Info Only: Comments from Service Engineering and Stormwater Engineering are in blue text.

EPC STORMWATER REVIEW COMMENTS IN ORANGE BOXES WITH BLACK TEXT

Final Drainage Report
for
Rolling Hills Ranch North Filing 2
at
Meridian Ranch

MERIDIAN RANCH
A GOLF & RECREATIONAL COMMUNITY

EL PASO COUNTY, COLORADO

July 2024

Prepared For:

GTL DEVELOPMENT, INC.
P.O. Box 80036
San Diego, CA 92138

Prepared By:
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11910 Tourmaline Drive, Suite 130
Falcon, CO 80831
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SF2424

REVISED

PCD Project No. SF-XXXX

CERTIFICATIONS

Design Engineer's Statement:

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

Thomas A. Kerby, P.E. #31429

Owner/Developer's Statement:

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

____ _______________

Raul Guzman, Vice President Date
GTL Development, Inc.
P.O. Box 80036
San Diego, CA 92138

El Paso County:

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

____ _____________

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

Rolling Hills Ranch North Filing 2
Final Drainage Report

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EXECUTIVE SUMMARY

The purpose of the following Final Drainage Report (FDR) is to present the changes to the drainage patterns as a result the Rolling Hills Ranch North Filing 2 (RHRN2) project. Runoff quantities and proposed facilities have been calculated using the current City of Colorado Springs/El Paso County Drainage Criteria Manual (DCM) (1994 version) and portions of the City of Colorado Springs Drainage Criteria Manual, Volume 1 (DCM-1) ((2014 version) as amended by the El Paso County Engineering Criteria Manual (ECM).

This report based on the Meridian Ranch 2021 Sketch Plan Amendment as adopted by the El Paso County Board of Commissioners on August 24, 2021 by Resolution 21-332. Hydrologic calculations follow method outlined in Chapter 6 of the 2014 version of the City of Colorado Springs Drainage Criteria Manual (COSDCM) as adopted by the El Paso County Board of County Commissioners by Resolution 15-042. Chapter 6 addresses the hydrologic calculation methods and includes an updated hydrograph to be used with storm drainage runoff. The Board adopted by the same resolution, Section 3.2.1 of Chapter 13 of the COSDCM referencing Full Spectrum Detention; the concept "provides better control of the full range of runoff rates that pass through detention facilities than the conventional multi-stage concept. This section of the COSDCM identifies the necessity to provide full spectrum detention but does not prescribe a methodology to reach such the detention requirements. This report includes hydrologic models from HEC-HMS for the historic and future conditions for the 2-yr, 5-yr, 10-yr, 50-yr, and 100-yr design storm frequencies. The future conditions include detention facilities sized and modeled such that *"frequent and infrequent inflows are released at rates approximating undeveloped conditions."*

RHRN2 encompasses 88± acres and is located in Section 20, Township 12 South, Range 64 West of the 6th Principal Meridian. It is approximately 17 miles northeast of the city of Colorado Springs, 4 miles north of the unincorporated town of Falcon, and immediately north of the Woodmen Hills development.

Rolling Hills Ranch North Filing 2 is located within Gieck Ranch Drainage Basin. The Gieck Ranch Basin has been studied, but has not received final approval from El Paso County. The developer has agreed to meet the requirements of the studied Gieck Ranch Basin but as yet to be approved Drainage Basin Study.

Based on the aforementioned design parameters the development of the project will not adversely affect downstream properties.

INTRODUCTION

Purpose

The purpose of the following Final Drainage Report (FDR) is to present proposed changes to the drainage patterns as a result of the development of RHRN2. The report outlines the proposed drainage mitigation based on calculated developed flows in excess of allowable exiting runoff discharge.

Scope

The scope of this report includes:

- Location and description of the proposed development stating the proposed land use, density, acreage and adjacent features to the site.
- Calculations for design peak flows from all off-site tributary drainage areas.
- Calculations for design peak flows within the proposed project area for all drainage areas.
- Discussion of major drainage facilities required as a result of the development.
- Discussion and analysis of existing and proposed facilities.

Runoff quantities and proposed facilities have been calculated using the current City of Colorado Springs/El Paso County Drainage Criteria Manual (DCM) (1994 version) and those portions of the City of Colorado Springs Drainage Criteria Manual, Volume 1 (DCM-1) ((2014 version) adopted by Resolution 15-042 of the El Paso County Board of County Commissioners as amended by the El Paso County Engineering Criteria Manual (ECM).

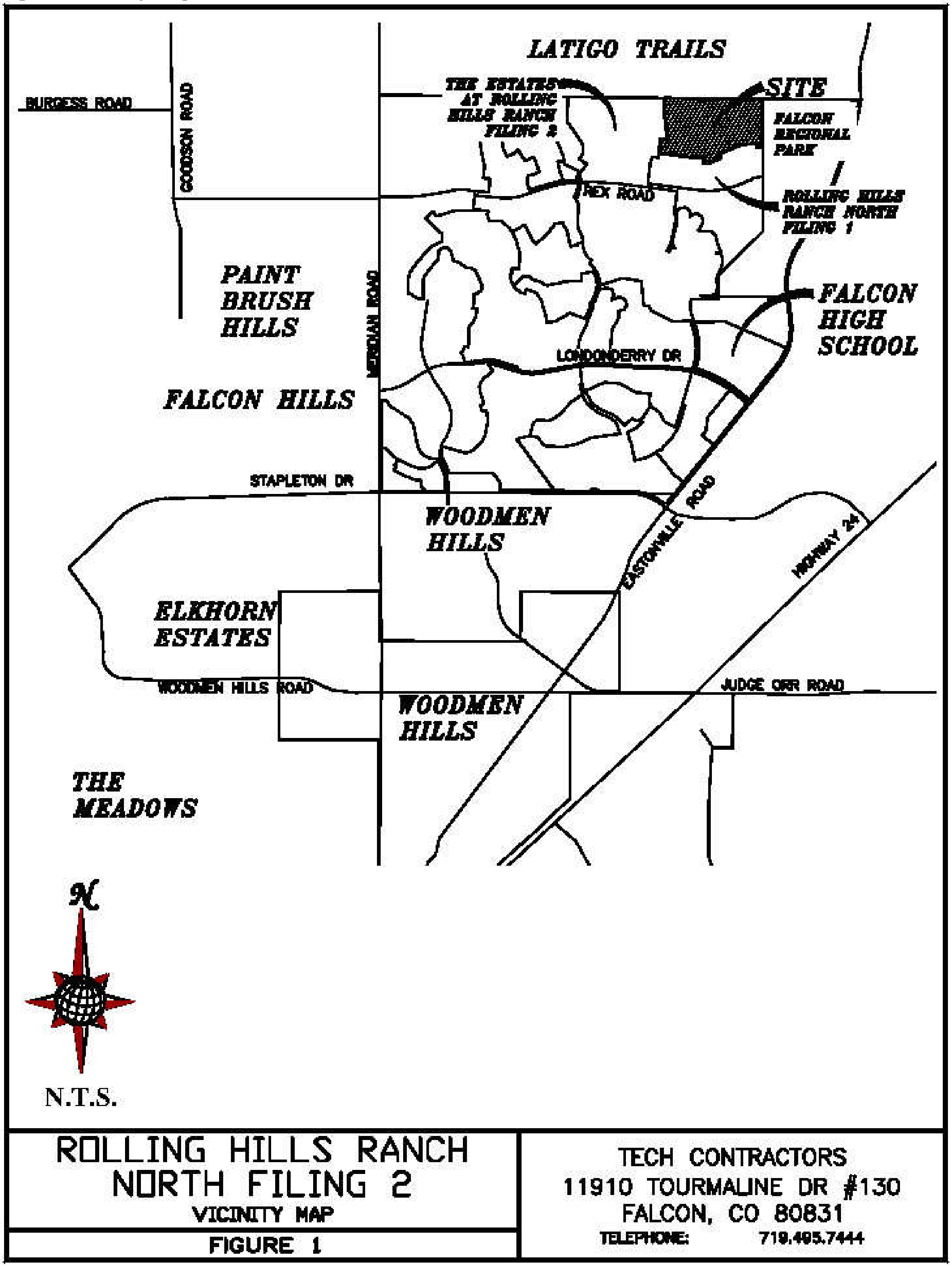
Background

On November 16, 2000 the El Paso County Board of County Commissioners approved the rezoning of the Meridian Ranch project (PUD-00-010) from A-35 to PUD with several conditions. Condition number seven stated in part that "drainage plans shall release and/or retain at approximately eighty percent (80%) of historic rates." At the time of the initial approvals there were no drainage improvements downstream of the Meridian Ranch project and the existing natural channels were shallow and undefined.

The Sketch Plan Amendment (SKP-17-001) was processed and approved in 2018 by the El Paso County Board of County Commissioners by resolution 18-104 for Meridian Ranch. The resolution eliminated the required restriction of 80% of historic peak flow rates mentioned above. The detention pond proposed with this project will release at historic or less peak flow rates as per the current El Paso County stormwater requirements.

Development has occurred downstream of this project downstream of this project including Rolling Hills Ranch North Filing 1, The Sanctuary Filing 1, and portions of the Falcon Regional Park providing sports fields, trails, dog park and associated parking. The Meridian Ranch MDDP and this report indicate the Eastonville Road culvert crossings located downstream of this project do not provide enough capacity for the historic flow rates. It is anticipated that these culverts will be replaced with the Eastonville Road construction to be completed by the Grandview Reserve Development.

Figure 1: Vicinity Map



Current calculations show the current design discharge of the existing Pond G to the Falcon Regional Park to be below historic flow rates at full build out for the full spectrum of design storms.

EXISTING CONDITIONS

General Location

Rolling Hills Ranch Estates project encompasses 88± acres and is located in Section 20, Township 12 South, Range 64 West of the 6th Principal Meridian. It is approximately 17 miles northeast of the city of Colorado Springs, 4 miles north of the unincorporated town of Falcon, and immediately north of the Woodmen Hills development.

Land Use

Historically, ranching dominated the area surrounding Meridian Ranch; however, urbanization has occurred in the general vicinity. Most notably, urbanization is occurring to the north with Latigo Trails, to the south and west are completed subdivisions within the Meridian Ranch development, and east is the Falcon Regional Park.

Climate

Mild summers and winter, light precipitation; high evaporation and moderately high wind velocities characterize the climate of the study area. The average annual monthly temperature is 48.4 F with an average monthly low of 30.3 F in the winter and an average monthly high of 68.1 F in the summer. Two years in ten will have maximum temperature higher than 98 F and a minimum temperature lower than –16 F. Precipitation averages 15.73" annually, with 80% of this occurring during the months of April through September. The average annual Class A pan evaporation is 45 inches. (Soil Survey of El Paso County Area, Colorado).

Topography and Floodplains

The topography of the site is typical of a high desert, short prairie grass with relatively flat slopes generally ranging from 2% to 4%. The project site drains generally from the northwest to southeast and is tributary to the Black Squirrel Creek.

