

**MASTER DEVELOPMENT DRAINAGE PLAN
AMENDMENT
FOR
STERLING RANCH**

**Prepared For:
SR Land, LLC
20 Boulder Crescent, 2nd Floor
Colorado Springs, CO 80903
(719) 491-3024**

**October 21, 2021
Project No. 25188.04**

**Prepared By:
JR Engineering, LLC
5475 Tech Center Drive
Colorado Springs, CO 80919
(303)-267-6240
Contact: Mike Bramlett, PE**

Engineering Review

12/13/2021 1:28:14 PM

dsdrice

JeffRice@elpasoco.com

(719) 520-7877

**EPC Planning & Community
Development Department**

See comment letter also.

ENGINEER'S STATEMENT:

The attached drainage plan amendment was prepared under my direction and supervision and is correct to the best of my knowledge and belief. Said drainage plan amendment has been prepared according to the criteria established by El Paso County for drainage plans 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. # 32314
For and On Behalf of JR Engineering, LLC

Date

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: _____

By: _____

Title: _____

Address: _____

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:



CONTENTS

PURPOSE.....	1
GENERAL LOCATION AND DESCRIPTION.....	1
LOCATION.....	1
DESCRIPTION OF PROPERTY	1
FLOODPLAIN STATEMENT.....	2
DRAINAGE BASINS AND SUBBASINS	2
MAJOR BASIN DESCRIPTIONS	2
EXISTING SUB-BASIN DRAINAGE	3
PROPOSED SUB-BASIN DRAINAGE.....	3
DRAINAGE DESIGN CRITERIA.....	5
DEVELOPMENT CRITERIA REFERENCE	5
HYDROLOGIC CRITERIA.....	5
HYDROLOGIC RESULTS.....	6
GENERAL CONCEPT.....	6
2018 MDDP COMPARISON TO 2021 DBPS	6
SWMM COMPARISON TO HEC-HMS.....	7
EXISTING CONDITIONS	7
PROPOSED CONDITIONS.....	7
DRAINAGE FACILITY DESIGN	11
GENERAL CONCEPT.....	11
SPECIFIC DETAILS	11
SUMMARY	14
REFERENCES:	15
APPENDICES	
A. Figures and Exhibits	
B. Existing Conditions Hydrologic Calculations	
C. Proposed Conditions Hydraulic Calculations	
D. Reference Material	
E. Drainage Maps	

Add a note that this amendment is not intended to address drainage and bridge fees or credits for DBPS improvements and that other submittals will address this (or include that information if you want to address those issues.)

PURPOSE

This document is an amendment to the approved Master Development Drainage Plan (MDDP) for Sterling Ranch. The purpose of this MDDP Amendment report is to:

1. Amend the approved MDDP to account for completed and planned on-site development within Sterling Ranch, including detention from completed filings.
2. Document all differences between the analysis and conclusions reached in the MDDP and this Amendment.
3. Provide analysis and conceptual design information for the on-line Detention Pond at Sterling Ranch Road (PNDW3).

GENERAL LOCATION AND DESCRIPTION

Location

Sterling Ranch, known as “the site” from herein, is a parcel of land located in Section 27, 28, 33 and 34, Township 12 South, and Section 4, Township 13 South, Range 65 West of the 6th Principal Meridian in El Paso County, Colorado. To the west the site is bound by Vollmer Road. To the north and east, the site is bounded by undeveloped land. To the south, the site is bound by the Pawnee Rancheros and Woodmen Heights developments. A vicinity map is presented in Appendix A.

Description of Property

Sterling Ranch is 1444 acres and is a Planned Unit Development to be built in multiple phases. The site is currently in various stages of development, with portions already in construction, with others unoccupied and undeveloped. The existing ground cover is sparse vegetation and open space, typical of a Colorado rolling range land condition. In general, the site slopes from north to south and the existing drainageways follow this topography.

Per a NRCS web soil survey of the area, the site is made up of Type A and B soils. Type A soils cover roughly 65% of the site while Type B soils cover the remaining 35% of the site. Group A soils have a high infiltration rate when thoroughly wet. Type B soils have a moderate infiltration when thoroughly wet. Type D soils have a very slow infiltration rate when thoroughly wet and have a high shrink-swell potential. A NRCS soil survey map has been presented in Appendix A.



not found

Floodplain Statement

Based on the FEMA FIRM Map numbers 08041C0533G and 08041C0535G, dated December 7, 2018, the site lies within Zone AE and Zone X of the Sand Creek floodplain. Zone AE is defined as area subject to inundation by the 1-percent-annual-chance flood event. 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. All proposed development within the site will occur in Zone X. The current FIRM Map has been presented in Appendix A.

DRAINAGE BASINS AND SUBBASINS

Major Basin Descriptions

1996 DBPS?



The site lies within two major drainage basins: the Sand Creek Drainage Basin and the East Fork of Sand Creek Drainage Basin. Both Basins have been previously studied firstly in the 2011 Drainage Basin Planning Study (DBPS) by Wilson, again in the 2018 Sterling Ranch MDDP by M&S, and finally in the 2021 DBPS by Stantec.

The Sand Creek Drainage Basin covers approximately 22 square miles and begins approximately five miles northeast of the Town of Falcon and travels approximately 15 miles to the southeast. The majority of the area within the basin is undeveloped and is characterized as rolling range land typically associated with Colorado's semi-arid climates. Anticipated land use for the basin includes residential, industrial, agricultural and commercial development. Residential developments will range from 0.125 – 5 acre lots with a mix of low, medium and high density developments.

As part of its drainage research, JR Engineering reviewed the following drainage studies and reports:

- Sand Creek Drainage Basin Study prepared by Wilson in 2011
- Sand Creek Drainage Basin Study prepared by Kiowa in 1996
- Sand Creek Drainage Basin Study prepared by Stantec in 2021
- Sterling Ranch Master Development Drainage Plan prepared by M&S in 2018
- Sterling Ranch Filing 1 Final Drainage report prepared by M&S in 2016
- Branding Iron at Sterling Ranch Filing 1 Drainage Report prepared by M&S in 2018
- Branding Iron at Sterling Ranch Filing 2 Drainage Report prepared by M&S in 2020
- Sterling Ranch Phase 3 Preliminary Drainage Report prepared by JR Engineering in 2020
- Sterling Ranch Filing 2 Final Drainage Report prepared by JR Engineering in 2021

- Homestead North at Sterling Ranch Preliminary Drainage Report prepared by JR Engineering in 2021
- Aspen Meadows Final Drainage Report prepared by Matrix Design Group in 2019
- Homestead at Sterling Ranch Filing 1 Final Drainage Report prepared by M&S in 2018
- Homestead at Sterling Ranch Filing 2 Final Drainage Report prepared by M&S in 2020

Existing Sub-basin Drainage

The existing conditions sub-basins remain unchanged from the MDDP.

2018

This is confusing - should the last sentence be under SC3-9?

Proposed Sub-basin Drainage

The proposed basins remain unchanged from the MDDP, except where stated below:

SC3-6B is approximately 30.9 acres. It is composed of a portion of the Sterling Ranch Filing 2 Development. The basin is comprised of single-family housing, open space, and a future school site. The basin drains south via curb and gutter and storm sewer to Pond W-5. Flows from Pond W-4 discharge directly into Sand Creek at design point 61.

SC3-12 is approximately 71.7 acres. It is composed of a portion of the Sterling Ranch Filing 1 Development. The basin is comprised of single-family housing and open space. The basin drains southwest via future on-site curb and gutter and storm sewer to Pond FSD12. Pond FS12 outfalls directly into Sand Creek upstream of Sterling Ranch Road.

SC3-12A is approximately 16.5 acres. It is composed of a portion of the Sterling Ranch Filing 1 Development. The basin is comprised of single-family housing and open space. The basin drains southwest via future on-site curb and gutter and storm sewer to Pond FSD12A. Pond FS12A outfalls directly into Sand Creek upstream of Sterling Ranch Road.

SC3-13 is approximately 41.0 acres. It is composed of Branding Iron at Sterling Ranch Filings 1 and 2, which is a portion of Sterling Ranch Filing 1. The basin is comprised of single-family housing and open space. The basin drains north to south via curb and gutter and storm sewer to Pond FSD13. Pond FSD13 outfall directly into Sand Creek.

SC3-14A is approximately 140.2 acres. It is composed of a portion of the Sterling Ranch Phase 3 Development. The basin is comprised of single-family housing and open space. The basin drains southwest via future on-site curb and gutter and storm sewer to Pond FSD14A. Pond FS14A outfalls directly into Sand Creek upstream of Sterling Ranch Road.

east of Sand Creek

and includes additional XX acres of contributing area proposed to be diverted to the main Sand Creek channel

Sterling Ranch MDDP Amendment 1

east of Sterling Ranch Road alignment

SC3-14B is approximately 63.3 acres. It is composed of a portion of the Sterling Ranch Phase 3 Development. The basin is comprised of single-family housing and open space. The basin drains southwest via future on-site curb and gutter and storm sewer to Pond FSD14B. Pond FSD14B's flows will be routed through the Phase 3 development and ultimately outfall in Sand Creek.

SC3-16A is approximately 178.0 acres. It is composed of a portion of the Sterling Ranch Phase 3 Development. The basin is comprised of single-family housing and open space. The basin drains south via future on-site curb and gutter and storm sewer. During final design, Ponds FSD16A and FSD16B will be consolidated into a single pond, FSD16. Pond FSD16's flows will be routed through the Phase 3 development, ultimately outfalling in Sand Creek.

SC3-16B is approximately 42.2 acres. It is composed of a portion of the Sterling Ranch Phase 3 Development. The basin is comprised of single-family housing and open space. The basin drains south via future on-site curb and gutter and storm sewer.

show A and B basins on the drainage plan

SC3-17A is approximately 30.4 acres. It is composed of a portion of the Homestead North development. The basin is comprised of single-family housing and open space. The basin drains north to south via curb and gutter and storm sewer into Pond A, previously a part of FSD17 in the MDDP. Flows from Pond A discharge east directly in Sand Creek at design point 70.

SC3-17B is approximately 24.6 acres. It is composed of a portion of the Homestead North development. The basin is comprised of single-family housing and open space. The basin drains west to east via curb and gutter and storm sewer into Pond B, previously a part of FSD17 and FSD18 in the MDDP. Flows from Pond B discharge east directly in Sand Creek at design point 69.

SC3-18 is approximately 22.8 acres. It is composed of a portion of the Homestead North development. The basin is comprised of single-family housing and open space. The basin drains north to south via curb and gutter and storm sewer into Pond C, previously a part of FSD18 in the MDDP. Flows from Pond C discharge east directly in Sand Creek at design point 69.

SC3-18B is approximately 45.6 acres. It is composed entirely of the Sand Creek channel adjacent to the Homestead North development. The basin drains north to south via the Sand Creek channel and outfalls at design point 69.

rural (or large-lot)

SC3-22 is approximately 29.4 acres. It is composed of a portion of the Retreat at Timber Ridge Filing 1 development. The basin is comprised of single-family housing. The basin is comprised of single-family housing and open space. The basin drains from northwest to southeast via drainage swale, curb and gutter, and storm sewer into the proposed full spectrum detention pond,

delete "previously"?

Pond 1, previously labeled FSD22 in the MDDP. Flows from Pond 1 discharge east into Sand Creek at design point 71.

SC3-24A is approximately 35.7 acres. It is comprised of a portion of a future filing of the Retreat at Timber Ridge development and Sand Creek floodplain. The drains north to south directly into Sand Creek at design point 73.

SC3-24B is approximately 12.2 acres. It is composed of a portion of the Retreat at Timber Ridge Filing 1 development and Sand Creek floodplain. The basin is comprised of single-family housing and open space. The basin drains from northwest to southeast via drainage swale, curb and gutter, and storm sewer directly into Sand Creek at design point 72.

urban density

SC3-27 is approximately 104.8 acres. It is composed of a portion of the Retreat at Timber Ridge Filing 1 development. The basin is comprised of single-family housing. The basin drains from north to southwest via curb and gutter and storm sewer into the proposed full spectrum detention pond, Pond 2, previously labeled FSD27 in the MDDP. Flows from Pond 2 discharge west into Sand Creek at design point 72.

71?

DRAINAGE DESIGN CRITERIA

Development Criteria Reference

Storm drainage analysis and design criteria for the project were taken from the “*City of Colorado Spring/El Paso County Drainage Criteria Manual*” Volumes 1 and 2 (EPCDCM), dated October 12, 1994, the “*Urban Storm Drainage Criteria Manual*” Volumes 1 - 3 (USDCM) and Chapter 6 and Section 3.2.1 of Chapter 13 of the “*Colorado Springs Drainage Criteria Manual (CCSDCM)*”, dated May 2014, as adopted by El Paso County, as well as the July 2019 El Paso County Engineering Criteria Manual update.

Hydrologic Criteria

Previously, the MDDP used HEC-HMS to model hydrologic conditions. With all of the on- and off-line detention present along Sand Creek, it was decided that CUHP-SWMM would be a more appropriate way to model the hydrologic conditions. All hydrologic data was obtained from NOAA Atlas 2 isopluvial maps found in the EPCDCM. Runoff was calculated using CUHP Version 2.0.0, developed by Urban Drainage and Flood Control District. The model utilizes the raingauge classified as “a 24-Hr Type II Storm” to simulate a long duration front storm common to the area, which is the same rain gauge used in the original MDDP. The following rainfall depths were utilized in the model: 2.1 inches for the 2 year storm, 2.5 inches for the 5 year storm,

3.0 inches for the 10 year storm, 3.6 inches for the 25 year storm, 4.1 inches for the 50 year storm, and 4.6 inches for the 100 year storm, which are the same point precipitation values used in the original MDDP. Using Table 5.2 from the EPCDCM, a distribution curve was created for each of the design storms to be used in CUHP. EPA SWMM 5.1 was utilized to route runoff flow rates for the sizing of stormwater storage facilities. The CUHP calculations and SWMM model are presented in Appendices B and C.

Urban Drainage and Flood Control District's UD-Detention, Version 3.07 workbook was used for in the original MDDP for preliminary pond sizing. Various other versions of UD-Detention were used in the different filings for final design of the full spectrum detention ponds. Required detention volumes and allowable release rates were designed per USDCM and CCS/EPCDCM. Pond sizing spreadsheets from the original MDDP and approved drainage reports are presented in Appendix D.

HYDROLOGIC RESULTS

General Concept

The general procedure for this MDDP Amendment is as follows. First the hydrology was evaluated to determine the most accurate way to model it using either SWMM internal hydrology or CUHP compared to the original HEC-HMS model. Next, the existing conditions were re-evaluated to determine the new baseline hydrology which would then determine the amount of detention required in Pond W-3 at Sterling Ranch Road. The third model was the proposed conditions model that updates the basins and various on-site ponds in the adjacent developments, as well as includes the preliminary design of the proposed Pond W-3 with the goal of reducing flows downstream to below historic levels

The adopted (1996) DBPS assumed low density development in this area.

2018 MDDP Comparison to 2021 DBPS

Comparing the original MDDP hydrology with the DBPS hydrology the main difference between the two is imperviousness. The DBPS shows imperviousness values with the current undeveloped conditions of basins, regardless of future development plans. The original MDDP accounts for future development within Sterling Ranch, as well as upstream and offsite basins that are still tributary to Sand Creek. With the intent of accounting for all possible future flows, as to avoid having to possibly improve the channel again in the future, it was decided that the original MDDP hydrology would be what was used for the baseline of this study, rather than the DBPS hydrology.

City

CUHP-SWMM Comparison to HEC-HMS

The first hydrologic analysis done was to verify the validity of using CUHP-SWMM instead of the previously used HEC-HMS. A technical memo summarizing the results of this analysis can be found in **Appendix B**.

Existing Conditions

The second model was a re-evaluation of the existing conditions along Sand Creek. Basic basin parameters (area, imperviousness, slope, routing parameters) were taken from the MDDP HEC-HMS model to create a model as close the previous one as possible, with the only difference being the software used to model the hydrology. With no detention present in the existing conditions model, the CUHP-SWMM model was able to produce numbers that were an average of 15% different from the HEC-RAS model, despite being functionally different in how they calculate runoff. The most critical values obtained from the model are at design points 63, 60A, and 53A, which are along Sand Creek downstream of the project. DP63, located at Sterling Ranch Road, saw an increase in flows from 1911.5 cfs to 1980.7 cfs compared to the previous model. DP60A, located along Sand Creek adjacent to the Aspen Meadows subdivision saw flows increase from 1913.5 cfs to 1969.2 cfs. DP53A, located along Sand Creek at Detention Basin #3 saw flows increase from 2061.5 cfs to 2197.7 cfs. Tables summarizing the comparison between the CUHP-SWMM model and the HEC-HMS model can be found in **Appendix B**.

Proposed Conditions

One of the purposes of this MDDP Amendment is to account for completed and planned development. The third model was a re-evaluation of the proposed conditions along Sand Creek. The model was built using basic basin parameters (area, imperviousness, slope, routing parameters) taken from the MDDP for the basins that remain unchanged from the MDDP. For the rest of the basins, updates were made based on either preliminary or final designs taken from various Approved Drainage Reports. After re-evaluating the existing and proposed conditions of Sterling Ranch, it was determined that an on-line detention pond upstream of Sterling Ranch Road was still necessary in order to attenuate proposed flowrates below existing conditions flow rates. The following is a list of all the updates from the previous Proposed Conditions model:

- Pond W-3 has been updated based on preliminary designs proposed with this MDDP Amendment.

please clarify
location

- The existing stock pond located near Sterling Ranch has been included in the model. Previously, the pond was excluded from the model since the thalweg of the channel did not go through the pond. Based on preliminary designs with this MDDP Amendment, the pond will remain in place, but flows will instead pass directly through it and outfall downstream via outlet structure.
- The larger stock pond located north of Briargate Parkway has been included in the model. Previously, the pond was excluded from the model since the thalweg of the channel did not go through the pond. Based on preliminary designs with this MDDP Amendment, the pond will remain in place, but flows will instead pass directly through it and outfall downstream via outlet structure. The smaller stock pond in this area is being removed from the channel, and thus will not need to be included in the model.
- With Sterling Ranch Phase 3 progressing to preliminary design, a 17.23 acre portion of Sub-Basin SCE-7 and a 11.06 acre portion of SCE-10 has been shifted to basin SC3-14B based on the proposed storm layout.
- As part of Sterling Ranch Phase 3, Pond 11A proved to be unnecessary as hypothesized in the MDDP. Sub-Basin 11A now drains to Pond FSD6.
- Sub-Basin SC3-7 still drains to FSD6 based on Pond W5 sizing. JR Engineering is currently coordinating with Matrix about the future routing of the flows from the Barbarick detention pond and rain garden through Sterling Ranch Phase 3, but for the purposes of this MDDP Amendment, flows from Sub-Basin SC3-7 have been accounted for in the design of Pond W-5 in Sterling Ranch Filing 2.
- Ponds 16A and 16B will be consolidated during final design for Sterling Ranch Phase 3. Since they haven't been designed yet, they will remain as shown in the MDDP since the areas haven't changed drastically. Sub-Basin SC3-16B's area has been modified slightly to account for the Sterling Ranch Phase 3 preliminary layout. The proposed Pond 16 will have the same release rate as Ponds 16A and 16B combined.
- Sterling Ranch Phase 3 is still in a preliminary design phase so Pond 14A and Pond 11B haven't had outlets designed yet. In order to update the storage and outfall curves, the preliminary pond grading was used along with the UD-Detention spreadsheet to generate a preliminary full spectrum ratings curve. Both the grading and outlet structure are subject to change during final design, but will maintain a discharge that is less than predevelopment flows.

describe where this
was planned to be

state that the previous MDDP considered this pond to be temporary and it is now permanent.

- Pond FSD12 has been designed as Pond 4 from Sterling Ranch Filing 1 by M&S dated 7/16. The pond was modeled using the storage and outfall curves from the 2018 MDDP.
- Pond FSD12A has been added to the model, which is Pond 1 from Homestead Filing 2 by M&S, dated 7/18. The sub-basin hydrologic values for Sub-Basin SC3-12A were taken from the Homestead Filing 2 Final Drainage Report's UD-Detention spreadsheet, while the pond was also modeled using the UD-Detention spreadsheet's stage-area and stage-discharge curves.
- Pond FSD13 has been designed as Pond 8 from Sterling Ranch Filing 1 by M&S dated 7/16 and modified for the Branding Iron Filing 2 development by M&S dated 1/20. The pond was modeled using the UD-Detention spreadsheet's stage-area and stage-discharge curves from the Branding Iron at Sterling Ranch Filing 2 Final Drainage Report.
- Pond FSD18 has been designed as Pond A from Homestead North by JR Engineering. The sub-basin hydrologic values for Sub-Basin SC3-18 were taken from the UD-Detention spreadsheet, while the pond was also modeled using the UD-Detention spreadsheet's stage-area and stage-discharge curves from the Homestead North Final Drainage Report.
- Pond FSD17A has been designed as Pond B from Homestead North by JR Engineering. The sub-basin hydrologic values for Sub-Basin SC3-17A were taken from the UD-Detention spreadsheet, while the pond was also modeled using the UD-Detention spreadsheet's stage-area and stage-discharge curves from the Homestead North Final Drainage Report.
- Pond FSD17B has been designed as Pond C from Homestead North by JR Engineering. The sub-basin hydrologic values for Sub-Basin SC3-17B were taken from the UD-Detention spreadsheet, while the pond was also modeled using the UD-Detention spreadsheet's stage-area and stage-discharge curves from the Homestead North Final Drainage Report.
- Sub-Basin SC318B was added to account for the runoff outside of the development, in the channel area from Sub-Basins SC3-17 and SC3-18 that were unaccounted for in the Homestead North detention ponds.
- Pond FSD22 has been designed as Pond 1 from Retreat at Timber Ridge Filing 1 by Classic Engineering. The sub-basin hydrologic values for Sub-Basin SC3-22 were taken from the UD-Detention spreadsheet, while the pond was also modeled using the UD-

Detention spreadsheet's stage-area and stage-discharge curves from the Retreat at Timber Ridge Filing 1 Final Drainage Report.

- Pond FSD27 has been designed as Pond 2 from Retreat at Timber Ridge Filing 1 by Classic Engineering. The sub-basin hydrologic values for Sub-Basin SC3-27 were taken from the UD-Detention spreadsheet, while the pond was also modeled using the UD-Detention spreadsheet's stage-area and stage-discharge curves from the Retreat at Timber Ridge Filing 1 Final Drainage Report.
- Pond FSD21 now outfalls directly into DP-73 instead of going through Pond FSD27. Based on the Drainage Report for The Retreat at Timber Ridge, flows from Sub-Basin SC3-21 drain to a future full spectrum detention pond that outfalls directly into Sand Creek.

A table summarizing the changes in the Full Spectrum Detention Pond's sizing and release rates can be found in **Appendix C**.

The second stated purpose of this MDDP Amendment is to document the differences between the MDDP and this MDDP Amendment. Comparing the MDDP Amendment's proposed conditions model to the MDDP, the median difference in Sub-basin peak flow rates between the two is a 6% decrease in the basin runoff. With the basin parameters carried over as much as possible, some of the differences is due to how the hydrographs were generated in HEC-HMS and SWMM respectively. The MDDP used curve number while the MDDP Amendment used CUHP. The MDDP Amendment also took into account changes basin parameters based on the various accepted Final Drainage Reports. The differences in Sub-basin peak flow rates were not universally higher in CUHP-SWMM, with there being a range from 100% higher to 100% lower. A table comparing the peak flow rates of the Sub-basins can be found in **Appendix C**.

The comparison between the routed hydrographs at the design points of the MDDP Amendment proposed conditions model and MDDP proposed conditions model shows a more consistent change. Peak runoff rates along the main fork are mostly a few percent higher, with a handful further downstream the reach 14 to 16% higher. The East Fork saw a reduction of peak runoff rates around 60% from the previous model. The total volume of water is consistently 10 to 25% lower than the previous model with a exception of a few places. This is due in part to the changes in detention release rates as well as the previously mentioned differences in how the hydrographs were created. The differences between the two models of when peak runoff occurs were typically within 10 to 15 minutes in each basin and at each node. Tables comparing the MDDP Amendment proposed conditions model with the previous one from the MDDP can be found in **Appendix C**.

The last and most crucial comparison is between the updated existing conditions model and the updated proposed conditions model. As seen in Table 1, all of the online and offline detention shows a clear reduction in flows along Sand Creek. The total volume of runoff is very similar in the undeveloped upper portion of the reach at Design Points 74, 75, and 78. As runoff accumulates downstream at Design Points 73, 71, 69, and 63 the volume of runoff drastically increases due to the increased imperviousness of the adjacent developments, but the peak flow rates remain lower than existing due to all of the full spectrum detention ponds along the reach. As seen in Table 1, Pond W-3 reduces peak flow rates downstream of it at Design Points 60A and 53A to below the pre-development rates seen in the updated existing conditions model. Flows have been reduced from 1969.2 and 2197.2 cfs, respectively, to 1889.4 and 1895.2 cfs. A table comparing the peak runoff rates and the total volume of runoff at the design points can be found in **Appendix C**.

DRAINAGE FACILITY DESIGN

being designed



General Concept

The third stated purpose of this MDDP Amendment is an evaluation of the required volume for on-line detention at Sterling Ranch Road (Pond W-3). Along with an on-line detention pond, new culverts are proposed at Sterling Ranch Road and Briargate Parkway by others. The amendment also includes revisions to the existing stock pond north of Sterling Ranch Road, the stock ponds north of Briargate Parkway, and improvements to Sand Creek channel.

Specific Details

Compared to the previous preliminary design of Pond W-3, the amount of storage volume has decreased from 78.2 ac-ft. to 50.6 ac-ft. In order to avoid classification as a jurisdictional dam, the maximum ponding depth is 10 feet. The peak release rate has been increased from 1350.6 cfs to 1552.5 cfs. Despite the increase in release rate, peak flow rates along Sand Creek downstream of the pond are lower than existing. The previous MDDP model outfalls at DP 53A, which is defined as the Full Spectrum Pond at Woodmen Drive, and so does the MDDP Amendment SWMM model. The MDDP model over-detains at Pond W-3 in order to reduce flows downstream well below those in the existing conditions. With the goal being to simply reduce flows to less than predevelopment rates, this amount of detention is unnecessary, hence the reduced storage volume and the increased release rate. A complete comparison between existing and proposed conditions of design flows along Sand Creek can be seen below.

Staff is not comfortable with this increase without a detailed review of the SWMM model and concurrence from the City.

Table 1.

Design Point Comparison Summary						
Location	Design Point ID	Existing (Updated)	Proposed (MDDP)	Proposed (Amendment)	% Difference Amend vs. MDDP	% Difference Amend vs. EX
		Q100 (cfs)				
	DP-74	352.3	262.8	293.8	12%	-17%
	DP-75	970.5	950.5	887.9	-7%	-9%
	DP-78	497.7	385.3	422.1	10%	-15%
	DP-73	1672	1506.7	1501.0	0%	-10%
Sterling Ranch N BNDY	DP-71	1734.9	1612.2	1627.1	1%	-6%
Briargate Pkwy X'ing	DP-69	1988.4	1775.7	1827.0	3%	-8%
Sterling Ranch S BNDY	DP-63	1980.7	1385.1	1580.5	14%	-20%
Marksheffel X'ing	DP-60A	1969.2	1661.8	1889.4	14%	-4%
Sand Creek and Pond 3	DP-53A	2197.7	1668.9	1895.2	14%	-14%
Near SE Prop Corner	DP-56	242.9	196.4	144.8	-26%	-51%

Conceptually, the current preliminary design for Pond W-3 is similar to what was previously shown in the MDDP. Ponding will occur adjacent to Sterling Ranch Road and pass through an outlet structure before entering the roadway culvert and continuing downstream. The Sterling Ranch Road culvert is currently proposed to be a Conspan arch, O-535 shape (by others).

The existing stock pond upstream of Sterling Ranch Road will remain in place, with flows passing through the pond and leaving through an outlet structure. The major change in how the pond functions is the new design does not have a diversion structure along Sand Creek that routes flows around the existing pond. Due the narrow space between the proposed development and the existing stock pond, this portion of channel would require extensive reinforcement due to high shears and velocities. In order to maintain the water right for the pond, an outlet orifice structure will maintain a static water surface of 7038 ft and all flows above that elevation will pass undetained through the orifice structure and outfall into Pond W-3. Adding the existing stock pond as online storage directly upstream of Pond W-3 made a drastic difference in peak flows. The time of peak concentration at Sterling Ranch Road was only about 20 minutes different, but the additional storage volume attributed to the stock ponds reduced peak flows by 160 cfs and reduced the maximum volume of water by 1.3 ac-ft.

The proposed channel improvements begin just north of the Sterling Ranch southern property boundary and run north roughly two miles to the northern property boundary. The channel will include a 17 feet wide, 0.71 feet deep, meandering bankfull channel along with a 1% flood terrace along the east side that ranges from 80 feet to 120 feet wide. The straight sections of channel will be rock riffles, while the curves will be eddy pools. The new bankfull will be set

see other
comments

lower than the existing channel to establish a new thalweg. Along the west side the bankfull channel will grade up to tie into the existing thalweg in order to preserve as many of the existing wetlands as possible. The channel has been broken up into three separate sections; Reach 1 is the portion between the southern boundary and Sterling Ranch Road, Reach 2 is the portion between Sterling Ranch Road and Briargate Parkway, and Reach 3 is the portion from Briargate Parkway to the northern boundary. A 15' maintenance trail will run the length of the channel on both sides of it, sitting several feet above the 100 year water surface, while access points from the proposed adjacent developments will be provided.

designed

Reach 1 of the channel is approximately 900 feet long. Upstream, it ties in directly to the downstream grading of the proposed Conspan Arch, Type O-535 (by others) culvert at Sterling Ranch Road. The culvert was designed to pass the full 100-year FIS flow rate of 2600 cfs while still providing 1 foot of freeboard within the culvert. In the amended MDDP hydrology, the peak 100-year release from Pond W-3 is 1580 cfs. There are 7 riffle sections, all with a slope of 0.50%, while the slope through the eddy pools is flat. There are two grouted boulder drops structures along this reach, one approximately 3 feet tall and the other approximately 4 feet tall. Due to the development on both sides of the channel, the flood terrace is at its narrowest width of 50 feet along this section. As the channel moves downstream it eventually widens to a maximum flood terrace width of approximately 240 feet, before tying into the existing channel upstream of the property boundary.

Reach 2 of the channel is approximately 5,030 feet long. Upstream, it ties in directly to the downstream grading of the proposed Conspan Arch, Type C42T (by others) culvert at Briargate Parkway. The culvert was designed to pass the full 100-year FIS flow rate of 2600 cfs while still providing 1 foot of freeboard within the culvert. In the amended MDDP hydrology, the peak 100-year flow at DP 69, located at Briargate Parkway, is 1827 cfs. There are 32 riffle sections with slopes ranging from 1.11% to 5.00%, while the slope through the eddy pools is flat, except for 2 with slopes less than 1.5%. There are two grouted boulder drops structures along this reach, one approximately 3.5 feet tall and the other approximately 4.5 feet tall. The flood terrace varies in width along this reach from approximately 160 feet up to 330 feet wide. The channel ends at the existing stock pond upstream of Sterling Ranch Road. Flows will accumulate in the stock pond until they reach the static water surface and then overtop the orifice structure and then outfall directly into Pond W-3. With development currently happening on both sides of the channel, especially on the west side, retaining walls are used extensively to grade in the maintenance trail along this reach.

Reach 3 of the channel is approximately 2,807 feet long. In the amended MDDP hydrology, the peak 100-year flow at DP 71, located at the northern boundary of Sterling Ranch, is 1,627 cfs. There are 20 riffle sections with slopes ranging from 1.11% to 5.00%, while the slope through the eddy pools is flat, except for 2 with slopes less than 1.5%. There is one grouted boulder drops

designed

structure along this reach, approximately 6 feet tall. The flood terrace varies in width along this reach from approximately 180 feet up to 260 feet wide. The larger of the two existing stock ponds on this reach will remain in place, approximately 900 feet upstream of the Briargate Parkway culvert. It will function similarly to the one just north of Sterling Ranch Road. Flows will enter the pond directly, and an orifice structure will maintain a static water surface in the pond. During larger events, flows will overtop the orifice structure and outfall downstream of the pond. A second stretch of channel approximately 550 feet long connects the pond outfall with the proposed drop structure associated with the Consplan Arch, Type C42T (by others) culvert at Briargate Parkway.

Address bank stabilization along the west side of the channel in the Homestead North development (from the Wheatland Drive cul-de-sac to Poco Road).

SUMMARY

The proposed development remains consistent with pre-development drainage conditions with the construction of the recommended drainage improvements, including ditches, culverts, detention ponds and drainage channel improvements. The proposed development will not adversely affect the offsite major drainageways or surrounding development. This report meets the latest El Paso County Drainage Criteria requirements for this site.

REFERENCES:

1. City of Colorado Springs Drainage Criteria Manual Volume 1, City of Colorado Springs, CO, May 2014.
 2. Final Drainage Report for Aspen Meadows, Matrix Design Group, January 2019.
 3. Final Drainage Report for Branding Iron at Sterling Ranch Filing No. 2, M&S Civil Consultants, January 2020.
 4. Final Drainage Report for Homestead at Sterling Ranch Filing No. 1, M&S Civil Consultants, July 2018.
 5. Final Drainage Report for Homestead at Sterling Ranch Filing No. 2, M&S Civil Consultants, January 2020.
 6. Final Drainage Report for Retreat at Timberridge Filing No. 1, Classic Consulting, June 2019.
 7. Master Development Drainage Plan for Sterling Ranch, M&S Civil Consultants, October 2018.
 8. Master Development Drainage Plan for Sterling Ranch Filing Nos. 1&2 and Final Drainage Report for Sterling Ranch Filing No. 1, M&S Civil Consultants, December 2017.
 9. Preliminary Drainage Report and MDDP Addendum for Homestead North at Sterling Ranch Preliminary Plan, JR Engineering, February 2021.
 10. Preliminary Drainage Report for Sterling Ranch Phase 3 Preliminary Plan, JR Engineering, December 2020.
 11. Sand Creek Drainage Basin Planning Study, Stantec, January 2021 ← (not adopted by EPC)
 12. Sterling Ranch Filing 2 Final Drainage Report, JR Engineering, June 2021.
 13. Urban Storm Drainage Criteria Manual, Urban Drainage and Flood Control District, Latest Revision.
- Add Kiowa DBPS (1996)
(adopted by EPC)

APPENDIX A

FIGURES AND EXHIBITS

NOTES TO USERS

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

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

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

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

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

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

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

NGS Information Services
NOAA, NIMS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, MD 20910-3282

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

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

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

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

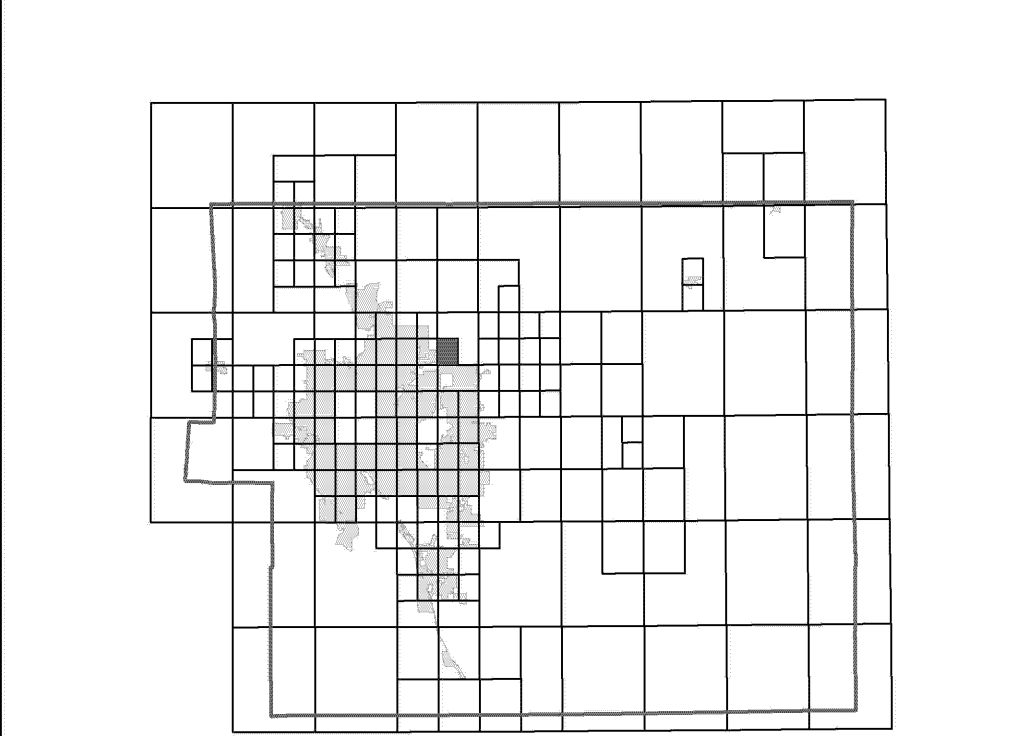
Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which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

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

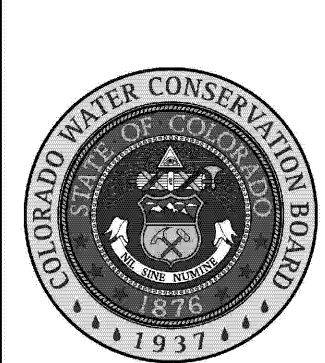
If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at <http://www.fema.gov/business/nfip>.

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

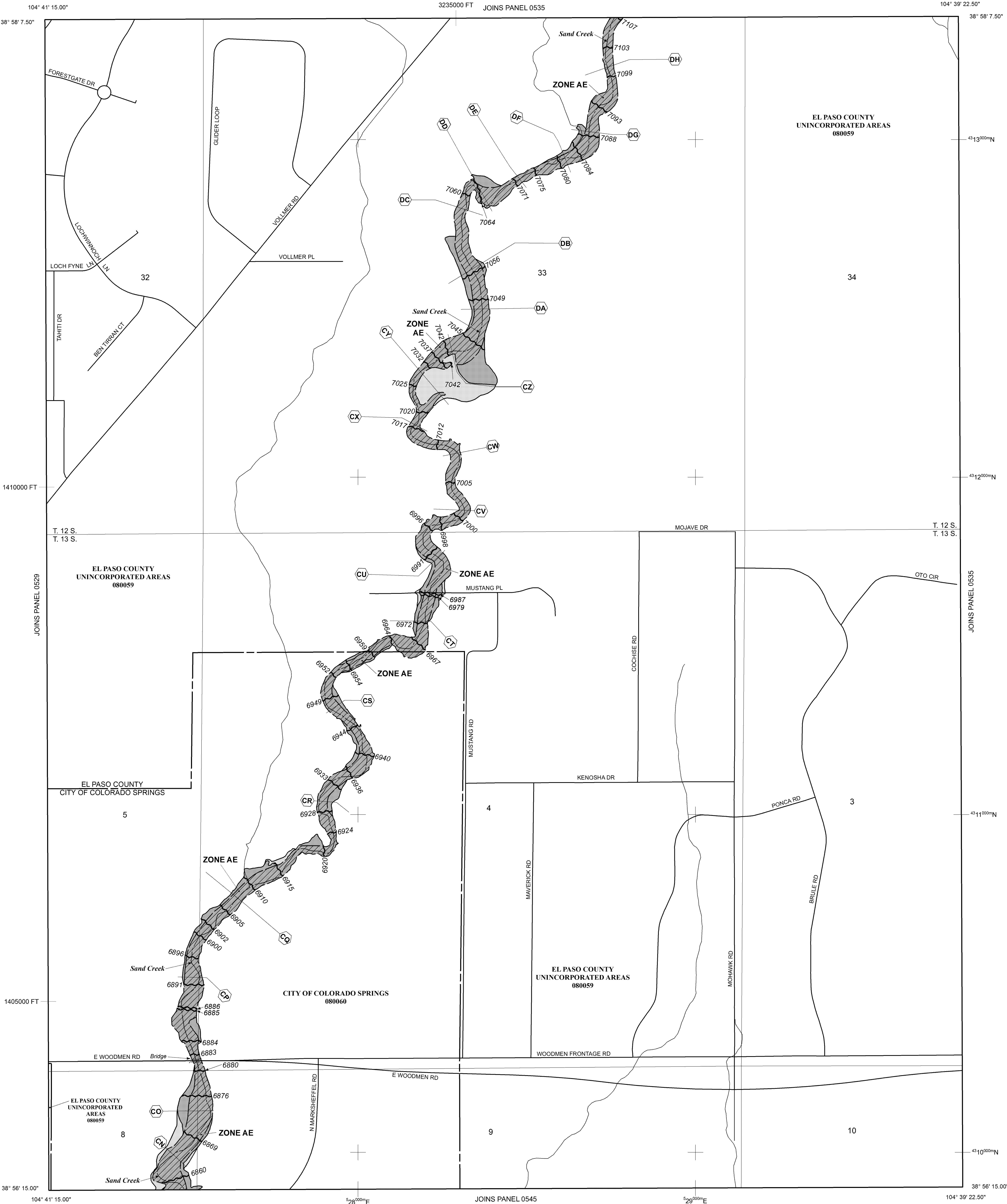
Panel Location Map



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



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



NOTE: MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN TOWNSHIP 12 SOUTH, RANGE 65 WEST, AND TOWNSHIP 13 SOUTH, RANGE 65 WEST.

LEGEND

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

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

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

FLOODWAY AREAS IN ZONE AE

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

OTHER FLOOD AREAS

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

OTHER AREAS

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

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

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

- Floodplain boundary
- Floodway boundary
- Zone D Boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- Base Flood Elevation line and value; elevation in feet* (EL 987)
- Base Flood Elevation value where uniform within zone; elevation in feet*

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

- Cross section line
- Transect line
- Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
- 1000-meter Universal Transverse Mercator grid ticks, zone 13
- 5000-foot grid ticks: Colorado State Plane coordinate system, central zone (FIPSZONE 0502), Lambert Conformal Conic Projection
- Bench mark (see explanation in Notes to Users section of this FIRM panel)
- River Mile

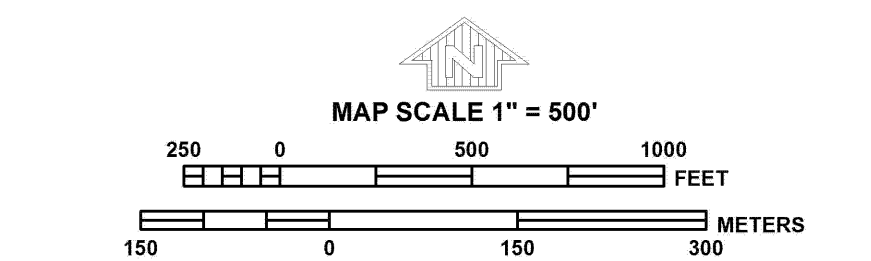
MAP REPOSITORIES
Refer to Map Repositories list on Map Index

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

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

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

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



PANEL 0533G

FIRM

FLOOD INSURANCE RATE MAP

EL PASO COUNTY, COLORADO AND INCORPORATED AREAS

PANEL 533 OF 1300

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
COLORADO SPRINGS, CITY OF	080060	0533	G
EL PASO COUNTY	080059	0533	G

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



MAP NUMBER
08041C0533G

MAP REVISED
DECEMBER 7, 2018

Federal Emergency Management Agency

NOTES TO USERS

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

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

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

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

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

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

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

NGS Information Services
NOAA, NIMS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, MD 20910-3282

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

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

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

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

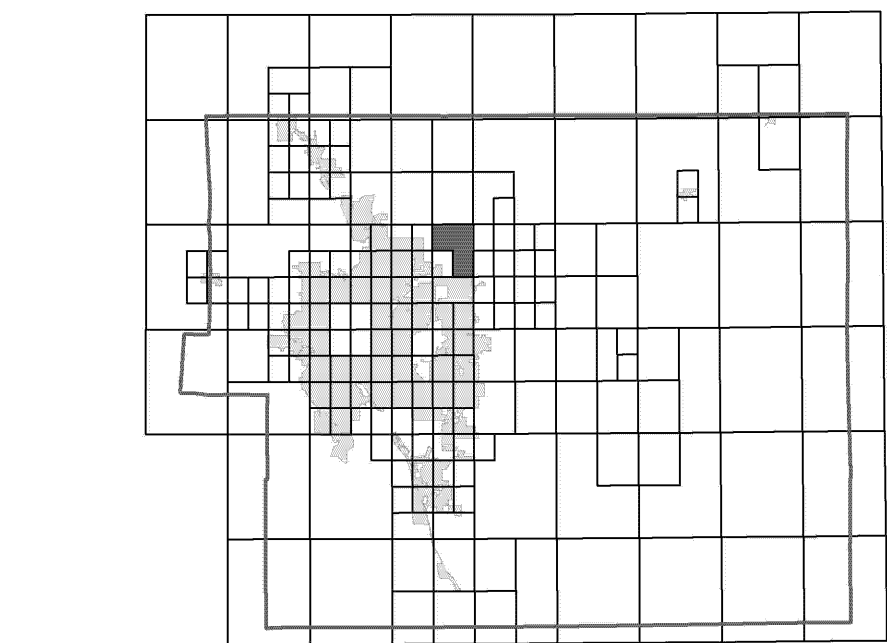
Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which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

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

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

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

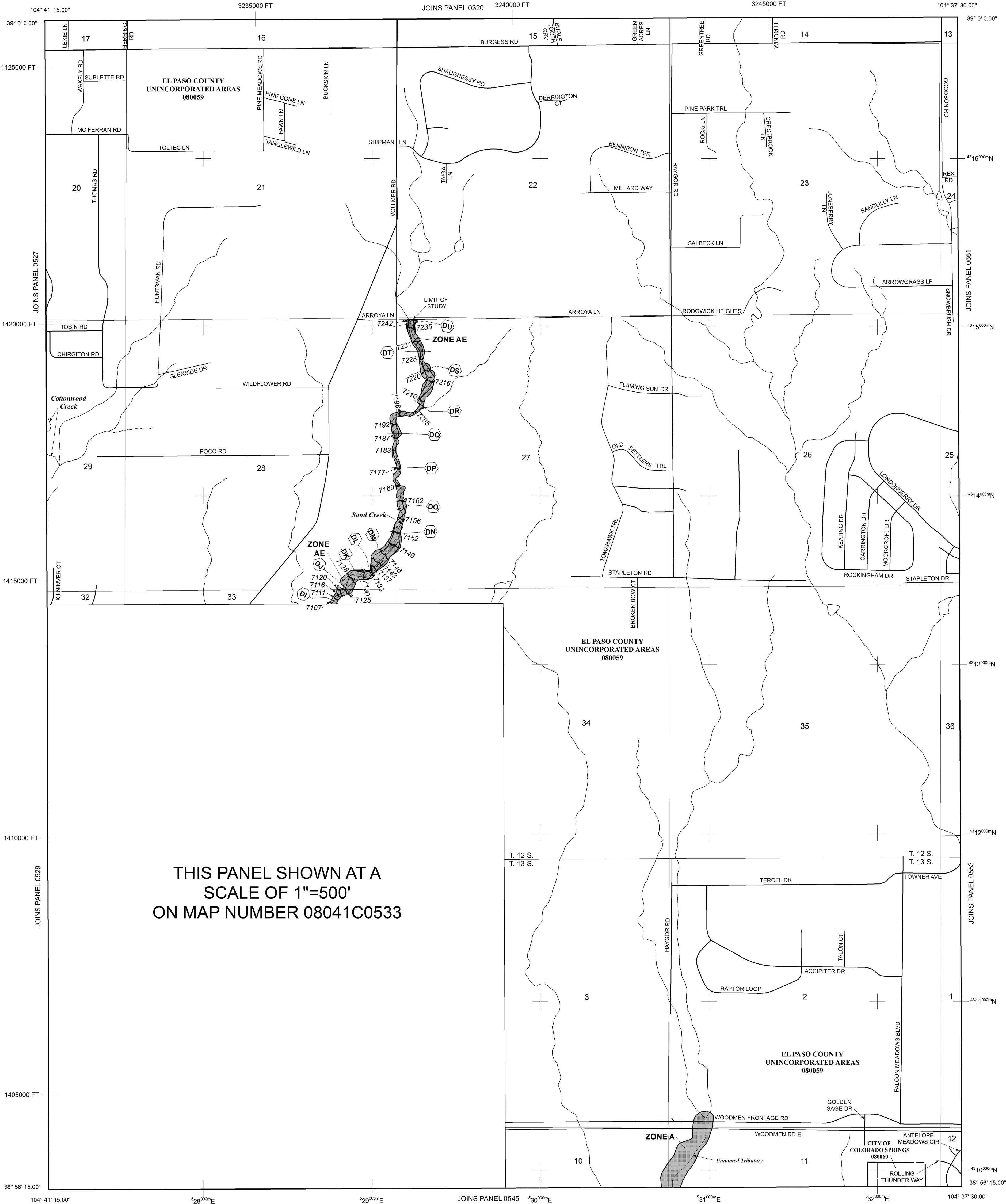
Panel Location Map



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



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



NOTE: MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN TOWNSHIP 12 SOUTH, RANGE 65 WEST, AND TOWNSHIP 13 SOUTH, RANGE 65 WEST.

LEGEND

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

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

ZONE A No Base Flood Elevations determined.
ZONE AE Base Flood Elevations determined.
ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.

ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE AR Special Flood Hazard Area Formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.

ZONE A99 Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.

ZONE V Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.

ZONE VE Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

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

OTHER FLOOD AREAS

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

OTHER AREAS

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

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

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

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

Floodplain boundary
 Floodway boundary
 Zone D boundary
 CBRS and OPA boundary

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

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

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

Cross section line

Transect line

97° 07' 30.00"
32° 22' 30.00"
43° 50' 00"N
Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)

1000-meter Universal Transverse Mercator grid ticks, zone 13

5000-foot grid ticks: Colorado State Plane coordinate system, central zone (FIPSZONE 0502), Lambert Conformal Conic Projection

6000000 FT
DX5510
Bench mark (see explanation in Notes to Users section of this FIRM panel)

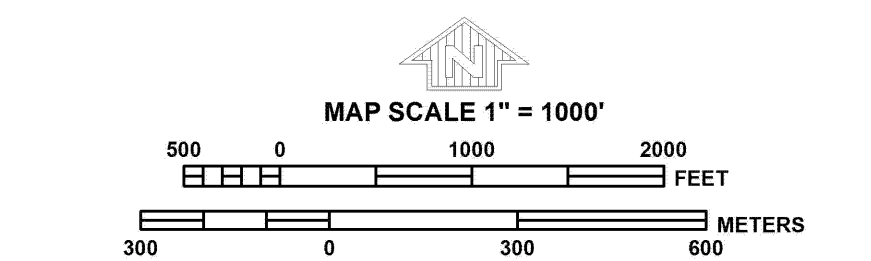
M1.5
River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index
EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
MARCH 17, 1997

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

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

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



PANEL 0535G

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

PANEL 535 OF 1300

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
COLORADO SPRINGS, CITY OF	080060	0535	G
EL PASO COUNTY	080059	0535	G

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



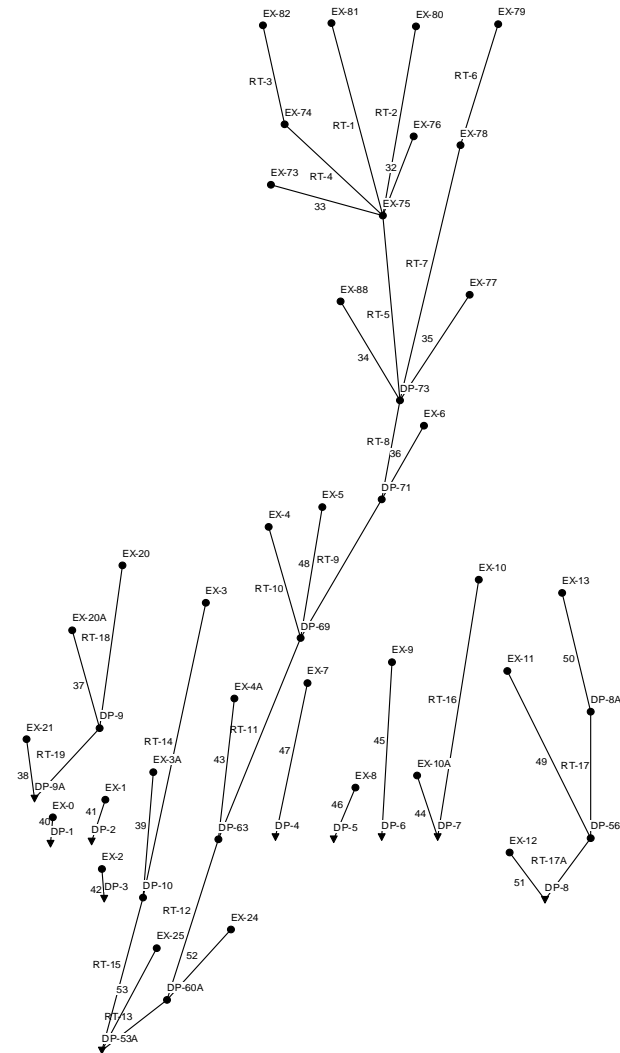
MAP NUMBER
08041C0535G

MAP REVISED
DECEMBER 7, 2018

Federal Emergency Management Agency

APPENDIX B

**EXISTING CONDITIONS HYDROLOGIC
CALCULATIONS**



Not checked in detail
from here down.

Sterling Ranch MDDP
Sand Creek and East Fork Sand Creek - Existing Condition Composite CN & Impervious % Table
6/21/2018

Basin	Basin	Basin	Basin	Sub-Area 1		HSG	UA CN	CN	Sub-Area 2		HSG	UA CN	CN	Sub-Area 3		HSG	UA CN	CN	Sub-Area 4		HSG	UA CN	CN	Sub-Area 5		HSG	UA CN	CN	Sub-Area 6		HSG	UA CN	CN	Sub-Area 7		HSG	UA CN	CN	Sub-Area 8		HSG	UA CN	CN	Sub-Area 9		HSG	UA CN	CN	Sub-Areas	% HSG	% HSG	Weighted	Weighted				
ID	Area	Area	Area	Area	Imp	Type	Value	Value	Area	Imp	Type	Value	Value	Area	Imp	Type	Value	Value	Area	Imp	Type	Value	Value	Area	Imp	Type	Value	Value	Area	Imp	Type	Value	Value	Area	Imp	Type	Value	Value	Area	Imp	Type	Value	Value	Area	Imp	Type	Value	Value	Total	A	B	Sub Areas Imp	Sub Area CN				
	(SF)	(AC)	(SQ. MI)	(AC)	(%)			(used)	(AC)	(%)			(used)	(AC)	(%)			(used)	(AC)	(%)			(used)	(AC)	(%)			(used)	(AC)	(%)			(used)	(AC)	(%)			(used)	(AC)	(%)			(used)	(Check)	%	%	%	No.									
EX-0	1034765	23.8	0.037	23.8	0	A	41	62																																				24	100	0	0	62									
EX-1	1120663	25.7	0.040	25.7	0	A	41	62																																					26	100	0	0	62								
EX-2	238567	5.5	0.009	5.5	0	A	41	62																																					5	100	0	0	62								
EX-3	5956997	136.8	0.214	91.4	0	B	62	62	45.3	10	B	63	63																																	137	0	100	3	62							
EX-3A	8193769	188.1	0.294	69.6	0	A	41	41	23.2	72	A	81	88	61.0	0	B	62	62	27.5	72	B	88	88	6.4	10	A	44	63																					188	53	47	20	61				
EX-4	8363354	192.0	0.300	119.4	0	B	62	62	17.3	5	B	62	62	55.4	10	B	63	63																														192	0	100	3	62					
EX-4A	6600380	151.5	0.237	5.8	0	A	41	41	95.0	0	B	62	62	43.9	0.5	B	62	62	6.8	27	A	56	71																										151	8	92	1	62				
EX-5	6703477	153.9	0.240	126.9	0	B	62	62	27.0	0.5	B	62	62																																			154	0	100	0	62					
EX-6	3928504	90.2	0.141	73.5	2	B	62	62	16.7	0.5	B	62	62																																			90	0	100	2	62					
EX-7	7187603	165.0	0.258	74.8	0	A	41	41	19.8	0	B	62	62	58.7	27	A	56	71	11.7	27	B	71	71																										165	81	12	12	56				
EX-8	1828489	42.0	0.066	36.7	0	A	41	41	5.2	27	A	56	71																																			42	88	12	3	45					
EX-9	5747518	131.9	0.206	72.5	0	A	41	41	47.9	27	A	56	71	11.5	0	B	62	62																															132	91	9	10	54				
EX-10	11793328	270.7	0.423	34.0	0	A	41	41	122.0	0	B	62	62	28.4	7	B	63	63	86.3	10	B	63	63																											271	13	87	4	60			
EX-10A	7809034	179.3	0.280	177.7	0	A	41	41	1.5	0	B	62	62																																				179	99	1	0	41				
EX-11	9119024	209.3	0.327	193.2	0	A	41	41	16.2	0	B	62	62																																				209	92	8	0	43				
EX-12	1719818	39.5	0.062	22.1	0	A	41	41	17.4	10	A	44	63																																				39	56	44	4	51				
EX-13	3888572	89.3	0.139	29.9	0	A	41	41	36.2	0	B	62	62	16.9	2	B	62	62	6.3	7	B	63	63																											89	34	66	1	55			
EX-20	6246166	143.4	0.224	32.4	0	A	41	63	75.8	0	B	62	62	35.1	10	B	63	63																																143	23	77	2	62			
EX-20A	7828526	179.7	0.281	48.2	10	A	44	63	82.4	12	A	46	65	6.7	0	B	62	62	42.3	10	B	63	63																											180	73	27	11	64			
EX-21	1448905	33.3	0.052	33.3	12	B	65	65																																										33	0	100	12	65			
EX-24	2750098	63.1	0.099	10.1	0	A	41	41	13.6	10	A	44	63	39.4	0.5	B	62	62																																63	38	62	2	59			
EX-25	2370050	54.4	0.085	42.6	0	A	41	41	6.2	0.5	A	41	41	5.4	0.5	B	62	62																																54	90	10	0	43			
EX-73	3921483	90.0	0.141	90.0	5	B	63	63																																										90	0	100	5	63			
EX-74	5213558	119.7	0.187	119.7	10	B	63	63																																										120	0	100	10	63			
EX-75	3452599	79.3	0.124	79.3	10	B	63	63																																										79	0	100	10	63			
EX-76	3761442	86.4	0.135	67.2	10	B	63	63	19.2	0	B	62	62																																					86	0	100	8	63			
EX-77	10046025	230.6	0.360	222.7	2	B	62	62	7.9	0.5	B	62	62																																					231	0	100	2	62			
EX-78	6778000	155.6	0.243	155.6	10	B	63	63																																												156	0	100	10	63	
EX-79	8231666	189.0	0.295	189.0	7	B	63	63																																												189	0	100	7	63	
EX-80	6434190	147.7	0.231	147.7	7	B	63	63																																												148	0	100	7	63	
EX-81	11449750	262.9	0.411	262.9	2	B	62	62																																													263	0	100	2	62
EX-82	5130284	117.8	0.184	117.8	2	B	62	62																																													118	0	100	2	62
EX-88	6062553	139.2	0.217	133.6	2	B	62	62	5.5	0.5	B	62	62																																							139	0	100	2	62	

Sterling Ranch Master Development Drainage Plan
Hydrologic Study - Existing Conditions - Reach Data
6/20/2018

Reach ID	Reach Length L1 (ft)	Reach Vert. Drop H1 (ft)	Reach Slope S1 %	Mannings N Value n	Reach Side Slope SS (H/V)	Bottom Width BW (ft)	Diameter D (ft)
RT-1	3975	100	2.5%	0.05	10	6	N/A
RT-2	4570	120	2.6%	0.05	10	6	N/A
RT-3	2360	65	2.8%	0.05	10	6	N/A
RT-4	2695	65	2.4%	0.05	10	6	N/A
RT-5	4100	92	2.2%	0.05	6	10	N/A
RT-6	3030	100	3.3%	0.05	10	6	N/A
RT-7	6145	122	2.0%	0.05	10	6	N/A
RT-8	2160	42	1.9%	0.05	6	15	N/A
RT-9	3565	66	1.9%	0.05	6	30	N/A
RT-10	3165	68	2.1%	0.05	6	6	N/A
RT-11	6400	96	1.5%	0.05	4	40	N/A
RT-12	4375	74	1.7%	0.05	6	40	N/A
RT-13	1480	22	1.5%	0.05	6	40	N/A
RT-14	6365	136	2.1%	0.05	4	6	N/A
RT-15	3130	74	2.4%	0.05	4	8	N/A
RT-16	5575	138	2.5%	0.05	10	6	N/A
RT-17A	2675	72	2.7%	0.05	6	6	N/A
RT-17B	1300	32	2.5%	0.05	6	6	N/A
RT-18	3400	74	2.2%	0.05	10	6	N/A
RT-19	1670	22	1.3%	0.05	6	6	N/A

Sterling Ranch Master Development Drainage Plan
Sand Creek & East Sand Creek Basins - Existing Condition - Lag Time Calculations
6/21/2018

Basin	OVERLAND FLOW					SHALLOW GUTTER FLOW				SHALLOW CHANNEL FLOW				STORM SEWER FLOW				CHANNELIZED FLOW				Tc	TLag
ID	P2	n	Length	Slope	Tt	Length	Slope	Vel	Tt	Length	Slope	Vel	Tt	Length	Slope	Vel	Tt	Length	Slope	Vel	Tt	Total	0.6*Tc
	(in)		(ft)	(%)	(min)	(ft)	(%)	(fps)	(min)	(ft)	(%)	(fps)	(min)	(ft)	(%)	(fps)	(min)	(ft)	(%)	(fps)	(min)	(min)	(min)
EX-0	2.1	0.15	160	2.5	16.1	0	0	0	0	1200	20	2.0	10.0	0	0	0	0.0	0	0.0	0.0	0.0	26.1	15.7
EX-1	2.1	0.15	200	2.0	21.1	0	0	0	0	1450	32	2.3	10.5	0	0	0	0.0	0	0.0	0.0	0.0	31.6	18.9
EX-2	2.1	0.15	200	1.5	23.6	0	0	0	0	1050	27	2.5	7.0	0	0	0	0.0	0	0.0	0.0	0.0	30.6	18.4
EX-3	2.1	0.15	300	5.3	19.7	0	0	0	0.0	1100	40	2.9	6.3	0	0	0	0.0	3540	2.7	4.1	14.4	40.4	24.2
EX-3A	2.1	0.15	200	3.0	17.9	0	0	0	0.0	1200	26	2.3	8.7	0	0	0	0.0	3360	2.1	4.5	12.4	39.0	23.4
EX-4	2.1	0.15	300	4.7	20.8	0	0	0	0.0	770	22	2.7	4.8	0	0	0	0.0	3900	3.0	4.0	16.3	41.8	25.1
EX-4A	2.1	0.15	200	3.0	17.9	0	0	0	0.0	250	8	2.8	1.5	0	0	0	0.0	5190	1.9	4.3	20.1	39.5	23.7
EX-5	2.1	0.15	200	4.0	16.0	0	0	0	0.0	1050	34	2.8	6.3	0	0	0	0.0	4425	2.3	3.8	19.4	41.6	25.0
EX-6	2.1	0.15	300	5.0	20.2	0	0	0	0.0	250	11	3.2	1.3	0	0	0	0.0	3490	2.3	3.8	15.3	36.8	22.1
EX-7	2.1	0.15	300	2.0	29.1	0	0	0	0.0	1650	42	2.4	11.5	0	0	0	0.0	3950	2.1	4.2	15.7	56.3	33.8
EX-8	2.1	0.15	200	2.0	21.1	0	0	0	0.0	1600	35	2.3	11.6	0	0	0	0.0	0	0.0	0.0	0.0	32.7	19.6
EX-9	2.1	0.15	200	2.0	21.1	0	0	0	0.0	800	26	2.8	4.8	0	0	0	0.0	3775	2.1	4.0	15.7	41.5	24.9
EX-10	2.1	0.15	300	5.3	19.7	0	0	0	0.0	880	32	2.9	5.1	0	0	0	0.0	6133	2.2	4.6	22.2	47.0	28.2
EX-10A	2.1	0.15	200	2.0	21.1	0	0	0	0.0	1440	35	2.4	10.0	0	0	0	0.0	5500	2.0	3.5	26.2	57.2	34.3
EX-11	2.1	0.15	200	4.0	16.0	0	0	0	0.0	1620	44	2.6	10.4	0	0	0	0.0	3000	2.7	4.0	12.5	38.8	23.3
EX-12	2.1	0.15	200	3.0	17.9	0	0	0	0.0	250	8	2.8	1.5	0	0	0	0.0	820	2.7	2.6	5.3	24.7	14.8
EX-13	2.1	0.15	200	9.0	11.5	0	0	0	0.0	250	12	3.4	1.2	0	0	0	0.0	4325	2.9	3.7	19.5	32.2	19.3
EX-20	2.1	0.15	300	3.8	22.5	0	0	0	0.0	730	40	3.5	3.5	0	0	0	0.0	2200	3.6	4.3	8.5	34.5	20.7
EX-20A	2.1	0.15	300	4.0	22.1	0	0	0	0.0	650	20	2.7	4.0	0	0	0	0.0	4450	1.8	4.2	17.7	43.7	26.2
EX-21	2.1	0.15	200	4.5	15.2	0	0	0	0.0	1175	42	2.9	6.8	0	0	0	0.0	915	1.7	2.5	6.1	28.1	16.8
EX-24	2.1	0.15	200	4.4	15.3	0	0	0	0.0	0	0	0.0	0.0	0	0	0	0.0	2400	2.3	3.1	12.9	28.2	16.9
EX-25	2.1	0.15	150	4.0	12.7	0	0	0	0.0	0	0	0.0	0.0	0	0	0	0.0	2700	1.6	3.1	14.5	27.2	16.3
EX-73	2.1	0.15	300	3.3	23.7	0	0	0	0.0	1650	3.3	2.9	9.5	0	0	0	0.0	1230	3.3	4.2	4.9	38.1	22.9
EX-74	2.1	0.15	300	4.7	20.8	0	0	0	0.0	2000	3.5	2.8	11.9	0	0	0	0.0	770	2.6	3.9	3.3	35.9	21.6
EX-75	2.1	0.15	300	3.3	23.7	0	0	0	0.0	1200	4.1	2.7	7.4	0	0	0	0.0	2300	2.8	3.1	12.4	43.5	26.1
EX-76	2.1	0.15	300	3.3	23.7	0	0	0	0.0	1160	3.4	3.1	6.2	0	0	0	0.0	3025	2.6	3.6	14.0	44.0	26.4
EX-77	2.1	0.15	300	4.7	20.8	0	0	0	0.0	1600	4.0	3.4	7.8	0	0	0	0.0	4850	2.1	5.1	15.8	44.4	26.7
EX-78	2.1	0.15	300	3.3	23.7	0	0	0	0.0	1560	4.1	3.3	7.9	0	0	0	0.0	1850	3.2	4.5	6.9	38.5	23.1
EX-79	2.1	0.15	300	4.0	22.1	0	0	0	0.0	1740	5.6	3.5	8.3	0	0	0	0.0	1100	1.8	3.0	6.1	36.5	21.9
EX-80	2.1	0.15	300	5.0	20.2	0	0	0	0.0	1625	4.9	3.4	8.0	0	0	0	0.0	2140	2.8	4.1	8.7	36.9	22.1
EX-81	2.1	0.15	300	6.7	18.0	0	0	0	0.0	2000	5.0	3.4	9.8	0	0	0	0.0	3600	3.1	4.9	12.2	40.0	24.0
EX-82	2.1	0.15	300	3.3	23.7	0	0	0	0.0	2000	4.7	3.3	10.1	0	0	0	0.0	625	3.2	4.1	2.5	36.4	21.8
EX-88	2.1	0.15	300	4.7	20.8	0	0	0	0.0	1750	4.1	3.4	8.6	0	0	0	0.0	2760	3.1	4.0	11.5	40.8	24.5

DCM TABLE 6-25 WAS USED FOR SHALLOW CONCENTRATED SWALE & GUTTER FLOW
N VALUE FOR OVERLAND FLOW WAS ASSUMED TO BE 0.15 FOR ALL BASINS
A ROUGHNESS COEFFICIENT OF 0.050 WAS USED FOR EARTHEN CHANNEL BOTTOMS
A ROUGHNESS COEFFICIENT OF 0.013 WAS USED FOR CONCRETE LINED CONVEYANCES

Basin Summary						
Basin	Peak Flow Rate					
	Q2 (cfs)	Q5 (cfs)	Q10 (cfs)	Q25 (cfs)	Q50 (cfs)	Q100 (cfs)
EX-0	0.0	4.9	11.8	17.6	26.0	31.5
EX-1	0.0	4.4	10.9	15.9	23.2	27.9
EX-2	0.0	0.7	1.7	2.5	3.7	4.5
EX-3	16.6	48.4	74.7	95.7	128.0	149.6
EX-3A	31.4	77.8	116.1	146.4	192.5	223.4
EX-4	24.5	71.7	110.6	141.7	189.4	221.2
EX-4A	10.1	32.1	50.4	65.5	89.0	104.8
EX-5	14.2	46.4	73.1	94.8	128.2	150.4
EX-6	10.1	30.5	47.3	60.8	81.5	95.3
EX-7	13.0	35.9	65.5	89.1	124.0	147.0
EX-8	1.2	9.4	20.8	29.8	42.6	50.9
EX-9	7.8	24.4	46.1	63.6	89.4	106.6
EX-10	28.2	79.8	122.7	157.6	211.7	247.9
EX-10A	0.0	18.2	45.7	67.6	100.1	121.6
EX-11	0.0	33.2	82.2	121.2	177.2	213.9
EX-12	2.0	17.0	29.4	39.3	53.7	63.4
EX-13	0.6	17.3	31.4	42.7	59.3	70.5
EX-20	22.9	69.9	108.7	138.8	184.5	215.0
EX-20A	13.9	40.9	75.9	103.9	144.8	171.9
EX-21	6.7	15.3	22.2	27.8	36.3	41.9
EX-24	1.0	15.4	27.3	36.7	50.9	60.4
EX-25	0.0	5.8	14.4	21.3	31.4	38.2
EX-73	12.6	34.1	51.7	65.8	87.5	102.0
EX-74	40.0	113.2	175.1	224.9	301.2	197.9
EX-75	104.1	300.6	468.8	607.4	824.6	85.8
EX-76	11.8	29.5	44.1	55.9	74.1	86.2
EX-77	19.7	59.7	92.7	120.0	162.2	190.5
EX-78	62.6	164.3	250.5	320.0	426.4	245.4
EX-79	40.3	104.1	156.4	197.0	258.6	299.7
EX-80	24.5	62.6	93.6	118.3	156.3	181.7
EX-81	28.0	84.9	131.6	169.3	228.0	267.2
EX-82	20.5	62.0	95.7	121.5	160.7	186.8
EX-88	16.6	50.3	77.9	100.0	134.0	156.6

Basin Summary

Basin	Total Runoff Volume					
	V2 (ac-ft)	V5 (ac-ft)	V10 (ac-ft)	V25 (ac-ft)	V50 (ac-ft)	V100 (ac-ft)
EX-0	0.00	0.25	0.62	0.92	1.37	1.7
EX-1	0.00	0.27	0.67	1.00	1.48	1.8
EX-2	0.00	0.06	0.15	0.22	0.33	0.4
EX-3	1.38	3.99	6.20	8.04	10.99	13.0
EX-3A	3.87	7.89	11.29	14.02	18.20	21.1
EX-4	1.93	5.62	8.68	11.29	15.41	18.2
EX-4A	1.33	4.20	6.63	8.65	11.88	14.1
EX-5	1.26	4.17	6.60	8.65	11.91	14.1
EX-6	0.85	2.57	4.02	5.22	7.15	8.4
EX-7	1.59	3.74	6.48	8.68	12.03	14.2
EX-8	0.08	0.54	1.21	1.75	2.56	3.1
EX-9	0.99	2.65	4.82	6.54	9.18	10.9
EX-10	2.92	8.10	12.49	16.17	22.00	25.9
EX-10A	0.00	1.88	4.73	7.00	10.40	12.7
EX-11	0.00	2.20	5.49	8.16	12.12	14.8
EX-12	0.11	0.86	1.50	2.00	2.77	3.3
EX-13	0.06	1.73	3.16	4.27	5.98	7.1
EX-20	1.35	4.08	6.38	8.32	11.35	13.4
EX-20A	1.54	3.84	6.81	9.21	12.80	15.2
EX-21	0.59	1.26	1.83	2.30	3.06	3.6
EX-24	0.08	1.28	2.29	3.10	4.30	5.1
EX-25	0.00	0.57	1.43	2.12	3.16	3.8
EX-73	1.04	2.78	4.24	5.46	7.43	8.7
EX-74	3.04	7.67	11.57	14.85	20.04	23.5
EX-75	11.11	28.88	43.58	56.16	75.80	89.3
EX-76	1.21	2.90	4.33	5.52	7.43	8.7
EX-77	2.16	6.57	10.22	13.35	18.26	21.5
EX-78	4.91	11.72	17.43	22.28	29.89	35.0
EX-79	2.48	6.17	9.24	11.85	15.99	18.8
EX-80	1.94	4.82	7.24	9.27	12.52	14.7
EX-81	2.47	7.49	11.69	15.22	20.87	24.6
EX-82	1.10	3.35	5.25	6.81	9.33	11.0
EX-88	1.30	3.96	6.17	8.04	11.02	13.0

Existing Conditions

Design Point Peak Flow Rate Summary																		
Design Point	MDDP						MDDP Amendment						% Difference					
	Q2 (cfs)	Q5 (cfs)	Q10 (cfs)	Q25 (cfs)	Q50 (cfs)	Q100 (cfs)	Q2 (cfs)	Q5 (cfs)	Q10 (cfs)	Q25 (cfs)	Q50 (cfs)	Q100 (cfs)	Q2	Q5	Q10	Q25	Q50	Q100
DP-73	225.9	380.7	618	957	1260.4	1582.3	171.2	503.09	791.79	1033.04	1414.41	1672.0	-32%	24%	22%	7%	11%	5%
DP-71	229.3	388.9	629.7	978.8	1277.3	1637.9	175	518.37	818.24	1068.91	1466.2	1734.9	-31%	25%	23%	8%	13%	6%
DP-69	253	434.8	707.7	1100	1453.3	1870.4	189.69	579.88	923.83	1213.68	1675.53	1988.4	-33%	25%	23%	9%	13%	6%
DP-63	251.4	430.7	713.1	1113.2	1496.2	1911.5	175.18	557.4	899.71	1192.36	1661.58	1980.7	-44%	23%	21%	7%	10%	3%
DP-10	36.5	56	106.4	162.9	220.6	287.2	32.32	93.36	146.19	189.33	255.2	300.1	-13%	40%	27%	14%	14%	4%
DP-9A	55.3	94.3	150.3	227.7	299.5	380.5	31.89	101.87	173.68	232.21	321.39	381.1	-73%	7%	13%	2%	7%	0%
DP-9	52.8	88.8	142.1	214.2	281	351.4	28.73	93.68	160.49	215.19	297.14	351.7	-84%	5%	11%	0%	5%	0%
DP-8A	7.7	15.2	27.1	44.2	60.5	78.4	0.56	17.3	31.43	42.65	59.34	70.5	-1275%	12%	14%	-4%	-2%	-11%
DP-8	24.2	45.1	77.8	124.4	169.5	220.9	1.97	50.28	115.07	167.23	245.12	297.4	-1128%	10%	32%	26%	31%	26%
DP-7	32.4	57.1	97.3	156.1	213.8	277.9	22.38	82.23	143.62	194.75	273.43	326.3	-45%	31%	32%	20%	22%	15%
DP-6	12.2	23.9	43.1	70.9	97	125.2	7.82	24.38	46.12	63.58	89.43	106.6	-56%	2%	7%	-12%	-8%	-17%
DP-5	0.5	1.7	4.5	9.4	14.5	20.5	1.18	9.36	20.8	29.82	42.58	50.9	58%	82%	78%	68%	66%	60%
DP-4	11.6	21.5	37.5	60.9	83.1	107.4	12.95	35.87	65.46	89.09	123.98	147.0	10%	40%	43%	32%	33%	27%
DP-3	1.1	1.8	2.8	4.3	5.6	7.1	0.0	0.69	1.71	2.52	3.71	4.5	-10900%	-161%	-64%	-71%	-51%	-57%
DP-2	4.8	7.9	12.4	18.7	24.5	30.9	0.0	4.41	10.85	15.93	23.17	27.9	-47900%	-79%	-14%	-17%	-6%	-11%
DP-1	5	8.2	13	19.6	25.7	32.2	0.0	4.88	11.82	17.63	25.97	31.5	-49900%	-68%	-10%	-11%	1%	-2%
DP-60A	247.7	430.2	707.1	1113	1496.6	1913.5	167.91	546.35	886.79	1179	1649.04	1969.2	-48%	21%	20%	6%	9%	3%
DP-56	23.2	42.5	71.9	115.6	157.4	202.9	0.35	40.19	96.37	141.51	207.98	242.9	-6529%	-6%	25%	18%	24%	16%
DP-53A	262.1	454	763.2	1196.5	1609.8	2061.5	182.68	602.01	983.58	1311.23	1837.86	2197.7	-43%	25%	22%	9%	12%	6%

Design Point Total Runoff Volume Summary																		
Design Point	MDDP						MDDP Amendment						% Difference					
	V2 (ac-ft)	V5 (ac-ft)	V10 (ac-ft)	V25 (ac-ft)	V50 (ac-ft)	V100 (ac-ft)	V2 (ac-ft)	V5 (ac-ft)	V10 (ac-ft)	V25 (ac-ft)	V50 (ac-ft)	V100 (ac-ft)	V2	V5	V10	V25	V50	V100
DP-73	40.4	61.5	92.1	134.3	173.1	214.9	19.9	51.9	78.6	101.0	136.3	159.9	-103%	-19%	-17%	-33%	-27%	-34%
DP-71	42.5	64.9	97.1	141.6	182.5	226.6	20.7	54.6	82.6	106.2	143.6	168.5	-105%	-19%	-18%	-33%	-27%	-34%
DP-69	50.7	77.4	116.1	169.4	218.6	271.4	24.0	64.4	98.2	126.4	171.2	201.0	-111%	-20%	-18%	-34%	-28%	-35%
DP-63	54.1	82.5	123.8	180.8	233.3	289.9	25.9	69.7	105.9	136.3	184.4	216.4	-109%	-18%	-17%	-33%	-26%	-34%
DP-10	7.6	11.7	17.6	25.8	33.4	41.6	5.4	12.2	17.9	22.5	29.6	34.4	-41%	4%	1%	-15%	-13%	-21%
DP-9A	9.3	14.1	21.1	30.7	39.4	48.8	3.6	9.4	15.2	20.0	27.5	32.5	-159%	-50%	-39%	-53%	-43%	-50%
DP-9	8.4	12.7	19	27.6	35.5	44	3.0	8.1	13.4	17.7	24.4	28.9	-181%	-56%	-42%	-56%	-45%	-52%
DP-8A	1.3	2.1	3.4	5.2	7	8.9	0.1	1.7	3.2	4.3	6.0	7.1	-2153%	-21%	-8%	-22%	-17%	-25%
DP-8	4.4	7	11.1	16.8	22.3	28.4	0.2	4.9	10.3	14.5	21.0	25.3	-2483%	-43%	-8%	-15%	-6%	-12%
DP-7	6.1	10	15.9	24.3	32.4	41.3	3.1	10.3	17.6	23.6	32.8	39.0	-99%	3%	10%	-3%	1%	-6%
DP-6	2.4	4	6.3	9.6	12.7	16	1.0	2.7	4.8	6.5	9.2	10.9	-142%	-51%	-31%	-47%	-38%	-46%
DP-5	0.2	0.4	0.8	1.4	1.9	2.6	0.1	0.5	1.2	1.7	2.6	3.1	-160%	26%	34%	20%	26%	16%
DP-4	2.6	4.2	6.7	10.2	13.5	17.2	1.6	3.7	6.5	8.7	12.0	14.2	-64%	-12%	-3%	-17%	-12%	-21%
DP-3	0.1	0.2	0.3	0.5	0.6	0.8	0.0	0.1	0.2	0.2	0.3	0.4	-9900%	-231%	-98%	-123%	-79%	-97%
DP-2	0.6	0.9	1.4	2.1	2.7	3.4	0.0	0.3	0.7	1.0	1.5	1.8	-59900%	-236%	-108%	-111%	-82%	-88%
DP-1	0.6	0.9	1.3	1.9	2.5	3.1	0.0	0.2	0.6	0.9	1.4	1.7	-59900%	-263%	-110%	-106%	-83%	-86%
DP-60A	55.3	84.4	126.4	184.8	238.5	296.6	26.1	71.2	108.6	139.6	189.0	221.9	-112%	-19%	-16%	-32%	-26%	-34%
DP-56	4	6.3	9.9	14.9	19.8	25.1	0.1	4.0	8.7	12.6	18.2	22.0	-6352%	-58%	-13%	-19%	-9%	-14%
DP-53A	63	96.4	144.7	211.8	273.9	340.9	31.6	84.1	128.0	164.5	221.9	260.5	-99%	-15%	-13%	-29%	-23%	-31%

[TITLE]

::Project Title/Notes

[OPTIONS]

::Option Value

FLOW_UNITS CFS

INFILTRATION HORTON

FLOW_ROUTING KINWAVE

LINK_OFFSETS DEPTH

MIN_SLOPE 0

ALLOW_PONDING NO

SKIP_STEADY_STATE NO

START_DATE 01/01/2005

START_TIME 00:00:00

REPORT_START_DATE 01/01/2005

REPORT_START_TIME 00:00:00

END_DATE 01/04/2005

END_TIME 06:00:00

SWEEP_START 01/01

SWEEP_END 12/31

DRY_DAYS 0

REPORT_STEP 00:05:00

WET_STEP 00:01:00

DRY_STEP 01:00:00

ROUTING_STEP 0:00:30

INERTIAL_DAMPING PARTIAL

NORMAL_FLOW_LIMITED BOTH

FORCE_MAIN_EQUATION H-W

VARIABLE_STEP 0.75

LENGTHENING_STEP 0

MIN_SURFAREA 12.557

MAX_TRIALS 8

HEAD_TOLERANCE 0.005

SYS_FLOW_TOL 5

LAT_FLOW_TOL 5

MINIMUM_STEP 0.5

THREADS 1

[FILES]

::Interfacing Files

USE INFLOWS "2518804 CUHP SWMM - EX Conditions 24hr Storm.txt"

[EVAPORATION]

::Data Source Parameters

::-----

CONSTANT 0.0

DRY_ONLY NO

[JUNCTIONS]

::Name Elevation MaxDepth InitDepth SurDepth Aponded

::-----

EX-3	210	0	0	0	0
EX-4	260	0	0	0	0
EX-10	138	0	0	0	0
EX-20	96	0	0	0	0
EX-79	522	0	0	0	0
EX-80	512	0	0	0	0
EX-81	492	0	0	0	0
EX-82	522	0	0	0	0
DP-10	74	0	0	0	0
DP-56	72	0	0	0	0
DP-60A	22	0	0	0	0
DP-63	96	0	0	0	0
DP-69	192	0	0	0	0
DP-71	258	0	0	0	0
DP-73	300	0	0	0	0
EX-74	457	0	0	0	0
EX-75	392	0	0	0	0
EX-78	422	0	0	0	0
DP-8A	104	0	0	0	0
DP-9	22	0	0	0	0
EX-76	392	0	0	0	0
EX-73	392	0	0	0	0
EX-88	300	0	0	0	0
EX-77	300	0	0	0	0
EX-6	258	0	0	0	0
EX-20A	22	0	0	0	0
EX-21	0	0	0	0	0
EX-3A	74	0	0	0	0
EX-0	0	0	0	0	0
EX-1	0	0	0	0	0
EX-2	0	0	0	0	0
EX-4A	96	0	0	0	0
EX-10A	0	0	0	0	0
EX-9	0	0	0	0	0
EX-8	0	0	0	0	0
EX-7	0	0	0	0	0
EX-5	192	0	0	0	0
EX-12	0	0	0	0	0
EX-11	72	0	0	0	0
EX-13	104	0	0	0	0
EX-24	22	0	0	0	0
EX-25	0	0	0	0	0

[OUTFALLS]

;;Name	Elevation	Type	Stage Data	Gated	Route To
DP-53A	0	FREE	NO		
DP-9A	0	FREE	NO		
DP-1	0	FREE	NO		
DP-2	0	FREE	NO		
DP-4	0	FREE	NO		
DP-5	0	FREE	NO		
DP-6	0	FREE	NO		

[CONDUITS]

$$\begin{array}{cc} \bullet & \bullet \\ // & // \end{array}$$

• •
// //

• •
// //

RT-4	TRAPEZOIDAL	20	6	10	10	1
RT-1	TRAPEZOIDAL	20	6	10	10	1
RT-3	TRAPEZOIDAL	20	6	10	10	1
RT-2	TRAPEZOIDAL	20	6	10	10	1
RT-6	TRAPEZOIDAL	20	6	10	10	1
RT-5	TRAPEZOIDAL	20	10	6	6	1
RT-7	TRAPEZOIDAL	20	6	10	10	1
RT-10	TRAPEZOIDAL	20	6	6	6	1
RT-9	TRAPEZOIDAL	20	30	6	6	1
RT-14	TRAPEZOIDAL	20	6	4	4	1
RT-13	TRAPEZOIDAL	20	40	6	6	1
RT-12	TRAPEZOIDAL	20	40	6	6	1
RT-18	TRAPEZOIDAL	20	6	10	10	1
RT-19	TRAPEZOIDAL	20	6	6	6	1
RT-11	TRAPEZOIDAL	20	40	4	4	1
RT-15	TRAPEZOIDAL	20	8	4	4	1
RT-8	TRAPEZOIDAL	20	15	6	6	1
RT-16	TRAPEZOIDAL	20	6	10	10	1
RT-17	TRAPEZOIDAL	20	6	6	6	1
RT-17A	TRAPEZOIDAL	20	6	6	6	1
32	DUMMY	0	0	0	0	1
33	DUMMY	0	0	0	0	1
34	DUMMY	0	0	0	0	1
35	DUMMY	0	0	0	0	1
36	DUMMY	0	0	0	0	1
37	DUMMY	0	0	0	0	1
38	DUMMY	0	0	0	0	1
39	DUMMY	0	0	0	0	1
40	DUMMY	0	0	0	0	1
41	DUMMY	0	0	0	0	1
42	DUMMY	0	0	0	0	1
43	DUMMY	0	0	0	0	1
44	DUMMY	0	0	0	0	1
45	DUMMY	0	0	0	0	1
46	DUMMY	0	0	0	0	1
47	DUMMY	0	0	0	0	1
48	DUMMY	0	0	0	0	1
49	DUMMY	0	0	0	0	1
50	DUMMY	0	0	0	0	1
51	DUMMY	0	0	0	0	1
52	DUMMY	0	0	0	0	1
53	DUMMY	0	0	0	0	1

[REPORT]

;;Reporting Options

INPUT NO

CONTROLS NO

SUBCATCHMENTS ALL

NODES ALL

LINKS ALL

[TAGS]

[MAP]

DIMENSIONS -2500.000 0.000 12500.000 10000.000

Units None

[COORDINATES]

::Node	X-Coord	Y-Coord
EX-3	2152.842	3756.835
EX-4	2571.814	4278.574
EX-10	3957.520	3914.976
EX-20	1604.854	4007.997
EX-79	4085.424	7724.977
EX-80	3542.799	7709.473
EX-81	2988.547	7728.853
EX-82	2531.192	7717.225
DP-10	1741.775	1729.169
DP-56	4701.691	2139.818
DP-60A	1895.925	1029.565
DP-63	2235.846	2136.283
DP-69	2781.300	3511.776
DP-71	3318.849	4464.344
DP-73	3437.426	5140.233
EX-74	2674.581	7037.464
EX-75	3322.017	6408.826
EX-78	3840.587	6895.172
DP-8A	4697.815	3008.018
DP-9	1457.570	2891.741
EX-76	3525.759	6956.775
EX-73	2765.778	6674.792
EX-88	3047.762	5818.523
EX-77	3900.591	5866.667
EX-6	3597.974	4972.571
EX-20A	1273.326	3569.530
EX-21	1084.191	2819.865
EX-3A	1806.345	2589.463
EX-0	1146.090	2286.847
EX-1	1493.411	2403.767
EX-2	1465.901	1931.593
EX-4A	2346.241	3097.356
EX-10A	3553.270	2571.215
EX-9	3388.206	3344.952
EX-8	3144.049	2488.683
EX-7	2824.238	3203.960
EX-5	2989.302	4355.967
EX-12	4302.934	1931.593
EX-11	4251.352	3327.758
EX-13	4509.264	3819.510
EX-24	1916.387	1518.934
EX-25	1710.057	1199.123
DP-53A	1469.048	685.692
DP-9A	1023.470	2411.130
DP-1	1128.119	2101.059
DP-2	1403.308	2116.563

DP-4	2616.461	2151.446
DP-5	3000.175	2135.942
DP-6	3317.998	2147.570
DP-7	3686.207	2151.446
DP-3	1480.825	1725.098
DP-8	4399.371	1721.222

[VERTICES]

::Link	X-Coord	Y-Coord
::-----	-----	-----

SAND CREEK 2021 MDDP AMENDMENT
EXISTING CONDITIONS
2-YR 100YR TYPE II STORM

WARNING 04: minimum elevation drop used for Conduit 32
WARNING 04: minimum elevation drop used for Conduit 33
WARNING 04: minimum elevation drop used for Conduit 34
WARNING 04: minimum elevation drop used for Conduit 35
WARNING 04: minimum elevation drop used for Conduit 36
WARNING 04: minimum elevation drop used for Conduit 37
WARNING 04: minimum elevation drop used for Conduit 38
WARNING 04: minimum elevation drop used for Conduit 39
WARNING 04: minimum elevation drop used for Conduit 40
WARNING 04: minimum elevation drop used for Conduit 41
WARNING 04: minimum elevation drop used for Conduit 42
WARNING 04: minimum elevation drop used for Conduit 43
WARNING 04: minimum elevation drop used for Conduit 44
WARNING 04: minimum elevation drop used for Conduit 45
WARNING 04: minimum elevation drop used for Conduit 46
WARNING 04: minimum elevation drop used for Conduit 47
WARNING 04: minimum elevation drop used for Conduit 48
WARNING 04: minimum elevation drop used for Conduit 49
WARNING 04: minimum elevation drop used for Conduit 50
WARNING 04: minimum elevation drop used for Conduit 51
WARNING 04: minimum elevation drop used for Conduit 52
WARNING 04: minimum elevation drop used for Conduit 53

NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.

Analysis Options

Flow Units CFS

Process Models:

Rainfall/Runoff NO

RDII NO

Snowmelt NO

Groundwater NO

Flow Routing YES

Ponding Allowed NO

Water Quality NO

Flow Routing Method KINWAVE

Starting Date 01/01/2005 00:00:00

Ending Date 01/04/2005 06:00:00

Antecedent Dry Days 0.0

Report Time Step 00:05:00

Routing Time Step 30.00 sec

```

*****
Flow Routing Continuity      Volume      Volume
                             acre-feet   10^6 gal
*****
Dry Weather Inflow .....    0.000    0.000
Wet Weather Inflow .....    0.000    0.000
Groundwater Inflow .....    0.000    0.000
RDII Inflow .....          0.000    0.000
External Inflow .....       39.199    12.774
External Outflow .....      41.031    13.371
Flooding Loss .....         0.000    0.000
Evaporation Loss .....      0.000    0.000
Exfiltration Loss .....     0.000    0.000
Initial Stored Volume ....    0.000    0.000
Final Stored Volume .....    0.000    0.000
Continuity Error (%) .....   -4.672

```

```

*****
Highest Flow Instability Indexes
*****
All links are stable.

```

```

*****
Routing Time Step Summary
*****
Minimum Time Step      : 30.00 sec
Average Time Step      : 30.00 sec
Maximum Time Step      : 30.00 sec
Percent in Steady State : 0.00
Average Iterations per Step : 1.00
Percent Not Converging  : 0.00

```

```

*****
Node Depth Summary
*****

```

Node	Type	Average Maximum Maximum Time of Max Reported				
		Depth	Depth	HGL	Occurrence	Max Depth
		Feet	Feet	Feet	days hr:min	Feet
EX-3	JUNCTION	0.02	0.68	210.68	0 12:25	0.68
EX-4	JUNCTION	0.02	0.79	260.79	0 12:25	0.78
EX-10	JUNCTION	0.02	0.74	138.74	0 12:30	0.74
EX-20	JUNCTION	0.01	0.69	96.69	0 12:25	0.69
EX-79	JUNCTION	0.02	0.82	522.82	0 12:20	0.81
EX-80	JUNCTION	0.02	0.68	512.68	0 12:25	0.68
EX-81	JUNCTION	0.02	0.73	492.73	0 12:30	0.73
EX-82	JUNCTION	0.01	0.62	522.62	0 12:20	0.61
DP-10	JUNCTION	0.04	0.84	74.84	0 12:38	0.84
DP-56	JUNCTION	0.00	0.09	72.09	0 13:10	0.09
DP-60A	JUNCTION	0.04	1.05	23.05	0 13:48	1.05
DP-63	JUNCTION	0.04	1.07	97.07	0 13:33	1.07
DP-69	JUNCTION	0.04	1.16	193.16	0 13:11	1.16
DP-71	JUNCTION	0.05	1.56	259.56	0 13:00	1.56

DP-73	JUNCTION	0.05	1.57	301.57	0 12:53	1.57
EX-74	JUNCTION	0.03	0.88	457.88	0 12:28	0.87
EX-75	JUNCTION	0.04	1.36	393.36	0 12:42	1.35
EX-78	JUNCTION	0.03	1.12	423.12	0 12:31	1.12
DP-8A	JUNCTION	0.01	0.12	104.12	0 12:25	0.12
DP-9	JUNCTION	0.04	0.96	22.96	0 12:36	0.96
EX-76	JUNCTION	0.00	0.00	392.00	0 00:00	0.00
EX-73	JUNCTION	0.00	0.00	392.00	0 00:00	0.00
EX-88	JUNCTION	0.00	0.00	300.00	0 00:00	0.00
EX-77	JUNCTION	0.00	0.00	300.00	0 00:00	0.00
EX-6	JUNCTION	0.00	0.00	258.00	0 00:00	0.00
EX-20A	JUNCTION	0.00	0.00	22.00	0 00:00	0.00
EX-21	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
EX-3A	JUNCTION	0.00	0.00	74.00	0 00:00	0.00
EX-0	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
EX-1	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
EX-2	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
EX-4A	JUNCTION	0.00	0.00	96.00	0 00:00	0.00
EX-10A	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
EX-9	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
EX-8	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
EX-7	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
EX-5	JUNCTION	0.00	0.00	192.00	0 00:00	0.00
EX-12	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
EX-11	JUNCTION	0.00	0.00	72.00	0 00:00	0.00
EX-13	JUNCTION	0.00	0.00	104.00	0 00:00	0.00
EX-24	JUNCTION	0.00	0.00	22.00	0 00:00	0.00
EX-25	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
DP-53A	OUTFALL	0.07	1.05	1.05	0 13:53	1.05
DP-9A	OUTFALL	0.03	0.95	0.95	0 12:47	0.94
DP-1	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
DP-2	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
DP-4	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
DP-5	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
DP-6	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
DP-7	OUTFALL	0.02	0.66	0.66	0 12:59	0.66
DP-3	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
DP-8	OUTFALL	0.00	0.06	0.06	0 13:51	0.06

Node Inflow Summary

Node	Type	Maximum		Lateral Inflow Volume 10^6 gal	Total Inflow Volume 10^6 gal	Flow Balance Error Percent			
		Lateral Inflow CFS	Maximum Total CFS						
			Time of Max Occurrence days hr:min						
EX-3	JUNCTION	16.58	16.58	0 12:25	0.449	0.449 0.000			
EX-4	JUNCTION	24.48	24.48	0 12:25	0.629	0.629 0.000			
EX-10	JUNCTION	28.19	28.19	0 12:30	0.95	0.95 0.000			
EX-20	JUNCTION	22.91	22.91	0 12:25	0.439	0.439 0.000			
EX-79	JUNCTION	40.26	40.26	0 12:20	0.807	0.807 0.000			
EX-80	JUNCTION	24.46	24.46	0 12:25	0.631	0.631 0.000			
EX-81	JUNCTION	28.03	28.03	0 12:30	0.805	0.805 0.000			

EX-82	JUNCTION	20.51	20.51	0 12:20	0.36	0.36	0.000
DP-10	JUNCTION	0.00	32.32	0 12:38	0	1.76	0.000
DP-56	JUNCTION	0.00	0.35	0 13:10	0	0.0202	0.000
DP-60A	JUNCTION	0.00	167.91	0 13:48	0	8.51	0.000
DP-63	JUNCTION	0.00	175.18	0 13:33	0	8.43	0.000
DP-69	JUNCTION	0.00	189.69	0 13:10	0	7.83	0.000
DP-71	JUNCTION	0.00	175.00	0 12:59	0	6.75	0.000
DP-73	JUNCTION	0.00	171.20	0 12:53	0	6.47	0.000
EX-74	JUNCTION	30.47	40.00	0 12:28	0.615	0.99	0.000
EX-75	JUNCTION	12.76	104.13	0 12:42	0.408	3.62	-0.000
EX-78	JUNCTION	37.10	62.60	0 12:31	0.801	1.6	0.000
DP-8A	JUNCTION	0.00	0.56	0 12:25	0	0.0188	0.000
DP-9	JUNCTION	0.00	28.73	0 12:36	0	0.975	0.000
EX-76	JUNCTION	11.84	11.84	0 12:25	0.393	0.393	0.000
EX-73	JUNCTION	12.58	12.58	0 12:25	0.338	0.338	0.000
EX-88	JUNCTION	16.59	16.59	0 12:25	0.425	0.425	0.000
EX-77	JUNCTION	19.74	19.74	0 12:35	0.705	0.705	0.000
EX-6	JUNCTION	10.10	10.10	0 12:25	0.276	0.276	0.000
EX-20A	JUNCTION	13.87	13.87	0 12:25	0.501	0.501	0.000
EX-21	JUNCTION	6.72	6.72	0 12:20	0.193	0.193	0.000
EX-3A	JUNCTION	31.40	31.40	0 12:20	1.26	1.26	0.000
EX-0	JUNCTION	0.00	0.00	0 00:00	0	0	0.000 gal
EX-1	JUNCTION	0.00	0.00	0 00:00	0	0	0.000 gal
EX-2	JUNCTION	0.00	0.00	0 00:00	0	0	0.000 gal
EX-4A	JUNCTION	10.14	10.14	0 12:35	0.433	0.433	0.000
EX-10A	JUNCTION	0.00	0.00	0 00:00	0	0	0.000 gal
EX-9	JUNCTION	7.82	7.82	0 12:25	0.323	0.323	0.000
EX-8	JUNCTION	1.18	1.18	0 12:20	0.0251	0.0251	0.000
EX-7	JUNCTION	12.95	12.95	0 12:25	0.518	0.518	0.000
EX-5	JUNCTION	14.15	14.15	0 12:30	0.409	0.409	0.000
EX-12	JUNCTION	1.97	1.97	0 12:15	0.0366	0.0366	0.000
EX-11	JUNCTION	0.00	0.00	0 00:00	0	0	0.000 gal
EX-13	JUNCTION	0.56	0.56	0 12:25	0.0188	0.0188	0.000
EX-24	JUNCTION	0.95	0.95	0 12:20	0.0276	0.0276	0.000
EX-25	JUNCTION	0.00	0.00	0 00:00	0	0	0.000 gal
DP-53A	OUTFALL	0.00	182.68	0 13:52	0	10.3	0.000
DP-9A	OUTFALL	0.00	31.89	0 12:46	0	1.17	0.000
DP-1	OUTFALL	0.00	0.00	0 00:00	0	0	0.000 gal
DP-2	OUTFALL	0.00	0.00	0 00:00	0	0	0.000 gal
DP-4	OUTFALL	0.00	12.95	0 12:25	0	0.518	0.000
DP-5	OUTFALL	0.00	1.18	0 12:20	0	0.0251	0.000
DP-6	OUTFALL	0.00	7.82	0 12:25	0	0.323	0.000
DP-7	OUTFALL	0.00	22.38	0 12:59	0	1	0.000
DP-3	OUTFALL	0.00	0.00	0 00:00	0	0	0.000 gal
DP-8	OUTFALL	0.00	1.97	0 12:15	0	0.0555	0.000

Node Flooding Summary

No nodes were flooded.

Outfall Loading Summary

Outfall Node	Flow Freq Pcnt	Avg Flow CFS	Max Flow CFS	Total Volume 10^6 gal
DP-53A	46.55	10.51	182.68	10.277
DP-9A	30.10	1.85	31.89	1.167
DP-1	0.00	0.00	0.00	0.000
DP-2	0.00	0.00	0.00	0.000
DP-4	31.22	0.79	12.95	0.518
DP-5	27.68	0.04	1.18	0.025
DP-6	31.32	0.49	7.82	0.323
DP-7	8.99	5.32	22.38	1.003
DP-3	0.00	0.00	0.00	0.000
DP-8	28.18	0.09	1.97	0.055
System	20.40	19.09	210.85	13.370

Link Flow Summary

Link	Type	Maximum Flow CFS	Time of Max Occurrence days hr:min	Maximum Veloc ft/sec	Max/ Full Flow	Max/ Full Depth
RT-4	CONDUIT	36.75	0 12:40	3.23	0.00	0.04
RT-1	CONDUIT	23.44	0 12:50	2.97	0.00	0.03
RT-3	CONDUIT	16.88	0 12:35	2.80	0.00	0.03
RT-2	CONDUIT	18.48	0 12:48	2.90	0.00	0.03
RT-6	CONDUIT	34.05	0 12:35	3.59	0.00	0.04
RT-5	CONDUIT	98.66	0 12:56	4.36	0.00	0.07
RT-7	CONDUIT	47.85	0 12:55	3.58	0.00	0.05
RT-10	CONDUIT	20.95	0 12:43	2.97	0.00	0.04
RT-9	CONDUIT	169.23	0 13:11	4.07	0.00	0.06
RT-14	CONDUIT	11.77	0 12:58	2.86	0.00	0.03
RT-13	CONDUIT	167.31	0 13:53	3.45	0.00	0.05
RT-12	CONDUIT	167.73	0 13:48	3.70	0.00	0.05
RT-18	CONDUIT	17.45	0 12:41	2.99	0.00	0.03
RT-19	CONDUIT	27.73	0 12:47	2.59	0.00	0.05
RT-11	CONDUIT	170.01	0 13:33	3.79	0.00	0.05
RT-15	CONDUIT	32.10	0 12:50	3.45	0.00	0.04
RT-8	CONDUIT	169.61	0 13:00	4.52	0.00	0.08
RT-16	CONDUIT	22.38	0 12:59	2.97	0.00	0.03
RT-17	CONDUIT	0.35	0 13:10	0.73	0.00	0.00
RT-17A	CONDUIT	0.35	0 13:51	1.06	0.00	0.00
32	DUMMY	11.84	0 12:25			
33	DUMMY	12.58	0 12:25			
34	DUMMY	16.59	0 12:25			
35	DUMMY	19.74	0 12:35			
36	DUMMY	10.10	0 12:25			
37	DUMMY	13.87	0 12:25			
38	DUMMY	6.72	0 12:20			
39	DUMMY	31.40	0 12:20			

40	DUMMY	0.00	0 00:00
41	DUMMY	0.00	0 00:00
42	DUMMY	0.00	0 00:00
43	DUMMY	10.14	0 12:35
44	DUMMY	0.00	0 00:00
45	DUMMY	7.82	0 12:25
46	DUMMY	1.18	0 12:20
47	DUMMY	12.95	0 12:25
48	DUMMY	14.15	0 12:30
49	DUMMY	0.00	0 00:00
50	DUMMY	0.56	0 12:25
51	DUMMY	1.97	0 12:15
52	DUMMY	0.95	0 12:20
53	DUMMY	0.00	0 00:00

Conduit Surcharge Summary

No conduits were surcharged.

Analysis begun on: Thu Sep 02 14:55:57 2021

Analysis ended on: Thu Sep 02 14:55:58 2021

Total elapsed time: 00:00:01

SAND CREEK 2021 MDDP AMENDMENT
EXISTING CONDITIONS
5-YR 100YR TYPE II STORM

WARNING 04: minimum elevation drop used for Conduit 32
WARNING 04: minimum elevation drop used for Conduit 33
WARNING 04: minimum elevation drop used for Conduit 34
WARNING 04: minimum elevation drop used for Conduit 35
WARNING 04: minimum elevation drop used for Conduit 36
WARNING 04: minimum elevation drop used for Conduit 37
WARNING 04: minimum elevation drop used for Conduit 38
WARNING 04: minimum elevation drop used for Conduit 39
WARNING 04: minimum elevation drop used for Conduit 40
WARNING 04: minimum elevation drop used for Conduit 41
WARNING 04: minimum elevation drop used for Conduit 42
WARNING 04: minimum elevation drop used for Conduit 43
WARNING 04: minimum elevation drop used for Conduit 44
WARNING 04: minimum elevation drop used for Conduit 45
WARNING 04: minimum elevation drop used for Conduit 46
WARNING 04: minimum elevation drop used for Conduit 47
WARNING 04: minimum elevation drop used for Conduit 48
WARNING 04: minimum elevation drop used for Conduit 49
WARNING 04: minimum elevation drop used for Conduit 50
WARNING 04: minimum elevation drop used for Conduit 51
WARNING 04: minimum elevation drop used for Conduit 52
WARNING 04: minimum elevation drop used for Conduit 53

← Please add a note
describing what
this means.

NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.

Analysis Options

Flow Units CFS

Process Models:

Rainfall/Runoff NO

RDII NO

Snowmelt NO

Groundwater NO

Flow Routing YES

Ponding Allowed NO

Water Quality NO

Flow Routing Method KINWAVE

Starting Date 01/01/2005 00:00:00

Ending Date 01/04/2005 06:00:00

Antecedent Dry Days 0.0

Report Time Step 00:05:00

Routing Time Step 30.00 sec


```

*****
Flow Routing Continuity      Volume      Volume
                             acre-feet   10^6 gal
*****
Dry Weather Inflow .....    0.000    0.000
Wet Weather Inflow .....    0.000    0.000
Groundwater Inflow .....    0.000    0.000
RDII Inflow .....          0.000    0.000
External Inflow .....      112.441    36.641
External Outflow .....     116.156    37.851
Flooding Loss .....         0.000    0.000
Evaporation Loss .....      0.000    0.000
Exfiltration Loss .....     0.000    0.000
Initial Stored Volume ....    0.000    0.000
Final Stored Volume .....    0.000    0.000
Continuity Error (%) .....   -3.303

```

```

*****
Highest Flow Instability Indexes
*****
All links are stable.

```

```

*****
Routing Time Step Summary
*****
Minimum Time Step      : 30.00 sec
Average Time Step      : 30.00 sec
Maximum Time Step      : 30.00 sec
Percent in Steady State : 0.00
Average Iterations per Step : 1.00
Percent Not Converging  : 0.00

```

```

*****
Node Depth Summary
*****

```

Node	Type	Average Maximum Maximum Time of Max Reported				
		Depth	Depth	HGL	Occurrence	Max Depth
		Feet	Feet	Feet	days hr:min	Feet
EX-3	JUNCTION	0.03	1.19	211.19	0 12:25	1.19
EX-4	JUNCTION	0.03	1.33	261.33	0 12:25	1.32
EX-10	JUNCTION	0.04	1.19	139.19	0 12:30	1.19
EX-20	JUNCTION	0.02	1.16	97.16	0 12:20	1.14
EX-79	JUNCTION	0.03	1.26	523.26	0 12:20	1.25
EX-80	JUNCTION	0.03	1.05	513.05	0 12:25	1.05
EX-81	JUNCTION	0.03	1.22	493.22	0 12:30	1.22
EX-82	JUNCTION	0.02	1.04	523.04	0 12:20	1.03
DP-10	JUNCTION	0.06	1.46	75.46	0 12:36	1.46
DP-56	JUNCTION	0.02	0.80	72.80	0 12:33	0.80
DP-60A	JUNCTION	0.07	2.06	24.06	0 13:25	2.06
DP-63	JUNCTION	0.07	2.09	98.09	0 13:14	2.09
DP-69	JUNCTION	0.06	2.18	194.18	0 12:58	2.18
DP-71	JUNCTION	0.08	2.67	260.67	0 12:51	2.67

DP-73	JUNCTION	0.08	2.68	302.68	0 12:47	2.68
EX-74	JUNCTION	0.04	1.40	458.40	0 12:27	1.39
EX-75	JUNCTION	0.06	2.26	394.26	0 12:38	2.26
EX-78	JUNCTION	0.05	1.72	423.72	0 12:28	1.71
DP-8A	JUNCTION	0.02	0.77	104.77	0 12:25	0.77
DP-9	JUNCTION	0.05	1.68	23.68	0 12:34	1.68
EX-76	JUNCTION	0.00	0.00	392.00	0 00:00	0.00
EX-73	JUNCTION	0.00	0.00	392.00	0 00:00	0.00
EX-88	JUNCTION	0.00	0.00	300.00	0 00:00	0.00
EX-77	JUNCTION	0.00	0.00	300.00	0 00:00	0.00
EX-6	JUNCTION	0.00	0.00	258.00	0 00:00	0.00
EX-20A	JUNCTION	0.00	0.00	22.00	0 00:00	0.00
EX-21	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
EX-3A	JUNCTION	0.00	0.00	74.00	0 00:00	0.00
EX-0	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
EX-1	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
EX-2	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
EX-4A	JUNCTION	0.00	0.00	96.00	0 00:00	0.00
EX-10A	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
EX-9	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
EX-8	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
EX-7	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
EX-5	JUNCTION	0.00	0.00	192.00	0 00:00	0.00
EX-12	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
EX-11	JUNCTION	0.00	0.00	72.00	0 00:00	0.00
EX-13	JUNCTION	0.00	0.00	104.00	0 00:00	0.00
EX-24	JUNCTION	0.00	0.00	22.00	0 00:00	0.00
EX-25	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
DP-53A	OUTFALL	0.10	2.05	2.05	0 13:28	2.05
DP-9A	OUTFALL	0.05	1.66	1.66	0 12:40	1.66
DP-1	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
DP-2	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
DP-4	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
DP-5	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
DP-6	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
DP-7	OUTFALL	0.03	1.11	1.11	0 12:52	1.11
DP-3	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
DP-8	OUTFALL	0.02	0.80	0.80	0 12:37	0.79

Node Inflow Summary

Node	Type	Maximum			Lateral Inflow Volume 10^6 gal	Total Inflow Volume 10^6 gal	Flow Balance Error Percent			
		CFS	CFS	Time of Max Occurrence days hr:min						
EX-3	JUNCTION	48.44	48.44	0 12:25	1.3	1.3	0.000			
EX-4	JUNCTION	71.69	71.69	0 12:25	1.83	1.83	0.000			
EX-10	JUNCTION	79.81	79.81	0 12:30	2.64	2.64	0.000			
EX-20	JUNCTION	69.92	69.92	0 12:20	1.33	1.33	0.000			
EX-79	JUNCTION	104.12	104.12	0 12:20	2.01	2.01	0.000			
EX-80	JUNCTION	62.55	62.55	0 12:25	1.57	1.57	0.000			
EX-81	JUNCTION	84.86	84.86	0 12:30	2.44	2.44	0.000			

EX-82	JUNCTION	62.03	62.03	0 12:20	1.09	1.09	0.000
DP-10	JUNCTION	0.00	93.36	0 12:36	0	3.98	0.000
DP-56	JUNCTION	0.00	40.19	0 12:33	0	1.3	0.000
DP-60A	JUNCTION	0.00	546.35	0 13:25	0	23.2	0.000
DP-63	JUNCTION	0.00	557.40	0 13:14	0	22.7	0.000
DP-69	JUNCTION	0.00	579.88	0 12:58	0	21	0.000
DP-71	JUNCTION	0.00	518.37	0 12:51	0	17.8	0.000
DP-73	JUNCTION	0.00	503.09	0 12:47	0	16.9	0.000
EX-74	JUNCTION	72.28	113.19	0 12:27	1.39	2.5	0.000
EX-75	JUNCTION	30.23	300.63	0 12:38	0.922	9.41	-0.000
EX-78	JUNCTION	88.40	164.33	0 12:28	1.81	3.82	0.000
DP-8A	JUNCTION	0.00	17.30	0 12:25	0	0.565	0.000
DP-9	JUNCTION	0.00	93.68	0 12:34	0	2.65	0.000
EX-76	JUNCTION	29.53	29.53	0 12:25	0.944	0.944	0.000
EX-73	JUNCTION	34.11	34.11	0 12:25	0.905	0.905	0.000
EX-88	JUNCTION	50.26	50.26	0 12:25	1.29	1.29	0.000
EX-77	JUNCTION	59.73	59.73	0 12:35	2.14	2.14	0.000
EX-6	JUNCTION	30.54	30.54	0 12:25	0.837	0.837	0.000
EX-20A	JUNCTION	40.88	40.88	0 12:25	1.25	1.25	0.000
EX-21	JUNCTION	15.25	15.25	0 12:20	0.411	0.411	0.000
EX-3A	JUNCTION	77.80	77.80	0 12:25	2.57	2.57	0.000
EX-0	JUNCTION	4.88	4.88	0 12:20	0.0807	0.0807	0.000
EX-1	JUNCTION	4.41	4.41	0 12:20	0.0874	0.0874	0.000
EX-2	JUNCTION	0.69	0.69	0 12:20	0.0197	0.0197	0.000
EX-4A	JUNCTION	32.14	32.14	0 12:35	1.37	1.37	0.000
EX-10A	JUNCTION	18.21	18.21	0 12:30	0.613	0.613	0.000
EX-9	JUNCTION	24.38	24.38	0 12:25	0.865	0.865	0.000
EX-8	JUNCTION	9.36	9.36	0 12:20	0.176	0.176	0.000
EX-7	JUNCTION	35.87	35.87	0 12:25	1.22	1.22	0.000
EX-5	JUNCTION	46.44	46.44	0 12:30	1.36	1.36	0.000
EX-12	JUNCTION	17.03	17.03	0 12:20	0.281	0.281	0.000
EX-11	JUNCTION	33.15	33.15	0 12:25	0.716	0.716	0.000
EX-13	JUNCTION	17.30	17.30	0 12:25	0.565	0.565	0.000
EX-24	JUNCTION	15.37	15.37	0 12:25	0.418	0.418	0.000
EX-25	JUNCTION	5.78	5.78	0 12:25	0.186	0.186	0.000
DP-53A	OUTFALL	0.00	602.01	0 13:27	0	27.4	0.000
DP-9A	OUTFALL	0.00	101.87	0 12:39	0	3.06	0.000
DP-1	OUTFALL	0.00	4.88	0 12:20	0	0.0807	0.000
DP-2	OUTFALL	0.00	4.41	0 12:20	0	0.0874	0.000
DP-4	OUTFALL	0.00	35.87	0 12:25	0	1.22	0.000
DP-5	OUTFALL	0.00	9.36	0 12:20	0	0.176	0.000
DP-6	OUTFALL	0.00	24.38	0 12:25	0	0.865	0.000
DP-7	OUTFALL	0.00	82.23	0 12:50	0	3.36	0.000
DP-3	OUTFALL	0.00	0.69	0 12:20	0	0.0197	0.000
DP-8	OUTFALL	0.00	50.28	0 12:33	0	1.59	0.000

Node Flooding Summary

No nodes were flooded.

Outfall Loading Summary

Outfall Node	Flow Freq Pcnt	Avg Flow CFS	Max Flow CFS	Total Volume 10^6 gal
DP-53A	48.54	26.87	602.01	27.393
DP-9A	30.77	4.73	101.87	3.057
DP-1	2.34	1.64	4.88	0.081
DP-2	2.77	1.50	4.41	0.087
DP-4	31.88	1.82	35.87	1.219
DP-5	28.56	0.29	9.36	0.176
DP-6	31.97	1.29	24.38	0.865
DP-7	10.35	15.46	82.23	3.362
DP-3	4.01	0.23	0.69	0.020
DP-8	28.94	2.61	50.28	1.588
System	22.01	56.46	744.77	37.848

Link Flow Summary

Link	Type	Maximum Flow CFS	Time of Max Occurrence days hr:min	Maximum Veloc ft/sec	Max/ Full Flow	Max/ Full Depth
RT-4	CONDUIT	105.39	0 12:36	4.20	0.00	0.07
RT-1	CONDUIT	75.57	0 12:45	4.03	0.00	0.06
RT-3	CONDUIT	54.00	0 12:30	3.76	0.00	0.05
RT-2	CONDUIT	50.88	0 12:41	3.71	0.00	0.05
RT-6	CONDUIT	91.46	0 12:31	4.61	0.00	0.06
RT-5	CONDUIT	287.83	0 12:48	5.78	0.01	0.11
RT-7	CONDUIT	130.49	0 12:48	4.44	0.00	0.08
RT-10	CONDUIT	64.67	0 12:39	3.99	0.00	0.06
RT-9	CONDUIT	505.82	0 12:59	5.71	0.01	0.11
RT-14	CONDUIT	37.24	0 12:49	3.88	0.00	0.05
RT-13	CONDUIT	545.00	0 13:28	5.09	0.01	0.10
RT-12	CONDUIT	541.38	0 13:25	5.41	0.01	0.10
RT-18	CONDUIT	57.33	0 12:35	4.00	0.00	0.05
RT-19	CONDUIT	91.21	0 12:40	3.53	0.00	0.08
RT-11	CONDUIT	536.57	0 13:14	5.54	0.01	0.10
RT-15	CONDUIT	91.96	0 12:46	4.68	0.00	0.07
RT-8	CONDUIT	499.30	0 12:51	6.08	0.01	0.13
RT-16	CONDUIT	67.70	0 12:52	3.87	0.00	0.05
RT-17	CONDUIT	15.11	0 12:48	2.18	0.00	0.04
RT-17A	CONDUIT	40.06	0 12:37	4.72	0.00	0.04
32	DUMMY	29.53	0 12:25			
33	DUMMY	34.11	0 12:25			
34	DUMMY	50.26	0 12:25			
35	DUMMY	59.73	0 12:35			
36	DUMMY	30.54	0 12:25			
37	DUMMY	40.88	0 12:25			
38	DUMMY	15.25	0 12:20			
39	DUMMY	77.80	0 12:25			

40	DUMMY	4.88	0	12:20
41	DUMMY	4.41	0	12:20
42	DUMMY	0.69	0	12:20
43	DUMMY	32.14	0	12:35
44	DUMMY	18.21	0	12:30
45	DUMMY	24.38	0	12:25
46	DUMMY	9.36	0	12:20
47	DUMMY	35.87	0	12:25
48	DUMMY	46.44	0	12:30
49	DUMMY	33.15	0	12:25
50	DUMMY	17.30	0	12:25
51	DUMMY	17.03	0	12:20
52	DUMMY	15.37	0	12:25
53	DUMMY	5.78	0	12:25

Conduit Surcharge Summary

No conduits were surcharged.

Analysis begun on: Thu Sep 02 14:55:27 2021

Analysis ended on: Thu Sep 02 14:55:27 2021

Total elapsed time: < 1 sec

SAND CREEK 2021 MDDP AMENDMENT
EXISTING CONDITIONS
10-YR 100YR TYPE II STORM

WARNING 04: minimum elevation drop used for Conduit 32
WARNING 04: minimum elevation drop used for Conduit 33
WARNING 04: minimum elevation drop used for Conduit 34
WARNING 04: minimum elevation drop used for Conduit 35
WARNING 04: minimum elevation drop used for Conduit 36
WARNING 04: minimum elevation drop used for Conduit 37
WARNING 04: minimum elevation drop used for Conduit 38
WARNING 04: minimum elevation drop used for Conduit 39
WARNING 04: minimum elevation drop used for Conduit 40
WARNING 04: minimum elevation drop used for Conduit 41
WARNING 04: minimum elevation drop used for Conduit 42
WARNING 04: minimum elevation drop used for Conduit 43
WARNING 04: minimum elevation drop used for Conduit 44
WARNING 04: minimum elevation drop used for Conduit 45
WARNING 04: minimum elevation drop used for Conduit 46
WARNING 04: minimum elevation drop used for Conduit 47
WARNING 04: minimum elevation drop used for Conduit 48
WARNING 04: minimum elevation drop used for Conduit 49
WARNING 04: minimum elevation drop used for Conduit 50
WARNING 04: minimum elevation drop used for Conduit 51
WARNING 04: minimum elevation drop used for Conduit 52
WARNING 04: minimum elevation drop used for Conduit 53

NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.

Analysis Options

Flow Units CFS

Process Models:

Rainfall/Runoff NO

RDII NO

Snowmelt NO

Groundwater NO

Flow Routing YES

Ponding Allowed NO

Water Quality NO

Flow Routing Method KINWAVE

Starting Date 01/01/2005 00:00:00

Ending Date 01/04/2005 06:00:00

Antecedent Dry Days 0.0

Report Time Step 00:05:00

Routing Time Step 30.00 sec

```

*****
Flow Routing Continuity      Volume      Volume
                             acre-feet   10^6 gal
*****
Dry Weather Inflow .....    0.000    0.000
Wet Weather Inflow .....    0.000    0.000
Groundwater Inflow .....    0.000    0.000
RDII Inflow .....          0.000    0.000
External Inflow .....      180.323    58.761
External Outflow .....     184.936    60.264
Flooding Loss .....         0.000    0.000
Evaporation Loss .....      0.000    0.000
Exfiltration Loss .....     0.000    0.000
Initial Stored Volume ....    0.000    0.000
Final Stored Volume .....    0.000    0.000
Continuity Error (%) .....   -2.558

```

```

*****
Highest Flow Instability Indexes
*****
All links are stable.

```

```

*****
Routing Time Step Summary
*****
Minimum Time Step      : 30.00 sec
Average Time Step      : 30.00 sec
Maximum Time Step      : 30.00 sec
Percent in Steady State : 0.00
Average Iterations per Step : 1.00
Percent Not Converging  : 0.00

```

```

*****
Node Depth Summary
*****

```

Node	Type	Average Maximum Maximum Time of Max Reported				
		Depth	Depth	HGL	Occurrence	Max Depth
		Feet	Feet	Feet	days hr:min	Feet
EX-3	JUNCTION	0.03	1.48	211.48	0 12:25	1.47
EX-4	JUNCTION	0.04	1.62	261.62	0 12:25	1.62
EX-10	JUNCTION	0.04	1.44	139.44	0 12:30	1.44
EX-20	JUNCTION	0.03	1.41	97.41	0 12:20	1.39
EX-79	JUNCTION	0.03	1.51	523.51	0 12:20	1.49
EX-80	JUNCTION	0.03	1.26	513.26	0 12:25	1.26
EX-81	JUNCTION	0.04	1.48	493.48	0 12:30	1.48
EX-82	JUNCTION	0.02	1.26	523.26	0 12:20	1.25
DP-10	JUNCTION	0.07	1.83	75.83	0 12:36	1.83
DP-56	JUNCTION	0.03	1.22	73.22	0 12:30	1.22
DP-60A	JUNCTION	0.09	2.68	24.68	0 13:17	2.68
DP-63	JUNCTION	0.08	2.73	98.73	0 13:07	2.73
DP-69	JUNCTION	0.08	2.84	194.84	0 12:54	2.84
DP-71	JUNCTION	0.10	3.32	261.32	0 12:48	3.32

DP-73	JUNCTION	0.09	3.33	303.33	0 12:44	3.33
EX-74	JUNCTION	0.04	1.69	458.69	0 12:25	1.69
EX-75	JUNCTION	0.08	2.78	394.78	0 12:36	2.77
EX-78	JUNCTION	0.05	2.05	424.05	0 12:27	2.04
DP-8A	JUNCTION	0.03	1.03	105.03	0 12:25	1.03
DP-9	JUNCTION	0.06	2.14	24.14	0 12:31	2.13
EX-76	JUNCTION	0.00	0.00	392.00	0 00:00	0.00
EX-73	JUNCTION	0.00	0.00	392.00	0 00:00	0.00
EX-88	JUNCTION	0.00	0.00	300.00	0 00:00	0.00
EX-77	JUNCTION	0.00	0.00	300.00	0 00:00	0.00
EX-6	JUNCTION	0.00	0.00	258.00	0 00:00	0.00
EX-20A	JUNCTION	0.00	0.00	22.00	0 00:00	0.00
EX-21	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
EX-3A	JUNCTION	0.00	0.00	74.00	0 00:00	0.00
EX-0	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
EX-1	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
EX-2	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
EX-4A	JUNCTION	0.00	0.00	96.00	0 00:00	0.00
EX-10A	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
EX-9	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
EX-8	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
EX-7	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
EX-5	JUNCTION	0.00	0.00	192.00	0 00:00	0.00
EX-12	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
EX-11	JUNCTION	0.00	0.00	72.00	0 00:00	0.00
EX-13	JUNCTION	0.00	0.00	104.00	0 00:00	0.00
EX-24	JUNCTION	0.00	0.00	22.00	0 00:00	0.00
EX-25	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
DP-53A	OUTFALL	0.12	2.68	2.68	0 13:20	2.68
DP-9A	OUTFALL	0.06	2.12	2.12	0 12:37	2.11
DP-1	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
DP-2	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
DP-4	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
DP-5	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
DP-6	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
DP-7	OUTFALL	0.04	1.36	1.36	0 12:50	1.36
DP-3	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
DP-8	OUTFALL	0.03	1.22	1.22	0 12:33	1.21

Node Inflow Summary

Node	Type	Maximum			Lateral Inflow Volume 10^6 gal	Total Inflow Volume 10^6 gal	Flow Balance Error Percent
		Lateral Inflow CFS	Total Inflow CFS	Time of Max Occurrence days hr:min			
EX-3	JUNCTION	74.70	74.70	0 12:25	2.02	2.02	0.000
EX-4	JUNCTION	110.61	110.61	0 12:25	2.83	2.83	0.000
EX-10	JUNCTION	122.69	122.69	0 12:30	4.07	4.07	0.000
EX-20	JUNCTION	108.71	108.71	0 12:20	2.08	2.08	0.000
EX-79	JUNCTION	156.40	156.40	0 12:20	3.01	3.01	0.000
EX-80	JUNCTION	93.62	93.62	0 12:25	2.36	2.36	0.000
EX-81	JUNCTION	131.58	131.58	0 12:30	3.81	3.81	0.000

EX-82	JUNCTION	95.70	95.70	0 12:20	1.71	1.71	-0.000
DP-10	JUNCTION	0.00	146.19	0 12:36	0	5.82	0.000
DP-56	JUNCTION	0.00	96.37	0 12:30	0	2.85	0.000
DP-60A	JUNCTION	0.00	886.79	0 13:17	0	35.4	0.000
DP-63	JUNCTION	0.00	899.71	0 13:07	0	34.5	0.000
DP-69	JUNCTION	0.00	923.83	0 12:54	0	32	0.000
DP-71	JUNCTION	0.00	818.24	0 12:48	0	26.9	0.000
DP-73	JUNCTION	0.00	791.79	0 12:44	0	25.6	0.000
EX-74	JUNCTION	106.02	175.09	0 12:25	2.04	3.77	0.000
EX-75	JUNCTION	44.57	468.77	0 12:36	1.35	14.2	0.000
EX-78	JUNCTION	130.23	250.53	0 12:27	2.65	5.68	0.000
DP-8A	JUNCTION	0.00	31.43	0 12:25	0	1.03	0.000
DP-9	JUNCTION	0.00	160.49	0 12:31	0	4.37	0.000
EX-76	JUNCTION	44.13	44.13	0 12:25	1.41	1.41	0.000
EX-73	JUNCTION	51.72	51.72	0 12:25	1.38	1.38	0.000
EX-88	JUNCTION	77.94	77.94	0 12:25	2.01	2.01	0.000
EX-77	JUNCTION	92.70	92.70	0 12:35	3.33	3.33	0.000
EX-6	JUNCTION	47.33	47.33	0 12:25	1.31	1.31	0.000
EX-20A	JUNCTION	75.91	75.91	0 12:25	2.22	2.22	0.000
EX-21	JUNCTION	22.24	22.24	0 12:20	0.595	0.595	0.000
EX-3A	JUNCTION	116.10	116.10	0 12:25	3.68	3.68	0.000
EX-0	JUNCTION	11.82	11.82	0 12:15	0.202	0.202	0.000
EX-1	JUNCTION	10.85	10.85	0 12:20	0.219	0.219	0.000
EX-2	JUNCTION	1.71	1.71	0 12:20	0.0493	0.0493	0.000
EX-4A	JUNCTION	50.39	50.39	0 12:35	2.16	2.16	0.000
EX-10A	JUNCTION	45.66	45.66	0 12:30	1.54	1.54	0.000
EX-9	JUNCTION	46.12	46.12	0 12:25	1.57	1.57	0.000
EX-8	JUNCTION	20.80	20.80	0 12:20	0.395	0.395	0.000
EX-7	JUNCTION	65.46	65.46	0 12:25	2.11	2.11	0.000
EX-5	JUNCTION	73.05	73.05	0 12:25	2.15	2.15	0.000
EX-12	JUNCTION	29.37	29.37	0 12:15	0.488	0.488	0.000
EX-11	JUNCTION	82.24	82.24	0 12:25	1.79	1.79	0.000
EX-13	JUNCTION	31.43	31.43	0 12:25	1.03	1.03	0.000
EX-24	JUNCTION	27.26	27.26	0 12:25	0.746	0.746	0.000
EX-25	JUNCTION	14.41	14.41	0 12:25	0.467	0.467	0.000
DP-53A	OUTFALL	0.00	983.58	0 13:19	0	41.7	0.000
DP-9A	OUTFALL	0.00	173.68	0 12:37	0	4.96	0.000
DP-1	OUTFALL	0.00	11.82	0 12:15	0	0.202	0.000
DP-2	OUTFALL	0.00	10.85	0 12:20	0	0.219	0.000
DP-4	OUTFALL	0.00	65.46	0 12:25	0	2.11	0.000
DP-5	OUTFALL	0.00	20.80	0 12:20	0	0.395	0.000
DP-6	OUTFALL	0.00	46.12	0 12:25	0	1.57	0.000
DP-7	OUTFALL	0.00	143.62	0 12:47	0	5.73	0.000
DP-3	OUTFALL	0.00	1.71	0 12:20	0	0.0493	0.000
DP-8	OUTFALL	0.00	115.07	0 12:31	0	3.34	0.000

Node Flooding Summary

No nodes were flooded.

Outfall Loading Summary

Outfall Node	Flow Freq	Avg Flow Pcnt	Max Flow CFS	Total Volume CFS	10^6 gal
DP-53A	49.33	40.23	983.58	41.681	
DP-9A	31.25	7.56	173.68	4.960	
DP-1	2.45	3.94	11.82	0.202	
DP-2	2.87	3.63	10.85	0.219	
DP-4	32.22	3.12	65.46	2.112	
DP-5	29.06	0.65	20.80	0.395	
DP-6	32.34	2.30	46.12	1.565	
DP-7	11.40	23.95	143.62	5.734	
DP-3	4.13	0.57	1.71	0.049	
DP-8	29.37	5.42	115.07	3.342	
System	22.44	91.36	1270.10	60.260	

Link Flow Summary

Link	Type	Maximum Flow CFS	Time of Max Occurrence days hr:min	Maximum Veloc ft/sec	Max/ Full Flow	Max/ Full Depth
RT-4	CONDUIT	164.54	0 12:34	4.68	0.00	0.08
RT-1	CONDUIT	119.66	0 12:43	4.46	0.00	0.07
RT-3	CONDUIT	85.36	0 12:29	4.19	0.00	0.06
RT-2	CONDUIT	78.68	0 12:40	4.12	0.00	0.06
RT-6	CONDUIT	140.15	0 12:30	5.11	0.00	0.07
RT-5	CONDUIT	451.23	0 12:45	6.48	0.01	0.14
RT-7	CONDUIT	203.01	0 12:45	4.86	0.00	0.09
RT-10	CONDUIT	101.36	0 12:37	4.47	0.00	0.08
RT-9	CONDUIT	801.27	0 12:55	6.53	0.01	0.13
RT-14	CONDUIT	59.61	0 12:45	4.37	0.00	0.07
RT-13	CONDUIT	884.79	0 13:20	5.91	0.02	0.13
RT-12	CONDUIT	876.50	0 13:17	6.27	0.01	0.13
RT-18	CONDUIT	91.02	0 12:34	4.41	0.00	0.06
RT-19	CONDUIT	157.38	0 12:37	4.05	0.00	0.11
RT-11	CONDUIT	864.66	0 13:07	6.44	0.02	0.14
RT-15	CONDUIT	144.19	0 12:43	5.30	0.00	0.09
RT-8	CONDUIT	786.90	0 12:48	6.85	0.01	0.17
RT-16	CONDUIT	106.83	0 12:50	4.31	0.00	0.07
RT-17	CONDUIT	28.18	0 12:45	2.58	0.00	0.05
RT-17A	CONDUIT	95.73	0 12:33	5.96	0.00	0.06
32	DUMMY	44.13	0 12:25			
33	DUMMY	51.72	0 12:25			
34	DUMMY	77.94	0 12:25			
35	DUMMY	92.70	0 12:35			
36	DUMMY	47.33	0 12:25			
37	DUMMY	75.91	0 12:25			
38	DUMMY	22.24	0 12:20			
39	DUMMY	116.10	0 12:25			

40	DUMMY	11.82	0	12:15
41	DUMMY	10.85	0	12:20
42	DUMMY	1.71	0	12:20
43	DUMMY	50.39	0	12:35
44	DUMMY	45.66	0	12:30
45	DUMMY	46.12	0	12:25
46	DUMMY	20.80	0	12:20
47	DUMMY	65.46	0	12:25
48	DUMMY	73.05	0	12:25
49	DUMMY	82.24	0	12:25
50	DUMMY	31.43	0	12:25
51	DUMMY	29.37	0	12:15
52	DUMMY	27.26	0	12:25
53	DUMMY	14.41	0	12:25

Conduit Surcharge Summary

No conduits were surcharged.

Analysis begun on: Thu Sep 02 14:54:53 2021

Analysis ended on: Thu Sep 02 14:54:53 2021

Total elapsed time: < 1 sec

SAND CREEK 2021 MDDP AMENDMENT
EXISTING CONDITIONS
25-YR 100YR TYPE II STORM

WARNING 04: minimum elevation drop used for Conduit 32
WARNING 04: minimum elevation drop used for Conduit 33
WARNING 04: minimum elevation drop used for Conduit 34
WARNING 04: minimum elevation drop used for Conduit 35
WARNING 04: minimum elevation drop used for Conduit 36
WARNING 04: minimum elevation drop used for Conduit 37
WARNING 04: minimum elevation drop used for Conduit 38
WARNING 04: minimum elevation drop used for Conduit 39
WARNING 04: minimum elevation drop used for Conduit 40
WARNING 04: minimum elevation drop used for Conduit 41
WARNING 04: minimum elevation drop used for Conduit 42
WARNING 04: minimum elevation drop used for Conduit 43
WARNING 04: minimum elevation drop used for Conduit 44
WARNING 04: minimum elevation drop used for Conduit 45
WARNING 04: minimum elevation drop used for Conduit 46
WARNING 04: minimum elevation drop used for Conduit 47
WARNING 04: minimum elevation drop used for Conduit 48
WARNING 04: minimum elevation drop used for Conduit 49
WARNING 04: minimum elevation drop used for Conduit 50
WARNING 04: minimum elevation drop used for Conduit 51
WARNING 04: minimum elevation drop used for Conduit 52
WARNING 04: minimum elevation drop used for Conduit 53

NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.

Analysis Options

Flow Units CFS

Process Models:

Rainfall/Runoff NO

RDII NO

Snowmelt NO

Groundwater NO

Flow Routing YES

Ponding Allowed NO

Water Quality NO

Flow Routing Method KINWAVE

Starting Date 01/01/2005 00:00:00

Ending Date 01/04/2005 06:00:00

Antecedent Dry Days 0.0

Report Time Step 00:05:00

Routing Time Step 30.00 sec

```

*****
Flow Routing Continuity      Volume      Volume
                             acre-feet   10^6 gal
*****
Dry Weather Inflow .....    0.000    0.000
Wet Weather Inflow .....    0.000    0.000
Groundwater Inflow .....    0.000    0.000
RDII Inflow .....          0.000    0.000
External Inflow .....      236.756    77.150
External Outflow .....     241.696    78.760
Flooding Loss .....        0.000    0.000
Evaporation Loss .....     0.000    0.000
Exfiltration Loss .....     0.000    0.000
Initial Stored Volume ....    0.000    0.000
Final Stored Volume .....    0.000    0.000
Continuity Error (%) .....   -2.086

```

```

*****
Highest Flow Instability Indexes
*****
All links are stable.

```

```

*****
Routing Time Step Summary
*****
Minimum Time Step      : 30.00 sec
Average Time Step      : 30.00 sec
Maximum Time Step      : 30.00 sec
Percent in Steady State : 0.00
Average Iterations per Step : 1.00
Percent Not Converging  : 0.00

```

```

*****
Node Depth Summary
*****

```

Node	Type	Average Maximum Maximum Time of Max Reported					Reported
		Depth	Depth	HGL	Occurrence	Max Depth	
		Feet	Feet	Feet	days hr:min	Feet	
EX-3	JUNCTION	0.04	1.67	211.67	0 12:25	1.66	
EX-4	JUNCTION	0.04	1.82	261.82	0 12:25	1.81	
EX-10	JUNCTION	0.05	1.61	139.61	0 12:30	1.60	
EX-20	JUNCTION	0.03	1.56	97.56	0 12:20	1.55	
EX-79	JUNCTION	0.04	1.66	523.66	0 12:20	1.65	
EX-80	JUNCTION	0.04	1.40	513.40	0 12:25	1.40	
EX-81	JUNCTION	0.04	1.65	493.65	0 12:30	1.65	
EX-82	JUNCTION	0.02	1.40	523.40	0 12:20	1.39	
DP-10	JUNCTION	0.08	2.08	76.08	0 12:34	2.08	
DP-56	JUNCTION	0.04	1.46	73.46	0 12:30	1.46	
DP-60A	JUNCTION	0.10	3.13	25.13	0 13:12	3.12	
DP-63	JUNCTION	0.10	3.20	99.20	0 13:04	3.20	
DP-69	JUNCTION	0.09	3.30	195.30	0 12:52	3.29	
DP-71	JUNCTION	0.11	3.76	261.76	0 12:46	3.75	

DP-73	JUNCTION	0.11	3.77	303.77	0 12:42	3.76
EX-74	JUNCTION	0.05	1.88	458.88	0 12:25	1.88
EX-75	JUNCTION	0.09	3.12	395.12	0 12:35	3.12
EX-78	JUNCTION	0.06	2.27	424.27	0 12:26	2.27
DP-8A	JUNCTION	0.03	1.19	105.19	0 12:25	1.19
DP-9	JUNCTION	0.07	2.44	24.44	0 12:30	2.43
EX-76	JUNCTION	0.00	0.00	392.00	0 00:00	0.00
EX-73	JUNCTION	0.00	0.00	392.00	0 00:00	0.00
EX-88	JUNCTION	0.00	0.00	300.00	0 00:00	0.00
EX-77	JUNCTION	0.00	0.00	300.00	0 00:00	0.00
EX-6	JUNCTION	0.00	0.00	258.00	0 00:00	0.00
EX-20A	JUNCTION	0.00	0.00	22.00	0 00:00	0.00
EX-21	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
EX-3A	JUNCTION	0.00	0.00	74.00	0 00:00	0.00
EX-0	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
EX-1	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
EX-2	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
EX-4A	JUNCTION	0.00	0.00	96.00	0 00:00	0.00
EX-10A	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
EX-9	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
EX-8	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
EX-7	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
EX-5	JUNCTION	0.00	0.00	192.00	0 00:00	0.00
EX-12	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
EX-11	JUNCTION	0.00	0.00	72.00	0 00:00	0.00
EX-13	JUNCTION	0.00	0.00	104.00	0 00:00	0.00
EX-24	JUNCTION	0.00	0.00	22.00	0 00:00	0.00
EX-25	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
DP-53A	OUTFALL	0.13	3.12	3.12	0 13:15	3.12
DP-9A	OUTFALL	0.07	2.42	2.42	0 12:36	2.41
DP-1	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
DP-2	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
DP-4	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
DP-5	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
DP-6	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
DP-7	OUTFALL	0.05	1.52	1.52	0 12:49	1.52
DP-3	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
DP-8	OUTFALL	0.03	1.46	1.46	0 12:32	1.45

Node Inflow Summary

Node	Type	Maximum		Lateral Inflow Volume 10^6 gal	Total Inflow Volume 10^6 gal	Flow Balance Error Percent	
		Lateral Inflow CFS	Total Inflow CFS				
							Time of Max Occurrence days hr:min
EX-3	JUNCTION	95.73	95.73	0 12:25	2.62	2.62	0.000
EX-4	JUNCTION	141.70	141.70	0 12:25	3.68	3.68	0.000
EX-10	JUNCTION	157.63	157.63	0 12:30	5.27	5.27	0.000
EX-20	JUNCTION	138.82	138.82	0 12:20	2.71	2.71	0.000
EX-79	JUNCTION	197.01	197.01	0 12:20	3.86	3.86	0.000
EX-80	JUNCTION	118.31	118.31	0 12:25	3.02	3.02	0.000
EX-81	JUNCTION	169.33	169.33	0 12:30	4.96	4.96	0.000

EX-82	JUNCTION	121.49	121.49	0	12:20	2.22	2.22	0.000
DP-10	JUNCTION	0.00	189.33	0	12:34	0	7.33	0.000
DP-56	JUNCTION	0.00	141.51	0	12:30	0	4.09	0.000
DP-60A	JUNCTION	0.00	1179.00	0	13:12	0	45.5	0.000
DP-63	JUNCTION	0.00	1192.36	0	13:04	0	44.4	0.000
DP-69	JUNCTION	0.00	1213.68	0	12:52	0	41.2	0.000
DP-71	JUNCTION	0.00	1068.91	0	12:46	0	34.6	0.000
DP-73	JUNCTION	0.00	1033.04	0	12:42	0	32.9	0.000
EX-74	JUNCTION	132.02	224.86	0	12:25	2.59	4.84	0.000
EX-75	JUNCTION	56.20	607.40	0	12:35	1.72	18.3	0.000
EX-78	JUNCTION	162.88	319.95	0	12:26	3.37	7.26	0.000
DP-8A	JUNCTION	0.00	42.65	0	12:25	0	1.39	0.000
DP-9	JUNCTION	0.00	215.19	0	12:30	0	5.78	0.000
EX-76	JUNCTION	55.94	55.94	0	12:25	1.8	1.8	0.000
EX-73	JUNCTION	65.79	65.79	0	12:25	1.78	1.78	0.000
EX-88	JUNCTION	100.02	100.02	0	12:25	2.62	2.62	0.000
EX-77	JUNCTION	119.97	119.97	0	12:30	4.35	4.35	0.000
EX-6	JUNCTION	60.79	60.79	0	12:25	1.7	1.7	0.000
EX-20A	JUNCTION	103.86	103.86	0	12:25	3	3	0.000
EX-21	JUNCTION	27.80	27.80	0	12:20	0.75	0.75	0.000
EX-3A	JUNCTION	146.37	146.37	0	12:20	4.57	4.57	0.000
EX-0	JUNCTION	17.63	17.63	0	12:15	0.3	0.3	0.000
EX-1	JUNCTION	15.93	15.93	0	12:20	0.325	0.325	0.000
EX-2	JUNCTION	2.52	2.52	0	12:20	0.073	0.073	0.000
EX-4A	JUNCTION	65.45	65.45	0	12:35	2.82	2.82	0.000
EX-10A	JUNCTION	67.61	67.61	0	12:30	2.28	2.28	0.000
EX-9	JUNCTION	63.58	63.58	0	12:25	2.13	2.13	0.000
EX-8	JUNCTION	29.82	29.82	0	12:20	0.57	0.57	0.000
EX-7	JUNCTION	89.09	89.09	0	12:25	2.83	2.83	0.000
EX-5	JUNCTION	94.83	94.83	0	12:25	2.82	2.82	0.000
EX-12	JUNCTION	39.30	39.30	0	12:15	0.653	0.653	0.000
EX-11	JUNCTION	121.23	121.23	0	12:25	2.66	2.66	0.000
EX-13	JUNCTION	42.65	42.65	0	12:25	1.39	1.39	0.000
EX-24	JUNCTION	36.67	36.67	0	12:20	1.01	1.01	0.000
EX-25	JUNCTION	21.29	21.29	0	12:25	0.691	0.691	0.000
DP-53A	OUTFALL	0.00	1311.23	0	13:14	0	53.6	0.000
DP-9A	OUTFALL	0.00	232.21	0	12:36	0	6.53	0.000
DP-1	OUTFALL	0.00	17.63	0	12:15	0	0.3	0.000
DP-2	OUTFALL	0.00	15.93	0	12:20	0	0.325	0.000
DP-4	OUTFALL	0.00	89.09	0	12:25	0	2.83	0.000
DP-5	OUTFALL	0.00	29.82	0	12:20	0	0.57	0.000
DP-6	OUTFALL	0.00	63.58	0	12:25	0	2.13	0.000
DP-7	OUTFALL	0.00	194.75	0	12:46	0	7.69	0.000
DP-3	OUTFALL	0.00	2.52	0	12:20	0	0.073	0.000
DP-8	OUTFALL	0.00	167.23	0	12:31	0	4.74	0.000

Node Flooding Summary

No nodes were flooded.

Outfall Loading Summary

Outfall Node	Flow Freq Pcnt	Avg Flow CFS	Max Flow CFS	Total Volume 10^6 gal
DP-53A	50.10	50.90	1311.23	53.562
DP-9A	31.54	9.85	232.21	6.526
DP-1	2.45	5.83	17.63	0.300
DP-2	2.87	5.38	15.93	0.325
DP-4	32.40	4.16	89.09	2.833
DP-5	29.36	0.92	29.82	0.570
DP-6	32.56	3.12	63.58	2.134
DP-7	12.38	29.56	194.75	7.688
DP-3	4.13	0.84	2.52	0.073
DP-8	29.63	7.62	167.23	4.744
System	22.74	118.20	1725.18	78.754

Link Flow Summary

Link	Type	Maximum Flow CFS	Time of Max Occurrence days hr:min	Maximum Veloc ft/sec	Max/ Full Flow	Max/ Full Depth
RT-4	CONDUIT	212.88	0 12:32	4.97	0.00	0.09
RT-1	CONDUIT	155.96	0 12:42	4.72	0.00	0.08
RT-3	CONDUIT	110.27	0 12:28	4.45	0.00	0.07
RT-2	CONDUIT	101.46	0 12:39	4.37	0.00	0.06
RT-6	CONDUIT	178.98	0 12:29	5.40	0.00	0.08
RT-5	CONDUIT	587.39	0 12:44	6.92	0.01	0.15
RT-7	CONDUIT	263.39	0 12:43	5.16	0.00	0.10
RT-10	CONDUIT	131.25	0 12:36	4.76	0.00	0.09
RT-9	CONDUIT	1049.57	0 12:53	7.05	0.02	0.16
RT-14	CONDUIT	78.22	0 12:45	4.68	0.00	0.07
RT-13	CONDUIT	1176.49	0 13:15	6.43	0.02	0.16
RT-12	CONDUIT	1164.03	0 13:12	6.82	0.02	0.15
RT-18	CONDUIT	118.47	0 12:33	4.31	0.00	0.07
RT-19	CONDUIT	211.25	0 12:36	4.36	0.01	0.12
RT-11	CONDUIT	1144.73	0 13:04	7.03	0.03	0.16
RT-15	CONDUIT	186.90	0 12:42	5.67	0.00	0.10
RT-8	CONDUIT	1027.18	0 12:46	7.35	0.02	0.19
RT-16	CONDUIT	139.19	0 12:49	4.60	0.00	0.08
RT-17	CONDUIT	38.62	0 12:43	2.79	0.00	0.06
RT-17A	CONDUIT	141.16	0 12:32	6.60	0.00	0.07
32	DUMMY	55.94	0 12:25			
33	DUMMY	65.79	0 12:25			
34	DUMMY	100.02	0 12:25			
35	DUMMY	119.97	0 12:30			
36	DUMMY	60.79	0 12:25			
37	DUMMY	103.86	0 12:25			
38	DUMMY	27.80	0 12:20			
39	DUMMY	146.37	0 12:20			

40	DUMMY	17.63	0	12:15
41	DUMMY	15.93	0	12:20
42	DUMMY	2.52	0	12:20
43	DUMMY	65.45	0	12:35
44	DUMMY	67.61	0	12:30
45	DUMMY	63.58	0	12:25
46	DUMMY	29.82	0	12:20
47	DUMMY	89.09	0	12:25
48	DUMMY	94.83	0	12:25
49	DUMMY	121.23	0	12:25
50	DUMMY	42.65	0	12:25
51	DUMMY	39.30	0	12:15
52	DUMMY	36.67	0	12:20
53	DUMMY	21.29	0	12:25

Conduit Surcharge Summary

No conduits were surcharged.

