK} = 0.013$

Height of Curb at Gutter Flow Line

 $H_{CURB} = 6.00$ inches

Distance from Curb Face to Street Crown

 $T_{CROWN} = 17.0$ ft

Gutter Width

 $W = 2.00$ ft

Street Transverse Slope

 $S_X = 0.020$ ft/ft

Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)

 $S_W = 0.083$ ft/ft

Street Longitudinal Slope - Enter 0 for sump condition

 $S_O = 0.033$ ft/ft

Manning's Roughness for Street Section (typically between 0.012 and 0.020)

 $n_{STREET} = 0.013$

Max. Allowable Spread for Minor & Major Storm

	Minor Storm	Major Storm	
$T_{MAX} =$	17.0	17.0	ft
$d_{MAX} =$	6.0	7.8	inches

Max. Allowable Depth at Gutter Flowline for Minor & Major Storm

Allow Flow Depth at Street Crown (leave blank for no)

check = yes

MINOR STORM Allowable Capacity is based on Depth Criterion**MAJOR STORM Allowable Capacity is based on Spread Criterion**

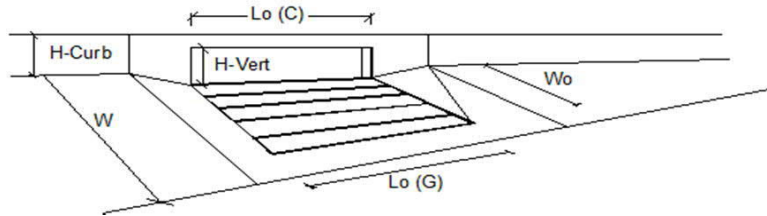
	Minor Storm	Major Storm	
$Q_{allow} =$	21.2	24.3	cfs

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

Version 4.05 Released March 2017



Design Information (Input)		MINOR		MAJOR	
Type of Inlet	CDOT Type R Curb Opening	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')		a _{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)		L _o =	15.00	15.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W _o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		C _r -G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		C _r -C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity		MINOR		MAJOR	
Total Inlet Interception Capacity		Q =	7.8	12.4	cfs
Total Inlet Carry-Over Flow (flow bypassing inlet)		Q _b =	0.3	5.0	cfs
Capture Percentage = Q _i /Q _a =		C% =	96	71	%

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

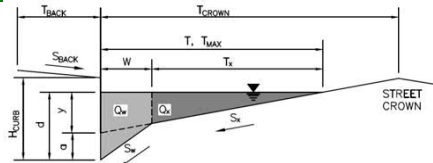
(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project:

Sterling Ranch Phase 2

Inlet ID:

A5 - DP16

**Gutter Geometry (Enter data in the blue cells)**

Maximum Allowable Width for Spread Behind Curb

T_{BACK} = 8.0 ft

Side Slope Behind Curb (leave blank for no conveyance credit behind curb)

S_{BACK} = 0.020 ft/ft

Manning's Roughness Behind Curb (typically between 0.012 and 0.020)

n_{BACK} = 0.016

Height of Curb at Gutter Flow Line

H_{CURB} = 6.00 inches

Distance from Curb Face to Street Crown

T_{CROWN} = 17.0 ft

Gutter Width

W = 1.17 ft

Street Transverse Slope

S_x = 0.020 ft/ft

Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)

S_w = 0.083 ft/ft

Street Longitudinal Slope - Enter 0 for sump condition

S_o = 0.029 ft/ft

Manning's Roughness for Street Section (typically between 0.012 and 0.020)

n_{STREET} = 0.016

Max. Allowable Spread for Minor & Major Storm

	Minor Storm	Major Storm	
T _{MAX}	15.8	17.0	ft

Max. Allowable Depth at Gutter Flowline for Minor & Major Storm

	Minor Storm	Major Storm	
d _{MAX}	4.6	7.8	inches

Allow Flow Depth at Street Crown (leave blank for no)

check = yes

MINOR STORM Allowable Capacity is based on Depth Criterion

	Minor Storm	Major Storm	
Q _{allow}	13.6	40.2	cfs

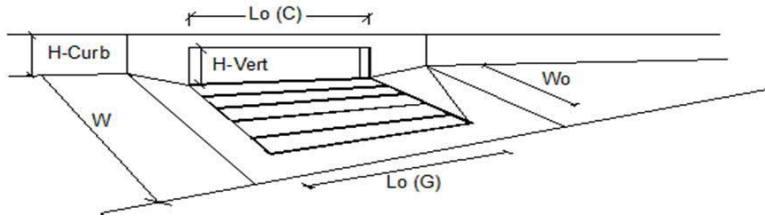
MAJOR STORM Allowable Capacity is based on Depth Criterion

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

Version 4.05 Released March 2017



Design Information (Input)		MINOR	MAJOR	
Type of Inlet	CDOT Type R Curb Opening	Type =	CDOT Type R Curb Opening	
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	3.0	3.0 inches
Total Number of Units in the Inlet (Grate or Curb Opening)		No =	1	1
Length of a Single Unit Inlet (Grate or Curb Opening)		L_o =	10.00	10.00 ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W_o =	N/A	N/A ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		C_r-G =	N/A	N/A
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		C_r-C =	0.10	0.10
Street Hydraulics: OK - $Q < \text{Allowable Street Capacity}$			MINOR	MAJOR
Total Inlet Interception Capacity		Q =	1.4	2.9 cfs
Total Inlet Carry-Over Flow (flow bypassing inlet)		Q_b =	0.0	0.0 cfs
Capture Percentage = Q_i/Q_o =		$C\%$ =	100	100 %

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

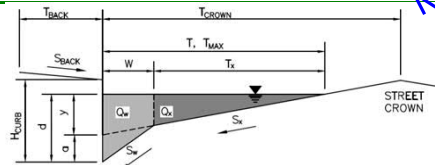
(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project:

Sterling Ranch Phase 2

Inlet ID:

B1- DP12



DP13?

JR Response:
Text Updated**Gutter Geometry (Enter data in the blue cells)**

Maximum Allowable Width for Spread Behind Curb

Side Slope Behind Curb (leave blank for no conveyance credit behind curb)

Manning's Roughness Behind Curb (typically between 0.012 and 0.020)

Height of Curb at Gutter Flow Line

Distance from Curb Face to Street Crown

Gutter Width

Street Transverse Slope

Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)

Street Longitudinal Slope - Enter 0 for sump condition

Manning's Roughness for Street Section (typically between 0.012 and 0.020)

T _{BACK}	=	17.0	ft
S _{BACK}	=	0.020	ft/ft
n _{BACK}	=	0.016	

H _{CURB}	=	6.00	inches
T _{CROWN}	=	17.0	ft
W	=	1.17	ft
S _X	=	0.020	ft/ft
S _W	=	0.083	ft/ft
S _O	=	0.000	ft/ft
n _{STREET}	=	0.016	

Max. Allowable Spread for Minor & Major Storm

Max. Allowable Depth at Gutter Flowline for Minor & Major Storm

Check boxes are not applicable in SUMP conditions

	Minor Storm	Major Storm	
T _{MAX}	17.0	17.0	ft
d _{MAX}	6.0	12.0	inches

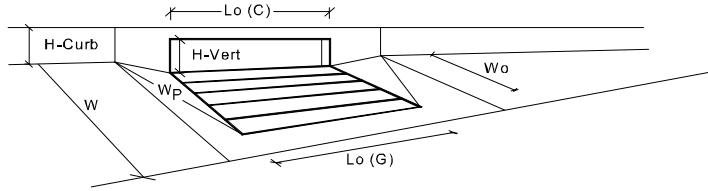
MINOR STORM Allowable Capacity is based on Depth Criterion

MAJOR STORM Allowable Capacity is based on Depth Criterion

	Minor Storm	Major Storm	
Q _{allow}	SUMP	SUMP	cfs

INLET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017



Design Information (Input)

Type of Inlet
Local Depression (additional to continuous gutter depression 'a' from above)
Number of Unit Inlets (Grate or Curb Opening)
Water Depth at Flowline (outside of local depression)
Grate Information
Length of a Unit Grate
Width of a Unit Grate
Area Opening Ratio for a Grate (typical values 0.15-0.90)
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)
Grate Weir Coefficient (typical value 2.15 - 3.60)
Grate Orifice Coefficient (typical value 0.60 - 0.80)

Curb Opening Information

Length of a Unit Curb Opening
Height of Vertical Curb Opening in Inches
Height of Curb Orifice Throat in Inches
Angle of Throat (see USDCM Figure ST-5)
Side Width for Depression Pan (typically the gutter width of 2 feet)
Clogging Factor for a Single Curb Opening (typical value 0.10)
Curb Opening Weir Coefficient (typical value 2.3-3.7)
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)

Low Head Performance Reduction (Calculated)

Depth for Grate Midwidth
Depth for Curb Opening Weir Equation
Combination Inlet Performance Reduction Factor for Long Inlets
Curb Opening Performance Reduction Factor for Long Inlets
Grated Inlet Performance Reduction Factor for Long Inlets

Total Inlet Interception Capacity (assumes clogged condition)

Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)

	MINOR	MAJOR	
Type =	CDOT Type R Curb Opening		
d_{local} =	3.00	3.00	inches
No =	1	1	
Ponding Depth =	5.0	12.0	inches
	MINOR	MAJOR	<input checked="" type="checkbox"/> Override
$L_o (G)$ =	N/A	N/A	feet
W_o =	N/A	N/A	feet
A_{ratio} =	N/A	N/A	
$C_r (G)$ =	N/A	N/A	
$C_w (G)$ =	N/A	N/A	
$C_o (G)$ =	N/A	N/A	
	MINOR	MAJOR	
$L_o (C)$ =	15.00	15.00	feet
H_{vert} =	6.00	6.00	inches
H_{throat} =	6.00	6.00	inches
Theta =	63.40	63.40	degrees
W_p =	1.17	1.17	feet
$C_r (C)$ =	0.10	0.10	
$C_w (C)$ =	3.60	3.60	
$C_o (C)$ =	0.67	0.67	
	MINOR	MAJOR	
d_{Grate} =	N/A	N/A	ft
d_{Curb} =	0.32	0.90	ft
$RF_{Combination}$ =	0.47	1.00	
RF_{Curb} =	0.72	1.00	
RF_{Grate} =	N/A	N/A	
	MINOR	MAJOR	
Q_a =	7.5	39.1	cfs
$Q_{PEAK REQUIRED}$ =	6.2	12.0	cfs

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

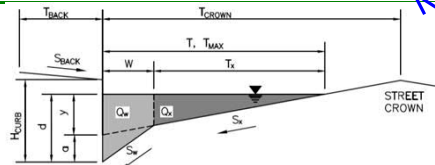
(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project:

Sterling Ranch Phase 2

Inlet ID:

B2 - DP13



DP12?

JR Response: Text Updated

Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb

Side Slope Behind Curb (leave blank for no conveyance credit behind curb)

Manning's Roughness Behind Curb (typically between 0.012 and 0.020)

Height of Curb at Gutter Flow Line

Distance from Curb Face to Street Crown

Gutter Width

Street Transverse Slope

Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)

Street Longitudinal Slope - Enter 0 for sump condition

Manning's Roughness for Street Section (typically between 0.012 and 0.020)

T _{BACK} =	17.0	ft
S _{BACK} =	0.020	ft/ft
n _{BACK} =	0.016	

H _{CURB} =	6.00	inches
T _{CROWN} =	17.0	ft
W =	1.17	ft
S _X =	0.020	ft/ft
S _W =	0.083	ft/ft
S _O =	0.000	ft/ft
n _{STREET} =	0.016	

Max. Allowable Spread for Minor & Major Storm

Max. Allowable Depth at Gutter Flowline for Minor & Major Storm

Check boxes are not applicable in SUMP conditions

	Minor Storm	Major Storm	
T _{MAX} =	17.0	17.0	ft
d _{MAX} =	6.0	12.0	inches

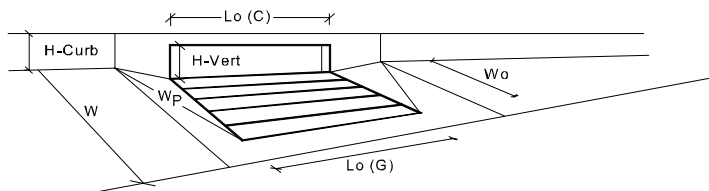
MINOR STORM Allowable Capacity is based on Depth Criterion

MAJOR STORM Allowable Capacity is based on Depth Criterion

	Minor Storm	Major Storm	
Q _{allow} =	SUMP	SUMP	cfs

INLET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017



Design Information (Input)

Type of Inlet
Local Depression (additional to continuous gutter depression 'a' from above)
Number of Unit Inlets (Grate or Curb Opening)
Water Depth at Flowline (outside of local depression)
Grate Information
Length of a Unit Grate
Width of a Unit Grate
Area Opening Ratio for a Grate (typical values 0.15-0.90)
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)
Grate Weir Coefficient (typical value 2.15 - 3.60)
Grate Orifice Coefficient (typical value 0.60 - 0.80)

Curb Opening Information

Length of a Unit Curb Opening
Height of Vertical Curb Opening in Inches
Height of Curb Orifice Throat in Inches
Angle of Throat (see USDCM Figure ST-5)
Side Width for Depression Pan (typically the gutter width of 2 feet)
Clogging Factor for a Single Curb Opening (typical value 0.10)
Curb Opening Weir Coefficient (typical value 2.3-3.7)
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)

Low Head Performance Reduction (Calculated)

Depth for Grate Midwidth
Depth for Curb Opening Weir Equation
Combination Inlet Performance Reduction Factor for Long Inlets
Curb Opening Performance Reduction Factor for Long Inlets
Grated Inlet Performance Reduction Factor for Long Inlets

Total Inlet Interception Capacity (assumes clogged condition)

Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)

	MINOR	MAJOR	
Type =	CDOT Type R Curb Opening		
d_{local} =	3.00	3.00	inches
No =	1	1	
Ponding Depth =	5.6	12.0	inches
	MINOR	MAJOR	<input checked="" type="checkbox"/> Override
$L_o (G)$ =	N/A	N/A	feet
W_o =	N/A	N/A	feet
A_{ratio} =	N/A	N/A	
$C_r (G)$ =	N/A	N/A	
$C_w (G)$ =	N/A	N/A	
$C_o (G)$ =	N/A	N/A	
	MINOR	MAJOR	
$L_o (C)$ =	20.00	20.00	feet
H_{vert} =	6.00	6.00	inches
H_{throat} =	6.00	6.00	inches
Theta =	63.40	63.40	degrees
W_p =	1.17	1.17	feet
$C_r (C)$ =	0.10	0.10	
$C_w (C)$ =	3.60	3.60	
$C_o (C)$ =	0.67	0.67	
	MINOR	MAJOR	
d_{Grate} =	N/A	N/A	ft
d_{Curb} =	0.37	0.90	ft
$RF_{Combination}$ =	0.53	1.00	
RF_{Curb} =	0.76	1.00	
RF_{Grate} =	N/A	N/A	
	MINOR	MAJOR	
Q_a =	13.1	52.7	cfs
$Q_{PEAK REQUIRED}$ =	9.1	18.7	cfs

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

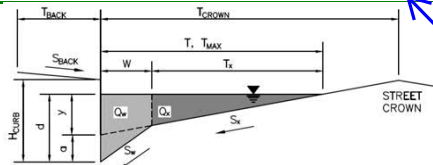
(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project:

Sterling Ranch Phase 2

Inlet ID:

B3 - DP9



is this correct?
DP15?

Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb

Side Slope Behind Curb (leave blank for no conveyance credit behind curb)

Manning's Roughness Behind Curb (typically between 0.012 and 0.020)

Height of Curb at Gutter Flow Line

Distance from Curb Face to Street Crown

Gutter Width

Street Transverse Slope

Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)

Street Longitudinal Slope - Enter 0 for sump condition

Manning's Roughness for Street Section (typically between 0.012 and 0.020)

Max. Allowable Spread for Minor & Major Storm

Max. Allowable Depth at Gutter Flowline for Minor & Major Storm

Allow Flow Depth at Street Crown (leave blank for no)

MINOR STORM Allowable Capacity is based on Spread Criterion

MAJOR STORM Allowable Capacity is based on Depth Criterion

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

T
S
n
H
T_{CR}

JR Response: The Sterling
ranch road Inlet calculation
has been provided in the fil-
ing 2 drainage report. Re-
moved

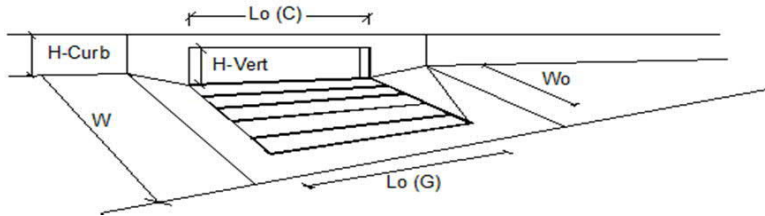
$S_x =$ 0.020 ft/ft
 $S_w =$ 0.083 ft/ft
 $S_o =$ 0.015 ft/ft
 $n_{STREET} =$ 0.016

	Minor Storm	Major Storm	
$T_{MAX} =$	15.0	30.0	ft
$d_{MAX} =$	6.0	6.0	inches
	<input type="checkbox"/>	<input type="checkbox"/>	check = yes

	Minor Storm	Major Storm	
$Q_{allow} =$	9.8	16.9	cfs

INLET ON A CONTINUOUS GRADE

Version 4.05 Released March 2017



Design Information (Input)		MINOR		MAJOR	
Type of Inlet	CDOT Type R Curb Opening	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')		a _{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		No =	3	3	
Length of a Single Unit Inlet (Grate or Curb Opening)		L _o =	5.00	5.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W _o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		C _{1-G} =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		C _{1-C} =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity		MINOR		MAJOR	
Total Inlet Interception Capacity		Q =	3.5	7.3	cfs
Total Inlet Carry-Over Flow (flow bypassing inlet)		Q _b =	0.0	0.0	cfs
Capture Percentage = Q _i /Q _a =		C% =	100	100	%

are 3 units
needed? Is future
flow higher?

JR Response: The Sterling ranch road Inlet calculation has been provided in the filling 2 drainage report. Removed

Channel Report

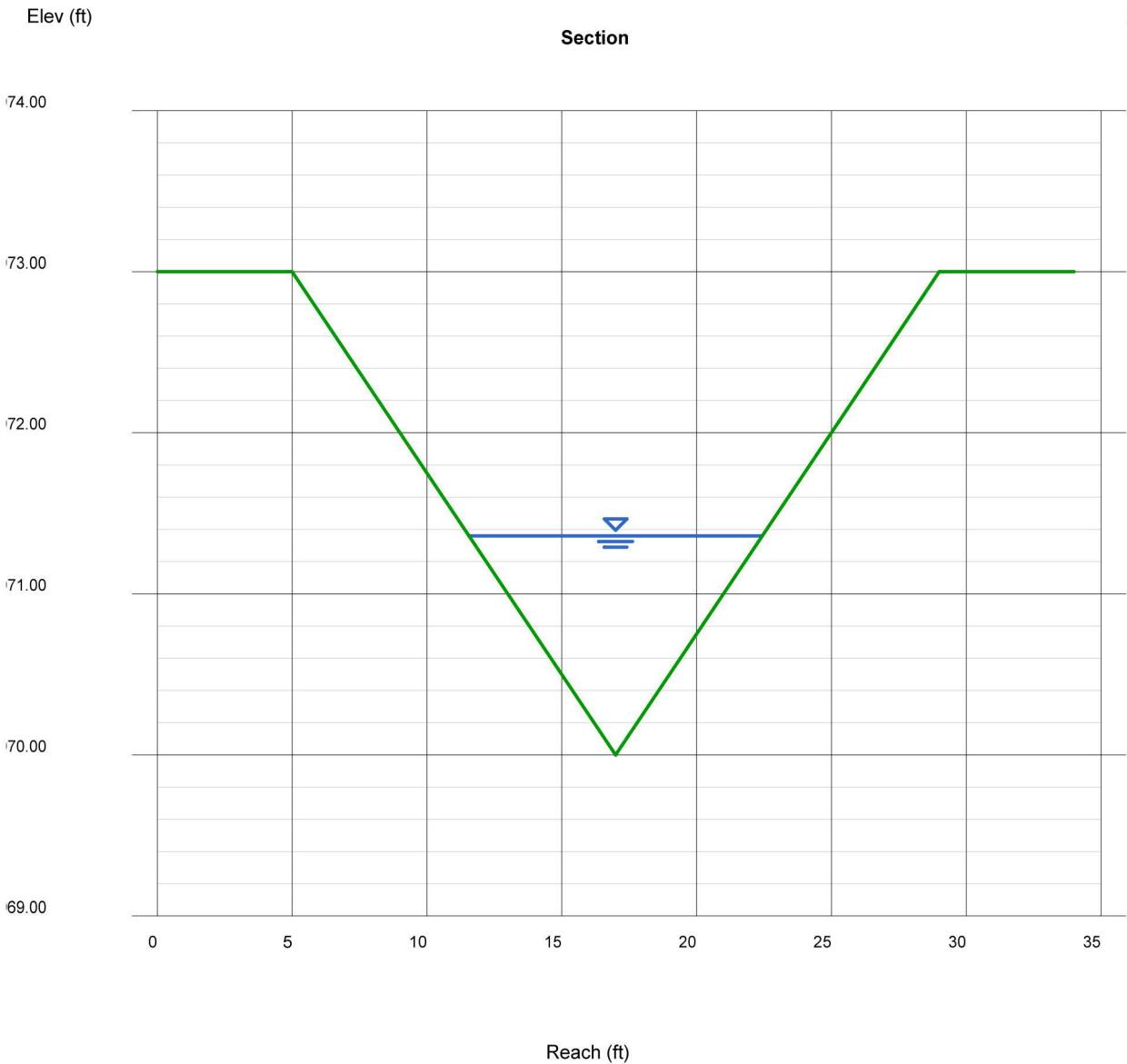
Interim Channel - DP I1

Triangular
Side Slopes (z:1) = 4.00, 4.00
Total Depth (ft) = 3.00

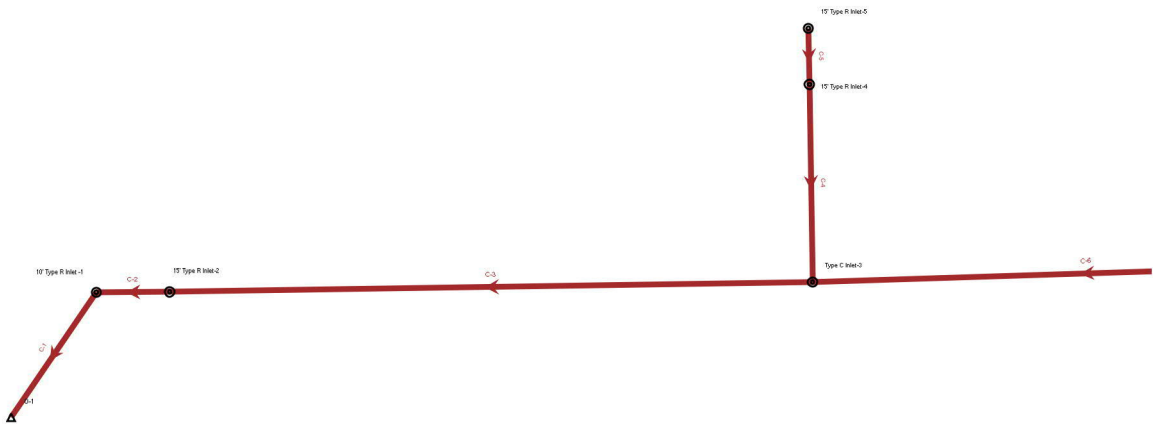
Invert Elev (ft) = 6970.00
Slope (%) = 0.88
N-Value = 0.025

Calculations
Compute by: Known Q
Known Q (cfs) = 31.20

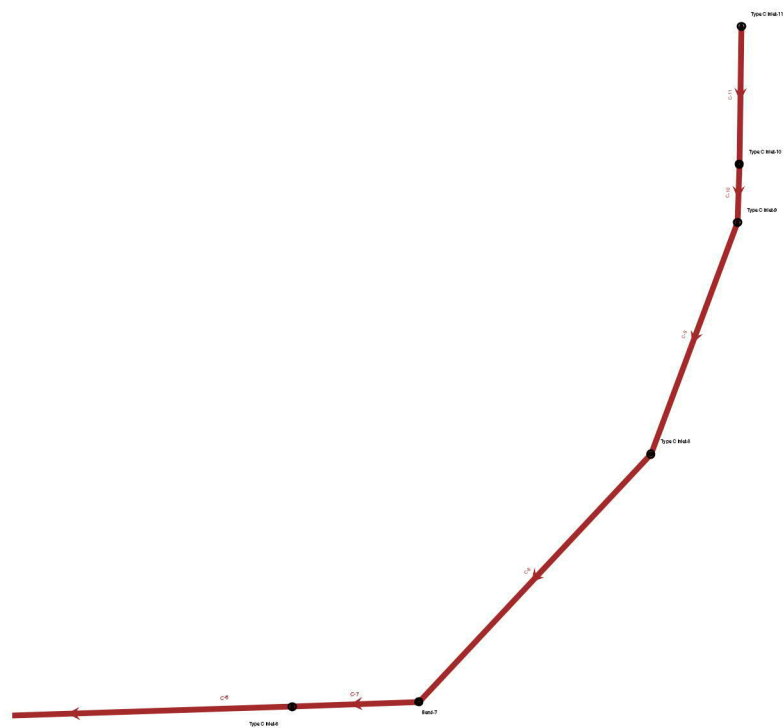
Highlighted
Depth (ft) = 1.36
Q (cfs) = 31.20
Area (sqft) = 7.40
Velocity (ft/s) = 4.22
Wetted Perim (ft) = 11.21
Crit Depth, Yc (ft) = 1.31
Top Width (ft) = 10.88
EGL (ft) = 1.64



Scenario: 100 Year



Scenario: 100 Year



Scenario: 100 Year
Current Time Step: 0.000 h
FlexTable: Conduit Table

Label	Flow (cfs)	Diameter (in)	Length (User Defined) (ft)	Slope (Calculated) (ft/ft)	Manning's n	Velocity (ft/s)	Capacity (Full Flow) (cfs)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Notes
C-11	1.40	18.0	109.7	0.027	0.013	5.84	17.13	7,013.59	7,010.88	12' RCP
C-10	2.80	18.0	45.0	0.016	0.013	5.99	13.38	7,010.87	7,009.97	12' RCP
C-9	4.20	18.0	199.1	0.015	0.013	6.50	12.83	7,005.26	7,002.09	12' RCP
C-5	18.70	18.0	34.0	0.010	0.013	10.58	10.66	7,003.46	7,002.36	18' RCP
C-4	30.30	24.0	126.1	0.019	0.013	11.20	30.88	7,002.17	6,999.57	24' RCP
C-8	5.60	18.0	275.2	0.010	0.013	3.17	10.65	6,999.20	6,998.41	12' RCP
C-3	34.10	30.0	416.6	0.003	0.013	6.95	22.47	6,995.28	6,992.40	24' RCP
C-6	6.80	18.0	355.0	0.003	0.013	3.85	5.77	6,998.10	6,996.61	18' RCP
C-7	5.60	18.0	101.9	0.011	0.013	3.17	11.16	6,998.40	6,998.11	12' RCP
C-2	43.90	30.0	45.6	0.003	0.013	8.94	22.73	6,992.34	6,991.82	24' RCP
C-1	45.60	30.0	93.8	0.003	0.013	9.29	22.46	6,991.19	6,989.88	30' RCP

X:\2510000.all\2518800\StormCAD\Sterling Ranch PH 2\Sterling Ranch PH-2.stsw

This needs to be
larger or steeper
based on HGL

JR Response: Conduit has been upsized to a
36" diameter

Scenario: 5 Year
Current Time Step: 0.000 h
FlexTable: Conduit Table

Label	Flow (cfs)	Diameter (in)	Length (User Defined) (ft)	Slope (Calculated) (ft/ft)	Manning's n	Velocity (ft/s)	Capacity (Full Flow) (cfs)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Notes
C-11	0.57	18.0	109.7	0.027	0.013	4.49	17.13	7,013.43	7,010.64	12' RCP
C-10	1.15	18.0	45.0	0.016	0.013	4.63	13.38	7,010.63	7,009.80	12' RCP
C-9	1.73	18.0	199.1	0.015	0.013	5.06	12.83	7,004.96	7,001.87	12' RCP
C-5	9.10	18.0	34.0	0.010	0.013	6.78	10.66	7,002.42	7,001.97	18' RCP
C-4	15.00	24.0	126.1	0.019	0.013	9.76	30.88	7,001.70	6,998.93	24' RCP
C-8	2.30	18.0	275.2	0.010	0.013	4.81	10.65	6,997.07	6,994.26	12' RCP
C-3	16.10	30.0	416.6	0.003	0.013	4.98	22.47	6,992.02	6,990.93	24' RCP
C-6	2.80	18.0	355.0	0.003	0.013	3.24	5.77	6,993.26	6,992.70	18' RCP
C-7	2.30	18.0	101.9	0.011	0.013	4.97	11.16	6,994.24	6,993.27	12' RCP
C-2	21.80	30.0	45.6	0.003	0.013	5.27	22.73	6,990.91	6,990.55	24' RCP
C-1	22.70	30.0	93.8	0.003	0.013	5.22	22.46	6,989.85	6,989.26	30' RCP

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these notes don't
match the
Diameter column.