The Flood Insurance Rate Maps (FIRM No. 08041C0552G dated 12/07/2018) indicates that the project is outside of any designated flood plain. Please see Figure 2: Estates at Rolling Hills Ranch Filing 2 Federal Emergency Management Agency (FEMA) Floodplain Map.

Geology

The National Resources Conservation Service (NRCS) soil survey records indicate that the service area is predominately covered by soils classified in the Stapleton series. This series is categorized as a Hydrological Soil Group B.

The Stapleton (83) sandy loam is a deep, non-calcareous, well-drained soil formed in alluvium derived from arkosic bedrock on uplands. Permeability of this soil is rapid. Available water capacity is moderate, surface runoff is slow, and the hazard of erosion and soil blowing is moderate. The Stapleton series is categorized as a Hydrological Soil Group B.

Figure 2: FEMA Floodplain Map

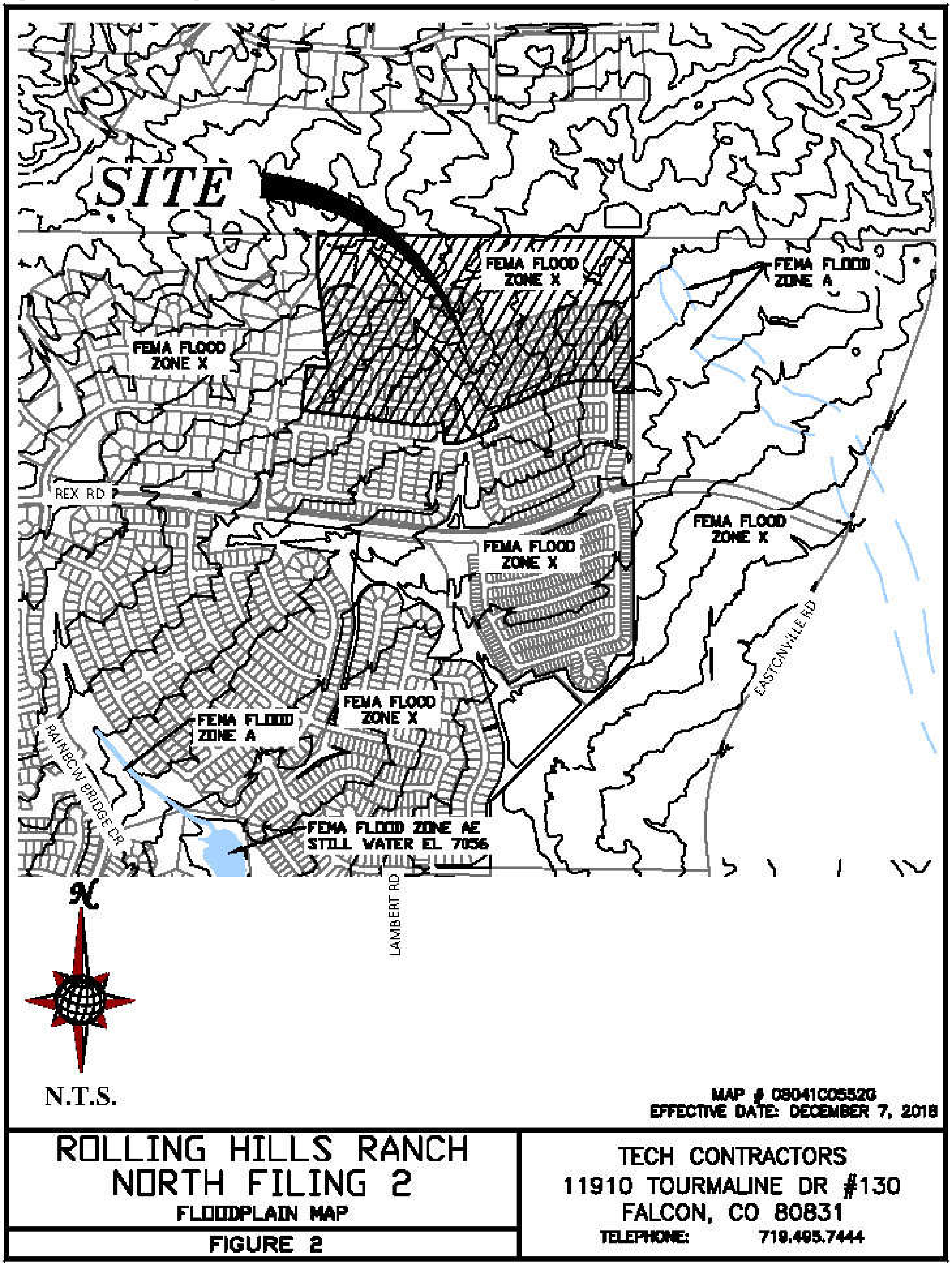
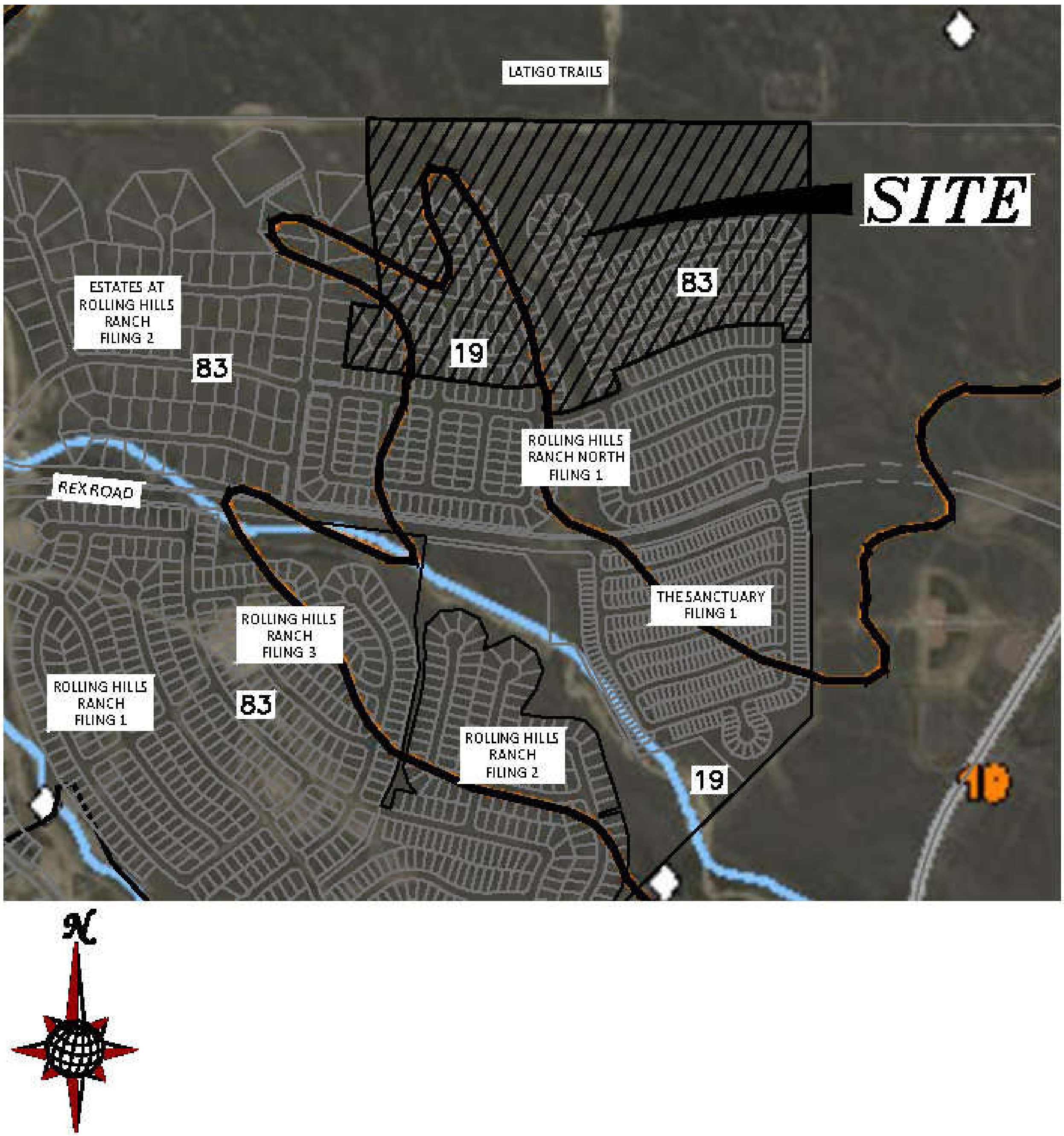


Figure 3: Soils Map



N.T.S.

ROLLING HILLS RANCH NORTH FILING 2 SOILS MAP	TECH CONTRACTORS 11910 TOURMALINE DR #130 FALCON, CO 80831 TELEPHONE: 719.495.7444
FIGURE 3	

This soil is suited to habitat for open land and rangeland wildlife. The main limitation of this soil for urban development is frost-action potential.

Typically, these soils are well-drained, gravelly sandy loams that form on alluvial terraces and fans and exhibit high permeability and low available water capacity with depth to bedrock greater than 6 feet.

The Columbine (19) gravelly sandy loam is a deep, well-drained to excessively drained soil formed in coarse textured material on alluvial terraces, fans and flood plains. Permeability of this soil is very rapid. Available water capacity is low to moderate, surface runoff is slow, and the hazard of erosion is slight to moderate. The Columbine series is categorized as a Hydrological Soil Group A.

This soil is used mainly for grazing livestock, for wildlife habitat and for home sites. The main limitation of this soil for urban development is a hazard of flooding in some areas.
Note: (#) indicates Soil Conservation Survey soil classification number. See Figure 3 Estates at Rolling Hills Ranch Filing 2 – Soils Map.

Natural Hazards Analysis

Natural hazards analysis indicates that no unusual surface or subsurface hazards are located near the vicinity. However, because the soils are cohesionless, sloughing of steep banks during drilling and/or excavation could occur. By citing improvements in a manner that provides an opportunity to lay the banks of excavations back at a 1:1 slope during construction, the problems associated with sloughing soils can be minimized.

DRAINAGE BASINS AND SUB-BASINS

The site is near the top of the Gieck Ranch Drainage Basin and accepts flow from areas north of the project site originating from portions of the adjacent Latigo Trails development. The runoff from Latigo is expected to be detained to flow rates at or near historic flow rates for the full spectrum design.

Two different scenarios were analyzed for the drainage conditions for the project.

The first scenario analyzes the historic conditions for Meridian Ranch. This condition has all of Meridian Ranch in the pre-development state; where the entirety of Meridian Ranch is modeled in its undeveloped, undisturbed condition, alternatively called the historic condition.

The second scenario analyzes the build out conditions for the entirety of the project to ensure the storm drain and future detention facilities located at the discharge point downstream of this project are able to properly attenuate the full spectrum of developed peak flow rates to historic peak flow rates as the storm water exits the Meridian Ranch project onto the adjacent Falcon Regional Park.