Analysis begun on: Thu Sep 02 14:53:56 2021

Analysis ended on: Thu Sep 02 14:53:56 2021

Total elapsed time: < 1 sec

SAND CREEK 2021 MDDP AMENDMENT
EXISTING CONDITIONS
50-YR 100YR TYPE II STORM

WARNING 04: minimum elevation drop used for Conduit 32
WARNING 04: minimum elevation drop used for Conduit 33
WARNING 04: minimum elevation drop used for Conduit 34
WARNING 04: minimum elevation drop used for Conduit 35
WARNING 04: minimum elevation drop used for Conduit 36
WARNING 04: minimum elevation drop used for Conduit 37
WARNING 04: minimum elevation drop used for Conduit 38
WARNING 04: minimum elevation drop used for Conduit 39
WARNING 04: minimum elevation drop used for Conduit 40
WARNING 04: minimum elevation drop used for Conduit 41
WARNING 04: minimum elevation drop used for Conduit 42
WARNING 04: minimum elevation drop used for Conduit 43
WARNING 04: minimum elevation drop used for Conduit 44
WARNING 04: minimum elevation drop used for Conduit 45
WARNING 04: minimum elevation drop used for Conduit 46
WARNING 04: minimum elevation drop used for Conduit 47
WARNING 04: minimum elevation drop used for Conduit 48
WARNING 04: minimum elevation drop used for Conduit 49
WARNING 04: minimum elevation drop used for Conduit 50
WARNING 04: minimum elevation drop used for Conduit 51
WARNING 04: minimum elevation drop used for Conduit 52
WARNING 04: minimum elevation drop used for Conduit 53

NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.

Analysis Options

Flow Units CFS

Process Models:

Rainfall/Runoff NO

RDII NO

Snowmelt NO

Groundwater NO

Flow Routing YES

Ponding Allowed NO

Water Quality NO

Flow Routing Method KINWAVE

Starting Date 01/01/2005 00:00:00

Ending Date 01/04/2005 06:00:00

Antecedent Dry Days 0.0

Report Time Step 00:05:00

Routing Time Step 30.00 sec

```

*****
Flow Routing Continuity      Volume      Volume
                             acre-feet   10^6 gal
*****
Dry Weather Inflow .....    0.000    0.000
Wet Weather Inflow .....    0.000    0.000
Groundwater Inflow .....    0.000    0.000
RDII Inflow .....          0.000    0.000
External Inflow .....      324.744   105.823
External Outflow .....     330.139   107.581
Flooding Loss .....        0.000    0.000
Evaporation Loss .....     0.000    0.000
Exfiltration Loss .....     0.000    0.000
Initial Stored Volume ....    0.000    0.000
Final Stored Volume .....    0.000    0.000
Continuity Error (%) .....  -1.661

```

```

*****
Highest Flow Instability Indexes
*****
All links are stable.

```

```

*****
Routing Time Step Summary
*****
Minimum Time Step      : 30.00 sec
Average Time Step      : 30.00 sec
Maximum Time Step      : 30.00 sec
Percent in Steady State : 0.00
Average Iterations per Step : 1.00
Percent Not Converging  : 0.00

```

```

*****
Node Depth Summary
*****

```

Node	Type	Average Maximum Maximum Time of Max Reported				
		Depth	Depth	HGL	Occurrence	Max Depth
		Feet	Feet	Feet	days hr:min	Feet

EX-3	JUNCTION	0.04	1.91	211.91	0 12:25	1.91
EX-4	JUNCTION	0.05	2.07	262.07	0 12:25	2.06
EX-10	JUNCTION	0.06	1.82	139.82	0 12:30	1.82
EX-20	JUNCTION	0.03	1.77	97.77	0 12:20	1.76
EX-79	JUNCTION	0.04	1.87	523.87	0 12:20	1.86
EX-80	JUNCTION	0.04	1.58	513.58	0 12:25	1.58
EX-81	JUNCTION	0.05	1.88	493.88	0 12:30	1.87
EX-82	JUNCTION	0.03	1.58	523.58	0 12:20	1.58
DP-10	JUNCTION	0.09	2.40	76.40	0 12:34	2.40
DP-56	JUNCTION	0.04	1.74	73.74	0 12:28	1.74
DP-60A	JUNCTION	0.12	3.73	25.73	0 13:08	3.73
DP-63	JUNCTION	0.11	3.83	99.83	0 13:01	3.83
DP-69	JUNCTION	0.11	3.94	195.94	0 12:49	3.94
DP-71	JUNCTION	0.12	4.34	262.34	0 12:44	4.34

DP-73	JUNCTION	0.12	4.35	304.35	0 12:41	4.35
EX-74	JUNCTION	0.05	2.13	459.13	0 12:24	2.13
EX-75	JUNCTION	0.10	3.58	395.58	0 12:34	3.58
EX-78	JUNCTION	0.07	2.56	424.56	0 12:26	2.56
DP-8A	JUNCTION	0.04	1.39	105.39	0 12:25	1.39
DP-9	JUNCTION	0.08	2.80	24.80	0 12:30	2.80
EX-76	JUNCTION	0.00	0.00	392.00	0 00:00	0.00
EX-73	JUNCTION	0.00	0.00	392.00	0 00:00	0.00
EX-88	JUNCTION	0.00	0.00	300.00	0 00:00	0.00
EX-77	JUNCTION	0.00	0.00	300.00	0 00:00	0.00
EX-6	JUNCTION	0.00	0.00	258.00	0 00:00	0.00
EX-20A	JUNCTION	0.00	0.00	22.00	0 00:00	0.00
EX-21	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
EX-3A	JUNCTION	0.00	0.00	74.00	0 00:00	0.00
EX-0	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
EX-1	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
EX-2	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
EX-4A	JUNCTION	0.00	0.00	96.00	0 00:00	0.00
EX-10A	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
EX-9	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
EX-8	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
EX-7	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
EX-5	JUNCTION	0.00	0.00	192.00	0 00:00	0.00
EX-12	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
EX-11	JUNCTION	0.00	0.00	72.00	0 00:00	0.00
EX-13	JUNCTION	0.00	0.00	104.00	0 00:00	0.00
EX-24	JUNCTION	0.00	0.00	22.00	0 00:00	0.00
EX-25	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
DP-53A	OUTFALL	0.15	3.73	3.73	0 13:11	3.73
DP-9A	OUTFALL	0.08	2.78	2.78	0 12:35	2.78
DP-1	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
DP-2	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
DP-4	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
DP-5	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
DP-6	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
DP-7	OUTFALL	0.05	1.74	1.74	0 12:48	1.74
DP-3	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
DP-8	OUTFALL	0.04	1.74	1.74	0 12:31	1.74

Node Inflow Summary

Node	Type	Maximum		Lateral Inflow Volume 10^6 gal	Total Inflow Volume 10^6 gal	Flow Balance Error Percent
		Lateral Inflow CFS	Maximum Time of Max Occurrence days hr:min			
		Total Inflow CFS	Max CFS			
EX-3	JUNCTION	128.03	128.03	0 12:25	3.58	3.58 0.000
EX-4	JUNCTION	189.38	189.38	0 12:25	5.02	5.02 0.000
EX-10	JUNCTION	211.69	211.69	0 12:30	7.17	7.17 0.000
EX-20	JUNCTION	184.50	184.50	0 12:20	3.7	3.7 0.000
EX-79	JUNCTION	258.55	258.55	0 12:20	5.21	5.21 0.000
EX-80	JUNCTION	156.30	156.30	0 12:25	4.08	4.08 0.000
EX-81	JUNCTION	228.01	228.01	0 12:30	6.8	6.8 0.000

EX-82	JUNCTION	160.67	160.67	0	12:20	3.04	3.04	0.000
DP-10	JUNCTION	0.00	255.20	0	12:34	0	9.66	0.000
DP-56	JUNCTION	0.00	207.98	0	12:28	0	5.93	0.000
DP-60A	JUNCTION	0.00	1649.04	0	13:08	0	61.6	0.000
DP-63	JUNCTION	0.00	1661.58	0	13:00	0	60.1	0.000
DP-69	JUNCTION	0.00	1675.53	0	12:49	0	55.8	0.000
DP-71	JUNCTION	0.00	1466.20	0	12:44	0	46.8	0.000
DP-73	JUNCTION	0.00	1414.41	0	12:41	0	44.4	0.000
EX-74	JUNCTION	171.48	301.19	0	12:24	3.46	6.53	0.000
EX-75	JUNCTION	73.94	824.55	0	12:34	2.3	24.7	0.000
EX-78	JUNCTION	212.35	426.39	0	12:26	4.5	9.74	0.000
DP-8A	JUNCTION	0.00	59.34	0	12:25	0	1.95	0.000
DP-9	JUNCTION	0.00	297.14	0	12:30	0	7.96	0.000
EX-76	JUNCTION	74.06	74.06	0	12:25	2.42	2.42	0.000
EX-73	JUNCTION	87.48	87.48	0	12:25	2.42	2.42	0.000
EX-88	JUNCTION	133.97	133.97	0	12:25	3.59	3.59	0.000
EX-77	JUNCTION	162.20	162.20	0	12:35	5.95	5.95	0.000
EX-6	JUNCTION	81.51	81.51	0	12:25	2.33	2.33	0.000
EX-20A	JUNCTION	144.84	144.84	0	12:25	4.17	4.17	0.000
EX-21	JUNCTION	36.26	36.26	0	12:20	0.996	0.996	0.000
EX-3A	JUNCTION	192.52	192.52	0	12:20	5.93	5.93	0.000
EX-0	JUNCTION	25.97	25.97	0	12:15	0.446	0.446	0.000
EX-1	JUNCTION	23.17	23.17	0	12:20	0.483	0.483	0.000
EX-2	JUNCTION	3.71	3.71	0	12:15	0.109	0.109	0.000
EX-4A	JUNCTION	89.03	89.03	0	12:35	3.87	3.87	0.000
EX-10A	JUNCTION	100.09	100.09	0	12:30	3.39	3.39	0.000
EX-9	JUNCTION	89.43	89.43	0	12:25	2.99	2.99	0.000
EX-8	JUNCTION	42.58	42.58	0	12:20	0.833	0.833	0.000
EX-7	JUNCTION	123.98	123.98	0	12:25	3.92	3.92	0.000
EX-5	JUNCTION	128.18	128.18	0	12:25	3.88	3.88	0.000
EX-12	JUNCTION	53.72	53.72	0	12:15	0.902	0.902	0.000
EX-11	JUNCTION	177.16	177.16	0	12:25	3.95	3.95	0.000
EX-13	JUNCTION	59.34	59.34	0	12:25	1.95	1.95	0.000
EX-24	JUNCTION	50.91	50.91	0	12:20	1.4	1.4	0.000
EX-25	JUNCTION	31.44	31.44	0	12:25	1.03	1.03	0.000
DP-53A	OUTFALL	0.00	1837.86	0	13:10	0	72.3	0.000
DP-9A	OUTFALL	0.00	321.39	0	12:34	0	8.95	0.000
DP-1	OUTFALL	0.00	25.97	0	12:15	0	0.446	0.000
DP-2	OUTFALL	0.00	23.17	0	12:20	0	0.483	0.000
DP-4	OUTFALL	0.00	123.98	0	12:25	0	3.92	0.000
DP-5	OUTFALL	0.00	42.58	0	12:20	0	0.833	0.000
DP-6	OUTFALL	0.00	89.43	0	12:25	0	2.99	0.000
DP-7	OUTFALL	0.00	273.43	0	12:44	0	10.7	0.000
DP-3	OUTFALL	0.00	3.71	0	12:15	0	0.109	0.000
DP-8	OUTFALL	0.00	245.12	0	12:28	0	6.84	0.000

Node Flooding Summary

No nodes were flooded.

Outfall Loading Summary

Outfall Node	Flow Freq	Avg Flow Pcnt	Max Flow CFS	Total Volume CFS	10^6 gal
DP-53A		50.89	67.64	1837.86	72.290
DP-9A		31.90	13.36	321.39	8.952
DP-1		2.55	8.31	25.97	0.446
DP-2		2.98	7.71	23.17	0.483
DP-4		32.64	5.71	123.98	3.915
DP-5		29.70	1.33	42.58	0.833
DP-6		32.83	4.33	89.43	2.987
DP-7		14.07	36.27	273.43	10.719
DP-3		4.25	1.22	3.71	0.109
DP-8		29.93	10.88	245.12	6.840
System		23.17	156.77	2455.20	107.573

Link Flow Summary

Link	Type	Maximum Flow CFS	Time of Max Occurrence days hr:min	Maximum Veloc ft/sec	Max/ Full Flow	Max/ Full Depth
RT-4	CONDUIT	287.68	0 12:31	5.34	0.00	0.10
RT-1	CONDUIT	212.94	0 12:41	5.08	0.00	0.09
RT-3	CONDUIT	148.46	0 12:27	4.76	0.00	0.08
RT-2	CONDUIT	137.30	0 12:38	4.70	0.00	0.07
RT-6	CONDUIT	238.46	0 12:28	5.76	0.00	0.09
RT-5	CONDUIT	801.60	0 12:42	7.47	0.01	0.18
RT-7	CONDUIT	358.68	0 12:42	5.54	0.00	0.12
RT-10	CONDUIT	177.88	0 12:34	5.12	0.00	0.10
RT-9	CONDUIT	1443.27	0 12:50	7.70	0.02	0.18
RT-14	CONDUIT	107.56	0 12:44	5.07	0.00	0.09
RT-13	CONDUIT	1645.84	0 13:11	7.10	0.03	0.19
RT-12	CONDUIT	1626.98	0 13:08	7.52	0.03	0.18
RT-18	CONDUIT	161.34	0 12:32	4.56	0.00	0.08
RT-19	CONDUIT	292.62	0 12:35	4.73	0.01	0.14
RT-11	CONDUIT	1593.34	0 13:01	7.77	0.04	0.19
RT-15	CONDUIT	252.44	0 12:40	6.13	0.01	0.12
RT-8	CONDUIT	1407.11	0 12:44	7.96	0.03	0.22
RT-16	CONDUIT	190.35	0 12:48	4.96	0.00	0.09
RT-17	CONDUIT	54.28	0 12:41	3.05	0.00	0.07
RT-17A	CONDUIT	207.70	0 12:31	7.29	0.00	0.09
32	DUMMY	74.06	0 12:25			
33	DUMMY	87.48	0 12:25			
34	DUMMY	133.97	0 12:25			
35	DUMMY	162.20	0 12:35			
36	DUMMY	81.51	0 12:25			
37	DUMMY	144.84	0 12:25			
38	DUMMY	36.26	0 12:20			
39	DUMMY	192.52	0 12:20			

40	DUMMY	25.97	0 12:15
41	DUMMY	23.17	0 12:20
42	DUMMY	3.71	0 12:15
43	DUMMY	89.03	0 12:35
44	DUMMY	100.09	0 12:30
45	DUMMY	89.43	0 12:25
46	DUMMY	42.58	0 12:20
47	DUMMY	123.98	0 12:25
48	DUMMY	128.18	0 12:25
49	DUMMY	177.16	0 12:25
50	DUMMY	59.34	0 12:25
51	DUMMY	53.72	0 12:15
52	DUMMY	50.91	0 12:20
53	DUMMY	31.44	0 12:25

Conduit Surcharge Summary

No conduits were surcharged.

Analysis begun on: Thu Sep 02 14:54:25 2021

Analysis ended on: Thu Sep 02 14:54:25 2021

Total elapsed time: < 1 sec

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.012)

WARNING 04: minimum elevation drop used for Conduit 32
WARNING 04: minimum elevation drop used for Conduit 33
WARNING 04: minimum elevation drop used for Conduit 34
WARNING 04: minimum elevation drop used for Conduit 35
WARNING 04: minimum elevation drop used for Conduit 36
WARNING 04: minimum elevation drop used for Conduit 37
WARNING 04: minimum elevation drop used for Conduit 38
WARNING 04: minimum elevation drop used for Conduit 39
WARNING 04: minimum elevation drop used for Conduit 40
WARNING 04: minimum elevation drop used for Conduit 41
WARNING 04: minimum elevation drop used for Conduit 42
WARNING 04: minimum elevation drop used for Conduit 43
WARNING 04: minimum elevation drop used for Conduit 44
WARNING 04: minimum elevation drop used for Conduit 45
WARNING 04: minimum elevation drop used for Conduit 46
WARNING 04: minimum elevation drop used for Conduit 47
WARNING 04: minimum elevation drop used for Conduit 48
WARNING 04: minimum elevation drop used for Conduit 49
WARNING 04: minimum elevation drop used for Conduit 50
WARNING 04: minimum elevation drop used for Conduit 51
WARNING 04: minimum elevation drop used for Conduit 52
WARNING 04: minimum elevation drop used for Conduit 53

NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.

Analysis Options

Flow Units CFS

Process Models:

Rainfall/Runoff NO

RDII NO

Snowmelt NO

Groundwater NO

Flow Routing YES

Ponding Allowed NO

Water Quality NO

Flow Routing Method KINWAVE

Starting Date 01/01/2005 00:00:00

Ending Date 01/04/2005 06:00:00

Antecedent Dry Days 0.0

Report Time Step 00:05:00

Routing Time Step 30.00 sec


```

*****
Flow Routing Continuity      Volume      Volume
                             acre-feet   10^6 gal
*****
Dry Weather Inflow .....    0.000    0.000
Wet Weather Inflow .....    0.000    0.000
Groundwater Inflow .....    0.000    0.000
RDII Inflow .....          0.000    0.000
External Inflow .....      383.667   125.024
External Outflow .....     389.413   126.896
Flooding Loss .....        0.000    0.000
Evaporation Loss .....     0.000    0.000
Exfiltration Loss .....     0.000    0.000
Initial Stored Volume ....    0.000    0.000
Final Stored Volume .....    0.000    0.000
Continuity Error (%) .....  -1.498

```

```

*****
Highest Flow Instability Indexes
*****

```

All links are stable.

```

*****
Routing Time Step Summary
*****
Minimum Time Step      : 30.00 sec
Average Time Step      : 30.00 sec
Maximum Time Step      : 30.00 sec
Percent in Steady State : 0.00
Average Iterations per Step : 1.00
Percent Not Converging  : 0.00

```

```

*****
Node Depth Summary
*****

```

Node	Average Depth Type	Maximum Depth Feet	Maximum HGL Feet	Time of Max Occurrence days hr:min	Reported Max Depth Feet
EX-3	JUNCTION	0.05	2.06	212.06 0 12:25	2.05
EX-4	JUNCTION	0.05	2.21	262.21 0 12:25	2.21
EX-10	JUNCTION	0.06	1.95	139.95 0 12:30	1.95
EX-20	JUNCTION	0.03	1.89	97.89 0 12:20	1.88
EX-79	JUNCTION	0.05	1.99	523.99 0 12:20	1.98
EX-80	JUNCTION	0.05	1.69	513.69 0 12:25	1.69
EX-81	JUNCTION	0.05	2.01	494.01 0 12:30	2.00
EX-82	JUNCTION	0.03	1.69	523.69 0 12:20	1.68
DP-10	JUNCTION	0.10	2.59	76.59 0 12:34	2.59
DP-56	JUNCTION	0.05	1.90	73.90 0 12:27	1.90

DP-60A	JUNCTION	0.13	4.10	26.10	0 13:06	4.09
DP-63	JUNCTION	0.12	4.22	100.22	0 12:59	4.21
DP-69	JUNCTION	0.12	4.32	196.32	0 12:48	4.32
DP-71	JUNCTION	0.13	4.68	262.68	0 12:43	4.68
DP-73	JUNCTION	0.13	4.69	304.69	0 12:40	4.69
EX-74	JUNCTION	0.05	2.27	459.27	0 12:24	2.27
EX-75	JUNCTION	0.11	3.85	395.85	0 12:34	3.84
EX-78	JUNCTION	0.07	2.73	424.73	0 12:25	2.73
DP-8A	JUNCTION	0.04	1.51	105.51	0 12:25	1.50
DP-9	JUNCTION	0.09	3.01	25.01	0 12:29	3.01
EX-76	JUNCTION	0.00	0.00	392.00	0 00:00	0.00
EX-73	JUNCTION	0.00	0.00	392.00	0 00:00	0.00
EX-88	JUNCTION	0.00	0.00	300.00	0 00:00	0.00
EX-77	JUNCTION	0.00	0.00	300.00	0 00:00	0.00
EX-6	JUNCTION	0.00	0.00	258.00	0 00:00	0.00
EX-20A	JUNCTION	0.00	0.00	22.00	0 00:00	0.00
EX-21	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
EX-3A	JUNCTION	0.00	0.00	74.00	0 00:00	0.00
EX-0	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
EX-1	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
EX-2	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
EX-4A	JUNCTION	0.00	0.00	96.00	0 00:00	0.00
EX-10A	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
EX-9	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
EX-8	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
EX-7	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
EX-5	JUNCTION	0.00	0.00	192.00	0 00:00	0.00
EX-12	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
EX-11	JUNCTION	0.00	0.00	72.00	0 00:00	0.00
EX-13	JUNCTION	0.00	0.00	104.00	0 00:00	0.00
EX-24	JUNCTION	0.00	0.00	22.00	0 00:00	0.00
EX-25	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
DP-53A	OUTFALL	0.16	4.09	4.09	0 13:09	4.09
DP-9A	OUTFALL	0.08	2.99	2.99	0 12:34	2.99
DP-1	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
DP-2	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
DP-4	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
DP-5	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
DP-6	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
DP-7	OUTFALL	0.06	1.87	1.87	0 12:47	1.87
DP-3	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
DP-8	OUTFALL	0.04	1.90	1.90	0 12:29	1.90

Node Inflow Summary

Node	Type	Maximum Lateral Inflow	Maximum Total Inflow CFS	Maximum Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 gal	Total Inflow Volume 10^6 gal	Flow Balance Error Percent
------	------	------------------------------	-----------------------------------	---	---	---------------------------------------	-------------------------------------

EX-3	JUNCTION	149.59	149.59	0	12:25	4.22	4.22	0.000
EX-4	JUNCTION	221.22	221.22	0	12:25	5.92	5.92	0.000
EX-10	JUNCTION	247.82	247.82	0	12:30	8.45	8.45	0.000
EX-20	JUNCTION	214.98	214.98	0	12:20	4.37	4.37	0.000
EX-79	JUNCTION	299.69	299.69	0	12:20	6.12	6.12	0.000
EX-80	JUNCTION	181.71	181.71	0	12:25	4.79	4.79	-0.000
EX-81	JUNCTION	267.18	267.18	0	12:30	8.02	8.02	0.000
EX-82	JUNCTION	186.82	186.82	0	12:20	3.59	3.59	0.000
DP-10	JUNCTION	0.00	300.10	0	12:34	0	11.2	0.000
DP-56	JUNCTION	0.00	252.85	0	12:27	0	7.17	0.000
DP-60A	JUNCTION	0.00	1969.24	0	13:06	0	72.3	0.000
DP-63	JUNCTION	0.00	1980.73	0	12:59	0	70.5	0.000
DP-69	JUNCTION	0.00	1988.41	0	12:48	0	65.5	0.000
DP-71	JUNCTION	0.00	1734.92	0	12:43	0	54.9	0.000
DP-73	JUNCTION	0.00	1672.02	0	12:40	0	52.1	0.000
EX-74	JUNCTION	197.86	352.34	0	12:24	4.05	7.67	-0.000
EX-75	JUNCTION	85.81	970.48	0	12:34	2.68	29.1	0.000
EX-78	JUNCTION	245.43	497.68	0	12:25	5.27	11.4	0.000
DP-8A	JUNCTION	0.00	70.54	0	12:25	0	2.32	0.000
DP-9	JUNCTION	0.00	351.65	0	12:29	0	9.41	0.000
EX-76	JUNCTION	86.18	86.18	0	12:25	2.84	2.84	0.000
EX-73	JUNCTION	101.98	101.98	0	12:25	2.85	2.85	0.000
EX-88	JUNCTION	156.62	156.62	0	12:25	4.23	4.23	0.000
EX-77	JUNCTION	190.53	190.53	0	12:35	7.02	7.02	0.000
EX-6	JUNCTION	95.34	95.34	0	12:25	2.75	2.75	0.000
EX-20A	JUNCTION	171.92	171.92	0	12:25	4.95	4.95	0.000
EX-21	JUNCTION	41.94	41.94	0	12:20	1.16	1.16	0.000
EX-3A	JUNCTION	223.40	223.40	0	12:20	6.86	6.86	0.000
EX-0	JUNCTION	31.45	31.45	0	12:15	0.543	0.543	0.000
EX-1	JUNCTION	27.93	27.93	0	12:20	0.588	0.588	0.000
EX-2	JUNCTION	4.52	4.52	0	12:15	0.132	0.132	0.000
EX-4A	JUNCTION	104.76	104.76	0	12:35	4.58	4.58	0.000
EX-10A	JUNCTION	121.64	121.64	0	12:30	4.13	4.13	0.000
EX-9	JUNCTION	106.57	106.57	0	12:25	3.56	3.56	0.000
EX-8	JUNCTION	50.92	50.92	0	12:20	1.01	1.01	0.000
EX-7	JUNCTION	147.04	147.04	0	12:25	4.64	4.64	0.000
EX-5	JUNCTION	150.41	150.41	0	12:25	4.59	4.59	0.000
EX-12	JUNCTION	63.35	63.35	0	12:15	1.07	1.07	0.000
EX-11	JUNCTION	213.92	213.92	0	12:25	4.82	4.82	0.000
EX-13	JUNCTION	70.54	70.54	0	12:25	2.32	2.32	0.000
EX-24	JUNCTION	60.43	60.43	0	12:20	1.67	1.67	0.000
EX-25	JUNCTION	38.17	38.17	0	12:25	1.25	1.25	0.000
DP-53A	OUTFALL	0.00	2197.66	0	13:08	0	84.9	0.000
DP-9A	OUTFALL	0.00	381.11	0	12:33	0	10.6	0.000
DP-1	OUTFALL	0.00	31.45	0	12:15	0	0.543	0.000
DP-2	OUTFALL	0.00	27.93	0	12:20	0	0.588	0.000
DP-4	OUTFALL	0.00	147.04	0	12:25	0	4.64	0.000
DP-5	OUTFALL	0.00	50.92	0	12:20	0	1.01	0.000
DP-6	OUTFALL	0.00	106.57	0	12:25	0	3.56	0.000
DP-7	OUTFALL	0.00	326.28	0	12:44	0	12.7	0.000
DP-3	OUTFALL	0.00	4.52	0	12:15	0	0.132	0.000
DP-8	OUTFALL	0.00	297.43	0	12:28	0	8.25	0.000

Node Flooding Summary

No nodes were flooded.

Outfall Loading Summary

Outfall Node	Flow Freq	Avg Flow Pcnt	Max Flow CFS	Total Volume 10^6 gal
DP-53A	51.14	78.99	2197.66	84.854
DP-9A	32.08	15.69	381.11	10.572
DP-1	2.55	10.13	31.45	0.543
DP-2	2.98	9.40	27.93	0.588
DP-4	32.77	6.74	147.04	4.637
DP-5	29.89	1.61	50.92	1.008
DP-6	32.96	5.14	106.57	3.555
DP-7	15.14	40.08	326.28	12.745
DP-3	4.25	1.48	4.52	0.132
DP-8	30.10	13.05	297.43	8.251
System	23.39	182.30	2955.71	126.887

Link Flow Summary

Link	Type	Maximum Flow CFS	Time of Max Occurrence days hr:min	Max Veloc ft/sec	Maximum Full Flow	Max/ Full Depth
RT-4	CONDUIT	337.89	0 12:31	5.55	0.00	0.11
RT-1	CONDUIT	251.20	0 12:40	5.29	0.00	0.10
RT-3	CONDUIT	173.98	0 12:27	4.94	0.00	0.08
RT-2	CONDUIT	161.46	0 12:38	4.88	0.00	0.08
RT-6	CONDUIT	278.31	0 12:28	5.97	0.00	0.10
RT-5	CONDUIT	945.90	0 12:41	7.78	0.02	0.19
RT-7	CONDUIT	423.39	0 12:41	5.75	0.01	0.13
RT-10	CONDUIT	209.08	0 12:34	5.32	0.00	0.11
RT-9	CONDUIT	1709.59	0 12:49	8.06	0.03	0.20
RT-14	CONDUIT	127.38	0 12:43	5.28	0.00	0.09
RT-13	CONDUIT	1965.55	0 13:09	7.47	0.03	0.20
RT-12	CONDUIT	1942.19	0 13:06	7.91	0.03	0.20

RT-18	CONDUIT	190.02	0	12:32	4.74	0.00	0.09
RT-19	CONDUIT	347.12	0	12:34	4.93	0.01	0.15
RT-11	CONDUIT	1898.12	0	12:59	8.18	0.04	0.21
RT-15	CONDUIT	297.12	0	12:40	6.39	0.01	0.13
RT-8	CONDUIT	1663.86	0	12:43	8.31	0.03	0.23
RT-16	CONDUIT	224.77	0	12:47	5.16	0.00	0.09
RT-17	CONDUIT	64.98	0	12:40	3.19	0.00	0.07
RT-17A	CONDUIT	252.10	0	12:29	7.66	0.00	0.10
32	DUMMY	86.18	0	12:25			
33	DUMMY	101.98	0	12:25			
34	DUMMY	156.62	0	12:25			
35	DUMMY	190.53	0	12:35			
36	DUMMY	95.34	0	12:25			
37	DUMMY	171.92	0	12:25			
38	DUMMY	41.94	0	12:20			
39	DUMMY	223.40	0	12:20			
40	DUMMY	31.45	0	12:15			
41	DUMMY	27.93	0	12:20			
42	DUMMY	4.52	0	12:15			
43	DUMMY	104.76	0	12:35			
44	DUMMY	121.64	0	12:30			
45	DUMMY	106.57	0	12:25			
46	DUMMY	50.92	0	12:20			
47	DUMMY	147.04	0	12:25			
48	DUMMY	150.41	0	12:25			
49	DUMMY	213.92	0	12:25			
50	DUMMY	70.54	0	12:25			
51	DUMMY	63.35	0	12:15			
52	DUMMY	60.43	0	12:20			
53	DUMMY	38.17	0	12:25			

Conduit Surcharge Summary

No conduits were surcharged.

Analysis begun on: Thu Aug 12 12:23:21 2021

Analysis ended on: Thu Aug 12 12:23:21 2021

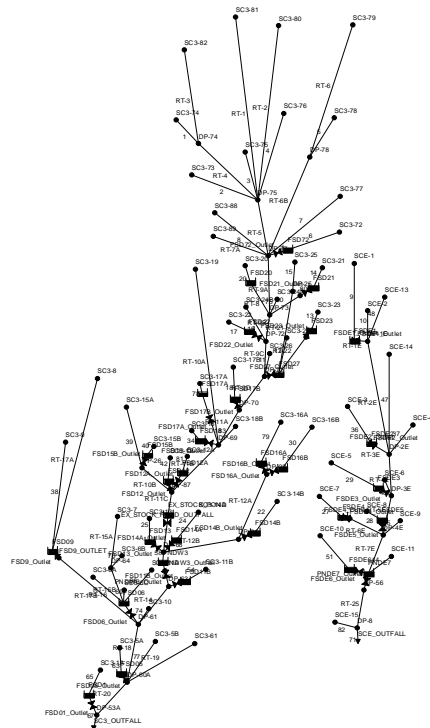
Total elapsed time: < 1 sec

APPENDIX C

PROPOSED CONDITIONS HYDRAULIC CALCULATIONS

Basin Changes Summary				
	MDDP (2018)		Updated (2021)	
Basin	Area (ac)	Imperv. %	Area (ac)	Imperv. %
SC3-1A	27.8	32%	27.8	32%
SC3-5A	39.1	61%	39.1	61%
SC3-5B	63.0	54%	63.0	54%
SC3-6A	49.3	71%	49.3	71%
SC3-6B	30.9	58%	30.9	58%
SC3-6C	58.0	46%	58.0	46%
SC3-7	45.7	72%	45.7	72%
SC3-8	143.4	2%	143.4	2%
SC3-9	217.4	15%	217.4	15%
SC3-10	36.0	8%	36.0	8%
SC3-11A	10.7	17%	10.7	17%
SC3-11B	76.6	39%	70.1	66%
SC3-12	88.2	55%	71.7	55%
SC3-12A			16.5	44%
SC3-13	41.0	65%	41.0	65%
SC3-14A	164.9	40%	140.2	63%
SC3-14B	34.7	65%	63.3	69%
SC3-15A	139.7	3%	139.7	3%
SC3-15B	7.9	60%	7.9	60%
SC3-16A	168.1	51%	178.0	69%
SC3-16B	50.7	67%	42.2	69%
SC3-17	70.6	29%	24.7	51%
SC3-17B			22.8	61%
SC3-18	53.8	44%	30.4	46%
SC3-18B			46.5	3%
SC3-19	184.0	4%	184.0	4%
SC3-20	34.2	12%	34.2	12%
SC3-21	23.3	16%	23.3	16%
SC3-22	33.9	12%	33.9	12%
SC3-23	14.5	19%	14.5	19%
SC3-24A	35.7	10%	35.7	10%
SC3-24B	12.2	9%	12.2	9%
SC3-25	19.0	15%	19.0	15%
SC3-26	10.0	3%	10.0	3%
SC3-27	70.0	28%	100.0	22%
SC3-61	65.5	10%	65.5	10%
SC3-72	56.2	8%	56.2	8%
SC3-73	90.0	5%	90.0	5%
SC3-74	119.7	10%	119.7	10%
SC3-75	79.3	10%	79.3	10%
SC3-76	86.4	8%	86.4	8%
SC3-77	106.9	2%	106.9	2%
SC3-78	155.6	10%	155.6	10%
SC3-79	189.0	7%	189.0	7%
SC3-80	147.7	7%	147.7	7%
SC3-81	262.9	2%	262.9	2%
SC3-82	117.8	2%	117.8	2%
SC3-88	60.2	2%	60.2	2%
SC3-89	27.5	2%	27.5	2%
SCE-1	64.4	14%	64.4	14%
SCE-2	15	10%	15.0	10%
SCE-3	67.5	25%	67.5	25%
SCE-4	29.5	25%	29.5	25%
SCE-5	85.5	70%	85.5	70%
SCE-6	3.8	10%	4.2	10%
SCE-7	44.9	76%	27.3	76%
SCE-8	25.5	95%	25.5	95%
SCE-9	4	10%	4.2	10%
SCE-10	174.3	45%	174.3	45%
SCE-11	5.8	10%	5.8	10%
SCE-13	78.6	10%	78.6	10%
SCE-14	52.5	10%	52.5	10%
SCE-15	39.7	20%	39.7	20%

Sterling Ranch 2021 MDDP Amendment



8/21/2018

Basin	Basin	Basin	Basin	Sub-Area 1		HSG	UA CN	CN	Sub-Area 2		HSG	UA CN	CN	Sub-Area 3		HSG	UA CN	CN	Sub-Area 4		HSG	UA CN	CN	Sub-Area 5		HSG	UA CN	CN	Sub-Area 6		HSG	UA CN	CN	Sub-Area 7		HSG	UA CN	CN	Sub-Area 8		HSG	UA CN	CN	Sub-Area 9		HSG	UA CN	CN	Sub-Areas		% HSG	% HSG	Weighted	Weighted																																																					
ID	Area	Area	Area	Area	Imp	Type	Value	Value	Area	Imp	Type	Value	Value	Area	Imp	Type	Value	Value	Area	Imp	Type	Value	Value	Area	Imp	Type	Value	Value	Area	Imp	Type	Value	Value	Area	Imp	Type	Value	Value	Area	Imp	Type	Value	Value	Area	Imp	Type	Value	Value	Total	(Check)	%	%	%	No.																																																					
	(SF)	(AC)	(SQ MI)	(AC)	(%)			(HSG B)	(AC)	(%)			(HSG B)	(AC)	(%)			(HSG B)	(AC)	(%)			(HSG B)	(AC)	(%)			(HSG B)	(AC)	(%)			(HSG B)	(AC)	(%)			(HSG B)	(AC)	(%)			(HSG B)	(AC)	(%)			(HSG B)	(Check)	%	%	%	No.																																																						
SC3-1A	1212906	27.8	0.044	5.5	10	A	43	64	15.3	55	A	71	81	7.1	0.5	B	62	62																																28	74	26	32	73																																																					
SC3-5A	1704646	39.1	0.061	28.2	65	A	77	85	5.5	100	A	98	98	5.4	0.5	B	62	62																																39	86	14	61	84																																																					
SC3-5B	2744509	63.0	0.098	36.3	65	A	77	85	10.4	0.5	B	62	62	16.2	65	B	85	85																																63	58	42	54	81																																																					
SC3-6A	2147750	49.3	0.077	13.0	45	A	65	83	21.7	70	A	79	87	9.1	95	A	89	92	5.6	100	A	98	98																													49	100	0	71	88																																																			
SC3-6B	1345036	30.9	0.048	13.6	45	A	65	83	6.6	55	A	71	81	3.8	100	A	98	98	5.4	55	B	81	81	1.5	100	B	98	98																									31	78	22	58	85																																																		
SC3-6C	2526273	58.0	0.091	5.0	10	A	43	64	45.4	45	A	65	83	5.2	60	A	74	83	2.6	100	A	98	98																														58	100	0	46	82																																																		
SC3-7	1989744	45.7	0.071	21.9	72	A	81	88	23.8	72	B	88	88																																							46	48	52	72	88																																																			
SC3-8	6246166	143.4	0.224	32.4	0	A	41	63	75.8	0	B	62	62	35.1	10	B	63	63																																			143	23	77	2	62																																																		
SC3-9	9468334	217.4	0.340	48.2	10	A	44	63	115.75	12	A	46	65	6.0	100	A	98	98	42.899	10	B	63	63	4.4	100	B	98	98																									217	78	22	15	66																																																		
SC3-10	1566853	36.0	0.056	20.0	10	A	44	63	8.6	0.5	B	62	62	7.5	10	B	63	63																																			36	55	45	8	63																																																		
SC3-11A	465880	10.7	0.017	6.7	0.5	B	62	62	4.0105	45	B	83	83																																								11	100	0	17	70																																																		
SC3-11B	3336117	76.6	0.120	9.2	12	A	46	65	47.604	45	A	65	83	0.9	100	A	98	98	5.3	12	B	65	65	13.6	45	B	83	83																												77	75	25	39	80																																															
SC3-12	3841948	88.2	0.138	16.0	0.5	B	62	62	52.1	65	B	85	85	16.3	85	B	92	92	3.8	10	B	69	69																																		88	0	100	55	81																																														
SC3-13	1787204	41.0	0.064	41.0	65	B	85	85																																															41	0	100	65	85																																																
SC3-14A	7182038	164.9	0.258	8.3	10	A	43	64	90.6	45	A	65	83	32.1	55	A	71	81	1.0	100	B	98	98	4.6	100	A	98	98	10.1	0.5	B	62	62	18.1	10	B	64	64																				165	82	18	40	79																																													
SC3-14B	1509758	34.7	0.054	14.3	45	A	65	65	14.3	70	A	79	79	6.1	100	A	98	98																																											35	0	100	65	77																																										
SC3-15A	6085114	139.7	0.218	94.6	0	B	62	62	45.3	10	B	63	63																																																				140	0	100	3	62																																						
SC3-15B	342108	7.9	0.012	5.8	45	B	83	83	2.1	100	B	98	98																																																					8	0	100	60	87																																					
SC3-16A	7323250	168.1	0.263	70.1	65	A	77	77	12.7	65	A	77	85	5.4	65	B	85	85	34.5	25	B	70	70	1.8	30	B	72	72	26.2	25	A	54	54	6.5	20	B	68	68	10.9	100	A	98	98																																																																

Sterling Ranch MDDP
Hydrologic Study -Developed Conditions - Reach Data
8/21/2018

Reach ID	Reach Length L1 (ft)	Reach Vert. Drop H1 (ft)	Reach Slope S1 %	Mannings N Value n	Reach Side Slope SS (H/V)	Bottom Width BW (ft)	Diameter D ft
RT-1	3975	100	2.5%	0.05	10	6	N/A
RT-2	4570	120	2.6%	0.05	10	6	N/A
RT-3	2360	65	2.8%	0.05	10	6	N/A
RT-4	2695	65	2.4%	0.05	10	6	N/A
RT-5	4100	92	2.2%	0.05	6	10	N/A
RT-6A	3030	100	3.3%	0.05	10	6	N/A
RT-6B	6145	122	2.0%	0.05	10	6	N/A
RT-7A	1050	35	3.3%	0.013			4
RT-8	625	24	3.8%	0.013			2
RT-9A	2600	40	1.5%	0.05	6	30	N/A
RT-9B	760	17	2.2%	0.05	6	30	N/A
RT-9C	1450	26	1.8%	0.05	6	30	N/A
RT-9D	1490	28	1.9%	0.05	6	30	N/A
RT-10A	1940	42	2.2%	0.013			5
RT-10B	1560	42	2.7%	0.013			5
RT-11A	1275	26	2.0%	0.05	6	30	N/A
RT-11B	2960	46	1.6%	0.05	6	30	N/A
RT-12A	2590	40	1.5%	0.05	6	40	
RT-12B	4200	66	1.6%	0.035	4	15	
RT-13	1550	20	1.3%	0.05	6	40	N/A
RT-14	1765	35	2.0%	0.05	6	40	N/A
RT-15A	900	24	2.7%	0.013			4
RT-15B	1450	30	2.1%	0.013			6
RT-16	1250	24	1.9%	0.013			3.5
RT-17A	5000	108	2.2%	0.04	4	4	N/A
RT-17B	3675	76	2.1%	0.013			4
RT-18	2500	41	1.6%	0.05	6	40	N/A
RT-19	1200	6	0.5%	0.013			6
RT-20	1480	22	1.5%	0.05	6	40	N/A
RT-21	3300	75	2.3%	0.013			3.5
RT-22	2000	38	1.9%	0.013			3

Sterling Ranch Master Development Drainage Plan
Sand Creek Basin - Developed Condition - Lag Time Calculations

8/21/2018

Basin	OVERLAND FLOW					SHALLOW GUTTER FLOW				SHALLOW CHANNEL FLOW				STORM SEWER FLOW				CHANNELIZED FLOW				Tc	Tlag
ID	P2	n	Length	Slope	Tt	Length	Slope	Vel	Tt	Length	Slope	Vel	Tt	Length	Slope	Vel	Tt	Length	Slope	Vel	Tt	Total	0.6*Tc
	(in)		(ft)	(%)	(min)	(ft)	(%)	(fps)	(min)	(ft)	(%)	(fps)	(min)	(ft)	(%)	(fps)	(min)	(ft)	(%)	(fps)	(min)	(min)	(min)
SC3-1A	2.1	0.15	100	1.5	13.6	200	1	0.5	1.5	0	0	0	0	800	2.3	8	1.7	0	0	0	0	16.7	10.0
SC3-5A	2.1	0.15	100	2.0	12.1	900	2.0	2.0	2.9	0	0	0	0	600	1.7	8	1.3	0	0	0	0	16.2	9.7
SC3-5B	2.1	0.15	100	2.0	12.1	975	2.5	2.5	3.1	0	0	0	0	1250	1.0	6	3.5	0	0	0	0	18.7	11.2
SC3-6A	2.1	0.15	100	2.0	12.1	1250	2.2	2.2	2.9	0	0	0	0	1030	1.9	8	2.1	0	0	0	0	17.1	10.3
SC3-6B	2.1	0.15	100	2.0	12.1	300	2.0	2.0	2.8	0	0	0	0	1300	2.2	8	2.7	0	0	0	0	17.6	10.6
SC3-6C	2.1	0.15	100	2.0	12.1	950	1.9	1.9	2.8	0	0	0	0	1195	1.7	8	2.5	0	0	0	0	17.4	10.4
SC3-7	2.1	0.15	100	3.0	10.3	0	0	0	0	1175	28	3.0	6.5	0	0	0	0	730	2.7	4.1	3.0	19.8	11.9
SC3-8	2.1	0.15	300	3.8	22.5	0	0	0	0	730	40	3.5	3.5	0	0	0	0	2200	3.6	4.3	8.5	34.5	20.7
SC3-9	2.1	0.15	300	4.0	22.1	0	0	0	0	650	20	2.7	4.0	0	0	0	0	4450	1.8	4.2	17.7	43.7	26.2
SC3-10	2.1	0.15	250	3.2	20.9	0	0	0	0	400	20	3.5	1.9	0	0	0	0	1150	2.0	3.0	6.4	29.2	17.5
SC3-11A	2.1	0.15	100	2.0	12.1	280	10	3.6	3.7	0	0	0	0	100	2.0	8	0.2	0	0	0	0	16.0	9.6
SC3-11B	2.1	0.15	100	2.0	12.1	550	12	2.2	2.9	0	0	0	0	2700	1.6	8	5.6	0	0	0	0	20.6	12.4
SC3-12	2.1	0.15	100	2.0	12.1	1000	30	3.0	3.5	0	0	0	0	400	3.0	10	0.7	0	0	0	0	16.3	9.8
SC3-13	2.1	0.15	100	2.0	12.1	820	18	2.2	3.0	0	0	0	0	1025	1.8	8	2.1	0	0	0	0	17.2	10.6
SC3-14A	2.1	0.15	100	3.0	10.3	875	22	2.5	3.0	0	0	0	0	2575	1.8	8	5.4	0	0	0	0	18.6	11.2
SC3-14B	2.1	0.15	100	2.0	12.1	930	22	2.4	3.1	0	0	0	0	1050	2.3	8	2.2	0	0	0	0	17.4	10.4
SC3-15A	2.1	0.15	300	5.3	19.7	0	0	0	0	1100	40	2.9	6.3	0	0	0	0	4163	2.5	4.1	16.9	42.9	25.8
SC3-15B	2.1	0.15	50	2.0	6.9	1380	23	1.0	2.6	0	0	0	0	0	0	0	0	315	3.8	4.1	1.3	10.8	6.5
SC3-16A	2.1	0.15	100	2.0	12.1	900	28	3.1	3.5	0	0	0	0	4485	2.3	8	9.3	0	0	0	0	24.9	15.0
SC3-16B	2.1	0.15	100	3.0	10.3	0	0	2.4	0	700	20	3.4	3.4	1290	3.6	12	1.8	0	0	0	0	15.5	9.3
SC3-17	2.1	0.15	100	3.0	10.3	0	0	0	0	700	20	3.4	3.4	1290	3.6	12	1.8	0	0	0	0	15.5	8.5
SC3-18	2.1	0.15	100	3.0	10.3	0	0	0	0	800	22	3.4	3.9	200	4.0	12	0.3	0	0	0	0	14.5	8.6
SC3-19	2.1	0.15	300	4.7	20.8	0	0	0	0	770	22	2.7	4.8	0	0	0	0	3900	3.0	4.0	16.3	41.8	25.1
SC3-20	2.1	0.15	200	4.0	16.0	0	0	0	0	70	2	2.7	0.4	0	0	0	0	975	4.3	3.1	5.2	21.6	13.0
SC3-21	2.1	0.15	200	4.0	16.0	0	0	0	0	630	26	3.1	3.4	0	0	0	0	875	3.4	3.4	4.3	23.6	14.2
SC3-22	2.1	0.15	200	4.0	16.0	0	0	0	0	400	16	3.0	2.2	0	0	0	0	1350	2.8	3.4	6.6	24.8	14.9
SC3-23	2.1	0.15	200	5.0	14.6	0	0	0	0	275	12	3.3	1.4	200	4.0	12	0.3	450	3.5	2.8	2.7	18.9	11.4
SC3-24A	2.1	0.15	200	3.0	17.9	0	0	0	0	495	18	2.9	2.8	0	0	0	0	1780	1.6	2.9	10.2	31.0	18.6
SC3-24B	2.1	0.15	200	3.0	17.9	0	0	0	0	320	14	3.3	1.6	0	0	0	0	930	4.5	2.9	5.3	24.9	14.9
SC3-25	2.1	0.15	200	6.0	13.6	0	0	0	0	340	20	2.7	2.1	600	2.0	8	1.3	960	1.9	2.1	7.6	24.5	14.7
SC3-26	2.1	0.15	100	2.0	12.1	0	0	0	0	0	0	0	0	0	0	0	0	1300	1.7	2.0	10.8	22.9	13.8
SC3-27	2.1	0.15	100	3.0	10.3	900	28.0	3.1	3.5	0	0	0	0	1800	2.0	8	3.8	0	0	0	0	17.5	10.5
SC3-61	2.1	0.15	200	3.0	17.9	0	0	0	0	0	0	0	0	0	0	0	0	2500	1.8	3.4	12.3	30.2	18.1
SC3-72	2.1	0.15	250	4.0	19.1	0	0	0	0	1025	4.4	3.8	4.5	0	0	0	0	1595	4.4	4.0	6.6	30.2	18.1
SC3-73	2.1	0.15	300	3.3	23.7	0	0	0	0	1650	3.3	2.9	9.5	0	0	0	0	1230	3.3	4.2	4.9	38.1	22.9
SC3-74	2.1	0.15	300	4.7	20.8	0	0	0	0	2000	2.6	2.8	11.9	0	0	0	0	770	2.6	3.9	3.3	35.9	21.6
SC3-75	2.1	0.15	300	3.3	23.7	0	0	0	0	1200	2.8	2.7	7.4	0	0	0	0	2300	2.8	3.1	12.4	43.5	26.1
SC3-76	2.1	0.15	300	3.3	23.7	0	0	0	0	1160	2.6	3.1	6.2	0	0	0	0	3025	2.6	3.6	14.0	44.0	26.4
SC3-77	2.1	0.15	300	4.7	20.8	0	0	0	0	1250	2.7	2.7	7.7	0	0	0	0	3600	2.7	4.4	13.6	42.1	25.3
SC3-78	2.1	0.15	300	3.3	23.7	0	0	0	0	1560	3.2	3.3	7.9	0	0	0	0	1850	3.2	4.5	6.9	38.5	23.1
SC3-79	2.1	0.15	300	4.0	22.1	0	0	0	0	1740	1.8	3.5	8.3	0	0	0	0	1100	1.8	3.0	6.1	36.5	21.9
SC3-80	2.1	0.15	300	5.0	20.2	0	0	0	0	1625	2.8	3.4	8.0	0	0	0	0	2140	2.8	4.1	8.7	36.9	22.1
SC3-81	2.1	0.15	300	6.7	18.0	0	0	0	0	2000	3.1	3.4	9.8	0	0	0	0	3600	3.1	4.9	12.2	40.0	24.0
SC3-82	2.1	0.15	300	3.3	23.7	0	0	0	0	2000	3.2	3.3	10.1	0	0	0	0	625	3.2	4.1	2.5	36.4	21.8
SC3-88	2.1	0.15	300	4.7	20.8	0	0	0	0	825	3.8	3.3	4.2	0	0	0	0	2400	3.8	3.9	10.3	35.2	21.1
SC3-89	2.1	0.15	200	4.0	16.0	0	0	0	0	910	4.1	4.0	3.8	0	0	0	0	830	4.1	3.5	4.0	23.7	14.2

DCM TABLE 6-25 WAS USED FOR SHALLOW CONCENTRATED SWALE & GUTTER FLOW
N VALUE FOR OVERLAND FLOW WAS ASSUMED TO BE 0.15 FOR ALL BASINS
A ROUGHNESS COEFFICIENT OF 0.050 WAS USED FOR EARTHEN CHANNEL BOTTOMS
A ROUGHNESS COEFFICIENT OF 0.013 WAS USED FOR CONCRETE LINED CONVEYANCES

Verify that these
values are not too high
for developed basins

Sterling Ranch MDDP - East Fork Basin
Hydrologic Study - Developed Condition Composite CN & Impervious % Table

[illegible]

Sterling Ranch - East Fork Basin
Hydrologic Study - Developed Conditions - Reach Data

Reach ID	Reach Length L1 (ft)	Reach Vert. Drop H1 (ft)	Reach Slope S1 %	Mannings N Value n	Reach Side Slope SS (H/V)	Bottom Width BW (ft)	Diameter D ft
RT-1E	300	6	2.0%	0.013	N/A	N/A	4
RT-2E	2000	40	2.0%	0.013	N/A	N/A	4
RT-3E	400	10	2.5%	0.013	N/A	N/A	4
RT-4E	3600	90	2.5%	0.013	N/A	N/A	4
RT-5E	1250	31	2.5%	0.013	N/A	N/A	5
RT-6E	1485	37	2.5%	0.013	N/A	N/A	4
RT-7E	1410	35	2.5%	0.013	N/A	N/A	6

Sterling Ranch MDDP - East Fork Basin
Hydrologic Study - Developed Condition - Lag Time Calculations

Basin	OVERLAND FLOW					SHALLOW GUTTER FLOW				SHALLOW CHANNEL FLOW				STORM SEWER FLOW				CHANNELIZED FLOW				Tc	TLag
ID	P2	n	Length	Slope	Tt	Length	Slope	Vel	Tt	Length	Slope	Vel	Tt	Length	Slope	Vel	Tt	Length	Slope	Vel	Tt	Total	0.6*Tc
	(in)		(ft)	(%)	(min)	(ft)	(%)	(fps)	(min)	(ft)	(%)	(fps)	(min)	(ft)	(%)	(fps)	(min)	(ft)	(%)	(fps)	(min)	(min)	(min)
SCE-1	2.1	0.15	100	3.9	9.3	500	2.8	0.5	1.5	0	0	0.0	0.0	1500	1.2	8	3.1	0	0.0	0.0	0.0	13.9	8.3
SCE-2	2.1	0.15	100	2.0	12.1	50	3.0	2.0	2.9	0	0	0.0	0.0	1800	1.4	8	3.8	0	0.0	0.0	0.0	18.7	11.2
SCE-3	2.1	0.15	100	2.0	12.1	350	2.0	2.0	2.8	0	0	0.0	0.0	2000	1.4	8	4.2	0	0.0	0.0	0.0	19.1	11.4
SCE-4	2.1	0.15	75	2.0	9.6	25	3.3	1.9	2.8	0	0	0.0	0.0	3350	0.6	8	7.0	0	0.0	0.0	0.0	19.4	11.6
SCE-5	2.1	0.15	150	3.0	14.2	830	2.7	2.7	2.8	0	0	0.0	0.0	556	1.2	7	1.3	0	0.0	0.0	0.0	18.3	11.0
SCE-6	2.1	0.15	25	2.0	4.0	25	3.1	3.0	2.8	0	0	0.0	0.0	123	1.5	8	0.3	0	0.0	0.0	0.0	7.0	4.2
SCE-7	2.1	0.15	100	2.0	12.1	400	2.9	2.1	2.8	0	0	0.0	0.0	754	1.8	7	1.8	0	0.0	0.0	0.0	16.7	10.0
SCE-8	2.1	0.15	100	2.0	12.1	300	2.8	3.4	2.8	0	0	0.0	0.0	650	1.5	7	1.5	0	0.0	0.0	0.0	16.4	9.9
SCE-9	2.1	0.15	35	2.0	5.2	25	3.5	3.6	3.7	0	0	0.0	0.0	100	2.0	8	0.2	0	0.0	0.0	0.0	9.1	5.5
SCE-10	2.1	0.15	150	2.0	16.7	900	2.5	2.2	2.9	0	0	0.0	0.0	2700	1.6	8	5.6	0	0.0	0.0	0.0	25.3	15.2
SCE-11	2.1	0.15	25	2.0	4.0	25	3	3.0	3.5	0	0	0.0	0.0	400	3.0	7	1.0	0	0.0	0.0	0.0	8.4	5.1
SCE-13	2.1	0.15	160	2.0	17.6	500	2.5	2.5	3.1	0	0	0.0	0.0	500	2.4	6	1.4	0	0.0	0.0	0.0	22.1	13.3
SCE-14	2.1	0.15	160	2.0	17.6	450	2.5	2.2	2.9	0	0	0.0	0.0	500	2.0	8	1.0	0	0.0	0.0	0.0	21.6	12.9

DCM TABLE 6-25 WAS USED FOR SHALLOW CONCENTRATED SWALE & GUTTER FLOW
N VALUE FOR OVERLAND FLOW WAS ASSUMED TO BE 0.15 FOR ALL BASINS
A ROUGHNESS COEFFICENT OF 0.050 WAS USED FOR EARTHEN CHANNEL BOTTOMS
A ROUGHNESS COEFFICENT OF 0.013 WAS USED FOR CONCRETE LINED CONVEYANCES

HY-8 Culvert Analysis Report

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0 cfs

Design Flow: 1550 cfs

Maximum Flow: 2600 cfs

Table 1 - Summary of Culvert Flows at Crossing: SRR (separate berm)

Headwater Elevation (ft)	Total Discharge (cfs)	Culvert 1 Discharge (cfs)	Culvert 2 (low flow) Discharge (cfs)	Roadway Discharge (cfs)	Iterations
7000.88	0.00	0.00	0.00	0.00	0
7003.13	260.00	151.32	108.64	0.00	3
7004.37	520.00	339.63	180.32	0.00	4
7005.52	780.00	552.62	227.38	0.00	4
7006.71	1040.00	773.45	266.59	0.00	4
7008.18	1300.00	994.87	305.19	0.00	4
7009.91	1550.00	1205.48	344.57	0.00	4
7011.14	1820.00	1333.23	369.90	115.89	7
7011.40	2080.00	1359.45	375.23	344.67	5
7011.62	2340.00	1380.22	379.47	580.03	5
7011.81	2600.00	1398.22	383.17	817.61	4
7010.88	1672.34	1307.58	364.76	0.00	Overtopping

Rating Curve Plot for Crossing: SRR (separate berm)

Total Rating Curve

Crossing: SRR (separate berm)

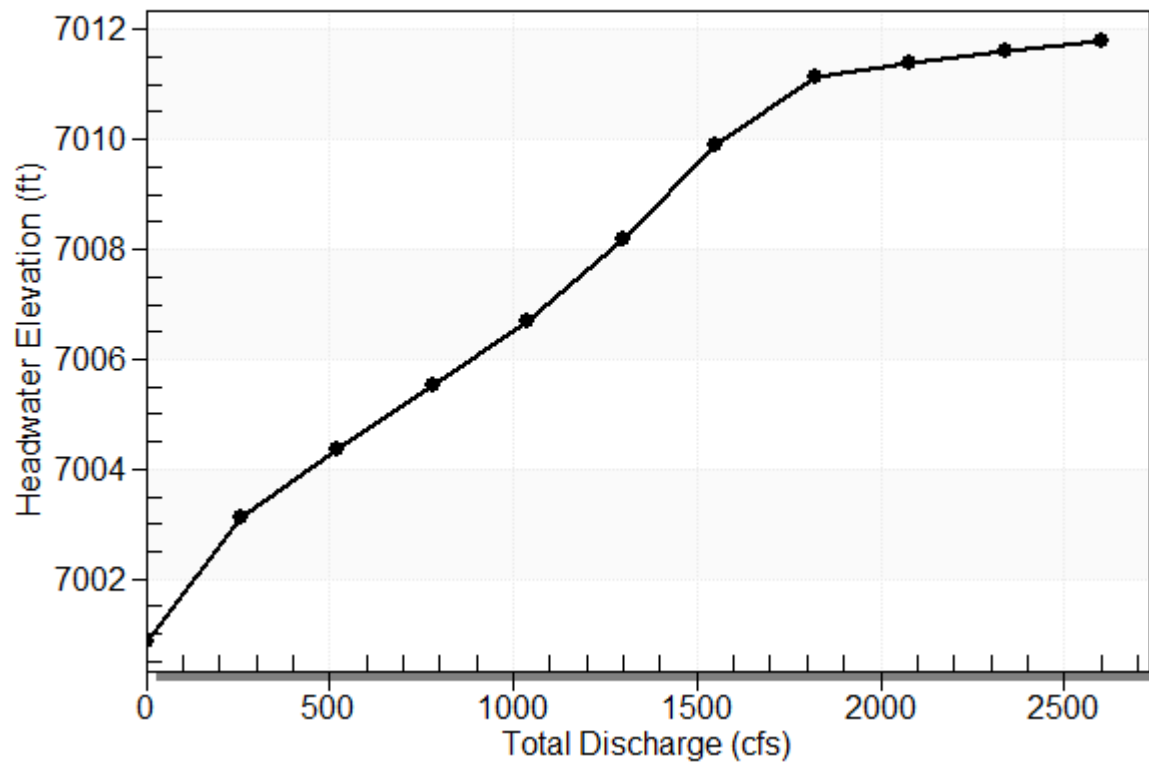


Table 2 - Culvert Summary Table: Culvert 1

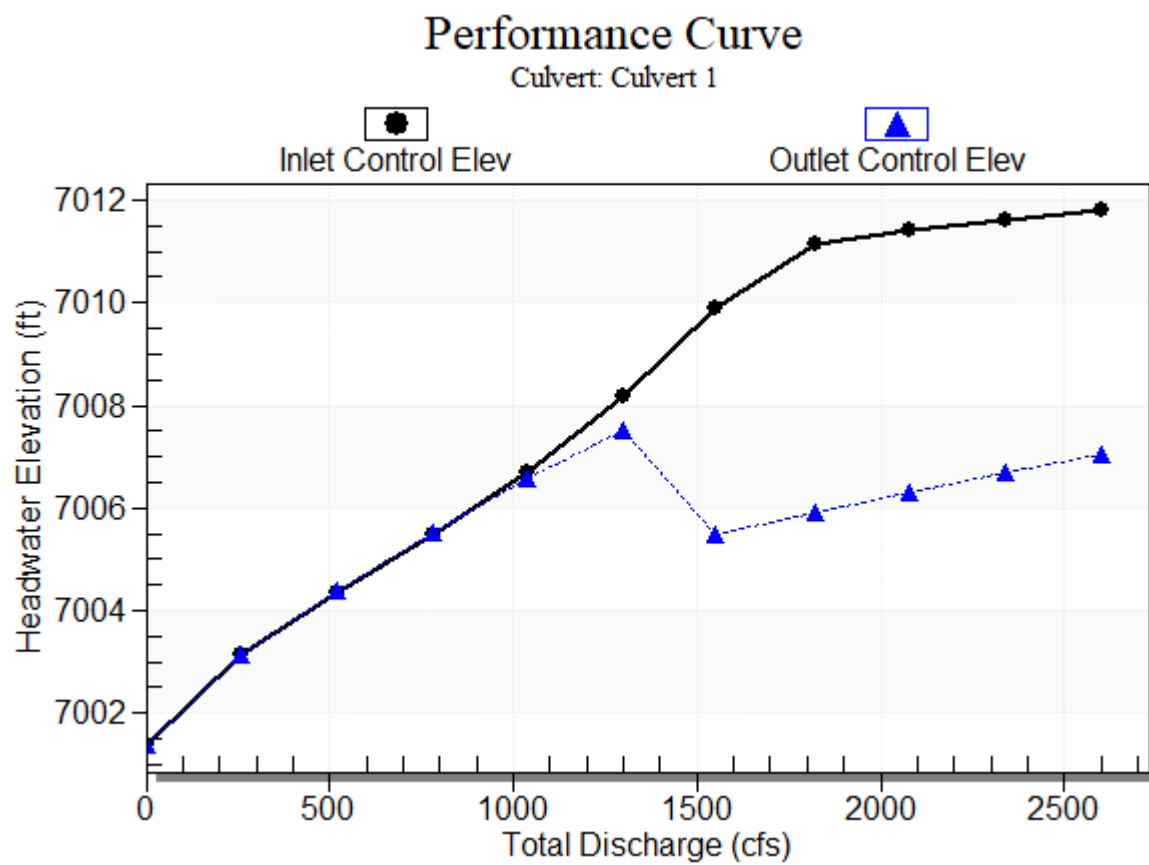
Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
0.00	0.00	7000.88	0.000	0.000	0-NF	0.000	0.000	0.000	0.000	0.000	0.000
260.00	151.32	7003.13	1.745	1.751	3-M2t	1.225	1.017	1.177	1.738	4.944	2.537
520.00	339.63	7004.37	2.954	2.998	3-M2t	2.077	1.743	2.032	2.593	6.429	3.216
780.00	552.62	7005.52	4.097	4.143	3-M2t	2.886	2.412	2.703	3.264	7.863	3.673
1040.00	773.45	7006.71	5.326	5.184	3-M2t	3.644	3.018	3.274	3.835	9.085	4.027
1300.00	994.87	7008.18	6.800	6.142	7-M2t	4.000	3.569	3.780	4.341	10.124	4.318
1550.00	1205.48	7009.91	8.531	4.111	5-M2t	4.000	4.000	3.780	4.781	0.000	4.558
1820.00	1333.23	7011.14	9.756	4.548	5-M2t	4.000	4.000	3.780	5.218	10.124	4.786
2080.00	1359.45	7011.40	10.024	4.939	5-M2t	4.000	4.000	3.780	5.609	10.124	4.982
2340.00	1380.22	7011.62	10.241	5.306	5-M2t	4.000	4.000	3.780	5.976	10.124	5.159
2600.00	1398.22	7011.81	10.431	5.652	5-M2t	4.000	4.000	3.780	6.322	10.124	5.322

Straight Culvert

Inlet Elevation (invert): 7001.38 ft, Outlet Elevation (invert): 7001.27 ft

Culvert Length: 84.00 ft, Culvert Slope: 0.0013

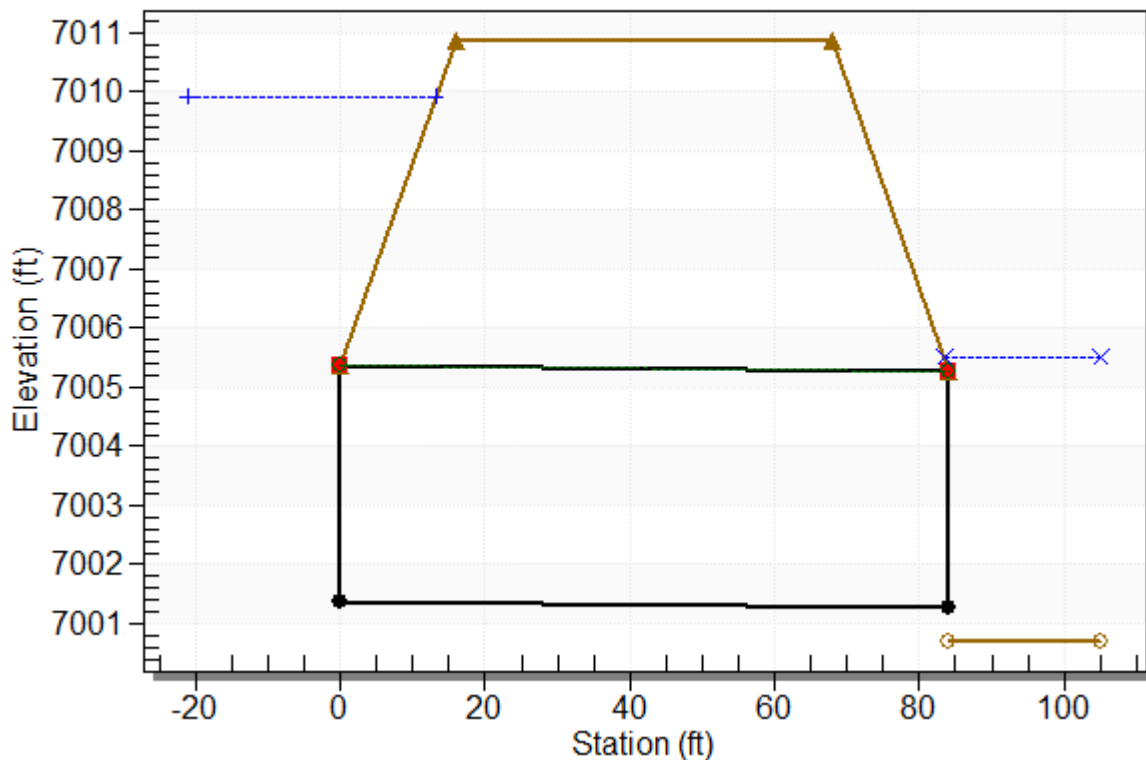
Culvert Performance Curve Plot: Culvert 1



Water Surface Profile Plot for Culvert: Culvert 1

Crossing - SRR (separate berm), Design Discharge - 1550.0 cfs

Culvert - Culvert 1, Culvert Discharge - 1205.5 cfs



Site Data - Culvert 1

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 7001.38 ft

Outlet Station: 84.00 ft

Outlet Elevation: 7001.27 ft

Number of Barrels: 2

Culvert Data Summary - Culvert 1

Barrel Shape: Concrete Box

Barrel Span: 13.00 ft

Barrel Rise: 4.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge (90°) Headwall

Inlet Depression: None

Table 3 - Culvert Summary Table: Culvert 2 (low flow)

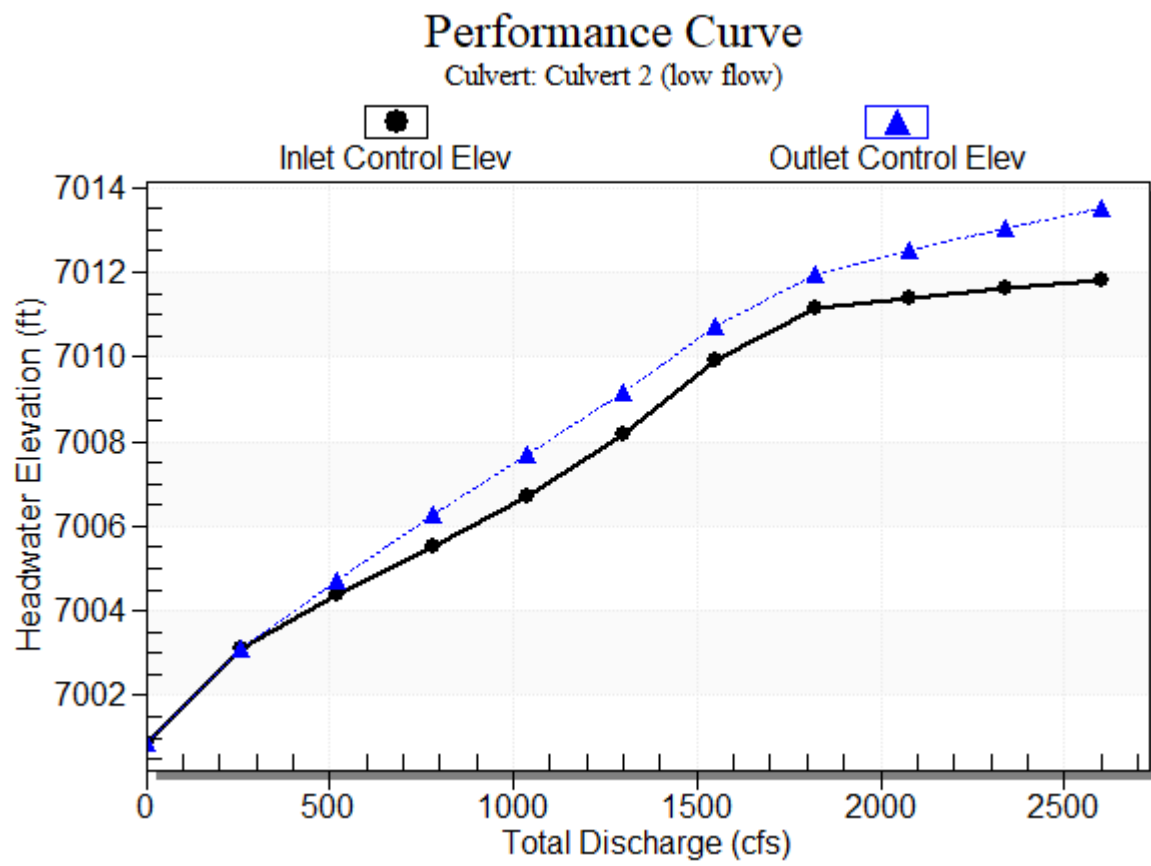
Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
0.00	0.00	7000.88	0.000	0.000	0-NF	0.000	0.000	0.000	0.000	0.000	0.000
260.00	108.64	7003.13	2.213	2.235	7-M1t	1.340	1.294	1.738	1.738	4.808	2.537
520.00	180.32	7004.37	3.494	3.860	4-FFf	1.865	1.815	2.000	2.593	6.935	3.216
780.00	227.38	7005.52	4.644	5.380	4-FFf	2.000	2.000	2.000	3.264	8.745	3.673
1040.00	266.59	7006.71	5.825	6.807	4-FFf	2.000	2.000	2.000	3.835	10.253	4.027
1300.00	305.19	7008.18	7.300	8.288	4-FFf	2.000	2.000	2.000	4.341	11.738	4.318
1550.00	344.57	7009.91	9.031	9.860	4-FFf	2.000	2.000	2.000	4.781	13.253	4.558
1820.00	369.90	7011.14	10.255	11.097	4-FFf	2.000	2.000	2.000	5.218	14.227	4.786
2080.00	375.23	7011.40	10.524	11.663	4-FFf	2.000	2.000	2.000	5.609	14.432	4.982
2340.00	379.47	7011.62	10.740	12.172	4-FFf	2.000	2.000	2.000	5.976	14.595	5.159
2600.00	383.17	7011.81	10.931	12.642	4-FFf	2.000	2.000	2.000	6.322	14.737	5.322

Straight Culvert

Inlet Elevation (invert): 7000.88 ft, Outlet Elevation (invert): 7000.71 ft

Culvert Length: 84.00 ft, Culvert Slope: 0.0020

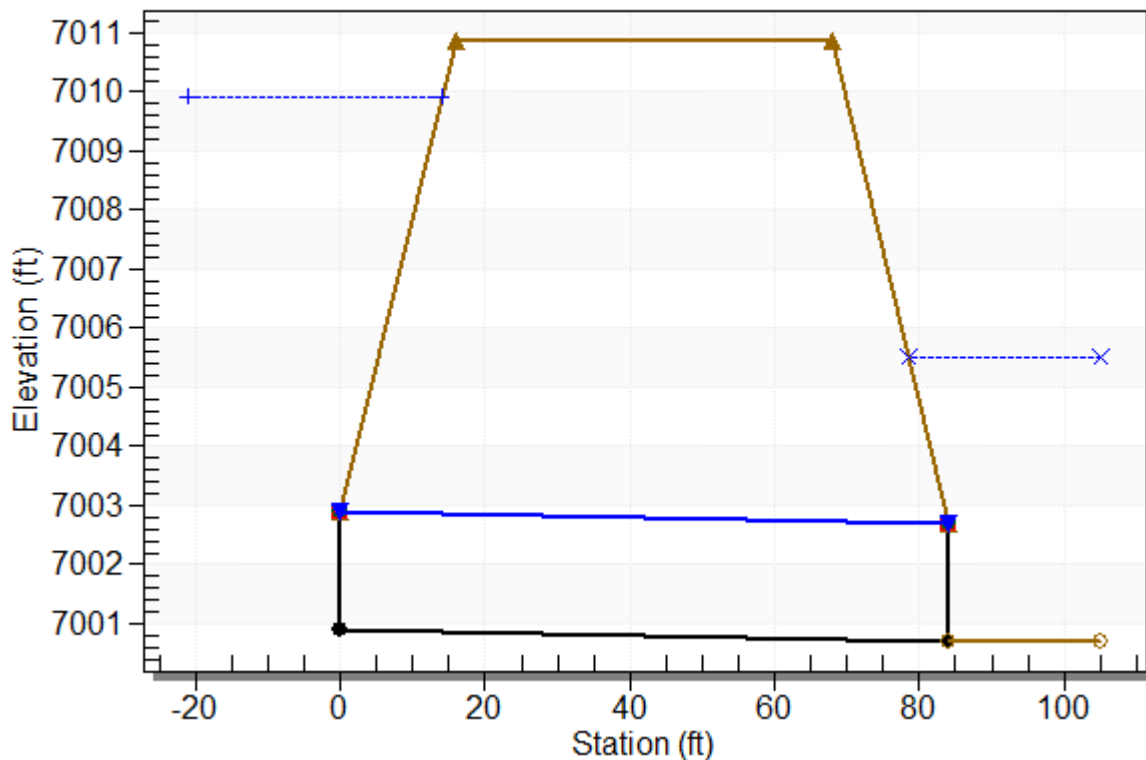
Culvert Performance Curve Plot: Culvert 2 (low flow)



Water Surface Profile Plot for Culvert: Culvert 2 (low flow)

Crossing - SRR (separate berm), Design Discharge - 1550.0 cfs

Culvert - Culvert 2 (low flow), Culvert Discharge - 344.6 cfs



Site Data - Culvert 2 (low flow)

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 7000.88 ft

Outlet Station: 84.00 ft

Outlet Elevation: 7000.71 ft

Number of Barrels: 1

Culvert Data Summary - Culvert 2 (low flow)

Barrel Shape: Concrete Box

Barrel Span: 13.00 ft

Barrel Rise: 2.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge (90°) Headwall

Inlet Depression: None

Table 4 - Downstream Channel Rating Curve (Crossing: SRR (separate berm))

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
0.00	7000.71	0.00	0.00	0.00	0.00
260.00	7002.45	1.74	2.54	0.22	0.36
520.00	7003.30	2.59	3.22	0.32	0.38
780.00	7003.97	3.26	3.67	0.41	0.39
1040.00	7004.55	3.84	4.03	0.48	0.40
1300.00	7005.05	4.34	4.32	0.54	0.41
1550.00	7005.49	4.78	4.56	0.60	0.41
1820.00	7005.93	5.22	4.79	0.65	0.42
2080.00	7006.32	5.61	4.98	0.70	0.42
2340.00	7006.69	5.98	5.16	0.75	0.43
2600.00	7007.03	6.32	5.32	0.79	0.43

Tailwater Channel Data - SRR (separate berm)

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 52.00 ft

Side Slope (H:V): 4.00 (4:1)

Channel Slope: 0.0020

Channel Manning's n: 0.0350

Channel Invert Elevation: 7000.71 ft

Roadway Data for Crossing: SRR (separate berm)

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 300.00 ft

Crest Elevation: 7010.88 ft

Roadway Surface: Paved

Roadway Top Width: 52.00 ft

Existing Stock Pond 1 Proposed Outlet Structure

width	25	area	625	open area x 70%	218.75	0.25
length	25	blockage	0.5			
perimeter	100	blockage	0	avail perm.	100	
Elev (ft)	Head (ft)			Orifice	Weir	
7036	0			0	0	
7036.25	0.25			526.6381	38.75	
7036.5	0.5			744.7787	109.6016	
7036.75	0.75			912.1639	201.3509	
7037	1			1053.276	310	
7037.25	1.25			1177.599	433.2382	
7037.5	1.5			1289.995	569.5064	
7037.75	1.75			1393.353	717.66	
7038	2			1489.557	876.8124	
7038.25	2.25			1579.914	1046.25	
7038.5	2.5			1665.376	1225.383	
7038.75	2.75			1746.661	1413.711	
7039	3			1824.328	1610.807	
7039.25	3.25			1898.821	1816.296	
7039.5	3.5			1970.499	2029.849	
7039.75	3.75			2039.66	2251.172	
7040	4			2106.552	2480	
7040.25	4.25			2171.384	2716.096	
7040.5	4.5			2234.336	2959.242	
7040.75	4.75			2295.562	3209.239	
7041	5			2355.197	3465.905	
7041.25	5.25			2413.359	3729.071	
7041.5	5.5			2470.152	3998.579	
7041.75	5.75			2525.667	4274.285	
7042	6			2579.989	4556.051	
7042.25	6.25			2633.19	4843.75	
7042.5	6.5			2685.338	5137.262	
7042.75	6.75			2736.492	5436.474	
7043	7			2786.707	5741.28	
7043.25	7.25			2836.033	6051.579	
7043.5	7.5			2884.516	6367.275	
7043.75	7.75			2932.197	6688.277	
7044	8			2979.115	7014.499	
7044.25	8.25			3025.305	7345.859	
7044.5	8.5			3070.801	7682.279	
7044.75	8.75			3115.633	8023.683	
7045	9			3159.828	8370	
7045.25	9.25			3203.414	8721.161	
7045.5	9.5			3246.415	9077.1	
7045.75	9.75			3288.854	9437.753	
7046	10			3330.752	9803.061	
7046.25	10.25			3372.129	10172.96	
7046.5	10.5			3413.005	10547.41	
7046.75	10.75			3453.397	10926.33	
7047	11			3493.322	11309.69	
7047.25	11.25			3532.796	11697.43	
7047.5	11.5			3571.833	12089.5	
7047.75	11.75			3610.449	12485.86	
7048	12			3648.656	12886.46	

Existing Stock Pond 2 Proposed Outlet Structure

width	25	area	625	open area x 70%	218.75
length	25	blockage	0.5		
perimeter	100	blockage	0	avail perm.	100
Elev (ft)	Head (ft)			Orifice	Weir
7117.75	0			0	0
7118	0.25			526.6381	38.75
7118.25	0.5			744.7787	109.6016
7118.5	0.75			912.1639	201.3509
7118.75	1			1053.276	310
7119	1.25			1177.599	433.2382
7119.25	1.5			1289.995	569.5064
7119.5	1.75			1393.353	717.66
7119.75	2			1489.557	876.8124
7120	2.25			1579.914	1046.25
7120.25	2.5			1665.376	1225.383
7120.5	2.75			1746.661	1413.711
7120.75	3			1824.328	1610.807
7121	3.25			1898.821	1816.296
7121.25	3.5			1970.499	2029.849
7121.5	3.75			2039.66	2251.172
7121.75	4			2106.552	2480
7122	4.25			2171.384	2716.096
7122.25	4.5			2234.336	2959.242
7122.5	4.75			2295.562	3209.239
7122.75	5			2355.197	3465.905
7123	5.25			2413.359	3729.071
7123.25	5.5			2470.152	3998.579
7123.5	5.75			2525.667	4274.285
7123.75	6			2579.989	4556.051
7124	6.25			2633.19	4843.75
7124.25	6.5			2685.338	5137.262
7124.5	6.75			2736.492	5436.474
7124.75	7			2786.707	5741.28
7125	7.25			2836.033	6051.579
7125.25	7.5			2884.516	6367.275
7125.5	7.75			2932.197	6688.277
7125.75	8			2979.115	7014.499
7126	8.25			3025.305	7345.859
7126.25	8.5			3070.801	7682.279
7126.5	8.75			3115.633	8023.683
7126.75	9			3159.828	8370
7127	9.25			3203.414	8721.161
7127.25	9.5			3246.415	9077.1
7127.5	9.75			3288.854	9437.753
7127.75	10			3330.752	9803.061
7128	10.25			3372.129	10172.96
7128.25	10.5			3413.005	10547.41
7128.5	10.75			3453.397	10926.33
7128.75	11			3493.322	11309.69
7129	11.25			3532.796	11697.43
7129.25	11.5			3571.833	12089.5
7129.5	11.75			3610.449	12485.86
7129.75	12			3648.656	12886.46

Existing vs. Proposed Peak Flow Rate Design Point Summary

Design Point	Existing	Proposed	%	Existing	Proposed		Existing	Proposed	%	Existing	Proposed	%	Existing	Proposed	%	Existing	Proposed	%
	Q ₂ (cfs)	Q ₂ (cfs)		Q ₅ (cfs)	Q ₅ (cfs)		Q ₁₀ (cfs)	Q ₁₀ (cfs)		Q ₂₅ (cfs)	Q ₂₅ (cfs)		Q ₅₀ (cfs)	Q ₅₀ (cfs)		Q ₁₀₀ (cfs)	Q ₁₀₀ (cfs)	
DP-73	171.2	146.94	-14%	503.09	442.08	-12%	791.79	703.27	-11%	1033.04	919.42	-11%	1414.41	1258.08	-11%	1672.0	1501	-10%
DP-71	175	149.9	-14%	518.37	482.49	-7%	818.24	775.61	-5%	1068.91	1017.54	-5%	1466.2	1379.22	-6%	1734.9	1627.14	-6%
DP-69	189.69	152.58	-20%	579.88	535.56	-8%	923.83	871.26	-6%	1213.68	1149.22	-5%	1675.53	1564.42	-7%	1988.4	1827.02	-8%
DP-63	175.18	130.32	-26%	557.4	432.3	-22%	899.71	722.71	-20%	1192.36	980.68	-18%	1661.58	1347.87	-19%	1980.7	1580.46	-20%
DP-60A	167.91	141.82	-16%	546.35	487.69	-11%	886.79	814.13	-8%	1179	1106.07	-6%	1649.04	1538.1	-7%	1969.2	1889.36	-4%
DP-53A	182.7	141.85	-22%	602.01	488.28	-19%	983.58	816.56	-17%	1311.23	1108.96	-15%	1837.86	1541.94	-16%	2197.7	1895.22	-14%
DP-56	0.4	25.31	7131%	40.19	45.74	14%	96.37	65.36	-32%	141.51	84.3	-40%	207.98	121.98	-41%	242.9	144.77	-40%
DP-8	2.0	27.43	1292%	50.28	49.21	-2%	115.07	69.75	-39%	167.23	89.22	-47%	245.12	122.68	-50%	297.4	146.21	-51%

Existing vs. Proposed Total Runoff Volume Design Point Summary

Design Point	Existing	Proposed	%	Existing	Proposed		Existing	Proposed	%	Existing	Proposed	%	Existing	Proposed	%	Existing	Proposed	%
	V ₂ (ac-ft)	V ₂ (ac-ft)		V ₅ (ac-ft)	V ₅ (ac-ft)		V ₁₀ (ac-ft)	V ₁₀ (ac-ft)		V ₂₅ (ac-ft)	V ₂₅ (ac-ft)		V ₅₀ (ac-ft)	V ₅₀ (ac-ft)		V ₁₀₀ (ac-ft)	V ₁₀₀ (ac-ft)	
DP-73	19.9	20.59	4%	51.9	52.17	1%	78.6	78.56	0%	101.0	100.66	0%	136.3	135.64	0%	159.9	158.97	-1%
DP-71	20.7	25.07	21%	54.6	60.76	11%	82.6	90.53	10%	106.2	115.39	9%	143.6	154.98	8%	168.5	181.37	8%
DP-69	24.0	29.22	22%	64.4	71.81	11%	98.2	107.10	9%	126.4	136.26	8%	171.2	181.37	6%	201.0	211.14	5%
DP-63	25.9	58.31	125%	69.7	124.60	79%	105.9	180.76	71%	136.3	226.48	66%	184.4	297.07	61%	216.4	343.71	59%
DP-60A	26.1	85.93	229%	71.2	170.63	140%	108.6	242.44	123%	139.6	301.06	116%	189.0	389.75	106%	221.9	448.06	102%
DP-53A	31.6	86.54	174%	84.1	171.55	104%	128.0	243.98	91%	164.5	302.90	84%	221.9	392.82	77%	260.5	451.12	73%
DP-56	0.1	31.30	50395%	4.0	46.34	1062%	8.7	59.84	584%	12.6	71.50	470%	18.2	89.00	389%	22.0	100.66	357%
DP-8	0.2	32.53	18999%	4.9	48.18	887%	10.3	62.60	511%	14.5	74.57	413%	21.0	93.29	344%	25.3	105.57	317%

Summary of Peak Discharges						
Design Point 75						
Storm Event (YR)	2	5	10	25	50	100
2016 Existing Cond. (cfs)	141	235	377	567	751	951
2021 Existing Cond. (cfs)						971
2018 Developed Cond. (cfs)	141	235	377	567	751	951
2021 Developed Cond. (cfs)	95	275	428	555	754	888
Design Point 77						
Storm Event (YR)	2	5	10	25	50	100
2016 Existing Cond. (cfs)	n/a	n/a	n/a	n/a	n/a	n/a
2021 Existing Cond. (cfs)						
2018 Developed Cond. (cfs)	210	352	581	887	1168	1468
2021 Developed Cond. (cfs)	144	428	674	880	1204	1428
1996 DBPS Existing Cond. (cfs)						2193
1996 DBPS Developed Cond. (cfs)						2262
Design Point 73						
Storm Event (YR)	2	5	10	25	50	100
2016 Existing Cond. (cfs)	226	381	618	957	1260	1582
2021 Existing Cond. (cfs)						1672
2018 Developed Cond. (cfs)	208	354	589	897	1187	1507
2021 Developed Cond. (cfs)	147	442	703	919	1258	1501
Design Point 71						
Storm Event (YR)	2	5	10	25	50	100
2016 Existing Cond. (cfs)	229	389	630	979	1277	1638
2021 Existing Cond. (cfs)						1735
2018 Developed Cond. (cfs)	206	349	611	932	1227	1612
2021 Developed Cond. (cfs)	150	482	776	1018	1379	1627
Design Point 69						
Storm Event (YR)	2	5	10	25	50	100
2016 Existing Cond. (cfs)	253	435	708	1100	1453	1870
2021 Existing Cond. (cfs)						1988
2018 Developed Cond. (cfs)	213	367	654	1011	1364	1776
2021 Developed Cond. (cfs)	153	536	871	1149	1564	1827
Design Point 68						
Storm Event (YR)	2	5	10	25	50	100
2016 Existing Cond. (cfs)	n/a	n/a	n/a	n/a	n/a	n/a
2021 Existing Cond. (cfs)						
2018 Developed Cond. w/o Pnd (cfs)	215	375	715	1188	1675	2204
2021 Developed Cond. (cfs)						
2018 Developed w/Pnd (cfs) Pnd W3	154	200	367	800	1086	1351
2021 Developed Cond. w/ Pnd(cfs)	98	513	952	1336	1863	2202
Design Point 63						
Storm Event (YR)	2	5	10	25	50	100
2016 Existing Cond. (cfs)	251	431	713	1113	1496	1912
2021 Existing Cond. (cfs)						1981
2018 Developed Cond. w/o Pnd (cfs)	213	373	721	1198	1705	2237
2018 Developed w/Pnd (cfs)	154	201	376	816	1112	1385
2021 Developed Cond. w/ Pnd(cfs)	130	432	723	981	1348	1580
2011 Wilson (cfs)			1066			1791
1996 DBPS Existing Cond. (cfs)						2508
1996 DBPS Developed Cond. (cfs)						2689
Design Point 61						
Storm Event (YR)	2	5	10	25	50	100
2016 Existing Cond. (cfs)	n/a	n/a	n/a	n/a	n/a	n/a
2018 Developed Cond. w/o Pnd (cfs)	214	375	783	1370	1967	2607
2018 Developed w/Pnd (cfs)	157	224	428	928	1287	1620
2021 Developed Cond. w/ Pnd(cfs)						1913
2011 Wilson (cfs)			1232			2087
Design Point 60a						
Storm Event (YR)	2	5	10	25	50	100
2016 Existing Cond. (cfs)	248	430	707	1113	1497	1914
2021 Existing Cond. (cfs)						1969
2018 Developed Cond. w/o Pnd (cfs)	216	378	795	1395	2004	2645
2018 Developed w/Pnd (cfs)	162	225	439	950	1321	1662
2021 Developed Cond. w/ Pnd(cfs)	133	480	802	1091	1518	1873
2011 Wilson (cfs)			1265			2133
1996 DBPS Existing Cond. (cfs)						2629
1996 DBPS Developed Cond. (cfs)						3295
Design Point 53a						
Storm Event (YR)	2	5	10	25	50	100
2016 Existing Cond. (cfs)	262	454	763	1197	1610	2062
2021 Existing Cond. (cfs)						2198
2018 Developed Cond. w/o Pnd (cfs)	215	378	792	1392	2009	2657
2018 Developed w/Pnd (cfs)	162	226	442	951	1326	1669
2021 Developed Cond. w/ Pnd(cfs)	142	488	817	1109	1542	1895

MDDP Proposed vs. Amendment Proposed Peak Flow Rate Basin Summary

Basin	MDDP Q2 (cfs)	Amend Q2 (cfs)	% Difference	MDDP Q5 (cfs)	Amend Q5 (cfs)	% Difference	MDDP Q10 (cfs)	Amend Q10 (cfs)	% Difference	MDDP Q25 (cfs)	Amend Q25 (cfs)	% Difference	MDDP Q50 (cfs)	Amend Q50 (cfs)	% Difference	MDDP Q100 (cfs)	Amend Q100 (cfs)	% Difference
SC3-1A	16.3	15.4	-6%	23.3	32.05	38%	33	44.63	35%	45.8	54.22	18%	57.1	68.02	19%	68.9	77.21	12%
SC3-5A	40.6	48.38	19%	53.7	75.2	40%	71	95.88	35%	92.4	112.35	22%	110.6	135.5	23%	129.1	150.82	17%
SC3-5B	53.8	60.26	12%	73	97.13	33%	98.5	126.36	28%	130.8	149	14%	158.6	181.48	14%	187	203.13	9%
SC3-6A	61.4	59.98	-2%	79.3	84.21	6%	102.2	106.32	4%	130.1	123.77	-5%	153.6	149.06	-3%	177.1	165.69	-6%
SC3-6B	32.9	31.63	-4%	43.4	49.78	15%	57	63.88	12%	73.9	74.85	1%	88.2	90.7	3%	102.7	101.25	-1%
SC3-6C	53.9	47.06	-13%	72.5	76.1	5%	97.1	105.16	8%	128	127.64	0%	154.5	159.19	3%	181.5	179.74	-1%
SC3-7	54	60.94	13%	69.9	87.91	26%	90.3	109.28	21%	115.2	126.05	9%	136.2	150.45	10%	157.2	166.71	6%
SC3-8	25.4	12.18	-52%	42.1	56.41	34%	66.7	93.96	41%	100.7	122.75	22%	132.3	166.13	26%	166.2	195.44	18%
SC3-9	45.8	24.66	-46%	71.5	73.44	3%	108.6	114.01	5%	158.9	146.06	-8%	204.9	193.77	-5%	254	225.81	-11%
SC3-10	7.6	2.94	-61%	12.3	14.36	17%	19.4	23.62	22%	29.1	30.77	6%	38	41.33	9%	47.7	48.66	2%
SC3-11A	5.3	3.51	-34%	7.8	7.3	-6%	11.3	10.41	-8%	15.9	12.81	-19%	20	16.43	-18%	24.3	18.84	-22%
SC3-11B	59.4	72.19	22%	81.3	105.66	30%	110.8	133.88	21%	148.1	155.96	5%	180.5	188.03	4%	213.7	209.37	-2%
SC3-12	77.8	67.41	-13%	105.6	101.58	-4%	142.5	129.79	-9%	189.1	151.27	-20%	229.1	183.61	-20%	270	205.11	-24%
SC3-12A		14.58			23.33			30.32			35.61			43.58			48.87	
SC3-13	43.9	56.24	28%	57.8	80.96	40%	76.5	100.72	32%	98.5	115.86	18%	117.6	138.53	18%	136.9	153.6	12%
SC3-14A	127.6	140.63	10%	175.4	205.63	17%	239.8	265.57	11%	321.9	313.32	-3%	393.2	380.84	-3%	466.3	425.59	-9%
SC3-14B	24.6	76.36	210%	34.3	108.26	216%	47.4	137.53	190%	64.2	160.58	150%	79	193.87	145%	94.1	215.7	129%
SC3-15A	21.6	14.69	-32%	35.5	42.69	20%	56.3	65.94	17%	85.3	84.89	0%	112.1	113.9	2%	141	133.28	-5%
SC3-15B	10.8	8.38	-22%	14	12.29	-12%	18.2	15.45	-15%	23.3	17.9	-23%	27.6	21.56	-22%	31.9	24	-25%
SC3-16A	84.4	205.27	143%	120.4	290.98	142%	170	369.4	117%	234.8	431.9	84%	292.2	520.35	78%	351.8	579.11	65%
SC3-16B	39	50.92	31%	53.7	72.27	35%	73.6	91.78	25%	99	107.1	8%	121.1	129.25	7%	143.8	143.79	0%
SC3-17	41.8	23.69	-43%	59.6	36.38	-39%	85.2	46.63	-45%	119	54.42	-54%	149.1	66.17	-56%	180.6	73.97	-59%
SC3-17B		24.31			35.54			44.68			51.73			62.29			69.33	
SC3-18	49.3	22.83	-54%	67.1	35.93	-46%	91	46.67	-49%	121.2	54.88	-55%	147.3	67.27	-54%	174	75.51	-57%
SC3-18B		7.24			20.98			32.18			40.93			54.26			63.16	
SC3-19	28.8	24.89	-14%	47.7	70.19	47%	75.7	107.48	42%	114.4	137.26	20%	150.2	182.95	22%	188.8	213.48	13%
SC3-20	9.9	10.09	2%	15.5	23.17	49%	23.8	33.9	42%	35.1	42.17	20%	45.5	54.58	20%	56.6	62.89	11%
SC3-21	7	9.52	36%	10.8	20.17	87%	16.3	28.72	76%	23.7	35.14	48%	30.4	44.8	47%	37.5	51.25	37%
SC3-22	9.4	8.91	-5%	14.8	20.52	39%	22.5	30.16	34%	32.9	37.67	14%	42.5	48.95	15%	52.6	56.51	7%
SC3-23	5.5	4.37	-21%	8.3	8.8	6%	12.4	12.47	1%	18	15.34	-15%	23	19.69	-14%	28.4	22.58	-20%
SC3-24A	13	6.37	-51%	20.4	15.1	-26%	31.1	22.28	-28%	45.7	28.01	-39%	59	36.72	-38%	73.2	42.55	-42%
SC3-24B	3.4	2.37	-30%	5.3	5.81	10%	8.1	8.66	7%	11.8	10.9	-8%	15.2	14.27	-6%	18.9	16.53	-13%
SC3-25	5.8	5.48	-6%	8.9	11.81	33%	13.4	17.01	27%	19.5	21.07	8%	25.1	27.2	8%	31	31.29	1%
SC3-26	2.5	1	-60%	4	2.91	-27%	6.2	4.5	-27%	9.2	5.76	-37%	12.1	7.7	-36%	15.1	9	-40%
SC3-27	35.1	26.55	-24%	51.2	51.28	0%	73.8	71.94	-3%	103.7	88.36	-15%	130.3	113.37	-13%	158.3	130.07	-18%
SC3-61	13.7	5.61	-59%	22	22.4	2%	34.4	36.4	6%	51.6	47.4	-8%	67.6	63.67	-6%	84.8	74.61	-12%
SC3-72	12.8	9.55	-25%	20.2	23.84	18%	31.4	35.61	13%	46.7	44.98	-4%	60.9	59.19	-3%	76	68.7	-10%
SC3-73	16.4	12.16	-26%	26.4	33.03	25%	41.3	50.14	21%	62.1	63.84	3%	81.3	84.94	4%	102	99.04	-3%
SC3-74	22.3	22.51	1%	36.5	53.27	46%	57.3	79.1	38%	85.9	99.77	16%	112.3	131.03	17%	140.7	151.94	8%
SC3-75	13.1	11.12	-15%	21.5	26.37	23%	33.7	38.98	16%	50.5	49.21	-3%	66.1	64.91	-2%	82.8	75.41	-9%
SC3-76	14.2	10.85	-24%	23.1	27.09	17%	36.4	40.54	11%	54.6	51.45	-6%	71.4	68.18	-5%	89.6	79.38	-11%
SC3-77	16.6	8.93	-46%	27.6	27.11	-2%	43.8	42.16	-4%	66.2	54.46	-18%	87	73.59	-15%	109.4	86.36	-21%
SC3-78	28.1	32.29	15%	45.3	77.46	71%	70.6	114.83	63%	106.2	144.42	36%	139.1	189.21	36%	174.5	219.17	26%
SC3-79	34.9	32.26	-8%	57	82.54	45%	89.5	123.52	38%	134.3	156.01	16%	175.6	205.95	17%	220.1	239.34	9%
SC3-80	27.3	22.36	-18%	44.3	57.34	29%	69.6	86.09	24%	104.5	109.14	4%	136.8	144.5	6%	171.4	168.15	-2%
SC3-81	42.6	26.67	-37%	70.2	81	15%	111	125.85	13%	167.4	162.22	-3%	219.6	218.65	0%	275.7	256.32	-7%
SC3-82	20	17.01	-15%	33.2	50.83	53%	52.8	79.48	51%	80	102.02	28%	105.1	136.18	30%	132.3	158.98	20%
SC3-88	10.5	6.28	-40%	17.4	18.99	9%	27.6	29.44	7%	41.8	37.84	-9%	54.9	50.8	-7%	69	59.46	-14%
SC3-89	6.1	3.64	-40%	10	10.98	10%	15.7	16.98	8%	23.6	21.7	-8%	30.8	28.9	-6%	38.6	33.71	-13%
SCE-1	23.3	9.82	-58%	35.9	21.3	-41%	53.8	30.85	-43%	79.1	38.58	-51%	102.4	50.51	-51%	127.4	58.52	-54%
SCE-2	4.4	1.42	-68%	7	3.35	-52%	10.8	4.95	-54%	15.9	6.27	-61%	20.7	8.3	-60%	25.7	9.66	-62%
SCE-3	30.6	9.63	-69%	45.2	19.25	-57%	65.9	28.62	-57%	93.3	36.11	-61%	118	47.22	-60%	143.9	54.72	-62%
SCE-4	13.3	4.16	-69%	19.6	7.52	-62%	28.6	10.35	-64%	40.6	12.67	-69%	257.8	16.29	-94%	62.6	18.71	-70%
SCE-5	100.4	88.24	-12%	130.6	122.76	-6%	169.6	155.3	-8%	217.4	181.58	-16%	257.8	219.7	-15%	298.4	244.74	-18%
SCE-6	1.6	0.18	-89%	2.5	0.55	-78%	3.7	1.03	-72%	5.4	1.42	-74%	7	2	-71%	8.6	2.39	-72%
SCE-7	58.9	39.33	-33%	75.5	54.94	-27%	96.6	67.52	-30%	122.2	77.22	-37%	143.7	91.69	-36%	165.2	101.34	-39%
SCE-8	38.6	47.1	22%	48.4	61.37	27%	60.7	73.41	21%	75.4	82.94	10%	87.7	97.16	11%	99.9	106.61	7%
SCE-9	1.5	0.22	-85%	2.4	0.68	-72%	3.6	1.27	-65%	5.3	1.75	-67%	6.8	2.46	-64%	8.5	2.94	-65%
SCE-10	7.6	115.17	1415%	189.4	179.69	-5%	19.4	250.23	1190%	29.1	307.87	958%	398.9	388.85	-3%	467.5	441.58	-6%
SCE-11	2.3	0.77	-67%	3.6	2.52	-30%	5.5	4.75	-14%	8	6.5	-19%	10.3	8.93	-13%	12.8	10.51	-18%
SCE-13	19.6	10.9	-44%	31.3	25.85	-17%	48.7	38.21	-22%	73.1	48.24	-34%	95.7	63.64	-34%	120	73.94	-38%
SCE-14	13.2	8	-39%	21.2	19.04	-10%	33.3	28.21	-15%	49.9	35.59	-29%	65.2	46.77	-28%	81.7	54.26	-34%
SCE-15	2.2	13.6	518%	5.1	27.2	433%	10.1	38.53	281%	17.7	47.35	168%	25.1	60.67	142%	35.4	69.54	96%

MDDP Proposed vs. Amendment Proposed Peak Flow Rate Design Point Summary

Design Point	MDDP	Amend	%	MDDP	Amend	%	MDDP	Amend	%	MDDP	Amend	%	MDDP	Amend	%	MDDP	Amend	%
	Q2 (cfs)	Q2 (cfs)		Q5 (cfs)	Q5 (cfs)		Q10 (cfs)	Q10 (cfs)		Q25 (cfs)	Q25 (cfs)		Q50 (cfs)	Q50 (cfs)		Q100 (cfs)	Q100 (cfs)	
DP-74	39.3	33.68	-14%	65.3	94.55	45%	104.8	145.74	39%	158.9	187.2	18%	209.1	251.03	20%	262.8	293.76	12%
DP-75	141.2	95.13	-33%	235.1	274.57	17%	376.6	427.98	14%	566.6	555.2	-2%	750.9	754.29	0%	950.5	887.87	-7%
DP-77	209.9	144.36	-31%	351.9	427.54	21%	580.6	674.49	16%	886.6	880.04	-1%	1168.4	1204.35	3%	1467.7	1427.72	-3%
DP-78	59.7	52.82	-12%	98.4	138.33	41%	154	210.37	37%	232.6	269.64	16%	306.2	360.98	18%	385.3	422.09	10%
DP-73	207.5	146.94	-29%	354.3	442.08	25%	588.5	703.27	20%	897.1	919.42	2%	1187.2	1258.08	6%	1506.7	1501	0%
DP-72	206.2	148.81	-28%	352.5	452.4	28%	586.7	721.06	23%	897.2	943.85	5%	1195.3	1288.24	8%	1518.6	1533.04	1%
DP-71	205.9	149.9	-27%	349.3	482.49	38%	610.5	775.61	27%	932.4	1017.54	9%	1226.9	1379.22	12%	1612.2	1627.14	1%
DP-70	205.3	150.16	-27%	349.8	487.36	39%	614	785.02	28%	940.1	1030.45	10%	1260.6	1398.64	11%	1636.7	1648.68	1%
DP-69	212.7	152.58	-28%	366.6	535.56	46%	653.7	871.26	33%	1010.6	1149.22	14%	1364.1	1564.42	15%	1775.7	1827.02	3%
DP-87	216.9	150.04	-31%	374.6	557.29	49%	681.9	918.47	35%	1072.1	1216.59	13%	1471.5	1696.05	15%	1905.9	2011.71	6%
DP-68	214.6	98.39	-54%	374.5	512.95	37%	714.9	951.59	33%	1187.6	1335.56	12%	1674.9	1863.02	11%	2204.1	2202.16	0%
DP-64	85.9	91.34	6%	112.1	135.67	21%	145.9	170.56	17%	187.5	198.05	6%	222.6	238.16	7%	258	264.76	3%
DP-63	154.4	130.32	-16%	201	432.3	115%	375.7	722.71	92%	815.9	980.68	20%	1112.1	1347.87	21%	1385.1	1580.46	14%
DP-61	156.6	133.17	-15%	223.9	479.78	114%	428	802.47	87%	928.2	1091.45	18%	1287.3	1518.06	18%	1620.1	1873.16	16%
DP-60A	161.6	141.82	-12%	224.8	487.69	117%	439.1	814.13	85%	950.4	1106.07	16%	1320.5	1538.1	16%	1661.8	1889.36	14%
DP-53A	161.6	141.85	-12%	225.7	488.28	116%	441.8	816.56	85%	951.1	1108.96	17%	1326	1541.94	16%	1668.9	1895.22	14%
DP-1E	23.9	12.41	-48%	38.3	29.33	-23%	70.1	43.32	-38%	132.8	54.71	-59%	173	72.19	-58%	220.9	83.88	-62%
DP-2E	48.9	25	-49%	76.8	56.23	-27%	123	82.19	-33%	228.7	103.33	-55%	319.7	135.83	-58%	419.4	157.53	-62%
DP-3E	48.5	27.53	-43%	75.7	60.36	-20%	122.2	88.05	-28%	271.1	111.2	-59%	387.1	160.33	-59%	500.1	205.49	-59%
DP-4E	48.1	29.33	-39%	76.2	63.53	-17%	122.4	93.04	-24%	286.9	117.69	-59%	407.3	169.81	-58%	534.8	214.58	-60%
DP-56	23.1	25.31	10%	35.3	45.74	30%	71.5	65.36	-9%	108.3	84.3	-22%	152.1	121.98	-20%	196.4	144.77	-26%
DP-8	24.1	27.43	14%	37.2	49.21	32%	73.5	69.75	-5%	111.3	89.22	-20%	155.4	122.68	-21%	200.7	146.21	-27%
DP-21	0.6	83.26	13777%	8.8	135.34	1438%	17.8	157.62	786%	57.1	168.07	194%	116.8	175.88	51%	174.9	175.87	1%
DP-22	0.6	64.01	10568%	8.8	116.13	1220%	17.6	138.34	686%	56.8	148.78	162%	105.1	156.5	49%	156.4	156.5	0%
DP-25	5.9	5.48	-7%	9.1	11.81	30%	16.3	17.01	4%	35.1	21.07	-40%	46.4	27.2	-41%	58.2	31.29	-46%
DP-26	0.1	14.77	14670%	1.1	42.79	3790%	3.2	70.03	2088%	7.3	91.26	1150%	9.5	122.38	1188%	12	143.11	1093%
EX_STOCK_POND_1		140.25			536.6			892.43			1190.7			1663.93			1977.61	
EX_STOCK_POND_2		150.16			487.36			785.02			1030.45			1398.64			1648.68	
PNDE7	46.5	33.38	-28%	75.4	70.58	-6%	121.2	103.35	-15%	285.2	130.43	-54%	402.4	203.13	-50%	548	263.89	-52%
PNDW3	214.6	98.39	-54%	374.5	512.95	37%	714.9	951.59	33%	1187.6	1335.56	12%	1674.9	1863.02	11%	2204.1	2202.16	0%

Is detention not assumed?

MDDP Proposed vs. Amendment Total Runoff Volume Proposed Design Point Summary

Design Point	MDDP	Amend	%	MDDP	Amend		MDDP	Amend	%	MDDP	Amend	%	MDDP	Amend	%	MDDP	Amend	%
	V2 (ac-ft)	V2 (ac-ft)		V5 (ac-ft)	V5 (ac-ft)		V10 (ac-ft)	V10 (ac-ft)		V25 (ac-ft)	V25 (ac-ft)		V50 (ac-ft)	V50 (ac-ft)		V100 (ac-ft)	V100 (ac-ft)	
DP-74	5.9	3.03	-49%	9	7.67	-15%	13.6	11.57	-15%	19.8	14.82	-25%	25.5	20.04	-21%	31.6	23.51	-26%
DP-75	22.7	11.05	-51%	34.5	28.82	-16%	51.7	43.58	-16%	75.4	56.16	-26%	97.1	75.80	-22%	120.5	89.00	-26%
DP-77	37.7	18.87	-50%	57.4	48.80	-15%	85.9	73.35	-15%	125.1	94.21	-25%	161.1	127.05	-21%	199.9	148.84	-26%
DP-78	8.9	4.91	-45%	13.5	11.69	-13%	20.1	17.40	-13%	29.3	22.25	-24%	37.7	29.86	-21%	46.7	34.99	-25%
DP-73	40	20.59	-49%	60.8	52.17	-14%	91	78.56	-14%	132.5	100.66	-24%	170.7	135.64	-21%	211.7	158.97	-25%
DP-72	41.3	21.39	-48%	62.9	54.01	-14%	94	81.02	-14%	136.8	103.73	-24%	176.2	139.94	-21%	218.5	163.88	-25%
DP-71	46.3	25.07	-46%	70	60.76	-13%	104.3	90.53	-13%	151.3	115.39	-24%	194.5	154.98	-20%	240.8	181.37	-25%
DP-70	49.5	27.07	-45%	74.5	63.53	-15%	110.6	93.91	-15%	160.1	119.38	-25%	205.4	159.58	-22%	254	186.59	-27%
DP-69	57.5	29.22	-49%	86.1	71.81	-17%	127.4	107.10	-16%	183.8	136.26	-26%	235.3	181.37	-23%	290.6	211.14	-27%
DP-87	66.5	36.52	-45%	98.9	85.01	-14%	145.6	125.21	-14%	209.1	158.35	-24%	267.1	209.60	-22%	329.1	243.67	-26%
DP-68	81.8	52.17	-36%	123.7	116.00	-6%	183.9	170.02	-8%	264.9	214.21	-19%	338	282.34	-16%	415.8	328.37	-21%
DP-64	7	7.58	8%	9.1	10.25	13%	11.8	12.52	6%	15.2	14.33	-6%	18.1	17.03	-6%	21.1	18.87	-11%
DP-63	85.6	58.31	-32%	129.5	124.60	-4%	192.3	180.76	-6%	276.7	226.48	-18%	352.8	297.07	-16%	433.5	343.71	-21%
DP-61	103.7	77.34	-25%	157.8	157.74	0%	235.1	225.56	-4%	338.4	280.80	-17%	431.3	365.20	-15%	529.8	420.44	-21%
DP-60A	111	85.93	-23%	168.6	170.63	1%	250.4	242.44	-3%	359.5	301.06	-16%	457.7	389.75	-15%	561.5	448.06	-20%
DP-53A	112	86.54	-23%	170	171.55	1%	252.6	243.98	-3%	362.6	302.90	-16%	461.7	392.82	-15%	566.5	451.12	-20%
DP-1E	3.1	2.48	-20%	5.2	5.19	0%	8.4	7.73	-8%	12.7	10.00	-21%	16.6	13.56	-18%	20.9	15.96	-24%
DP-2E	6.1	6.20	2%	10.4	11.94	15%	16.9	17.25	2%	25.7	21.76	-15%	33.7	28.79	-15%	42.2	33.45	-21%
DP-3E	7	14.58	108%	13.7	23.17	69%	23.4	31.00	32%	36.1	37.75	5%	47.4	47.87	1%	59.3	54.63	-8%
DP-4E	7.6	20.87	175%	15.6	31.30	101%	27.2	41.12	51%	43	49.10	14%	57.2	61.38	7%	72	69.66	-3%
DP-56	7.7	31.30	307%	16.1	46.34	188%	28.6	59.84	109%	51.3	71.50	39%	71.7	89.00	24%	92.9	100.66	8%
DP-8	8	32.53	307%	16.7	48.18	189%	26.6	62.60	135%	53	74.57	41%	74	93.29	26%	95.9	105.57	10%
DP-21	6.3	18.90	200%	11.3	28.63	153%	18.3	37.13	103%	27.5	44.19	61%	35.6	54.63	53%	44	61.68	40%
DP-22	6.3	14.58	131%	10.7	22.19	107%	16.7	28.91	73%	24.6	34.37	40%	31.5	42.35	34%	38.7	47.87	24%
DP-25	1.3	0.40	-69%	1.9	0.79	-58%	2.8	1.12	-60%	4.1	1.40	-66%	5.2	1.84	-65%	6.4	2.14	-67%
DP-26	0.7	1.86	166%	0.9	4.79	432%	1.2	7.24	504%	1.5	9.33	522%	1.8	12.58	599%	2.1	14.79	604%

Full Spectrum Detention Pond Updates											
MDDP By M&S				Proposed Designs By JR & Others							
Name	Peak Inflow	Stored Volume	Peak Release Rate	Name	Design Firm	Peak Inflow	Percent Difference	Stored Volume	Percent Difference	Peak Release Rate	Percent Difference
	100-YR (cfs) From MDDP By M&S	100-YR (ac-ft)	100-YR (cfs)			100-YR (cfs) From MDDP By JR		100-YR (ac-ft)		100-YR (cfs)	
FSD1	68.9	2.2	25.4		Unchanged	77.21	12%	2.3	5%	25.4	0%
FSD5	129.1	5.2	30.1	Pond 1	Matrix	150.8	17%	6.2	19%	3.7	-88%
FSD6	608.6	26.0	149.6	Pond W-6	JR	597.1	-2%	24.6	-5%	139.3	-7%
FSD9	410.1	13.8	289.9	Pond W-4	JR	386	-6%	10.8	-22%	264.75	-9%
FSD11A	24.3	0.6	12.3	Removed							
FSD11B	213.7	8.2	69.5		JR	209.4	-2%	6.7	-18%	77	11%
FSD12	270.0	8.9	103.1	Pond 4	M&S	205.1	-24%	5.8	-35%	103.1	0%
Added - FSD12A				Pond 1	M&S	48.9		1.4		23.4	
FSD13	136.9	5.0	47.2	Pond 8	M&S	153.6	12%	5.1	2%	43.8	-7%
FSD14A	466.3	17.3	142.2		JR	425.6	-9%	16.6	-4%	176.2	24%
FSD14B	94.1	3.8	19.3		Unchanged	215.7	129%	10.2	168%	19.3	0%
FSD15B	31.9	1.0	12		Unchanged	24	-25%	3.1	210%	12	0%
FSD16A	351.8	13.8	128.3		JR	579.1	65%	17.5	27%	128.3	0%
FSD16B	143.8	5.8	28.1		JR	143.8	0%	6.7	16%	28.2	0%
FSD17	180.6	4.7	86.1	Pond C	JR	74.0	-59%	2.7	-43%	26.7	-69%
Added - FSD17B				Pond B	JR	69.3		2.8		24.3	
FSD18	174	5.3	69.6	Pond A	JR	75.5	-57%	2.9	-45%	32.2	-54%
FSD20	56.6	1.2	42.4		Unchanged	62.9	11%	0.5	-58%	44.35	5%
FSD21	37.5	0.8	30.1		Unchanged	51.3	37%	0.9	13%	30.3	1%
FSD22	52.6	1.0	43.8	Pond 1	Classic	56.5	7%	1.5	50%	24	-45%
FSD23	28.4	0.6	18.6		Unchanged	22.6	-20%	0.1	-83%	21.17	14%
FSD27	206.3	4.2	161.9	Pond 2	Classic	167.3	-19%	6.9	64%	91.9	-43%
FSD72	76.0	1.3	73.4		Unchanged	68.7	-10%	1.2	-8%	62.1	-15%
Added				EX Stock Pond 1	JR	1977.6		36.0		1897.2	
Added				EX stock Pond 2		1648.7		8.7		1644.8	
PNDW3	2204.1	78.2	1350.6		JR	2202.2	0%	50.6	-35%	1552.53	15%
FSD-E1	127.4	2.5	84		Unchanged	58.5	-54%	4.4	76%	21.81	-74%
FSD-E2	143.9	3.8	74.7		Unchanged	54.7	-62%	4.2	11%	21.11	-72%
FSD-E3	298.4	11.4	101.3		Unchanged	224.7	-25%	13.6	19%	56.99	-44%
FSD-E4	165.2	6.9	43.6		Unchanged	101.3	-39%	5.3	-23%	4.91	-89%
FSD-E5	99.9	5.3	10		Unchanged	106.6	7%	5.8	9%	3.8	-62%
FSD-E6	467.5	23.7	123.3		Unchanged	441.6	-6%	22.2	-6%	56.78	-54%
PND-E7	548	28.0	196.4		Unchanged	263.9	-52%	16	-43%	144.77	-26%

[TITLE]

::Project Title/Notes

Sterling Ranch 2021 MDDP Amendment

50-YR Type II Storm

[OPTIONS]

::Option Value

FLOW_UNITS CFS

INFILTRATION HORTON

FLOW_ROUTING KINWAVE

LINK_OFFSETS DEPTH

MIN_SLOPE 0

ALLOW_PONDING NO

SKIP_STEADY_STATE NO

START_DATE 01/01/2005

START_TIME 00:00:00

REPORT_START_DATE 01/01/2005

REPORT_START_TIME 00:00:00

END_DATE 01/04/2005

END_TIME 06:00:00

SWEEP_START 01/01

SWEEP_END 12/31

DRY_DAYS 0

REPORT_STEP 00:05:00

WET_STEP 00:05:00

DRY_STEP 01:00:00

ROUTING_STEP 0:00:30

INERTIAL_DAMPING PARTIAL

NORMAL_FLOW_LIMITED BOTH

FORCE_MAIN_EQUATION H-W

VARIABLE_STEP 0.75

LENGTHENING_STEP 0

MIN_SURFAREA 12.557

MAX_TRIALS 8

HEAD_TOLERANCE 0.005

SYS_FLOW_TOL 5

LAT_FLOW_TOL 5

MINIMUM_STEP 0.5

THREADS 1

[FILES]

::Interfacing Files

USE INFLOWS "2518804 CUHP SWMM - PROP Conditions-100YR 24hr Storm.xlsm.txt"

[EVAPORATION]

::Data Source Parameters

::-----

CONSTANT 0.0

DRY_ONLY NO

[JUNCTIONS]

::Name Elevation MaxDepth InitDepth SurDepth Apended

::-----

DP-1E 258.9 0 0 0 0

DP-21 184.2 0 0 0 0

DP-22	224.2	0	0	0	0
DP-25	332.2	0	0	0	0
DP-26	199.2	0	0	0	0
DP-2E	218.9	0	0	0	0
DP-3E	128.9	0	0	0	0
DP-4E	60.5	0	0	0	0
DP-53A	0	0	0	0	0
DP-56	32	0	0	0	0
DP-60A	22.2	0	0	0	0
DP-61	63.2	0	0	0	0
DP-63	98.2	0	0	0	0
DP-64	93.2	0	0	0	0
DP-68	118.4	0	0	0	0
DP-69	203.2	0	0	0	0
DP-70	229.2	0	0	0	0
DP-71	257.2	0	0	0	0
DP-72	283.2	0	0	0	0
DP-73	300.2	0	0	0	0
DP-74	497.2	0	0	0	0
DP-75	432.2	0	0	0	0
DP-77	340.2	0	0	0	0
DP-78	462.2	0	0	0	0
DP-8	0	0	0	0	0
DP-87	157.2	0	0	0	0
FSD9_OUTLET	139.2	0	0	0	0
FSDE1_Outlet	264.9	0	0	0	0
FSDE2_Outlet	228.9	0	0	0	0
FSDE4_Outlet	97.6	0	0	0	0
SC3-10	63.2	0	0	0	0
SC3-11A	98.2	0	0	0	0
SC3-11B	98.2	0	0	0	0
SC3-12	157.2	0	0	0	0
SC3-13	118.6	0	0	0	0
SC3-14A	118.5	0	0	0	0
SC3-14B	184.2	0	0	0	0
SC3-15A	199.2	0	0	0	0
SC3-15B	199.2	0	0	0	0
SC3-16A	224.2	0	0	0	0
SC3-16B	224.2	0	0	0	0
;Homestead North Pond C					
SC3-17B	229.2	0	0	0	0
;Homestead North Pond A					
SC3-18	203.2	0	0	0	0
SC3-17A	203.2	0	0	0	0
SC3-19	245.2	0	0	0	0
SC3-1A	0	0	0	0	0
SC3-20	324.2	0	0	0	0
SC3-21	332.2	0	0	0	0
SC3-22	283.2	0	0	0	0
SC3-23	295.2	0	0	0	0
SC3-24A	300.2	0	0	0	0
SC3-24B	283.2	0	0	0	0
SC3-25	332.2	0	0	0	0
SC3-26	257.2	0	0	0	0
SC3-27	257.2	0	0	0	0
SC3-5A	22.2	0	0	0	0
SC3-5B	0	0	0	0	0

SC3-61	28.2	0	0	0	0
SC3-6A	87.2	0	0	0	0
SC3-6B	93.2	0	0	0	0
SC3-6C	63.2	0	0	0	0
SC3-7	117.2	0	0	0	0
SC3-72	340.2	0	0	0	0
SC3-73	432.2	0	0	0	0
SC3-74	497.2	0	0	0	0
SC3-75	432.2	0	0	0	0
SC3-76	432.2	0	0	0	0
SC3-77	340.2	0	0	0	0
SC3-78	462.2	0	0	0	0
SC3-79	562.2	0	0	0	0
SC3-8	247.2	0	0	0	0
SC3-80	552.2	0	0	0	0
SC3-81	532.2	0	0	0	0
SC3-82	562.2	0	0	0	0
SC3-88	340.2	0	0	0	0
SC3-89	375.2	0	0	0	0
SC3-9	139.2	0	0	0	0
SCE-1	266	0	0	0	0
SCE-10	32.5	0	0	0	0
SCE-11	32.5	0	0	0	0
SCE-13	258.9	0	0	0	0
SCE-14	218.9	0	0	0	0
SCE-2	258.9	0	0	0	0
SCE-3	230	0	0	0	0
SCE-4	218.9	0	0	0	0
SCE-5	128.9	0	0	0	0
SCE-6	128.9	0	0	0	0
SCE-7	98	0	0	0	0
SCE-8	60.5	0	0	0	0
SCE-9	60.5	0	0	0	0
PNDW3_Outfall	118.2	0	0	0	0
79	295	0	0	0	0
80	331	0	0	0	0
SC3-12A	157.2	0	0	0	0
SCE-15	0	0	0	0	0
SC3-18B	203.2	0	0	0	0
81	229	0	0	0	0

[OUTFALLS]

Name	Elevation	Type	Stage Data	Gated	Route To
SC3_OUTFALL	0	FREE		NO	
SCE_OUTFALL	0	FREE		NO	

[STORAGE]

Name	Elev.	MaxDepth	InitDepth	Shape	Curve Name/Params	N/A	Fevap	Psi	Ksat	IMD
;Pond 1 from Aspen Meadows FDR by Matrix dated 01/19										
FSD05	22.2	9	0	TABULAR	FSD05_Storage	0	0			
;Pond W-5 From SR Filing 2 Drainage Report by JR 4/21										
FSD06	63.2	10.5	0	TABULAR	FSD06_Storage	0	0			
;Pond W-4 From SR Filing 2 Report by JR 4/21										
FSD09	139.2	11	0	TABULAR	FSD09_Storage	0	0			
FSD1	0	9	0	TABULAR	FSD01_Storage	0	0			

```

;Pond FSD11B From Sterling Ranch Phase 3 Prelim DR by JR Dated 12/20
FSD11B    98.2  9    0    TABULAR  FSD11B_Storage    0    0
;Pond 4 Sterling Ranch F1 by M&S 7/16
FSD12     157   9    0    TABULAR  FSD12_Storage    0    0
;Pond 8 Sterling Ranch F1 by M&S 7/16
FSD13     118.5 10.5  0    TABULAR  FSD13_Storage    0    0
;Pond FSD14A From Sterling Ranch Phase 3 Prelim DR by JR Dated 12/20
FSD14A    118.4  9    0    TABULAR  FSD14A_Storage    0    0
FSD14B    184.2 10    0    TABULAR  FSD14B_Storage    0    0
FSD15B    199.2 11    0    TABULAR  FSD15B           0    0
FSD16A    224.2 12    0    TABULAR  FSD16A_Storage    0    0
FSD16B    224.2 10    0    TABULAR  FSD16B_Storage    0    0
;Homestead North Pond B
FSD17A    203.2  9    0    TABULAR  FSD17A_Storage    0    0
;Homestead North Pond C
FSD17B    229.2  9    0    TABULAR  FSD17B_Storage    0    0
;Homestead North Pond A
FSD18     203.2  9    0    TABULAR  FSD18_Storage    0    0
FSD20     324.2  9    0    TABULAR  FSD20_Storage    0    0
FSD21     332.2  9    0    TABULAR  FSD21_Storage    0    0
;Pond 1 in Retreat at Timber Ridge by Classic Engineering dated 6/20
FSD22     283.2  8    0    TABULAR  FSD22_Storage    0    0
FSD23     296   9    0    TABULAR  FSD23_Storage    0    0
;Pond 2 in Retreat at Timber Ridge by Classic Engineering dated 6/20
FSD27     257.2 10    0    TABULAR  FSD27_Storage    0    0
FSD72     340.2  9    0    TABULAR  FSD72_Storage    0    0
FSDE1     266   9    0    TABULAR  FSDE1_Storage    0    0
FSDE2     230   9    0    TABULAR  FSDE2_Storage    0    0
FSDE3     128.9  9    0    TABULAR  FSDE3_Storage    0    0
FSDE4     98    10    0    TABULAR  FSDE4_Storage    0    0
FSDE5     60.5  9    0    TABULAR  FSDE5_Storage    0    0
PNDE7     32.5  9    0    TABULAR  PNDE7_Storage    0    0
FSDE6     32.5  9    0    TABULAR  FSDE6_Storage    0    0
PNDW3     118.3 11    0    TABULAR  PNDW3_Storage    0    0
;Existing Stock Pond 1
EX_STOCK_POND_1 142  12    0    TABULAR  EX_STOCKPOND      0    0
;Pond 1 From Homestead Filing 2 by M&S,dated 1/20
FSD12A    157   9.83  0    TABULAR  FSD12A_Storage    0    0
EX_STOCK_POND_2 229.1 7    0    TABULAR  EX_STOCKPOND_2    0    0

```

[CONDUITS]

```

;;Name      From Node    To Node      Length  Roughness InOffset OutOffset InitFlow  MaxFlow
;;-----
RT-1        SC3-81      DP-75        3975   .05      0      0      0      0
RT-10A      SC3-19      DP-69        1940   0.05     0      0      0      0
RT-10B      DP-26       DP-87        1940   0.013    0      0      0      0
RT-11A      81          DP-69        1275   0.05     0      0      0      0
RT-11B      DP-69       DP-87        2960   0.05     0      0      0      0
RT-11C      DP-87       EX_STOCK_POND_1 2590   0.05     0      0      0      0
RT-12A      DP-22       DP-21        2260   0.013    0      0      0      0
RT-12B      DP-21       DP-68        1925   0.013    0      0      0      0
RT-16       SC3-6A      FSD06        1250   0.013    0      0      0      0
RT-17B      FSD9_OUTLET DP-61        3375   0.013    0      0      0      0
RT-18       DP-61       DP-60A       2500   0.05     0      0      0      0
RT-19       SC3-61      DP-60A       1200   0.013    0      0      0      0
RT-1E       FSDE1_Outlet DP-1E        300    .021     0      0      0      0
RT-2        SC3-80      DP-75        4570   0.05     0      0      0      0

```

RT-20	DP-60A	DP-53A	400	0.05	0	0	0	0
RT-21	DP-25	FSD27	3300	0.013	0	0	0	0
RT-22	79	FSD27	2000	.013	0	0	0	0
RT-2E	DP-1E	DP-2E	2000	.02	0	0	0	0
RT-3	SC3-82	DP-74	2360	.05	0	0	0	0
RT-3E	FSDE2_Outlet	DP-2E	400	.021	0	0	0	0
RT-4	DP-74	DP-75	2695	0.05	0	0	0	0
RT-4E	DP-2E	DP-3E	3600	0.021	0	0	0	0
RT-5	DP-75	DP-77	4100	0.05	0	0	0	0
RT-5E	DP-3E	DP-4E	1250	0.021	0	0	0	0
RT-6	SC3-79	DP-78	3030	0.05	0	0	0	0
RT-6B	DP-78	DP-77	6145	0.05	0	0	0	0
RT-6E	FSDE4_Outlet	DP-4E	1485	0.021	0	0	0	0
RT-7A	SC3-89	DP-77	1035	.013	0	0	0	0
RT-7E	DP-4E	PNDE7	1410	0.021	0	0	0	0
RT-8	FSD20	DP-73	625	0.013	0	0	0	0
RT-9A	DP-77	DP-73	2600	0.05	0	0	0	0
RT-9B	DP-73	DP-72	760	0.05	0	0	0	0
RT-9C	DP-72	DP-71	1450	0.05	0	0	0	0
RT-9D	DP-71	DP-70	1490	0.05	0	0	0	0
RT-14	DP-63	DP-61	1765	0.05	0	0	0	0
1	SC3-74	DP-74	1	0.05	0	0	0	0
2	SC3-73	DP-75	1	0.05	0	0	0	0
3	SC3-75	DP-75	1	0.05	0	0	0	0
4	SC3-76	DP-75	1	0.05	0	0	0	0
5	SC3-78	DP-78	1	0.05	0	0	0	0
6	SC3-72	FSD72	1	0.05	0	0	0	0
7	SC3-77	DP-77	1	0.05	0	0	0	0
8	SC3-88	DP-77	1	0.05	0	0	0	0
9	SCE-1	FSDE1	1	0.01	0	0	0	0
10	SCE-2	DP-1E	1	0.01	0	0	0	0
11	SC3-26	DP-71	1	0.05	0	0	0	0
12	SC3-27	FSD27	1	0.05	0	0	0	0
13	SC3-23	FSD23	1	0.05	0	0	0	0
14	SC3-21	FSD21	1	0.05	0	0	0	0
15	SC3-25	DP-25	1	0.05	0	0	0	0
16	SC3-24B	DP-72	1	0.05	0	0	0	0
17	SC3-22	FSD22	1	0.05	0	0	0	0
18	SC3-17B	FSD17B	1	0.05	0	0	0	0
20	SC3-20	FSD20	1	0.05	0	0	0	0
22	SC3-14B	FSD14B	1	0.05	0	0	0	0
24	SC3-14A	FSD14A	1	0.05	0	0	0	0
25	SC3-13	FSD13	1	0.05	0	0	0	0
27	SCE-7	FSDE4	1	0.01	0	0	0	0
28	SCE-8	FSDE5	1	0.01	0	0	0	0
29	SCE-5	FSDE3	1	0.01	0	0	0	0
30	SC3-16B	FSD16B	1	0.05	0	0	0	0
34	SC3-18	FSD18	1	0.05	0	0	0	0
36	SCE-3	FSDE2	1	0.01	0	0	0	0
37	SCE-4	DP-2E	1	0.01	0	0	0	0
38	SC3-9	FSD09	1	0.05	0	0	0	0
RT-17A	SC3-8	FSD09	5000	0.04	0	0	0	0
39	SC3-15A	DP-26	1	0.05	0	0	0	0
40	SC3-15B	FSD15B	1	0.05	0	0	0	0
42	SC3-12	FSD12	1	0.05	0	0	0	0
44	SCE-11	PNDE7	1	0.01	0	0	0	0
45	SCE-9	DP-4E	1	0.01	0	0	0	0

46	SCE-6	DP-3E	1	0.01	0	0	0	0
47	SCE-14	DP-2E	1	0.01	0	0	0	0
48	SCE-13	DP-1E	1	0.01	0	0	0	0
51	SCE-10	FSDE6	1	0.01	0	0	0	0
54	SC3-11B	FSD11B	1	0.05	0	0	0	0
56	SC3-11A	FSD06	1	0.05	0	0	0	0
58	DP-68	PNDW3	1	0.05	0	0	0	0
63	SC3-5A	FSD05	1	0.05	0	0	0	0
65	SC3-1A	FSD1	1	0.05	0	0	0	0
67	DP-53A	SC3_OUTFALL	1	0.05	0	0	0	0
RT-15A	SC3-7	DP-64	900	0.013	0	0	0	0
RT-15B	DP-64	FSD06	1450	0.013	0	0	0	0
69	SC3-6C	FSD06	1	0.05	0	0	0	0
70	SC3-6B	DP-64	1	0.05	0	0	0	0
RT-25	DP-56	DP-8	1300	.05	0	0	0	0
71	DP-8	SCE_OUTFALL	400	0.01	0	0	0	0
74	SC3-10	DP-61	1	0.05	0	0	0	0
75	SC3-24A	DP-73	1	0.05	0	0	0	0
77	SC3-5B	DP-60A	1	0.05	0	0	0	0
78	SC3-17A	FSD17A	1	0.05	0	0	0	0
79	SC3-16A	FSD16A	1	0.05	0	0	0	0
80	80	DP-73	1389	.013	0	0	0	0
81	SC3-12A	FSD12A	1	0.01	0	0	0	0
82	SCE-15	DP-8	1	0.01	0	0	0	0
83	SC3-18B	DP-69	1	.035	0	0	0	0
84	DP-70	EX_STOCK_POND_2	1	0.035	0	0	0	0

[OUTLETS]

Name	From Node	To Node	Offset	Type	QTable/Qcoeff	Qexpon	Gated
------	-----------	---------	--------	------	---------------	--------	-------

FSD01_Outlet	FSD1	DP-53A	0	TABULAR/DEPTH	FSD01_Outlet		NO
--------------	------	--------	---	---------------	--------------	--	----

;From Aspend Meadows FDR by Matrix dated 01/19

FSD05_Outlet	FSD05	DP-60A	0	TABULAR/DEPTH	FSD05_Outlet		NO
FSD06_Outlet	FSD06	DP-61	0	TABULAR/DEPTH	FSD06_Outlet		NO

;Rough calc based on Prelim Sizing

FSD11B_Outlet	FSD11B	DP-63	0	TABULAR/DEPTH	FSD11B_Outlet		NO
FSD12_Outlet	FSD12	DP-87	0	TABULAR/DEPTH	FSD12_Outlet		NO
FSD13_Outlet	FSD13	DP-68	0	TABULAR/DEPTH	FSD13_Outlet		NO

;Rough calc based on Prelim Pond sizing

FSD14A_Outlet	FSD14A	DP-68	0	TABULAR/DEPTH	FSD14A_Outlet		NO
FSD14B_Outlet	FSD14B	DP-21	0	TABULAR/DEPTH	FSD14B_Outlet		NO
FSD15B_Outlet	FSD15B	DP-26	0	TABULAR/DEPTH	FSD15B_Outlet		NO
FSD16A_Outlet	FSD16A	DP-22	0	TABULAR/DEPTH	FSD16A_Outlet		NO
FSD16B_Outlet	FSD16B	DP-22	0	TABULAR/DEPTH	FSD16B_Outlet		NO
FSD17B_Outlet	FSD17B	DP-70	0	TABULAR/DEPTH	FSD17B_Outlet		NO
FSD18_Outlet	FSD18	DP-69	0	TABULAR/DEPTH	FSD18_Outlet		NO
FSD21_Outlet	FSD21	80	0	TABULAR/DEPTH	FSD21_Outlet		NO

;From Retreat at Timber Ridge F1 FDR

FSD22_Outlet	FSD22	DP-72	0	TABULAR/DEPTH	FSD22_Outlet		NO
FSD72_Outlet	FSD72	DP-77	0	TABULAR/DEPTH	FSD72_Outlet		NO
FSD9_Outlet	FSD09	FSD9_OUTLET	0	TABULAR/DEPTH	FSD09_Outlet		NO
FSDE2_Outlet	FSDE2	FSDE2_Outlet	0	TABULAR/DEPTH	FSDE2_Outlet		NO
FSDE3_Outlet	FSDE3	DP-3E	0	TABULAR/DEPTH	FSDE3_Outlet		NO
FSDE4_Outlet	FSDE4	FSDE4_Outlet	0	TABULAR/DEPTH	FSDE4_Outlet		NO
FSDE5_Outlet	FSDE5	DP-4E	0	TABULAR/DEPTH	FSDE5_Outlet		NO
FSDE6_Outlet	FSDE6	PNDE7	0	TABULAR/DEPTH	FSDE6_Outlet		NO
FSDE1_Outlet	FSDE1	FSDE1_Outlet	0	TABULAR/DEPTH	FSDE1_Outlet		NO

PNDE7_Outlet	PNDE7	DP-56	0	TABULAR/DEPTH	FSDE7_Outlet	NO
FSD17A_Outlet	FSD17A	DP-69	0	TABULAR/DEPTH	FSD17A_Outlet	NO
PNDW3_Outlet	PNDW3	DP-63	0	TABULAR/DEPTH	PNDW3	NO

;From Retreat at Timber Ridge F1 FDR

FSD27_Outlet	FSD27	DP-71	0	TABULAR/DEPTH	FSD27_Outlet	NO
EX_STOCK_POND_1_OUTFALL	EX_STOCK_POND_1	DP-68	0	TABULAR/DEPTH	EX_STOCK_POND	NO
FSD23_Outlet	FSD23	79	0	TABULAR/DEPTH	FSD23_Outlet	NO
FSD12A_Outlet	FSD12A	DP-87	0	TABULAR/DEPTH	FSD12A_Outlet	NO
EX_STOCK_POND_2_OUTLET	EX_STOCK_POND_2	81	0	TABULAR/DEPTH	EX_STOCKPOND_2_Outlet	NO

[XSECTIONS]

::Link	Shape	Geom1	Geom2	Geom3	Geom4	Barrels	Culvert
--------	-------	-------	-------	-------	-------	---------	---------

::-----

RT-1	TRAPEZOIDAL	20	6	10	10	1	
RT-10A	CIRCULAR	5	0	0	0	1	
RT-10B	CIRCULAR	5	0	0	0	1	
RT-11A	TRAPEZOIDAL	20	30	6	6	1	
RT-11B	TRAPEZOIDAL	20	30	6	6	1	
RT-11C	TRAPEZOIDAL	20	40	6	6	1	
RT-12A	CIRCULAR	4	0	0	0	1	
RT-12B	CIRCULAR	4.5	0	0	0	1	
RT-16	CIRCULAR	3.5	0	0	0	1	
RT-17B	CIRCULAR	4	0	0	0	1	
RT-18	TRAPEZOIDAL	20	40	6	6	1	
RT-19	CIRCULAR	6	0	0	0	1	
RT-1E	CIRCULAR	4	0	0	0	1	
RT-2	TRAPEZOIDAL	20	6	10	10	1	
RT-20	TRAPEZOIDAL	20	40	6	6	1	
RT-21	CIRCULAR	3.5	0	0	0	1	
RT-22	CIRCULAR	3	0	0	0	1	
RT-2E	CIRCULAR	4	0	0	0	1	
RT-3	TRAPEZOIDAL	20	6	10	10	1	
RT-3E	CIRCULAR	4	0	0	0	1	
RT-4	TRAPEZOIDAL	20	6	10	10	1	
RT-4E	CIRCULAR	4	0	0	0	1	
RT-5	TRAPEZOIDAL	20	10	6	6	1	
RT-5E	CIRCULAR	5	0	0	0	1	
RT-6	TRAPEZOIDAL	20	6	10	10	1	
RT-6B	TRAPEZOIDAL	20	6	10	10	1	
RT-6E	CIRCULAR	4	0	0	0	1	
RT-7A	CIRCULAR	4	0	0	0	1	
RT-7E	CIRCULAR	6	0	0	0	1	
RT-8	CIRCULAR	2	0	0	0	1	
RT-9A	TRAPEZOIDAL	20	30	6	6	1	
RT-9B	TRAPEZOIDAL	20	30	6	6	1	
RT-9C	TRAPEZOIDAL	20	30	6	6	1	
RT-9D	TRAPEZOIDAL	20	30	6	6	1	
RT-14	TRAPEZOIDAL	20	40	6	6	1	
1	DUMMY	0	0	0	0	1	
2	DUMMY	0	0	0	0	1	
3	DUMMY	0	0	0	0	1	
4	DUMMY	0	0	0	0	1	
5	DUMMY	0	0	0	0	1	
6	DUMMY	0	0	0	0	1	
7	DUMMY	0	0	0	0	1	
8	DUMMY	0	0	0	0	1	
9	DUMMY	0	0	0	0	1	

10	DUMMY	0	0	0	0	1
11	DUMMY	0	0	0	0	1
12	DUMMY	0	0	0	0	1
13	DUMMY	0	0	0	0	1
14	DUMMY	0	0	0	0	1
15	DUMMY	0	0	0	0	1
16	DUMMY	0	0	0	0	1
17	DUMMY	0	0	0	0	1
18	DUMMY	0	0	0	0	1
20	DUMMY	0	0	0	0	1
22	DUMMY	0	0	0	0	1
24	DUMMY	0	0	0	0	1
25	DUMMY	0	0	0	0	1
27	DUMMY	0	0	0	0	1
28	DUMMY	0	0	0	0	1
29	DUMMY	0	0	0	0	1
30	DUMMY	0	0	0	0	1
34	DUMMY	0	0	0	0	1
36	DUMMY	0	0	0	0	1
37	DUMMY	0	0	0	0	1
38	DUMMY	0	0	0	0	1
RT-17A	TRAPEZOIDAL	20	4	4	4	1
39	DUMMY	0	0	0	0	1
40	DUMMY	0	0	0	0	1
42	DUMMY	0	0	0	0	1
44	DUMMY	0	0	0	0	1
45	DUMMY	0	0	0	0	1
46	DUMMY	0	0	0	0	1
47	DUMMY	0	0	0	0	1
48	DUMMY	0	0	0	0	1
51	DUMMY	0	0	0	0	1
54	DUMMY	0	0	0	0	1
56	DUMMY	0	0	0	0	1
58	TRAPEZOIDAL	20	40	6	6	1
63	DUMMY	0	0	0	0	1
65	DUMMY	0	0	0	0	1
67	DUMMY	0	0	0	0	1
RT-15A	CIRCULAR	4	0	0	0	1
RT-15B	CIRCULAR	6	0	0	0	1
69	DUMMY	0	0	0	0	1
70	DUMMY	0	0	0	0	1
RT-25	TRAPEZOIDAL	10	6	6	6	1
71	CIRCULAR	1	0	0	0	1
74	DUMMY	0	0	0	0	1
75	DUMMY	0	0	0	0	1
77	DUMMY	0	0	0	0	1
78	DUMMY	0	0	0	0	1
79	DUMMY	0	0	0	0	1
80	CIRCULAR	3	0	0	0	1
81	DUMMY	0	0	0	0	1
82	DUMMY	0	0	0	0	1
83	DUMMY	0	0	0	0	1
84	DUMMY	0	0	0	0	1

[CURVES]

Name	Type	X-Value	Y-Value

FSD01_Outlet	Rating	0	0
FSD01_Outlet		2.16	0.1
FSD01_Outlet		2.1625	1.7
FSD01_Outlet		2.37	3.3
FSD01_Outlet		2.67	10.9
FSD01_Outlet		3.03	17.5
FSD01_Outlet		3.33	25.5
;			
FSD05_Outlet	Rating	0	0
FSD05_Outlet		2.71	0.1
FSD05_Outlet		3.05	0.4
FSD05_Outlet		3.27	0.5
FSD05_Outlet		3.50375	3.2
FSD05_Outlet		4.04	3.6
FSD05_Outlet		4.44	3.7
;			
FSD06_Outlet	Rating	0	0
FSD06_Outlet		4.13	1.7
FSD06_Outlet		5.98	3.0
FSD06_Outlet		6.77	3.4
FSD06_Outlet		7.35	5.1
FSD06_Outlet		7.76	38.8
FSD06_Outlet		8.05	77.3
FSD06_Outlet		8.43	139.3
;			
FSD09_Outlet	Rating	0	0
FSD09_Outlet		3.58	1.1
FSD09_Outlet		4.55	1.4
FSD09_Outlet		5.30	7.7
FSD09_Outlet		6.04	43.3
FSD09_Outlet		7.15	141.1
FSD09_Outlet		7.83	219.9
FSD09_Outlet		8.71	285.0
;			
FSD11A_Outlet	Rating	0	0
FSD11A_Outlet		3.33	0.1
FSD11A_Outlet		3.335	1.6
FSD11A_Outlet		3.57	3.2
FSD11A_Outlet		3.95	7.5
FSD11A_Outlet		4.45	9.7
FSD11A_Outlet		4.94	12.4
;			
FSD11B_Outlet	Rating	0	0
FSD11B_Outlet		3.28	0.8
FSD11B_Outlet		4.58	1.1
FSD11B_Outlet		4.65	9.1
FSD11B_Outlet		4.70	19.1
FSD11B_Outlet		4.77	39.4
FSD11B_Outlet		4.82	55.1
FSD11B_Outlet		4.89	77.0
;			
FSD12_Outlet	Rating	0	0
FSD12_Outlet		2.77	0
FSD12_Outlet		4.50	0
FSD12_Outlet		4.93	13.2
FSD12_Outlet		5.21	26.7
FSD12_Outlet		5.51	62.0

FSD12_Outlet	5.78	80.2
FSD12_Outlet	6.33	103.1

;

FSD13_Outlet	Rating	0	0
FSD13_Outlet		2.85	0.3
FSD13_Outlet		4.80	0.8
FSD13_Outlet		5.14	5
FSD13_Outlet		5.51	13.4
FSD13_Outlet		5.90	26.3
FSD13_Outlet		6.19	37.8
FSD13_Outlet		6.59	43.8

;

FSD14A_Outlet	Rating	0	0
FSD14A_Outlet		1.3	1.5
FSD14A_Outlet		3.06	3.9
FSD14A_Outlet		3.35	19.3
FSD14A_Outlet		3.59	40.9
FSD14A_Outlet		3.97	87.2
FSD14A_Outlet		4.22	123.3
FSD14A_Outlet		4.56	176.2

;

FSD14B_Outlet	Rating	0	0
FSD14B_Outlet		3.1	0
FSD14B_Outlet		3.5	0.3
FSD14B_Outlet		4.3	0.5
FSD14B_Outlet		4.31	5.7
FSD14B_Outlet		4.35	11.8
FSD14B_Outlet		4.6	19.3

;

FSD15B_Outlet	Rating	0	0
FSD15B_Outlet		3.14	0.1
FSD15B_Outlet		3.1425	1.6
FSD15B_Outlet		3.3	3.2
FSD15B_Outlet		3.63	7.3
FSD15B_Outlet		4.01	9.5
FSD15B_Outlet		4.39	12

;

FSD16A_Outlet	Rating	0	0
FSD16A_Outlet		5	0.6
FSD16A_Outlet		5.01	8.8
FSD16A_Outlet		5.53	17.3
FSD16A_Outlet		6.21	56.2
FSD16A_Outlet		6.91	88.4
FSD16A_Outlet		7.59	128.3