JR Response: Table has been updated

Appendix D

Reference Material

SAND CREEK DRAINAGE BASIN PLANNING STUDY

PRELIMINARY DESIGN REPORT

CITY OF COLORADO SPRINGS, EL PASO COUNTY, COLORADO



PREPARED FOR:

City of Colorado Springs
Department of Comprehensive Planning, Development and Finance
Engineering Division
30 S. Nevada
Colorado Springs, Colorado 80903

PREPARED BY:

Kiowa Engineering Corporation
1011 North Weber
Colorado Springs, CO 80903

II. STUDY AREA DESCRIPTION

The Sand Creek drainage basin is a left-bank tributary to the Fountain Creek lying in the west-central portions of El Paso County. Sand Creek's drainage area at Fountain Creek is approximately 54 square miles of which approximately 18.8 square miles are inside the City of Colorado Springs corporate limits. The basin is divided into five major sub-basins, the Sand Creek mainstem, the East Fork Sand Creek, the Central Tributary to East Fork, the West Fork, and the East Fork Subtributary. Figure II-1 shows the location of the Sand Creek basin.

Basin Description

The Sand Creek basin covers a total of 54 square miles in unincorporated El Paso County and Colorado Springs, Colorado. Of this total, approximately 28 square miles is encompassed by the Sand Creek basin, and 26 square miles for the East Fork Sand Creek basin. The basin trends in generally a south to southwesterly direction, entering the Fountain Creek approximately two miles upstream of the Academy Boulevard bridge over Fountain Creek. Two main tributaries drain the basin, those being the mainstem of Sand Creek and East Fork Sand Creek. Development presence in most evident along the mainstem. At this time, approximately 25 percent of the basin is developed. This alternative evaluation focuses upon the Sand Creek basin only.

The maximum basin elevation is approximately 7,620 feet above mean sea level, and falls to approximately 5,790 feet at the confluence with Fountain Creek. The headwaters of the basin originate in the conifer covered areas of The Black Forest. The middle eastern portions of the basin are typified by rolling range land with fair to good vegetative cover associated with semi-arid climates.

Climate

This area of El Paso County can be described, in general as high plains, with total precipitation amounts typical of a semi-arid region. Winters are generally cold and dry. Precipitation ranges from 14 to 16 inches per year, with the majority of this precipitation occurring in spring and summer in the form of rainfall. Thunderstorms are common during the summer months, and are typified by quick-moving low pressure cells which draw moisture from the Gulf of Mexico into the region. Average temperatures range from about 30°F in the winter

to 75° in the summer. The relative humidity ranges from about 25 percent in the summer to 45 percent in the winter.

Soils and Geology

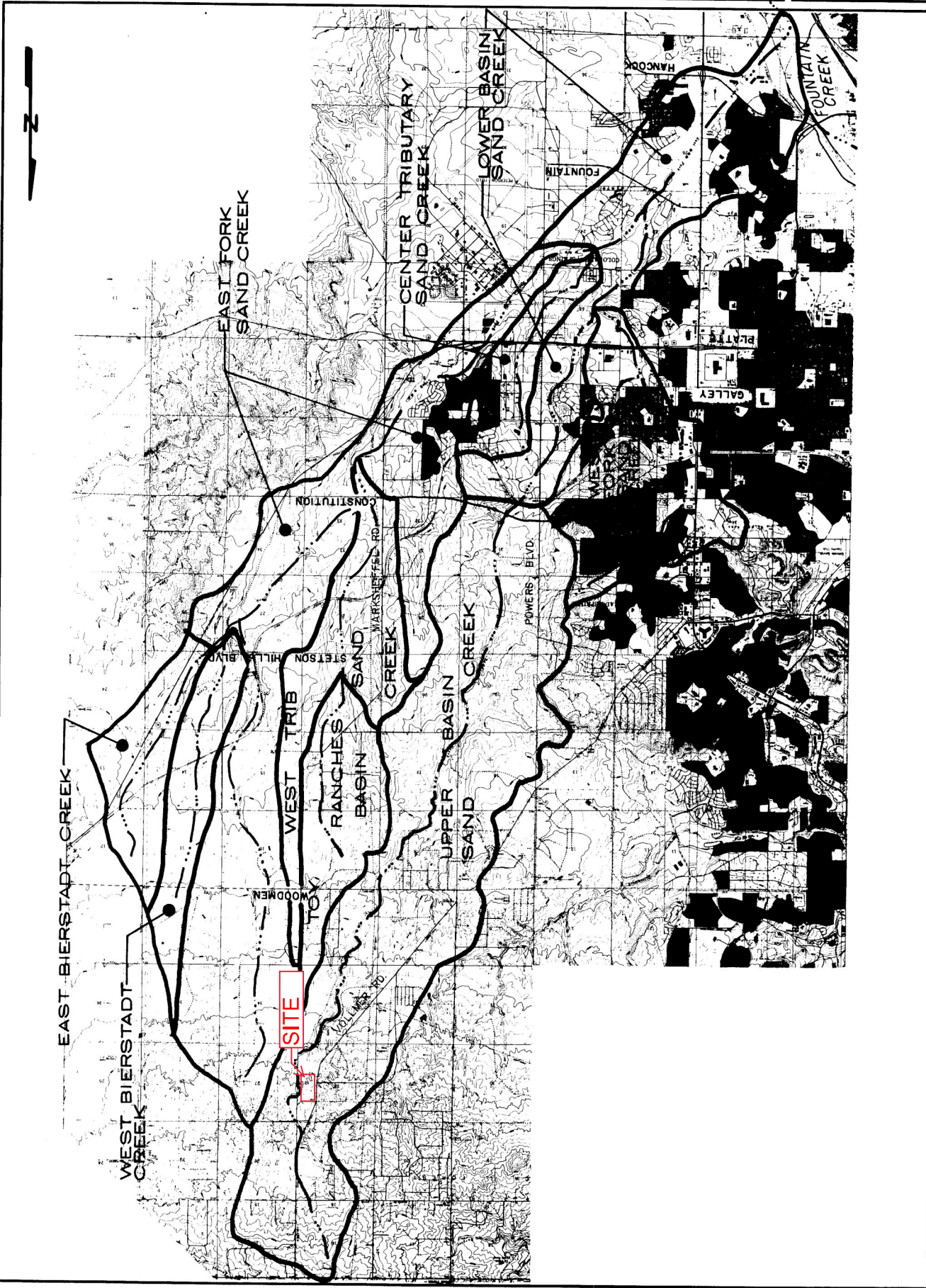
Soils within the Sand Creek basin vary between soil types A through D, as identified by the U. S. Department of Agriculture, Soil Conservation Service. The predominant soil groupings are in the Truckton and Bresser soil associations. The soils consist of deep, well drained soils that formed in alluvium and residuum, derived from sedimentary rock. The soils have high to moderate infiltration rates, and are extremely susceptible to wind and water erosion where poor vegetation cover exists. In undeveloped areas, the predominance of Type A and B soils give this basin a lower runoff per unit area as compared to basins with soils dominated by Types C and D. Presented on Figure II-2 is the Hydrologic Soil distribution map for the Sand Creek basin.

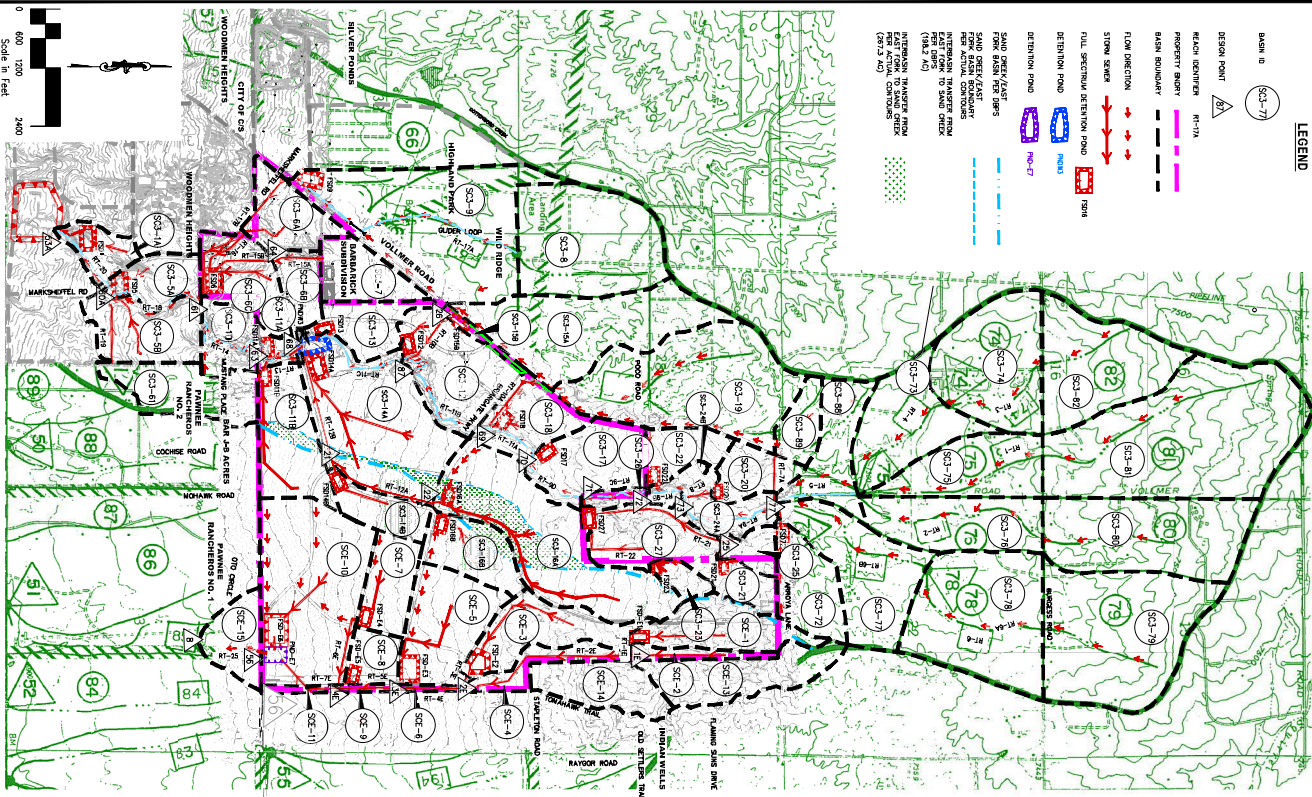
Property Ownership and Impervious Land Densities

Property ownership along the major drainageway within the Sand Creek basin vary from public to private. Along the developed reaches, drainage right-of-ways and greenbelts have been dedicated during the development of the adjacent residential and commercial land. Where development has not occurred, the drainageways remain under private ownership with no delineated drainage right-of-way or easements. There are several public parks which abut the mainstem of Sand Creek. Roadway and utility easements abutting or crossing the major drainageways occur most frequently in the developed portions of the basin.

Land use information for the existing and future conditions were reviewed as part of the planning effort. This information is used in the hydrologic analysis to predict runoff rates and volumes for the purposes of facility evaluation. The identification of land uses abutting the drainageways is also useful in the identification of feasible plans for stabilization and aesthetic treatment of the creek. Presented on Figure II-3 is the proposed land use map used in the evaluation of impervious land densities discussed in the hydrologic section of this report. Figure II-3 is not intended to reflect the future zoning or land use policies of the City or the County.

The land use information within the Banning-Lewis Ranch property was obtained from Aries Properties during the time the draft East Fork Sand Creek Drainage Basin Planning Study was being prepared. The land use information was again reviewed with the City of Colorado Springs Department of Planning and was found to be appropriate for use in the estimation of hydrology for the East Fork Basin. The location of future arterial streets and roadways within



[illegible]

WATER QUALITY & DESIGN POND FLOW SUMMARY														
STORM EVENT (NO)	2	5	10	25	50	100	200	500	1000	2000	5000	10000	20000	50000
PEAK INFLOW (CFS)	18.3	33.3	53.0	68	97.4	126.9	157.1	204.9	262.9	332.9	414.9	509.9	619.9	749.9
PEAK INFLOW (MGD)	0.1	1.6	2.3	3.0	4.2	5.4	6.9	8.9	11.4	14.4	17.9	21.9	26.9	32.9
MODIFIED RELEASE (CFS)	0.1	1.6	2.3	3.0	4.2	5.4	6.9	8.9	11.4	14.4	17.9	21.9	26.9	32.9
MODIFIED RELEASE (MGD)	0.01	0.2	0.3	0.4	0.6	0.8	1.0	1.3	1.6	2.0	2.4	2.9	3.5	4.3
STORM VOLUME (AC-FT)	2.4	7.6	12.0	15.6	21.6	28.0	35.6	44.4	54.4	65.6	78.4	92.8	108.8	127.2
STORM VOLUME (MG)	0.03	0.1	0.2	0.3	0.4	0.5	0.6	0.8	0.9	1.1	1.3	1.5	1.7	2.0
STORM DURATION (HRS)	2.4	7.6	12.0	15.6	21.6	28.0	35.6	44.4	54.4	65.6	78.4	92.8	108.8	127.2
STORM DURATION (MINS)	144	456	720	936	1296	1680	2136	2664	3264	3936	4704	5568	6528	7632
STORM DURATION (SECS)	8640	27360	43200	56160	77760	100800	128160	160000	195840	236160	282240	334080	391680	457920
STORM VOLUME (AC-FT)	14.5	26.6	39.6	51.6	70.6	91.6	114.6	140.6	169.6	201.6	236.6	274.6	315.6	360.6
STORM VOLUME (MG)	0.2	0.4	0.6	0.8	1.1	1.4	1.7	2.1	2.6	3.1	3.7	4.3	5.0	5.8
STORM DURATION (HRS)	2	5	10	25	50	100	200	500	1000	2000	5000	10000	20000	50000
STORM DURATION (MINS)	120	300	600	1500	3000	6000	12000	30000	60000	120000	300000	600000	1200000	3000000
STORM DURATION (SECS)	7200	18000	36000	90000	180000	360000	720000	1800000	3600000	7200000	18000000	36000000	72000000	180000000
STORM VOLUME (AC-FT)	8.7	16.0	24.0	31.6	41.6	52.6	65.6	80.6	96.6	114.6	134.6	156.6	180.6	206.6
STORM VOLUME (MG)	0.1	0.2	0.3	0.4	0.6	0.8	1.0	1.3	1.6	2.0	2.4	2.9	3.5	4.3
STORM DURATION (HRS)	2	5	10	25	50	100	200	500	1000	2000	5000	10000	20000	50000
STORM DURATION (MINS)	120	300	600	1500	3000	6000	12000	30000	60000	120000	300000	600000	1200000	3000000
STORM DURATION (SECS)	7200	18000	36000	90000	180000	360000	720000	1800000	3600000	7200000	18000000	36000000	72000000	180000000
STORM VOLUME (AC-FT)	4.8	9.0	13.6	17.6	23.6	30.6	38.6	47.6	57.6	68.6	80.6	93.6	108.6	125.6
STORM VOLUME (MG)	0.07	0.1	0.2	0.3	0.4	0.5	0.6	0.8	1.0	1.2	1.4	1.6	1.9	2.2
STORM DURATION (HRS)	4.8	12.0	24.0	60.0	120.0	240.0	480.0	960.0	1920.0	3840.0	7680.0	15360.0	30720.0	61440.0
STORM DURATION (MINS)	288	720	1440	3600	7200	14400	28800	57600	115200	230400	460800	921600	1843200	3686400
STORM DURATION (SECS)	17280	43200	86400	216000	432000	864000	1728000	3456000	6912000	13824000	27648000	55296000	110592000	221184000
STORM VOLUME (AC-FT)	3.1	5.6	8.4	10.6	13.6	17.6	22.6	28.6	35.6	43.6	52.6	62.6	73.6	85.6
STORM VOLUME (MG)	0.04	0.08	0.1	0.1	0.2	0.2	0.3	0.4	0.5	0.6	0.8	0.9	1.1	1.3
STORM DURATION (HRS)	3.1	7.6	15.2	38.0	76.0	152.0	304.0	608.0	1216.0	2432.0	4864.0	9728.0	19456.0	38912.0
STORM DURATION (MINS)	186	456	912	2280	4560	9120	18240	36480	72960	145920	291840	583680	1167360	2334720
STORM DURATION (SECS)	11160	27360	54720	136800	273600	547200	1094400	2188800	4377600	8755200	17510400	35020800	70041600	140083200
STORM VOLUME (AC-FT)	1.9	2.9	4.3	5.6	7.0	8.4	9.8	11.2	12.6	14.0	15.4	16.8	18.2	19.6
STORM VOLUME (MG)	0.03	0.04	0.06	0.08	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.4
STORM DURATION (HRS)	1.9	4.8	9.6	24.0	48.0	96.0	192.0	384.0	768.0	1536.0	3072.0	6144.0	12288.0	24576.0
STORM DURATION (MINS)	114	288	576	1440	2880	5760	11520	23040	46080	92160	184320	368640	737280	1474560
STORM DURATION (SECS)	6840	17280	34560	86400	172800	345600	691200	1382400	2764800	5529600	11059200	22118400	44236800	88473600
STORM VOLUME (AC-FT)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
STORM VOLUME (MG)	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
STORM DURATION (HRS)	2	5	10	25	50	100	200	500	1000	2000	5000	10000	20000	50000
STORM DURATION (MINS)	120	300	600	1500	3000	6000	12000	30000	60000	120000	300000	600000	1200000	3000000
STORM DURATION (SECS)	7200	18000	36000	90000	180000	360000	720000	1800000	3600000	7200000	18000000	36000000	72000000	180000000
STORM VOLUME (AC-FT)	2.6	34.3	47.4	64.7	79.0	94.1	109	125	140	155	170	185	199	214
STORM VOLUME (MG)	0.04	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7
STORM DURATION (HRS)	2	5	10	25	50	100	200	500	1000	2000	5000	10000	20000	50000
STORM DURATION (MINS)	120	300	600	1500	3000	6000	12000	30000	60000	120000	300000	600000	1200000	3000000
STORM DURATION (SECS)	7200	18000	36000	90000	180000	360000	720000	1800000	3600000	7200000	18000000	36000000	72000000	180000000
STORM VOLUME (AC-FT)	1.9	2.9	4.3	5.6	7.0	8.4	9.8	11.2	12.6	14.0	15.4	16.8	18.2	19.6
STORM VOLUME (MG)	0.03	0.04	0.06	0.08	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.4
STORM DURATION (HRS)	1.9	4.8	9.6	24.0	48.0	96.0	192.0	384.0	768.0	1536.0	3072.0	6144.0	12288.0	24576.0
STORM DURATION (MINS)	114	288	576	1440	2880	5760	11520	23040	46080	92160	184320	368640	737280	1474560
STORM DURATION (SECS)	6840	17280	34560	86400	172800	345600	691200	1382400	2764800	5529600	11059200	22118400	44236800	88473600
STORM VOLUME (AC-FT)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
STORM VOLUME (MG)	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
STORM DURATION (HRS)	2	5	10	25	50	100	200	500	1000	2000	5000	10000	20000	50000
STORM DURATION (MINS)	120	300	600	1500	3000	6000	12000	30000	60000	120000	300000	600000	1200000	3000000
STORM DURATION (SECS)	7200	18000	36000	90000	180000	360000	720000	1800000	3600000	7200000	18000000	36000000	72000000	180000000
STORM VOLUME (AC-FT)	2.6	34.3	47.4	64.7	79.0	94.1	109	125	140	155	170	185	199	214
STORM VOLUME (MG)	0.04	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7
STORM DURATION (HRS)	2	5	10	25	50	100	200	500	1000	2000	5000	10000	20000	50000
STORM DURATION (MINS)	120	300	600	1500	3000	6000	12000	30000	60000	120000	300000	600000	1200000	3000000
STORM DURATION (SECS)	7200	18000	36000	90000	180000	360000	720000	1800000	3600000	7200000	18000000	36000000	72000000	180000000
STORM VOLUME (AC-FT)	1.9	2.9	4.3	5.6	7.0	8.4	9.8	11.2	12.6	14.0	15.4	16.8	18.2	19.6
STORM VOLUME (MG)	0.03	0.04	0.06	0.08	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.4
STORM DURATION (HRS)	1.9	4.8	9.6	24.0	48.0	96.0	192.0	384.0	768.0	1536.0	3072.0	6144.0	12288.0	24576.0
STORM DURATION (MINS)	114	288	576	1440	2880	5760	11520	23040	46080	92160	184320	368640	737280	1474560
STORM DURATION (SECS)	6840	17280	34560	86400	172800	345600	691200	1382400	2764800	5529600	11059200	22118400	44236800	88473600
STORM VOLUME (AC-FT)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
STORM VOLUME (MG)	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
STORM DURATION (HRS)	2	5	10	25	50	100	200	500	1000	2000	5000	10000	20000	50000
STORM DURATION (MINS)	120	300	600	1500	3000	6000	12000	30000	60000	120000	300000	600000	1200000	3000000
STORM DURATION (SECS)	7200	18000	36000	90000	180000	360000	720000	1800000	3600000	7200000	18000000	36000000	72000000	180000000
STORM VOLUME (AC-FT)	2.6	34.3	47.4	64.7	79.0	94.1	109	125	140	155	170	185	199	214
STORM VOLUME (MG)	0.04	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7
STORM DURATION (HRS)	2	5	10	25	50	100	200	500	1000	2000	5000	10000	20000	50000
STORM DURATION (MINS)	120	300	600	1500	3000	6000	12000	30000	60000	120000	300000	600000	1200000	3000000
STORM DURATION (SECS)	7200	18000	36000	90000	180000	360000	720000	1800000	3600000	7200000	18000000	36000000	72000000	180000000
STORM VOLUME (AC-FT)	1.9	2.9	4.3	5.6	7.0	8.4	9.8	11.2	12.6	14.0	15.4	16.8	18.2	19.6
STORM VOLUME (MG)	0.03	0.04	0.06	0.08	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.4
STORM DURATION (HRS)	1.9	4.8	9.6	24.0	48.0	96.0	192.0	384.0	768.0	1536.0	3072.0	6144.0	12288.0	24576.0
STORM DURATION (MINS)	114	288	576	1440	2880	5760	11520	23040	46080	92160	184320	368640	737280	1474560
STORM DURATION (SECS)	6840	17280	34560	86400	172800	345600	691200	1382400	2764800	5529600	11059200	22118400	44236800	88473600
STORM VOLUME (AC-FT)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
STORM VOLUME (MG)	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01		

[illegible]

Worksheet for FSD Outlet Orifice Plate

Project Description

Solve For Diameter

Input Data

Discharge	45.90	ft ³ /s	(16.5 H _{1/2} + 29.4 P ₂)
Headwater Elevation	4.70	ft	
Centroid Elevation	0.00	ft	
Tailwater Elevation	0.00	ft	
Discharge Coefficient	0.60		

Results

Diameter	2.37	ft
Headwater Height Above Centroid	4.70	ft
Tailwater Height Above Centroid	0.00	ft
Flow Area	4.40	ft ²
Velocity	10.43	ft/s

Worksheet for FSD Overflow - Pass

Project Description

Solve For Discharge

Input Data

Headwater Elevation	0.90	ft
Crest Elevation	0.00	ft
Tailwater Elevation	0.00	ft
Crest Surface Type	Gravel	
Crest Breadth	12.00	ft
Crest Length	36.00	ft

Results

Discharge	86.22	ft ³ /s
Headwater Height Above Crest	0.90	ft
Tailwater Height Above Crest	0.00	ft
Weir Coefficient	2.80	US
Submergence Factor	1.00	
Adjusted Weir Coefficient	2.80	US
Flow Area	32.40	ft ²
Velocity	2.66	ft/s
Wetted Perimeter	37.80	ft
Top Width	36.00	ft

$$(55 \text{ D}) + 29.4 \text{ pass} = 84.4 \text{ (ft)}$$

Worksheet for FSD Overflow - Pass

Project Description

Solve For Discharge

Input Data

Headwater Elevation	0.90	ft
Crest Elevation	0.00	ft
Tailwater Elevation	0.00	ft
Crest Surface Type	Gravel	
Crest Breadth	12.00	ft
Crest Length	36.00	ft

Results

Discharge	86.22	ft ³ /s
Headwater Height Above Crest	0.90	ft
Tailwater Height Above Crest	0.00	ft
Weir Coefficient	2.80	US
Submergence Factor	1.00	
Adjusted Weir Coefficient	2.80	US
Flow Area	32.40	ft ²
Velocity	2.66	ft/s
Wetted Perimeter	37.80	ft
Top Width	36.00	ft

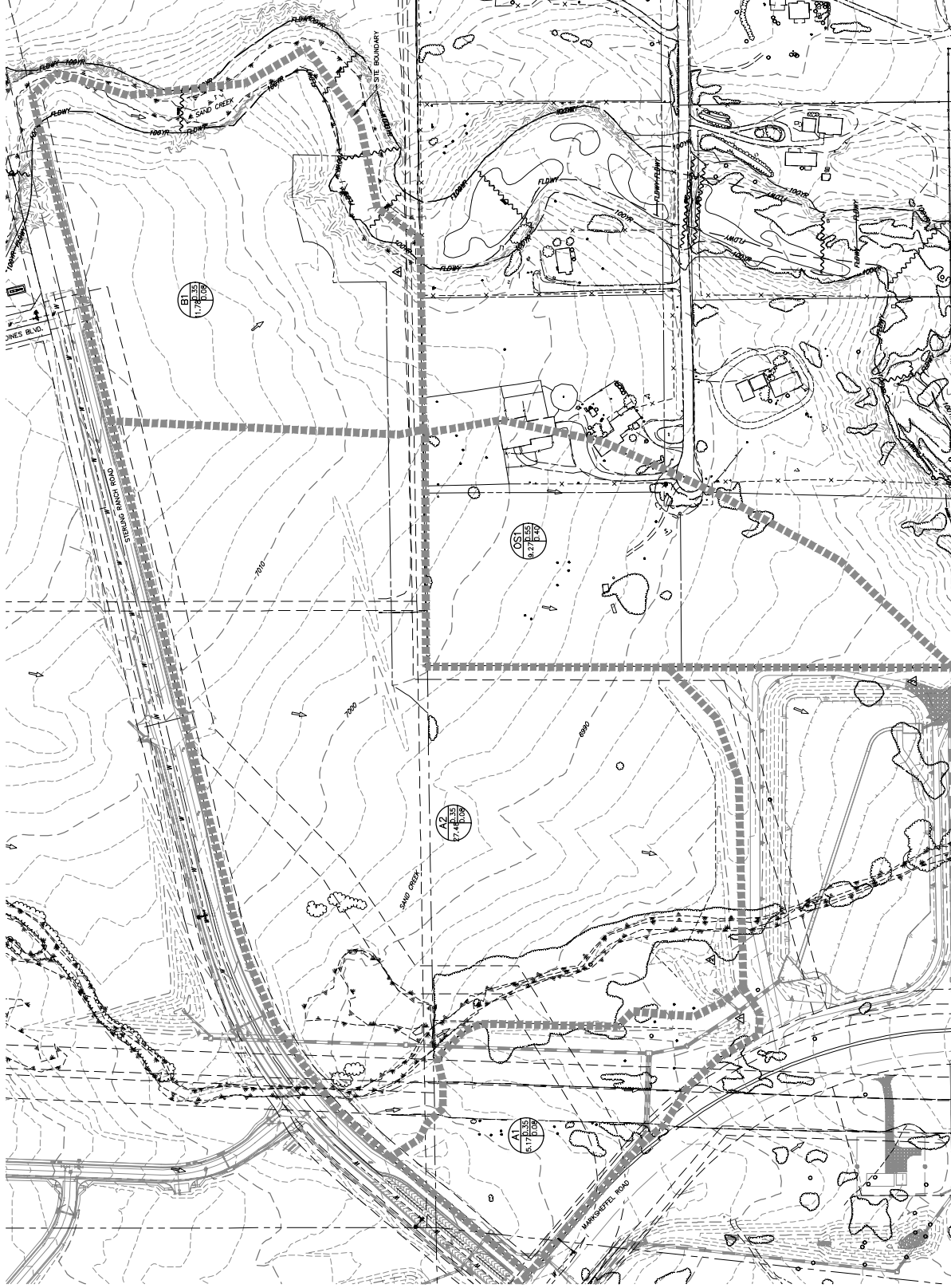
$$(55 \text{ D}) + 29.4 \text{ pass} = 84.4 \text{ (ft)}$$

Appendix E Drainage Maps

Provide a water quality
treatment area map.