DRAINAGE DESIGN CRITERIA

SCS Hydrograph Procedure

The US Army Corp of Engineers HEC-HMS computer program was used to model the Soil Conservation Service (SCS) Hydrograph procedure to determine final design parameters for the major drainage facilities within the project. Onsite basin areas were calculated using aerial topography of the site and approved final design data. Times of concentration were estimated using the SCS procedures described in the DCM. Based upon the hydrologic soil type, the natural conditions found in the basins and the runoff curve numbers (CN) chart from Table 6-10 of the City of Colorado Springs DCM for Antecedent Runoff Condition II (ARC II), the following CN values were used for the given conditions.

Table 1: SCS Runoff Curve Numbers

Condition	CN*
Residential Lots (5 acre)	63
Residential Lots (2.5 acre)	66
Residential Lots (1 acre)	68
Residential Lots (1/2 acre)	70
Residential Lots (1/3 acre)	72
Residential Lots (1/4 acre)	75
Residential Lots (1/5 acre)	78
Residential Lots (1/6 acre)	80

School	80
Parks/Open Space	62
Commercial	85
Roadways	98
Graded	67
Golf Course	62
Latigo Undeveloped	65
Undeveloped	61

*Curve Numbers were interpolated and based on amount of impervious area per lot. The 24 hour storm precipitation values were selected from the NOAA Atlas 14, Volume 8, Version 2 for the Meridian Ranch location (Latitude 38.9783°, Longitude -104.5842°, Elevation 7054 ft). These numbers along with SCS information were used as input to the U.S. Army Corp of Engineers HEC-HMS computer model to determine design runoffs. See the table for all the design storm events in Appendix A. These numbers along with SCS information were used as input to the U.S. Army Corp of Engineers HEC-HMS computer model to determine design runoffs.

Full Spectrum Design

The City of Colorado Springs adopted a new Drainage Criteria Manual (DCM) in 2014 which incorporated the use of *Full Spectrum Design* for storm drainage analysis for projects located within the city limits. El Paso County adopted portions of the City's 2014 DCM by resolution in January 2015; the County resolution adopted Chapter 6 (Hydrology) and Section 3.2.1 of Chapter 13 (Full Spectrum Detention) for projects outside of the City of Colorado Springs establishing a one-year review period to analyze the impacts of the Full Spectrum Design on the storm drainage analysis of projects. This report has incorporated the use of full spectrum in the analysis using the SCS Method to determine the size requirements for the detention pond during the interim and future conditions.

The idea behind full spectrum detention is to release the developed runoff flow rates that will approximate those of the pre-developed condition. The existing design of Pond G and the outlet control structure will meet or exceed the intent and spirit of the concept.

Table 2: Detention Pond Summary:

POND G				
	PEAK INFLOW	PEAK OUTFLOW	PEAK STORAGE	PEAK ELEVATION
	CFS	CFS	AC-FT	FT
FUTURE CONDITIONS				
2-YEAR STORM	37	5.2	5.5	7026.8
5-YEAR STORM	93	19	8.8	7027.5
10-YEAR STORM	168	51	11.3	7027.9
50-YEAR STORM	444	289	19.9	7029.4
100-YEAR STORM	623	444	24.5	7030.1

DRAINAGE CALCULATIONS

SCS General Overview

The project is located within the Gieck Ranch Drainage Basin; storm water runoff will be conveyed across the site overland and within proposed storm drain networks to the existing Pond G regional detention facility. Pond G was constructed in 2020 with the overlot grading operations for Rolling Hills Ranch. The pond was designed and constructed to accommodate full development of the remaining portions of Meridian Ranch.

The Pond G detention facility has been adequately sized such that the developed flows detained and released will approximate the historic flow rates for the various design storm events upon full development Meridian Ranch onto the adjacent Falcon Regional Park.

Figure 4: Meridian Ranch SCS Calculations – Historic Conditions Map and Figure 5: Meridian Ranch SCS Calculations – Future Conditions Map depict the general drainage patterns for Rolling Hills Ranch North Filing 2.

The purpose of this report is to show that the development of Rolling Hills Ranch North Filing 2 will not adversely impact the existing drainage facilities adjacent to and downstream of the developed area and the existing Pond G is properly sized for all anticipated future development.

SCS Calculations

Historic Drainage - SCS Calculation Method

Following is a tabulation of the surface drainage characteristics under Existing Conditions using the SCS calculation method. Please refer to Figure 4 - Meridian Ranch SCS Calculations - Historic Basin Map.

Table 3: Historic Drainage Basins – SCS

HISTORIC SCS (Full Spectrum)						
HYDROLOGIC ELEMENT	DRAINAGE AREA (SQ. MI.)	PEAK DISCHARGE Q100 (CFS)	PEAK DISCHARGE Q50 (CFS)	PEAK DISCHARGE Q10 (CFS)	PEAK DISCHARGE Q5 (CFS)	PEAK DISCHARGE Q2 (CFS)
OS06	0.1313	80	52	12	3.8	0.52
OS06-G02	0.1313	77	52	11	3.7	0.52
OS05	0.0578	39	26	5.6	1.8	0.23
OS05-G01	0.0578	38	25	5.5	1.7	0.23
HG01	0.0547	32	21	4.7	1.5	0.22

HISTORIC SCS (Full Spectrum)						
HYDROLOGIC ELEMENT	DRAINAGE AREA (SQ. MI.)	PEAK DISCHARGE Q100 (CFS)	PEAK DISCHARGE Q50 (CFS)	PEAK DISCHARGE Q10 (CFS)	PEAK DISCHARGE Q5 (CFS)	PEAK DISCHARGE Q2 (CFS)
G01	0.1125	70	46	10	3.2	0.45
G01-G02	0.1125	68	46	9.9	3.2	0.45
HG02	0.0906	45	30	6.7	2.3	0.36
G02	0.3344	191	127	27	9.0	1.3
G02-G03	0.3344	190	125	27	9.0	1.3
HG03	0.1828	77	51	12	4.3	0.72
OS07	0.0328	25	17	4.5	1.7	0.26
OS07-G03	0.0328	24	17	4.3	1.7	0.26
G03	0.5500	291	192	42	15	2.3
G03-G04	0.5500	281	189	42	14	2.3
OS09	0.1547	91	63	19	8.3	1.9
OS09-G04	0.1547	90	62	18	8.3	1.9
HG04	0.0891	40	26	5.9	2.1	0.34
HG05	0.1125	49	32	7.4	2.6	0.43
OS08	0.0406	35	25	7.7	3.4	0.72
OS08-G04	0.0406	34	24	7.4	3.4	0.72
G04	0.9469	493	332	76	28	4.7
G04-G05	0.9469	488	318	76	27	4.7
HG06A	0.1375	49	32	7.6	2.9	0.51
G05	1.0844	536	350	84	30	5.2
G05-G06	1.0844	520	348	83	30	5.2
HG06B	0.1031	33	22	5.3	2.0	0.37
G06	1.1875	551	369	88	32	5.5
HG14	0.2297	79	52	12	4.7	0.84
HG13	0.1053	38	25	5.8	2.2	0.39
G14	0.1053	38	25	5.8	2.2	0.39
G14-G16	0.1053	37	25	5.8	2.2	0.39
G16	0.335	116	77	18	6.8	1.2

Future Drainage - SCS Calculation Method

Following is a tabulation of the surface drainage characteristics for the future conditions using the SCS calculation method. Please refer to Figure 5 - Meridian Ranch SCS Calculations – Future Basins Map

Table 4: Future Drainage Basins-SCS

FUTURE SCS (Full Spectrum)						
	DRAINAGE AREA (SQ. MI.)	PEAK DISCHARGE Q100 (CFS)	PEAK DISCHARGE Q50 (CFS)	PEAK DISCHARGE Q10 (CFS)	PEAK DISCHARGE Q5 (CFS)	PEAK DISCHARGE Q2 (CFS)
OS06	0.1313	80	52	12	3.8	0.52
G1a	0.1313	80	52	12	3.8	0.52
G1a-G2	0.1313	79	52	11	3.7	0.52
OS05	0.0578	39	26	5.6	1.8	0.23
OS05-G1	0.0578	39	25	5.5	1.7	0.23
FG01	0.0538	31	22	7.0	3.4	0.92
FG01-G1	0.0538	31	22	7.0	3.4	0.92
G1	0.1116	61	41	11	4.9	1.1
G1-G2	0.1116	61	41	11	4.8	1.1
FG02	0.0391	32	22	6.4	2.7	0.48

FUTURE SCS (Full Spectrum)						
	DRAINAGE AREA (SQ. MI.)	PEAK DISCHARGE Q100 (CFS)	PEAK DISCHARGE Q50 (CFS)	PEAK DISCHARGE Q10 (CFS)	PEAK DISCHARGE Q5 (CFS)	PEAK DISCHARGE Q2 (CFS)
G2	0.2820	167	112	27	10	1.9
G2-G3	0.2820	162	109	27	10	1.9
FG03	0.0203	24	17	5.9	3.0	0.84
FG04	0.0172	22	16	5.8	3.1	0.90
G3	0.3195	184	122	31	12	2.4
FG06	0.0675	56	40	12	5.8	1.3
FG05	0.0580	45	33	12	6.7	2.4
OS07ab	0.0170	12	7.9	1.8	0.54	0.07
OS07ab-POND F	0.0170	12	7.6	1.7	0.53	0.07
POND F IN	0.4620	292	199	53	23	5.0
POND F	0.4620	177	121	16	8.0	2.1
POND F-G7	0.4620	177	120	16	8.0	2.1
OS07c	0.0296	19	12	2.7	0.86	0.12
OS07c-G4	0.0296	18	12	2.7	0.85	0.12
FG21a	0.0095	5.9	4.0	1.0	0.38	0.06
G4	0.0391	24	16	3.5	1.2	0.17
G4-G7	0.0391	23	16	3.5	1.2	0.17
FG21b	0.0150	21	16	6.5	3.9	1.7
G7	0.5161	194	131	18	8.9	2.3
G7-G8	0.5161	194	130	18	8.9	2.3
FG22	0.1354	121	88	32	17	5.4
OS08a	0.0251	16	11	2.3	0.73	0.10
OS08-G8	0.0251	16	10	2.3	0.73	0.10
FG23a	0.0216	21	15	5.2	2.7	0.84
OS07d	0.0034	2.5	1.6	0.4	0.11	0.01
OS07d-G8	0.0034	2.4	1.6	0.4	0.11	0.01
G8	0.7016	276	176	46	24	7.7
G8-G10	0.7016	275	175	45	24	7.6
FG24b	0.0589	52	39	16	10	4.3
FG24a	0.0348	24	16	4.5	2.0	0.37
OS08b	0.0165	9.5	6.3	1.4	0.45	0.07
OS08b-G9a	0.0165	9.4	6.0	1.4	0.45	0.07
OS09a	0.0093	5.3	3.5	0.8	0.25	0.04
OS09a-G9a	0.0093	5.2	3.4	0.8	0.25	0.04
G9a	0.1195	87	61	21	12	4.7
G9a-G9b	0.1195	85	60	20	12	4.6
FG24c	0.0291	40	30	13	8.4	4.0
FG24d	0.0262	39	30	14	8.7	4.4
G9b	0.1748	137	101	40	23	10.1
REX RD WQCV	0.1748	136	100	40	23	9.7
G9b-G10	0.1748	135	99	39	23	9.6
FG23b	0.0236	17	11	2.7	0.9	0.13
G10	0.9000	391	243	84	45	16
G10-G11	0.9000	389	243	82	44	16
FG23c	0.0109	9	6.5	1.9	0.8	0.16
G11	0.9109	393	247	83	44	16
FG25	0.1084	111	84	36	22	9.9
FG28	0.0184	15	10	3.0	1.2	0.19
POND G IN-WEST	1.0377	485	333	116	61	22
FG27	0.0679	98	79	42	30	18
FG26	0.0567	58	44	19	12	5.6
G13	0.0567	58	44	19	12	5.6
G13-POND G	0.0567	57	43	19	12	5.6
POND G IN-EAST	0.1246	153	121	60	41	23
POND G	1.1623	444	289	51	19	5.2