;

FSD16B_Outlet	Rating	0	0
FSD16B_Outlet		3.91	0
FSD16B_Outlet		4.7	0.4
FSD16B_Outlet		5.6	0.7
FSD16B_Outlet		5.61	8.3
FSD16B_Outlet		5.75	17.2
FSD16B_Outlet		6.14	28.2

;

FSD17B_Outlet	Rating	0	0
FSD17B_Outlet		2.39	0.2
FSD17B_Outlet		3.83	0.7
FSD17B_Outlet		4.05	3.2

FSD17B_Outlet	4.24	6.9
FSD17B_Outlet	4.52	14.0
FSD17B_Outlet	4.69	19.4
FSD17B_Outlet	4.99	24.3
;		
FSD18_Outlet	Rating 0	0
FSD18_Outlet	2.58	0.2
FSD18_Outlet	4.27	0.9
FSD18_Outlet	4.70	3.9
FSD18_Outlet	5.01	9
FSD18_Outlet	5.38	18.4
FSD18_Outlet	5.61	25.7
FSD18_Outlet	6.00	32.2
;		
FSD17A_Outlet	Rating 0	0
FSD17A_Outlet	3.06	0.2
FSD17A_Outlet	4.11	0.5
FSD17A_Outlet	4.31	2.9
FSD17A_Outlet	4.48	6.5
FSD17A_Outlet	4.75	13.8
FSD17A_Outlet	4.91	19.3
FSD17A_Outlet	5.15	26.7
;		
FSD20_Outlet	Rating 0	0
FSD20_Outlet	3.6	0.4
FSD20_Outlet	3.6055	5.5
FSD20_Outlet	3.64	11.1
FSD20_Outlet	3.94	25.7
FSD20_Outlet	4.335	33.1
FSD20_Outlet	4.83	42.5
;		
FSD21_Outlet	Rating 0	0
FSD21_Outlet	2.385	0.3
FSD21_Outlet	2.3855	4.0
FSD21_Outlet	2.645	8.0
FSD21_Outlet	2.9	12
FSD21_Outlet	3.23	14
FSD21_Outlet	3.52	16
;		
FSD22_Outlet	Rating 0	0
FSD22_Outlet	2.22	0.1
FSD22_Outlet	3.05	0.2
FSD22_Outlet	3.18	0.17
FSD22_Outlet	4.00	3.8
FSD22_Outlet	4.67	17.5
FSD22_Outlet	5.11	22.3
FSD22_Outlet	6.22	24.0
;		
FSD23_Outlet	Rating 0	0
FSD23_Outlet	2	0.2
FSD23_Outlet	2.0025	2.4
FSD23_Outlet	2.22	4.9
FSD23_Outlet	2.47	11.2
FSD23_Outlet	2.77	14.5
FSD23_Outlet	3.1	18.6
;		
FSD27_Outlet	Rating 0	0

FSD27_Outlet	3.65	0.5
FSD27_Outlet	5.15	0.8
FSD27_Outlet	5.37	0.858
FSD27_Outlet	6.24	17.1
FSD27_Outlet	7.13	62.2
FSD27_Outlet	7.61	85.9
FSD27_Outlet	8.91	91.9
;		
FSD72_Outlet	Rating 0	0
FSD72_Outlet	4.35	0.6
FSD72_Outlet	4.3525	9.6
FSD72_Outlet	4.58	19.3
FSD72_Outlet	4.61	44.4
FSD72_Outlet	4.83	57.4
FSD72_Outlet	5.065	73.4
;		
FSD77_Outlet	Rating 0	0
FSD77_Outlet	2.82	1.6
FSD77_Outlet	2.83	23.7
FSD77_Outlet	3.01	48.1
FSD77_Outlet	3.29	112.2
FSD77_Outlet	3.6	145.1
FSD77_Outlet	3.930	186.9
;		
FSD81_Outlet	Rating 0	0
FSD81_Outlet	4.68	2.4
FSD81_Outlet	4.686	36.7
FSD81_Outlet	4.931	74.5
FSD81_Outlet	5.210	174.3
FSD81_Outlet	5.536	225.5
FSD81_Outlet	5.882	290.9
;		
FSD82_Outlet	Rating 0	0
FSD82_Outlet	2.13	1.1
FSD82_Outlet	2.14	16.4
FSD82_Outlet	2.29	33.4
FSD82_Outlet	2.53	78.1
FSD82_Outlet	2.84	101.1
FSD82_Outlet	3.21	130.4
;		
FSD88_Outlet	Rating 0	0
FSD88_Outlet	1.543	0.8
FSD88_Outlet	1.5435	12.6
FSD88_Outlet	1.67	26.2
FSD88_Outlet	1.825	59.7
FSD88_Outlet	2.02	77.3
FSD88_Outlet	2.245	99.5
;		
FSDE1_Outlet	Rating 0	0
FSDE1_Outlet	4.03	0.4
FSDE1_Outlet	5.39	1.7
FSDE1_Outlet	6.68	14.7
FSDE1_Outlet	7.36	39.5
FSDE1_Outlet	8.74	66.9
FSDE1_Outlet	10.24	71.7
FSDE1_Outlet	12.29	77.8
;		

```

FSDE2_Outlet Rating 0 0
FSDE2_Outlet 2.99 2.6
FSDE2_Outlet 4.74 5.7
FSDE2_Outlet 6.03 8.1
FSDE2_Outlet 6.81 24.4
FSDE2_Outlet 7.57 56.1
FSDE2_Outlet 8.19 70.0
FSDE2_Outlet 9.42 73.8
;
FSDE3_Outlet Rating 0 0
FSDE3_Outlet 3.02 1.1
FSDE3_Outlet 5.53 6.1
FSDE3_Outlet 6.11 8.6
FSDE3_Outlet 6.73 21.6
FSDE3_Outlet 7.29 45
FSDE3_Outlet 7.71 67.4
FSDE3_Outlet 8.36 70.5
;
FSDE4_Outlet Rating 0 0
FSDE4_Outlet 2.86 0.5
FSDE4_Outlet 5.55 4.4
FSDE4_Outlet 5.66 4.7
FSDE4_Outlet 6.36 6.1
FSDE4_Outlet 7.21 7.5
FSDE4_Outlet 7.94 8.4
FSDE4_Outlet 8.68 10.7
;
FSDE5_Outlet Rating 0 0
FSDE5_Outlet 2.8 0.6
FSDE5_Outlet 5.76 1.2
FSDE5_Outlet 6 1.3
FSDE5_Outlet 6.58 2.1
FSDE5_Outlet 7.13 2.5
FSDE5_Outlet 7.67 3.8
;
FSDE6_Outlet Rating 0 0
FSDE6_Outlet 3.25 1.3
FSDE6_Outlet 5.56 9.4
FSDE6_Outlet 5.94 10.3
FSDE6_Outlet 7.19 38.9
FSDE6_Outlet 7.81 68.8
FSDE6_Outlet 8.75 71.8
;
PNDW3 Rating 0 0
PNDW3 2.24 260
PNDW3 3.86 520
PNDW3 5.38 780
PNDW3 6.81 1040
PNDW3 8.29 1300
PNDW3 9.86 1550
PNDW3 11.10 1820
PNDW3 11.66 2080
PNDW3 12.17 2340
PNDW3 12.64 2600
;
EX_STOCK_POND Rating 0 0
EX_STOCK_POND 7.9 0

```


EX_STOCK_POND	8	0
EX_STOCK_POND	8.5	109.6
EX_STOCK_POND	9	310
EX_STOCK_POND	9.5	569.5
EX_STOCK_POND	10	876.8
EX_STOCK_POND	10.5	1225.5
EX_STOCK_POND	11	1610.8
EX_STOCK_POND	11.5	1970.5
EX_STOCK_POND	12	2106.55

;

FSDE7_Outlet	Rating	0	0
FSDE7_Outlet	1	13	
FSDE7_Outlet	2	40	
FSDE7_Outlet	3	80	
FSDE7_Outlet	4	95	
FSDE7_Outlet	5	135	
FSDE7_Outlet	6	150	
FSDE7_Outlet	7.3	185	
FSDE7_Outlet	7.9	200	
FSDE7_Outlet	8.1	225	

;

FSD12A_Outlet	Rating	0	0
FSD12A_Outlet	3.35	0.1	
FSD12A_Outlet	5.72	0.2	
FSD12A_Outlet	5.96	0.7	
FSD12A_Outlet	6.44	6.0	
FSD12A_Outlet	6.91	15.8	
FSD12A_Outlet	7.15	22.3	
FSD12A_Outlet	7.75	23.4	

;

EX_STOCKPOND_2_Outlet	Rating	0	0
EX_STOCKPOND_2_Outlet	3.75	0	
EX_STOCKPOND_2_Outlet	4	38.75	
EX_STOCKPOND_2_Outlet	4.25	109.6015511	
EX_STOCKPOND_2_Outlet	4.5	201.3509064	
EX_STOCKPOND_2_Outlet	4.75	310	
EX_STOCKPOND_2_Outlet	5	433.2381706	
EX_STOCKPOND_2_Outlet	5.25	569.5063652	
EX_STOCKPOND_2_Outlet	5.5	717.6600431	
EX_STOCKPOND_2_Outlet	5.75	876.8124087	
EX_STOCKPOND_2_Outlet	6	1046.25	
EX_STOCKPOND_2_Outlet	6.25	1225.382593	
EX_STOCKPOND_2_Outlet	6.5	1413.711317	
EX_STOCKPOND_2_Outlet	6.75	1610.807251	
EX_STOCKPOND_2_Outlet	7	1816.296455	

;

FSD01_Storage	Storage	0	0
FSD01_Storage	1	30456	
FSD01_Storage	2	33376	
FSD01_Storage	3	36424	
FSD01_Storage	4	39600	
FSD01_Storage	5	42906	
FSD01_Storage	6	46336	
FSD01_Storage	7	49896	
FSD01_Storage	8	53584	
FSD01_Storage	9	57400	

;

FSD05_Storage	Storage	0	77
FSD05_Storage		0.5	77
FSD05_Storage		1.5	77
FSD05_Storage		2	4494
FSD05_Storage		3	50208
FSD05_Storage		4	54337
FSD05_Storage		5	58563
FSD05_Storage		6	62889
FSD05_Storage		7	67315
FSD05_Storage		8	71840
;			
FSD06_Storage	Storage	0	20
FSD06_Storage		0.5	1328
FSD06_Storage		1.5	13823
FSD06_Storage		2.5	40724
FSD06_Storage		3.5	71720
FSD06_Storage		4.5	112095
FSD06_Storage		5.5	136106
FSD06_Storage		6.5	158377
FSD06_Storage		7.5	174976
FSD06_Storage		8.5	188903
FSD06_Storage		9.5	199637
FSD06_Storage		10.5	210510
;			
FSD09_Storage	Storage	0	20
FSD09_Storage		1	7181
FSD09_Storage		2	30115
FSD09_Storage		3	49313
FSD09_Storage		4	52785
FSD09_Storage		5	74559
FSD09_Storage		6	79051
FSD09_Storage		7	84185
FSD09_Storage		8	98917
FSD09_Storage		9	94245
FSD09_Storage		10	99228
FSD09_Storage		11	104318
;			
FSD11A_Storage	Storage	0	0
FSD11A_Storage		1	3864
FSD11A_Storage		2	5000
FSD11A_Storage		3	6264
FSD11A_Storage		4	7656
FSD11A_Storage		5	9196
FSD11A_Storage		6	10824
FSD11A_Storage		7	12600
FSD11A_Storage		8	14504
;			
FSD11B_Storage	Storage	0	20
FSD11B_Storage		1	6880
FSD11B_Storage		2	25596
FSD11B_Storage		3	42260
FSD11B_Storage		4	53720
FSD11B_Storage		5	58818
FSD11B_Storage		6	63678
FSD11B_Storage		7	69168
;			
FSD12_Storage	Storage	0	2326

FSD12_Storage	1	9156
FSD12_Storage	3	14117
FSD12_Storage	5	29614
FSD12_Storage	7	46467
FSD12_Storage	9	55697
;		
FSD13_Storage	Storage 0	10
FSD13_Storage	0.5	457
FSD13_Storage	1.5	7423
FSD13_Storage	2.5	20206
FSD13_Storage	3.5	28371
FSD13_Storage	4.5	33351
FSD13_Storage	5.5	37998
FSD13_Storage	6.5	41980
FSD13_Storage	7.5	43012
FSD13_Storage	8.5	50147
FSD13_Storage	9.5	54386
FSD13_Storage	10.5	58728
;		
FSD14A_Storage	Storage 0	20
FSD14A_Storage	1	157104
FSD14A_Storage	2	164045
FSD14A_Storage	3	171085
FSD14A_Storage	4	178224
FSD14A_Storage	5	185464
FSD14A_Storage	6	192803
FSD14A_Storage	7	200248
;		
FSD14B_Storage	Storage 0	0
FSD14B_Storage	1	18943
FSD14B_Storage	2	43220
FSD14B_Storage	3	46969
FSD14B_Storage	4	50873
FSD14B_Storage	5	54930
FSD14B_Storage	6	59144
FSD14B_Storage	7	63512
FSD14B_Storage	8	68024
FSD14B_Storage	9	70710
FSD14B_Storage	10	77514
;		
FSD15B	Storage 0	0
FSD15B	1	8576
FSD15B	2	10224
FSD15B	3	12000
FSD15B	4	13904
FSD15B	5	15936
FSD15B	6	18096
FSD15B	7	20384
FSD15B	8	22800
FSD15B	9	25304
;		
FSD16A_Storage	Storage 0	0
FSD16A_Storage	1	30866
FSD16A_Storage	2	76123
FSD16A_Storage	3	86494
FSD16A_Storage	4	91584
FSD16A_Storage	5	96800

FSD16A_Storage	6	102144
FSD16A_Storage	7	107616
FSD16A_Storage	8	113216
FSD16A_Storage	9	118944
FSD16A_Storage	12	150000

;

FSD16B_Storage	Storage	0	0
FSD16B_Storage	1	18943	
FSD16B_Storage	2	43220	
FSD16B_Storage	3	46969	
FSD16B_Storage	4	50873	
FSD16B_Storage	5	54930	
FSD16B_Storage	6	59144	
FSD16B_Storage	7	63512	
FSD16B_Storage	8	68024	
FSD16B_Storage	9	70710	
FSD16B_Storage	10	77514	

;

FSD17B_Storage	Storage	0	118
FSD17B_Storage	1	118	
FSD17B_Storage	2	23827	
FSD17B_Storage	3	31534	
FSD17B_Storage	4	34586	
FSD17B_Storage	5	37765	
FSD17B_Storage	6	41073	
FSD17B_Storage	7	44509	
FSD17B_Storage	8	48072	
FSD17B_Storage	9	51764	

;

FSD18_Storage	Storage	0	130
FSD18_Storage	1	130	
FSD18_Storage	2	21961	
FSD18_Storage	3	24525	
FSD18_Storage	4	27216	
FSD18_Storage	5	30035	
FSD18_Storage	6	32983	
FSD18_Storage	7	36058	
FSD18_Storage	8	39261	
FSD18_Storage	9	42593	

;

FSD17A_Storage	Storage	0	113
FSD17A_Storage	1	113	
FSD17A_Storage	2	6948	
FSD17A_Storage	3	24183	
FSD17A_Storage	4	46459	
FSD17A_Storage	5	50179	
FSD17A_Storage	6	54027	
FSD17A_Storage	7	58003	
FSD17A_Storage	8	62108	
FSD17A_Storage	9	66340	

;

FSD20_Storage	Storage	0	0
FSD20_Storage	1	9292	
FSD20_Storage	2	10676	
FSD20_Storage	3	12430	
FSD20_Storage	4	14013	
FSD20_Storage	5	15785	

FSD20_Storage	6	17656
FSD20_Storage	7	19626
FSD20_Storage	8	21985
FSD20_Storage	9	24472

;

FSD21_Storage	Storage	0	0
FSD21_Storage	1	9292	
FSD21_Storage	2	10676	
FSD21_Storage	3	12430	
FSD21_Storage	4	14013	
FSD21_Storage	5	15785	
FSD21_Storage	6	17656	
FSD21_Storage	7	19626	
FSD21_Storage	8	21985	
FSD21_Storage	9	24472	

;

FSD22_Storage	Storage	0	50
FSD22_Storage	2	6905	
FSD22_Storage	4	12575	
FSD22_Storage	6	18016	
FSD22_Storage	8	26430	

;

FSD23_Storage	Storage	0	0
FSD23_Storage	1	8576	
FSD23_Storage	2	10224	
FSD23_Storage	3	12000	
FSD23_Storage	4	13904	
FSD23_Storage	5	15936	
FSD23_Storage	6	18096	
FSD23_Storage	7	20384	
FSD23_Storage	8	22800	
FSD23_Storage	9	25304	

;

FSD27_Storage	Storage	0	277
FSD27_Storage	2	10268	
FSD27_Storage	4	30108	
FSD27_Storage	6	38919	
FSD27_Storage	8	45498	
FSD27_Storage	10	52628	

;

FSD72_Storage	Storage	0	0
FSD72_Storage	1	9292	
FSD72_Storage	2	10676	
FSD72_Storage	3	12430	
FSD72_Storage	4	14013	
FSD72_Storage	5	15785	
FSD72_Storage	6	17656	
FSD72_Storage	7	19626	
FSD72_Storage	8	21985	
FSD72_Storage	9	24472	

;

FSDE1_Storage	Storage	0	0
FSDE1_Storage	1	21618	
FSDE1_Storage	2	24523	
FSDE1_Storage	3	27481	
FSDE1_Storage	4	30595	
FSDE1_Storage	5	33863	

FSDE1_Storage	6	37286
FSDE1_Storage	7	40864
FSDE1_Storage	8	44579
FSDE1_Storage	9	48485

;

FSDE2_Storage	Storage	0	0
FSDE2_Storage	1	21618	
FSDE2_Storage	2	24523	
FSDE2_Storage	3	27481	
FSDE2_Storage	4	30595	
FSDE2_Storage	5	33863	
FSDE2_Storage	6	37286	
FSDE2_Storage	7	40864	
FSDE2_Storage	8	44579	
FSDE2_Storage	9	48485	

;

FSDE3_Storage	Storage	0	0
FSDE3_Storage	1	30866	
FSDE3_Storage	2	76123	
FSDE3_Storage	3	86496	
FSDE3_Storage	4	91584	
FSDE3_Storage	5	96800	
FSDE3_Storage	6	102144	
FSDE3_Storage	7	107616	
FSDE3_Storage	8	113216	
FSDE3_Storage	9	118944	

;

FSDE4_Storage	Storage	0	0
FSDE4_Storage	1	18943	
FSDE4_Storage	2	43220	
FSDE4_Storage	3	46969	
FSDE4_Storage	4	50873	
FSDE4_Storage	5	54930	
FSDE4_Storage	6	59144	
FSDE4_Storage	7	63512	
FSDE4_Storage	8	68024	
FSDE4_Storage	9	70710	
FSDE4_Storage	10	77514	

;

FSDE5_Storage	Storage	0	0
FSDE5_Storage	1	20604	
FSDE5_Storage	2	23100	
FSDE5_Storage	3	25724	
FSDE5_Storage	4	28476	
FSDE5_Storage	5	31356	
FSDE5_Storage	6	34364	
FSDE5_Storage	7	37500	
FSDE5_Storage	8	40764	
FSDE5_Storage	9	44156	

;

FSDE6_Storage	Storage	0	0
FSDE6_Storage	1	35000	
FSDE6_Storage	2	11000	
FSDE6_Storage	3	166000	
FSDE6_Storage	4	175000	
FSDE6_Storage	5	180000	
FSDE6_Storage	6	190000	

FSDE6_Storage	7	195000
FSDE6_Storage	8	205000
FSDE6_Storage	9	210000
;		
PNDE7_Storage	Storage 0	0
PNDE7_Storage	1	35000
PNDE7_Storage	2	110000
PNDE7_Storage	3	165500
PNDE7_Storage	4	176000
PNDE7_Storage	5	179100
PNDE7_Storage	6	191000
PNDE7_Storage	7	285000
PNDE7_Storage	8	310000
PNDE7_Storage	9	325000
;		
PNDW3_Storage	Storage 0	0
PNDW3_Storage	1	9992
PNDW3_Storage	2	59043
PNDW3_Storage	3	205185
PNDW3_Storage	4	264198
PNDW3_Storage	5	285521
PNDW3_Storage	6	295282
PNDW3_Storage	7	304495
PNDW3_Storage	8	314697
PNDW3_Storage	9	324413
PNDW3_Storage	10	341308
PNDW3_Storage	11	350000
;		
EX_STOCKPOND	Storage 0	0
EX_STOCKPOND	2	53785
EX_STOCKPOND	4	124292
EX_STOCKPOND	6	158179
EX_STOCKPOND	8	197284
EX_STOCKPOND	12	215000
;		
FSD12A_Storage	Storage 0	0
FSD12A_Storage	0.33	40
FSD12A_Storage	0.83	100
FSD12A_Storage	1.83	4187
FSD12A_Storage	3.83	8006
FSD12A_Storage	5.83	11106
FSD12A_Storage	7.83	14529
FSD12A_Storage	9.83	18087
;		
EX_STOCKPOND_2	Storage 0	42900.00
EX_STOCKPOND_2	1	46208.00
EX_STOCKPOND_2	2	49635.00
EX_STOCKPOND_2	3	53177.00
EX_STOCKPOND_2	4	56840.00
EX_STOCKPOND_2	5	60624.00
EX_STOCKPOND_2	6	64531.00
EX_STOCKPOND_2	7	87989.00

[REPORT]

::Reporting Options

INPUT NO

CONTROLS NO

SUBCATCHMENTS ALL

NODES ALL

LINKS ALL

[TAGS]

[MAP]

DIMENSIONS 0.000 0.000 10000.000 10000.000

Units None

[COORDINATES]

::Node	X-Coord	Y-Coord
DP-1E	6547.197	4663.182
DP-21	5158.237	2461.303
DP-22	5459.717	3182.701
DP-25	5742.688	5221.372
DP-26	4124.592	3258.071
DP-2E	6775.999	3411.503
DP-3E	6797.533	2948.516
DP-4E	6714.169	2510.093
DP-53A	3642.762	501.684
DP-56	6504.129	1896.028
DP-60A	3963.085	867.767
DP-61	4084.215	1511.103
DP-63	4412.613	1939.097
DP-64	3794.068	2142.966
DP-68	4356.369	2316.580
DP-69	4942.894	3508.407
DP-70	5226.979	3993.237
DP-71	5442.103	4272.974
DP-72	5451.641	4665.874
DP-73	5492.018	4961.970
DP-74	4727.551	6865.062
DP-75	5365.504	6237.876
DP-77	5475.867	5618.766
DP-78	5921.485	6716.523
DP-8	6434.142	1478.802
DP-87	4444.914	2983.509
FSD9_Outlet	3238.995	2256.727
FSDE1_Outlet	6434.271	4669.016
FSDE2_Outlet	6611.596	3515.305
FSDE4_Outlet	6354.741	2689.617
SC3-10	4194.578	1691.453
SC3-11A	4229.398	2117.054
SC3-11B	4810.997	2130.213
SC3-12	4428.057	3368.053
SC3-13	4205.345	2690.104
SC3-14A	4732.935	2762.783
SC3-14B	5570.080	2881.221
SC3-15A	3957.994	3935.659
SC3-15B	4253.797	3492.256
SC3-16A	5610.874	3769.538
SC3-16B	5946.930	3710.291
SC3-17B	5117.530	4438.851
SC3-18	4661.171	3672.264
SC3-17A	4578.103	4371.096

SC3-19	4700.634	5468.026
SC3-1A	3683.139	1002.356
SC3-20	5233.607	5508.402
SC3-21	6057.293	5486.868
SC3-22	5053.257	4878.525
SC3-23	6014.224	4991.580
SC3-24A	5574.257	5135.860
SC3-24B	5238.990	5048.107
SC3-25	5766.580	5548.779
SC3-26	5493.928	4529.508
SC3-27	5680.443	4700.867
SC3-5A	3887.715	1250.000
SC3-5B	4269.948	1325.370
SC3-61	4689.866	1301.144
SC3-6A	3599.724	2036.725
SC3-6B	3911.941	2278.262
SC3-6C	3931.404	1899.389
SC3-7	3866.181	2719.714
SC3-72	6243.026	5882.560
SC3-73	4660.257	6517.821
SC3-74	4487.983	7134.240
SC3-75	5230.915	6770.849
SC3-76	5642.758	7201.535
SC3-77	6251.101	6280.944
SC3-78	6185.792	7157.036
SC3-79	6385.690	8189.419
SC3-8	3648.146	4254.031
SC3-80	5591.614	8184.036
SC3-81	5125.935	8278.248
SC3-82	4579.503	7912.166
SC3-88	4902.517	6095.211
SC3-89	4886.367	5834.108
SC3-9	3303.598	3543.400
SCE-1	6399.149	5529.937
SCE-10	6035.758	2498.988
SCE-11	6797.533	2267.494
SCE-13	6727.547	5155.779
SCE-14	6773.307	4520.518
SCE-2	6541.814	5005.039
SCE-3	6329.163	3944.476
SCE-4	7030.774	3734.824
SCE-5	6151.505	3309.215
SCE-6	6725.692	3121.900
SCE-7	6024.991	2935.057
SCE-8	6533.739	2768.166
SCE-9	6893.358	2668.804
PNDW3_Outfall	4371.627	2108.472
79	5884.515	4712.131
80	5817.704	5171.853
SC3-12A	4611.234	3386.371
SCE-15	6197.784	1540.228
SC3-18B	5224.373	3688.343
81	5073.229	3732.644
SC3_OUTFALL	3610.089	362.777
SCE_OUTFALL	6437.143	1321.540
FSD05	3903.865	964.671
FSD06	3926.222	1751.687

FSD09	3166.317	2329.405
FSD1	3551.242	727.794
FSD11B	4590.270	1990.241
FSD12	4403.012	3117.276
FSD13	4205.345	2437.077
FSD14A	4488.523	2453.916
FSD14B	5333.203	2531.289
FSD15B	4181.119	3398.044
FSD16A	5397.806	3311.907
FSD16B	5631.991	3249.996
FSD17A	4653.675	4264.253
FSD17B	5154.013	4081.838
FSD18	4743.086	3557.071
FSD20	5286.628	5319.839
FSD21	5965.772	5260.758
FSD22	5271.292	4776.237
FSD23	5938.854	4787.004
FSD27	5586.231	4302.483
FSD72	5683.135	5683.368
FSDE1	6401.841	4671.258
FSDE2	6587.574	3529.941
FSDE3	6652.177	3034.653
FSDE4	6269.944	2711.639
FSDE5	6692.554	2679.337
PNDE7	6555.273	2081.761
FSDE6	6342.622	2130.213
PNDW3	4348.595	2207.747
EX_STOCK_POND_1	4407.171	2730.935
FSD12A	4556.281	3198.614
EX_STOCK_POND_2	5130.815	3839.177

[VERTICES]

::Link	X-Coord	Y-Coord
;;-----		
EX_STOCK_POND_1_OUTFALL	4395.690	2640.525
EX_STOCK_POND_1_OUTFALL	4394.255	2640.525

Sterling Ranch 2021 MDDP Amendment
2-YR Type II Storm

WARNING 04: minimum elevation drop used for Conduit 1
WARNING 04: minimum elevation drop used for Conduit 2
WARNING 04: minimum elevation drop used for Conduit 3
WARNING 04: minimum elevation drop used for Conduit 4
WARNING 04: minimum elevation drop used for Conduit 5
WARNING 04: minimum elevation drop used for Conduit 6
WARNING 04: minimum elevation drop used for Conduit 7
WARNING 04: minimum elevation drop used for Conduit 8
WARNING 04: minimum elevation drop used for Conduit 9
WARNING 04: minimum elevation drop used for Conduit 10
WARNING 04: minimum elevation drop used for Conduit 11
WARNING 04: minimum elevation drop used for Conduit 12
WARNING 04: minimum elevation drop used for Conduit 14
WARNING 04: minimum elevation drop used for Conduit 15
WARNING 04: minimum elevation drop used for Conduit 16
WARNING 04: minimum elevation drop used for Conduit 17
WARNING 04: minimum elevation drop used for Conduit 18
WARNING 04: minimum elevation drop used for Conduit 20
WARNING 04: minimum elevation drop used for Conduit 22
WARNING 04: minimum elevation drop used for Conduit 27
WARNING 04: minimum elevation drop used for Conduit 28
WARNING 04: minimum elevation drop used for Conduit 29
WARNING 04: minimum elevation drop used for Conduit 30
WARNING 04: minimum elevation drop used for Conduit 34
WARNING 04: minimum elevation drop used for Conduit 36
WARNING 04: minimum elevation drop used for Conduit 37
WARNING 04: minimum elevation drop used for Conduit 38
WARNING 04: minimum elevation drop used for Conduit 39
WARNING 04: minimum elevation drop used for Conduit 40
WARNING 04: minimum elevation drop used for Conduit 44
WARNING 04: minimum elevation drop used for Conduit 45
WARNING 04: minimum elevation drop used for Conduit 46
WARNING 04: minimum elevation drop used for Conduit 47
WARNING 04: minimum elevation drop used for Conduit 48
WARNING 04: minimum elevation drop used for Conduit 51
WARNING 04: minimum elevation drop used for Conduit 54
WARNING 08: elevation drop exceeds length for Conduit 56
WARNING 04: minimum elevation drop used for Conduit 63
WARNING 04: minimum elevation drop used for Conduit 65
WARNING 04: minimum elevation drop used for Conduit 67
WARNING 04: minimum elevation drop used for Conduit 69
WARNING 04: minimum elevation drop used for Conduit 70
WARNING 04: minimum elevation drop used for Conduit 71
WARNING 04: minimum elevation drop used for Conduit 74
WARNING 04: minimum elevation drop used for Conduit 75
WARNING 08: elevation drop exceeds length for Conduit 77
WARNING 04: minimum elevation drop used for Conduit 78
WARNING 04: minimum elevation drop used for Conduit 79
WARNING 04: minimum elevation drop used for Conduit 82
WARNING 04: minimum elevation drop used for Conduit 83

WARNING 10: crest elevation raised to downstream invert for regulator Link FSD12_Outlet
WARNING 10: crest elevation raised to downstream invert for regulator Link FSD12A_Outlet

NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.

Analysis Options

Flow Units CFS

Process Models:

Rainfall/Runoff NO

RDII NO

Snowmelt NO

Groundwater NO

Flow Routing YES

Ponding Allowed NO

Water Quality NO

Flow Routing Method KINWAVE

Starting Date 01/01/2005 00:00:00

Ending Date 01/04/2005 06:00:00

Antecedent Dry Days 0.0

Report Time Step 00:05:00

Routing Time Step 30.00 sec

***** Volume Volume

Flow Routing Continuity acre-feet 10^6 gal

***** -----

Dry Weather Inflow 0.000 0.000

Wet Weather Inflow 0.000 0.000

Groundwater Inflow 0.000 0.000

RDII Inflow 0.000 0.000

External Inflow 162.239 52.868

External Outflow 86.933 28.328

Flooding Loss 32.035 10.439

Evaporation Loss 0.000 0.000

Exfiltration Loss 0.000 0.000

Initial Stored Volume 0.000 0.000

Final Stored Volume 43.260 14.097

Continuity Error (%) 0.006

Highest Flow Instability Indexes

Link PNDW3_Outlet (67)

Link RT-14 (67)

Link RT-18 (67)

Link RT-20 (65)

Link 67 (65)

Routing Time Step Summary

Minimum Time Step : 30.00 sec
Average Time Step : 30.00 sec
Maximum Time Step : 30.00 sec
Percent in Steady State : 0.00
Average Iterations per Step : 1.00
Percent Not Converging : 0.00

Node Depth Summary

Node	Type	Average Maximum Maximum Time of Max Reported					
		Depth	Depth	HGL	Occurrence	Max Depth	
		Feet	Feet	Feet	days hr:min	Feet	
DP-1E	JUNCTION	0.12	0.83	259.73	0 12:25	0.82	
DP-21	JUNCTION	0.22	1.59	185.79	0 12:43	1.59	
DP-22	JUNCTION	0.22	1.59	225.79	0 12:41	1.59	
DP-25	JUNCTION	0.02	0.45	332.65	0 12:15	0.44	
DP-26	JUNCTION	0.07	0.67	199.87	0 12:30	0.67	
DP-2E	JUNCTION	0.17	1.14	220.04	0 12:30	1.14	
DP-3E	JUNCTION	0.24	1.13	130.03	0 12:37	1.13	
DP-4E	JUNCTION	0.36	1.14	61.64	0 12:39	1.14	
DP-53A	JUNCTION	0.14	0.65	0.65	0 12:55	0.65	
DP-56	JUNCTION	0.29	0.77	32.77	0 13:31	0.77	
DP-60A	JUNCTION	0.20	0.87	23.07	0 12:56	0.87	
DP-61	JUNCTION	0.19	0.90	64.10	0 12:44	0.90	
DP-63	JUNCTION	0.15	0.84	99.04	0 12:36	0.84	
DP-64	JUNCTION	0.08	1.57	94.77	0 12:16	1.55	
DP-68	JUNCTION	0.21	1.46	119.86	0 12:45	1.46	
DP-69	JUNCTION	0.12	1.66	204.86	0 12:34	1.66	
DP-70	JUNCTION	0.07	1.07	230.27	0 13:20	1.07	
DP-71	JUNCTION	0.07	1.08	258.28	0 13:13	1.08	
DP-72	JUNCTION	0.05	1.09	284.29	0 13:09	1.08	
DP-73	JUNCTION	0.08	1.10	301.30	0 13:07	1.10	
DP-74	JUNCTION	0.03	0.81	498.01	0 12:32	0.81	
DP-75	JUNCTION	0.04	1.30	433.50	0 12:45	1.30	
DP-77	JUNCTION	0.05	1.26	341.46	0 12:59	1.26	
DP-78	JUNCTION	0.04	1.04	463.24	0 12:33	1.04	
DP-8	JUNCTION	9.63	10.00	10.00	0 02:55	10.00	
DP-87	JUNCTION	0.13	1.29	158.49	0 13:47	1.29	
FSD9_OUTLET	JUNCTION	0.13	0.23	139.43	0 15:01	0.23	
FSDE1_Outlet	JUNCTION	0.10	0.13	265.03	0 15:50	0.13	
FSDE2_Outlet	JUNCTION	0.07	0.33	229.23	0 14:53	0.33	
FSDE4_Outlet	JUNCTION	0.15	0.26	97.86	0 14:53	0.26	
SC3-10	JUNCTION	0.00	0.00	63.20	0 00:00	0.00	
SC3-11A	JUNCTION	0.00	0.00	98.20	0 00:00	0.00	
SC3-11B	JUNCTION	0.00	0.00	98.20	0 00:00	0.00	
SC3-12	JUNCTION	0.00	0.00	157.20	0 00:00	0.00	
SC3-13	JUNCTION	0.00	0.00	118.60	0 00:00	0.00	
SC3-14A	JUNCTION	0.00	0.00	118.50	0 00:00	0.00	
SC3-14B	JUNCTION	0.00	0.00	184.20	0 00:00	0.00	
SC3-15A	JUNCTION	0.00	0.00	199.20	0 00:00	0.00	

SC3-15B	JUNCTION	0.00	0.00	199.20	0 00:00	0.00
SC3-16A	JUNCTION	0.00	0.00	224.20	0 00:00	0.00
SC3-16B	JUNCTION	0.00	0.00	224.20	0 00:00	0.00
SC3-17B	JUNCTION	0.00	0.00	229.20	0 00:00	0.00
SC3-18	JUNCTION	0.00	0.00	203.20	0 00:00	0.00
SC3-17A	JUNCTION	0.00	0.00	203.20	0 00:00	0.00
SC3-19	JUNCTION	0.05	1.70	246.90	0 12:25	1.69
SC3-1A	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
SC3-20	JUNCTION	0.00	0.00	324.20	0 00:00	0.00
SC3-21	JUNCTION	0.00	0.00	332.20	0 00:00	0.00
SC3-22	JUNCTION	0.00	0.00	283.20	0 00:00	0.00
SC3-23	JUNCTION	0.00	0.00	295.20	0 00:00	0.00
SC3-24A	JUNCTION	0.00	0.00	300.20	0 00:00	0.00
SC3-24B	JUNCTION	0.00	0.00	283.20	0 00:00	0.00
SC3-25	JUNCTION	0.00	0.00	332.20	0 00:00	0.00
SC3-26	JUNCTION	0.00	0.00	257.20	0 00:00	0.00
SC3-27	JUNCTION	0.00	0.00	257.20	0 00:00	0.00
SC3-5A	JUNCTION	0.00	0.00	22.20	0 00:00	0.00
SC3-5B	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
SC3-61	JUNCTION	0.03	0.56	28.76	0 12:20	0.56
SC3-6A	JUNCTION	0.08	1.60	88.80	0 12:15	1.59
SC3-6B	JUNCTION	0.00	0.00	93.20	0 00:00	0.00
SC3-6C	JUNCTION	0.00	0.00	63.20	0 00:00	0.00
SC3-7	JUNCTION	0.07	1.39	118.59	0 12:15	1.38
SC3-72	JUNCTION	0.00	0.00	340.20	0 00:00	0.00
SC3-73	JUNCTION	0.00	0.00	432.20	0 00:00	0.00
SC3-74	JUNCTION	0.00	0.00	497.20	0 00:00	0.00
SC3-75	JUNCTION	0.00	0.00	432.20	0 00:00	0.00
SC3-76	JUNCTION	0.00	0.00	432.20	0 00:00	0.00
SC3-77	JUNCTION	0.00	0.00	340.20	0 00:00	0.00
SC3-78	JUNCTION	0.00	0.00	462.20	0 00:00	0.00
SC3-79	JUNCTION	0.02	0.74	562.94	0 12:25	0.73
SC3-8	JUNCTION	0.01	0.61	247.81	0 12:25	0.61
SC3-80	JUNCTION	0.02	0.65	552.85	0 12:25	0.65
SC3-81	JUNCTION	0.02	0.72	532.92	0 12:30	0.71
SC3-82	JUNCTION	0.01	0.57	562.77	0 12:25	0.56
SC3-88	JUNCTION	0.00	0.00	340.20	0 00:00	0.00
SC3-89	JUNCTION	0.01	0.33	375.53	0 12:20	0.33
SC3-9	JUNCTION	0.00	0.00	139.20	0 00:00	0.00
SCE-1	JUNCTION	0.00	0.00	266.00	0 00:00	0.00
SCE-10	JUNCTION	0.00	0.00	32.50	0 00:00	0.00
SCE-11	JUNCTION	0.00	0.00	32.50	0 00:00	0.00
SCE-13	JUNCTION	0.00	0.00	258.90	0 00:00	0.00
SCE-14	JUNCTION	0.00	0.00	218.90	0 00:00	0.00
SCE-2	JUNCTION	0.00	0.00	258.90	0 00:00	0.00
SCE-3	JUNCTION	0.00	0.00	230.00	0 00:00	0.00
SCE-4	JUNCTION	0.00	0.00	218.90	0 00:00	0.00
SCE-5	JUNCTION	0.00	0.00	128.90	0 00:00	0.00
SCE-6	JUNCTION	0.00	0.00	128.90	0 00:00	0.00
SCE-7	JUNCTION	0.00	0.00	98.00	0 00:00	0.00
SCE-8	JUNCTION	0.00	0.00	60.50	0 00:00	0.00
SCE-9	JUNCTION	0.00	0.00	60.50	0 00:00	0.00
PNDW3_Outfall	JUNCTION	0.00	0.00	118.20	0 00:00	0.00
79	JUNCTION	0.04	0.10	295.10	0 14:11	0.10
80	JUNCTION	0.05	0.12	331.12	0 13:29	0.12
SC3-12A	JUNCTION	0.00	0.00	157.20	0 00:00	0.00
SCE-15	JUNCTION	0.00	0.00	0.00	0 00:00	0.00

SC3-18B	JUNCTION	0.00	0.00	203.20	0 00:00	0.00
81	JUNCTION	0.07	1.03	230.03	0 13:29	1.03
SC3_OUTFALL	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
SCE_OUTFALL	OUTFALL	0.96	1.00	1.00	0 03:22	1.00
FSD05	STORAGE	2.76	4.28	26.48	0 13:04	4.28
FSD06	STORAGE	4.83	7.08	70.28	0 17:01	7.08
FSD09	STORAGE	1.94	4.38	143.58	0 15:01	4.38
FSD1	STORAGE	1.45	1.86	1.86	1 00:07	1.86
FSD11B	STORAGE	2.86	4.79	102.99	0 12:29	4.79
FSD12	STORAGE	4.26	5.67	162.67	0 12:22	5.66
FSD13	STORAGE	3.10	5.45	123.95	0 12:40	5.45
FSD14A	STORAGE	1.57	3.09	121.49	0 14:48	3.09
FSD14B	STORAGE	3.34	4.73	188.93	0 12:42	4.73
FSD15B	STORAGE	2.22	3.13	202.33	0 20:48	3.13
FSD16A	STORAGE	4.09	6.38	230.58	0 12:41	6.38
FSD16B	STORAGE	3.81	4.76	228.96	1 00:06	4.76
FSD17A	STORAGE	3.03	4.14	207.34	0 14:19	4.14
FSD17B	STORAGE	2.48	3.85	233.05	0 14:30	3.85
FSD18	STORAGE	2.54	4.29	207.49	0 14:19	4.29
FSD20	STORAGE	0.02	0.62	324.82	0 12:22	0.62
FSD21	STORAGE	0.63	2.32	334.52	0 13:29	2.32
FSD22	STORAGE	1.45	3.45	286.65	0 13:26	3.45
FSD23	STORAGE	0.58	1.92	297.92	0 14:11	1.92
FSD27	STORAGE	3.24	5.64	262.84	0 13:53	5.64
FSD72	STORAGE	0.88	3.25	343.45	0 14:31	3.25
FSDE1	STORAGE	1.57	2.62	268.62	0 15:50	2.62
FSDE2	STORAGE	0.33	2.31	232.31	0 14:53	2.31
FSDE3	STORAGE	2.49	4.47	133.37	0 14:39	4.47
FSDE4	STORAGE	2.06	3.31	101.31	0 14:53	3.31
FSDE5	STORAGE	2.56	5.10	65.60	0 16:46	5.10
PNDE7	STORAGE	0.36	1.46	33.96	0 13:31	1.46
FSDE6	STORAGE	2.73	4.27	36.77	0 14:35	4.27
PNDW3	STORAGE	0.08	0.85	119.15	0 12:45	0.85
EX_STOCK_POND_1	STORAGE	6.65	8.16	150.16	0 16:03	8.16
FSD12A	STORAGE	4.12	6.04	163.04	0 14:29	6.04
EX_STOCK_POND_2	STORAGE	3.16	4.35	233.45	0 13:29	4.35

Node Inflow Summary

Node							
	Maximum		Maximum		Lateral	Total	Flow
	Lateral		Total		Inflow	Inflow	Balance
	Inflow	Inflow	Occurrence	Time of Max	Volume	Volume	Error
Type	CFS	CFS	days	hr:min	10^6 gal	10^6 gal	Percent
DP-1E	JUNCTION	0.00	12.41	0 12:25	0	0.808	0.000
DP-21	JUNCTION	0.00	83.26	0 12:43	0	6.16	0.000
DP-22	JUNCTION	0.00	64.01	0 12:41	0	4.75	0.000
DP-25	JUNCTION	0.00	5.48	0 12:15	0	0.13	0.000
DP-26	JUNCTION	0.00	14.77	0 12:30	0	0.606	-0.000
DP-2E	JUNCTION	0.00	25.00	0 12:30	0	2.02	0.000
DP-3E	JUNCTION	0.00	27.53	0 12:37	0	4.75	0.000
DP-4E	JUNCTION	0.00	29.33	0 12:39	0	6.8	0.000
DP-53A	JUNCTION	0.00	141.85	0 12:55	0	28.2	0.000

DP-56	JUNCTION	0.00	25.31	0	13:31	0	10.2	0.000
DP-60A	JUNCTION	0.00	141.82	0	12:54	0	28	0.000
DP-61	JUNCTION	0.00	133.17	0	12:44	0	25.2	0.000
DP-63	JUNCTION	0.00	130.32	0	12:36	0	19	0.000
DP-64	JUNCTION	0.00	91.34	0	12:16	0	2.47	0.000
DP-68	JUNCTION	0.00	98.39	0	12:44	0	17	0.000
DP-69	JUNCTION	0.00	152.58	0	13:33	0	9.52	0.000
DP-70	JUNCTION	0.00	150.16	0	13:20	0	8.82	0.000
DP-71	JUNCTION	0.00	149.90	0	13:15	0	8.17	0.000
DP-72	JUNCTION	0.00	148.81	0	13:09	0	6.97	0.000
DP-73	JUNCTION	0.00	146.94	0	13:07	0	6.71	0.000
DP-74	JUNCTION	0.00	33.68	0	12:32	0	0.987	0.000
DP-75	JUNCTION	0.00	95.13	0	12:45	0	3.6	0.000
DP-77	JUNCTION	0.00	144.36	0	12:58	0	6.15	0.000
DP-78	JUNCTION	0.00	52.82	0	12:33	0	1.6	0.000
DP-8	JUNCTION	0.00	27.43	0	13:22	0	10.6	0.002
DP-87	JUNCTION	0.00	150.04	0	13:47	0	11.9	-0.000
FSD9_OUTLET	JUNCTION	0.00	1.35	0	15:01	0	1.25	0.000
FSDE1_Outlet	JUNCTION	0.00	0.26	0	15:50	0	0.326	0.000
FSDE2_Outlet	JUNCTION	0.00	2.01	0	14:53	0	0.608	0.000
FSDE4_Outlet	JUNCTION	0.00	1.15	0	14:53	0	0.907	0.000
SC3-10	JUNCTION	2.94	2.94	0	12:20	0.0737	0.0737	0.000
SC3-11A	JUNCTION	3.51	3.51	0	12:15	0.081	0.081	0.000
SC3-11B	JUNCTION	72.19	72.19	0	12:15	2.29	2.29	0.000
SC3-12	JUNCTION	67.41	67.41	0	12:15	2	2	0.000
SC3-13	JUNCTION	56.24	56.24	0	12:15	1.33	1.33	0.000
SC3-14A	JUNCTION	140.63	140.63	0	12:15	4.33	4.33	0.000
SC3-14B	JUNCTION	76.36	76.36	0	12:15	2.12	2.12	0.000
SC3-15A	JUNCTION	14.69	14.69	0	12:30	0.458	0.458	0.000
SC3-15B	JUNCTION	8.38	8.38	0	12:15	0.234	0.234	0.000
SC3-16A	JUNCTION	205.27	205.27	0	12:15	6.1	6.1	0.000
SC3-16B	JUNCTION	50.92	50.92	0	12:15	1.41	1.41	0.000
SC3-17B	JUNCTION	24.31	24.31	0	12:15	0.702	0.702	0.000
SC3-18	JUNCTION	22.83	22.83	0	12:15	0.705	0.705	0.000
SC3-17A	JUNCTION	23.69	23.69	0	12:15	0.63	0.63	0.000
SC3-19	JUNCTION	24.89	24.89	0	12:25	0.645	0.645	0.000
SC3-1A	JUNCTION	15.40	15.40	0	12:15	0.35	0.35	0.000
SC3-20	JUNCTION	10.09	10.09	0	12:15	0.198	0.198	0.000
SC3-21	JUNCTION	9.52	9.52	0	12:15	0.167	0.167	0.000
SC3-22	JUNCTION	8.91	8.91	0	12:20	0.196	0.196	0.000
SC3-23	JUNCTION	4.37	4.37	0	12:15	0.123	0.123	0.000
SC3-24A	JUNCTION	6.37	6.37	0	12:20	0.183	0.183	0.000
SC3-24B	JUNCTION	2.37	2.37	0	12:15	0.0589	0.0589	0.000
SC3-25	JUNCTION	5.48	5.48	0	12:15	0.13	0.13	0.000
SC3-26	JUNCTION	1.00	1.00	0	12:20	0.0327	0.0327	0.000
SC3-27	JUNCTION	26.55	26.55	0	12:20	0.966	0.966	0.000
SC3-5A	JUNCTION	48.38	48.38	0	12:15	1.13	1.13	0.000
SC3-5B	JUNCTION	60.26	60.26	0	12:15	1.62	1.62	0.000
SC3-61	JUNCTION	5.61	5.61	0	12:20	0.177	0.177	0.000
SC3-6A	JUNCTION	59.98	59.98	0	12:15	1.71	1.71	0.000
SC3-6B	JUNCTION	31.63	31.63	0	12:15	0.853	0.853	0.000
SC3-6C	JUNCTION	47.06	47.06	0	12:15	1.21	1.21	0.000
SC3-7	JUNCTION	60.94	60.94	0	12:15	1.62	1.62	0.000
SC3-72	JUNCTION	9.55	9.55	0	12:20	0.256	0.256	0.000
SC3-73	JUNCTION	12.16	12.16	0	12:25	0.337	0.337	0.000
SC3-74	JUNCTION	22.51	22.51	0	12:25	0.616	0.616	0.000
SC3-75	JUNCTION	11.12	11.12	0	12:25	0.408	0.408	0.000

SC3-76	JUNCTION	10.85	10.85	0	12:25	0.393	0.393	0.000
SC3-77	JUNCTION	8.93	8.93	0	12:30	0.327	0.327	0.000
SC3-78	JUNCTION	32.29	32.29	0	12:20	0.8	0.8	0.000
SC3-79	JUNCTION	32.26	32.26	0	12:25	0.807	0.807	0.000
SC3-8	JUNCTION	12.18	12.18	0	12:25	0.246	0.246	0.000
SC3-80	JUNCTION	22.36	22.36	0	12:25	0.631	0.631	0.000
SC3-81	JUNCTION	26.67	26.67	0	12:30	0.804	0.804	-0.000
SC3-82	JUNCTION	17.01	17.01	0	12:25	0.36	0.36	0.000
SC3-88	JUNCTION	6.28	6.28	0	12:25	0.184	0.184	0.000
SC3-89	JUNCTION	3.64	3.64	0	12:20	0.0839	0.0839	0.000
SC3-9	JUNCTION	24.66	24.66	0	12:25	0.985	0.985	0.000
SCE-1	JUNCTION	9.82	9.82	0	12:25	0.42	0.42	0.000
SCE-10	JUNCTION	115.17	115.17	0	12:15	3.62	3.62	0.000
SCE-11	JUNCTION	0.77	0.77	0	12:15	0.0138	0.0138	0.000
SCE-13	JUNCTION	10.90	10.90	0	12:25	0.404	0.404	0.000
SCE-14	JUNCTION	8.00	8.00	0	12:20	0.27	0.27	0.000
SCE-2	JUNCTION	1.42	1.42	0	12:25	0.0772	0.0772	0.000
SCE-3	JUNCTION	9.63	9.63	0	12:25	0.608	0.608	0.000
SCE-4	JUNCTION	4.16	4.16	0	12:30	0.333	0.333	0.000
SCE-5	JUNCTION	88.24	88.24	0	12:15	2.97	2.97	0.000
SCE-6	JUNCTION	0.18	0.18	0	12:20	0.0103	0.0103	0.000
SCE-7	JUNCTION	39.33	39.33	0	12:15	1.02	1.02	0.000
SCE-8	JUNCTION	47.10	47.10	0	12:15	1.19	1.19	0.000
SCE-9	JUNCTION	0.22	0.22	0	12:20	0.0102	0.0102	0.000
PNDW3_Outfall	JUNCTION	0.00	0.00	0	00:00	0	0	0.000 gal
79	JUNCTION	0.00	0.19	0	14:11	0	0.123	-0.000
80	JUNCTION	0.00	0.29	0	13:29	0	0.167	0.000
SC3-12A	JUNCTION	14.58	14.58	0	12:15	0.354	0.354	0.000
SCE-15	JUNCTION	13.60	13.60	0	12:15	0.354	0.354	0.000
SC3-18B	JUNCTION	7.24	7.24	0	12:20	0.152	0.152	0.000
81	JUNCTION	0.00	145.01	0	13:29	0	7.43	0.000
SC3_OUTFALL	OUTFALL	0.00	141.85	0	12:55	0	28.2	0.000
SCE_OUTFALL	OUTFALL	0.00	0.08	0	03:21	0	0.148	0.000
FSD05	STORAGE	0.00	48.38	0	12:15	0	1.13	0.024
FSD06	STORAGE	0.00	197.56	0	12:16	0	5.45	0.001
FSD09	STORAGE	0.00	29.55	0	12:35	0	1.25	0.006
FSD1	STORAGE	0.00	15.40	0	12:15	0	0.35	-0.001
FSD11B	STORAGE	0.00	72.19	0	12:15	0	2.29	0.151
FSD12	STORAGE	0.00	67.41	0	12:15	0	2	0.157
FSD13	STORAGE	0.00	56.24	0	12:15	0	1.33	0.072
FSD14A	STORAGE	0.00	140.63	0	12:15	0	4.33	0.002
FSD14B	STORAGE	0.00	76.36	0	12:15	0	2.12	0.081
FSD15B	STORAGE	0.00	8.38	0	12:15	0	0.234	-0.001
FSD16A	STORAGE	0.00	205.27	0	12:15	0	6.1	0.071
FSD16B	STORAGE	0.00	50.92	0	12:15	0	1.41	-0.000
FSD17A	STORAGE	0.00	23.69	0	12:15	0	0.63	0.002
FSD17B	STORAGE	0.00	24.31	0	12:15	0	0.702	0.004
FSD18	STORAGE	0.00	22.83	0	12:15	0	0.705	0.007
FSD20	STORAGE	0.00	10.09	0	12:15	0	0.198	0.383
FSD21	STORAGE	0.00	9.52	0	12:15	0	0.167	0.011
FSD22	STORAGE	0.00	8.91	0	12:20	0	0.196	0.033
FSD23	STORAGE	0.00	4.37	0	12:15	0	0.123	0.007
FSD27	STORAGE	0.00	31.14	0	12:23	0	1.22	0.017
FSD72	STORAGE	0.00	9.55	0	12:20	0	0.256	0.012
FSDE1	STORAGE	0.00	9.82	0	12:25	0	0.42	-0.000
FSDE2	STORAGE	0.00	9.63	0	12:25	0	0.608	0.013
FSDE3	STORAGE	0.00	88.24	0	12:15	0	2.97	0.006

FSDE4	STORAGE	0.00	39.33	0	12:15	0	1.02	0.001
FSDE5	STORAGE	0.00	47.10	0	12:15	0	1.19	0.003
PNDE7	STORAGE	0.00	33.38	0	12:42	0	10.2	0.012
FSDE6	STORAGE	0.00	115.17	0	12:15	0	3.62	0.005
PNDW3	STORAGE	0.00	98.39	0	12:44	0	17	1.858
EX_STOCK_POND_1	STORAGE	0.00	140.25	0	14:02	0	12	0.006
FSD12A	STORAGE	0.00	14.58	0	12:15	0	0.354	0.001
EX_STOCK_POND_2	STORAGE	0.00	150.16	0	13:20	0	8.82	0.154

Node Flooding Summary

Flooding refers to all water that overflows a node, whether it ponds or not.

Node	Total Maximum				
	Maximum Hours Flooded	Time of Max Rate CFS	Flood Occurrence days hr:min	Ponded Volume 10^6 gal	Ponded Volume 1000 ft3
	DP-8	75.09	27.36	0 13:22	10.439

Storage Volume Summary

Storage Unit	Average Volume 1000 ft3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 ft3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CFS
	FSD05	23.707	6	0	0	96.396	24	0 13:03
FSD06	264.076	22	0	0	548.808	46	0 17:00	4.30
FSD09	39.835	6	0	0	134.756	19	0 15:01	1.35
FSD1	30.673	8	0	0	42.539	12	1 00:07	0.09
FSD11B	59.936	14	0	0	145.445	33	0 12:29	44.49
FSD12	57.417	23	0	0	94.426	38	0 12:22	57.02
FSD13	37.444	11	0	0	106.671	31	0 12:39	11.95
FSD14A	177.551	11	0	0	421.607	27	0 14:48	5.33
FSD14B	106.049	21	0	0	172.945	34	0 12:41	19.30
FSD15B	16.732	9	0	0	26.333	14	0 20:48	0.10
FSD16A	256.423	22	0	0	472.158	40	0 12:41	64.01
FSD16B	130.597	25	0	0	174.385	34	1 00:06	0.42
FSD17A	26.771	8	0	0	61.196	18	0 14:19	0.89
FSD17B	28.014	10	0	0	67.767	24	0 14:30	0.96
FSD18	25.747	11	0	0	68.252	29	0 14:18	1.03
FSD20	0.019	0	0	0	1.817	1	0 12:22	9.39
FSD21	3.609	3	0	0	18.110	14	0 13:28	0.29
FSD22	5.280	5	0	0	19.998	20	0 13:25	1.39
FSD23	2.817	2	0	0	12.846	10	0 14:10	0.19
FSD27	41.130	14	0	0	106.073	35	0 13:53	5.82
FSD72	6.024	5	0	0	29.280	22	0 14:31	0.45
FSDE1	25.222	9	0	0	49.536	17	0 15:49	0.26
FSDE2	4.432	2	0	0	41.588	15	0 14:53	2.01
FSDE3	117.119	15	0	0	283.367	37	0 14:39	4.00

FSDE4	47.764	9	0	0	100.237	19	0	14:53	1.15
FSDE5	48.902	19	0	0	116.846	44	0	16:46	1.07
PNDE7	4.139	0	0	0	41.261	3	0	13:30	25.31
FSDE6	135.758	11	0	0	346.652	27	0	14:34	4.87
PNDW3	0.081	0	0	0	3.593	0	0	12:44	98.41
EX_STOCK_POND_1	715.270	42	0	0	902.238	53	0	16:02	35.97
FSD12A	18.725	20	0	0	35.848	39	0	14:28	0.45
EX_STOCK_POND_2	155.579	39	0	0	218.832	55	0	13:28	145.01

Outfall Loading Summary

Outfall Node	Flow Freq Pcnt	Avg Flow CFS	Max Flow CFS	Total Volume 10^6 gal
SC3_OUTFALL	96.90	13.85	141.85	28.179
SCE_OUTFALL	96.29	0.07	0.08	0.148
System	96.60	13.92	141.93	28.326

Link Flow Summary

Link	Type	Maximum Flow CFS	Time of Max Occurrence days hr:min	Max Veloc ft/sec	Maximum Full Flow	Max/ Full Depth
RT-1	CONDUIT	22.62	0 12:50	2.91	0.00	0.03
RT-10A	CONDUIT	23.81	0 12:34	4.30	0.24	0.33
RT-10B	CONDUIT	14.67	0 12:32	9.43	0.04	0.13
RT-11A	CONDUIT	142.73	0 13:34	3.88	0.00	0.05
RT-11B	CONDUIT	140.01	0 13:47	3.59	0.00	0.05
RT-11C	CONDUIT	140.25	0 14:02	2.44	0.00	0.06
RT-12A	CONDUIT	63.96	0 12:43	13.71	0.33	0.40
RT-12B	CONDUIT	83.24	0 12:45	18.55	0.23	0.33
RT-16	CONDUIT	58.99	0 12:16	14.05	0.42	0.45
RT-17B	CONDUIT	1.35	0 15:10	4.75	0.01	0.06
RT-18	CONDUIT	127.35	0 12:56	3.28	0.00	0.04
RT-19	CONDUIT	5.44	0 12:25	4.16	0.02	0.09
RT-1E	CONDUIT	0.26	0 15:51	1.98	0.00	0.03
RT-2	CONDUIT	17.16	0 12:50	2.83	0.00	0.03
RT-20	CONDUIT	141.78	0 12:55	4.96	0.00	0.03
RT-21	CONDUIT	4.94	0 12:26	7.49	0.03	0.12
RT-22	CONDUIT	0.19	0 14:20	2.58	0.00	0.03
RT-2E	CONDUIT	12.22	0 12:31	6.62	0.09	0.21
RT-3	CONDUIT	14.50	0 12:36	2.65	0.00	0.03
RT-3E	CONDUIT	2.01	0 14:55	4.00	0.01	0.08
RT-4	CONDUIT	30.94	0 12:44	3.06	0.00	0.04
RT-4E	CONDUIT	24.54	0 12:37	8.50	0.17	0.28
RT-5	CONDUIT	90.46	0 12:59	4.24	0.00	0.06

RT-5E	CONDUIT	27.52	0	12:39	11.23	0.07	0.18
RT-6	CONDUIT	28.06	0	12:39	3.37	0.00	0.03
RT-6B	CONDUIT	41.94	0	13:00	3.35	0.00	0.05
RT-6E	CONDUIT	1.15	0	14:59	3.37	0.01	0.06
RT-7A	CONDUIT	3.59	0	12:23	7.44	0.01	0.08
RT-7E	CONDUIT	29.28	0	12:42	7.83	0.08	0.19
RT-8	CONDUIT	9.38	0	12:23	11.21	0.21	0.31
RT-9A	CONDUIT	141.61	0	13:07	3.57	0.00	0.05
RT-9B	CONDUIT	146.79	0	13:09	4.03	0.00	0.05
RT-9C	CONDUIT	148.19	0	13:13	3.77	0.00	0.05
RT-9D	CONDUIT	149.47	0	13:20	3.84	0.00	0.05
RT-14	CONDUIT	127.49	0	12:44	3.46	0.00	0.04
1	DUMMY	22.51	0	12:25			
2	DUMMY	12.16	0	12:25			
3	DUMMY	11.12	0	12:25			
4	DUMMY	10.85	0	12:25			
5	DUMMY	32.29	0	12:20			
6	DUMMY	9.55	0	12:20			
7	DUMMY	8.93	0	12:30			
8	DUMMY	6.28	0	12:25			
9	DUMMY	9.82	0	12:25			
10	DUMMY	1.42	0	12:25			
11	DUMMY	1.00	0	12:20			
12	DUMMY	26.55	0	12:20			
13	DUMMY	4.37	0	12:15			
14	DUMMY	9.52	0	12:15			
15	DUMMY	5.48	0	12:15			
16	DUMMY	2.37	0	12:15			
17	DUMMY	8.91	0	12:20			
18	DUMMY	24.31	0	12:15			
20	DUMMY	10.09	0	12:15			
22	DUMMY	76.36	0	12:15			
24	DUMMY	140.63	0	12:15			
25	DUMMY	56.24	0	12:15			
27	DUMMY	39.33	0	12:15			
28	DUMMY	47.10	0	12:15			
29	DUMMY	88.24	0	12:15			
30	DUMMY	50.92	0	12:15			
34	DUMMY	22.83	0	12:15			
36	DUMMY	9.63	0	12:25			
37	DUMMY	4.16	0	12:30			
38	DUMMY	24.66	0	12:25			
RT-17A	CONDUIT	8.84	0	12:45	3.30	0.00	0.03
39	DUMMY	14.69	0	12:30			
40	DUMMY	8.38	0	12:15			
42	DUMMY	67.41	0	12:15			
44	DUMMY	0.77	0	12:15			
45	DUMMY	0.22	0	12:20			
46	DUMMY	0.18	0	12:20			
47	DUMMY	8.00	0	12:20			
48	DUMMY	10.90	0	12:25			
51	DUMMY	115.17	0	12:15			
54	DUMMY	72.19	0	12:15			
56	DUMMY	3.51	0	12:15			
58	CONDUIT	98.39	0	12:44	5.24	0.00	0.02
63	DUMMY	48.38	0	12:15			
65	DUMMY	15.40	0	12:15			

67	DUMMY	141.85	0	12:55				
RT-15A	CONDUIT	60.46	0	12:16	15.77	0.26	0.35	
RT-15B	CONDUIT	90.35	0	12:17	15.61	0.15	0.26	
69	DUMMY	47.06	0	12:15				
70	DUMMY	31.63	0	12:15				
RT-25	CONDUIT	25.30	0	13:36	3.07	0.00	0.08	
71	CONDUIT	0.08	0	03:21	0.10	1.08	1.00	
74	DUMMY	2.94	0	12:20				
75	DUMMY	6.37	0	12:20				
77	DUMMY	60.26	0	12:15				
78	DUMMY	23.69	0	12:15				
79	DUMMY	205.27	0	12:15				
80	CONDUIT	0.29	0	13:34	3.11	0.00	0.04	
81	DUMMY	14.58	0	12:15				
82	DUMMY	13.60	0	12:15				
83	DUMMY	7.24	0	12:20				
84	DUMMY	150.16	0	13:20				
FSD01_Outlet	DUMMY	0.09	1	00:07				
FSD05_Outlet	DUMMY	3.66	0	13:04				
FSD06_Outlet	DUMMY	4.30	0	17:01				
FSD11B_Outlet	DUMMY	44.49	0	12:29				
FSD12_Outlet	DUMMY	57.02	0	12:22				
FSD13_Outlet	DUMMY	11.95	0	12:40				
FSD14A_Outlet	DUMMY	5.33	0	14:48				
FSD14B_Outlet	DUMMY	19.30	0	12:28				
FSD15B_Outlet	DUMMY	0.10	0	20:48				
FSD16A_Outlet	DUMMY	64.01	0	12:41				
FSD16B_Outlet	DUMMY	0.42	1	00:06				
FSD17B_Outlet	DUMMY	0.96	0	14:30				
FSD18_Outlet	DUMMY	1.03	0	14:19				
FSD21_Outlet	DUMMY	0.29	0	13:29				
FSD22_Outlet	DUMMY	1.39	0	13:26				
FSD72_Outlet	DUMMY	0.45	0	14:31				
FSD9_Outlet	DUMMY	1.35	0	15:01				
FSDE2_Outlet	DUMMY	2.01	0	14:53				
FSDE3_Outlet	DUMMY	4.00	0	14:39				
FSDE4_Outlet	DUMMY	1.15	0	14:53				
FSDE5_Outlet	DUMMY	1.07	0	16:46				
FSDE6_Outlet	DUMMY	4.87	0	14:35				
FSDE1_Outlet	DUMMY	0.26	0	15:50				
PNDE7_Outlet	DUMMY	25.31	0	13:31				
FSD17A_Outlet	DUMMY	0.89	0	14:19				
PNDW3_Outlet	DUMMY	98.41	0	12:45				
FSD27_Outlet	DUMMY	5.82	0	13:53				
EX_STOCK_POND_1_OUTFALL	DUMMY	35.97	0	16:03				
FSD23_Outlet	DUMMY	0.19	0	14:11				
FSD12A_Outlet	DUMMY	0.45	0	14:29				
EX_STOCK_POND_2_OUTLET	DUMMY	145.01	0	13:29				

Conduit Surcharge Summary

Hours Hours
----- Hours Full ----- Above Full Capacity

Conduit	Both Ends	Upstream	Dnstream	Normal Flow	Limited
71	75.09	75.09	75.09	0.04	75.09

Analysis begun on: Fri Oct 15 16:15:58 2021

Analysis ended on: Fri Oct 15 16:15:59 2021

Total elapsed time: 00:00:01

Sterling Ranch 2021 MDDP Amendment
5-YR Type II Storm

WARNING 04: minimum elevation drop used for Conduit 1
WARNING 04: minimum elevation drop used for Conduit 2
WARNING 04: minimum elevation drop used for Conduit 3
WARNING 04: minimum elevation drop used for Conduit 4
WARNING 04: minimum elevation drop used for Conduit 5
WARNING 04: minimum elevation drop used for Conduit 6
WARNING 04: minimum elevation drop used for Conduit 7
WARNING 04: minimum elevation drop used for Conduit 8
WARNING 04: minimum elevation drop used for Conduit 9
WARNING 04: minimum elevation drop used for Conduit 10
WARNING 04: minimum elevation drop used for Conduit 11
WARNING 04: minimum elevation drop used for Conduit 12
WARNING 04: minimum elevation drop used for Conduit 14
WARNING 04: minimum elevation drop used for Conduit 15
WARNING 04: minimum elevation drop used for Conduit 16
WARNING 04: minimum elevation drop used for Conduit 17
WARNING 04: minimum elevation drop used for Conduit 18
WARNING 04: minimum elevation drop used for Conduit 20
WARNING 04: minimum elevation drop used for Conduit 22
WARNING 04: minimum elevation drop used for Conduit 27
WARNING 04: minimum elevation drop used for Conduit 28
WARNING 04: minimum elevation drop used for Conduit 29
WARNING 04: minimum elevation drop used for Conduit 30
WARNING 04: minimum elevation drop used for Conduit 34
WARNING 04: minimum elevation drop used for Conduit 36
WARNING 04: minimum elevation drop used for Conduit 37
WARNING 04: minimum elevation drop used for Conduit 38
WARNING 04: minimum elevation drop used for Conduit 39
WARNING 04: minimum elevation drop used for Conduit 40
WARNING 04: minimum elevation drop used for Conduit 44
WARNING 04: minimum elevation drop used for Conduit 45
WARNING 04: minimum elevation drop used for Conduit 46
WARNING 04: minimum elevation drop used for Conduit 47
WARNING 04: minimum elevation drop used for Conduit 48
WARNING 04: minimum elevation drop used for Conduit 51
WARNING 04: minimum elevation drop used for Conduit 54
WARNING 08: elevation drop exceeds length for Conduit 56
WARNING 04: minimum elevation drop used for Conduit 63
WARNING 04: minimum elevation drop used for Conduit 65
WARNING 04: minimum elevation drop used for Conduit 67
WARNING 04: minimum elevation drop used for Conduit 69
WARNING 04: minimum elevation drop used for Conduit 70
WARNING 04: minimum elevation drop used for Conduit 71
WARNING 04: minimum elevation drop used for Conduit 74
WARNING 04: minimum elevation drop used for Conduit 75
WARNING 08: elevation drop exceeds length for Conduit 77
WARNING 04: minimum elevation drop used for Conduit 78
WARNING 04: minimum elevation drop used for Conduit 79
WARNING 04: minimum elevation drop used for Conduit 82
WARNING 04: minimum elevation drop used for Conduit 83

WARNING 10: crest elevation raised to downstream invert for regulator Link FSD12_Outlet
WARNING 10: crest elevation raised to downstream invert for regulator Link FSD12A_Outlet

NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.

Analysis Options

Flow Units CFS

Process Models:

Rainfall/Runoff NO

RDII NO

Snowmelt NO

Groundwater NO

Flow Routing YES

Ponding Allowed NO

Water Quality NO

Flow Routing Method KINWAVE

Starting Date 01/01/2005 00:00:00

Ending Date 01/04/2005 06:00:00

Antecedent Dry Days 0.0

Report Time Step 00:05:00

Routing Time Step 30.00 sec

***** Volume Volume

Flow Routing Continuity acre-feet 10^6 gal

***** ----- -----

Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.000	0.000
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	264.559	86.210
External Outflow	172.097	56.080
Flooding Loss	47.693	15.541
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	45.359	14.781
Continuity Error (%)	-0.223	

Highest Flow Instability Indexes

Link RT-14 (66)

Link PNDW3_Outlet (66)

Link RT-18 (65)

Link RT-20 (64)

Link 67 (64)

Routing Time Step Summary

Minimum Time Step : 30.00 sec
Average Time Step : 30.00 sec
Maximum Time Step : 30.00 sec
Percent in Steady State : 0.00
Average Iterations per Step : 1.00
Percent Not Converging : 0.00

Node Depth Summary

Node	Type	Average Maximum Maximum Time of Max Reported				
		Depth	Depth	HGL	Occurrence	Max Depth
		Feet	Feet	Feet	days hr:min	Feet
DP-1E	JUNCTION	0.17	1.28	260.18	0 12:25	1.28
DP-21	JUNCTION	0.26	2.25	186.45	0 12:38	2.25
DP-22	JUNCTION	0.26	2.25	226.45	0 12:36	2.25
DP-25	JUNCTION	0.02	0.66	332.86	0 12:15	0.64
DP-26	JUNCTION	0.08	1.13	200.33	0 12:30	1.13
DP-2E	JUNCTION	0.23	1.76	220.66	0 12:28	1.76
DP-3E	JUNCTION	0.29	1.75	130.65	0 12:33	1.74
DP-4E	JUNCTION	0.41	1.68	62.18	0 12:35	1.68
DP-53A	JUNCTION	0.18	1.33	1.33	0 14:14	1.33
DP-56	JUNCTION	0.35	1.04	33.04	0 13:35	1.04
DP-60A	JUNCTION	0.25	1.86	24.06	0 14:14	1.86
DP-61	JUNCTION	0.25	1.86	65.06	0 14:08	1.86
DP-63	JUNCTION	0.19	1.67	99.87	0 14:06	1.66
DP-64	JUNCTION	0.09	1.92	95.12	0 12:16	1.90
DP-68	JUNCTION	0.24	1.90	120.30	0 12:39	1.90
DP-69	JUNCTION	0.16	3.04	206.24	0 12:32	3.02
DP-70	JUNCTION	0.10	2.05	231.25	0 13:05	2.05
DP-71	JUNCTION	0.10	2.06	259.26	0 13:02	2.05
DP-72	JUNCTION	0.08	2.01	285.21	0 12:58	2.01
DP-73	JUNCTION	0.10	2.02	302.22	0 12:58	2.01
DP-74	JUNCTION	0.04	1.29	498.49	0 12:30	1.29
DP-75	JUNCTION	0.07	2.17	434.37	0 12:41	2.17
DP-77	JUNCTION	0.08	2.13	342.33	0 12:51	2.13
DP-78	JUNCTION	0.05	1.59	463.79	0 12:31	1.59
DP-8	JUNCTION	9.70	10.00	10.00	0 02:24	10.00
DP-87	JUNCTION	0.17	2.68	159.88	0 13:17	2.67
FSD9_OUTLET	JUNCTION	0.18	1.32	140.52	0 13:18	1.32
FSDE1_Outlet	JUNCTION	0.13	0.23	265.13	0 15:40	0.23
FSDE2_Outlet	JUNCTION	0.10	0.45	229.35	0 14:46	0.45
FSDE4_Outlet	JUNCTION	0.17	0.34	97.94	0 14:12	0.34
SC3-10	JUNCTION	0.00	0.00	63.20	0 00:00	0.00
SC3-11A	JUNCTION	0.00	0.00	98.20	0 00:00	0.00
SC3-11B	JUNCTION	0.00	0.00	98.20	0 00:00	0.00
SC3-12	JUNCTION	0.00	0.00	157.20	0 00:00	0.00
SC3-13	JUNCTION	0.00	0.00	118.60	0 00:00	0.00
SC3-14A	JUNCTION	0.00	0.00	118.50	0 00:00	0.00
SC3-14B	JUNCTION	0.00	0.00	184.20	0 00:00	0.00
SC3-15A	JUNCTION	0.00	0.00	199.20	0 00:00	0.00

SC3-15B	JUNCTION	0.00	0.00	199.20	0 00:00	0.00
SC3-16A	JUNCTION	0.00	0.00	224.20	0 00:00	0.00
SC3-16B	JUNCTION	0.00	0.00	224.20	0 00:00	0.00
SC3-17B	JUNCTION	0.00	0.00	229.20	0 00:00	0.00
SC3-18	JUNCTION	0.00	0.00	203.20	0 00:00	0.00
SC3-17A	JUNCTION	0.00	0.00	203.20	0 00:00	0.00
SC3-19	JUNCTION	0.07	3.10	248.30	0 12:25	3.08
SC3-1A	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
SC3-20	JUNCTION	0.00	0.00	324.20	0 00:00	0.00
SC3-21	JUNCTION	0.00	0.00	332.20	0 00:00	0.00
SC3-22	JUNCTION	0.00	0.00	283.20	0 00:00	0.00
SC3-23	JUNCTION	0.00	0.00	295.20	0 00:00	0.00
SC3-24A	JUNCTION	0.00	0.00	300.20	0 00:00	0.00
SC3-24B	JUNCTION	0.00	0.00	283.20	0 00:00	0.00
SC3-25	JUNCTION	0.00	0.00	332.20	0 00:00	0.00
SC3-26	JUNCTION	0.00	0.00	257.20	0 00:00	0.00
SC3-27	JUNCTION	0.00	0.00	257.20	0 00:00	0.00
SC3-5A	JUNCTION	0.00	0.00	22.20	0 00:00	0.00
SC3-5B	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
SC3-61	JUNCTION	0.04	1.11	29.31	0 12:20	1.10
SC3-6A	JUNCTION	0.09	1.96	89.16	0 12:15	1.94
SC3-6B	JUNCTION	0.00	0.00	93.20	0 00:00	0.00
SC3-6C	JUNCTION	0.00	0.00	63.20	0 00:00	0.00
SC3-7	JUNCTION	0.08	1.70	118.90	0 12:15	1.68
SC3-72	JUNCTION	0.00	0.00	340.20	0 00:00	0.00
SC3-73	JUNCTION	0.00	0.00	432.20	0 00:00	0.00
SC3-74	JUNCTION	0.00	0.00	497.20	0 00:00	0.00
SC3-75	JUNCTION	0.00	0.00	432.20	0 00:00	0.00
SC3-76	JUNCTION	0.00	0.00	432.20	0 00:00	0.00
SC3-77	JUNCTION	0.00	0.00	340.20	0 00:00	0.00
SC3-78	JUNCTION	0.00	0.00	462.20	0 00:00	0.00
SC3-79	JUNCTION	0.03	1.14	563.34	0 12:25	1.13
SC3-8	JUNCTION	0.02	1.30	248.50	0 12:20	1.29
SC3-80	JUNCTION	0.03	1.01	553.21	0 12:25	1.01
SC3-81	JUNCTION	0.03	1.20	533.40	0 12:30	1.19
SC3-82	JUNCTION	0.02	0.95	563.15	0 12:20	0.95
SC3-88	JUNCTION	0.00	0.00	340.20	0 00:00	0.00
SC3-89	JUNCTION	0.01	0.56	375.76	0 12:20	0.55
SC3-9	JUNCTION	0.00	0.00	139.20	0 00:00	0.00
SCE-1	JUNCTION	0.00	0.00	266.00	0 00:00	0.00
SCE-10	JUNCTION	0.00	0.00	32.50	0 00:00	0.00
SCE-11	JUNCTION	0.00	0.00	32.50	0 00:00	0.00
SCE-13	JUNCTION	0.00	0.00	258.90	0 00:00	0.00
SCE-14	JUNCTION	0.00	0.00	218.90	0 00:00	0.00
SCE-2	JUNCTION	0.00	0.00	258.90	0 00:00	0.00
SCE-3	JUNCTION	0.00	0.00	230.00	0 00:00	0.00
SCE-4	JUNCTION	0.00	0.00	218.90	0 00:00	0.00
SCE-5	JUNCTION	0.00	0.00	128.90	0 00:00	0.00
SCE-6	JUNCTION	0.00	0.00	128.90	0 00:00	0.00
SCE-7	JUNCTION	0.00	0.00	98.00	0 00:00	0.00
SCE-8	JUNCTION	0.00	0.00	60.50	0 00:00	0.00
SCE-9	JUNCTION	0.00	0.00	60.50	0 00:00	0.00
PNDW3_Outfall	JUNCTION	0.00	0.00	118.20	0 00:00	0.00
79	JUNCTION	0.05	0.43	295.43	0 12:53	0.43
80	JUNCTION	0.06	0.60	331.60	0 12:39	0.60
SC3-12A	JUNCTION	0.00	0.00	157.20	0 00:00	0.00
SCE-15	JUNCTION	0.00	0.00	0.00	0 00:00	0.00

SC3-18B	JUNCTION	0.00	0.00	203.20	0	00:00	0.00
81	JUNCTION	0.10	2.03	231.03	0	13:07	2.02
SC3_OUTFALL	OUTFALL	0.00	0.00	0.00	0	00:00	0.00
SCE_OUTFALL	OUTFALL	0.97	1.00	1.00	0	02:51	1.00
FSD05	STORAGE	2.90	4.99	27.19	0	13:19	4.99
FSD06	STORAGE	5.09	7.71	70.91	0	12:56	7.71
FSD09	STORAGE	2.36	6.13	145.33	0	13:18	6.12
FSD1	STORAGE	1.70	2.31	2.31	0	12:58	2.31
FSD11B	STORAGE	2.92	5.00	103.20	0	12:25	5.00
FSD12	STORAGE	4.33	6.00	163.00	0	12:23	6.00
FSD13	STORAGE	3.19	6.00	124.50	0	12:30	6.00
FSD14A	STORAGE	1.65	3.54	121.94	0	12:56	3.54
FSD14B	STORAGE	3.40	5.78	189.98	0	12:47	5.78
FSD15B	STORAGE	2.26	3.25	202.45	0	12:50	3.25
FSD16A	STORAGE	4.16	7.38	231.58	0	12:36	7.37
FSD16B	STORAGE	4.29	5.60	229.80	0	19:42	5.60
FSD17A	STORAGE	3.10	4.46	207.66	0	12:56	4.46
FSD17B	STORAGE	2.55	4.23	233.43	0	12:56	4.23
FSD18	STORAGE	2.63	4.91	208.11	0	13:05	4.91
FSD20	STORAGE	0.03	0.97	325.17	0	12:22	0.96
FSD21	STORAGE	0.68	2.69	334.89	0	12:39	2.69
FSD22	STORAGE	1.52	4.26	287.46	0	12:49	4.26
FSD23	STORAGE	0.65	2.14	298.14	0	12:53	2.14
FSD27	STORAGE	3.36	6.50	263.70	0	13:07	6.50
FSD72	STORAGE	1.33	4.41	344.61	0	12:56	4.41
FSDE1	STORAGE	2.67	4.43	270.43	0	15:40	4.43
FSDE2	STORAGE	0.55	3.68	233.68	0	14:46	3.68
FSDE3	STORAGE	2.80	5.44	134.34	0	14:21	5.44
FSDE4	STORAGE	2.25	3.92	101.92	0	14:12	3.92
FSDE5	STORAGE	3.19	6.16	66.66	0	15:35	6.16
PNDE7	STORAGE	0.48	2.14	34.64	0	13:35	2.14
FSDE6	STORAGE	3.07	5.09	37.59	0	14:07	5.09
PNDW3	STORAGE	0.16	3.28	121.58	0	14:07	3.28
EX_STOCK_POND_1	STORAGE	6.76	9.23	151.23	0	13:49	9.23
FSD12A	STORAGE	4.21	6.61	163.61	0	12:45	6.61
EX_STOCK_POND_2	STORAGE	3.19	5.10	234.20	0	13:07	5.09

Node Inflow Summary

Node	Type	Maximum		Maximum		Lateral Inflow Volume 10^6 gal	Total Inflow Volume 10^6 gal	Flow Balance Error Percent			
		CFS	CFS	Time of Occurrence days hr:min	Max						
DP-1E	JUNCTION	0.00	29.33	0	12:25	0	1.69	0.000			
DP-21	JUNCTION	0.00	135.34	0	12:38	0	9.33	0.000			
DP-22	JUNCTION	0.00	116.13	0	12:36	0	7.23	0.000			
DP-25	JUNCTION	0.00	11.81	0	12:15	0	0.257	0.000			
DP-26	JUNCTION	0.00	42.79	0	12:30	0	1.56	0.000			
DP-2E	JUNCTION	0.00	56.23	0	12:28	0	3.89	0.000			
DP-3E	JUNCTION	0.00	60.36	0	12:34	0	7.55	-0.000			
DP-4E	JUNCTION	0.00	63.53	0	12:35	0	10.2	0.000			
DP-53A	JUNCTION	0.00	488.28	0	14:14	0	55.9	0.000			

DP-56	JUNCTION	0.00	45.74	0	13:35	0	15.1	0.000
DP-60A	JUNCTION	0.00	487.69	0	14:13	0	55.6	0.000
DP-61	JUNCTION	0.00	479.78	0	14:08	0	51.4	0.000
DP-63	JUNCTION	0.00	432.30	0	14:06	0	40.6	0.000
DP-64	JUNCTION	0.00	135.67	0	12:16	0	3.34	0.000
DP-68	JUNCTION	0.00	512.95	0	13:48	0	37.8	0.000
DP-69	JUNCTION	0.00	535.56	0	13:09	0	23.4	0.000
DP-70	JUNCTION	0.00	487.36	0	13:05	0	20.7	0.000
DP-71	JUNCTION	0.00	482.49	0	13:02	0	19.8	0.000
DP-72	JUNCTION	0.00	452.40	0	12:58	0	17.6	0.000
DP-73	JUNCTION	0.00	442.08	0	12:57	0	17	0.000
DP-74	JUNCTION	0.00	94.55	0	12:30	0	2.5	0.000
DP-75	JUNCTION	0.00	274.57	0	12:41	0	9.39	0.000
DP-77	JUNCTION	0.00	427.54	0	12:51	0	15.9	0.000
DP-78	JUNCTION	0.00	138.33	0	12:31	0	3.81	0.000
DP-8	JUNCTION	0.00	49.21	0	13:24	0	15.7	0.001
DP-87	JUNCTION	0.00	557.29	0	13:17	0	27.7	0.000
FSD9_OUTLET	JUNCTION	0.00	50.81	0	13:18	0	3.62	0.000
FSDE1_Outlet	JUNCTION	0.00	0.79	0	15:40	0	0.6	0.000
FSDE2_Outlet	JUNCTION	0.00	3.82	0	14:46	0	1.04	0.000
FSDE4_Outlet	JUNCTION	0.00	2.03	0	14:12	0	1.22	0.000
SC3-10	JUNCTION	14.36	14.36	0	12:20	0.299	0.299	0.000
SC3-11A	JUNCTION	7.30	7.30	0	12:15	0.153	0.153	0.000
SC3-11B	JUNCTION	105.66	105.66	0	12:15	3.11	3.11	0.000
SC3-12	JUNCTION	101.58	101.58	0	12:15	2.76	2.76	0.000
SC3-13	JUNCTION	80.96	80.96	0	12:15	1.8	1.8	0.000
SC3-14A	JUNCTION	205.63	205.63	0	12:15	5.87	5.87	0.000
SC3-14B	JUNCTION	108.26	108.26	0	12:15	2.82	2.82	0.000
SC3-15A	JUNCTION	42.69	42.69	0	12:30	1.33	1.33	0.000
SC3-15B	JUNCTION	12.29	12.29	0	12:15	0.319	0.319	0.000
SC3-16A	JUNCTION	290.98	290.98	0	12:15	8.17	8.17	0.000
SC3-16B	JUNCTION	72.27	72.27	0	12:15	1.88	1.88	0.000
SC3-17B	JUNCTION	35.54	35.54	0	12:15	0.957	0.957	0.000
SC3-18	JUNCTION	35.93	35.93	0	12:15	1	1	0.000
SC3-17A	JUNCTION	36.38	36.38	0	12:15	0.882	0.882	0.000
SC3-19	JUNCTION	70.19	70.19	0	12:25	1.8	1.8	0.000
SC3-1A	JUNCTION	32.05	32.05	0	12:15	0.566	0.566	0.000
SC3-20	JUNCTION	23.17	23.17	0	12:15	0.421	0.421	0.000
SC3-21	JUNCTION	20.17	20.17	0	12:15	0.322	0.322	0.000
SC3-22	JUNCTION	20.52	20.52	0	12:15	0.418	0.418	0.000
SC3-23	JUNCTION	8.80	8.80	0	12:15	0.223	0.223	0.000
SC3-24A	JUNCTION	15.10	15.10	0	12:20	0.414	0.414	0.000
SC3-24B	JUNCTION	5.81	5.81	0	12:15	0.137	0.137	0.000
SC3-25	JUNCTION	11.81	11.81	0	12:15	0.257	0.257	0.000
SC3-26	JUNCTION	2.91	2.91	0	12:20	0.095	0.095	0.000
SC3-27	JUNCTION	51.28	51.28	0	12:20	1.69	1.69	0.000
SC3-5A	JUNCTION	75.20	75.20	0	12:15	1.53	1.53	0.000
SC3-5B	JUNCTION	97.13	97.13	0	12:15	2.27	2.27	0.000
SC3-61	JUNCTION	22.40	22.40	0	12:20	0.593	0.593	0.000
SC3-6A	JUNCTION	84.21	84.21	0	12:15	2.27	2.27	0.000
SC3-6B	JUNCTION	49.78	49.78	0	12:15	1.18	1.18	0.000
SC3-6C	JUNCTION	76.10	76.10	0	12:15	1.69	1.69	0.000
SC3-7	JUNCTION	87.91	87.91	0	12:15	2.17	2.17	0.000
SC3-72	JUNCTION	23.84	23.84	0	12:20	0.615	0.615	0.000
SC3-73	JUNCTION	33.03	33.03	0	12:25	0.903	0.903	0.000
SC3-74	JUNCTION	53.27	53.27	0	12:25	1.39	1.39	0.000
SC3-75	JUNCTION	26.37	26.37	0	12:25	0.921	0.921	0.000

SC3-76	JUNCTION	27.09	27.09	0	12:25	0.945	0.945	0.000
SC3-77	JUNCTION	27.11	27.11	0	12:30	0.992	0.992	0.000
SC3-78	JUNCTION	77.46	77.46	0	12:20	1.81	1.81	0.000
SC3-79	JUNCTION	82.54	82.54	0	12:25	2.01	2.01	0.000
SC3-8	JUNCTION	56.41	56.41	0	12:20	1.14	1.14	0.000
SC3-80	JUNCTION	57.34	57.34	0	12:25	1.57	1.57	0.000
SC3-81	JUNCTION	81.00	81.00	0	12:30	2.44	2.44	0.000
SC3-82	JUNCTION	50.83	50.83	0	12:20	1.09	1.09	0.000
SC3-88	JUNCTION	18.99	18.99	0	12:25	0.558	0.558	0.000
SC3-89	JUNCTION	10.98	10.98	0	12:20	0.255	0.255	0.000
SC3-9	JUNCTION	73.44	73.44	0	12:25	2.43	2.43	0.000
SCE-1	JUNCTION	21.30	21.30	0	12:25	0.849	0.849	0.000
SCE-10	JUNCTION	179.69	179.69	0	12:15	5.08	5.08	0.000
SCE-11	JUNCTION	2.52	2.52	0	12:15	0.0369	0.0369	0.000
SCE-13	JUNCTION	25.85	25.85	0	12:25	0.913	0.913	0.000
SCE-14	JUNCTION	19.04	19.04	0	12:20	0.61	0.61	0.000
SCE-2	JUNCTION	3.35	3.35	0	12:25	0.174	0.174	0.000
SCE-3	JUNCTION	19.25	19.25	0	12:25	1.04	1.04	0.000
SCE-4	JUNCTION	7.52	7.52	0	12:30	0.554	0.554	0.000
SCE-5	JUNCTION	122.76	122.76	0	12:15	3.95	3.95	0.000
SCE-6	JUNCTION	0.55	0.55	0	12:20	0.0275	0.0275	0.000
SCE-7	JUNCTION	54.94	54.94	0	12:15	1.36	1.36	0.000
SCE-8	JUNCTION	61.37	61.37	0	12:15	1.54	1.54	0.000
SCE-9	JUNCTION	0.68	0.68	0	12:20	0.0274	0.0274	0.000
PNDW3_Outfall	JUNCTION	0.00	0.00	0	00:00	0	0	0.000 gal
79	JUNCTION	0.00	4.00	0	12:53	0	0.223	-0.000
80	JUNCTION	0.00	8.69	0	12:39	0	0.322	0.000
SC3-12A	JUNCTION	23.33	23.33	0	12:15	0.508	0.508	0.000
SCE-15	JUNCTION	27.20	27.20	0	12:15	0.633	0.633	0.000
SC3-18B	JUNCTION	20.98	20.98	0	12:20	0.442	0.442	0.000
81	JUNCTION	0.00	486.51	0	13:07	0	19.3	0.000
SC3_OUTFALL	OUTFALL	0.00	488.28	0	14:14	0	55.9	0.000
SCE_OUTFALL	OUTFALL	0.00	0.08	0	02:50	0	0.149	0.000
FSD05	STORAGE	0.00	75.20	0	12:15	0	1.53	0.015
FSD06	STORAGE	0.00	296.40	0	12:16	0	7.44	0.029
FSD09	STORAGE	0.00	112.72	0	12:33	0	3.62	0.115
FSD1	STORAGE	0.00	32.05	0	12:15	0	0.566	0.035
FSD11B	STORAGE	0.00	105.66	0	12:15	0	3.11	0.193
FSD12	STORAGE	0.00	101.58	0	12:15	0	2.76	0.093
FSD13	STORAGE	0.00	80.96	0	12:15	0	1.8	0.091
FSD14A	STORAGE	0.00	205.63	0	12:15	0	5.87	0.039
FSD14B	STORAGE	0.00	108.26	0	12:15	0	2.82	0.055
FSD15B	STORAGE	0.00	12.29	0	12:15	0	0.319	0.064
FSD16A	STORAGE	0.00	290.98	0	12:15	0	8.17	0.070
FSD16B	STORAGE	0.00	72.27	0	12:15	0	1.88	0.001
FSD17A	STORAGE	0.00	36.38	0	12:15	0	0.882	0.033
FSD17B	STORAGE	0.00	35.54	0	12:15	0	0.957	0.041
FSD18	STORAGE	0.00	35.93	0	12:15	0	1	0.048
FSD20	STORAGE	0.00	23.17	0	12:15	0	0.421	0.245
FSD21	STORAGE	0.00	20.17	0	12:15	0	0.322	0.213
FSD22	STORAGE	0.00	20.52	0	12:15	0	0.418	0.174
FSD23	STORAGE	0.00	8.80	0	12:15	0	0.223	0.147
FSD27	STORAGE	0.00	62.12	0	12:21	0	2.17	0.115
FSD72	STORAGE	0.00	23.84	0	12:20	0	0.615	-1.739
FSDE1	STORAGE	0.00	21.30	0	12:25	0	0.849	0.001
FSDE2	STORAGE	0.00	19.25	0	12:25	0	1.04	0.021
FSDE3	STORAGE	0.00	122.76	0	12:15	0	3.95	0.009

FSDE4	STORAGE	0.00	54.94	0	12:15	0	1.36	0.007
FSDE5	STORAGE	0.00	61.37	0	12:15	0	1.54	0.003
PNDE7	STORAGE	0.00	70.58	0	12:38	0	15.1	0.019
FSDE6	STORAGE	0.00	179.69	0	12:15	0	5.08	0.009
PNDW3	STORAGE	0.00	512.95	0	13:48	0	37.8	0.832
EX_STOCK_POND_1	STORAGE	0.00	536.60	0	13:27	0	27.7	0.148
FSD12A	STORAGE	0.00	23.33	0	12:15	0	0.508	0.081
EX_STOCK_POND_2	STORAGE	0.00	487.36	0	13:05	0	20.7	0.194

Node Flooding Summary

Flooding refers to all water that overflows a node, whether it ponds or not.

Total Maximum					
Maximum Time of Max Flood Ponded					
Hours Rate Occurrence Volume Volume					
Node	Flooded	CFS	days hr:min	10^6 gal	1000 ft3

DP-8	75.61	49.14	0 13:25	15.541	0.000

Storage Volume Summary

Average Avg Evap Exfil Maximum Max Time of Max Maximum									
Volume Pcnt Pcnt Pcnt Volume Pcnt Occurrence Outflow									
Storage Unit	1000 ft3	Full	Loss	Loss	1000 ft3	Full	days hr:min	CFS	

FSD05	30.086	7	0	0	136.865	34	0 13:19	3.70	
FSD06	295.182	25	0	0	657.719	55	0 12:56	34.37	
FSD09	55.672	8	0	0	263.446	37	0 13:17	50.81	
FSD1	38.781	11	0	0	57.600	16	0 12:58	2.83	
FSD11B	61.737	14	0	0	157.696	36	0 12:24	77.00	
FSD12	58.482	23	0	0	106.675	43	0 12:23	81.10	
FSD13	39.377	11	0	0	128.243	37	0 12:30	30.29	
FSD14A	188.416	12	0	0	499.852	32	0 12:56	36.25	
FSD14B	108.593	21	0	0	231.709	45	0 12:47	19.30	
FSD15B	17.131	9	0	0	27.897	15	0 12:50	2.72	
FSD16A	261.668	22	0	0	578.760	50	0 12:35	115.75	
FSD16B	155.759	30	0	0	221.218	43	0 19:41	1.10	
FSD17A	28.372	8	0	0	76.265	23	0 12:56	6.06	
FSD17B	29.749	10	0	0	80.913	28	0 12:56	6.73	
FSD18	27.797	12	0	0	86.110	37	0 13:04	7.29	
FSD20	0.040	0	0	0	4.375	3	0 12:22	21.02	
FSD21	4.008	3	0	0	22.406	17	0 12:38	8.69	
FSD22	5.726	6	0	0	29.801	29	0 12:48	9.12	
FSD23	3.233	2	0	0	15.154	11	0 12:52	4.00	
FSD27	43.907	15	0	0	140.011	46	0 13:06	30.51	
FSD72	10.475	8	0	0	45.268	34	0 12:55	11.95	
FSDE1	53.984	19	0	0	102.501	36	0 15:39	0.79	
FSDE2	9.016	3	0	0	79.268	28	0 14:46	3.82	
FSDE3	143.696	19	0	0	376.706	49	0 14:20	5.92	

FSDE4	55.850	11	0	0	130.370	25	0	14:12	2.03
FSDE5	66.207	25	0	0	151.891	58	0	15:35	1.52
PNDE7	8.770	1	0	0	106.362	7	0	13:35	45.74
FSDE6	176.758	14	0	0	492.364	39	0	14:07	7.73
PNDW3	3.210	0	0	0	231.407	9	0	14:06	426.87
EX_STOCK_POND_1	731.502	43	0	0	1116.165	66	0	13:48	430.06
FSD12A	19.428	21	0	0	42.698	47	0	12:45	5.69
EX_STOCK_POND_2	157.543	40	0	0	263.595	66	0	13:07	486.51

Outfall Loading Summary

	Flow	Avg	Max	Total
	Freq	Flow	Flow	Volume
Outfall Node	Pcnt	CFS	CFS	10^6 gal
SC3_OUTFALL	97.49	27.31	488.28	55.928
SCE_OUTFALL	96.89	0.07	0.08	0.149
System	97.19	27.39	488.35	56.076

Link Flow Summary

Link	Type	Maximum Flow CFS	Time of Max Occurrence days hr:min	Maximum Veloc ft/sec	Max/ Full Flow	Max/ Full Depth
RT-1	CONDUIT	72.48	0 12:46	3.92	0.00	0.06
RT-10A	CONDUIT	68.18	0 12:32	5.58	0.68	0.61
RT-10B	CONDUIT	42.78	0 12:31	12.94	0.11	0.23
RT-11A	CONDUIT	485.09	0 13:10	5.71	0.01	0.10
RT-11B	CONDUIT	519.79	0 13:18	5.39	0.01	0.11
RT-11C	CONDUIT	536.60	0 13:27	3.74	0.01	0.13
RT-12A	CONDUIT	116.04	0 12:38	15.97	0.61	0.56
RT-12B	CONDUIT	135.30	0 12:39	21.19	0.37	0.42
RT-16	CONDUIT	82.73	0 12:16	15.28	0.59	0.55
RT-17B	CONDUIT	50.71	0 13:21	14.07	0.24	0.33
RT-18	CONDUIT	478.55	0 14:14	5.06	0.01	0.09
RT-19	CONDUIT	21.94	0 12:24	6.23	0.07	0.18
RT-1E	CONDUIT	0.79	0 15:41	2.77	0.01	0.06
RT-2	CONDUIT	47.12	0 12:44	3.62	0.00	0.05
RT-20	CONDUIT	487.68	0 14:14	7.63	0.00	0.07
RT-21	CONDUIT	11.05	0 12:22	9.40	0.07	0.18
RT-22	CONDUIT	3.98	0 12:57	9.44	0.04	0.14
RT-2E	CONDUIT	29.01	0 12:29	8.47	0.22	0.32
RT-3	CONDUIT	46.37	0 12:33	3.57	0.00	0.05
RT-3E	CONDUIT	3.82	0 14:47	4.86	0.03	0.11
RT-4	CONDUIT	88.71	0 12:39	3.98	0.00	0.06
RT-4E	CONDUIT	55.54	0 12:33	10.62	0.39	0.44
RT-5	CONDUIT	263.80	0 12:51	5.64	0.00	0.11

RT-5E	CONDUIT	60.31	0	12:35	14.09	0.16	0.27
RT-6	CONDUIT	75.03	0	12:35	4.34	0.00	0.05
RT-6B	CONDUIT	113.27	0	12:52	4.18	0.00	0.07
RT-6E	CONDUIT	2.03	0	14:17	4.01	0.01	0.08
RT-7A	CONDUIT	10.90	0	12:21	10.40	0.04	0.14
RT-7E	CONDUIT	63.44	0	12:37	9.80	0.17	0.28
RT-8	CONDUIT	21.01	0	12:23	13.94	0.47	0.48
RT-9A	CONDUIT	420.93	0	12:58	5.03	0.01	0.10
RT-9B	CONDUIT	441.79	0	12:59	5.73	0.01	0.09
RT-9C	CONDUIT	450.97	0	13:02	5.36	0.01	0.10
RT-9D	CONDUIT	481.00	0	13:05	5.56	0.01	0.10
RT-14	CONDUIT	431.80	0	14:10	5.20	0.01	0.08
1	DUMMY	53.27	0	12:25			
2	DUMMY	33.03	0	12:25			
3	DUMMY	26.37	0	12:25			
4	DUMMY	27.09	0	12:25			
5	DUMMY	77.46	0	12:20			
6	DUMMY	23.84	0	12:20			
7	DUMMY	27.11	0	12:30			
8	DUMMY	18.99	0	12:25			
9	DUMMY	21.30	0	12:25			
10	DUMMY	3.35	0	12:25			
11	DUMMY	2.91	0	12:20			
12	DUMMY	51.28	0	12:20			
13	DUMMY	8.80	0	12:15			
14	DUMMY	20.17	0	12:15			
15	DUMMY	11.81	0	12:15			
16	DUMMY	5.81	0	12:15			
17	DUMMY	20.52	0	12:15			
18	DUMMY	35.54	0	12:15			
20	DUMMY	23.17	0	12:15			
22	DUMMY	108.26	0	12:15			
24	DUMMY	205.63	0	12:15			
25	DUMMY	80.96	0	12:15			
27	DUMMY	54.94	0	12:15			
28	DUMMY	61.37	0	12:15			
29	DUMMY	122.76	0	12:15			
30	DUMMY	72.27	0	12:15			
34	DUMMY	35.93	0	12:15			
36	DUMMY	19.25	0	12:25			
37	DUMMY	7.52	0	12:30			
38	DUMMY	73.44	0	12:25			
RT-17A	CONDUIT	46.37	0	12:36	4.98	0.00	0.06
39	DUMMY	42.69	0	12:30			
40	DUMMY	12.29	0	12:15			
42	DUMMY	101.58	0	12:15			
44	DUMMY	2.52	0	12:15			
45	DUMMY	0.68	0	12:20			
46	DUMMY	0.55	0	12:20			
47	DUMMY	19.04	0	12:20			
48	DUMMY	25.85	0	12:25			
51	DUMMY	179.69	0	12:15			
54	DUMMY	105.66	0	12:15			
56	DUMMY	7.30	0	12:15			
58	CONDUIT	512.95	0	13:48	9.45	0.00	0.06
63	DUMMY	75.20	0	12:15			
65	DUMMY	32.05	0	12:15			

67	DUMMY	488.28	0	14:14				
RT-15A	CONDUIT	87.12	0	12:16	17.40	0.37	0.42	
RT-15B	CONDUIT	134.10	0	12:16	17.48	0.22	0.32	
69	DUMMY	76.10	0	12:15				
70	DUMMY	49.78	0	12:15				
RT-25	CONDUIT	45.73	0	13:40	3.61	0.00	0.10	
71	CONDUIT	0.08	0	02:50	0.10	1.08	1.00	
74	DUMMY	14.36	0	12:20				
75	DUMMY	15.10	0	12:20				
77	DUMMY	97.13	0	12:15				
78	DUMMY	36.38	0	12:15				
79	DUMMY	290.98	0	12:15				
80	CONDUIT	8.67	0	12:41	15.90	0.09	0.20	
81	DUMMY	23.33	0	12:15				
82	DUMMY	27.20	0	12:15				
83	DUMMY	20.98	0	12:20				
84	DUMMY	487.36	0	13:05				
FSD01_Outlet	DUMMY	2.83	0	12:58				
FSD05_Outlet	DUMMY	3.70	0	12:18				
FSD06_Outlet	DUMMY	34.37	0	12:56				
FSD11B_Outlet	DUMMY	77.00	0	12:17				
FSD12_Outlet	DUMMY	81.10	0	12:23				
FSD13_Outlet	DUMMY	30.29	0	12:30				
FSD14A_Outlet	DUMMY	36.25	0	12:56				
FSD14B_Outlet	DUMMY	19.30	0	12:15				
FSD15B_Outlet	DUMMY	2.72	0	12:50				
FSD16A_Outlet	DUMMY	115.75	0	12:36				
FSD16B_Outlet	DUMMY	1.10	0	19:42				
FSD17B_Outlet	DUMMY	6.73	0	12:56				
FSD18_Outlet	DUMMY	7.29	0	13:05				
FSD21_Outlet	DUMMY	8.69	0	12:39				
FSD22_Outlet	DUMMY	9.12	0	12:49				
FSD72_Outlet	DUMMY	11.95	0	12:56				
FSD9_Outlet	DUMMY	50.81	0	13:18				
FSDE2_Outlet	DUMMY	3.82	0	14:46				
FSDE3_Outlet	DUMMY	5.92	0	14:21				
FSDE4_Outlet	DUMMY	2.03	0	14:12				
FSDE5_Outlet	DUMMY	1.52	0	15:35				
FSDE6_Outlet	DUMMY	7.73	0	14:07				
FSDE1_Outlet	DUMMY	0.79	0	15:40				
PNDE7_Outlet	DUMMY	45.74	0	13:35				
FSD17A_Outlet	DUMMY	6.06	0	12:56				
PNDW3_Outlet	DUMMY	426.87	0	14:07				
FSD27_Outlet	DUMMY	30.51	0	13:07				
EX_STOCK_POND_1_OUTFALL	DUMMY	430.06	0	13:49				
FSD23_Outlet	DUMMY	4.00	0	12:53				
FSD12A_Outlet	DUMMY	5.69	0	12:45				
EX_STOCK_POND_2_OUTLET	DUMMY	486.51	0	13:07				

Conduit Surcharge Summary

Hours Hours
----- Hours Full ----- Above Full Capacity

Conduit	Both Ends	Upstream	Dnstream	Normal Flow	Limited
71	75.61	75.61	75.61	0.04	75.61

Analysis begun on: Fri Oct 15 16:17:35 2021

Analysis ended on: Fri Oct 15 16:17:36 2021

Total elapsed time: 00:00:01

Sterling Ranch 2021 MDDP Amendment
10-YR Type II Storm

WARNING 04: minimum elevation drop used for Conduit 1
WARNING 04: minimum elevation drop used for Conduit 2
WARNING 04: minimum elevation drop used for Conduit 3
WARNING 04: minimum elevation drop used for Conduit 4
WARNING 04: minimum elevation drop used for Conduit 5
WARNING 04: minimum elevation drop used for Conduit 6
WARNING 04: minimum elevation drop used for Conduit 7
WARNING 04: minimum elevation drop used for Conduit 8
WARNING 04: minimum elevation drop used for Conduit 9
WARNING 04: minimum elevation drop used for Conduit 10
WARNING 04: minimum elevation drop used for Conduit 11
WARNING 04: minimum elevation drop used for Conduit 12
WARNING 04: minimum elevation drop used for Conduit 14
WARNING 04: minimum elevation drop used for Conduit 15
WARNING 04: minimum elevation drop used for Conduit 16
WARNING 04: minimum elevation drop used for Conduit 17
WARNING 04: minimum elevation drop used for Conduit 18
WARNING 04: minimum elevation drop used for Conduit 20
WARNING 04: minimum elevation drop used for Conduit 22
WARNING 04: minimum elevation drop used for Conduit 27
WARNING 04: minimum elevation drop used for Conduit 28
WARNING 04: minimum elevation drop used for Conduit 29
WARNING 04: minimum elevation drop used for Conduit 30
WARNING 04: minimum elevation drop used for Conduit 34
WARNING 04: minimum elevation drop used for Conduit 36
WARNING 04: minimum elevation drop used for Conduit 37
WARNING 04: minimum elevation drop used for Conduit 38
WARNING 04: minimum elevation drop used for Conduit 39
WARNING 04: minimum elevation drop used for Conduit 40
WARNING 04: minimum elevation drop used for Conduit 44
WARNING 04: minimum elevation drop used for Conduit 45
WARNING 04: minimum elevation drop used for Conduit 46
WARNING 04: minimum elevation drop used for Conduit 47
WARNING 04: minimum elevation drop used for Conduit 48
WARNING 04: minimum elevation drop used for Conduit 51
WARNING 04: minimum elevation drop used for Conduit 54
WARNING 08: elevation drop exceeds length for Conduit 56
WARNING 04: minimum elevation drop used for Conduit 63
WARNING 04: minimum elevation drop used for Conduit 65
WARNING 04: minimum elevation drop used for Conduit 67
WARNING 04: minimum elevation drop used for Conduit 69
WARNING 04: minimum elevation drop used for Conduit 70
WARNING 04: minimum elevation drop used for Conduit 71
WARNING 04: minimum elevation drop used for Conduit 74
WARNING 04: minimum elevation drop used for Conduit 75
WARNING 08: elevation drop exceeds length for Conduit 77
WARNING 04: minimum elevation drop used for Conduit 78
WARNING 04: minimum elevation drop used for Conduit 79
WARNING 04: minimum elevation drop used for Conduit 82
WARNING 04: minimum elevation drop used for Conduit 83

WARNING 10: crest elevation raised to downstream invert for regulator Link FSD12_Outlet
WARNING 10: crest elevation raised to downstream invert for regulator Link FSD12A_Outlet

NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.

Analysis Options

Flow Units CFS

Process Models:

Rainfall/Runoff NO

RDII NO

Snowmelt NO

Groundwater NO

Flow Routing YES

Ponding Allowed NO

Water Quality NO

Flow Routing Method KINWAVE

Starting Date 01/01/2005 00:00:00

Ending Date 01/04/2005 06:00:00

Antecedent Dry Days 0.0

Report Time Step 00:05:00

Routing Time Step 30.00 sec

***** Volume Volume

Flow Routing Continuity acre-feet 10⁶ gal

***** ----- -----

Dry Weather Inflow 0.000 0.000

Wet Weather Inflow 0.000 0.000

Groundwater Inflow 0.000 0.000

RDII Inflow 0.000 0.000

External Inflow 351.945 114.686

External Outflow 244.451 79.658

Flooding Loss 62.187 20.265

Evaporation Loss 0.000 0.000

Exfiltration Loss 0.000 0.000

Initial Stored Volume 0.000 0.000

Final Stored Volume 46.164 15.043

Continuity Error (%) -0.244

Highest Flow Instability Indexes

Link PNDW3_Outlet (65)

Link RT-14 (65)

Link RT-18 (65)

Link 67 (63)

Link RT-20 (63)

Routing Time Step Summary

Minimum Time Step : 30.00 sec
Average Time Step : 30.00 sec
Maximum Time Step : 30.00 sec
Percent in Steady State : 0.00
Average Iterations per Step : 1.00
Percent Not Converging : 0.00

Node Depth Summary

Node	Type	Average Maximum Maximum Time of Max Reported				
		Depth	Depth	HGL	Occurrence	Max Depth
		Feet	Feet	Feet	days hr:min	Feet
DP-1E	JUNCTION	0.19	1.58	260.48	0 12:25	1.57
DP-21	JUNCTION	0.28	2.52	186.72	0 12:56	2.52
DP-22	JUNCTION	0.28	2.52	226.72	0 12:55	2.52
DP-25	JUNCTION	0.03	0.79	332.99	0 12:15	0.78
DP-26	JUNCTION	0.09	1.45	200.65	0 12:30	1.45
DP-2E	JUNCTION	0.26	2.20	221.10	0 12:27	2.19
DP-3E	JUNCTION	0.32	2.19	131.09	0 12:32	2.18
DP-4E	JUNCTION	0.45	2.05	62.55	0 12:34	2.05
DP-53A	JUNCTION	0.20	1.78	1.78	0 13:58	1.78
DP-56	JUNCTION	0.39	1.23	33.23	0 13:40	1.23
DP-60A	JUNCTION	0.28	2.47	24.67	0 13:58	2.47
DP-61	JUNCTION	0.28	2.47	65.67	0 13:54	2.47
DP-63	JUNCTION	0.22	2.22	100.42	0 13:53	2.22
DP-64	JUNCTION	0.10	2.17	95.37	0 12:15	2.15
DP-68	JUNCTION	0.26	2.07	120.47	0 12:58	2.07
DP-69	JUNCTION	0.18	4.57	207.77	0 12:32	4.31
DP-70	JUNCTION	0.11	2.65	231.85	0 12:59	2.65
DP-71	JUNCTION	0.12	2.65	259.85	0 12:56	2.65
DP-72	JUNCTION	0.10	2.58	285.78	0 12:53	2.58
DP-73	JUNCTION	0.12	2.58	302.78	0 12:53	2.58
DP-74	JUNCTION	0.04	1.56	498.76	0 12:29	1.56
DP-75	JUNCTION	0.08	2.67	434.87	0 12:39	2.66
DP-77	JUNCTION	0.09	2.62	342.82	0 12:48	2.62
DP-78	JUNCTION	0.06	1.91	464.11	0 12:30	1.91
DP-8	JUNCTION	9.73	10.00	10.00	0 02:06	10.00
DP-87	JUNCTION	0.20	3.51	160.71	0 13:09	3.50
FSD9_OUTLET	JUNCTION	0.20	2.01	141.21	0 13:01	2.01
FSDE1_Outlet	JUNCTION	0.15	0.42	265.32	0 15:08	0.42
FSDE2_Outlet	JUNCTION	0.11	0.55	229.45	0 14:40	0.55
FSDE4_Outlet	JUNCTION	0.18	0.39	97.99	0 13:55	0.39
SC3-10	JUNCTION	0.00	0.00	63.20	0 00:00	0.00
SC3-11A	JUNCTION	0.00	0.00	98.20	0 00:00	0.00
SC3-11B	JUNCTION	0.00	0.00	98.20	0 00:00	0.00
SC3-12	JUNCTION	0.00	0.00	157.20	0 00:00	0.00
SC3-13	JUNCTION	0.00	0.00	118.60	0 00:00	0.00
SC3-14A	JUNCTION	0.00	0.00	118.50	0 00:00	0.00
SC3-14B	JUNCTION	0.00	0.00	184.20	0 00:00	0.00
SC3-15A	JUNCTION	0.00	0.00	199.20	0 00:00	0.00

SC3-15B	JUNCTION	0.00	0.00	199.20	0 00:00	0.00
SC3-16A	JUNCTION	0.00	0.00	224.20	0 00:00	0.00
SC3-16B	JUNCTION	0.00	0.00	224.20	0 00:00	0.00
SC3-17B	JUNCTION	0.00	0.00	229.20	0 00:00	0.00
SC3-18	JUNCTION	0.00	0.00	203.20	0 00:00	0.00
SC3-17A	JUNCTION	0.00	0.00	203.20	0 00:00	0.00
SC3-19	JUNCTION	0.09	5.00	250.20	0 12:21	5.00
SC3-1A	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
SC3-20	JUNCTION	0.00	0.00	324.20	0 00:00	0.00
SC3-21	JUNCTION	0.00	0.00	332.20	0 00:00	0.00
SC3-22	JUNCTION	0.00	0.00	283.20	0 00:00	0.00
SC3-23	JUNCTION	0.00	0.00	295.20	0 00:00	0.00
SC3-24A	JUNCTION	0.00	0.00	300.20	0 00:00	0.00
SC3-24B	JUNCTION	0.00	0.00	283.20	0 00:00	0.00
SC3-25	JUNCTION	0.00	0.00	332.20	0 00:00	0.00
SC3-26	JUNCTION	0.00	0.00	257.20	0 00:00	0.00
SC3-27	JUNCTION	0.00	0.00	257.20	0 00:00	0.00
SC3-5A	JUNCTION	0.00	0.00	22.20	0 00:00	0.00
SC3-5B	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
SC3-61	JUNCTION	0.05	1.41	29.61	0 12:20	1.40
SC3-6A	JUNCTION	0.10	2.29	89.49	0 12:15	2.25
SC3-6B	JUNCTION	0.00	0.00	93.20	0 00:00	0.00
SC3-6C	JUNCTION	0.00	0.00	63.20	0 00:00	0.00
SC3-7	JUNCTION	0.09	1.92	119.12	0 12:15	1.90
SC3-72	JUNCTION	0.00	0.00	340.20	0 00:00	0.00
SC3-73	JUNCTION	0.00	0.00	432.20	0 00:00	0.00
SC3-74	JUNCTION	0.00	0.00	497.20	0 00:00	0.00
SC3-75	JUNCTION	0.00	0.00	432.20	0 00:00	0.00
SC3-76	JUNCTION	0.00	0.00	432.20	0 00:00	0.00
SC3-77	JUNCTION	0.00	0.00	340.20	0 00:00	0.00
SC3-78	JUNCTION	0.00	0.00	462.20	0 00:00	0.00
SC3-79	JUNCTION	0.04	1.36	563.56	0 12:25	1.36
SC3-8	JUNCTION	0.03	1.64	248.84	0 12:20	1.62
SC3-80	JUNCTION	0.04	1.22	553.42	0 12:25	1.21
SC3-81	JUNCTION	0.04	1.45	533.65	0 12:30	1.45
SC3-82	JUNCTION	0.02	1.16	563.36	0 12:20	1.15
SC3-88	JUNCTION	0.00	0.00	340.20	0 00:00	0.00
SC3-89	JUNCTION	0.01	0.69	375.89	0 12:20	0.68
SC3-9	JUNCTION	0.00	0.00	139.20	0 00:00	0.00
SCE-1	JUNCTION	0.00	0.00	266.00	0 00:00	0.00
SCE-10	JUNCTION	0.00	0.00	32.50	0 00:00	0.00
SCE-11	JUNCTION	0.00	0.00	32.50	0 00:00	0.00
SCE-13	JUNCTION	0.00	0.00	258.90	0 00:00	0.00
SCE-14	JUNCTION	0.00	0.00	218.90	0 00:00	0.00
SCE-2	JUNCTION	0.00	0.00	258.90	0 00:00	0.00
SCE-3	JUNCTION	0.00	0.00	230.00	0 00:00	0.00
SCE-4	JUNCTION	0.00	0.00	218.90	0 00:00	0.00
SCE-5	JUNCTION	0.00	0.00	128.90	0 00:00	0.00
SCE-6	JUNCTION	0.00	0.00	128.90	0 00:00	0.00
SCE-7	JUNCTION	0.00	0.00	98.00	0 00:00	0.00
SCE-8	JUNCTION	0.00	0.00	60.50	0 00:00	0.00
SCE-9	JUNCTION	0.00	0.00	60.50	0 00:00	0.00
PNDW3_Outfall	JUNCTION	0.00	0.00	118.20	0 00:00	0.00
79	JUNCTION	0.06	0.57	295.57	0 12:41	0.57
80	JUNCTION	0.06	0.74	331.74	0 12:37	0.74
SC3-12A	JUNCTION	0.00	0.00	157.20	0 00:00	0.00
SCE-15	JUNCTION	0.00	0.00	0.00	0 00:00	0.00

SC3-18B	JUNCTION	0.00	0.00	203.20	0	00:00	0.00
81	JUNCTION	0.11	2.61	231.61	0	13:01	2.61
SC3_OUTFALL	OUTFALL	0.00	0.00	0.00	0	00:00	0.00
SCE_OUTFALL	OUTFALL	0.97	1.00	1.00	0	02:34	1.00
FSD05	STORAGE	3.07	5.58	27.78	0	13:34	5.58
FSD06	STORAGE	5.17	8.16	71.36	0	12:42	8.16
FSD09	STORAGE	2.42	6.78	145.98	0	13:01	6.78
FSD1	STORAGE	1.72	2.62	2.62	0	12:44	2.62
FSD11B	STORAGE	2.96	5.47	103.67	0	12:30	5.47
FSD12	STORAGE	4.37	6.36	163.36	0	12:25	6.36
FSD13	STORAGE	3.24	6.44	124.94	0	12:29	6.44
FSD14A	STORAGE	1.69	3.88	122.28	0	12:44	3.88
FSD14B	STORAGE	3.47	6.73	190.93	0	12:50	6.73
FSD15B	STORAGE	2.28	3.46	202.66	0	12:40	3.46
FSD16A	STORAGE	4.22	8.32	232.52	0	12:38	8.32
FSD16B	STORAGE	4.34	5.64	229.84	0	12:55	5.64
FSD17A	STORAGE	3.14	4.68	207.88	0	12:46	4.68
FSD17B	STORAGE	2.60	4.49	233.69	0	12:44	4.49
FSD18	STORAGE	2.68	5.24	208.44	0	12:49	5.24
FSD20	STORAGE	0.03	1.22	325.42	0	12:22	1.20
FSD21	STORAGE	0.71	3.11	335.31	0	12:37	3.10
FSD22	STORAGE	1.55	4.63	287.83	0	12:40	4.63
FSD23	STORAGE	0.67	2.32	298.32	0	12:41	2.32
FSD27	STORAGE	3.44	6.97	264.17	0	12:55	6.97
FSD72	STORAGE	1.35	4.59	344.79	0	12:37	4.59
FSDE1	STORAGE	2.98	5.51	271.51	0	15:08	5.51
FSDE2	STORAGE	0.70	4.78	234.78	0	14:40	4.78
FSDE3	STORAGE	3.01	6.19	135.09	0	13:42	6.18
FSDE4	STORAGE	2.39	4.42	102.42	0	13:55	4.42
FSDE5	STORAGE	3.44	6.84	67.34	0	14:39	6.84
PNDE7	STORAGE	0.57	2.63	35.13	0	13:40	2.63
FSDE6	STORAGE	3.33	5.87	38.37	0	13:57	5.87
PNDW3	STORAGE	0.21	5.00	123.30	0	13:53	5.00
EX_STOCK_POND_1	STORAGE	6.79	9.88	151.88	0	13:30	9.88
FSD12A	STORAGE	4.26	6.94	163.94	0	12:34	6.94
EX_STOCK_POND_2	STORAGE	3.21	5.60	234.70	0	13:01	5.60

Node Inflow Summary

Node							
	Maximum		Maximum		Lateral		Flow
	Lateral		Total		Inflow		
	Inflow	Inflow	Time of	Max	Volume	Volume	Error
Type	CFS	CFS	Occurrence	days hr:min	10^6 gal	10^6 gal	Percent
DP-1E	JUNCTION	0.00	43.32	0 12:25	0	2.52	0.000
DP-21	JUNCTION	0.00	157.62	0 12:56	0	12.1	0.000
DP-22	JUNCTION	0.00	138.34	0 12:55	0	9.42	0.000
DP-25	JUNCTION	0.00	17.01	0 12:15	0	0.365	0.000
DP-26	JUNCTION	0.00	70.03	0 12:30	0	2.36	0.000
DP-2E	JUNCTION	0.00	82.19	0 12:27	0	5.62	0.000
DP-3E	JUNCTION	0.00	88.05	0 12:32	0	10.1	0.000
DP-4E	JUNCTION	0.00	93.04	0 12:34	0	13.4	-0.000
DP-53A	JUNCTION	0.00	816.56	0 13:58	0	79.5	0.000

DP-56	JUNCTION	0.00	65.36	0	13:40	0	19.5	0.000
DP-60A	JUNCTION	0.00	814.13	0	13:58	0	79	0.000
DP-61	JUNCTION	0.00	802.47	0	13:54	0	73.5	-0.000
DP-63	JUNCTION	0.00	722.71	0	13:53	0	58.9	0.000
DP-64	JUNCTION	0.00	170.56	0	12:15	0	4.08	0.000
DP-68	JUNCTION	0.00	951.59	0	13:29	0	55.4	0.000
DP-69	JUNCTION	0.00	871.26	0	13:02	0	34.9	0.000
DP-70	JUNCTION	0.00	785.02	0	12:59	0	30.6	0.000
DP-71	JUNCTION	0.00	775.61	0	12:56	0	29.5	0.000
DP-72	JUNCTION	0.00	721.06	0	12:53	0	26.4	0.000
DP-73	JUNCTION	0.00	703.27	0	12:52	0	25.6	0.000
DP-74	JUNCTION	0.00	145.74	0	12:29	0	3.77	0.000
DP-75	JUNCTION	0.00	427.98	0	12:39	0	14.2	0.000
DP-77	JUNCTION	0.00	674.49	0	12:47	0	23.9	0.000
DP-78	JUNCTION	0.00	210.37	0	12:30	0	5.67	0.000
DP-8	JUNCTION	0.00	69.75	0	13:25	0	20.4	0.001
DP-87	JUNCTION	0.00	918.47	0	13:09	0	40.8	0.000
FSD9_OUTLET	JUNCTION	0.00	108.63	0	13:01	0	5.59	0.000
FSDE1_Outlet	JUNCTION	0.00	2.96	0	15:08	0	0.926	0.000
FSDE2_Outlet	JUNCTION	0.00	5.77	0	14:40	0	1.46	0.000
FSDE4_Outlet	JUNCTION	0.00	2.76	0	13:55	0	1.48	0.000
SC3-10	JUNCTION	23.62	23.62	0	12:20	0.49	0.49	0.000
SC3-11A	JUNCTION	10.41	10.41	0	12:15	0.215	0.215	0.000
SC3-11B	JUNCTION	133.88	133.88	0	12:15	3.79	3.79	0.000
SC3-12	JUNCTION	129.79	129.79	0	12:15	3.4	3.4	0.000
SC3-13	JUNCTION	100.72	100.72	0	12:15	2.19	2.19	0.000
SC3-14A	JUNCTION	265.57	265.57	0	12:15	7.2	7.2	0.000
SC3-14B	JUNCTION	137.53	137.53	0	12:15	3.44	3.44	0.000
SC3-15A	JUNCTION	65.94	65.94	0	12:25	2.06	2.06	0.000
SC3-15B	JUNCTION	15.45	15.45	0	12:15	0.391	0.391	0.000
SC3-16A	JUNCTION	369.40	369.40	0	12:15	9.95	9.95	0.000
SC3-16B	JUNCTION	91.78	91.78	0	12:15	2.29	2.29	0.000
SC3-17B	JUNCTION	44.68	44.68	0	12:15	1.17	1.17	0.000
SC3-18	JUNCTION	46.67	46.67	0	12:15	1.25	1.25	0.000
SC3-17A	JUNCTION	46.63	46.63	0	12:15	1.09	1.09	0.000
SC3-19	JUNCTION	107.48	107.48	0	12:25	2.76	2.76	0.000
SC3-1A	JUNCTION	44.63	44.63	0	12:15	0.748	0.748	0.000
SC3-20	JUNCTION	33.90	33.90	0	12:15	0.61	0.61	0.000
SC3-21	JUNCTION	28.72	28.72	0	12:15	0.455	0.455	0.000
SC3-22	JUNCTION	30.16	30.16	0	12:15	0.605	0.605	0.000
SC3-23	JUNCTION	12.47	12.47	0	12:15	0.31	0.31	0.000
SC3-24A	JUNCTION	22.28	22.28	0	12:20	0.608	0.608	0.000
SC3-24B	JUNCTION	8.66	8.66	0	12:15	0.203	0.203	0.000
SC3-25	JUNCTION	17.01	17.01	0	12:15	0.365	0.365	0.000
SC3-26	JUNCTION	4.50	4.50	0	12:20	0.147	0.147	0.000
SC3-27	JUNCTION	71.94	71.94	0	12:20	2.3	2.3	0.000
SC3-5A	JUNCTION	95.88	95.88	0	12:15	1.88	1.88	0.000
SC3-5B	JUNCTION	126.36	126.36	0	12:15	2.82	2.82	0.000
SC3-61	JUNCTION	36.40	36.40	0	12:20	0.946	0.946	0.000
SC3-6A	JUNCTION	106.32	106.32	0	12:15	2.76	2.76	0.000
SC3-6B	JUNCTION	63.88	63.88	0	12:15	1.45	1.45	0.000
SC3-6C	JUNCTION	105.16	105.16	0	12:15	2.15	2.15	0.000
SC3-7	JUNCTION	109.28	109.28	0	12:15	2.63	2.63	0.000
SC3-72	JUNCTION	35.61	35.61	0	12:20	0.917	0.917	0.000
SC3-73	JUNCTION	50.14	50.14	0	12:25	1.38	1.38	0.000
SC3-74	JUNCTION	79.10	79.10	0	12:20	2.04	2.04	0.000
SC3-75	JUNCTION	38.98	38.98	0	12:25	1.35	1.35	0.000

SC3-76	JUNCTION	40.54	40.54	0	12:25	1.41	1.41	0.000
SC3-77	JUNCTION	42.16	42.16	0	12:30	1.55	1.55	0.000
SC3-78	JUNCTION	114.83	114.83	0	12:20	2.65	2.65	0.000
SC3-79	JUNCTION	123.52	123.52	0	12:25	3.01	3.01	0.000
SC3-8	JUNCTION	93.96	93.96	0	12:20	1.88	1.88	0.000
SC3-80	JUNCTION	86.09	86.09	0	12:25	2.36	2.36	0.000
SC3-81	JUNCTION	125.85	125.85	0	12:30	3.81	3.81	0.000
SC3-82	JUNCTION	79.48	79.48	0	12:20	1.7	1.7	-0.000
SC3-88	JUNCTION	29.44	29.44	0	12:25	0.871	0.871	0.000
SC3-89	JUNCTION	16.98	16.98	0	12:20	0.397	0.397	0.000
SC3-9	JUNCTION	114.01	114.01	0	12:25	3.64	3.64	0.000
SCE-1	JUNCTION	30.85	30.85	0	12:25	1.21	1.21	0.000
SCE-10	JUNCTION	250.23	250.23	0	12:15	6.46	6.46	0.000
SCE-11	JUNCTION	4.75	4.75	0	12:15	0.0668	0.0668	0.000
SCE-13	JUNCTION	38.21	38.21	0	12:25	1.34	1.34	0.000
SCE-14	JUNCTION	28.21	28.21	0	12:20	0.895	0.895	0.000
SCE-2	JUNCTION	4.95	4.95	0	12:20	0.256	0.256	0.000
SCE-3	JUNCTION	28.62	28.62	0	12:25	1.46	1.46	0.000
SCE-4	JUNCTION	10.35	10.35	0	12:30	0.742	0.742	0.000
SCE-5	JUNCTION	155.30	155.30	0	12:15	4.81	4.81	0.000
SCE-6	JUNCTION	1.03	1.03	0	12:20	0.0497	0.0497	0.000
SCE-7	JUNCTION	67.52	67.52	0	12:15	1.64	1.64	0.000
SCE-8	JUNCTION	73.41	73.41	0	12:15	1.84	1.84	0.000
SCE-9	JUNCTION	1.27	1.27	0	12:20	0.0496	0.0496	0.000
PNDW3_Outfall	JUNCTION	0.00	0.00	0	00:00	0	0	0.000 gal
79	JUNCTION	0.00	7.33	0	12:41	0	0.309	0.000
80	JUNCTION	0.00	13.25	0	12:37	0	0.454	0.000
SC3-12A	JUNCTION	30.32	30.32	0	12:15	0.636	0.636	0.000
SCE-15	JUNCTION	38.53	38.53	0	12:15	0.872	0.872	0.000
SC3-18B	JUNCTION	32.18	32.18	0	12:20	0.684	0.684	0.000
81	JUNCTION	0.00	783.64	0	13:01	0	29.2	0.000
SC3_OUTFALL	OUTFALL	0.00	816.56	0	13:58	0	79.5	0.000
SCE_OUTFALL	OUTFALL	0.00	0.08	0	02:33	0	0.149	0.000
FSD05	STORAGE	0.00	95.88	0	12:15	0	1.88	0.006
FSD06	STORAGE	0.00	384.70	0	12:16	0	9.19	0.077
FSD09	STORAGE	0.00	184.19	0	12:31	0	5.6	0.109
FSD1	STORAGE	0.00	44.63	0	12:15	0	0.748	0.099
FSD11B	STORAGE	0.00	133.88	0	12:15	0	3.79	0.111
FSD12	STORAGE	0.00	129.79	0	12:15	0	3.4	0.055
FSD13	STORAGE	0.00	100.72	0	12:15	0	2.19	0.093
FSD14A	STORAGE	0.00	265.57	0	12:15	0	7.2	0.082
FSD14B	STORAGE	0.00	137.53	0	12:15	0	3.44	0.045
FSD15B	STORAGE	0.00	15.45	0	12:15	0	0.391	0.071
FSD16A	STORAGE	0.00	369.40	0	12:15	0	9.95	0.055
FSD16B	STORAGE	0.00	91.78	0	12:15	0	2.29	0.017
FSD17A	STORAGE	0.00	46.63	0	12:15	0	1.09	0.078
FSD17B	STORAGE	0.00	44.68	0	12:15	0	1.17	0.088
FSD18	STORAGE	0.00	46.67	0	12:15	0	1.25	0.097
FSD20	STORAGE	0.00	33.90	0	12:15	0	0.61	0.175
FSD21	STORAGE	0.00	28.72	0	12:15	0	0.455	0.150
FSD22	STORAGE	0.00	30.16	0	12:15	0	0.605	0.167
FSD23	STORAGE	0.00	12.47	0	12:15	0	0.31	0.195
FSD27	STORAGE	0.00	87.86	0	12:20	0	2.97	0.117
FSD72	STORAGE	0.00	35.61	0	12:20	0	0.917	0.179
FSDE1	STORAGE	0.00	30.85	0	12:25	0	1.21	0.007
FSDE2	STORAGE	0.00	28.62	0	12:25	0	1.46	0.028
FSDE3	STORAGE	0.00	155.30	0	12:15	0	4.81	0.013

FSDE4	STORAGE	0.00	67.52	0	12:15	0	1.64	0.010
FSDE5	STORAGE	0.00	73.41	0	12:15	0	1.84	0.005
PNDE7	STORAGE	0.00	103.35	0	12:35	0	19.5	0.023
FSDE6	STORAGE	0.00	250.23	0	12:15	0	6.46	0.011
PNDW3	STORAGE	0.00	951.59	0	13:29	0	55.4	0.573
EX_STOCK_POND_1	STORAGE	0.00	892.43	0	13:17	0	40.8	0.123
FSD12A	STORAGE	0.00	30.32	0	12:15	0	0.636	0.108
EX_STOCK_POND_2	STORAGE	0.00	785.02	0	12:59	0	30.6	0.144

Node Flooding Summary

Flooding refers to all water that overflows a node, whether it ponds or not.

Node	Total Maximum				
	Maximum Hours Flooded	Time of Max Rate CFS	Flood Occurrence days hr:min	Ponded Volume 10^6 gal	Ponded Volume 1000 ft3
	DP-8	75.91	69.67	0 13:25	20.242
SC3-19	0.19	7.59	0 12:26	0.022	0.000

Storage Volume Summary

Storage Unit	Average Volume 1000 ft3	Avg Evap Pcnt Full	Evap Exfil Pcnt Loss	Maximum Volume 1000 ft3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CFS
	FSD05	38.500	9	0 0	172.162	42	0 13:33
FSD06	303.787	25	0 0	740.072	62	0 12:42	95.39
FSD09	58.020	8	0 0	316.857	44	0 13:01	108.63
FSD1	39.114	11	0 0	68.358	19	0 12:44	9.58
FSD11B	62.956	14	0 0	186.130	43	0 12:30	77.00
FSD12	59.291	24	0 0	120.677	48	0 12:24	95.84
FSD13	40.502	12	0 0	146.254	42	0 12:29	41.57
FSD14A	195.049	12	0 0	559.895	36	0 12:44	76.12
FSD14B	111.845	22	0 0	288.716	56	0 12:50	19.30
FSD15B	17.273	9	0 0	30.553	16	0 12:39	5.22
FSD16A	266.452	23	0 0	684.949	59	0 12:38	128.30
FSD16B	157.633	31	0 0	223.347	43	0 12:54	10.04
FSD17A	29.323	9	0 0	87.007	26	0 12:46	11.92
FSD17B	30.830	11	0 0	90.073	31	0 12:44	13.17
FSD18	28.904	12	0 0	96.340	41	0 12:49	14.95
FSD20	0.060	0	0 0	6.695	5	0 12:22	30.36
FSD21	4.174	3	0 0	27.519	21	0 12:36	13.25
FSD22	5.924	6	0 0	34.845	34	0 12:40	16.60
FSD23	3.369	3	0 0	17.015	13	0 12:41	7.33
FSD27	45.447	15	0 0	159.133	53	0 12:54	53.94
FSD72	10.644	8	0 0	47.987	36	0 12:37	28.06
FSDE1	63.250	22	0 0	139.036	49	0 15:08	2.96
FSDE2	12.850	5	0 0	113.740	40	0 14:39	5.77

FSDE3	161.373	21	0	0	451.945	59	0	13:42	10.18
FSDE4	62.104	12	0	0	156.366	30	0	13:55	2.76
FSDE5	73.745	28	0	0	176.545	67	0	14:39	2.29
PNDE7	13.929	1	0	0	170.887	11	0	13:39	65.36
FSDE6	215.105	17	0	0	637.414	51	0	13:56	10.13
PNDW3	11.575	0	0	0	681.810	26	0	13:53	715.30
EX_STOCK_POND_1	737.050	44	0	0	1249.465	74	0	13:29	805.48
FSD12A	19.760	22	0	0	46.936	51	0	12:34	12.34
EX_STOCK_POND_2	158.640	40	0	0	294.972	74	0	13:01	783.64

Outfall Loading Summary

Outfall Node	Flow Freq Pcnt	Avg Flow CFS	Max Flow CFS	Total Volume 10^6 gal
SC3_OUTFALL	97.81	38.70	816.56	79.503
SCE_OUTFALL	97.28	0.07	0.08	0.149
System	97.54	38.77	816.64	79.652

Link Flow Summary

Link	Type	Maximum Flow CFS	Time of Max Occurrence days	Max Veloc ft/sec	Maximum Full Flow	Max/ Full Depth
RT-1	CONDUIT	114.92	0 12:44	4.39	0.00	0.07
RT-10A	CONDUIT	107.82	0 12:32	6.09	1.08	0.91
RT-10B	CONDUIT	69.91	0 12:31	14.87	0.18	0.29
RT-11A	CONDUIT	782.11	0 13:03	6.58	0.01	0.13
RT-11B	CONDUIT	854.84	0 13:09	6.22	0.02	0.15
RT-11C	CONDUIT	892.43	0 13:17	4.34	0.02	0.17
RT-12A	CONDUIT	138.32	0 12:56	16.73	0.72	0.63
RT-12B	CONDUIT	157.61	0 12:58	22.13	0.43	0.46
RT-16	CONDUIT	104.49	0 12:16	16.11	0.75	0.64
RT-17B	CONDUIT	108.36	0 13:05	17.22	0.50	0.50
RT-18	CONDUIT	801.04	0 13:58	5.93	0.01	0.12
RT-19	CONDUIT	35.79	0 12:23	7.17	0.12	0.23
RT-1E	CONDUIT	2.96	0 15:09	4.18	0.02	0.11
RT-2	CONDUIT	72.69	0 12:42	4.01	0.00	0.06
RT-20	CONDUIT	814.08	0 13:58	9.03	0.01	0.09
RT-21	CONDUIT	16.03	0 12:22	10.45	0.11	0.22
RT-22	CONDUIT	7.25	0 12:45	11.34	0.08	0.19
RT-2E	CONDUIT	42.95	0 12:28	9.43	0.33	0.39
RT-3	CONDUIT	73.10	0 12:31	4.01	0.00	0.06
RT-3E	CONDUIT	5.77	0 14:40	5.51	0.04	0.14
RT-4	CONDUIT	138.04	0 12:37	4.44	0.00	0.08
RT-4E	CONDUIT	81.49	0 12:32	11.70	0.58	0.55

RT-5	CONDUIT	413.17	0	12:48	6.32	0.01	0.13
RT-5E	CONDUIT	88.04	0	12:34	15.69	0.23	0.33
RT-6	CONDUIT	114.62	0	12:33	4.80	0.00	0.07
RT-6B	CONDUIT	175.57	0	12:49	4.63	0.00	0.09
RT-6E	CONDUIT	2.76	0	13:59	4.46	0.02	0.10
RT-7A	CONDUIT	16.76	0	12:22	11.82	0.06	0.17
RT-7E	CONDUIT	92.94	0	12:35	10.90	0.25	0.34
RT-8	CONDUIT	30.34	0	12:23	15.20	0.68	0.61
RT-9A	CONDUIT	666.32	0	12:53	5.75	0.01	0.13
RT-9B	CONDUIT	702.74	0	12:54	6.59	0.01	0.12
RT-9C	CONDUIT	719.07	0	12:56	6.16	0.01	0.13
RT-9D	CONDUIT	773.54	0	12:59	6.39	0.01	0.13
RT-14	CONDUIT	722.15	0	13:56	6.12	0.01	0.11
1	DUMMY	79.10	0	12:20			
2	DUMMY	50.14	0	12:25			
3	DUMMY	38.98	0	12:25			
4	DUMMY	40.54	0	12:25			
5	DUMMY	114.83	0	12:20			
6	DUMMY	35.61	0	12:20			
7	DUMMY	42.16	0	12:30			
8	DUMMY	29.44	0	12:25			
9	DUMMY	30.85	0	12:25			
10	DUMMY	4.95	0	12:20			
11	DUMMY	4.50	0	12:20			
12	DUMMY	71.94	0	12:20			
13	DUMMY	12.47	0	12:15			
14	DUMMY	28.72	0	12:15			
15	DUMMY	17.01	0	12:15			
16	DUMMY	8.66	0	12:15			
17	DUMMY	30.16	0	12:15			
18	DUMMY	44.68	0	12:15			
20	DUMMY	33.90	0	12:15			
22	DUMMY	137.53	0	12:15			
24	DUMMY	265.57	0	12:15			
25	DUMMY	100.72	0	12:15			
27	DUMMY	67.52	0	12:15			
28	DUMMY	73.41	0	12:15			
29	DUMMY	155.30	0	12:15			
30	DUMMY	91.78	0	12:15			
34	DUMMY	46.67	0	12:15			
36	DUMMY	28.62	0	12:25			
37	DUMMY	10.35	0	12:30			
38	DUMMY	114.01	0	12:25			
RT-17A	CONDUIT	79.25	0	12:35	5.64	0.00	0.07
39	DUMMY	65.94	0	12:25			
40	DUMMY	15.45	0	12:15			
42	DUMMY	129.79	0	12:15			
44	DUMMY	4.75	0	12:15			
45	DUMMY	1.27	0	12:20			
46	DUMMY	1.03	0	12:20			
47	DUMMY	28.21	0	12:20			
48	DUMMY	38.21	0	12:25			
51	DUMMY	250.23	0	12:15			
54	DUMMY	133.88	0	12:15			
56	DUMMY	10.41	0	12:15			
58	CONDUIT	951.59	0	13:29	11.60	0.01	0.08
63	DUMMY	95.88	0	12:15			

65	DUMMY	44.63	0	12:15				
67	DUMMY	816.56	0	13:58				
RT-15A	CONDUIT	108.11	0	12:16	18.40	0.46	0.48	
RT-15B	CONDUIT	169.45	0	12:16	18.61	0.28	0.36	
69	DUMMY	105.16	0	12:15				
70	DUMMY	63.88	0	12:15				
RT-25	CONDUIT	65.34	0	13:44	3.97	0.01	0.12	
71	CONDUIT	0.08	0	02:33	0.10	1.08	1.00	
74	DUMMY	23.62	0	12:20				
75	DUMMY	22.28	0	12:20				
77	DUMMY	126.36	0	12:15				
78	DUMMY	46.63	0	12:15				
79	DUMMY	369.40	0	12:15				
80	CONDUIT	13.24	0	12:39	15.98	0.13	0.25	
81	DUMMY	30.32	0	12:15				
82	DUMMY	38.53	0	12:15				
83	DUMMY	32.18	0	12:20				
84	DUMMY	785.02	0	12:59				
FSD01_Outlet	DUMMY	9.58	0	12:44				
FSD05_Outlet	DUMMY	3.70	0	12:14				
FSD06_Outlet	DUMMY	95.39	0	12:42				
FSD11B_Outlet	DUMMY	77.00	0	12:12				
FSD12_Outlet	DUMMY	95.84	0	12:25				
FSD13_Outlet	DUMMY	41.57	0	12:29				
FSD14A_Outlet	DUMMY	76.12	0	12:44				
FSD14B_Outlet	DUMMY	19.30	0	12:10				
FSD15B_Outlet	DUMMY	5.22	0	12:40				
FSD16A_Outlet	DUMMY	128.30	0	12:21				
FSD16B_Outlet	DUMMY	10.04	0	12:55				
FSD17B_Outlet	DUMMY	13.17	0	12:44				
FSD18_Outlet	DUMMY	14.95	0	12:49				
FSD21_Outlet	DUMMY	13.25	0	12:37				
FSD22_Outlet	DUMMY	16.60	0	12:40				
FSD72_Outlet	DUMMY	28.06	0	12:37				
FSD9_Outlet	DUMMY	108.63	0	13:01				
FSDE2_Outlet	DUMMY	5.77	0	14:40				
FSDE3_Outlet	DUMMY	10.18	0	13:42				
FSDE4_Outlet	DUMMY	2.76	0	13:55				
FSDE5_Outlet	DUMMY	2.29	0	14:39				
FSDE6_Outlet	DUMMY	10.13	0	13:57				
FSDE1_Outlet	DUMMY	2.96	0	15:08				
PNDE7_Outlet	DUMMY	65.36	0	13:40				
FSD17A_Outlet	DUMMY	11.92	0	12:46				
PNDW3_Outlet	DUMMY	715.30	0	13:53				
FSD27_Outlet	DUMMY	53.94	0	12:55				
EX_STOCK_POND_1_OUTFALL	DUMMY	805.48	0	13:30				
FSD23_Outlet	DUMMY	7.33	0	12:41				
FSD12A_Outlet	DUMMY	12.34	0	12:34				
EX_STOCK_POND_2_OUTLET	DUMMY	783.64	0	13:01				

Conduit Surcharge Summary

Hours Hours

Conduit	----- Hours Full -----		----- Above Full -----		Capacity
	Both Ends	Upstream	Dnstream	Normal Flow	Limited
RT-10A	0.18	0.18	0.18	0.14	0.18
71	75.91	75.91	75.91	0.03	75.91

Analysis begun on: Fri Oct 15 16:18:51 2021

Analysis ended on: Fri Oct 15 16:18:52 2021

Total elapsed time: 00:00:01

Sterling Ranch 2021 MDDP Amendment
25-YR Type II Storm

WARNING 04: minimum elevation drop used for Conduit 1
WARNING 04: minimum elevation drop used for Conduit 2
WARNING 04: minimum elevation drop used for Conduit 3
WARNING 04: minimum elevation drop used for Conduit 4
WARNING 04: minimum elevation drop used for Conduit 5
WARNING 04: minimum elevation drop used for Conduit 6
WARNING 04: minimum elevation drop used for Conduit 7
WARNING 04: minimum elevation drop used for Conduit 8
WARNING 04: minimum elevation drop used for Conduit 9
WARNING 04: minimum elevation drop used for Conduit 10
WARNING 04: minimum elevation drop used for Conduit 11
WARNING 04: minimum elevation drop used for Conduit 12
WARNING 04: minimum elevation drop used for Conduit 14
WARNING 04: minimum elevation drop used for Conduit 15
WARNING 04: minimum elevation drop used for Conduit 16
WARNING 04: minimum elevation drop used for Conduit 17
WARNING 04: minimum elevation drop used for Conduit 18
WARNING 04: minimum elevation drop used for Conduit 20
WARNING 04: minimum elevation drop used for Conduit 22
WARNING 04: minimum elevation drop used for Conduit 27
WARNING 04: minimum elevation drop used for Conduit 28
WARNING 04: minimum elevation drop used for Conduit 29
WARNING 04: minimum elevation drop used for Conduit 30
WARNING 04: minimum elevation drop used for Conduit 34
WARNING 04: minimum elevation drop used for Conduit 36
WARNING 04: minimum elevation drop used for Conduit 37
WARNING 04: minimum elevation drop used for Conduit 38
WARNING 04: minimum elevation drop used for Conduit 39
WARNING 04: minimum elevation drop used for Conduit 40
WARNING 04: minimum elevation drop used for Conduit 44
WARNING 04: minimum elevation drop used for Conduit 45
WARNING 04: minimum elevation drop used for Conduit 46
WARNING 04: minimum elevation drop used for Conduit 47
WARNING 04: minimum elevation drop used for Conduit 48
WARNING 04: minimum elevation drop used for Conduit 51
WARNING 04: minimum elevation drop used for Conduit 54
WARNING 08: elevation drop exceeds length for Conduit 56
WARNING 04: minimum elevation drop used for Conduit 63
WARNING 04: minimum elevation drop used for Conduit 65
WARNING 04: minimum elevation drop used for Conduit 67
WARNING 04: minimum elevation drop used for Conduit 69
WARNING 04: minimum elevation drop used for Conduit 70
WARNING 04: minimum elevation drop used for Conduit 71
WARNING 04: minimum elevation drop used for Conduit 74
WARNING 04: minimum elevation drop used for Conduit 75
WARNING 08: elevation drop exceeds length for Conduit 77
WARNING 04: minimum elevation drop used for Conduit 78
WARNING 04: minimum elevation drop used for Conduit 79
WARNING 04: minimum elevation drop used for Conduit 82
WARNING 04: minimum elevation drop used for Conduit 83

WARNING 10: crest elevation raised to downstream invert for regulator Link FSD12_Outlet
WARNING 10: crest elevation raised to downstream invert for regulator Link FSD12A_Outlet

NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.