JR Response: Map has been added to this Appendix

STERLING RANCH FILING 3 EXISTING DRAINAGE MAP



- LEGEND**
- BASIN ID
A: BASIN LABEL
B: C-100 YR
C: C-5 YR
- DESIGN POINT
EXISTING FLOW DIRECTION
BASIN DRAINAGE AREA
EXISTING STORM SEWER
SITE BOUNDARY
PROPERTY LINE
ROW EXISTING
FL EXISTING
SIDEWALK EXISTING
DRAINAGE ACCESS & MAINTENANCE
CASEMENT

EXISTING
100'

BASIN SUMMARY TABLE

Tributary Sub-basin	Area (acres)	Percent Impervious	C _u	t _c (min)	Q _p (cfs)	Q ₁₀₀ (cfs)
A1	5.17	28%	0.08	72.4	1.1	4.0
A2	27.4	28%	0.08	72.4	4.4	15.0
B1	11.78	0%	0.08	0.35	25.3	2.6
B2	9.27	37%	0.40	0.35	23.7	10.5
B3					24.4	

DESIGN POINT

DP	OS	C1000
1	1	100
2	2	4.6
3	3	10.5
4	4	2.6

NOTE
THIS DRAINAGE MAP ASSUMES FILING 2, STERLING RANCH ROAD, & MARGUERITE ROAD ARE BUILT.



100 50 0 100 200
ORIGINAL SCALE: 1" = 100'

STERLING RANCH FILING 3
EXISTING DRAINAGE MAP
JOB NO. 25188.02
06/09/21 OF 1

JR ENGINEERING
A Wetters Company
Contact: 954-786-2888 • Client: Sterling Ranch
For: 954-571-8588 • www.jrengineering.com

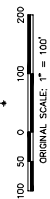
[illegible]

JR Response: Path labeled

Add a column for proposed inlet or conveyance size or label inlet and pipe sizes on the

BASIN SUMMARY					Q ₁	Q ₂	Q ₃	Q ₄
Trihedral Sub-basin	Area (km ²)	Percent Impervious	C _d		Q ₁ (m ³ /s)	Q ₂ (m ³ /s)	Q ₃ (m ³ /s)	Q ₄ (m ³ /s)
11	21.09	1%	0.08	4.1	31.2			
12	3.47	0%	0.08	0.35	31.1	4.7	4.9	
A1	4.31	63%	0.49	6.4	12.5	8.1	17.4	
A5	0.45	78%	0.62	0.73	5.0	1.4	2.9	
B1	2.44	80%	0.64	0.73	5.14	6.2	12.0	
B2	4.33	73%	0.55	0.67	12.2	9.1	18.7	
B3	0.66	63%	0.57	0.71	14.4	1.4	2.8	
B4	1.55	57%	0.40	0.56	15.9	2.1	5.0	
B5	0.45	53%	0.37	0.54	8.8	0.7	1.7	
B6	0.78	46%	0.33	0.51	18.5	0.8	2.2	
C1	0.45	53%	0.37	0.54	18.5	0.8	2.2	
D1	3.22	60%	0.08	1.35	8.1	1.9	9.9	

grading now shown



STERLING RANCH FILING 3
PROPOSED CONDITION DRAINAGE MAP
JOB NO. 25188.02
06/09/21
SHEET 1 OF 1



Centennial 303-740-9393 • Colorado Springs 719-520-2593
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1. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE EXISTENCE AND LOCATION OF ALL UNDERGROUND UTILITIES ALONG THE ROUTE OF THE WORK. THE OMISSION FROM OR THE INCLUSION OF UTILITY LOCATIONS ON THE PLANS IS NOT TO BE CONSIDERED AS THE NONEXISTENCE OF OR A DEFINITE LOCATION OF EXISTING UNDERGROUND UTILITIES.
2. THE CONTRACTOR WILL TAKE THE NECESSARY PRECAUTIONS TO PROTECT EXISTING UTILITIES FROM DAMAGE DUE TO THIS OPERATION. ANY DAMAGE TO THE UTILITIES WILL BE REPAIRED AT THE CONTRACTOR'S EXPENSE, AND ANY SERVICE DISRUPTION WILL BE SETTLED BY THE CONTRACTOR.
3. ADDITIONAL EROSION CONTROL STRUCTURES MAY BE REQUIRED AT THE TIME OF CONSTRUCTION.
4. ALL BACKFILL, SUB-BASE, AND/OR BASE COURSE (CLASS 6) MATERIAL SHALL BE COMPACTED PER THE SOILS ENGINEER'S RECOMMENDATIONS, AND APPROVED BY EL PASO COUNTY PCD.
5. ALL STATING IS CENTERLINE OF IMPROVEMENTS UNLESS OTHERWISE INDICATED. ALL ELEVATIONS ARE FLOW LINE UNLESS OTHERWISE INDICATED AS TOP BACK OF CURB (TBC), ASPHALT (ASP), OR TOP OF INLET OR COW (TOE).
6. ALL DISTURBED PAVEMENT EDGES SHALL BE CUT TO NEAT LINES. REPAIR SHALL CONFORM TO EPIC EDM APPENDIX X - 1.2C.
7. ALL INTERSECTION AREAS TO BE CONSTRUCTED WITH A 25 FOOT SIGHT VISIBILITY TRIANGLES IS REQUIRED AND THERE SHALL BE NO OBSTRUCTIONS GREATER THAN 18" VERTICAL IN THIS AREA.
8. ALL CULVERTS AND STORM DRAIN PIPES SHALL BE SMOOTH INTERIOR CORRUGATED POLYETHYLENE PIPE (HDPE), REINFORCED CONCRETE PIPE (RCP). ALL CULVERTS SHALL BE PLACED COMPLETE WITH FLARED END SECTIONS. ADEQUACY OF MATERIAL THICKNESS FOR ANY PIPE INSTALLED SHALL BE VERIFIED BY THE OWNER'S GEOTECHNICAL ENGINEER TO SUPPORT MINIMUM 50 YEAR DESIGN LIFE. CULVERTS MUST CONFORM TO EPIC SECTION 3.32 - CULVERTS.
9. ASPHALT THICKNESS AND BASE COURSE THICKNESS (COMPACTED) FOR ROADS SHALL BE PER DESIGN REPORT BY OWNER'S GEOTECHNICAL ENGINEER. OWNER'S GEOTECHNICAL ENGINEER SHALL BE ON SITE AT THE TIME OF ROAD CONSTRUCTION TO EVALUATE SOIL CONDITIONS AND DETERMINE IF ADDITIONAL MEASURES ARE NECESSARY TO ASSURE STABILITY OF THE NEW ROADS. PAVEMENT DESIGN SHALL BE APPROVED BY EL PASO COUNTY DEVELOPMENT SERVICES ENGINEERING DIVISION PRIOR TO CONSTRUCTION.

- ALL SIGNS AND PAYMENT MARKING SHALL BE IN COMPLIANCE WITH THE CURRENT MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD).
- REMOVAL OF EXISTING PAYMENT MARKINGS SHALL BE ACCOMPLISHED BY A METHOD THAT DOES NOT WASTFULLY DAMAGE THE PAVEMENT. THE PAYMENT MARKINGS SHALL BE REMOVED TO THE EXTENT THAT THEY WILL NOT BE VISIBLE UNDER DAY OR NIGHT CONDITIONS. AT NO TIME WILL IT BE NECESSARY TO MAINTAIN TRAFFIC IN ONE LANE.
- ANY DEVIATION FROM THE STRIPING AND SIGNING PLAN SHALL BE APPROVED BY EL PASO COUNTY PLANNING AND COMMUNITY DEVELOPMENT.
- ALL SIGNS SHOWN ON THE SIGNING AND STRIPPING PLAN SHALL BE NEW SIGNS. EXISTING SIGNS MAY REMAIN OR BE REUSED IF THEY MEET CURRENT EL PASO COUNTY AND MUTCD STANDARDS.
- STREET NAME AND REGULATORY STOP SIGN SHALL BE ON THE SAME POST AT INTERSECTIONS.
- ALL REMOVED SIGNS SHALL BE DISPOSED OF IN A PROPER MANNER BY THE CONTRACTOR.
- ALL STREET NAME SIGNS SHALL HAVE 1" SERIES LETTERS, WITH LOCAL ROADWAY SIGNS BEING 4" UPPER-LOWER CASE LETTERING OR 8" BLANK AND 4" BLANK LOWER CASE LETTERING. ALL OTHER SIGNS SHALL HAVE 2" SERIES LETTERS WITH A WHITE BORDER THAT IS NOT RECESSED. ALL MAJOR LOCAL ROADWAYS WITH SPEED LIMITS OF 40 MPH OR HIGHER SHALL HAVE 8" UPPER-LOWER CASE LETTERING ON 18" BLANK WITH A WHITE BORDER THAT IS NOT RECESSED. THE WIDTH OF THE NON-RECESSED WHITE BORDER SHALL MATCH PLACE LETTERS OF THE 2012 MUTCD "STANDARD HIGHWAY SIGNAGE".
- ALL LOCAL RESIDENTIAL STREET SIGNS SHALL BE MOUNTED ON A 1.75" X 1.75" SQUARE TUBE SIGN POST AND STUB POST FRAME, FOR OTHER APPLICATIONS, REFER TO THE CDOT STANDARD S-614-S REGARDING USE OF THE P2 SQUARE TUBE SIGN POST SUPPLUSE DESIGN.
- ALL LOCAL RESIDENTIAL STREET SIGNS SHALL BE MOUNTED WITH 0.100" SPACING.
- ALL LIMIT LINES/STOP LINES, CROSSWALK LINES, PAVEMENT LEGENDS, AND ARROWS SHALL BE A MINIMUM 1/8" THICKNESS PREPARED BY THERMOPLASTIC PAVEMENT MARKINGS WITH TAPEDED LEGENDS PER CDOT STANDARD S-627-1. WORD AND SYMBOL MARKINGS SHALL BE THE MINIMUM 1/8" THICKNESS PREPARED BY THERMOPLASTIC PAVEMENT MARKINGS.
- ALL LONGITUDINAL LINES SHALL BE A MINIMUM 1/8" THICKNESS EPOXY PAINT, ALL NON-LOCAL RESIDENTIAL ROADWAYS SHALL INCLUDE BOTH RIGHT AND LEFT EDGE LINE STRIPING AND ANY ADDITIONAL STRIPING AS REQUIRED BY CDOT S-627-1.
- THE CONTRACTOR SHALL NOTIFY EL PASO COUNTY PLANNING AND COMMUNITY DEVELOPMENT (719) 580-6819 PRIOR TO AND UPON COMPLETION OF SIGNING AND STRIPING.
- THE CONTRACTOR SHALL OBTAIN A WORK IN THE RIGHT OF WAY PERMIT FROM THE EL PASO COUNTY DEPARTMENT OF PUBLIC WORKS (DPW) PRIOR TO THE CONTRACTOR'S BEGINNING OF STRIPING AND SIGNING.

ALL DRAINAGE AND ROADWAY TRANSPORT SHALL MEET THE STANDARDS AND SPECIFICATIONS OF THE CITY OF COLORADO SPRINGS/EL PASO COUNTY DRAINAGE CRITERIA MANUAL, VOLUMES 1 AND 2, AND THE EL PASO COUNTY ENGINEERING CRITERIA MANUAL.

2. CONTRACTOR SHALL BE RESPONSIBLE FOR THE NOTIFICATION AND FIELD NOTIFICATION OF ALL EXISTING UTILITIES, WHETHER SHOWN ON THE PLANS OR NOT, BEFORE BEGINNING CONSTRUCTION. LOCATION OF EXISTING UTILITIES SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION. CALL 811 TO CONTACT THE UTILITY NOTIFICATION CENTER OF COLORADO (UNCC).

3. CONTRACTOR SHALL KEEP A COPY OF THESE APPROVED PLANS, THE GRADING AND EROSION CONTROL PLAN, THE STORMWATER MANAGEMENT PLAN (SMP), THE SOIL AND GEOTECHNICAL REPORT, AND APPROPRIATE DESIGN AND CONSTRUCTION STANDARDS AND SPECIFICATIONS AT THE JOB SITE AT ALL TIMES, INCLUDING THE FOLLOWING:

- a. EL PASO COUNTY ENGINEERING CRITERIA MANUAL (ECM)
- b. CITY OF COLORADO SPRINGS/EL PASO COUNTY DRAINAGE CRITERIA MANUAL, VOLUMES 1 AND 2
- c. COLORADO DEPARTMENT OF TRANSPORTATION (CDOT) STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION
- d. CDOT M & S STANDARDS

4. NOTWITHSTANDING ANYTHING DEPICTED IN THESE PLANS IN WORDS OR GRAPHIC REPRESENTATION, ALL DESIGN AND CONSTRUCTION RELATED TO ROADS, STORM DRAINAGE, EROSION CONTROL, SHALL CONFORM TO THE STANDARDS AND REQUIREMENTS OF THE MOST RECENT VERSION OF THE RELEVANT ADOPTED EL PASO COUNTY STANDARDS, INCLUDING THE LAND DEVELOPMENT CODE, THE ENGINEERING CRITERIA MANUAL, THE DRAINAGE CRITERIA MANUAL, AND THE DRAINAGE CRITERIA MANUAL VOLUME 2. ANY DEVIATIONS FROM REGULATIONS AND STANDARDS MUST BE REQUESTED, AND APPROVED, IN WRITING. ANY MODIFICATIONS NECESSARY TO MEET CITIES AFTER-THE-FACT WILL BE ENTIRELY THE DEVELOPER'S RESPONSIBILITY TO RECTIFY.

5. IT IS THE DESIGN ENGINEER'S RESPONSIBILITY TO ACCURATELY SHOW EXISTING CONDITIONS, BOTH ONSITE AND OFFSITE, ON THE CONSTRUCTION PLANS. ANY MODIFICATIONS NECESSARY DUE TO CONFLICTS, OMISSIONS, OR CHANGED CONDITIONS WILL BE ENTIRELY THE DEVELOPER'S RESPONSIBILITY TO RECTIFY.

6. CONTRACTOR SHALL SCHEDULE A PRE-CONSTRUCTION MEETING WITH EL PASO COUNTY PLANNING AND COMMUNITY DEVELOPMENT (PCD) - INSPECTORS, PRIOR TO STARTING CONSTRUCTION.

7. IT IS THE CONTRACTOR'S RESPONSIBILITY TO UNDERSTAND THE REQUIREMENTS OF ALL JURISDICTIONAL AGENCIES AND TO OBTAIN ALL REQUIRED PERMITS, INCLUDING BUT NOT LIMITED TO EL PASO COUNTY EROSION AND STORMWATER QUALITY CONTROL PERMIT (EQCQ), REGIONAL BUILDING FLOODPLAIN DEVELOPMENT PERMIT, U.S. ARMY CORPS OF ENGINEERS-ISSUED 401 AND/OR 404 PERMITS, AND COUNTY AND STATE FUGITIVE DUST PERMITS.

8. CONTRACTOR SHALL NOT DEVIATE FROM THE PLANS WITHOUT FIRST OBTAINING WRITTEN APPROVAL FROM THE DESIGN ENGINEER AND PCD.

9. CONTRACTOR SHALL NOTIFY THE DESIGN ENGINEER IMMEDIATELY UPON DISCOVERY OF ANY ERRORS OR INCONSISTENCIES.

10. ALL STORM DRAIN PIPE SHALL BE CLASS II OR UNLESS OTHERWISE NOTED BY PCD.

10. CONTRACTOR SHALL COORDINATE GEOTECHNICAL TESTING PER EGM STANDARDS. PAVEMENT DESIGN SHALL BE APPROVED BY EL PASO COUNTY PCD PRIOR TO PLACEMENT OF CURB AND GUTTER AND PAVEMENT.

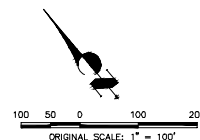
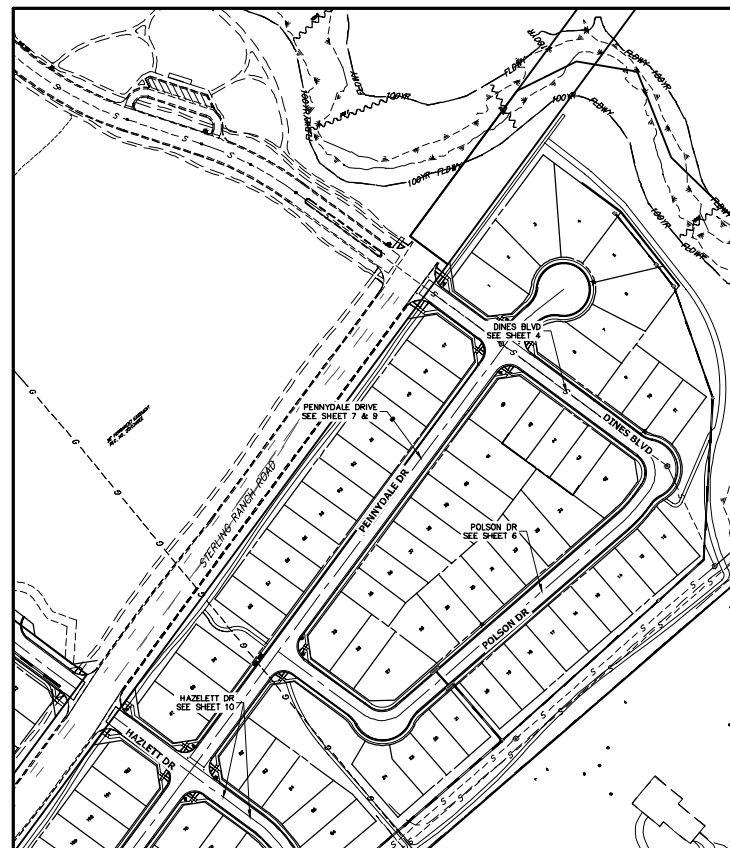
11. ALL CONSTRUCTION TRAFFIC MUST ENTER/EXIT THE SITE AT APPROVED CONSTRUCTION ACCESS POINTS.

12. SIGHT VISIBILITY TRIANGLES AS IDENTIFIED IN THE PLANS SHALL BE PROVIDED AT ALL INTERSECTIONS. OBSTRUCTIONS GREATER THAN 18 INCHES ABOVE FLOWLINE ARE NOT ALLOWED WITHIN SIGHT TRIANGLES.


13. SIGNING AND STRIPING SHALL COMPLY WITH EL PASO COUNTY PCD AND MUTCD CRITERIA. (IF APPLICABLE, ADDITIONAL SIGNING AND STRIPING NOTICES WILL BE PROVIDED).

14. CONTRACTOR SHALL OBTAIN ANY PERMITS REQUIRED BY EL PASO COUNTY DPW, INCLUDING WORK WITHIN THE RIGHT-OF-WAY AND SPECIAL TRANSPORT PERMITS.

15. THE LIMITS OF CONSTRUCTION SHALL REMAIN WITHIN THE PROPERTY LINE UNLESS OTHERWISE NOTED. THE OWNER/DEVELOPER SHALL OBTAIN WRITTEN PERMITS AND EASEMENTS, WHERE REQUIRED, FROM ADJOINING PROPERTY OWNERS(S) PRIOR TO ANY OFF-SITE DISTURBANCE, GRADING, OR CONSTRUCTION.

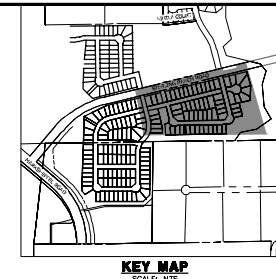
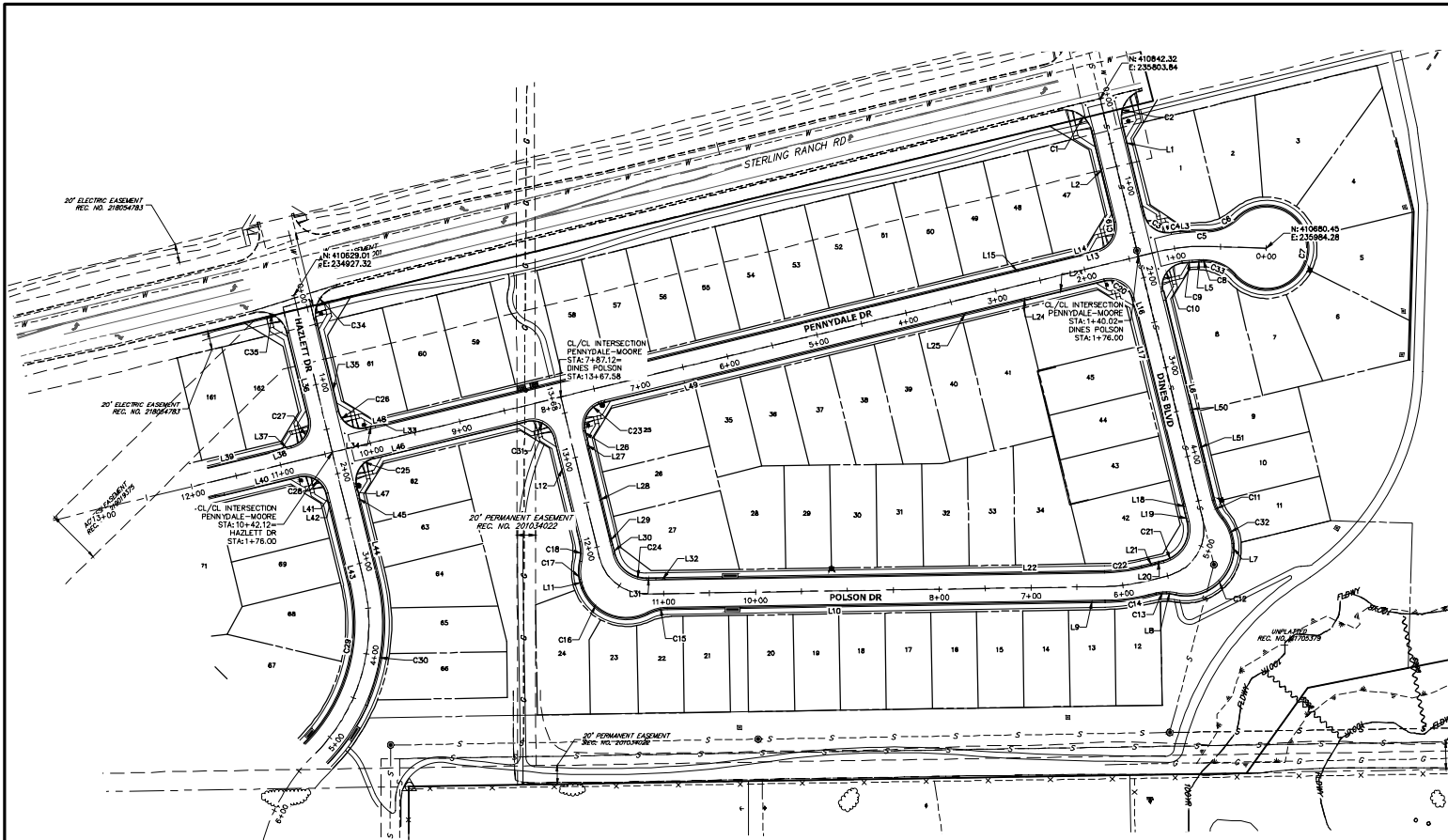


KEY MAP

STERLING RANCH FILING 3	H-SCALE		N/A		No.		REVISION		BY		DATE	
	V-SCALE		N/A									
	DATE		6/17/21									
GENERAL NOTES	DESIGNED BY AJH											
	DRAWN BY CCV											
	CHECKED BY											
 <p>J.R. ENGINEERING A Westlink Company</p> <p>Central 303-340-5838 • Colorado Stamp 791-56-2569 Fax 303-340-613888 • www.jrengineering.com</p>												
<p>PREPARED FOR</p> <p>SR LAND, LLC 20 BOWLER CRESCENT SUITE 201 COLORADO SPRINGS, CO 80903 JAMES F. MORLEY (719) 471-1742</p>												
<p>NOT SUCHING AS THESE DRAWINGS ARE APPROVED BY THE ENGINEERING AGENCIES, WE ENGINEERING APPROVES THEIR USE. THESE DRAWINGS ARE DESIGNATED BY WRITTEN AUTHORIZATION.</p>												
JOB NO.	25188											
SHEET	2 OF 13											



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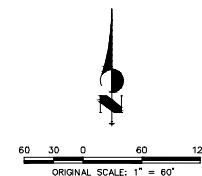
UNTIL SUCH TIME AS THE PROJECT IS REVIEWED AND APPROVED BY THE COLORADO DEPARTMENT OF TRANSPORTATION, THE DESIGN SHALL BE USED FOR THE PROJECTS DESCRIBED HEREIN. THE DESIGN IS NOT TO BE USED FOR ANY OTHER PURPOSES WITHOUT THE WRITTEN AUTHORIZATION OF J.R. ENGINEERING.