FUTURE SCS (Full Spectrum)						
	DRAINAGE AREA (SQ. MI.)	PEAK DISCHARGE Q100 (CFS)	PEAK DISCHARGE Q50 (CFS)	PEAK DISCHARGE Q10 (CFS)	PEAK DISCHARGE Q5 (CFS)	PEAK DISCHARGE Q2 (CFS)
G12	1.1623	444	289	51	19	5.2
G12-G06	1.1623	444	287	50	19	5.2
FG29	0.0983	60	39	8.9	2.9	0.42
FG32	0.0406	17	11	2.6	0.93	0.15
FG32-G06	0.0406	17	11	2.6	0.93	0.15
G06	1.3012	475	307	54	21	5.5
OS09b	0.0435	19	12	2.8	1.0	0.17
OS09b-G14	0.0435	18	12	2.8	1.0	0.17
FG34	0.0275	18	12	3.1	1.3	0.22
G14	0.0710	32	21	5.0	1.9	0.34
G14-G15	0.0710	32	21	4.9	1.9	0.34
FG35	0.0292	25	18	5.5	2.4	0.46
G15	0.1002	45	29	7.1	2.8	0.57
G15-G16	0.1002	44	29	7.0	2.8	0.57
FG37	0.0754	46	31	7.3	2.7	0.43
FG36	0.0295	19	13	3.9	1.8	0.38
G15a	0.0295	19	13	3.9	1.8	0.38
G15a-G16	0.0295	19	13	3.8	1.7	0.38
G16	0.2051	103	67	16	6.5	1.2

See approved Meridian Ranch MDDP (EPC File SKP171) dated January 2018 for complete hydrologic calculations and maps.

Rational Calculations

The Rational Hydrologic Calculation Method was used to estimate the total runoff from the 5-year and the 100-year design storm and thus establish the storm drainage system design. Using the rational calculation methodology outlined in the Hydrology Section (Ch 6) of the COSDCM coupled with the El Paso County EPCDCM an effective storm drainage design for Rolling Hills Ranch North Filing 2 has been designed. The storm drainage facilities have been designed such that minor storms will be captured by the inlets and conveyed by the storm drain pipes such that the street flow does not overtop the curbs. The storm drainage facility has been designed so that the major storm will have some runoff captured by the inlets and conveyed by the storm drain pipes with the remainder conveyed on the surface and does not exceed the right-of-way widths for residential streets and the hydraulic grade line will remain greater than one foot below the surface.

The site is located within the Gieck Ranch Drainage Basin. The storm drainage runoff from the western portion will be collected by a series of inlets and storm drain pipe then conveyed through the project and discharge into an existing natural drainage course continuing to the existing Pond G. The runoff from the eastern portion will be collected by a series of inlets and storm drain pipe then conveyed directly to the existing Pond G passing through the Sanctuary Filing 1 subdivision. Pond G is properly sized to safely capture the storm water flows and discharge the runoff away from the project without damaging adjacent property.

Rational Narrative

The following is a detailed narrative of the storm drainage system located in Rolling Hills Ranch North Filing 2. These storm drainage systems meet the requirements of as found in the El Paso County Engineering Criteria Manual I.7 New Development Stormwater Management (ECM) for storm water quality and discharge. The discharge from Storm Systems A & C is routed through a water quality structure located north of Rex Road prior to being discharged into a natural drainage course upstream of the existing Pond G Regional Detention Facility. Storm System B discharges directly into Pond G after being routed through the Sanctuary Filing 1 subdivision. Areas adjacent to the Falcon Regional Park will bypass Pond G while m... ve below, see Appendix F for runoff re... g Hills Ranch North Rational Drainage M...

'Forced' sump inlets are located at curb returns, the overflow continues downstream to the next inlet. (typical)

For all sump inlets, the emergency overflow path in the case that the inlet becomes fully clogged needs to be discussed.

Storm Drain System A

- Basin A01 (5.4 acres, Q_5= 4.7 CFS, Q_{100} = 15 CFS) contains lots along Galeros Drive and Toroweap Way located within proposed Rolling Hills Ranch North Filing 2. The surface runoff will sheet flow off the lots onto the adjacent streets carrying the flow to a proposed forced sump inlet (I01) located at the northwest corner of the intersection ...s Dr. and Toroweap Way. Most of the flow (Q_5= 4.7 CFS, Q_{100} = 14 CFS) is ...nd conveyed downstream via an 18" RCP to manholes J01, J02 & J03 where the flow is combined with runoff captured by inlet I02. The remaining flow (Q_{100} = 1.2 CFS) continues downstream to Inlet EI08, combining with surface runoff from area A08.

The 18" RCP mentioned here is all proposed. No change

Please mention the proposed 18" RCP and the existing RCP, as there are two sections of pipes in this area.

It appears there are existing storm pipes and inlets within the project area. Please assess their capacity to handle the proposed runoff and provide hydraulic calculations for all existing storm pipes and inlets.

- Basin A02 (3.0 acres, Q_5= 3.8 CFS, Q_{100} = 11 CFS) contains lots along streets Galeros Dr., Esplanade Dr., and Bright Angel Dr. located within proposed Rolling Hills Ranch North Filing 2. The surface runoff will sheet flo... and carry the flow to a proposed forced sump inle... of the intersection of Galeros Dr. and Esplande... Q_{100} = 9.9 CFS) is captured and conveyed downs... where the flow is combined with runoff captured by inlet I01. The remaining surface flow (Q_{100} = 0.6 CFS) continues downstream to the existing Inlet EI06, combining with surface runoff from area A06.

Hydraulic calculations for Systems A & B through Filing 2 and the existing Filing 1 are found in Appendix B. No change.

- The total pipe flow conveyed to manhole J03 is Q_5= 7.6 CFS, Q_{100} = 21 CFS and is conveyed via a 24" RCP to the existing manhole EJ08 constructed as part of Rolling Hills Ranch North Filing 1. The Rolling Hills Ranch North Filing 1 storm drain system was designed and constructed in anticipation of the Rolling Hills Ranch North Filing 2 development. See Rolling Hills Ranch North Filing 1, prepared by Tech Contractors, July 2024 for more information

- Basin OS1 (4.1 acres, Q_5= 3.0 CFS, Q_{100} = 11 CFS) contains off-site area west of Rolling Hills Ranch North Filing 2 within the Estates at Rolling Hills Ranch Filing 2 subdivision entering the project from the west as sheet flow across the subdivision boundary identified and shown on Figure 6 as Design Point 1. The surface runoff is conveyed across the subdivision boundary to Basin Area A03. The surface runoff is conveyed easterly toward the proposed Galeros Dr. located in Basin A03 to be conveyed downstream proposed inlet I03.

- Basin A03 (3.2 acres, Q_5= 2.8 CFS, Q_{100} = 8.8 CFS) the lots along the west side of Galeros Dr. located within proposed Rolling Hills Ranch North Filing 2. The surface

Please revise the highlighted numbers to match the calculations and summary table.

No change

runoff will combine with sheet flow from off-site area OS1 for a total flow of Q_5= 5.4 CFS and Q_{100} = 18 CFS, flow off the lots onto the adjacent street carrying the flow to a proposed flow by inlet (I03) located at the southwest corner of the intersection of Galeros Dr. and Bright Angel Dr. Most of the flow (Q_5= 4.5 CFS, Q_{100} = 13 CFS) is captured and conveyed downstream via an 18" RCP to manholes J04 & J05 via an 18" RCP. The remaining flow (Q_5= 0.9 CFS, Q_{100} = 5.9 CFS) continues downstream to Inlet I04, combining with surface runoff from area A04.

- Basin A04 (3.4 acres, Q_5= 3.1 CFS, Q_{100} = 9.8 CFS) contains lots along streets Esplanade Dr., and Bright Angel Dr. located within proposed Rolling Hills Ranch North Filing 2. The surface runoff will sheet flow off the lots onto the adjacent streets, combining with the surface flow-by from A03, carrying the flow to a proposed forced sump inlet (I04) located at the northwest corner of the intersection of Bright Angel Dr. and Esplande Dr. all of the flow (Q_5= 3.5 CFS, Q_{100} = 14 CFS) is captured and conveyed downstream via an 18" RCP to manhole J05.

- The total pipe flow conveyed to manhole J05 is Q_5= 7.8 CFS, Q_{100} = 26 CFS and is conveyed via a 24" RCP to the existing manhole EJ06 constructed as a part of Rolling Hills Ranch North Filing 1. The Rolling Hills Ranch North Filing 1 storm drain system was designed and constructed in anticipation of the Rolling Hills Ranch North Filing 2 development.

- Basin OS2 (5.3 acres, Q_5= 6.4 CFS, Q_{100} = 16 CFS) contains off-site area west of Rolling Hills Ranch North Filing 1 & 2 within the Estates at Rolling Hills Ranch Filing 2 subdivision along Estate Ridge Dr. The surface runoff will sheet flow off the lots onto Estate Ridge Dr. and continue to an existing flow-by inlet (ExI6) located at the northeast corner of the intersection of Estate Ridge Dr. and Sunrise Ridge Dr. Most of the flow (Q_5= 5.2 CFS, Q_{100} = 11 CFS) is captured and conveyed to an existing manhole (ExJ9) via an 18" RCP then south along Estate Ridge Dr. via a 42" RCP. See Estates at Rolling Hills Ranch Filing 2, prepared by Tech Contractors, September 2020 for more information. The remaining flow (Q_5= 1.2 CFS, Q_{100} = 4.7 CFS) continues downstream along Sunrise Ridge Dr. to Inlet EI05, combining with surface runoff from area A05.