Analysis Options

Flow Units CFS

Process Models:

Rainfall/Runoff NO

RDII NO

Snowmelt NO

Groundwater NO

Flow Routing YES

Ponding Allowed NO

Water Quality NO

Flow Routing Method KINWAVE

Starting Date 01/01/2005 00:00:00

Ending Date 01/04/2005 06:00:00

Antecedent Dry Days 0.0

Report Time Step 00:05:00

Routing Time Step 30.00 sec

***** Volume Volume

Flow Routing Continuity acre-feet 10^6 gal

***** -----

Dry Weather Inflow 0.000 0.000

Wet Weather Inflow 0.000 0.000

Groundwater Inflow 0.000 0.000

RDII Inflow 0.000 0.000

External Inflow 423.846 138.116

External Outflow 303.339 98.848

Flooding Loss 74.951 24.424

Evaporation Loss 0.000 0.000

Exfiltration Loss 0.000 0.000

Initial Stored Volume 0.000 0.000

Final Stored Volume 46.523 15.160

Continuity Error (%) -0.228

Highest Flow Instability Indexes

Link RT-14 (65)

Link PNDW3_Outlet (65)

Link RT-18 (65)

Link 67 (64)

Link RT-20 (64)

Routing Time Step Summary

Minimum Time Step : 30.00 sec
Average Time Step : 30.00 sec
Maximum Time Step : 30.00 sec
Percent in Steady State : 0.00
Average Iterations per Step : 1.00
Percent Not Converging : 0.00

Node Depth Summary

Node	Type	Average Maximum Maximum Time of Max Reported				
		Depth	Depth	HGL	Occurrence	Max Depth
Node	Type	Feet	Feet	Feet	days hr:min	Feet
DP-1E	JUNCTION	0.20	1.79	260.69	0 12:25	1.79
DP-21	JUNCTION	0.30	2.65	186.85	0 12:47	2.65
DP-22	JUNCTION	0.30	2.65	226.85	0 12:45	2.65
DP-25	JUNCTION	0.03	0.88	333.08	0 12:15	0.86
DP-26	JUNCTION	0.09	1.66	200.86	0 12:30	1.66
DP-2E	JUNCTION	0.28	2.55	221.45	0 12:27	2.54
DP-3E	JUNCTION	0.34	2.54	131.44	0 12:32	2.53
DP-4E	JUNCTION	0.48	2.33	62.83	0 12:34	2.33
DP-53A	JUNCTION	0.22	2.11	2.11	0 13:51	2.11
DP-56	JUNCTION	0.41	1.39	33.39	0 14:03	1.39
DP-60A	JUNCTION	0.30	2.92	25.12	0 13:51	2.92
DP-61	JUNCTION	0.30	2.92	66.12	0 13:46	2.92
DP-63	JUNCTION	0.23	2.62	100.82	0 13:47	2.62
DP-64	JUNCTION	0.11	2.35	95.55	0 12:15	2.33
DP-68	JUNCTION	0.28	2.15	120.55	0 12:48	2.15
DP-69	JUNCTION	0.20	5.00	208.20	0 12:24	5.00
DP-70	JUNCTION	0.13	3.05	232.25	0 12:57	3.05
DP-71	JUNCTION	0.13	3.06	260.26	0 12:54	3.05
DP-72	JUNCTION	0.11	2.97	286.17	0 12:51	2.97
DP-73	JUNCTION	0.13	2.97	303.17	0 12:51	2.97
DP-74	JUNCTION	0.05	1.74	498.94	0 12:28	1.73
DP-75	JUNCTION	0.09	3.00	435.20	0 12:38	2.99
DP-77	JUNCTION	0.10	2.99	343.19	0 12:45	2.98
DP-78	JUNCTION	0.06	2.12	464.32	0 12:29	2.12
DP-8	JUNCTION	9.76	10.00	10.00	0 01:54	10.00
DP-87	JUNCTION	0.21	4.06	161.26	0 13:05	4.06
FSD9_OUTLET	JUNCTION	0.21	2.51	141.71	0 12:56	2.51
FSDE1_Outlet	JUNCTION	0.16	0.65	265.55	0 14:23	0.65
FSDE2_Outlet	JUNCTION	0.13	0.62	229.52	0 14:37	0.62
FSDE4_Outlet	JUNCTION	0.19	0.42	98.02	0 13:49	0.42
SC3-10	JUNCTION	0.00	0.00	63.20	0 00:00	0.00
SC3-11A	JUNCTION	0.00	0.00	98.20	0 00:00	0.00
SC3-11B	JUNCTION	0.00	0.00	98.20	0 00:00	0.00
SC3-12	JUNCTION	0.00	0.00	157.20	0 00:00	0.00
SC3-13	JUNCTION	0.00	0.00	118.60	0 00:00	0.00
SC3-14A	JUNCTION	0.00	0.00	118.50	0 00:00	0.00
SC3-14B	JUNCTION	0.00	0.00	184.20	0 00:00	0.00
SC3-15A	JUNCTION	0.00	0.00	199.20	0 00:00	0.00

SC3-15B	JUNCTION	0.00	0.00	199.20	0 00:00	0.00
SC3-16A	JUNCTION	0.00	0.00	224.20	0 00:00	0.00
SC3-16B	JUNCTION	0.00	0.00	224.20	0 00:00	0.00
SC3-17B	JUNCTION	0.00	0.00	229.20	0 00:00	0.00
SC3-18	JUNCTION	0.00	0.00	203.20	0 00:00	0.00
SC3-17A	JUNCTION	0.00	0.00	203.20	0 00:00	0.00
SC3-19	JUNCTION	0.11	5.00	250.20	0 12:16	5.00
SC3-1A	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
SC3-20	JUNCTION	0.00	0.00	324.20	0 00:00	0.00
SC3-21	JUNCTION	0.00	0.00	332.20	0 00:00	0.00
SC3-22	JUNCTION	0.00	0.00	283.20	0 00:00	0.00
SC3-23	JUNCTION	0.00	0.00	295.20	0 00:00	0.00
SC3-24A	JUNCTION	0.00	0.00	300.20	0 00:00	0.00
SC3-24B	JUNCTION	0.00	0.00	283.20	0 00:00	0.00
SC3-25	JUNCTION	0.00	0.00	332.20	0 00:00	0.00
SC3-26	JUNCTION	0.00	0.00	257.20	0 00:00	0.00
SC3-27	JUNCTION	0.00	0.00	257.20	0 00:00	0.00
SC3-5A	JUNCTION	0.00	0.00	22.20	0 00:00	0.00
SC3-5B	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
SC3-61	JUNCTION	0.05	1.61	29.81	0 12:20	1.60
SC3-6A	JUNCTION	0.11	2.57	89.77	0 12:15	2.53
SC3-6B	JUNCTION	0.00	0.00	93.20	0 00:00	0.00
SC3-6C	JUNCTION	0.00	0.00	63.20	0 00:00	0.00
SC3-7	JUNCTION	0.09	2.09	119.29	0 12:15	2.07
SC3-72	JUNCTION	0.00	0.00	340.20	0 00:00	0.00
SC3-73	JUNCTION	0.00	0.00	432.20	0 00:00	0.00
SC3-74	JUNCTION	0.00	0.00	497.20	0 00:00	0.00
SC3-75	JUNCTION	0.00	0.00	432.20	0 00:00	0.00
SC3-76	JUNCTION	0.00	0.00	432.20	0 00:00	0.00
SC3-77	JUNCTION	0.00	0.00	340.20	0 00:00	0.00
SC3-78	JUNCTION	0.00	0.00	462.20	0 00:00	0.00
SC3-79	JUNCTION	0.04	1.50	563.70	0 12:25	1.50
SC3-8	JUNCTION	0.03	1.85	249.05	0 12:20	1.84
SC3-80	JUNCTION	0.04	1.35	553.55	0 12:25	1.35
SC3-81	JUNCTION	0.04	1.62	533.82	0 12:30	1.62
SC3-82	JUNCTION	0.03	1.30	563.50	0 12:20	1.29
SC3-88	JUNCTION	0.00	0.00	340.20	0 00:00	0.00
SC3-89	JUNCTION	0.02	0.77	375.97	0 12:20	0.77
SC3-9	JUNCTION	0.00	0.00	139.20	0 00:00	0.00
SCE-1	JUNCTION	0.00	0.00	266.00	0 00:00	0.00
SCE-10	JUNCTION	0.00	0.00	32.50	0 00:00	0.00
SCE-11	JUNCTION	0.00	0.00	32.50	0 00:00	0.00
SCE-13	JUNCTION	0.00	0.00	258.90	0 00:00	0.00
SCE-14	JUNCTION	0.00	0.00	218.90	0 00:00	0.00
SCE-2	JUNCTION	0.00	0.00	258.90	0 00:00	0.00
SCE-3	JUNCTION	0.00	0.00	230.00	0 00:00	0.00
SCE-4	JUNCTION	0.00	0.00	218.90	0 00:00	0.00
SCE-5	JUNCTION	0.00	0.00	128.90	0 00:00	0.00
SCE-6	JUNCTION	0.00	0.00	128.90	0 00:00	0.00
SCE-7	JUNCTION	0.00	0.00	98.00	0 00:00	0.00
SCE-8	JUNCTION	0.00	0.00	60.50	0 00:00	0.00
SCE-9	JUNCTION	0.00	0.00	60.50	0 00:00	0.00
PNDW3_Outfall	JUNCTION	0.00	0.00	118.20	0 00:00	0.00
79	JUNCTION	0.06	0.67	295.67	0 12:37	0.67
80	JUNCTION	0.06	0.81	331.81	0 12:34	0.81
SC3-12A	JUNCTION	0.00	0.00	157.20	0 00:00	0.00
SCE-15	JUNCTION	0.00	0.00	0.00	0 00:00	0.00

SC3-18B	JUNCTION	0.00	0.00	203.20	0	00:00	0.00
81	JUNCTION	0.12	3.01	232.01	0	12:58	3.01
SC3_OUTFALL	OUTFALL	0.00	0.00	0.00	0	00:00	0.00
SCE_OUTFALL	OUTFALL	0.97	1.00	1.00	0	02:23	1.00
FSD05	STORAGE	3.23	6.04	28.24	0	13:47	6.04
FSD06	STORAGE	5.23	8.49	71.69	0	12:38	8.49
FSD09	STORAGE	2.46	7.27	146.47	0	12:56	7.27
FSD1	STORAGE	1.73	2.85	2.85	0	12:40	2.85
FSD11B	STORAGE	2.99	5.92	104.12	0	12:34	5.92
FSD12	STORAGE	4.41	6.67	163.67	0	12:27	6.67
FSD13	STORAGE	3.27	6.88	125.38	0	12:30	6.88
FSD14A	STORAGE	1.72	4.14	122.54	0	12:39	4.14
FSD14B	STORAGE	3.53	7.45	191.65	0	12:52	7.44
FSD15B	STORAGE	2.29	3.63	202.83	0	12:36	3.63
FSD16A	STORAGE	4.27	9.20	233.40	0	12:41	9.20
FSD16B	STORAGE	4.36	5.87	230.07	0	12:45	5.87
FSD17A	STORAGE	3.17	4.85	208.05	0	12:41	4.85
FSD17B	STORAGE	2.63	4.68	233.88	0	12:39	4.68
FSD18	STORAGE	2.72	5.49	208.69	0	12:44	5.49
FSD20	STORAGE	0.03	1.41	325.61	0	12:22	1.40
FSD21	STORAGE	0.73	3.54	335.74	0	12:38	3.54
FSD22	STORAGE	1.58	4.99	288.19	0	12:40	4.99
FSD23	STORAGE	0.68	2.43	298.43	0	12:37	2.42
FSD27	STORAGE	3.49	7.35	264.55	0	12:50	7.35
FSD72	STORAGE	1.36	4.61	344.81	0	12:30	4.61
FSDE1	STORAGE	3.04	5.94	271.94	0	14:23	5.94
FSDE2	STORAGE	0.82	5.59	235.59	0	14:37	5.59
FSDE3	STORAGE	3.08	6.63	135.53	0	13:12	6.63
FSDE4	STORAGE	2.50	4.82	102.82	0	13:49	4.82
FSDE5	STORAGE	3.64	7.38	67.88	0	14:17	7.38
PNDE7	STORAGE	0.64	3.29	35.79	0	14:03	3.29
FSDE6	STORAGE	3.44	6.39	38.89	0	13:16	6.39
PNDW3	STORAGE	0.26	6.44	124.74	0	13:47	6.43
EX_STOCK_POND_1	STORAGE	6.82	10.34	152.34	0	13:22	10.33
FSD12A	STORAGE	4.29	7.18	164.18	0	12:30	7.18
EX_STOCK_POND_2	STORAGE	3.23	5.97	235.07	0	12:58	5.97

Node Inflow Summary

Node	Type	Maximum		Lateral Inflow Volume 10^6 gal	Total Inflow Volume 10^6 gal	Flow Balance Error Percent		
		Lateral Inflow CFS	Total Inflow CFS					
							Time of Occurrence days	Max hr:min
DP-1E	JUNCTION	0.00	54.71	0	12:25	0	3.26	0.000
DP-21	JUNCTION	0.00	168.07	0	12:47	0	14.4	0.000
DP-22	JUNCTION	0.00	148.78	0	12:45	0	11.2	0.000
DP-25	JUNCTION	0.00	21.07	0	12:15	0	0.456	0.000
DP-26	JUNCTION	0.00	91.26	0	12:30	0	3.04	0.000
DP-2E	JUNCTION	0.00	103.33	0	12:27	0	7.09	0.000
DP-3E	JUNCTION	0.00	111.20	0	12:32	0	12.3	0.000
DP-4E	JUNCTION	0.00	117.69	0	12:34	0	16	-0.000
DP-53A	JUNCTION	0.00	1108.96	0	13:51	0	98.7	0.000

DP-56	JUNCTION	0.00	84.30	0	14:03	0	23.3	0.000
DP-60A	JUNCTION	0.00	1106.07	0	13:50	0	98.1	0.000
DP-61	JUNCTION	0.00	1091.45	0	13:46	0	91.5	0.000
DP-63	JUNCTION	0.00	980.68	0	13:47	0	73.8	0.000
DP-64	JUNCTION	0.00	198.05	0	12:15	0	4.67	0.000
DP-68	JUNCTION	0.00	1335.56	0	13:22	0	69.8	-0.000
DP-69	JUNCTION	0.00	1149.22	0	12:59	0	44.4	0.000
DP-70	JUNCTION	0.00	1030.45	0	12:57	0	38.9	0.000
DP-71	JUNCTION	0.00	1017.54	0	12:54	0	37.6	0.000
DP-72	JUNCTION	0.00	943.85	0	12:51	0	33.8	0.000
DP-73	JUNCTION	0.00	919.42	0	12:50	0	32.8	0.000
DP-74	JUNCTION	0.00	187.20	0	12:28	0	4.83	0.000
DP-75	JUNCTION	0.00	555.20	0	12:38	0	18.3	0.000
DP-77	JUNCTION	0.00	880.04	0	12:45	0	30.7	0.000
DP-78	JUNCTION	0.00	269.64	0	12:29	0	7.25	0.000
DP-8	JUNCTION	0.00	89.22	0	13:18	0	24.3	0.001
DP-87	JUNCTION	0.00	1216.59	0	13:05	0	51.6	0.000
FSD9_OUTLET	JUNCTION	0.00	155.28	0	12:56	0	7.16	0.000
FSDE1_Outlet	JUNCTION	0.00	7.20	0	14:23	0	1.23	0.000
FSDE2_Outlet	JUNCTION	0.00	7.27	0	14:37	0	1.8	-0.000
FSDE4_Outlet	JUNCTION	0.00	3.34	0	13:49	0	1.7	0.000
SC3-10	JUNCTION	30.77	30.77	0	12:20	0.643	0.643	0.000
SC3-11A	JUNCTION	12.81	12.81	0	12:15	0.267	0.267	0.000
SC3-11B	JUNCTION	155.96	155.96	0	12:15	4.34	4.34	0.000
SC3-12	JUNCTION	151.27	151.27	0	12:15	3.92	3.92	0.000
SC3-13	JUNCTION	115.86	115.86	0	12:15	2.51	2.51	0.000
SC3-14A	JUNCTION	313.32	313.32	0	12:15	8.27	8.27	0.000
SC3-14B	JUNCTION	160.58	160.58	0	12:15	3.94	3.94	0.000
SC3-15A	JUNCTION	84.89	84.89	0	12:25	2.68	2.68	0.000
SC3-15B	JUNCTION	17.90	17.90	0	12:15	0.449	0.449	0.000
SC3-16A	JUNCTION	431.90	431.90	0	12:15	11.4	11.4	0.000
SC3-16B	JUNCTION	107.10	107.10	0	12:15	2.62	2.62	0.000
SC3-17B	JUNCTION	51.73	51.73	0	12:15	1.34	1.34	0.000
SC3-18	JUNCTION	54.88	54.88	0	12:15	1.46	1.46	0.000
SC3-17A	JUNCTION	54.42	54.42	0	12:15	1.26	1.26	0.000
SC3-19	JUNCTION	137.26	137.26	0	12:25	3.58	3.58	0.000
SC3-1A	JUNCTION	54.22	54.22	0	12:15	0.894	0.894	0.000
SC3-20	JUNCTION	42.17	42.17	0	12:15	0.77	0.77	0.000
SC3-21	JUNCTION	35.14	35.14	0	12:15	0.567	0.567	0.000
SC3-22	JUNCTION	37.67	37.67	0	12:15	0.763	0.763	0.000
SC3-23	JUNCTION	15.34	15.34	0	12:15	0.382	0.382	0.000
SC3-24A	JUNCTION	28.01	28.01	0	12:20	0.772	0.772	0.000
SC3-24B	JUNCTION	10.90	10.90	0	12:15	0.258	0.258	0.000
SC3-25	JUNCTION	21.07	21.07	0	12:15	0.456	0.456	0.000
SC3-26	JUNCTION	5.76	5.76	0	12:20	0.191	0.191	0.000
SC3-27	JUNCTION	88.36	88.36	0	12:20	2.82	2.82	0.000
SC3-5A	JUNCTION	112.35	112.35	0	12:15	2.16	2.16	0.000
SC3-5B	JUNCTION	149.00	149.00	0	12:15	3.26	3.26	0.000
SC3-61	JUNCTION	47.40	47.40	0	12:20	1.23	1.23	0.000
SC3-6A	JUNCTION	123.77	123.77	0	12:15	3.16	3.16	0.000
SC3-6B	JUNCTION	74.85	74.85	0	12:15	1.67	1.67	0.000
SC3-6C	JUNCTION	127.64	127.64	0	12:15	2.51	2.51	0.000
SC3-7	JUNCTION	126.05	126.05	0	12:15	3	3	0.000
SC3-72	JUNCTION	44.98	44.98	0	12:20	1.17	1.17	0.000
SC3-73	JUNCTION	63.84	63.84	0	12:25	1.78	1.78	0.000
SC3-74	JUNCTION	99.77	99.77	0	12:20	2.59	2.59	0.000
SC3-75	JUNCTION	49.21	49.21	0	12:25	1.72	1.72	0.000

SC3-76	JUNCTION	51.45	51.45	0	12:25	1.8	1.8	0.000
SC3-77	JUNCTION	54.46	54.46	0	12:30	2.02	2.02	0.000
SC3-78	JUNCTION	144.42	144.42	0	12:20	3.37	3.37	0.000
SC3-79	JUNCTION	156.01	156.01	0	12:25	3.87	3.87	0.000
SC3-8	JUNCTION	122.75	122.75	0	12:20	2.48	2.48	0.000
SC3-80	JUNCTION	109.14	109.14	0	12:25	3.02	3.02	0.000
SC3-81	JUNCTION	162.22	162.22	0	12:30	4.96	4.96	0.000
SC3-82	JUNCTION	102.02	102.02	0	12:20	2.22	2.22	0.000
SC3-88	JUNCTION	37.84	37.84	0	12:25	1.14	1.14	0.000
SC3-89	JUNCTION	21.70	21.70	0	12:20	0.518	0.518	0.000
SC3-9	JUNCTION	146.06	146.06	0	12:25	4.62	4.62	0.000
SCE-1	JUNCTION	38.58	38.58	0	12:25	1.52	1.52	0.000
SCE-10	JUNCTION	307.87	307.87	0	12:15	7.58	7.58	0.000
SCE-11	JUNCTION	6.50	6.50	0	12:15	0.091	0.091	0.000
SCE-13	JUNCTION	48.24	48.24	0	12:25	1.7	1.7	0.000
SCE-14	JUNCTION	35.59	35.59	0	12:20	1.14	1.14	0.000
SCE-2	JUNCTION	6.27	6.27	0	12:25	0.325	0.325	0.000
SCE-3	JUNCTION	36.11	36.11	0	12:25	1.8	1.8	0.000
SCE-4	JUNCTION	12.67	12.67	0	12:30	0.9	0.9	0.000
SCE-5	JUNCTION	181.58	181.58	0	12:15	5.5	5.5	0.000
SCE-6	JUNCTION	1.42	1.42	0	12:20	0.0678	0.0678	0.000
SCE-7	JUNCTION	77.22	77.22	0	12:15	1.87	1.87	0.000
SCE-8	JUNCTION	82.94	82.94	0	12:15	2.08	2.08	0.000
SCE-9	JUNCTION	1.75	1.75	0	12:20	0.0676	0.0676	0.000
PNDW3_Outfall	JUNCTION	0.00	0.00	0	00:00	0	0	0.000 gal
79	JUNCTION	0.00	10.14	0	12:37	0	0.381	0.000
80	JUNCTION	0.00	16.00	0	12:34	0	0.566	0.000
SC3-12A	JUNCTION	35.61	35.61	0	12:15	0.741	0.741	0.000
SCE-15	JUNCTION	47.35	47.35	0	12:15	1.07	1.07	0.000
SC3-18B	JUNCTION	40.93	40.93	0	12:20	0.889	0.889	0.000
81	JUNCTION	0.00	1028.87	0	12:58	0	37.5	0.000
SC3_OUTFALL	OUTFALL	0.00	1108.96	0	13:51	0	98.7	0.000
SCE_OUTFALL	OUTFALL	0.00	0.08	0	02:22	0	0.15	0.000
FSD05	STORAGE	0.00	112.35	0	12:15	0	2.16	0.002
FSD06	STORAGE	0.00	453.51	0	12:16	0	10.6	0.076
FSD09	STORAGE	0.00	241.20	0	12:30	0	7.17	0.094
FSD1	STORAGE	0.00	54.22	0	12:15	0	0.894	0.113
FSD11B	STORAGE	0.00	155.96	0	12:15	0	4.34	0.061
FSD12	STORAGE	0.00	151.27	0	12:15	0	3.92	0.037
FSD13	STORAGE	0.00	115.86	0	12:15	0	2.51	0.077
FSD14A	STORAGE	0.00	313.32	0	12:15	0	8.27	0.087
FSD14B	STORAGE	0.00	160.58	0	12:15	0	3.94	0.034
FSD15B	STORAGE	0.00	17.90	0	12:15	0	0.449	0.119
FSD16A	STORAGE	0.00	431.90	0	12:15	0	11.4	0.045
FSD16B	STORAGE	0.00	107.10	0	12:15	0	2.62	0.070
FSD17A	STORAGE	0.00	54.42	0	12:15	0	1.26	0.109
FSD17B	STORAGE	0.00	51.73	0	12:15	0	1.34	0.102
FSD18	STORAGE	0.00	54.88	0	12:15	0	1.46	0.097
FSD20	STORAGE	0.00	42.17	0	12:15	0	0.77	0.163
FSD21	STORAGE	0.00	35.14	0	12:15	0	0.567	0.055
FSD22	STORAGE	0.00	37.67	0	12:15	0	0.763	0.139
FSD23	STORAGE	0.00	15.34	0	12:15	0	0.382	0.232
FSD27	STORAGE	0.00	108.34	0	12:20	0	3.65	0.097
FSD72	STORAGE	0.00	44.98	0	12:20	0	1.17	0.116
FSDE1	STORAGE	0.00	38.58	0	12:25	0	1.52	0.028
FSDE2	STORAGE	0.00	36.11	0	12:25	0	1.8	0.031
FSDE3	STORAGE	0.00	181.58	0	12:15	0	5.5	0.026

FSDE4	STORAGE	0.00	77.22	0	12:15	0	1.87	0.012
FSDE5	STORAGE	0.00	82.94	0	12:15	0	2.08	0.007
PNDE7	STORAGE	0.00	130.43	0	12:35	0	23.3	0.028
FSDE6	STORAGE	0.00	307.87	0	12:15	0	7.58	0.019
PNDW3	STORAGE	0.00	1335.56	0	13:22	0	69.8	0.446
EX_STOCK_POND_1	STORAGE	0.00	1190.70	0	13:12	0	51.6	0.112
FSD12A	STORAGE	0.00	35.61	0	12:15	0	0.741	0.094
EX_STOCK_POND_2	STORAGE	0.00	1030.45	0	12:57	0	38.9	0.125

Node Flooding Summary

Flooding refers to all water that overflows a node, whether it ponds or not.

Node	Total Maximum				
	Maximum Hours Flooded	Time of Max Rate CFS	Flood Occurrence days hr:min	Ponded Volume 10^6 gal	Ponded Volume 1000 ft3
	DP-8	76.10	89.15	0 13:18	24.162
SC3-19	0.44	37.27	0 12:26	0.260	0.000

Storage Volume Summary

Storage Unit	Average Volume 1000 ft3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 ft3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CFS
	FSD05	46.476	11	0	0	200.342	49	0 13:46
FSD06	309.367	26	0	0	801.590	67	0 12:37	139.30
FSD09	59.626	8	0	0	358.622	50	0 12:55	155.28
FSD1	39.349	11	0	0	76.723	21	0 12:39	14.25
FSD11B	64.048	15	0	0	214.340	49	0 12:33	77.00
FSD12	59.897	24	0	0	134.148	53	0 12:26	103.10
FSD13	41.314	12	0	0	164.684	48	0 12:30	43.80
FSD14A	199.531	13	0	0	605.954	39	0 12:39	111.35
FSD14B	115.144	22	0	0	334.556	65	0 12:52	19.30
FSD15B	17.381	9	0	0	32.704	17	0 12:35	7.26
FSD16A	271.064	23	0	0	788.061	67	0 12:40	128.30
FSD16B	158.406	31	0	0	236.656	46	0 12:45	20.48
FSD17A	29.988	9	0	0	95.329	28	0 12:41	17.21
FSD17B	31.579	11	0	0	97.012	34	0 12:39	19.01
FSD18	29.686	13	0	0	103.884	44	0 12:43	21.78
FSD20	0.078	0	0	0	8.608	6	0 12:22	37.53
FSD21	4.353	3	0	0	33.169	25	0 12:37	16.00
FSD22	6.084	6	0	0	40.205	40	0 12:40	20.98
FSD23	3.475	3	0	0	18.228	14	0 12:36	10.14
FSD27	46.557	15	0	0	175.475	58	0 12:50	73.03
FSD72	10.753	8	0	0	48.229	36	0 12:30	40.25
FSDE1	64.875	23	0	0	154.344	54	0 14:23	7.20
FSDE2	15.886	6	0	0	141.557	50	0 14:37	7.27

FSDE3	167.702	22	0	0	498.845	65	0	13:12	19.59
FSDE4	66.959	13	0	0	177.406	34	0	13:49	3.34
FSDE5	79.581	30	0	0	196.697	75	0	14:16	3.09
PNDE7	19.876	1	0	0	275.584	17	0	14:03	84.30
FSDE6	232.888	18	0	0	735.632	58	0	13:15	20.49
PNDW3	20.207	1	0	0	1101.181	43	0	13:46	971.89
EX_STOCK_POND_1	740.432	44	0	0	1344.192	79	0	13:22	1115.43
FSD12A	19.987	22	0	0	50.071	55	0	12:30	17.73
EX_STOCK_POND_2	159.466	40	0	0	318.595	80	0	12:58	1028.87

Outfall Loading Summary

Outfall Node	Flow Freq Pcnt	Avg Flow CFS	Max Flow CFS	Total Volume 10^6 gal
SC3_OUTFALL	97.99	47.95	1108.96	98.691
SCE_OUTFALL	97.52	0.07	0.08	0.150
System	97.76	48.02	1109.03	98.840

Link Flow Summary

Link	Type	Maximum Flow CFS	Time of Max Occurrence days	Max Veloc ft/sec	Maximum Full Flow	Max/ Full Depth
RT-1	CONDUIT	149.77	0 12:43	4.67	0.00	0.08
RT-10A	CONDUIT	107.73	0 12:23	6.19	1.08	1.00
RT-10B	CONDUIT	91.29	0 12:31	16.05	0.24	0.33
RT-11A	CONDUIT	1027.15	0 13:00	7.12	0.02	0.15
RT-11B	CONDUIT	1133.39	0 13:05	6.73	0.02	0.17
RT-11C	CONDUIT	1190.70	0 13:12	4.72	0.03	0.20
RT-12A	CONDUIT	148.77	0 12:47	16.82	0.78	0.66
RT-12B	CONDUIT	168.06	0 12:48	22.42	0.46	0.48
RT-16	CONDUIT	121.70	0 12:16	16.57	0.87	0.72
RT-17B	CONDUIT	155.05	0 12:58	18.74	0.72	0.63
RT-18	CONDUIT	1089.77	0 13:51	6.51	0.02	0.15
RT-19	CONDUIT	46.59	0 12:23	7.73	0.16	0.27
RT-1E	CONDUIT	7.20	0 14:24	5.44	0.06	0.16
RT-2	CONDUIT	94.01	0 12:40	4.27	0.00	0.06
RT-20	CONDUIT	1106.03	0 13:51	9.95	0.01	0.11
RT-21	CONDUIT	19.95	0 12:21	11.12	0.13	0.24
RT-22	CONDUIT	10.07	0 12:40	11.49	0.11	0.22
RT-2E	CONDUIT	54.33	0 12:28	10.04	0.41	0.45
RT-3	CONDUIT	94.58	0 12:30	4.26	0.00	0.06
RT-3E	CONDUIT	7.27	0 14:38	5.89	0.05	0.15
RT-4	CONDUIT	178.58	0 12:36	4.73	0.00	0.08
RT-4E	CONDUIT	102.51	0 12:32	12.33	0.73	0.63

RT-5	CONDUIT	538.07	0	12:46	6.75	0.01	0.15
RT-5E	CONDUIT	111.13	0	12:34	16.72	0.29	0.37
RT-6	CONDUIT	146.64	0	12:33	5.08	0.00	0.07
RT-6B	CONDUIT	228.12	0	12:47	4.92	0.00	0.10
RT-6E	CONDUIT	3.33	0	13:53	4.68	0.02	0.11
RT-7A	CONDUIT	21.59	0	12:21	12.72	0.08	0.19
RT-7E	CONDUIT	117.59	0	12:35	11.62	0.32	0.39
RT-8	CONDUIT	37.51	0	12:23	15.86	0.85	0.71
RT-9A	CONDUIT	870.93	0	12:51	6.22	0.02	0.15
RT-9B	CONDUIT	918.85	0	12:52	7.13	0.01	0.14
RT-9C	CONDUIT	941.60	0	12:54	6.65	0.02	0.15
RT-9D	CONDUIT	1015.28	0	12:57	6.91	0.02	0.15
RT-14	CONDUIT	980.06	0	13:50	6.73	0.01	0.13
1	DUMMY	99.77	0	12:20			
2	DUMMY	63.84	0	12:25			
3	DUMMY	49.21	0	12:25			
4	DUMMY	51.45	0	12:25			
5	DUMMY	144.42	0	12:20			
6	DUMMY	44.98	0	12:20			
7	DUMMY	54.46	0	12:30			
8	DUMMY	37.84	0	12:25			
9	DUMMY	38.58	0	12:25			
10	DUMMY	6.27	0	12:25			
11	DUMMY	5.76	0	12:20			
12	DUMMY	88.36	0	12:20			
13	DUMMY	15.34	0	12:15			
14	DUMMY	35.14	0	12:15			
15	DUMMY	21.07	0	12:15			
16	DUMMY	10.90	0	12:15			
17	DUMMY	37.67	0	12:15			
18	DUMMY	51.73	0	12:15			
20	DUMMY	42.17	0	12:15			
22	DUMMY	160.58	0	12:15			
24	DUMMY	313.32	0	12:15			
25	DUMMY	115.86	0	12:15			
27	DUMMY	77.22	0	12:15			
28	DUMMY	82.94	0	12:15			
29	DUMMY	181.58	0	12:15			
30	DUMMY	107.10	0	12:15			
34	DUMMY	54.88	0	12:15			
36	DUMMY	36.11	0	12:25			
37	DUMMY	12.67	0	12:30			
38	DUMMY	146.06	0	12:25			
RT-17A	CONDUIT	104.75	0	12:34	6.00	0.00	0.09
39	DUMMY	84.89	0	12:25			
40	DUMMY	17.90	0	12:15			
42	DUMMY	151.27	0	12:15			
44	DUMMY	6.50	0	12:15			
45	DUMMY	1.75	0	12:20			
46	DUMMY	1.42	0	12:20			
47	DUMMY	35.59	0	12:20			
48	DUMMY	48.24	0	12:25			
51	DUMMY	307.87	0	12:15			
54	DUMMY	155.96	0	12:15			
56	DUMMY	12.81	0	12:15			
58	CONDUIT	1335.56	0	13:22	12.93	0.01	0.10
63	DUMMY	112.35	0	12:15			

65	DUMMY	54.22	0	12:15				
67	DUMMY	1108.96	0	13:51				
RT-15A	CONDUIT	125.05	0	12:16	19.10	0.53	0.52	
RT-15B	CONDUIT	197.04	0	12:16	19.39	0.32	0.39	
69	DUMMY	127.64	0	12:15				
70	DUMMY	74.85	0	12:15				
RT-25	CONDUIT	84.29	0	14:07	4.25	0.01	0.14	
71	CONDUIT	0.08	0	02:22	0.10	1.08	1.00	
74	DUMMY	30.77	0	12:20				
75	DUMMY	28.01	0	12:20				
77	DUMMY	149.00	0	12:15				
78	DUMMY	54.42	0	12:15				
79	DUMMY	431.90	0	12:15				
80	CONDUIT	16.01	0	12:42	16.17	0.16	0.27	
81	DUMMY	35.61	0	12:15				
82	DUMMY	47.35	0	12:15				
83	DUMMY	40.93	0	12:20				
84	DUMMY	1030.45	0	12:57				
FSD01_Outlet	DUMMY	14.25	0	12:40				
FSD05_Outlet	DUMMY	3.70	0	12:11				
FSD06_Outlet	DUMMY	139.30	0	12:31				
FSD11B_Outlet	DUMMY	77.00	0	12:09				
FSD12_Outlet	DUMMY	103.10	0	12:20				
FSD13_Outlet	DUMMY	43.80	0	12:20				
FSD14A_Outlet	DUMMY	111.35	0	12:39				
FSD14B_Outlet	DUMMY	19.30	0	12:06				
FSD15B_Outlet	DUMMY	7.26	0	12:36				
FSD16A_Outlet	DUMMY	128.30	0	12:17				
FSD16B_Outlet	DUMMY	20.48	0	12:45				
FSD17B_Outlet	DUMMY	19.01	0	12:39				
FSD18_Outlet	DUMMY	21.78	0	12:44				
FSD21_Outlet	DUMMY	16.00	0	12:34				
FSD22_Outlet	DUMMY	20.98	0	12:40				
FSD72_Outlet	DUMMY	40.25	0	12:30				
FSD9_Outlet	DUMMY	155.28	0	12:56				
FSDE2_Outlet	DUMMY	7.27	0	14:37				
FSDE3_Outlet	DUMMY	19.59	0	13:12				
FSDE4_Outlet	DUMMY	3.34	0	13:49				
FSDE5_Outlet	DUMMY	3.09	0	14:17				
FSDE6_Outlet	DUMMY	20.49	0	13:16				
FSDE1_Outlet	DUMMY	7.20	0	14:23				
PNDE7_Outlet	DUMMY	84.30	0	14:03				
FSD17A_Outlet	DUMMY	17.21	0	12:41				
PNDW3_Outlet	DUMMY	971.89	0	13:47				
FSD27_Outlet	DUMMY	73.03	0	12:50				
EX_STOCK_POND_1_OUTFALL	DUMMY	1115.43	0	13:22				
FSD23_Outlet	DUMMY	10.14	0	12:37				
FSD12A_Outlet	DUMMY	17.73	0	12:30				
EX_STOCK_POND_2_OUTLET	DUMMY	1028.87	0	12:58				

Conduit Surcharge Summary

	Hours	Hours
--	-------	-------

Conduit	----- Hours Full -----		Above Full		Capacity
	Both Ends	Upstream	Dnstream	Normal Flow	Limited
RT-10A	0.43	0.43	0.43	0.47	0.43
71	76.10	76.10	76.10	0.03	76.10

Analysis begun on: Fri Oct 15 16:19:59 2021

Analysis ended on: Fri Oct 15 16:20:00 2021

Total elapsed time: 00:00:01

Sterling Ranch 2021 MDDP Amendment
50-YR Type II Storm

WARNING 04: minimum elevation drop used for Conduit 1
WARNING 04: minimum elevation drop used for Conduit 2
WARNING 04: minimum elevation drop used for Conduit 3
WARNING 04: minimum elevation drop used for Conduit 4
WARNING 04: minimum elevation drop used for Conduit 5
WARNING 04: minimum elevation drop used for Conduit 6
WARNING 04: minimum elevation drop used for Conduit 7
WARNING 04: minimum elevation drop used for Conduit 8
WARNING 04: minimum elevation drop used for Conduit 9
WARNING 04: minimum elevation drop used for Conduit 10
WARNING 04: minimum elevation drop used for Conduit 11
WARNING 04: minimum elevation drop used for Conduit 12
WARNING 04: minimum elevation drop used for Conduit 14
WARNING 04: minimum elevation drop used for Conduit 15
WARNING 04: minimum elevation drop used for Conduit 16
WARNING 04: minimum elevation drop used for Conduit 17
WARNING 04: minimum elevation drop used for Conduit 18
WARNING 04: minimum elevation drop used for Conduit 20
WARNING 04: minimum elevation drop used for Conduit 22
WARNING 04: minimum elevation drop used for Conduit 27
WARNING 04: minimum elevation drop used for Conduit 28
WARNING 04: minimum elevation drop used for Conduit 29
WARNING 04: minimum elevation drop used for Conduit 30
WARNING 04: minimum elevation drop used for Conduit 34
WARNING 04: minimum elevation drop used for Conduit 36
WARNING 04: minimum elevation drop used for Conduit 37
WARNING 04: minimum elevation drop used for Conduit 38
WARNING 04: minimum elevation drop used for Conduit 39
WARNING 04: minimum elevation drop used for Conduit 40
WARNING 04: minimum elevation drop used for Conduit 44
WARNING 04: minimum elevation drop used for Conduit 45
WARNING 04: minimum elevation drop used for Conduit 46
WARNING 04: minimum elevation drop used for Conduit 47
WARNING 04: minimum elevation drop used for Conduit 48
WARNING 04: minimum elevation drop used for Conduit 51
WARNING 04: minimum elevation drop used for Conduit 54
WARNING 08: elevation drop exceeds length for Conduit 56
WARNING 04: minimum elevation drop used for Conduit 63
WARNING 04: minimum elevation drop used for Conduit 65
WARNING 04: minimum elevation drop used for Conduit 67
WARNING 04: minimum elevation drop used for Conduit 69
WARNING 04: minimum elevation drop used for Conduit 70
WARNING 04: minimum elevation drop used for Conduit 71
WARNING 04: minimum elevation drop used for Conduit 74
WARNING 04: minimum elevation drop used for Conduit 75
WARNING 08: elevation drop exceeds length for Conduit 77
WARNING 04: minimum elevation drop used for Conduit 78
WARNING 04: minimum elevation drop used for Conduit 79
WARNING 04: minimum elevation drop used for Conduit 82
WARNING 04: minimum elevation drop used for Conduit 83

WARNING 10: crest elevation raised to downstream invert for regulator Link FSD12_Outlet
WARNING 10: crest elevation raised to downstream invert for regulator Link FSD12A_Outlet

NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.

Analysis Options

Flow Units CFS

Process Models:

Rainfall/Runoff NO

RDII NO

Snowmelt NO

Groundwater NO

Flow Routing YES

Ponding Allowed NO

Water Quality NO

Flow Routing Method KINWAVE

Starting Date 01/01/2005 00:00:00

Ending Date 01/04/2005 06:00:00

Antecedent Dry Days 0.0

Report Time Step 00:05:00

Routing Time Step 30.00 sec

***** Volume Volume

Flow Routing Continuity acre-feet 10^6 gal

***** ----- -----

Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.000	0.000
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	535.087	174.366
External Outflow	393.689	128.289
Flooding Loss	95.598	31.152
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	46.901	15.284
Continuity Error (%)	-0.206	

Highest Flow Instability Indexes

Link PNDW3_Outlet (64)

Link RT-14 (64)

Link RT-18 (64)

Link 67 (63)

Link RT-20 (63)

Routing Time Step Summary

Minimum Time Step : 30.00 sec
Average Time Step : 30.00 sec
Maximum Time Step : 30.00 sec
Percent in Steady State : 0.00
Average Iterations per Step : 1.00
Percent Not Converging : 0.00

Node Depth Summary

Node	Type	Average Maximum Maximum Time of Max Reported					
		Depth	Depth	HGL	Occurrence	Max Depth	
		Feet	Feet	Feet	days hr:min	Feet	
DP-1E	JUNCTION	0.22	2.11	261.01	0 12:25	2.11	
DP-21	JUNCTION	0.33	2.76	186.96	0 13:01	2.75	
DP-22	JUNCTION	0.32	2.75	226.95	0 12:28	2.75	
DP-25	JUNCTION	0.03	1.00	333.20	0 12:15	0.99	
DP-26	JUNCTION	0.10	1.94	201.14	0 12:29	1.94	
DP-2E	JUNCTION	0.31	3.16	222.06	0 12:27	3.15	
DP-3E	JUNCTION	0.37	3.14	132.04	0 12:32	3.13	
DP-4E	JUNCTION	0.51	2.86	63.36	0 12:41	2.86	
DP-53A	JUNCTION	0.24	2.53	2.53	0 13:44	2.53	
DP-56	JUNCTION	0.44	1.64	33.64	0 14:12	1.64	
DP-60A	JUNCTION	0.33	3.48	25.68	0 13:43	3.48	
DP-61	JUNCTION	0.33	3.64	66.84	0 13:02	3.48	
DP-63	JUNCTION	0.26	3.11	101.31	0 13:44	3.11	
DP-64	JUNCTION	0.12	2.61	95.81	0 12:15	2.58	
DP-68	JUNCTION	0.30	2.39	120.79	0 13:15	2.39	
DP-69	JUNCTION	0.21	5.00	208.20	0 12:19	5.00	
DP-70	JUNCTION	0.14	3.57	232.77	0 12:54	3.57	
DP-71	JUNCTION	0.14	3.57	260.77	0 12:52	3.56	
DP-72	JUNCTION	0.12	3.49	286.69	0 12:49	3.49	
DP-73	JUNCTION	0.14	3.49	303.69	0 12:49	3.49	
DP-74	JUNCTION	0.05	1.97	499.17	0 12:27	1.96	
DP-75	JUNCTION	0.10	3.44	435.64	0 12:37	3.43	
DP-77	JUNCTION	0.12	3.51	343.71	0 12:44	3.51	
DP-78	JUNCTION	0.07	2.39	464.59	0 12:28	2.39	
DP-8	JUNCTION	9.79	10.00	10.00	0 01:40	10.00	
DP-87	JUNCTION	0.24	4.82	162.02	0 13:02	4.80	
FSD9_OUTLET	JUNCTION	0.23	4.00	143.20	0 12:43	4.00	
FSDE1_Outlet	JUNCTION	0.18	0.89	265.79	0 13:57	0.89	
FSDE2_Outlet	JUNCTION	0.14	0.89	229.79	0 13:59	0.89	
FSDE4_Outlet	JUNCTION	0.21	0.47	98.07	0 13:43	0.47	
SC3-10	JUNCTION	0.00	0.00	63.20	0 00:00	0.00	
SC3-11A	JUNCTION	0.00	0.00	98.20	0 00:00	0.00	
SC3-11B	JUNCTION	0.00	0.00	98.20	0 00:00	0.00	
SC3-12	JUNCTION	0.00	0.00	157.20	0 00:00	0.00	
SC3-13	JUNCTION	0.00	0.00	118.60	0 00:00	0.00	
SC3-14A	JUNCTION	0.00	0.00	118.50	0 00:00	0.00	
SC3-14B	JUNCTION	0.00	0.00	184.20	0 00:00	0.00	
SC3-15A	JUNCTION	0.00	0.00	199.20	0 00:00	0.00	

SC3-15B	JUNCTION	0.00	0.00	199.20	0 00:00	0.00
SC3-16A	JUNCTION	0.00	0.00	224.20	0 00:00	0.00
SC3-16B	JUNCTION	0.00	0.00	224.20	0 00:00	0.00
SC3-17B	JUNCTION	0.00	0.00	229.20	0 00:00	0.00
SC3-18	JUNCTION	0.00	0.00	203.20	0 00:00	0.00
SC3-17A	JUNCTION	0.00	0.00	203.20	0 00:00	0.00
SC3-19	JUNCTION	0.12	5.00	250.20	0 12:13	5.00
SC3-1A	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
SC3-20	JUNCTION	0.00	0.00	324.20	0 00:00	0.00
SC3-21	JUNCTION	0.00	0.00	332.20	0 00:00	0.00
SC3-22	JUNCTION	0.00	0.00	283.20	0 00:00	0.00
SC3-23	JUNCTION	0.00	0.00	295.20	0 00:00	0.00
SC3-24A	JUNCTION	0.00	0.00	300.20	0 00:00	0.00
SC3-24B	JUNCTION	0.00	0.00	283.20	0 00:00	0.00
SC3-25	JUNCTION	0.00	0.00	332.20	0 00:00	0.00
SC3-26	JUNCTION	0.00	0.00	257.20	0 00:00	0.00
SC3-27	JUNCTION	0.00	0.00	257.20	0 00:00	0.00
SC3-5A	JUNCTION	0.00	0.00	22.20	0 00:00	0.00
SC3-5B	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
SC3-61	JUNCTION	0.06	1.88	30.08	0 12:20	1.87
SC3-6A	JUNCTION	0.12	3.50	90.70	0 12:14	3.50
SC3-6B	JUNCTION	0.00	0.00	93.20	0 00:00	0.00
SC3-6C	JUNCTION	0.00	0.00	63.20	0 00:00	0.00
SC3-7	JUNCTION	0.10	2.33	119.53	0 12:15	2.31
SC3-72	JUNCTION	0.00	0.00	340.20	0 00:00	0.00
SC3-73	JUNCTION	0.00	0.00	432.20	0 00:00	0.00
SC3-74	JUNCTION	0.00	0.00	497.20	0 00:00	0.00
SC3-75	JUNCTION	0.00	0.00	432.20	0 00:00	0.00
SC3-76	JUNCTION	0.00	0.00	432.20	0 00:00	0.00
SC3-77	JUNCTION	0.00	0.00	340.20	0 00:00	0.00
SC3-78	JUNCTION	0.00	0.00	462.20	0 00:00	0.00
SC3-79	JUNCTION	0.05	1.69	563.89	0 12:25	1.69
SC3-8	JUNCTION	0.04	2.12	249.32	0 12:20	2.10
SC3-80	JUNCTION	0.05	1.53	553.73	0 12:25	1.53
SC3-81	JUNCTION	0.05	1.84	534.04	0 12:30	1.84
SC3-82	JUNCTION	0.03	1.47	563.67	0 12:20	1.46
SC3-88	JUNCTION	0.00	0.00	340.20	0 00:00	0.00
SC3-89	JUNCTION	0.02	0.89	376.09	0 12:20	0.89
SC3-9	JUNCTION	0.00	0.00	139.20	0 00:00	0.00
SCE-1	JUNCTION	0.00	0.00	266.00	0 00:00	0.00
SCE-10	JUNCTION	0.00	0.00	32.50	0 00:00	0.00
SCE-11	JUNCTION	0.00	0.00	32.50	0 00:00	0.00
SCE-13	JUNCTION	0.00	0.00	258.90	0 00:00	0.00
SCE-14	JUNCTION	0.00	0.00	218.90	0 00:00	0.00
SCE-2	JUNCTION	0.00	0.00	258.90	0 00:00	0.00
SCE-3	JUNCTION	0.00	0.00	230.00	0 00:00	0.00
SCE-4	JUNCTION	0.00	0.00	218.90	0 00:00	0.00
SCE-5	JUNCTION	0.00	0.00	128.90	0 00:00	0.00
SCE-6	JUNCTION	0.00	0.00	128.90	0 00:00	0.00
SCE-7	JUNCTION	0.00	0.00	98.00	0 00:00	0.00
SCE-8	JUNCTION	0.00	0.00	60.50	0 00:00	0.00
SCE-9	JUNCTION	0.00	0.00	60.50	0 00:00	0.00
PNDW3_Outfall	JUNCTION	0.00	0.00	118.20	0 00:00	0.00
79	JUNCTION	0.06	0.77	295.77	0 12:37	0.77
80	JUNCTION	0.07	0.81	331.81	0 12:21	0.81
SC3-12A	JUNCTION	0.00	0.00	157.20	0 00:00	0.00
SCE-15	JUNCTION	0.00	0.00	0.00	0 00:00	0.00

SC3-18B	JUNCTION	0.00	0.00	203.20	0	00:00	0.00
81	JUNCTION	0.14	3.53	232.53	0	12:56	3.52
SC3_OUTFALL	OUTFALL	0.00	0.00	0.00	0	00:00	0.00
SCE_OUTFALL	OUTFALL	0.98	1.00	1.00	0	02:10	1.00
FSD05	STORAGE	3.48	6.69	28.89	0	14:01	6.69
FSD06	STORAGE	5.31	9.29	72.49	0	12:41	9.28
FSD09	STORAGE	2.51	7.92	147.12	0	12:52	7.91
FSD1	STORAGE	1.74	3.20	3.20	0	12:36	3.20
FSD11B	STORAGE	3.03	6.62	104.82	0	12:38	6.61
FSD12	STORAGE	4.45	7.38	164.38	0	12:32	7.37
FSD13	STORAGE	3.32	7.66	126.16	0	12:33	7.65
FSD14A	STORAGE	1.76	4.50	122.90	0	12:35	4.50
FSD14B	STORAGE	3.64	8.44	192.64	0	12:55	8.44
FSD15B	STORAGE	2.31	3.93	203.13	0	12:35	3.93
FSD16A	STORAGE	4.35	10.43	234.63	0	12:45	10.43
FSD16B	STORAGE	4.39	6.35	230.55	0	12:43	6.34
FSD17A	STORAGE	3.21	5.10	208.30	0	12:38	5.09
FSD17B	STORAGE	2.67	5.01	234.21	0	12:38	5.00
FSD18	STORAGE	2.76	5.86	209.06	0	12:41	5.86
FSD20	STORAGE	0.04	1.80	326.00	0	12:24	1.79
FSD21	STORAGE	0.76	4.50	336.70	0	12:44	4.50
FSD22	STORAGE	1.62	5.81	289.01	0	12:46	5.81
FSD23	STORAGE	0.71	2.65	298.65	0	12:37	2.65
FSD27	STORAGE	3.56	8.15	265.35	0	12:54	8.15
FSD72	STORAGE	1.38	4.75	344.95	0	12:30	4.75
FSDE1	STORAGE	3.09	6.59	272.59	0	13:57	6.59
FSDE2	STORAGE	0.92	6.37	236.37	0	13:59	6.37
FSDE3	STORAGE	3.16	7.20	136.10	0	13:00	7.20
FSDE4	STORAGE	2.65	5.39	103.39	0	13:43	5.39
FSDE5	STORAGE	3.87	8.15	68.65	0	14:07	8.15
PNDE7	STORAGE	0.74	4.67	37.17	0	14:12	4.67
FSDE6	STORAGE	3.55	7.13	39.63	0	13:08	7.13
PNDW3	STORAGE	0.32	8.52	126.82	0	13:44	8.52
EX_STOCK_POND_1	STORAGE	6.85	10.97	152.97	0	13:16	10.97
FSD12A	STORAGE	4.34	7.58	164.58	0	12:30	7.58
EX_STOCK_POND_2	STORAGE	3.25	6.48	235.58	0	12:56	6.47

Node Inflow Summary

Node							
	Maximum		Maximum		Lateral		Flow
	Lateral		Total		Inflow		
	Inflow	Inflow	Occurrence	Time of Max	Volume	Volume	Error
Type	CFS	CFS	days	hr:min	10^6 gal	10^6 gal	Percent
DP-1E	JUNCTION	0.00	72.19	0 12:25	0	4.42	0.000
DP-21	JUNCTION	0.00	175.88	0 13:01	0	17.8	0.000
DP-22	JUNCTION	0.00	156.50	0 12:28	0	13.8	0.000
DP-25	JUNCTION	0.00	27.20	0 12:15	0	0.6	0.000
DP-26	JUNCTION	0.00	122.38	0 12:29	0	4.1	0.000
DP-2E	JUNCTION	0.00	135.83	0 12:27	0	9.38	0.000
DP-3E	JUNCTION	0.00	160.33	0 12:40	0	15.6	0.000
DP-4E	JUNCTION	0.00	169.81	0 12:41	0	20	0.000
DP-53A	JUNCTION	0.00	1541.94	0 13:44	0	128	0.000

DP-56	JUNCTION	0.00	121.98	0	14:12	0	29	0.000
DP-60A	JUNCTION	0.00	1538.10	0	13:43	0	127	0.000
DP-61	JUNCTION	0.00	1518.06	0	13:40	0	119	0.000
DP-63	JUNCTION	0.00	1347.87	0	13:44	0	96.8	0.000
DP-64	JUNCTION	0.00	238.16	0	12:15	0	5.55	0.000
DP-68	JUNCTION	0.00	1863.02	0	13:15	0	92	0.000
DP-69	JUNCTION	0.00	1564.42	0	12:59	0	59.1	0.000
DP-70	JUNCTION	0.00	1398.64	0	12:54	0	52	0.000
DP-71	JUNCTION	0.00	1379.22	0	12:52	0	50.5	0.000
DP-72	JUNCTION	0.00	1288.24	0	12:49	0	45.6	0.000
DP-73	JUNCTION	0.00	1258.08	0	12:48	0	44.2	0.000
DP-74	JUNCTION	0.00	251.03	0	12:27	0	6.53	-0.000
DP-75	JUNCTION	0.00	754.29	0	12:37	0	24.7	0.000
DP-77	JUNCTION	0.00	1204.35	0	12:44	0	41.4	0.000
DP-78	JUNCTION	0.00	360.98	0	12:28	0	9.73	-0.000
DP-8	JUNCTION	0.00	122.68	0	14:14	0	30.4	0.001
DP-87	JUNCTION	0.00	1696.05	0	13:02	0	68.3	0.000
FSD9_OUTLET	JUNCTION	0.00	226.29	0	12:52	0	9.59	0.000
FSDE1_Outlet	JUNCTION	0.00	13.77	0	13:57	0	1.71	0.000
FSDE2_Outlet	JUNCTION	0.00	15.12	0	13:59	0	2.31	0.000
FSDE4_Outlet	JUNCTION	0.00	4.17	0	13:43	0	2.02	0.000
SC3-10	JUNCTION	41.33	41.33	0	12:15	0.874	0.874	0.000
SC3-11A	JUNCTION	16.43	16.43	0	12:15	0.348	0.348	0.000
SC3-11B	JUNCTION	188.03	188.03	0	12:15	5.17	5.17	0.000
SC3-12	JUNCTION	183.61	183.61	0	12:15	4.72	4.72	0.000
SC3-13	JUNCTION	138.53	138.53	0	12:15	2.99	2.99	0.000
SC3-14A	JUNCTION	380.84	380.84	0	12:15	9.89	9.89	0.000
SC3-14B	JUNCTION	193.87	193.87	0	12:15	4.69	4.69	0.000
SC3-15A	JUNCTION	113.90	113.90	0	12:25	3.65	3.65	0.000
SC3-15B	JUNCTION	21.56	21.56	0	12:15	0.537	0.537	0.000
SC3-16A	JUNCTION	520.35	520.35	0	12:15	13.5	13.5	0.000
SC3-16B	JUNCTION	129.25	129.25	0	12:15	3.12	3.12	0.000
SC3-17B	JUNCTION	62.29	62.29	0	12:15	1.6	1.6	0.000
SC3-18	JUNCTION	67.27	67.27	0	12:15	1.77	1.77	0.000
SC3-17A	JUNCTION	66.17	66.17	0	12:15	1.53	1.53	0.000
SC3-19	JUNCTION	182.95	182.95	0	12:25	4.87	4.87	0.000
SC3-1A	JUNCTION	68.02	68.02	0	12:15	1.11	1.11	0.000
SC3-20	JUNCTION	54.58	54.58	0	12:15	1.02	1.02	0.000
SC3-21	JUNCTION	44.80	44.80	0	12:15	0.742	0.742	0.000
SC3-22	JUNCTION	48.95	48.95	0	12:15	1.01	1.01	0.000
SC3-23	JUNCTION	19.69	19.69	0	12:15	0.495	0.495	0.000
SC3-24A	JUNCTION	36.72	36.72	0	12:20	1.03	1.03	0.000
SC3-24B	JUNCTION	14.27	14.27	0	12:15	0.346	0.346	0.000
SC3-25	JUNCTION	27.20	27.20	0	12:15	0.6	0.6	0.000
SC3-26	JUNCTION	7.70	7.70	0	12:20	0.261	0.261	0.000
SC3-27	JUNCTION	113.37	113.37	0	12:20	3.62	3.62	0.000
SC3-5A	JUNCTION	135.50	135.50	0	12:15	2.59	2.59	0.000
SC3-5B	JUNCTION	181.48	181.48	0	12:15	3.92	3.92	0.000
SC3-61	JUNCTION	63.67	63.67	0	12:20	1.66	1.66	0.000
SC3-6A	JUNCTION	149.06	149.06	0	12:15	3.75	3.75	-0.000
SC3-6B	JUNCTION	90.70	90.70	0	12:15	2.01	2.01	0.000
SC3-6C	JUNCTION	159.19	159.19	0	12:15	3.07	3.07	0.000
SC3-7	JUNCTION	150.45	150.45	0	12:15	3.55	3.55	0.000
SC3-72	JUNCTION	59.19	59.19	0	12:20	1.58	1.58	0.000
SC3-73	JUNCTION	84.94	84.94	0	12:25	2.41	2.41	0.000
SC3-74	JUNCTION	131.03	131.03	0	12:20	3.46	3.46	0.000
SC3-75	JUNCTION	64.91	64.91	0	12:25	2.29	2.29	0.000

SC3-76	JUNCTION	68.18	68.18	0	12:25	2.42	2.42	0.000
SC3-77	JUNCTION	73.59	73.59	0	12:30	2.76	2.76	0.000
SC3-78	JUNCTION	189.21	189.21	0	12:20	4.5	4.5	0.000
SC3-79	JUNCTION	205.95	205.95	0	12:25	5.22	5.22	0.000
SC3-8	JUNCTION	166.13	166.13	0	12:20	3.41	3.41	0.000
SC3-80	JUNCTION	144.50	144.50	0	12:25	4.08	4.08	0.000
SC3-81	JUNCTION	218.65	218.65	0	12:30	6.79	6.79	0.000
SC3-82	JUNCTION	136.18	136.18	0	12:20	3.04	3.04	0.000
SC3-88	JUNCTION	50.80	50.80	0	12:25	1.55	1.55	0.000
SC3-89	JUNCTION	28.90	28.90	0	12:20	0.709	0.709	0.000
SC3-9	JUNCTION	193.77	193.77	0	12:25	6.11	6.11	0.000
SCE-1	JUNCTION	50.51	50.51	0	12:25	2	2	0.000
SCE-10	JUNCTION	388.85	388.85	0	12:15	9.26	9.26	0.000
SCE-11	JUNCTION	8.93	8.93	0	12:15	0.127	0.127	0.000
SCE-13	JUNCTION	63.64	63.64	0	12:25	2.27	2.27	0.000
SCE-14	JUNCTION	46.77	46.77	0	12:20	1.52	1.52	0.000
SCE-2	JUNCTION	8.30	8.30	0	12:25	0.434	0.434	0.000
SCE-3	JUNCTION	47.22	47.22	0	12:25	2.31	2.31	0.000
SCE-4	JUNCTION	16.29	16.29	0	12:30	1.15	1.15	0.000
SCE-5	JUNCTION	219.70	219.70	0	12:15	6.54	6.54	0.000
SCE-6	JUNCTION	2.00	2.00	0	12:20	0.0949	0.0949	0.000
SCE-7	JUNCTION	91.69	91.69	0	12:15	2.21	2.21	0.000
SCE-8	JUNCTION	97.16	97.16	0	12:15	2.44	2.44	0.000
SCE-9	JUNCTION	2.46	2.46	0	12:20	0.0947	0.0947	0.000
PNDW3_Outfall	JUNCTION	0.00	0.00	0	00:00	0	0	0.000 gal
79	JUNCTION	0.00	13.23	0	12:37	0	0.494	0.000
80	JUNCTION	0.00	16.00	0	12:21	0	0.741	0.000
SC3-12A	JUNCTION	43.58	43.58	0	12:15	0.903	0.903	0.000
SCE-15	JUNCTION	60.67	60.67	0	12:15	1.39	1.39	0.000
SC3-18B	JUNCTION	54.26	54.26	0	12:20	1.21	1.21	0.000
81	JUNCTION	0.00	1396.21	0	12:56	0	50.6	0.000
SC3_OUTFALL	OUTFALL	0.00	1541.94	0	13:44	0	128	0.000
SCE_OUTFALL	OUTFALL	0.00	0.08	0	02:09	0	0.15	0.000
FSD05	STORAGE	0.00	135.50	0	12:15	0	2.59	0.001
FSD06	STORAGE	0.00	547.81	0	12:16	0	12.7	0.066
FSD09	STORAGE	0.00	327.53	0	12:30	0	9.6	0.088
FSD1	STORAGE	0.00	68.02	0	12:15	0	1.11	0.106
FSD11B	STORAGE	0.00	188.03	0	12:15	0	5.17	0.018
FSD12	STORAGE	0.00	183.61	0	12:15	0	4.72	0.022
FSD13	STORAGE	0.00	138.53	0	12:15	0	2.99	0.061
FSD14A	STORAGE	0.00	380.84	0	12:15	0	9.89	0.081
FSD14B	STORAGE	0.00	193.87	0	12:15	0	4.69	0.023
FSD15B	STORAGE	0.00	21.56	0	12:15	0	0.537	0.093
FSD16A	STORAGE	0.00	520.35	0	12:15	0	13.5	0.033
FSD16B	STORAGE	0.00	129.25	0	12:15	0	3.12	0.066
FSD17A	STORAGE	0.00	66.17	0	12:15	0	1.53	0.111
FSD17B	STORAGE	0.00	62.29	0	12:15	0	1.6	0.085
FSD18	STORAGE	0.00	67.27	0	12:15	0	1.77	0.077
FSD20	STORAGE	0.00	54.58	0	12:15	0	1.02	0.712
FSD21	STORAGE	0.00	44.80	0	12:15	0	0.742	0.082
FSD22	STORAGE	0.00	48.95	0	12:15	0	1.01	0.075
FSD23	STORAGE	0.00	19.69	0	12:15	0	0.495	0.210
FSD27	STORAGE	0.00	143.50	0	12:25	0	4.71	0.071
FSD72	STORAGE	0.00	59.19	0	12:20	0	1.58	0.547
FSDE1	STORAGE	0.00	50.51	0	12:25	0	2	0.054
FSDE2	STORAGE	0.00	47.22	0	12:25	0	2.31	0.045
FSDE3	STORAGE	0.00	219.70	0	12:15	0	6.54	0.052

FSDE4	STORAGE	0.00	91.69	0	12:15	0	2.21	0.014
FSDE5	STORAGE	0.00	97.16	0	12:15	0	2.44	0.012
PNDE7	STORAGE	0.00	203.13	0	12:45	0	29	0.027
FSDE6	STORAGE	0.00	388.85	0	12:15	0	9.26	0.034
PNDW3	STORAGE	0.00	1863.02	0	13:15	0	92	0.349
EX_STOCK_POND_1	STORAGE	0.00	1663.93	0	13:08	0	68.3	0.103
FSD12A	STORAGE	0.00	43.58	0	12:15	0	0.903	0.097
EX_STOCK_POND_2	STORAGE	0.00	1398.64	0	12:54	0	52	0.109

Node Flooding Summary

Flooding refers to all water that overflows a node, whether it ponds or not.

Total Maximum						
Maximum		Time of Max		Flood Poned		
Hours		Rate		Occurrence		Volume
Node		Flooded		CFS		1000 ft3
DP-8	76.33	122.61	0	14:14	30.202	0.000
FSD9_OUTLET	0.32	10.71	0	12:52	0.062	0.000
SC3-19	0.72	82.86	0	12:26	0.880	0.000
SC3-6A	0.06	8.27	0	12:15	0.007	0.000

Storage Volume Summary

Average		Avg Evap Exfil			Maximum		Max		Time of Max	
Volume		Pcnt Pcnt Pcnt			Volume		Pcnt		Occurrence	
Storage Unit		1000 ft3			1000 ft3		Full		days hr:min	
FSD05	60.384	15	0	0	242.809	60	0	14:01	3.70	
FSD06	318.185	26	0	0	955.145	79	0	12:41	139.30	
FSD09	61.830	9	0	0	418.499	58	0	12:51	226.29	
FSD1	39.698	11	0	0	89.475	25	0	12:36	22.08	
FSD11B	65.828	15	0	0	259.490	60	0	12:37	77.00	
FSD12	60.872	24	0	0	167.070	67	0	12:31	103.10	
FSD13	42.682	12	0	0	198.011	57	0	12:33	43.80	
FSD14A	205.339	13	0	0	670.927	43	0	12:34	166.40	
FSD14B	121.186	24	0	0	402.075	78	0	12:55	19.30	
FSD15B	17.553	9	0	0	36.817	19	0	12:35	9.05	
FSD16A	278.793	24	0	0	944.871	81	0	12:44	128.30	
FSD16B	159.637	31	0	0	265.273	52	0	12:42	28.20	
FSD17A	30.777	9	0	0	107.667	32	0	12:37	25.02	
FSD17B	32.583	11	0	0	109.276	38	0	12:38	24.30	
FSD18	30.772	13	0	0	115.942	50	0	12:41	29.92	
FSD20	0.111	0	0	0	12.492	9	0	12:24	44.35	
FSD21	4.694	4	0	0	46.697	35	0	12:44	16.00	
FSD22	6.407	6	0	0	53.745	53	0	12:46	23.38	
FSD23	3.631	3	0	0	20.763	15	0	12:36	13.23	
FSD27	48.210	16	0	0	211.417	70	0	12:54	88.41	
FSD72	10.902	8	0	0	50.412	38	0	12:30	52.63	

FSDE1	66.611	23	0	0	179.257	63	0	13:57	13.77
FSDE2	18.747	7	0	0	170.617	60	0	13:59	15.12
FSDE3	174.583	23	0	0	559.064	73	0	13:00	41.08
FSDE4	74.171	14	0	0	209.477	41	0	13:42	4.17
FSDE5	87.007	33	0	0	227.505	86	0	14:06	3.80
PNDE7	33.680	2	0	0	517.914	32	0	14:11	121.98
FSDE6	249.204	20	0	0	879.735	70	0	13:08	37.50
PNDW3	34.749	1	0	0	1747.722	68	0	13:43	1337.37
EX_STOCK_POND_1	744.708	44	0	0	1476.066	87	0	13:15	1589.88
FSD12A	20.313	22	0	0	55.491	60	0	12:29	22.71
EX_STOCK_POND_2	160.585	41	0	0	353.707	89	0	12:56	1396.21

Outfall Loading Summary

Outfall Node	Flow Freq Pcnt	Avg Flow CFS	Max Flow CFS	Total Volume 10^6 gal
SC3_OUTFALL	98.22	62.11	1541.94	128.130
SCE_OUTFALL	97.82	0.07	0.08	0.150
System	98.02	62.18	1542.01	128.280

Link Flow Summary

Link	Type	Maximum Flow CFS	Time of Max Occurrence days hr:min	Max Veloc ft/sec	Maximum Full Flow	Max/ Full Depth
RT-1	CONDUIT	204.56	0 12:42	5.02	0.00	0.09
RT-10A	CONDUIT	107.59	0 13:00	6.17	1.08	1.00
RT-10B	CONDUIT	122.47	0 12:31	17.40	0.32	0.39
RT-11A	CONDUIT	1394.34	0 12:58	7.76	0.02	0.18
RT-11B	CONDUIT	1553.05	0 13:03	7.34	0.03	0.20
RT-11C	CONDUIT	1663.93	0 13:08	5.17	0.05	0.24
RT-12A	CONDUIT	156.58	0 13:01	16.99	0.82	0.69
RT-12B	CONDUIT	175.85	0 13:02	22.68	0.48	0.49
RT-16	CONDUIT	149.03	0 12:17	17.04	1.07	0.92
RT-17B	CONDUIT	232.43	0 13:02	20.16	1.08	0.92
RT-18	CONDUIT	1516.45	0 13:43	7.17	0.02	0.17
RT-19	CONDUIT	62.83	0 12:22	8.41	0.21	0.31
RT-1E	CONDUIT	13.77	0 13:58	6.58	0.11	0.22
RT-2	CONDUIT	127.32	0 12:40	4.59	0.00	0.07
RT-20	CONDUIT	1538.03	0 13:44	11.02	0.01	0.13
RT-21	CONDUIT	25.91	0 12:21	11.95	0.17	0.28
RT-22	CONDUIT	13.21	0 12:39	12.38	0.14	0.26
RT-2E	CONDUIT	71.77	0 12:28	10.76	0.54	0.53
RT-3	CONDUIT	127.74	0 12:29	4.57	0.00	0.07
RT-3E	CONDUIT	15.12	0 14:00	7.31	0.11	0.22

RT-4	CONDUIT	241.31	0	12:35	5.08	0.00	0.10
RT-4E	CONDUIT	134.84	0	12:32	12.94	0.96	0.78
RT-5	CONDUIT	734.58	0	12:45	7.29	0.01	0.17
RT-5E	CONDUIT	160.27	0	12:41	18.44	0.42	0.46
RT-6	CONDUIT	195.99	0	12:32	5.44	0.00	0.08
RT-6B	CONDUIT	311.09	0	12:45	5.28	0.00	0.11
RT-6E	CONDUIT	4.17	0	13:47	5.01	0.03	0.12
RT-7A	CONDUIT	28.80	0	12:21	13.83	0.11	0.22
RT-7E	CONDUIT	169.72	0	12:42	12.80	0.46	0.48
RT-8	CONDUIT	46.52	0	12:31	16.50	1.05	0.93
RT-9A	CONDUIT	1194.61	0	12:49	6.79	0.02	0.17
RT-9B	CONDUIT	1257.43	0	12:49	7.80	0.02	0.16
RT-9C	CONDUIT	1285.72	0	12:52	7.26	0.02	0.17
RT-9D	CONDUIT	1376.68	0	12:54	7.53	0.02	0.18
RT-14	CONDUIT	1347.35	0	13:46	7.39	0.02	0.16
1	DUMMY	131.03	0	12:20			
2	DUMMY	84.94	0	12:25			
3	DUMMY	64.91	0	12:25			
4	DUMMY	68.18	0	12:25			
5	DUMMY	189.21	0	12:20			
6	DUMMY	59.19	0	12:20			
7	DUMMY	73.59	0	12:30			
8	DUMMY	50.80	0	12:25			
9	DUMMY	50.51	0	12:25			
10	DUMMY	8.30	0	12:25			
11	DUMMY	7.70	0	12:20			
12	DUMMY	113.37	0	12:20			
13	DUMMY	19.69	0	12:15			
14	DUMMY	44.80	0	12:15			
15	DUMMY	27.20	0	12:15			
16	DUMMY	14.27	0	12:15			
17	DUMMY	48.95	0	12:15			
18	DUMMY	62.29	0	12:15			
20	DUMMY	54.58	0	12:15			
22	DUMMY	193.87	0	12:15			
24	DUMMY	380.84	0	12:15			
25	DUMMY	138.53	0	12:15			
27	DUMMY	91.69	0	12:15			
28	DUMMY	97.16	0	12:15			
29	DUMMY	219.70	0	12:15			
30	DUMMY	129.25	0	12:15			
34	DUMMY	67.27	0	12:15			
36	DUMMY	47.22	0	12:25			
37	DUMMY	16.29	0	12:30			
38	DUMMY	193.77	0	12:25			
RT-17A	CONDUIT	144.63	0	12:33	6.48	0.00	0.10
39	DUMMY	113.90	0	12:25			
40	DUMMY	21.56	0	12:15			
42	DUMMY	183.61	0	12:15			
44	DUMMY	8.93	0	12:15			
45	DUMMY	2.46	0	12:20			
46	DUMMY	2.00	0	12:20			
47	DUMMY	46.77	0	12:20			
48	DUMMY	63.64	0	12:25			
51	DUMMY	388.85	0	12:15			
54	DUMMY	188.03	0	12:15			
56	DUMMY	16.43	0	12:15			

58	CONDUIT	1863.02	0	13:15	14.35	0.01	0.12
63	DUMMY	135.50	0	12:15			
65	DUMMY	68.02	0	12:15			
67	DUMMY	1541.94	0	13:44			
RT-15A	CONDUIT	149.34	0	12:16	19.92	0.64	0.58
RT-15B	CONDUIT	236.71	0	12:16	20.36	0.39	0.43
69	DUMMY	159.19	0	12:15			
70	DUMMY	90.70	0	12:15			
RT-25	CONDUIT	121.96	0	14:15	4.68	0.01	0.16
71	CONDUIT	0.08	0	02:09	0.10	1.08	1.00
74	DUMMY	41.33	0	12:15			
75	DUMMY	36.72	0	12:20			
77	DUMMY	181.48	0	12:15			
78	DUMMY	66.17	0	12:15			
79	DUMMY	520.35	0	12:15			
80	CONDUIT	16.04	0	13:16	15.51	0.16	0.27
81	DUMMY	43.58	0	12:15			
82	DUMMY	60.67	0	12:15			
83	DUMMY	54.26	0	12:20			
84	DUMMY	1398.64	0	12:54			
FSD01_Outlet	DUMMY	22.08	0	12:36			
FSD05_Outlet	DUMMY	3.70	0	12:08			
FSD06_Outlet	DUMMY	139.30	0	12:20			
FSD11B_Outlet	DUMMY	77.00	0	12:06			
FSD12_Outlet	DUMMY	103.10	0	12:15			
FSD13_Outlet	DUMMY	43.80	0	12:15			
FSD14A_Outlet	DUMMY	166.40	0	12:35			
FSD14B_Outlet	DUMMY	19.30	0	12:01			
FSD15B_Outlet	DUMMY	9.05	0	12:35			
FSD16A_Outlet	DUMMY	128.30	0	12:13			
FSD16B_Outlet	DUMMY	28.20	0	12:28			
FSD17B_Outlet	DUMMY	24.30	0	12:34			
FSD18_Outlet	DUMMY	29.92	0	12:41			
FSD21_Outlet	DUMMY	16.00	0	12:21			
FSD22_Outlet	DUMMY	23.38	0	12:46			
FSD72_Outlet	DUMMY	52.63	0	12:30			
FSD9_Outlet	DUMMY	226.29	0	12:52			
FSDE2_Outlet	DUMMY	15.12	0	13:59			
FSDE3_Outlet	DUMMY	41.08	0	13:00			
FSDE4_Outlet	DUMMY	4.17	0	13:43			
FSDE5_Outlet	DUMMY	3.80	0	12:34			
FSDE6_Outlet	DUMMY	37.50	0	13:08			
FSDE1_Outlet	DUMMY	13.77	0	13:57			
PNDE7_Outlet	DUMMY	121.98	0	14:12			
FSD17A_Outlet	DUMMY	25.02	0	12:38			
PNDW3_Outlet	DUMMY	1337.37	0	13:44			
FSD27_Outlet	DUMMY	88.41	0	12:54			
EX_STOCK_POND_1_OUTFALL	DUMMY	1589.88	0	13:16			
FSD23_Outlet	DUMMY	13.23	0	12:37			
FSD12A_Outlet	DUMMY	22.71	0	12:30			
EX_STOCK_POND_2_OUTLET	DUMMY	1396.21	0	12:56			

Conduit Surcharge Summary

Conduit	Hours				Capacity Normal Flow	Limited
	Hours Full		Above Full			
	Both Ends	Upstream	Dnstream			
RT-10A	0.71	0.71	0.71	0.76	0.71	
RT-16	0.05	0.05	0.05	0.05	0.05	
RT-17B	0.31	0.31	0.31	0.30	0.31	
RT-8	0.23	0.23	0.23	0.23	0.23	
71	76.33	76.33	76.33	0.04	76.33	

Analysis begun on: Fri Oct 15 16:22:04 2021

Analysis ended on: Fri Oct 15 16:22:05 2021

Total elapsed time: 00:00:01

Sterling Ranch 2021 MDDP Amendment
100-YR Type II Storm

WARNING 04: minimum elevation drop used for Conduit 1
WARNING 04: minimum elevation drop used for Conduit 2
WARNING 04: minimum elevation drop used for Conduit 3
WARNING 04: minimum elevation drop used for Conduit 4
WARNING 04: minimum elevation drop used for Conduit 5
WARNING 04: minimum elevation drop used for Conduit 6
WARNING 04: minimum elevation drop used for Conduit 7
WARNING 04: minimum elevation drop used for Conduit 8
WARNING 04: minimum elevation drop used for Conduit 9
WARNING 04: minimum elevation drop used for Conduit 10
WARNING 04: minimum elevation drop used for Conduit 11
WARNING 04: minimum elevation drop used for Conduit 12
WARNING 04: minimum elevation drop used for Conduit 14
WARNING 04: minimum elevation drop used for Conduit 15
WARNING 04: minimum elevation drop used for Conduit 16
WARNING 04: minimum elevation drop used for Conduit 17
WARNING 04: minimum elevation drop used for Conduit 18
WARNING 04: minimum elevation drop used for Conduit 20
WARNING 04: minimum elevation drop used for Conduit 22
WARNING 04: minimum elevation drop used for Conduit 27
WARNING 04: minimum elevation drop used for Conduit 28
WARNING 04: minimum elevation drop used for Conduit 29
WARNING 04: minimum elevation drop used for Conduit 30
WARNING 04: minimum elevation drop used for Conduit 34
WARNING 04: minimum elevation drop used for Conduit 36
WARNING 04: minimum elevation drop used for Conduit 37
WARNING 04: minimum elevation drop used for Conduit 38
WARNING 04: minimum elevation drop used for Conduit 39
WARNING 04: minimum elevation drop used for Conduit 40
WARNING 04: minimum elevation drop used for Conduit 44
WARNING 04: minimum elevation drop used for Conduit 45
WARNING 04: minimum elevation drop used for Conduit 46
WARNING 04: minimum elevation drop used for Conduit 47
WARNING 04: minimum elevation drop used for Conduit 48
WARNING 04: minimum elevation drop used for Conduit 51
WARNING 04: minimum elevation drop used for Conduit 54
WARNING 08: elevation drop exceeds length for Conduit 56
WARNING 04: minimum elevation drop used for Conduit 63
WARNING 04: minimum elevation drop used for Conduit 65
WARNING 04: minimum elevation drop used for Conduit 67
WARNING 04: minimum elevation drop used for Conduit 69
WARNING 04: minimum elevation drop used for Conduit 70
WARNING 04: minimum elevation drop used for Conduit 71
WARNING 04: minimum elevation drop used for Conduit 74
WARNING 04: minimum elevation drop used for Conduit 75
WARNING 08: elevation drop exceeds length for Conduit 77
WARNING 04: minimum elevation drop used for Conduit 78
WARNING 04: minimum elevation drop used for Conduit 79
WARNING 04: minimum elevation drop used for Conduit 82
WARNING 04: minimum elevation drop used for Conduit 83
WARNING 10: crest elevation raised to downstream invert for regulator Link FSD12_Outlet
WARNING 10: crest elevation raised to downstream invert for regulator Link FSD12A_Outlet

NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.

Analysis Options

Flow Units CFS

Process Models:

Rainfall/Runoff NO

RDII NO

Snowmelt NO

Groundwater NO

Flow Routing YES

Ponding Allowed NO

Water Quality NO

Flow Routing Method KINWAVE

Starting Date 01/01/2005 00:00:00

Ending Date 01/04/2005 06:00:00

Antecedent Dry Days 0.0

Report Time Step 00:05:00

Routing Time Step 30.00 sec

***** Volume Volume
Flow Routing Continuity acre-feet 10^6 gal

***** -----

Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.000	0.000
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	609.785	198.707
External Outflow	452.533	147.465
Flooding Loss	111.609	36.369
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	47.104	15.350
Continuity Error (%)	-0.240	

Highest Flow Instability Indexes

Link RT-14 (65)

Link PNDW3_Outlet (65)

Link RT-18 (65)

Link RT-20 (64)

Link 67 (64)

Routing Time Step Summary

Minimum Time Step	:	30.00 sec
Average Time Step	:	30.00 sec
Maximum Time Step	:	30.00 sec
Percent in Steady State	:	0.00
Average Iterations per Step	:	1.00
Percent Not Converging	:	0.00

Node Depth Summary

Node	Type	Average Depth	Maximum Depth	Maximum HGL	Time of Max Occurrence	Max Reported Depth
		Feet	Feet	Feet	days hr:min	Feet

DP-1E	JUNCTION	0.23	2.32	261.22	0 12:25	2.31
DP-21	JUNCTION	0.34	2.76	186.96	0 13:27	2.75
DP-22	JUNCTION	0.34	2.75	226.95	0 12:22	2.75
DP-25	JUNCTION	0.03	1.08	333.28	0 12:15	1.06
DP-26	JUNCTION	0.11	2.12	201.32	0 12:30	2.12
DP-2E	JUNCTION	0.32	4.00	222.90	0 12:19	4.00
DP-3E	JUNCTION	0.38	3.72	132.62	0 12:42	3.52
DP-4E	JUNCTION	0.54	3.28	63.78	0 12:43	3.27
DP-53A	JUNCTION	0.26	2.83	2.83	0 13:37	2.82
DP-56	JUNCTION	0.46	1.78	33.78	0 14:13	1.78
DP-60A	JUNCTION	0.34	3.88	26.08	0 13:36	3.88
DP-61	JUNCTION	0.35	4.00	67.20	0 12:45	4.00
DP-63	JUNCTION	0.27	3.39	101.59	0 13:31	3.37
DP-64	JUNCTION	0.12	2.77	95.97	0 12:15	2.74
DP-68	JUNCTION	0.32	2.62	121.02	0 13:14	2.62
DP-69	JUNCTION	0.22	5.00	208.20	0 12:17	5.00
DP-70	JUNCTION	0.15	3.88	233.08	0 12:53	3.87
DP-71	JUNCTION	0.15	3.88	261.08	0 12:50	3.88
DP-72	JUNCTION	0.13	3.81	287.01	0 12:48	3.81
DP-73	JUNCTION	0.15	3.81	304.01	0 12:48	3.80
DP-74	JUNCTION	0.06	2.11	499.31	0 12:27	2.10
DP-75	JUNCTION	0.11	3.70	435.90	0 12:36	3.69
DP-77	JUNCTION	0.13	3.82	344.02	0 12:43	3.82
DP-78	JUNCTION	0.08	2.55	464.75	0 12:28	2.55
DP-8	JUNCTION	9.80	10.00	10.00	0 01:33	10.00
DP-87	JUNCTION	0.25	5.25	162.45	0 13:01	5.25
FSD9_OUTLET	JUNCTION	0.24	4.00	143.20	0 12:35	4.00
FSDE1_Outlet	JUNCTION	0.18	1.13	266.03	0 13:41	1.13
FSDE2_Outlet	JUNCTION	0.15	1.05	229.95	0 13:47	1.05
FSDE4_Outlet	JUNCTION	0.21	0.51	98.11	0 13:35	0.51
SC3-10	JUNCTION	0.00	0.00	63.20	0 00:00	0.00
SC3-11A	JUNCTION	0.00	0.00	98.20	0 00:00	0.00
SC3-11B	JUNCTION	0.00	0.00	98.20	0 00:00	0.00
SC3-12	JUNCTION	0.00	0.00	157.20	0 00:00	0.00
SC3-13	JUNCTION	0.00	0.00	118.60	0 00:00	0.00
SC3-14A	JUNCTION	0.00	0.00	118.50	0 00:00	0.00
SC3-14B	JUNCTION	0.00	0.00	184.20	0 00:00	0.00
SC3-15A	JUNCTION	0.00	0.00	199.20	0 00:00	0.00
SC3-15B	JUNCTION	0.00	0.00	199.20	0 00:00	0.00
SC3-16A	JUNCTION	0.00	0.00	224.20	0 00:00	0.00
SC3-16B	JUNCTION	0.00	0.00	224.20	0 00:00	0.00
SC3-17B	JUNCTION	0.00	0.00	229.20	0 00:00	0.00
SC3-18	JUNCTION	0.00	0.00	203.20	0 00:00	0.00
SC3-17A	JUNCTION	0.00	0.00	203.20	0 00:00	0.00
SC3-19	JUNCTION	0.13	5.00	250.20	0 12:12	5.00
SC3-1A	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
SC3-20	JUNCTION	0.00	0.00	324.20	0 00:00	0.00
SC3-21	JUNCTION	0.00	0.00	332.20	0 00:00	0.00
SC3-22	JUNCTION	0.00	0.00	283.20	0 00:00	0.00
SC3-23	JUNCTION	0.00	0.00	295.20	0 00:00	0.00
SC3-24A	JUNCTION	0.00	0.00	300.20	0 00:00	0.00
SC3-24B	JUNCTION	0.00	0.00	283.20	0 00:00	0.00
SC3-25	JUNCTION	0.00	0.00	332.20	0 00:00	0.00
SC3-26	JUNCTION	0.00	0.00	257.20	0 00:00	0.00
SC3-27	JUNCTION	0.00	0.00	257.20	0 00:00	0.00
SC3-5A	JUNCTION	0.00	0.00	22.20	0 00:00	0.00
SC3-5B	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
SC3-61	JUNCTION	0.06	2.04	30.24	0 12:20	2.03
SC3-6A	JUNCTION	0.13	3.50	90.70	0 12:11	3.50
SC3-6B	JUNCTION	0.00	0.00	93.20	0 00:00	0.00
SC3-6C	JUNCTION	0.00	0.00	63.20	0 00:00	0.00
SC3-7	JUNCTION	0.11	2.49	119.69	0 12:15	2.46
SC3-72	JUNCTION	0.00	0.00	340.20	0 00:00	0.00
SC3-73	JUNCTION	0.00	0.00	432.20	0 00:00	0.00
SC3-74	JUNCTION	0.00	0.00	497.20	0 00:00	0.00

SC3-75	JUNCTION	0.00	0.00	432.20	0 00:00	0.00
SC3-76	JUNCTION	0.00	0.00	432.20	0 00:00	0.00
SC3-77	JUNCTION	0.00	0.00	340.20	0 00:00	0.00
SC3-78	JUNCTION	0.00	0.00	462.20	0 00:00	0.00
SC3-79	JUNCTION	0.05	1.81	564.01	0 12:25	1.81
SC3-8	JUNCTION	0.04	2.28	249.48	0 12:20	2.26
SC3-80	JUNCTION	0.05	1.63	553.83	0 12:25	1.63
SC3-81	JUNCTION	0.05	1.97	534.17	0 12:30	1.97
SC3-82	JUNCTION	0.03	1.58	563.78	0 12:20	1.56
SC3-88	JUNCTION	0.00	0.00	340.20	0 00:00	0.00
SC3-89	JUNCTION	0.02	0.96	376.16	0 12:20	0.96
SC3-9	JUNCTION	0.00	0.00	139.20	0 00:00	0.00
SCE-1	JUNCTION	0.00	0.00	266.00	0 00:00	0.00
SCE-10	JUNCTION	0.00	0.00	32.50	0 00:00	0.00
SCE-11	JUNCTION	0.00	0.00	32.50	0 00:00	0.00
SCE-13	JUNCTION	0.00	0.00	258.90	0 00:00	0.00
SCE-14	JUNCTION	0.00	0.00	218.90	0 00:00	0.00
SCE-2	JUNCTION	0.00	0.00	258.90	0 00:00	0.00
SCE-3	JUNCTION	0.00	0.00	230.00	0 00:00	0.00
SCE-4	JUNCTION	0.00	0.00	218.90	0 00:00	0.00
SCE-5	JUNCTION	0.00	0.00	128.90	0 00:00	0.00
SCE-6	JUNCTION	0.00	0.00	128.90	0 00:00	0.00
SCE-7	JUNCTION	0.00	0.00	98.00	0 00:00	0.00
SCE-8	JUNCTION	0.00	0.00	60.50	0 00:00	0.00
SCE-9	JUNCTION	0.00	0.00	60.50	0 00:00	0.00
PNDW3_Outfall	JUNCTION	0.00	0.00	118.20	0 00:00	0.00
79	JUNCTION	0.06	0.83	295.83	0 12:37	0.83
80	JUNCTION	0.07	0.81	331.81	0 12:18	0.81
SC3-12A	JUNCTION	0.00	0.00	157.20	0 00:00	0.00
SCE-15	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
SC3-18B	JUNCTION	0.00	0.00	203.20	0 00:00	0.00
81	JUNCTION	0.15	3.83	232.83	0 12:55	3.83
SC3_OUTFALL	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
SCE_OUTFALL	OUTFALL	0.98	1.00	1.00	0 02:03	1.00
FSD05	STORAGE	3.67	7.12	29.32	0 14:14	7.12
FSD06	STORAGE	5.35	9.86	73.06	0 12:43	9.86
FSD09	STORAGE	2.55	8.44	147.64	0 12:52	8.43
FSD1	STORAGE	1.75	3.44	3.44	0 12:36	3.43
FSD11B	STORAGE	3.06	7.09	105.29	0 12:40	7.09
FSD12	STORAGE	4.48	7.93	164.93	0 12:34	7.93
FSD13	STORAGE	3.36	8.16	126.66	0 12:35	8.16
FSD14A	STORAGE	1.78	4.79	123.19	0 12:36	4.79
FSD14B	STORAGE	3.72	9.06	193.26	0 12:58	9.05
FSD15B	STORAGE	2.32	4.14	203.34	0 12:35	4.14
FSD16A	STORAGE	4.41	11.20	235.40	0 12:47	11.19
FSD16B	STORAGE	4.41	6.78	230.98	0 12:44	6.78
FSD17A	STORAGE	3.22	5.29	208.49	0 12:39	5.29
FSD17B	STORAGE	2.69	5.30	234.50	0 12:40	5.30
FSD18	STORAGE	2.79	6.18	209.38	0 12:42	6.17
FSD20	STORAGE	0.05	2.46	326.66	0 12:30	2.46
FSD21	STORAGE	0.79	5.20	337.40	0 12:47	5.19
FSD22	STORAGE	1.65	6.48	289.68	0 12:51	6.47
FSD23	STORAGE	0.72	2.84	298.84	0 12:37	2.83
FSD27	STORAGE	3.61	8.99	266.19	0 13:00	8.99
FSD72	STORAGE	1.39	4.90	345.10	0 12:30	4.90
FSDE1	STORAGE	3.12	6.88	272.88	0 13:41	6.87
FSDE2	STORAGE	0.95	6.65	236.65	0 13:47	6.65
FSDE3	STORAGE	3.21	7.51	136.41	0 12:55	7.51
FSDE4	STORAGE	2.75	5.77	103.77	0 13:35	5.77
FSDE5	STORAGE	4.09	8.73	69.23	0 14:20	8.73
PNDE7	STORAGE	0.81	5.65	38.15	0 14:13	5.65
FSDE6	STORAGE	3.61	7.56	40.06	0 13:03	7.56
PNDW3	STORAGE	0.37	9.87	128.17	0 13:42	9.86
EX_STOCK_POND_1	STORAGE	6.87	11.40	153.40	0 13:14	11.40
FSD12A	STORAGE	4.37	7.99	164.99	0 12:32	7.98
EX_STOCK_POND_2	STORAGE	3.26	6.79	235.89	0 12:55	6.79

Node Inflow Summary

Node	Type	Maximum		Lateral	Total	Flow	Error
		Inflow	Inflow				
		CFS	CFS	Volume	Volume	Balance	Percent
			Occurrence	10^6 gal	10^6 gal		
			days hr:min				
DP-1E	JUNCTION	0.00	83.88	0 12:25	0	5.2	0.000
DP-21	JUNCTION	0.00	175.87	0 13:27	0	20.1	0.000
DP-22	JUNCTION	0.00	156.50	0 12:22	0	15.6	0.000
DP-25	JUNCTION	0.00	31.29	0 12:15	0	0.696	0.000
DP-26	JUNCTION	0.00	143.11	0 12:30	0	4.82	-0.000
DP-2E	JUNCTION	0.00	157.53	0 12:27	0	10.9	-0.000
DP-3E	JUNCTION	0.00	205.49	0 12:42	0	17.8	0.000
DP-4E	JUNCTION	0.00	214.58	0 12:43	0	22.7	0.000
DP-53A	JUNCTION	0.00	1895.22	0 13:37	0	147	0.000
DP-56	JUNCTION	0.00	144.77	0 14:13	0	32.8	0.000
DP-60A	JUNCTION	0.00	1889.36	0 13:36	0	146	0.000
DP-61	JUNCTION	0.00	1873.16	0 13:33	0	137	0.000
DP-63	JUNCTION	0.00	1580.46	0 13:31	0	112	0.000
DP-64	JUNCTION	0.00	264.76	0 12:15	0	6.15	0.000
DP-68	JUNCTION	0.00	2202.16	0 13:14	0	107	0.000
DP-69	JUNCTION	0.00	1827.02	0 12:56	0	68.8	0.000
DP-70	JUNCTION	0.00	1648.68	0 12:53	0	60.8	0.000
DP-71	JUNCTION	0.00	1627.14	0 12:50	0	59.1	0.000
DP-72	JUNCTION	0.00	1533.04	0 12:48	0	53.4	0.000
DP-73	JUNCTION	0.00	1501.00	0 12:47	0	51.8	0.000
DP-74	JUNCTION	0.00	293.76	0 12:27	0	7.66	0.000
DP-75	JUNCTION	0.00	887.87	0 12:36	0	29	0.000
DP-77	JUNCTION	0.00	1427.72	0 12:43	0	48.5	0.000
DP-78	JUNCTION	0.00	422.09	0 12:28	0	11.4	0.000
DP-8	JUNCTION	0.00	146.21	0 13:36	0	34.4	0.001
DP-87	JUNCTION	0.00	2011.71	0 13:01	0	79.4	0.000
FSD9_OUTLET	JUNCTION	0.00	264.75	0 12:52	0	11.3	0.000
FSDE1_Outlet	JUNCTION	0.00	21.81	0 13:41	0	2.03	0.000
FSDE2_Outlet	JUNCTION	0.00	21.11	0 13:47	0	2.65	0.000
FSDE4_Outlet	JUNCTION	0.00	4.91	0 13:35	0	2.24	0.000
SC3-10	JUNCTION	48.66	48.66	0 12:15	1.03	1.03	0.000
SC3-11A	JUNCTION	18.84	18.84	0 12:15	0.403	0.403	0.000
SC3-11B	JUNCTION	209.37	209.37	0 12:15	5.72	5.72	0.000
SC3-12	JUNCTION	205.11	205.11	0 12:15	5.25	5.25	0.000
SC3-13	JUNCTION	153.60	153.60	0 12:15	3.31	3.31	0.000
SC3-14A	JUNCTION	425.59	425.59	0 12:15	11	11	0.000
SC3-14B	JUNCTION	215.70	215.70	0 12:15	5.19	5.19	0.000
SC3-15A	JUNCTION	133.28	133.28	0 12:25	4.31	4.31	0.000
SC3-15B	JUNCTION	24.00	24.00	0 12:15	0.596	0.596	0.000
SC3-16A	JUNCTION	579.11	579.11	0 12:15	15	15	0.000
SC3-16B	JUNCTION	143.79	143.79	0 12:15	3.45	3.45	0.000
SC3-17B	JUNCTION	69.33	69.33	0 12:15	1.78	1.78	0.000
SC3-18	JUNCTION	75.51	75.51	0 12:15	1.98	1.98	0.000
SC3-17A	JUNCTION	73.97	73.97	0 12:15	1.7	1.7	0.000
SC3-19	JUNCTION	213.48	213.48	0 12:25	5.74	5.74	0.000
SC3-1A	JUNCTION	77.21	77.21	0 12:15	1.27	1.27	0.000
SC3-20	JUNCTION	62.89	62.89	0 12:15	1.19	1.19	0.000
SC3-21	JUNCTION	51.25	51.25	0 12:15	0.86	0.86	0.000
SC3-22	JUNCTION	56.51	56.51	0 12:15	1.18	1.18	0.000
SC3-23	JUNCTION	22.58	22.58	0 12:15	0.572	0.572	0.000
SC3-24A	JUNCTION	42.55	42.55	0 12:20	1.21	1.21	0.000
SC3-24B	JUNCTION	16.53	16.53	0 12:15	0.405	0.405	0.000
SC3-25	JUNCTION	31.29	31.29	0 12:15	0.696	0.696	0.000
SC3-26	JUNCTION	9.00	9.00	0 12:20	0.308	0.308	0.000

SC3-27	JUNCTION	130.07	130.07	0 12:20	4.17	4.17	0.000
SC3-5A	JUNCTION	150.82	150.82	0 12:15	2.87	2.87	0.000
SC3-5B	JUNCTION	203.13	203.13	0 12:15	4.36	4.36	0.000
SC3-61	JUNCTION	74.61	74.61	0 12:20	1.95	1.95	0.000
SC3-6A	JUNCTION	165.69	165.69	0 12:15	4.15	4.15	0.000
SC3-6B	JUNCTION	101.25	101.25	0 12:15	2.23	2.23	0.000
SC3-6C	JUNCTION	179.74	179.74	0 12:15	3.44	3.44	0.000
SC3-7	JUNCTION	166.71	166.71	0 12:15	3.92	3.92	0.000
SC3-72	JUNCTION	68.70	68.70	0 12:20	1.85	1.85	0.000
SC3-73	JUNCTION	99.04	99.04	0 12:25	2.84	2.84	0.000
SC3-74	JUNCTION	151.94	151.94	0 12:20	4.05	4.05	0.000
SC3-75	JUNCTION	75.41	75.41	0 12:25	2.68	2.68	0.000
SC3-76	JUNCTION	79.38	79.38	0 12:25	2.84	2.84	0.000
SC3-77	JUNCTION	86.36	86.36	0 12:30	3.26	3.26	0.000
SC3-78	JUNCTION	219.17	219.17	0 12:20	5.26	5.26	0.000
SC3-79	JUNCTION	239.34	239.34	0 12:25	6.12	6.12	0.000
SC3-8	JUNCTION	195.44	195.44	0 12:20	4.07	4.07	0.000
SC3-80	JUNCTION	168.15	168.15	0 12:25	4.78	4.78	0.000
SC3-81	JUNCTION	256.32	256.32	0 12:30	8.02	8.02	0.000
SC3-82	JUNCTION	158.98	158.98	0 12:20	3.59	3.59	0.000
SC3-88	JUNCTION	59.46	59.46	0 12:25	1.83	1.83	0.000
SC3-89	JUNCTION	33.71	33.71	0 12:20	0.837	0.837	0.000
SC3-9	JUNCTION	225.81	225.81	0 12:25	7.13	7.13	0.000
SCE-1	JUNCTION	58.52	58.52	0 12:25	2.33	2.33	0.000
SCE-10	JUNCTION	441.58	441.58	0 12:15	10.4	10.4	0.000
SCE-11	JUNCTION	10.51	10.51	0 12:15	0.152	0.152	0.000
SCE-13	JUNCTION	73.94	73.94	0 12:25	2.66	2.66	0.000
SCE-14	JUNCTION	54.26	54.26	0 12:20	1.78	1.78	0.000
SCE-2	JUNCTION	9.66	9.66	0 12:25	0.508	0.508	0.000
SCE-3	JUNCTION	54.72	54.72	0 12:25	2.65	2.65	0.000
SCE-4	JUNCTION	18.71	18.71	0 12:30	1.31	1.31	0.000
SCE-5	JUNCTION	244.74	244.74	0 12:15	7.23	7.23	0.000
SCE-6	JUNCTION	2.39	2.39	0 12:20	0.113	0.113	0.000
SCE-7	JUNCTION	101.34	101.34	0 12:15	2.44	2.44	0.000
SCE-8	JUNCTION	106.61	106.61	0 12:15	2.67	2.67	0.000
SCE-9	JUNCTION	2.94	2.94	0 12:15	0.113	0.113	0.000
PNDW3_Outfall	JUNCTION	0.00	0.00	0 00:00	0	0	0.000 gal
79	JUNCTION	0.00	15.32	0 12:37	0	0.571	0.000
80	JUNCTION	0.00	16.00	0 12:18	0	0.86	0.000
SC3-12A	JUNCTION	48.87	48.87	0 12:15	1.01	1.01	0.000
SCE-15	JUNCTION	69.54	69.54	0 12:15	1.6	1.6	0.000
SC3-18B	JUNCTION	63.16	63.16	0 12:20	1.43	1.43	0.000
81	JUNCTION	0.00	1644.79	0 12:55	0	59.4	0.000
SC3_OUTFALL	OUTFALL	0.00	1895.22	0 13:37	0	147	0.000
SCE_OUTFALL	OUTFALL	0.00	0.08	0 02:02	0	0.15	0.000
FSD05	STORAGE	0.00	150.82	0 12:15	0	2.87	0.001
FSD06	STORAGE	0.00	597.05	0 12:15	0	14.1	0.056
FSD09	STORAGE	0.00	386.00	0 12:30	0	11.3	0.071
FSD1	STORAGE	0.00	77.21	0 12:15	0	1.27	0.103
FSD11B	STORAGE	0.00	209.37	0 12:15	0	5.72	-0.032
FSD12	STORAGE	0.00	205.11	0 12:15	0	5.25	0.012
FSD13	STORAGE	0.00	153.60	0 12:15	0	3.31	0.053
FSD14A	STORAGE	0.00	425.59	0 12:15	0	11	0.081
FSD14B	STORAGE	0.00	215.70	0 12:15	0	5.19	0.012
FSD15B	STORAGE	0.00	24.00	0 12:15	0	0.596	0.067
FSD16A	STORAGE	0.00	579.11	0 12:15	0	15	0.026
FSD16B	STORAGE	0.00	143.79	0 12:15	0	3.45	0.063
FSD17A	STORAGE	0.00	73.97	0 12:15	0	1.7	0.089
FSD17B	STORAGE	0.00	69.33	0 12:15	0	1.78	0.079
FSD18	STORAGE	0.00	75.51	0 12:15	0	1.98	0.076
FSD20	STORAGE	0.00	62.89	0 12:15	0	1.19	0.379
FSD21	STORAGE	0.00	51.25	0 12:15	0	0.86	0.021
FSD22	STORAGE	0.00	56.51	0 12:15	0	1.18	0.055
FSD23	STORAGE	0.00	22.58	0 12:15	0	0.572	0.174
FSD27	STORAGE	0.00	167.34	0 12:23	0	5.43	0.054
FSD72	STORAGE	0.00	68.70	0 12:20	0	1.85	0.414

FSDE1	STORAGE	0.00	58.52	0 12:25	0	2.33	0.070
FSDE2	STORAGE	0.00	54.72	0 12:25	0	2.65	0.060
FSDE3	STORAGE	0.00	244.74	0 12:15	0	7.23	0.056
FSDE4	STORAGE	0.00	101.34	0 12:15	0	2.44	0.015
FSDE5	STORAGE	0.00	106.61	0 12:15	0	2.67	0.011
PNDE7	STORAGE	0.00	263.89	0 12:45	0	32.8	0.022
FSDE6	STORAGE	0.00	441.58	0 12:15	0	10.4	0.046
PNDW3	STORAGE	0.00	2202.16	0 13:14	0	107	0.297
EX_STOCK_POND_1	STORAGE	0.00	1977.61	0 13:07	0	79.4	0.098
FSD12A	STORAGE	0.00	48.87	0 12:15	0	1.01	0.076
EX_STOCK_POND_2	STORAGE	0.00	1648.68	0 12:53	0	60.8	0.100

Node Flooding Summary

Flooding refers to all water that overflows a node, whether it ponds or not.

Node	Hours Flooded	Maximum Rate CFS	Total Time of Max Occurrence days hr:min	Maximum Flood Volume 10^6 gal	Maximum Ponded Volume 1000 ft3
DP-2E	0.38	16.88	0 12:27	0.113	0.000
DP-8	76.45	146.14	0 13:36	34.206	0.000
FSD9_OUTLET	0.70	49.16	0 12:52	0.600	0.000
SC3-19	0.88	113.32	0 12:26	1.402	0.000
SC3-6A	0.14	24.78	0 12:15	0.047	0.000

Storage Volume Summary

Storage Unit	Average Volume 1000 ft3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 ft3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CFS
FSD05	70.954	17	0	0	271.332	67	0 14:13	3.70
FSD06	323.934	27	0	0	1070.069	89	0 12:43	139.30
FSD09	63.364	9	0	0	469.434	65	0 12:51	264.75
FSD1	39.930	11	0	0	98.225	27	0 12:35	25.50
FSD11B	67.107	15	0	0	291.539	67	0 12:40	77.00
FSD12	61.582	25	0	0	193.966	77	0 12:34	103.10
FSD13	43.678	13	0	0	221.356	64	0 12:34	43.80
FSD14A	208.188	13	0	0	724.098	46	0 12:35	176.20
FSD14B	125.802	24	0	0	444.949	86	0 12:57	19.30
FSD15B	17.672	9	0	0	39.752	21	0 12:34	10.37
FSD16A	284.471	24	0	0	1050.485	90	0 12:46	128.30
FSD16B	160.673	31	0	0	292.049	57	0 12:44	28.20
FSD17A	31.233	9	0	0	117.441	35	0 12:38	26.70
FSD17B	33.266	12	0	0	120.473	42	0 12:40	24.30
FSD18	31.476	13	0	0	126.309	54	0 12:42	32.20
FSD20	0.168	0	0	0	19.724	15	0 12:30	44.35
FSD21	4.986	4	0	0	57.462	43	0 12:47	16.00
FSD22	6.717	7	0	0	66.083	65	0 12:50	24.00
FSD23	3.737	3	0	0	22.857	17	0 12:36	15.32
FSD27	49.550	16	0	0	251.395	83	0 12:59	91.90
FSD72	11.001	8	0	0	52.733	39	0 12:29	62.10
FSDE1	67.413	24	0	0	190.726	67	0 13:40	21.81
FSDE2	19.611	7	0	0	181.810	64	0 13:46	21.11
FSDE3	178.438	23	0	0	593.993	78	0 12:54	56.99
FSDE4	78.757	15	0	0	230.731	45	0 13:35	4.91
FSDE5	94.297	36	0	0	251.982	95	0 14:20	3.80

PNDE7	42.893	3	0	0	695.289	43	0	14:12	144.77
FSDE6	257.427	20	0	0	965.464	77	0	13:03	56.78
PNDW3	45.419	2	0	0	2190.048	85	0	13:42	1552.53
EX_STOCK_POND_1	747.292	44	0	0	1566.017	92	0	13:14	1897.21
FSD12A	20.548	22	0	0	61.411	67	0	12:31	23.40
EX_STOCK_POND_2	161.289	41	0	0	378.702	96	0	12:54	1644.79

Outfall Loading Summary

Outfall Node	Flow Freq Pcnt	Avg Flow CFS	Max Flow CFS	Total Volume 10^6 gal
SC3_OUTFALL	98.32	71.33	1895.22	147.303
SCE_OUTFALL	97.97	0.07	0.08	0.150
System	98.15	71.40	1895.30	147.454

Link Flow Summary

Link	Type	Maximum Flow CFS	Time of Max Occurrence days hr:min	Max Veloc ft/sec	Max/ Full Flow	Max/ Full Depth
RT-1	CONDUIT	241.28	0 12:41	5.22	0.00	0.10
RT-10A	CONDUIT	107.59	0 13:08	6.17	1.08	1.00
RT-10B	CONDUIT	143.22	0 12:31	18.14	0.37	0.42
RT-11A	CONDUIT	1642.50	0 12:57	8.12	0.03	0.19
RT-11B	CONDUIT	1808.66	0 13:01	7.64	0.03	0.21
RT-11C	CONDUIT	1977.61	0 13:07	5.43	0.05	0.26
RT-12A	CONDUIT	156.57	0 13:27	16.99	0.82	0.69
RT-12B	CONDUIT	175.86	0 13:27	22.68	0.48	0.49
RT-16	CONDUIT	150.78	0 12:20	17.35	1.08	1.00
RT-17B	CONDUIT	233.08	0 12:43	20.54	1.08	1.00
RT-18	CONDUIT	1863.01	0 13:36	7.62	0.03	0.19
RT-19	CONDUIT	73.63	0 12:22	8.80	0.25	0.34
RT-1E	CONDUIT	21.81	0 13:41	7.50	0.17	0.28
RT-2	CONDUIT	149.76	0 12:39	4.77	0.00	0.08
RT-20	CONDUIT	1889.25	0 13:37	11.73	0.02	0.14
RT-21	CONDUIT	29.81	0 12:21	12.42	0.20	0.30
RT-22	CONDUIT	15.29	0 12:39	12.75	0.17	0.28
RT-2E	CONDUIT	83.38	0 12:28	11.16	0.63	0.58
RT-3	CONDUIT	149.88	0 12:29	4.74	0.00	0.08
RT-3E	CONDUIT	21.10	0 13:47	8.05	0.15	0.26
RT-4	CONDUIT	283.34	0 12:34	5.28	0.00	0.10
RT-4E	CONDUIT	152.15	0 12:42	13.20	1.08	0.94
RT-5	CONDUIT	866.84	0 12:44	7.60	0.02	0.18
RT-5E	CONDUIT	204.14	0 12:43	19.62	0.54	0.52
RT-6	CONDUIT	228.99	0 12:32	5.64	0.00	0.09
RT-6B	CONDUIT	367.10	0 12:45	5.49	0.00	0.12
RT-6E	CONDUIT	4.91	0 13:39	5.25	0.03	0.13
RT-7A	CONDUIT	33.61	0 12:21	14.47	0.13	0.24
RT-7E	CONDUIT	213.55	0 12:45	13.57	0.58	0.55
RT-8	CONDUIT	46.72	0 12:46	16.47	1.05	0.93
RT-9A	CONDUIT	1416.31	0 12:48	7.12	0.03	0.19
RT-9B	CONDUIT	1500.03	0 12:48	8.19	0.02	0.18
RT-9C	CONDUIT	1529.13	0 12:50	7.63	0.03	0.19
RT-9D	CONDUIT	1624.38	0 12:53	7.89	0.03	0.19

RT-14	CONDUIT	1569.65	0 13:33	7.73	0.02	0.17
1	DUMMY	151.94	0 12:20			
2	DUMMY	99.04	0 12:25			
3	DUMMY	75.41	0 12:25			
4	DUMMY	79.38	0 12:25			
5	DUMMY	219.17	0 12:20			
6	DUMMY	68.70	0 12:20			
7	DUMMY	86.36	0 12:30			
8	DUMMY	59.46	0 12:25			
9	DUMMY	58.52	0 12:25			
10	DUMMY	9.66	0 12:25			
11	DUMMY	9.00	0 12:20			
12	DUMMY	130.07	0 12:20			
13	DUMMY	22.58	0 12:15			
14	DUMMY	51.25	0 12:15			
15	DUMMY	31.29	0 12:15			
16	DUMMY	16.53	0 12:15			
17	DUMMY	56.51	0 12:15			
18	DUMMY	69.33	0 12:15			
20	DUMMY	62.89	0 12:15			
22	DUMMY	215.70	0 12:15			
24	DUMMY	425.59	0 12:15			
25	DUMMY	153.60	0 12:15			
27	DUMMY	101.34	0 12:15			
28	DUMMY	106.61	0 12:15			
29	DUMMY	244.74	0 12:15			
30	DUMMY	143.79	0 12:15			
34	DUMMY	75.51	0 12:15			
36	DUMMY	54.72	0 12:25			
37	DUMMY	18.71	0 12:30			
38	DUMMY	225.81	0 12:25			
RT-17A	CONDUIT	172.21	0 12:32	6.76	0.00	0.11
39	DUMMY	133.28	0 12:25			
40	DUMMY	24.00	0 12:15			
42	DUMMY	205.11	0 12:15			
44	DUMMY	10.51	0 12:15			
45	DUMMY	2.94	0 12:15			
46	DUMMY	2.39	0 12:20			
47	DUMMY	54.26	0 12:20			
48	DUMMY	73.94	0 12:25			
51	DUMMY	441.58	0 12:15			
54	DUMMY	209.37	0 12:15			
56	DUMMY	18.84	0 12:15			
58	CONDUIT	2202.16	0 13:14	15.10	0.01	0.13
63	DUMMY	150.82	0 12:15			
65	DUMMY	77.21	0 12:15			
67	DUMMY	1895.22	0 13:37			
RT-15A	CONDUIT	165.30	0 12:16	20.37	0.70	0.62
RT-15B	CONDUIT	263.41	0 12:16	20.94	0.43	0.46
69	DUMMY	179.74	0 12:15			
70	DUMMY	101.25	0 12:15			
RT-25	CONDUIT	144.77	0 14:16	4.89	0.02	0.18
71	CONDUIT	0.08	0 02:02	0.10	1.08	1.00
74	DUMMY	48.66	0 12:15			
75	DUMMY	42.55	0 12:20			
77	DUMMY	203.13	0 12:15			
78	DUMMY	73.97	0 12:15			
79	DUMMY	579.11	0 12:15			
80	CONDUIT	16.04	0 13:33	16.28	0.16	0.27
81	DUMMY	48.87	0 12:15			
82	DUMMY	69.54	0 12:15			
83	DUMMY	63.16	0 12:20			
84	DUMMY	1648.68	0 12:53			
FSD01_Outlet	DUMMY	25.50	0 12:27			
FSD05_Outlet	DUMMY	3.70	0 12:06			
FSD06_Outlet	DUMMY	139.30	0 12:17			

FSD11B_Outlet	DUMMY	77.00	0	12:05
FSD12_Outlet	DUMMY	103.10	0	12:14
FSD13_Outlet	DUMMY	43.80	0	12:12
FSD14A_Outlet	DUMMY	176.20	0	12:24
FSD14B_Outlet	DUMMY	19.30	0	11:57
FSD15B_Outlet	DUMMY	10.37	0	12:35
FSD16A_Outlet	DUMMY	128.30	0	12:11
FSD16B_Outlet	DUMMY	28.20	0	12:22
FSD17B_Outlet	DUMMY	24.30	0	12:24
FSD18_Outlet	DUMMY	32.20	0	12:30
FSD21_Outlet	DUMMY	16.00	0	12:18
FSD22_Outlet	DUMMY	24.00	0	12:36
FSD72_Outlet	DUMMY	62.10	0	12:30
FSD9_Outlet	DUMMY	264.75	0	12:52
FSDE2_Outlet	DUMMY	21.11	0	13:47
FSDE3_Outlet	DUMMY	56.99	0	12:55
FSDE4_Outlet	DUMMY	4.91	0	13:35
FSDE5_Outlet	DUMMY	3.80	0	12:23
FSDE6_Outlet	DUMMY	56.78	0	13:03
FSDE1_Outlet	DUMMY	21.81	0	13:41
PNDE7_Outlet	DUMMY	144.77	0	14:13
FSD17A_Outlet	DUMMY	26.70	0	12:26
PNDW3_Outlet	DUMMY	1552.53	0	13:42
FSD27_Outlet	DUMMY	91.90	0	12:51
EX_STOCK_POND_1_OUTFALL	DUMMY	1897.21	0	13:14
FSD23_Outlet	DUMMY	15.32	0	12:37
FSD12A_Outlet	DUMMY	23.40	0	12:28
EX_STOCK_POND_2_OUTLET	DUMMY	1644.79	0	12:55

Conduit Surcharge Summary

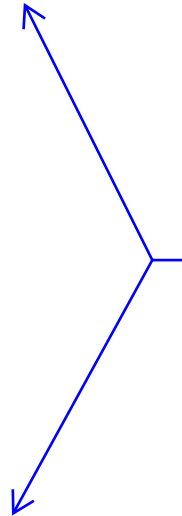
Conduit	Hours Full		Hours Above Full		Capacity
	Both Ends	Upstream	Dnstream	Normal Flow	Limited
RT-10A	0.88	0.88	0.88	0.93	0.88
RT-16	0.13	0.13	0.13	0.13	0.13
RT-17B	0.69	0.69	0.69	0.71	0.69
RT-4E	0.38	0.38	0.38	0.38	0.38
RT-8	0.51	0.51	0.51	0.33	0.51
71	76.45	76.45	76.45	0.04	76.45

Analysis begun on: Fri Oct 15 16:10:07 2021
Analysis ended on: Fri Oct 15 16:10:08 2021
Total elapsed time: 00:00:01
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.012)

Sterling Ranch 2021 MDDP Addendum
w/ a Pond W-3 Outlet Structure, using a 37x10 grated overflow

WARNING 04: minimum elevation drop used for Conduit 1
WARNING 04: minimum elevation drop used for Conduit 2
WARNING 04: minimum elevation drop used for Conduit 3
WARNING 04: minimum elevation drop used for Conduit 4
WARNING 04: minimum elevation drop used for Conduit 5
WARNING 04: minimum elevation drop used for Conduit 6
WARNING 04: minimum elevation drop used for Conduit 7
WARNING 04: minimum elevation drop used for Conduit 8
WARNING 04: minimum elevation drop used for Conduit 9
WARNING 04: minimum elevation drop used for Conduit 10

WARNING 04: minimum elevation drop used for Conduit 11
 WARNING 04: minimum elevation drop used for Conduit 12
 WARNING 04: minimum elevation drop used for Conduit 14
 WARNING 04: minimum elevation drop used for Conduit 15
 WARNING 04: minimum elevation drop used for Conduit 16
 WARNING 04: minimum elevation drop used for Conduit 17
 WARNING 04: minimum elevation drop used for Conduit 18
 WARNING 04: minimum elevation drop used for Conduit 20
 WARNING 04: minimum elevation drop used for Conduit 22
 WARNING 04: minimum elevation drop used for Conduit 27
 WARNING 04: minimum elevation drop used for Conduit 28
 WARNING 04: minimum elevation drop used for Conduit 29
 WARNING 04: minimum elevation drop used for Conduit 30
 WARNING 04: minimum elevation drop used for Conduit 34
 WARNING 04: minimum elevation drop used for Conduit 36
 WARNING 04: minimum elevation drop used for Conduit 37
 WARNING 04: minimum elevation drop used for Conduit 38
 WARNING 04: minimum elevation drop used for Conduit 39
 WARNING 04: minimum elevation drop used for Conduit 40
 WARNING 04: minimum elevation drop used for Conduit 44
 WARNING 04: minimum elevation drop used for Conduit 45
 WARNING 04: minimum elevation drop used for Conduit 46
 WARNING 04: minimum elevation drop used for Conduit 47
 WARNING 04: minimum elevation drop used for Conduit 48
 WARNING 04: minimum elevation drop used for Conduit 51
 WARNING 04: minimum elevation drop used for Conduit 54
 WARNING 08: elevation drop exceeds length for Conduit 56
 WARNING 04: minimum elevation drop used for Conduit 63
 WARNING 04: minimum elevation drop used for Conduit 65
 WARNING 04: minimum elevation drop used for Conduit 67
 WARNING 04: minimum elevation drop used for Conduit 69
 WARNING 04: minimum elevation drop used for Conduit 70
 WARNING 04: minimum elevation drop used for Conduit 71
 WARNING 04: minimum elevation drop used for Conduit 74
 WARNING 04: minimum elevation drop used for Conduit 75
 WARNING 08: elevation drop exceeds length for Conduit 77
 WARNING 04: minimum elevation drop used for Conduit 78
 WARNING 04: minimum elevation drop used for Conduit 79
 WARNING 04: minimum elevation drop used for Conduit 82
 WARNING 04: minimum elevation drop used for Conduit 83
 WARNING 10: crest elevation raised to downstream invert for regulator Link FSD12_Outlet
 WARNING 10: crest elevation raised to downstream invert for regulator Link FSD12A_Outlet



Please add a note
 describing what this
 means and verify that
 there are no actual errors.

 NOTE: The summary statistics displayed in this report are
 based on results found at every computational time step,
 not just on results from each reporting time step.

 Analysis Options

Flow Units CFS
 Process Models:
 Rainfall/Runoff NO
 RDII NO
 Snowmelt NO
 Groundwater NO
 Flow Routing YES
 Ponding Allowed NO
 Water Quality NO
 Flow Routing Method KINWAVE
 Starting Date 01/01/2005 00:00:00
 Ending Date 01/04/2005 06:00:00
 Antecedent Dry Days 0.0
 Report Time Step 00:05:00

Routing Time Step 30.00 sec

```
*****
Flow Routing Continuity      Volume      Volume
                             acre-feet   10^6 gal
*****
Dry Weather Inflow .....    0.000    0.000
Wet Weather Inflow .....    0.000    0.000
Groundwater Inflow .....    0.000    0.000
RDII Inflow .....          0.000    0.000
External Inflow .....      609.785   198.707
External Outflow .....     456.209   148.662
Flooding Loss .....        111.609   36.369
Evaporation Loss .....      0.000    0.000
Exfiltration Loss .....      0.000    0.000
Initial Stored Volume ....    0.000    0.000
Final Stored Volume .....    43.869   14.295
Continuity Error (%) .....   -0.312
```

```
*****
Highest Flow Instability Indexes
*****
Link FSD72_Outlet (1)
```

```
*****
Routing Time Step Summary
*****
Minimum Time Step      : 30.00 sec
Average Time Step      : 30.00 sec
Maximum Time Step      : 30.00 sec
Percent in Steady State : 0.00
Average Iterations per Step : 1.00
Percent Not Converging  : 0.00
```

```
*****
Node Depth Summary
*****
```

Node	Average Depth Type	Maximum Depth Feet	Maximum HGL Feet	Time of Max Occurrence days hr:min	Max Depth Feet	Reported Depth
DP-1E	JUNCTION	0.23	2.32	261.22	0 12:25	2.31
DP-21	JUNCTION	0.34	2.76	186.96	0 13:27	2.75
DP-22	JUNCTION	0.34	2.75	226.95	0 12:22	2.75
DP-25	JUNCTION	0.03	1.08	333.28	0 12:15	1.06
DP-26	JUNCTION	0.11	2.12	201.32	0 12:30	2.12
DP-2E	JUNCTION	0.32	4.00	222.90	0 12:19	4.00
DP-3E	JUNCTION	0.38	3.72	132.62	0 12:42	3.52
DP-4E	JUNCTION	0.54	3.28	63.78	0 12:43	3.27
DP-53A	JUNCTION	0.26	2.88	2.88	0 13:35	2.88
DP-56	JUNCTION	0.46	1.78	33.78	0 14:13	1.78
DP-60A	JUNCTION	0.35	3.95	26.15	0 13:34	3.95
DP-61	JUNCTION	0.36	4.00	67.20	0 12:45	4.00
DP-63	JUNCTION	0.28	3.44	101.64	0 13:31	3.43
DP-64	JUNCTION	0.12	2.77	95.97	0 12:15	2.74
DP-68	JUNCTION	0.32	2.64	121.04	0 13:11	2.63
DP-69	JUNCTION	0.22	5.00	208.20	0 12:17	5.00
DP-70	JUNCTION	0.16	3.88	233.08	0 12:53	3.87
DP-71	JUNCTION	0.15	3.88	261.08	0 12:50	3.88
DP-72	JUNCTION	0.13	3.81	287.01	0 12:48	3.81
DP-73	JUNCTION	0.15	3.81	304.01	0 12:48	3.80

DP-74	JUNCTION	0.06	2.11	499.31	0 12:27	2.10
DP-75	JUNCTION	0.11	3.70	435.90	0 12:36	3.69
DP-77	JUNCTION	0.13	3.82	344.02	0 12:43	3.82
DP-78	JUNCTION	0.08	2.55	464.75	0 12:28	2.55
DP-8	JUNCTION	9.80	10.00	10.00	0 01:33	10.00
DP-87	JUNCTION	0.25	5.26	162.46	0 12:59	5.26
FSD9_OUTLET	JUNCTION	0.24	4.00	143.20	0 12:35	4.00
FSDE1_Outlet	JUNCTION	0.18	1.13	266.03	0 13:41	1.13
FSDE2_Outlet	JUNCTION	0.15	1.05	229.95	0 13:47	1.05
FSDE4_Outlet	JUNCTION	0.21	0.51	98.11	0 13:35	0.51
SC3-10	JUNCTION	0.00	0.00	63.20	0 00:00	0.00
SC3-11A	JUNCTION	0.00	0.00	98.20	0 00:00	0.00
SC3-11B	JUNCTION	0.00	0.00	98.20	0 00:00	0.00
SC3-12	JUNCTION	0.00	0.00	157.20	0 00:00	0.00
SC3-13	JUNCTION	0.00	0.00	118.60	0 00:00	0.00
SC3-14A	JUNCTION	0.00	0.00	118.50	0 00:00	0.00
SC3-14B	JUNCTION	0.00	0.00	184.20	0 00:00	0.00
SC3-15A	JUNCTION	0.00	0.00	199.20	0 00:00	0.00
SC3-15B	JUNCTION	0.00	0.00	199.20	0 00:00	0.00
SC3-16A	JUNCTION	0.00	0.00	224.20	0 00:00	0.00
SC3-16B	JUNCTION	0.00	0.00	224.20	0 00:00	0.00
SC3-17B	JUNCTION	0.00	0.00	229.20	0 00:00	0.00
SC3-18	JUNCTION	0.00	0.00	203.20	0 00:00	0.00
SC3-17A	JUNCTION	0.00	0.00	203.20	0 00:00	0.00
SC3-19	JUNCTION	0.13	5.00	250.20	0 12:12	5.00
SC3-1A	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
SC3-20	JUNCTION	0.00	0.00	324.20	0 00:00	0.00
SC3-21	JUNCTION	0.00	0.00	332.20	0 00:00	0.00
SC3-22	JUNCTION	0.00	0.00	283.20	0 00:00	0.00
SC3-23	JUNCTION	0.00	0.00	295.20	0 00:00	0.00
SC3-24A	JUNCTION	0.00	0.00	300.20	0 00:00	0.00
SC3-24B	JUNCTION	0.00	0.00	283.20	0 00:00	0.00
SC3-25	JUNCTION	0.00	0.00	332.20	0 00:00	0.00
SC3-26	JUNCTION	0.00	0.00	257.20	0 00:00	0.00
SC3-27	JUNCTION	0.00	0.00	257.20	0 00:00	0.00
SC3-5A	JUNCTION	0.00	0.00	22.20	0 00:00	0.00
SC3-5B	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
SC3-61	JUNCTION	0.06	2.04	30.24	0 12:20	2.03
SC3-6A	JUNCTION	0.13	3.50	90.70	0 12:11	3.50
SC3-6B	JUNCTION	0.00	0.00	93.20	0 00:00	0.00
SC3-6C	JUNCTION	0.00	0.00	63.20	0 00:00	0.00
SC3-7	JUNCTION	0.11	2.49	119.69	0 12:15	2.46
SC3-72	JUNCTION	0.00	0.00	340.20	0 00:00	0.00
SC3-73	JUNCTION	0.00	0.00	432.20	0 00:00	0.00
SC3-74	JUNCTION	0.00	0.00	497.20	0 00:00	0.00
SC3-75	JUNCTION	0.00	0.00	432.20	0 00:00	0.00
SC3-76	JUNCTION	0.00	0.00	432.20	0 00:00	0.00
SC3-77	JUNCTION	0.00	0.00	340.20	0 00:00	0.00
SC3-78	JUNCTION	0.00	0.00	462.20	0 00:00	0.00
SC3-79	JUNCTION	0.05	1.81	564.01	0 12:25	1.81
SC3-8	JUNCTION	0.04	2.28	249.48	0 12:20	2.26
SC3-80	JUNCTION	0.05	1.63	553.83	0 12:25	1.63
SC3-81	JUNCTION	0.05	1.97	534.17	0 12:30	1.97
SC3-82	JUNCTION	0.03	1.58	563.78	0 12:20	1.56
SC3-88	JUNCTION	0.00	0.00	340.20	0 00:00	0.00
SC3-89	JUNCTION	0.02	0.96	376.16	0 12:20	0.96
SC3-9	JUNCTION	0.00	0.00	139.20	0 00:00	0.00
SCE-1	JUNCTION	0.00	0.00	266.00	0 00:00	0.00
SCE-10	JUNCTION	0.00	0.00	32.50	0 00:00	0.00
SCE-11	JUNCTION	0.00	0.00	32.50	0 00:00	0.00
SCE-13	JUNCTION	0.00	0.00	258.90	0 00:00	0.00
SCE-14	JUNCTION	0.00	0.00	218.90	0 00:00	0.00
SCE-2	JUNCTION	0.00	0.00	258.90	0 00:00	0.00
SCE-3	JUNCTION	0.00	0.00	230.00	0 00:00	0.00
SCE-4	JUNCTION	0.00	0.00	218.90	0 00:00	0.00
SCE-5	JUNCTION	0.00	0.00	128.90	0 00:00	0.00

SCE-6	JUNCTION	0.00	0.00	128.90	0	00:00	0.00
SCE-7	JUNCTION	0.00	0.00	98.00	0	00:00	0.00
SCE-8	JUNCTION	0.00	0.00	60.50	0	00:00	0.00
SCE-9	JUNCTION	0.00	0.00	60.50	0	00:00	0.00
PNDW3_Outfall	JUNCTION	0.00	0.00	118.20	0	00:00	0.00
79	JUNCTION	0.06	0.83	295.83	0	12:37	0.83
80	JUNCTION	0.07	0.81	331.81	0	12:18	0.81
SC3-12A	JUNCTION	0.00	0.00	157.20	0	00:00	0.00
SCE-15	JUNCTION	0.00	0.00	0.00	0	00:00	0.00
SC3-18B	JUNCTION	0.00	0.00	203.20	0	00:00	0.00
SC3_OUTFALL	OUTFALL	0.00	0.00	0.00	0	00:00	0.00
SCE_OUTFALL	OUTFALL	0.98	1.00	1.00	0	02:03	1.00
FSD05	STORAGE	3.67	7.12	29.32	0	14:14	7.12
FSD06	STORAGE	5.35	9.86	73.06	0	12:43	9.86
FSD09	STORAGE	2.55	8.44	147.64	0	12:52	8.43
FSD1	STORAGE	1.75	3.44	3.44	0	12:36	3.43
FSD11B	STORAGE	3.06	7.09	105.29	0	12:40	7.09
FSD12	STORAGE	4.48	7.93	164.93	0	12:34	7.93
FSD13	STORAGE	3.36	8.16	126.66	0	12:35	8.16
FSD14A	STORAGE	1.78	4.79	123.19	0	12:36	4.79
FSD14B	STORAGE	3.72	9.06	193.26	0	12:58	9.05
FSD15B	STORAGE	2.32	4.14	203.34	0	12:35	4.14
FSD16A	STORAGE	4.41	11.20	235.40	0	12:47	11.19
FSD16B	STORAGE	4.41	6.78	230.98	0	12:44	6.78
FSD17A	STORAGE	3.22	5.29	208.49	0	12:39	5.29
FSD17B	STORAGE	2.69	5.30	234.50	0	12:40	5.30
FSD18	STORAGE	2.79	6.18	209.38	0	12:42	6.17
FSD20	STORAGE	0.05	2.46	326.66	0	12:30	2.46
FSD21	STORAGE	0.79	5.20	337.40	0	12:47	5.19
FSD22	STORAGE	1.65	6.48	289.68	0	12:51	6.47
FSD23	STORAGE	0.72	2.84	298.84	0	12:37	2.83
FSD27	STORAGE	3.61	8.99	266.19	0	13:00	8.99
FSD72	STORAGE	1.39	4.90	345.10	0	12:30	4.90
FSDE1	STORAGE	3.12	6.88	272.88	0	13:41	6.87
FSDE2	STORAGE	0.95	6.65	236.65	0	13:47	6.65
FSDE3	STORAGE	3.21	7.51	136.41	0	12:55	7.51
FSDE4	STORAGE	2.75	5.77	103.77	0	13:35	5.77
FSDE5	STORAGE	4.09	8.73	69.23	0	14:20	8.73
PNDE7	STORAGE	0.81	5.65	38.15	0	14:13	5.65
FSDE6	STORAGE	3.61	7.56	40.06	0	13:03	7.56
PNDW3	STORAGE	2.37	10.46	128.76	0	13:40	10.46
EX_STOCK_POND	STORAGE	6.90	11.43	153.43	0	13:12	11.42
FSD12A	STORAGE	4.37	7.99	164.99	0	12:32	7.98

Node Inflow Summary

Node	Type	Maximum			Lateral Inflow Volume 10^6 gal	Total Inflow Volume 10^6 gal	Flow Balance Error Percent			
		CFS	Maximum							
			Inflow	Time of Max Occurrence days hr:min						
DP-1E	JUNCTION	0.00	83.88	0 12:25	0	5.2	0.000			
DP-21	JUNCTION	0.00	175.87	0 13:27	0	20.1	0.000			
DP-22	JUNCTION	0.00	156.50	0 12:22	0	15.6	0.000			
DP-25	JUNCTION	0.00	31.29	0 12:15	0	0.696	0.000			
DP-26	JUNCTION	0.00	143.11	0 12:30	0	4.82	-0.000			
DP-2E	JUNCTION	0.00	157.53	0 12:27	0	10.9	-0.000			
DP-3E	JUNCTION	0.00	205.49	0 12:42	0	17.8	0.000			
DP-4E	JUNCTION	0.00	214.58	0 12:43	0	22.7	0.000			
DP-53A	JUNCTION	0.00	1966.37	0 13:35	0	149	0.000			
DP-56	JUNCTION	0.00	144.77	0 14:13	0	32.8	0.000			
DP-60A	JUNCTION	0.00	1960.16	0 13:34	0	148	0.000			

DP-61	JUNCTION	0.00	1934.17	0	13:32	0	139	0.000
DP-63	JUNCTION	0.00	1632.58	0	13:31	0	113	0.000
DP-64	JUNCTION	0.00	264.76	0	12:15	0	6.15	0.000
DP-68	JUNCTION	0.00	2232.85	0	13:11	0	108	0.000
DP-69	JUNCTION	0.00	1833.53	0	12:55	0	70.2	0.000
DP-70	JUNCTION	0.00	1648.68	0	12:53	0	60.8	0.000
DP-71	JUNCTION	0.00	1627.14	0	12:50	0	59.1	0.000
DP-72	JUNCTION	0.00	1533.04	0	12:48	0	53.4	0.000
DP-73	JUNCTION	0.00	1501.00	0	12:47	0	51.8	0.000
DP-74	JUNCTION	0.00	293.76	0	12:27	0	7.66	0.000
DP-75	JUNCTION	0.00	887.87	0	12:36	0	29	0.000
DP-77	JUNCTION	0.00	1427.72	0	12:43	0	48.5	0.000
DP-78	JUNCTION	0.00	422.09	0	12:28	0	11.4	0.000
DP-8	JUNCTION	0.00	146.21	0	13:36	0	34.4	0.001
DP-87	JUNCTION	0.00	2023.62	0	12:59	0	80.7	0.000
FSD9_Outlet	JUNCTION	0.00	264.75	0	12:52	0	11.3	0.000
FSDE1_Outlet	JUNCTION	0.00	21.81	0	13:41	0	2.03	0.000
FSDE2_Outlet	JUNCTION	0.00	21.11	0	13:47	0	2.65	0.000
FSDE4_Outlet	JUNCTION	0.00	4.91	0	13:35	0	2.24	0.000
SC3-10	JUNCTION	48.66	48.66	0	12:15	1.03	1.03	0.000
SC3-11A	JUNCTION	18.84	18.84	0	12:15	0.403	0.403	0.000
SC3-11B	JUNCTION	209.37	209.37	0	12:15	5.72	5.72	0.000
SC3-12	JUNCTION	205.11	205.11	0	12:15	5.25	5.25	0.000
SC3-13	JUNCTION	153.60	153.60	0	12:15	3.31	3.31	0.000
SC3-14A	JUNCTION	425.59	425.59	0	12:15	11	11	0.000
SC3-14B	JUNCTION	215.70	215.70	0	12:15	5.19	5.19	0.000
SC3-15A	JUNCTION	133.28	133.28	0	12:25	4.31	4.31	0.000
SC3-15B	JUNCTION	24.00	24.00	0	12:15	0.596	0.596	0.000
SC3-16A	JUNCTION	579.11	579.11	0	12:15	15	15	0.000
SC3-16B	JUNCTION	143.79	143.79	0	12:15	3.45	3.45	0.000
SC3-17B	JUNCTION	69.33	69.33	0	12:15	1.78	1.78	0.000
SC3-18	JUNCTION	75.51	75.51	0	12:15	1.98	1.98	0.000
SC3-17A	JUNCTION	73.97	73.97	0	12:15	1.7	1.7	0.000
SC3-19	JUNCTION	213.48	213.48	0	12:25	5.74	5.74	0.000
SC3-1A	JUNCTION	77.21	77.21	0	12:15	1.27	1.27	0.000
SC3-20	JUNCTION	62.89	62.89	0	12:15	1.19	1.19	0.000
SC3-21	JUNCTION	51.25	51.25	0	12:15	0.86	0.86	0.000
SC3-22	JUNCTION	56.51	56.51	0	12:15	1.18	1.18	0.000
SC3-23	JUNCTION	22.58	22.58	0	12:15	0.572	0.572	0.000
SC3-24A	JUNCTION	42.55	42.55	0	12:20	1.21	1.21	0.000
SC3-24B	JUNCTION	16.53	16.53	0	12:15	0.405	0.405	0.000
SC3-25	JUNCTION	31.29	31.29	0	12:15	0.696	0.696	0.000
SC3-26	JUNCTION	9.00	9.00	0	12:20	0.308	0.308	0.000
SC3-27	JUNCTION	130.07	130.07	0	12:20	4.17	4.17	0.000
SC3-5A	JUNCTION	150.82	150.82	0	12:15	2.87	2.87	0.000
SC3-5B	JUNCTION	203.13	203.13	0	12:15	4.36	4.36	0.000
SC3-61	JUNCTION	74.61	74.61	0	12:20	1.95	1.95	0.000
SC3-6A	JUNCTION	165.69	165.69	0	12:15	4.15	4.15	0.000
SC3-6B	JUNCTION	101.25	101.25	0	12:15	2.23	2.23	0.000
SC3-6C	JUNCTION	179.74	179.74	0	12:15	3.44	3.44	0.000
SC3-7	JUNCTION	166.71	166.71	0	12:15	3.92	3.92	0.000
SC3-72	JUNCTION	68.70	68.70	0	12:20	1.85	1.85	0.000
SC3-73	JUNCTION	99.04	99.04	0	12:25	2.84	2.84	0.000
SC3-74	JUNCTION	151.94	151.94	0	12:20	4.05	4.05	0.000
SC3-75	JUNCTION	75.41	75.41	0	12:25	2.68	2.68	0.000
SC3-76	JUNCTION	79.38	79.38	0	12:25	2.84	2.84	0.000
SC3-77	JUNCTION	86.36	86.36	0	12:30	3.26	3.26	0.000
SC3-78	JUNCTION	219.17	219.17	0	12:20	5.26	5.26	0.000
SC3-79	JUNCTION	239.34	239.34	0	12:25	6.12	6.12	0.000
SC3-8	JUNCTION	195.44	195.44	0	12:20	4.07	4.07	0.000
SC3-80	JUNCTION	168.15	168.15	0	12:25	4.78	4.78	0.000
SC3-81	JUNCTION	256.32	256.32	0	12:30	8.02	8.02	0.000
SC3-82	JUNCTION	158.98	158.98	0	12:20	3.59	3.59	0.000
SC3-88	JUNCTION	59.46	59.46	0	12:25	1.83	1.83	0.000
SC3-89	JUNCTION	33.71	33.71	0	12:20	0.837	0.837	0.000
SC3-9	JUNCTION	225.81	225.81	0	12:25	7.13	7.13	0.000

SCE-1	JUNCTION	58.52	58.52	0	12:25	2.33	2.33	0.000
SCE-10	JUNCTION	441.58	441.58	0	12:15	10.4	10.4	0.000
SCE-11	JUNCTION	10.51	10.51	0	12:15	0.152	0.152	0.000
SCE-13	JUNCTION	73.94	73.94	0	12:25	2.66	2.66	0.000
SCE-14	JUNCTION	54.26	54.26	0	12:20	1.78	1.78	0.000
SCE-2	JUNCTION	9.66	9.66	0	12:25	0.508	0.508	0.000
SCE-3	JUNCTION	54.72	54.72	0	12:25	2.65	2.65	0.000
SCE-4	JUNCTION	18.71	18.71	0	12:30	1.31	1.31	0.000
SCE-5	JUNCTION	244.74	244.74	0	12:15	7.23	7.23	0.000
SCE-6	JUNCTION	2.39	2.39	0	12:20	0.113	0.113	0.000
SCE-7	JUNCTION	101.34	101.34	0	12:15	2.44	2.44	0.000
SCE-8	JUNCTION	106.61	106.61	0	12:15	2.67	2.67	0.000
SCE-9	JUNCTION	2.94	2.94	0	12:15	0.113	0.113	0.000
PNDW3_Outfall	JUNCTION	0.00	0.00	0	00:00	0	0	0.000 gal
79	JUNCTION	0.00	15.32	0	12:37	0	0.571	0.000
80	JUNCTION	0.00	16.00	0	12:18	0	0.86	0.000
SC3-12A	JUNCTION	48.87	48.87	0	12:15	1.01	1.01	0.000
SCE-15	JUNCTION	69.54	69.54	0	12:15	1.6	1.6	0.000
SC3-18B	JUNCTION	63.16	63.16	0	12:20	1.43	1.43	0.000
SC3_OUTFALL	OUTFALL	0.00	1966.37	0	13:35	0	149	0.000
SCE_OUTFALL	OUTFALL	0.00	0.08	0	02:02	0	0.15	0.000
FSD05	STORAGE	0.00	150.82	0	12:15	0	2.87	0.001
FSD06	STORAGE	0.00	597.05	0	12:15	0	14.1	0.056
FSD09	STORAGE	0.00	386.00	0	12:30	0	11.3	0.071
FSD1	STORAGE	0.00	77.21	0	12:15	0	1.27	0.103
FSD11B	STORAGE	0.00	209.37	0	12:15	0	5.72	-0.032
FSD12	STORAGE	0.00	205.11	0	12:15	0	5.25	0.012
FSD13	STORAGE	0.00	153.60	0	12:15	0	3.31	0.053
FSD14A	STORAGE	0.00	425.59	0	12:15	0	11	0.081
FSD14B	STORAGE	0.00	215.70	0	12:15	0	5.19	0.012
FSD15B	STORAGE	0.00	24.00	0	12:15	0	0.596	0.067
FSD16A	STORAGE	0.00	579.11	0	12:15	0	15	0.026
FSD16B	STORAGE	0.00	143.79	0	12:15	0	3.45	0.063
FSD17A	STORAGE	0.00	73.97	0	12:15	0	1.7	0.089
FSD17B	STORAGE	0.00	69.33	0	12:15	0	1.78	0.079
FSD18	STORAGE	0.00	75.51	0	12:15	0	1.98	0.076
FSD20	STORAGE	0.00	62.89	0	12:15	0	1.19	0.379
FSD21	STORAGE	0.00	51.25	0	12:15	0	0.86	0.021
FSD22	STORAGE	0.00	56.51	0	12:15	0	1.18	0.055
FSD23	STORAGE	0.00	22.58	0	12:15	0	0.572	0.174
FSD27	STORAGE	0.00	167.34	0	12:23	0	5.43	0.054
FSD72	STORAGE	0.00	68.70	0	12:20	0	1.85	0.414
FSDE1	STORAGE	0.00	58.52	0	12:25	0	2.33	0.070
FSDE2	STORAGE	0.00	54.72	0	12:25	0	2.65	0.060
FSDE3	STORAGE	0.00	244.74	0	12:15	0	7.23	0.056
FSDE4	STORAGE	0.00	101.34	0	12:15	0	2.44	0.015
FSDE5	STORAGE	0.00	106.61	0	12:15	0	2.67	0.011
PNDE7	STORAGE	0.00	263.89	0	12:45	0	32.8	0.022
FSDE6	STORAGE	0.00	441.58	0	12:15	0	10.4	0.046
PNDW3	STORAGE	0.00	2232.85	0	13:11	0	108	0.033
EX_STOCK_POND	STORAGE	0.00	1995.36	0	13:05	0	80.7	0.096
FSD12A	STORAGE	0.00	48.87	0	12:15	0	1.01	0.076

Node Flooding Summary

Flooding refers to all water that overflows a node, whether it ponds or not.