PREPARED FOR
SR LAND, LLC
20 BOULDER CRESCENT
SUITE 201
COLORADO SPRINGS, CO 80903
JAMES F. MORLEY
(719) 471-1742

J.R. ENGINEERING
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BY	DATE	REVISION	NO.	1"=60'	H-SCALE	V-SCALE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY
				N/A			6/17/21	ARJ	ARJ	
STERLING RANCH FILING 3 HORIZONTAL CONTROL										
SHEET 3 OF 13										
JOB NO. 25188.00										

LINE AND CURVE TABLE				LINE AND CURVE TABLE				LINE AND CURVE TABLE				LINE AND CURVE TABLE			
LINE/CURVE	BEARING/DELTA	LENGTH	RADIUS	LINE/CURVE	BEARING/DELTA	LENGTH	RADIUS	LINE/CURVE	BEARING/DELTA	LENGTH	RADIUS	LINE/CURVE	BEARING/DELTA	LENGTH	RADIUS
C1	90°00'00"	47.12'	30.00'	C23	90°00'00"	39.27'	25.00'	L11	S19°58'22"E	10.10'		L33	N81°05'03"E	10.03'	
C2	90°00'00"	47.12'	30.00'	C24	77°14'51"	47.19'	35.00'	L12	S13°40'40"E	115.70'		L34	N76°19'20"E	10.00'	
C3	85°29'41"	37.30'	25.00'	C25	90°00'00"	39.27'	25.00'	L13	S76°19'20"W	10.00'		L35	S13°40'40"E	102.00'	
C4	2°38'25"	10.00'	217.00'	C26	90°00'00"	39.27'	25.00'	L14	N71°33'38"E	10.03'		L36	S13°40'40"E	96.00'	
C5	4°59'37"	18.84'	216.17'	C27	90°00'00"	39.27'	25.00'	L15	N76°19'20"E	778.10'		L37	N76°19'20"E	10.00'	
C6	46°36'19"	36.60'	45.00'	C28	90°00'00"	39.27'	25.00'	L16	S18°28'22"E	10.03'		L38	S71°33'38"W	10.03'	
C7	27°42'38"	215.48'	45.00'	C29	59°37'12"	191.29'	183.83'	L17	S13°40'40"E	211.38'		L39	N76°19'20"E	350.69'	
C8	1°08'23"	3.88'	183.83'	C30	35°09'37"	132.85'	216.17'	L18	N08°54'57"W	10.03'		L40	N76°19'20"E	83.00'	
C9	3°07'00"	9.85'	183.00'	C31	90°00'00"	39.27'	25.00'	L19	N13°40'40"W	10.00'		L41	S13°40'40"E	10.00'	
C10	96°54'35"	42.28'	25.00'	C32	31°45'54"	26.37'	51.17'	L20	N71°33'38"E	10.03'		L42	S19°26'23"E	10.03'	
C11	25°00'31"	22.02'	48.83'	C33	48°15'43"	37.80'	45.00'	L21	N76°19'20"E	14.34'		L43	S13°40'40"E	81.67'	
C12	96°17'35"	87.39'	52.00'	C34	90°00'00"	47.12'	30.00'	L22	N89°04'30"E	478.39'		L44	S13°40'40"E	81.67'	
C13	12°55'16"	11.01'	48.83'	C35	90°00'00"	47.12'	30.00'	L23	N76°19'20"E	83.00'		L45	S08°54'57"E	10.03'	
C14	12°45'09"	48.11'	216.17'	L1	S13°40'40"E	102.75'		L24	S81°05'03"W	10.03'		L46	N76°19'20"E	171.00'	
C15	25°50'32"	22.02'	48.83'	L2	S13°40'40"E	102.00'		L25	N76°19'20"E	367.10'		L47	S13°40'40"E	10.00'	
C16	95°54'15"	85.85'	51.17'	L3	S89°32'42"W	10.05'		L26	S13°40'40"E	10.00'		L48	N81°05'03"E	10.03'	
C17	21°49'47"	19.81'	52.00'	L5	N83°08'09"E	10.01'		L27	S08°54'57"E	10.03'		L49	S71°33'38"W	10.03'	
C18	25°00'31"	21.65'	48.00'	L6	S13°40'40"E	125.80'		L28	S13°40'40"E	97.72'		L50	N08°54'57"W	10.03'	
C19	90°00'00"	39.27'	25.00'	L7	N04°44'43"W	9.94'		L29	S18°26'22"E	10.03'		L51	S13°40'40"E	93.48'	
C20	90°00'00"	39.27'	25.00'	L8	N79°54'56"W	11.22'		L30	S13°40'40"E	10.00'					
C21	90°00'00"	54.98'	35.00'	L9	S89°04'30"W	476.37'		L31	S89°04'30"W	10.00'					
C22	12°45'09"	40.92'	183.83'	L10	S89°04'30"W	476.37'		L32	S86°09'48"E	10.03'					

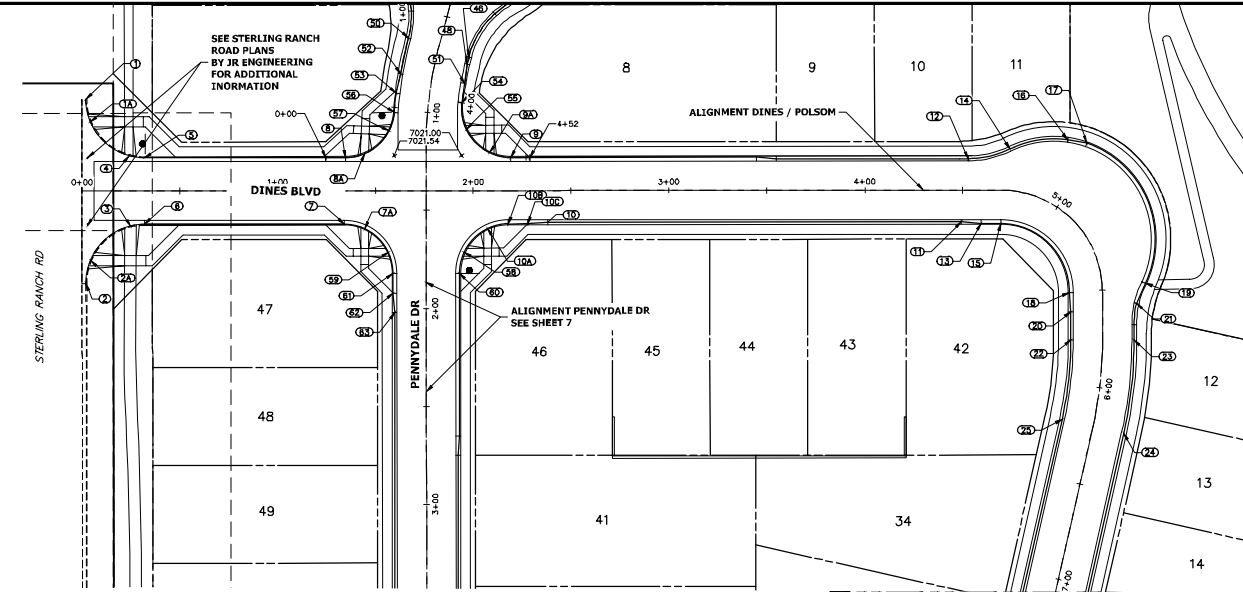


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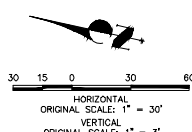
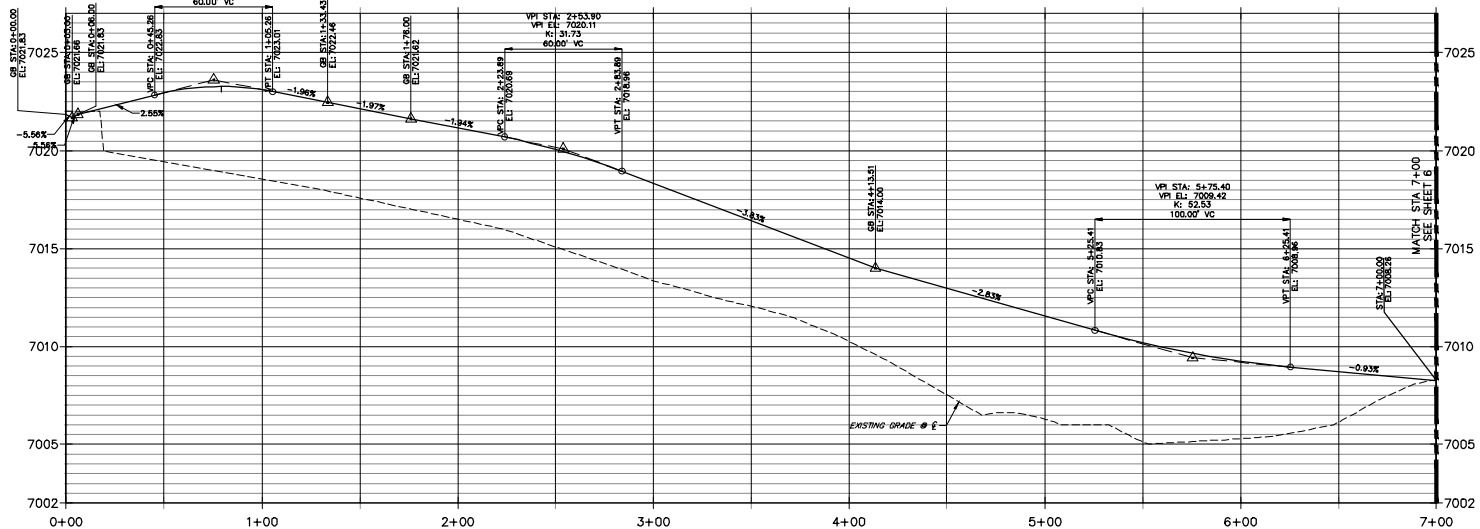
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POINT TABULATION				
POINT NUMBER	STATION	OFFSET	ALIGNMENT	ELEVATION
1	0+02.00	47.00' (LT)	DINES POLSON	7022.00
1A	0+04.35	35.36' (LT)	DINES POLSON	7022.14
2	0+02.00	47.00' (RT)	DINES POLSON	7021.23
2A	0+04.35	35.36' (RT)	DINES POLSON	7021.54
3	0+24.86	17.86' (RT)	DINES POLSON	7021.97
4	0+24.02	18.08' (LT)	DINES POLSON	7022.46
5	0+32.00	17.00' (LT)	DINES POLSON	7022.56
6	0+32.00	17.00' (RT)	DINES POLSON	7022.07
7	1+34.00	17.00' (RT)	DINES POLSON	7021.98
7A	1+44.60	19.36' (RT)	DINES POLSON	7021.57
8	1+34.75	17.00' (LT)	DINES POLSON	7021.98
8A	1+44.45	18.96' (LT)	DINES POLSON	7021.96
9	2+19.15	17.00' (LT)	DINES POLSON	7020.55
9A	2+08.55	19.36' (LT)	DINES POLSON	7020.73
10	2+38.00	16.17' (RT)	DINES POLSON	7020.00
10A	2+07.40	19.36' (RT)	DINES POLSON	7020.72
10B	2+16.00	17.00' (RT)	DINES POLSON	7020.50
10C	2+28.00	17.00' (RT)	DINES POLSON	7020.25
11	4+49.38	16.17' (RT)	DINES POLSON	7012.59
12	4+52.72	16.17' (LT)	DINES POLSON	7012.53
13	4+59.38	17.00' (RT)	DINES POLSON	7012.24
14	4+72.72	21.20' (LT)	DINES POLSON	7012.11
15	4+69.38	17.00' (RT)	DINES POLSON	7011.95
16	4+91.02	32.88' (LT)	DINES POLSON	7011.56
17	4+96.71	35.97' (LT)	DINES POLSON	7011.31
18	5+51.06	17.00' (RT)	DINES POLSON	7009.70
19	5+47.83	22.07' (RT)	DINES POLSON	7009.76
20	5+61.06	16.17' (RT)	DINES POLSON	7009.71
21	5+56.73	17.41' (LT)	DINES POLSON	7009.62
22	5+75.40	16.17' (RT)	DINES POLSON	7009.26
23	5+75.40	16.17' (LT)	DINES POLSON	7009.26
24	6+19.91	16.17' (LT)	DINES POLSON	7008.61
25	6+19.91	16.17' (RT)	DINES POLSON	7008.61



DINES PROFILE
STA 0+00.00 TO 7+00.00



ENGINEER'S STATEMENT

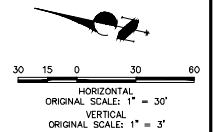
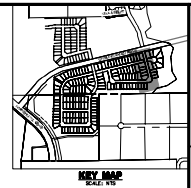
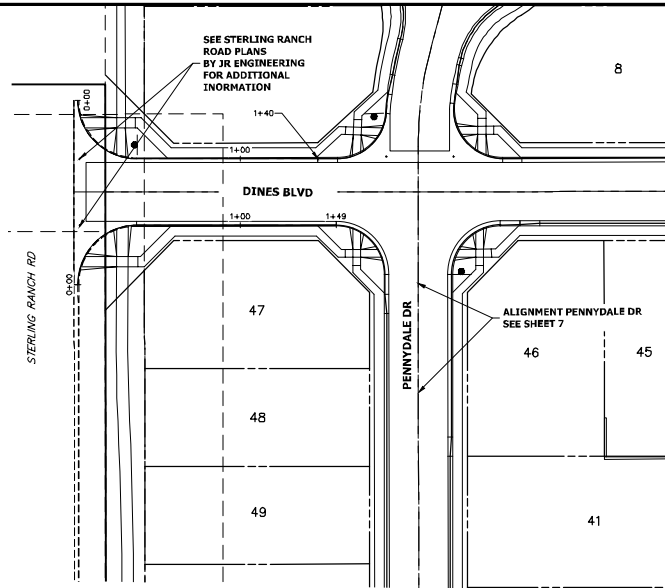
PREPARED UNDER MY DIRECT SUPERVISION AND ON BEHALF OF JR ENGINEERING.

MIKE A. BRAMBLETT, P.E.
COLORADO P.E. 32314
FOR AND ON BEHALF OF JR ENGINEERING

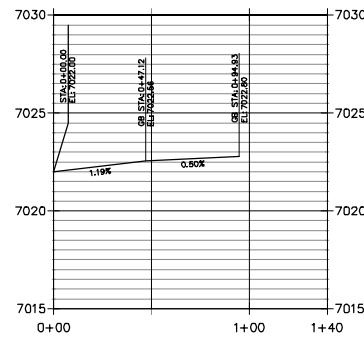


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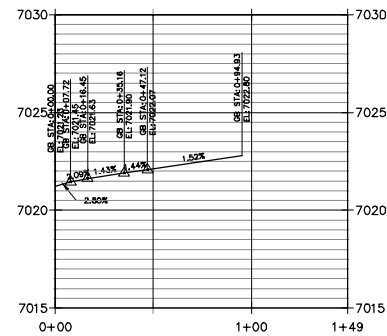
PREPARED FOR SR LAND, LLC 20 BOULDER CRESCENT SUITE 201 COLORADO SPRINGS, CO 80903 JAMES F. MORLEY (719) 471-1742		UNTIL SUCH TIME AS APPROVED BY THE APPROPRIATE REVIEWING OFFICIALS FOR THE APPROPRIATE USE OF THE INFORMATION CONTAINED HEREIN AUTHORIZATION
JR ENGINEERING A Whiting Company Central 303-740-8339 • Colorado Springs 719-596-2588 For Color 970-691-8888 • www.jrengineering.com		BY _____ DATE _____ NO. _____ REVISION _____ H-SCALE 1"=30' V-SCALE 1"=3' DATE 6/17/21 DESIGNED BY JRM DRAWN BY JRM CHECKED BY _____
STERLING RANCH FILING 3 STREET IMPROVEMENT PLAN		SHEET 4 OF 13 JOB NO. 25188-00



**EAST FL DINES PROFILE
STA 0+00.00 TO 1+39.87**



**WEST FL DINES PROFILE
STA 0+00.00 TO 1+49.12**



ENGINEER'S STATEMENT

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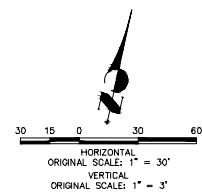
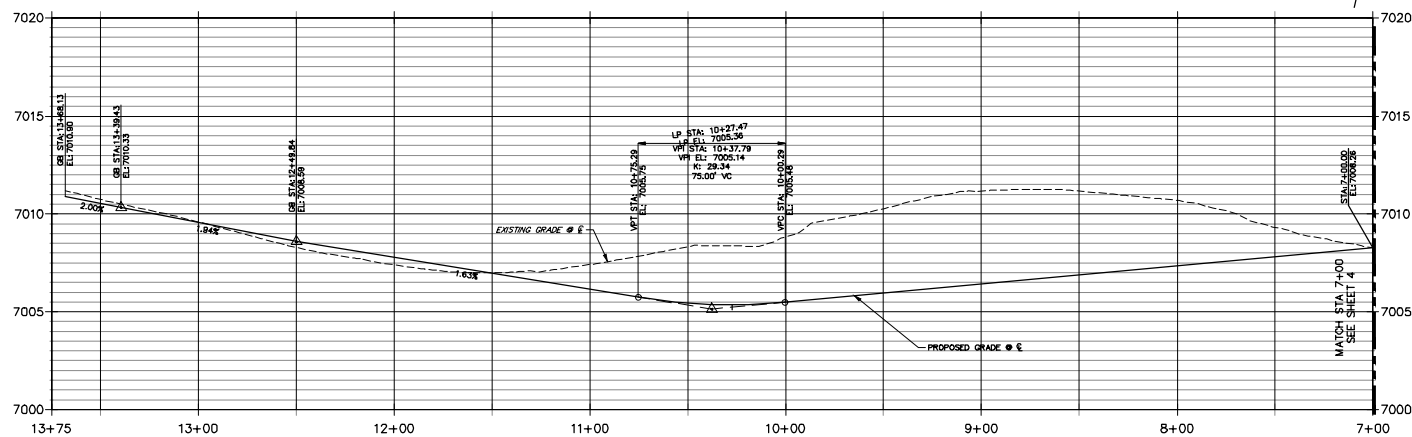
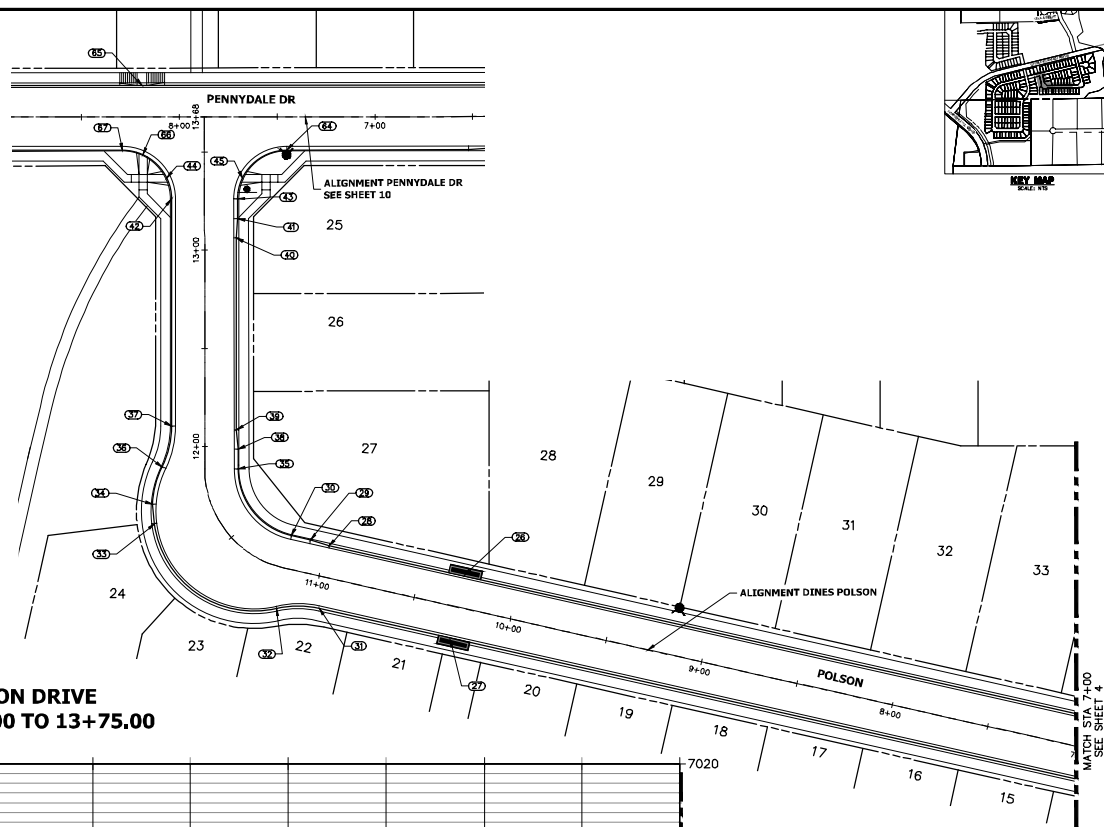
MIKE A. BRAMLETT, P.E.
COLORADO P.E. 32314
FOR AND ON BEHALF OF JR ENGINEERING, INC.



FILE NO. SF-21-XXX

<p>PREPARED FOR</p> <p>SR LAND, LLC</p> <p>20 BOULDER CRESCENT</p> <p>SUITE 201</p> <p>BOULDER, CO 80503</p> <p>COLORADO</p> <p>JAMES F. MORLEY</p> <p>(719) 471-1742</p>		<p>UNLESS SUCH TIME AS THE PROJECT IS APPROVED BY THE APPROPRIATE REVIEWING AGENCIES, THESE PLANS ARE NOT TO BE USED FOR ANY PURPOSES WITHOUT THE WRITTEN AUTHORIZATION OF JR ENGINEERING.</p>	
<p>BY</p> <p>DATE</p>		<p>REVISION</p> <p>NO.</p>	
<p>H-Scale 1"=30'</p> <p>V-Scale 1"=3'</p>		<p>DATE</p> <p>DESIGNED BY</p> <p>DRAWN BY</p> <p>CHECKED BY</p>	
<p>STERLING RANCH FILING 3</p> <p>STREET IMPROVEMENT PLAN</p>		<p>SHEET 5 OF 13</p> <p>JOB NO. 25188.00</p>	

POINT TABULATION					
POINT NUMBER	STATION	OFFSET	ALIGNMENT	ELEVATION	DESCRIPTION
26	10+27.53	16.83' (RT)	DINES POLSON	7005.36	LOW POINT
27	10+27.51	16.99' (LT)	DINES POLSON	7005.45	LOW POINT
28	10+98.31	16.17' (RT)	DINES POLSON	7006.01	CURB TRANSITION
29	11+08.31	17.00' (RT)	DINES POLSON	7005.82	CURB TRANSITION
30	11+18.31	17.00' (RT)	DINES POLSON	7005.98	PCR
31	10+96.29	16.17' (LT)	DINES POLSON	7005.69	PCR
32	11+17.57	20.05' (LT)	DINES POLSON	7005.95	PCR
33	11+70.46	31.64' (LT)	DINES POLSON	7006.95	CURB TRANSITION
34	11+76.79	28.89' (LT)	DINES POLSON	7007.07	CURB TRANSITION
35	11+88.41	17.00' (RT)	DINES POLSON	7007.12	PCR
36	11+89.51	21.80' (LT)	DINES POLSON	7007.30	PCR
37	12+10.43	17.00' (LT)	DINES POLSON	7007.57	PCR
38	11+98.41	17.00' (RT)	DINES POLSON	7007.29	CURB TRANSITION
39	12+08.41	16.17' (RT)	DINES POLSON	7007.52	CURB TRANSITION
40	13+06.13	16.25' (RT)	DINES POLSON	7009.33	CURB TRANSITION
41	13+16.13	17.00' (RT)	DINES POLSON	7009.44	CURB TRANSITION
42	13+26.13	17.00' (LT)	DINES POLSON	7009.41	PCR
43	13+28.13	17.00' (RT)	DINES POLSON	7009.66	PCR
44	13+36.72	19.36' (LT)	DINES POLSON	7009.55	HC RAMP MID PT
45	13+36.72	19.36' (RT)	DINES POLSON	7009.55	HC RAMP MID PT



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

ENGINEER'S STATEMENT

PREPARED UNDER MY DIRECT SUPERVISION
ENGINEERING

MIKE A. BRAMLETT, P.E.
COLORADO P.E. 32314
FOR AND ON BEHALF OF JR ENGINEERING, LLC

FILE NO. SF-21-XXX

UNTIL SUCH TIME AS
THESE DRAWINGS ARE
APPROVED BY THE
APPROPRIATE REVIEWING
AGENCIES, JR ENGINEERING
APPROVES THEIR USE
ONLY FOR THE PURPOSES
DESIGNATED BY WRITTEN
AUTHORIZATION.

PREPARED FOR
SR LAND, LLC
20 BOULDER CRESCENT
SUITE 201
COLORADO SPRINGS, CO 80903
JAMES F. MORLEY
(719) 471-1742

J-R ENGINEERING

2

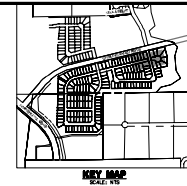
Centennial 303-740-9303 • Colorado Springs 719-533-2583
Fort Collins 970-491-9898 • www.jengineering.com

H-SCALE	I* = 30"	No.	REVISION	BY	DATE
V-SCALE	I* = 3'				
DATE	6/17/21				
DESIGNED BY	JRM				
DRAWN BY	CJD				

STERLING RANCH
FILING 3

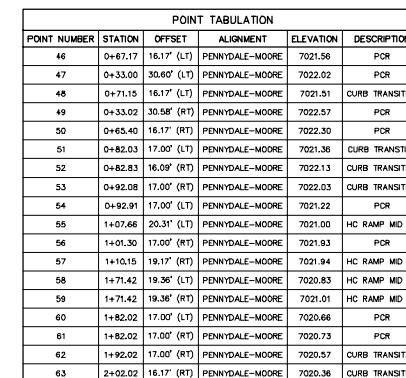
STREET IMPROVEMENT PLAN

SHEET	6	OF	13
JOB NO.	25188.00		



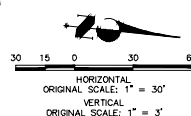
J-R ENGINEERING
A Westlin Company

Central 303-740-5933 • Colorado Springs 719-595-2563
Fort Collins 970-491-9888 • www.jrengineering.com



MIKE A. BRAMLETT, P.E.
COLORADO P.E. 32314
FOR AND ON BEHALF OF JR ENGINEERING

SHEET	8	OF	13
STERLING RANCH FLING 3			
STREET IMPROVEMENT PLAN			
H-SCALE 1"=30'		No. REVISION	
V-SCALE 1"=3'			
DATE 6/17/21		BY DATE	
DESIGNED BY JRM			
DRAWN BY JRM			
CHECKED BY			
JOB NO. 25188.00			



POINT TABULATION					
POINT NUMBER	STATION	OFFSET	ALIGNMENT	ELEVATION	DESCRIPTION
143	1+34.00	17'00" (RT)	HAZLETT DR	7008.51	PCR
144	1+34.00	17'00" (LT)	HAZLETT DR	7008.84	PCR
145	1+44.60	19'36" (LT)	HAZLETT DR	7008.72	HC RAMP MID
146	0+32.00	17'00" (RT)	HAZLETT DR	7008.73	PCR
147	0+32.00	17'00" (LT)	HAZLETT DR	7009.62	PCR
148	0+20.55	22'60" (RT)	HAZLETT DR	7008.32	HC RAMP MID
149	0+20.56	19'22" (LT)	HAZLETT DR	7008.58	HC RAMP HC R
150	0+08.00	47'00" (RT)	HAZLETT DR	7007.40	PCR



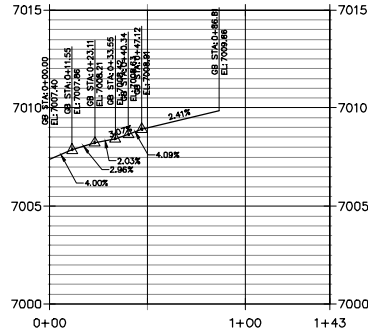
Know what's below.
Call before you dig.