- Basin A05 (5.8 acres, Q_5= 5.4 CFS, Q_{100} = 16 CFS) contains lots along streets Sunrise Ridge Dr., Esplanade Dr., and Bright Angel Dr. located within existing Rolling Hills Ranch North Filing 1 and proposed Rolling Hills Ranch North Filing 2. The surface runoff will sheet flow off the lots onto the adjacent streets, combining with the surface flow-by from OS2, carrying the flow to an existing forced sump inlet (EI05) located at the northwest corner of the intersection of Bright Angel Dr. and Sunrise Ridge Dr. nearly all of the flow (Q_5= 5.4 CFS, Q_{100} = 17 CFS) is captured and conveyed downstream via a 24" RCP to manhole EJ06. The remaining surface flow (Q_{100} = 0.2 CFS) continues along Sunrise Ridge Dr. to Inlet EI06, combining with surface runoff from areas A02 and A06.

Please revise all calculations for the highlighted numbers. These numbers do not match the summary table.

No change

- The total pipe flow conveyed to manhole EJ06 is Q_5= 12 CFS, Q_{100} = 40 CFS and is conveyed via an existing 30" RCP to manholes EJ07A, EJ07B and EJ09 constructed as a part of Rolling Hills Ranch North Filing 1.

- Basin A06 (4.1 acres, Q_5= 4.8 CFS, Q_{100} = 13 CFS) contains lots along streets Sunrise Ridge Dr., Galeros Dr., Esplanade Dr., and Bright Angel Dr. located within existing Rolling Hills Ranch North Filing 1 and proposed Rolling Hills Ranch North Filing 2. The surface runoff will sheet flow off the lots onto the adjacent streets, combining with the surface flow-by from A02 and A05 (combined total: Q_5= 4.8 CFS, Q_{100} = 14 CFS), carrying the flow to an existing forced sump inlet (EI06) constructed as a part of Rolling Hills Ranch North Filing 1 located at the northwest corner of the intersection of Galeros Dr. and Sunrise Ridge Dr. Most of the flow (Q_5= 4.8 CFS, Q_{100} = 9.9 CFS) is captured and conveyed downstream via an existing 18" RCP to the existing manhole J08 where the flow is combined with pipe flow from manhole J03. The remaining surface flow (Q_{100} = 4.0 CFS) continues downstream to Inlet EI08 constructed as a part of Rolling Hills Ranch North Filing 1, combining with surface runoff from areas A07 and A08.

- The total pipe flow conveyed out of manhole EJ08 is Q_5= 12 CFS, Q_{100} = 30 CFS and is conveyed via an existing 24" RCP to manhole EJ09.

- The total pipe flow from EJ07B and EJ08 is conveyed to manhole EJ09 is Q_5= 22 CFS, Q_{100} = 63 CFS and is conveyed via a 42" RCP to manhole EJ11.

- Basin A07 (3.6 acres, Q_5= 4.4 CFS, Q_{100} = 11 CFS) contains lots along Cardenas Drive located within proposed Rolling Hills Ranch North Filing 2. The surface runoff will sheet flow off the lots onto the adjacent street carrying the flow to an existing forced sump inlet (EI07) constructed as a part of Rolling Hills Ranch North Filing 1 located at the northwest corner of the intersection of Sunrise Ridge Dr. and Cardenas Dr. Most of the flow (Q_5= 4.4 CFS, Q_{100} = 9.9 CFS) is captured and conveyed downstream via an 18" RCP to manholes EJ10 & EJ11. The remaining flow (Q_{100} = 1.2 CFS) continues downstream to Inlet EI08, combining with surface runoff from areas A06 and A08.

- Basin A08 (5.7 acres, Q_5= 5.5 CFS, Q_{100} = 15 CFS) contains lots along Sunrise Ridge Dr. and Galeros Dr. located within existing Rolling Hills Ranch North Filing 1 and proposed Rolling Hills Ranch North Filing 2. The surface runoff will sheet flow off the lots onto the adjacent streets, combining with the surface flow-by from A06 and A07, carrying the total flow (Q_5= 5.5 CFS, Q_{100} = 19 CFS) to an existing inlet (EI08) constructed as a part of Rolling Hills Ranch North Filing 1 located at a sump along Sunrise Ridge Dr. Most of the flow (Q_5= 5.5 CFS, Q_{100} = 17 CFS) is captured at inlet EI08. The remaining surface flow (Q_{100} = 2.0 CFS) crosses the centerline of Sunrise Ridge Dr. to inlet I09, combining with surface runoff from area A09.

- The surface flow from inlet EI08 combines the pipe flow from DP2 for a total flow of Q_5= 16 CFS and Q_{100} = 75 CFS and conveyed downstream to manhole EJ11 via a 48" RCP.

Revise calculation of the total flow at EI08 is from sub-basins A06, A07, and A08. Please double-check ALL the calculations to ensure all numbers are consistent throughout the report, and summary table.

No change

- The pipe flow from inlet EI08 and manholes EJ09 & EJ10 combine at manhole EJ11 for a total flow of Q_5= 38 CFS and Q_{100} = 139 CFS and conveyed downstream to inlet EI09 via a 48” RCP.

- Basin A09 (0.2 acres, Q_5= 1.0 CFS, Q_{100} = 1.8 CFS) contains lots along the south side of Sunrise Ridge Dr. located within existing Rolling Hills Ranch North Filing 1. The surface runoff will sheet flow onto the street, combining with the surface flow from A08, for a total flow (Q_5= 1.0 CFS, Q_{100} = 3.1 CFS) at the existing inlet (EI09) located at a sump along Sunrise Ridge Dr. All of the flow (Q_5= 1.0 CFS, Q_{100} = 3.1 CFS) is captured at existing inlet EI09.

- All of the captured flow is combined with upstream flow from manhole EJ11 for a total flow (Q_5= 39 CFS, Q_{100} = 141 CFS) conveyed to end section ES01 via a proposed 48” RCP where it will be discharged to a natural drainage course and directed downstream toward Rex Rd. to exit the site.

Updated to match Water Quality Site Map

Which basin or design point does this flow come from? The description is unclear. If it refers to runoff captured at inlet I10, please revise it to match the summary table.

No change

<u>Storm Drain System B</u>

- Basin B01 (6.4 acres, Q_5= 7.3 CFS, Q_{100} = 19 CFS) contains lots along Chalk Cliffs Dr., Lava Falls Dr., and Shelter Creek Dr. located within proposed Rolling Hills Ranch North Filing 2. The surface runoff will sheet flow off the lots onto the adjacent streets carrying the flow to a proposed forced sump inlet (I10) located at the northwest corner of the intersection of Lava Falls Dr. and Shelter Creek Dr. Most of the flow (Q_5= 7.3 CFS, Q_{100} = 14 CFS) is captured and conveyed downstream via a 24” RCP to manholes EJ12 & EJ13 where the flow is combined with runoff captured by existing inlet EI11. The remaining flow (Q_{100} = 5.1 CFS) continues downstream to existing inlet EI11, combining with surface runoff from area B02.

Revise this calculation.

No change

- Basin B02 (6.2 acres, Q_5= 7.5 CFS, Q_{100} = 19 CFS) contains lots ... Dr., Lava Falls Dr., and Shelter Creek Dr. located within existing Rolling Hills Ranch North Filing 1 and proposed Rolling Hills Ranch North Filing 2. The surface runoff will sheet flow off the lots onto the adjacent streets, combining with the surface flow-by from B01, carrying the flow (Q_5= 7.5 CFS, Q_{100} = 22 CFS) to an existing forced sump inlet (EI11) constructed as a part of Rolling Hills Ranch North Filing 1 located at the northwest corner of the intersection of Sunrise Ridge Dr. and Shelter Creek Dr. Most of the flow (Q_5= 7.5 CFS, Q_{100} = 17 CFS) is captured and conveyed downstream via an 18” RCP to manhole J13 where the flow is combined with runoff captured by inlet I10. The remaining surface flow (Q_{100} = 4.5 CFS) continues downstream to existing inlet EI12, combining with surface runoff from area B03.

- The total pipe flow conveyed to the existing manhole EJ13 is Q_5= 14 CFS, Q_{100} = 30 CFS and is conveyed via a 30” RCP to the existing manhole EJ14. The flow is conveyed via an existing storm drain system constructed as a part of Rolling Hills Ranch North Filing 1. The calculated proposed flow from this report at manhole EJ14 matches the flow from the Rolling Hills Ranch North Filing 1 FDR at the same point. See the approved FDR for Rolling Hills Ranch North Filing 1 dated July 2024 prepared by Tech Contractors. The flow wi[...]rm drain system conveyed downstream

Revised

Please clarify this point. Confirm that the runoff from these basins will be treated before being discharged into the state water and will eventually flow to Detention Pond G before final discharge.

through Rolling Hills Ranch North Filing 1 and the Sanctuary Filing 1 where it is discharged in the existing Pond G

<u>Runoff Reduction</u>

Areas along the eastern tier of lots adjacent to the open space Tract A within the future Rolling Hills Ranch North Filing 2 and immediately adjacent to the regional park will rely on runoff reduction via sheet flow discharge off the rear of the lots. The stormwater flow will be directed southeasterly through the regional park toward Rex Rd. See Appendix F for calculations and exhibits depicting these areas.

- Area A – The runoff from the impervious areas from existing lot 127 of Rolling Hills Ranch North Filing 1 and proposed lots 140 – 144 of Rolling Hills Ranch North Filing 2 will be directed to the rear yards discharging to Tract A of RHRN Filing 2 as sheet flow. The vegetative areas of Tract A will provide the necessary runoff reduction. The runoff will then be directed to a low point near the rear of lot 127 of RHRN Filing 1 then continue easterly through the regional park.
- Area B – The runoff from the impervious areas from proposed lots 130 – 139 of Rolling Hills Ranch North Filing 2 will be directed to the rear yards discharging to Tract A of RHRN Filing 2 as sheet flow. The vegetative areas of Tract A will provide the necessary runoff reduction. The runoff will then continue to sheet flow across the tract to an adjacent drainage swale then continue easterly through the regional park.
- Area C – The runoff from the impervious areas from lots proposed 104 – 116 of Rolling Hills Ranch North Filing 2 will be directed to the rear yards discharging to Tract A of RHRN Filing 2 as sheet flow. The vegetative areas of Tract A will provide the necessary runoff reduction. Some runoff will gather in a natural swale and flow easterly across Tract A. The runoff from other lots will gather within a constructed swale along the rear of lots 117 to 129 across Tract A. The total flow from this area (FG34) continues downstream within a constructed drainage swale exit the site and continue easterly through the regional park.

<u>***DETENTION POND***</u>

Pond G Detention Storage Criteria

Existing Detention Pond G was constructed with grading operations associated with the Rough Grading Plans for Rolling Hills Ranch at Meridian Ranch in anticipation of the future development of the Rolling Hills Ranch in accordance with the approved Sketch Plan. The pond is located within the Gieck Ranch Drainage Basin in the eastern portion of Rolling Hills Ranch adjacent to the Falcon Regional Park. The pond is owned and maintained by the Meridian Service Metropolitan District (MSMD) and a maintenance agreement between the MSMD and El Paso County was recorded with the Rolling Hills Ranch Filing 1 final plat. The facility is functioning as intended, there have been no reported issues associated with the facility.