Node	Maximum Hours Flooded	Maximum Rate CFS	Total Time of Max Occurrence days hr:min	Maximum Flood Volume 10^6 gal	Maximum Ponded Volume 1000 ft3
DP-2E	0.38	16.88	0 12:27	0.113	0.000

DP-8	76.45	146.14	0	13:36	34.206	0.000
FSD9_OUTLET	0.70	49.16	0	12:52	0.600	0.000
SC3-19	0.88	113.32	0	12:26	1.402	0.000
SC3-6A	0.14	24.78	0	12:15	0.047	0.000

Storage Volume Summary

Storage Unit	Average Volume 1000 ft3	Avg Evap Pcnt	Exfil Pcnt	Loss Pcnt	Maximum Volume 1000 ft3	Max Pcnt	Time of Max Occurrence days hr:min	Maximum Outflow CFS
FSD05	70.954	17	0	0	271.332	67	0 14:13	3.70
FSD06	323.934	27	0	0	1070.069	89	0 12:43	139.30
FSD09	63.364	9	0	0	469.434	65	0 12:51	264.75
FSD1	39.930	11	0	0	98.225	27	0 12:35	25.50
FSD11B	67.107	15	0	0	291.539	67	0 12:40	77.00
FSD12	61.582	25	0	0	193.966	77	0 12:34	103.10
FSD13	43.678	13	0	0	221.356	64	0 12:34	43.80
FSD14A	208.188	13	0	0	724.098	46	0 12:35	176.20
FSD14B	125.802	24	0	0	444.949	86	0 12:57	19.30
FSD15B	17.672	9	0	0	39.752	21	0 12:34	10.37
FSD16A	284.471	24	0	0	1050.485	90	0 12:46	128.30
FSD16B	160.673	31	0	0	292.049	57	0 12:44	28.20
FSD17A	31.233	9	0	0	117.441	35	0 12:38	26.70
FSD17B	33.266	12	0	0	120.473	42	0 12:40	24.30
FSD18	31.476	13	0	0	126.309	54	0 12:42	32.20
FSD20	0.168	0	0	0	19.724	15	0 12:30	44.35
FSD21	4.986	4	0	0	57.462	43	0 12:47	16.00
FSD22	6.717	7	0	0	66.083	65	0 12:50	24.00
FSD23	3.737	3	0	0	22.857	17	0 12:36	15.32
FSD27	49.550	16	0	0	251.395	83	0 12:59	91.90
FSD72	11.001	8	0	0	52.733	39	0 12:29	62.10
FSDE1	67.413	24	0	0	190.726	67	0 13:40	21.81
FSDE2	19.611	7	0	0	181.810	64	0 13:46	21.11
FSDE3	178.438	23	0	0	593.993	78	0 12:54	56.99
FSDE4	78.757	15	0	0	230.731	45	0 13:35	4.91
FSDE5	94.297	36	0	0	251.982	95	0 14:20	3.80
PNDE7	42.893	3	0	0	695.289	43	0 14:12	144.77
FSDE6	257.427	20	0	0	965.464	77	0 13:03	56.78
PNDW3	174.875	7	0	0	2376.723	92	0 13:40	1580.86
EX_STOCK_POND	748.534	44	0	0	1573.195	93	0 13:12	1921.66
FSD12A	20.548	22	0	0	61.411	67	0 12:31	23.40

Outfall Loading Summary

Outfall Node	Flow Freq Pcnt	Avg Flow CFS	Max Flow CFS	Total Volume 10^6 gal
SC3_OUTFALL	98.32	71.91	1966.37	148.501
SCE_OUTFALL	97.97	0.07	0.08	0.150
System	98.15	71.98	1966.44	148.651

Link Flow Summary

Link	Type	Maximum Flow CFS	Time of Max Occurrence days	Max Veloc hr:min ft/sec	Maximum Full Flow	Max/ Full Depth	Max/ Full Depth
RT-1	CONDUIT	241.28	0	12:41	5.22	0.00	0.10
RT-10A	CONDUIT	107.59	0	13:08	6.17	1.08	1.00
RT-10B	CONDUIT	143.22	0	12:31	18.14	0.37	0.42
RT-11A	CONDUIT	1646.59	0	12:55	8.14	0.03	0.19
RT-11B	CONDUIT	1816.45	0	13:00	7.64	0.03	0.21
RT-11C	CONDUIT	1995.36	0	13:05	5.44	0.05	0.26
RT-12A	CONDUIT	156.57	0	13:27	16.99	0.82	0.69
RT-12B	CONDUIT	175.86	0	13:27	22.68	0.48	0.49
RT-16	CONDUIT	150.78	0	12:20	17.35	1.08	1.00
RT-17B	CONDUIT	233.08	0	12:43	20.54	1.08	1.00
RT-18	CONDUIT	1933.05	0	13:34	7.70	0.03	0.20
RT-19	CONDUIT	73.63	0	12:22	8.80	0.25	0.34
RT-1E	CONDUIT	21.81	0	13:41	7.50	0.17	0.28
RT-2	CONDUIT	149.76	0	12:39	4.77	0.00	0.08
RT-20	CONDUIT	1959.97	0	13:35	11.86	0.02	0.14
RT-21	CONDUIT	29.81	0	12:21	12.42	0.20	0.30
RT-22	CONDUIT	15.29	0	12:39	12.75	0.17	0.28
RT-2E	CONDUIT	83.38	0	12:28	11.16	0.63	0.58
RT-3	CONDUIT	149.88	0	12:29	4.74	0.00	0.08
RT-3E	CONDUIT	21.10	0	13:47	8.05	0.15	0.26
RT-4	CONDUIT	283.34	0	12:34	5.28	0.00	0.10
RT-4E	CONDUIT	152.15	0	12:42	13.20	1.08	0.94
RT-5	CONDUIT	866.84	0	12:44	7.60	0.02	0.18
RT-5E	CONDUIT	204.14	0	12:43	19.62	0.54	0.52
RT-6	CONDUIT	228.99	0	12:32	5.64	0.00	0.09
RT-6B	CONDUIT	367.10	0	12:45	5.49	0.00	0.12
RT-6E	CONDUIT	4.91	0	13:39	5.25	0.03	0.13
RT-7A	CONDUIT	33.61	0	12:21	14.47	0.13	0.24
RT-7E	CONDUIT	213.55	0	12:45	13.57	0.58	0.55
RT-8	CONDUIT	46.72	0	12:46	16.47	1.05	0.93
RT-9A	CONDUIT	1416.31	0	12:48	7.12	0.03	0.19
RT-9B	CONDUIT	1500.03	0	12:48	8.19	0.02	0.18
RT-9C	CONDUIT	1529.13	0	12:50	7.63	0.03	0.19
RT-9D	CONDUIT	1624.38	0	12:53	7.89	0.03	0.19
RT-14	CONDUIT	1628.08	0	13:32	7.83	0.02	0.17
1	DUMMY	151.94	0	12:20			
2	DUMMY	99.04	0	12:25			
3	DUMMY	75.41	0	12:25			
4	DUMMY	79.38	0	12:25			
5	DUMMY	219.17	0	12:20			
6	DUMMY	68.70	0	12:20			
7	DUMMY	86.36	0	12:30			
8	DUMMY	59.46	0	12:25			
9	DUMMY	58.52	0	12:25			
10	DUMMY	9.66	0	12:25			
11	DUMMY	9.00	0	12:20			
12	DUMMY	130.07	0	12:20			
13	DUMMY	22.58	0	12:15			
14	DUMMY	51.25	0	12:15			
15	DUMMY	31.29	0	12:15			
16	DUMMY	16.53	0	12:15			
17	DUMMY	56.51	0	12:15			
18	DUMMY	69.33	0	12:15			
20	DUMMY	62.89	0	12:15			
22	DUMMY	215.70	0	12:15			
24	DUMMY	425.59	0	12:15			
25	DUMMY	153.60	0	12:15			
27	DUMMY	101.34	0	12:15			
28	DUMMY	106.61	0	12:15			
29	DUMMY	244.74	0	12:15			

30	DUMMY	143.79	0 12:15				
34	DUMMY	75.51	0 12:15				
36	DUMMY	54.72	0 12:25				
37	DUMMY	18.71	0 12:30				
38	DUMMY	225.81	0 12:25				
RT-17A	CONDUIT	172.21	0 12:32	6.76	0.00	0.11	
39	DUMMY	133.28	0 12:25				
40	DUMMY	24.00	0 12:15				
42	DUMMY	205.11	0 12:15				
44	DUMMY	10.51	0 12:15				
45	DUMMY	2.94	0 12:15				
46	DUMMY	2.39	0 12:20				
47	DUMMY	54.26	0 12:20				
48	DUMMY	73.94	0 12:25				
51	DUMMY	441.58	0 12:15				
54	DUMMY	209.37	0 12:15				
56	DUMMY	18.84	0 12:15				
58	CONDUIT	2232.85	0 13:11	15.17	0.01	0.13	
63	DUMMY	150.82	0 12:15				
65	DUMMY	77.21	0 12:15				
67	DUMMY	1966.37	0 13:35				
RT-15A	CONDUIT	165.30	0 12:16	20.37	0.70	0.62	
RT-15B	CONDUIT	263.41	0 12:16	20.94	0.43	0.46	
69	DUMMY	179.74	0 12:15				
70	DUMMY	101.25	0 12:15				
RT-25	CONDUIT	144.77	0 14:16	4.89	0.02	0.18	
71	CONDUIT	0.08	0 02:02	0.10	1.08	1.00	
74	DUMMY	48.66	0 12:15				
75	DUMMY	42.55	0 12:20				
77	DUMMY	203.13	0 12:15				
78	DUMMY	73.97	0 12:15				
79	DUMMY	579.11	0 12:15				
80	CONDUIT	16.04	0 13:33	16.28	0.16	0.27	
81	DUMMY	48.87	0 12:15				
82	DUMMY	69.54	0 12:15				
83	DUMMY	63.16	0 12:20				
FSD01_Outlet	DUMMY	25.50	0 12:27				
FSD05_Outlet	DUMMY	3.70	0 12:06				
FSD06_Outlet	DUMMY	139.30	0 12:17				
FSD11B_Outlet	DUMMY	77.00	0 12:05				
FSD12_Outlet	DUMMY	103.10	0 12:14				
FSD13_Outlet	DUMMY	43.80	0 12:12				
FSD14A_Outlet	DUMMY	176.20	0 12:24				
FSD14B_Outlet	DUMMY	19.30	0 11:57				
FSD15B_Outlet	DUMMY	10.37	0 12:35				
FSD16A_Outlet	DUMMY	128.30	0 12:11				
FSD16B_Outlet	DUMMY	28.20	0 12:22				
FSD17B_Outlet	DUMMY	24.30	0 12:24				
FSD18_Outlet	DUMMY	32.20	0 12:30				
FSD21_Outlet	DUMMY	16.00	0 12:18				
FSD22_Outlet	DUMMY	24.00	0 12:36				
FSD72_Outlet	DUMMY	62.10	0 12:30				
FSD9_Outlet	DUMMY	264.75	0 12:52				
FSDE2_Outlet	DUMMY	21.11	0 13:47				
FSDE3_Outlet	DUMMY	56.99	0 12:55				
FSDE4_Outlet	DUMMY	4.91	0 13:35				
FSDE5_Outlet	DUMMY	3.80	0 12:23				
FSDE6_Outlet	DUMMY	56.78	0 13:03				
FSDE1_Outlet	DUMMY	21.81	0 13:41				
PNDE7_Outlet	DUMMY	144.77	0 14:13				
FSD17A_Outlet	DUMMY	26.70	0 12:26				
PNDW3_Outlet	DUMMY	1580.86	0 13:40				
FSD27_Outlet	DUMMY	91.90	0 12:51				
EX_STOCK_POND_OUTFALL	DUMMY	1921.66	0 13:12				
FSD23_Outlet	DUMMY	15.32	0 12:37				
FSD12A_Outlet	DUMMY	23.40	0 12:28				

 Conduit Surcharge Summary

Conduit	Hours		Hours		Capacity
	----- Both Ends	Hours Full Upstream	----- Above Full Dnstream	Hours	
RT-10A	0.88	0.88	0.88	0.93	0.88
RT-16	0.13	0.13	0.13	0.13	0.13
RT-17B	0.69	0.69	0.69	0.71	0.69
RT-4E	0.38	0.38	0.38	0.38	0.38
RT-8	0.51	0.51	0.51	0.33	0.51
71	76.45	76.45	76.45	0.04	76.45

Analysis begun on: Mon Aug 16 11:39:48 2021
 Analysis ended on: Mon Aug 16 11:39:49 2021
 Total elapsed time: 00:00:01

APPENDIX D

REFERENCE MATERIAL

TECHNICAL MEMORANDUM



To: Jeff Rice, PE, El Paso County
From: Mike Bramlett, PE, JR Engineering
Date: April 13, 2021
Subject: Sterling Ranch MDDP – Hydrology Alternatives

Mr. Rice,

JR Engineering is preparing an updated MDDP for the Sterling Ranch Development, revising the approved *Master Development Drainage Plan for Sterling Ranch* prepared by M&S Civil Consultants, dated October 2018. JR is presenting two alternatives for how the hydrology for the MDDP along Sand Creek could be analyzed. Initially, JR was provided with a HEC-HMS model previously done by M&S for the current MDDP. Due in part to skepticism over the validity of the model, as well as the desire to incorporate all the proposed offline storage into the model, it was decided that rather than revising the existing model in HEC-HMS, it would be preferable to use EPA SWMM for the hydrologic modeling. Unfortunately, there is no clean, easy way to directly convert a HEC-HMS model to SWMM. The HEC-HMS model uses SCS Curve Number for its infiltration calculations. Colorado Springs criteria explicitly states that Curve Number cannot be used in SWMM because it doesn't accurately model infiltration with Curve Number. Unable to directly use Curve Number, it is proposed instead to use Horton's Equation for infiltration.

The two modeling methods presented both use SWMM. One model uses CUHP to generate sub-basin hydrology, while the other uses the internal hydrologic parameters in SWMM. Rather than modeling all the design storms at this time, we decided to use just the Existing Conditions 100-year storm for this comparison, since the model is simpler and where the differences between models would be at their most extreme. Both models use the 24-hour Type II Storm, simulating a frontal storm typically seen along the Front Range.

Alternative 1: This evaluation uses the Colorado Urban Hydrograph Procedure (CUHP) to develop sub-basin hydrographs for use in SWMM. To get as close of a comparison as possible, we tried to use as much original sub-basin information as possible from the 2018 MDDP. From the MDDP Appendices we were able to determine basin area and imperviousness. Basin length and distance to centroid were determined by re-creating the Existing Conditions Map. Basin slope was determined based on the Lag Time tables in the appendices and then adjusted based Colorado Springs criteria for slopes in SWMM models. Horton parameters were determined based on the soil group composition of each basin. The rain gauge for the 24-hr storm was made by converting the cumulative hydrograph into an incremental one, so as to better model the peaks.

All basins were defined as junction nodes. Any nodes that had a defined channel connecting them were used based on parameters taken from the HEC-HMS model. When a channel wasn't defined in the HEC-HMS model, it was assumed that one wasn't present and a dummy conduit of minimal length was used to connect the node to its nearest downstream junction. Results from both alternatives can be seen in the table below.

Alternative 2: This alternative calculates the sub-basin hydrology based on the internal hydrology parameters within SWMM. Basin area, imperviousness, and slope were all the same as those used in alternative 1. Horton parameters were also taken directly from alternative 1. All defined channels were also taken directly from alternative 1. One of the biggest differences between the two is how it calculates basin width. Colorado Springs provides an excel spreadsheet to convert an irregular shaped basin into a uniform width rectangle. The other big difference between the two models is how routing is done. To simulate runoff from single family houses and local roads in the mostly large, undeveloped basins, pervious routing was used. Depression storage depths were the same assumptions used in alternative 1, and it was assumed that zero percent of all the basins had no depression storage available. The rain gauge was identical to the cumulative hydrograph in the HEC-HMS model.

The basins were laid out in a similar fashion as the HEC-HMS model. If a basin doesn't drain directly to a defined channel, then the basin drains to a dummy node at the top of the channel, which then conveys it downstream to the next node. Channel parameters were taken directly from the HEC-HMS model. Results from both alternatives can be seen in the table below.

Basin Summary					
Basin	MDDP (HEC-HMS)	CUHP		SWMM	
	24-hr Type II Storm Q100 (cfs)	CUHP Q100 (cfs)	Percent Difference	Internal Hydrology Q100 (cfs)	Percent Difference
EX-0	32.2	31.5	2%	67.7	210%
EX-1	30.9	27.9	10%	73.3	237%
EX-2	7.1	4.5	36%	58.9	830%
EX-3	143.1	149.6	5%	640.5	448%
EX-3A	192.6	223.4	16%	556.7	289%
EX-4	197.3	221.2	12%	542.5	275%
EX-4A	160.1	104.8	35%	378.6	236%
EX-5	158.2	150.4	5%	786.7	497%
EX-6	100.5	95.3	5%	387.6	386%
EX-7	107.4	147.0	37%	484.5	451%
EX-8	20.5	50.9	248%	151.4	738%
EX-9	125.2	106.6	15%	222.9	178%
EX-10	236.1	247.9	5%	786.5	333%
EX-10A	43.1	121.6	282%	338.2	785%
EX-11	126.1	213.9	170%	365.1	290%
EX-12	33.3	63.4	90%	98.8	297%
EX-13	78.4	70.5	10%	327.7	418%
EX-20	166.2	215.0	29%	453.7	273%
EX-20A	194.6	171.9	12%	235.3	121%
EX-21	49	41.9	14%	259.6	530%
EX-24	73	60.4	17%	148.0	203%
EX-25	25.1	38.2	52%	72.2	287%
EX-73	102	102.0	0%	262.2	257%
EX-74	140.7	197.9	41%	349.0	248%
EX-75	82.8	85.8	4%	330.7	399%
EX-76	89.6	86.2	4%	330.5	369%
EX-77	227.7	190.5	16%	704.5	309%
EX-78	174.5	245.4	41%	318.9	183%
EX-79	220.1	299.7	36%	348.6	158%
EX-80	171.4	181.7	6%	373.6	218%
EX-81	275.7	267.2	3%	349.1	127%
EX-82	132.3	186.8	41%	243.3	184%
EX-88	144.4	156.6	8%	410.1	284%



Results: As seen in the above table, almost across the board, the CUHP model was closer to MDDP results than the SWMM Internal Geometry. There are basins where the CUHP is within a few percent of the MDDP, while the Internal Hydrology is several times higher. A few basins are over double compared to the MDDP in both models, but for the most part the Internal Hydrology model is substantially higher. The discrepancy appears to be mainly in the hydrology itself. The values at the design points of the model are overall closer to the MDDP values. Peak values at design points for the CUHP model are within 40% with one exception, while there are 8 nodes in the Internal Hydrology model that are at least double that of the MDDP. Curiously, volumes across the board show a lower percent difference than peak flows. The CUHP volumes all stay below 50% of the MDDP model, while the highest difference in the Internal Hydrology model is 76%.

Conclusions: As expected, converting a HEC-HMS model to a SWMM model creates differences in results, regardless of how you choose to model it. Due to SWMM's inability to properly model SCS Curve Number, neither of these models is a perfect comparison to the 2018 MDDP's HEC-HMS models. Using as many parameters provided from the MDDP model as possible, we were able to create two functioning SWMM models. Using CUHP to calculate basin hydrology proved to be across the board more similar to the MDDP results than by calculating basin hydrology with SWMM's internal parameters.

It is our recommendation that CUHP and SWMM be used for all further hydrologic modeling involved with this MDDP revision.

FINAL DRAINAGE REPORT FOR HOMESTEAD AT STERLING RANCH FILING NO. 1

EL PASO COUNTY, COLORADO

July 2018

Prepared for:

**SR Land, LLC
20 Boulder Crescent, Suite 210
Colorado Springs, CO 80903**

Prepared by:



**20 Boulder Crescent, Suite 110
Colorado Springs, CO 80903
(719) 955-5485**

Project #09-005
DSD Project # SF-17-025

DP5, (Aka DP5*) 0.80 acres, consists of 0.61 acres proposed backyards of residential lots (Basin G) that have assigned runoff coefficients of 0.22 for the 5-year and 0.46 for the 100-year, as well 0.19 acres of Dines Boulevard (Basin H) with runoff coefficients of 0.90 for the 5-year and 0.96 for the 100-year as well as flow by from DP4. Developed runoff of 4.2 and 19.7 cfs has been calculated to reach DP5 in the two events respectively. An existing 15' CDOT type R at-grade inlet at DP5 will intercept flows of Q5=4.2 cfs and Q100=14.7 cfs. These flows are equivalent to the flows documented in the MDDPSR report (Q5=4.2 cfs and Q100=19.7 cfs). An existing 36" RCP will carry the collected runoff under existing Dines Boulevard towards DP6, while flow-by from DP5 will continue south within Dines Boulevard.

DP6, (Aka DP5*) 4.68 acres, consists backyards of residential lots of 0.43 and 0.61 acres in size (Basins OS3 and OS4) that have been assigned runoff coefficients of 0.22 for the 5-year and 0.46 for the 100-year events and 2.1 acre portion of Wheatland Drive and 1.54 acre portion of Dines Boulevard, both with assigned runoff coefficients of 0.90 for the 5-year and 0.96 for the 100-year events. Developed runoff of Q5=14.1 cfs and Q100=26.7 cfs has been calculated to reach DP6. An existing 15' CDOT type R at-grade inlet. These flows are equivalent to the flows documented in the MDDPSR report (Q5=14.1 cfs and Q100=26.7 cfs). Flow-by from DP6 will continue south within Dines Boulevard.

DP7, (Aka DP9*) 9.73 acres, consists of proposed residential lots of the planned development located east of the subject site (Basin OS-6) that have been assigned runoff coefficients of 0.38 for the 5-year and 0.55 for the 100-year events. Developed runoff of Q5=12.6 cfs and Q100=30.5 cfs has been calculated to reach DP7. An existing 30" RCP will convey runoff to existing FSD Pond 4. The flows in PR7 are approximately equivalent to the flows documented in the MDDPSR report of Q5=12.5 cfs and Q100=30.4 cfs.

DP8,(Aka DP10*) 1.97 acres, consists of Basin S (Existing FSD Pond 4) with runoff coefficients of 0.08 for the 5-year and 0.35 for the 100-year and runoff from PR4, PR6 and PR7. Based upon this drainage analysis the total combined developed runoff to reach DP10 at the existing pond will be Q5=49.2 cfs and Q100=105.39 cfs for the 5 and 100 year events respectively, which varies just slightly from the MDDPSR flows of Q5=50.0 cfs and Q100=102.9 cfs that the facility was designed for.

The existing privately maintained facility, as constructed, continues to provide full spectrum detention and water quality for the calculated runoff as planned. The pond will continue to treat approx 27.63 acres, and provide 0.46 ac-ft of water quality storage and 2.915 ac-ft of 100-year storage (refer to UD-Detention worksheet in appendix of this report). According to the updated UD detention worksheet, the slight inflow increase in results in only an increase in the ponding elevation of 0.03' and an increase of 0.6 cfs being released from the pond when compared to the initial design worksheets. Despite the minor increase the pond continues to meet the required drain times and pre-developed flow release rates as necessary with no negative impacts to downstream facilities.

In the event of clogging or total inlet failure, flows at DP8 will over top the existing emergency spillway and outfall into Sand Creek. The existing detention pond will be private and shall be maintained by the Sterling Ranch Metropolitan District (SRMD). Access has been granted to the SRMD and El Paso County for access and maintenance of the private detention pond.

DP9,(Aka DP10*) 3.01 acres, consists of 2.71 acres of existing low density residential (Basin OS1A) that have assigned runoff coefficients of 0.08 for the 5-year and 0.35 for the 100-year and 0.31 acres of existing

bottom of the rundown provides to dissipate energy and prevent local scour. Runoff is conveyed southerly in an existing earthen swale that leads to existing Detention Pond W-9.

DP14 (Aka DP61*), 4.03 acres, consists 1.15 acres of rear residential lots with runoff coefficients of 0.22 for the 5-year and 0.46 for the 100-year and 1.60 acres of landscape area and an existing FSD pond (Basin M2) that has been assigned runoff coefficients of 0.08 for the 5-year and 0.35 for the 100-year and 2.04 acres of the eastern half of existing Vollmer Road and adjacent landscaped areas, which have been assigned runoff coefficients of 0.63 and 0.76 for the 5 and 100 year events respectively as well as flows from DP13. Runoff reaching the existing pond at DP 14 is calculated to be $Q_5=8.9$ cfs and $Q_{100}=21.2$ cfs, which matches the MDDPSR flows of $Q_5=8.9$ cfs and $Q_{100}=21.2$ cfs that the facility was designed for.

The existing facility functions to provide full spectrum detention and water quality for runoff calculated to reach DP14. The existing pond will treat approx 5.87 acres, and provide 0.092 ac-ft of water quality storage and 0.638 ac-ft of 100-year storage. As described within the MDDPSR the detention facility is private and shall be maintained by the Sterling Ranch Metropolitan District. Access shall be granted to the owner and El Paso County for access and maintenance of the private detention pond. In the event of clogging or total inlet failure, flows at DP14 will over top the emergency spillway and outfall into a proposed swale which will route flows to an existing Vollmer Road side swale. The peak release rates from Pond W-9 (PR13, $Q_5=0.6$ cfs and $Q_{100}=8.7$ cfs) are conveyed within an existing 18" RCP to and existing 30" RCP ((PR14) ($Q_5=7.6$ cfs and $Q_{100}=47.2$ cfs)). These flows will be combine with flows from PR12 and be routed east, within the Homestead Sterling Ranch Filing No. 1 subdivision, via a 54" RCP, PR15 ($Q_5=23.8$ cfs and $Q_{100}=164.1$ cfs). These flows will combine with flows from PR16 ($Q_5=2.8$ cfs and $Q_{100}=36.8$ cfs, release rate Pond 4) and be routed south via a 60" RCP, PR12 ($Q_5=26.6$ cfs and $Q_{100}=200.9$ cfs). These flows are nearly equivalent to the SRMDDP runoff rates of ($Q_5=26.5$ cfs and $Q_{100}=200.3$ cfs) which the pipe was designed. The collected runoff will outfall into an existing low tailwater riprap basin at Sand Creek.

Basin N 2.08 acres, consists of proposed residential backyard lots and part of Tract L located along the south boundary of Homestead at Sterling Ranch Filing No. 1 with runoff coefficients of 0.22 for the 5-year and 0.46 for the 100-year. Developed runoff of $Q_5=1.6$ cfs and $Q_{100}=5.7$ cfs have been calculated for the basin. Runoff from the proposed residential backyard lots will flow to an existing swale that falls along the east boundary of the Barbarick Subdivision. Basin N was part of a larger Basin YY* that was as discussed in the MDDPSR. The limited developed flows from Basin N that are discharged to the south are considerably less than the historic flows previously directed toward the Barbarick subdivision as can be seen by noting Basin EX-3A in the Sterling Ranch MDDP Existing Conditions Map. As the backyards are typically permeable, and roof drainage from the back of the house shall be directed to the front of the lot water quality treatment will be addressed in the paragraph below.

The flows generated by Basin N and Tract L will be routed south via overlot grading and swales to a temporary sediment basin (future Pond W-5), at the south end of the Sterling Ranch Development. Upon development of the Sterling Ranch Filing No. 2 infrastructure Pond W-5 will be constructed and flows from Basin N and Tract L will be treated as WQCV and Full Spectrum Detention. As such the proposed develop shall not adversely affect the downstream infrastructure.

Basin O 0.57 acres, consists of planned residential backyard lots located along the south boundary of Homestead at Sterling Ranch Filing No. 1 that have been assigned runoff coefficients of 0.22 for the 5-year and 0.46 for the 100-year storm events. Developed runoff of, Q5=0.5 cfs and Q100=1.8 cfs is anticipated to be produced by the basin. Runoff from the proposed residential backyard lots will sheet flows towards the planned Branding Iron at Sterling Ranch Filing No. 1 as discussed in the MDDPSR. Basin O was part of a larger Basin GG* in the MDDPSR. Runoff from basin O and the flow-by from DP1, 2, 5 and 6 will be collected within existing system within existing Dines Boulevard and detained and released at pre-developed flow rates from FSD Pond 4. Refer to Branding Iron at Sterling Ranch filing No.1 FDR for additional information.

DETENTION PONDS

Water Quality/Full Spectrum Detention Facilities

As discussed in the detained drainage summary, developed runoff from Homestead at Sterling Ranch Filing No. 1 is conveyed to existing Full Spectrum Detention Ponds No 4, 8 and W-9 in accordance with the Sterling Ranch Filing Nos. 1&2 MDDP. Based upon the provided analysis the ponds are adequate to serve their intended purpose and require no modification. This is because this final drainage report and the SR Filing 1 and 2 MDDP were nearly concurrent. Thus the larger scale concept planning was very finite and thus allowed for the developed flow rates to align between the two documents and thereby not requiring modifications to facility which is often common between conceptual and final design. The information provided in this report regarding Ponds 8 and W-9 shall supersede the information presented in the MDDP and should be re-referenced with future design.

The flows generated by Basin N and Tract L will be routed south via overlot grading and vegetated swales to a temporary sediment basin (future Pond W-5), at the south end of the Sterling Ranch Development. Upon development of the Sterling Ranch Filing No. 2 infrastructure Pond W-5 will be constructed and flows from Basin N and Tract L will be treated as WQCV (see WQCV deviation request) and Full Spectrum Detention. As such the proposed develop shall not adversely affect the downstream infrastructure.

EROSION CONTROL

It is the policy of the El Paso County that a grading and erosion control plan be submitted with the drainage report. EPC approved “Early Grading Plan for Sterling Ranch Phase I Onsite Grading & Erosion Control”, November 18, 2015. And “Early Grading Plan for Sterling Ranch Phase I Offsite Grading & Erosion Control”, December 3, 2015. Grading and Erosion control operations are currently underway (August 2016). Grading and Erosion Control will cease with the final development of the site in the next 12-36 months.

CONSTRUCTION COST OPINION – HOMESTEAD AT STERLING RANCH FILING NO. 1

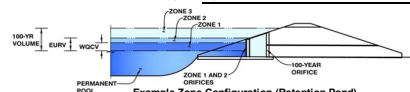
Drainage Facilities:

Minor improvements with the development of Homestead at Sterling Ranch Filing No. 1 are listed below. The majority of the infrastructure construction costs have been accounted for in the “Master Development

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

Project: STERLING RANCH FILING NO. 1

Basin ID: POND 4



PERMANENT POOL

Example Zone Configuration (Retention Pond)

Required Volume Calculation

Required Volume Calculation		
Selected BMP Type =	EDB	
Watershed Area =	27.63	acres
Watershed Length =	1.720	ft
Watershed Slope =	0.030	ft/ft
Watershed Imperviousness =	53.00%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	100.0%	percent
Percentage Hydrologic Soil Group C/D =	0.0%	percent
Desired WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depth =	West	

Location for 1-hr Rainfall Depth = User Input

Location for 1-Hr Rainfall Depth = 0.49 in.	acre-feet
Water Quality Capture Volume (WCQV) =	0.494
Excess Urban Runoff Volume (EURV) =	1.573
2-yr Runoff Volume (P1 = 1.19 in.) =	1.312
5-yr Runoff Volume (P1 = 1.5 in.) =	1.981
10-yr Runoff Volume (P1 = 1.75 in.) =	2.542
25-yr Runoff Volume (P1 = 2 in.) =	3.324
50-yr Runoff Volume (P1 = 2.25 in.) =	3.977
100-yr Runoff Volume (P1 = 2.52 in.) =	4.720
500-yr Runoff Volume (P1 = 6.53 in.) =	13.003
Approximate 2-yr Detention Volume =	1.241
Approximate 5-yr Detention Volume =	1.821
Approximate 10-yr Detention Volume =	1.991
Approximate 25-yr Detention Volume =	2.082
Approximate 50-yr Detention Volume =	2.317
Approximate 100-yr Detention Volume =	2.781

Optional User Input 1-hr Precipitation	
1.19	inches
1.50	inches
1.75	inches
2.00	inches
2.25	inches
2.52	inches
6.53	inches

Stage-Storage Calculation

Stage-storage Calculation		
Zone 1 Volume ($WQCV_1$) =	0.494	acre-feet
Zone 2 Volume ($EURV - Z_1$) =	1.079	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	1.209	acre-feet
Total Detention Basin Volume =	2.781	acre-feet
Initial Surge Volume (ISV) =	user	ft ³
Initial Surge Depth (ISD) =	user	ft
Total Available Detention Depth (H_{det}) =	user	ft
Depth of Trickle Channel (H_{TC}) =	user	ft
Slope of Trickle Channel (S_{TC}) =	user	ft/ft
Slopes of Main Basin Sides (S_{mb}) =	user	H:V
Basin Length-to-Width Ratio (R_{bw}) =	user	

Slopes of Main Basin Sides (S_{main}) =	user	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	user	

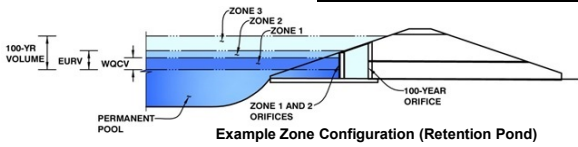
Initial Surcharge Area (A_{00})	= user	m ²
Surcharge Volume Length (L_{00})	= user	m
Surcharge Volume Width (W_{00})	= user	m
Depth of Basin Floor ($H_{1(0,0)}$)	= user	m
Length of Basin Floor ($H_{2(0,0)}$)	= user	m
Width of Basin Floor ($W_{1(0,0)}$)	= user	m
Area of Basin Floor (A_{00})	= user	m ²
Volume of Basin Floor (V_{00})	= user	m ³
Depth of Main Basin ($H_{1(u,u)}$)	= user	m
Length of Main Basin ($H_{2(u,u)}$)	= user	m
Width of Main Basin ($W_{1(u,u)}$)	= user	m
Area of Main Basin (A_{uu})	= user	m ²
Volume of Main Basin (V_{uu})	= user	m ³
Calculated Total Basin Volume ($V_{00} + V_{uu}$)	= user	acre-feet

[illegible]

Detention Basin Outlet Structure Design

Project: **STERLING RANCH FILING NO. 1**

Basin ID: **POND 4**



Example Zone Configuration (Retention Pond)

	Stage (ft)	Zone Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	3.32	0.494	Orifice Plate
Zone 2 (EURV)	5.38	1.079	Orifice Plate
Zone 3 (100-year)	6.69	1.209	Weir&Pipe (Restrict)
		2.781	Total

User Input: Orifice at Underdrain Outlet (typically used to drain WQCV in a Filtration BMP)

Underdrain Orifice Invert Depth = ft (distance below the filtration media surface)
Underdrain Orifice Diameter = inches

Calculated Parameters for Underdrain

Underdrain Orifice Area = ft²
Underdrain Orifice Centroid = feet

User Input: Orifice Plate with one or more orifices or Elliptical Slot Weir (typically used to drain WQCV and/or EURV in a sedimentation BMP)

Invert of Lowest Orifice = ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Orifice Plate = ft (relative to basin bottom at Stage = 0 ft)
Orifice Plate: Orifice Vertical Spacing = inches
Orifice Plate: Orifice Area per Row = inches

Calculated Parameters for Plate

WQ Orifice Area per Row = ft²
Elliptical Half-Width = feet
Elliptical Slot Centroid = feet
Elliptical Slot Area = ft²

User Input: Stage and Total Area of Each Orifice Row (numbered from lowest to highest)

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	1.79	3.58					
Orifice Area (sq. inches)	2.33	2.33	2.60					

	Row 9 (optional)	Row 10 (optional)	Row 11 (optional)	Row 12 (optional)	Row 13 (optional)	Row 14 (optional)	Row 15 (optional)	Row 16 (optional)
Stage of Orifice Centroid (ft)								
Orifice Area (sq. inches)								

User Input: Vertical Orifice (Circular or Rectangular)

	Not Selected	Not Selected	
Invert of Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)
Vertical Orifice Diameter =	N/A	N/A	inches

Calculated Parameters for Vertical Orifice

	Not Selected	Not Selected	
Vertical Orifice Area =	N/A	N/A	ft ²
Vertical Orifice Centroid =	N/A	N/A	feet

User Input: Overflow Weir (Dropbox) and Grate (Flat or Sloped)

	Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, H _o =	5.37	N/A	ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length =	9.00	N/A	feet
Overflow Weir Slope =	4.00	N/A	H:V (enter zero for flat grate)
Horiz. Length of Weir Sides =	2.91	N/A	feet
Overflow Grate Open Area % =	70%	N/A	% grate open area/total area
Debris Clogging % =	50%	N/A	%

Calculated Parameters for Overflow Weir

	Zone 3 Weir	Not Selected	
Height of Grate Upper Edge, H ₁ =	6.10	N/A	feet
Over Flow Weir Slope Length =	3.00	N/A	feet
Grate Open Area / 100-yr Orifice Area =	4.06	N/A	should be ≥ 4
Overflow Grate Open Area w/o Debris =	18.90	N/A	ft ²
Overflow Grate Open Area w/ Debris =	9.45	N/A	ft ²

User Input: Outlet Pipe w/ Flow Restriction Plate (Circular Orifice, Restrictor Plate, or Rectangular Orifice)

	Zone 3 Restrictor	Not Selected	
Depth to Invert of Outlet Pipe =	0.00	N/A	ft (distance below basin bottom at Stage = 0 ft)
Outlet Pipe Diameter =	30.00	N/A	inches
Restrictor Plate Height Above Pipe Invert =	27.00		inches

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

	Zone 3 Restrictor	Not Selected	
Outlet Orifice Area =	4.65	N/A	ft ²
Outlet Orifice Centroid =	1.19	N/A	feet
Half-Central Angle of Restrictor Plate on Pipe =	2.50	N/A	radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage = ft (relative to basin bottom at Stage = 0 ft)
Spillway Crest Length = feet
Spillway End Slopes = H:V
Freeboard above Max Water Surface = feet

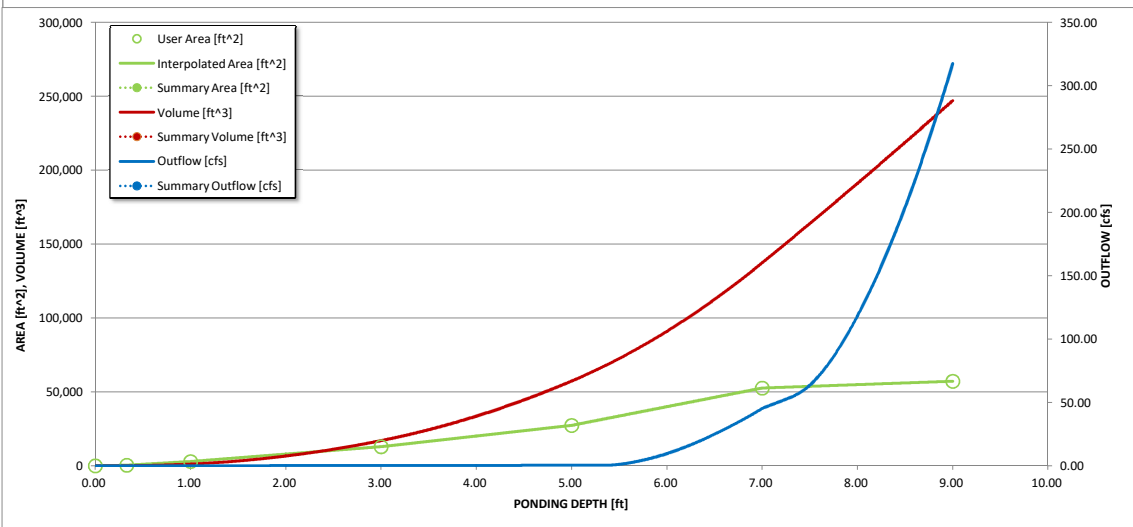
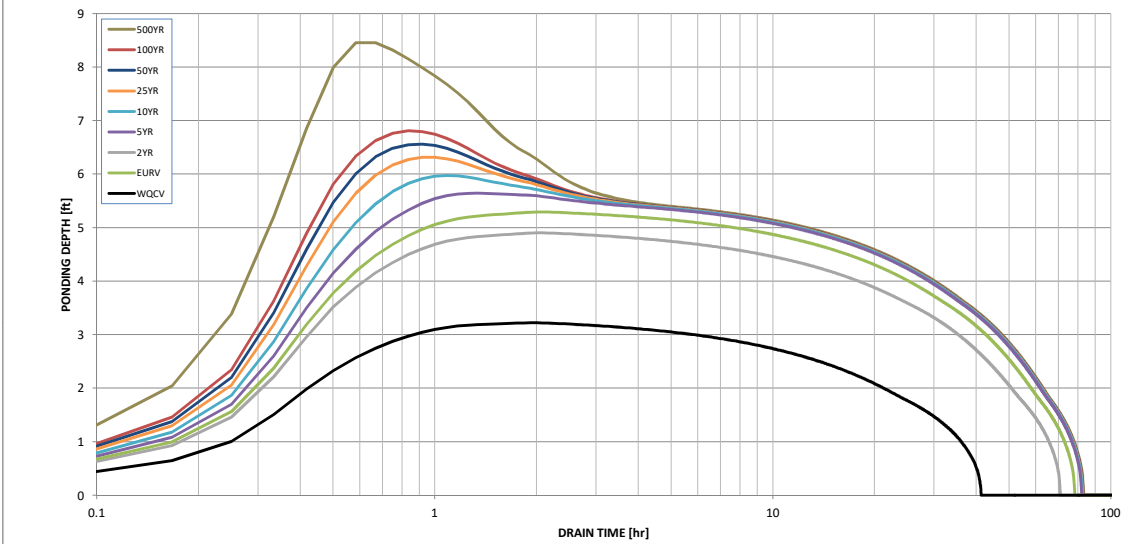
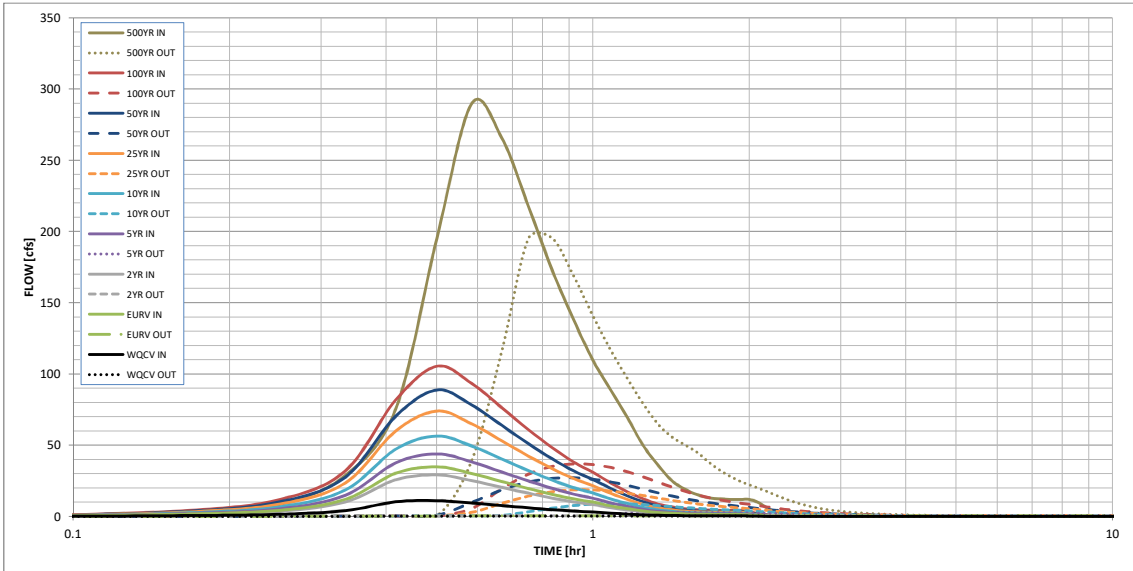
Calculated Parameters for Spillway

Spillway Design Flow Depth = feet
Stage at Top of Freeboard = feet
Basin Area at Top of Freeboard = acres

Routed Hydrograph Results

	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
Design Storm Return Period =									
One-Hour Rainfall Depth (in) =	0.53	1.07	1.19	1.50	1.75	2.00	2.25	2.52	6.53
Calculated Runoff Volume (acre-ft) =	0.494	1.573	1.312	1.981	2.542	3.324	3.977	4.720	13.003
OPTIONAL Override Runoff Volume (acre-ft) =									
Inflow Hydrograph Volume (acre-ft) =	0.494	1.573	1.312	1.982	2.543	3.326	3.980	4.723	13.012
Predevelopment Unit Peak Flow, q (cfs/acre) =	0.00	0.00	0.01	0.20	0.40	0.90	1.16	1.48	2.09
Predevelopment Peak Q (cfs) =	0.0	0.0	0.4	5.5	11.0	24.8	32.1	40.9	57.7
Peak Inflow Q (cfs) =	11.0	34.8	29.1	43.8	56.3	73.9	88.6	105.3	289.7
Peak Outflow Q (cfs) =	0.2	0.4	0.4	2.8	9.0	18.6	27.1	36.8	195.3
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.5	0.8	0.7	0.8	0.9	3.4
Structure Controlling Flow =	Plate	Plate	Plate	Overflow Grate 1	Overflow Grate 1	Overflow Grate 1	Overflow Grate 1	Overflow Grate 1	Spillway
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	0.1	0.4	1.0	1.4	1.9	3.2
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	38	70	64	72	70	68	66	64	48
Time to Drain 99% of Inflow Volume (hours) =	40	75	68	78	77	76	76	75	65
Maximum Ponding Depth (ft) =	3.22	5.29	4.90	5.64	5.97	6.32	6.56	6.81	8.46
Area at Maximum Ponding Depth (acres) =	0.33	0.71	0.61	0.81	0.91	1.01	1.08	1.15	1.28
Maximum Volume Stored (acre-ft) =	0.460	1.510	1.253	1.776	2.060	2.386	2.647	2.915	4.956

Detention Basin Outlet Structure Design



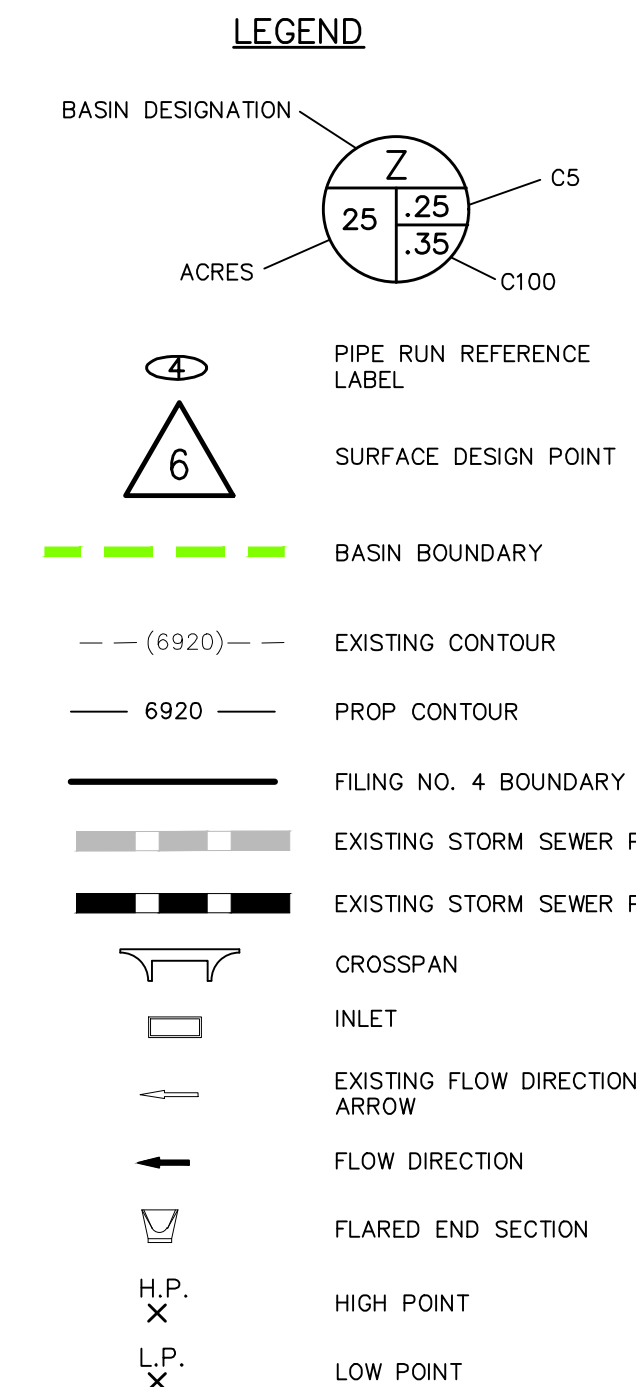
S-A-V-D Chart Axis Override	X-axis	Left Y-Axis	Right Y-Axis
minimum bound			
maximum bound			

COUNTY OF EL PASO, STATE OF COLORADO
FINAL DRAINAGE MAP

1" = 80'

0 40 80 160

Scale in Feet

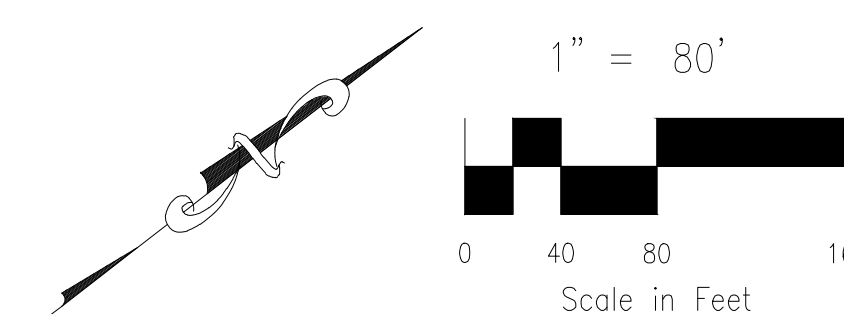


BASIN SUMMARY			
BASIN	AREA (ACRES)	Q ₅	Q ₁₀₀
OS2	2.10	8.9	15.9
OS3	0.43	0.4	1.3
OS4	0.61	0.5	1.9
OS5	1.54	5.6	10.0
OS6	9.73	12.5	30.4
OS7	1.97	0.7	5.3
A	2.79	3.6	8.7
B	2.70	3.6	8.6
C	2.92	4.2	10.1
D	2.90	4.3	10.4
E	5.34	8.2	19.9
F	1.12	4.3	7.7
G	0.61	0.5	1.9
EX-H	0.19	0.9	1.6
M	1.15	1.0	3.6
M2	1.60	0.4	3.2
N	2.08	1.6	5.7
O	0.57	0.5	1.8
W-2	10.00	2.7	19.7
OS1 HISTORIC	111.70	18.9	136.8
SUB-BASIN OS1A	2.70	0.7	5.3
SUB-BASIN OS1B	9.09	2.4	17.8
SUB-BASIN OS1C	5.64	1.5	11.1
SUB-BASIN OS1D	94.3	16.3	119.5
V1A	0.31	1.4	2.6
V1B	0.26	1.2	2.2
V1C	0.21	1.0	1.7
V1D	0.13	0.6	1.1
V2	0.32	1.5	2.7
RP-2B	2.04	4.9	9.9
RP-2C	1.28	4.3	8.2

DESIGN POINT SUMMARY				
DESIGN POINT	Q _s	Q ₁₀₀	BASIN	STRUCTURE
1	3.6	8.7	A	15' AT-GRADE INLET
2	3.6	8.6	B	15' AT-GRADE INLET
3	4.2	10.1	C	8' SUMP INLET
4	16.1	36.7	D, E, F	15' AT-GRADE INLET
5	4.2	19.7	G, EX-H, FLOWBY DP4	EX 15' AT-GRADE INLET
6	14.1	26.7	OS2, OS3, OS4, OS5	EX 15' AT-GRADE INLET
7	12.6	30.5	OS6	EX 18' RCP
8	49.2	105.3	OS7, PR4, PR6, PR7	EX FSD POND 4
9	1.6	7.0	OS1A, VIA	EX 12" CMP CULVERT
10	4.8	26.3	OS1B, V1B, DP6	EX 2'x9.5" CDOT TYPE D INLET
11	2.2	12.3	OS1C, VIC,	EX 2'x9.2" CDOT TYPE C INLET
12	18.9	133.7	OSID, VID, W-2, V2	EX 4'x14' MOD CDOT TYPE D INLET
13	2.8	5.6	RP-2B	EX CDOT EMBANKMENT PROTECTOR TYPE 5
14	8.9	21.2	M, M2, RP2C, DP13	EX FSD POND W-9

STORM SEWER SUMMARY				
PIPE RUN	Q _s	Q ₁₀₀	PIPE SIZE	CONTRIBUTING PIPES/DP'S
1	3.6	8.7	30" RCP	DP1
2	7.1	17.2	36" RCP	DP2, PR1
3	4.2	10.1	18" RCP	DP3
4	16.8	29.4	30" RCP	DP4, PR3
5	10.8	30.0	36" RCP	DP5, PR2
6	21.0	44.6	36" RCP	DP6, PR5
7	12.6	30.5	24" RCP	DP7
8	1.6	7.0	12" CMP	DP9
9	4.8	26.3	24" RCP	DP10
10	2.2	12.3	18" RCP	DP11
11	7.0	38.6	30" RCP	PR5, PR6
12	18.9	133.7	54" RCP	DP12
13	0.6	8.7	18" RCP	OUTFLOW LBS POND = W-9
14	7.6	47.2	30" RCP	PR7, PR9
15	23.8	164.1	54" RCP	PR8, PR10
16	2.7	36.2	30" RCP	OUTFLOW LBS POND = 4
17	26.5	200.3	60" RCP	PR11, PR12

REVISED POND 4 FSD BASIN DATA	REVISED POND W-9 FSD BASIN DATA
WQ WATER SURFACE EL = 7056.39	WQ WATER SURFACE EL = 7086.59
WQ VOLUME = 0.046 AC-FT	WQ VOLUME = 0.092 AC-FT
EURV WATER SURFACE EL = 7058.46	EURV WATER SURFACE EL = 7087.99
EURV VOLUME = 1.510 AC-FT	EURV VOLUME = 0.390 AC-FT
100-YR WATER SURFACE EL = 7059.98	100-YR WATER SURFACE EL = 7088.84
SPILLWAY CREST EL = 7060.0	SPILLWAY CREST EL = 7088.84
TOP OF EMBANKMENT EL = 7063.0	TOP OF EMBANKMENT EL = 7090.5
100-YR VOLUME = 2.915 AC-FT	100-YR VOLUME = 0.995 AC-FT
100-YR INFLOW = 105.3 CFS	100-YR INFLOW = 21.2 CFS
100-YR RELEASE = 36.8 CFS	100-YR RELEASE = 8.7 CFS



20 BOULDER CRESCENT, SUITE 110
COLORADO SPRINGS, CO 80903
PHONE: 719.955.5485

HOMESTEAD AT STERLING RANCH FIL NO. 1

FINAL DRAINAGE MAP

PROJECT NO. 09-005	SCALE: HORIZONTAL: 1"=80'	DATE: 4/12/2018
DESIGNED BY: CMN DRAWN BY: CMN CHECKED BY: VAS	VERTICAL: N/A	SHEET 1 OF 1 FDM01

FINAL DRAINAGE REPORT FOR HOMESTEAD AT STERLING RANCH FILING NO. 2

EL PASO COUNTY, COLORADO

January 2020

Prepared for:
SR Land, LLC
20 Boulder Crescent, Suite 210
Colorado Springs, CO 80903

Prepared by:



Project #09-007
SF -19-004

respectively. The total combined developed area being discharge to the channel is less than one acre. It is not practicable to provide WQCV for these areas, as stated earlier in this paragraph, areas consists primarily of vegetated tracts with no development.

CHANNEL IMPROVEMENTS

Slope grading and intermittent channel bank lining has been proposed for portions of the developable areas adjacent to Sand Creek to protect the developed lots and prevent excessive erosion until the DBPS recommended Sand Creek Channel improvements are installed. The proposed slope grading is intended to reduce outer bank grades and bring uniformity to areas where significant riling and destabilization has occurred. Proposed channel stabilization improvements includes placement of soil riprap and turf reinforcement matting along embankment toes and along embankment slopes, both of which will function to retain soils and vegetation during heavy rains or larger flood flow events. All disturbed areas, not hardscaped will be re-vegetated with native species grasses, per El Paso County erosion control standards. Storm sewer outfalls into Sand Creek shall be protected by low-tailwater riprap basins. The outfall protection is shown on the accompanying drainage map in the appendix. Refer to the Homestead Filing No.2 Grading and Erosion Control Plans for riprap and turf reinforcement map placement and construction details.

Permanently installed check structures and rip-rap channel lining will be installed within Sand Creek Channel to handle the runoff from fully developed Sterling Ranch and up-gradient watershed in accordance with the Sand Creek DBPS. A discussion regarding the timing of these channel improvements is provided in a subsequent paragraph titled Sterling Ranch Filing No. 1 Subdivision Improvement agreement which follows the Construction Costs segment of this report. Financial Assurance shall be posted for the proposed Sand Creek Channel Improvements and Bank Stabilization (Slope Protection and grade control structures).

WATER QUALITY PROVISIONS

The proposed Full Spectrum Detention Facility, Pond 1 functions to provide detention storage and water quality facility for runoff produced onsite from tributary Basins T, U, V1, V2 and W3. This water quality facility is designed to treat 0.245 ac-ft of water quality storage (WQCV), 0.741 ac-feet of excess urban runoff volume (EURV) and 1.331 ac-ft of 100-year storage. A rolled erosion control blanketed emergency spillway, concrete forebay, trickle channel and outlet structure, and gravel maintenance access road has been designed for Pond 1.

A 24" RCP pipe extending from the proposed modified 6'x2.9' CDOT Type D sump inlet (see Design Point 13) will convey discharge from the pond to Sand Creek. Runoff discharged to Sand Creek is anticipated to reach peak flow rates of $Q_5=0.7$ cfs and $Q_{100}=23.4$ cfs. A soil riprap stilling basin has been provided at the termination of the pipe to arrest erosion.

Runoff produced within the residential backyard lots, of Basins X1, X2, W1 and Y1 will be conveyed in backyard swales and as sheet flow to a Sand Filter Basin within each lot. The treated flows will be collected by private storm sewer systems and discharged into the Sand Creek Channel. This water quality facility, for each Sand Filter Basin, is designed to treat 0.001 ac-ft of water quality storage (WQCV), 0.005 ac-feet of excess urban runoff volume (EURV) and 0.014 ac-ft of 100-year storage. A 20' wide typical drainage easement is provided within the lots to accommodate the BMP's. The facilities constructed are to be privately maintained by the Sterling Ranch metro district.

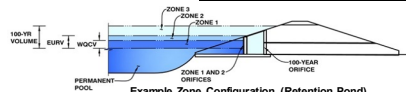
The WQCV and EURV required for the site has been determined using the guidelines set forth in the City of Colorado Springs/El Paso County Drainage Criteria Manual - Volume II. Refer to the water quality

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)

Project: Homestead At Sterling Ranch Filings Nos. 2

Basin ID: FSD Pond 1



Example Zone Configuration (Retention Pond)

Required Volume Calculation

Selected BMP Type =	EDB	
Watershed Area =	16.51	acres
Watershed Length =	875	ft
Watershed Slope =	0.020	ft/ft
Watershed Imperviousness =	44.10%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	100.0%	percent
Percentage Hydrologic Soil Group C =	0.0%	percent
Desired WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depth =	User Input	
Water Quality Capture Volume (WQCV) =	0.662	acre-feet
Excess Urban Runoff Volume (EURV) =	0.771	acre-feet
2-yr Runoff Volume (P1 = 1.5%) =	0.847	acre-feet
5-yr Runoff Volume (P1 = 1.5%) =	0.847	acre-feet
25-yr Runoff Volume (P1 = 1.75%) =	1.177	acre-feet
50-yr Runoff Volume (P1 = 2.0%) =	1.710	acre-feet
50-yr Runoff Volume (P1 = 2.25%) =	2.073	acre-feet
100-yr Runoff Volume (P1 = 2.5%) =	2.550	acre-feet
500-yr Runoff Volume (P1 = 0.0%) =	0.000	acre-feet
Approximate 2-yr Detention Volume =	0.574	acre-feet
Approximate 5-yr Detention Volume =	0.795	acre-feet
Approximate 10-yr Detention Volume =	1.075	acre-feet
Approximate 25-yr Detention Volume =	1.190	acre-feet
Approximate 50-yr Detention Volume =	1.247	acre-feet
Approximate 100-yr Detention Volume =	1.412	acre-feet

Water Quality Capture Volume (WQCV) =	0.262	acre-feet	Optional User Override 1-hr Precipitation	
Excess Urban Runoff Volume (EURV) =	0.771	acre-feet		
2-yr Runoff Volume (P1 = 1.19 in.) =	0.614	acre-feet		1.19 inches
5-yr Runoff Volume (P1 = 1.51 in.) =	0.847	acre-feet		1.50 inches
10-yr Runoff Volume (P1 = 1.75 in.) =	1.177	acre-feet		1.75 inches
25-yr Runoff Volume (P1 = 2 in.) =	1.710	acre-feet		2.00 inches
50-yr Runoff Volume (P1 = 2.25 in.) =	2.073	acre-feet		2.25 inches
100-yr Runoff Volume (P1 = 2.52 in.) =	2.550	acre-feet	2.52 inches	
500-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet		

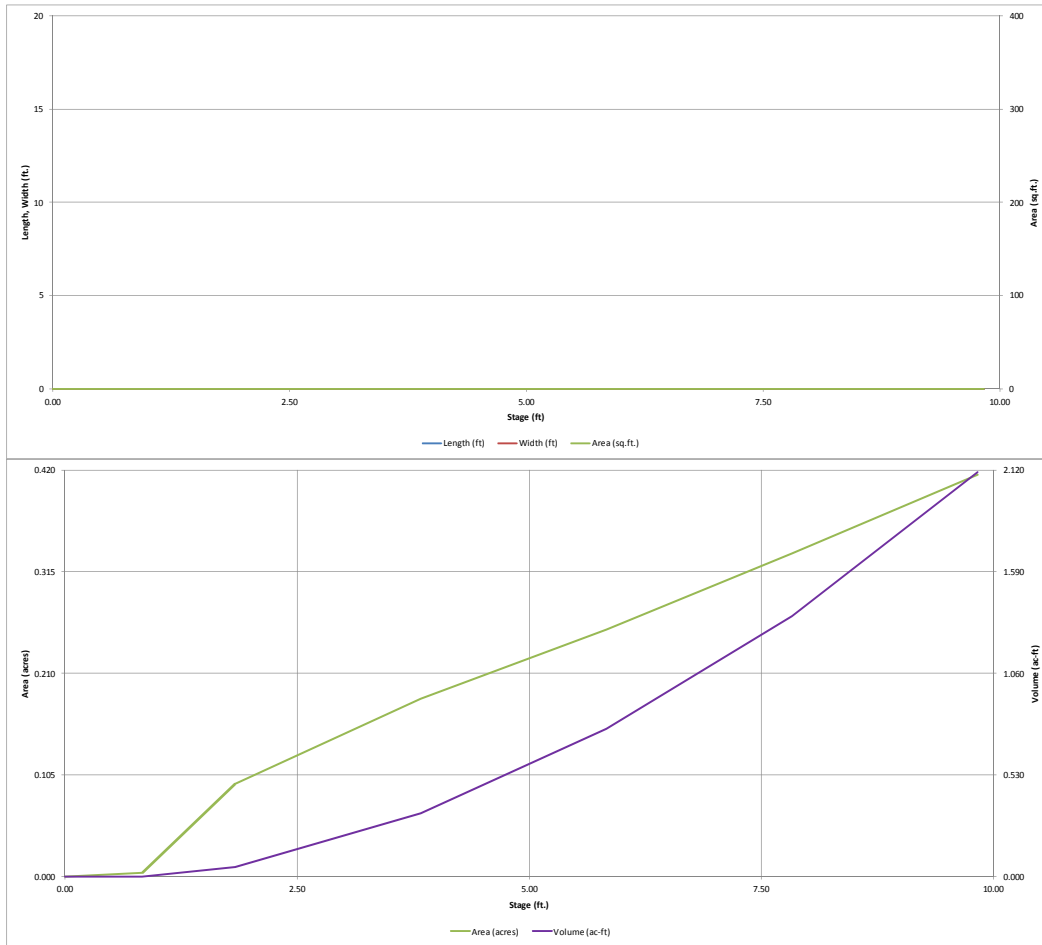
Stage-Storage Calculation

Zone 1 Volume ($WOCV_1$)	=	0.262	acre-feet
Zone 2 Volume ($EURV - Zone 1$)	=	0.508	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2)	=	0.642	acre-feet
Total Detention Basin Volume	=	1.412	acre-feet
Initial Surcharge Volume (ISV)	=	user	ft ³
Initial Surcharge Depth (ISD)	=	user	ft
Total Available Detention Depth (H_{DAV})	=	user	ft
Depth of Trickle Channel (H_{TC})	=	user	ft
Slope of Trickle Channel (S_{TC})	=	user	ft/ft
Slopes of Main Basin Sides (S_{MAIN})	=	user	H/V
Basin Length-to-Width Ratio ($R_{L/W}$)	=	user	
Initial Surcharge Area (A_{ISU})	=	user	ft ²
Surcharge Volume Length (L_{SV})	=	user	ft
Surcharge Volume Width (W_{SV})	=	user	ft
Depth of Basin Floor (H_{100A})	=	user	ft
Length of Basin Floor (L_{100A})	=	user	ft
Width of Basin Floor (W_{100A})	=	user	ft
Area of Basin Floor (V_{100A})	=	user	ft ²
Volume of Basin Floor (V_{100A})	=	user	ft ³
Depth of Main Basin (H_{MAIN})	=	user	ft
Length of Main Basin (L_{MAIN})	=	user	ft
Width of Main Basin (W_{MAIN})	=	user	ft
Area of Main Basin (A_{MAIN})	=	user	ft ²
Volume of Main Basin (V_{MAIN})	=	user	ft ³
Calculated Total Basin Volume (V_{TBL})	=	0.567	acre-feet

[illegible]

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)

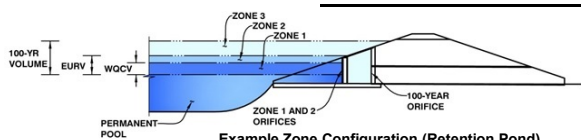


Detention Basin Outlet Structure Design

UD-Detention, Version 3.07 (February 2017)

Project: _____

Basin ID: _____



Example Zone Configuration (Retention Pond)

	Stage (ft)	Zone Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	3.45	0.262	Orifice Plate
Zone 2 (EURV)	5.84	0.508	Orifice Plate
Zone 3 (100-year)	8.00	0.642	Weir&Pipe (Restrict)
		1.412	Total

User Input: Orifice at Underdrain Outlet (typically used to drain WQCV in a Filtration BMP)

Underdrain Orifice Invert Depth = ft (distance below the filtration media surface)
Underdrain Orifice Diameter = inches

Calculated Parameters for Underdrain

Underdrain Orifice Area = ft²
Underdrain Orifice Centroid = feet

User Input: Orifice Plate with one or more orifices or Elliptical Slot Weir (typically used to drain WQCV and/or EURV in a sedimentation BMP)

Invert of Lowest Orifice = ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Orifice Plate = ft (relative to basin bottom at Stage = 0 ft)
Orifice Plate: Orifice Vertical Spacing = inches
Orifice Plate: Orifice Area per Row = sq. inches (diameter = 1-3/16 inches)

Calculated Parameters for Plate

WQ Orifice Area per Row = ft²
Elliptical Half-Width = feet
Elliptical Slot Centroid = feet
Elliptical Slot Area = ft²

User Input: Stage and Total Area of Each Orifice Row (numbered from lowest to highest)

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	<input type="text" value="0.00"/>	<input type="text" value="1.95"/>	<input type="text" value="3.89"/>					
Orifice Area (sq. inches)	<input type="text" value="1.19"/>	<input type="text" value="1.19"/>	<input type="text" value="1.19"/>					

	Row 9 (optional)	Row 10 (optional)	Row 11 (optional)	Row 12 (optional)	Row 13 (optional)	Row 14 (optional)	Row 15 (optional)	Row 16 (optional)
Stage of Orifice Centroid (ft)								
Orifice Area (sq. inches)								

User Input: Vertical Orifice (Circular or Rectangular)

	Not Selected	Not Selected	
Invert of Vertical Orifice =	<input type="text" value="N/A"/>	<input type="text" value="N/A"/>	ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Vertical Orifice =	<input type="text" value="N/A"/>	<input type="text" value="N/A"/>	ft (relative to basin bottom at Stage = 0 ft)
Vertical Orifice Diameter =	<input type="text" value="N/A"/>	<input type="text" value="N/A"/>	inches

Calculated Parameters for Vertical Orifice

	Not Selected	Not Selected	
Vertical Orifice Area =	<input type="text" value="N/A"/>	<input type="text" value="N/A"/>	ft ²
Vertical Orifice Centroid =	<input type="text" value="N/A"/>	<input type="text" value="N/A"/>	feet

User Input: Overflow Weir (Dropbox) and Grate (Flat or Sloped)

	Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, H _o =	<input type="text" value="5.84"/>	<input type="text" value="N/A"/>	ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length =	<input type="text" value="6.00"/>	<input type="text" value="N/A"/>	feet
Overflow Weir Slope =	<input type="text" value="3.00"/>	<input type="text" value="N/A"/>	H:V (enter zero for flat grate)
Horiz. Length of Weir Sides =	<input type="text" value="2.91"/>	<input type="text" value="N/A"/>	feet
Overflow Grate Open Area % =	<input type="text" value="70%"/>	<input type="text" value="N/A"/>	% grate open area/total area
Debris Clogging % =	<input type="text" value="50%"/>	<input type="text" value="N/A"/>	%

Calculated Parameters for Overflow Weir

	Zone 3 Weir	Not Selected	
Height of Grate Upper Edge, H _t =	<input type="text" value="6.81"/>	<input type="text" value="N/A"/>	feet
Over Flow Weir Slope Length =	<input type="text" value="3.07"/>	<input type="text" value="N/A"/>	feet
Grate Open Area / 100-yr Orifice Area =	<input type="text" value="7.21"/>	<input type="text" value="N/A"/>	should be ≥ 4
Overflow Grate Open Area w/o Debris =	<input type="text" value="12.88"/>	<input type="text" value="N/A"/>	ft ²
Overflow Grate Open Area w/ Debris =	<input type="text" value="6.44"/>	<input type="text" value="N/A"/>	ft ²

User Input: Outlet Pipe w/ Flow Restriction Plate (Circular Orifice, Restrictor Plate, or Rectangular Orifice)

	Zone 3 Restrictor	Not Selected	
Depth to Invert of Outlet Pipe =	<input type="text" value="0.25"/>	<input type="text" value="N/A"/>	ft (distance below basin bottom at Stage = 0 ft)
Outlet Pipe Diameter =	<input type="text" value="24.00"/>	<input type="text" value="N/A"/>	inches
Restrictor Plate Height Above Pipe Invert =	<input type="text" value="13.30"/>		inches

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

	Zone 3 Restrictor	Not Selected	
Outlet Orifice Area =	<input type="text" value="1.79"/>	<input type="text" value="N/A"/>	ft ²
Outlet Orifice Centroid =	<input type="text" value="0.63"/>	<input type="text" value="N/A"/>	feet
Half-Central Angle of Restrictor Plate on Pipe =	<input type="text" value="1.68"/>	<input type="text" value="N/A"/>	radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage = ft (relative to basin bottom at Stage = 0 ft)
Spillway Crest Length = feet
Spillway End Slopes = H:V
Freeboard above Max Water Surface = feet

Calculated Parameters for Spillway

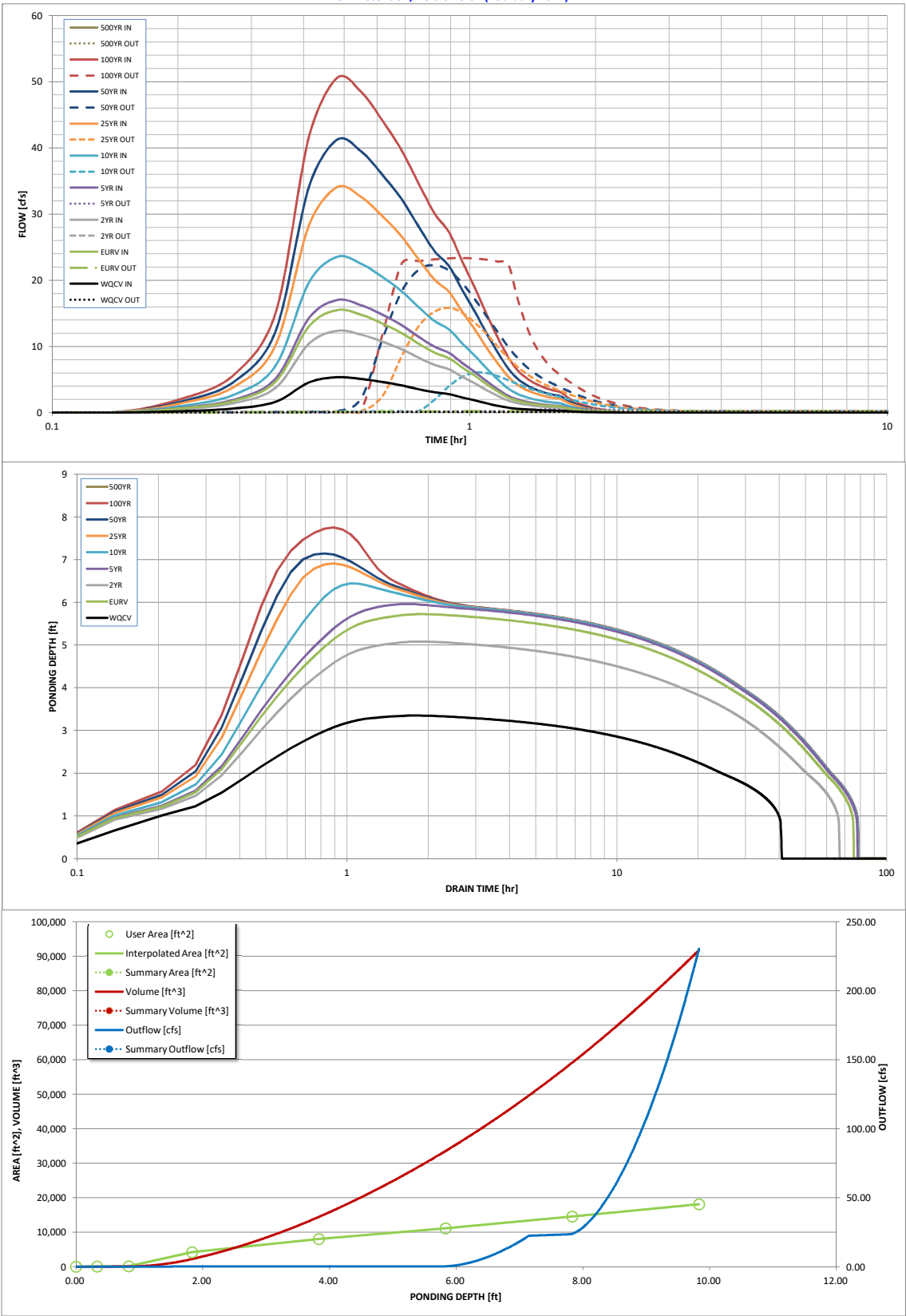
Spillway Design Flow Depth = feet
Stage at Top of Freeboard = feet
Basin Area at Top of Freeboard = acres

Routed Hydrograph Results

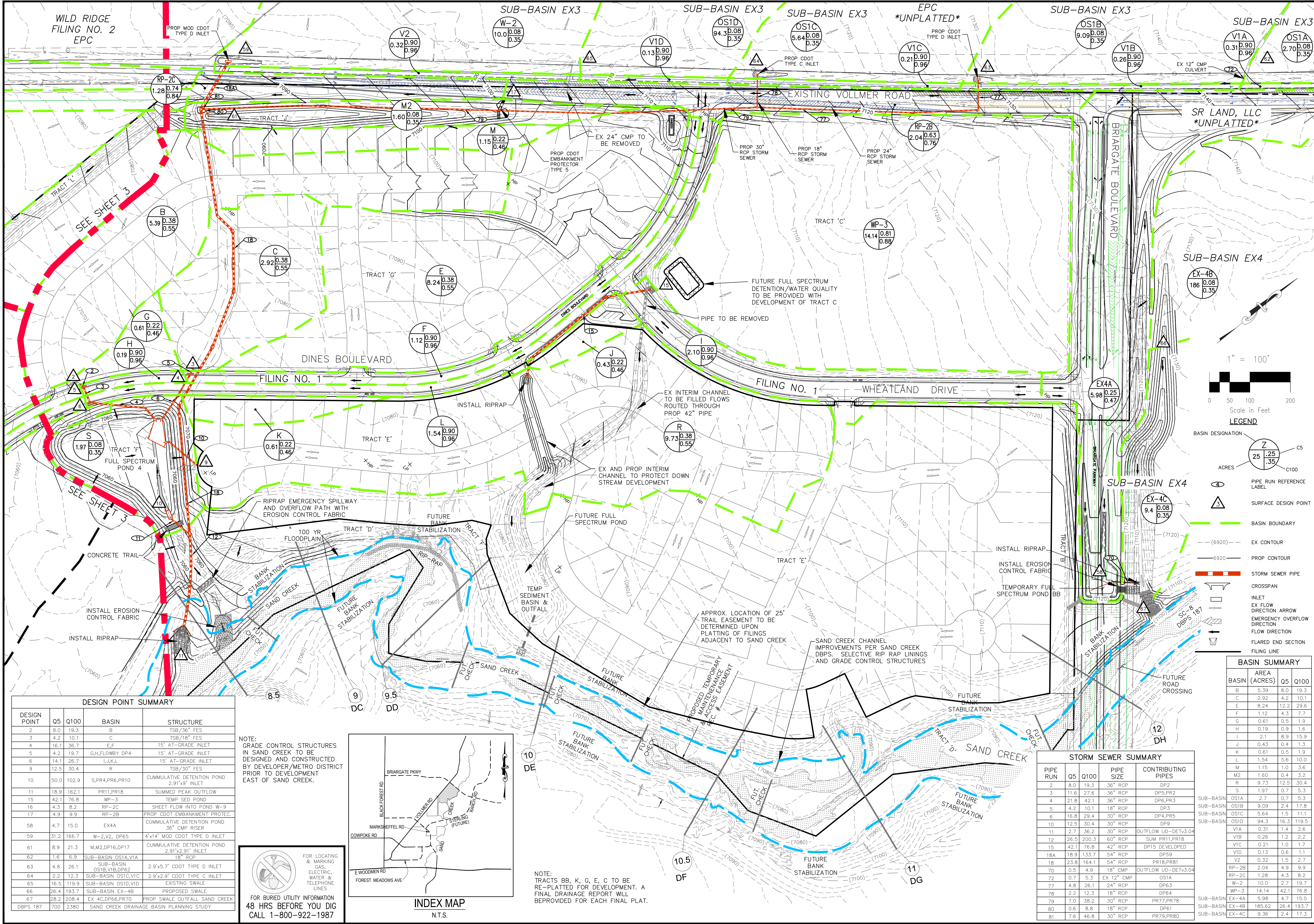
	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
Design Storm Return Period =									
One-Hour Rainfall Depth (in) =	<input type="text" value="0.53"/>	<input type="text" value="1.07"/>	<input type="text" value="1.19"/>	<input type="text" value="1.50"/>	<input type="text" value="1.75"/>	<input type="text" value="2.00"/>	<input type="text" value="2.25"/>	<input type="text" value="2.52"/>	<input type="text" value="0.00"/>
Calculated Runoff Volume (acre-ft) =	<input type="text" value="0.262"/>	<input type="text" value="0.771"/>	<input type="text" value="0.614"/>	<input type="text" value="0.847"/>	<input type="text" value="1.177"/>	<input type="text" value="1.710"/>	<input type="text" value="2.073"/>	<input type="text" value="2.550"/>	<input type="text" value="0.000"/>
OPTIONAL Override Runoff Volume (acre-ft) =									
Inflow Hydrograph Volume (acre-ft) =	<input type="text" value="0.262"/>	<input type="text" value="0.771"/>	<input type="text" value="0.614"/>	<input type="text" value="0.847"/>	<input type="text" value="1.176"/>	<input type="text" value="1.710"/>	<input type="text" value="2.074"/>	<input type="text" value="2.551"/>	<input type="text" value="#N/A"/>
Predevelopment Unit Peak Flow, q (cfs/acre) =	<input type="text" value="0.00"/>	<input type="text" value="0.00"/>	<input type="text" value="0.02"/>	<input type="text" value="0.03"/>	<input type="text" value="0.27"/>	<input type="text" value="0.84"/>	<input type="text" value="1.16"/>	<input type="text" value="1.55"/>	<input type="text" value="0.00"/>
Predevelopment Peak Q (cfs) =	<input type="text" value="0.0"/>	<input type="text" value="0.0"/>	<input type="text" value="0.3"/>	<input type="text" value="0.4"/>	<input type="text" value="4.4"/>	<input type="text" value="13.9"/>	<input type="text" value="19.2"/>	<input type="text" value="25.5"/>	<input type="text" value="0.0"/>
Peak Inflow Q (cfs) =	<input type="text" value="5.3"/>	<input type="text" value="15.5"/>	<input type="text" value="12.4"/>	<input type="text" value="17.0"/>	<input type="text" value="23.5"/>	<input type="text" value="34.1"/>	<input type="text" value="41.2"/>	<input type="text" value="50.5"/>	<input type="text" value="#N/A"/>
Peak Outflow Q (cfs) =	<input type="text" value="0.1"/>	<input type="text" value="0.2"/>	<input type="text" value="0.2"/>	<input type="text" value="0.7"/>	<input type="text" value="6.0"/>	<input type="text" value="15.8"/>	<input type="text" value="22.3"/>	<input type="text" value="23.4"/>	<input type="text" value="#N/A"/>
Ratio Peak Outflow to Predevelopment Q =	<input type="text" value="N/A"/>	<input type="text" value="N/A"/>	<input type="text" value="N/A"/>	<input type="text" value="1.5"/>	<input type="text" value="1.4"/>	<input type="text" value="1.1"/>	<input type="text" value="1.2"/>	<input type="text" value="0.9"/>	<input type="text" value="#N/A"/>
Structure Controlling Flow =	<input type="text" value="Plate"/>	<input type="text" value="Plate"/>	<input type="text" value="Plate"/>	<input type="text" value="Overflow Grate 1"/>	<input type="text" value="Overflow Grate 1"/>	<input type="text" value="Overflow Grate 1"/>	<input type="text" value="Outlet Plate 1"/>	<input type="text" value="Outlet Plate 1"/>	<input type="text" value="#N/A"/>
Max Velocity through Grate 1 (fps) =	<input type="text" value="N/A"/>	<input type="text" value="N/A"/>	<input type="text" value="N/A"/>	<input type="text" value="0.0"/>	<input type="text" value="0.4"/>	<input type="text" value="1.2"/>	<input type="text" value="1.7"/>	<input type="text" value="1.8"/>	<input type="text" value="#N/A"/>
Max Velocity through Grate 2 (fps) =	<input type="text" value="N/A"/>	<input type="text" value="N/A"/>	<input type="text" value="N/A"/>	<input type="text" value="N/A"/>	<input type="text" value="N/A"/>	<input type="text" value="N/A"/>	<input type="text" value="N/A"/>	<input type="text" value="N/A"/>	<input type="text" value="#N/A"/>
Time to Drain 97% of Inflow Volume (hours) =	<input type="text" value="39"/>	<input type="text" value="69"/>	<input type="text" value="62"/>	<input type="text" value="71"/>	<input type="text" value="69"/>	<input type="text" value="66"/>	<input type="text" value="63"/>	<input type="text" value="61"/>	<input type="text" value="#N/A"/>
Time to Drain 99% of Inflow Volume (hours) =	<input type="text" value="40"/>	<input type="text" value="73"/>	<input type="text" value="65"/>	<input type="text" value="76"/>	<input type="text" value="75"/>	<input type="text" value="74"/>	<input type="text" value="73"/>	<input type="text" value="72"/>	<input type="text" value="#N/A"/>
Maximum Ponding Depth (ft) =	<input type="text" value="3.35"/>	<input type="text" value="5.72"/>	<input type="text" value="5.08"/>	<input type="text" value="5.96"/>	<input type="text" value="6.44"/>	<input type="text" value="6.91"/>	<input type="text" value="7.15"/>	<input type="text" value="7.75"/>	<input type="text" value="#N/A"/>
Area at Maximum Ponding Depth (acres) =	<input type="text" value="0.16"/>	<input type="text" value="0.25"/>	<input type="text" value="0.23"/>	<input type="text" value="0.26"/>	<input type="text" value="0.28"/>	<input type="text" value="0.30"/>	<input type="text" value="0.31"/>	<input type="text" value="0.33"/>	<input type="text" value="#N/A"/>
Maximum Volume Stored (acre-ft) =	<input type="text" value="0.245"/>	<input type="text" value="0.741"/>	<input type="text" value="0.588"/>	<input type="text" value="0.802"/>	<input type="text" value="0.932"/>	<input type="text" value="1.067"/>	<input type="text" value="1.137"/>	<input type="text" value="1.331"/>	<input type="text" value="#N/A"/>

Detention Basin Outlet Structure Design

UD-Detention, Version 3.07 (February 2017)



S-A-V-D Chart Axis Override	X-axis	Left Y-Axis	Right Y-Axis
minimum bound			
maximum bound			

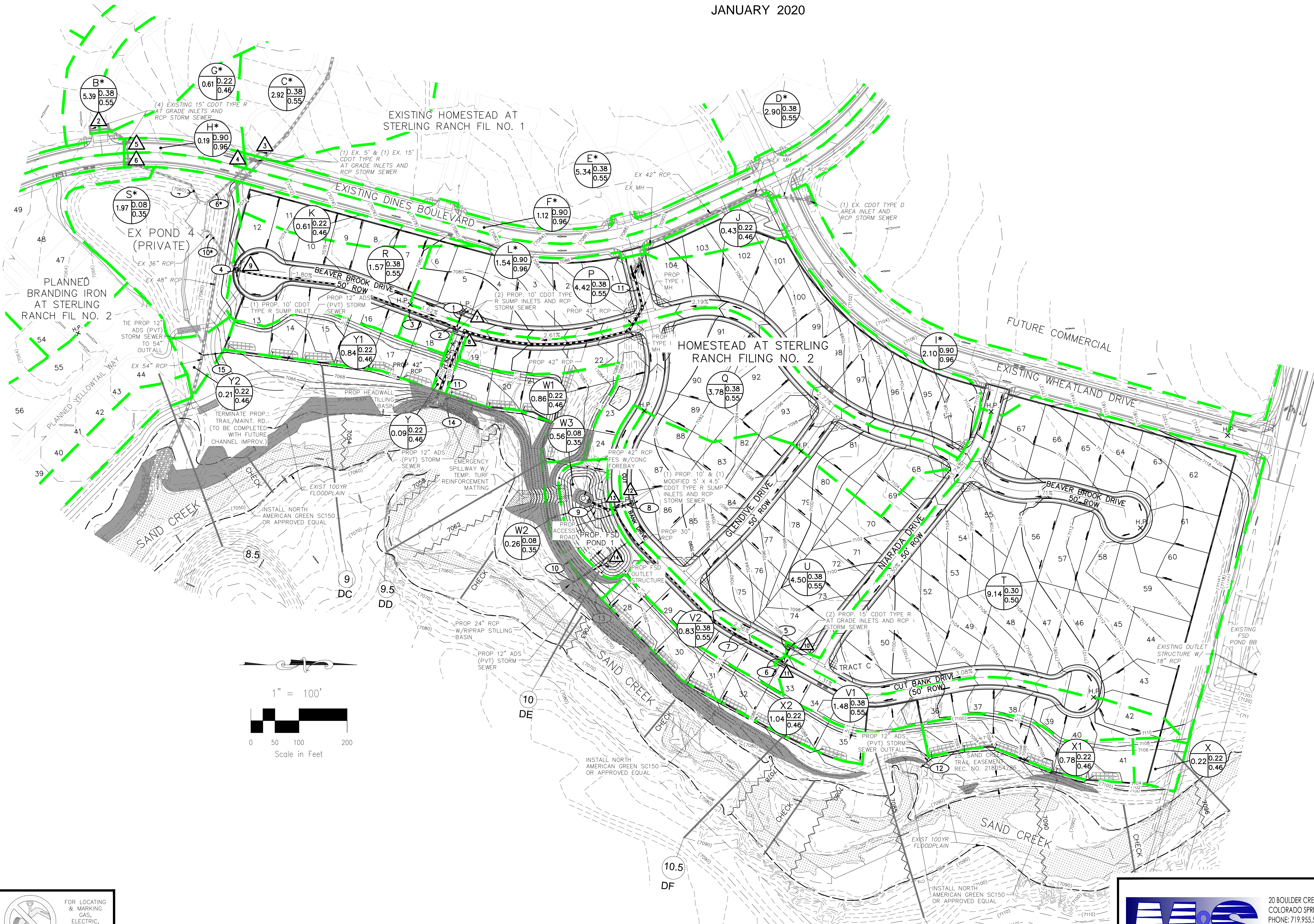


HOMESTEAD AT STERLING RANCH FILING NO. 2
COUNTY OF EL PASO, STATE OF COLORADO
PROPOSED DRAINAGE MAP

JANUARY 2020

LEGEND

- BASIN DESIGNATION
ACRES
PIPE RUN REFERENCE LABEL
SURFACE DESIGN POINT
BASIN BOUNDARY
EXISTING CONTOUR
PROP CONTOUR
HOMESTEAD FILING NOS. 2&3 BOUNDARY
PROPOSED STORM SEWER PIPE
EXISTING STORM SEWER PIPE
CROSSSPAN
INLET
EXISTING FLOW DIRECTION ARROW
PROPOSED FLOW DIRECTION ARROW
FLARED END SECTION
HIGH POINT
LOW POINT



STORM SEWER SUMMARY				
PIPE RUN	Q _s	Q ₁₀₀	PIPE SIZE	CONTRIBUTING PIPES/DESIGN POINTS
1	5.7	13.8	18" RCP	DP7
2	4.9	11.8	18" RCP	DP8
3	10.6	25.7	24" RCP	PR1, PR2
4	12.4	30.1	30" RCP	DP9, PR3
5	9.1	12.7	18" RCP	DP10
6	1.9	12.7	18" RCP	DP11
7	10.9	25.3	30" RCP	PR5, PR6
8	6.2	17.2	24" RCP	DP12
9	17.9	47.1	42" RCP	DP13, PR7, PR8
10	0.7	23.5	24" RCP	OUTLET STRUC.
11	42.1	76.8	42" RCP	CONTINUED FROM MDDP DP15*
12	0.0	1.3	12" ADS	LOTS 36-41
13	0.0	1.6	12" ADS	LOTS 28-35
14	0.0	1.5	12" ADS	LOTS 19-24
15	0.0	1.4	12" ADS	LOTS 13-18
4*	21.8	42.1	36" RCP	SEE MDDP*
6*	16.8	29.4	30" RCP	SEE MDDP*
10*	12.5	30.4	30" RCP	SEE MDDP*

BASIN SUMMARY				
BASIN	AREA (ACRES)	Q _s	Q ₁₀₀	
ONSITE BASINS				
J	0.43	0.4	1.3	
K	0.61	0.5	1.9	
P	4.42	5.7	13.8	
Q	3.78	4.9	11.8	
R	1.57	2.2	5.4	
T	9.14	9.4	26.4	
U	4.50	6.4	15.6	
V1	1.48	2.1	5.0	
V2	0.83	1.2	2.9	
W1	0.56	0.2	1.7	
W2	0.26	0.1	0.8	
W3	0.56	0.2	1.7	
X	0.22	0.2	0.8	
X1	0.78	0.8	2.8	
X2	1.04	1.1	3.7	
Y	0.09	0.1	0.3	
Y1	0.84	0.8	3.0	
Y2	0.21	0.2	0.7	

FULL SPECTRUM DETENTION INTERIM POND 1			
WO VOLUME	0.245 AC-FT		
EURV VOLUME	0.741 AC-FT		
100 YR STORAGE VOLUME	1.331 AC-FT		
100 YR WATER SURFACE EL	7083.91		
SPILLWAY CREST EL	7084.16		
TOP OF EMBANKMENT EL	7086.00		
SPILLWAY DESIGN FLOW DEPTH	0.84 FT		

B*	5.39	8.0	19.3
C*	2.92	4.2	10.1
D*	2.90	4.3	10.4
E*	5.34	8.2	19.9
F*	1.12	4.3	7.7
G*	0.61	0.5	1.9
H*	0.19	0.9	1.6
I*	2.10	8.9	15.9
L*	1.54	5.6	10.0
S*	1.97	0.7	5.3

DESIGN POINT SUMMARY			
DESIGN POINT	Q _s	Q ₁₀₀	STRUCTURE
2*	8.0	19.3	(2) EX. 15" AT-GRADE INLETS
3*	4.2	10.1	C* EX. 6" SUMP INLET
4*	16.1	36.7	D*, E*, F* EX. 15" AT-GRADE INLET
5*	4.2	19.7	G*, H*, FLOWBY DP4* EX. 15" AT-GRADE INLET
6*	14.1	26.7	I*, J*, K*, L* EX. 15" AT-GRADE INLET
7	5.7	13.8	P PROP. 10' SUMP INLET
8	4.9	11.8	Q PROP. 10' SUMP INLET
9	2.2	5.4	R PROP. 5' SUMP INLET
10	9.4	15.6	T PROP. 15" AT-GRADE INLET
11	1.9	15.6	V1 PROP. 15" AT-GRADE INLET
12	6.2	17.2	U, FLOWBY DP10 PROP. 10' SUMP INLET
13	1.2	5.9	V2, FLOWBY DP11 PROP. 5' SUMP INLET
14	19.6	52.4	W3, PR9 CUMULATIVE DETENTION POND

* For detailed information on Design Points, Basins, Flowby, or Pipe Runs see Sterling Ranch Filing Nos. 1&2 MDDP prepared by MS Civil Consultants, dated April 2017.
Refer to Homestead at Sterling Ranch Filing No. 2 Grading and Erosion Control Plan for additional interim channel stabilization improvements.
All elevations provided on map are referenced in NGVD29

FOR LOCATING & MARKING GAS, ELECTRIC, WATER & TELEPHONE LINES
FOR BURIED UTILITY INFORMATION 48 HRS BEFORE YOU DIG CALL 1-800-922-1987



20 BOULDER CRESCENT, SUITE 110
COLORADO SPRINGS, CO 80903
PHONE: 719.955.5485

HOMESTEAD AT STERLING RANCH FIL. NO. 2

PROPOSED DRAINAGE MAP

PROJECT NO. 09-007	SCALE: HORIZONTAL: 1"=100' VERTICAL: N/A	DATE: 01/15/2020	
DESIGNED BY: CMN	DRAWN BY: CMN	CHECKED BY: VAS	
			SHEET 1 OF 1
			PDM

FINAL DRAINAGE REPORT FOR BRANDING IRON AT STERLING RANCH FILING NO. 2

EL PASO COUNTY, COLORADO

January 2020

Prepared for:
SR Land, LLC
20 Boulder Crescent, Suite 210
Colorado Springs, CO 80903

Prepared by:



Project #09-012
EPC Project # SF-19-018

EXISTING DRAINAGE CONDITIONS

The Branding Iron at Sterling Ranch Filing No. 2 site consists of 18.881 acres and is situated west of the Sand Creek Watershed. This area was previously studied in the "Sand Creek Drainage Basin Planning Study" (DBPS) prepared by Kiowa Corporation, revised March 1996. More recently the area was studied in the "Master Development Drainage Report for Sterling Ranch Filing Nos. 1&2, and Final Drainage Report for Sterling Ranch Filing No.1" prepared by MS Civil Consultants, dated April 2017 (henceforth referred to as "Sterling Ranch Filing Nos. 1&2 MDDP"). Branding Iron at Sterling Ranch Filing No. 2 and the surrounding areas, with the exception of the existing Barbarick Subdivision, have already been graded during the overlot of the subdivision. Please refer to the Sterling Ranch Filing Nos. 1&2 MDDP by MS Civil Consultants for information on historic conditions and overlot drainage patterns.

PROPOSED DRAINAGE CHARACTERISTICS

General Concept Drainage Discussion

The following is a description of the onsite basins, offsite bypass flows and the overall drainage characteristics for the development of Branding Iron at Sterling Ranch Filing No. 2. The development of Branding Iron at Sterling Ranch Filing No. 2 consists of residential streets and cul-de-sacs, proposed storm drainage improvements, and lots located within the filing boundary. The proposed development results in drainage patterns and flow values that are the same or less than those in the Sterling Ranch Filing Nos. 1&2 MDDP. Surface flow is designated as Design Points (DP). The following DPs and Basins were determined using the Rational Method since this method offers a more conservative approach to drainage. It should be noted that all calculations and drainage basins have been revised to reflect the new criteria updates by the El Paso County/City of Colorado Springs Drainage Criteria Manual. For comparison, the **asterisk (*)** symbol in the detailed drainage discussions below represents each Basin or Design Point as labeled in the Sterling Ranch Filing Nos. 1&2 MDDP.

Detailed Drainage Discussion (Design Points)

DP2*, 5.39 acres, consists of Basin B* planned residential lots and streets with runoff coefficients of 0.38 for the 5-year and 0.55 for the 100-year. Developed runoff of Q5=8.0 cfs and Q100=19.3 cfs has been calculated for DP2*. The surface runoff is routed via overlot grading and planned swales to two existing 15' CDOT Type R at-grade inlets. The flows are routed east via a 36" RCP to DP5.

DP5*, 0.80 acres, consists of Basin G* residential lots with runoff coefficients of 0.22 for the 5-year and 0.46 for the 100-year, Basin H* existing Dines Boulevard, with runoff coefficients of 0.90 for the 5-year and 0.96 for the 100-year and flowby from Sterling Ranch Filing Nos. 1&2 MDDP DP4*. Developed runoff of Q5=4.2 and Q100=19.7 cfs has been calculated for DP5*. The surface runoff is routed via overlot grading and curb and gutter to DP5* which is collected by an existing 15' CDOT type R at-grade inlet. DP5* has an intercepted flow of (Q5=4.2 cfs and Q100=14.7 cfs) and of flowby of (Q5=0.0 cfs and Q100=5.0 cfs).

DP6*, 4.68 acres, consists of Sterling Ranch Filing Nos. 1&2 MDDP Basins J* and K* planned residential lots with runoff coefficients of 0.22 for the 5-year and 0.46 for the 100-year, Sterling Ranch Filing Nos. 1&2 MDDP Basin I* (Wheatland Drive) and Basin L* (Dines Boulevard) with runoff coefficients of 0.90 for the 5-year and 0.96 for the 100-year. Developed runoff of Q5=14.1 cfs and Q100=26.7cfs has been calculated for DP6*. The surface runoff is routed via overlot grading and curb and gutter to DP6* which is collected by an existing 15' CDOT type R at-grade inlet. DP6* has an intercepted flow of (Q5=12.1 cfs and Q100=17.2 cfs) and of flowby of (Q5=2.0 cfs and Q100=9.5 cfs).

DP27, 33.84 acres, consists of Pond 8 an existing full spectrum detention pond. Runoff tributary to Pond 8 consists of Basin UU* with runoff coefficients of 0.08 for the 5-year and 0.35 for the 100-year, existing pipe runs PR20*, PR23*, PR26* and proposed pipe run PR2. Developed runoff of Q5=50.0 cfs and Q100=132.0 cfs has been calculated for DP27. A 2.91' X 9' outlet structure is designed to detain and treat all flows reaching DP27. Refer to the Hydraulic Calculations section of the appendix for more information.

Detailed Drainage Discussion (Drainage Basins)

Basins VV and WW, 1.00 acres, consists of proposed residential backyard lots located along the east and south boundaries of the site, with runoff coefficients of 0.22 for the 5-year and 0.46 for the 100-year. Developed combined runoff of Q5=0.9 cfs and Q100=3.0 cfs has been calculated for these basins. Sheet flow produced within the residential backyard lots of Basins VV and WW travels east and south via backyard lot grading towards Sand Creek. Since the total area draining into Sand Creek is less than One acre, no permanent water quality facilities are necessary. No deviation to the EPC code is required or requested.

IMPROVEMENTS TO POND 8

An additional watershed area of 6.22 acres was added to existing Pond 8 from proposed Basin RR and Basin SS. Runoff produced within these basins is collected at Design Point 24 by a proposed 15' CDOT Type R sump inlet and routed to existing Pond 8 via a proposed 24" and existing 30" RCP pipe (Pipe Run 1). The increased volume and hydraulic affects for Pond 8 were analyzed and are summarized in the table below. Adjustments were performed to the design of Pond 8 to accommodate for the increase in tributary impervious area and runoff volume. Refer to the Hydraulic Calculations section of the appendix for more information. A forebay calculation sheet has been included in the appendix. A copy of the draft CD/pond modifications have been included with this report.

Description	MDDP	Branding Iron Fil. No. 2
Watershed Area	28.98 Acres	35.20 Acres
100 yr WSE	7020.59	7021.13
Emergency Spillway Crest EL	7020.60	7021.15
100 yr Volume	2.988 Ac-ft	3.490 Ac-ft
North Forebay Volume Required	643 CF	732 CF
North Forebay Volume Provided	855 CF	855 CF

EROSION CONTROL

It is the policy of the El Paso County that a grading and erosion control plan be submitted with the drainage report. EPC approved "Early Grading Plan for Sterling Ranch Phase I Onsite Grading & Erosion Control", November 18, 2015. And "Early Grading Plan for Sterling Ranch Phase I Offsite Grading & Erosion Control", December 3, 2015. Grading and Erosion control operations are currently underway (August 2016). Grading and Erosion Control will cease with the final development of the site in the next 12-36 months.

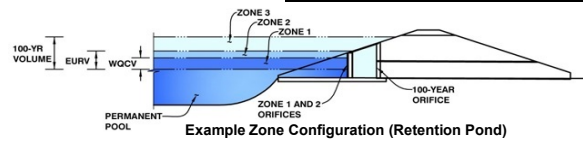
CHANNEL IMPROVEMENTS

Slope grading and intermittent channel bank lining has been proposed for portions of the developable areas adjacent to Sand Creek to protect the developed lots and prevent excessive erosion until the DBPS recommended Sand Creek Channel improvements are installed. The proposed slope grading is intended to reduce outer bank grades and bring uniformity to areas where significant riling and destabilization has

BRANDING IRON AT STERLING RANCH FIL. NO.2

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

Project: STERLING RANCH FILING NO. 1

Basin ID: POND 8

Required Volume Calculation

Selected BMP Type =	EDB	
Watershed Area =	35.20	acres
Watershed Length =	2,151	ft
Watershed Slope =	0.021	ft/ft
Watershed Imperviousness =	53.00%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	100.0%	percent
Percentage Hydrologic Soil Groups C/D =	0.0%	percent
Desired WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths = User Input		
Water Quality Capture Volume (WQCV) =	0.630	acre-feet
Excess Urban Runoff Volume (EURV) =	2.004	acre-feet
2-yr Runoff Volume (P1 = 1.19 in.) =	1.671	acre-feet
5-yr Runoff Volume (P1 = 1.5 in.) =	2.524	acre-feet
10-yr Runoff Volume (P1 = 1.75 in.) =	3.238	acre-feet
25-yr Runoff Volume (P1 = 2 in.) =	4.235	acre-feet
50-yr Runoff Volume (P1 = 2.25 in.) =	5.066	acre-feet
100-yr Runoff Volume (P1 = 2.52 in.) =	6.013	acre-feet
500-yr Runoff Volume (P1 = 6.53 in.) =	16.565	acre-feet
Approximate 2-yr Detention Volume =	1.581	acre-feet
Approximate 5-yr Detention Volume =	2.320	acre-feet
Approximate 10-yr Detention Volume =	2.537	acre-feet
Approximate 25-yr Detention Volume =	2.653	acre-feet
Approximate 50-yr Detention Volume =	2.952	acre-feet
Approximate 100-yr Detention Volume =	3.543	acre-feet

Top of MP=7014.54

Stage-Storage Calculation

Zone 1 Volume (WQCV) =	0.630	acre-feet
Zone 2 Volume (EURV - Zone 1) =	1.374	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	1.540	acre-feet
Total Detention Basin Volume =	3.543	acre-feet
Initial Surcharge Volume (ISV) =	user	ft ³
Initial Surcharge Depth (ISD) =	user	ft
Total Available Detention Depth ($H_{t_{\text{avail}}}$) =	user	ft
Depth of Trickle Channel (H_{TC}) =	user	ft
Slope of Trickle Channel (S_{TC}) =	user	ft/ft
Slopes of Main Basin Sides (S_{main}) =	user	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	user	

Optional User Input
1-hr Precipitation

1.19	inches
1.50	inches
1.75	inches
2.00	inches
2.25	inches
2.52	inches
6.53	inches

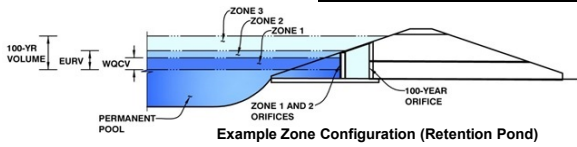
[illegible]

BRANDING IRON AT STERLING RANCH FIL. NO.2

Detention Basin Outlet Structure Design

Project: STERLING RANCH FILING NO. 1

Basin ID: POND 8



Example Zone Configuration (Retention Pond)

	Stage (ft)	Zone Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	2.94	0.630	Orifice Plate
Zone 2 (EURV)	4.92	1.374	Orifice Plate
Zone 3 (100-year)	6.64	1.540	Weir&Pipe (Restrict)
		3.543	Total

User Input: Orifice at Underdrain Outlet (typically used to drain WQCV in a Filtration BMP)

Underdrain Orifice Invert Depth = ft (distance below the filtration media surface)
Underdrain Orifice Diameter = inches

Calculated Parameters for Underdrain

Underdrain Orifice Area = ft²
Underdrain Orifice Centroid = feet

User Input: Orifice Plate with one or more orifices or Elliptical Slot Weir (typically used to drain WQCV and/or EURV in a sedimentation BMP)

Invert of Lowest Orifice = ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Orifice Plate = ft (relative to basin bottom at Stage = 0 ft)
Orifice Plate: Orifice Vertical Spacing = inches
Orifice Plate: Orifice Area per Row = inches

Calculated Parameters for Plate

WQ Orifice Area per Row = ft²
Elliptical Half-Width = feet
Elliptical Slot Centroid = feet
Elliptical Slot Area = ft²

User Input: Stage and Total Area of Each Orifice Row (numbered from lowest to highest)

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	1.60	3.20	4.80				
Orifice Area (sq. inches)	2.87	2.90	4.38	2.88				

	Row 9 (optional)	Row 10 (optional)	Row 11 (optional)	Row 12 (optional)	Row 13 (optional)	Row 14 (optional)	Row 15 (optional)	Row 16 (optional)
Stage of Orifice Centroid (ft)								
Orifice Area (sq. inches)								

User Input: Vertical Orifice (Circular or Rectangular)

	Not Selected	Not Selected	
Invert of Vertical Orifice =	<input type="text" value="N/A"/>	<input type="text" value="N/A"/>	ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Vertical Orifice =	<input type="text" value="N/A"/>	<input type="text" value="N/A"/>	ft (relative to basin bottom at Stage = 0 ft)
Vertical Orifice Diameter =	<input type="text" value="N/A"/>	<input type="text" value="N/A"/>	inches

Calculated Parameters for Vertical Orifice

	Not Selected	Not Selected	
Vertical Orifice Area =	<input type="text" value="N/A"/>	<input type="text" value="N/A"/>	ft ²
Vertical Orifice Centroid =	<input type="text" value="N/A"/>	<input type="text" value="N/A"/>	feet

User Input: Overflow Weir (Dropbox) and Grate (Flat or Sloped)

	Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, H _o =	<input type="text" value="4.74"/>	<input type="text" value="N/A"/>	ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length =	<input type="text" value="9.00"/>	<input type="text" value="N/A"/>	feet
Overflow Weir Slope =	<input type="text" value="4.00"/>	<input type="text" value="N/A"/>	H:V (enter zero for flat grate)
Horiz. Length of Weir Sides =	<input type="text" value="2.91"/>	<input type="text" value="N/A"/>	feet
Overflow Grate Open Area % =	<input type="text" value="70%"/>	<input type="text" value="N/A"/>	% grate open area/total area
Debris Clogging % =	<input type="text" value="50%"/>	<input type="text" value="N/A"/>	%

Calculated Parameters for Overflow Weir

	Zone 3 Weir	Not Selected	
Height of Grate Upper Edge, H ₁ =	<input type="text" value="5.47"/>	<input type="text" value="N/A"/>	feet
Over Flow Weir Slope Length =	<input type="text" value="3.00"/>	<input type="text" value="N/A"/>	feet
Grate Open Area / 100-yr Orifice Area =	<input type="text" value="4.90"/>	<input type="text" value="N/A"/>	should be ≥ 4
Overflow Grate Open Area w/o Debris =	<input type="text" value="18.90"/>	<input type="text" value="N/A"/>	ft ²
Overflow Grate Open Area w/ Debris =	<input type="text" value="9.45"/>	<input type="text" value="N/A"/>	ft ²

User Input: Outlet Pipe w/ Flow Restriction Plate (Circular Orifice, Restrictor Plate, or Rectangular Orifice)

	Zone 3 Restrictor	Not Selected	
Depth to Invert of Outlet Pipe =	<input type="text" value="0.00"/>	<input type="text" value="N/A"/>	ft (distance below basin bottom at Stage = 0 ft)
Outlet Pipe Diameter =	<input type="text" value="30.00"/>	<input type="text" value="N/A"/>	inches
Restrictor Plate Height Above Pipe Invert =	<input type="text" value="22.00"/>	<input type="text" value="N/A"/>	inches

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

	Zone 3 Restrictor	Not Selected	
Outlet Orifice Area =	<input type="text" value="3.86"/>	<input type="text" value="N/A"/>	ft ²
Outlet Orifice Centroid =	<input type="text" value="1.02"/>	<input type="text" value="N/A"/>	feet
Half-Central Angle of Restrictor Plate on Pipe =	<input type="text" value="2.06"/>	<input type="text" value="N/A"/>	radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage = ft (relative to basin bottom at Stage = 0 ft)
Spillway Crest Length = feet
Spillway End Slopes = H:V
Freeboard above Max Water Surface = feet

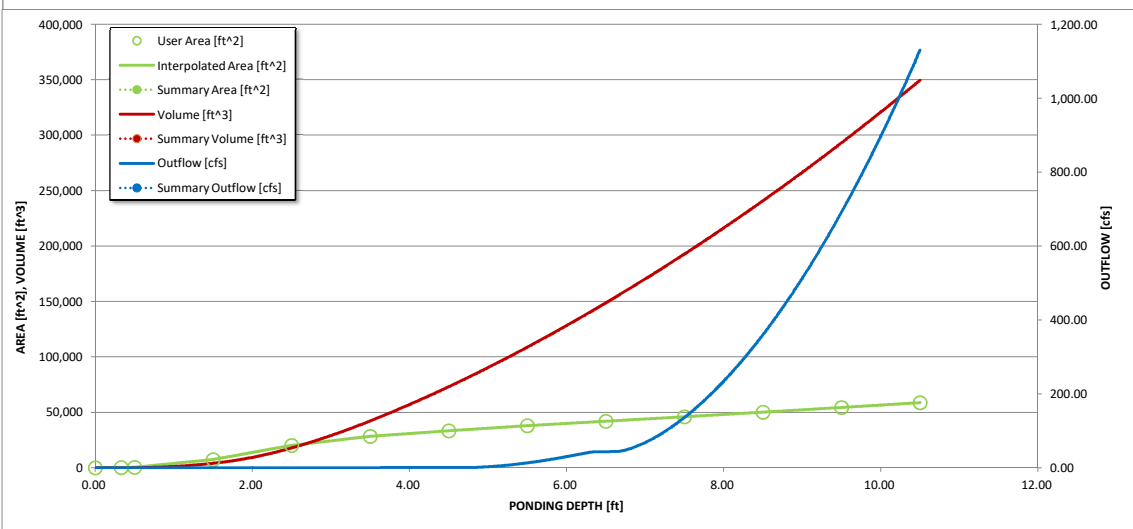
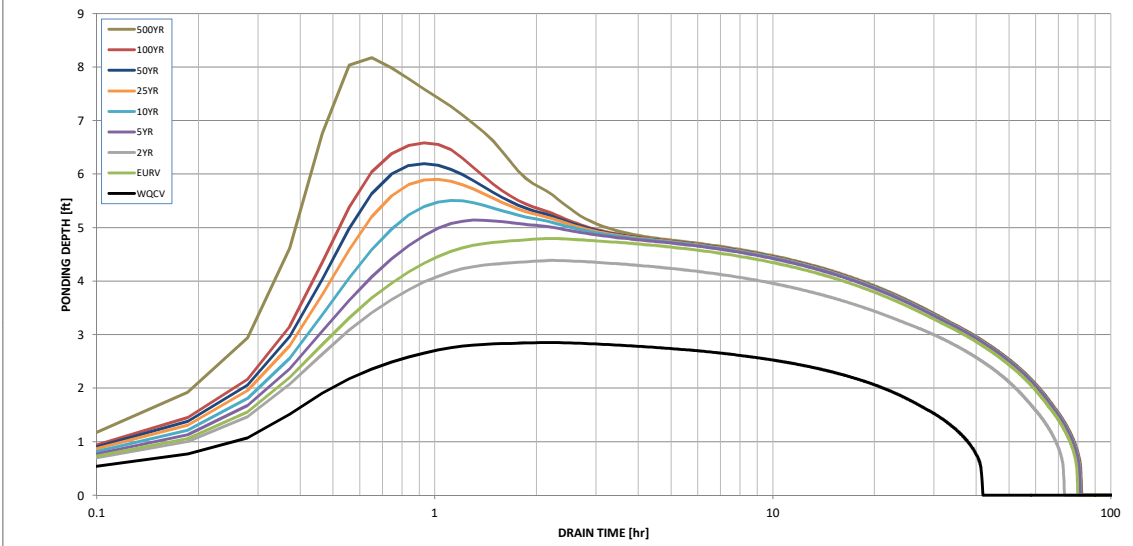
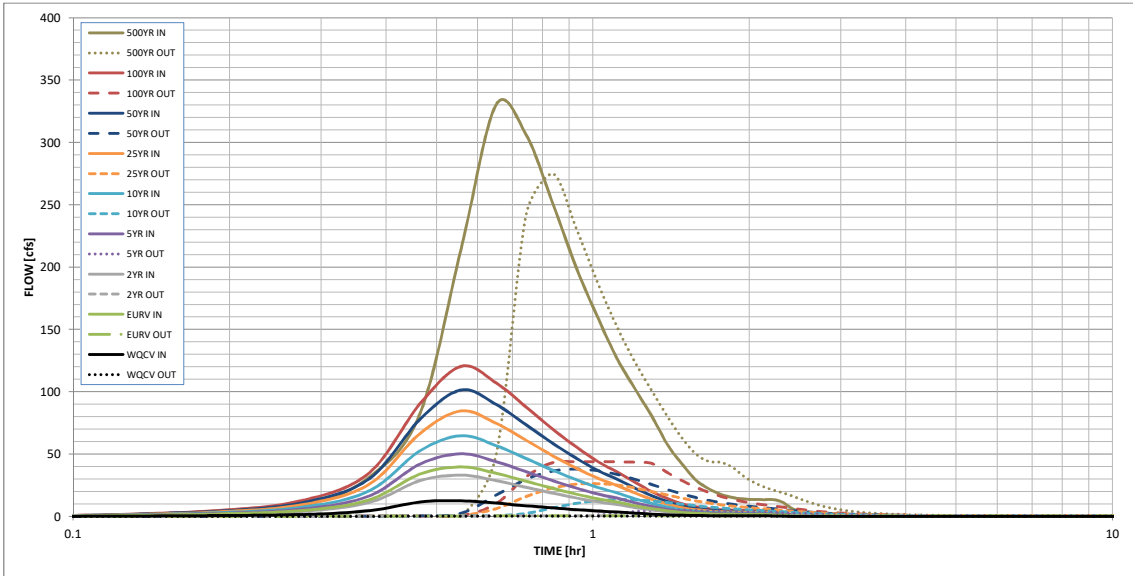
Calculated Parameters for Spillway

Spillway Design Flow Depth = feet
Stage at Top of Freeboard = feet
Basin Area at Top of Freeboard = acres

Routed Hydrograph Results

	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
Design Storm Return Period =									
One-Hour Rainfall Depth (in) =	0.53	1.07	1.19	1.50	1.75	2.00	2.25	2.52	6.53
Calculated Runoff Volume (acre-ft) =	0.630	2.004	1.671	2.524	3.238	4.235	5.066	6.013	16.565
OPTIONAL Override Runoff Volume (acre-ft) =									
Inflow Hydrograph Volume (acre-ft) =	0.629	2.003	1.670	2.523	3.237	4.233	5.062	6.008	16.555
Predevelopment Unit Peak Flow, q (cfs/acre) =	0.00	0.00	0.01	0.17	0.34	0.78	1.01	1.29	1.83
Predevelopment Peak Q (cfs) =	0.0	0.0	0.4	6.0	12.0	27.5	35.6	45.6	64.5
Peak Inflow Q (cfs) =	12.5	39.7	33.2	50.2	64.6	84.7	101.4	120.4	329.9
Peak Outflow Q (cfs) =	0.3	0.8	0.5	5.0	13.4	26.3	37.8	43.8	274.9
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.8	1.1	1.0	1.1	1.0	4.3
Structure Controlling Flow =	Plate	Overflow Grate 1	Plate	Overflow Grate 1	Overflow Grate 1	Overflow Grate 1	Overflow Grate 1	Outlet Plate 1	Spillway
Max Velocity through Grate 1 (fps) =	N/A	0.01	N/A	0.2	0.7	1.3	1.9	2.3	2.6
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	39	72	66	72	70	67	65	63	47
Time to Drain 99% of Inflow Volume (hours) =	41	77	70	77	77	76	75	74	65
Maximum Ponding Depth (ft) =	2.85	4.80	4.39	5.14	5.51	5.90	6.19	6.59	8.17
Area at Maximum Ponding Depth (acres) =	0.53	0.80	0.75	0.83	0.87	0.91	0.94	0.97	1.12
Maximum Volume Stored (acre-ft) =	0.584	1.902	1.585	2.179	2.495	2.851	3.119	3.490	5.152

Detention Basin Outlet Structure Design



S-A-V-D Chart Axis Override

	X-axis	Left Y-Axis	Right Y-Axis
minimum bound			
maximum bound			

JANUARY 2020

FUT.
CHECK

LEGEND

BASIN DESIGNATION \

6 SURFACE DESIGN POINT

 CROSSPAN

 EXISTING FLOW DIRECTION ARROW

PROPOSED FLOW DIRECTION ARROW

L_P LOW POINT

EXISTING WETLANDS

BASIN SUMMARY

BASIN	AREA (ACRES)	Q ₅	Q ₁₀₀
ONSITE BASINS			
BB	1.80	2.6	6.4
DD	2.58	3.7	9.0
FF	2.72	3.9	9.6
HH	3.77	5.3	12.9
LL	0.23	0.2	0.7
RR	5.93	7.9	19.2
SS	0.29	0.1	0.9
TT	1.32	2.0	4.9
VV	0.41	0.4	1.3
WW	0.59	0.5	1.8
OFFSITE BASINS			
B*	5.39	8.0	19.3
C*	0.61	0.5	1.9
H*	0.19	0.9	1.6
K*	0.61	0.5	1.9
L*	1.54	5.6	10.0
GG*	8.72	11.3	27.3
II*	1.02	4.0	7.2
JJ*	0.99	3.9	7.0
KK*	1.97	2.9	7.1
MM*	0.22	1.0	1.8
NN*	0.20	0.9	1.7
OO*	0.30	0.3	1.0
PP*	0.37	1.7	3.1
UU*	2.17	0.8	5.8

DESIGN POINT SUMMARY

DESIGN POINT SUMMARY				
DESIGN POINT	Q ₅	Q ₁₀₀	BASIN	STRUCTURE
2*	8.0	19.3	B*	(2) EX. 15' AT-GRADE INLETS
5*	4.2	19.7	G*, H*, FLOWBY DP4*	EX. 15' AT-GRADE INLET
6*	14.1	26.7	I*, J*, K*, L*	EX. 15' AT-GRADE INLET
18*	14.1	41.6	GG*, II*, FLOWBY DP5*	EX. 15' AT-GRADE INLET
19	20.5	52.0	BB,DD,FF,HH,J*, FLOWBY DP6*	EX. 15' AT-GRADE INLET
20*	5.2	27.9	KK*,MM*,FLOWBY DP18*	EX. 15' AT-GRADE INLET
21*	6.4	30.7	LL,NN*, FLOWBY DP19*	EX. 15' AT-GRADE INLET
24	8.0	19.8	RR,SS	PROP. 15' SUMP INLET
26	2.0	4.9	TT	PROP. 5' SUMP INLET
27	50.0	132.0	UU*, PR2, PR20*, PR23*, PR26*	CUMULATIVE DET. POND 8

* For detailed information on Desing Points, Basins, Flowby, or Pipe Runs see Sterling Ranch Filing Nos. 1&2 MDDP prepared by MS Civil Consultants, dated April 2017

STORM SEWER SUMMARY

STORM SEWER SUMMARY				
PIPE RUN	Q ₅	Q ₁₀₀	PIPE SIZE	CONTRIBUTING PIPES/DESIGN POINTS
1	8.0	19.8	24" RCP	DP24
2	9.5	23.5	24" RCP	DP26, PR1
20*	25.8	42.3	36" RCP	SEE MDDP*
23*	11.1	34.4	30" RCP	SEE MDDP*
26*	3.2	27.7	36" RCP	SEE MDDP*

BRANDING IRON AT SR FIL. NO. 2

PROPOSED DRAINAGE MAP

PROJECT NO. 09-012

DESIGNED BY: CMN

DRAWN BY: CMN

DATE: 01/27/2020

DATE: 01/27/2020

SHEET 1 OF 1 | P1

DM

File: O:\09012A\Challenger East\dwg\Eng Exhibits\Prop Drain Map Branding Iron Fill No 2.dwg Plotstamp: 3/24/2020 4:27 PM



FOR LOCATING
& MARKING
GAS,
ELECTRIC,
WATER &
TELEPHONE
LINES

FOR BURIED UTILITY INFORMATION
48 HRS BEFORE YOU DIG
CALL 1-800-922-1987



CIVIL CONSULTANTS, INC.

20 BOULDER CRESCENT, SUITE 110
COLORADO SPRINGS, CO 80903
PHONE: 719.955.5485

**PRELIMINARY DRAINAGE REPORT AND MDDP ADDENDUM
FOR
HOMESTEAD NORTH AT STERLING RANCH PRELIMINARY PLAN**

Prepared For:

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

**February, 2021
Project No. 25188.00**

Prepared By:

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

**PCD Filing No.:
SP-20-008**

FLOODPLAIN STATEMENT

Based on the FEMA Firm Maps Number 08041C0533G and 08041C0535G revised December 7, 2018, the vast majority of the development is located within Zone X, or areas area outside the Special Flood Hazard Area (SFHA) and higher than the elevation of the 0.2-percent-annual-chance (or 500-year) flood. The eastern property boundary will be platted to the center of Sand creek placing a portion of the site within Zone AE. The area of disturbance for site grading is located outside of the delineated floodway within Zone X. The FEMA map containing the site has been presented in Appendix A.

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 Homestead North at Sterling Ranch property to have a "large lot residential" use for the majority of the site. However, the proposed Sterling Ranch master plan is a mix of; school, multi-family, single-family, and commercial land uses, resulting in higher runoff. 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 in the east portion 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, Kiowa 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", (MMDP) prepared by M&S Civil Consultants, Inc., dated October 24, 2018. The MMDP "Developed Hydrologic Conditions Map" as shown within Appendix E, shows the estimated detention for the site. The site is tributary to basins SC3-18, SC3-17, and a portion of basin SC-322. Full-spectrum detention in the MMDP was previously analyzed and corresponds to ponds FSD18 and FSD17 for the site. Pond FSD17 is associated with ponds A and B within this report. Pond FSD18 is associated with ponds B and C within this report. Runoff as shown in the proposed M&S conduit RT-10A will drain offsite runoff parallel to the site as shown in the MDDP within a 5' conduit. The total estimated/projected detention and estimated outflows from the MDDP are shown in Table 1 below.

Table 1.

FSD17						
STORM EVENT (YR)	2	5	10	25	50	100
PEAK INFLOW (CFS)	41.8	59.6	85.2	119.0	149.1	180.6
ALLOWABLE RELEASE (CFS)	0.7	11.1	22.5	52	67.2	86.3
MODELED RELEASE (CFS)	0.7	8.4	22.4	52	67.2	86.1
STORED VOLUME (AC-FT)	2.6	2.6	2.8	3.4	4.0	4.7

FSD18						
STORM EVENT (YR)	2	5	10	25	50	100
PEAK INFLOW (CFS)	49.3	67.1	91.0	121.2	147.3	174
ALLOWABLE RELEASE (CFS)	0.6	9.2	18.4	42.2	54.6	69.9
MODELED RELEASE (CFS)	0.6	6.3	18.4	42.2	54.6	69.6
STORED VOLUME (AC-FT)	3.2	3.2	3.4	4.0	4.7	5.3

The MMDP plans for additional detention to the north of the site as shown in appendix E. No future offsite detention is necessary for the site.

In summary, the site will have three detention ponds A, B, and C. Ponds A and B associated with pond FSD17 of the M&S MDDP and Ponds B and C associated with pond FSD18. The release rates of these ponds will be below 90% of the historic drainage in continuity with the approved M&S MDDP. The report remains in continuity with MDDP and conveys the existing offsite runoff from basin SC3-19 of the MDDP to Sand Creek via proposed storm pipe along Vollmer road and Briargate parkway. The total net detention being stored onsite in the 100 year event is 7.6 Acre-ft, as shown Tables 2.1-2.3 of this report. The total runoff released from the detention ponds is 87.7 cfs in the 100 year event for the three ponds, as shown Tables 2.1-2.3 of this report. The net allowed release rate for the site is 156.2 cfs, as shown in Table 1 above.

Basin A7 1.97 acres and 15% percent impervious is comprised of open grass area, and a portion of a residential road Aspen Valley Road. The runoff ($Q_5=1.3$ cfs, $Q_{100}=4.8$ cfs) from this basin drains to design point 7A a 20' type R sump inlet. The runoff from the sump inlet collects tributary runoff basins A7, A5, A3, and A1.

Basin A8 0.42 acres and 57% percent impervious is comprised of a portion of a residential road Aspen Valley Road. The runoff ($Q_5=1.2$ cfs, $Q_{100}=2.5$ cfs) from this basin drains to design point 8A a 15' type R sump inlet. From here on runoff is piped for basin A1-A8 to detention pond A and detained for the water-quality event and up to the 100-year event.

Basin A9 2.97 acres and 16% percent impervious is comprised of pond A, grass and walk-out lots facing the detention area. Runoff ($Q_5=2.2$ cfs, $Q_{100}=7.9$ cfs) generated in Basin A9 sheet flows into Pond A where it is treated for water-quality and is detained up until the 100 year-event. The UD Detention sheet for pond A is shown in Appendix C of this report.

Pond A has a total tributary area of 30.43 Acres, the net percent impervious area of pond A is 46.3%. Pond A has been conceptually graded in to fit the design volume, as shown in Appendix C of this report. This pond will be built in phase 2 of Homestead North at Sterling Ranch. Pond A will outfall directly into the Sand Creek basin. The WQCV, 5 year and 100 year volumes, releases rates and stages for pond A are shown in Table 2.1 below. These results correspond to the Routed Hydrograph results, as shown in Appendix C of this report.

	TABLE 2.1 Pond A		
	Stage –ft	Volume (Acres)	Release Rate (cfs)
WQCV	2.58	0.503	0.2
5 Year	4.70	1.774	3.9
100 Year	6.00	2.708	32.2

Basin B1.1 3.35 acres and 45% percent impervious is comprised of single-family residential lots, a local roads Billy Claiborne Drive, Perry Owens Drive and an urban knuckle. The runoff ($Q_5=5.5$ cfs, $Q_{100}=12.5$ cfs) from basin B1.1 drains to design point 1.1B.

Basin B1.2 1.81 acres and 54% percent impervious is comprised of single-family residential lots, a local roads Claiborne Drive, Perry Owens Drive and an urban knuckle. The runoff ($Q_5=3.5$ cfs, $Q_{100}=7.4$ cfs) from basin B1.2 drains to design point 1.2B.

Basin B1.3 0.47 acres and 47% percent impervious is comprised of single-family residential lots and a local roads Aspen Valley Road and Perry Owens Drive. The runoff ($Q_5=1.0$ cfs, $Q_{100}=2.2$ cfs) from basin B1.3 drains to design point 1.3B.

Basin B11 1.77 acres and 14% percent impervious is comprised of pond B. Runoff ($Q_5=0.9$ cfs, $Q_{100}=3.9$ cfs) generated in Basin B11 sheet flows into Pond B where it is treated for water-quality and is detained up until the 100 year-event. The UD Detention sheet for pond B is shown in Appendix C of this report.

Pond B has a tributary area 24.73 acres and is 51.1 % impervious. Pond B has been conceptually graded in to fit the design volume, as shown in Appendix C of this report. This pond will be built in phase 1 of Homestead North at Sterling Ranch. The pond B emergency overflow spillway will drain directly into Sand Creek. The WQCV, 5 year and 100 year volumes, releases rates and stages for pond B are shown in Table 2.2 below. These results correspond to the Routed Hydrograph results, as shown in Appendix C of this report.

TABLE 2.2 Pond B			
	Stage –ft	Volume (Acres)	Release Rate (cfs)
WQCV	3.06	0.435	0.2
5 Year	4.31	1.577	2.9
100 Year	5.09	2.455	31.2

Basin C1 2.82 acres and 69% percent impervious is comprised of single-family lots, and the northwestern side of the local residential roads Texas Jack Drive and Harvey Logan Drive. Runoff ($Q_5=5.4$ cfs, $Q_{100}=11.4$ cfs) from basin C1 drains to design point 1C at Wheatland Drive.

Basin C2.1 0.20 acres and 91% percent impervious is comprised of single-family lots, and the north western side of the residential road Texas Jack Drive. Runoff ($Q_5=0.8$ cfs, $Q_{100}=1.6$ cfs) from basin C2.1 drains to design point 2.1C a 5' on grade type R inlet.

Basin C2.2 4.69 acres and 73% percent impervious is comprised of local roads, single-family lots, and the north western side of the residential road Wheatland Drive. Runoff ($Q_5=9.9$ cfs, $Q_{100}=20.3$ cfs) from basin C2.2 drains to design point 2.2C in confluence with bypass runoff from basin C2.3. The runoff ultimately drains to design point 4C a 20' type R sump inlet. The total runoff from basins C1, C2.1, C2.2, C2.3 and C4.1 is collected within the sump inlet.

Basin C2.3 0.83 acres and 67% percent impervious is comprised of local roads Tom Ketchum Drive Jack Helm Drive and Harvey Logan Drive, single-family lots, and the north western side of the residential road Wheatland Drive. Runoff ($Q_5=1.9$ cfs, $Q_{100}=3.9$ cfs) from basin C2.3 drains to design point 2.3C in confluence with runoff from basin C1 at an on grade 15' Type R inlet.

Pond C has a tributary area of 22.77 acres and is 60.8 % impervious. Pond C has been conceptually graded in to fit the design volume, as shown in Appendix C of this report. This pond will be built in phase 1 of Homestead North at Sterling Ranch. The Pond C overflow emergency spillway will overflow into Sand Creek. The WQCV, 5 year and 100 year volumes, releases rates and stages for pond C are shown in Table 2.3 below. These results correspond to the Routed Hydrograph results, as shown in Appendix C of this report.

TABLE 2.3 Pond C			
	Stage –ft	Volume (Acres)	Release Rate (cfs)
WQCV	2.39	0.455	0.2
5 Year	4.05	1.682	3.2
100 Year	4.99	2.464	24.3

DRAINAGE DESIGN CRITERIA

DEVELOPMENT CRITERIA REFERENCE

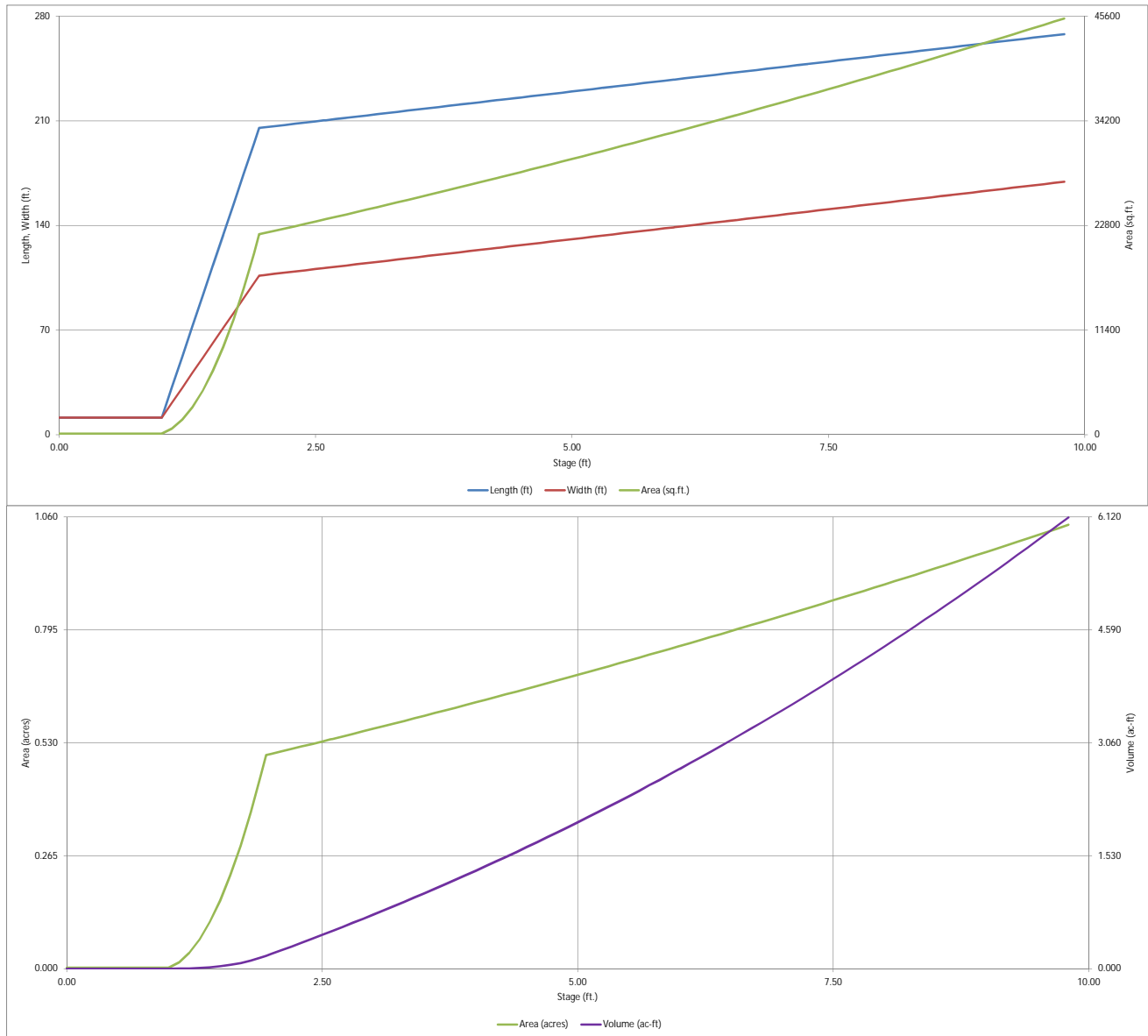
Storm drainage analysis and design criteria for this project were taken from the “*City of Colorado Springs/El Paso County Drainage Criteria Manual*” Volumes 1 and 2 (EPCDCM), dated October 12, 1994, the “*Urban Storm Drainage Criteria Manual*” Volumes 1 to 3 (USDCM) and Chapter 6 and Section 3.2.1 of 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 CSDCM. 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 CSDCM. Time of concentrations were developed using equations from CSDCM. All runoff calculations and applicable charts and graphs are included in the Appendices.

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.03 (May 2020)

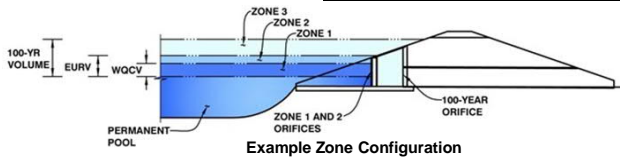


DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.03 (May 2020)

Project: Homestead North at Sterling Ranch

Basin ID: Pond A



Example Zone Configuration

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
V)	2.58	0.498	Orifice Plate
V)	4.27	0.999	Orifice Plate
1R)	5.99	1.197	Weir&Pipe (Restrict)
Total (all zones)		2.695	

User Input: Orifice at Underdrain Outlet (typically used to drain WOCV in a Filtration BMP)

Underdrain Orifice Invert Depth = ft (distance below the filtration media surface)
Underdrain Orifice Diameter = inches

Calculated Parameters for Underdrain
Underdrain Orifice Area = ft²
Underdrain Orifice Centroid = feet

User Input: Orifice Plate with one or more orifices or Elliptical Slot Weir (typically used to drain WOCV and/or EURV in a sedimentation BMP)

Invert of Lowest Orifice = 0.00 ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Orifice Plate = 4.27 ft (relative to basin bottom at Stage = 0 ft)
Orifice Plate: Orifice Vertical Spacing = N/A inches
Orifice Plate: Orifice Area per Row = N/A inches

Calculated Parameters for Plate
WQ Orifice Area per Row = N/A ft²
Elliptical Half-Width = N/A feet
Elliptical Slot Centroid = N/A feet
Elliptical Slot Area = N/A ft²

User Input: Stage and Total Area of Each Orifice Row (numbered from lowest to highest)

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	1.42	2.85	3.85				
Orifice Area (sq. inches)	2.11	2.11	2.11	24.00				

	Row 9 (optional)	Row 10 (optional)	Row 11 (optional)	Row 12 (optional)	Row 13 (optional)	Row 14 (optional)	Row 15 (optional)	Row 16 (optional)
Stage of Orifice Centroid (ft)								
Orifice Area (sq. inches)								

User Input: Vertical Orifice (Circular or Rectangular)

Invert of Vertical Orifice = N/A Not Selected ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Vertical Orifice = N/A Not Selected ft (relative to basin bottom at Stage = 0 ft)
Vertical Orifice Diameter = N/A Not Selected inches

Calculated Parameters for Vertical Orifice
Vertical Orifice Area = N/A Not Selected ft²
Vertical Orifice Centroid = N/A Not Selected feet

User Input: Overflow Weir (Dropbox with Flat or Sloped Grate and Outlet Pipe OR Rectangular/Trapezoidal Weir (and No Outlet Pipe))

Overflow Weir Front Edge Height, H_o = 4.30 Not Selected ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length = 5.00 Not Selected feet
Overflow Weir Grate Slope = 4.00 Not Selected H:V
Horiz. Length of Weir Sides = 5.00 Not Selected feet
Overflow Grate Open Area % = 75% Not Selected %, grate open area/total area
Debris Clogging % = 50% Not Selected %

Calculated Parameters for Overflow Weir
Height of Grate Upper Edge, H₁ = 5.55 Not Selected feet
Overflow Weir Slope Length = 5.15 Not Selected feet
Grate Open Area / 100-yr Orifice Area = 7.74 Not Selected
Overflow Grate Open Area w/o Debris = 19.33 Not Selected ft²
Overflow Grate Open Area w/ Debris = 9.66 Not Selected ft²

User Input: Outlet Pipe w/ Flow Restriction Plate (Circular Orifice, Restrictor Plate, or Rectangular Orifice)

Depth to Invert of Outlet Pipe = 2.00 Not Selected ft (distance below basin bottom at Stage = 0 ft)
Outlet Pipe Diameter = 24.00 Not Selected inches
Restrictor Plate Height Above Pipe Invert = 17.80 Not Selected inches

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate
Outlet Orifice Area = 2.50 Not Selected ft²
Outlet Orifice Centroid = 0.82 Not Selected feet
Half-Central Angle of Restrictor Plate on Pipe = 2.08 Not Selected radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage = 6.10 Not Selected ft (relative to basin bottom at Stage = 0 ft)
Spillway Crest Length = 23.00 Not Selected feet
Spillway End Slopes = 4.00 Not Selected H:V
Freeboard above Max Water Surface = 1.00 Not Selected feet

Calculated Parameters for Spillway
Spillway Design Flow Depth = 0.91 Not Selected feet
Stage at Top of Freeboard = 8.01 Not Selected feet
Basin Area at Top of Freeboard = 0.90 Not Selected acres
Basin Volume at Top of Freeboard = 4.37 Not Selected acre-ft

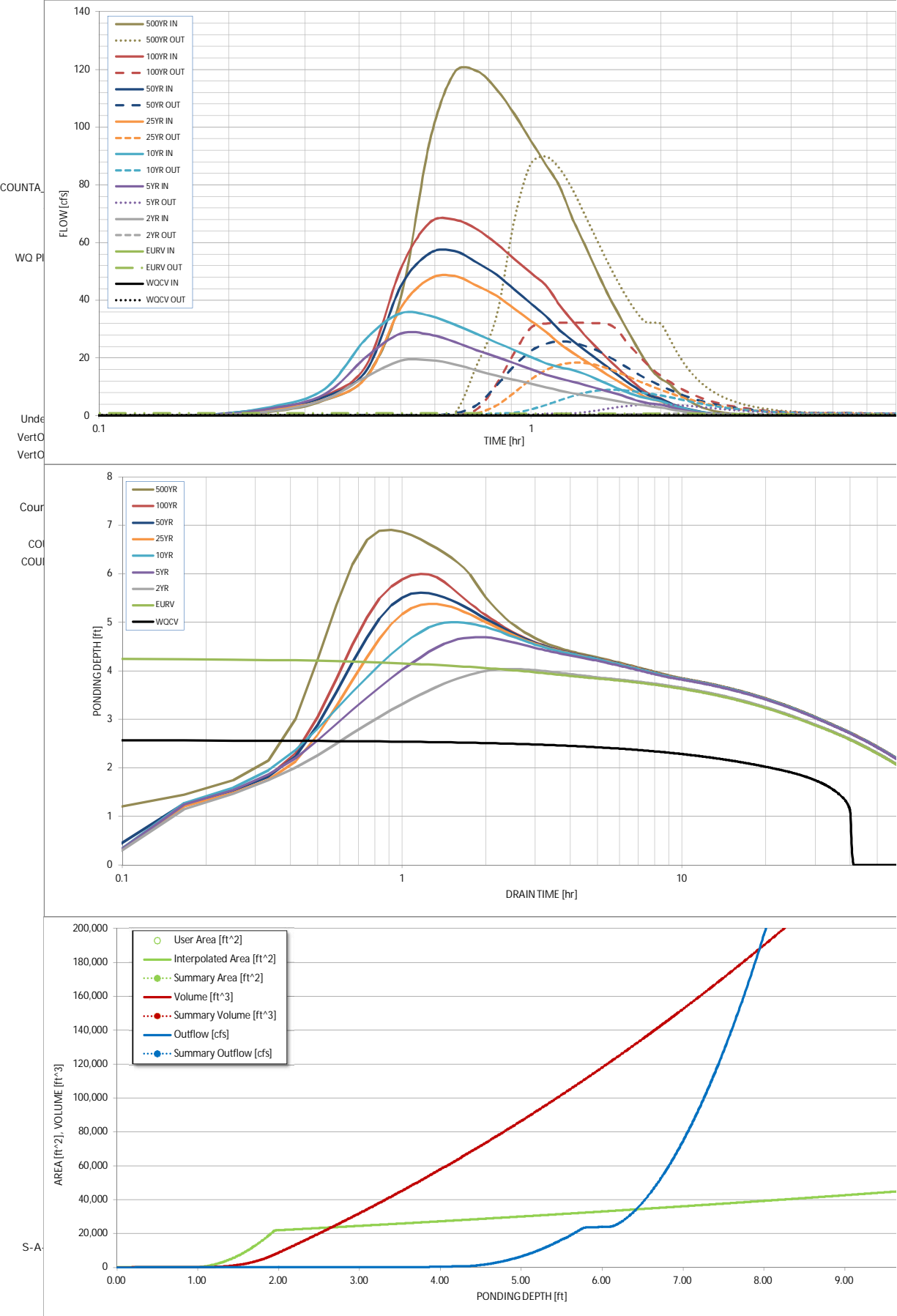
Routed Hydrograph Results

The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AF).

	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
Design Storm Return Period =	N/A	N/A	1.19	1.50	1.75	2.00	2.25	2.52	4.00
One-Hour Rainfall Depth (in) =	N/A	N/A	1.19	1.50	1.75	2.00	2.25	2.52	4.00
CUHP Runoff Volume (acre-ft) =	0.498	1.497	1.440	2.088	2.661	3.451	4.081	4.888	8.806
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	1.440	2.088	2.661	3.451	4.081	4.888	8.806
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	2.8	7.9	12.0	21.6	27.2	34.8	68.5
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.09	0.26	0.40	0.71	0.89	1.14	2.25
Peak Inflow Q (cfs) =	N/A	N/A	19.2	28.5	35.5	48.4	57.1	67.9	119.5
Peak Outflow Q (cfs) =	0.2	0.9	0.7	3.9	9.0	18.4	25.7	32.2	89.8
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.5	0.7	0.8	0.9	0.9	1.3
Structure Controlling Flow =	Plate	Plate	Plate	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Outlet Plate 1	Spillway
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	0.1	0.4	0.9	1.2	1.6	1.7
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	38	75	76	78	76	74	73	71	62
Time to Drain 99% of Inflow Volume (hours) =	40	79	79	82	82	81	80	80	76
Maximum Ponding Depth (ft) =	2.58	4.27	4.04	4.70	5.01	5.38	5.61	6.00	6.91
Area at Maximum Ponding Depth (acres) =	0.54	0.64	0.63	0.67	0.69	0.71	0.73	0.76	0.82
Maximum Volume Stored (acre-ft) =	0.503	1.499	1.353	1.774	1.985	2.251	2.418	2.708	3.418

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.00 (December 2019)



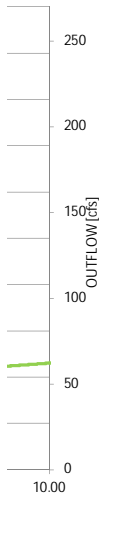
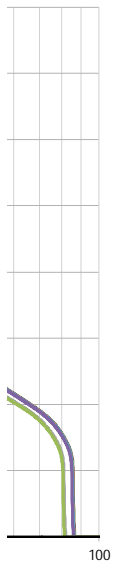
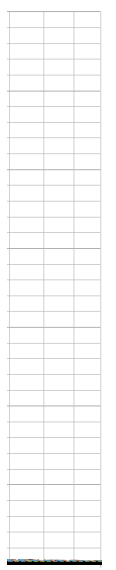
S-A-V-D Chart Axis Override	X-axis	Left Y-Axis	Right Y-Axis
minimum bound			
maximum bound			

DETENTION BASIN OUTLET STRUCTURE DESIGN

Outflow Hydrograph Workbook Filename: _____

Inflow Hydrographs

The user can override the calculated inflow hydrographs from this workbook with inflow hydrographs developed in a separate program.



SOURCE	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP
TIME	WQCV [cfs]	EURV [cfs]	2 Year [cfs]	5 Year [cfs]	10 Year [cfs]	25 Year [cfs]	50 Year [cfs]	100 Year [cfs]	500 Year [cfs]
0:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.02	1.31
0:15:00	0.00	0.00	1.51	2.47	3.07	2.06	2.60	2.52	5.34
0:20:00	0.00	0.00	5.58	7.43	9.27	5.55	6.50	6.93	13.75
0:25:00	0.00	0.00	13.54	20.45	26.86	13.34	15.84	17.68	40.83
0:30:00	0.00	0.00	19.05	28.45	35.52	37.38	44.83	50.89	94.87
0:35:00	0.00	0.00	19.23	28.10	34.63	47.43	56.27	66.87	119.06
0:40:00	0.00	0.00	17.82	25.57	31.54	48.41	57.08	67.89	119.48
0:45:00	0.00	0.00	15.70	22.67	28.33	45.04	53.05	64.60	113.15
0:50:00	0.00	0.00	13.89	20.40	25.35	41.53	48.88	59.57	104.45
0:55:00	0.00	0.00	12.41	18.19	22.73	37.06	43.72	54.26	95.34
1:00:00	0.00	0.00	11.06	16.10	20.33	32.87	38.87	49.52	87.05
1:05:00	0.00	0.00	9.87	14.23	18.18	29.14	34.52	45.13	79.33
1:10:00	0.00	0.00	8.69	12.90	16.77	24.93	29.58	38.26	68.10
1:15:00	0.00	0.00	7.78	11.78	15.82	21.83	26.00	32.76	59.21
1:20:00	0.00	0.00	7.05	10.64	14.45	19.06	22.70	27.89	50.52
1:25:00	0.00	0.00	6.39	9.57	12.74	16.67	19.83	23.67	42.77
1:30:00	0.00	0.00	5.76	8.56	11.11	14.32	16.98	20.04	36.10
1:35:00	0.00	0.00	5.14	7.59	9.59	12.14	14.34	16.72	30.02
1:40:00	0.00	0.00	4.54	6.43	8.20	10.12	11.91	13.66	24.45
1:45:00	0.00	0.00	4.01	5.36	6.99	8.27	9.68	10.88	19.41
1:50:00	0.00	0.00	3.63	4.59	6.17	6.66	7.75	8.53	15.37
1:55:00	0.00	0.00	3.18	4.15	5.61	5.60	6.52	6.97	12.82
2:00:00	0.00	0.00	2.83	3.81	5.07	4.96	5.77	6.01	11.19
2:05:00	0.00	0.00	2.32	3.12	4.15	3.95	4.59	4.68	8.77
2:10:00	0.00	0.00	1.85	2.47	3.30	3.06	3.55	3.54	6.64
2:15:00	0.00	0.00	1.47	1.95	2.61	2.38	2.75	2.66	5.00
2:20:00	0.00	0.00	1.16	1.54	2.04	1.84	2.11	1.97	3.72
2:25:00	0.00	0.00	0.91	1.21	1.58	1.42	1.62	1.47	2.77
2:30:00	0.00	0.00	0.71	0.93	1.20	1.08	1.24	1.12	2.10
2:35:00	0.00	0.00	0.56	0.71	0.91	0.82	0.93	0.85	1.58
2:40:00	0.00	0.00	0.43	0.54	0.69	0.62	0.71	0.65	1.21
2:45:00	0.00	0.00	0.33	0.41	0.53	0.48	0.54	0.51	0.94
2:50:00	0.00	0.00	0.24	0.30	0.40	0.36	0.41	0.39	0.71
2:55:00	0.00	0.00	0.17	0.21	0.28	0.26	0.30	0.28	0.51
3:00:00	0.00	0.00	0.11	0.14	0.19	0.18	0.20	0.19	0.34
3:05:00	0.00	0.00	0.07	0.09	0.11	0.11	0.13	0.12	0.21
3:10:00	0.00	0.00	0.03	0.05	0.06	0.06	0.07	0.06	0.11
3:15:00	0.00	0.00	0.01	0.02	0.02	0.02	0.03	0.02	0.04
3:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.03 (May 2020)

Summary Stage-Area-Volume-Discharge Relationships

The user can create a summary S-A-V-D by entering the desired stage increments and the remainder of the table will populate automatically.