PREPARED UNDER MY DIRECT SUPERVISION AND ON BEHALF OF JR
ENGINEERING

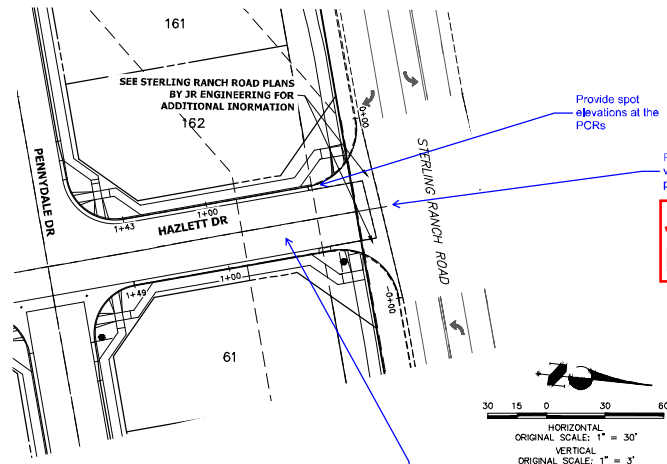
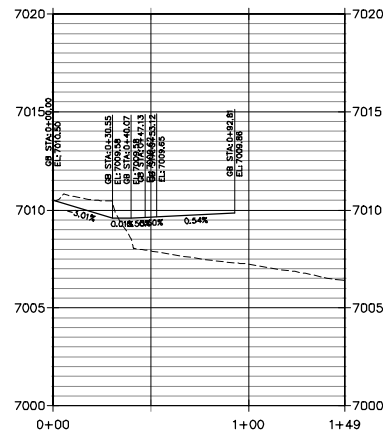
MIKE A. BRAMLETT
32314
PROFESSIONAL ENGINEER
STATE OF COLORADO

FILE NO. SF-21-XXX

**WEST FL HAZLETT DRIVE PROFILE PROFILE
STA 0+00.00 TO 1+43.12**



**EAST FL HAZLETT DRIVE PROFILE
STA 0+00.00 TO 1+49.12**



label warping and cross-slopes

Provide spot elevations at the PCR's

Please rotate the view to match the profiles.

JR Response: Moved Profiles

JR Response: Added

JR Response:Updated



Know what's below.
Call before you dig.

ENGINEER'S STATEMENT

PREPARED UNDER MY DIRECT SUPERVISION AND ON BEHALF OF JR ENGINEERING.

MIKE A. BRAMLEY, P.E.
COLORADO P.E. 32314
FOR AND ON BEHALF OF JR ENGINEERING



FILE NO. SF-21-XXX

BY	DATE	REVISION	No.	1"=30'	1"=3"	DATE	DESIGNED BY	DRAWN BY	CHECKED BY
						6/17/21	JRM	JRM	

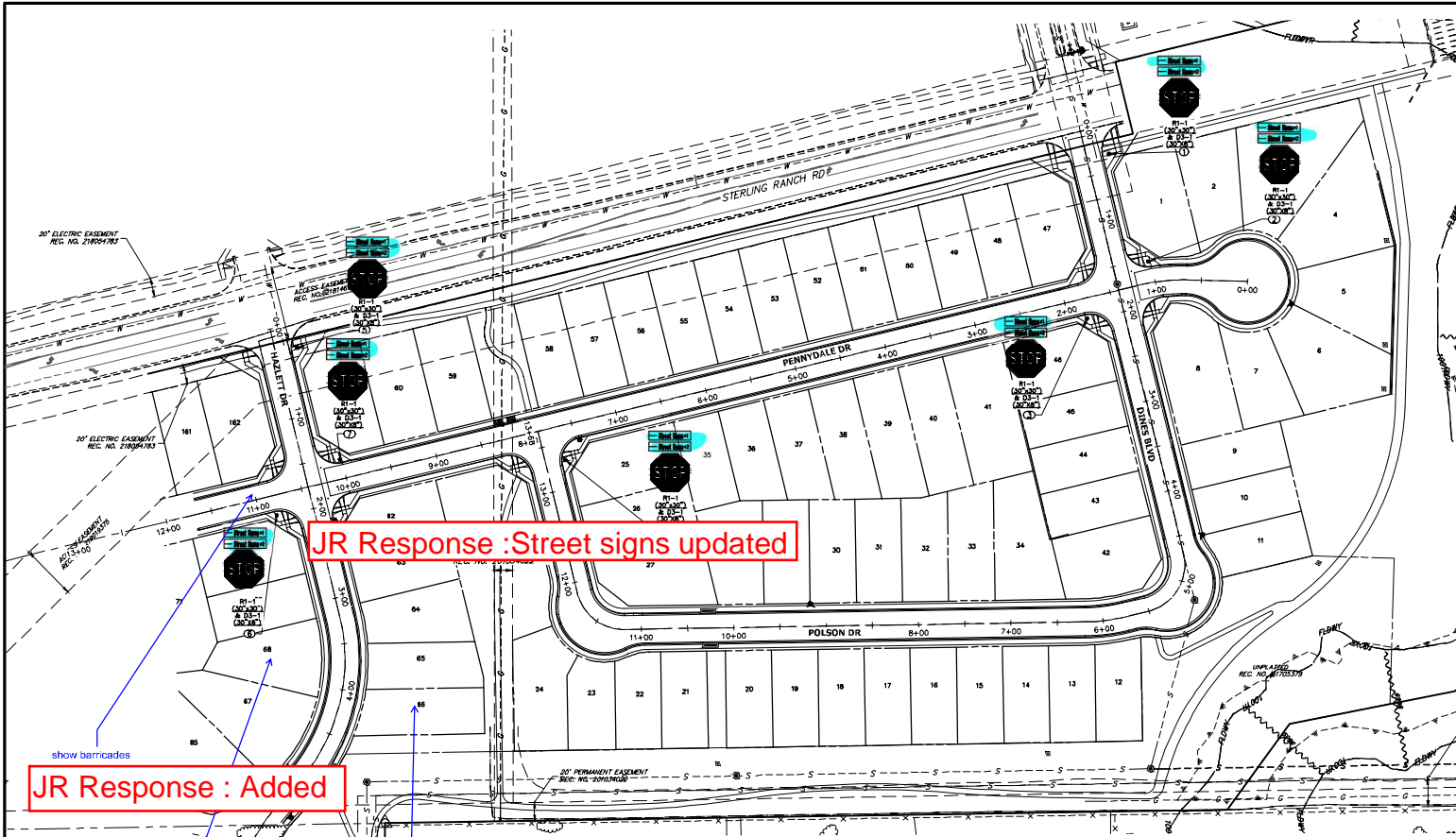
STERLING RANCH
FILING 3
STREET IMPROVEMENT PLAN

SHEET 11 OF 13
JOB NO. 25188.00

PREPARED FOR
SR LAND, LLC
20 BOULDER CRESCENT
SUITE 201 CO 80903
COLORADO
JAMES F. MORLEY
(719) 471-1742

JR ENGINEERING
A Whiting Company
Central 303-740-5339 • Colorado Springs 719-596-2593
For Calls 810-497-888 • www.jrengineering.com

UNTIL SUCH TIME AS THE DESIGN HAS BEEN APPROVED BY THE APPROPRIATE REVIEWING AGENCIES, THIS DRAWING IS NOT TO BE USED FOR ANY PURPOSES WITHOUT THE WRITTEN AUTHORIZATION.



show barricades

don't show lots not on the plat

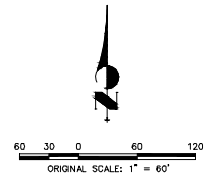
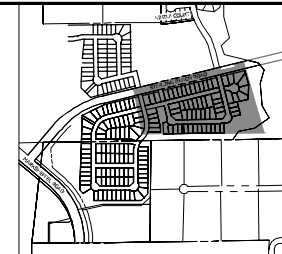
Label lots to match the plat

JR Response : Added

JR Response : Street signs updated

JR Response: Updated

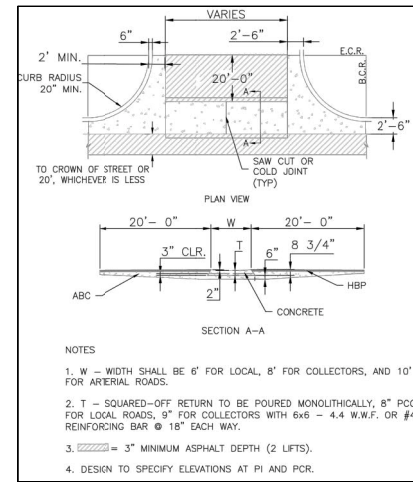
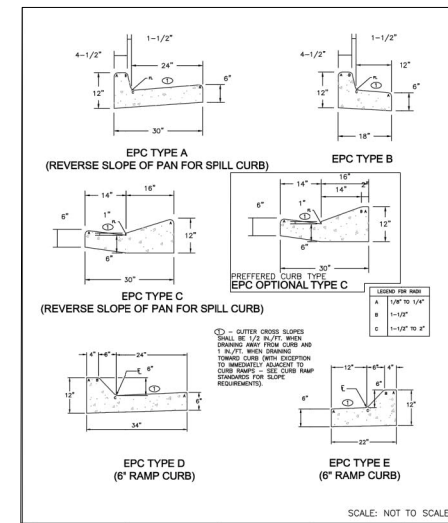
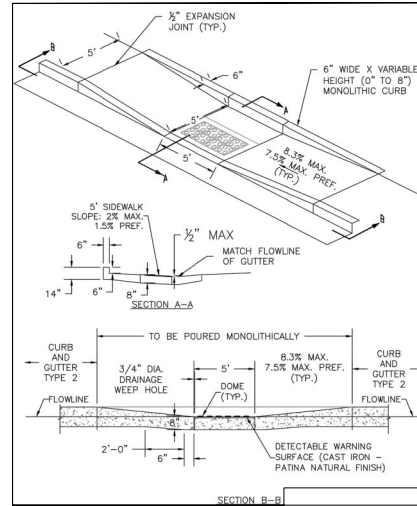
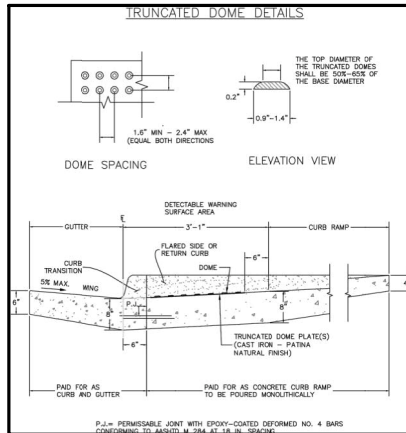
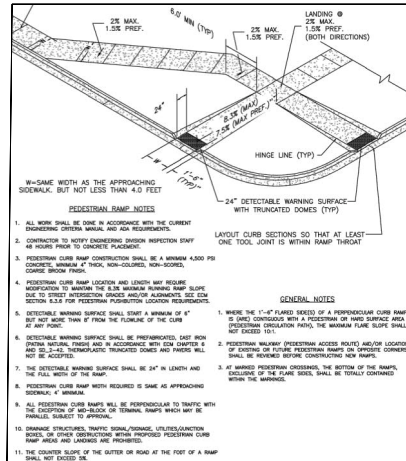
POINT TABULATION				
POINT NUMBER	STATION	OFFSET	ALIGNMENT	DESCRIPTION
1			DINES POLSON	STOP SIGN AND STREET SIGNS
2			PENNYDALE-MOORE	STOP SIGN AND STREET SIGNS
3	1+80.51	21.96' (LT)	PENNYDALE-MOORE	STOP SIGN AND STREET SIGNS
4	13+31.09	21.71' (RT)	DINES POLSON	STOP SIGN AND STREET SIGNS
5	0+28.55	23.75' (LT)	HAZZLETT DR	STOP SIGN AND STREET SIGNS
6	10+82.64	21.47' (LT)	PENNYDALE-MOORE	STOP SIGN AND STREET SIGNS
7	10+01.78	20.89' (RT)	PENNYDALE-MOORE	STOP SIGN AND STREET SIGNS



Know what's below.
Call before you dig.

FILE NO. SF-21-XXX

PREPARED FOR SR LAND, LLC 20 BOULDER CRESCENT SUITE 201 CO 80903 COLORADO JAMES F. MORLEY (719) 471-1742		UNTIL SUCH TIME AS THE PROJECT HAS BEEN APPROVED BY THE APPROPRIATE REVIEWING AGENCIES FOR THE PURPOSES OF THE STANDARD DRAWING AUTHORIZATION.	
JR ENGINEERING A Whiting Company Central 303-740-8338 • Colorado Springs 719-596-2588 For Calls 970-691-8888 • www.jrengineering.com		BY DATE	NO. REVISION 1"=60' N/A 6/17/21 DESIGNED BY ARJ DRAWN BY ARJ CHECKED BY
STERLING RANCH FILING 3 STREET SIGNAGE		SHEET 12 OF 13 JOB NO. 25188.00	



Provide trail and maintenance access road cross-sections

JR Response: Updated



UNTIL SUCH TIME AS THE PROJECT IS APPROVED BY THE APPROPRIATE REVIEWING AGENCY FOR THE PURPOSES OF THE STANDARD DRAWING AUTHORIZATION.		PREPARED FOR		DATE	
SR LAND, LLC		20 BOULDER CRESCENT		BY	
SUITE 201		COLORADO SPRINGS, CO 80903		REVISION	
JAMES F. MORLEY		(719) 471-1742		No.	
www.jrengineering.com		JRE ENGINEERING		N/A	
Central 303-740-0308 • Colorado Springs 719-596-2588		A Whiting Company		DATE	
For Call 970-697-8888 • www.jrengineering.com		STERLING RANCH FILING 3		DESIGNED BY	
		DETAILS		DRAWN BY	
				CHECKED BY	
				SHEET 13 OF 9	
				JOB NO. 25188.00	

AGENCIES

OWNER/DEVELOPER: 20 LAND, LLC
80 SULLY CRESCENT, SUITE 201
COLORADO SPRINGS, CO 80903
JAMES F. MORLEY (719) 471-1742

CIVIL ENGINEER: R. ENGINEERING, LLC
8475 TECH CENTER DRIVE
COLORADO SPRINGS, CO 80919
MIKE BRAMLETT P.E. (303) 267-6240

COUNTY ENGINEERING: EL PASO COUNTY PLANNING
AND COMMUNITY DEVELOPMENT
2880 INTERNATIONAL CIRCLE, SUITE 110
COLORADO SPRINGS, CO 80910
JEFF RICE, P.E. (719) 520-6300

TRAFFIC ENGINEERING: EL PASO COUNTY DEPARTMENT OF PUBLIC WORKS
3275 MEERS DRIVE
COLORADO SPRINGS, CO 80922
JENNIFER IRVINE, P.E. (719) 520-6460

WATER RESOURCES: STERLING RANCH CONSULTING ENGINEERS
435-HYDRO MERCANTILE
245 E. PINEB LAKE AVE., SUITE 300
COLORADO SPRINGS, CO 80903
JOHN MCINNIS (719) 668-4919

FIRE DISTRICT: BLACK FOREST FIRE PROTECTION DISTRICT
11445 TEACHTOWN ROAD
COLORADO SPRINGS, CO 80908
CHIEF BRIAN JACK (719) 450-4300

GAS DEPARTMENT: COLORADO SPRINGS UTILITIES
7710 DURANT DR.
COLORADO SPRINGS, CO 80947
TM WENDT (719) 668-3556

ELECTRIC DEPARTMENT: MOUNTAIN VIEW ELECTRIC
11140 E. WOODMEN ROAD
FALCON, CO 80831
(719) 495-2283

COMMUNICATIONS: QWEST COMMUNICATIONS
(U.S.L.C. LOCATORS) (800) 922-1987
A&T LOCATORS (719) 635-3674

STORMWATER: STORMWATER ENTERPRISE
30 S. NEVADA AVE., SUITE 401
COLORADO SPRINGS, CO 80903

COMMUNICATIONS: QWEST COMMUNICATIONS
(U.S.L.C. LOCATORS) (800) 922-1987
A&T LOCATORS (719) 635-3674

STORMWATER: STORMWATER ENTERPRISE
30 S. NEVADA AVE., SUITE 401
COLORADO SPRINGS, CO 80903
(719) 385-5880

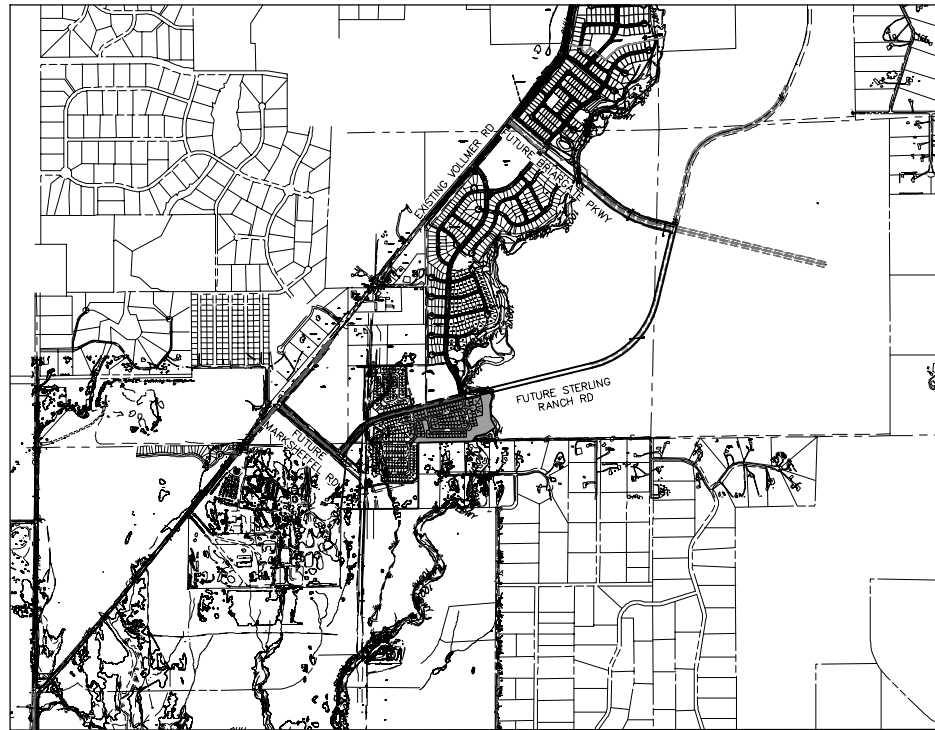
TRAFFIC: TRAFFIC AND TRANSPORTATION ENGINEERING
30 S. NEVADA AVE.
COLORADO SPRINGS, CO 80903
(719) 385-5908

GAS: STEPHEN BACON
SR. BOM AGENT #1
COLORADO INTERSTATE GAS CO. (HENDER MORGAN)
2 N. NEVADA AVE.
COLORADO SPRINGS, CO 80903
719-658-5838

GAS: DRAC KIRSEY
REAL ESTATE | MAGALLAN MESTREMAN PARTNERS, L.P.
ONE WILLIAMS CENTER, 010-B, TULSA, OK 74112
918-514-7096

BENCHMARKS

1. THE TOP OF AN ALUMINUM SURVEYORS CAP,
STAMPED "9853", AT THE SOUTHEAST BOUNDARY
CORNER OF BARBARICK SUBDIVISION
NORTHING = 41146.273
EASTING = 235617.071
ELEVATION = 7023.42
2. THE TOP OF A RED PLASTIC SURVEYORS CAP,
ILLEGIBLE, AT THE NORTHWEST BOUNDARY
CORNER OF PAWNEE RANCHEROS SUBDIVISION
NORTHING = 41099.404
EASTING = 235952.131
ELEVATION = 7000.40
3. THE TOP OF A RED PLASTIC SURVEYORS CAP,
STAMPED "3814", AT THE SOUTHWEST BOUNDARY
CORNER OF BARBARICK SUBDIVISION
NORTHING = 41139.962
EASTING = 23349.177
ELEVATION = 7030.82



VICINITY MAP
SCALE : 1"=1,000'

SHEET INDEX

- | | |
|-----|-------------------|
| 1 | COVER SHEET |
| 2 | NOTES |
| 3-4 | STORM SEWER PLANS |
| 6-7 | DETAIL SHEET |

OWNER/DEVELOPER STATEMENT

JAMES F. MORLEY DATE

SR LAND, LLC
20 BOULDER CRESCENT, SUITE 201
COLORADO SPRINGS, CO 80903

EL PASO COUNTY STATEMENT

COUNTY PLAN REVIEW IS PROVIDED ONLY FOR GENERAL CONFORMANCE WITH COUNTY DESIGN CRITERIA. THE COUNTY IS NOT RESPONSIBLE FOR THE ACCURACY AND ADEQUACY OF THE DESIGN, DIMENSIONS, AND/OR ELEVATIONS WHICH SHALL BE CONFIRMED AT THE JOB SITE. THE COUNTY THROUGH THE APPROVAL OF THIS DOCUMENT ASSUMES NO RESPONSIBILITY FOR COMPLETENESS AND/OR ACCURACY OF THIS DOCUMENT.

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.

IN ACCORDANCE WITH ECM SECTION 1.12, THESE CONSTRUCTION DOCUMENTS WILL BE VALID FOR CONSTRUCTION FOR A PERIOD OF 2 YEARS FROM THE DATE SIGNED BY THE EL PASO COUNTY ENGINEER. IF CONSTRUCTION HAS NOT STARTED WITHIN THOSE 2 YEARS, THE PLANS WILL NEED TO BE RESUBMITTED FOR APPROVAL, INCLUDING PAYMENT OF REVIEW FEES AT THE PLANNING AND COMMUNITY DEVELOPMENT DIRECTORS DISCRETION.

JENNIFER IRVINE, P.E. DATE

COUNTY ENGINEER/ECM ADMINISTRATOR

ENGINEER'S STATEMENT

THESE DETAILED PLANS AND SPECIFICATIONS WERE PREPARED UNDER MY DIRECT SUPERVISION. SAID PLANS AND SPECIFICATIONS HAVE BEEN PREPARED ACCORDING TO THE CRITERIA ESTABLISHED BY THE COUNTY FOR DETAILED ROADWAY, DRAINAGE, EROSION AND EROSION CONTROL PLANS. SAID PLANS AND SPECIFICATIONS HAVE BEEN PREPARED IN CONFORMITY WITH APPLICABLE MASTER DRAINAGE PLANS AND MASTER TRANSPORTATION PLANS. SAID PLAN AND SPECIFICATIONS MEET THE PURPOSES FOR WHICH THE PARTICULAR ROADWAY AND DRAINAGE FACILITIES ARE DESIGNED AND ARE CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF. I ACCEPT RESPONSIBILITY FOR ANY LIABILITY CAUSED BY ANY NEGLIGENT ACTS, ERRORS OR OMISSIONS ON MY PART IN PREPARATION OF THESE DETAILED PLANS AND SPECIFICATIONS.



MIKE A. BRAMLETT, P.E.
COLORADO P.E. 32314
FOR AND ON BEHALF OF JR ENGINEERING, LLC

DISTRICT APPROVALS

THESE DOCUMENTS HAVE BEEN REVIEWED AND APPROVED FOR STORM DRAIN AND ASSOCIATED UTILITY SERVICE CONSTRUCTION.

FOR AND ON BEHALF OF THE STERLING RANCH METRO DISTRICT

FILE NO. SF-21-XXX

Know what's below.
Call before you dig.

UNTIL SUCH TIME AS THESE DRAWINGS ARE APPROVED BY THE APPROPRIATE REVIEWING AGENCIES, JR ENGINEERS APPROVES THEIR USE ONLY FOR THE PURPOSES DESIGNATED BY WRITTEN AUTHORIZATION.

PREPARED FOR
SR LAND, LLC
20 BOULDER CRESCENT
SUITE 201
COLORADO SPRINGS, CO 80901
JAMES F. MORLEY
(719) 471-1742

J.R. ENGINEERING
a Westrian Company

Centennial 303-740-9393 • Colorado Springs 719-593-2593
Fort Collins 970-491-9898 • www.jengineering.com

No.	REVISION	BY	DATE
	V-SCALE H-SCALE I ⁿ "=1000'	N/A	
	DATE	06/18/21	
	DESIGNED BY	XXX	
	DRAWN BY	XXX	
	CHECKED BY		

STERLING RANCH FILING 3

COVER SHEET

SHEET	1	OF	7
JOB NO.	25188.00		

1. ALL DRAINAGE AND ROADWAY CONSTRUCTION SHALL MEET THE STANDARDS AND SPECIFICATIONS OF THE CITY OF COLORADO SPRINGS/EL PASO COUNTY DRAINAGE CRITERIA MANUAL VOLUMES 1 AND 2, AND THE EL PASO COUNTY ENGINEERING CRITERIA MANUAL.
2. CONTRACTOR SHALL BE RESPONSIBLE FOR THE NOTIFICATION AND FIELD LOCATION OF ALL EXISTING UTILITIES, WHETHER SHOWN ON THE PLANS OR NOT, BEFORE BEGINNING CONSTRUCTION. LOCATION OF EXISTING UTILITIES SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION. CALL 811 TO CONTACT THE UTILITY NOTIFICATION CENTER OF COLORADO (UNCC).
3. CONTRACTOR SHALL KEEP A COPY OF THESE APPROVED PLANS, THE GRADING AND EROSION CONTROL PLAN, THE STORMWATER MANAGEMENT PLAN (SWMP), THE SOILS AND GEOTECHNICAL REPORT AND THE APPROVED EROSION CONTROL STANDARDS AND SPECIFICATIONS AT THE JOB SITE AT ALL TIMES DURING THE FOLLOWING:
 - 3.1 EL PASO COUNTY ENGINEERING CRITERIA MANUAL (ECM)
 - 3.2 CITY OF COLORADO SPRINGS/EL PASO COUNTY ENGINEERING CRITERIA MANUAL VOLUMES 1 AND 2.
 - 3.3 COLORADO DEPARTMENT OF TRANSPORTATION (CDOT) STANDARDS SPECIFICATION FOR ROAD AND BRIDGE CONSTRUCTION.
 - 3.4 CDOT MMS STANDARDS.
4. IT IS THE DESIGN ENGINEER'S RESPONSIBILITY TO ACCURACY SHOW EXISTING CONDITION BOTH ONSITE AND OFFSITE ON THE CONSTRUCTION PLANS. ANY MODIFICATION NECESSARY DUE TO CONFLICT OMISSIONS OR CHANGED CONDITIONS WILL BE ENTIRELY THE DEVELOPER'S RESPONSIBILITY TO RECTIFY.
5. IT IS THE CONTRACTORS RESPONSIBILITY TO UNDERSTAND THE REQUIREMENTS OF ALL JURISDICTIONAL AGENCIES AND TO OBTAIN ALL REQUIRED PERMITS, INCLUDING BUT NOT LIMITED TO EL PASO COUNTY EROSION AND STORM WATER QUALITY CONTROL PERMIT (ESQCP), REGIONAL BUILDING FLOODPLAIN DEVELOPMENT PERMIT, US ARMY CORPS OF ENGINEER (ESLD 402 AND/OR 404 PERMITS AND COUNTY AND STATE FLUIDE DUST PERMITS.
6. ANY TEMPORARY SIGNAGE AND STRIPING SHALL COMPLY WITH EL PASO COUNTY PCD AND MUTCD CRITERIA.
7. CONTRACTOR SHALL OBTAIN ANY PERMITS REQUIRED BY EL PASO COUNTY DOT INCLUDING WORK WITHIN THE RIGHT-OF-WAY AND SPECIAL TRANSPORT PERMITS.
8. THE LIMITS OF CONSTRUCTION SHALL REMAIN WITHIN THE PROPERTY LINE UNLESS OTHERWISE NOTED. THE OWNER/DEVELOPER SHALL OBTAIN WRITTEN PERMISSION AND EASEMENTS, WHERE REQUIRED, FROM ADJOINING PROPERTY OWNER(S) PRIOR TO ANY OFFSITE DISTURBANCE GRADING, OR CONSTRUCTION.