The existing pond works such that the peak flow rates from the Meridian Ranch development do not adversely affect the drainage patterns downstream of the Meridian Ranch project. A permanent concrete control structure handles the full build out of the Meridian Ranch tributary areas and reduces the developed flows to approximately the historic peak flow rates for the full spectrum of design storms. No modifications are necessary for this project.

The existing concrete control structure the outlet of Pond G will attenuate the peak developed flow rates to approximately historic peak rates for the full spectrum of design storms as per the requirements set forth in Resolution 15-042 adopted by the Board of County Commissioners, County of El Paso. The control structure consists of a water quality control feature, a rectangular slotted orifice located on the front and a grated top to reduce the developed peak flow rates. Table 8 provides summary data for the various design storms for the completed development for all areas tributary to Pond G including Estates at Rolling Hills Ranch Filing 2. Pond G was designed and constructed to receive and discharge interim flow and the anticipated future developed flows and therefore there are no proposed changes to the existing pond or outlet structure.

Table 5: Pond G Summary Data

POND G				
	PEAK INFLOW	PEAK OUTFLOW	PEAK STORAGE	PEAK ELEVATION
	CFS	CFS	AC-FT	FT
FUTURE CONDITIONS				
2-YEAR STORM	37	5.2	5.5	7026.8
5-YEAR STORM	93	19	8.8	7027.5
10-YEAR STORM	168	51	11.3	7027.9
50-YEAR STORM	444	289	19.9	7029.4
100-YEAR STORM	623	444	24.5	7030.1

Downstream Analysis

The developed flow from this project will discharge at the westerly boundary of the Falcon Regional Park (G12), upstream of Eastonville Rd (DP G06). The outlet (DP G12) for the Existing Detention Pond G is located west of the Falcon Regional Park, upstream of Eastonville Rd (DP G06). With the completion of this project, the discharge from Pond G will be 444 CFS during the 100-yr storm event into an existing natural drainage course that traverses the regional park. The 100-year historical peak flow rate at the western boundary of the regional park is 536 CFS. The calculated 100-year developed flow rate will be 83% of the historic flow rate. The developed peak flow rate for the full spectrum of design storms are calculated to be approximate that of the corresponding historic peak flow rates. See Table 6 for a complete comparative list of the peak flow rates for the key design points impacted by the development of Rolling Hills Ranch North.

Table 6: Key Design Point Comparison – Future SCS Model

MERIDIAN RANCH DISCHARGE KEY DESIGN POINTS (FUTURE)						
		PEAK DISCHARGE Q_{100} (CFS)	PEAK DISCHARGE Q_{50} (CFS)	PEAK DISCHARGE Q_{10} (CFS)	PEAK DISCHARGE Q_5 (CFS)	PEAK DISCHARGE Q_2 (CFS)
G12 - POND G OUTLET REGIONAL PARK (G05 - HISTORIC)	Historic	536	350	84	30	5.2
	Future	444	289	51	19	5.2
	% of Historic	83%	83%	60%	65%	100%
G06 - EASTONVILLE ROAD[1]	Historic	551	369	88	32	5.5
	Future	475	307	54	21	5.5
	% of Historic	86%	83%	61%	65%	100%
G14 - OUTLET TO REGIONAL PARK	Historic	38	25	5.8	2.2	0.4
	Future	32	21	5.0	1.9	0.3
	% of Historic	86%	86%	86%	85%	87%
G16 - EASTONVILLE ROAD[1]	Historic	116	77	18	6.8	1.2
	Future	103	67	16	6.5	1.2
	% of Historic	89%	87%	87%	95%	99%

[1] Flow rate at Eastonville Rd. listed for reference only

DRAINAGE FEES

The proposed development falls in the Gieck Ranch Drainage Basin. The entire development occupies 88.17 acres of residential development of which 64.04 acres are residential development and 14.35 acres are designated as right-of-way, the remainder is open space.

The following is the imperviousness calculation:

	Acres	Assumed Imperviousness	Impervious Acres
Open Space	39.84	3%	1.20
Right-of-way	10.19	90%	9.17
Residential Lots	38.14	40% (202 Lots)	15.26
Total	88.17		25.63=29.07% imperv

GIECK RANCH FEES:

Drainage Fees: There are no drainage fees for this basin.

Bridge Fees: There are no bridge fees for this basin.

CONCLUSION

The rational and SCS based hydrologic calculation methods were used to estimate the historic and developed runoff values to determine the impact of this project on surrounding property. The resulting calculations were used to estimate the hydraulic impact on the existing and proposed facilities. Finally, the model storms were analyzed to simulate the impacts of storm events of various return periods on the existing detention pond and downstream facilities. Based on the aforementioned design parameters the development of the project will not adversely affect downstream properties.

EROSION CONTROL DESIGN

General Concept

Historically, erosion on this property has been held to a minimum by a variety of natural features and agricultural practices including:

- Substantial prairie grass growth
- Construction of drainage arresting berms
- Construction of multiple stock ponds along drainage courses

Existing temporary sediment ponds will also help to minimize erosion by reducing both the volume and velocity of the peak runoff.

During construction, best management practices (BMP) for erosion control will be employed based on El Paso county Criteria. BMP's will be utilized as deemed necessary by the contractor and/or engineer and are not limited to the measures shown on the construction drawing set. The contractor shall minimize the amount of area disturbed during all construction activities.

In general the following shall be applied in developing the sequence of major activities:

- Install down-slope and side-slope perimeter BMP's before the land disturbing activity occurs.
- Do not disturb an area until it is necessary for the construction activity to proceed
- Cover or stabilize as soon as possible.
- Time the construction activities to reduce the impacts from seasonal climatic changes or weather events.
- The construction of filtration BMP's should wait until the end of the construction project when upstream drainage areas have been stabilized.
- Do not remove the temporary perimeter controls until after all upstream areas are stabilized.

Four Step Process

The following four step process is recommended for selecting structural BMP's in developing urban areas:

Step 1: Employ Runoff Reduction Practices

> This development incorporates wider rights-of-way than other developments, thus increasing the amount of pervious area within the right-of-way. With the rights-of-way within Meridian Ranch at 60 ft. instead of the normal 50 ft., the amount of pervious area per lineal foot is tripled from 5' wide to 15' wide.
>
> The project has over thirty-five acres of open space, accounting for over 45% of the entire project, creating a lower density development.
>
> Homeowners and builders are encouraged to direct roof drains to the side yards where the runoff will travel overland to the streets and creating an opportunity to allow the runoff to infiltrate into the ground.

Step 2: Stabilize Drainageways

The drainage swale bisecting the site and adjacent to the project was designed to have a wide flat bottom and slope reducing the velocity of the concentrated flow traveling along the drainageway. The construction of the swale also included erosion control along the entire length of the swale.

Step 3: Provide Water Quality Capture Volume (WQCV)

The existing extended detention Pond G with water quality capture volume is located to the south of the project that was designed to accommodate the runoff from this development. The areas east of the drainage course that bisects the project discharge directly to the pond. Existing Detention Pond G was constructed with grading operations associated with the Rolling Hills Ranch Rough Grading Permit (EPC# CON2024) in anticipation of the future development of the final phases of the Meridian Ranch Development in accordance with the approved Sketch Plan. No modifications are necessary for this project.

An existing water quality facility is also located south of the project and adjacent to Rex Rd is and constructed designed to accommodate the volume and settle the suspended solids found in the stormwater prior to being discharged downstream of Rex Rd. The areas adjacent to and west of the drainage course that bisects the project have water quality treatment at this facility. Existing water quality facility was constructed with grading operations associated with the for Rolling Hills Ranch North and Sanctuary Rough Grading Permit at Meridian Ranch (EPC# CON2237) in anticipation of the future development of the final phases of the Meridian Ranch Development in accordance with the approved Sketch Plan. No modifications are necessary for this project.

Areas along the eastern tier of lots adjacent to the open space Tract A and immediately adjacent to the regional park will rely on runoff reduction via sheet flow discharge off the rear of the lots. The vegetative areas of Tract A will provide the necessary runoff reduction. The stormwater flow will be directed southeasterly through the regional park toward Rex Rd. See Appendix D for calculations and exhibits.

All existing detention and water quality facilities are operating as intended and there have been no known reported issues.

See the Water Quality Site Map (Figure 8) in Appendix G for more information on the tributary areas.

Step 4: Consider Need for Industrial and Commercial BMP's

This project is neither industrial nor commercial and therefore this section does not apply.

Detention Pond

The existing detention pond G will act as the primary water quality control for the areas within the eastern portions of the project. Runoff will be collected by the proposed storm drainage system and diverted into the detention pond. The pond will serve a dual purpose: first, by facilitating the settling of sediment in runoff during and after construction (by means of the WQCV) and, second, by releasing the peak flow rates at approximately historical values.

Water Quality Facility

The water quality facility is located on the south boundary of Rolling Hills Ranch North Filing 1 north of Rex Rd. Runoff will be collected by the proposed storm drainage system and diverted the water quality facility in order to allow for suspended solids to settle from the stormwater prior to being discharge downstream of Rex Rd.

Silt Fence

Silt fence and Erosion Bales are not shown on the GEC Plans. Update text or add additional BMPs to GEC Plans.

Silt fence will be place along downstream limits of disturbed areas. This will prevent suspended sediment from leaving the site during infrastructure construction. Silt fencing is to remain in place until vegetation is reestablished.

Erosion Bales

updated to match conversation with Mikayla. October 29

Erosion bales will be [illegible]m the inlet of all culverts during construction to prevent culverts from filling with sediment. Erosion bales will remain in place until vegetation is reestablished. Erosion bale checks will be used on slopes greater than 1 percent to reduce flow velocities until vegetation is reestablished.

Miscellaneous

Best erosion control practices will be utilized as deemed necessary by the Contractor or Engineer and are not limited to the measures described above.

REFERENCES

1. “City of Colorado Springs/El Paso County Drainage Criteria Manual” September 1987, Revised November 1991, Revised October 1994.

2. Chapter 6, Hydrology and Chapter 11, Storage, Section 3.2.1 of the “City of Colorado Springs Drainage Criteria Manual” May 2014.

3. “Volume 2, El Paso County/City of Colorado Springs Drainage Criteria Manual-Stormwater Quality Policies, Procedures and Best Management Practices” November 1, 2002.

4. Flood Insurance Rate Study for El Paso County, Colorado and Incorporated Areas. Federal Emergency Management Agency, Revised March 17, 1997.

5. Soils Survey of El Paso County area, Natural Resources Conservation Services of Colorado.

6. Master Development Drainage Plan Meridian Ranch. August 2000. Prepared by URS Corp.

7. Revision to Master Development Drainage Plan Meridian Ranch. May 2021. Prepared by Tech Contractors.

8. Master Development Drainage Plan Latigo Trails. October 2001. Prepared by URS Corp.

9. “Urban Storm Drainage Criteria Manual” September 1969, Revised January 2016.