The user should graphically compare the summary S-A-V-D table to the full S-A-V-D table in the chart to confirm it captures all key transition points.

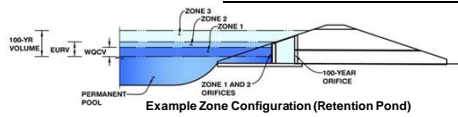
[illegible]

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.03 (May 2020)

Project: Homestead North at Sterling Ranch

Basin ID: Pond B



Watershed Information

Selected BMP Type =	EDB
Watershed Area =	24.73 acres
Watershed Length =	1,290 ft
Watershed Length to Centroid =	775 ft
Watershed Slope =	0.020 ft/ft
Watershed Imperviousness =	51.10% percent
Percentage Hydrologic Soil Group A =	0.0% percent
Percentage Hydrologic Soil Group B =	100.0% percent
Percentage Hydrologic Soil Groups C/D =	0.0% percent
Target WQCV Drain Time =	40.0 hours
Location for 1-hr Rainfall Depths =	User Input

After providing required inputs above including 1-hour rainfall depths, click 'Run CUHP' to generate runoff hydrographs using the embedded Colorado Urban Hydrograph Procedure.

Water Quality Capture Volume (WQCV) =	0.431 acre-feet
Excess Urban Runoff Volume (EURV) =	1.353 acre-feet
2-yr Runoff Volume (P1 = 1.19 in.) =	1.273 acre-feet
5-yr Runoff Volume (P1 = 1.5 in.) =	1.812 acre-feet
10-yr Runoff Volume (P1 = 1.75 in.) =	2.284 acre-feet
25-yr Runoff Volume (P1 = 2 in.) =	2.915 acre-feet
50-yr Runoff Volume (P1 = 2.25 in.) =	3.428 acre-feet
100-yr Runoff Volume (P1 = 2.52 in.) =	4.078 acre-feet
500-yr Runoff Volume (P1 = 4 in.) =	7.262 acre-feet
Approximate 2-yr Detention Volume =	1.023 acre-feet
Approximate 5-yr Detention Volume =	1.400 acre-feet
Approximate 10-yr Detention Volume =	1.848 acre-feet
Approximate 25-yr Detention Volume =	2.020 acre-feet
Approximate 50-yr Detention Volume =	2.111 acre-feet
Approximate 100-yr Detention Volume =	2.350 acre-feet

Define Zones and Basin Geometry

Zone 1 Volume (WQCV) =	0.431 acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.922 acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	0.997 acre-feet
Total Detention Basin Volume =	2.350 acre-feet
Initial Surge Volume (ISV) =	56 ft ³
Initial Surge Depth (ISD) =	0.50 ft
Total Available Detention Depth (H _{total}) =	5.00 ft
Depth of Trickle Channel (H _{TC}) =	0.50 ft
Slope of Trickle Channel (S _{TC}) =	0.010 ft/ft
Slopes of Main Basin Sides (S _{main}) =	4 ft/V
Basin Length-to-Width Ratio (R _{L/W}) =	2
Initial Surge Area (A _{ISV}) =	113 ft ²
Surge Volume Length (L _{ISV}) =	10.6 ft
Surge Volume Width (W _{ISV}) =	10.6 ft
Depth of Basin Floor (H _{floor}) =	2.81 ft
Length of Basin Floor (L _{floor}) =	302.9 ft
Width of Basin Floor (W _{floor}) =	151.1 ft
Area of Basin Floor (A _{floor}) =	45,767 ft ²
Volume of Basin Floor (V _{floor}) =	45,101 ft ³
Depth of Main Basin (H _{main}) =	1.19 ft
Length of Main Basin (L _{main}) =	312.4 ft
Width of Main Basin (W _{main}) =	160.6 ft
Area of Main Basin (A _{main}) =	50,179 ft ²
Volume of Main Basin (V _{main}) =	57,068 ft ³
Calculated Total Basin Volume (V _{total}) =	2.348 acre-feet

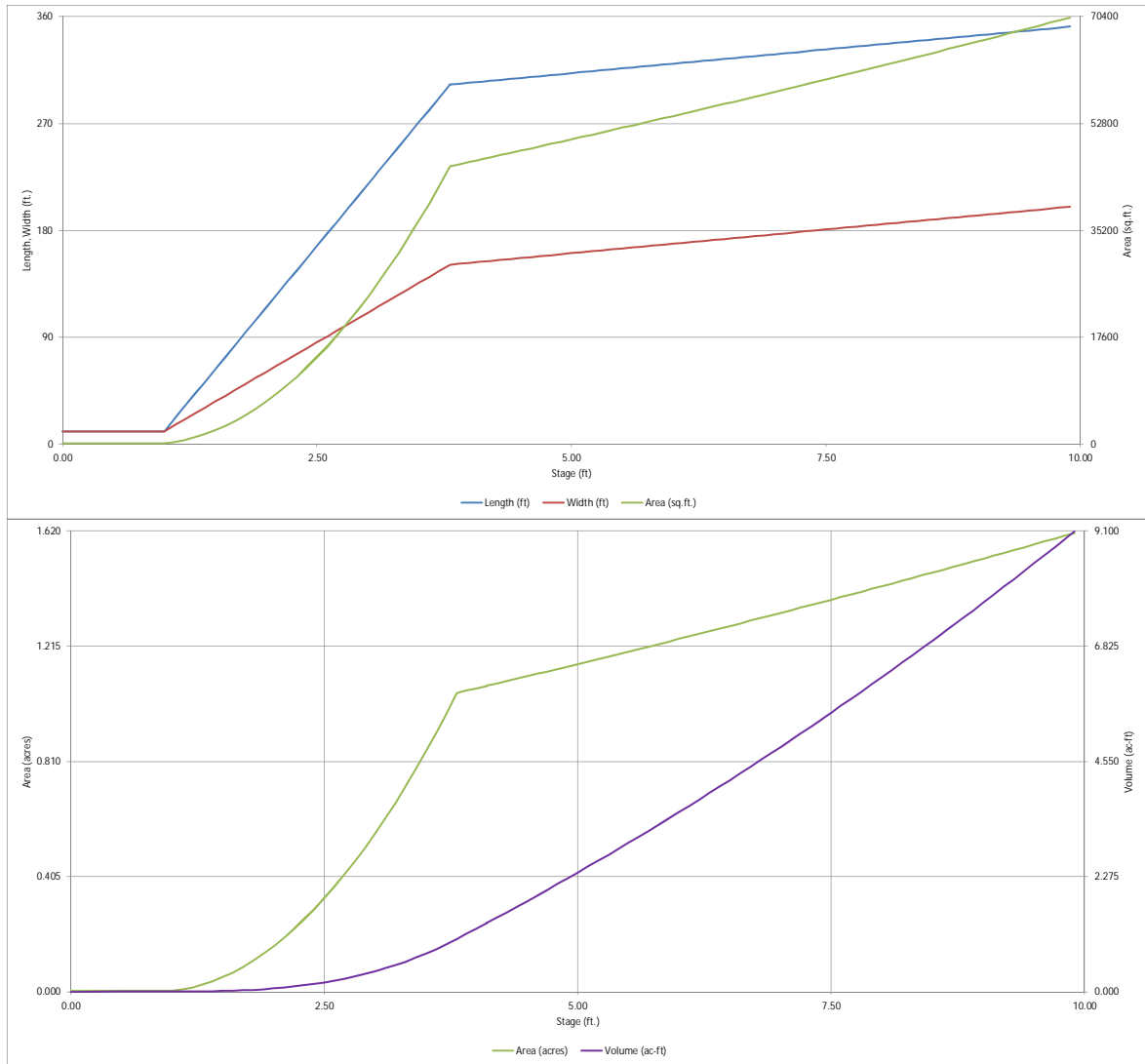
Optional User Overrides

	acre-feet
	acre-feet
1.19	inches
1.50	inches
1.75	inches
2.00	inches
2.25	inches
2.52	inches
4.00	inches

Depth Increment =	0.10	ft								
Stage - Storage Description	Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft ²)	Optional Override Area (ft ²)	Area (acre)	Volume (ft ³)	Volume (ac-ft)	
Top of Micropool	0.00		10.6	10.6	113		0.003			
ISV	0.50		10.6	10.6	113		0.003	56	0.001	
	0.60		10.6	10.6	113		0.003	68	0.002	
	0.70		10.6	10.6	113		0.003	79	0.002	
	0.80		10.6	10.6	113		0.003	90	0.002	
	0.90		10.6	10.6	113		0.003	101	0.002	
	1.00		10.6	10.6	113		0.003	113	0.003	
	1.10		21.0	15.6	328		0.008	134	0.003	
	1.20		31.4	20.6	648		0.015	182	0.004	
	1.30		41.8	25.6	1,071		0.025	267	0.006	
	1.40		52.2	30.6	1,599		0.037	400	0.009	
	1.50		62.6	35.6	2,230		0.051	590	0.014	
	1.60		73.0	40.6	2,966		0.068	849	0.019	
	1.70		83.4	45.6	3,805		0.087	1,187	0.027	
	1.80		93.8	50.6	4,749		0.109	1,614	0.037	
	1.90		104.2	55.6	5,796		0.133	2,140	0.049	
	2.00		114.6	60.6	6,948		0.159	2,776	0.064	
	2.10		125.0	65.6	8,203		0.188	3,533	0.081	
	2.20		135.4	70.6	9,563		0.220	4,420	0.101	
	2.30		145.8	75.6	11,026		0.253	5,449	0.125	
	2.40		156.2	80.6	12,594		0.289	6,629	0.152	
	2.50		166.6	85.6	14,265		0.327	7,971	0.183	
	2.60		177.0	90.6	16,041		0.368	9,486	0.218	
	2.70		187.4	95.6	17,920		0.411	11,183	0.257	
	2.80		197.8	100.6	19,904		0.457	13,073	0.300	
	2.90		208.2	105.6	21,991		0.505	15,167	0.348	
	3.00		218.6	110.6	24,183		0.555	17,475	0.401	
	Zone 1 (WQCV)	3.06		224.9	113.6	25,548		0.586	18,967	0.435
		3.10		229.0	115.6	26,478		0.608	20,007	0.459
		3.20		239.4	120.6	28,878		0.663	22,774	0.523
		3.30		249.8	125.6	31,381		0.720	25,786	0.592
3.40			260.2	130.6	33,989		0.780	29,054	0.667	
3.50			270.6	135.6	36,700		0.843	32,587	0.748	
3.60			281.0	140.6	39,516		0.907	36,397	0.836	
3.70			291.4	145.6	42,435		0.974	40,494	0.930	
3.80			301.8	150.6	45,459		1.044	44,888	1.030	
3.81			302.9	151.1	45,767		1.051	45,344	1.041	
Floor	3.90		303.6	151.8	46,094		1.058	49,477	1.136	
	4.00		304.4	152.6	46,459		1.067	54,105	1.242	
	4.10		305.2	153.4	46,825		1.075	58,769	1.349	
	4.11		305.3	153.5	46,862		1.076	59,238	1.360	
	4.20		306.0	154.2	47,193		1.083	63,470	1.457	
	4.30		306.8	155.0	47,562		1.092	68,208	1.566	
	4.40		307.6	155.8	47,932		1.100	72,983	1.675	
	4.50		308.4	156.6	48,303		1.109	77,794	1.786	
	4.60		309.2	157.4	48,676		1.117	82,643	1.897	
	4.70		310.0	158.2	49,050		1.126	87,530	2.009	
	4.80		310.8	159.0	49,425		1.135	92,453	2.122	
	4.90		311.6	159.8	49,801		1.143	97,415	2.236	
	Zone 3 (100-year)	5.00		312.4	160.6	50,179		1.152	102,414	2.351
		5.10		313.2	161.4	50,558		1.161	107,450	2.467
		5.20		314.0	162.2	50,939		1.169	112,525	2.583
		5.30		314.8	163.0	51,320		1.178	117,638	2.701
		5.40		315.6	163.8	51,703		1.187	122,789	2.819
		5.50		316.4	164.6	52,087		1.196	127,979	2.938
		5.60		317.2	165.4	52,473		1.205	133,207	3.058
		5.70		318.0	166.2	52,859		1.213	138,473	3.179
5.80			318.8	167.0	53,247		1.222	143,779	3.301	
5.90			319.6	167.8	53,637		1.231	149,123	3.423	
6.00		320.4	168.6	54,027		1.240	154,506	3.547		
	6.10		321.2	169.4	54,419		1.249	159,929	3.671	
	6.20		322.0	170.2	54,812		1.258	165,390	3.797	
	6.30		322.8	171.0	55,207		1.267	170,891	3.923	
	6.40		323.6	171.8	55,602		1.276	176,431	4.050	
	6.50		324.4	172.6	55,999		1.286	182,012	4.178	
	6.60		325.2	173.4	56,398		1.295	187,631	4.307	
	6.70		326.0	174.2	56,797		1.304	193,291	4.437	
	6.80		326.8	175.0	57,198		1.313	198,991	4.568	
	6.90		327.6	175.8	57,600		1.322	204,731	4.700	
	7.00		328.4	176.6	58,003		1.332	210,511	4.833	
	7.10		329.2	177.4	58,408		1.341	216,332	4.966	
	7.20		330.0	178.2	58,814		1.350	222,193	5.101	
	7.30		330.8	179.0	59,221		1.360	228,094	5.236	
	7.40		331.6	179.8	59,630		1.369	234,037	5.373	
	7.50		332.4	180.6	60,039		1.378	240,020	5.510	
	7.60		333.2	181.4	60,451		1.388	246,045	5.648	
	7.70		334.0	182.2	60,863		1.397	252,110	5.788	
	7.80		334.8	183.0	61,276		1.407	258,217	5.928	
	7.90		335.6	183.8	61,691		1.416	264,366	6.069	
	8.00		336.4	184.6	62,108		1.426	270,556	6.211	
	8.10		337.2	185.4	62,525		1.435	276,787	6.354	
	8.20		338.0	186.2	62,944		1.445	283,061	6.498	
	8.30		338.8	187.0	63,364		1.455	289,376	6.643	
	8.40		339.6	187.8	63,785		1.464	295,734	6.789	
	8.50		340.4	188.6	64,208		1.474	302,133	6.936	
	8.60		341.2	189.4	64,631		1.484	308,575	7.084	
	8.70		342.0	190.2	65,057		1.493	315,060	7.233	
	8.80		342.8	191.0	65,483		1.503	321,587	7.383	
	8.90		343.6	191.8	65,911		1.513	328,156	7.533	
	9.00		344.4	192.6	66,340		1.523	334,769	7.685	
	9.10		345.2	193.4	66,770		1.533	341,424	7.838	
	9.20		346.0	194.2	67,201		1.543	348,123	7.992	
	9.30		346.8	195.0	67,634		1.553	354,864	8.147	
	9.40		347.6	195.8	68,068		1.563	361,650	8.302	
	9.50		348.4	196.6	68,504		1.573	368,478	8.459	
	9.60		349.2	197.4	68,940		1.583	375,350	8.617	
	9.70		350.0	198.2	69,378		1.593	382,266	8.776	
	9.80		350.8	199.0	69,818		1.603	389,226	8.935	
	9.90		351.6	199.8	70,258		1.613	396,230	9.096	

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Depotion, Version 4.03 (May 2020)

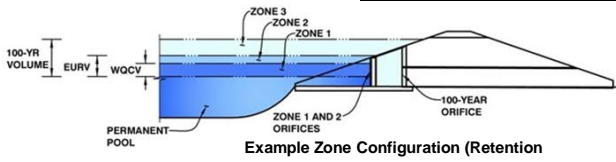


DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.03 (May 2020)

Project: Homestead North at Sterling Ranch

Basin ID: Pond B



Example Zone Configuration (Retention)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	3.06	0.431	Orifice Plate
Zone 2 (EURV)	4.11	0.922	Orifice Plate
Zone 3 (100-yr)	5.00	0.997	Weir&Pipe (Restrict)
Total (all zones)		2.350	

User Input: Orifice at Underdrain Outlet (typically used to drain WQCV in a Filtration BMP)

Underdrain Orifice Invert Depth = ft (distance below the filtration media surface)
Underdrain Orifice Diameter = inches

Calculated Parameters for Underdrain
Underdrain Orifice Area = ft²
Underdrain Orifice Centroid = feet

User Input: Orifice Plate with one or more orifices or Elliptical Slot Weir (typically used to drain WQCV and/or EURV in a sedimentation BMP)

Invert of Lowest Orifice = ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Orifice Plate = ft (relative to basin bottom at Stage = 0 ft)
Orifice Plate: Orifice Vertical Spacing = inches
Orifice Plate: Orifice Area per Row = inches

Calculated Parameters for Plate
WQ Orifice Area per Row = ft²
Elliptical Half-Width = feet
Elliptical Slot Centroid = feet
Elliptical Slot Area = ft²

User Input: Stage and Total Area of Each Orifice Row (numbered from lowest to highest)

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	1.37	2.74	3.20				
Orifice Area (sq. inches)	1.40	1.40	1.40	9.00				

	Row 9 (optional)	Row 10 (optional)	Row 11 (optional)	Row 12 (optional)	Row 13 (optional)	Row 14 (optional)	Row 15 (optional)	Row 16 (optional)
Stage of Orifice Centroid (ft)								
Orifice Area (sq. inches)								

User Input: Vertical Orifice (Circular or Rectangular)

Invert of Vertical Orifice = ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Vertical Orifice = ft (relative to basin bottom at Stage = 0 ft)
Vertical Orifice Diameter = inches

Calculated Parameters for Vertical Orifice
Vertical Orifice Area = ft²
Vertical Orifice Centroid = feet

User Input: Overflow Weir (Dropbox with Flat or Sloped Grate and Outlet Pipe OR Rectangular/Trapezoidal Weir (and No Outlet Pipe))

Zone 3 Weir
Overflow Weir Front Edge Height, H_o = ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length = feet
Overflow Weir Grate Slope = H:V
Horiz. Length of Weir Sides = feet
Overflow Grate Open Area % = %
Debris Clogging % = %

Calculated Parameters for Overflow Weir
Height of Grate Upper Edge, H₁ = feet
Overflow Weir Slope Length = feet
Grate Open Area / 100-yr Orifice Area =
Overflow Grate Open Area w/o Debris = ft²
Overflow Grate Open Area w/ Debris = ft²

User Input: Outlet Pipe w/ Flow Restriction Plate (Circular Orifice, Restrictor Plate, or Rectangular Orifice)

one 3 Restrictor
Depth to Invert of Outlet Pipe = ft (distance below basin bottom at Stage = 0 ft)
Outlet Pipe Diameter = inches
Restrictor Plate Height Above Pipe Invert = inches

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate
Outlet Orifice Area = ft²
Outlet Orifice Centroid = feet
Half-Central Angle of Restrictor Plate on Pipe = radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage = ft (relative to basin bottom at Stage = 0 ft)
Spillway Crest Length = feet
Spillway End Slopes = H:V
Freeboard above Max Water Surface = feet

Calculated Parameters for Spillway
Spillway Design Flow Depth = feet
Stage at Top of Freeboard = feet
Basin Area at Top of Freeboard = acres
Basin Volume at Top of Freeboard = acre-ft

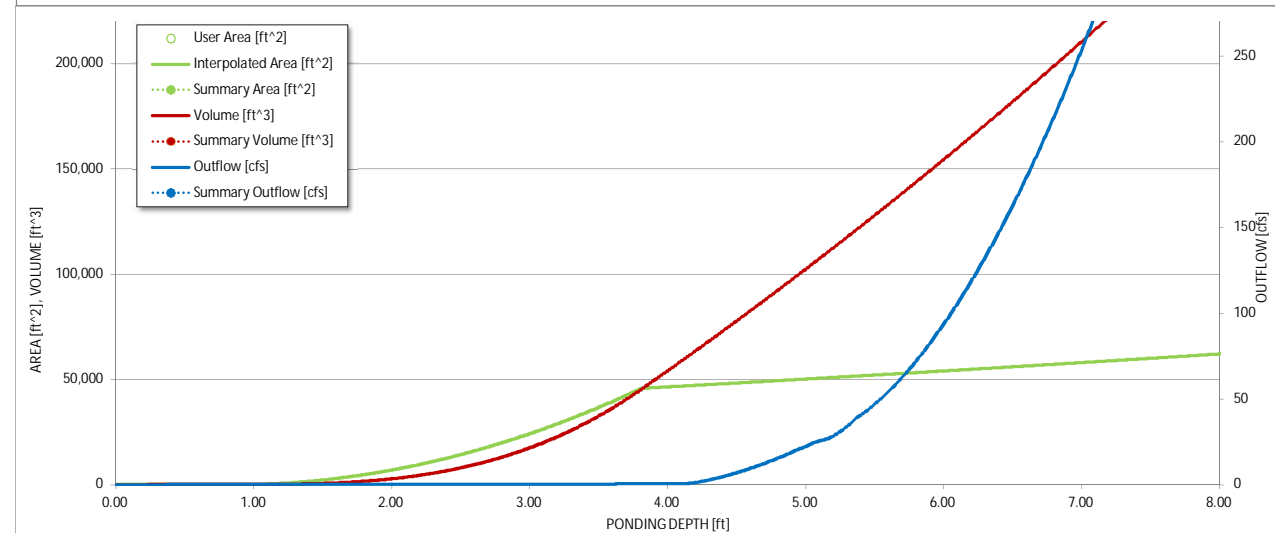
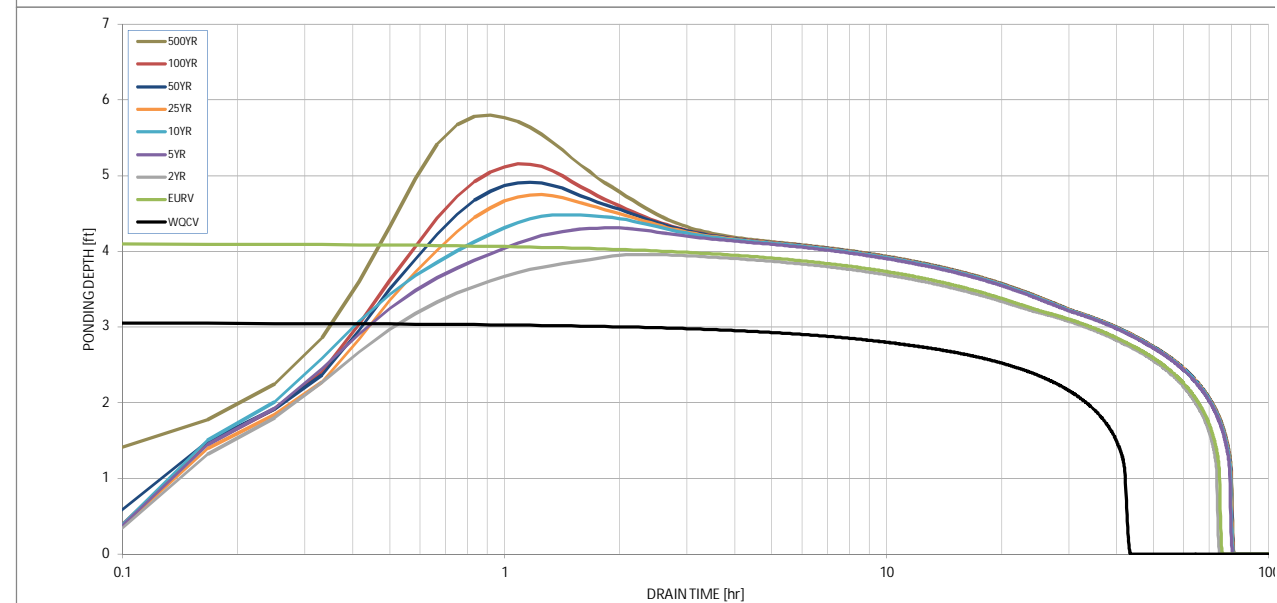
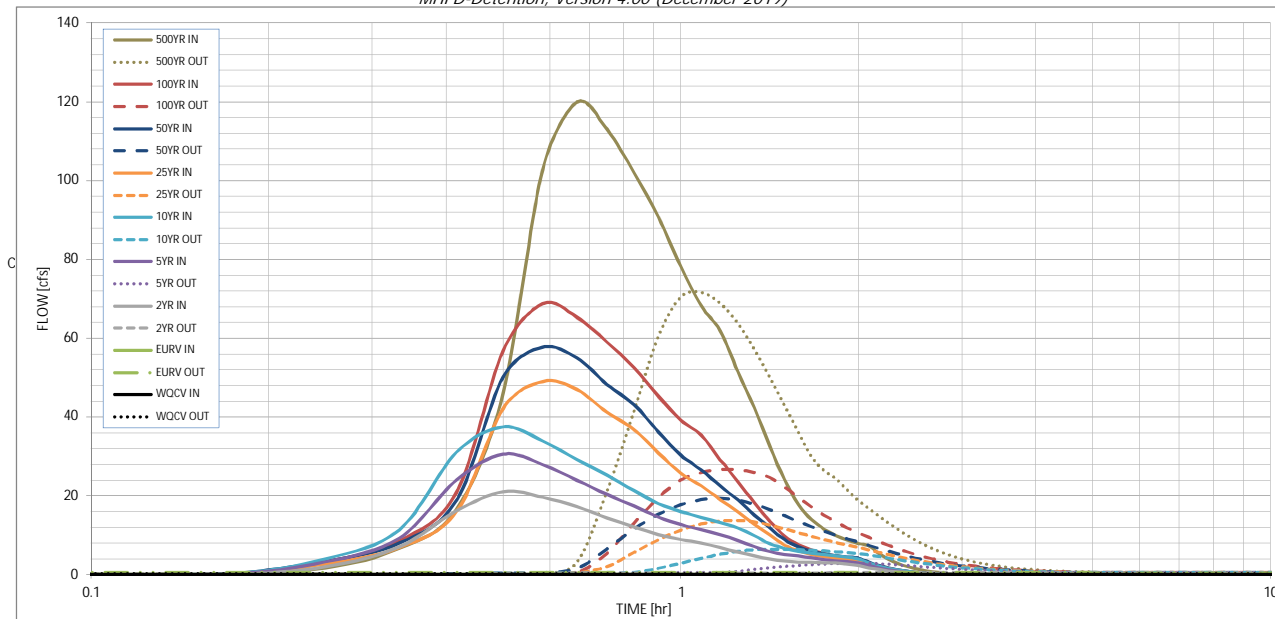
Routed Hydrograph Results

The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AF).

	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
Design Storm Return Period	N/A	N/A	1.19	1.50	1.75	2.00	2.25	2.52	4.00
One-Hour Rainfall Depth (in)	0.431	1.353	1.273	1.812	2.284	2.915	3.428	4.078	7.262
CUHP Runoff Volume (acre-ft)	N/A	N/A	1.273	1.812	2.284	2.915	3.428	4.078	7.262
Inflow Hydrograph Volume (acre-ft)	N/A	N/A	2.7	7.7	11.6	20.6	25.8	33.0	64.7
CUHP Predevelopment Peak Q (cfs)	N/A	N/A							
OPTIONAL Override Predevelopment Peak Q (cfs)	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre)	N/A	N/A	0.11	0.31	0.47	0.83	1.04	1.34	2.62
Peak Inflow Q (cfs)	N/A	N/A	21.0	30.6	37.5	49.0	57.7	68.7	119.9
Peak Outflow Q (cfs)	0.2	0.5	0.5	2.9	6.5	13.8	19.3	26.7	71.6
Ratio Peak Outflow to Predevelopment Q	N/A	N/A	N/A	0.4	0.6	0.7	0.7	0.8	1.1
Structure Controlling Flow	Plate	Overflow Weir 1	Plate	overflow Weir	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	overflow Weir	Spillway
Max Velocity through Grate 1 (fps)	N/A	N/A	N/A	0.1	0.3	0.8	1.1	1.5	1.9
Max Velocity through Grate 2 (fps)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours)	40	68	68	72	70	68	67	65	55
Time to Drain 99% of Inflow Volume (hours)	42	72	71	76	76	75	75	74	70
Maximum Ponding Depth (ft)	3.06	4.11	3.96	4.31	4.48	4.75	4.91	5.15	5.80
Area at Maximum Ponding Depth (acres)	0.59	1.08	1.06	1.09	1.11	1.13	1.14	1.17	1.22
Maximum Volume Stored (acre-ft)	0.435	1.360	1.189	1.577	1.764	2.055	2.248	2.525	3.288

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.00 (December 2019)



S-A-V-D Chart Axis Override	X-axis	Left Y-Axis	Right Y-Axis
minimum bound			
maximum bound			

DETENTION BASIN OUTLET STRUCTURE DESIGN

Outflow Hydrograph Workbook Filename: _____

Inflow Hydrographs

The user can override the calculated inflow hydrographs from this workbook with inflow hydrographs developed in a separate program.

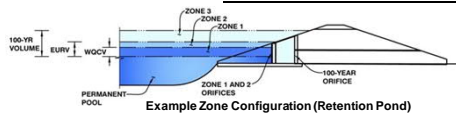
Time Interval	SOURCE	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP
	TIME	WQCV [cfs]	EURV [cfs]	2 Year [cfs]	5 Year [cfs]	10 Year [cfs]	25 Year [cfs]	50 Year [cfs]	100 Year [cfs]	500 Year [cfs]
5.00 min	0:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.02	1.70
	0:15:00	0.00	0.00	1.98	3.24	4.02	2.70	3.37	3.29	6.71
	0:20:00	0.00	0.00	7.03	9.26	11.39	6.86	7.99	8.56	16.49
	0:25:00	0.00	0.00	16.22	23.99	31.04	15.92	18.80	20.87	46.11
	0:30:00	0.00	0.00	21.04	30.58	37.52	42.14	50.19	56.78	102.80
	0:35:00	0.00	0.00	19.65	27.93	33.93	49.02	57.73	68.74	119.90
	0:40:00	0.00	0.00	17.24	23.97	29.19	46.99	55.03	65.36	113.04
	0:45:00	0.00	0.00	14.41	20.36	25.26	41.20	48.24	59.02	102.02
	0:50:00	0.00	0.00	12.07	17.45	21.34	36.87	43.17	52.57	90.73
	0:55:00	0.00	0.00	10.18	14.61	18.05	30.88	36.21	45.31	78.28
	1:00:00	0.00	0.00	8.92	12.71	16.03	25.78	30.32	39.24	68.31
	1:05:00	0.00	0.00	8.04	11.38	14.57	22.52	26.59	35.44	61.90
	1:10:00	0.00	0.00	6.85	10.17	13.19	19.04	22.51	29.22	51.57
	1:15:00	0.00	0.00	5.75	8.68	11.82	15.96	18.93	23.67	42.36
	1:20:00	0.00	0.00	4.75	7.12	9.91	12.79	15.14	18.24	32.54
	1:25:00	0.00	0.00	3.94	5.85	7.86	10.05	11.86	13.58	24.18
	1:30:00	0.00	0.00	3.45	5.14	6.63	7.51	8.85	9.83	17.81
	1:35:00	0.00	0.00	3.23	4.79	5.92	6.04	7.09	7.62	13.97
	1:40:00	0.00	0.00	3.11	4.26	5.41	5.13	5.99	6.29	11.58
	1:45:00	0.00	0.00	3.05	3.84	5.05	4.54	5.27	5.36	9.90
	1:50:00	0.00	0.00	3.00	3.54	4.80	4.14	4.78	4.72	8.75
	1:55:00	0.00	0.00	2.63	3.31	4.49	3.88	4.45	4.27	7.92
	2:00:00	0.00	0.00	2.31	3.05	4.03	3.70	4.22	3.96	7.34
	2:05:00	0.00	0.00	1.75	2.30	3.02	2.78	3.17	2.93	5.42
	2:10:00	0.00	0.00	1.30	1.69	2.19	2.03	2.30	2.13	3.92
	2:15:00	0.00	0.00	0.95	1.23	1.58	1.48	1.67	1.56	2.85
	2:20:00	0.00	0.00	0.69	0.89	1.15	1.08	1.22	1.15	2.09
	2:25:00	0.00	0.00	0.50	0.63	0.82	0.76	0.86	0.82	1.49
	2:30:00	0.00	0.00	0.35	0.43	0.58	0.54	0.61	0.58	1.05
	2:35:00	0.00	0.00	0.24	0.30	0.40	0.38	0.43	0.41	0.74
	2:40:00	0.00	0.00	0.15	0.20	0.26	0.25	0.29	0.27	0.49
	2:45:00	0.00	0.00	0.08	0.12	0.15	0.15	0.17	0.16	0.29
	2:50:00	0.00	0.00	0.04	0.06	0.07	0.07	0.08	0.08	0.14
	2:55:00	0.00	0.00	0.01	0.02	0.02	0.02	0.03	0.03	0.04
	3:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.03 (May 2020)

Project: Homestead North at Sterling Ranch

Basin ID: Pond C



Example Zone Configuration (Retention Pond)

Watershed Information

Selected BMP Type =	EDB
Watershed Area =	22.77 acres
Watershed Length =	1,580 ft
Watershed Length to Centroid =	948 ft
Watershed Slope =	0.021 ft/ft
Watershed Imperviousness =	60.80% percent
Percentage Hydrologic Soil Group A =	0.0% percent
Percentage Hydrologic Soil Group B =	100.0% percent
Percentage Hydrologic Soil Groups C/D =	0.0% percent
Target WQCV Drain Time =	40.0 hours
Location for 1-hr Rainfall Depths =	User Input

After providing required inputs above including 1-hour rainfall depths, click 'Run CUHP' to generate runoff hydrographs using the embedded Colorado Urban Hydrograph Procedure.

Water Quality Capture Volume (WQCV) =	0.453 acre-feet
Excess Urban Runoff Volume (EURV) =	1.503 acre-feet
2-yr Runoff Volume (P1 = 1.19 in.) =	1.395 acre-feet
5-yr Runoff Volume (P1 = 1.5 in.) =	1.923 acre-feet
10-yr Runoff Volume (P1 = 1.75 in.) =	2.376 acre-feet
25-yr Runoff Volume (P1 = 2 in.) =	2.946 acre-feet
50-yr Runoff Volume (P1 = 2.25 in.) =	3.429 acre-feet
100-yr Runoff Volume (P1 = 2.52 in.) =	4.022 acre-feet
500-yr Runoff Volume (P1 = 4 in.) =	6.989 acre-feet
Approximate 2-yr Detention Volume =	1.158 acre-feet
Approximate 5-yr Detention Volume =	1.561 acre-feet
Approximate 10-yr Detention Volume =	2.008 acre-feet
Approximate 25-yr Detention Volume =	2.170 acre-feet
Approximate 50-yr Detention Volume =	2.262 acre-feet
Approximate 100-yr Detention Volume =	2.465 acre-feet

Optional User Overrides

	acre-feet
	acre-feet
1.19	inches
1.50	inches
1.75	inches
2.00	inches
2.25	inches
2.52	inches
4.00	inches

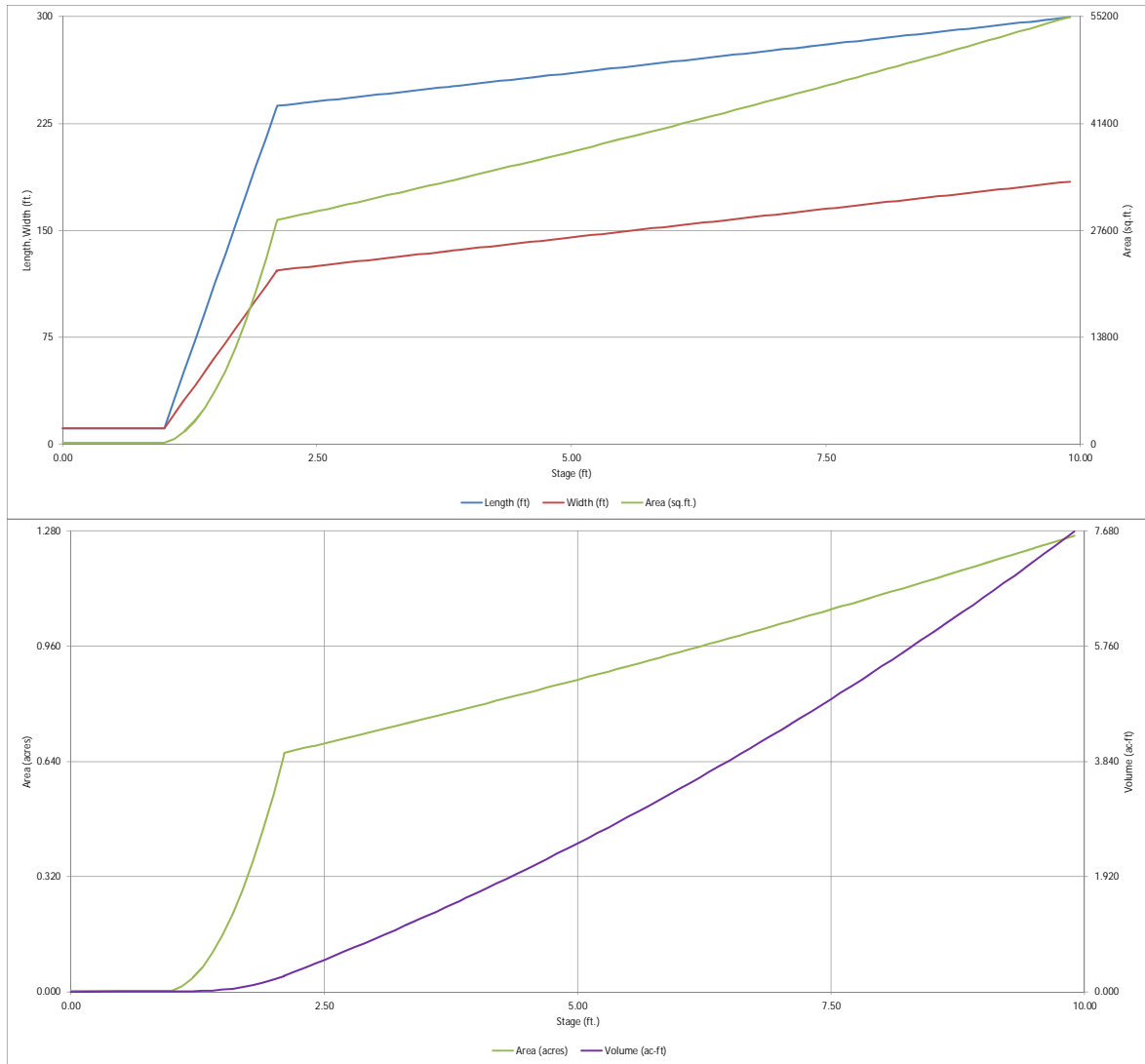
Define Zones and Basin Geometry

Zone 1 Volume (WQCV) =	0.453 acre-feet
Zone 2 Volume (EURV - Zone 1) =	1.050 acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	0.962 acre-feet
Total Detention Basin Volume =	2.465 acre-feet
Initial Surge Volume (ISV) =	59 ft ³
Initial Surge Depth (ISD) =	0.50 ft
Total Available Detention Depth (H _{total}) =	5.00 ft
Depth of Trickle Channel (H _{TC}) =	0.50 ft
Slope of Trickle Channel (S _{TC}) =	0.005 ft/ft
Slopes of Main Basin Sides (S _{main}) =	4 ft/V
Basin Length-to-Width Ratio (R _{L/W}) =	2
Initial Surge Area (A _{ISV}) =	118 ft ²
Surge Volume Length (L _{ISV}) =	10.9 ft
Surge Volume Width (W _{ISV}) =	10.9 ft
Depth of Basin Floor (H _{f,100yr}) =	1.11 ft
Length of Basin Floor (L _{f,100yr}) =	237.3 ft
Width of Basin Floor (W _{f,100yr}) =	121.9 ft
Area of Basin Floor (A _{f,100yr}) =	28,926 ft ²
Volume of Basin Floor (V _{f,100yr}) =	11,431 ft ³
Depth of Main Basin (H _{main}) =	2.89 ft
Length of Main Basin (L _{main}) =	260.4 ft
Width of Main Basin (W _{main}) =	145.0 ft
Area of Main Basin (A _{main}) =	37,765 ft ²
Volume of Main Basin (V _{main}) =	96,086 ft ³
Calculated Total Basin Volume (V _{total}) =	2,471 acre-feet

Depth Increment =	0.10									
Stage - Storage Description	Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft ²)	Optional Override Area (ft ²)	Area (acre)	Volume (ft ³)	Volume (ac-ft)	
Top of Micropool	0.00		10.9	10.9	118		0.003			
ISV	0.50		10.9	10.9	118		0.003	59	0.001	
	0.60		10.9	10.9	118		0.003	71	0.002	
	0.70		10.9	10.9	118		0.003	83	0.002	
	0.80		10.9	10.9	118		0.003	95	0.002	
	0.90		10.9	10.9	118		0.003	107	0.002	
	1.00		10.9	10.9	118		0.003	118	0.003	
	1.10		31.3	20.9	653		0.015	154	0.004	
	1.20		51.7	30.9	1,596		0.037	263	0.006	
	1.30		72.1	40.9	2,947		0.068	486	0.011	
	1.40		92.5	50.9	4,706		0.108	866	0.020	
Floor	1.50		112.9	60.9	6,873		0.158	1,441	0.033	
	1.60		133.3	70.9	9,448		0.217	2,254	0.052	
	1.70		153.7	80.9	12,431		0.285	3,344	0.077	
	1.80		174.1	90.9	15,821		0.363	4,754	0.109	
	1.90		194.5	100.9	19,620		0.450	6,522	0.150	
	2.00		214.9	110.9	23,827		0.547	8,691	0.200	
	2.10		235.3	120.9	28,442		0.653	11,301	0.259	
	2.11		237.3	121.9	28,926		0.664	11,588	0.266	
	2.20		238.0	122.6	29,185		0.670	14,203	0.326	
	2.30		238.8	123.4	29,474		0.677	17,136	0.393	
Zone 1 (WQCV)	2.39		239.6	124.1	29,736		0.683	19,801	0.455	
	2.40		239.6	124.2	29,765		0.683	20,098	0.461	
	2.50		240.4	125.0	30,056		0.690	23,089	0.530	
	2.60		241.2	125.8	30,349		0.697	26,109	0.599	
	2.70		242.0	126.6	30,644		0.703	29,159	0.669	
	2.80		242.8	127.4	30,939		0.710	32,238	0.740	
	2.90		243.6	128.2	31,236		0.717	35,347	0.811	
	3.00		244.4	129.0	31,534		0.724	38,485	0.884	
	3.10		245.2	129.8	31,834		0.731	41,654	0.956	
	3.20		246.0	130.6	32,134		0.738	44,852	1.030	
	3.30		246.8	131.4	32,436		0.745	48,081	1.104	
	3.40		247.6	132.2	32,740		0.752	51,340	1.179	
	3.50		248.4	133.0	33,044		0.759	54,629	1.254	
	3.60		249.2	133.8	33,350		0.766	57,948	1.330	
	3.70		250.0	134.6	33,657		0.773	61,299	1.407	
	3.80		250.8	135.4	33,965		0.780	64,680	1.485	
	Zone 2 (EURV)	3.83		251.1	135.6	34,058		0.782	65,700	1.508
		3.90		251.6	136.2	34,275		0.787	68,092	1.563
	4.00		252.4	137.0	34,586		0.794	71,535	1.642	
	4.10		253.2	137.8	34,898		0.801	75,009	1.722	
	4.20		254.0	138.6	35,212		0.808	78,515	1.802	
	4.30		254.8	139.4	35,526		0.816	82,051	1.884	
	4.40		255.6	140.2	35,842		0.823	85,620	1.966	
	4.50		256.4	141.0	36,160		0.830	89,220	2.048	
	4.60		257.2	141.8	36,478		0.837	92,852	2.132	
	4.70		258.0	142.6	36,798		0.845	96,516	2.216	
	4.80		258.8	143.4	37,119		0.852	100,211	2.301	
	4.90		259.6	144.2	37,442		0.860	103,939	2.386	
	Zone 3 (100-year)	5.00		260.4	145.0	37,765		0.867	107,700	2.472
		5.10		261.2	145.8	38,090		0.874	111,493	2.560
	5.20		262.0	146.6	38,417		0.882	115,318	2.647	
	5.30		262.8	147.4	38,744		0.889	119,176	2.736	
5.40		263.6	148.2	39,073		0.897	123,067	2.825		
5.50		264.4	149.0	39,403		0.905	126,991	2.915		
5.60		265.2	149.8	39,735		0.912	130,948	3.006		
5.70		266.0	150.6	40,067		0.920	134,938	3.098		
	5.80		266.8	151.4	40,401		0.927	138,961	3.190	
	5.90		267.6	152.2	40,736		0.935	143,018	3.283	
	6.00		268.4	153.0	41,073		0.943	147,108	3.377	
	6.10		269.2	153.8	41,411		0.951	151,233	3.472	
	6.20		270.0	154.6	41,750		0.958	155,391	3.567	
	6.30		270.8	155.4	42,090		0.966	159,583	3.664	
	6.40		271.6	156.2	42,432		0.974	163,809	3.761	
	6.50		272.4	157.0	42,775		0.982	168,069	3.858	
	6.60		273.2	157.8	43,119		0.990	172,364	3.957	
	6.70		274.0	158.6	43,464		0.998	176,693	4.056	
	6.80		274.8	159.4	43,811		1.006	181,057	4.156	
	6.90		275.6	160.2	44,159		1.014	185,455	4.257	
	7.00		276.4	161.0	44,509		1.022	189,889	4.359	
	7.10		277.2	161.8	44,859		1.030	194,357	4.462	
	7.20		278.0	162.6	45,211		1.038	198,860	4.565	
	7.30		278.8	163.4	45,564		1.046	203,399	4.669	
	7.40		279.6	164.2	45,919		1.054	207,973	4.774	
	7.50		280.4	165.0	46,274		1.062	212,583	4.880	
	7.60		281.2	165.8	46,631		1.071	217,228	4.987	
	7.70		282.0	166.6	46,990		1.079	221,909	5.094	
7.80		282.8	167.4	47,349		1.087	226,626	5.203		
	7.90		283.6	168.2	47,710		1.095	231,379	5.312	
	8.00		284.4	169.0	48,072		1.104	236,168	5.422	
	8.10		285.2	169.8	48,436		1.112	240,994	5.532	
	8.20		286.0	170.6	48,800		1.120	245,855	5.644	
	8.30		286.8	171.4	49,166		1.129	250,754	5.757	
	8.40		287.6	172.2	49,533		1.137	255,689	5.870	
	8.50		288.4	173.0	49,902		1.146	260,660	5.984	
	8.60		289.2	173.8	50,272		1.154	265,669	6.099	
	8.70		290.0	174.6	50,643		1.163	270,715	6.215	
	8.80		290.8	175.4	51,015		1.171	275,798	6.331	
8.90		291.6	176.2	51,389		1.180	280,918	6.449		
9.00		292.4	177.0	51,764		1.188	286,076	6.567		
9.10		293.2	177.8	52,140		1.197	291,271	6.687		
9.20		294.0	178.6	52,517		1.206	296,504	6.807		
9.30		294.8	179.4	52,896		1.214	301,774	6.928		
9.40		295.6	180.2	53,276		1.223	307,083	7.050		
9.50		296.4	181.0	53,658		1.232	312,430	7.172		
9.60		297.2	181.8	54,040		1.241	317,814	7.296		
9.70		298.0	182.6	54,424		1.249	323,238	7.421		
9.80		298.8	183.4	54,809		1.258	328,699	7.546		
9.90		299.6	184.2	55,196		1.267	334,200	7.672		

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.03 (May 2020)

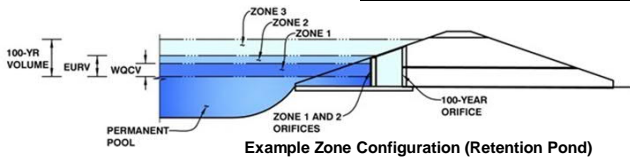


DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.03 (May 2020)

Project: Homestead North at Sterling Ranch

Basin ID: Pond C



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WOCV)	2.39	0.453	Orifice Plate
Zone 2 (EURV)	3.83	1.050	Orifice Plate
Zone 3 (100-year)	5.00	0.962	Weir&Pipe (Restrict)
Total (all zones)		2.465	

User Input: Orifice at Underdrain Outlet (typically used to drain WOCV in a Filtration BMP)

Underdrain Orifice Invert Depth = ft (distance below the filtration media surface)
Underdrain Orifice Diameter = inches

Calculated Parameters for Underdrain
Underdrain Orifice Area = ft²
Underdrain Orifice Centroid = feet

User Input: Orifice Plate with one or more orifices or Elliptical Slot Weir (typically used to drain WOCV and/or EURV in a sedimentation BMP)

Invert of Lowest Orifice = ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Orifice Plate = ft (relative to basin bottom at Stage = 0 ft)
Orifice Plate: Orifice Vertical Spacing = inches
Orifice Plate: Orifice Area per Row = inches

Calculated Parameters for Plate
WO Orifice Area per Row = ft²
Elliptical Half-Width = feet
Elliptical Slot Centroid = feet
Elliptical Slot Area = ft²

User Input: Stage and Total Area of Each Orifice Row (numbered from lowest to highest)

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	<input type="text" value="0.00"/>	<input type="text" value="1.30"/>	<input type="text" value="2.00"/>	<input type="text" value="3.00"/>				
Orifice Area (sq. inches)	<input type="text" value="0.75"/>	<input type="text" value="3.10"/>	<input type="text" value="3.50"/>	<input type="text" value="10.00"/>				

	Row 9 (optional)	Row 10 (optional)	Row 11 (optional)	Row 12 (optional)	Row 13 (optional)	Row 14 (optional)	Row 15 (optional)	Row 16 (optional)
Stage of Orifice Centroid (ft)								
Orifice Area (sq. inches)								

User Input: Vertical Orifice (Circular or Rectangular)

Invert of Vertical Orifice = ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Vertical Orifice = ft (relative to basin bottom at Stage = 0 ft)
Vertical Orifice Diameter = inches

Calculated Parameters for Vertical Orifice
Vertical Orifice Area = ft²
Vertical Orifice Centroid = feet

User Input: Overflow Weir (Dropbox with Flat or Sloped Grate and Outlet Pipe OR Rectangular/Trapezoidal Weir (and No Outlet Pipe))

Overflow Weir Front Edge Height, H_o = ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length = feet
Overflow Weir Grate Slope = H:V
Horiz. Length of Weir Sides = feet
Overflow Grate Open Area % = %
Debris Clogging % = %

Calculated Parameters for Overflow Weir
Height of Grate Upper Edge, H₁ = feet
Overflow Weir Slope Length = feet
Grate Open Area / 100-yr Orifice Area = ft²
Overflow Grate Open Area w/o Debris = ft²
Overflow Grate Open Area w/ Debris = ft²

User Input: Outlet Pipe w/ Flow Restriction Plate (Circular Orifice, Restrictor Plate, or Rectangular Orifice)

Depth to Invert of Outlet Pipe = ft (distance below basin bottom at Stage = 0 ft)
Outlet Pipe Diameter = inches
Restrictor Plate Height Above Pipe Invert = inches

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate
Outlet Orifice Area = ft²
Outlet Orifice Centroid = feet
Half-Central Angle of Restrictor Plate on Pipe = radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage = ft (relative to basin bottom at Stage = 0 ft)
Spillway Crest Length = feet
Spillway End Slopes = H:V
Freeboard above Max Water Surface = feet

Calculated Parameters for Spillway
Spillway Design Flow Depth = feet
Stage at Top of Freeboard = feet
Basin Area at Top of Freeboard = acres
Basin Volume at Top of Freeboard = acre-ft

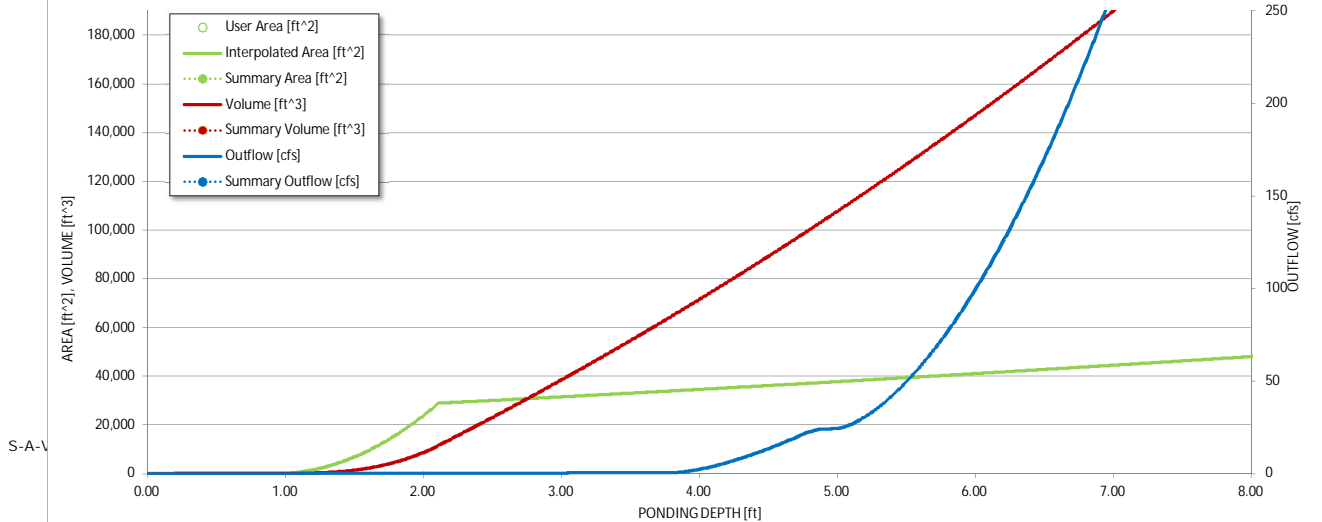
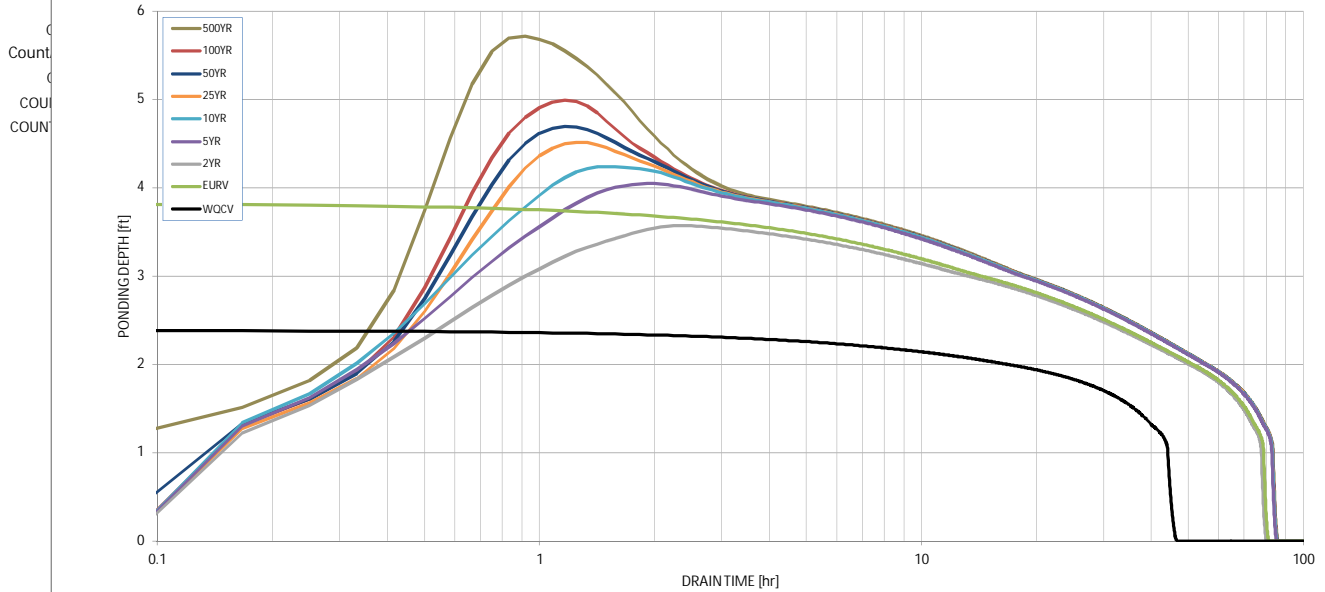
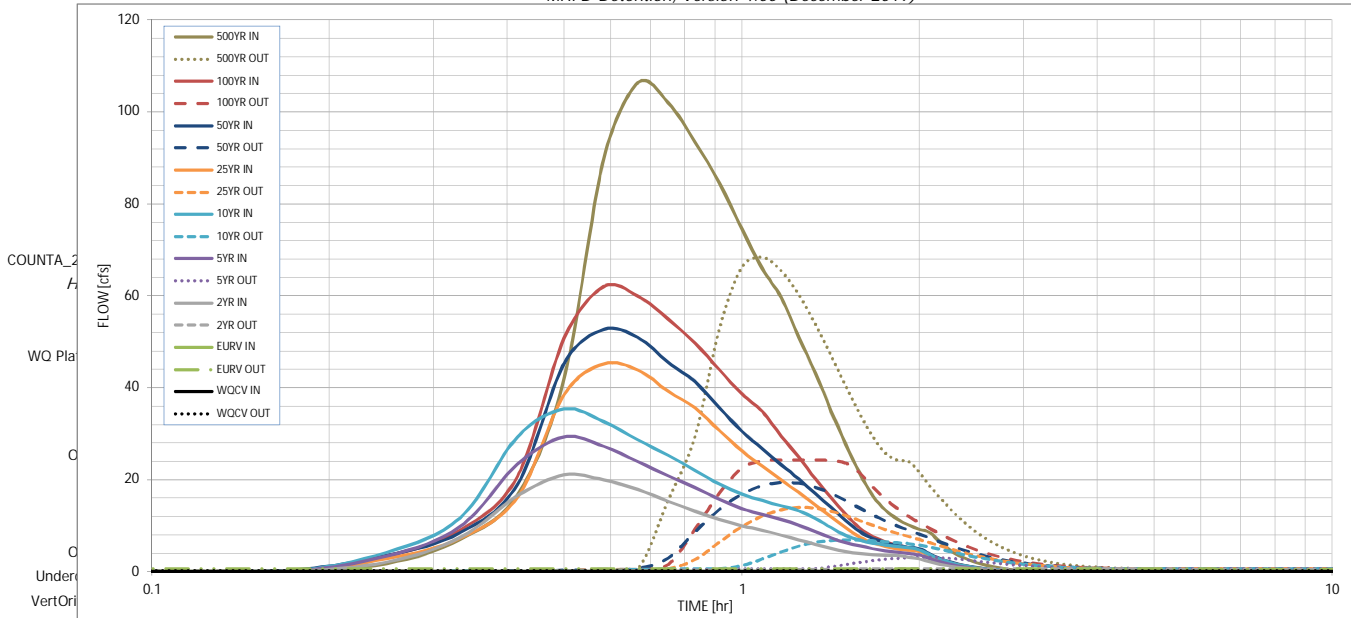
Routed Hydrograph Results

The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AF).

	WOCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
Design Storm Return Period =	N/A	N/A	1.19	1.50	1.75	2.00	2.25	2.52	4.00
One-Hour Rainfall Depth (in) =	N/A	N/A	1.395	1.923	2.376	2.946	3.429	4.022	6.989
CUHP Runoff Volume (acre-ft) =	N/A	N/A	1.395	1.923	2.376	2.946	3.429	4.022	6.989
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	1.395	1.923	2.376	2.946	3.429	4.022	6.989
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	2.1	5.9	8.9	16.0	20.1	25.7	50.8
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.09	0.26	0.39	0.70	0.88	1.13	2.23
Peak Inflow Q (cfs) =	N/A	N/A	21.1	29.3	35.4	45.2	52.7	62.0	106.3
Peak Outflow Q (cfs) =	0.2	0.7	0.6	3.2	6.9	14.0	19.4	24.3	68.4
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.5	0.8	0.9	1.0	0.9	1.3
Structure Controlling Flow =	Plate	Overflow Weir 1	Plate	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Outlet Plate	Spillway
Max Velocity through Gate 1 (fps) =	N/A	N/A	N/A	0.1	0.3	0.7	1.0	1.2	1.3
Max Velocity through Gate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	40	69	68	71	70	68	66	64	55
Time to Drain 99% of Inflow Volume (hours) =	43	74	73	77	77	76	75	74	70
Maximum Ponding Depth (ft) =	2.39	3.83	3.57	4.05	4.24	4.52	4.69	4.99	5.71
Area at Maximum Ponding Depth (acres) =	0.68	0.78	0.76	0.80	0.81	0.83	0.84	0.87	0.92
Maximum Volume Stored (acre-ft) =	0.455	1.508	1.307	1.682	1.835	2.057	2.207	2.464	3.107

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.00 (December 2019)



S-A-V-D Chart Axis Override	X-axis	Left Y-Axis	Right Y-Axis
minimum bound			
maximum bound			

DETENTION BASIN OUTLET STRUCTURE DESIGN

Outflow Hydrograph Workbook Filename: _____

Inflow Hydrographs

The user can override the calculated inflow hydrographs from this workbook with inflow hydrographs developed in a separate program.

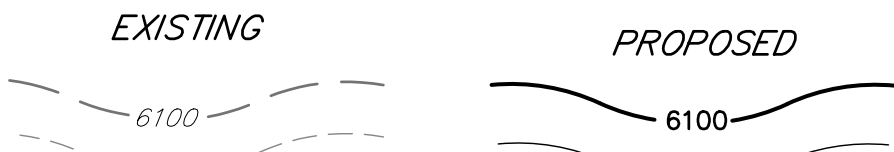
	SOURCE	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP
Time Interval	TIME	WQCV [cfs]	EURV [cfs]	2 Year [cfs]	5 Year [cfs]	10 Year [cfs]	25 Year [cfs]	50 Year [cfs]	100 Year [cfs]	500 Year [cfs]
5.00 min	0:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.02	1.76
	0:15:00	0.00	0.00	2.07	3.38	4.18	2.80	3.51	3.42	7.04
	0:20:00	0.00	0.00	7.44	9.81	11.74	7.28	8.48	9.07	16.75
	0:25:00	0.00	0.00	16.50	23.35	29.31	16.19	18.96	20.73	41.98
	0:30:00	0.00	0.00	21.06	29.32	35.40	38.54	45.30	50.76	89.72
	0:35:00	0.00	0.00	19.96	27.28	32.63	45.18	52.70	62.01	106.34
	0:40:00	0.00	0.00	17.86	23.95	28.68	43.85	50.93	59.93	102.03
	0:45:00	0.00	0.00	15.32	20.84	25.31	39.25	45.55	55.00	93.50
	0:50:00	0.00	0.00	13.15	18.30	21.97	35.57	41.28	49.72	84.52
	0:55:00	0.00	0.00	11.34	15.74	19.04	30.68	35.65	43.89	74.61
	1:00:00	0.00	0.00	9.96	13.74	16.87	26.25	30.55	38.70	65.94
	1:05:00	0.00	0.00	9.02	12.40	15.46	22.96	26.77	34.84	59.61
	1:10:00	0.00	0.00	7.92	11.36	14.33	19.88	23.21	29.50	50.89
	1:15:00	0.00	0.00	6.90	10.08	13.22	17.25	20.17	24.83	43.18
	1:20:00	0.00	0.00	5.96	8.65	11.54	14.49	16.93	20.14	34.99
	1:25:00	0.00	0.00	5.09	7.36	9.55	12.02	14.02	16.04	27.76
	1:30:00	0.00	0.00	4.37	6.30	7.88	9.59	11.14	12.47	21.51
	1:35:00	0.00	0.00	3.92	5.64	6.85	7.54	8.71	9.51	16.50
	1:40:00	0.00	0.00	3.69	5.00	6.24	6.27	7.23	7.67	13.42
	1:45:00	0.00	0.00	3.58	4.52	5.82	5.49	6.31	6.54	11.48
	1:50:00	0.00	0.00	3.52	4.18	5.52	4.99	5.71	5.77	10.14
	1:55:00	0.00	0.00	3.12	3.92	5.20	4.64	5.28	5.23	9.19
	2:00:00	0.00	0.00	2.77	3.63	4.73	4.41	5.00	4.84	8.50
	2:05:00	0.00	0.00	2.15	2.83	3.67	3.42	3.88	3.68	6.45
	2:10:00	0.00	0.00	1.63	2.12	2.75	2.55	2.88	2.69	4.71
	2:15:00	0.00	0.00	1.23	1.60	2.05	1.91	2.16	2.01	3.51
	2:20:00	0.00	0.00	0.93	1.20	1.52	1.43	1.61	1.51	2.62
	2:25:00	0.00	0.00	0.69	0.88	1.11	1.05	1.18	1.12	1.94
	2:30:00	0.00	0.00	0.50	0.63	0.81	0.76	0.85	0.82	1.42
	2:35:00	0.00	0.00	0.36	0.45	0.59	0.56	0.62	0.60	1.03
	2:40:00	0.00	0.00	0.25	0.31	0.42	0.40	0.45	0.43	0.74
	2:45:00	0.00	0.00	0.16	0.21	0.28	0.27	0.30	0.29	0.50
	2:50:00	0.00	0.00	0.09	0.13	0.16	0.17	0.19	0.18	0.30
	2:55:00	0.00	0.00	0.04	0.07	0.08	0.09	0.10	0.09	0.16
	3:00:00	0.00	0.00	0.02	0.03	0.03	0.03	0.04	0.03	0.06
	3:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DRAINAGE MAP



LEGEND

- BASIN ID
A: BASIN LABEL
B: AREA
C: C -100 YR
D: C-5 YR
- DESIGN POINT
PROPOSED FLOW DIRECTION
- BASIN DRAINAGE AREA
EXISTING STORM SEWER
STORM SEWER PROPOSED
PROPOSED R.O.W
PROPOSED PROPERTY LINES
PROPOSED SIDEWALK
EXISTING PROPERTY LINE
ROW EXISTING
FL EXISTING
SIDEWALK EXISTING
DRAINAGE ACCESS & MAINTENANCE EASEMENT

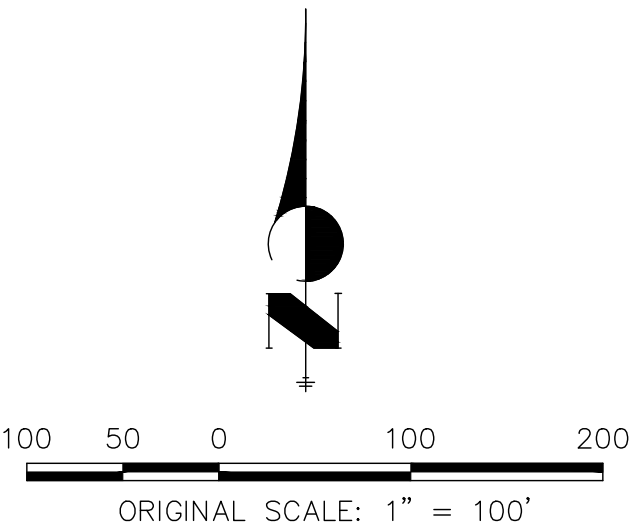


DESIGN POINT SUMMARY TABLE

DP	Q5		Q100	
	Total		Total	
1a	6.9		14.6	
2a	6.5		13.4	
3a	8.2		20.4	
4a	7.2		16.6	
5a	9.5		26.1	
6a	10.7		18.6	
7a	10.4		29.9	
8a	11.4		20.0	
9a	21.6		49.5	
1.1b	5.5		12.5	
1.2b	3.5		7.4	
1.3b	1.0		2.2	
2b	2.4		6.8	
3b	0.9		1.7	
4b	6.7		15.9	
5b	4.3		8.9	
6b	10.4		26.5	
7b	7.0		14.4	
8b	4.1		10.9	
9b	12.1		30.4	
10b	4.7		12.2	
11b	17.4		45.5	
1c	5.4		11.4	
2.1c	0.8		1.6	
2.2c	9.8		20.1	
2.3c	7.1		14.9	
3.1c	1.2		2.4	
3.2c	3.6		7.9	
4c	16.9		36.2	
4.2c	4.8		11.2	
5c	4.1		8.8	
6c	20.6		46.6	

BASIN SUMMARY TABLE

Tributary	Area	Percent			tc	Q5	Q100
Sub-basin	(acres)	Impervious	C5	C100	(min)	(cfs)	(cfs)
A1	3.67	52%	0.51	0.64	13.4	6.9	14.6
A2	3.27	56%	0.54	0.67	13.6	6.5	13.4
A3	4.79	50%	0.49	0.63	13.9	8.5	18.4
A4	3.95	54%	0.52	0.65	14.1	7.4	15.6
A5	5.43	50%	0.49	0.62	11.1	10.5	22.6
A6	3.96	53%	0.52	0.65	12.6	7.7	16.3
A7	1.97	15%	0.19	0.43	16.5	1.3	4.8
A8	0.42	57%	0.54	0.69	5.0	1.2	2.5
A9	2.97	16%	0.20	0.43	13.4	2.2	7.9
B1.1	3.35	45%	0.45	0.60	13.4	5.5	12.5
B1.2	1.81	54%	0.52	0.65	12.8	3.5	7.4
B1.3	0.47	47%	0.46	0.63	8.1	1.0	2.2
B2	0.82	58%	0.55	0.69	5.0	2.3	4.9
B3	0.24	79%	0.73	0.83	5.0	0.9	1.7
B4	3.98	40%	0.40	0.57	9.5	6.7	15.9
B5	1.75	58%	0.55	0.68	7.8	4.3	8.9
B6	3.66	58%	0.55	0.68	6.5	9.6	20.0
B7	1.14	61%	0.58	0.70	8.8	2.9	5.8
B8	1.74	58%	0.56	0.68	9.3	4.1	8.5
B9	3.69	65%	0.50	0.64	13.1	6.9	14.8
B10	0.22	80%	0.73	0.83	5.0	0.8	1.6
B11	1.77	14%	0.15	0.40	16.8	0.9	3.9
C1	2.82	69%	0.52	0.65	13.1	5.4	11.4
C2.1	0.20	91%	0.82	0.90	5.0	0.8	1.6
C2.2	4.69	73%	0.56	0.68	12.8	9.9	20.3
C2.3	0.83	67%	0.54	0.68	10.1	1.9	3.9
C3.1	0.35	73%	0.68	0.79	5.0	1.2	2.4
C3.2	1.46	71%	0.56	0.68	8.4	3.6	7.4
C4.1	6.37	65%	0.49	0.63	12.7	11.8	25.4
C4.2	3.47	55%	0.42	0.58	17.2	4.8	11.2
C5	0.16	81%	0.74	0.84	5.0	0.6	1.1
C6	2.42	10%	0.13	0.38	5.0	1.6	8.0



DRAINAGE MAP
HOMESTEAD NORTH
JOB NO. 25188.00
2/15/21
SHEET 1 OF 2



Centennial 303-740-9393 • Colorado Springs 719-593-2593
Fort Collins 970-491-9888 • www.jrengineering.com

SEE SHEET 2

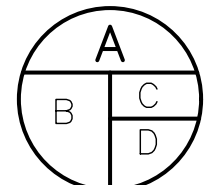
DRAINAGE MAP

SEE SHEET 1



LEGEND

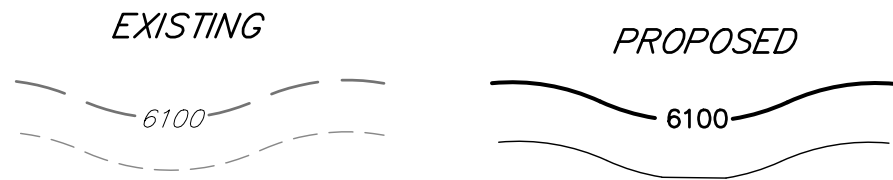
BASIN ID
A: BASIN LABEL
B: AREA
C: C-100 YR
D: C-5 YR



DESIGN POINT
PROPOSED FLOW DIRECTION



BASIN DRAINAGE AREA
EXISTING STORM SEWER
STORM SEWER PROPOSED
PROPOSED R.O.W
PROPOSED PROPERTY LINES
PROPOSED SIDEWALK
EXISTING PROPERTY LINE
ROW EXISTING
FL EXISTING
SIDEWALK EXISTING
DRAINAGE ACCESS & MAINTENANCE EASEMENT



DESIGN POINT SUMMARY TABLE

DP	Q5	Q100
	Total	Total
1a	6.9	14.6
2a	6.5	13.4
3a	8.2	20.4
4a	7.2	16.6
5a	9.5	26.1
6a	10.7	18.6
7a	10.4	29.9
8a	11.4	20.0
9a	21.6	49.5
1.1b	5.5	12.5
1.2b	3.5	7.4
1.3b	1.0	2.2
2b	2.4	6.8
3b	0.9	1.7
4b	6.7	15.9
5b	4.3	8.9
6b	10.4	26.5
7b	7.0	14.4
8b	4.1	10.9
9b	12.1	30.4
10b	4.7	12.2
11b	17.4	45.5
1c	5.4	11.4
2.1c	0.8	1.6
2.2c	9.8	20.1
2.3c	7.1	14.9
3.1c	1.2	2.4
3.2c	3.6	7.9
4c	16.9	36.2
4.2c	4.8	11.2
5c	4.1	8.8
6c	20.6	46.6

BASIN SUMMARY TABLE

Tributary	Area	Percent			tc	Q5	Q100
Sub-basin	(acres)	Impervious	C5	C100	(min)	(cfs)	(cfs)
A1	3.67	52%	0.51	0.64	13.4	6.9	14.6
A2	3.27	56%	0.54	0.67	13.6	6.5	13.4
A3	4.79	50%	0.49	0.63	13.9	8.5	18.4
A4	3.95	54%	0.52	0.65	14.1	7.4	15.6
A5	5.43	50%	0.49	0.62	11.1	10.5	22.6
A6	3.96	53%	0.52	0.65	12.6	7.7	16.3
A7	1.97	15%	0.19	0.43	16.5	1.3	4.8
A8	0.42	57%	0.54	0.69	5.0	1.2	2.5
A9	2.97	16%	0.20	0.43	13.4	2.2	7.9
B1.1	3.35	45%	0.45	0.60	13.4	5.5	12.5
B1.2	1.81	54%	0.52	0.65	12.8	3.5	7.4
B1.3	0.47	47%	0.46	0.63	8.1	1.0	2.2
B2	0.82	58%	0.55	0.69	5.0	2.3	4.9
B3	0.24	79%	0.73	0.83	5.0	0.9	1.7
B4	3.98	40%	0.40	0.57	9.5	6.7	15.9
B5	1.75	58%	0.55	0.68	7.8	4.3	8.9
B6	3.66	58%	0.55	0.68	6.5	9.6	20.0
B7	1.14	61%	0.58	0.70	8.8	2.9	5.8
B8	1.74	58%	0.56	0.68	9.3	4.1	8.5
B9	3.69	65%	0.50	0.64	13.1	6.9	14.8
B10	0.22	80%	0.73	0.83	5.0	0.8	1.6
B11	1.77	14%	0.15	0.40	16.8	0.9	3.9
C1	2.82	69%	0.52	0.65	13.1	5.4	11.4
C2.1	0.20	91%	0.82	0.90	5.0	0.8	1.6
C2.2	4.69	73%	0.56	0.68	12.8	9.9	20.3
C2.3	0.83	67%	0.54	0.68	10.1	1.9	3.9
C3.1	0.35	73%	0.68	0.79	5.0	1.2	2.4
C3.2	1.46	71%	0.56	0.68	8.4	3.6	7.4
C4.1	6.37	65%	0.49	0.63	12.7	11.8	25.4
C4.2	3.47	55%	0.42	0.58	17.2	4.8	11.2
C5	0.16	81%	0.74	0.84	5.0	0.6	1.1
C6	2.42	10%	0.13	0.38	5.0	1.6	8.0

DESIGN POINT FROM M&S MDDP
(PROPOSED CONDITIONS MAP) TO BE EXISTING
AT THE TIME OF CHANNEL DEVELOPMENT
Q₍₁₀₀₎ = 1775.7 CFS
Q₍₅₎ = 366.6 CFS



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

DRAINAGE MAP
HOMESTEAD NORTH
JOB NO. 25188.00
2/15/21
SHEET 2 OF 2



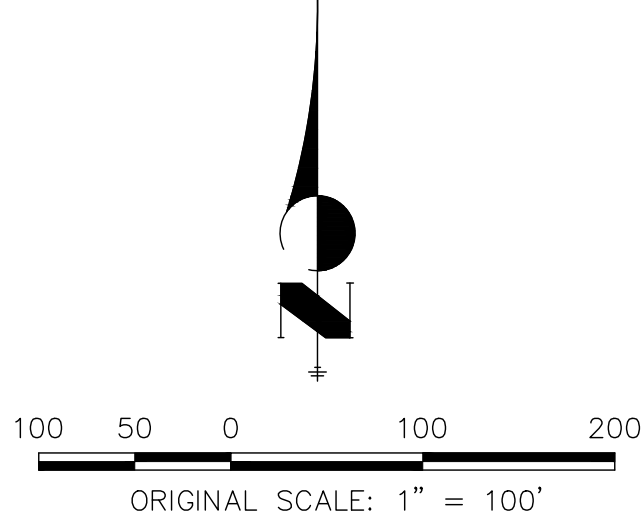
Centennial 303-740-9393 • Colorado Springs 719-593-2593
Fort Collins 970-491-9888 • www.jrengineering.com

WATER QUALITY CAPTURE PLAN

HOMESTEAD NORTH



- POND A 30.43 ACRES, 46.3% IMPERVIOUS**
- POND B 24.64 ACRES, 51.1% IMPERVIOUS**
- POND C 22.77 ACRES, 60.8% IMPERVIOUS**



WQ -PONDS
HOMESTEAD NORTH
JOB NO. 25188.00
2-13-2021
SHEET 1 OF 1



Centennial 303-740-9393 • Colorado Springs 719-583-2593
Fort Collins 970-491-9888 • www.jrengineering.com

STERLING RANCH RETENTION POND VOLUME

(Pond Volume Calculation)

BIG POND

Elevation	SF	CF	Storage	
			AF	Sum
7028	0.00	-		0
7030	53,785.00	53,785.00	1.23	1.23
7032	70,507.00	124,292.00	2.85	4.09
7034	87,672.00	158,179.00	3.63	7.72
7036	109,612.00	197,284.00	4.53	12.25

Total = 533,540 CF
Total = 12.25 Ac-ft

At Elevation 7035, the Storage is 9.98 Ac-ft.

At Elevation 7034, the Storage is 7.72 Ac-ft.

Calculated by: VAS

Date: 4/21/2016

Checked by: VAS

STERLING RANCH

"BIG POND"

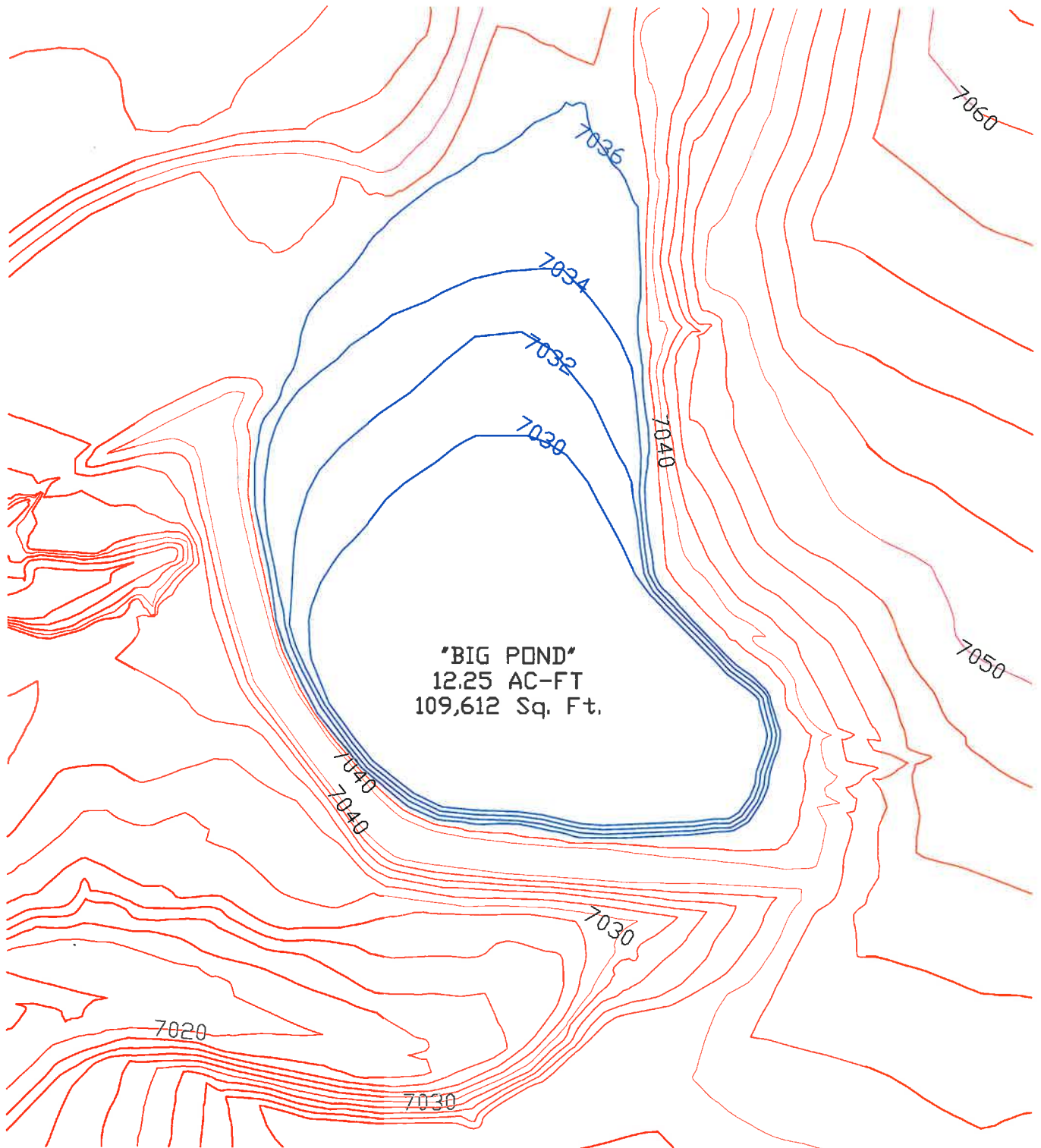


EXHIBIT
STERLING RANCH
JOB NO. 09-001
DATE PREPARED: 4-25-16
DATE REVISED:



CIVIL CONSULTANTS, INC.

20 BOULDER CRESCENT, STE. 110
COLORADO SPRINGS,
COLORADO 80903

☎ 719.955.5485
✉ 719.444.8427

SHEET 1 OF 1



INNOVATIVE DESIGN. **CLASSIC RESULTS.**

**FINAL DRAINAGE REPORT
FOR
RETREAT AT TIMBERRIDGE
FILING NO. 1**

Prepared for:
TIMBERRIDGE DEVELOPMENT GROUP, LLC
2138 FLYING HORSE CLUB DRIVE
COLORADO SPRINGS CO 80921
(719) 592-9333

Prepared by:
CLASSIC CONSULTING
619 N. CASCADE AVE SUITE 200
COLORADO SPRINGS CO 80903
(719) 785-0790

Job No. 1185.00

PCD Project No. SF-19-009

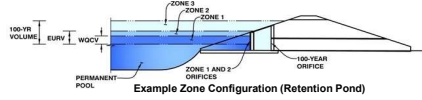


DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)

Project: RETREAT AT TIMBERRIDGE FILING NO. 1

Basin ID: POND 1



Required Volume Calculation

Selected BMP Type =	EDB	
Watershed Area =	29.40	acres
Watershed Length =	2,130	ft
Watershed Slope =	0.018	ft
Watershed Imperviousness =	13.80%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	100.0%	percent
Percentage Hydrologic Soil Groups C/D =	0.0%	percent
Desired WQCV Drain Time =	48.0	hours
Location for 1-hr Rainfall Depths =	User Input	
Water Quality Capture Volume (WQCV) =	0.214	acre-feet
Excess Urban Runoff Volume (EURV) =	0.391	acre-feet
2-yr Runoff Volume (P1 = 1.19 in.) =	0.279	1.19 inches
5-yr Runoff Volume (P1 = 1.51 in.) =	0.421	1.50 inches
10-yr Runoff Volume (P1 = 1.75 in.) =	0.832	1.75 inches
25-yr Runoff Volume (P1 = 2 in.) =	1.922	2.00 inches
50-yr Runoff Volume (P1 = 2.25 in.) =	2.610	2.25 inches
100-yr Runoff Volume (P1 = 2.52 in.) =	3.508	2.52 inches
500-yr Runoff Volume (P1 = 3.85 in.) =	6.448	3.85 inches
Approximate 2-yr Detention Volume =	0.258	acre-feet
Approximate 5-yr Detention Volume =	0.394	acre-feet
Approximate 10-yr Detention Volume =	0.720	acre-feet
Approximate 25-yr Detention Volume =	0.951	acre-feet
Approximate 50-yr Detention Volume =	1.002	acre-feet
Approximate 100-yr Detention Volume =	1.268	acre-feet

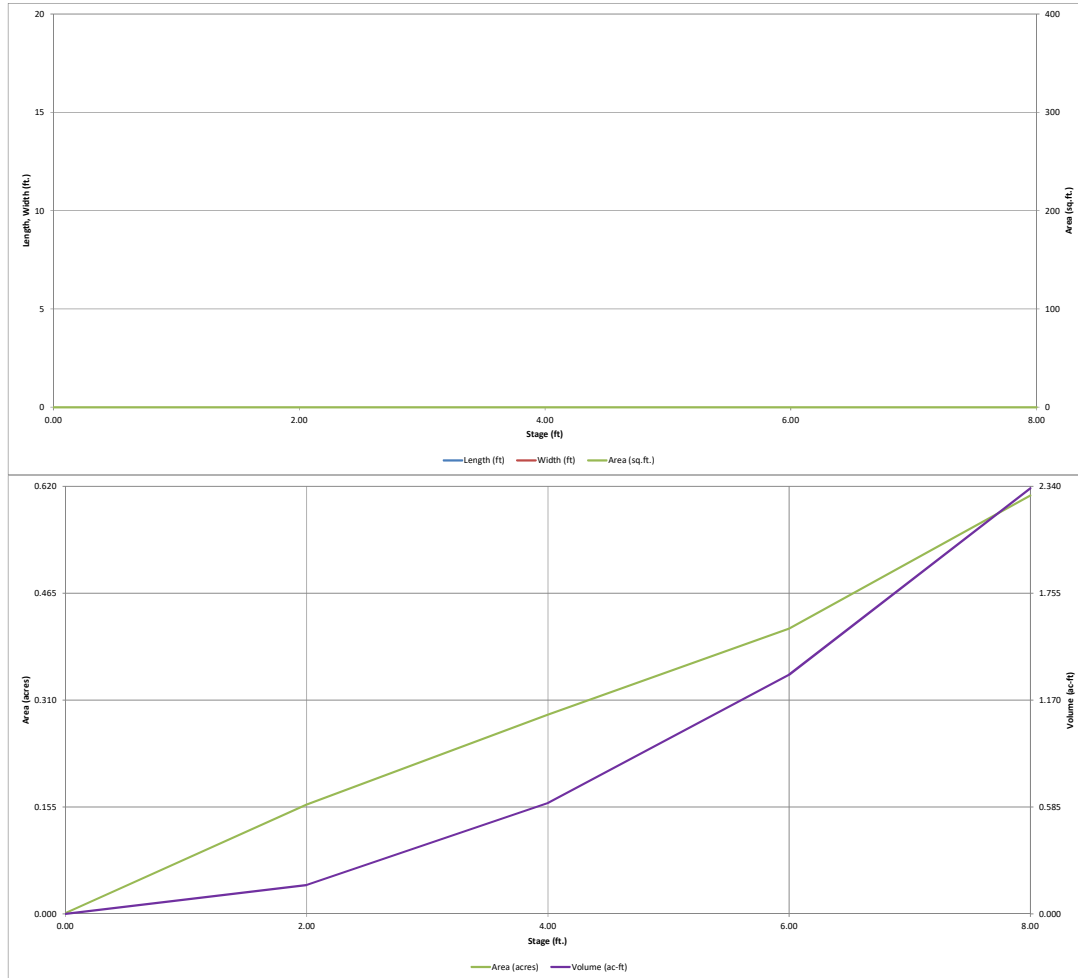
Stage-Storage Calculation

Zone 1 Volume ($WOCV_1$) =	0.214	acre-feet
Zone 2 Volume ($EJRV - Zone 1$) =	0.177	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	0.877	acre-feet
Total Detention Basin Volume =	1.268	acre-feet
Initial Surcharge Volume (ISV) =	user#	ft ³
Initial Surcharge Depth (ISD) =	user#	ft
Total Available Detention Depth (H_{total}) =	user#	ft
Depth of Trickle Channel (H_{TC}) =	user#	ft
Slope of Trickle Channel (S_{TC}) =	user#	ft/ft
Slopes of Main Basin Sides (S_{main}) =	user#	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	user#	
Initial Surcharge Area (A_{ISV}) =	user#	ft ²
Surcharge Volume Length (L_{ISV}) =	user#	ft
Surcharge Volume Width (W_{ISV}) =	user#	ft
Depth of Basin Floor ($H_{b,000}$) =	user#	ft
Length of Basin Floor ($L_{b,000}$) =	user#	ft
Width of Basin Floor ($W_{b,000}$) =	user#	ft
Area of Basin Floor ($A_{b,000}$) =	user#	ft ²
Volume of Basin Floor ($V_{b,000}$) =	user#	ft ³
Depth of Main Basin (H_{main}) =	user#	ft
Length of Main Basin (L_{main}) =	user#	ft
Width of Main Basin (W_{main}) =	user#	ft
Area of Main Basin (A_{main}) =	user#	ft ²
Volume of Main Basin (V_{main}) =	user#	ft ³
Calculated Total Basin Volume (V_{total}) =	user#	acre-feet

[illegible]

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)

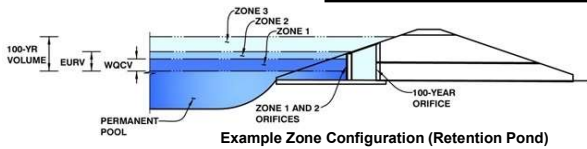


Detention Basin Outlet Structure Design

UD-Detention, Version 3.07 (February 2017)

Project: RETREAT AT TIMBERIDGE FILING NO. 1

Basin ID: POND 1



Example Zone Configuration (Retention Pond)

	Stage (ft)	Zone Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	2.33	0.214	Orifice Plate
Zone 2 (EURV)	3.18	0.177	Orifice Plate
Zone 3 (100-year)	5.91	0.877	Weir&Pipe (Restrict)
		1.268	Total

User Input: Orifice at Underdrain Outlet (typically used to drain WQCV in a Filtration BMP)

Underdrain Orifice Invert Depth =	N/A	ft (distance below the filtration media surface)
Underdrain Orifice Diameter =	N/A	inches

Calculated Parameters for Underdrain

Underdrain Orifice Area =	N/A	ft ²
Underdrain Orifice Centroid =	N/A	feet

User Input: Orifice Plate with one or more orifices or Elliptical Slot Weir (typically used to drain WQCV and/or EURV in a sedimentation BMP)

Invert of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Orifice Plate =	3.50	ft (relative to basin bottom at Stage = 0 ft)
Orifice Plate: Orifice Vertical Spacing =	14.00	inches
Orifice Plate: Orifice Area per Row =	N/A	inches

Calculated Parameters for Plate

WQ Orifice Area per Row =	N/A	ft ²
Elliptical Half-Width =	N/A	feet
Elliptical Slot Centroid =	N/A	feet
Elliptical Slot Area =	N/A	ft ²

User Input: Stage and Total Area of Each Orifice Row (numbered from lowest to highest)

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	1.20	2.40					
Orifice Area (sq. inches)	1.20	1.31	1.31					

	Row 9 (optional)	Row 10 (optional)	Row 11 (optional)	Row 12 (optional)	Row 13 (optional)	Row 14 (optional)	Row 15 (optional)	Row 16 (optional)
Stage of Orifice Centroid (ft)								
Orifice Area (sq. inches)								

User Input: Vertical Orifice (Circular or Rectangular)

	Not Selected	Not Selected	
Invert of Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)
Vertical Orifice Diameter =	N/A	N/A	inches

Calculated Parameters for Vertical Orifice

	Not Selected	Not Selected	
Vertical Orifice Area =	N/A	N/A	ft ²
Vertical Orifice Centroid =	N/A	N/A	feet

User Input: Overflow Weir (Dropbox) and Grate (Flat or Sloped)

	Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, Ho =	3.50	N/A	ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length =	4.00	N/A	feet
Overflow Weir Slope =	4.00	N/A	H:V (enter zero for flat grate)
Horiz. Length of Weir Sides =	4.00	N/A	feet
Overflow Grate Open Area % =	75%	N/A	%, grate open area/total area
Debris Clogging % =	50%	N/A	%

Calculated Parameters for Overflow Weir

	Zone 3 Weir	Not Selected	
Height of Grate Upper Edge, H _u =	4.50	N/A	feet
Over Flow Weir Slope Length =	4.12	N/A	feet
Grate Open Area / 100-yr Orifice Area =	7.00	N/A	should be ≥ 4
Overflow Grate Open Area w/o Debris =	12.37	N/A	ft ²
Overflow Grate Open Area w/ Debris =	6.18	N/A	ft ²

User Input: Outlet Pipe w/ Flow Restriction Plate (Circular Orifice, Restrictor Plate, or Rectangular Orifice)

	Zone 3 Restrictor	Not Selected	
Depth to Invert of Outlet Pipe =	2.50	N/A	ft (distance below basin bottom at Stage = 0 ft)
Outlet Pipe Diameter =	18.00	N/A	inches
Restrictor Plate Height Above Pipe Invert =	18.00		inches

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

	Zone 3 Restrictor	Not Selected	
Outlet Orifice Area =	1.77	N/A	ft ²
Outlet Orifice Centroid =	0.75	N/A	feet
Half-Central Angle of Restrictor Plate on Pipe =	3.14	N/A	radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage=	6.30	ft (relative to basin bottom at Stage = 0 ft)
Spillway Crest Length =	30.00	feet
Spillway End Slopes =	3.00	H:V
Freeboard above Max Water Surface =	1.00	feet

Calculated Parameters for Spillway

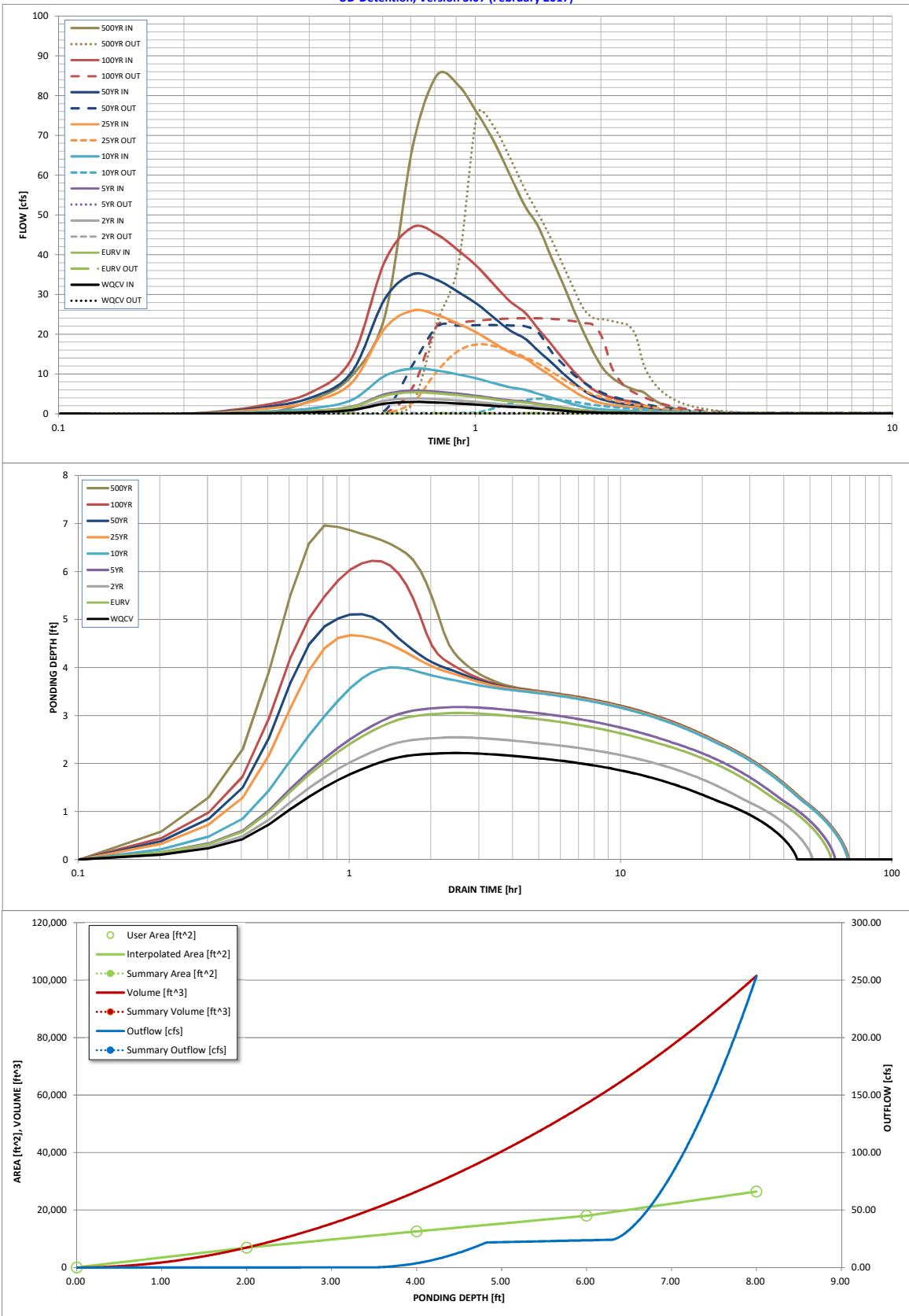
Spillway Design Flow Depth=	0.62	feet
Stage at Top of Freeboard =	7.92	feet
Basin Area at Top of Freeboard =	0.60	acres

Routed Hydrograph Results

	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
Design Storm Return Period =									
One-Hour Rainfall Depth (in) =	0.53	1.07	1.19	1.50	1.75	2.00	2.25	2.52	3.85
Calculated Runoff Volume (acre-ft) =	0.214	0.391	0.278	0.421	0.832	1.922	2.610	3.508	6.448
OPTIONAL Override Runoff Volume (acre-ft) =									
Inflow Hydrograph Volume (acre-ft) =	0.214	0.391	0.277	0.421	0.832	1.922	2.610	3.508	6.443
Predevelopment Unit Peak Flow, q (cfs/acre) =	0.00	0.00	0.01	0.02	0.15	0.53	0.73	0.99	1.81
Predevelopment Peak Q (cfs) =	0.0	0.0	0.3	0.479	4.5	15.5	21.5	29.2	53.1
Peak Inflow Q (cfs) =	3.0	5.4	3.8	5.8	11.3	26.0	35.1	47.0	85.1
Peak Outflow Q (cfs) =	0.1	0.2	0.1	0.172	3.8	17.5	22.3	24.0	75.6
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.4	0.8	1.1	1.0	0.8	1.4
Structure Controlling Flow =	Plate	Plate	Plate	Plate	Overflow Grate 1	Overflow Grate 1	Outlet Plate 1	Outlet Plate 1	Spillway
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	N/A	0.3	1.4	1.8	1.9	2.0
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	41	53	46	55	57	48	44	39	28
Time to Drain 99% of Inflow Volume (hours) =	43	57	49	59	64	60	58	55	47
Maximum Ponding Depth (ft) =	2.22	3.05	2.54	3.18	4.00	4.67	5.11	6.22	6.96
Area at Maximum Ponding Depth (acres) =	0.17	0.23	0.19	0.23	0.29	0.33	0.36	0.43	0.51
Maximum Volume Stored (acre-ft) =	0.194	0.362	0.255	0.390	0.607	0.814	0.962	1.402	1.746

Detention Basin Outlet Structure Design

UD-Detention, Version 3.07 (February 2017)



S-A-V-D Chart Axis Override	X-axis	Left Y-Axis	Right Y-Axis
minimum bound			
maximum bound			

Detention Basin Outlet Structure Design

UD-Detention, Version 3.07 (February 2017)

Summary Stage-Area-Volume-Discharge Relationships

The user can create a summary S-A-V-D by entering the desired stage increments and the remainder of the table will populate automatically.

The user should graphically compare the summary S-A-V-D table to the full S-A-V-D table in the chart to confirm it captures all key transition points.

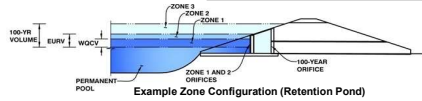
[illegible]

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)

Project: RETREAT AT TIMBERRIDGE FILING NO. 1

Basin ID: **POND 2**



Required Volume Calculation

Selected BMP Type =	EDB	
Watershed Area =	100.40	acres
Watershed Length =	4.000	ft
Watershed Slope =	0.032	ft/ft
Watershed Imperviousness =	21.60%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	100.0%	percent
Percentage Hydrologic Soil Groups C/D =	0.0%	percent
Desired WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Data =		
Water Quality Capture Volume (WQCV) =	1.022	acre-feet
Excess Urban Runoff Volume (EURV) =	2.168	acre-feet
2-yr Runoff Volume ($P1 = 1.19$ in.) =	1.608	acre-feet
5-yr Runoff Volume ($P1 = 1.5$ in.) =	2.351	acre-feet
10-yr Runoff Volume ($P1 = 1.75$ in.) =	3.953	acre-feet
25-yr Runoff Volume ($P1 = 2$ in.) =	7.552	acre-feet
50-yr Runoff Volume ($P1 = 2.25$ in.) =	9.884	acre-feet
100-yr Runoff Volume ($P1 = 2.52$ in.) =	12.887	acre-feet
500-yr Runoff Volume ($P1 = 3.85$ in.) =	23.106	acre-feet
Approximate 2-yr Detention Volume =	1.499	acre-feet
Approximate 5-yr Detention Volume =	2.205	acre-feet
Approximate 10-yr Detention Volume =	3.488	acre-feet
Approximate 25-yr Detention Volume =	4.261	acre-feet
Approximate 50-yr Detention Volume =	4.500	acre-feet
Approximate 100-yr Detention Volume =	5.494	acre-feet

Optional User Override

1.19	inches
1.50	inches
1.75	inches
2.00	inches
2.25	inches
2.52	inches
3.85	inches

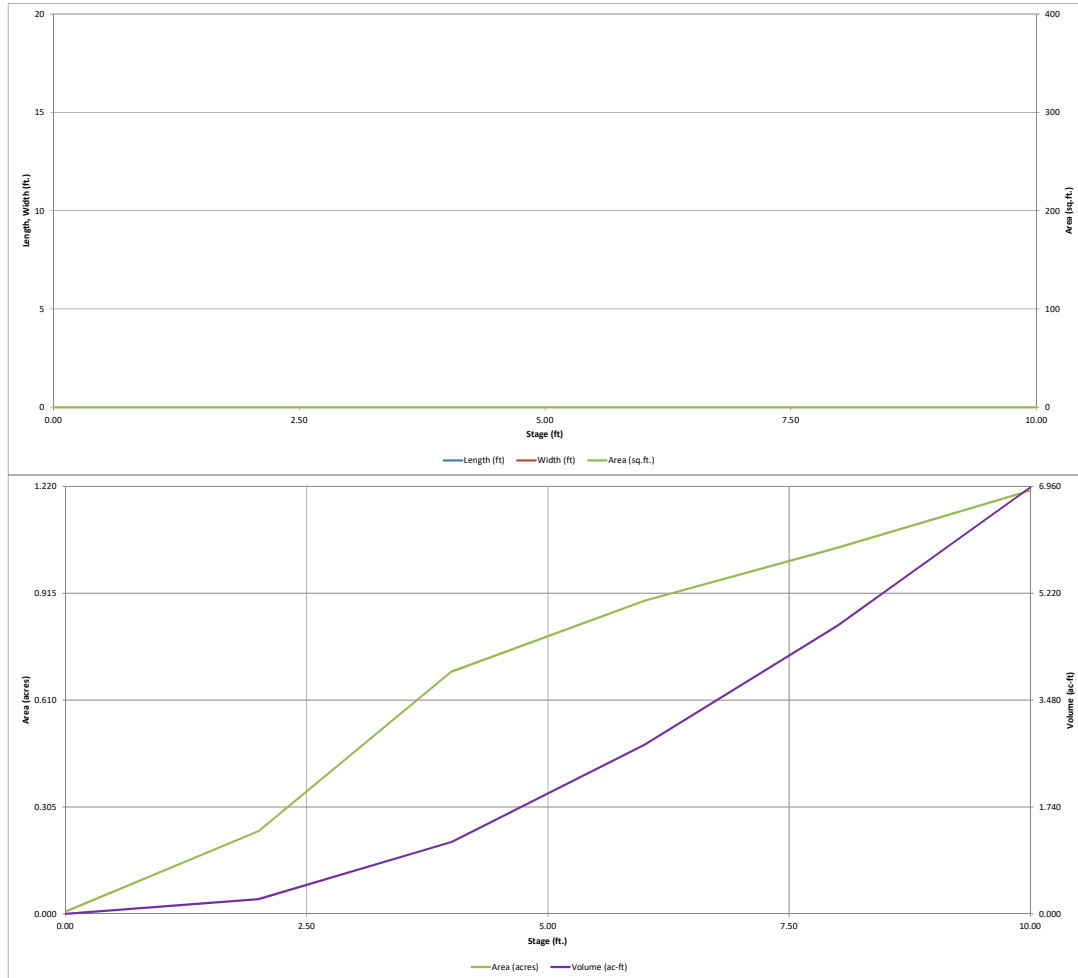
Stage-Storage Calculation

Zone 1 Volume ($WQCV$) =	1,022	acre-feet
Zone 2 Volume ($EURV$ - Zone 1) =	1,146	acre-feet
Zone 3 Volume (100 Year - Zones 1 & 2) =	3,327	acre-feet
Total Detention Basin Volume =	5,494	acre-feet
Initial Surge Volume (ISV) =	user	ft ³
Initial Surge Depth (ISD) =	user	ft
Total Available Detention Depth ($H_{(DA)}$) =	user	ft
Depth of Trickle Channel (H_{TC}) =	user	ft
Slope of Trickle Channel (S_{TC}) =	user	ft/ft
Slopes of Main Basin Sides ($S_{(MA)}$) =	user	H-V
Basin Length-to-Width Ratio ($R_{(W)}$) =	user	
Initial Surge Area ($A_{(S)}$) =	user	ft ²
Surge Volume Length ($L_{(S)}$) =	user	ft
Surge Volume Width ($W_{(S)}$) =	user	ft
Depth of Basin Floor ($H_{(LDA)}$) =	user	ft
Length of Basin Floor ($L_{(LDA)}$) =	user	ft
Width of Basin Floor ($W_{(LDA)}$) =	user	ft
Area of Basin Floor ($A_{(LDA)}$) =	user	ft ²
Volume of Basin Floor ($V_{(LDA)}$) =	user	ft ³
Depth of Main Basin ($H_{(MA)}$) =	user	ft
Length of Main Basin ($L_{(MA)}$) =	user	ft
Width of Main Basin ($W_{(MA)}$) =	user	ft
Area of Main Basin ($A_{(MA)}$) =	user	ft ²
Volume of Main Basin ($V_{(MA)}$) =	user	ft ³
Calculated Total Basin Volume ($V_{(BA)}$) =	user	acre-feet

[illegible]

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)

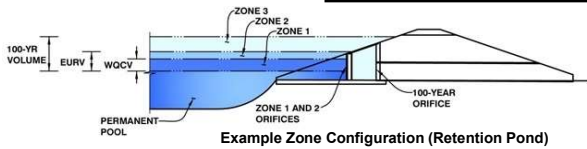


Detention Basin Outlet Structure Design

UD-Detention, Version 3.07 (February 2017)

Project: RETREAT AT TIMBERIDGE FILING NO. 1

Basin ID: POND 2



Example Zone Configuration (Retention Pond)

	Stage (ft)	Zone Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	3.78	1.022	Orifice Plate
Zone 2 (EURV)	5.32	1.146	Orifice Plate
Zone 3 (100-year)	8.75	3.327	Weir&Pipe (Restrict)
		5.494	Total

User Input: Orifice at Underdrain Outlet (typically used to drain WQCV in a Filtration BMP)

Underdrain Orifice Invert Depth =	N/A	ft (distance below the filtration media surface)
Underdrain Orifice Diameter =	N/A	inches

Calculated Parameters for Underdrain

Underdrain Orifice Area =	N/A	ft ²
Underdrain Orifice Centroid =	N/A	feet

User Input: Orifice Plate with one or more orifices or Elliptical Slot Weir (typically used to drain WQCV and/or EURV in a sedimentation BMP)

Invert of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Orifice Plate =	5.50	ft (relative to basin bottom at Stage = 0 ft)
Orifice Plate: Orifice Vertical Spacing =	16.50	inches
Orifice Plate: Orifice Area per Row =	N/A	inches

Calculated Parameters for Plate

WQ Orifice Area per Row =	N/A	ft ²
Elliptical Half-Width =	N/A	feet
Elliptical Slot Centroid =	N/A	feet
Elliptical Slot Area =	N/A	ft ²

User Input: Stage and Total Area of Each Orifice Row (numbered from lowest to highest)

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	1.40	2.80	4.20				
Orifice Area (sq. inches)	3.00	4.00	4.00	4.00				

	Row 9 (optional)	Row 10 (optional)	Row 11 (optional)	Row 12 (optional)	Row 13 (optional)	Row 14 (optional)	Row 15 (optional)	Row 16 (optional)
Stage of Orifice Centroid (ft)								
Orifice Area (sq. inches)								

User Input: Vertical Orifice (Circular or Rectangular)

	Not Selected	Not Selected	
Invert of Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)
Vertical Orifice Diameter =	N/A	N/A	inches

Calculated Parameters for Vertical Orifice

	Not Selected	Not Selected	
Vertical Orifice Area =	N/A	N/A	ft ²
Vertical Orifice Centroid =	N/A	N/A	feet

User Input: Overflow Weir (Dropbox) and Grate (Flat or Sloped)

	Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, Ho =	5.50	N/A	ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length =	12.00	N/A	feet
Overflow Weir Slope =	4.00	N/A	H:V (enter zero for flat grate)
Horiz. Length of Weir Sides =	4.00	N/A	feet
Overflow Grate Open Area % =	75%	N/A	%, grate open area/total area
Debris Clogging % =	50%	N/A	%

Calculated Parameters for Overflow Weir

	Zone 3 Weir	Not Selected	
Height of Grate Upper Edge, H _t =	6.50	N/A	feet
Over Flow Weir Slope Length =	4.12	N/A	feet
Grate Open Area / 100-yr Orifice Area =	6.22	N/A	should be ≥ 4
Overflow Grate Open Area w/o Debris =	37.11	N/A	ft ²
Overflow Grate Open Area w/ Debris =	18.55	N/A	ft ²

User Input: Outlet Pipe w/ Flow Restriction Plate (Circular Orifice, Restrictor Plate, or Rectangular Orifice)

	Zone 3 Restrictor	Not Selected	
Depth to Invert of Outlet Pipe =	2.50	N/A	ft (distance below basin bottom at Stage = 0 ft)
Outlet Pipe Diameter =	42.00	N/A	inches
Restrictor Plate Height Above Pipe Invert =	25.00		inches

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

	Zone 3 Restrictor	Not Selected	
Outlet Orifice Area =	5.97	N/A	ft ²
Outlet Orifice Centroid =	1.18	N/A	feet
Half-Central Angle of Restrictor Plate on Pipe =	1.76	N/A	radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage=	9.00	ft (relative to basin bottom at Stage = 0 ft)
Spillway Crest Length =	65.00	feet
Spillway End Slopes =	3.00	H:V
Freeboard above Max Water Surface =		feet

Calculated Parameters for Spillway

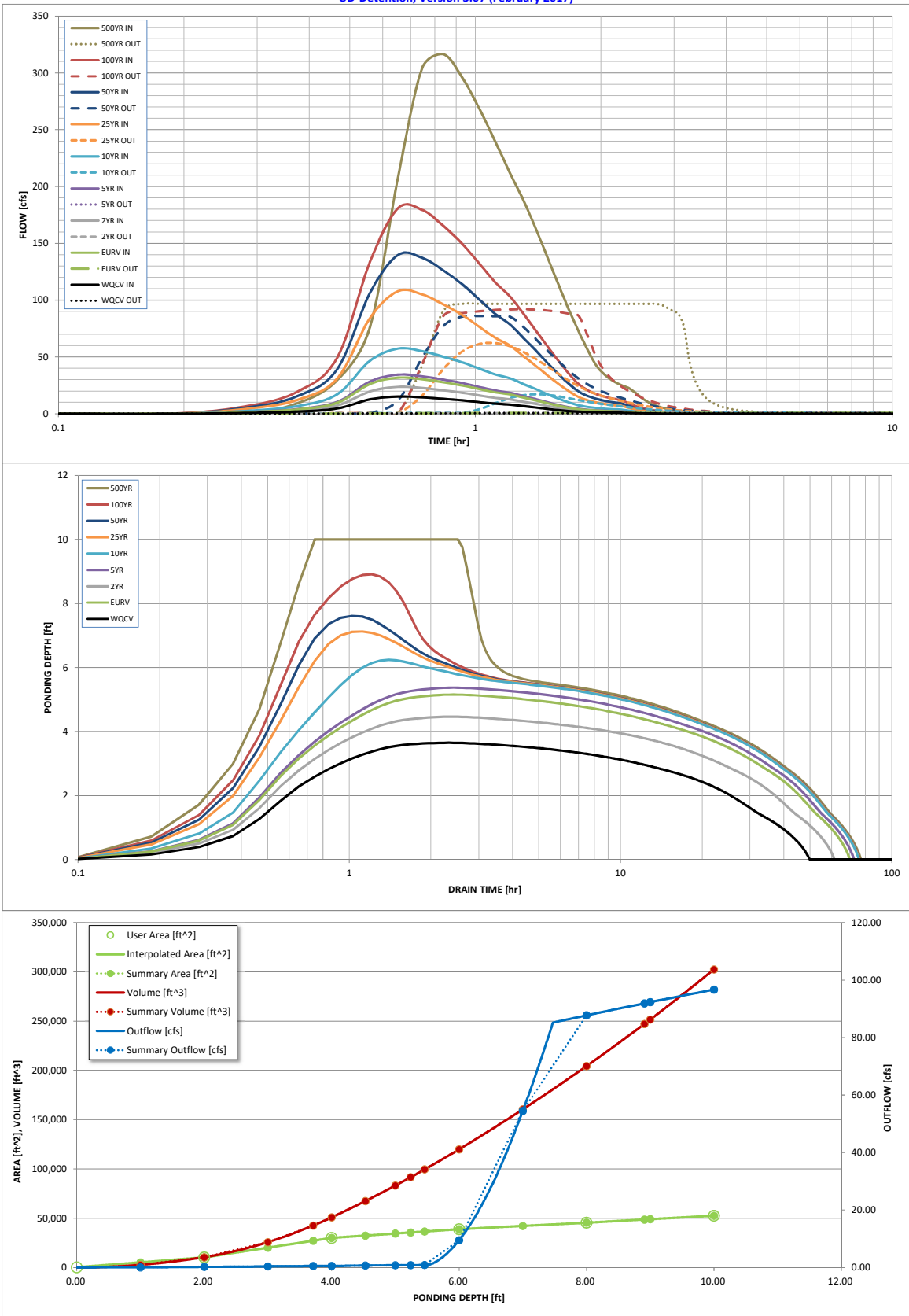
Spillway Design Flow Depth=	0.96	feet
Stage at Top of Freeboard =	9.96	feet
Basin Area at Top of Freeboard =	1.20	acres

Routed Hydrograph Results

	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
Design Storm Return Period =									
One-Hour Rainfall Depth (in) =	0.53	1.07	1.19	1.50	1.75	2.00	2.25	2.52	3.85
Calculated Runoff Volume (acre-ft) =	1.022	2.168	1.608	2.351	3.953	7.552	9.864	12.887	23.106
OPTIONAL Override Runoff Volume (acre-ft) =									
Inflow Hydrograph Volume (acre-ft) =	1.021	2.165	1.607	2.349	3.949	7.544	9.852	12.868	23.079
Predevelopment Unit Peak Flow, q (cfs/acre) =	0.00	0.00	0.01	0.02	0.17	0.58	0.80	1.08	1.97
Predevelopment Peak Q (cfs) =	0.0	0.0	1.0	1.800	17.0	58.0	80.3	108.7	197.5
Peak Inflow Q (cfs) =	15.1	31.7	23.6	34.3	57.3	107.8	139.7	180.8	316.4
Peak Outflow Q (cfs) =	0.5	0.8	0.7	0.858	17.1	62.2	85.9	91.9	96.7
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.5	1.0	1.1	1.1	0.8	0.5
Structure Controlling Flow =	Plate	Plate	Plate	Plate	Overflow Grate 1	Overflow Grate 1	Outlet Plate 1	Outlet Plate 1	N/A
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	N/A	0.4	1.7	2.3	2.4	2.6
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	44	59	53	61	59	53	49	46	36
Time to Drain 99% of Inflow Volume (hours) =	47	65	58	68	68	64	62	59	53
Maximum Ponding Depth (ft) =	3.65	5.15	4.46	5.37	6.24	7.13	7.61	8.91	10.00
Area at Maximum Ponding Depth (acres) =	0.61	0.81	0.74	0.83	0.91	0.98	1.02	1.12	1.21
Maximum Volume Stored (acre-ft) =	0.935	2.031	1.498	2.203	2.961	3.802	4.290	5.676	6.944

Detention Basin Outlet Structure Design

UD-Detention, Version 3.07 (February 2017)



S-A-V-D Chart Axis Override	X-axis	Left Y-Axis	Right Y-Axis
minimum bound			
maximum bound			

Detention Basin Outlet Structure Design

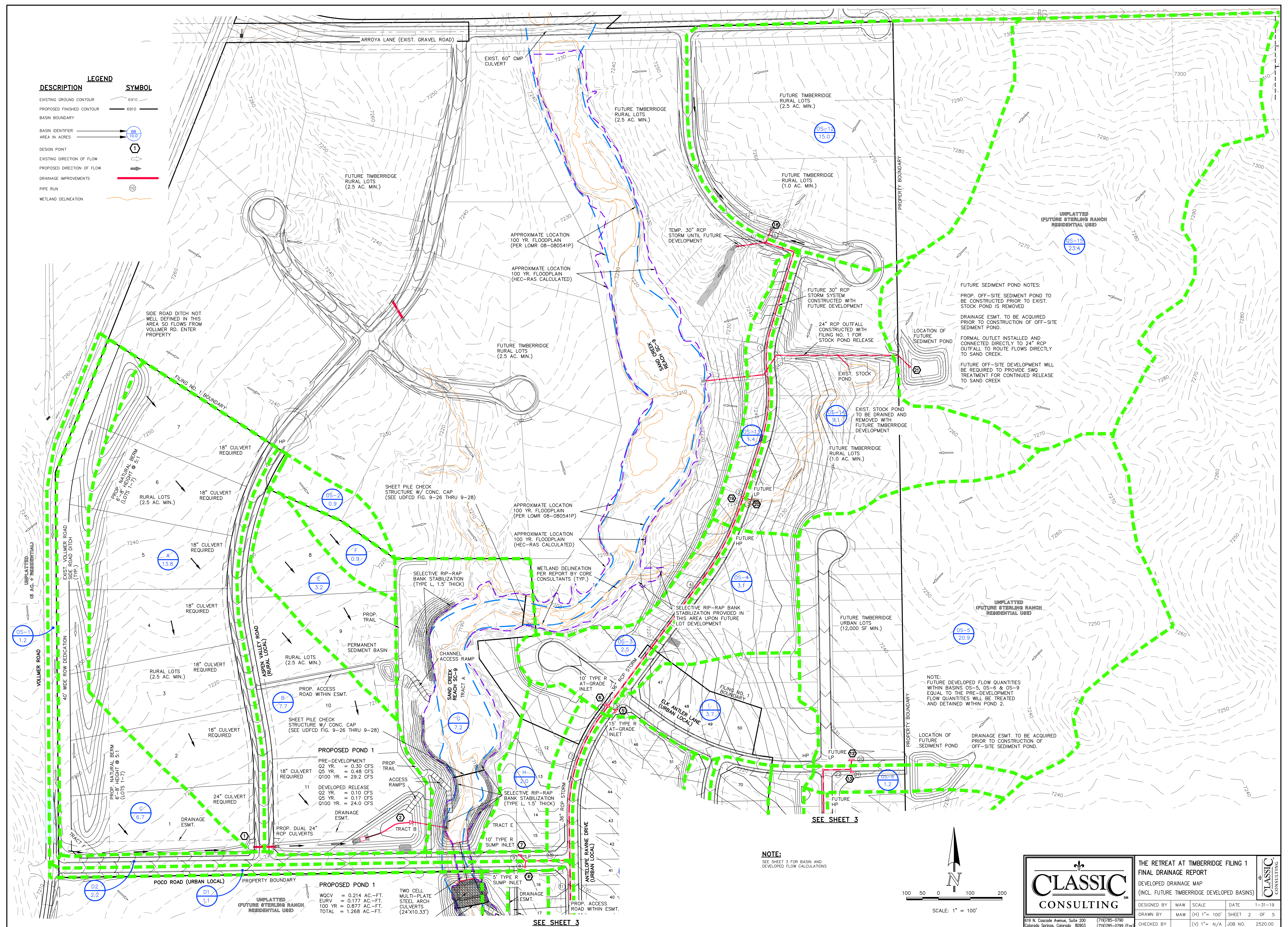
UD-Detention, Version 3.07 (February 2017)

Summary Stage-Area-Volume-Discharge Relationships

The user can create a summary S-A-V-D by entering the desired stage increments and the remainder of the table will populate automatically.

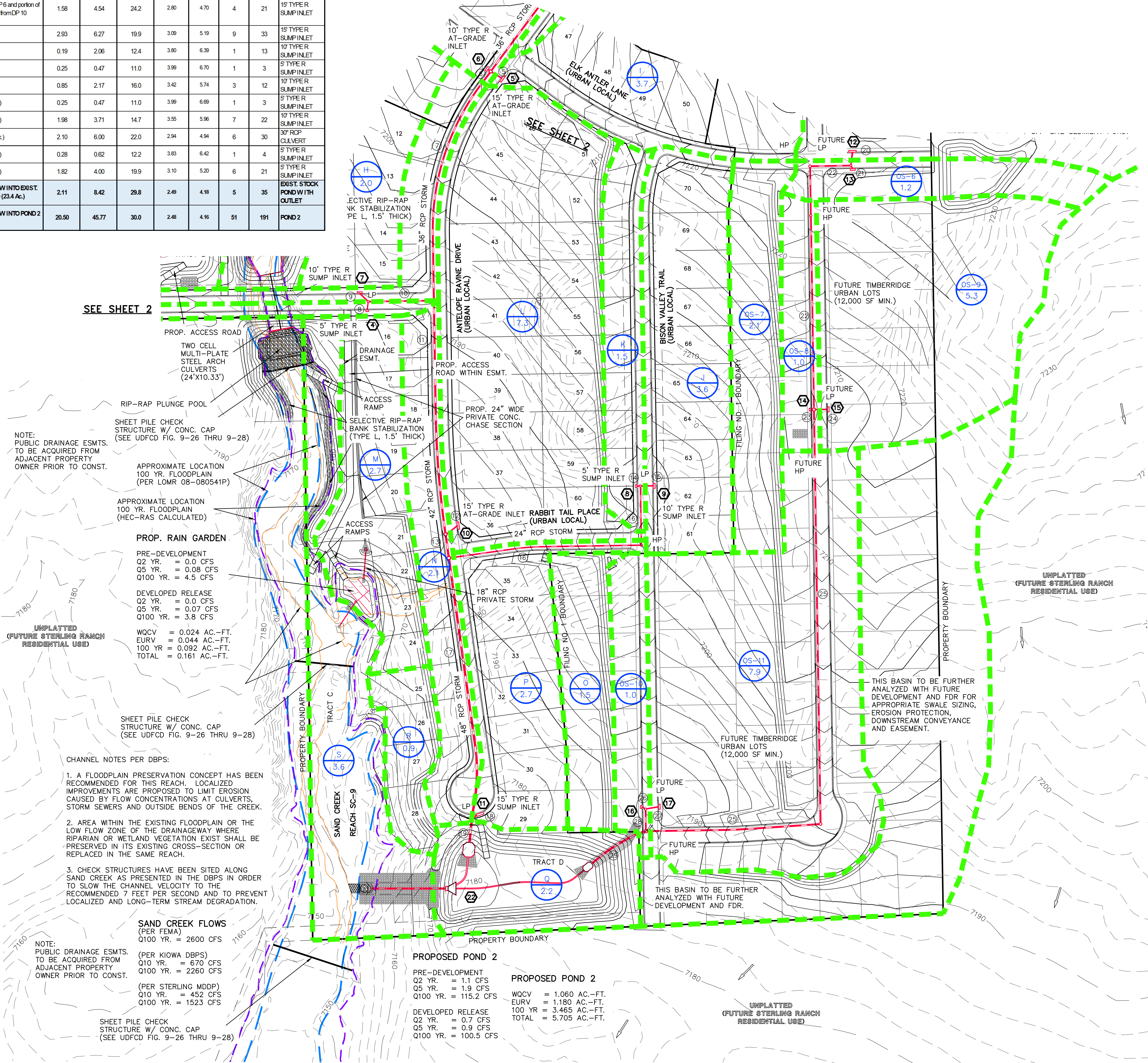
The user should graphically compare the summary S-A-V-D table to the full S-A-V-D table in the chart to confirm it captures all key transition points.

[illegible]



FINAL DRAINAGE REPORT - SURFACE ROUTING SUMMARY									
Design Point(s)	Contributing Basins	Equivalent CA(5)	Equivalent CA(100)	Maximum Tc	Intensity I(5)	Intensity I(100)	Flow Q(5)	Flow Q(100)	Inlet Size
1	A(13.8 Ac), OS-1(11.2 Ac) and C(6.7 Ac)	3.58	9.08	31.8	3.29	4.02	9	36	DUAL 24" RCP CULVERTS
2	TOTAL INFLOW INTO POND 1 (A, B, C and OS-1 (28.4 Ac))	4.66	12.16	33.8	2.30	3.86	11	47	POND 1
3	No longer used								
4	D1 (1.1 Ac)	0.74	0.87	15.2	3.50	5.88	3	5	8" TYPER SUMP INLET
5	OS-4 (3.1 Ac), I (3.7 Ac)	1.61	3.17	17.7	3.29	5.50	5	17	10" TYPER AT-GRADE INLET
6	OS-3 (2.5 Ac)	0.63	1.18	11.9	3.86	6.49	2	8	10" TYPER AT-GRADE INLET
7	Basin D2, Basin H and 50% of 100 yr Flow from DP-6 (5.5 Ac)	1.51	2.47	27.3	2.62	4.40	4	11	10" TYPER SUMP INLET
8	K (1.5 Ac)	0.38	0.71	12.6	3.78	6.35	1	4	8" TYPER SUMP INLET
9	J and OS-7 (5.7 Ac)	1.43	2.68	16.0	3.43	5.75	5	15	10" TYPER SUMP INLET
10	Flow from DP-5 and Basin L (7.3 Ac)	1.83	4.29	21.2	3.00	5.04	5	22	10" TYPER AT-GRADE INLET
11	Basin N, O, P and 50% 100 Yr Flow from DP-6 and portion of 100 Yr Flow from DP-10 (13.6 Ac)	1.58	4.54	24.2	2.80	4.70	4	21	10" TYPER SUMP INLET
12	OS-5 (20.9 Ac)	2.93	6.27	19.9	3.09	5.19	9	33	10" TYPER SUMP INLET
13	OS-6 (1.2 Ac)	0.19	2.06	12.4	3.80	6.39	1	13	10" TYPER SUMP INLET
14	OS-8 (1.0 Ac)	0.25	0.47	11.0	3.99	6.70	1	3	8" TYPER SUMP INLET
15	OS-9 (5.3 Ac)	0.85	2.17	16.0	3.42	5.74	3	12	10" TYPER SUMP INLET
16	OS-10 (1.0 Ac)	0.25	0.47	11.0	3.99	6.68	1	3	8" TYPER SUMP INLET
17	OS-11 (7.8 Ac)	1.98	3.71	14.7	3.55	5.96	7	22	10" TYPER SUMP INLET
18	OS-12 (15.0 Ac)	2.10	6.00	22.0	2.94	4.94	6	30	30" RCP CULVERT
19	OS-13 (1.4 Ac)	0.28	0.82	12.2	3.83	6.42	1	4	8" TYPER SUMP INLET
20	OS-14 (8.1 Ac)	1.82	4.00	19.9	3.10	5.20	6	21	8" TYPER SUMP INLET
21	TOTAL INFLOW INTO EXIST. STOCK POND (23.4 Ac)	2.11	8.42	29.8	2.49	4.18	5	35	EXIST. STOCK POND WITH OUTLET
22	TOTAL INFLOW INTO POND 2 (104.8 Ac)	20.50	45.77	30.0	2.48	4.16	51	191	POND 2

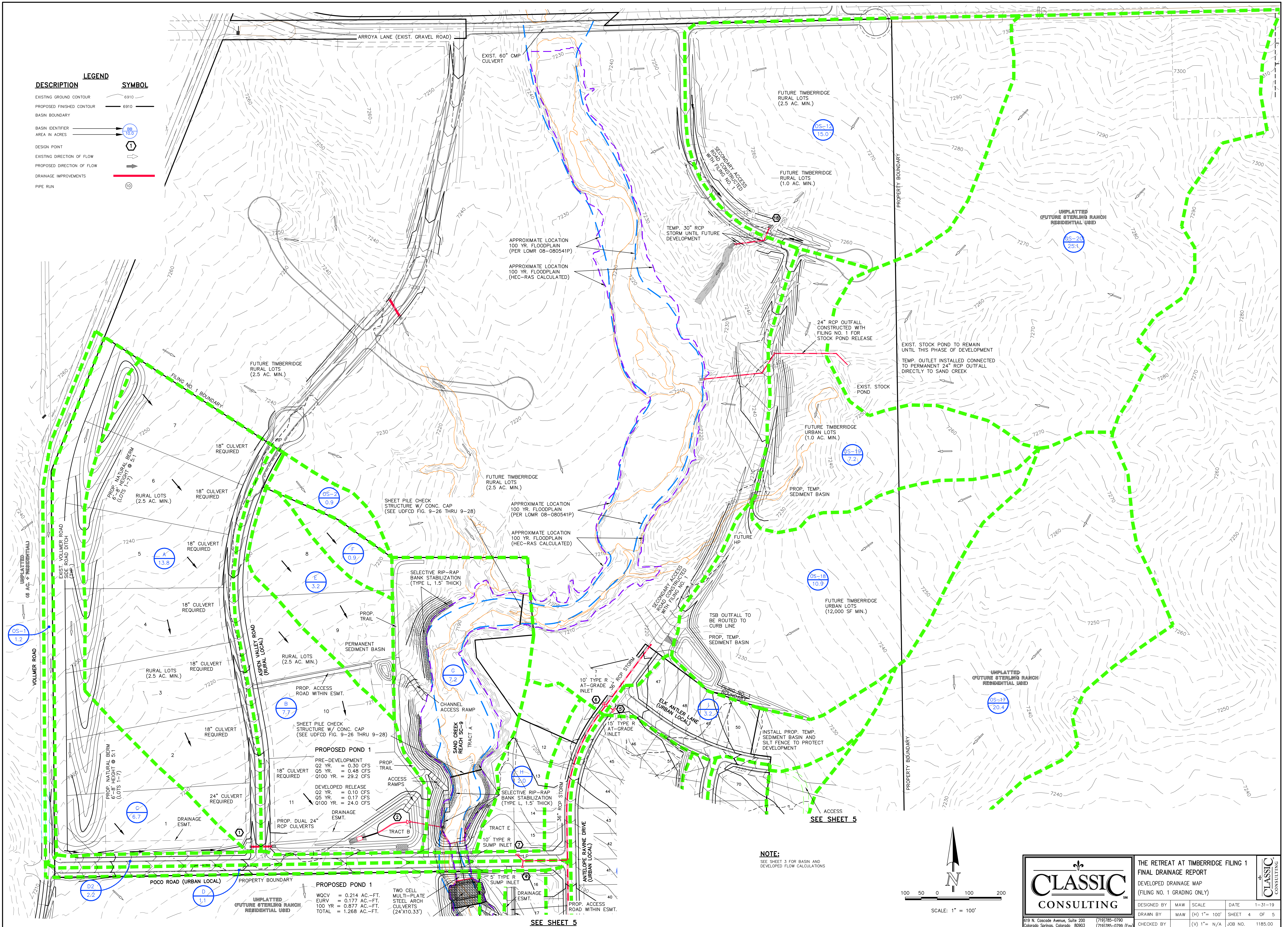
DESCRIPTION	LEGEND	SYMBOL
EXISTING GROUND CONTOUR	6910	
PROPOSED FINISHED CONTOUR	6910	
BASIN BOUNDARY		
BASIN IDENTIFIER		
AREA IN ACRES		
DESIGN POINT		
EXISTING DIRECTION OF FLOW		
PROPOSED DIRECTION OF FLOW		
DRAINAGE IMPROVEMENTS		



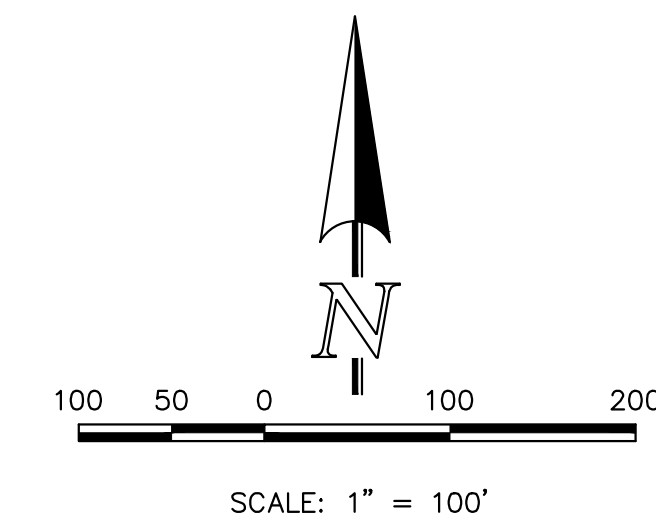
FINAL DRAINAGE REPORT - BASIN RUNOFF SUMMARY																							
BASIN	WEIGHTED					OVERLAND			STREET / CHANNEL FLOW				INTENSITY				TOTAL FLOWS						
	CA(2)	CA(5)	CA(10)	CA(25)	CA(50)	CA(100)	Cs (Length)	Ct (Height)	Tc (Time)	Length (ft)	Slope (%)	Velocity (ft/s)	Tc (Time)	TOTAL (min)	I(2) (in/hr)	I(5) (in/hr)	I(10) (in/hr)	I(25) (in/hr)	I(50) (in/hr)	Q(2) (cfs)	Q(5) (cfs)	Q(100) (cfs)	
OS-1	0.68	0.71	0.76	0.82	0.85	0.88	0.08	10	0.2	4.6	1700	3.5%	1.9	151	19.8	2.48	3.11	3.62	4.14	4.66	5.21	2	5
OS-2	0.02	0.07	0.14	0.23	0.27	0.32	0.08	10	0.30	10.5	211		2.1	241	2.11	2.41	3.01	3.51	4.01	4.51	5.05	0.0	0.2
OS-3	0.45	0.63	0.80	0.96	1.06	1.18	0.25	55	11	91	600	3.0%	3.5	2.9	11.9	3.08	3.86	4.51	5.15	5.60	6.49	1	2
OS-4	0.47	0.68	0.93	1.15	1.27	1.43	0.22	200	6	156	400	3.0%	3.5	1.9	176	2.62	3.28	3.83	4.38	4.93	5.51	1	2
OS-5	1.25	2.93	4.81	6.48	7.52	8.36	0.14	200	8	155	750	2.0%	2.8	4.4	19.9	2.47	3.09	3.61	4.13	4.64	5.19	3	4
OS-6	0.08	0.19	0.29	0.38	0.44	0.49	0.16	55	11	100	500	3.0%	3.5	2.4	12.4	3.04	3.80	4.44	5.07	5.71	6.39	0.3	1
OS-7	0.38	0.53	0.67	0.82	0.90	0.99	0.25	100	10	72			7.2	3.69	4.63	5.40	6.17	6.94	7.77	1	2	8	
OS-8	0.18	0.25	0.32	0.39	0.43	0.47	0.25	55	11	91	400	3.0%	3.5	1.9	110	3.18	3.89	4.65	5.32	5.98	6.70	1	1
OS-9	0.37	0.85	1.27	1.70	1.96	2.17	0.16	200	10	141	400	3.0%	3.5	1.9	160	2.73	3.42	3.99	4.58	5.13	5.74	1	3
OS-10	0.18	0.25	0.32	0.39	0.43	0.47	0.25	55	11	91	400	3.8%	3.9	1.9	110	3.18	3.89	4.65	5.32	5.98	6.69	1	1
OS-11	1.42	1.96	2.53	3.08	3.40	3.71	0.25	200	10	128	450	3.8%	3.9	1.9	147	2.84	3.55	4.14	4.74	5.38	5.98	4	7
OS-12	0.90	2.10	3.45	4.65	5.40	6.00	0.14	300	13	165	600	2.0%	2.8	3.5	22.0	2.35	2.94	3.43	3.93	4.42	4.94	2	6
OS-13	0.17	0.28	0.38	0.49	0.56	0.62	0.20	55	11	96	450	2.0%	2.8	2.7	12.2	3.05	3.83	4.46	5.10	5.74	6.42	0.5	1
OS-14	1.09	1.82	2.46	3.19	3.64	4.00	0.20	300	12	178	350	2.0%	2.8	2.1	19.9	2.48	3.10	3.62	4.13	4.65	5.20	3	6
OS-15	0.70	2.11	3.98	6.06	7.25	8.42	0.09	300	16	182	1300	3.5%	1.9	11.6	28.6	2.00	2.49	2.91	3.32	3.74	4.18	1	5
OS-16	0.23	0.69	1.31	2.00	2.39	2.77	0.09	300	10	212	600	3.5%	1.9	5.3	26.6	2.13	2.66	3.11	3.55	4.00	4.47	0.5	2
OS-17	0.61	1.84	3.47	5.30	6.32	7.34	0.09	300	9.5	216	650	3.5%	1.9	5.8	27.4	2.10	2.62	3.05	3.49	3.93	4.39	1	3
OS-18	0.33	0.96	1.85	2.83	3.38	3.92	0.09	300	10	212	700	3.5%	1.9	6.2	27.5	2.09	2.61	3.05	3.49	3.92	4.39	0.7	3
OS-19	0.22	0.65	1.22	1.87	2.23	2.59	0.09	300	10	212	400	3.5%	1.9	3.6	24.8	2.21	2.77	3.23	3.69	4.15	4.64	0.5	2
OS-20	0.75	2.26	4.27	6.53	7.78	9.04	0.09	300	16	182	1300	3.5%	1.9	11.6	28.6	2.00	2.49	2.91	3.32	3.74	4.18	2	6
A	0.63	1.93	3.17	4.28	4.97	5.52	0.14	300	10.5	199	1280	3.2%	1.8	11.9	31.8	1.92	2.39	2.79	3.19	3.59	4.02	2	5
B	0.46	1.06	1.77	2.39	2.77	3.08	0.14	300	10.5	199	400	2.0%	1.4	4.7	24.6	2.23	2.78	3.24	3.71	4.17	4.67	1	3
C	0.40	0.94	1.54	2.08	2.41	2.68	0.14	300	10.5	199	1100	1.5%	2.4	7.5	27.3	2.10	2.62	3.06	3.49	3.93	4.40	1	2
D	0.72	0.74	0.78	0.83	0.85	0.87	0.08	15	0.3	57	1400	1.5%	2.4	9.5	15.2	2.80	3.00	4.08	4.67	5.25	5.86	2	3
D2	0.96	1.07	1.18	1.30	1.36	1.43	0.25	55	11	91	500	2.5%	3.2	2.6	11.7	3.11	3.89	4.54	5.19	5.84	6.54	3	4
E	0.19	0.45	0.74	0.99	1.15	1.28	0.14	300	10.5	199	300	2.0%	1.4	3.5	23.4	2.28	2.85	3.33	3.81	4.28	4.79	0.4	1
F	0.05	0.13	0.21	0.28	0.32	0.36	0.14	300	10.5	199			19.9	2.48	3.10	3.62	4.13	4.65	5.20	5.71	6.23	0.1	0.4
G	0.14	0.56	1.08	1.80	2.16	2.52	0.08	70	14	57	900	2.0%	1.4	10.6	16.3	2.71	3.39	3.96	4.52	5.09	5.70	0.4	2
H	0.30	0.44	0.60	0.74	0.82	0.92	0.22	100	4	101	300	3.0%	3.5	1.4	115	3.13	3.92	4.57	5.23	5.98	6.68	1	2
I	0.67	0.93	1.18	1.44	1.59	1.74	0.25	120	3	124	550	3.5%	3.7	2.4	14.9	2.80	3.53	4.12	4.71	5.30	5.93	2	3
J	0.65	0.90	1.15	1.40	1.55	1.69	0.25	120	3	124	600	2.8	3.5	16.0	2.74	3.43	4.00	4.57	5.14	5.75	2	3	
K	0.27	0.38	0.48	0.59	0.65	0.71	0.25	55	11	91	600	2.0%	2.8	3.5	12.6	3.02	3.78	4.41	5.05	5.68	6.35	0.8	1
L	1.31	1.83	2.34	2.85	3.14	3.43	0.25	150	4.5	131	850	2.5%	3.2	4.5	17.6	2.62	3.28	3.83	4.38	4.93	5.51	3	6
M	0.41	0.59	0.81	1.00	1.11	1.24	0.22	100	4	101	400	2.0%	2.8	2.4	12.4	3.04	3.60	4.44	5.07	5.71	6.39	1	2
N	0.38	0.53	0.67	0.82	0.90	0.99	0.25	55	11	91	1050	2.0%	2.8	6.2	15.2	2.79	3.50	4.08	4.66	5.25	5.87	2	6
O	0.27	0.38	0.48	0.59	0.65	0.71	0.25	80	5	75			7.5	3.64	4.56	5.32	6.08	6.84	7.66	1	2	5	
P	0.48	0.68	0.86	1.05	1.16	1.27	0.25	120	3	124	450	1.5%	2.4	3.1	15.5	2.77	3.47	4.05	4.63	5.21	5.83	1	2
Q	0.13	0.31	0.51	0.68	0.79	0.88	0.14	90	22	57	300	1.5%	1.2	4.1	9.8	3.32	4.16	4.85	5.54	6.24	6.96	0.4	1
R	0.16	0.23	0.29	0.35	0.39	0.42	0.25	90	6	78			7.8	3.59	4.50	5.26	6.01	6.76	7.51	1	1	3	
S	0.07	0.29	0.54	0.90	1.06	1.26	0.08	140	14	102	750	1.5%	2.4	5.1	15.3	2.79	3.49	4.07	4.66	5.24	5.86	0.2	10

FINAL DRAINAGE REPORT - PIPE ROUTING SUMMARY									
Pipe Run	Contributing Basins	Equivalent CA(5)	Equivalent CA(100)	Maximum Tc	Intensity		Flow		Pipe Size*
					I(5)	I(100)	Q(5)	Q(100)	
1	DP-18	2.10	6.00	23.2	2.86	4.81	6	29	30" RCP
2	DP-19	0.28	0.62	12.2	3.83	6.42	1	4	18" RCP
3	DP-20	1.82	4.00	19.9	3.10	5.20	6	21	24" RCP
4	PR-1, PR-2, PR-3	4.20	10.62	23.9	2.82	4.73	12	50	36" RCP
5	Captured from DP-5	1.61	2.31	17.7	3.28	5.50	5	13	24" RCP
6	Captured from DP-6	0.63	0.93	11.9	3.86	6.49	2	6	18" RCP
7	PR-4, PR-5, PR-6	6.43	13.86	24.4	2.79	4.68	18	65	36" RCP
8	DP-4	0.74	0.87	15.2	3.50	5.88	3	5	18" RCP
9	DP-7	1.51	2.47	27.3	2.62	4.40	4	11	24" RCP
10	PR-8, PR-9	2.25	3.34	27.5	2.61	4.38	6	15	30" RCP
11	PR-7, PR-10	8.69	17.20	28.0	2.58	4.33	22	75	42" RCP
12	Captured from DP-10	1.83	2.83	21.2	3.00	5.04	5	14	24" RCP
13	PR-11, PR-12	10.51	20.03	28.1	2.58	4.33	27	87	42" RCP
14	DP-8	0.38	0.71	12.6	3.78	6.35	1	4	18" RCP
15	DP-9	1.43	2.68	16.0	3.43	5.75	5	15	24" RCP
16	PR-14, PR-15	1.80	3.38	16.4	3.39	5.69	6	19	24" RCP
17	PR-13, PR-16	12.31	23.41	28.6	2.55	4.28	31	100	48" RCP
18	DP-11	1.58	4.54	24.2	2.80	4.70	4	21	30" RCP
19	PR-17, PR-18 WLY FOREBAY OUTFALL	13.89	27.96	28.8	2.54	4.26	35	119	48" RCP
20	DP-12	2.93	6.27	19.9	3.08	5.19	9	33	30" RCP
21	DP-13	0.19	2.06	12.4	3.80	6.39	1	13	24" RCP
22	PR-20, PR-21	3.12	8.33	20.7	3.04	5.10	9	42	30" RCP
23	DP-14	0.25	0.47	11.0	3.99	6.70	1	3	18" RCP
24	DP-15	0.85	2.17	16.0	3.42	5.74	3	12	24" RCP
25	PR-22, PR-23, PR-24	4.22	10.97	22.0	2.94	4.94	12	54	36" RCP
26	DP-16	0.25	0.47	11.0	3.99	6.69	1	3	18" RCP
27	DP-17	1.98	3.71	14.7	3.55	5.96	7	22	30" RCP
28	PR-26, PR-27	2.23	4.18	14.9	3.53	5.93	8	25	30" RCP
29	PR-25, PR-28 ELY FOREBAY OUTFALL	6.44	15.16	22.3	2.92	4.91	19	74	42" RCP

DESCRIPTION	LEGEND	SYMBOL
EXISTING GROUND CONTOUR	6910	
PROPOSED FINISHED CONTOUR	6910	
BASIN BOUNDARY		
BASIN IDENTIFIER		BB 10.0
DESIGN POINT		①
EXISTING DIRECTION OF FLOW		
PROPOSED DIRECTION OF FLOW		
DRAINAGE IMPROVEMENTS		
PIPE RUN		⑩



NOTE:
SEE SHEET 3 FOR BASIN AND DEVELOPED FLOW CALCULATIONS






THE RETREAT AT TIMBERIDGE FILING 1
FINAL DRAINAGE REPORT
DEVELOPED DRAINAGE MAP
(FILING NO. 1 GRADING ONLY)

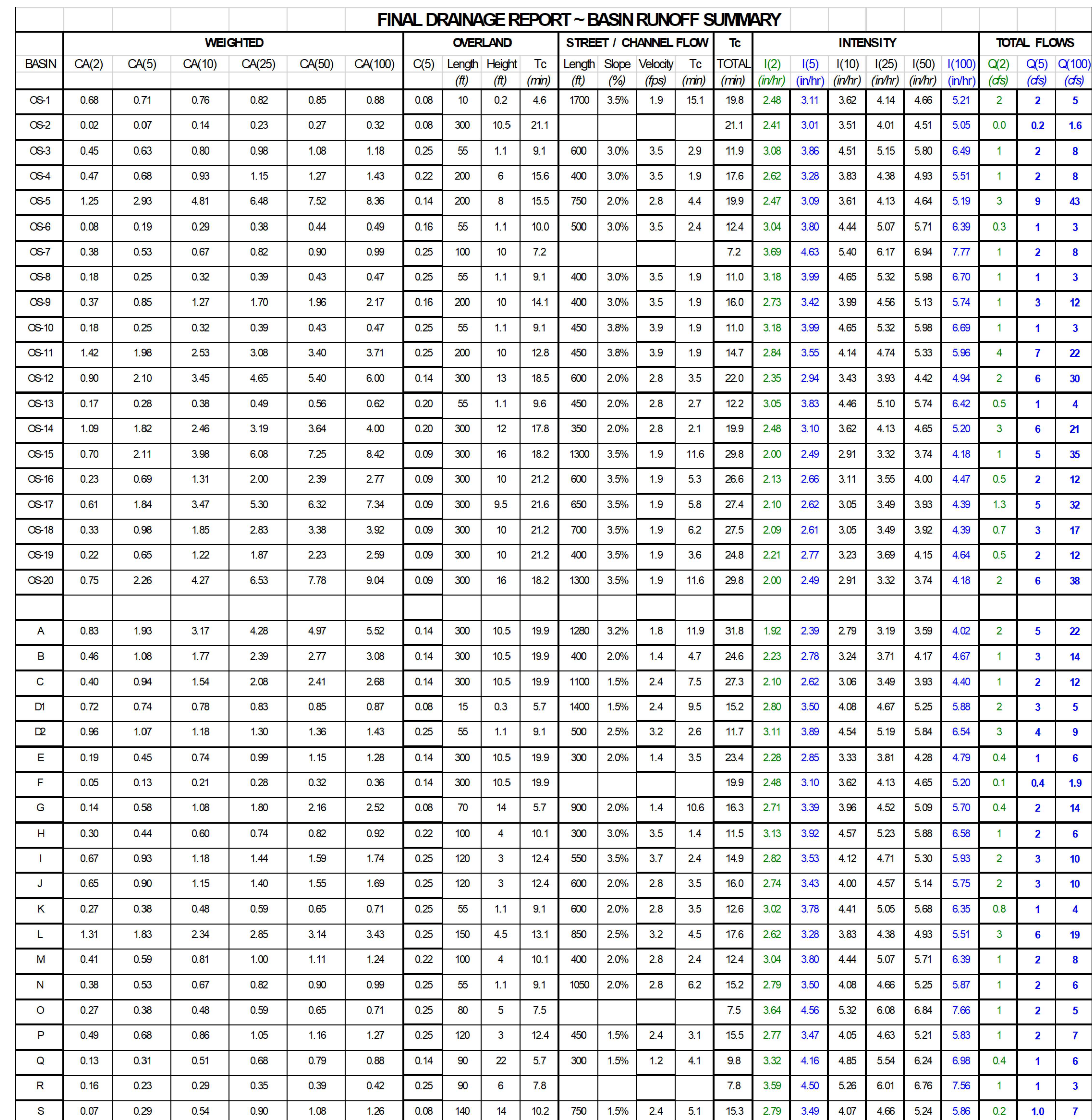
DESIGNED BY	MAW	SCALE	DATE	1-31-19
DRAWN BY	MAW	(H) 1"= 100'	SHEET	4 OF 5
CHECKED BY	(V) 1"= N/A	JOB NO.	1185.00	

619 N. Cascade Avenue, Suite 200
Colorado Springs, Colorado 80903

(719)785-0790
(719)785-0799 (fax)



LEGEND	
DESCRIPTION	SYMBOL
EXISTING GROUND CONTOUR	
PROPOSED FINISHED CONTOUR	
BASIN BOUNDARY	
BASIN IDENTIFIER	
AREA IN ACRES	
DESIGN POINT	
EXISTING DIRECTION OF FLOW	
PROPOSED DIRECTION OF FLOW	
DRAINAGE IMPROVEMENTS	





100 50 0 100 200

SCALE: 1" = 100'



THE RETREAT AT TIMBERIDGE FILING 1

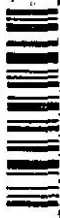
FINAL DRAINAGE REPORT

DEVELOPED DRAINAGE MAP

(FILING NO. 1 GRADING ONLY)

DESIGNED BY	MAW	SCALE	DATE	1-31-19
DRAWN BY	MAW	(H) 1" = 100'	SHEET	5 OF 5
CHECKED BY		(V) 1" = N/A	JOB NO.	1185.00

619 N. Cascade Avenue, Suite 200
Colwyn, Sonoma, California 94903
(719) 785-0190
(719) 785-0198 (fax)



**MASTER DEVELOPMENT
DRAINAGE REPORT
FOR
STERLING RANCH FILING NOS. 1&2
AND
FINAL DRAINAGE REPORT FOR
STERLING RANCH FILING NO. 1
EL PASO COUNTY, COLORADO**

DECEMBER 2017

Prepared for:

**SR Land, LLC
20 Boulder Crescent, Suite 210
Colorado Springs, CO 80903**

Prepared by:



CIVIL CONSULTANTS, INC.
20 Boulder Crescent, Suite 110
Colorado Springs, CO 80903
(719) 955-5485

RECEIVED VERSION

JAN 04 2018

Project #09-002
DSD Project # SF-16-013

Keep

SF-16-013

5-year and 0.96 for the 100-year. Developed runoff of Q5=16.1 cfs and Q100=36.7 cfs has been calculated for DP4. The surface runoff is routed via overlot grading and curb and gutter to DP4 which will be collected by a 15' CDOT type R at-grade inlet. The intercepted flow (Q5=13.3 cfs and Q100=20.0 cfs) will combine with flows from PR5 and be routed east via a 30" RCP (PR6, Q5=16.8 cfs and Q100=29.4 cfs) to Detention Pond 4 (DP 10). Flows will outfall into a concrete lined forebay.