1. ALL SETTING IS ALONG STORM SEWER CENTERLINE UNLESS OTHERWISE INDICATED. ALL ELEVATIONS ARE INVERT UNLESS OTHERWISE INDICATED.
2. ALL STORM SEWER BENDS AND WYES SHOWN ON THE PLAN SHALL BE PREFABRICATED.
3. HORIZONTAL AND VERTICAL BENDS ARE INDICATED ON THE PLANS.
4. JOINTS SHALL BE IN ACCORDANCE WITH ASTM C443 "STANDARD SPECIFICATIONS FOR JOINTS FOR CIRCULAR CONCRETE SEWER AND CULVERT PIPE USING RUBBER GASKET." IN NO CASE SHALL THE MAXIMUM JOINT OPENING FOR STRAIGHT ALIGNMENT EXCEED 1 INCH OR ONE AND ONE-HALF INCH ON CURVED ALIGNMENT.
5. INLET DIMENSIONS SHOWN ON PLANS REFER TO DISTANCES FROM INSIDE FACES OF BOX BETWEEN THE WIDTHS AND LENGTHS.
6. MANHOLE WIDTHS AND LENGTHS SHOWN ON PLAN REFER TO THE EXTERIOR WALL DIMENSIONS.
7. ALL STORM SEWER SHALL BE A MINIMUM OF CLASS II REINFORCED CONCRETE PIPE. SPECIFIC SEGMENTS OF STORM SEWER SHALL BE REQUIRED TO BE CONSTRUCTED OF A MINIMUM OF 5000 PSI CONCRETE DUE TO EXCESSIVE VIBRATIONS. REFER TO ADDITIONAL NOTES WITHIN CONSTRUCTION PLANS.
8. SINCE ALL PIPE ENTRIES INTO THE BASE ARE VARIABLE, THE DIMENSIONS SHOWN ARE TYPICAL. ACTUAL DIMENSIONS AND QUANTITIES FOR CONCRETE AND REINFORCEMENT SHALL BE AS REQUIRED IN THE WORK.
9. THE MH RING (FRAME) SHALL BE SET IN A BED OF GROUT. THE FRAME SHALL BE SURROUNDED WITH A GROUT IN UNPAVED AREA, OR A CONCRETE COLLAR IN PAVED AREA.
10. PRECAST MANHOLES AND REINFORCEMENT SHALL CONFORM TO ASTM C 478 (AASHTO M 199).
11. CAST IN PLACE MANHOLES SHALL BE CLASS B CONCRETE.
12. STEPS SHALL BE REQUIRED WHEN THE MANHOLE DEPTH EXCEEDS 3'-6" AND SHALL BE IN ACCORDANCE WITH AASHTO M 199.
13. ALL REINFORCING STEEL SHALL HAVE A MINIMUM YIELD STRENGTH OF 60,000 PSI. VERTICAL STEEL SHALL BE PLACED AT 6" OF WALL. ALL BARS SHALL HAVE A 2" MINIMUM CLEARANCE.
14. FLOW CHANNELS AND INVERTS SHALL BE FORMED BY SHAPING WITH CLASS B CONCRETE OR APPROVED GROUT.
15. STUB-OUTS SHALL EXTEND 4 FT MINIMUM BEYOND OUTSIDE WALL SURFACE OF MANHOLE AND BE SATISFACTORILY PLUGGED.
16. CHECK WITH THE LOCAL GOVERNMENT AUTHORITY FOR ANY ADDITIONAL STORM SEWER SPECIFICATIONS, DETAILS, OR REGULATIONS.
17. THE SLOPE OF THE MANHOLE COVER SHALL MATCH THE ROADWAY PROFILE AND CROSS SLOPE.
18. THE CONTRACTOR SHALL PROVIDE SHOP DRAWINGS OF ALL PREFABRICATED STRUCTURES TO THE ENGINEER FOR REVIEW PRIOR TO INSTALLATION.

1. THE SOIL MATERIAL SHALL BE NATIVE TOPSOIL AND MIXED WITH SIXTY FIVE PERCENT (65%) RIPRAP AND THIRTY FIVE PERCENT (35%) SOIL BY VOLUME.
2. SOIL RIPRAP SHALL CONSIST OF A UNIFORM MIXTURE OF SOIL AND RIPRAP WITHOUT VOIDS.
3. CONTRACTOR SHALL COOPERATE WITH ENGINEER IN OBTAINING AND PROVIDING SAMPLES OF ALL SPECIFIED MATERIALS.
4. CONTRACTOR SHALL SUBMIT CERTIFIED LABORATORY TEST CERTIFICATES FOR ALL ITEMS REQUIRED FOR SOIL RIPRAP.
5. RIPRAP USED SHALL BE THE TYPE DESIGNATED ON THE DRAWINGS AND SHALL CONFORM TO TABLE SHOWN TO THE RIGHT.
6. THE RIPRAP DESIGNATION AND TOTAL THICKNESS OF RIPRAP SHALL BE AS SHOWN ON THE DRAWINGS. THE MAXIMUM STONE SIZE SHALL NOT LARGER THAN THE THICKNESS OF THE RIPRAP.
7. NEITHER WIDTH NOR THICKNESS OF A SINGLE STONE OF RIPRAP SHALL BE LESS THAN ONE-THIRD ($\frac{1}{3}$) OF ITS LENGTH.
8. THE SPECIFIC GRAVITY OF THE RIPRAP SHALL BE TWO AND ONE-HALF (2.5) OR GREATER.
9. MINIMUM DENSITY FOR ACCEPTABLE RIPRAP SHALL BE ONE HUNDRED AND SIXTY FIVE (165) POUNDS PER CUBIC FOOT.
10. RIPRAP SPECIFIC GRAVITY SHALL BE ACCORDING TO THE BULK-SATURATED, SURFACE-DRY BASIS, IN ACCORDANCE WITH AASHTO T85.
11. BROKEN CONCRETE OR ASPHALT PAVEMENT SHALL NOT BE ACCEPTABLE FOR USE IN THE WORK.
12. ROUNDED RIPRAP (RIVER ROCK) IS NOT ACCEPTABLE, UNLESS SPECIFICALLY DESIGNATED ON THE DRAWINGS.

1. ALL CONSTRUCTION INVOLVING THE PLACEMENT OF STRUCTURAL CONCRETE SHALL BE COMPLETED IN ACCORDANCE WITH STANDARD SPECIFICATIONS, AND AS SUPPLEMENTED BY THE COLORADO DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR ROADWAY AND BRIDGE CONSTRUCTION.

2. STEEL REINFORCING SHALL BE GRADE 60 FOR ALL REINFORCING STEEL GREATER THAN #4. SPLICING, LAP SPLICING SHALL BE MINIMUM IN THE FOLLOWING TABLE UNLESS OTHERWISE SPECIFIED:

BAR SIZE	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12
SPLICE LENGTH	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"
SPLICE LENGTH	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"

3. ALL REINFORCING SHALL HAVE A 2-INCH MINIMUM COVER UNLESS OTHERWISE SPECIFIED. ALL REINFORCED STEEL TO BE EPOXY COATED.

4. CAST-IN-PLACE CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH (6) OF 4,000 PSI AT 28 DAYS. ALL CONCRETE PLACED AGAINST SOIL SHALL BE TYPE II PORTLAND CEMENT. ALL EXPOSED CORNERS SHALL BE FORMED WITH A 3/4" CHAMFER UNLESS OTHERWISE SPECIFIED.

5. EXPANSION JOINT MATERIAL SHALL MEET AASHTO SPECIFICATION M-213.

6. BACKFILL AGAINST STRUCTURES SHALL NOT COMMENCE UNTIL ALL SUPPORTING DIAPHRAGMS ARE IN PLACE AND CONCRETE HAS OBTAINED ITS FULL SEVEN DAY STRENGTH. BACKFILL SHALL BE PLACED EQUALLY ON EACH SIDE OF RETAINING WALL STRUCTURES AND CUTOFF WALLS UNTIL THE FINAL GRADE IS REACHED.

7. FOOTING EXCAVATIONS SHALL BE EXAMINED BY THE GEOTECHNICAL ENGINEER WITH A 24-HOUR MINIMUM NOTIFICATION FOR SOIL AND/OR CONCRETE TESTING. PLACEMENT OF CONCRETE IN THE ABSENCE OF TESTING SHALL BE COATED AT THE SOLE DISCRETION OF THE CONTRACTOR.

8. PRIOR TO THE PLACEMENT OF CONCRETE IN AREAS WHERE SOIL IS PRESENT, THE SOIL SHALL BE SCARIFIED TO A MINIMUM DEPTH OF 6-INCHES. THE MOISTURE CONTENT SHALL BE ADJUSTED TO WITHIN PLUS OR MINUS 2 PERCENT OF THE OPTIMUM MOISTURE CONTENT AND RECOMPACTED TO AT LEAST 95 PERCENT RELATIVE DENSITY (AASHTO-T-180).

EC -- EPOXY COATED O.F. -- OUTSIDE FACE E.F. -- EACH FACE E.W. -- EACH WAY I.F. -- INSIDE FACE N.F. -- NEAR FACE
T.O.C. -- TOP OF CONCRETE B.O.C. -- BOTTOM OF CONCRETE CONT. -- CONTINUOUS

PREPARED FOR
SR LAND, LLC
BOULDER CREST
SUITE 201
ADO SPRINGS, CO
JAMES F. MORLEY
(719) 471-1742

J-R ENGINEERING
A Westrian Company

Centennial 303-740-5933 • Colorado Springs 719-593-2593
Fort Collins 970-491-9888 • www.jrengineering.com

NO.	REVISION	BY	DATE
1	"X"		
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GENERAL NOTES

SHEET 2 OF 7

JOB NO. 25188.00

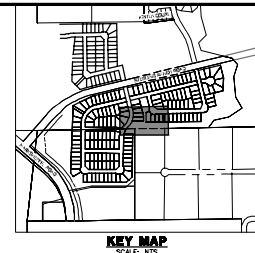
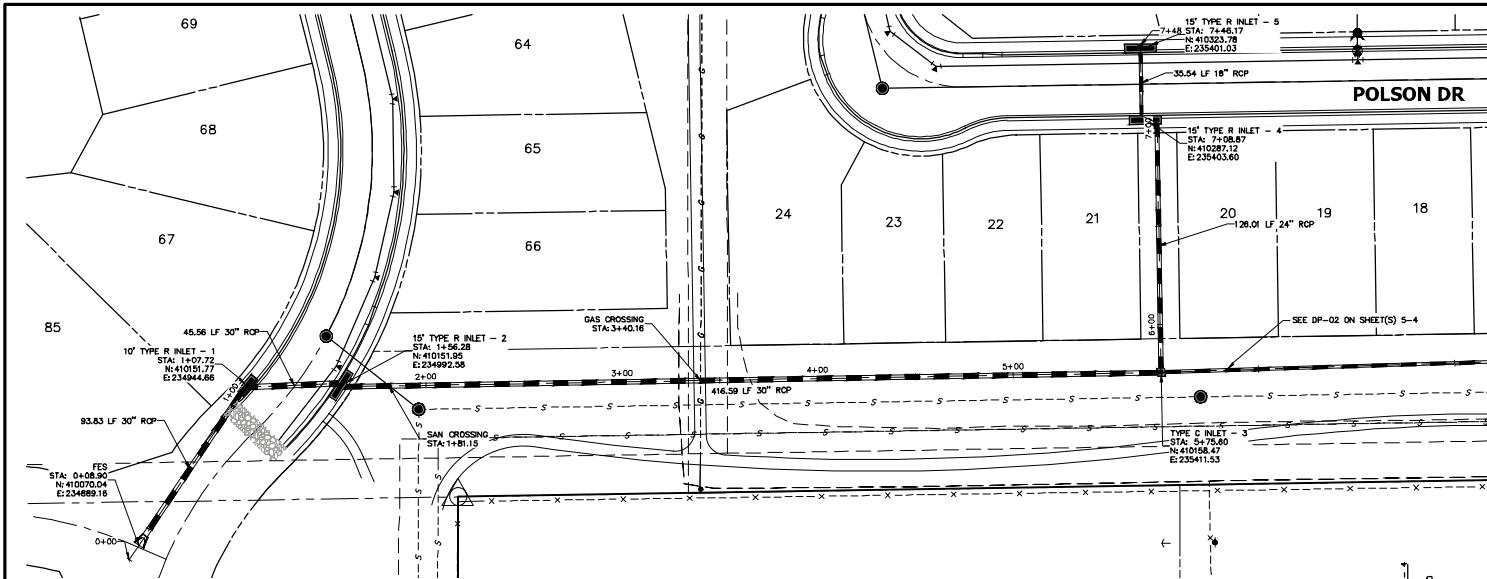
STANDARD DETAILS SHOWN WERE REVIEWED ONLY AS TO THEIR APPLICATION ON THIS PROJECT

MIKE A. BRAMLETT, P.E.

COLORADO P.E. 32314
FOR AND ON BEHALF OF J.R. ENGINEERING

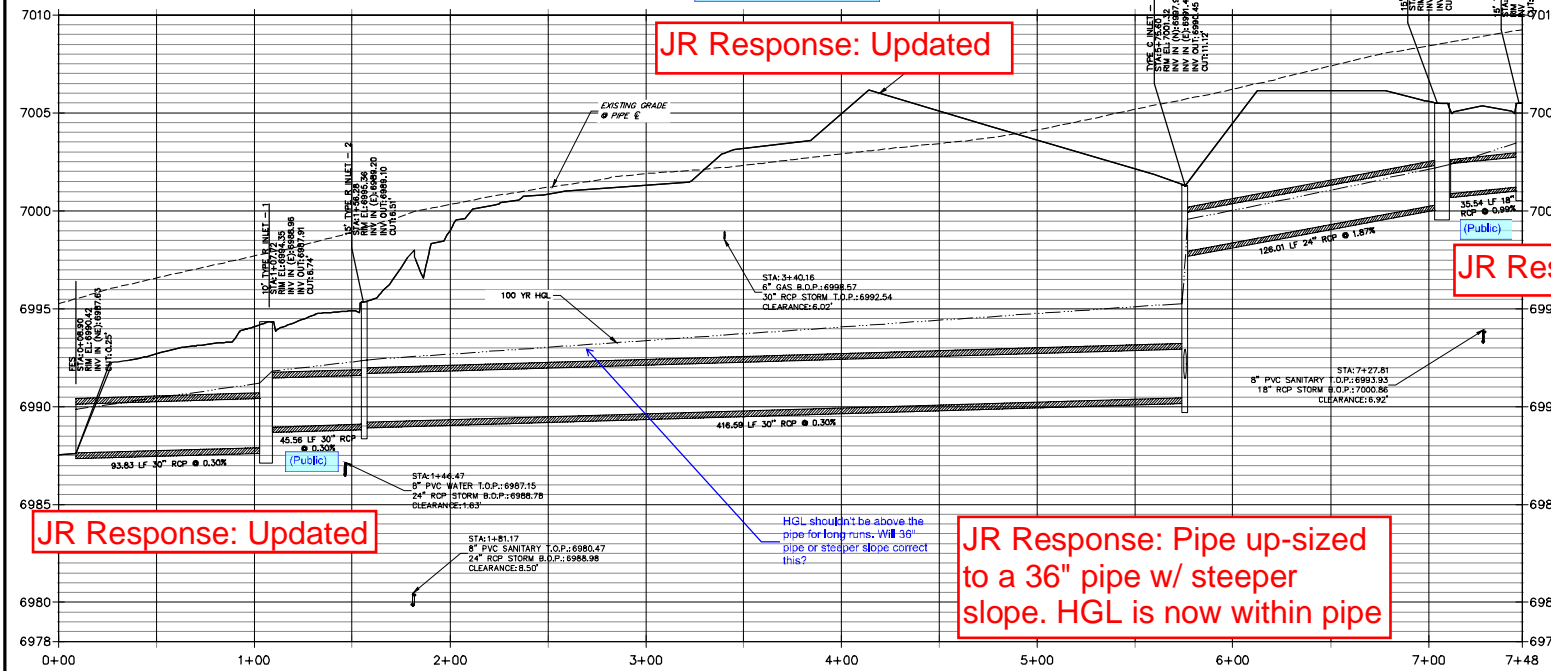
FOR AND ON BEHALF OF AN ENGINEER,

FILE NO. SF-21-XXX



ENGINEER'S STATEMENT
 PREPARED UNDER MY DIRECT SUPERVISION AND ON BEHALF OF JR ENGINEERING
 MIKE A. BRAMLETT, P.E.
 COLORADO P.E. #32314
 FOR AND ON BEHALF OF JR ENGINEERING, LLC
 DATE: 06/19/21

DP-01 PROFILE
STA 0+00.00 TO 7+47.67
 SRMD-owned except where noted

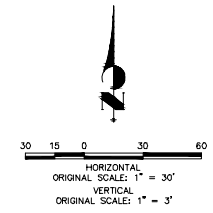


JR Response: Updated

JR Response: Updated

JR Response: Updated

JR Response: Pipe up-sized to a 36" pipe w/ steeper slope. HGL is now within pipe



UNTIL SUCH TIME AS THE PROJECT IS APPROVED BY THE APPROPRIATE REVIEWING AGENCIES, THESE PLANS ARE NOT TO BE USED FOR ANY PURPOSES WITHOUT THE WRITTEN AUTHORIZATION OF JR ENGINEERING.

PREPARED FOR
 SR LAND, LLC
 20 BOULDER CRESCENT
 SUITE 201 CO 80903
 COLORADO
 JAMES F. MORLEY
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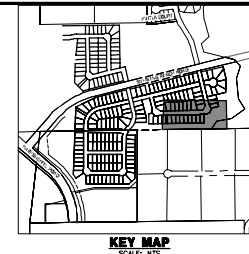
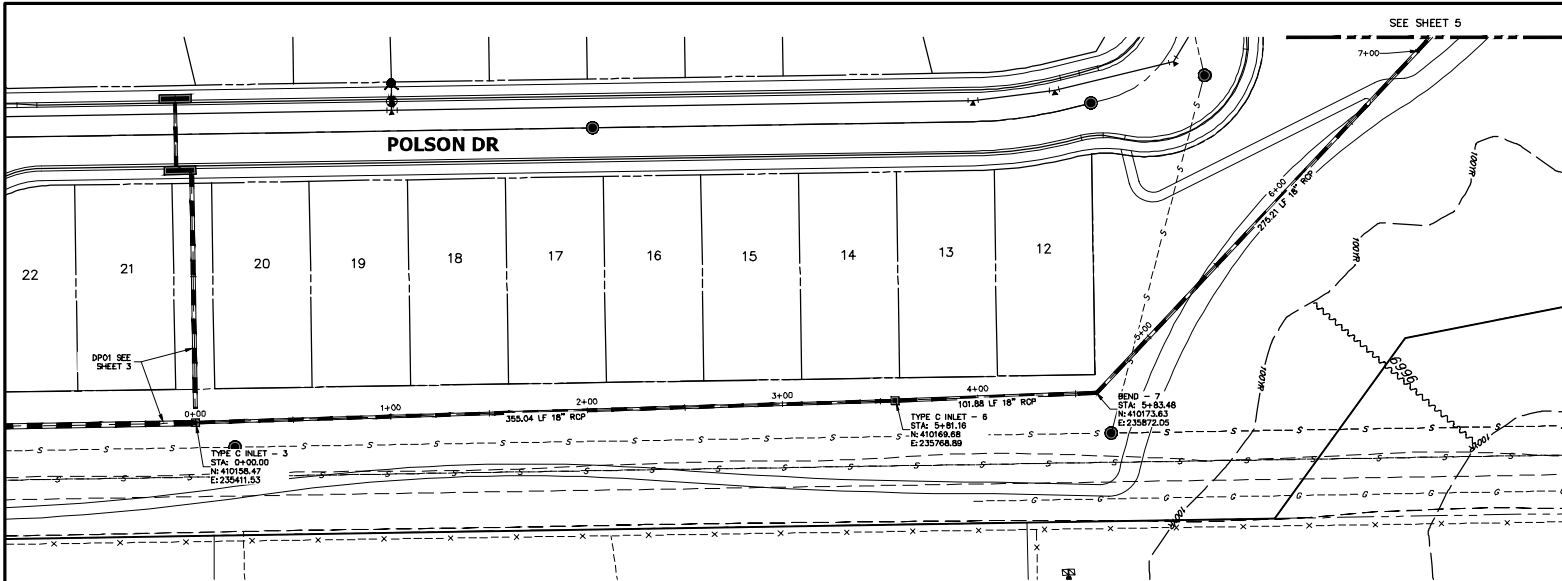
BY	DATE	NO.	REVISION
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STERLING RANCH FILING 3

STORM SEWER PLAN

SHEET 3 OF 7

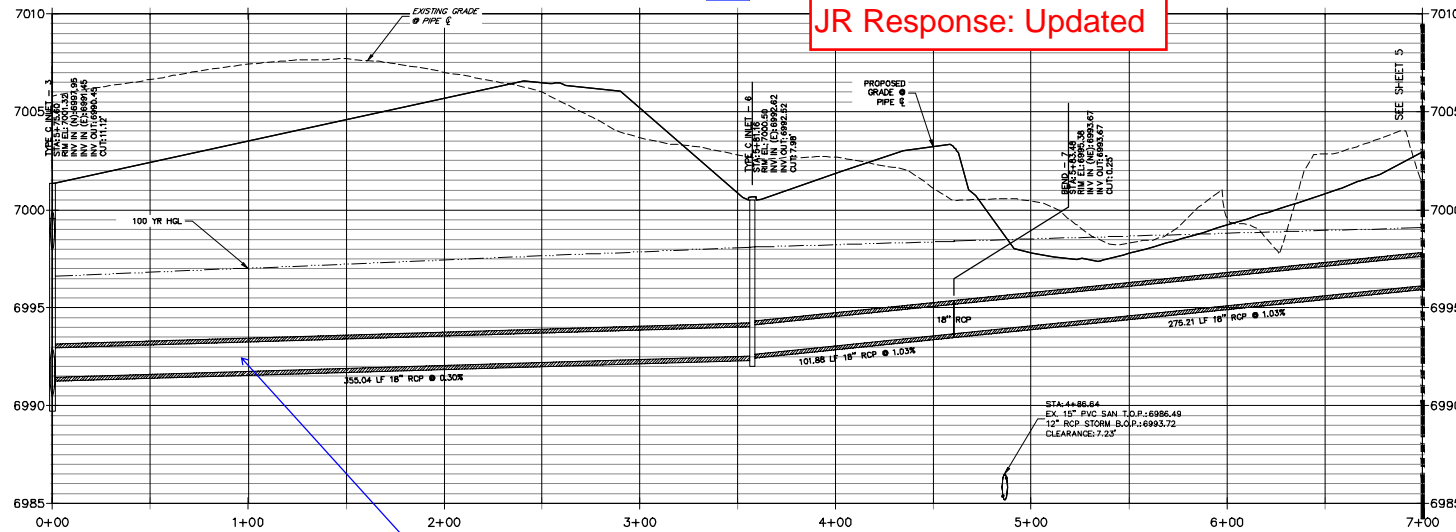
JOB NO. 25188.00



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SR LAND, LLC
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COLORADO SPRINGS, CO 80903
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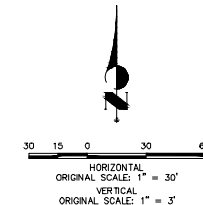
JR ENGINEERING
A Whiting Company
Central 303-740-8338 • Colorado Springs 719-596-2593
For Color 970-491-8888 • www.jrengineering.com

DP-02 PROFILE (1)
STA 0+00.00 TO 7+00.00



JR Response: Updated

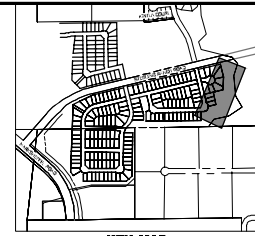
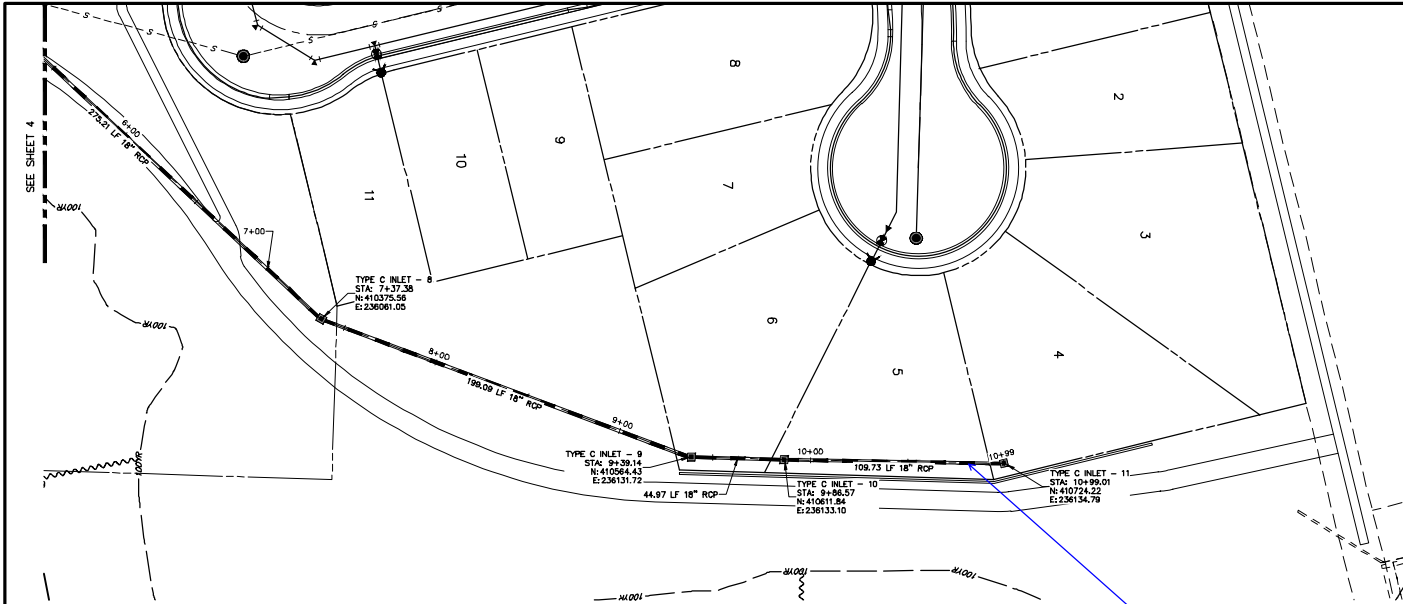
JR Response: Updated



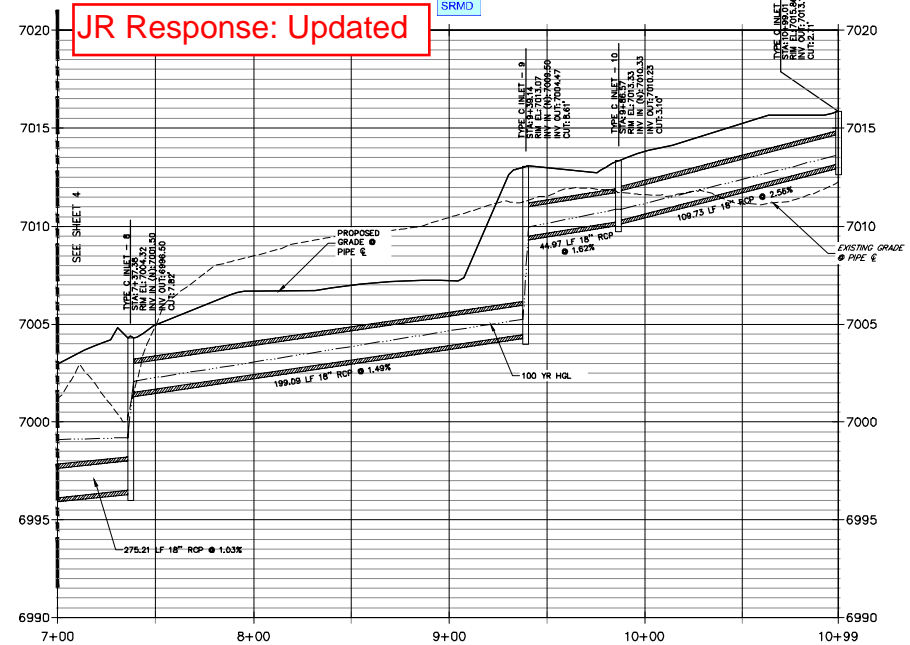
ENGINEER'S STATEMENT
PREPARED UNDER MY DIRECT SUPERVISION AND ON BEHALF OF JR ENGINEERING
MIKE A. BRAMLETT, P.E.
COLORADO P.E. 32314
FOR AND ON BEHALF OF JR ENGINEERING, LEAST END DATE

STERLING RANCH FILING 3
STORM SEWER PLAN
SHEET 4 OF 7
JOB NO. 25188.00

FILE NO. SF-21-XXX

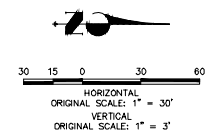


**DP-02 PROFILE (2)
STA 7+00.00 TO 10+99.01**



JR Response: Easement added and labeled

Show and label the necessary drainage easement.