10. Final Drainage Report for Rolling Hills Ranch Standalone Grading at Meridian Ranch. March 2020. Prepared by Tech Contractors.

11. Final Drainage Report for Rolling Hills Ranch Standalone North Grading at Meridian Ranch. May 2022. Prepared by Tech Contractors.

12. Final Drainage Report for the Sanctuary Filing 1 at Meridian Ranch. August 2022. Prepared by Tech Contractors.

13. Preliminary Drainage Report for Rolling Hills Ranch North PUD at Meridian Ranch. February 2024. Prepared by Tech Contractors.

14. Final Drainage Report for the Rolling Hills Ranch North Filing 1 at Meridian Ranch. July 2024. Prepared by Tech Contractors.

Appendices

Appendix A - HEC-HMS Data

Input Data

Rolling Hills Ranch North Filing 2 FDR

BASIN	AREA (acre)	AREA (mi^2)	CURVE NO.	LAG TIME (min)
HISTORIC				
OS05	37	0.0578	61.0	15.2
OS06	84	0.1313	61.0	18.7
OS07	21	0.0328	63.1	15.4
OS08	26	0.0406	65.7	15.9
OS09	98	0.1527	65.0	29.5
HG01	35	0.0547	61.0	19.6
HG02	58	0.0906	61.0	25.4
HG03	117	0.1828	61.1	33.8
HG04	57	0.0891	61.0	30.7
HG05	72	0.1125	61.0	31.8
HG06A	88	0.1375	61.0	43.2
HG06B	66	0.1031	61.0	49.5
HG13	54	0.0844	63.1	43.0
HG14	147	0.2297	61.0	45.1

BASIN	AREA (acre)	AREA (mi^2)	CURVE NO.	LAG TIME (min)
FUTURE				
OS05	37	0.0578	61.0	15.2
OS06	84	0.1313	61.0	18.7
OS07ab	11	0.0170	61.0	13.9
OS07c	19	0.0296	61.0	17.4
OS07d	2	0.0034	61.0	13.1
OS08a	16	0.0251	61.0	16.7
OS08b	11	0.0165	61.0	20.3
OS09a	6	0.0093	61.0	20.9
OS09b	28	0.0435	61.0	32.9
FG01	34	0.0538	66.4	33.8
FG02	25	0.0391	64.6	16.1
FG03	13	0.0203	68.0	11.6
FG04	11	0.0172	68.0	7.6
FG05	37	0.0580	70.1	28.4
FG06	43	0.0675	66.1	18.4
FG21a	6	0.0095	62.6	21.4
FG21b	10	0.0150	73.1	12.7
FG22	87	0.1354	69.0	20.3
FG23a	14	0.0216	68.6	18.0
FG23b	15	0.0236	61.8	15.0
FG23c	7	0.0109	65.2	16.1
FG24a	22	0.0348	64.3	21.9
FG24b	38	0.0589	73.4	28.8
FG24c	19	0.0291	75.0	14.7
FG24d	17	0.0262	76.4	13.9
FG25	69	0.1084	74.1	23.8
FG26	36	0.0567	75.0	25.5
FG27	43	0.0679	83.3	22.1
FG28	12	0.0184	64.1	14.8
FG29	63	0.0983	61.2	19.1
FG32	26	0.0406	61.0	33.0
FG34	18	0.0275	63.3	22.1
FG35	19	0.0292	65.3	15.0
FG36	19	0.0295	65.1	25.8
FG37	48	0.0754	62.1	21.0

If this information is from the approved project, please label it as an excerpt from the approved project.

Please highlight only the information relevant to the subject project - Filling No.2.

Please label this as a calculation for the existing condition.

No change per conversation with Daniel (Oct 29, 2024)

COMPOSITE 'C' FACTORS

PROJECT: **Rolling Hills Ranch North Filing 2 FDR** — Date 7/23/2024

BASIN DESIGNATION	AREA (AC.) UNDEV	LATIGO UNDEV.	2.5 AC	1 DU/AC	2 DU/AC	3 DU/AC	4 DU/AC	5 DU/AC	8 DU/AC or more	STREETS	OPEN SPACE PARKS	COMM.	TOTAL	AREA (MI^2)	COMPOSITE 'C' FACTOR	PERCENT IMPERV.
HISTORIC																
OS05	37												37	0.0578	**61.0**	**0.0%**
OS06	84												84	0.1313	**61.0**	**0.0%**
OS07	12		8.7										21	0.0328	**63.1**	**4.6%**
OS08	1.8		24										26	0.0406	**65.7**	**10.2%**
OS09		98											98	0.1527	**65.0**	**0.0%**
HG01	35												35	0.0547	**61.0**	**0.0%**
HG02	58												58	0.0906	**61.0**	**0.0%**
HG03	115	2.3											117	0.1828	**61.1**	**0.0%**
HG04	57												57	0.0891	**61.0**	**0.0%**
HG05	72												72	0.1125	**61.0**	**0.0%**
HG06A	88												88	0.1375	**61.0**	**0.0%**
HG06B	66												66	0.1031	**61.0**	**0.0%**
HG13	32		22										54	0.0844	**63.1**	**4.5%**
HG14	147												147	0.2297	**61.0**	**0.0%**
														1.4995	**Composite**	**0.6%**

BASIN DESIGNATION	AREA (AC.)													AREA (MI^2)	COMPOSITE 'C' FACTOR	PERCENT IMPERV.
	UNDEV	LATIGO UNDEV.	2.5 AC	1 DU/AC	2 DU/AC	3 DU/AC	4 DU/AC	5 DU/AC	8 DU/AC or more	STREETS	OPEN SPACE PARKS	COMM.	TOTAL			
FUTURE																
OS05	37												37	0.0578	**61.0**	**0.0%**
OS06	84												84	0.1313	**61.0**	**0.0%**
OS07ab	11												11	0.0170	**61.0**	**0.0%**
OS07c	19												19	0.0296	**61.0**	**0.0%**
OS07d	2.2												2.2	0.0034	**61.0**	**0.0%**
OS08a	16												16	0.0251	**61.0**	**0.0%**
OS08b	11												11	0.0165	**61.0**	**0.0%**
OS09a	5.9												5.9	0.0093	**61.0**	**0.0%**
OS09b	28												28	0.0435	**61.0**	**0.0%**
FG01	13			19								2.1	34	0.0538	**66.4**	**16.9%**
FG02	12			13									25	0.0391	**64.6**	**10.4%**
FG03				13									13	0.0203	**68.0**	**20.0%**
FG04				11									11	0.0172	**68.0**	**20.0%**
FG05	1.5			33						3.0			37	0.0580	**70.1**	**25.7%**
FG06	15			27						0.9	0.5		43	0.0675	**66.1**	**14.4%**
FG21a	4.7			1.4									6.1	0.0095	**62.6**	**4.6%**
FG21b					3.8						2.5	3.3	9.6	0.0150	**73.1**	**43.1%**
FG22	17			16	48					2.1	0.9	3.3	87	0.1354	**69.0**	**23.4%**
FG23a	3.1				2.8	5.0				0.6	2.3		14	0.0216	**68.6**	**20.6%**
FG23b	14						0.9						15	0.0236	**61.8**	**2.4%**
FG23c	4.9						2.1						7.0	0.0109	**65.2**	**12.0%**
FG24a	18						2.3	2.4					22	0.0348	**64.3**	**8.8%**
FG24b	0.2			4.1	2.7	11.3	14	5.7			0.1		38	0.0589	**73.4**	**34.0%**
FG24c							19						19	0.0291	**75.0**	**40.0%**
FG24d	5.5						5.7			4.8	0.8		17	0.0262	**76.4**	**42.3%**
FG25						9.3	57	0.9			2.6		69	0.1084	**74.1**	**37.3%**
FG26							35			0.3	0.6		36	0.0567	**75.0**	**39.8%**
FG27	2.5							1.7	35	2.8	1.7		43	0.0679	**83.3**	**56.2%**
FG28							1.7		0.1		10		12	0.0184	**64.1**	**8.0%**
FG29	62						0.7						63	0.0983	**61.2**	**0.4%**
FG32	26												26	0.0406	**61.0**	**0.0%**
FG34	15						2.9						18	0.0275	**63.3**	**6.5%**
FG35	14							1.6		1.4	1.2		19	0.0292	**65.3**	**11.3%**
FG36	16									2.1	0.5		19	0.0295	**65.1**	**11.2%**
FG37	15									0.5	33		48	0.0754	**62.1**	**2.4%**
														1.5062	**Composite:**	**16.5%**

LAG TIME

SCS Calculations

PROJECT: **Rolling Hills Ranch North Filing 2 FDR** DATE: 7/23/2024

SUBBASIN DATA			INITIAL/OVERLAND TIME (T_i)						TRAVEL TIME (T_t)					TOTAL	FINAL
BASIN DESIGNATION	P_2	AREA (SQ MI)	LENGTH (FT)	ΔH	SLOPE %	OVERLAND CONVEYANCE TYPE	n	T_i (Min.)*	LENGTH (FT)	ΔH	TRAVEL CONVEYANCE TYPE	VEL. (FPS)	T_t (Min.)**	T_i+T_t (Min.)	T_{lag} (min)
OS05	1.88	0.058	200	10	5.0%	GP	0.15	15.4	2100	115	G	3.5	10.0	25.4	**15.2**
OS06	1.88	0.131	200	9	4.5%	GP	0.15	16.1	2840	125	G	3.1	15.0	31.1	**18.7**
OS07	1.88	0.033	200	6	3.0%	GP	0.15	18.9	1080	35	G	2.7	6.7	25.6	**15.4**
OS08	1.88	0.041	300	26	8.7%	GP	0.15	17.1	1535	50	G	2.7	9.5	26.6	**15.9**
OS09	1.88	0.153	200	4	2.0%	GP	0.15	22.3	3525	75	G	2.2	26.9	49.1	**29.5**
HG01	1.88	0.055	300	11.0	3.7%	GP	0.15	24.2	1495	56	G	2.9	8.6	32.7	**19.6**
HG02	1.88	0.091	300	10.0	3.3%	GP	0.15	25.1	2755	87	G	2.7	17.2	42.3	**25.4**
HG03	1.88	0.183	300	8.0	2.7%	GP	0.15	27.4	4270	115	G	2.5	28.9	56.3	**33.8**
HG04	1.88	0.089	300	8.0	2.7%	GP	0.15	27.4	4205	120	N	3.0	23.7	51.1	**30.7**
HG05	1.88	0.113	300	9.0	3.0%	GP	0.15	26.2	4085	117	G	2.5	26.8	53.0	**31.8**
HG06A	1.88	0.138	725	20.0	2.8%	GP	0.15	54.8	2750	64	N	2.7	17.2	72.0	**43.2**
HG06B	1.88	0.103	955	27.0	2.8%	GP	0.15	67.7	1750	22	N	2.0	14.9	82.6	**49.5**
HG13	1.88	0.084	745	27.0	3.6%	GP	0.15	50.2	3225	90	G	2.5	21.5	71.7	**43.0**
HG14	1.88	0.230	550	14.0	2.5%	GP	0.15	45.4	3650	68	G	2.0	29.7	75.1	**45.1**