DP2, 5.39 acres, consists of Basin B future residential lots and streets with runoff coefficients of 0.38 for the 5-year and 0.55 for the 100-year. Developed runoff of Q5=8.0 cfs and Q100=19.3 cfs has been calculated for DP2. The surface runoff is routed via overlot grading and proposed swales to a temporary sediment basin at DP2 which will be collected by a temporary 36" FES. The flows will be routed east via a 36" RCP (PR2, Q5=8.0 cfs and Q100=19.3 cfs) to DP5.

DP5, 0.80 acres, consists of Basin G future residential lots with runoff coefficients of 0.22 for the 5-year and 0.46 for the 100-year, Basin H (Dines Boulevard) with runoff coefficients of 0.90 for the 5-year and 0.96 for the 100-year and flowby from DP4. Developed runoff of Q5=4.2 cfs and Q100=19.7 cfs has been calculated for DP5. The surface runoff is routed via overlot grading and curb and gutter to DP5 which will be collected by a 15' CDOT type R at-grade inlet. The intercepted flow (Q5=4.2 cfs and Q100=14.7 cfs) will combine with flows from PR2 and be routed east via a 36" RCP (PR3, Q5=11.6 cfs and Q100=27.6 cfs) to DP6.

DP6, 4.68 acres, consists of Basin J and K future residential lots with runoff coefficients of 0.22 for the 5-year and 0.46 for the 100-year, Basin L (Dines Boulevard) and Basin I (Wheatland Drive) with runoff coefficients of 0.90 for the 5-year and 0.96 for the 100-year. Developed runoff of Q5=14.1 cfs and Q100=26.7 cfs has been calculated for DP6. The surface runoff is routed via overlot grading and curb and gutter to DP6 which will be collected by a 15' CDOT type R at-grade inlet. The intercepted flow (Q5=12.1 cfs and Q100=17.2 cfs) will combine with flows from PR3 and be routed east via a 36" RCP (PR4, Q5=21.8 cfs and Q100=42.1 cfs) to Detention Pond 4 (DP 10). Flows will outfall into a concrete lined forebay.

DP9, 9.73 acres, consists of Basin R future residential lots and streets with runoff coefficients of 0.38 for the 5-year and 0.55 for the 100-year. Developed runoff of Q5=12.5 cfs and Q100=30.4 cfs has been calculated for DP9. The surface runoff is routed via overlot grading and swales to a temporary sediment basin at DP9 which will be collected by a 30" FES. The flow will be routed south via a 30" RCP (PR10, Q5=12.5 cfs and Q100=30.4 cfs) to Detention Pond 4 (DP 10). Flows will outfall into a concrete lined forebay.

DP10, 1.97 acres, consists of Basin S (**Detention Pond 4**) with runoff coefficients of 0.08 for the 5-year and 0.35 for the 100-year. The combined upstream developed runoff of Q5=50.0 cfs and Q100=102.9 cfs has been calculated for DP10. The proposed Detention Pond functions to provide full spectrum detention and water quality for runoff calculated onsite. The pond is designed to treat approx 27.5 acres, and provide 0.46 ac-ft of water quality storage and 2.90 ac-ft of 100-year storage. The forebay, trickle channel micropool, outlet structure and pipe have been designed per the UDFCD manual and per the Detention Design-UD-Detention v3.05 workbook. The detention pond will be private and shall be maintained by the Sterling Ranch Metropolitan District. Access shall be granted to the owner and El Paso County for access and maintenance of the private detention pond. A private maintenance agreement document shall accompany the submittal. In the event of clogging or total inlet failure, flows at DP10 will over top the emergency spillway and outfall into Sand Creek. A rip rap apron will be constructed to dissipate energy and prevent local scour at the outlet. The peak release rate from pond 4 (PR11, Q5=2.7 cfs and Q100=36.2 cfs ~30" RCP) will combine with offsite flows from PR18 (Q5=16.2 cfs and Q100=125.9 cfs). The summed flows (PR12, Q5=18.9 cfs and Q100=162.1 cfs) will outfall, via a 54" RCP at DP11 and into Sand Creek. Impacts from the outfall into Sand Creek will be addressed in the revised TM-SCCS.

DP23 which will be collected by a 10' CDOT type R sump inlet. The flow will combine with flow from PR25 and will be routed east via a 36" RCP (PR26, Q5=3.2 cfs and Q100=27.7 cfs) to Detention Pond 8 (DP 27). Flows will outfall into a concrete lined forebay. In the event of clogging or total inlet failure, flows at DP23 will over top the curb and gutter and outfall into the Detention Pond 8 (DP 27).

DP26, 1.32 acres, consists of Basin TT future residential lots and streets with runoff coefficients of 0.38 for the 5-year and 0.55 for the 100-year. Developed runoff of Q5=2.0 cfs and Q100=4.9 cfs has been calculated for DP26. The surface runoff is routed via overlot grading and swales to a temporary sediment basin at DP26 which will be collected by an 18" FES. The flow will be routed south via an 18" RCP (PR28) to Detention Pond 8 (DP 27). Flows will outfall into a concrete lined forebay.

DP27, 2.17 acres, consists of Basin UU (**Detention Pond 8**) with runoff coefficients of 0.08 for the 5-year and 0.35 for the 100-year. The combined upstream developed runoff of Q5=42.3 cfs and Q100=112.8 cfs has been calculated for DP27. The proposed Detention Pond functions to provide full spectrum detention and water quality for runoff calculated onsite. The pond is designed to treat approx 29.0 acres, and provide 0.48 ac-ft of water quality storage and 3.00 ac-ft of 100-year storage. The forebay, trickle channel micropool, outlet structure and pipe have been designed per the UDFCD manual and per the Detention Design-UD-Detention v3.05 workbook. The detention pond will be private and shall be maintained by the Sterling Ranch Metropolitan District. A private maintenance agreement document shall accompany the submittal. In the event of clogging or total inlet failure, flows at DP27 will over top the emergency spillway and outfall into Sand Creek. A rip rap apron will be constructed to dissipate energy and prevent local scour at the outlet. The peak release rate from pond 8 (PR29, Q5=2.9 cfs and Q100=41.7 cfs) will outfall, via a 30" RCP into Sand Creek. Impacts from the outfall into Sand Creek will be addressed in the revised TM-SCCS.

The water quality volume and 100-year volume required for the site has been determined using the guidelines set forth in the City of Colorado Springs/El Paso County Drainage Criteria Manual Chapter 6-Volume II. Refer to the Detention Basin Design sheets located within the appendix of this report.

Design Points Tributary to Detention Pond W-5 (Prelim. Drainage Map Sheet 1)–Filing No. 2

DP28, 33.3 acres, consists of Basin OS3 off-site Barbarick Subdivision with runoff coefficients of 0.36 for the 5-year and 0.55 for the 100-year and Basin YY future Sterling Ranch residential lots with runoff coefficients of 0.22 for the 5-year and 0.46 for the 100-year. Developed runoff of Q5=25.8 cfs and Q100=60.2 cfs has been calculated for DP28. Per the "Final Drainage Report for Barbarick Subdivision Portions of Lots 1, 2 and Lots 3, 4", prepared by Matrix Design Group, dated June 6, 2016, a combined onsite flow of Q5=11.4 cfs and Q100=85.4 cfs was calculated up to the detention pond on the south boundary line of the Barbarick Subdivision. The reduction of flow, from previous reports is attributed to a reduction of Sterling Ranch Subdivision flow contributing to the OS3 basin. The release rate from the detention pond combined with Basin YY are Q5=25.8 cfs and Q100=60.2 cfs. The surface runoff shall be collected by a temporary sediment basin and 36" FES and routed south via 36" RCP (PR32) to PR34. In the event of clogging, flow will be routed via historic drainage patterns to DP33. Historic flows produced by Basin OS3 will be accounted for in the calculations for detention/water quality for Pond W5. The drainage report was prepared by Matrix Design Group, 2016 for the Barbarick Subdivision and has been attached at the end of the reference section of this report. The Final Drainage Report for Filing No. 2 will address the revisions from the previous report to the new Matrix report.

DP29, 12.58 acres, consists of Basin XX future residential lots and streets with runoff coefficients of 0.22 for the 5-year and 0.46 for the 100-year and Basin JP-1 future school site with runoff coefficients of 0.39 for the 5-year and 0.55 for the 100-year. Developed runoff of Q5=17.3 cfs and Q100=41.7 cfs has been calculated for DP29. The surface runoff will be routed via overlot grading and curb and gutter to a temporary sediment basin at DP29 which will be collected by a 36" FES. The flow will be routed west via

a 36" RCP (PR33) and will combine with flow from PR32. The combined flows in PR34 (Q5=41.4 cfs and Q100=97.8 cfs) will be routed south and west via a 48" RCP to PR35.

DP30, 2.46 acres, consists of Basin III future open space area with runoff coefficients of 0.08 for the 5-year and 0.35 for the 100-year and Basin JP-7A (Sterling Ranch Road) with runoff coefficients of 0.90 for the 5-year and 0.96 for the 100-year. Developed runoff of Q5=6.5 cfs and Q100=13.0 cfs has been calculated for DP30. The surface runoff is routed via overlot grading and curb and gutter to DP30 which will be collected by a 15' CDOT type R at-grade inlet. The intercepted flow (Q5=6.5 cfs and Q100=11.1 cfs) will be routed south via a 24" RCP (PR34A) and will combine with flows from PR34 and PR34B. The combined flows (Q5=53.1 cfs and Q100=117.8 cfs) will be routed west via a 48" RCP (PR35) to PR39.

DP31, 4.64 acres, consists of Basin JJJ future residential lots with runoff coefficients of 0.22 for the 5-year and 0.46 for the 100-year and Basin JP-7A (Sterling Ranch Road) with runoff coefficients of 0.90 for the 5-year and 0.96 for the 100-year. Developed runoff of Q5=8.4 cfs and Q100=19.8 cfs has been calculated for DP31. The surface runoff is routed via overlot grading and curb and gutter to DP31 which will be collected by a 15' CDOT type R at-grade inlet. The intercepted flow (Q5=8.2 cfs and Q100=14.2 cfs) will be routed south via a 24" RCP (PR34B) and will combine with flows from PR34 and PR34A. The combined flows (PR35, Q5=53.1 cfs and Q100=117.8 cfs) will be routed west via a 48" RCP to PR39.

DP32, 17.0 acres, consists of Basin OS2 off-site Barbarick Subdivision with runoff coefficients of 0.49 for the 5-year and 0.62 for the 100-year. Developed runoff of Q5=30.4 cfs and Q100=80.8 cfs has been calculated for DP32 Per the "Final Drainage Report for Barbarick Subdivision Portions of Lots 1, 2 and Lots 3, 4", prepared by Matrix Design Group, dated June 6, 2016, a combined onsite flow of Q5=3.13 cfs and Q100=11.6 cfs was calculated up to the sand filter pond on the south boundary line of the Barbarick Subdivision. The release rate from the sand filter pond combined with Lots 1 and 2 west of the sand filter pond are Q5=30.4 cfs and Q100=80.8 cfs. The surface runoff shall be collected by a temporary sediment basin and 42" FES. In the event of clogging, flow will be routed via historic drainage patterns to DP33. The flow will be routed south via 42" RCP (PR36) to PR38. Upon future development of this basin, full spectrum detention shall be required and will release to historic release rates of Q5=30.4 cfs and Q100=80.8 cfs. Historic flows produced by Basin OS2 will be accounted for in the calculations for detention/water quality for Pond W5. The Final Drainage Report for Filing No. 2, will address the revisions from the previous report to the new Matrix report.

DP33, 9.68 acres, consists of Basin AAA future residential lots and streets with runoff coefficients of 0.49 for the 5-year and 0.65 for the 100-year. Developed runoff of Q5=17.3 cfs and Q100=38.5 cfs has been calculated for DP33. The surface runoff will be routed via overlot grading and curb and gutter to a temporary sediment basin at DP33 which will be collected by a 30" FES. The flow will be routed west via a 30" RCP (PR37) and will combine with flows from PR36. The combined flows (PR38, Q5=45.9 cfs and Q100=115.2 cfs) will be routed south via a 48" RCP to PR39. The combined flows of PR35 and PR38 (PR39, Q5=98.5 cfs and Q100=232.0 cfs) will be routed south via a 66" RCP to PR57.

DP40, 13.89 acres, consists of Basin CCC future residential lots and streets with runoff coefficients of 0.49 for the 5-year and 0.62 for the 100-year. Developed runoff of Q5=25.5 cfs and Q100=54.2 cfs has been calculated for DP40. The surface runoff is routed via overlot grading and curb and gutter to a temporary sediment basin at DP40 which will be collected by a 36" FES. The flow will be routed west via a 36" RCP (PR46) and will combine with flow from PR47. The combined flows in PR48 (Q5=26.0 cfs and Q100=61.7 cfs) will be routed south via a 42" RCP to PR52.

DP44, 4.24 acres, consists of Basin HHH undisturbed gas line easements and minimal rear residential lots with runoff coefficients of 0.08 for the 5-year and 0.35 for the 100-year. Developed runoff of Q5=1.2 cfs and Q100=9.1 cfs has been calculated for DP44. The surface runoff is routed via historic drainage patterns and overlot grading to a temporary sediment basin at DP44 which will be collected by an 18" FES. The

calculated for DP50. In the undeveloped condition, runoff of Q5=2.0 cfs and Q100=15.0 cfs are routed via historic drainage patterns and proposed swales to DP50. The surface runoff will be collected by a 36" FES. The flows will be routed south via a 36" RCP (PR64) to PR65. The accumulated flow in PR65 (Q5=32.0 cfs and Q100=309.7 cfs) will be routed south to PR67. Upon future development of this basin, full spectrum detention shall be required and will release to historic release rates of Q5=2.0 cfs and Q100=15.0 cfs.

DP53, 5.37 acres, consists of Basin JP-12 a future commercial parcel with runoff coefficients of 0.81 for the 5-year and 0.88 for the 100-year. Developed runoff of Q5=19.8 cfs and Q100=36.1 cfs has been calculated for DP53. In the undeveloped condition, runoff of Q5=1.4 cfs and Q100=10.0 cfs are routed via historic drainage patterns and proposed swales to DP53. The surface runoff will be collected by a 30" FES. The flows will be routed south via a 30" RCP (PR66) to PR67. The accumulated flow in PR67 (Q5=39.1 cfs and Q100=322.5 cfs) will be routed via a 72" RCP south to Sand Creek. Upon future development of this basin, full spectrum detention shall be required and will release to historic release rates of Q5=1.4 cfs and Q100=10.0 cfs. The summed flows at DP68 (PR74, Q5=42.2 cfs and Q100=472.2 cfs) will outfall into Sand Creek. Impacts from the outfall into Sand Creek will be addressed in the revised TM-SCCS. A riprap apron will be constructed to dissipate energy and prevent local scour at the outlet.

DP54, 1.21 acres, consists of Basin RP-7D (Marksheffel Road) with runoff coefficients of 0.08 for the 5-year and 0.35 for the 100-year and DP51 flowby. Undeveloped runoff of Q5=0.4 cfs and Q100=3.5 cfs has been calculated for DP54. Undeveloped flows will be routed to a temporary sediment basin via overlot grading as shown on the "Sterling Ranch-Phase 1 Offsite Grading, Early Grading & Erosion Control Plans", prepared by M&S Civil Consultants, Inc., dated November 2015, which will route flows to Sand Creek. Erosion control will be provided.

DP55, 1.28 acres, consists of Basin RP-7C (Marksheffel Road) with runoff coefficients of 0.08 for the 5-year and 0.35 for the 100-year and DP51 flowby. Undeveloped runoff of Q5=0.4 cfs and Q100=4.9 cfs has been calculated for DP55. Undeveloped flows will be routed to a temporary sediment basin via overlot grading as shown on the "Sterling Ranch-Phase 1 Offsite Grading, Early Grading & Erosion Control Plans", prepared by M&S Civil Consultants, Inc., dated November 2015, which will route flows to Sand Creek. Erosion control will be provided.

Basin SSS, 1.21 acres, consists of the backyards of future residential lots with runoff coefficients of 0.22 for the 5-year and 0.46 for the 100-year. Developed runoff of Q5=1.1 cfs and Q100=3.8 cfs has been calculated for this basin. Developed flows will be sheet flow into Sand Creek. Erosion control will be provided.

There will be bank stabilization improvements to the Sand Creek Drainage Channel with the development of the STERLING RANCH FILING NOS. 1&2 site (Roadways and tracts) to maintain the integrity of roadways and ponds. However, channel improvements for Sand Creek (checks, drops, etc...) will be installed in accordance with the Subdivision Improvement Agreement.

DETENTION PONDS

Detention Pond 4, has combined upstream developed runoff of Q5=50.0 cfs and Q100=102.9 cfs. The proposed Detention Pond functions to provide full spectrum detention and water quality for runoff calculated onsite. The pond is designed to treat approx 27.5 acres, and provide 0.46 ac-ft of water quality storage and 2.90 ac-ft of 100-year storage. The forebay, trickle channel micropool, outlet structure and pipe have been designed per the UDFCD manual and per the Detention Design-UD-Detention v3.05 workbook.

Detention Pond 8, has combined upstream developed runoff of Q5=42.3 cfs and Q100=112.8 cfs. The proposed Detention Pond functions to provide full spectrum detention and water quality for runoff

calculated onsite. The pond is designed to treat approximately 29.0 acres, and provide 0.48 ac-ft of water quality storage and 3.00 ac-ft of 100-year storage. The forebay, trickle channel micropool, outlet structure and pipe have been designed per the UDFCD manual and per the Detention Design-UD-Detention v3.05 workbook.

Detention Pond W-5, has combined upstream developed runoff of $Q5=233.2$ cfs and $Q100=518.2$ cfs. The proposed Detention Pond functions to provide full spectrum detention and water quality for runoff calculated onsite. The pond is designed to treat approx 175.6 acres, and provide 2.90 ac-ft of water quality storage and 17.16 ac-ft of 100-year storage. The forebay, trickle channel micropool, outlet structure and pipe have been designed per the UDFCD manual and per the Detention Design-UD-Detention v3.05 workbook. Design and calculations will be addressed in the Filing No. 2 Final Drainage Report. See Sand Creek Channel Study-Future Hydrologic Conditions Map in the appendix. Impacts from the outfall into Sand Creek will be addressed in the revised TM-SCCS.

Detention Pond B-B, has combined upstream developed runoff of $Q5=4.7$ cfs and $Q100=15.0$ cfs. The proposed temporary Detention Pond functions to provide full spectrum detention and water quality for runoff calculated onsite. The pond is designed to treat approximately 5.98 acres, and provide 0.04 ac-ft of water quality storage and 0.48 ac-ft of 100-year storage. The outlet structure and pipe have been designed to release the required rates per the UDFCD manual and per the Detention Design-UD-Detention v3.05 workbook.

Detention Pond W-9, has combined upstream developed runoff of $Q5=8.9$ cfs and $Q100=21.2$ cfs. The proposed Detention Pond functions to provide full spectrum detention and water quality for runoff calculated offsite. The pond is designed to treat approx 5.87 acres, and provide 0.092 ac-ft of water quality storage and 0.638 ac-ft of 100-year storage. The outlet structure, 18" filter layer(minimum), underdrain and pipe have been designed per the UDFCD manual and per the Detention Design-UD-Detention v3.07 workbook.

Conceptual Detention Pond W-4, has combined upstream developed runoff of $Q5=72.9$ cfs and $Q100=368.4$ cfs. The proposed Detention Pond functions to provide full spectrum detention and water quality for runoff calculated offsite. The pond is designed to treat approx 352.2 acres, and provide 1.73 ac-ft of water quality storage and 6.63 ac-ft of 100-year storage. The forebay, trickle channel micropool, outlet structure and pipe have been designed per the UDFCD manual and per the Detention Design-UD-Detention v3.05 workbook. Design and calculations will be addressed in the Filing No. 2 Final Drainage Report. See Sand Creek Channel Study-Future Hydrologic Conditions Map in the appendix. Impacts from the outfall into Sand Creek will be addressed in the revised TM-SCCS. The Conceptual Detention Pond W-4 is subject to El Paso County approval for the site shown.

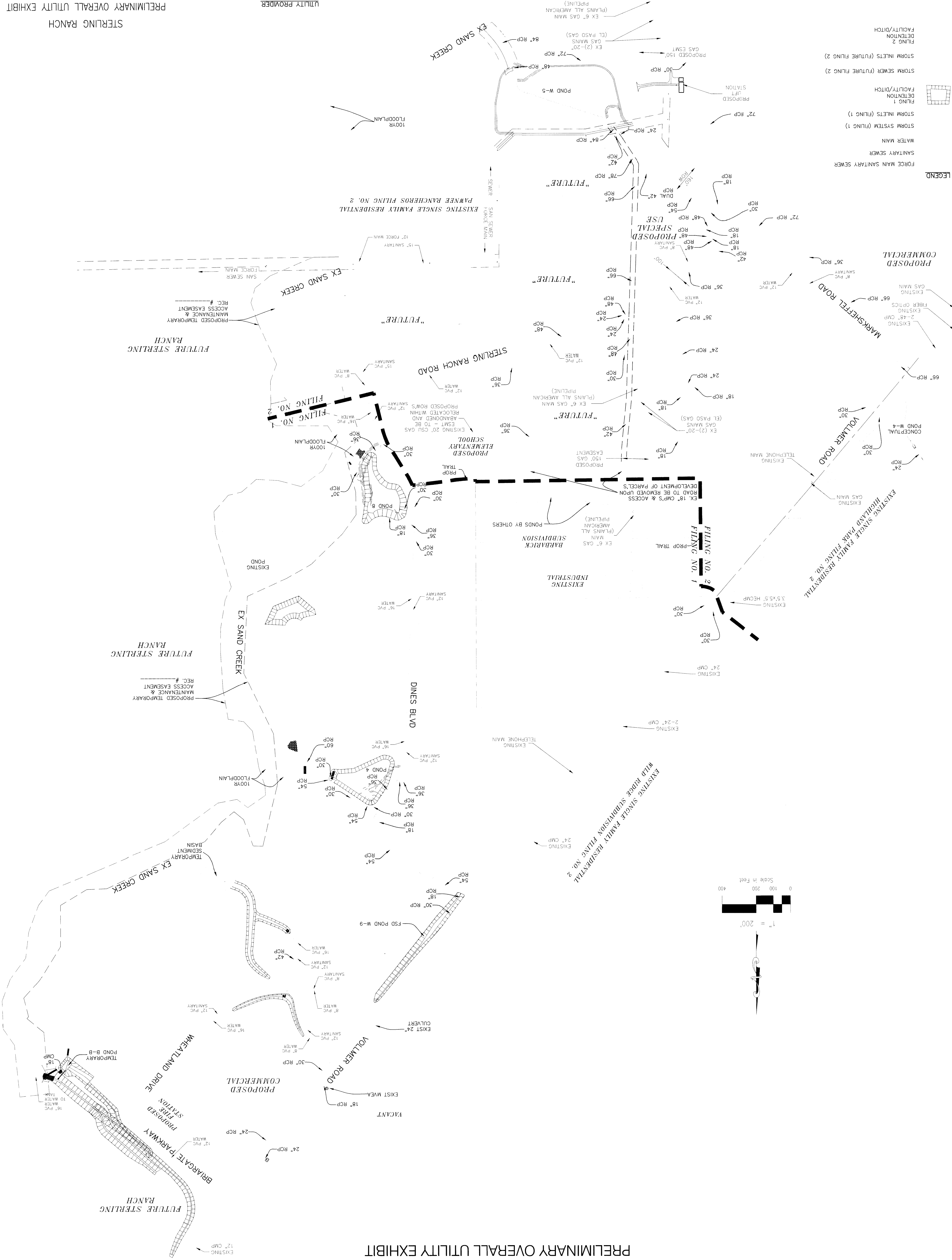
The detention ponds will be private and shall be maintained by the Sterling Ranch Metropolitan District. Access shall be granted to the owner and El Paso County for access and maintenance of the private detention ponds. A private maintenance agreement documents shall accompany the submittal. In the event of clogging or total inlet failure, flows will over top the emergency spillway and outfall into Sand Creek. A rip rap apron will be constructed to dissipate energy and prevent local scour at the outlet.

The water quality volume and 100-year volume required for the site has been determined using the guidelines set forth in the City of Colorado Springs/El Paso County Drainage Criteria Manual Chapter 6 - Volume II. Refer to the Detention Basin Design sheets located within the appendix of this report.

EROSION CONTROL

It is the policy of the El Paso County that a grading and erosion control plan be submitted with the drainage report. EPC approved "Early Grading Plan for Sterling Ranch Phase I Onsite Grading &

STERLING RANCH
PRELIMINARY OVERALL UTILITY EXHIBIT

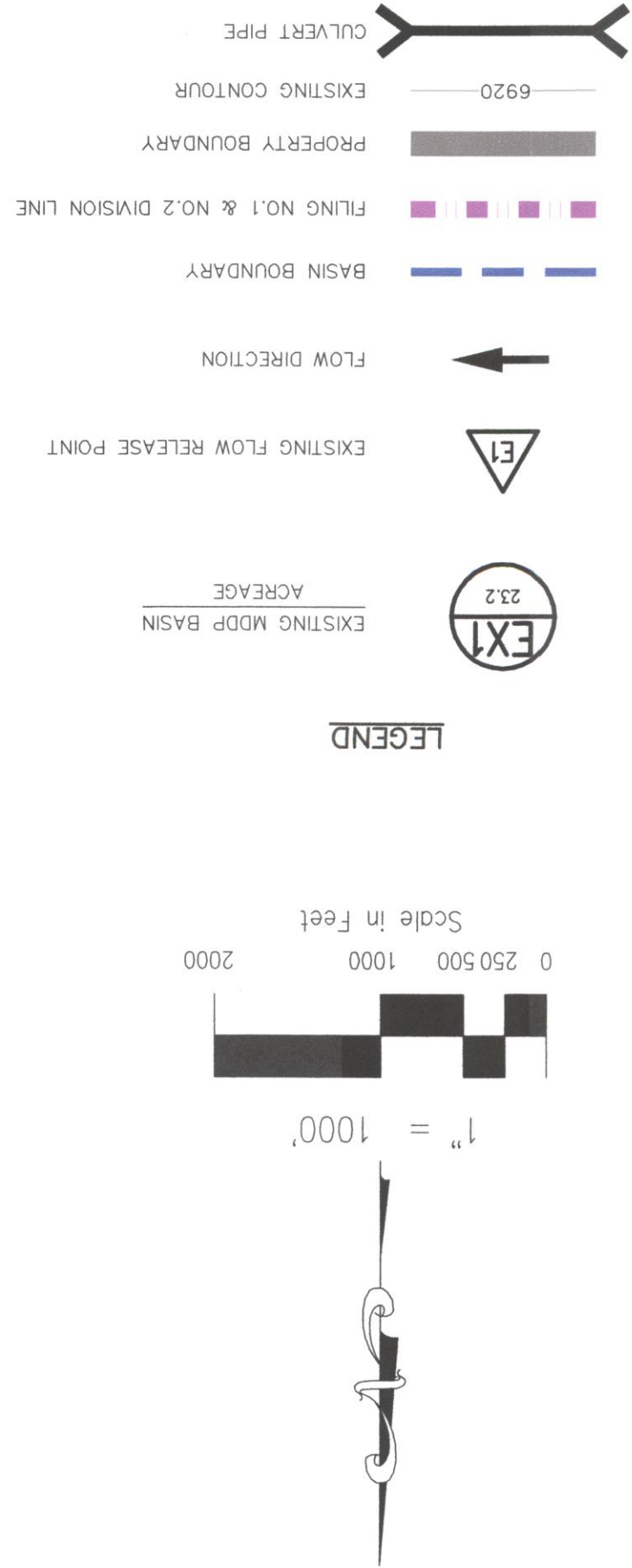


STERLING RANCH
PRELIMINARY OVERALL UTILITY EXHIBIT

PROJECT NO. 09-002
FILE: Q:\dwg\eng\exhibits\MDPP HISTORIC
DATE: 2/6/17
SCALE: 1"=1000'
VERT: N/A
DESIGNED BY: VAS
CHECKED BY: VAS
DRAWN BY: VAS
HORIZ: 1"=1000'

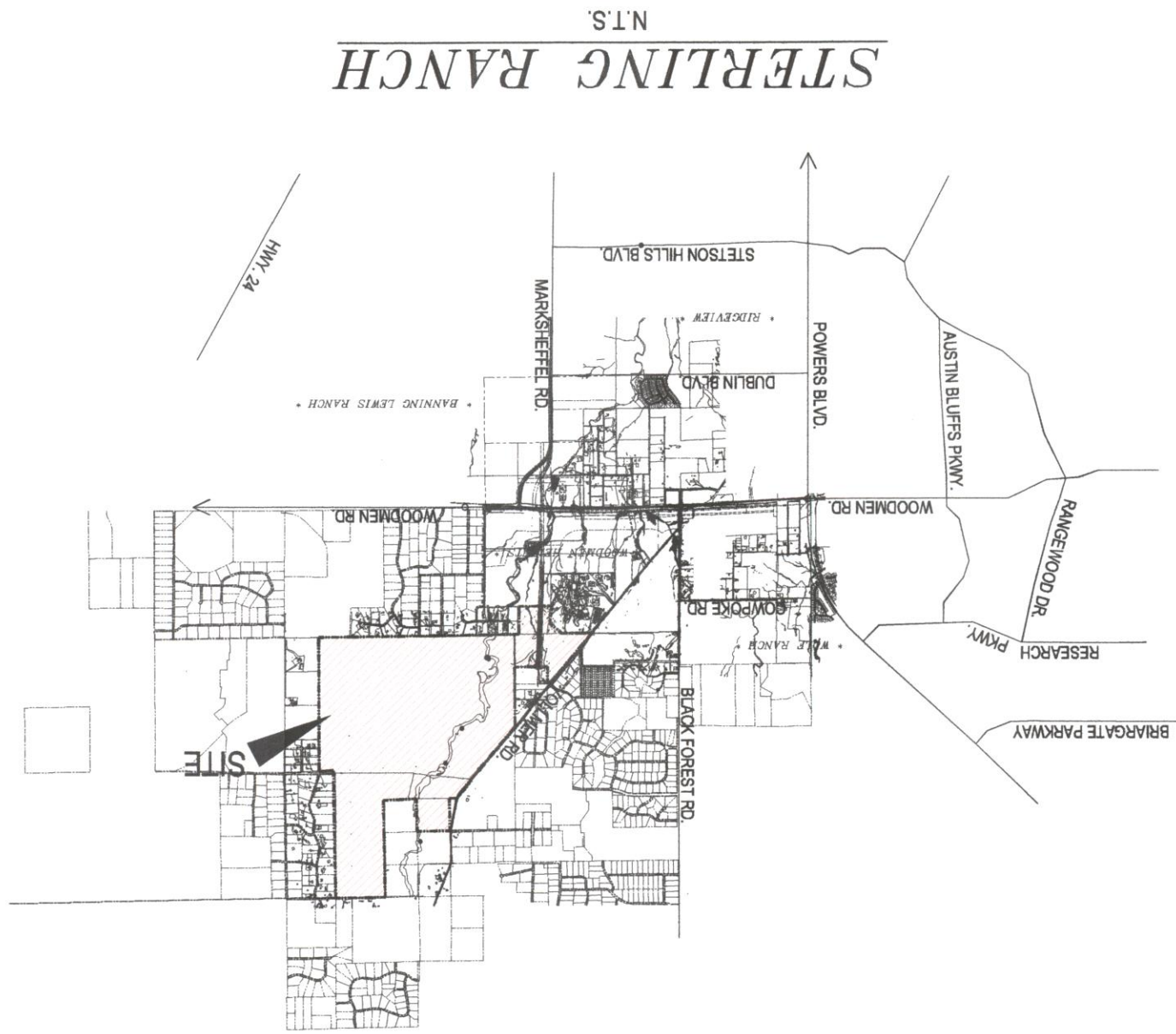
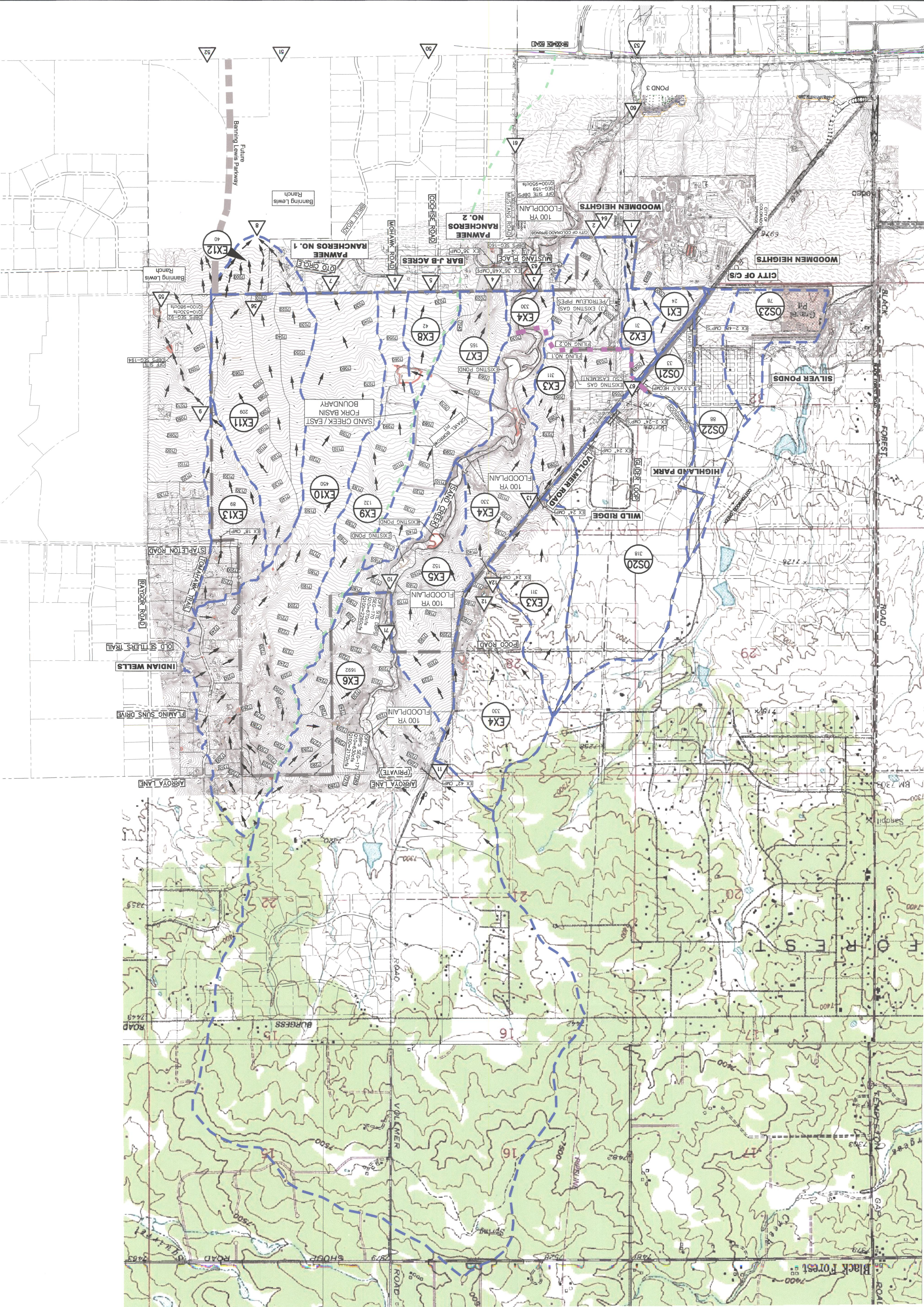
STERLING RANCH
HISTORIC - DRAINAGE MAP
SHEET 1 OF 1

15 NORTH NEVADA AVENUE
COLORADO SPRINGS, CO 80903
(719) 955-5485, FAX (719) 471-4812
CIVIL CONSULTANTS, INC.
MS



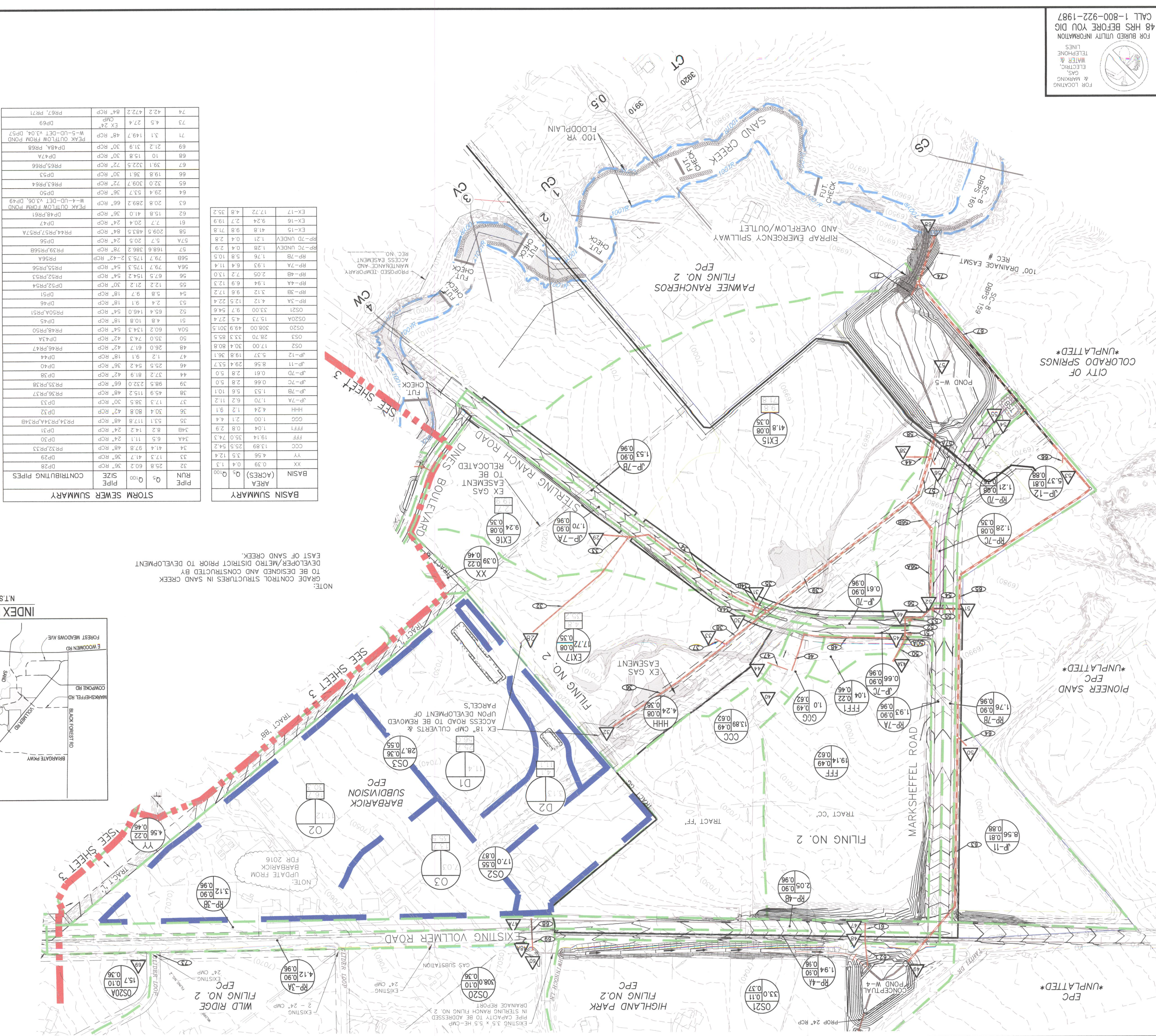
DESIGN POINTS			
DESIGN POINT	SO. DBPS	Q ₁₀₀ (cfs)	Q ₁₀₀ (cfs)
1	0.09	5	84
2	0.49	49	341
3	0.52	139	2610
4	0.26	12	197
5	0.07	4	64
6	0.21	11	149
7	0.70	48	474
8	0.39	18	305
9	0.14	6	114
10	2.64	122	2245
11	0.09	5	83
12	0.27	10	200
13	0.17	6	126
NOTE: SO. MI ARE NOT CONSTANT AT EACH DESIGN POINT DP-DBPS			
55	0.48	#	56
56	0.53	1210	57
57	5.38	2629	60

HISTORIC CONDITION			
BASIN	AREA (ac)	Q ₁₀₀ (cfs)	Q ₁₀₀ (cfs)
EX-1	24	3	40
EX-2	31	3	45
EX-3	311	49	341
EX-4	330	71	352
EX-5	152	14	209
EX-6	1692	118	2168
EX-7	165	12	197
EX-8	42	4	64
EX-9	132	11	149
EX-10	450	48	474
EX-11	209	17	261
EX-12	40	5	65
EX-13	89	6	114
OS-20	318	61	310
OS-21	33	8	38
OS-22	88	18	91
OS-23	78	34	84
NOTE: BASIN OS-22 & OS-23 NOT HISTORIC PATTERNS ON THE WEST SIDE OF VOLLER ROAD.			
PART OF THIS REPORT. FLOWS FOLLOW HISTORIC PATTERNS ON THE WEST SIDE OF VOLLER ROAD.			



FOR LOCATING
& MARKING
GAS,
ELECTRIC,
WATER &
TELEPHONE
LINES

FOR BURIED UTILITY INFORMATION
48 HRS BEFORE YOU DIG
CALL 1-800-922-1987



PIPE RUN	Q _s	STORM SEWER SUMMARY	PIPE SIZE	CONTRIBUTING PIPES
32	25.8	60.0	36"	DP28
33	17.3	41.7	48"	DP29
34	14.1	97.8	48"	PP22,PP33
34A	6.5	11.1	24"	DP30
34B	53.1	117.8	48"	PP34,PP34A,PP34B
35	30.4	30.8	30"	DP32
36	17.3	38.5	30"	DP33
39	115.2	48"	48"	PP35,PP38
44	75.5	81.9	42"	DP38
46	54.2	36.2	36"	DP40
47	9.1	9.1	18"	DP44
48	76.0	61.7	42"	PP46,PP47
50	63.0	74.3	42"	DP47
50A	134.3	54"	48"	PP48,PP50
51	146.0	54"	48"	PP50A,PP51
52	10.8	18"	18"	DP45
53	9.1	18"	18"	DP46
54	2.4	18"	30"	DP52,PP54
55	12.2	21.2	30"	DP53
56A	79.7	175.3	54"	PP55,PP56
56B	196.6	386.2	78"	PP59,PP58B
56C	79.7	175.3	24"	PP57,PP56B
57A	209.5	485.5	24"	PP43,PP57A,PP57A
58	15.8	41.0	36"	DP48,PP61
61	20.4	26.4	24"	DP47
62	17.8	25.8	36"	DP48,PP61
63	28.9	36.6	36"	W-4-UP-107,PP60,PP49
64	29.4	53.7	36"	DP50
65	30.8	30.9	72"	PP63,PP64
66	36.1	30"	30"	PP65,PP66
67	39.1	322.5	72"	DP47A
69	15.8	30"	30"	DP47A
69	21.2	30"	30"	DP48A,PP68
71	14.9	48"	48"	W-5-UP-107,PP67,PP60
73	42.2	EX 24"	QMP	DP69
74	47.2	47.2	48"	PP67,PP71

[illegible]

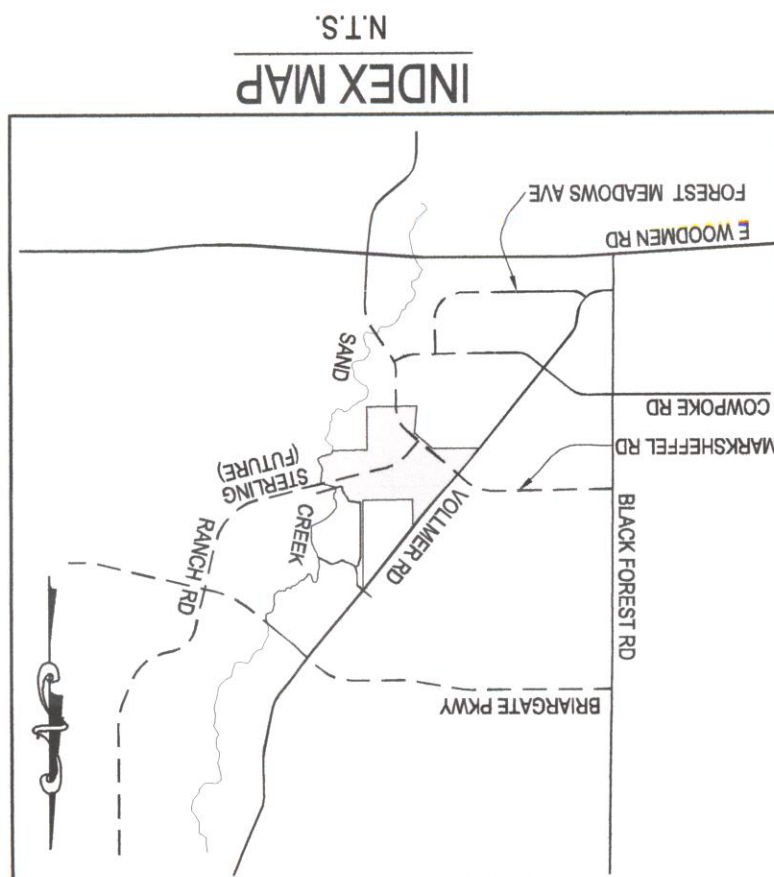
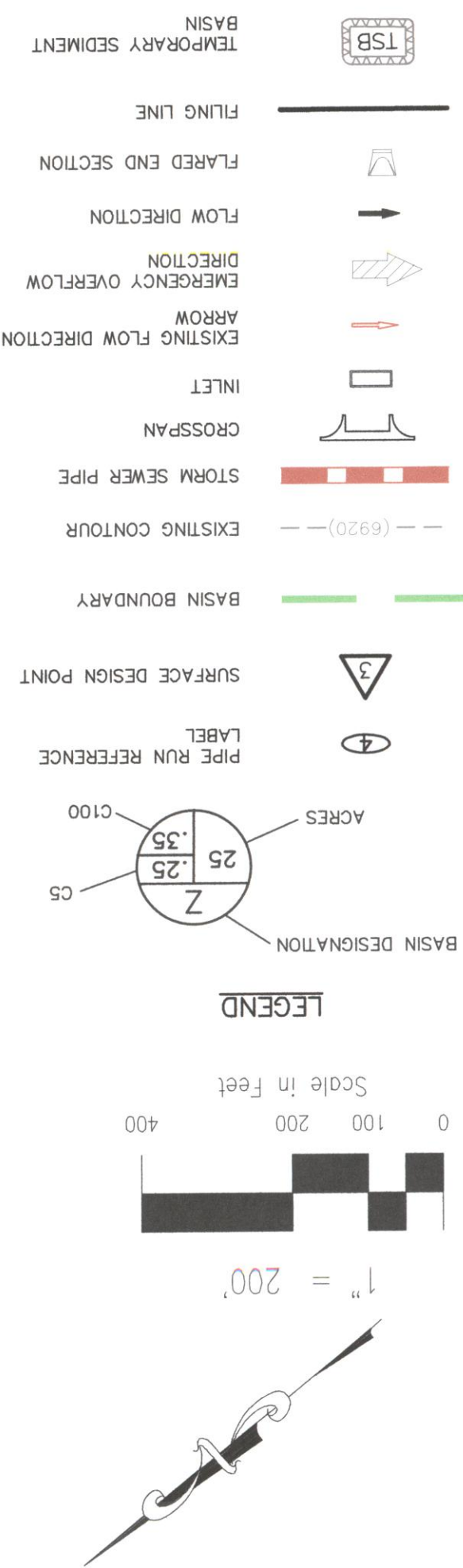
DESIGN POINT	Q _s	DESIGN POINT SUMMARY	
		BASIN	STRUCTURE
28	25.8	053.4V	36" FES/TSB BARRIARIC SUBDIVISION
29	17.3	4P-1.1X	36" FES/TSB
30	8.5	7P-7A.III	15" AT-GRADE
31	6.4	4P-7B.III	15" AT-GRADE INLET
32	30.4	80.8	052
33	17.3	38.5	30" FES/TSB
38	37.2	81.9	42" FES/TSB
40	25.5	000	36" FES/TSB
43A	35.0	74.3	42" FES/TSB
44	4.8	9.1	18" FES/TSB
45	12.4	000	15" AT-GRADE INLET
46	2.4	9.7	15" AT-GRADE INLET
47A	11.1	24.4	INTERIOR AREA INLET
			2.9x5.7" TYPE D COOL INLET
			INTERIOR SHEET PILE
			FUTURE 15" AT-GRADE INLET
48A	13.5	26.6	RP-3A
			FUTURE 15" AT-GRADE INLET
			ROADSIDE DITCH
			ORF SHOULDER INLET
48	8.2	21.0	RP-4B,FLOWBY DP47A
49	72.9	366.4	RP-4A,FLOWBY DP48A
49	29.4	53.7	14" SUMP INLET
50	5.8	10.5	14" SUMP INLET
51	5.8	10.5	14" SUMP INLET
52	6.4	13.6	RP-7A,FLOWBY DP45
53	19.8	36.1	RP-7B
54	0.4	3.5	36" FES/TSB
55	0.4	4.9	36" FES/TSB
56	5.7	20.5	36" FES/TSB
57	217.9	520.3	36" FES/TSB
60	69.7	316.2	36" FES/TSB
68	42.2	47.2	36" FES/TSB
69	4.5	27.4	36" FES/TSB
DP5 159	950	950	36" FES/TSB
DP5 160	770	2630	36" FES/TSB


<u>REVISIONS:</u>					
NO.	DATE:	BY:	DESCRIPTION:	APPROV'D BY:	DATE:

THE ENGINEER PREPARING THESE PLANS WILL NOT BE RESPONSIBLE OR LIABLE FOR UNAUTHORIZED CHANGES TO OR USES OF THESE PLANS. ALL CHANGES TO THE PLANS MUST BE IN WRITING AND MUST BE APPROVED BY THE PREPAREDOR OF THESE PLANS.

VIRGIL A. SANCHEZ, COLORADO P.E. NO. 97180

 FOR AND ON BEHALF OF
 M&S CIVIL CONSULTANTS,
 INC.





CIVIL CONSULTANTS, INC.

20 BOULDER CREEK, SUITE 110
 COLORADO SPRINGS, CO 80903
 PHONE: 719.955.5465

STERLING RANCH FILING NO. 1

PROPOSED FINAL DRAINAGE MAP

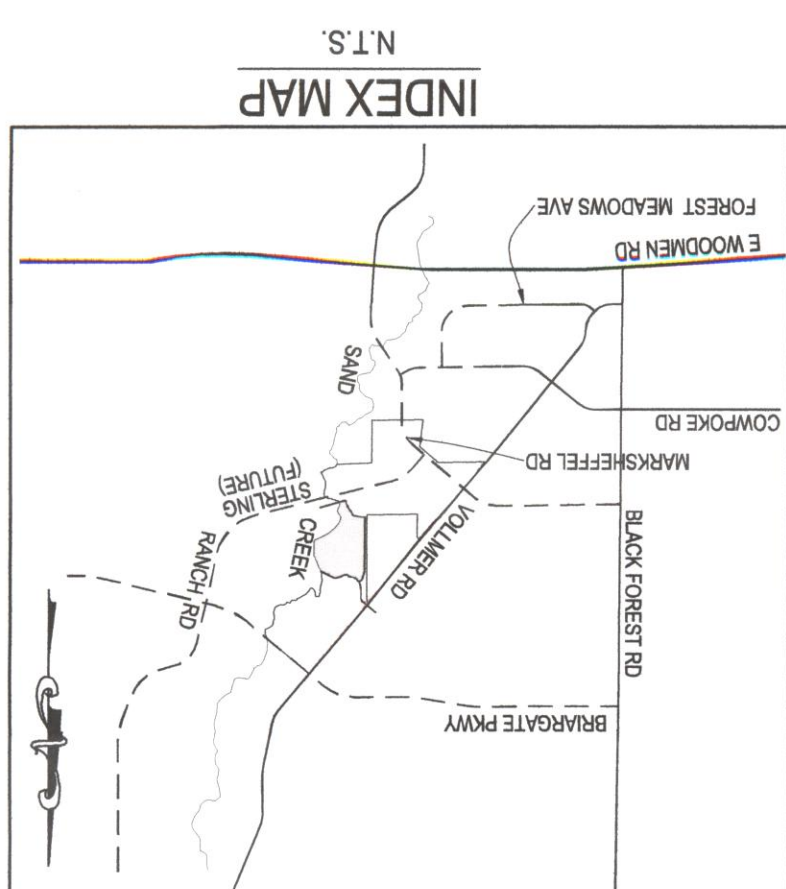
PROJECT NO. 09-002	SCALE: HORIZONTAL: 1"=200'
DESIGNED BY: ET	DATE: 6/1/2017
DRAWN BY: BB	SHEET 2 OF 4
CHECKED BY: GT	SHEET 2

[illegible]

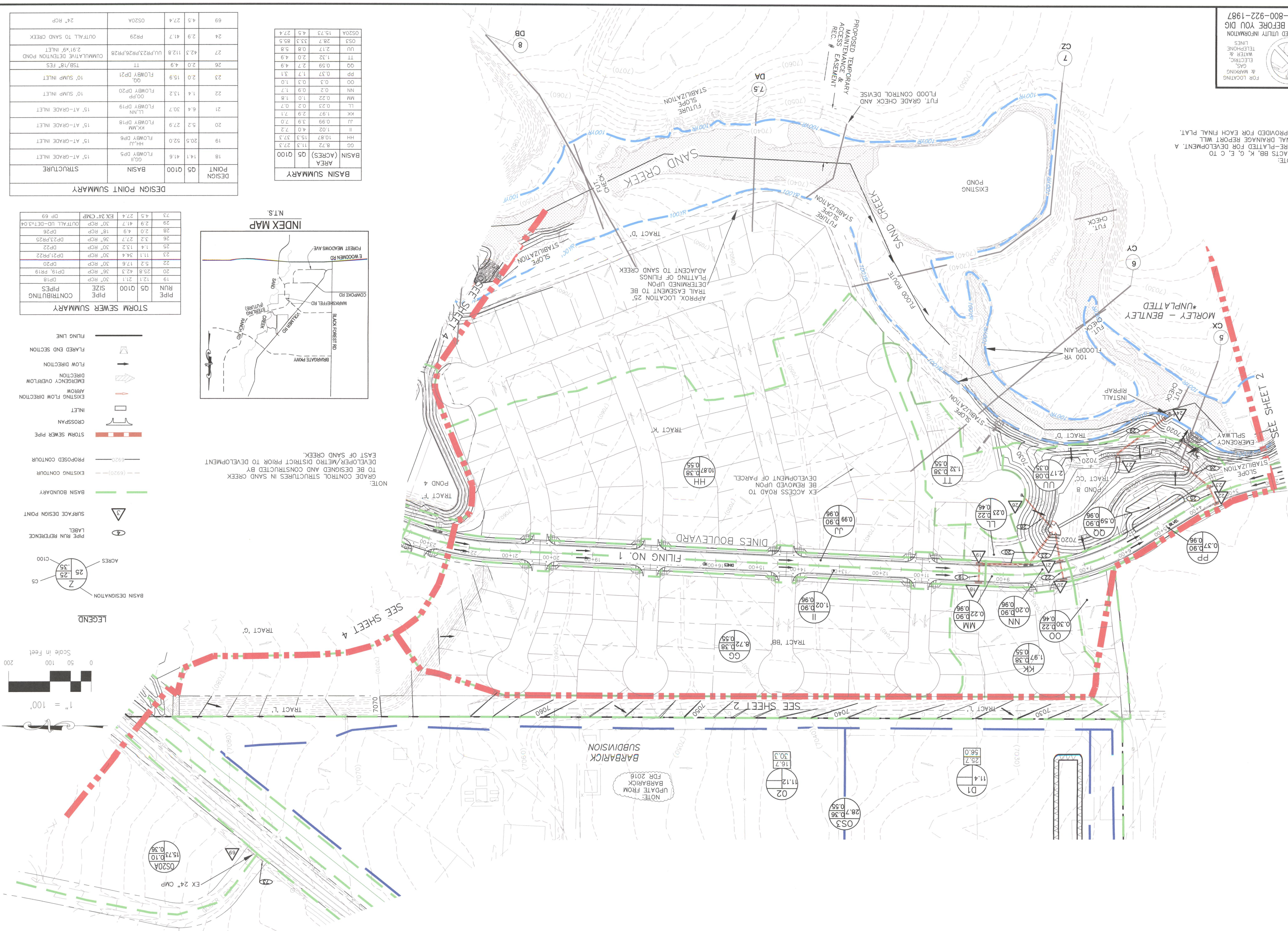
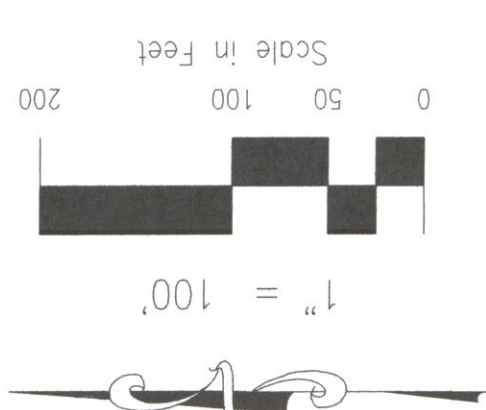
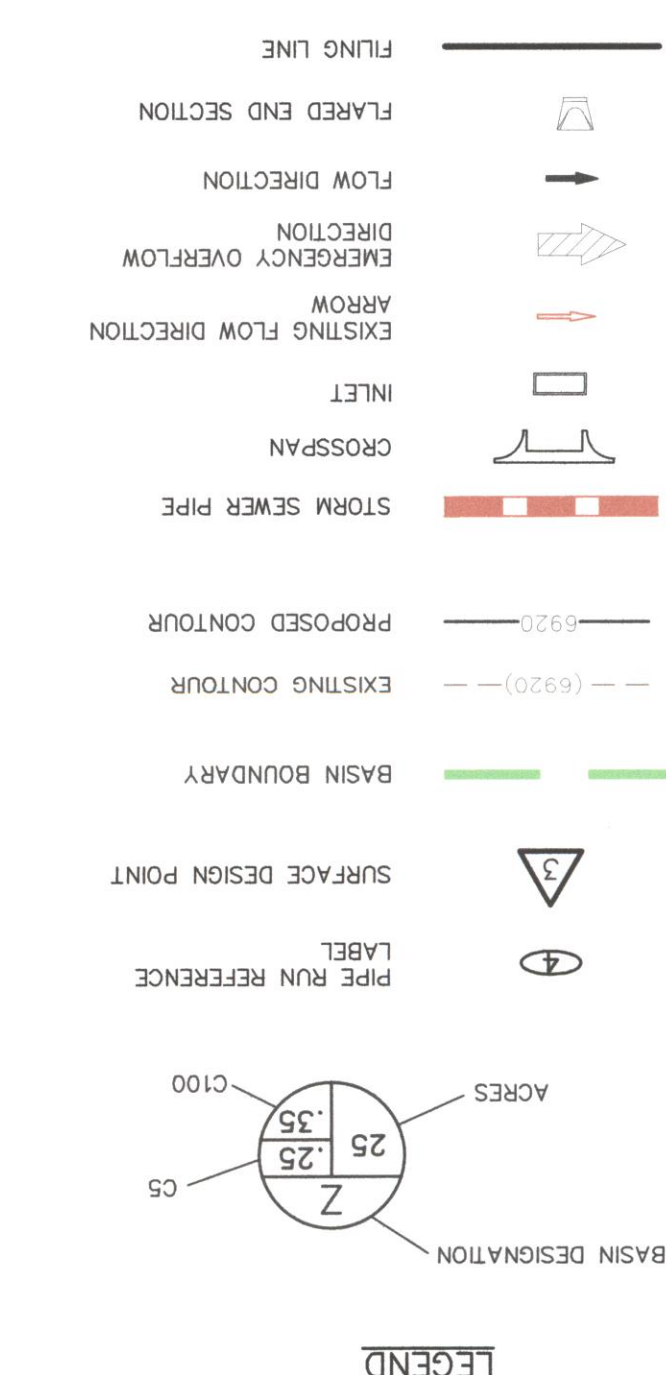
BASIN SUMMARY		AREA	BASIN (ACRES)
05	Q100	11.3	27.3
		15.3	37.3
		4.0	7.2
		0.99	3.9
		1.97	7.0
		0.22	0.7
		0.9	2.0
		0.3	0.7
		0.59	1.3
		0.27	0.6
		2.17	4.9
		15.73	35.5
		4.5	10.4

DESIGN POINT SUMMARY		DESIGN POINT	GO	Q100	BSIN	STRUCTURE
18		14.1	41.6	100	FLOWB D05	15' AT-GRADE INLET
19		20.5	52.6	100	FLOWB P06	15' AT-GRADE INLET
20		5.2	27.9	100	FLOWB P08	15' AT-GRADE INLET
21		6.4	30.7	100	FLOWB P09	15' AT-GRADE INLET
22		1.4	15.2	100	FLOWB P20	10' SWAMP INLET
23		15.9	2.0	100	FLOWB P21	10' SWAMP INLET
26		4.9	2.0	11		15B/1P/1ES
27		12.8	100	100	FLOWB P22, P26, P28	CUMULATING DETENTION POND
24		2.9	41.7	100	P29	OUTFALL TO SANDY CREEK
69		4.5	27.4	100	D020A	24" RCP

STORM SEWER SUMMARY			
PIPE RUN	Q5	SIZE	PIPE CONTRIBUTING
19	121	21	Dp18
20	45	36	Dp19, Rp19
21	22	17.6	Dp20
22	111	34.4	Dp21, Rp22
23	13.2	30	Dp22
24	3.2	27.7	Dp23, Rp25
25	2.9	41.7	Dp26
26	2.0	49	Dp26
27	4.5	27.4	EX 24" CMP
28	73	69	DP 69

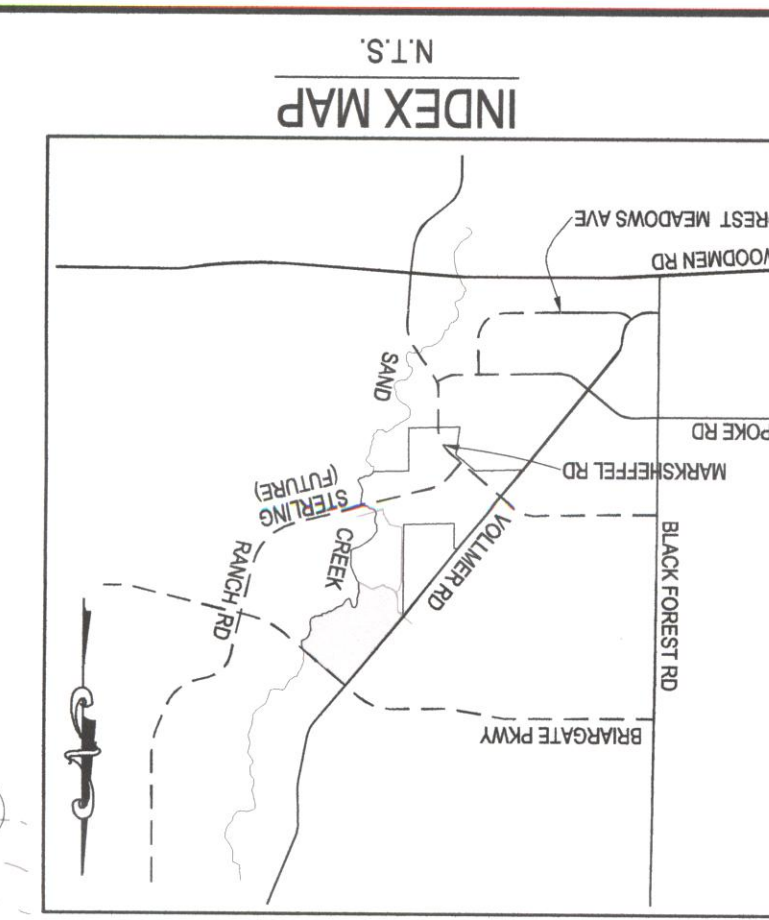


NOTE:
GRADE CONTROL STRUCTURES IN SAND CREEK
TO BE DESIGNED AND CONSTRUCTED BY
DEVELOPER/METRO DISTRICT PRIOR TO DEVELOPMENT
EAST OF SAND CREEK.

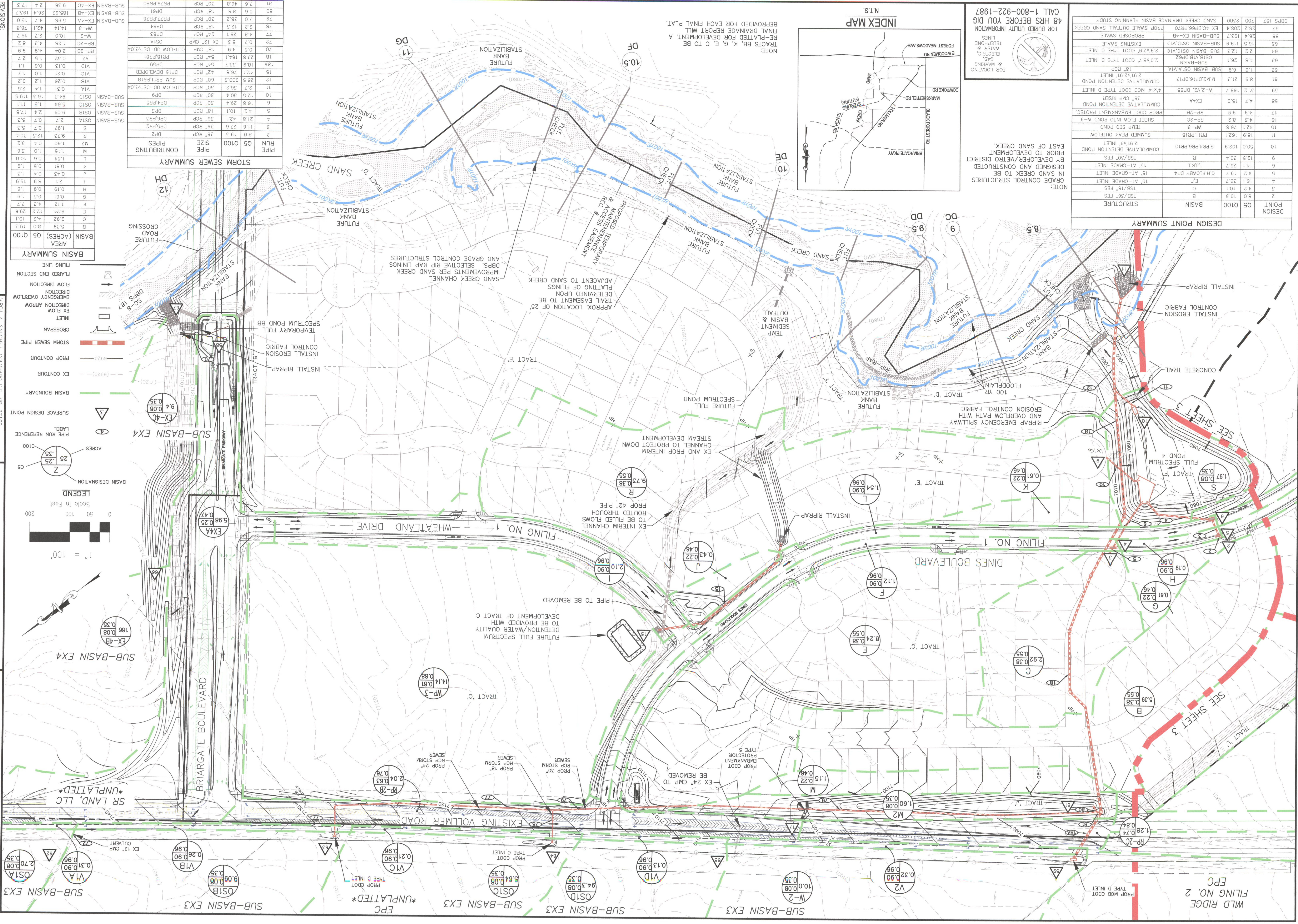


DESIGN POINT	POINT	DESIGN POINT SUMMARY
1	05 0100	BAZIN
2	05 0100	STRUCTURE
3	05 0100	TSB/18' FTS
4	05 0100	TSB/18' FTS
5	05 0100	TSB/18' FTS
6	05 0100	TSB/18' FTS
7	05 0100	TSB/18' FTS
8	05 0100	TSB/18' FTS
9	05 0100	TSB/18' FTS
10	05 0100	TSB/18' FTS
11	05 0100	TSB/18' FTS
12	05 0100	TSB/18' FTS
13	05 0100	TSB/18' FTS
14	05 0100	TSB/18' FTS
15	05 0100	TSB/18' FTS
16	05 0100	TSB/18' FTS
17	05 0100	TSB/18' FTS
18	05 0100	TSB/18' FTS
19	05 0100	TSB/18' FTS
20	05 0100	TSB/18' FTS
21	05 0100	TSB/18' FTS
22	05 0100	TSB/18' FTS
23	05 0100	TSB/18' FTS
24	05 0100	TSB/18' FTS
25	05 0100	TSB/18' FTS
26	05 0100	TSB/18' FTS
27	05 0100	TSB/18' FTS
28	05 0100	TSB/18' FTS
29	05 0100	TSB/18' FTS
30	05 0100	TSB/18' FTS
31	05 0100	TSB/18' FTS
32	05 0100	TSB/18' FTS
33	05 0100	TSB/18' FTS
34	05 0100	TSB/18' FTS
35	05 0100	TSB/18' FTS
36	05 0100	TSB/18' FTS
37	05 0100	TSB/18' FTS
38	05 0100	TSB/18' FTS
39	05 0100	TSB/18' FTS
40	05 0100	TSB/18' FTS
41	05 0100	TSB/18' FTS
42	05 0100	TSB/18' FTS
43	05 0100	TSB/18' FTS
44	05 0100	TSB/18' FTS
45	05 0100	TSB/18' FTS
46	05 0100	TSB/18' FTS
47	05 0100	TSB/18' FTS
48	05 0100	TSB/18' FTS
49	05 0100	TSB/18' FTS
50	05 0100	TSB/18' FTS
51	05 0100	TSB/18' FTS
52	05 0100	TSB/18' FTS
53	05 0100	TSB/18' FTS
54	05 0100	TSB/18' FTS
55	05 0100	TSB/18' FTS
56	05 0100	TSB/18' FTS
57	05 0100	TSB/18' FTS
58	05 0100	TSB/18' FTS
59	05 0100	TSB/18' FTS
60	05 0100	TSB/18' FTS
61	05 0100	TSB/18' FTS
62	05 0100	TSB/18' FTS
63	05 0100	TSB/18' FTS
64	05 0100	TSB/18' FTS
65	05 0100	TSB/18' FTS
66	05 0100	TSB/18' FTS
67	05 0100	TSB/18' FTS
68	05 0100	TSB/18' FTS
69	05 0100	TSB/18' FTS
70	05 0100	TSB/18' FTS
71	05 0100	TSB/18' FTS
72	05 0100	TSB/18' FTS
73	05 0100	TSB/18' FTS
74	05 0100	TSB/18' FTS
75	05 0100	TSB/18' FTS
76	05 0100	TSB/18' FTS
77	05 0100	TSB/18' FTS
78	05 0100	TSB/18' FTS
79	05 0100	TSB/18' FTS
80	05 0100	TSB/18' FTS
81	05 0100	TSB/18' FTS
82	05 0100	TSB/18' FTS
83	05 0100	TSB/18' FTS
84	05 0100	TSB/18' FTS
85	05 0100	TSB/18' FTS
86	05 0100	TSB/18' FTS
87	05 0100	TSB/18' FTS
88	05 0100	TSB/18' FTS
89	05 0100	TSB/18' FTS
90	05 0100	TSB/18' FTS
91	05 0100	TSB/18' FTS
92	05 0100	TSB/18' FTS
93	05 0100	TSB/18' FTS
94	05 0100	TSB/18' FTS
95	05 0100	TSB/18' FTS
96	05 0100	TSB/18' FTS
97	05 0100	TSB/18' FTS
98	05 0100	TSB/18' FTS
99	05 0100	TSB/18' FTS
100	05 0100	TSB/18' FTS

FOR BUREAU OF PUBLIC WORKS
CALL 1-800-922-1987
48 HRS BEFORE YOU DIG
FOR BUREAU OF PUBLIC WORKS
CALL 1-800-922-1987
48 HRS BEFORE YOU DIG



NOTE: TRACTS BB, K, G, E, C TO BE REPROVED FOR EACH FINAL PLAT.
RE-PLATTED FOR DEVELOPMENT. A
FINAL DRAINAGE REPORT WILL BE PROVIDED FOR EACH FINAL PLAT.



NO.	DATE	BY	DESCRIPTION
1	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
2	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
3	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
4	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
5	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
6	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
7	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
8	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
9	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
10	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
11	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
12	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
13	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
14	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
15	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
16	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
17	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
18	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
19	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
20	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
21	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
22	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
23	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
24	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
25	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
26	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
27	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
28	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
29	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
30	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
31	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
32	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
33	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
34	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
35	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
36	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
37	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
38	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
39	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
40	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
41	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
42	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
43	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
44	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
45	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
46	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
47	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
48	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
49	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
50	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
51	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
52	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
53	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
54	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
55	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
56	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
57	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
58	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
59	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
60	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
61	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
62	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
63	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
64	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
65	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
66	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
67	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
68	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
69	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
70	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
71	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
72	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
73	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
74	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
75	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
76	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
77	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
78	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
79	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
80	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
81	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
82	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
83	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
84	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
85	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
86	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
87	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
88	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
89	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
90	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
91	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
92	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
93	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
94	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
95	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
96	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
97	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
98	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
99	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP
100	1/2/2018	BT	PROPOSED FINAL DRAINAGE MAP

FOR AND ON BEHALF OF
M&S CIVIL
CONSULTANTS, INC.

2010008 CRESCENT SITE 110
COLORADO SPRINGS, CO 80903
PHONE 719.553.5465

STERLING RANCH FILING NO. 1
PROPOSED FINAL DRAINAGE MAP

SCALE: HORIZONTAL 1"=100'
VERTICAL 1"=100'

DATE: 1/2/2018

SHEET 4 OF 4

SHEET 4

**FINAL DRAINAGE REPORT
FOR
STERLING RANCH FILING NO. 2**

**Prepared For:
SR Land, LLC
20 Boulder Crescent, Suite 210
Colorado Springs, CO 80903**

**June 2021
Project No. 25188.01**

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

PCD File No. SF-20-015

DRAINAGE FACILITY DESIGN

General Concept

The proposed stormwater conveyance system was designed to convey the developed Sterling Ranch Filing No. 2 runoff to the proposed full spectrum water quality and detention pond W5 via storm sewer. Pond W4 will be utilized to detain and treat large portions of offsite area. The proposed ponds were designed to release at less than historic rates to minimize adverse impacts downstream. Treated water will outfall directly into the Sand Creek Drainageway, where it will eventually outfall into Fountain Creek. All Ponds will be owned and maintained by Sterling Ranch Metro District. A proposed drainage map is presented in Appendix E showing locations of the pond and channel outfall locations.

To maintain the integrity of Pond W5, there will be bank stabilization improvements to the Sand Creek Drainage Channel with the development of the Sterling Ranch Filing No. 2 site. The pond release location will be protected with riprap. However, channel improvements for Sand Creek (checks, drops, etc.) will be installed in accordance with the construction plans performed by Matrix Design Group. JR Engineering is coordinating with Matrix Design Group. The flows discharged from Pond W5 will outfall into the reach of Sand Creek designed by Matrix. The discharge point from Sterling Ranch Filing No. 2 into Sand Creek is shown on the Matrix Design Plans in Appendix D. The rerouting of flows to ponds W4 and W5 outfall location should cause no negative impacts to downstream reaches of Sand Creek. Per the DBPS, Reach SC-9, the recommended improvements to the channel include selective rip rap linings, grade control check structures, and drop structure improvements that are anticipated to stabilize the channel to prevent further degradation, scour and meandering. Full Spectrum Detention in ponds W4 and W5 will reduce peak flows within the channel there-by adding to the integrity of the Sand Creek Channel.

The report is in compliance with the M&S 2018 MDDP. The total net outflow of the site into Sand Creek is 320.3 cfs at design point 4.8, as shown in the proposed drainage map in Appendix E. The diversion outfall for pond W5/W4 is in continuity with the approved MDDP. W4 and W5 correspond to pond FSD9 and FSD6 within the approved M&S 2018 MDDP. The MDDP shows the total net allowable release rate of these ponds to be 441.6 cfs at the junction structure and outfalls into Sand Creek.

Pond W4 and pond W5 350.74 acres and 173.97 acre have 524.71 acre tributary area. The existing drainage basins have a total net area of 569.9 acres. The total net existing runoff for the site is 473.2 cfs. In the proposed condition, the site will release a total of 320.3 cfs. No adverse downstream impacts are anticipated, with the proposed runoff being less than the existing runoff.

Specific Details

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, stabilizing drainageways, treating the water quality capture volume (WQCV), and consider the need for Industrial Commercial BMP's.

Step 1, Reducing Runoff Volumes: The development of the project site is a proposed single-family development with open spaces and lawn areas interspersed within the development which helps disconnect impervious areas and reduce runoff volumes.

Step 2, Stabilize Drainageways: Sterling Ranch Filing No. 2 utilizes storm sewer throughout the project site. This storm sewer directs the on-site development flows to the full spectrum detention Pond W5 that releases at or below historic rates into the Sand Creek Drainageway. Measures shall be implemented to prevent any negative impacts to the drainageway. Riprap at the outfall locations will be utilized to prevent any erosion. An emergency overflow spillway rundown has been designed from Pond W5 down into the Sand Creek Drainageway. The overflow channel will help protect and stabilize the drainageway by reducing channel degradation and erosion. The channel utilizes 4 foot deep “VH Soil Riprap” base with a minimum 4 inch overlay of topsoil, seed and mulch. A detailed analysis of the Sand Creek Drainageway is currently being conducted by Matrix Design Group. This report will cover stabilization measures and channel improvements needed for this reach of the Sand Creek Drainageway. The portions of Sand Creek to the south of the historic confluence point are to be stabilized per the Sand Creek Stabilization at Aspen Meadows Subdivision Filing No. 1 plans by Matrix Design Group, April 2020.

Step 3, Treat the WQCV: Water Quality treatment is provided in two proposed full spectrum water quality detention ponds: Pond W4 and Pond W5. Pond W5 will receive all runoff generated within Sterling Ranch Filing No. 2 as well as future Sterling Ranch Phase 2 and Copper Chase at Sterling Ranch, a school site and a small portion of offsite areas. Pond W4 will receive runoff generated from portions of Vollmer Road and a large portion of offsite areas to the north and west of Vollmer road. In general, the runoff from this site will be collected within inlets and conveyed to the proposed ponds via storm sewer. 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 structures have 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 into the Sand Creek Drainageway. These ponds will facilitate pollutant removal for the site, while also reducing peak stormwater rates into the Sand Creek Drainageway.

Step 4, Consider the need for Industrial and Commercial BMP's: future commercial sites are proposed within this development. Site specific storm water quality and erosion control plans will be required for each commercial tract prior to development. A site specific storm water quality and erosion control plan and narrative have also been prepared in conjunction with this final drainage report. Site specific temporary source control BMPs as well as permanent BMP's will be detailed in this plan and narrative to protect receiving waters.

Water Quality

In accordance with Section 13.3.2.1 of the CCS/EPCDCM, full spectrum water quality and detention are provided for all developed basins. For this site, two detention ponds have been proposed. The WQCV for each pond shall be released within 40 hours and the EURV shall be released within 72 hours. The table below provides the volumes required for each pond, along with their respective release rates for the 5-year and 100-year storm. Both ponds will utilize forebays, trickle channels, and outlet structures to dissipate energy and treat flows. The outlet structure for these ponds shall

reduce the release rates for all storm events to less than historic rates to minimize adverse impacts to downstream stormwater facilities. A broad crested weir is provided as an emergency spillway for each pond. The emergency spillway provided for Pond W5 will convey flows directly into the Sand Creek Drainageway. The emergency spillway provided for Pond W4 shall convey flows to the existing roadside swale along Vollmer Road. Both spillways will utilize riprap aprons to prevent scour at the outlets. Pond and outlet structure calculations and sizing can be found in Appendix C. The detention ponds will be private and shall be maintained by the Sterling Ranch Metropolitan District. Access shall be granted to the owner and El Paso County for access and maintenance of the private detention pond. Pond W5 corresponds to pond FSD6 from the MMDP ($Q_5=7.6$ cfs, $Q_{100}=149.7$ cfs) and is releasing less than the MDDP values in the proposed design.

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	18.376	18.441	3.32	11.843	3.40	139.3
INTERIM POND W4	7.506	7.506	2.220	3.714	20.7	285.0

Per the MDDP, Pond W4 is sized to maximize the area on the site & could be potentially enlarged in the future if more land is purchased. A preliminary design for the ultimate configuration of Pond W4 has been used to calculate potential volume. Upon future development, an expansion of Pond W4 will need to be finalized. The pond is designed to treat approximately 352.2 acres and provide approximately 2.281 ac-ft of water quality storage. Modifications will be required to ensure the outlet structure complies with local and El Paso County criteria. A preliminary pond sizing for the ultimate condition can be found in the appendix. Pond W4 corresponds to pond FSD9 from the MMDP ($Q_5=24.9$ cfs, $Q_{100}=290$ cfs) and is releasing less than the MDDP values in the proposed design. The ultimate emergency overflow path will be through Marksheffel and a section can be found within Appendix B demonstrating the ability to pass 319.2 cfs. The interim emergency overflow path will be via an emergency overflow inlet and the existing ditch along Vollmer Road.

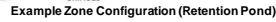
Erosion Control Plan

The El Paso County Drainage Criteria Manual specifies an Erosion Control Plan and associated cost estimate must be submitted with each Final Drainage Report. The Erosion Control Plan for Sterling Ranch Filing No. 2 has been submitted with this report.

Operation & Maintenance

In order to ensure the function and effectiveness of the stormwater infrastructure, maintenance activities such as inspection, routine maintenance, restorative maintenance, rehabilitation and repair, are required. All proposed drainage structures within the any platted County ROW will be owned and maintained by El Paso County. All proposed drainage structures within the property or tracts will be owned and maintained by the Sterling Ranch Metro District. Vegetation in the natural and improved portions of Sand Creek Drainageway is the responsibility of Sterling Ranch Metro District. This includes all mowing, seeding and weed control activities. An Inspection & Maintenance Plan has been submitted concurrently with this final drainage report that details the required maintenance activities and intervals to ensure proper function of all stormwater infrastructures in the future. The full spectrum detention ponds will be owned & maintained by Sterling Ranch Metro District.

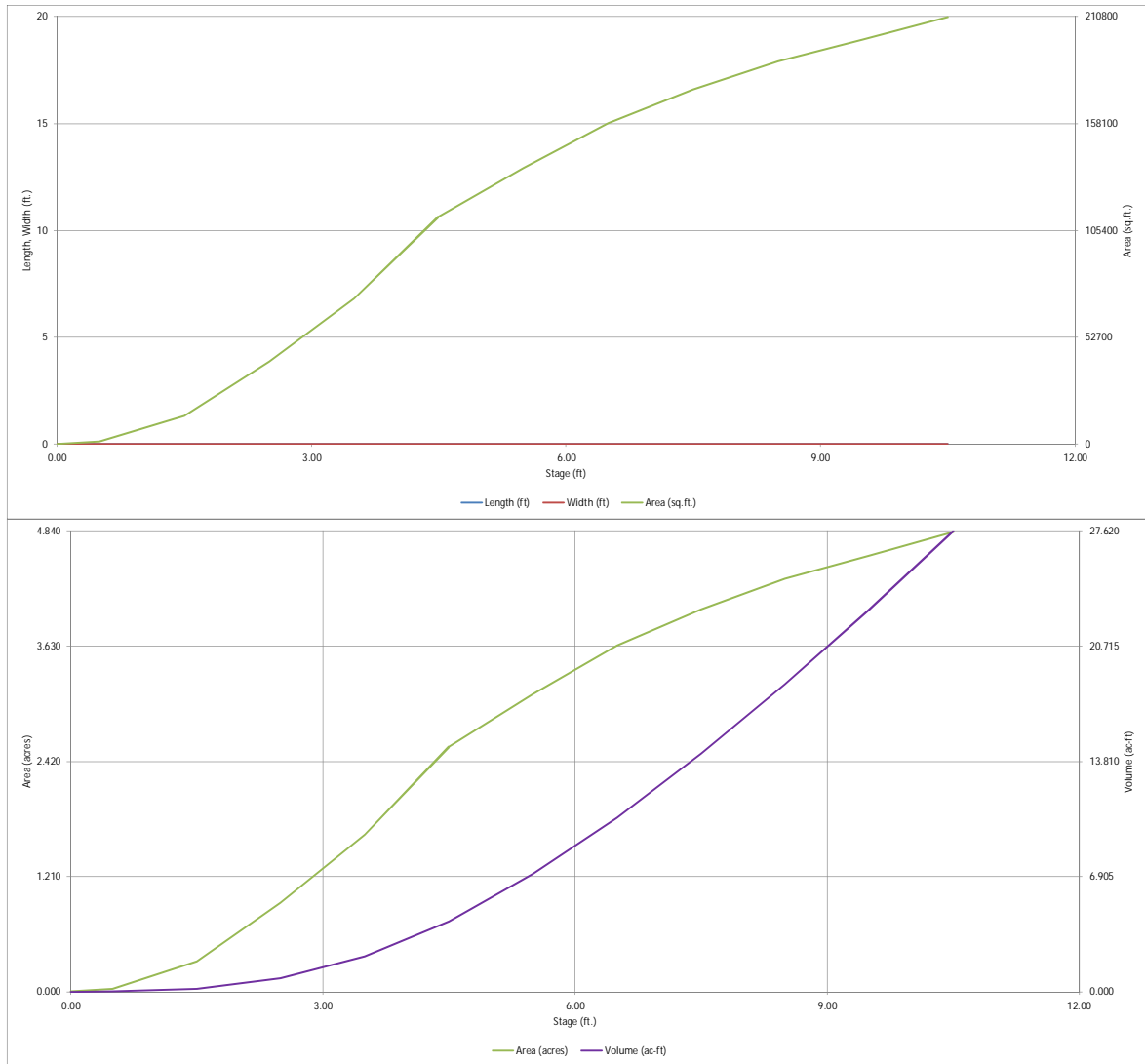
MHFD-Detention, Version 4.03 (May 2020)

Basin ID: POND W5

	acre-feet
	acre-feet
1.19	inches
1.50	inches
1.75	inches
2.00	inches
2.25	inches
2.52	inches
	inches

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.03 (May 2020)

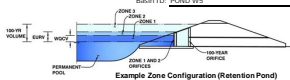


DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD Detention, Version 4.03 (May 2020)

Project: STERLING RANCH FILLING NO. 2

Basin ID: POND W5



	Estimated Volume (ac-ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WOCV)	4.13	3.311	Orifice Plate
Zone 2 (EURV)	6.88	8.532	Rectangular Orifice
Zone 3 (100-year)	8.49	6.532	Weir/Pipe (Restrict)
Total (all zones)		18.376	

User Input - Orifice at Underdrain Outlet (typically used to drain WOCV in a Filtration BMP)

Underdrain Orifice Invert Depth	N/A	ft (distance below the filtration media surface)
Underdrain Orifice Diameter	N/A	inches

Calculated Parameters for Underdrain

Underdrain Orifice Area	N/A	ft ²
Underdrain Orifice Centroid	N/A	feet

User Input - Orifice Plate with one or more orifices or Elliptical Slot Weir (typically used to drain WOCV and/or EURV in a sedimentation BMP)

Invert of Lowest Orifice	0.00	ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Orifice Plate	6.88	ft (relative to basin bottom at Stage = 0 ft)
Orifice Plate: Orifice Vertical Spacing	N/A	inches
Orifice Plate: Orifice Area per Row	N/A	inches

Calculated Parameters for Orifice

WQ Orifice Area per Row	N/A	ft ²
Elliptical Half-Width	N/A	feet
Elliptical Slot Centroid	N/A	feet
Elliptical Slot Area	N/A	ft ²

User Input - Stage and Total Area of Each Orifice Row (numbered from lowest to highest)

Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	2.35	4.00				
Orifice Area (sq. inches)	12.55	12.55	25.00				
	Row 9 (optional)	Row 10 (optional)	Row 11 (optional)	Row 12 (optional)	Row 13 (optional)	Row 14 (optional)	Row 15 (optional)
Stage of Orifice Centroid (ft)							
Orifice Area (sq. inches)							

User Input - Vertical Orifice (Circular or Rectangular)

Zone 2 Rectangular	Not Selected	
Invert of Vertical Orifice	N/A	ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Vertical Orifice	N/A	ft (relative to basin bottom at Stage = 0 ft)
Vertical Orifice Height	N/A	inches
Vertical Orifice Width	N/A	inches

Calculated Parameters for Vertical Orifice

Zone 2 Rectangular	Not Selected	
Vertical Orifice Area	N/A	ft ²
Vertical Orifice Centroid	N/A	feet

User Input - Overflow Weir (Dropbox with Flat or Sloped Grate and Outlet Pipe, NB Rectangular/Trapezoidal Weir, and No Outlet Pipe)

Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, H _o	7.30	ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length	20.00	N/A
Overflow Weir Grate Slope	0.00	N/A
Horiz. Length of Weir Sides	6.00	N/A
Overflow Grate Open Area %	70%	N/A
Debris Choking %	50%	N/A

Calculated Parameters for Overflow Weir

Zone 3 Weir	Not Selected	
Height of Grate Upper Edge, H _u	7.30	N/A
Overflow Weir Slope Length	6.00	ft
Grate Open Area / 100-yr Orifice Area	6.48	N/A
Overflow Grate Open Area w/o Debris	84.00	N/A
Overflow Grate Open Area w/ Debris	42.00	N/A

User Input - Outlet Pipe w/ Flow Restriction Plate (Circular Orifice, Restrictor Plate, or Rectangular Orifice)

Zone 3 Restrictor	Not Selected	
Depth to Invert of Outlet Pipe	2.25	N/A
Outlet Pipe Diameter	54.00	N/A
Restrictor Plate Height Above Pipe Invert	41.00	inches

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

Zone 3 Restrictor	Not Selected	
Outlet Orifice Area	12.96	N/A
Outlet Orifice Centroid	1.88	N/A
Half-Central Angle of Restrictor Plate on Pipe	2.12	N/A

User Input - Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage	8.50	ft (relative to basin bottom at Stage = 0 ft)
Spillway Crest Length	48.00	ft
Spillway End Slopes	10.00	H:V
Freeboard above Max Water Surface	2.00	feet

Calculated Parameters for Spillway

Spillway Design Flow Depth - Stage at Top of Freeboard	1.74	feet
Basin Area at Top of Freeboard	12.24	feet
Basin Volume at Top of Freeboard	4.83	acres
	27.61	acre-ft

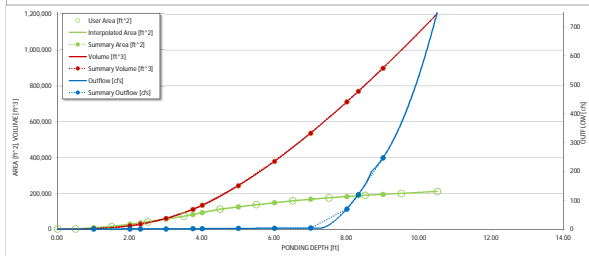
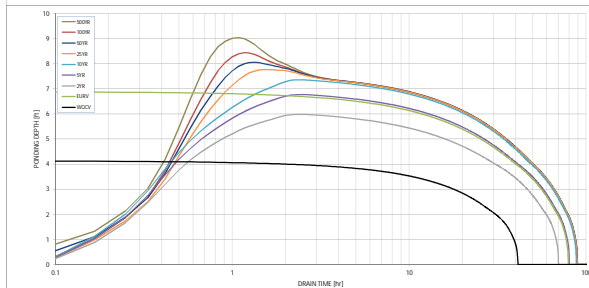
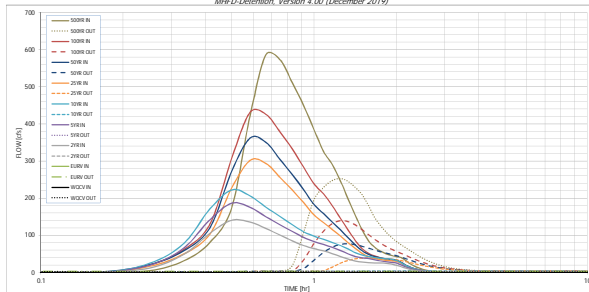
Result Hydrograph Results

The user can override the default CRRP hydrographs and rainfall volumes by entering new values in the Inflow Hydrographs table (Columns H through J).

	WOCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
Design Storm Return Period	N/A	N/A	1.19	1.50	1.75	2.00	2.25	2.52	3.14
One-Hour Rainfall Depth (in)	3.311	11.843	9.121	11.991	14.334	18.244	21.510	25.732	34.734
Inflow Hydrograph Volume (acre-ft)	N/A	N/A	9.121	11.991	14.334	18.244	21.510	25.732	34.734
CRRP Prerequisite Peak O (cfs)	N/A	N/A	1.6	2.9	5.1	54.6	85.6	128.5	217.8
OPTIONAL: Override Prerequisite Peak O (cfs)	N/A	N/A							
Prerequisite Unit Peak Flow, q (cfs/acre)	N/A	N/A	0.01	0.02	0.03	0.31	0.49	0.74	1.25
Prerequisite Unit Peak Flow, q (cfs/acre)	N/A	N/A	140.5	186.5	222.1	301.6	361.5	431.2	586.0
Peak Inflow O (cfs)	1.7	3.4	3.0	3.4	5.1	38.8	77.3	139.3	252.7
Ratio Peak Outflow to Prerequisite O	Plate	Plate	N/A	1.2	1.0	0.7	0.9	1.1	1.2
Structure Controlling Flow	Plate	Plate	Plate	Plate	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Spillway
Max Velocity through Grate 1 (fps)	N/A	N/A	N/A	N/A	0.0	0.4	0.9	1.6	2.2
Max Velocity through Grate 2 (fps)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours)	38	70	63	71	78	76	75	73	70
Time to Drain 99% of Inflow Volume (hours)	40	76	67	77	84	84	83	82	81
Maximum Ponding Depth (ft)	4.13	6.88	5.98	6.77	7.35	7.76	8.05	8.43	9.04
Area at Maximum Ponding Depth (acres)	2.23	3.78	3.37	3.73	3.96	4.10	4.19	4.31	4.47
Maximum Volume Stored (acre-ft)	3.320	11.847	8.616	11.396	13.666	15.319	16.522	18.138	20.774

DETENTION BASIN OUTLET STRUCTURE DESIGN

MMFD- Detention, Version 4.00 (December 2019)



S-A-V-D Chart 1 Axis Override:	X-axis	Left Y-axis	Right Y-axis
minimum bound			
maximum bound			

DETENTION BASIN OUTLET STRUCTURE DESIGN

Outflow Hydrograph Workbook Filename:

Inflow Hydrographs

The user can override the calculated inflow hydrographs from this workbook with inflow hydrographs developed in a separate program.

SOURCE	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP
Time Interval	TIME	WQV [cfs]	EURV [cfs]	2 Year [cfs]	5 Year [cfs]	10 Year [cfs]	25 Year [cfs]	50 Year [cfs]	100 Year [cfs]	500 Year [cfs]
5.00 min	0.00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.10:00	0.00	0.00	0.00	0.00	0.00	0.00	1.37	0.14	4.42
	0.15:00	0.00	0.00	12.01	19.62	24.38	16.41	21.13	20.11	30.88
	0.20:00	0.00	0.00	48.30	65.33	77.56	49.45	58.16	61.60	81.16
	0.25:00	0.00	0.00	105.72	142.54	171.74	104.07	121.39	121.21	174.25
	0.30:00	0.00	0.00	160.48	186.46	222.15	227.64	272.85	308.13	402.01
	0.35:00	0.00	0.00	135.46	175.22	206.02	301.61	361.54	431.24	585.96
	0.40:00	0.00	0.00	118.36	150.07	175.68	290.61	350.26	425.82	573.28
	0.45:00	0.00	0.00	100.92	128.44	150.65	256.40	304.92	376.98	510.45
	0.50:00	0.00	0.00	84.87	110.40	128.43	222.14	263.81	332.30	449.36
	0.55:00	0.00	0.00	72.36	94.33	109.32	187.66	222.42	282.99	384.40
	1.00:00	0.00	0.00	64.06	83.13	97.59	154.96	182.98	238.59	325.88
	1.05:00	0.00	0.00	58.14	75.08	88.94	134.19	158.26	211.50	290.49
	1.10:00	0.00	0.00	50.72	67.68	80.67	115.60	135.72	179.70	246.12
	1.15:00	0.00	0.00	42.71	59.08	72.45	97.95	114.30	145.50	197.69
	1.20:00	0.00	0.00	35.76	50.04	63.10	80.42	93.20	113.95	153.88
	1.25:00	0.00	0.00	30.54	42.87	53.10	64.63	74.31	85.95	114.90
	1.30:00	0.00	0.00	27.71	39.21	46.68	51.11	58.33	64.24	85.13
	1.35:00	0.00	0.00	26.36	37.32	42.89	47.74	48.57	51.51	67.73
	1.40:00	0.00	0.00	25.40	34.28	40.22	37.77	42.78	44.23	57.57
	1.45:00	0.00	0.00	25.13	31.06	38.26	34.61	39.11	39.26	50.51
	1.50:00	0.00	0.00	24.76	28.74	36.93	32.45	36.59	35.99	45.78
	1.55:00	0.00	0.00	22.48	27.05	35.35	31.03	34.94	31.68	42.43
	2.00:00	0.00	0.00	19.58	25.23	33.57	30.00	33.77	32.06	40.11
	2.05:00	0.00	0.00	15.52	20.27	25.90	24.54	27.57	26.36	32.38
	2.10:00	0.00	0.00	11.36	14.69	18.66	17.66	19.83	18.68	22.23
	2.15:00	0.00	0.00	8.25	10.65	13.66	12.75	14.30	13.52	16.79
	2.20:00	0.00	0.00	5.94	7.66	9.70	9.23	10.34	9.85	12.22
	2.25:00	0.00	0.00	4.23	5.34	6.86	6.50	7.28	6.96	8.63
	2.30:00	0.00	0.00	2.91	3.63	4.77	4.51	5.04	4.82	5.97
	2.35:00	0.00	0.00	1.96	2.50	3.30	3.19	3.57	3.40	4.20
	2.40:00	0.00	0.00	1.21	1.65	2.12	2.10	2.34	2.23	2.75
	2.45:00	0.00	0.00	0.65	0.97	1.20	1.24	1.38	1.31	1.60
	2.50:00	0.00	0.00	0.28	0.47	0.55	0.60	0.66	0.63	0.76
	2.55:00	0.00	0.00	0.09	0.15	0.16	0.19	0.20	0.19	0.22
	3.00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3.05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3.10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3.15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3.20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3.25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3.30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3.35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3.40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3.45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3.50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3.55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4.00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4.05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4.10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4.15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4.20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4.25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4.30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4.35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4.40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4.45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4.50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4.55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5.00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5.05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5.10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5.15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5.20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5.25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5.30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5.35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5.40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5.45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5.50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5.55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6.00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.03 (May 2020)

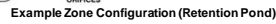
Summary Stage-Area-Volume-Discharge Relationships

The user can create a summary S-A-V-D by entering the desired stage increments and the remainder of the table will populate automatically.

The user should graphically compare the summary S-A-V-D table to the full S-A-V-D table in the chart to confirm it captures all key transition points.

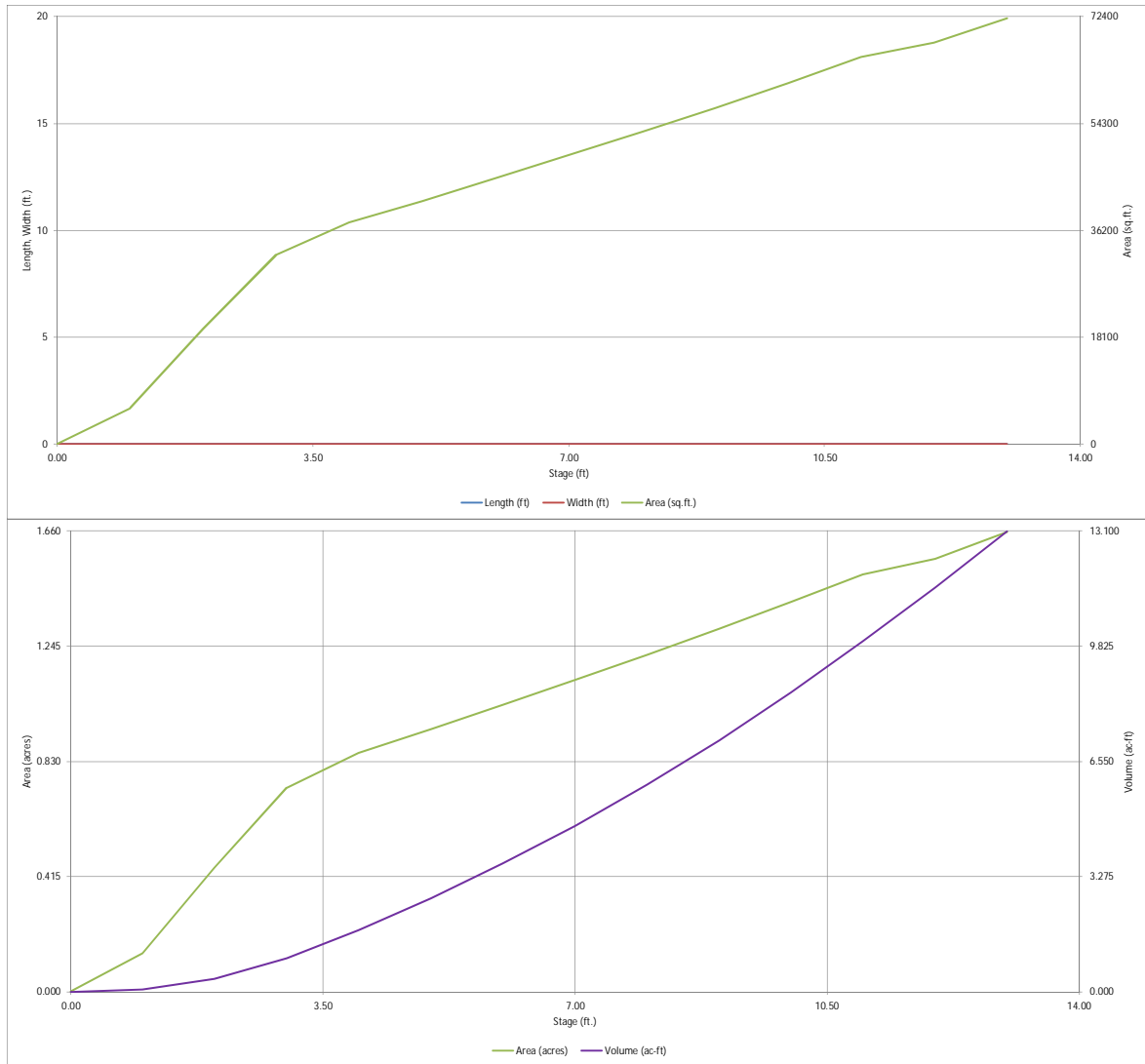
[illegible]

MHFD-Detention, Version 4.03 (May 2020)

Basin ID: POND W4 Interim[illegible]

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.03 (May 2020)

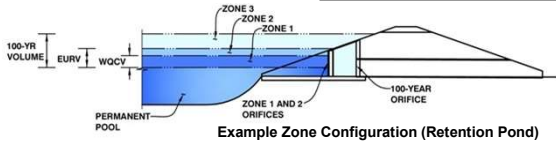


DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.03 (May 2020)

Project: **STERLING RANCH FILING NO. 2**

Basin ID: **POND W4 Interim**



	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	4.61	2.281	Orifice Plate
Zone 2 (EURV)	6.07	1.429	Orifice Plate
Zone 3 (100-year)	12.46	8.500	Weir&Pipe (Restrict)
Total (all zones)		12.211	

User Input: Orifice at Underdrain Outlet (typically used to drain WQCV in a Filtration BMP)

Underdrain Orifice Invert Depth = ft (distance below the filtration media surface)
Underdrain Orifice Diameter = inches

Calculated Parameters for Underdrain
Underdrain Orifice Area = ft²
Underdrain Orifice Centroid = feet

User Input: Orifice Plate with one or more orifices or Elliptical Slot Weir (typically used to drain WQCV and/or EURV in a sedimentation BMP)

Invert of Lowest Orifice = ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Orifice Plate = ft (relative to basin bottom at Stage = 0 ft)
Orifice Plate: Orifice Vertical Spacing = inches
Orifice Plate: Orifice Area per Row = sq. inches (use rectangular openings)

Calculated Parameters for Plate
WQ Orifice Area per Row = ft²
Elliptical Half-Width = feet
Elliptical Slot Centroid = feet
Elliptical Slot Area = ft²

User Input: Stage and Total Area of Each Orifice Row (numbered from lowest to highest)

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	1.66	3.33					
Orifice Area (sq. inches)	6.80	6.80	6.80					

	Row 9 (optional)	Row 10 (optional)	Row 11 (optional)	Row 12 (optional)	Row 13 (optional)	Row 14 (optional)	Row 15 (optional)	Row 16 (optional)
Stage of Orifice Centroid (ft)								
Orifice Area (sq. inches)								

User Input: Vertical Orifice (Circular or Rectangular)

Invert of Vertical Orifice = Not Selected Not Selected ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Vertical Orifice = Not Selected Not Selected ft (relative to basin bottom at Stage = 0 ft)
Vertical Orifice Diameter = Not Selected Not Selected inches

Calculated Parameters for Vertical Orifice
Vertical Orifice Area = Not Selected Not Selected ft²
Vertical Orifice Centroid = Not Selected Not Selected feet

User Input: Overflow Weir (Dropbox with Flat or Sloped Grate and Outlet Pipe OR Rectangular/Trapezoidal Weir (and No Outlet Pipe))

Overflow Weir Front Edge Height, Ho = Zone 3 Weir Not Selected ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length = 6.07 N/A feet
Overflow Weir Grate Slope = 20.00 N/A H:V
Horiz. Length of Weir Sides = 4.00 N/A feet
Overflow Grate Open Area % = 10.00 N/A %, grate open area/total area
Debris Clogging % = 70% N/A %
Debris Clogging % = 50% N/A %

Calculated Parameters for Overflow Weir
Height of Grate Upper Edge, H_u = Zone 3 Weir Not Selected feet
Overflow Weir Slope Length = 8.57 N/A feet
Grate Open Area / 100-yr Orifice Area = 10.31 N/A feet
Overflow Grate Open Area w/o Debris = 6.46 N/A ft²
Overflow Grate Open Area w/ Debris = 144.31 N/A ft²
Overflow Grate Open Area w/ Debris = 72.15 N/A ft²

User Input: Outlet Pipe w/ Flow Restriction Plate (Circular Orifice, Restrictor Plate, or Rectangular Orifice)

Depth to Invert of Outlet Pipe = Zone 3 Restrictor Not Selected ft (distance below basin bottom at Stage = 0 ft)
Outlet Pipe Diameter = 0.58 N/A inches
Restrictor Plate Height Above Pipe Invert = 66.00 N/A inches
Restrictor Plate Height Above Pipe Invert = 58.80 Not Selected inches

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate
Outlet Orifice Area = Zone 3 Restrictor Not Selected ft²
Outlet Orifice Centroid = 22.35 N/A feet
Half-Central Angle of Restrictor Plate on Pipe = 2.60 N/A radians
Half-Central Angle of Restrictor Plate on Pipe = 2.47 N/A radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage = 9.50 ft (relative to basin bottom at Stage = 0 ft)
Spillway Crest Length = 74.00 feet
Spillway End Slopes = 4.00 H:V
Freeboard above Max Water Surface = 1.50 feet

Calculated Parameters for Spillway
Spillway Design Flow Depth = 1.20 feet
Stage at Top of Freeboard = 12.20 feet
Basin Area at Top of Freeboard = 1.58 acres
Basin Volume at Top of Freeboard = 11.80 acre-ft

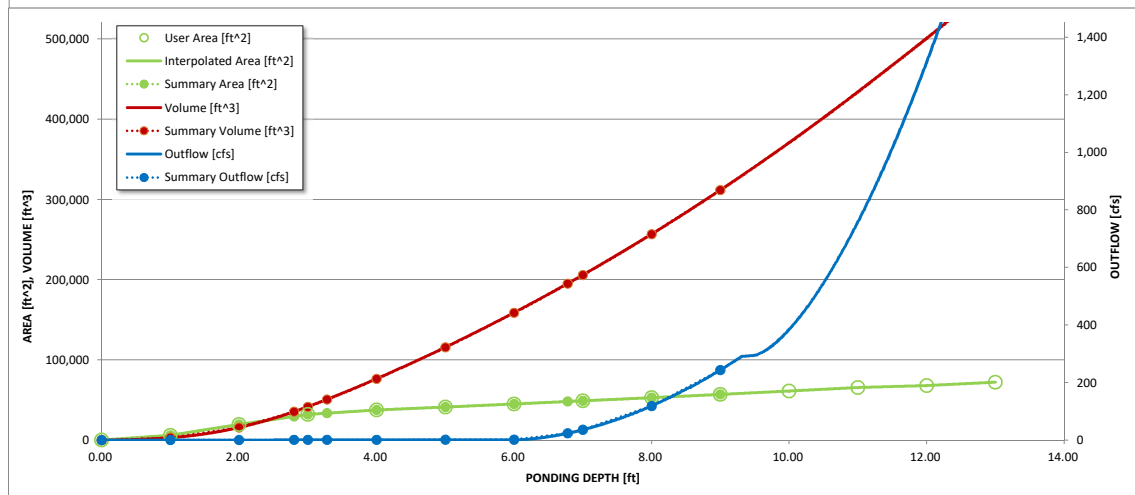
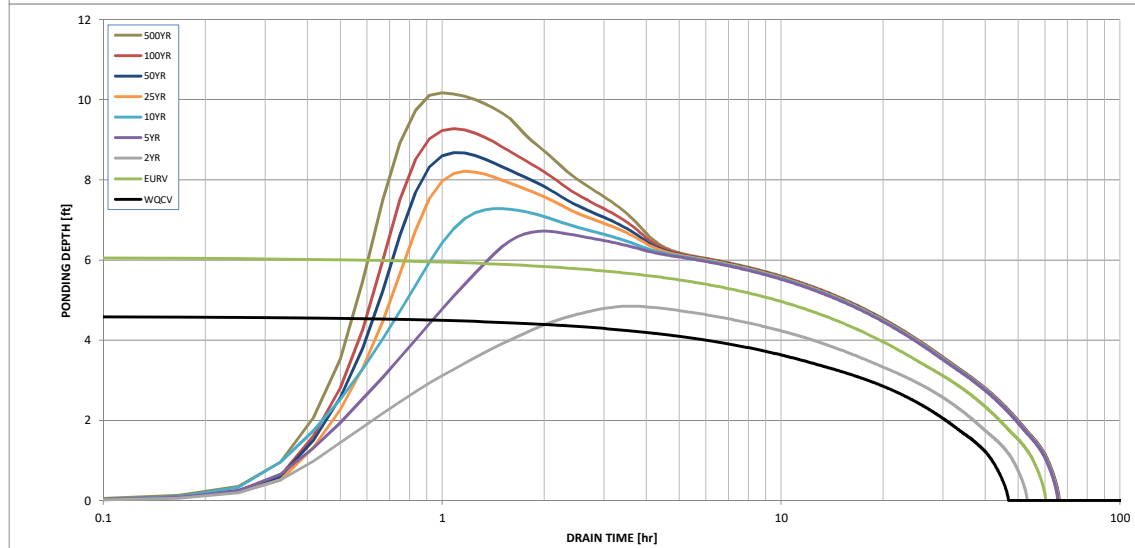
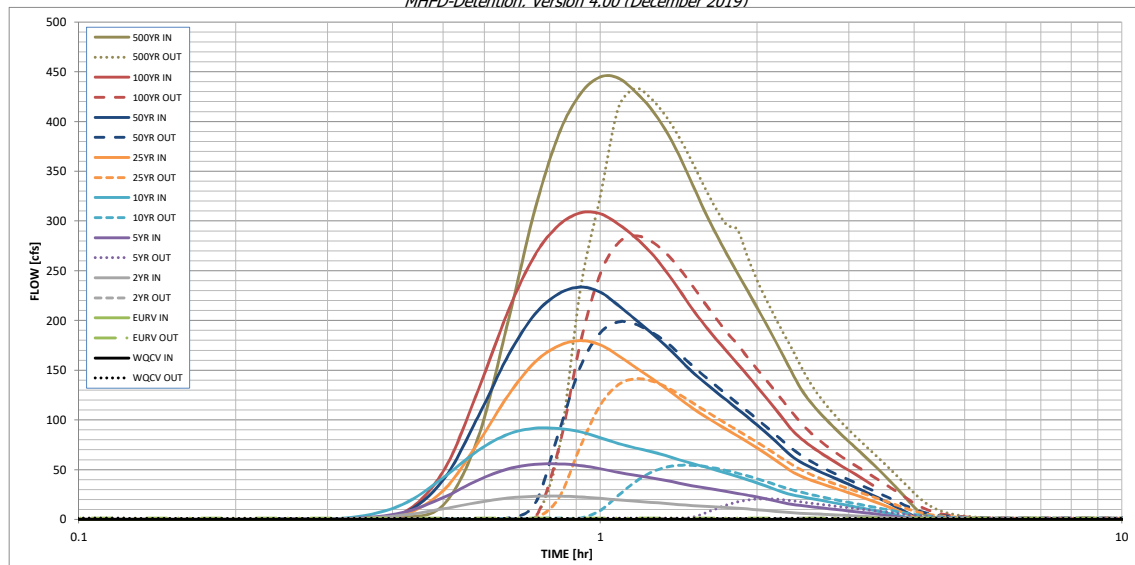
Routed Hydrograph Results

The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AF).

	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
Design Storm Return Period =	N/A	N/A	1.19	1.50	1.75	2.00	2.25	2.52	3.14
One-Hour Rainfall Depth (in) =	N/A	N/A	2.802	6.573	10.859	20.281	26.707	36.815	54.041
CUHP Runoff Volume (acre-ft) =	N/A	N/A	2.802	6.573	10.859	20.281	26.707	36.815	54.041
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	3.7	30.4	64.6	150.7	203.5	280.5	416.0
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	0.01	0.09	0.18	0.43	0.58	0.80	1.19
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A	23.4	55.7	91.6	179.7	233.5	308.1	444.7
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	1.2	20.7	54.4	141.3	198.4	285.0	433.1
Peak Inflow Q (cfs) =	N/A	N/A	0.7	0.8	0.9	1.0	1.0	1.0	1.0
Peak Outflow Q (cfs) =	N/A	N/A	0.7	0.8	0.9	1.0	1.0	1.0	1.0
Ratio Peak Outflow to Predevelopment Q =	Plate	Overflow Weir 1	Plate	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Spillway
Structure Controlling Flow =	N/A	N/A	N/A	0.1	0.4	1.0	1.4	2.0	2.1
Max Velocity through Gate 1 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Max Velocity through Gate 2 (fps) =	42	53	48	55	51	44	40	35	27
Time to Drain 97% of Inflow Volume (hours) =	45	57	51	61	59	55	53	50	46
Time to Drain 99% of Inflow Volume (hours) =	4.61	6.07	4.85	6.72	7.28	8.21	8.68	9.28	10.17
Maximum Ponding Depth (ft) =	0.91	1.04	0.93	1.10	1.15	1.23	1.28	1.33	1.42
Area at Maximum Ponding Depth (acres) =	2.290	3.714	2.511	4.398	5.039	6.146	6.736	7.506	8.745
Maximum Volume Stored (acre-ft) =									

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.00 (December 2019)



S-A-V-D Chart Axis Override	X-axis	Left Y-Axis	Right Y-Axis
minimum bound			
maximum bound			

DETENTION BASIN OUTLET STRUCTURE DESIGN

Outflow Hydrograph Workbook Filename:

Inflow Hydrographs

The user can override the calculated inflow hydrographs from this workbook with inflow hydrographs developed in a separate program.

Time Interval	SOURCE	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP
	TIME	WQCV [cfs]	EURV [cfs]	2 Year [cfs]	5 Year [cfs]	10 Year [cfs]	25 Year [cfs]	50 Year [cfs]	100 Year [cfs]	500 Year [cfs]
5.00 min	0:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.05
	0:15:00	0.00	0.00	0.13	0.22	0.27	0.19	0.26	0.23	0.41
	0:20:00	0.00	0.00	0.70	1.03	1.91	0.80	0.98	0.99	1.99
	0:25:00	0.00	0.00	4.05	6.62	14.64	3.93	5.22	5.86	14.30
	0:30:00	0.00	0.00	10.59	21.88	41.83	28.88	39.54	48.08	81.91
	0:35:00	0.00	0.00	17.09	39.51	69.21	76.76	103.22	129.56	199.96
	0:40:00	0.00	0.00	21.42	50.84	85.74	124.91	164.83	209.85	311.38
	0:45:00	0.00	0.00	23.26	55.39	91.58	158.09	206.35	265.79	387.19
	0:50:00	0.00	0.00	23.43	55.73	91.37	174.59	226.89	295.75	427.74
	0:55:00	0.00	0.00	22.60	54.20	87.99	179.69	233.50	308.15	444.73
	1:00:00	0.00	0.00	21.09	50.99	82.12	175.52	228.49	307.36	443.68
	1:05:00	0.00	0.00	19.58	47.22	76.30	164.74	215.25	296.89	430.21
	1:10:00	0.00	0.00	18.33	44.40	71.93	153.13	201.32	283.81	413.28
	1:15:00	0.00	0.00	17.16	41.96	68.16	142.50	188.13	268.44	391.95
	1:20:00	0.00	0.00	16.00	39.30	64.26	132.29	174.98	250.51	366.18
	1:25:00	0.00	0.00	14.87	36.45	60.01	122.00	161.53	231.17	338.13
	1:30:00	0.00	0.00	13.96	33.90	56.25	112.10	148.57	212.08	310.76
	1:35:00	0.00	0.00	13.21	31.96	52.94	104.00	137.94	195.94	287.45
	1:40:00	0.00	0.00	12.50	30.03	49.64	96.86	128.39	181.69	266.65
	1:45:00	0.00	0.00	11.83	28.10	46.33	90.29	119.57	168.78	247.80
	1:50:00	0.00	0.00	11.16	26.19	43.06	83.95	111.08	156.61	230.01
	1:55:00	0.00	0.00	10.46	24.30	39.85	77.88	102.92	144.90	212.87
	2:00:00	0.00	0.00	9.73	22.42	36.66	71.85	94.85	133.46	196.17
	2:05:00	0.00	0.00	8.94	20.50	33.43	65.81	86.82	122.23	179.75
	2:10:00	0.00	0.00	8.12	18.55	30.15	59.74	78.80	111.18	163.53
	2:15:00	0.00	0.00	7.29	16.62	27.00	53.67	70.78	100.15	147.40
	2:20:00	0.00	0.00	6.67	15.07	24.72	47.94	63.30	89.82	132.66
	2:25:00	0.00	0.00	6.21	14.10	23.11	43.84	58.01	82.20	121.64
	2:30:00	0.00	0.00	5.79	13.19	21.64	40.65	53.80	76.06	112.54
	2:35:00	0.00	0.00	5.42	12.32	20.22	37.96	50.19	70.67	104.47
	2:40:00	0.00	0.00	5.06	11.50	18.86	35.48	46.87	65.80	97.17
	2:45:00	0.00	0.00	4.71	10.71	17.53	33.22	43.83	61.30	90.40
	2:50:00	0.00	0.00	4.37	9.94	16.25	31.01	40.87	57.03	84.03
	2:55:00	0.00	0.00	4.04	9.19	15.00	28.84	37.99	53.02	78.06
	3:00:00	0.00	0.00	3.72	8.47	13.79	26.71	35.19	49.23	72.44
	3:05:00	0.00	0.00	3.41	7.76	12.62	24.62	32.42	45.47	66.87
	3:10:00	0.00	0.00	3.10	7.07	11.48	22.54	29.69	41.74	61.34
	3:15:00	0.00	0.00	2.80	6.38	10.35	20.48	26.97	38.01	55.82
	3:20:00	0.00	0.00	2.50	5.70	9.23	18.42	24.26	34.28	50.31
	3:25:00	0.00	0.00	2.20	5.03	8.12	16.37	21.55	30.56	44.81
	3:30:00	0.00	0.00	1.91	4.36	7.01	14.32	18.86	26.85	39.32
	3:35:00	0.00	0.00	1.62	3.69	5.91	12.27	16.16	23.14	33.84
	3:40:00	0.00	0.00	1.34	3.02	4.81	10.23	13.47	19.43	28.38
	3:45:00	0.00	0.00	1.06	2.36	3.72	8.20	10.79	15.74	22.93
	3:50:00	0.00	0.00	0.78	1.72	2.65	6.18	8.13	12.05	17.51
	3:55:00	0.00	0.00	0.52	1.11	1.69	4.19	5.51	8.43	12.27
	4:00:00	0.00	0.00	0.38	0.70	1.15	2.44	3.26	5.30	7.97
	4:05:00	0.00	0.00	0.30	0.56	0.93	1.47	2.05	3.46	5.40
	4:10:00	0.00	0.00	0.25	0.46	0.76	0.94	1.34	2.31	3.71
	4:15:00	0.00	0.00	0.22	0.37	0.62	0.64	0.91	1.52	2.50
	4:20:00	0.00	0.00	0.18	0.30	0.50	0.44	0.62	0.97	1.64
	4:25:00	0.00	0.00	0.15	0.24	0.39	0.33	0.45	0.58	1.03
	4:30:00	0.00	0.00	0.13	0.19	0.30	0.25	0.32	0.32	0.61
	4:35:00	0.00	0.00	0.11	0.14	0.22	0.18	0.22	0.18	0.38
	4:40:00	0.00	0.00	0.09	0.11	0.16	0.14	0.16	0.13	0.30
	4:45:00	0.00	0.00	0.07	0.09	0.12	0.10	0.12	0.10	0.23
	4:50:00	0.00	0.00	0.05	0.07	0.09	0.08	0.09	0.08	0.19
	4:55:00	0.00	0.00	0.04	0.05	0.07	0.06	0.07	0.06	0.14
	5:00:00	0.00	0.00	0.03	0.04	0.05	0.04	0.05	0.05	0.11
	5:05:00	0.00	0.00	0.02	0.03	0.03	0.03	0.04	0.03	0.07
	5:10:00	0.00	0.00	0.01	0.02	0.02	0.02	0.02	0.02	0.05
	5:15:00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.03
	5:20:00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01
	5:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.03 (May 2020)

The user can create a summary S-A-V-D by entering the desired stage increments and the remainder of the table will populate automatically.

The user should graphically compare the summary S-A-V-D table to the full S-A-V-D table in the chart to confirm it captures all key transition points.