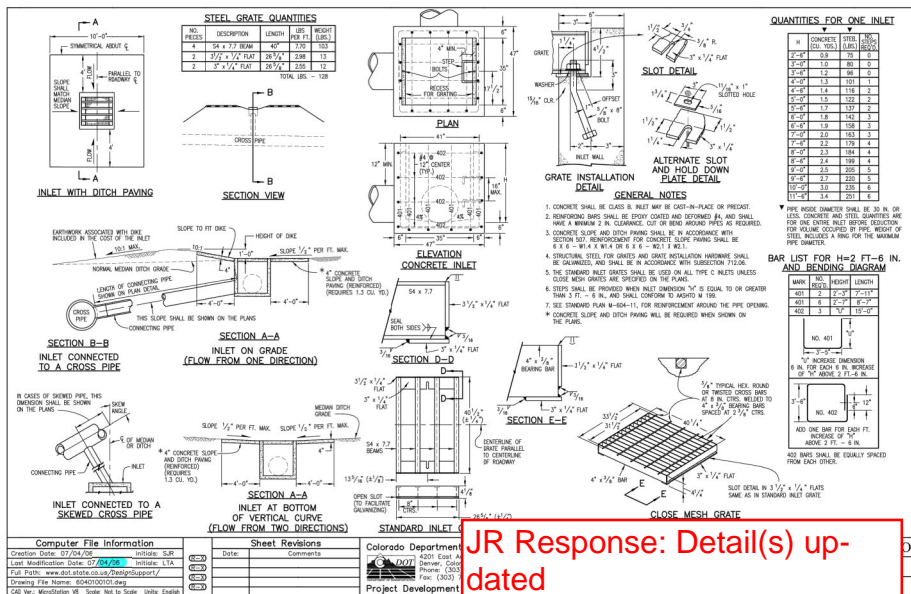
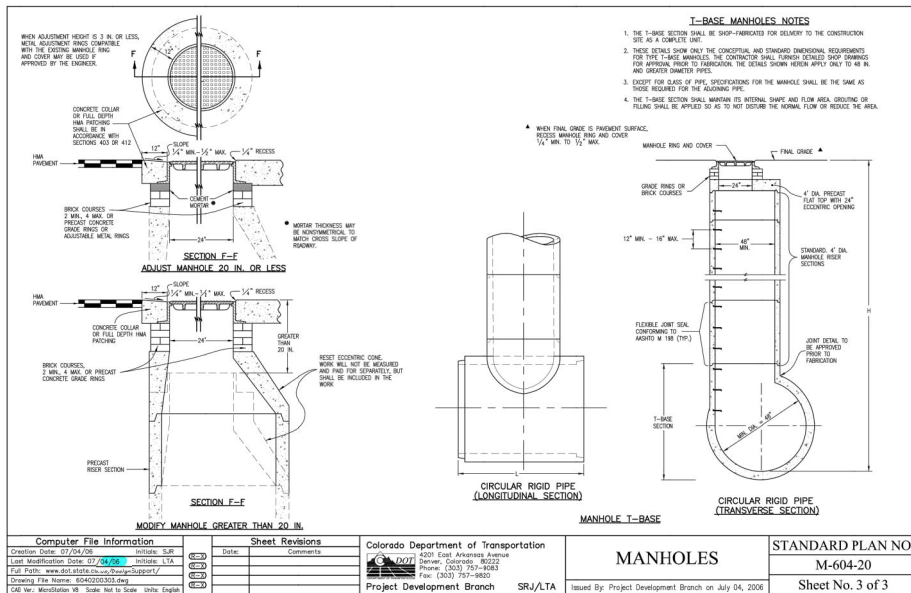
ENGINEER'S STATEMENT
PREPARED UNDER MY DIRECT SUPERVISION AND ON BEHALF OF JR ENGINEERING

MIKE A. BRAMLETT, P.E.
COLORADO P.E. 32314
FOR AND ON BEHALF OF JR ENGINEERING, LLC

DATE: 06/18/21

STERLING RANCH FILING 3	SHEET 5 OF 7	
	JOB NO. 25188.00	
STORM SEWER PLAN	DATE	06/18/21
	DESIGNED BY	ARJ
	DRAWN BY	ARJ
	CHECKED BY	
PREPARED FOR SR LAND, LLC 20 BOULDER CRESCENT SUITE 201 CO 80903 COLORADO JAMES F. MORLEY (719) 471-1742		
PREPARED BY JR ENGINEERING A Whiting Company Central 303-740-8338 • Colorado Springs 719-590-2588 For Calls 877-697-8888 • www.jrengineering.com		
UNTIL SUCH TIME AS THE DESIGN HAS BEEN APPROVED BY THE APPROPRIATE REVIEWING AGENCY FOR THE PURPOSES OF THE PROJECT, THIS DESIGN IS NOT TO BE USED FOR ANY OTHER PURPOSES WITHOUT THE WRITTEN AUTHORIZATION.		

FILE NO. SF-21-XXX



GENERAL NOTES

1. ALL UTILITY CONSTRUCTION TO BE CONDUCTED IN CONFORMANCE WITH THE CURRENT STERLING RANCH METROPOLITAN DISTRICT (SRMD, THE DISTRICT) SPECIFICATIONS.
2. ALL PLANS ON THE JOB SITE SHALL BE SIGNED BY THE DISTRICT AND THE DISTRICT'S ENGINEER, ANY REVISION TO THE PLANS SHALL BE SO NOTED WITH THE OLD DRAWING MARKED NOT VALID.
3. ALL STATIONING IS CENTERLINE UNLESS OTHERWISE NOTED, ALL ELEVATIONS ARE CENTERLINE UNLESS OTHERWISE NOTED.
4. ALL MATERIALS AND WORKMANSHIP SHALL BE SUBJECT TO INSPECTION BY THE DISTRICT. THE DISTRICT RESERVES THE RIGHT TO ACCEPT OR REJECT ANY SUCH MATERIALS AND WORKMANSHIP THAT DOES NOT CONFORM TO ITS STANDARDS AND SPECIFICATIONS.
5. ALL WATER AND SEWER SERVICE LOCATIONS SHALL BE CLEARLY MARKED ON EITHER THE CURB HEAD OR THE FACE OF THE CURB, WITH AN "S" FOR SEWER AND A "W" FOR WATER.
6. DUCTILE IRON PIPES, INCLUDING FITTINGS, VALVES AND FIRE HYDRANTS, SHALL BE WRAPPED WITH POLYETHYLENE TUBING, DOUBLE BONDED AT EACH JOINT AND ELECTRICALLY ISOLATED. BONDING AND ANODE CONNECTIONS SHALL BE THOROUGHLY COATED WITH BITUMINOUS COATINGS.
7. ALL DUCTILE IRON PIPE LESS THAN 12 INCHES AND FITTINGS SHALL HAVE CATHODIC PROTECTION USING TWO NO. 6 WIRES WITH 17 LB MAGNESIUM ANODES EVERY 400 FEET AND 9 LB MAGNESIUM ANODES AT EACH FITTING. ALL DUCTILE IRON PIPE 12 INCHES AND GREATER AND FITTINGS SHALL HAVE CATHODIC PROTECTION USING TWO NO. 6 WIRES WITH 17 LB MAGNESIUM ANODES EVERY 300 FEET AND 9 LB MAGNESIUM ANODES AT EACH FITTING.
8. ALL PIPE MATERIAL, BACKFILL AND INSTALLATION SHALL CONFORM TO THE APPLICABLE SPECIFICATIONS OF THE CITY OF COLORADO SPRINGS, COLORADO DEPARTMENT OF TRANSPORTATION, EL PASO COUNTY DEPARTMENT OF TRANSPORTATION, COLORADO SPRINGS UTILITIES AND THE GEOTECHNICAL ENGINEER.
9. COMPACTION TESTS SHALL BE 95% STANDARD PROCTOR AS DETERMINED BY ASTM D698, UNLESS OTHERWISE APPROVED BY THE DISTRICT OR HIGHER STANDARD AS IMPOSED BY ANOTHER AGENCIES HAVING RIGHT-OF-WAY JURISDICTION. THIS SHALL INCLUDE ALL VALVES, FIRE HYDRANT RUNS, WATER & SEWER SERVICE LINES AND MANHOLES. ALL REPORTS SHALL BE SUBMITTED TO THE DISTRICT FOR REVIEW AND APPROVAL.
10. THE LOCATION OF ALL EXISTING UTILITIES SHOWN ON THE DRAWINGS ARE APPROXIMATE ONLY. THE LOCATION OF ALL UTILITIES SHALL BE FIELD VERIFIED PRIOR TO COMMENCING CONSTRUCTION ACTIVITIES. THE DISTRICT SHALL BE NOTIFIED OF ANY DEVIATIONS TO THE LINE AND/OR GRADE AS DEPICTED ON THE PLANS. CONTRACTOR SHALL SUBMIT TO THE DISTRICT AND THE ENGINEER OF RECORD A REPORT OF THE FIELD VERIFIED INFORMATION PRIOR TO THE START OF CONSTRUCTION.
11. ALL BENDS SHALL BE FIELD STAKED PRIOR TO THE START OF CONSTRUCTION.
12. BENDS, DEFLECTION & CUT PIPE LENGTHS SHALL BE USED TO HOLD HORIZONTAL ALIGNMENT OF SEWER AND WATER LINES TO NO MORE THAN 0.5' FROM THE DESIRED ALIGNMENT. CONSTRUCTION STAKES TO BE AT 25' INTERVALS ALONG CURVES TO ASSURE LOCATION PIPE LINE CONSTRUCTION.
13. AT ALL LOCATIONS WHERE CAP AND STUB IS NOTED ON DRAWINGS, PROVIDE A PLUG AT THE END OF THE PIPE JOINT NEAREST THE SPECIFIED STATION. PROVIDE A REVERSE ANCHOR AT ALL WATER LINE PLUGS.
14. ALL UNUSED SALVAGED WATER UTILITY MATERIAL SHALL BE RETURNED TO THE METROPOLITAN DISTRICT AS REQUESTED.
15. AT THE CONTRACTOR'S EXPENSE, ALL UTILITY MAINS SHALL BE SUPPORTED AND PROTECTED SUCH THAT THEY SHALL FUNCTION CONTINUOUSLY DURING CONSTRUCTION OPERATIONS. SHOULD A UTILITY MAIN FAIL AS A RESULT OF THE CONTRACTOR'S OPERATION, IT SHALL BE REPLACED IMMEDIATELY BY THE CONTRACTOR OR BY THE DISTRICT AT FULL COST OF LABOR AND MATERIALS TO THE CONTRACTOR/DEVELOPER.
16. PUMPING OR BYPASS OPERATIONS SHALL BE REVIEWED AND APPROVED BY BOTH THE DISTRICT AND THE DISTRICT ENGINEER PRIOR TO EXECUTION.
17. THE CONTRACTOR SHALL REPLACE OR REPAIR DAMAGE TO ALL SURFACE IMPROVEMENTS, INCLUDING BUT NOT LIMITED TO FENCES, LANDSCAPING, CURBS AND GUTTER AND/OR ASPHALT THAT MAY BE CAUSED DURING CONSTRUCTION.
18. ALL CONTRACTORS WORKING ON OR NEAR A WATER OR SEWER FACILITY (TO INCLUDE SERVICE LINE) SHALL HAVE LIABILITY INSURANCE NAMING THE DISTRICT AS AN ADDITIONAL INSURED AND SHALL PROVIDE A CURRENT COPY OF WORKERS COMPENSATION INSURANCE ON FILE WITH THE DISTRICT. NO WORK CAN PROCEED WITHOUT CURRENT CERTIFICATES ON FILE AT THE DISTRICTS OFFICE.
19. THE CONTRACTOR SHALL NOTIFY THE DISTRICT AND ALL AFFECTED UTILITY COMPANIES ADJACENT TO THE PROPOSED UTILITY CONSTRUCTION A MINIMUM OF 48 HOURS AND A MAXIMUM OF 96 HOURS PRIOR TO THE START OF CONSTRUCTION. A WEEKLY CONSTRUCTION MEETING SHALL BE REQUIRED WITH THE CONTRACTOR, DISTRICT ENGINEER AND ALL OTHER PARTIES AS DEEMED NECESSARY BY THE DISTRICT.
20. COMMENCEMENT OF CONSTRUCTION OF WATER/SEWER SYSTEMS WITHIN THE METROPOLITAN DISTRICT.
 - a. PRIOR TO THE START OF CONSTRUCTION, A PRE-CONSTRUCTION MEETING IS REQUIRED A MINIMUM OF 48 HOURS IN ADVANCE OF COMMENCEMENT OF WORK. A REPRESENTATIVE OF THE OWNER OR DEVELOPER, A REPRESENTATIVE OF THE CONTRACTOR AND DESIGN ENGINEER ARE REQUIRED TO ATTEND. CONTACT THE DISTRICT TO SCHEDULE THE PRE-CONSTRUCTION MEETING. NO PRE-CONSTRUCTION MEETING CAN BE SCHEDULED PRIOR TO FOUR (4) SUBMITTED/RECEIVED PLANS BEING RECEIVED BY THE DISTRICT.
 - b. THE CONTRACTOR IS REQUIRED TO NOTIFY THE DISTRICT A MINIMUM OF 48 HOURS AND A MAXIMUM OF 2 WEEKS PRIOR TO THE START OF CONSTRUCTION. THE CONTRACTOR SHALL ALSO NOTIFY AFFECTED UTILITY COMPANIES AT LEAST 48 HOURS PRIOR TO THE START OF CONSTRUCTION ADJACENT TO THE KNOWN UTILITY LINES.
21. TESTING OF FACILITIES:
 - a. THE CONTRACTOR SHALL NOTIFY THE DISTRICT A MINIMUM OF 48 HOURS AND A MAXIMUM OF 96 HOURS PRIOR TO THE START OF ANY TESTING.
 - b. ALL SECTIONS OF WATER LINE ARE TO MEET THE FOLLOWING PRESSURE TESTING REQUIREMENTS:
 - TEST 100% OF ALL LINES
 - MUST PASS PRESSURE TEST TO 200 PSI FOR TWO HOURS (UNLESS OTHERWISE APPROVED ON THE PLANS).
 - c. ALL SANITARY SEWER FACILITIES ARE TO MEET THE FOLLOWING TESTING REQUIREMENTS
 - ALL LINES SHALL BE JET CLEANED PRIOR TO VACUUM OR PRESSURE TESTING
 - ALL MANHOLES SHALL BE VACUUM TESTED WITH DISTRICT STAFF PRESENT PRIOR TO CCTV INSPECTION.
 - SEWER MAINS TO BE PRESSURE TEST PRIOR TO CCTV INSPECTION
 - ALL LINES SHALL BE CCTV INSPECTED AND VIDEO SHALL TO BE SUBMITTED TO THE DISTRICT FOR REVIEW AND APPROVAL.
22. PRELIMINARY ACCEPTANCE SHALL BE DEFINED AS THE POINT IN TIME THAT THE DISTRICT ACCEPTS THE FACILITY FOR USE. ALL SURFACE IMPROVEMENTS AND RESTORATION SHALL BE COMPLETED WITHIN 30 DAYS OF COMMENCEMENT OF SERVICE. SHOULD THE CONTRACTOR FAIL TO COMPLETE ALL SURFACE IMPROVEMENTS AND RESTORATION WITHIN 30 DAYS OF COMMENCEMENT OF SERVICE, THE DISTRICT, AT THEIR DISCRETION, MAY ELECT TO COMPLETE THE IMPROVEMENTS AT THE CONTRACTORS COST.
23. FINAL ACCEPTANCE BY THE DISTRICT OF ANY LINE OR SYSTEM SHALL NOT OCCUR UNTIL COMPLETION OF FINAL ASPHALT LAYERS AND/OR FINAL COMPLETION AND/OR RESTORATION OF ALL SURFACE IMPROVEMENTS, THE WARRANTY PERIOD FOR ALL FACILITIES PRIOR TO FINAL ACCEPTANCE SHALL BE 24 MONTHS COMMENCING AFTER PRELIMINARY ACCEPTANCE.
24. ACCEPTANCE:
 - a. THE DISTRICT MAY GIVE PRELIMINARY ACCEPTANCE ONCE ALL OF THE TESTS ON ALL THE LINES HAVE BEEN COMPLETED AND A WALK-THRU HAS OCCURRED.
 - b. A SECOND ACCEPTANCE MAY OCCUR ONCE FIRST LIFT OF ASPHALT GOES DOWN AND A SECOND WALK-THRU OF THE SYSTEM OCCURS. IF ALL FACILITIES ARE CLEAN AND ACCESSIBLE, A FINAL ACCEPTANCE MAY OCCUR (THE DISTRICT MAY REQUIRE CLEANING AND RE-VIDEO OF THE SYSTEM, DEPENDING ON THE SEVERITY OF THE CONTAMINATION).
25. ALL WATER AND SEWER MAINS, INCLUDING SERVICE LINES, SHALL HAVE "AS-BUILT" DRAWINGS PREPARED AND APPROVED PRIOR TO PRELIMINARY ACCEPTANCE BY THE DISTRICT.
26. ALL COMMERCIAL/BUSINESS DEVELOPMENTS SHALL HAVE AN EIGHT INCH (8") WATER MAIN LOOPED THROUGH THE PROPOSED PROPERTY WITH GATE VALVES LOCATED WHERE THE MAIN ENTERS THE PROPERTY LINE. AN EIGHT INCH SEWER MAIN SHALL BE INSTALLED FOR SERVICE TO COMMERCIAL/BUSINESS DEVELOPMENTS AND A MANHOLE SHALL BE LOCATED WHERE THE MAIN ENTERS THE PROPERTY. THE END OF THE MAINS SHALL BE MARKED WITH THE APPROPRIATE COLORED CARBONITE MARKER ALONG WITH TRACER WIRE.
27. AFTER REVIEW AND APPROVAL OF PLANS FOR THE EXTENSION OF LINES, FACILITIES AND/OR SERVICES, CONSTRUCTION MUST BE COMMENCED WITHIN 18 MONTHS FOR RESIDENTIAL SUBDIVISIONS AND 12 MONTHS FOR ANY COMMERCIAL INSTALLATIONS.
28. INSPECTION FEES: CALL THE DISTRICT (719-495-2500) FOR FEE SCHEDULE.

WASTEWATER SYSTEM INSTALLATION NOTES

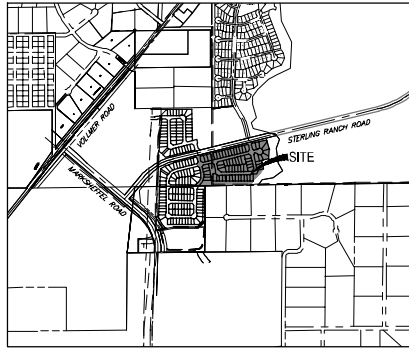
1. SANITARY SEWER LENGTHS ARE 1/4" CENTER-TO-CENTER (OR STRUCTURE CENTER-TO-STRUCTURE CENTER). ALL SANITARY SEWER PIPES SHALL BE SDR 35 PVC OR EQUAL. SEWER LINES MAY NOT EXCEED 7% GRADE FOR ANY SIZE WITHOUT PRIOR APPROVAL OF THE DISTRICT. ALL NEWLY CONSTRUCTED SANITARY SEWER LINES SHALL USE PRE-MANUFACTURED IN-LINE PVC PUSH-ON WYES. TAPPING SAIDLES MAY ONLY BE USED FOR TAPPING PRE-EXISTING MAINS.
2. ALL SANITARY SEWER MANHOLES SHALL BE WRAPPED WITH RU110 - RUBR-NEK JOINT WRAP OR EQUIVALENT AND COATED.
3. COMMENCEMENT OF USE OF SEWER LINES AND/OR SYSTEMS:
 - a. NO SANITARY SEWER FACILITY SHALL BE PLACED IN SERVICE UNTIL AFTER THE COMPLETION OF ALL JET CLEANING, PRESSURE TESTING, CCTV INSPECTION, COMPACTION TESTING AND AS-BUILT DRAWINGS ARE SUBMITTED AND APPROVED BY THE DISTRICT.
 - b. NO SANITARY SEWER FACILITY SHALL BE PLACED IN SERVICE UNTIL ALL SERVICE LINES ARE COMPLETED AND THE FIRST LIFT OF ASPHALT IS COMPLETED OVER THE LINES. WHEN ASPHALT IS TO BE PLACED OVER THE LINE, ANY REQUIRED SURFACE SURFACE IMPROVEMENTS SHALL BE COMPLETED PRIOR TO USE OF THE FACILITY.
 - c. ALL NECESSARY EASEMENTS (PLATTED OR DEEDED) ARE DEDICATED, EXECUTED BY THE DISTRICT, AND RECORDED.
 - d. DOWNSTREAM PLEGS CAN BE REMOVED ONCE FIRST LIFT OF ASPHALT IS DOWN AND THE ABOVE REQUIREMENTS ARE MET.

STERLING RANCH FILING 3

COUNTY OF EL PASO, STATE OF COLORADO

SANITARY SEWER PLANS

JUNE 2021



VICINITY MAP
SCALE: 1"=1,000'

SHEET INDEX

- 1 COVER SHEET
- 2-4 SANITARY SEWER PLANS
- 5 SANITARY SERVICE PLAN

BENCHMARKS

1. THE TOP OF AN ALUMINUM SURVEYORS CAP, STAMPED "9853", AT THE SOUTHEAST BOUNDARY CORNER OF BARBARICK SUBDIVISION
NORTHING = 411416.273
EASTING = 235167.071
ELEVATION = 7023.42
2. THE TOP OF A RED PLASTIC SURVEYORS CAP, ILLEGIBLE, AT THE NORTHWEST BOUNDARY CORNER OF PAMNEE RANCHEROS SUBDIVISION
NORTHING = 410095.404
EASTING = 235052.131
ELEVATION = 7000.40
3. THE TOP OF A RED PLASTIC SURVEYORS CAP, STAMPED "38141", AT THE SOUTHWEST BOUNDARY CORNER OF BARBARICK SUBDIVISION
NORTHING = 411389.982
EASTING = 233849.817
ELEVATION = 7035.82

LEGEND

- | | |
|-------|-------------------------|
| ROW | RIGHT OF WAY |
| FL-TL | FLOWLINE TO FLOWLINE |
| BOF | BOTTOM OF PIPE |
| TOP | TOP OF PIPE |
| SS | SANITARY SEWER |
| STM | STORM SEWER |
| WL | WATER |
| STA | STATION |
| LOT | LOT NUMBER |
| BT | BEGIN TRANSITION |
| ET | END TRANSITION |
| PCR | POINT OF CURB RETURN |
| PRC | POINT OF REVERSE CURVE |
| PCC | POINT OF COMPOUND CURVE |
| PC | POINT OF CURVE |
| PT | POINT OF TANGENT |
| XC | SPECIAL BEDDING NOTES |

AGENCIES

OWNER/DEVELOPER:	SR LAND, LLC 20 BOULDER CRESCENT, SUITE 201 COLORADO SPRINGS, CO 80903 JAMES F. MORLEY (719) 471-1742
CIVIL ENGINEER:	JR ENGINEERING, LLC 5475 TECH CENTER DRIVE COLORADO SPRINGS, CO 80919 MIKE BRAMLETT P.E. (303) 267-6240
COUNTY ENGINEERING:	EL PASO COUNTY PLANNING AND COMMUNITY DEVELOPMENT 2880 INTERNATIONAL CIRCL, SUITE 110 COLORADO SPRINGS, CO 80903 JEFF RICE, P.E. (719) 520-6300
TRAFFIC ENGINEERING:	EL PASO COUNTY DEPARTMENT OF PUBLIC WORKS 3275 AKERS DRIVE COLORADO SPRINGS, CO 80922 JENNIFER IRVINE, P.E. (719) 520-6460
WATER RESOURCES:	STERLING RANCH METRO DISTRICT ENGINEERS 405-HYPER CONSULTANTS 540 E. Pikes Peak Ave., Suite 300 COLORADO SPRINGS, CO 80903 JOHN MOON (719) 668-8789
FIRE DISTRICT:	BLACK FOREST FIRE PROTECTION DISTRICT 11445 TEACHOUT ROAD COLORADO SPRINGS, CO 80908 CHIEF BRYAN JACK (719) 495-4300
GAS DEPARTMENT:	COLORADO SPRINGS UTILITIES 7710 DURANT DR. COLORADO SPRINGS, CO 80947 TIM WENDT (719) 668-3556
ELECTRIC DEPARTMENT:	MOUNTAIN VIEW ELECTRIC 11140 E. HOESMER ROAD FALCON, CO 80831 (719) 495-2283
COMMUNICATIONS:	QUEST COMMUNICATIONS (LIN/C.C. LOCATORS) (800) 922-1987 AT&T (LOCATORS) (719) 635-3674

EL PASO COUNTY STATEMENT

COUNTY PLAN REVIEW IS PROVIDED ONLY FOR GENERAL CONFORMANCE WITH COUNTY DESIGN CRITERIA. THE COUNTY IS NOT RESPONSIBLE FOR THE ACCURACY AND ADEQUACY OF THE DESIGN, DIMENSIONS, AND/OR ELEVATIONS WHICH SHALL BE CONFIRMED AT THE JOB SITE. THE COUNTY THROUGH THE APPROVAL OF THIS DOCUMENT ASSUMES NO RESPONSIBILITY FOR COMPLETENESS AND/OR ACCURACY OF THIS DOCUMENT.