St.	St.	Stone	Area	Area	Volume	Volume	Total
-----	-----	-------	------	------	--------	--------	-------

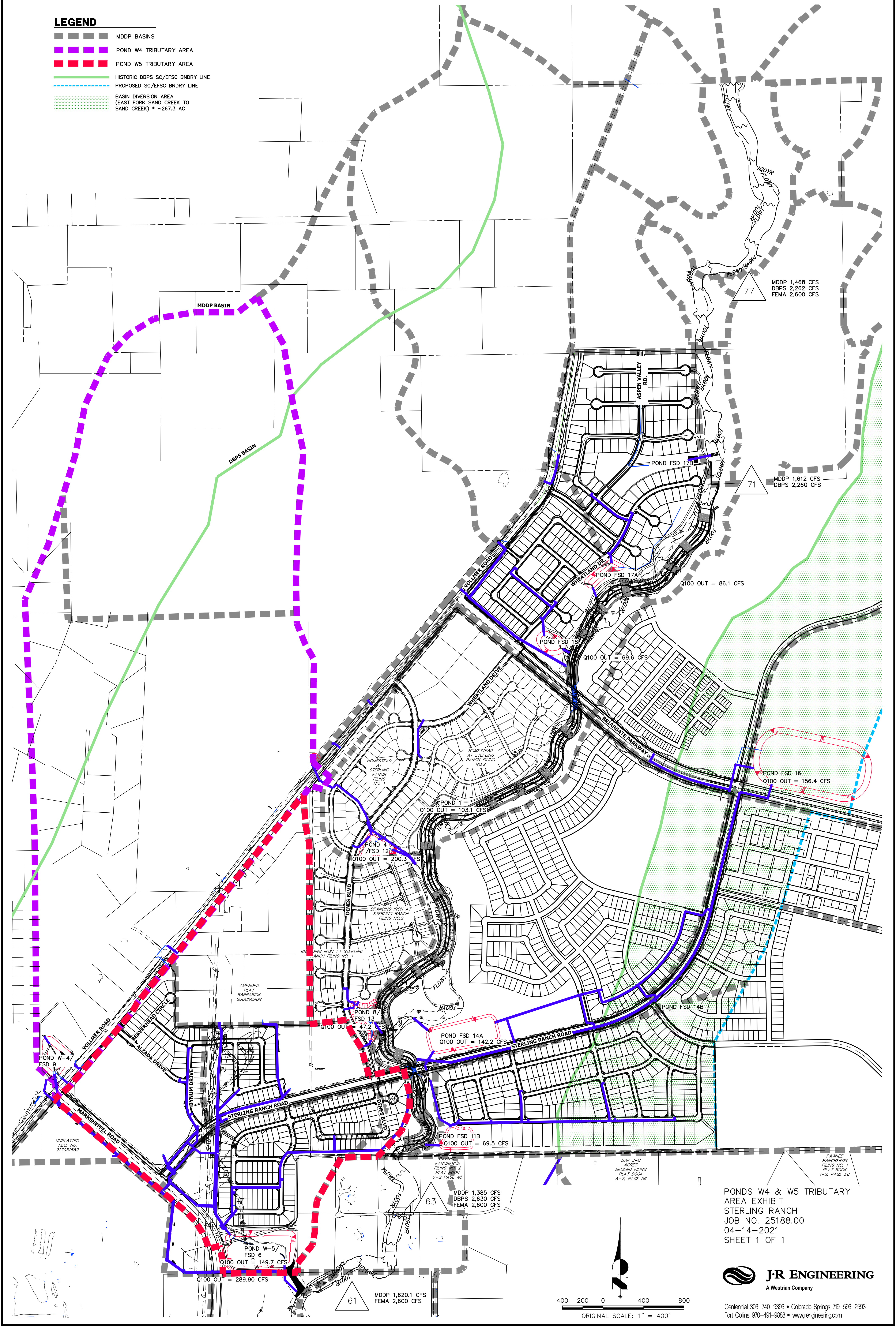
[illegible]

STERLING RANCH

PONDS W4 & W5 TRIBUTARY AREA EXHIBIT

LEGEND

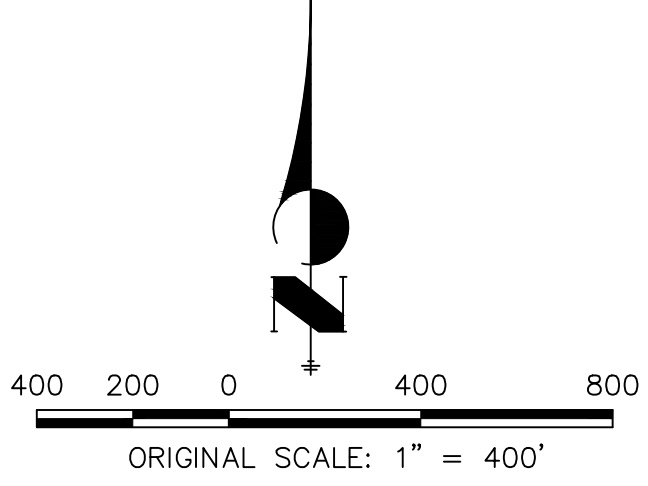
- MDDP BASINS
- POND W4 TRIBUTARY AREA
- POND W5 TRIBUTARY AREA
- HISTORIC DBPS SC/EFSC BNDRY LINE
- PROPOSED SC/EFSC BNDRY LINE
- BASIN DIVERSION AREA (EAST FORK SAND CREEK TO SAND CREEK) • ~267.3 AC



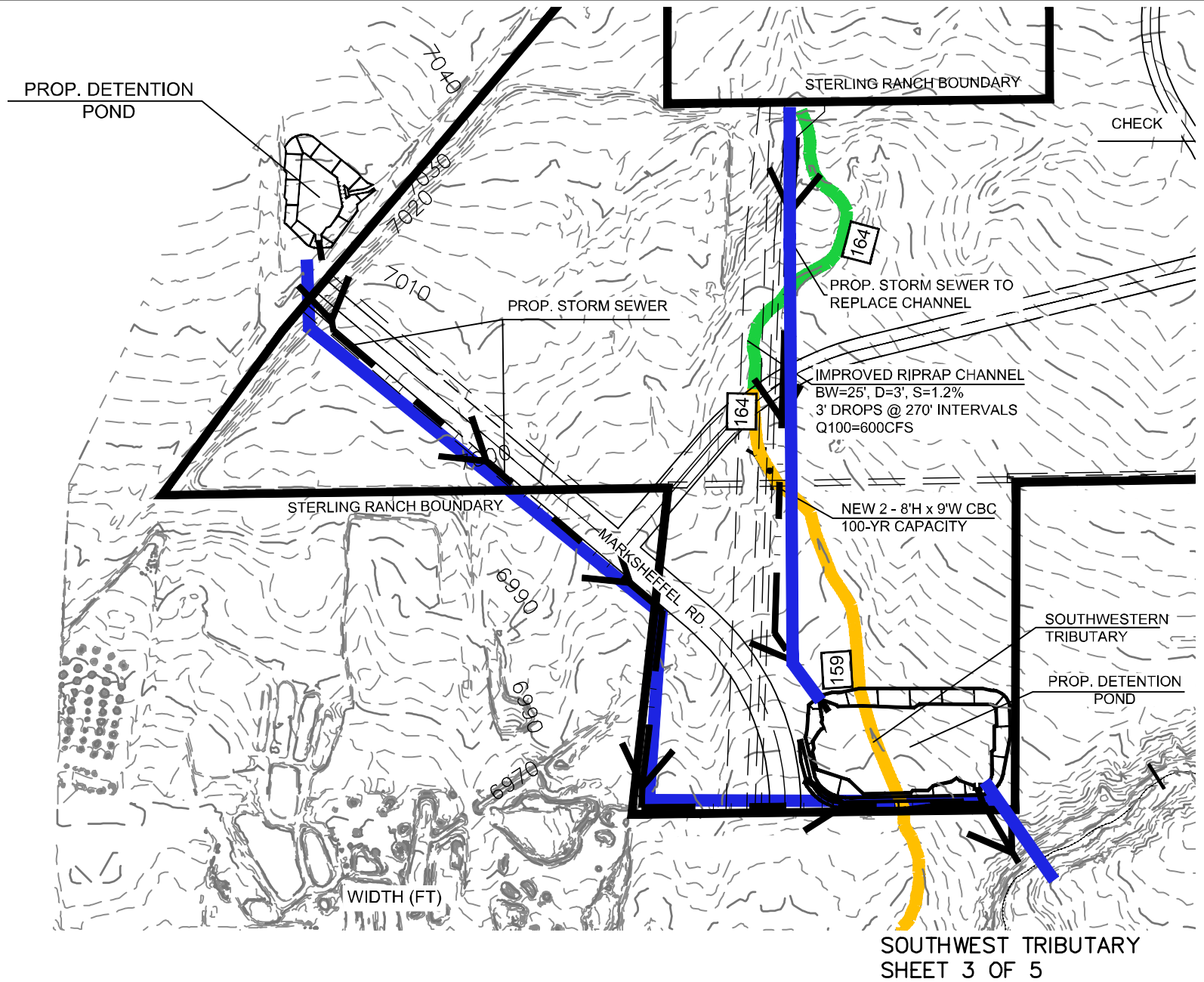
PONDS W4 & W5 TRIBUTARY
AREA EXHIBIT
STERLING RANCH
JOB NO. 25188.00
04-14-2021
SHEET 1 OF 1



Centennial 303-740-9393 • Colorado Springs 719-593-2593
Fort Collins 970-491-9888 • www.jrengineering.com



X:\25188\Drawings\Presentations\2021-4-14 Ponds W4 & W5 Tributary Area.dwg, 24/06 Title Portal, 03/23/2021 12:23:00 PM, FC



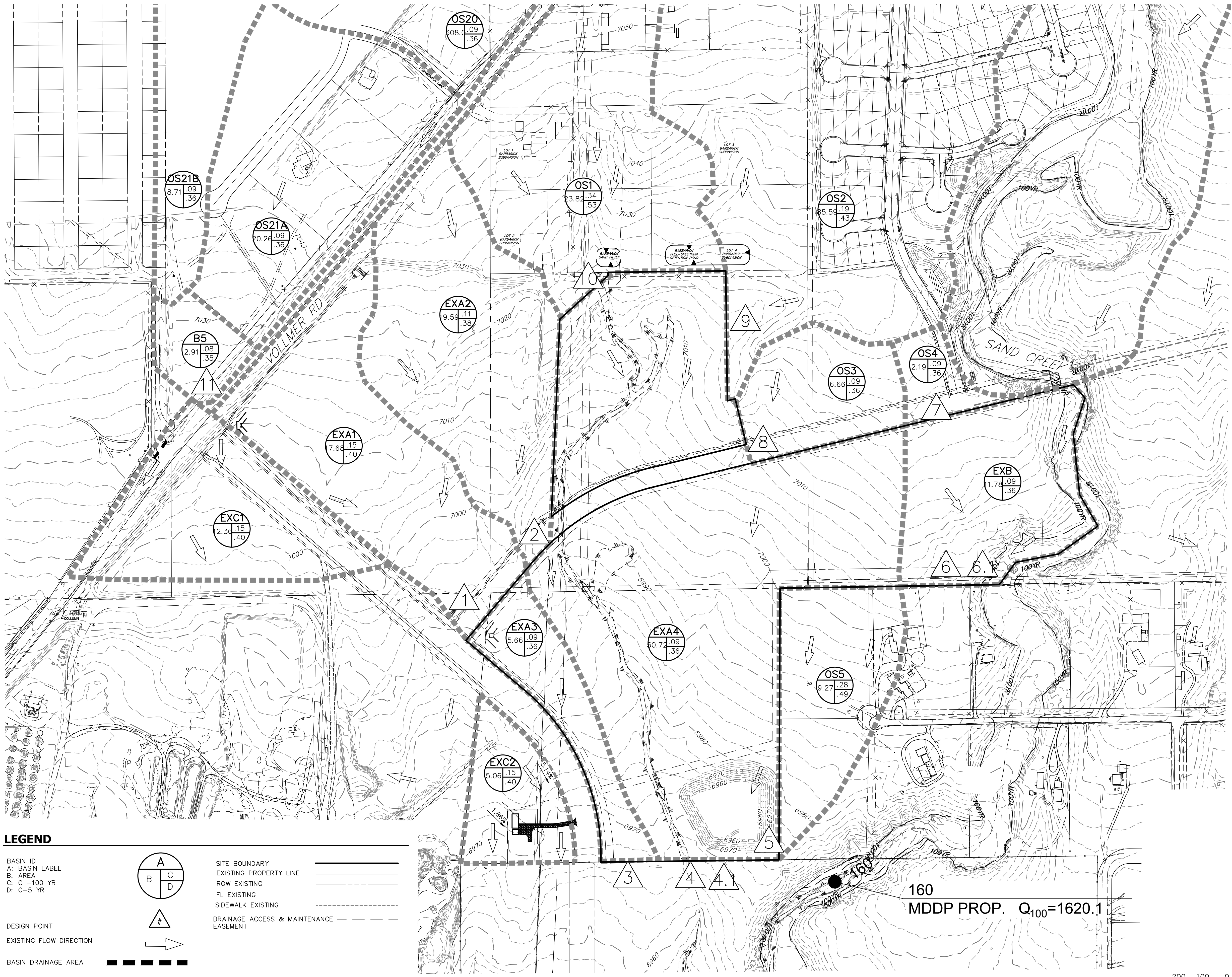
J·R ENGINEERING
A Westrian Company

Centennial 303-740-9393 • Colorado Springs 719-593-2593
Fort Collins 970-491-9888 • www.jrengineering.com

APPENDIX E
DRAINAGE MAPS & PLANS

STERLING RANCH

EXISTING DRAINAGE MAP

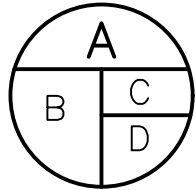


DESIGN POINT		
DP	Q5	Q100
Total	Total	Total
1	7.2	12.1
2	5.4	9.0
3	1.4	2.3
4	10.6	17.8
5	7.5	23.4
6	3.0	5.0
7	0.5	0.9
8	1.8	3.1
9	37.3	62.6
10	23.9	40.1
4.1	45.6	76.5
6.1	3.0	5.1
11	56.9	215.3

BASIN SUMMARY TABLE							
Tributary Sub-basin	Area (acres)	Percent Impervious	C _s	C ₁₀₀	t _c (min)	Q _s (cfs)	Q ₁₀₀ (cfs)
EXA1	17.68	9%	0.15	0.40	25.4	7.2	12.1
EXA2	19.59	5%	0.11	0.38	31.5	5.4	9.0
EXA3	5.66	2%	0.09	0.36	26.4	1.4	2.3
EXA4	50.72	2%	0.09	0.36	33.2	10.6	17.8
EXC1	12.36	2%	0.09	0.36	22.0	3.3	5.5
EXC2	5.06	2%	0.09	0.36	20.6	1.4	2.3
EXB	11.78	2%	0.09	0.36	23.8	3.0	5.0
OS1	23.82	45%	0.34	0.53	22.4	23.9	40.1
OS2	85.59	18%	0.19	0.43	34.1	37.3	62.6
OS3	6.66	2%	0.09	0.36	20.3	1.8	3.1
OS4	2.19	2%	0.09	0.36	26.6	0.5	0.9
OS5	9.27	9%	0.28	0.49	22.8	7.5	23.4
B5	2.91	26%	0.79	1.19	5.0	11.8	19.9
OS20	308.00	9%	0.13	0.40	68.9	61.0	310.0
OS21A	20.26	12%	0.13	0.40	53.5	4.2	7.1
OS21B	8.71	12%	0.13	0.40	24.5	3.1	5.3

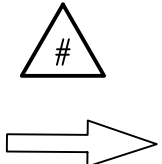
LEGEND

BASIN ID
A: BASIN LABEL
B: AREA
C: C-100 YR
D: C-5 YR



SITE BOUNDARY
EXISTING PROPERTY LINE
ROW EXISTING
FL EXISTING
SIDEWALK EXISTING
DRAINAGE ACCESS & MAINTENANCE
EASEMENT

DESIGN POINT
EXISTING FLOW DIRECTION



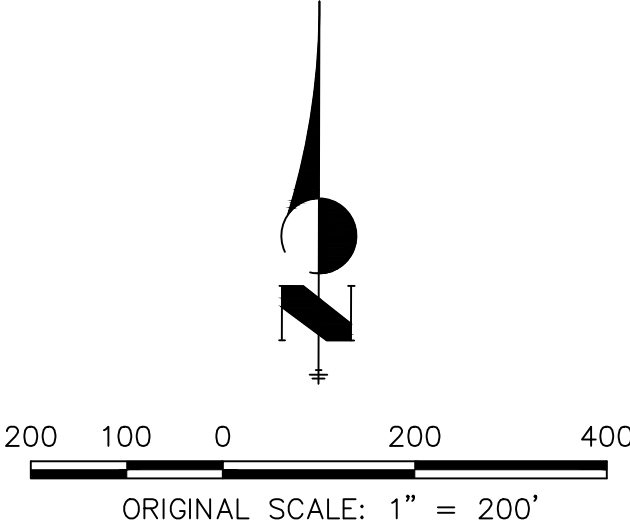
BASIN DRAINAGE AREA



EXISTING CONTOURS



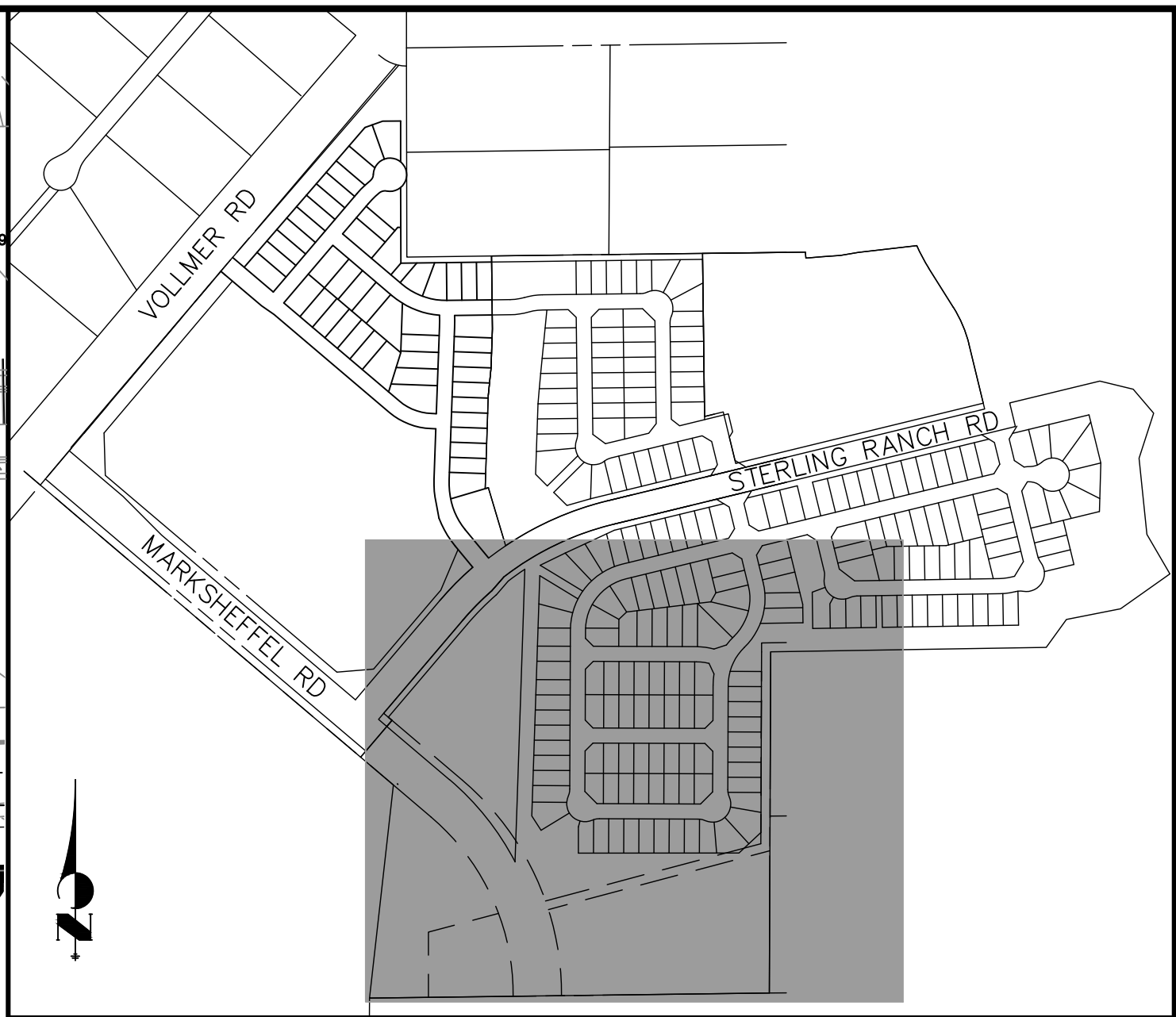
160
MDDP PROP. Q₁₀₀=1620.1



STERLING RANCH FILING 2
EXISTING DRAINAGE MAP
JOB NO. 25188.00
04/19/21
SHEET 1 OF 1



Centennial 303-740-9393 • Colorado Springs 719-593-2593
Fort Collins 970-491-9888 • www.jrengineering.com



DESIGN POINT			
DP	Q5	Q100	Q100
	Total	Total	Total
1	4.4	9.4	
2	1.9	3.9	
3	11.1	24.7	
4	3.7	7.4	
5	4.1	10.6	
6	3.3	6.7	
7	27.5	60.6	
8	3.0	12.5	
9	1.9	4.8	
10	9.2	17.3	
11	9.5	19.9	
12	1.9	9.5	
13	15.7	34.6	
14	16.0	37.9	
15	5.4	11.7	
16	4.4	9.5	
17	1.4	4.7	
18	4.3	14.0	
19	38.8	85.4	
20	7.1	13.4	
21	7.4	15.2	
22	2.7	15.4	
23	8.8	15.8	
24	11.5	20.6	
25	61.0	310.9	
26	4.2	21.9	
27	6.3	11.7	
28	6.9	14.4	
29	3.1	16.3	
30	0.9	6.4	
31	2.0	15.0	
32	1.4	10.0	
1.0	6.0	10.3	
1.1	12.6	19.7	
1.2	17.6	28.2	
1.3	25.9	46.9	
1.3A	5.0	8.7	
1.4	52.5	105.9	
1.5	55.1	103.9	
1.6	56.4	107.7	
1.7	17.3	25.3	
1.8	68.8	125.0	
2.0	23.2	74.5	
2.1	38.1	106.6	
2.2	56.9	138.7	
2.3	9.6	17.2	
2.4	63.7	151.9	
2.5	96.6	250.7	
2.6	97.8	250.4	
2.7	192.0	396.8	
2.8	189.8	424.4	
2.9	14.2	22.5	
3.0	199.8	424.4	
3.1	14.2	22.5	
3.2	187.5	428.2	
4.0	18.4	24.1	
4.1	56.2	204.7	
4.2	12.7	26.0	
4.3	49.1	201.3	
4.4	9.1	3.1	
4.5	51.1	51.1	
4.6	56.5	207.7	
4.7	58.4	248.6	
4.8	59.8	320.3	
OS2	19.8	28.1	
OS3	17.6	48.5	
OS4	2.6	8.5	
D1	3.31	6.30	
D2	1.63	2.97	

BASIN SUMMARY TABLE									
Tributary	Area	Percent	C _s	C ₁₀₀	t _c	Q _s	Q ₁₀₀		
Sub-basin	(acres)	(%)			(min)	(cfs)	(cfs)		
A1	2.06	66%	0.51	0.65	9.7	4.4	9.4		
A2	0.92	69%	0.53	0.66	9.1	1.9	3.9		
A3	6.76	60%	0.47	0.62	15.0	11.1	24.7		
A4	1.51	77%	0.60	0.71	10.2	3.7	7.4		
A5	1.70	76%	0.59	0.70	9.9	4.1	8.3		
A6	1.37	75%	0.58	0.70	10.0	3.3	6.6		
AGA	0.53	95%	0.81	0.88	5.0	2.2	4.1		
A7	19.00	65%	0.45	0.59	18.3	27.5	60.6		
A8	1.48	63%	0.56	0.70	13.9	3.0	6.3		
A9	0.61	79%	0.73	0.83	8.7	1.9	3.7		
A10	2.61	86%	0.79	0.88	7.9	9.2	17.3		
A11	2.89	83%	0.76	0.86	8.7	9.5	18.1		
A12	3.87	8%	0.13	0.38	11.9	1.9	9.5		
A13	9.65	65%	0.45	0.59	14.0	15.7	34.6		
A14	11.76	55%	0.39	0.55	15.3	16.0	37.9		
A15	2.91	54%	0.52	0.68	14.9	5.4	11.7		
A16	2.34	56%	0.54	0.69	14.7	4.4	9.6		
A17	1.76	24%	0.21	0.44	13.7	1.4	4.7		
A18	5.27	21%	0.24	0.47	16.4	4.3	14.0		
A19	31.85	67%	0.45	0.59	25.8	38.8	85.4		
A20	1.83	89%	0.81	0.89	8.0	6.6	12.2		
A21	1.93	90%	0.82	0.90	8.7	6.8	12.6		
A22	8.68	5%	0.11	0.37	23.3	2.7	15.4		
B1	2.98	100%	0.90	0.96	17.6	8.8	15.8		
B2	3.89	100%	0.90	0.96	17.6	11.5	20.6		
B3	1.53	100%	0.90	0.96	9.4	5.8	10.4		
B4	1.50	100%	0.90	0.96	9.4	5.7	10.2		
B5	2.91	5%	0.08	0.35	13.1	0.9	6.4		
C1	8.01	95%	0.81	0.88	9.9	2.0	15.0		
C2	5.06	95%	0.81	0.88	7.9	1.4	10.0		
OS20	308.00	9%	0.13	0.40	68.9	61.0	310.0		
OS21A	20.26	12%	0.13	0.40	53.5	4.2	21.9		
OS21B	8.71	12%	0.13	0.40	24.5	3.1	16.3		
OS2	17.00	70%	0.49	0.62	36.0	13.8	39.1		
OS3	28.70	70%	0.49	0.62	52.6	17.6	48.9		
OS4	5.08	15%	0.20	0.40	29.5	2.6	8.5		
D1	0.45	95%	0.81	0.88	7.0	1.7	3.1		
D2	0.43	95%	0.81	0.88	7.0	1.6	3.0		

LEGEND:

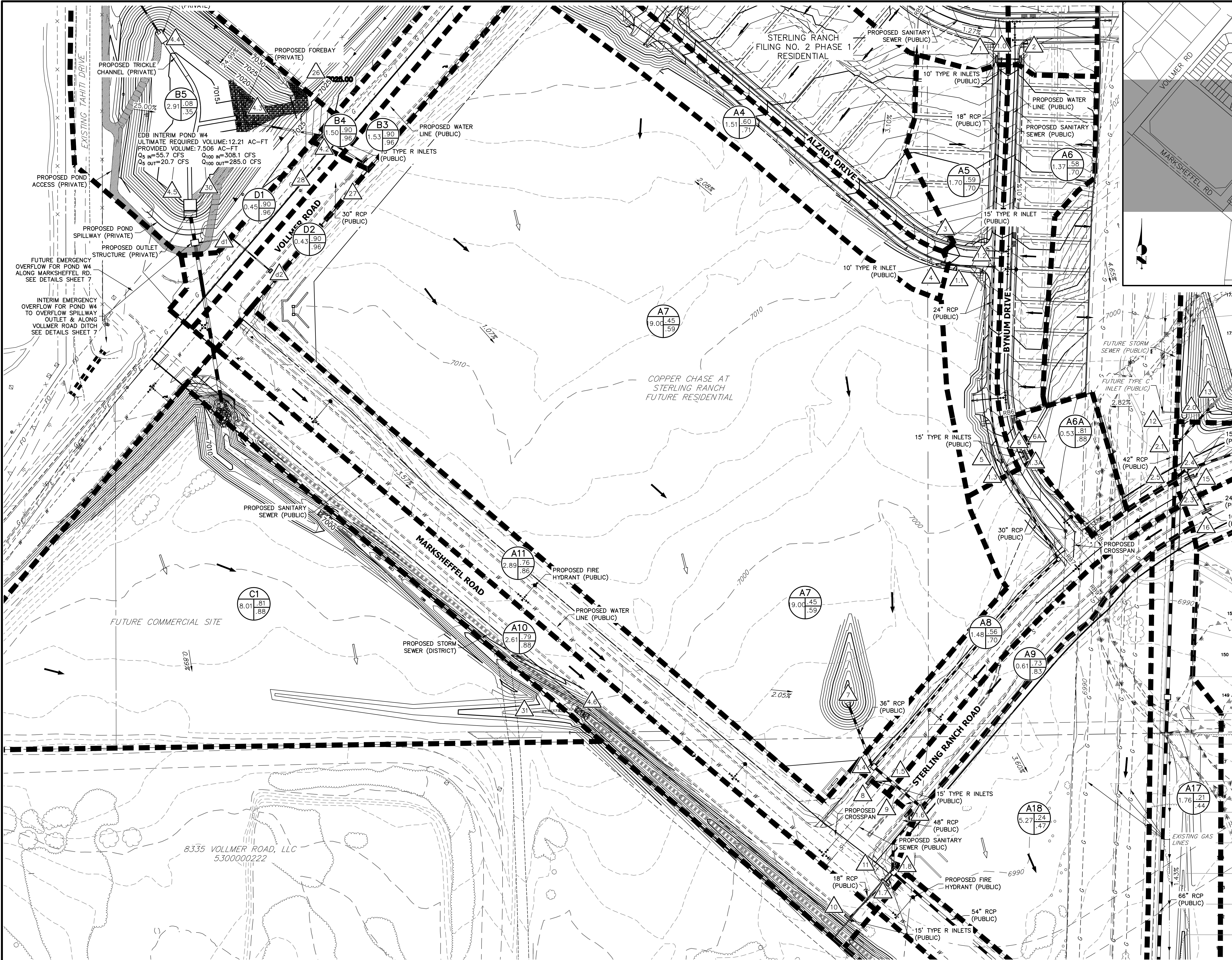
- PROPOSED STORM SEWER
- 5000 FUTURE RD MAJOR CONTOUR
- 5000 FUTURE RD MINOR CONTOUR
- PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- 5000 EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- DRAINAGE BASIN
- A = BASIN DESIGNATION
- B = AREA IN ACRES
- C = 5-YR RUNOFF COEFFICIENT
- D = 100-YR RUNOFF COEFFICIENT
- DESIGN POINT
- HIP HIGH POINT
- LOW POINT
- DRAINAGE ARROW
- EXISTING DRAINAGE ARROW
- PROPOSED DRAINAGE SWALE

DRAINAGE MAP
STERLING RANCH FILING 2
JOB NO. 25188.01
6/23/21
SHEET 1 OF 7



Centennial 303-740-9393 • Colorado Springs 719-593-2593
Fort Collins 970-491-9888 • www.jrengineering.com





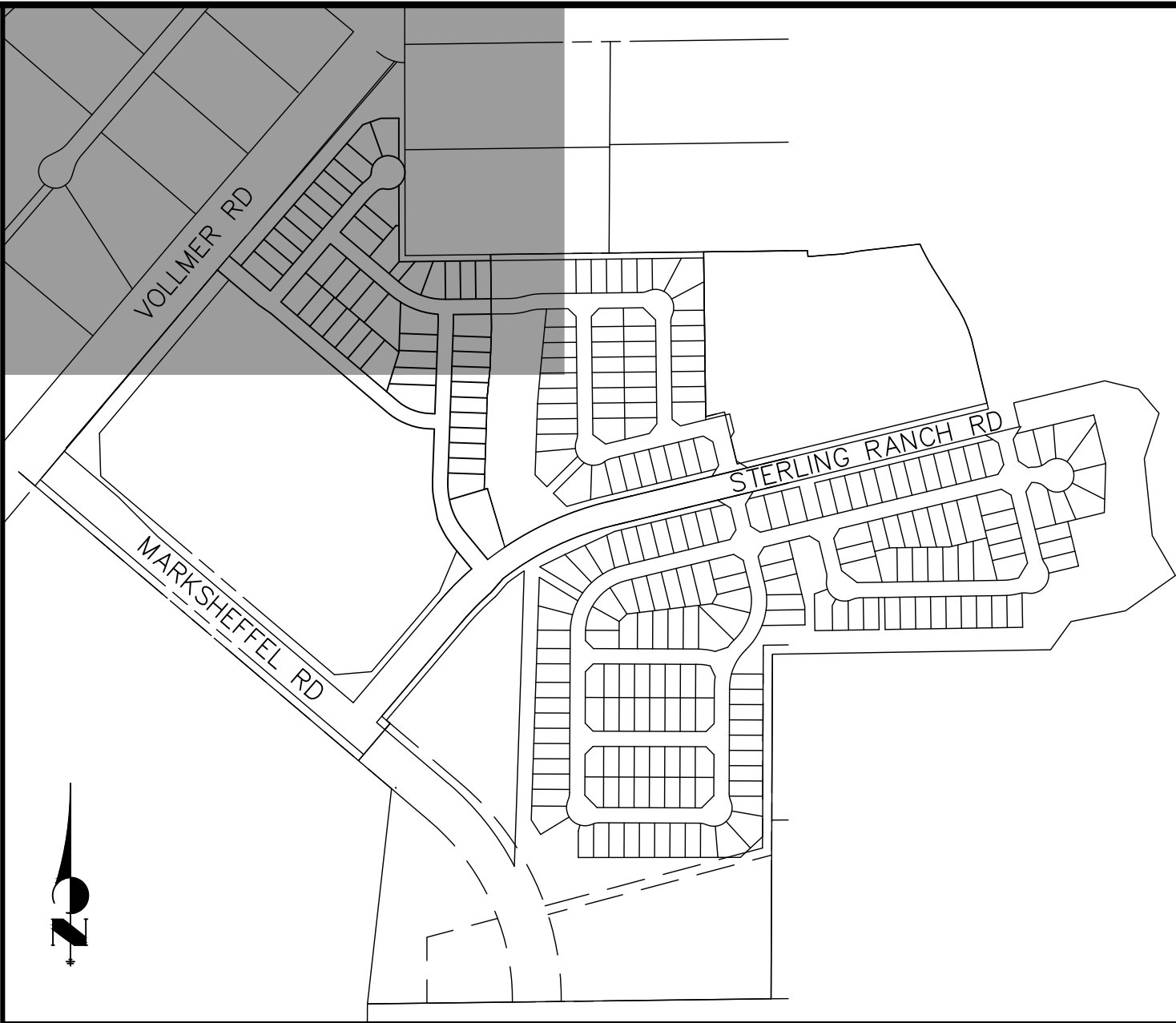
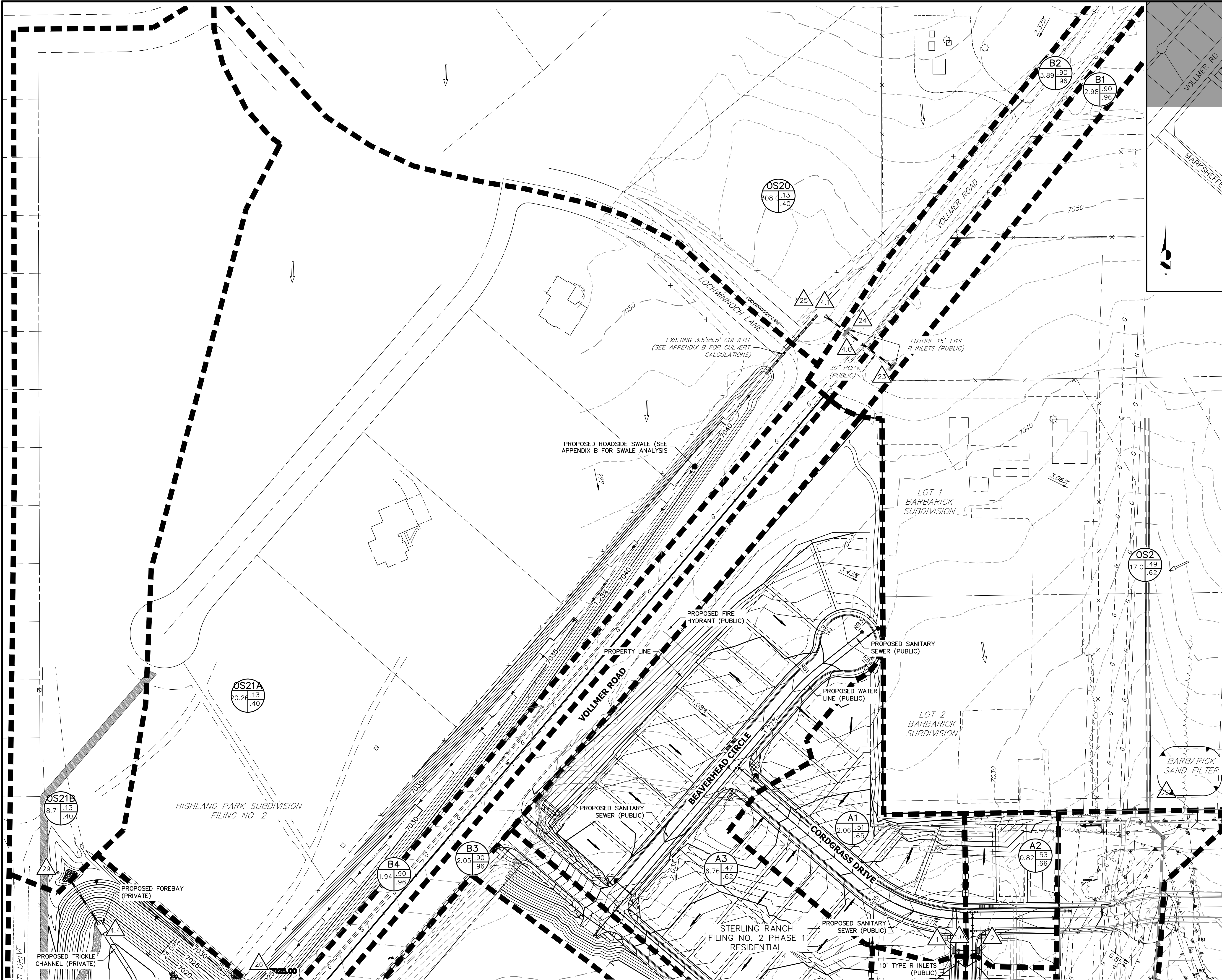
LEGEND:

- PROPOSED STORM SEWER
- 5000 FUTURE RD MAJOR CONTOUR
- 5000 FUTURE RD MINOR CONTOUR
- 5000 PROPOSED MAJOR CONTOUR
- 5000 PROPOSED MINOR CONTOUR
- 5000 EXISTING MAJOR CONTOUR
- 5000 EXISTING MINOR CONTOUR
- DRAINAGE BASIN

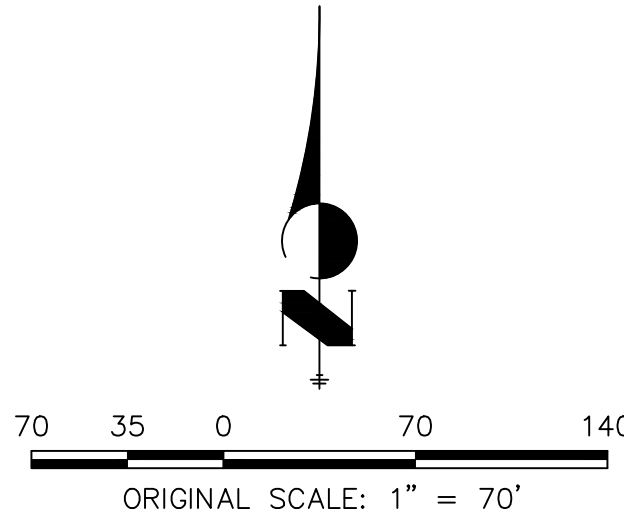
Symbol	Description
<div><div>A</div><div>B</div><div>C</div><div>D</div></div>	A = BASIN DESIGNATION B = AREA IN ACRES C = 5-YR RUNOFF COEFFICIENT D = 100-YR RUNOFF COEFFICIENT
<div>1</div>	DESIGN POINT
HP	HIGH POINT
LP	LOW POINT
<div>→</div>	DRAINAGE ARROW
<div>→</div>	EXISTING DRAINAGE ARROW
<div>→</div>	PROPOSED DRAINAGE SWALE

70 35 0 70 140
ORIGINAL SCALE: 1" = 70'

DRAINAGE MAP
STERLING RANCH FILING 2
JOB NO. 25188.01
6/23/21
SHEET 2 OF 7



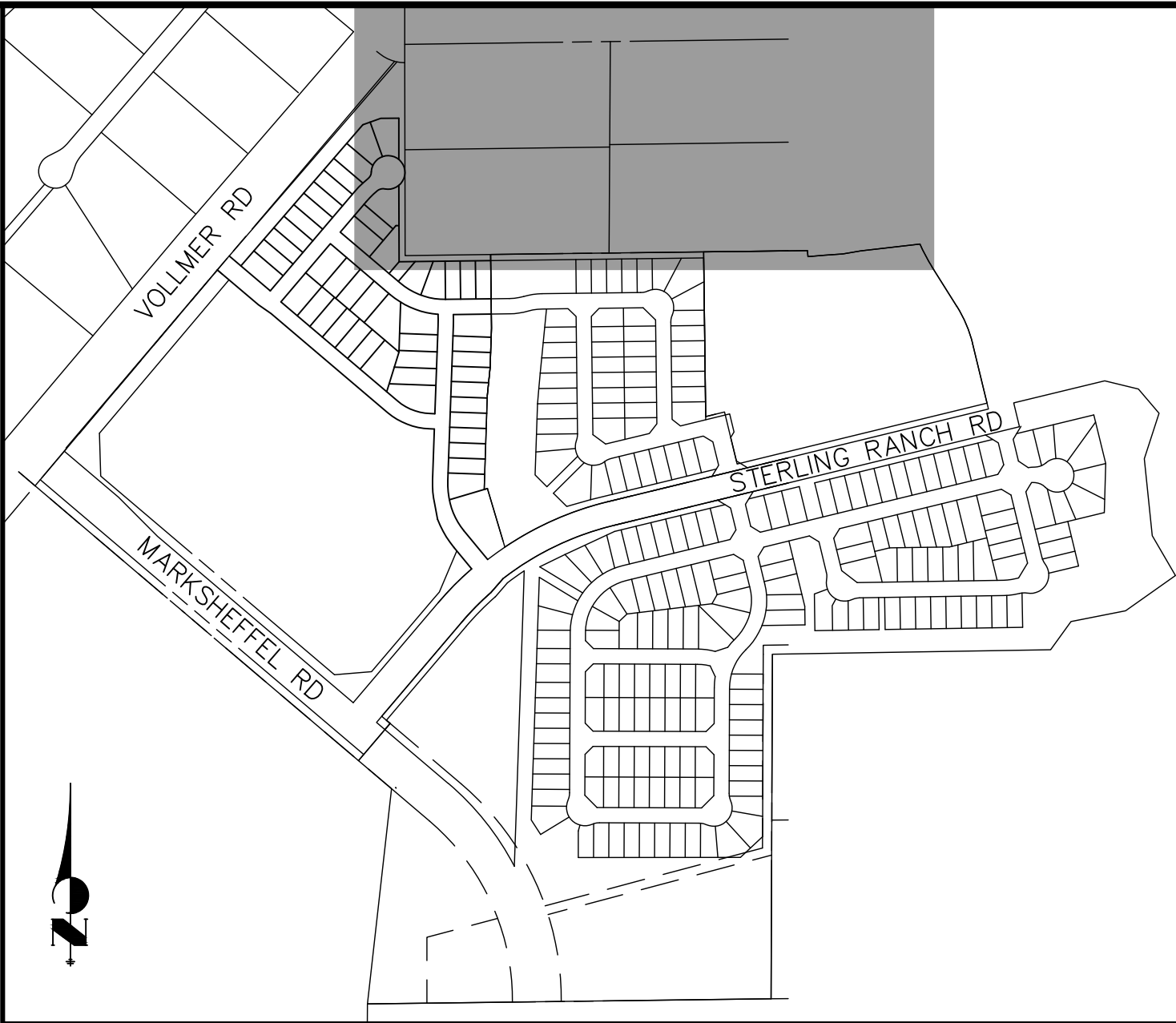
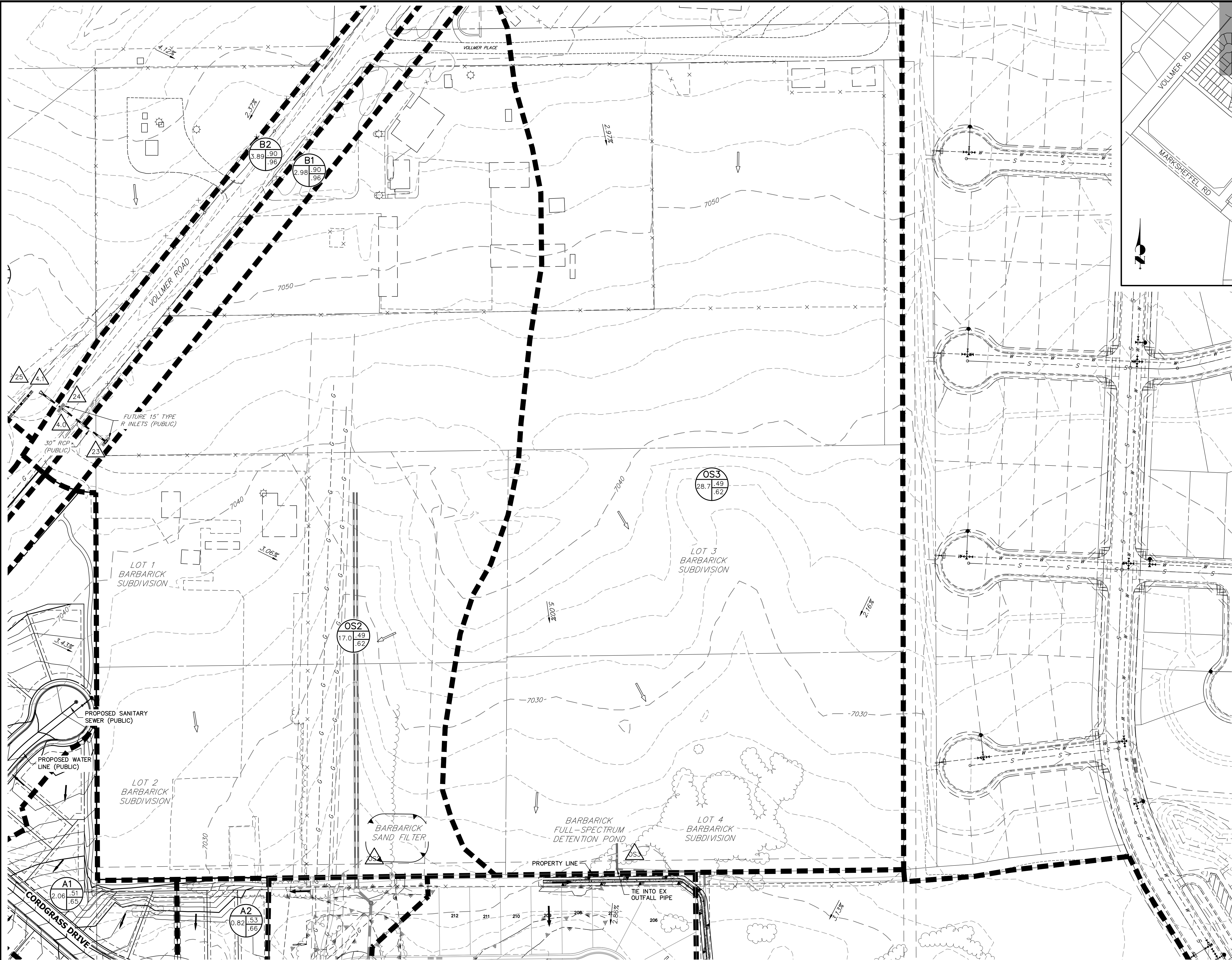
- LEGEND:**
- PROPOSED STORM SEWER
 - 5000 FUTURE RD MAJOR CONTOUR
 - 5000 FUTURE RD MINOR CONTOUR
 - 5000 PROPOSED MAJOR CONTOUR
 - 5000 PROPOSED MINOR CONTOUR
 - 5000 EXISTING MAJOR CONTOUR
 - 5000 EXISTING MINOR CONTOUR
 - DRAINAGE BASIN
- | A | B | C | D |
|---|---|---|---|
| A | B | C | D |
- A = BASIN DESIGNATION
B = AREA IN ACRES
C = 5-YR RUNOFF COEFFICIENT
D = 100-YR RUNOFF COEFFICIENT
- DESIGN POINT
 - HP HIGH POINT
 - LP LOW POINT
 - DRAINAGE ARROW
 - EXISTING DRAINAGE ARROW
 - PROPOSED DRAINAGE SWALE



DRAINAGE MAP
STERLING RANCH FILING 2
JOB NO. 25188.01
6/23/21
SHEET 4 OF 7

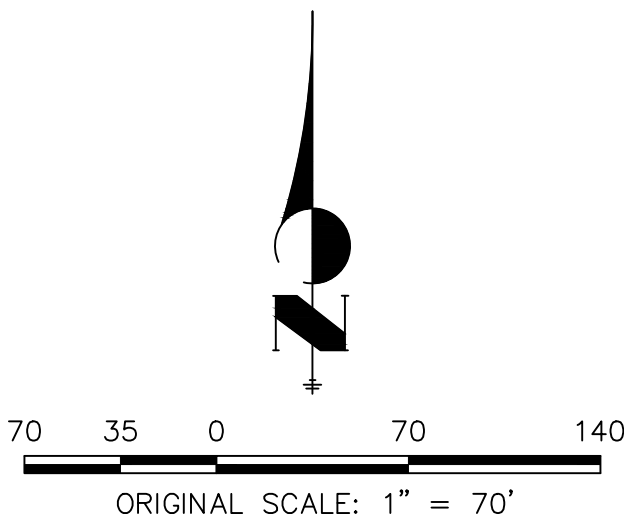


Centennial 303-740-9393 • Colorado Springs 719-593-2593
Fort Collins 970-491-9888 • www.jrengineering.com



LEGEND:

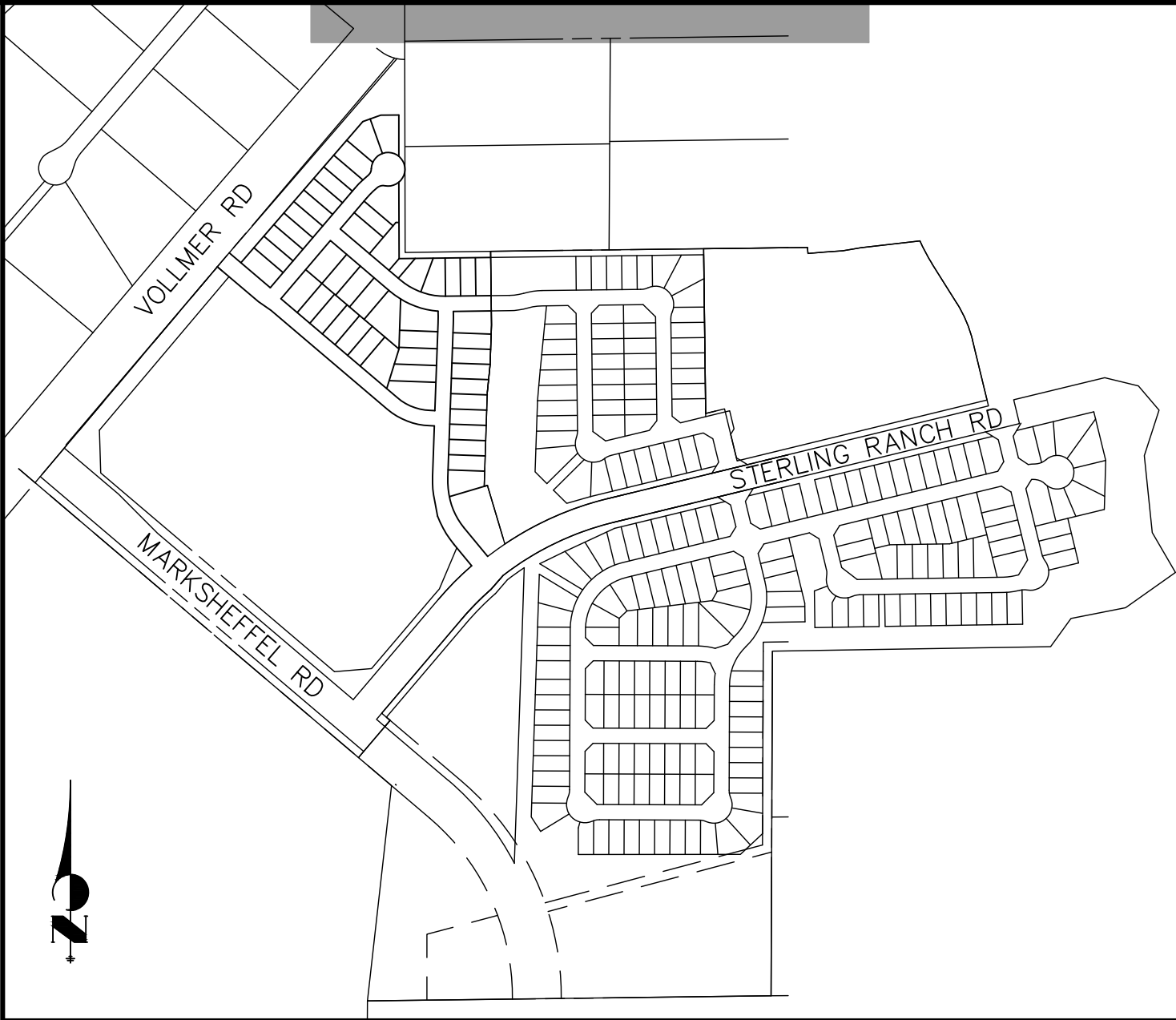
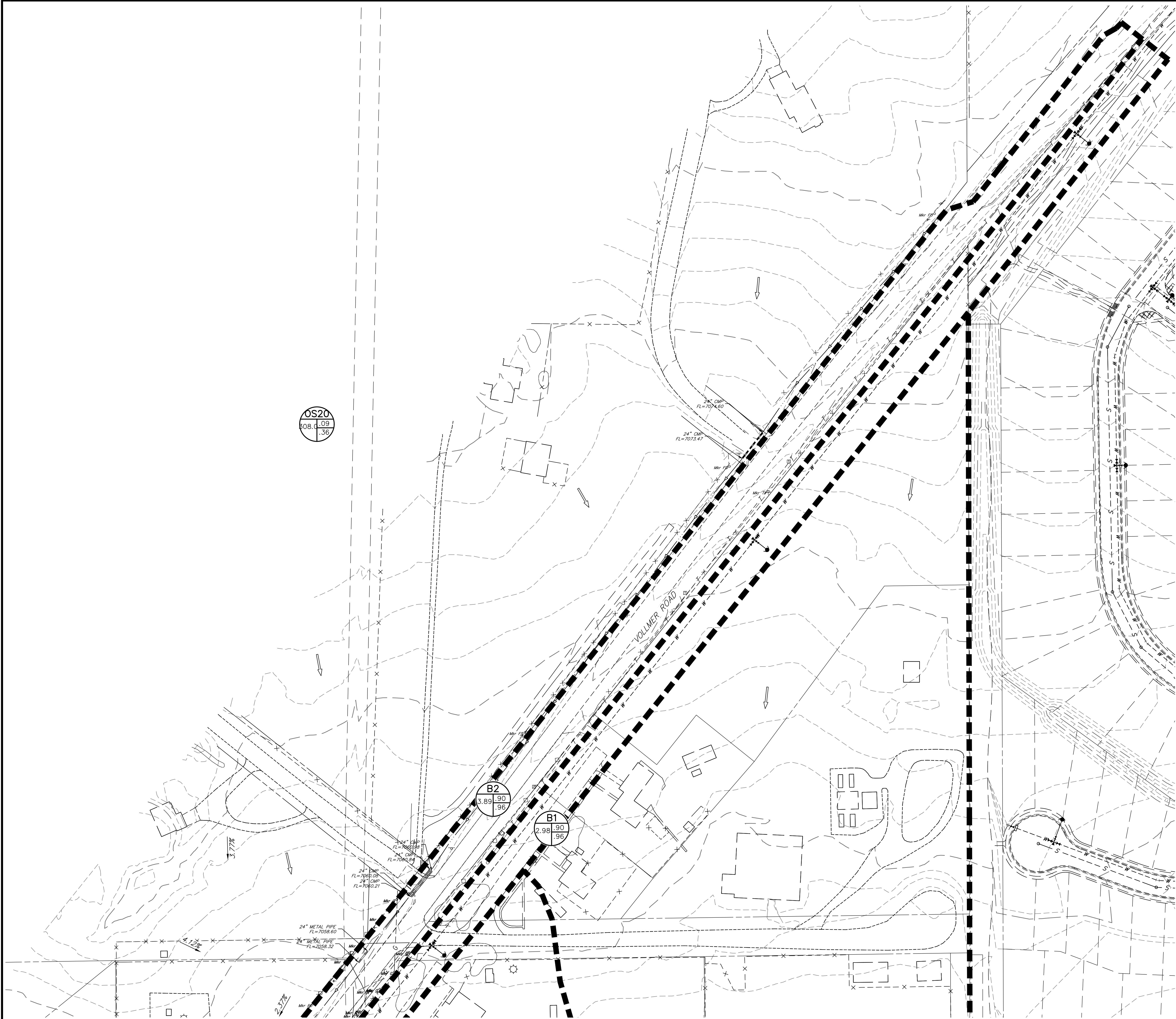
- PROPOSED STORM SEWER
- 5000 FUTURE RD MAJOR CONTOUR
- 5000 FUTURE RD MINOR CONTOUR
- 5000 PROPOSED MAJOR CONTOUR
- 5000 PROPOSED MINOR CONTOUR
- 5000 EXISTING MAJOR CONTOUR
- 5000 EXISTING MINOR CONTOUR
- DRAINAGE BASIN
- A = BASIN DESIGNATION
- B = AREA IN ACRES
- C = 5-YR RUNOFF COEFFICIENT
- D = 100-YR RUNOFF COEFFICIENT
- DESIGN POINT
- HP HIGH POINT
- LP LOW POINT
- DRAINAGE ARROW
- EXISTING DRAINAGE ARROW
- PROPOSED DRAINAGE SWALE



DRAINAGE MAP
STERLING RANCH FILING 2
JOB NO. 25188.01
6/23/21
SHEET 5 OF 7

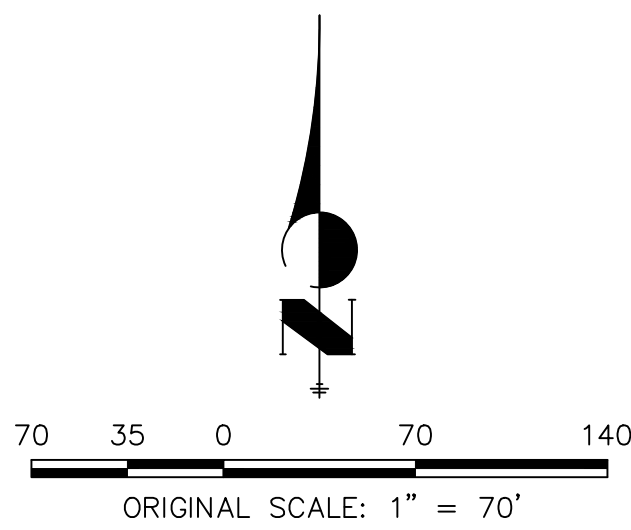


Centennial 303-740-9393 • Colorado Springs 719-593-2593
Fort Collins 970-491-9888 • www.jrengineering.com



LEGEND:

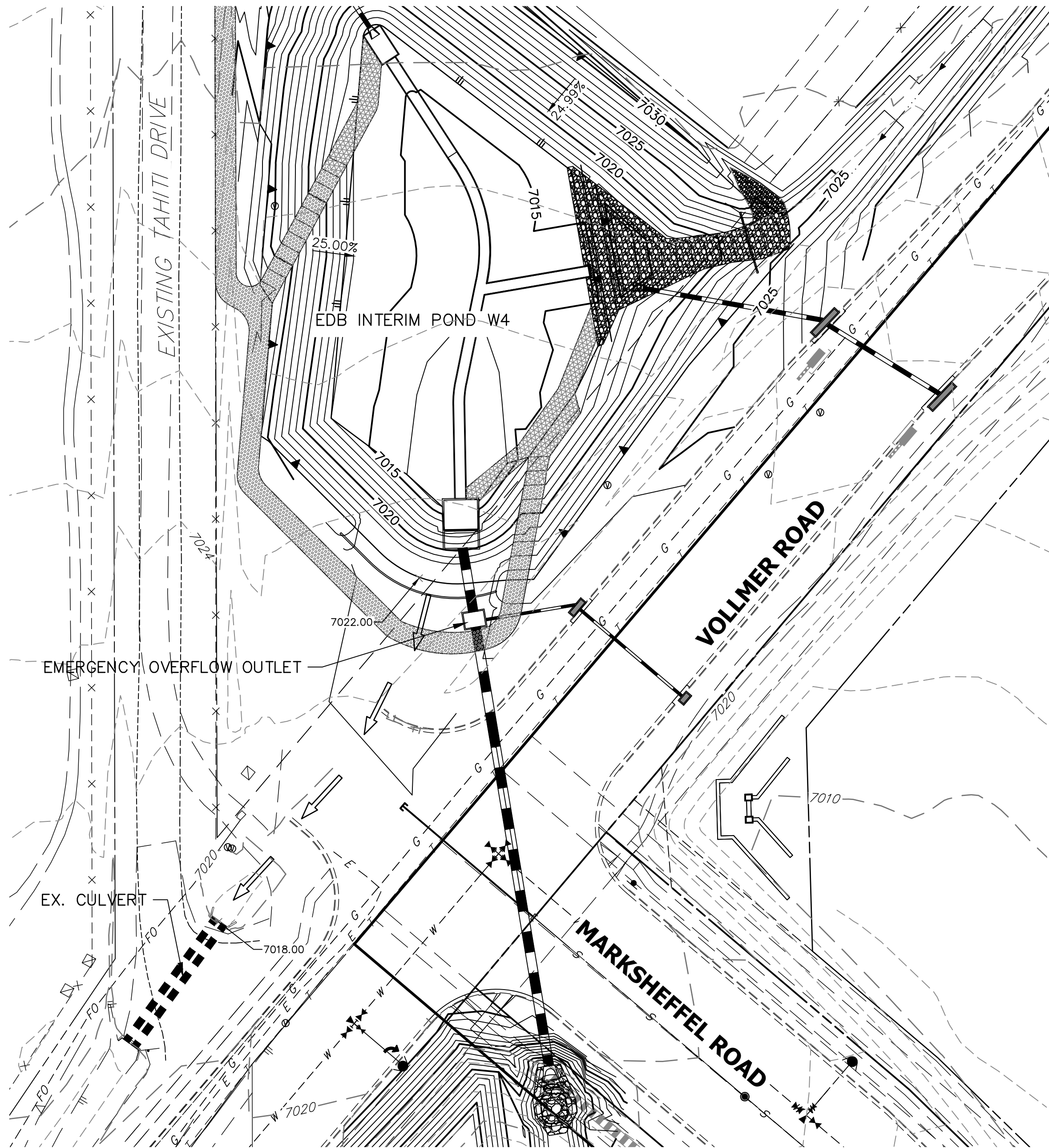
- PROPOSED STORM SEWER
- 5000 FUTURE RD MAJOR CONTOUR
- 5000 FUTURE RD MINOR CONTOUR
- 5000 PROPOSED MAJOR CONTOUR
- 5000 PROPOSED MINOR CONTOUR
- 5000 EXISTING MAJOR CONTOUR
- 5000 EXISTING MINOR CONTOUR
- DRAINAGE BASIN
- A = BASIN DESIGNATION
- B = AREA IN ACRES
- C = 5-YR RUNOFF COEFFICIENT
- D = 100-YR RUNOFF COEFFICIENT
- 1 DESIGN POINT
- HP HIGH POINT
- LP LOW POINT
- DRAINAGE ARROW
- EXISTING DRAINAGE ARROW
- PROPOSED DRAINAGE SWALE



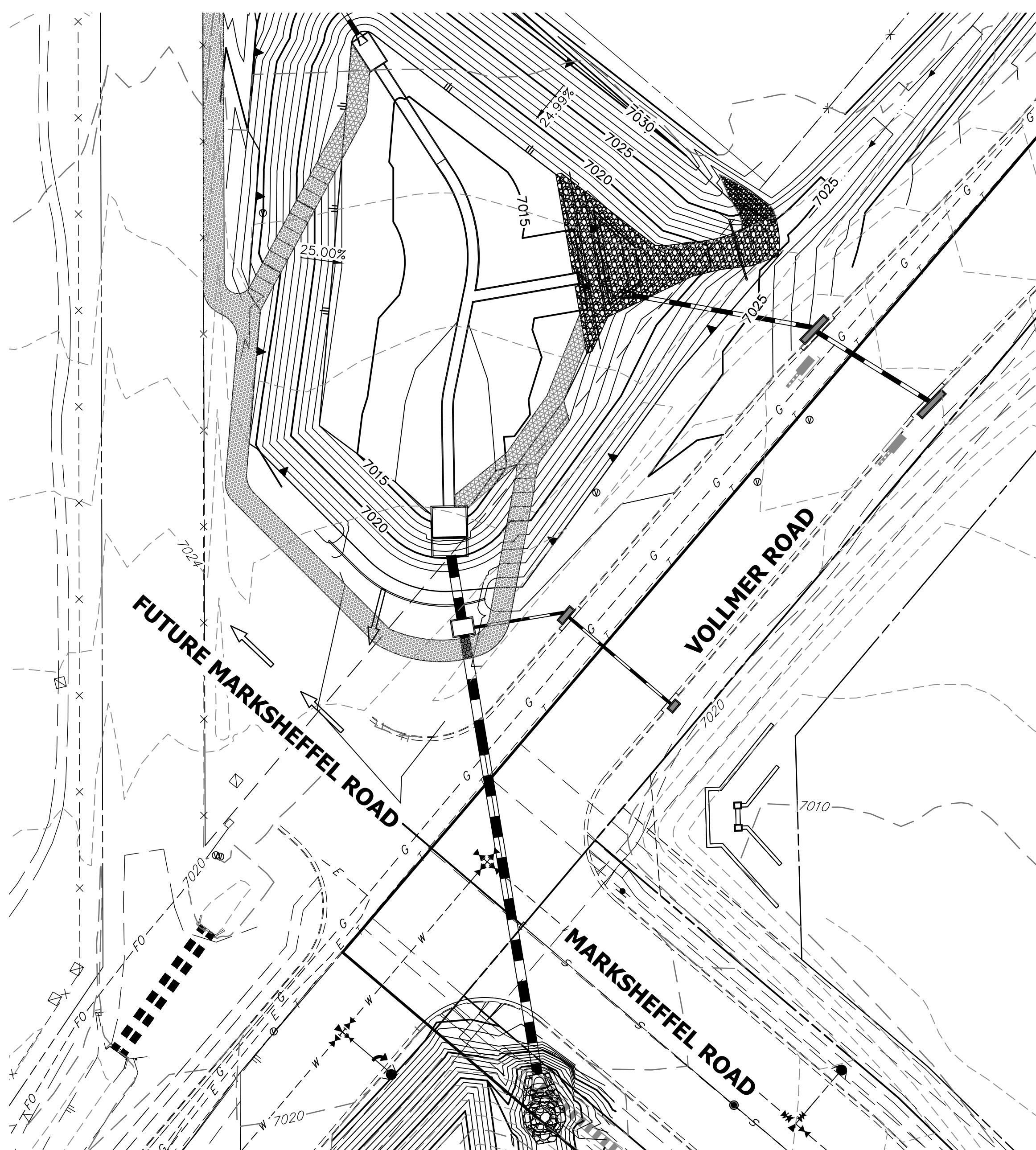
DRAINAGE MAP
STERLING RANCH FILING 2
JOB NO. 25188.01
4/16/21
SHEET 6 OF 6



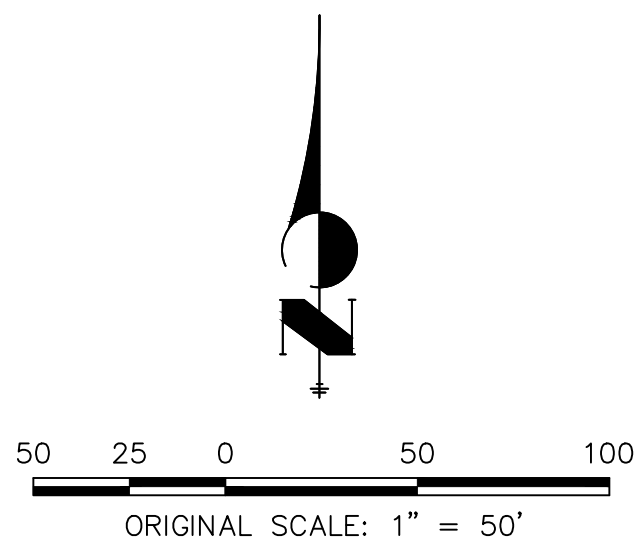
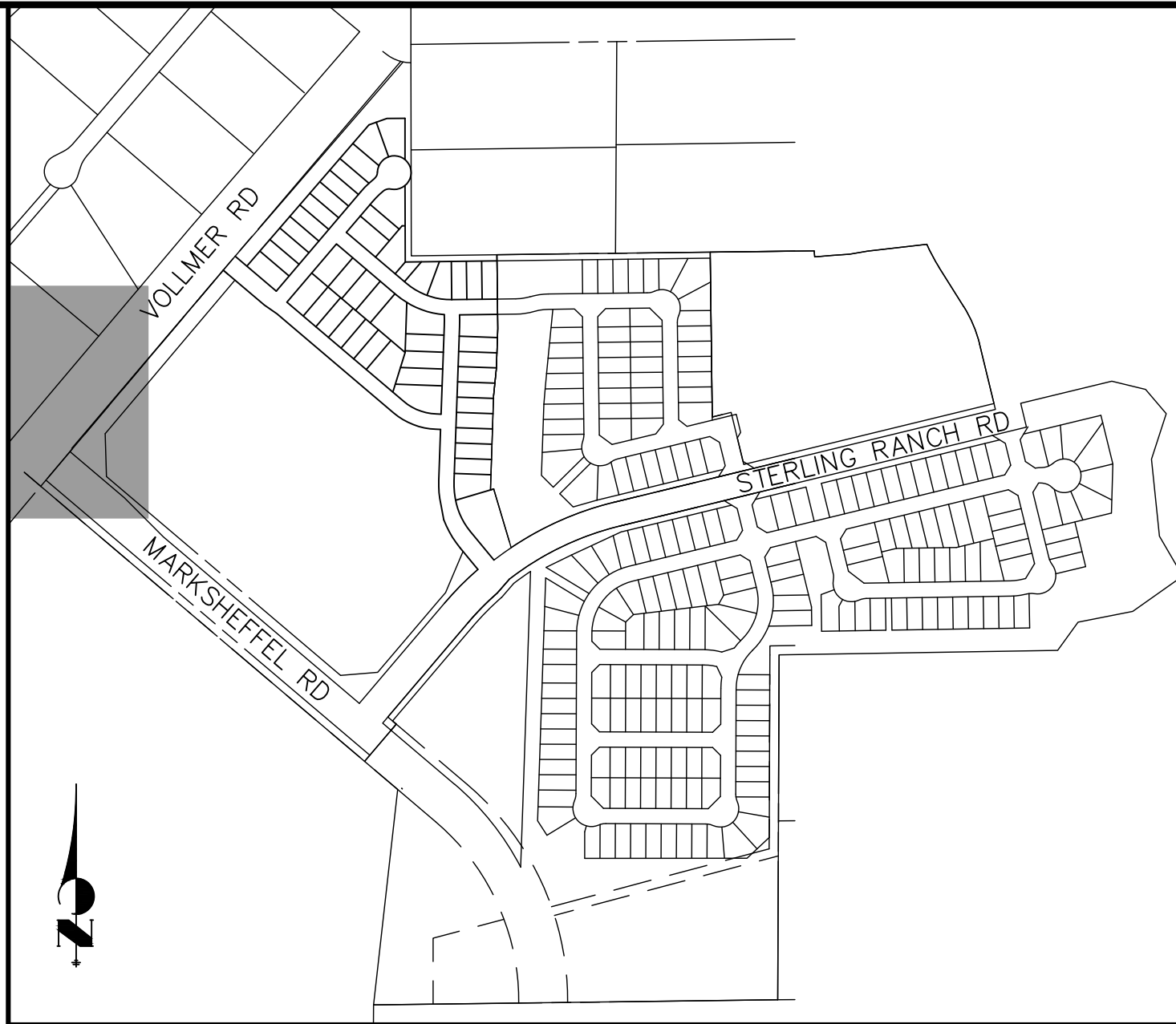
Centennial 303-740-9393 • Colorado Springs 719-593-2593
Fort Collins 970-491-9888 • www.jrengineering.com



POND W4 EMERGENCY OVERFLOW INTERIM CONDITION



POND W4 EMERGENCY OVERFLOW ULTIMATE CONDITION



DRAINAGE MAP
STERLING RANCH FILING 2
JOB NO. 25188.01
6/23/21
SHEET 7 OF 7



Centennial 303-740-9393 • Colorado Springs 719-593-2593
Fort Collins 970-491-9888 • www.jrengineering.com

X:\25188.01\Drawings\Sheet Dwg\Damage Maps\Pond W4 Emergency Overflow.dwg, 24x36 Title Landscape (2), 6/23/2021 3:14:12 PM, PC

**PRELIMINARY DRAINAGE REPORT
FOR
STERLING RANCH PHASE 3 PRELIMINARY PLAN**

Prepared For:

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

**December 1, 2020
Project No. 25188.03**

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

Step 3 – Treat the WQCV: Water Quality treatment for this site is provided in the proposed full spectrum water quality detention ponds. The runoff from this site will be collected within inlets and conveyed to the proposed ponds via storm sewer. Upon entrance to the ponds, flows will be captured in a forebay designed to promote settlement of suspended solids. A trickle channel will be incorporated into the ponds to minimize the amount of standing water. The outlet structure will be 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, four full spectrum water quality and detention ponds, and permanent vegetation.

WATER QUALITY

In accordance with Section 13.3.2.1 of the CCS/EPCDCM, full spectrum water quality and detention are provided for all developed basins. This site will drain into four Full Spectrum Drainage Ponds FSD14A, FSD11B, FSD16 and FSD14B. Further details as well as all pond volume, water quality, and outfall calculations will be included in the Sterling Ranch Phase 3 Final Drainage Report. A summary of Pond FSD11B and FSD11B has been included below for reference. Ponds FSD16 and FSD14B are sized per the MDDP and will be designed with the corresponding future development.

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 FSD14A	15.5	17.52	2.86	9.5	7.5	142.4
POND FSD11B	8.07	9.7	1.5	5.03	4.5	69.6

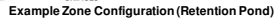
EROSION CONTROL PLAN

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

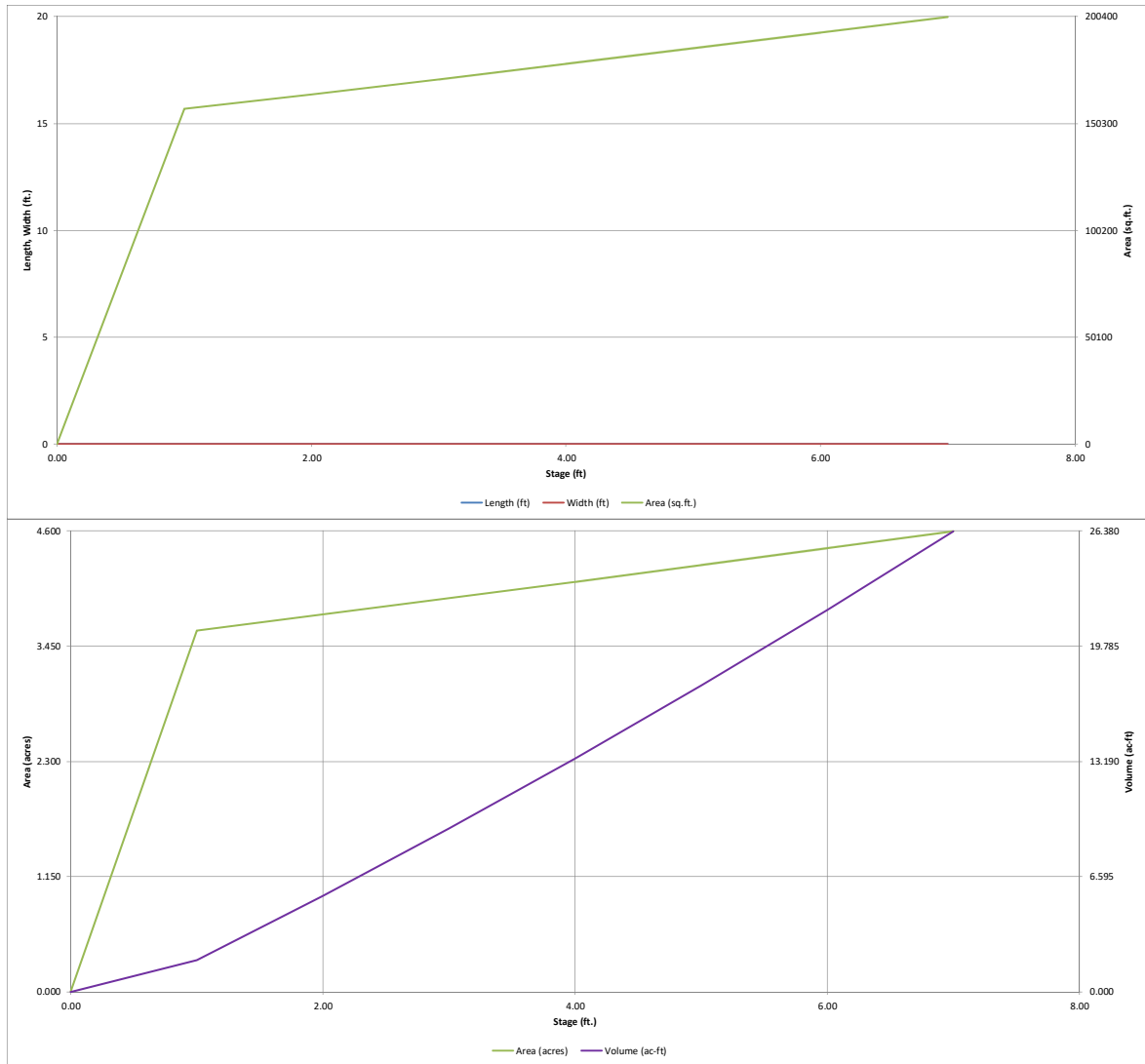
In order to ensure the function and effectiveness of the stormwater infrastructure, maintenance activities such as inspection, routine maintenance, restorative maintenance, rehabilitation and repair,

MHFD-Detention, Version 4.03 (May 2020)

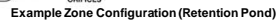
Basin ID: Pond FSD14A[illegible]

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.03 (May 2020)

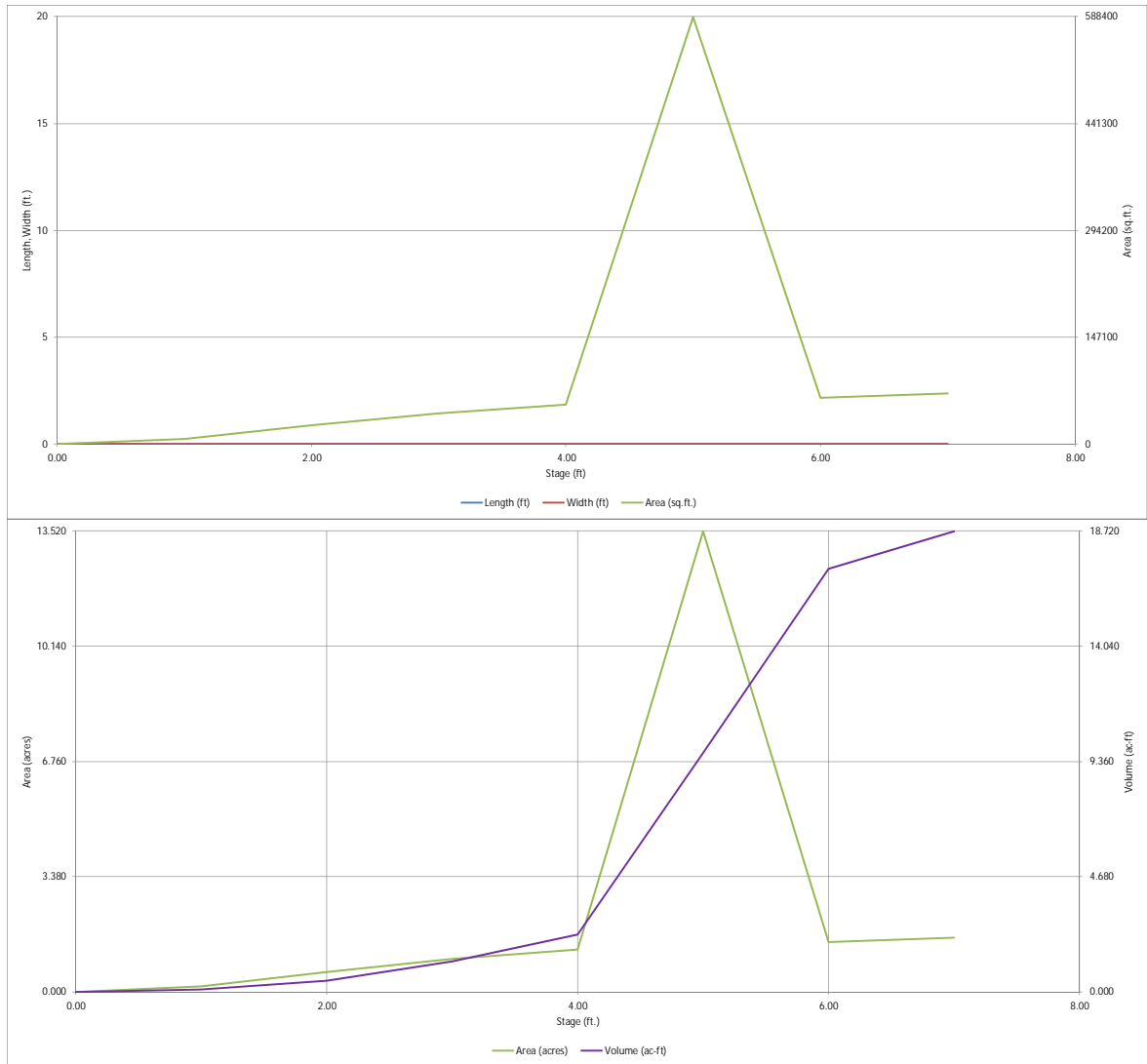


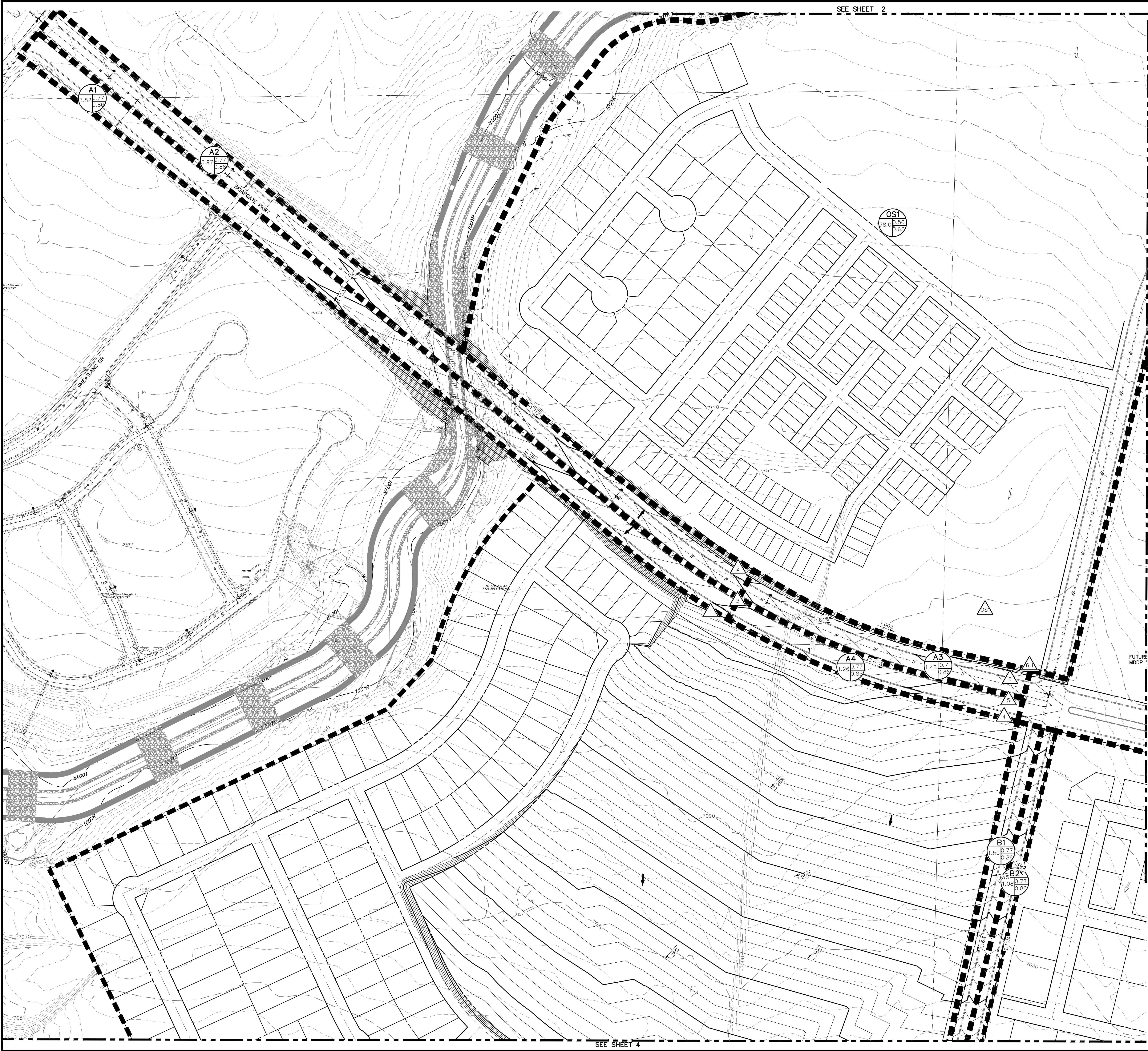
MHFD-Detention, Version 4.03 (May 2020)

Basin ID: Pond FSD11B[illegible]

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.03 (May 2020)





LEGEND

BASIN ID
A: BASIN LABEL
B: AREA
C: C-100 YR
D: C-5 YR

DESIGN POINT
PROPOSED FLOW DIRECTION

BASIN DRAINAGE AREA

EXISTING STORM SEWER

STORM SEWER PROPOSED

PROPOSED R.O.W

PROPOSED PROPERTY LINES

PROPOSED SIDEWALK

EXISTING PROPERTY LINE

ROW EXISTING

FL EXISTING

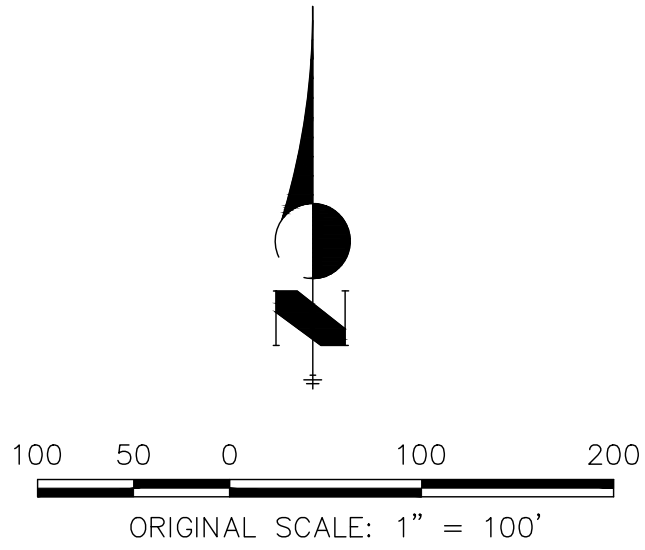
SIDEWALK EXISTING

DRAINAGE ACCESS & MAINTENANCE EASEMENT

EXISTING

PROPOSED

BASIN SUMMARY TABLE											
Tributary Sub-basin	Area (acres)	Percent Impervious	C _s	C ₁₀₀	t _c (min)	Q _s (cfs)	Q ₁₀₀ (cfs)				
A1	3.82	84%	0.77	0.86	15.5	10.2	19.2				
A2	3.97	84%	0.77	0.86	16.4	10.3	19.4				
A3	1.48	84%	0.77	0.86	8.0	5.1	9.5				
A4	1.26	84%	0.77	0.86	8.6	4.2	8.0				
B1	1.50	84%	0.77	0.86	6.8	5.4	10.2				
B2	1.08	84%	0.77	0.86	6.9	3.9	7.3				
B3	0.91	84%	0.76	0.86	7.5	3.2	6.0				
B4	0.96	85%	0.77	0.86	7.7	3.3	6.3				
B5	0.62	84%	0.77	0.86	6.4	2.3	4.3				
B6	0.66	85%	0.78	0.87	5.9	2.5	4.7				
B7	0.69	84%	0.77	0.86	6.1	2.6	4.9				
B8	0.76	83%	0.76	0.86	6.2	2.8	5.3				
B9	1.20	84%	0.77	0.86	6.0	4.5	8.5				
B10	1.28	84%	0.77	0.86	6.2	4.8	9.0				
B11	130.52	61%	0.45	0.60	21.1	176.6	393.9				
C1	63.22	68%	0.49	0.63	13.5	115.0	244.7				
D1	0.55	84%	0.77	0.86	5.8	2.1	3.9				
E1	6.48	72%	0.55	0.67	15.9	12.1	24.9				
E2	2.96	73%	0.55	0.68	10.6	6.6	13.6				
E3	7.18	74%	0.56	0.68	11.9	15.7	31.9				
E4	5.79	76%	0.60	0.71	12.1	13.3	26.6				
E5	5.12	74%	0.56	0.68	13.8	10.5	21.4				
E6	6.47	70%	0.51	0.64	19.2	10.5	22.0				
E7	5.76	72%	0.54	0.66	21.5	9.3	19.2				
E8	7.86	72%	0.54	0.67	13.6	15.6	32.2				
E9	2.25	2%	0.08	0.35	8.9	0.8	5.7				
E10	2.38	78%	0.61	0.72	9.9	6.0	11.9				
E11	1.54	75%	0.58	0.69	10.0	3.7	7.4				
E12	3.64	75%	0.58	0.70	9.7	8.9	17.9				
E13	1.16	65%	0.45	0.59	11.5	2.0	4.5				
E14	10.99	41%	0.31	0.50	26.4	9.1	24.6				
OS1	178.02	69%	0.50	0.63	27.0	235.3	498.4				
OS2	42.21	69%	0.50	0.63	17.3	70.2	148.4				



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
A Western Company
Central 303-740-3933 • Colorado Springs 719-535-2933
Fort Collins 970-491-9988 • www.jrengineering.com

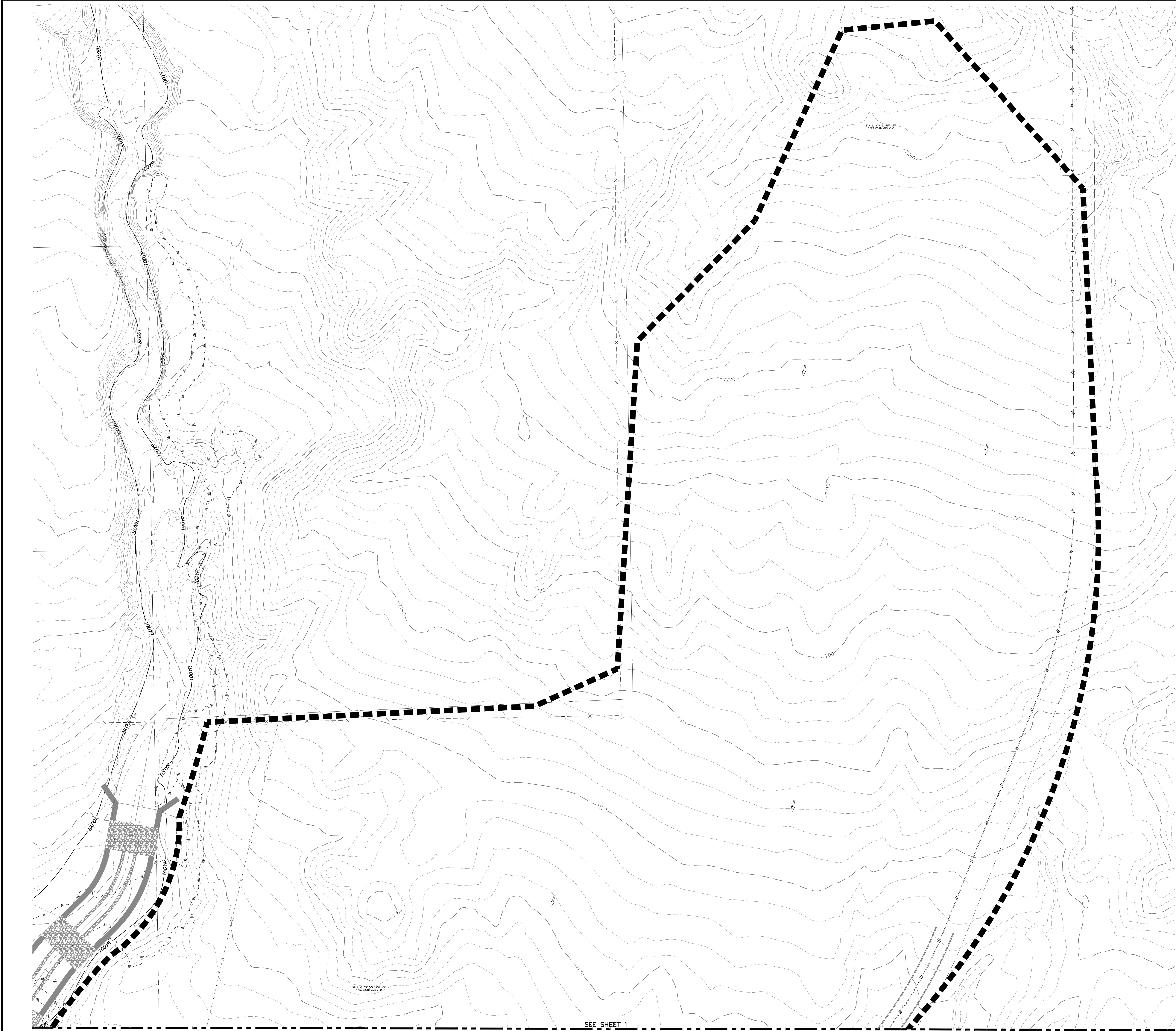
BY	DATE	NO.	REVISION	H-SCALE 1" = 100'	V-SCALE 1" = 1'	DATE	DESIGNED BY	DRAWN BY	CHECKED BY
						12/01/2020	RAB	CGV	

STERLING RANCH PHASE 3

PROPOSED CONDITIONS MAP

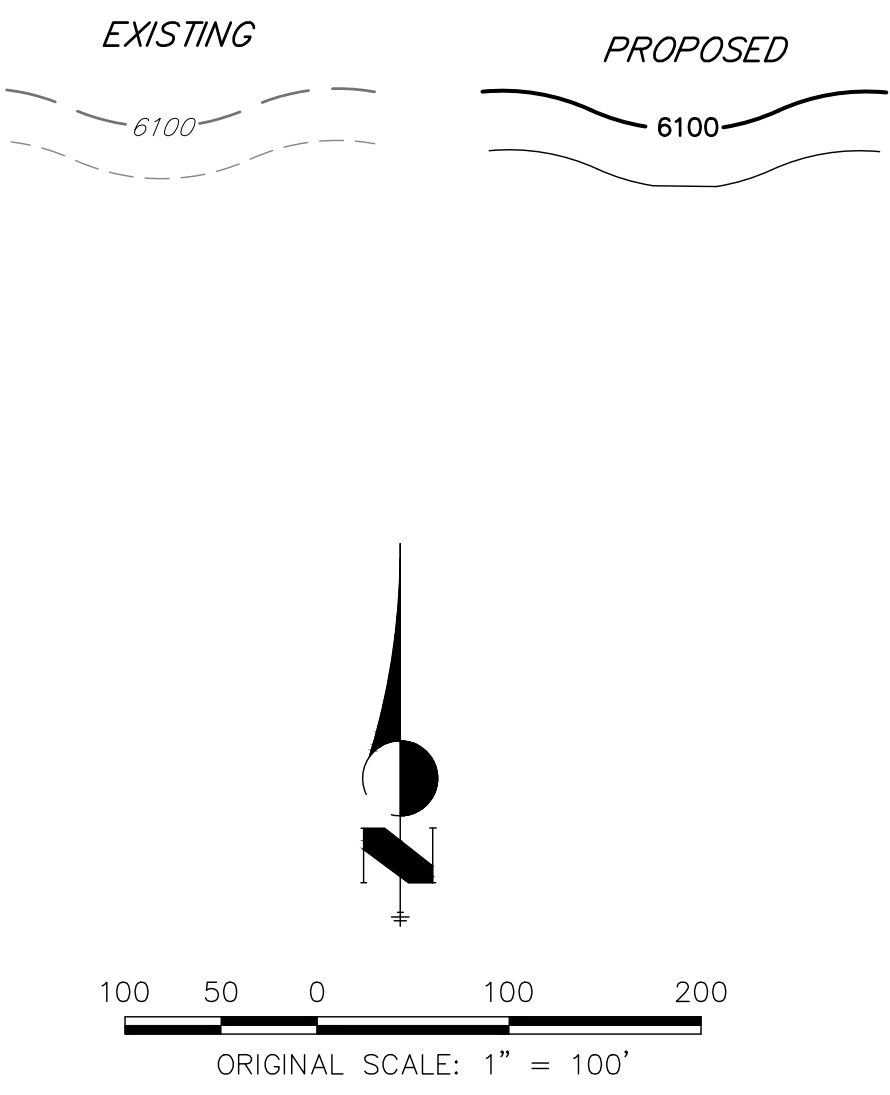
SHEET 1 OF 5

JOB NO. 25188.03



KEY MAP
SCALE: NTS

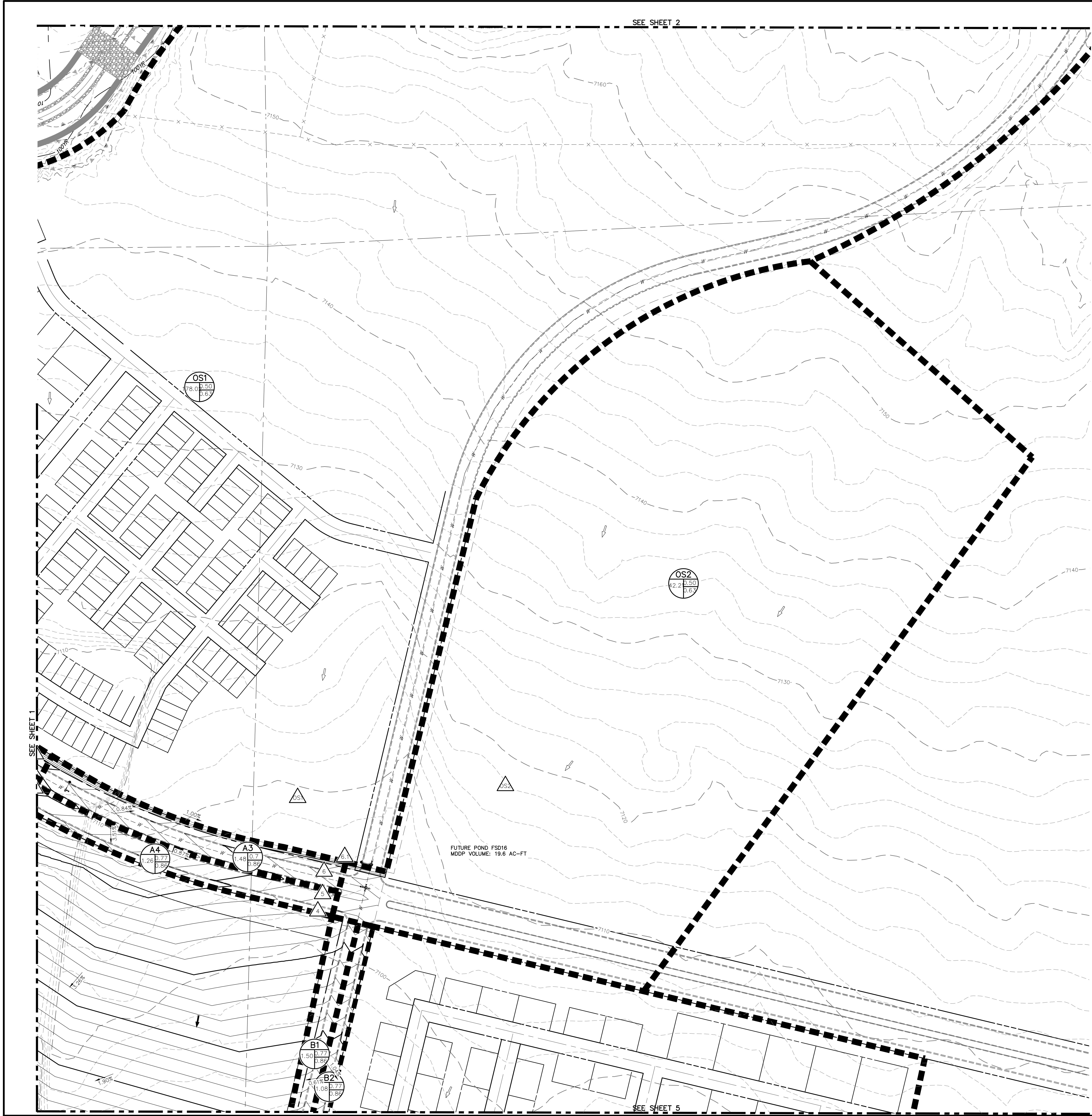
- LEGEND**
- BASIN ID
A: BASIN LABEL
B: AREA
C: C - 100 YR
D: C - 5 YR
- DESIGN POINT
PROPOSED FLOW DIRECTION
- BASIN DRAINAGE AREA
- EXISTING STORM SEWER
- STORM SEWER PROPOSED
- PROPOSED R.O.W
- PROPOSED PROPERTY LINES
- PROPOSED SIDEWALK
- EXISTING PROPERTY LINE
- ROW EXISTING
- FL EXISTING
- SIDEWALK EXISTING
- DRAINAGE ACCESS & MAINTENANCE
- EASEMENT



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		DESIGNED BY DRAWN BY CHECKED BY		DATE 12/01/2020		BY DATE		No. REVISION		H-SCALE V-SCALE DATE DESIGNED BY DRAWN BY CHECKED BY		1" = 100' 1" = 1' 12/01/2020 RAB CGV		STERLING RANCH PHASE 3 PROPOSED CONDITIONS MAP		SHEET 2 OF 5 JOB NO. 25188.03	
--	--	---	--	---------------------------------------	--	--------------------	--	------------	--	----------------	--	---	--	--	--	---	--	----------------------------------	--



SEE SHEET 1



LEGEND

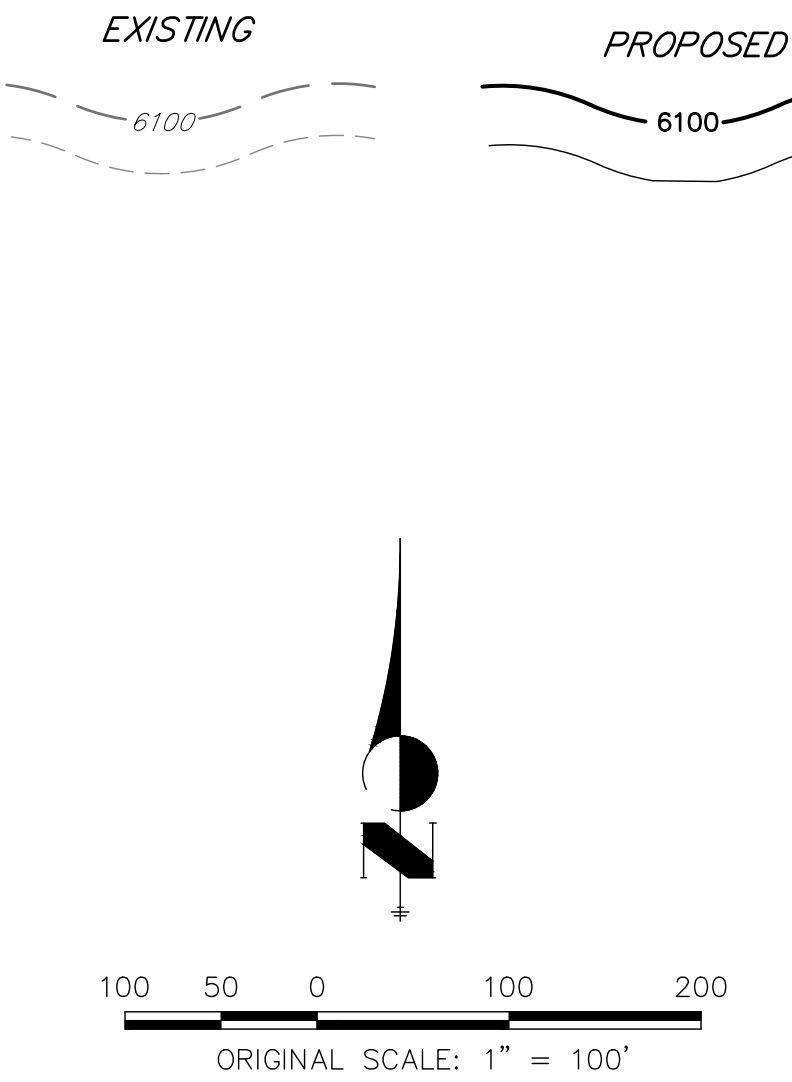
BASIN ID
A: BASIN LABEL
B: AREA
C: C -100 YR
D: C-5 YR

DESIGN POINT
PROPOSED FLOW DIRECTION

BASIN DRAINAGE AREA

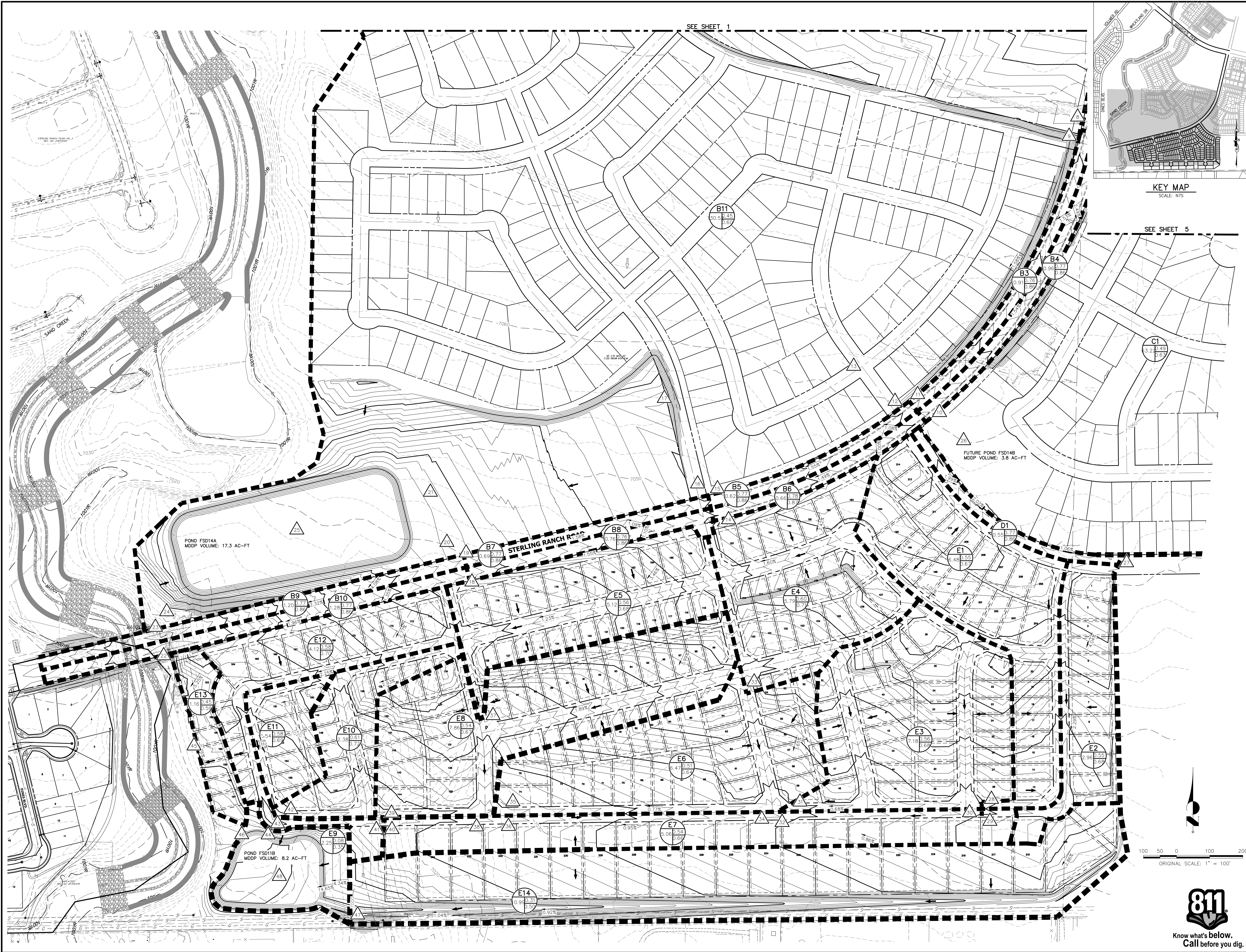
EXISTING STORM SEWER


STORM SEWER PROPOSED
PROPOSED R.O.W
PROPOSED PROPERTY LINES
PROPOSED SIDEWALK
EXISTING PROPERTY LINE
ROW EXISTING
FL EXISTING
SIDEWALK EXISTING
DRAINAGE ACCESS & MAINTENANCE
EASEMENT



Know what's below.
Call before you dig.

UNTIL SUCH TIME AS THESE DRAWINGS ARE APPROVED BY THE APPROPRIATE REVIEWING AGENCIES, JR ENGINEERING APPROVES THEIR DESIGN AND BY WRITTEN AUTHORIZATION.		PREPARED FOR SR LAND LLC 20 BOULDER CRESCENT SUITE 201 COLORADO SPRINGS, CO 80903 JAMES F. MORLEY (719) 471-1742		JR ENGINEERING A Westman Company Central 303-740-8888 • Colorado Springs 719-586-2888 Fort Collins 970-491-8888 • www.jrengineering.com	
STERLING RANCH PHASE 3		PROPOSED CONDITIONS MAP		SHEET 3 OF 5	
H-SCALE 1"=100'		V-SCALE 1"=1'		DATE 12/01/2020	
DESIGNED BY RAB		DRAWN BY CGV		CHECKED BY	
BY		DATE		REVISION	
No.		1"=100'		1"=1'	
12/01/2020		RAB		CGV	
RAB		CGV		CHECKED BY	
JOB NO. 25188.03		SHEET 3 OF 5		DATE	



STERLING RANCH PHASE 3		H-SCALE 1"= 100'	No.	REVISION	BY	DATE	<div>811 Know what's below. Call before you dig.</div> <div>J·R ENGINEERING A Westman Company Central 303-740-3933 • Colorado Springs 719-555-2593 Fort Collins 970-491-9988 • www.jrengineering.com</div>	PREPARED FOR SR LAND LLC 20 BOULDER CRESCENT SUITE 201 COLORADO SPRINGS, CO 80903 JAMES F. MORLEY (719) 471-1742	UNTIL SUCH TIME AS THESE DRAWINGS ARE APPROVED BY THE APPROPRIATE REVIEWING AGENCIES, J·R ENGINEERING APPROVES THEIR USE ONLY FOR THE PURPOSES DESIGNATED BY WRITTEN AUTHORIZATION.
PROPOSED CONDITIONS MAP	V-SCALE 1"= 1"								
	DATE 12/01/2020								
	DESIGNED BY RAB								
	DRAWN BY CGV								
SHEET 4 OF 5	CHECKED BY								
JOB NO. 25188.03									

**FINAL DRAINAGE REPORT
For
Aspen Meadows**

**Sand Creek
Drainage Basin**

Prepared for:
City of Colorado Springs
Engineering Development Review Division Team
30 North Nevada Avenue, Suite 401
Colorado Springs, CO 80903

On Behalf of:

COLA, LLC.
7910 Gateway Boulevard, Suite 102
El Paso, TX 79915

Prepared by:



2435 Research Parkway, Suite 300
Colorado Springs, CO 80920
(719) 575-0100
fax (719) 572-0208

January 2019

Project No. 17.886.004

D. Four-Step Process

Per the DCM Chapter 1, Section 4, the City of Colorado Springs require the UDFCD Four Step Process for receiving water protection that focuses on reducing runoff volumes, treating the water quality capture volume (WQCV), stabilizing draingeways, and implementing long-term source controls. Stonebridge Development complies with this process in the following ways:

1. Reducing runoff volumes – the runoff reduction worksheet has been completed and can be found in Appendix C. An example of this step would be to provide landscaping in the available open space areas. Majority of runoff generated from this site area is being released/conveyed through overland flow and grassed swales which help to eliminate unnecessary impervious area.
2. These flows eventually discharge into Pond 1 which has been designed to treat the runoff for water quality and release flows at historic rates.
3. The runoff is routed through proposed storm sewer into proposed Pond 1. Downstream from Pond 1, treated release runoff enters existing Sand Creek Channel that conveys flows approximately 2,875 feet downstream, to another existing Detention Facility “Pond 3”.
4. Implementing long-term source controls – source control BMP’s such as temporary sedimentation basins, covering storage/handling areas and implementing containment/control measures, particularly around vehicular activities should be utilized to control potential source contaminants. The specific location(s) of source control areas will be identified within the SWMP as determined by the site superintendent.

E. Detention and Water Quality

Development of the site requires that full spectrum detention be provided to reduce the fully developed flows from the site to pre-project levels. This is due in part to the master planning of the area, as well as consideration of environmental impacts to existing downstream facilities. A full spectrum extended detention basin is proposed to treat the full spectrum of runoff from the single-family development and an extended water quality control volume detention area is proposed to treat runoff to Marksheffel Road. Please refer to Appendix C for UD-detention spreadsheet calculations for Pond 1 and the Marksheffel WQCV treatment pond.

To effectively treat the water quality runoff volume, each pond utilizes a small outlet structure to extend the time required to discharge the full volume of runoff. Treating the water quality volume requires an extended discharge time of 40 hours. This is the time required to achieve removal of a significant amount of total suspended solids (TSS). The ponds will also have low flow trickle channels which drain to a micro pool at the outlet structure, which is in place to promote biological uptake. Pond 1 was designed with a total watershed area of 21.45 Acres and 55.9% imperviousness. The WQCV treatment pond for Marksheffel Road was designed with a watershed of 8.09 Acres (including 5.7 Acres from Sub-basins A12 through A17 and 2.49 Acres from Sub-basins

RP-7C and RP-7D), and 91.2% watershed imperviousness. The basins and their structures are sized based on pre-development peak flows as calculated by the UD-Detention spreadsheet from UDFCD. The spreadsheets can be found in Appendix C.

The overall volume requirement calculated for the full spectrum EDB, which includes the water quality control volume, the excess urban runoff volume, and detention for storms from the 5-year (20% probability) to the 100-year (1% probability) is 2.32 acre-ft or 101,234 cubic feet. This total detention volume is slightly higher than the value indicated by UD-Detention (2.25 Acre-ft) in order to account for additional flows to Marksheffel Drive from portions of the development along Marksheffel Drive which cannot be diverted to Pond 1. The EURV volume in the lower portion of the detention volume will allow for low and high probability storms to be released to Sand Creek at rates which approximate pre-development conditions. This also reduces the higher probability storms (i.e. less than 2-year (50% probability)) to a level which is at or near the sediment carrying threshold value for the downstream drainageways. The proposed storm sewer drainage facilities will be publicly owned and maintained by the metro district.

The proposed outfall for Pond 1 must discharge the Q100 (1% probability flow) at 90% of the pre-development rate of 7.2 cfs for the development to comply with city requirements. The peak discharge rate is further decreased (overdetained) to 3.7 cfs to account for the portion of Aspen Meadows which adds a flow of approximately 3.5 cfs over the UD-Detention calculation for pre-development flows to Marksheffel Drive. This is a reduction from the pre-project Q100 discharge for the site which is estimated to be approximately 46 cfs.

The emergency overflow for the pond will be at the 5' stage and will discharge directly to Sand Creek.

Channel Improvements

Sand Creek runs directly adjacent to the proposed Aspen Meadows development, running from the northeast to the southwest. Improvements to this channel are one of the conditions of development and Matrix Design Group, Inc. is designing these improvements under a different project and which will be covered under a separate submittal. Based on previous similar rehabilitation projects a rough estimate of stream rehabilitation for Sand Creek ranges from \$705 to \$1,340 per linear foot of channel improvement. For the 4,250-foot proposed project this means a range of \$2,996,250 to \$5,695,000 in projected construction costs. In the future, as the designs are refined, we will be able to narrow the cost estimate window.

VIII. Erosion Control Plan

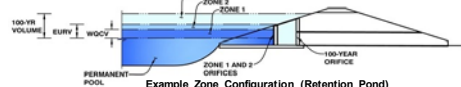
Per the city of Colorado Springs Drainage Criteria Manual Volume 1, an erosion control plan is required to be included with the drainage analysis. At this time, it is respectfully

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)

Project: Aspen meadows

Basin ID: SINGLE FAMILY AREA OF 21.45 ACRES



Required Volume Calculation

Selected BMP Type =	EDB
Watershed Area =	21.45 acres
Watershed Length =	1.988 ft
Watershed Slope =	0.010 ft/ft
Watershed Imperviousness =	55.90% percent
Percentage Hydrologic Soil Group A =	95.3% percent
Percentage Hydrologic Soil Group B =	4.7% percent
Percentage Hydrologic Soil Group C/D =	0.0% percent
Desired WQCV Drain Time =	40.0 hours
Location for 1-hr Rainfall Depths =	User Input
Water Quality Capture Volume (WQCV) =	0.399 acre-feet
Excess Urban Runoff Volume (EURV) =	1.420 acre-feet
2-yr Runoff Volume ($P1 = 0.95$ in.) =	0.782 acre-feet
5-yr Runoff Volume ($P1 = 1.23$ in.) =	1.055 acre-feet
10-yr Runoff Volume ($P1 = 1.49$ in.) =	1.348 acre-feet
25-yr Runoff Volume ($P1 = 1.88$ in.) =	1.842 acre-feet
50-yr Runoff Volume ($P1 = 2.21$ in.) =	2.350 acre-feet
100-yr Runoff Volume ($P1 = 2.57$ in.) =	2.959 acre-feet
500-yr Runoff Volume ($P1 = 3.52$ in.) =	4.557 acre-feet
Approximate 2-yr Detention Volume =	0.738 acre-feet
Approximate 5-yr Detention Volume =	0.997 acre-feet
Approximate 10-yr Detention Volume =	1.262 acre-feet
Approximate 25-yr Detention Volume =	1.682 acre-feet
Approximate 50-yr Detention Volume =	1.945 acre-feet
Approximate 100-yr Detention Volume =	2.246 acre-feet

0.95	inches
1.23	inches
1.49	inches
1.88	inches
2.21	inches
2.57	inches
3.52	inches

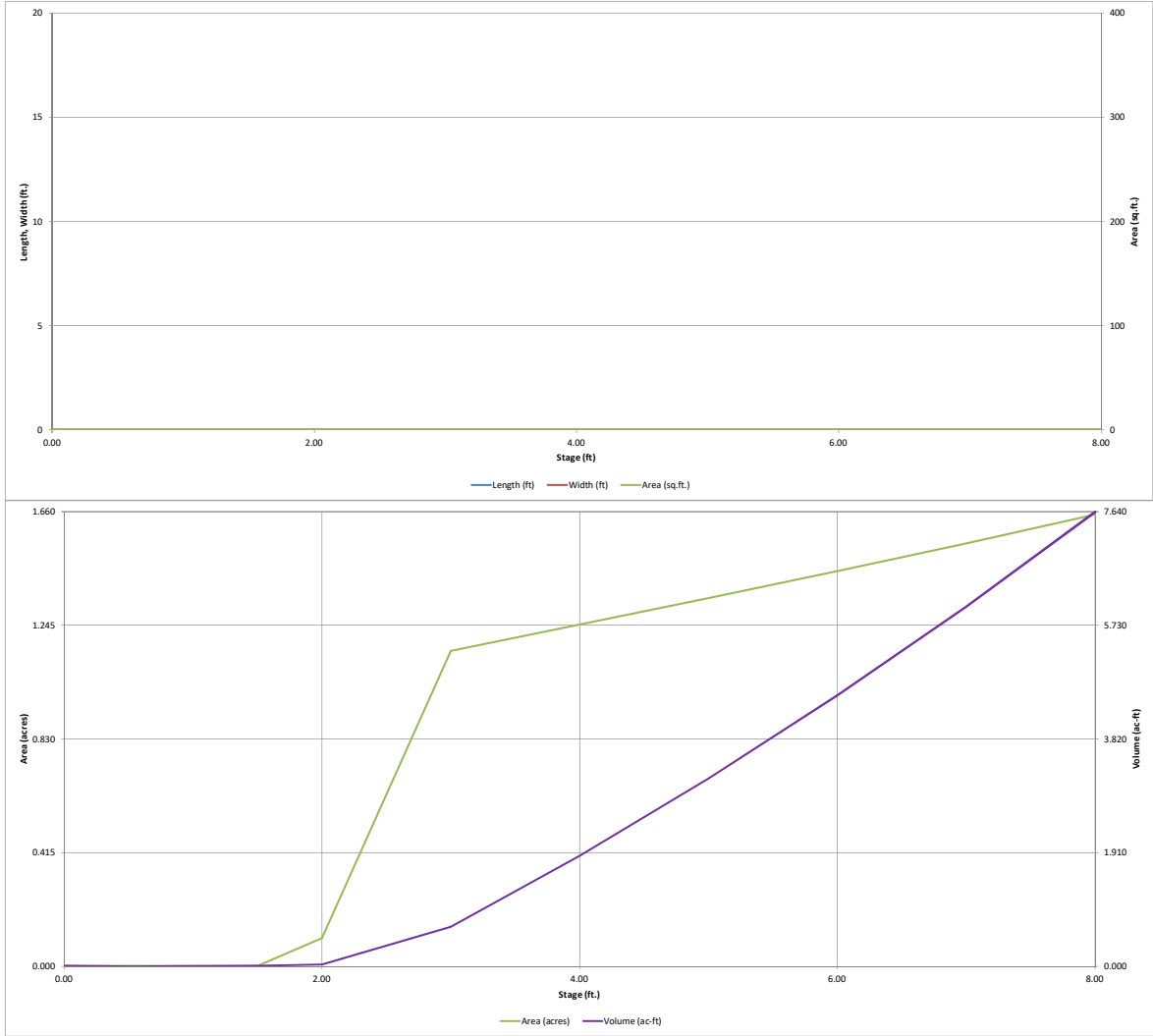
Stage-Storage Calculation

Zone 1 Volume (V_{QVC}) =	0.399	acre-feet
Zone 2 Volume (EURV - Zone 1) =	1.021	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	0.825	acre-feet
Total Detention Basin Volume =	2.246	acre-feet
Initial Surcharge Volume (V_{SI}) =	user	ft ³
Initial Surcharge Depth (SD) =	user	ft
Total Available Detention Depth (H_{DA}) =	user	ft
Depth of Trickle Channel (H_{TC}) =	user	ft
Slope of Trickle Channel (S_{TC}) =	user	ft/ft
Slopes of Main Basin Sides (S_{MS}) =	user	H/V
Basin Length-to-Width Ratio (R_{BW}) =	user	
Initial Surcharge Area (A_{SI}) =	user	ft ²
Surcharge Volume Length (L_{SV}) =	user	ft
Surcharge Volume Width (W_{SV}) =	user	ft
Depth of Basin Floor ($H_{1,100}$) =	user	ft
Length of Basin Floor ($L_{1,100}$) =	user	ft
Width of Basin Floor ($W_{1,100}$) =	user	ft
Area of Basin Floor (A_{BF}) =	user	ft ²
Volume of Basin Floor ($V_{BF,100}$) =	user	ft ³
Depth of Main Basin (H_{MB}) =	user	ft
Length of Main Basin (L_{MB}) =	user	ft
Width of Main Basin (W_{MB}) =	user	ft
Area of Main Basin (A_{MB}) =	user	ft ²
Volume of Main Basin (V_{MB}) =	user	ft ³
Calculated Total Basin Volume (V_{TB}) =	user	acre-feet

[illegible]

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)

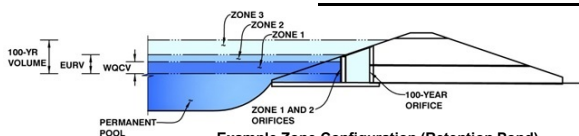


Detention Basin Outlet Structure Design

UD-Detention, Version 3.07 (February 2017)

Project: Aspen Meadows

Basin ID: SINGLE FAMILY AREA OF 21.45 ACRES



	Stage (ft)	Zone Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	2.75	0.399	Orifice Plate
Zone 2 (EURV)	3.65	1.021	Rectangular Orifice
Zone 3 (100-year)	4.31	0.825	Weir&Pipe (Circular)
		2.246	Total

User Input: Orifice at Underdrain Outlet (typically used to drain WQCV in a Filtration BMP)

Underdrain Orifice Invert Depth = ft (distance below the filtration media surface)
Underdrain Orifice Diameter = inches

Calculated Parameters for Underdrain

Underdrain Orifice Area = ft²
Underdrain Orifice Centroid = feet

User Input: Orifice Plate with one or more orifices or Elliptical Slot Weir (typically used to drain WQCV and/or EURV in a sedimentation BMP)

Invert of Lowest Orifice = ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Orifice Plate = ft (relative to basin bottom at Stage = 0 ft)
Orifice Plate: Orifice Vertical Spacing = inches
Orifice Plate: Orifice Area per Row = sq. inches (diameter = 1-1/8 inches)

Calculated Parameters for Plate

WQ Orifice Area per Row = ft²
Elliptical Half-Width = feet
Elliptical Slot Centroid = feet
Elliptical Slot Area = ft²

User Input: Stage and Total Area of Each Orifice Row (numbered from lowest to highest)

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	0.91	1.82					
Orifice Area (sq. inches)	1.00	1.00	1.00					

	Row 9 (optional)	Row 10 (optional)	Row 11 (optional)	Row 12 (optional)	Row 13 (optional)	Row 14 (optional)	Row 15 (optional)	Row 16 (optional)
Stage of Orifice Centroid (ft)								
Orifice Area (sq. inches)								

User Input: Vertical Orifice (Circular or Rectangular)

	Zone 2 Rectangular	Not Selected	
Invert of Vertical Orifice =	2.75	N/A	ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Vertical Orifice =	3.65	N/A	ft (relative to basin bottom at Stage = 0 ft)
Vertical Orifice Height =	2.00	N/A	inches
Vertical Orifice Width =	6.67		inches

Calculated Parameters for Vertical Orifice

	Zone 2 Rectangular	Not Selected	
Vertical Orifice Area =	0.09	N/A	ft ²
Vertical Orifice Centroid =	0.08	N/A	feet

User Input: Overflow Weir (Dropbox) and Grate (Flat or Sloped)

	Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, H _o =	3.54	N/A	ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length =	3.00	N/A	feet
Overflow Weir Slope =	0.00	N/A	H:V (enter zero for flat grate)
Horiz. Length of Weir Sides =	3.00	N/A	feet
Overflow Grate Open Area % =	70%	N/A	%, grate open area/total area
Debris Clogging % =	50%	N/A	%

Calculated Parameters for Overflow Weir

	Zone 3 Weir	Not Selected	
Height of Grate Upper Edge, H _g =	3.54	N/A	feet
Overflow Weir Slope Length =	3.00	N/A	feet
Grate Open Area / 100-yr Orifice Area =	16.97	N/A	should be ≥ 4
Overflow Grate Open Area w/o Debris =	6.30	N/A	ft ²
Overflow Grate Open Area w/ Debris =	3.15	N/A	ft ²

User Input: Outlet Pipe w/ Flow Restriction Plate (Circular Orifice, Restrictor Plate, or Rectangular Orifice)

	Zone 3 Circular	Not Selected	
Depth to Invert of Outlet Pipe =	0.30	N/A	ft (distance below basin bottom at Stage = 0 ft)
Circular Orifice Diameter =	8.25	N/A	inches

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

	Zone 3 Circular	Not Selected	
Outlet Orifice Area =	0.37	N/A	ft ²
Outlet Orifice Centroid =	0.34	N/A	feet
Half-Central Angle of Restrictor Plate on Pipe =	N/A	N/A	radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage = ft (relative to basin bottom at Stage = 0 ft)
Spillway Crest Length = feet
Spillway End Slopes = H:V
Freeboard above Max Water Surface = feet

Calculated Parameters for Spillway

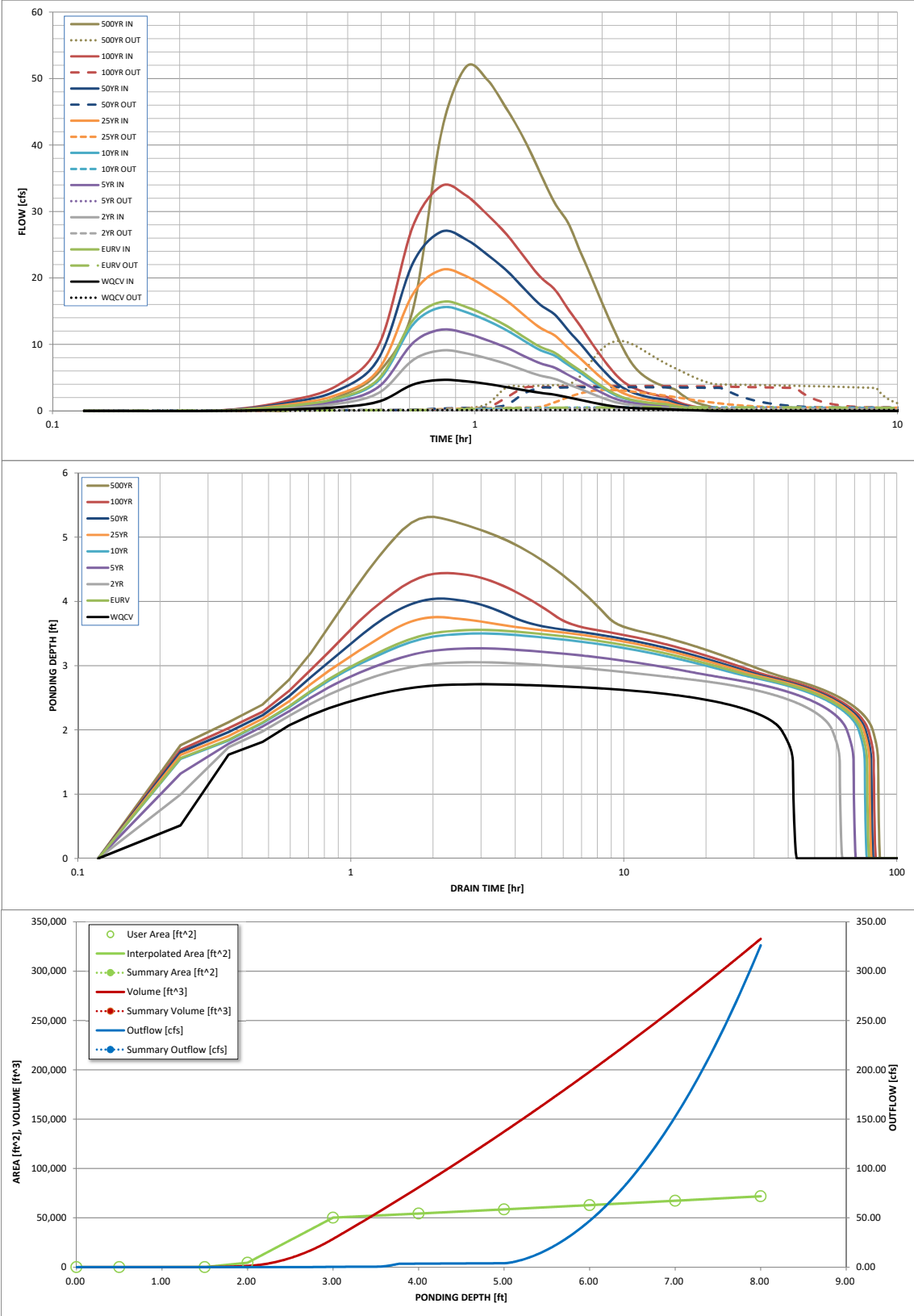
Spillway Design Flow Depth = feet
Stage at Top of Freeboard = feet
Basin Area at Top of Freeboard = acres

Routed Hydrograph Results

	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
Design Storm Return Period =									
One-Hour Rainfall Depth (in) =	0.53	1.07	0.95	1.23	1.49	1.88	2.21	2.57	3.52
Calculated Runoff Volume (acre-ft) =	0.399	1.420	0.782	1.055	1.348	1.842	2.350	2.959	4.557
OPTIONAL Override Runoff Volume (acre-ft) =									
Inflow Hydrograph Volume (acre-ft) =	0.399	1.421	0.783	1.056	1.349	1.843	2.352	2.961	4.560
Predevelopment Unit Peak Flow, q (cfs/acre) =	0.00	0.00	0.00	0.00	0.01	0.03	0.14	0.33	0.82
Predevelopment Peak Q (cfs) =	0.0	0.0	0.0	0.1	0.2	0.7	3.1	7.1	17.6
Peak Inflow Q (cfs) =	4.7	16.4	9.1	12.2	15.6	21.2	27.0	33.8	51.7
Peak Outflow Q (cfs) =	0.1	0.6	0.4	0.4	0.5	3.2	3.6	3.7	10.5
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	6.9	2.2	4.3	1.2	0.5	0.6
Structure Controlling Flow =	Plate	Overflow Grate 1	Vertical Orifice 1	Vertical Orifice 1	Vertical Orifice 1	Overflow Grate 1	Outlet Plate 1	Outlet Plate 1	Spillway
Max Velocity through Grate 1 (fps) =	N/A	0.01	N/A	N/A	N/A	0.4	0.5	0.5	0.5
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	40	72	59	65	71	73	72	72	70
Time to Drain 99% of Inflow Volume (hours) =	42	76	61	68	75	77	78	78	80
Maximum Ponding Depth (ft) =	2.71	3.56	3.05	3.27	3.50	3.75	4.04	4.44	5.31
Area at Maximum Ponding Depth (acres) =	0.85	1.20	1.16	1.18	1.20	1.22	1.25	1.29	1.38
Maximum Volume Stored (acre-ft) =	0.367	1.305	0.715	0.971	1.245	1.548	1.907	2.415	3.574

Detention Basin Outlet Structure Design

UD-Detention, Version 3.07 (February 2017)



S-A-V-D Chart Axis Override	X-axis	Left Y-Axis	Right Y-Axis
minimum bound			
maximum bound			

ASPEN MEADOWS

COLORADO SPRINGS, CO

PROPOSED CONDITIONS MAP



Design Point Summary Table									
Design Point	Upstream Area (Acres)	Q5 (cfs)	Q100 (cfs)	Subbasins Included	Inlet Name	Inlet Type	Inlet Size (in)	Outlet Pipe Size/Type	Downstream Design Point
DP1	4.22	4.6	13.2	A2	A2	D 10 R	8	24" RCP/HP	D2
DP2	8.17	10.0	28.7	A1,A2	A1	D 10 R	8	30" RCP/HP	D5
DP3	0.93	1.5	4.2	A3	A3	D 10 R	6	18" RCP/HP	D4
DP4	1.31	2.0	5.7	A3,A4	A4	D 10 R	6	18" RCP/HP	D5
DP5	9.48	12.0	34.4	A1,A2,A3,A4	D5	MH	6	30" RCP/HP	D9
DP6	3.92	3.3	11.0	A6	A6	D 10 R	8	24" RCP/HP	D7
DP7	5.08	5.0	15.9	A6,A7	A5	D 10 R	6	24" RCP/HP	D9
DP8	0.43	0.7	1.9	A8	A7	D 10 R	6	18" RCP/HP	D9
DP9	16.10	19.3	56.8	A1,A2,A3,A4,A6,A7,A8,A9	A8	D 10 R	8	36" RCP/HP	D10
DP10	2.00	2.8	8.0	A5	A5	D 10 R	0	0	0
DP Pond	21.45	24.4	75.1	A1,A2,A3,A4,A5,A6,A7,A8,A9,A10	A9	Detention Outlet Structure	Orifice Plate: 1.02 Sq. In. (Stage 0', 9' & 1.06') Overflow Weir/Grate: L=2', W=2' w/ slope: 0 Structure Outlet Pipe: 18" RCP/HP (10.5' Orifice Plate.		Sand Creek
DP11	1.68	5.4	12.1	A12	A12	D 10 R	16	18" RCP/HP	D12
DP12	3.82	10.7	24.0	A12,A13	A13	D 10 R	16	24" RCP/HP	D14
DP13	0.71	2.7	6.0	A14	A14	D 10 R	16	18" RCP/HP	D14
DP14	5.24	16.0	36.0	A12,A13,A14,A15	A15	D 10 R	16	30" RCP/HP	D16
DP15	1.90	4.8	11.6	A16	A16	D 10 R	20	18" RCP/HP	D16
DP16	8.09	24.3	55.4	A12,A13,A14,A15,A16,A17	A17	D 10 R	16	30" RCP/HP	Sand Creek

Basin Summary Table			
Aspen Meadows			
Area ID	Area (Acres)	Q5 (cfs)	Q100 (cfs)
RP-7C	1.28	2.8	6.4
RP-7D	1.21	2.9	6.5
A1	4.22	5.4	15.5
A2	3.95	4.6	13.2
A3	0.93	1.5	4.2
A4	0.38	0.5	1.5
A5	2.00	2.8	8.0
A6	3.92	3.3	11.0
A7	1.17	1.7	4.8
A8	0.43	0.7	1.9
A9	1.11	1.6	4.6
A10	3.34	2.3	10.3
A11	0.88	0.3	2.8
A12	0.67	2.5	5.6
A13	0.66	2.5	5.6
A14	0.71	2.7	6.0
A15	0.71	2.6	5.9
A16	1.90	4.8	11.6
A17	0.94	3.5	7.9

CONSULTANT:
CIVIL ENGINEER:
Matrix
DESIGN GROUP
2435 Research Parkway, Suite 300
Colorado Springs, CO 80920
Phone 719-575-0100
Fax 719-575-0208
LANDSCAPE ARCHITECT:
Thomas & Thomas Planning-Urban
614 N. Tejon Street
Colorado Springs, CO 80903
Phone (719)578-8777

PROJECT:
ASPEN MEADOWS
FILING NO. 1
DEVELOPMENT PLAN
CITY OF COLORADO SPRINGS
JANUARY 2019

OWNER:
COLA, LLC
555 MIDDLE PARKWAY
COLORADO SPRINGS, CO 80921
(719)459-0807

DEVELOPER:
COLA, LLC
555 MIDDLE PARKWAY
COLORADO SPRINGS, CO 80921
(719)459-0807

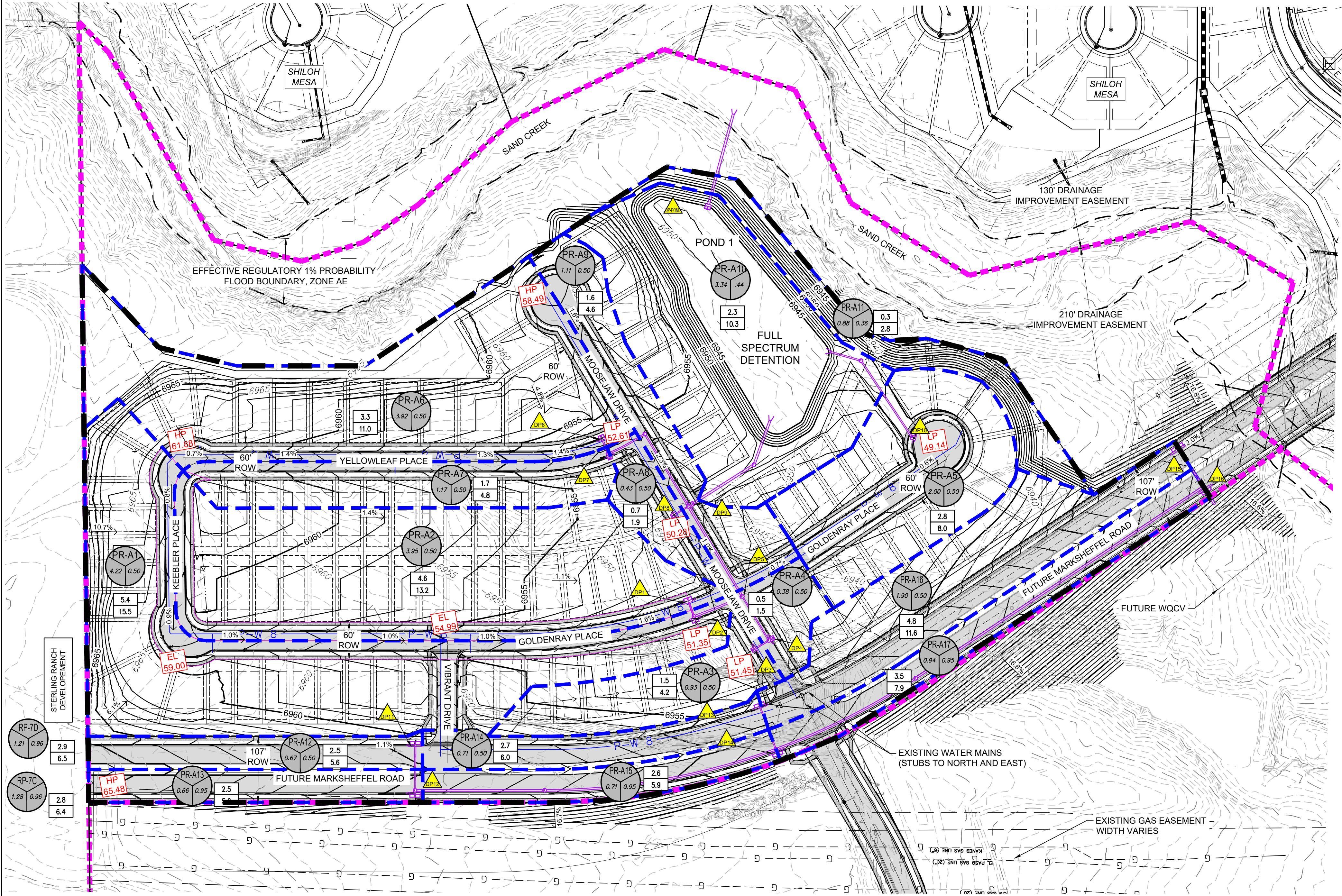
CITY PLANNING FILE NO: AR DP XXXXXXXXX
ISSUE: JANUARY, 2019

DRAWING INFORMATION:
PROJECT NO: 17.886.004.000
DRAWN BY: CRAIG DOLD
CHECKED BY: JEFF ODOR
APPROVED BY: JEFF ODOR
SHEET TITLE:

DRAINAGE REPORT MAP

DR02

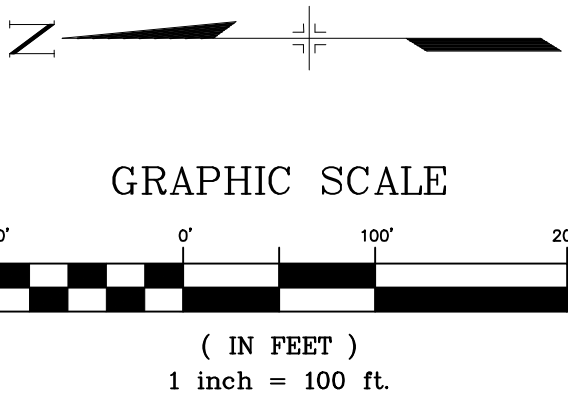
SHEET 2 OF 3



NOTES:
1. Spot elevations subject to change with final grading design and construction.

LEGEND

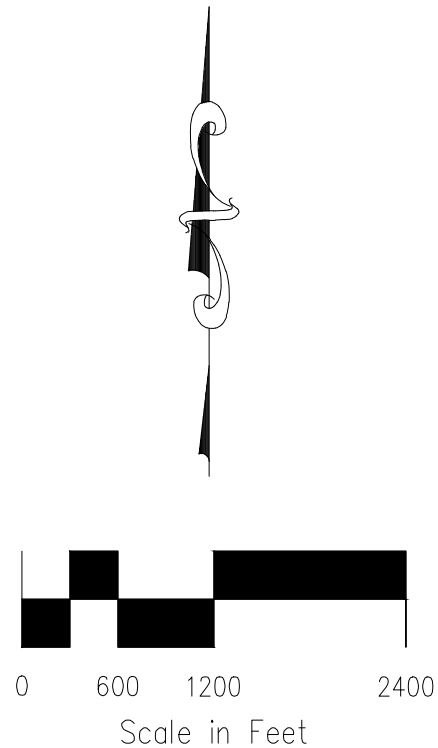
- SUB-BASIN BOUNDARY
- EXISTING CONTOUR
- PROPOSED CONTOUR
- FLOW DIRECTION
- LOW POINT AND ELEVATION
- HIGH POINT AND ELEVATION
- SPOT ELEVATION
- SWALE
- DESIGN POINT
- SUB BASIN DESIGNATION
- SUB BASIN RUNOFF COEFFICIENT
- SUB BASIN AREA (AC.)
- 5-YEAR STORM EVENT PEAK FLOW (CFS)
- 100-YEAR STORM EVENT PEAK FLOW (CFS)
- PROPERTY LINE
- STORM PIPE



APPENDIX E
DRAINAGE MAPS



FOR LOCATING & MARKING GAS, ELECTRIC, WATER & TELEPHONE LINES
FOR BURIED UTILITY INFORMATION
48 HRS BEFORE YOU DIG
CALL 1-800-922-1987



LEGEND

BASIN ID - SC3-77

DESIGN POINT - 87

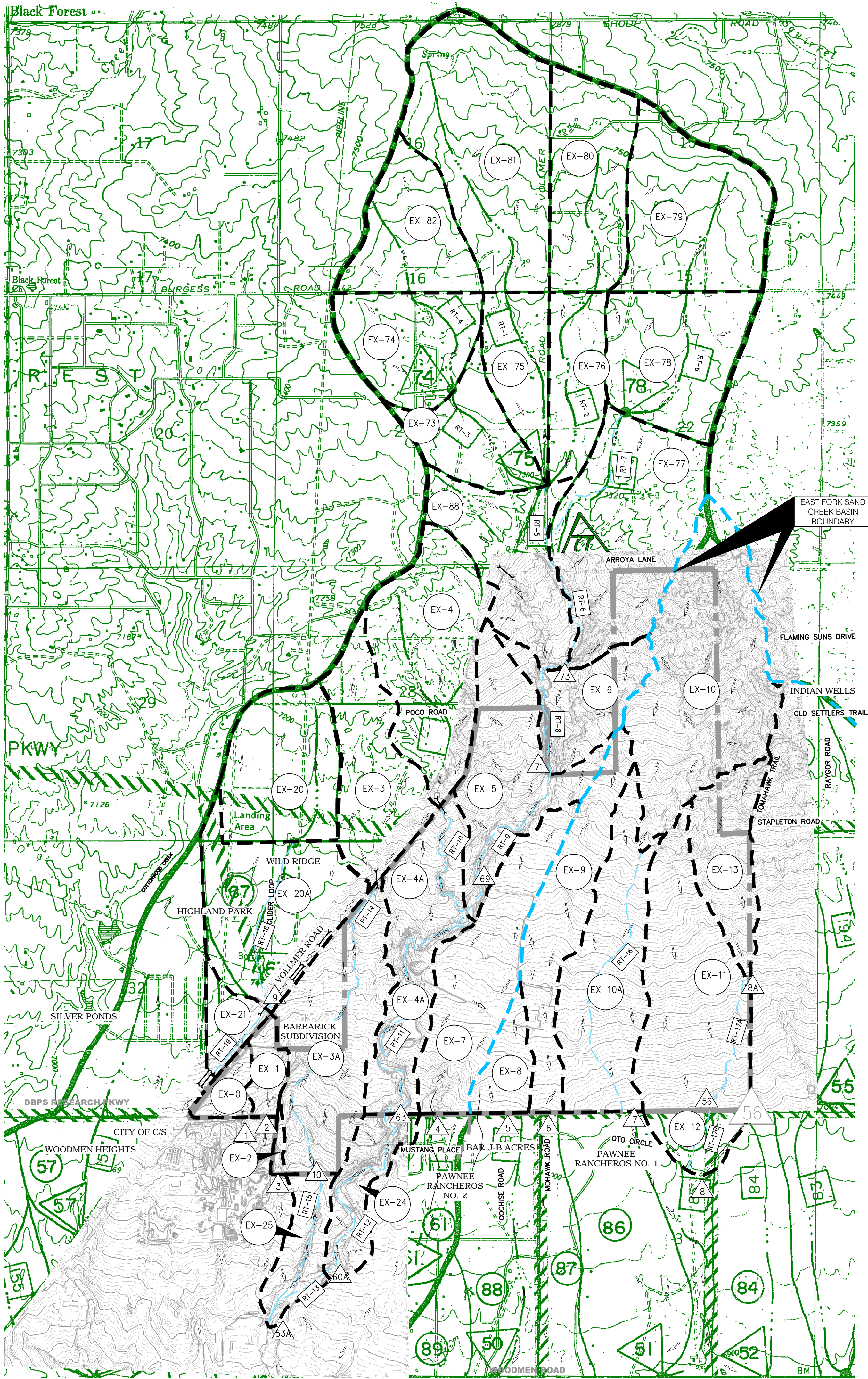
REACH IDENTIFIER - RT-17A

BASIN BOUNDARY - - - - -

EAST FORK SAND CREEK - - - - -

BASIN BOUNDARY - - - - -

FLOW DIRECTION - - - - -



BASIN SUMMARY									
BASIN	CN	AREA (ACRES)	AREA (SQ MI)	Q ₂ (CFS)	Q ₅ (CFS)	Q ₁₀ (CFS)	Q ₂₅ (CFS)	Q ₅₀ (CFS)	Q ₁₀₀ (CFS)
EX-0	62	23.8	0.037	5.0	8.2	13.0	19.6	25.7	32.2
EX-1	62	25.7	0.040	4.8	7.9	12.4	18.7	24.5	30.9
EX-2	62	5.5	0.009	1.1	1.8	2.8	4.3	5.6	7.1
EX-3	62	136.8	0.214	22.0	36.4	57.6	86.9	114.0	143.1
EX-3A	61	188.1	0.294	28.3	47.4	75.7	115.1	152.2	192.6
EX-4	62	192.0	0.300	30.1	49.9	79.1	119.5	157.0	197.3
EX-4A	62	151.5	0.237	24.7	40.8	64.4	97.0	127.2	160.1
EX-5	62	153.9	0.240	24.2	40.0	63.4	95.9	125.9	158.2
EX-6	62	90.2	0.141	15.3	25.5	40.1	60.7	79.9	100.5
EX-7	56	165.0	0.258	11.6	21.5	37.5	60.9	83.1	107.4
EX-8	45	42.0	0.066	0.5	1.7	4.5	9.4	14.5	20.5
EX-9	54	131.9	0.206	12.2	23.9	43.1	70.9	97.0	125.2
EX-10	60	270.7	0.423	32.7	56.0	91.1	140.1	185.9	236.1
EX-10A	41	179.3	0.280	0.6	2.2	7.3	17.4	29.1	43.1
EX-11	43	209.3	0.327	18.0	29.8	47.7	73.4	98.3	126.1
EX-12	51	39.5	0.062	2.2	5.1	10.1	17.7	25.1	33.3
EX-13	55	89.3	0.139	7.7	15.2	27.1	44.2	60.5	78.4
EX-20	62	143.4	0.224	25.4	42.1	66.7	100.7	132.3	166.2
EX-20A	64	179.7	0.281	32.2	51.9	80.5	119.8	155.9	194.6
EX-21	65	33.3	0.052	8.6	13.5	20.7	30.5	39.4	49.0
EX-24	59	63.1	0.099	9.5	16.6	27.5	42.9	57.4	73.0
EX-25	43	54.4	0.085	0.3	1.5	4.8	10.7	17.2	25.1
EX-73	63	90.0	0.141	16.4	26.4	41.3	62.1	81.3	102.0
EX-74	63	119.7	0.187	22.3	36.5	57.3	85.9	112.3	140.7
EX-75	63	79.3	0.124	13.1	21.5	33.7	50.5	66.1	82.8
EX-76	63	86.4	0.135	14.2	23.1	36.4	54.6	71.4	89.6
EX-77	62	230.6	0.360	34.7	58.9	90.6	137.5	180.9	227.7
EX-78	63	155.6	0.243	28.1	45.3	70.6	106.2	139.1	174.5
EX-79	63	189.0	0.295	34.9	57.0	89.5	134.3	175.6	220.1
EX-80	63	147.7	0.231	27.3	44.3	69.6	104.5	136.8	171.4
EX-81	62	262.9	0.411	42.6	70.2	111.0	167.4	219.6	275.7
EX-82	62	117.8	0.184	20.0	33.2	52.8	80.0	105.1	132.3
EX-88	62	139.2	0.217	22.2	36.7	58.0	87.6	115.0	144.4

DESIGN POINT SUMMARY (PEAK FLOW)								LOCATION
DESIGN POINT	AREA (SQ MI)	Q ₂ (CFS)	Q ₅ (CFS)	Q ₁₀ (CFS)	Q ₂₅ (CFS)	Q ₅₀ (CFS)	Q ₁₀₀ (CFS)	
DP-74	0.371	39.3	65.3	104.8	158.9	209.1	262.8	
DP-75	1.413	141.2	235.1	376.6	566.6	750.9	950.5	
DP-78	0.538	59.7	98.4	154.0	232.6	306.2	385.3	
DP-73	2.528	225.9	380.7	618.0	957.0	1260.4	1582.3	
DP-71	2.669	229.3	388.9	629.7	978.8	1277.3	1637.9	STERLING RANCH NORTHERN BNDRY
DP-69	3.209	253.0	434.8	707.7	1100.0	1453.3	1870.4	
DP-63	3.446	251.4	430.7	713.1	1113.2	1496.2	1911.5	STERLING RANCH SOUTHERN BNDRY
DP-10	0.508	36.5	56.0	106.4	162.9	220.6	287.2	COLORADO SPRINGS/EL PASO BNDRY
DP-9A	0.557	55.3	94.3	150.3	227.7	299.5	380.5	VOLLMER/TAHITI DRIVE
DP-9	0.505	52.8	88.8	142.1	214.2	281.0	351.4	VOLLMER/LOCHWINNOCH LN
DP-8A	0.139	7.7	15.2	27.1	44.2	60.5	78.4	D/S STERLING RANCH EASTERN BNDRY
DP-8	0.528	24.2	45.1	77.8	124.4	169.5	220.9	D/S STERLING RANCH SOUTHERN BNDRY
DP-7	0.703	32.4	57.1	97.3	156.1	213.8	277.9	STERLING RANCH SOUTHERN BNDRY
DP-6	0.206	12.2	23.9	43.1	70.9	97.0	125.2	STERLING RANCH SOUTHERN BNDRY
DP-5	0.066	0.5	1.7	4.5	9.4	14.5	20.5	STERLING RANCH SOUTHERN BNDRY
DP-4	0.258	11.6	21.5	37.5	60.9	83.1	107.4	STERLING RANCH SOUTHERN BNDRY
DP-3	0.009	1.1	1.8	2.8	4.3	5.6	7.1	STERLING RANCH SOUTHERN BNDRY
DP-2	0.040	4.8	7.9	12.4	18.7	24.5	30.9	STERLING RANCH SOUTHERN BNDRY
DP-1	0.037	5.0	8.2	13.0	19.6	25.7	32.2	STERLING RANCH SOUTHERN BNDRY
DP-60A	3.545	247.7	430.2	707.1	1113.0	1496.6	1913.5	FUTURE MARKSHEFFEL X-ING
DP-56	0.466	23.2	42.5	71.9	115.6	157.4	202.9	STERLING RANCH SOUTHERN BNDRY
DP-53A	4.138	262.1	454.0	763.2	1196.5	1609.8	2061.5	SAND CREEK AND POND 3

DESIGN POINT SUMMARY (VOLUME)								LOCATION
DESIGN POINT	AREA (SQ MI)	V ₂ (AC-FT)	V ₅ (AC-FT)	V ₁₀ (AC-FT)	V ₂₅ (AC-FT)	V ₅₀ (AC-FT)	V ₁₀₀ (AC-FT)	
DP-74	0.371	5.9	9.0	13.6	19.8	25.5	31.6	
DP-75	1.413	22.7	34.5	51.7	75.4	97.1	120.5	
DP-78	0.538	8.9	13.5	20.1	29.3	37.7	46.7	
DP-73	2.528	40.4	61.5	92.1	134.3	173.1	214.9	
DP-71	2.669	42.5	64.9	97.1	141.6	182.5	226.6	STERLING RANCH NORTHERN BNDRY
DP-69	3.209	50.7	77.4	116.1	169.4	218.6	271.4	
DP-63	3.446	54.1	82.5	123.8	180.8	233.3	289.9	STERLING RANCH SOUTHERN BNDRY
DP-10	0.508	7.6	11.7	17.6	25.8	33.4	41.6	COLORADO SPRINGS/EL PASO BNDRY
DP-9A	0.557	9.3	14.1	21.1	30.7	39.4	48.8	VOLLMER/TAHITI DRIVE
DP-9	0.505	8.4	12.7	19.0	27.6	35.5	44.0	VOLLMER/LOCHWINNOCH LN
DP-8A	0.139	1.3	2.1	3.4	5.2	7.0	8.9	D/S STERLING RANCH EASTERN BNDRY
DP-8	0.528	4.4	7.0	11.1	16.8	22.3	28.4	D/S STERLING RANCH SOUTHERN BNDRY
DP-7	0.703	6.1	10.0	15.9	24.3	32.4	41.3	STERLING RANCH SOUTHERN BNDRY
DP-6	0.206	2.4	4.0	6.3	9.6	12.7	16.0	STERLING RANCH SOUTHERN BNDRY
DP-5	0.066	0.2	0.4	0.8	1.4	1.9	2.6	STERLING RANCH SOUTHERN BNDRY
DP-4	0.258	2.6	4.2	6.7	10.2	13.5	17.2	STERLING RANCH SOUTHERN BNDRY
DP-3	0.009	0.1	0.2	0.3	0.5	0.6	0.8	STERLING RANCH SOUTHERN BNDRY
DP-2	0.040	0.6	0.9	1.4	2.1	2.7	3.4	STERLING RANCH SOUTHERN BNDRY
DP-1	0.037	0.6	0.9	1.3	1.9	2.5	3.1	STERLING RANCH SOUTHERN BNDRY
DP-60A	3.545	55.3	84.4	126.4	184.8	238.5	296.6	FUTURE MARKSHEFFEL X-ING
DP-56	0.466	4.0	6.3	9.9	14.9	19.8	25.1	SAND CREEK AND POND 3
DP-53A	4.138	63.0	96.4	144.7	211.8	273.9	340.9	SAND CREEK AND POND 3

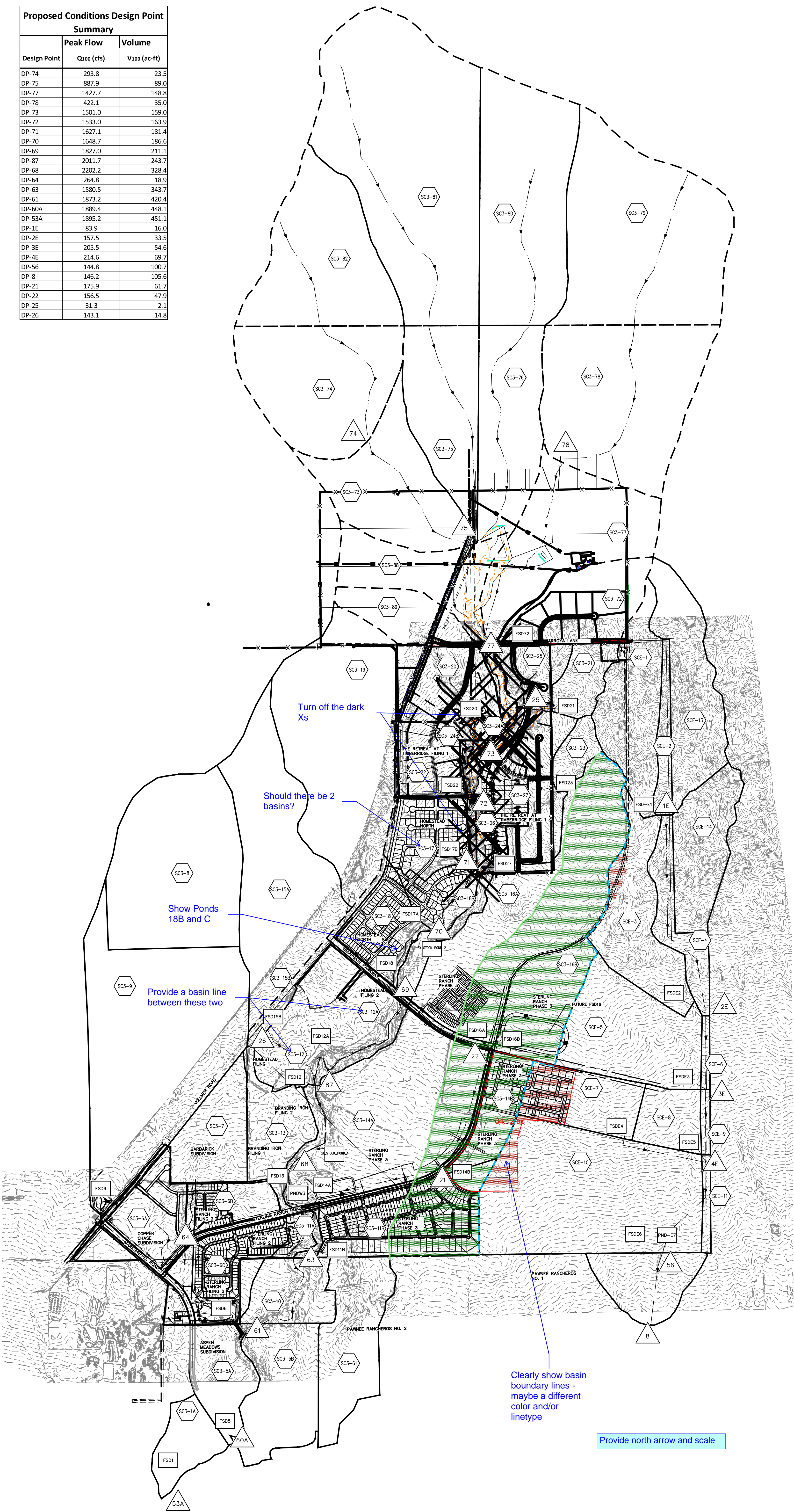
EFSC DBPS DESIGN POINT SUMMARY (PEAK FLOW)			
DBPS DESIGN POINT	AREA (SQ MI)	Q ₂ (CFS)	Q ₁₀₀ (CFS)
DP-50	0.32	47.0	195.7
DP-51 (BASIN 86)	0.33	17.7	74.1
DP-52	1.67	80.5	456.5
DP-56	0.79	63.6	265.0
Values reported from SCDBPS (DP 50, 51, 52 Not analyzed as a part of this study) DBPS Reach 85(Basin#1)=Q10=28.8cfs Q100=115.2cfs			

20 BOULDER CRESCENT, SUITE 110
COLORADO SPRINGS, CO 80903
PHONE: 719.955.5485

2018 STERLING RANCH MDDP EXISTING HYDROLOGIC CONDITIONS MAP			
PROJECT NO. 09-002	FILE: \\dwg\Eng Exhibits\2018-MDDP-ExistCondWSWMap.dwg		
DESIGNED BY: DLM	SCALE: HORIZ: NTS	DATE: 08-22-18	DM1
DRAWN BY: DLM	VERT: NTS		
CHECKED BY: VAS			

Proposed Conditions Design Point Summary		
Design Point	Peak Flow	Volume
	Q ₁₀₀ (cfs)	V ₁₀₀ (ac-ft)
DP-74	293.8	23.5
DP-75	887.9	89.0
DP-77	1427.7	148.8
DP-78	422.1	35.0
DP-73	1501.0	159.0
DP-72	1533.0	163.9
DP-71	1627.1	181.4
DP-70	1648.7	186.6
DP-69	1827.0	211.1
DP-87	2011.7	243.7
DP-68	2202.2	328.4
DP-64	264.8	18.9
DP-63	1580.5	343.7
DP-61	1873.2	420.4
DP-60A	1889.4	448.1
DP-53A	1895.2	451.1
DP-1E	83.9	16.0
DP-2E	157.5	33.5
DP-3E	205.5	54.6
DP-4E	214.6	69.7
DP-56	144.8	100.7
DP-8	146.2	105.6
DP-21	175.9	61.7
DP-22	156.5	47.9
DP-25	31.3	2.1
DP-26	143.1	14.8

Proposed Conditions Basin Summary	
Basin	Q ₁₀₀ (cfs)
SC3-1A	75.4
SC3-5A	150.8
SC3-5B	203.1
SC3-6A	165.7
SC3-6B	101.3
SC3-6C	179.7
SC3-7	166.7
SC3-8	195.4
SC3-9	225.8
SC3-10	48.7
SC3-11A	18.8
SC3-11B	209.4
SC3-12	205.1
SC3-12A	48.9
SC3-13	153.6
SC3-14A	425.6
SC3-14B	215.7
SC3-15A	133.3
SC3-15B	24.0
SC3-16A	579.1
SC3-16B	143.8
SC3-17	74.0
SC3-17B	69.3
SC3-18	75.5
SC3-18B	63.2
SC3-19	213.5
SC3-20	62.9
SC3-21	51.3
SC3-22	56.5
SC3-23	22.6
SC3-24A	42.6
SC3-24B	16.5
SC3-25	31.3
SC3-26	9.0
SC3-27	130.7
SC3-61	74.6
SC3-72	68.7
SC3-73	99.0
SC3-74	151.9
SC3-75	75.4
SC3-76	79.4
SC3-77	86.4
SC3-78	219.2
SC3-79	239.3
SC3-80	168.2
SC3-81	256.3
SC3-82	159.0
SC3-88	59.5
SC3-89	33.7
SCE-1	58.5
SCE-2	83.6
SCE-3	54.7
SCE-4	72.2
SCE-5	244.7
SCE-6	2.4
SCE-7	153.7
SCE-8	106.6
SCE-9	2.9
SCE-10	441.6
SCE-11	10.5
SCE-13	73.9
SCE-14	54.3
SCE-15	69.5



- SC3-11 SWMM BASIN
- PND-E7 SWMM DETENTION POND
- 56 SWMM DESIGN POINT
- PREVIOUS EAST FORK BASIN TRANSFER AREA
- ADDITIONAL EAST FORK BASIN TRANSFER AREA
- EAST FORK BASIN BOUNDARY
- 2018 MDDP DRAINAGE BASIN BOUNDARY
- 2021 MODIFIED DRAINAGE BASIN BOUNDARY

PROPOSED DRAINAGE MAP
SAND CREEK MDDP AMENDMENT
JOB NO. 25188.04
08/17/21
SHEET 1 OF 1



Centennial 303-740-9393 • Colorado Springs 719-593-2593
Fort Collins 970-491-9888 • www.jrengineering.com