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.

IN ACCORDANCE WITH EGM SECTION 1.12, THESE CONSTRUCTION DOCUMENTS WILL BE VALID FOR CONSTRUCTION FOR A PERIOD OF 2 YEARS FROM THE DATE SIGNED BY THE EL PASO COUNTY ENGINEER. IF CONSTRUCTION HAS NOT STARTED WITHIN THOSE 2 YEARS, THE PLANS WILL NEED TO BE RESUBMITTED FOR APPROVAL, INCLUDING PAYMENT OF REVIEW FEES AT THE PLANNING AND COMMUNITY DEVELOPMENT DIRECTORS DISCRETION.

JENNIFER IRVINE, P.E. _____ DATE _____
COUNTY ENGINEER/ECM ADMINISTRATOR

WATER & SEWER MAIN EXTENSIONS

ANY CHANGES OR ALTERATIONS AFFECTING THE GRADE, ALIGNMENT, ELEVATION AND/OR DEPTH OF COVER OF ANY WATER OR SEWER MAINS OR OTHER APPURTENANCE SHOWN ON THIS DRAWING SHALL BE THE RESPONSIBILITY OF THE OWNER/DEVELOPER. THE OWNER/DEVELOPER SHALL BE RESPONSIBLE FOR ALL OPERATIONAL DAMAGES AND DEFECTS IN INSTALLATION AND MATERIAL FOR MAINS AND SERVICES FROM THE DATE OF APPROVAL UNTIL FINAL ACCEPTANCE IS ISSUED.

SIGNED _____ DATE _____
JAMES F. MORLEY
SR LAND, LLC
20 BOULDER CRESCENT, SUITE 201
COLORADO SPRINGS, CO 80903
(719) 471-1742

DISTRICT APPROVALS

THE STERLING RANCH METROPOLITAN DISTRICT RECOGNIZES THE DESIGN ENGINEER AS HAVING RESPONSIBILITY FOR THE DESIGN AND HAS LIMITED ITS SCOPE OF REVIEW ACCORDINGLY.

STERLING RANCH METROPOLITAN DISTRICT WASTEWATER DESIGN APPROVAL

DATE: _____ BY: _____

PROJECT NO. _____

IN CASE OF ERRORS OR OMISSIONS WITH THE WATER DESIGN AS SHOWN ON THIS DOCUMENT THE STANDARDS AS DEFINED IN THE "RULES AND REGULATIONS FOR INSTALLATION OF WASTEWATER MAINS AND SERVICES" SHALL RULE.

APPROVAL EXPIRES 180 DAYS FROM DESIGN APPROVAL.

ENGINEER'S STATEMENT

THIS WASTEWATER SYSTEM PLAN WAS PREPARED UNDER MY DIRECTION AND SUPERVISION AND IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF. SAID PLAN HAS BEEN PREPARED ACCORDING TO THE CRITERIA ESTABLISHED BY THE COUNTY FOR WASTEWATER SYSTEM PLANS. I ACCEPT RESPONSIBILITY FOR ANY LIABILITY CAUSED BY ANY NEGLIGENT ACTS, ERRORS OR OMISSIONS ON MY PART IN PREPARING THESE PLANS.

MIKE A. BRAMLETT, P.E.
COLORADO P.E. 323314
FOR AND ON BEHALF OF JR ENGINEERING, LLC _____ DATE _____



Know what's below.
Call before you dig.

UNTIL SUCH TIME AS THE PLANS ARE APPROVED BY THE APPROPRIATE AGENCIES, THE USER APPROVES THEIR USE. THE USER RELEASES JR ENGINEERING FROM LIABILITY FOR ANY DAMAGES CAUSED BY THE USER'S FAILURE TO OBTAIN THE NECESSARY AUTHORIZATION.

PREPARED FOR
SR LAND, LLC
20 BOULDER CRESCENT
SUITE 201
COLORADO SPRINGS, CO 80903
JAMES F. MORLEY
(719) 471-1742

JR ENGINEERING
A Merit Company



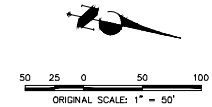
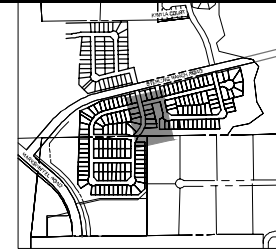
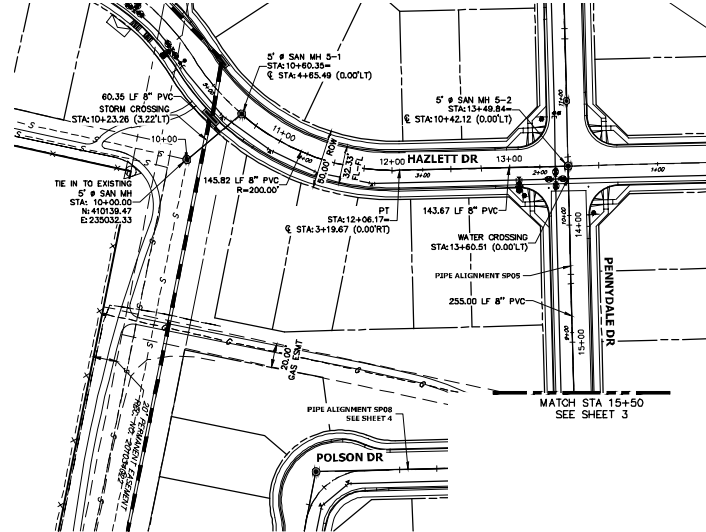
Central 303-740-5339 • Colorado State 719-595-2580
For Calls 970-699-8888 • www.jrengineering.com

DATE	BY	NO.	REVISION	H-SCALE	N/A	N/A	N/A	DATE	DESIGNED BY	DRAWN BY	CHECKED BY
								6/9/21	JMF	JRM	

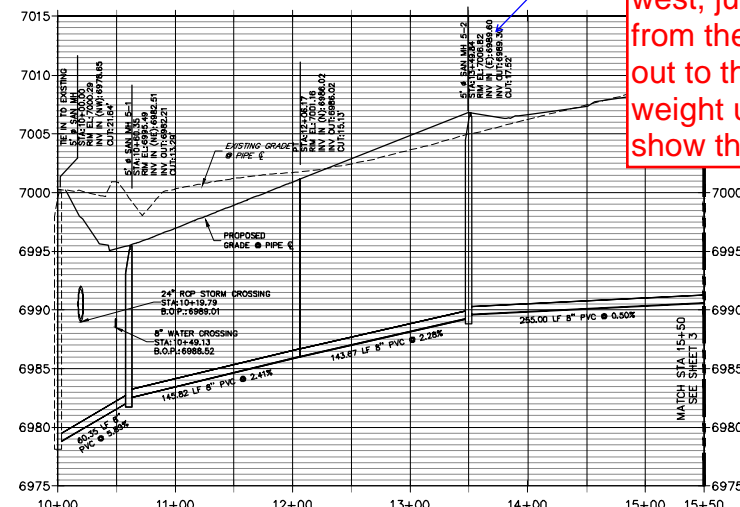
STERLING RANCH FILING 3

COVER SHEET

SHEET 1 OF 5
JOB NO. 25188.00



SP05 PROFILE
STA 10+00.00 TO 15+50.00

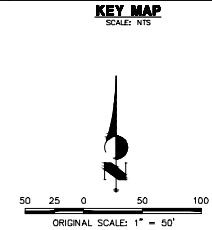
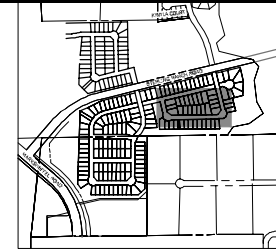
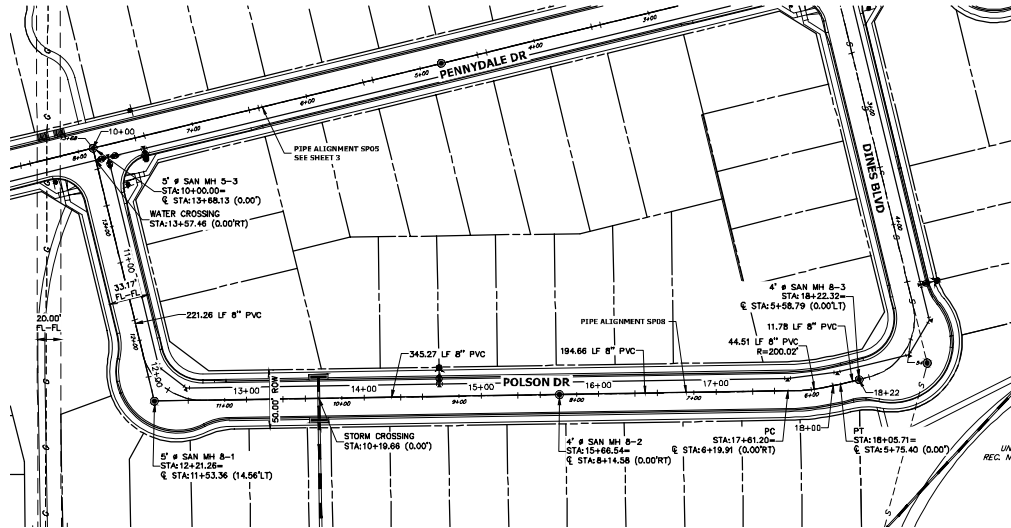


JR Response: There is so invert in from the west, just an invert in from the east and invert out to the south. line weight update to help show this.

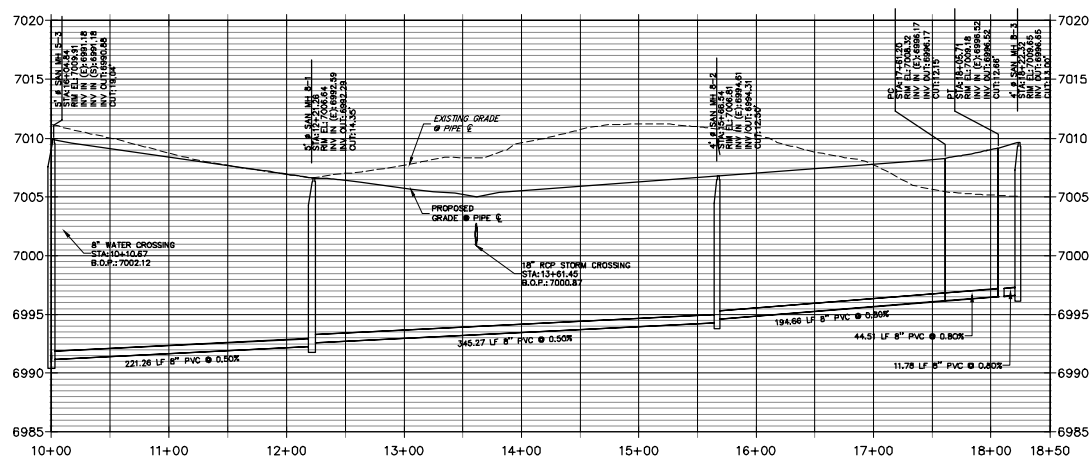


ENGINEER'S STATEMENT
 PREPARED UNDER MY DIRECT SUPERVISION AND ON BEHALF OF JR
 ENGINEERING.
 MIKE A. BRAMLETT, P.E.
 COLORADO P.E. 32314
 FOR AND ON BEHALF OF JR ENGINEERING, LLC ALL EXEMPT
 08864 5/26/2021

PREPARED FOR SR LAND, LLC 20 BOULDER CRESCENT SUITE 201 COLORADO SPRINGS, CO 80903 JAMES F. MORLEY (719) 471-1742	UNTIL SUCH TIME AS THE DESIGNER HAS BEEN APPROVED BY THE APPROPRIATE REVIEWING AGENCIES FOR THEIR USE. THIS DOCUMENT IS NOT TO BE REPRODUCED OR COPIED WITHOUT THE WRITTEN AUTHORIZATION OF THE DESIGNER.	JR ENGINEERING A Woman's Company Central 303-740-8338 • Colorado Springs 719-596-2588 For Calls 970-697-8888 • www.jrengineering.com	BY	DATE
			NO.	REVISION
STERLING RANCH FILING 3 SANITARY SEWER PLANS	H-Scale 1"=50' V-Scale 1"=5' DATE 6/9/21 DESIGNED BY JRM DRAWN BY JRM CHECKED BY	SHEET 2 OF 5 JOB NO. 25188.00		



**SP08 PROFILE
STA 10+00.00 TO 18+50.00**



ENGINEER'S STATEMENT
 PREPARED UNDER MY DIRECT SUPERVISION AND ON BEHALF OF JR
 ENGINEERING.
 MIKE A. BRAMLETT, P.E.
 COLORADO P.E. 32314
 FOR AND ON BEHALF OF JR ENGINEERING, LLC (ALTERNATE)
 08884 5/26/2021

STERLING RANCH FILING 3		BY DATE		PREPARED FOR		UNTIL SUCH TIME AS THESE DRAWINGS ARE APPROVED BY THE APPROPRIATE REVIEWING AGENCIES FOR THE PURPOSES OF OBTAINING THE NECESSARY STANDARD PLAT AUTHORIZATION.	
SANITARY SEWER PLANS		NO. REVISION		SR LAND, LLC		COLORADO SPRINGS, CO 80903	
SHEET 4 OF 5		H-SCALE 1"=50'		DATE 6/8/21		JRM	
JOB NO. 25188.00		V-SCALE 1"=5'		DESIGNED BY		JRM	
				DRAWN BY		JRM	
				CHECKED BY			

Label lots per the plat



1. WATER SERVICE TO BE 10' FROM "DOWNSTREAM" PROPERTY LINE AND EXTENDED TO WHMD UTILITY EASEMENT LINE.
2. SEWER SERVICE TO BE PLACED APPROXIMATELY IN THE MIDDLE OF THE LOT AND EXTENDED TO WHMD UTILITY EASEMENT LINE.
3. SERVICE SHALL BE MARKED WITH 2"x4" POST AT TERMINATION POINT FOR LOCATION DURING CONNECTION TO RESIDENCE. POSTS SHALL BE SPRAY-PAINTED BLUE FOR WATER AND GREEN FOR SEWER.

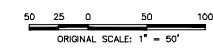


JR ENGINEERING
A Weickert Company

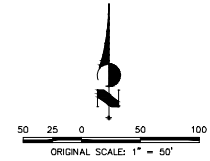
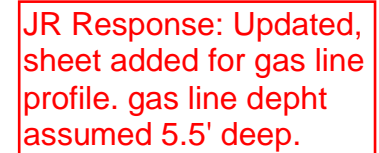
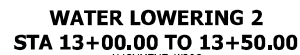
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Fort Collins 970-491-9988 • www.jrengineering.com

SHEET	5	OF	5
STERLING RANCH FILING 3			
SANITARY SEWER PLANS			
JOB NO.		25188.00	

SANITARY SERVICE TABULATION		
SERVICE/LOT #	STATION	AL
SS-LOT 66	11+06.08	
SS-LOT 67	10+82.97	
SS-LOT 68	11+60.33	
SS-LOT 69	12+34.34	
SS-LOT 70	12+84.34	



MIKE A. BRAMLETT, P.E.
COLORADO P.E. 32314
FOR AND ON BEHALF OF JR ENGINEERING, INC.



PREPARED FOR
SR LAND, LLC
20 BOULDER CRESCENT
SUITE 201
COLORADO SPRINGS, CO 80903
JAMES F. MORLEY
(719) 471-1742

J.R. ENGINEERING
A Westlin Company

Centennial 303-740-9938 • Colorado Springs 719-538-2588
Fort Collins 970-491-9889 • www.jrengineering.com

SHEET	3	H-SCALE 1"=50'	No.	REVISION	BY	DATE
JOB NO.	25186.00	V-SCALE 1"=5'				
STERLING RANCH FILING 3						
WATER LOWERING PROFILES						
DESIGNED BY JRM						
DRAWN BY JRM						
CHECKED BY						



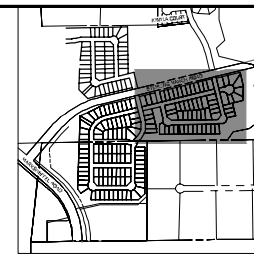
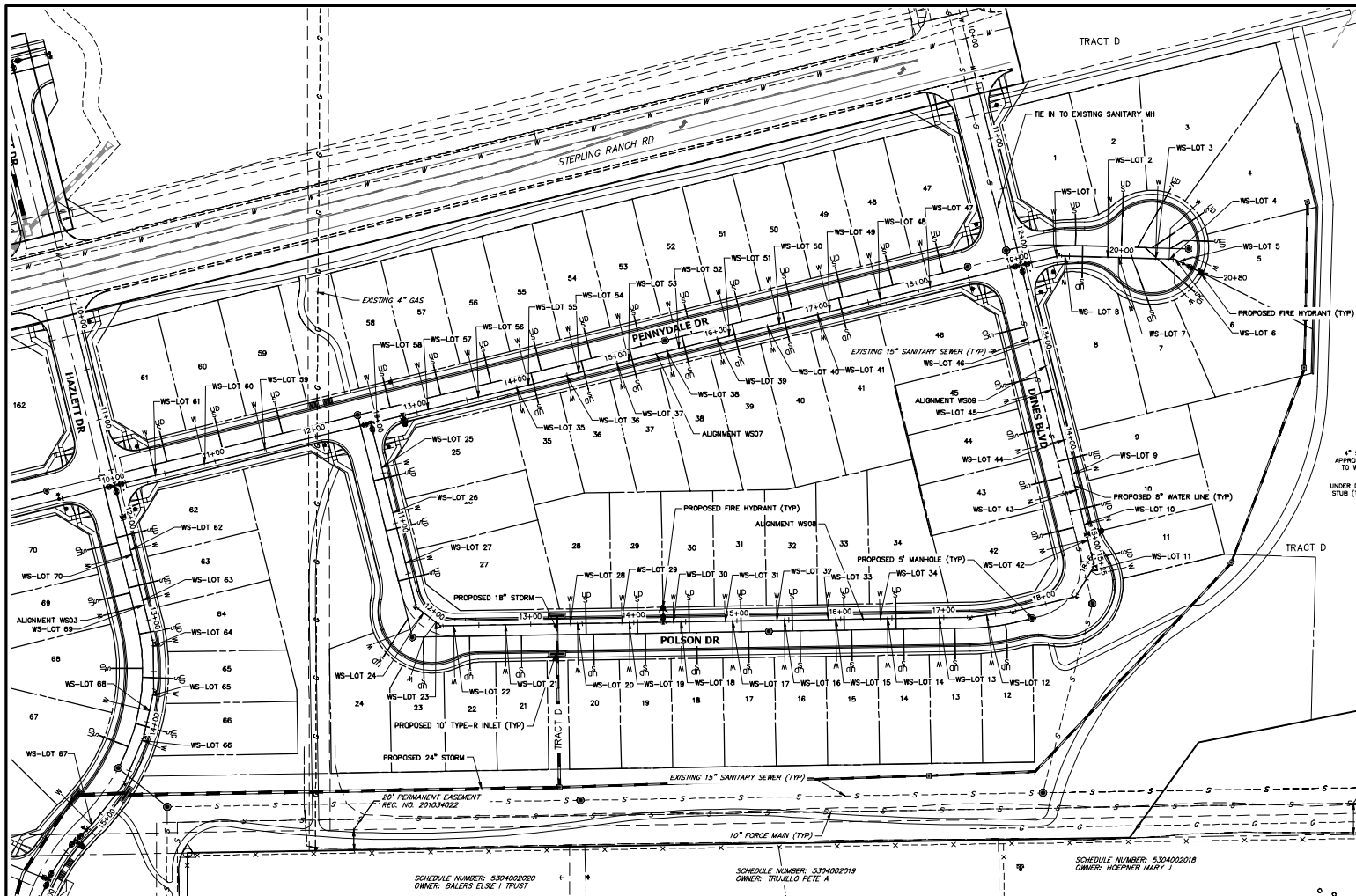
Know what's below.
Call before you dig.

ENGINEER'S STATEMENT

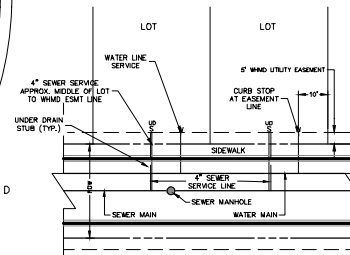
PREPARED UNDER MY DIRECT SUPERVISION AND ON BEHALF OF JR
ENGINEERING

MIKE A. BRAMLETT, P.E.
COLORADO P.E. 32314
FOR AND ON BEHALF OF JR ENGINEERING,

PERMISSION AND ON BEHALF OF JR
MINE A. BRANLEY
0834
5/26/2021
DATE
ENGINEERING, LLC



- NOTES:**
1. WATER SERVICE TO BE 10' FROM "DOWNSTREAM" PROPERTY LINE AND EXTENDED TO WIND UTILITY EASEMENT LINE.
 2. SEWER SERVICE TO BE PLACED APPROXIMATELY IN THE MIDDLE OF THE LOT AND EXTENDED TO WIND UTILITY EASEMENT LINE.
 3. SERVICE SHALL BE MARKED WITH 2"x4" POST AT TERMINATION POINT FOR LOCATION DURING CONNECTION TO RESIDENCE. POSTS SHALL BE SPRAY-PAINTED BLUE FOR WATER AND GREEN FOR SEWER.



UTILITY SERVICE LOCATIONS
NTS

WATER SERVICE TABULATION		
SERVICE/LOT #	STATION	ALIGNMENT
WS-Lot 8	19+45.79	WP07
WS-Lot 1	19+57.16	WP07
WS-Lot 2	19+56.93	WP07
WS-Lot 3	20+33.05	WP07
WS-Lot 4	20+46.20	WP07
WS-Lot 5	20+55.80	WP07
WS-Lot 6	20+51.86	WP07
WS-Lot 7	19+97.68	WP07
WS-Lot 9	14+33.95	WP09
WS-Lot 10	14+83.95	WP09
WS-Lot 11	18+58.28	WP08
WS-Lot 12	17+41.42	WP08
WS-Lot 13	16+95.46	WP08

WATER SERVICE TABULATION		
SERVICE/LOT #	STATION	ALIGNMENT
WS-Lot 14	16+45.46	WP08
WS-Lot 15	15+95.46	WP08
WS-Lot 16	15+45.46	WP08
WS-Lot 17	14+95.46	WP08
WS-Lot 18	14+45.46	WP08
WS-Lot 19	13+95.46	WP08
WS-Lot 20	13+45.46	WP08
WS-Lot 21	12+75.46	WP08
WS-Lot 22	12+25.46	WP08
WS-Lot 23	12+07.25	WP08
WS-Lot 24	11+92.17	WP08
WS-Lot 25	10+44.34	WP08
WS-Lot 26	10+89.33	WP08

WATER SERVICE TABULATION		
SERVICE/LOT #	STATION	ALIGNMENT
WS-Lot 27	11+39.33	WP08
WS-Lot 28	13+36.28	WP08
WS-Lot 29	13+86.28	WP08
WS-Lot 30	14+36.28	WP08
WS-Lot 31	14+86.28	WP08
WS-Lot 32	15+36.28	WP08
WS-Lot 33	15+86.28	WP08
WS-Lot 34	16+36.28	WP08
WS-Lot 35	13+09.33	WP07
WS-Lot 36	14+49.33	WP07
WS-Lot 37	14+49.33	WP07
WS-Lot 38	15+49.33	WP07
WS-Lot 39	15+99.33	WP07

WATER SERVICE TABULATION		
SERVICE/LOT #	STATION	ALIGNMENT
WS-Lot 40	16+48.33	WP07
WS-Lot 41	16+99.33	WP07
WS-Lot 42	14+99.38	WP09
WS-Lot 43	14+50.00	WP09
WS-Lot 44	14+00.00	WP09
WS-Lot 45	13+50.00	WP09
WS-Lot 46	13+00.00	WP09
WS-Lot 47	18+11.44	WP07
WS-Lot 48	17+61.44	WP07
WS-Lot 49	17+11.44	WP07
WS-Lot 50	16+61.44	WP07
WS-Lot 51	16+11.44	WP07
WS-Lot 52	15+61.44	WP07

WATER SERVICE TABULATION		
SERVICE/LOT #	STATION	ALIGNMENT
WS-Lot 53	15+11.44	WP07
WS-Lot 54	14+61.44	WP07
WS-Lot 55	14+11.44	WP07
WS-Lot 56	13+61.44	WP07
WS-Lot 57	13+11.44	WP07
WS-Lot 58	12+61.44	WP07
WS-Lot 59	11+49.33	WP07
WS-Lot 60	10+89.33	WP07
WS-Lot 61	10+40.34	WP07
WS-Lot 62	12+40.00	WP03
WS-Lot 63	12+80.00	WP03
WS-Lot 64	13+25.50	WP03
WS-Lot 65	13+73.46	WP03

WATER SERVICE TABULATION		
SERVICE/LOT #	STATION	ALIGNMENT
WS-Lot 66	14+17.96	WP03
WS-Lot 67	15+13.95	WP03
WS-Lot 68	13+88.59	WP03
WS-Lot 69	12+84.68	WP03
WS-Lot 70	12+35.00	WP03



ORIGINAL SCALE: 1" = 50'

ENGINEER'S STATEMENT
 PREPARED UNDER MY DIRECT SUPERVISION AND ON BEHALF OF JR
 ENGINEERING
 MIKE A. BRAMLETT, P.E.
 COLORADO P.E. 32314
 FOR AND ON BEHALF OF JR ENGINEERING, LLC
 DATE 5/26/2021

PREPARED FOR
 SR LAND, LLC
 20 BOULDER CRESCENT
 SUITE 201
 COLORADO SPRINGS, CO 80903
 JAMES F. MORLEY
 (719) 471-1742

JR ENGINEERING
 A WINDMILL COMPANY
 Central 303-740-9339 • Colorado Springs 719-595-2580
 For Color 970-697-8888 • www.jrengineering.com

DATE	BY	REVISION
6/9/21 <td>JRM <td>1</td> </td>	JRM <td>1</td>	1

STERLING RANCH FILING 3
 WATER PLANS
 SHEET 4 OF 4
 JOB NO. 25188.00