TIME OF CONCENTRATION

SUBBASIN DATA			INITIAL/OVERLAND TIME (T_i)						TRAVEL TIME (T_t)					TOTAL	FINAL
BASIN DESIGNATION	P_2	AREA (SQ MI)	LENGTH (FT)	ΔH	SLOPE %	OVERLAND CONVEYANCE TYPE	n	T_i (Min.)*	LENGTH (FT)	ΔH	TRAVEL CONVEYANCE TYPE	VEL. (FPS)	T_t (Min.)**	T_i+T_t (Min.)	T_{lag} (min)
FUTURE															
OS05	1.88	0.058	FROM APPROVED MERIDIAN RANCH FILING MDDP, JAN 2018											25.4	**15.2**
OS06	1.88	0.131												31.1	**18.7**
OS07ab	1.88	0.017	285	19.0	6.7%	GP	0.15	18.3	950	45	G	3.3	4.8	23.1	**13.9**
OS07c	1.88	0.030	270	18.0	6.7%	GP	0.15	17.5	1620	40	G	2.4	11.5	28.9	**17.4**
OS07d	1.88	0.003	250	10.0	4.0%	GP	0.15	20.2	185	2	N	1.8	1.7	21.9	**13.1**
OS08a	1.88	0.025	275	11.0	4.0%	GP	0.15	21.8	1000	24	N	2.7	6.1	27.9	**16.7**
OS08b	1.88	0.017	420	20.0	4.8%	GP	0.15	28.5	830	18	N	2.6	5.4	33.8	**20.3**
OS09a	1.88	0.009	455	18.0	4.0%	GP	0.15	32.7	385	12	N	3.1	2.1	34.8	**20.9**
OS09b	1.88	0.043	495	28.0	5.7%	GD	0.24	44.2	1725	41	N	2.7	10.7	54.8	**32.9**
FG01	1.88	0.054	FROM APPROVED MERIDIAN RANCH FILING MDDP, JAN 2018											56.4	**33.8**
FG02	1.88	0.039												26.9	**16.1**
FG03	1.88	0.020												19.3	**11.6**
FG04	1.88	0.017												12.6	**7.6**
FG05	1.88	0.058	300	8.0	2.7%	GP	0.15	27.4	3690	88	P	3.1	19.9	47.4	**28.4**
FG06	1.88	0.068	220	20.0	9.1%	GP	0.15	13.1	2250	46	G	2.1	17.5	30.6	**18.4**
FG21a	1.88	0.010	FROM APPROVED ESTATES AT ROLLING HILLS RANCH GRADING FDR, MAR 2020											35.6	**21.4**
FG21b	1.88	0.015	145	6.0	4.1%	GP	0.15	12.9	1255	36	G	2.5	8.2	21.1	**12.7**
FG22	1.88	0.135	FROM RATIONAL CALCULATIONS ESTATES AT ROLLING HILLS RANCH FILING 2											33.9	**20.3**
FG23a	1.88	0.022	185	9.0	4.9%	GD	0.24	21.3	1685	45	P	3.3	8.6	29.9	**18.0**
FG23b	1.88	0.024	180	13.0	7.2%	GP	0.15	12.2	1795	32	N	2.3	12.8	25.0	**15.0**
FG23c	1.88	0.011	200	11.0	5.5%	GD	0.24	21.6	770	15	N	2.4	5.3	26.9	**16.1**
FG24a	1.88	0.035	350	22.0	6.3%	GP	0.15	22.0	2355	57	N	2.7	14.4	36.4	**21.9**
FG24b	1.88	0.059	325	16.0	4.9%	GD	0.24	33.3	2350	42	P	2.7	14.7	48.1	**28.8**
FG24c	1.88	0.029	70	3.0	4.3%	GD	0.24	10.3	2075	31	P	2.4	14.1	24.5	**14.7**
FG24d	1.88	0.026	50	1.0	2.0%	GD	0.24	10.7	2065	39	P	2.7	12.5	23.2	**13.9**
FG25	1.88	0.108	FROM RATIONAL CALCULATIONS ROLLING HILLS RANCH FILING 3											39.7	**23.8**
FG26	1.88	0.057	145	2.0	1.4%	GD	0.24	29.1	2430	55	P	3.0	13.5	42.5	**25.5**
FG27	1.88	0.068	100	4.0	4.0%	GD	0.24	14.1	2935	34	P	2.2	22.7	36.8	**22.1**
FG28	1.88	0.018	100	2.0	2.0%	GD	0.24	18.6	340	6	L	0.9	6.1	24.7	**14.8**
FG29	1.88	0.098	255	14.0	5.5%	GP	0.15	18.0	1890	32	N	2.3	13.8	31.9	**19.1**
FG32	1.88	0.041	280	4.0	1.4%	GD	0.24	48.5	1345	40	P	3.4	6.5	55.0	**33.0**
FG34	1.88	0.027	305	22.0	7.2%	GP	0.15	18.7	2850	64	N	2.6	18.1	36.8	**22.1**
FG35	1.88	0.029	165	7.0	4.2%	GP	0.15	14.1	1450	32	G	2.2	10.8	25.0	**15.0**
FG36	1.88	0.030	305	7.0	2.3%	GP	0.15	29.5	1770	38	G	2.2	13.4	42.9	**25.8**
FG37	1.88	0.075	305	15.0	4.9%	GP	0.15	21.8	1780	40	G	2.2	13.2	35.0	**21.0**

TYPE OF SURFACE		n
SMOOTH SURFACES (conc, asph, gravel, bare soil, etc)	S	0.0110
FALLOW (no cover)	F	0.0500
CULTIVATED SOILS (<20% cover)	CL	0.0600
CULTIVATED SOILS (>20% cover)	CG	0.1700
GRASS (Short prairie grass)	GP	0.1500
GRASS (Dense grass)	GD	0.2400
GRASS (Bermuda grass)	GB	0.4100
RANGE (Natural)	R	0.1300
WOODS (Light Underbrush)	WL	0.4000
WOODS (Dense Underbrush)	WD	0.8000

Notes: * $T_i = 0.42\ (n \bullet L)^{0.8} / (P_2)^{0.5} \bullet S^{0.4}$ (min)

** $T_t = L/60 \bullet V$ (min)

TYPE OF SURFACE	
HEAVY MEADOW	H
TILLAGE/FIELD	T
RIPRAP (not buried)	R
SHORT PASTURE AND LAWNS	L
NEARLY BARE GROUND	B
GRASSED WATERWAY	G
NATURAL SANDY CHANNEL	N
PAVED AREAS	P

NOAA Atlas 14, Volume 8, Version 2
Location name: Peyton, Colorado, USA*
Latitude: 38.9783°, Longitude: -104.5842°
Elevation: 7054.14 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Deborah Martin, Sandra Pavlovic, Ishani Roy, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Michael Yekta, Geoffery Bonnin

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.239** (0.190-0.301)	**0.291** (0.232-0.367)	**0.381** (0.302-0.482)	**0.460** (0.363-0.585)	**0.576** (0.442-0.764)	**0.670** (0.501-0.899)	**0.770** (0.556-1.06)	**0.875** (0.606-1.23)	**1.02** (0.680-1.48)	**1.14** (0.737-1.66)
10-min	**0.349** (0.278-0.441)	**0.426** (0.339-0.538)	**0.558** (0.443-0.706)	**0.674** (0.532-0.857)	**0.843** (0.647-1.12)	**0.982** (0.734-1.32)	**1.13** (0.814-1.55)	**1.28** (0.888-1.80)	**1.50** (0.996-2.16)	**1.67** (1.08-2.44)
15-min	**0.426** (0.340-0.538)	**0.519** (0.413-0.656)	**0.680** (0.540-0.861)	**0.822** (0.648-1.04)	**1.03** (0.789-1.36)	**1.20** (0.895-1.61)	**1.37** (0.993-1.89)	**1.56** (1.08-2.20)	**1.82** (1.22-2.64)	**2.03** (1.31-2.97)
30-min	**0.608** (0.485-0.768)	**0.741** (0.590-0.936)	**0.969** (0.769-1.23)	**1.17** (0.923-1.49)	**1.46** (1.12-1.94)	**1.70** (1.27-2.28)	**1.95** (1.41-2.68)	**2.21** (1.53-3.12)	**2.58** (1.72-3.73)	**2.87** (1.86-4.20)
60-min	**0.778** (0.620-0.982)	**0.934** (0.744-1.18)	**1.21** (0.962-1.54)	**1.47** (1.16-1.86)	**1.84** (1.42-2.46)	**2.16** (1.62-2.91)	**2.50** (1.81-3.44)	**2.87** (1.99-4.05)	**3.38** (2.26-4.91)	**3.80** (2.46-5.56)
2-hr	**0.948** (0.762-1.19)	**1.13** (0.905-1.41)	**1.46** (1.16-1.83)	**1.76** (1.40-2.22)	**2.23** (1.73-2.96)	**2.62** (1.99-3.51)	**3.05** (2.23-4.18)	**3.52** (2.47-4.95)	**4.19** (2.82-6.04)	**4.73** (3.09-6.87)
3-hr	**1.04** (0.839-1.29)	**1.22** (0.986-1.52)	**1.57** (1.26-1.96)	**1.90** (1.51-2.38)	**2.41** (1.90-3.21)	**2.86** (2.18-3.83)	**3.35** (2.47-4.59)	**3.90** (2.75-5.47)	**4.68** (3.18-6.75)	**5.33** (3.50-7.71)
6-hr	**1.21** (0.980-1.49)	**1.40** (1.14-1.73)	**1.78** (1.44-2.21)	**2.16** (1.74-2.68)	**2.76** (2.19-3.65)	**3.29** (2.53-4.38)	**3.88** (2.88-5.28)	**4.53** (3.23-6.34)	**5.49** (3.76-7.88)	**6.29** (4.17-9.04)
12-hr	**1.39** (1.14-1.70)	**1.62** (1.33-1.98)	**2.06** (1.68-2.53)	**2.48** (2.02-3.06)	**3.16** (2.53-4.14)	**3.76** (2.92-4.96)	**4.42** (3.31-5.97)	**5.15** (3.70-7.14)	**6.22** (4.30-8.85)	**7.10** (4.75-10.1)
24-hr	**1.61** (1.33-1.95)	**1.88** (1.55-2.29)	**2.39** (1.97-2.92)	**2.88** (2.35-3.52)	**3.63** (2.91-4.69)	**4.27** (3.34-5.58)	**4.98** (3.75-6.66)	**5.75** (4.17-7.90)	**6.87** (4.78-9.70)	**7.79** (5.25-11.1)
2-day	**1.86** (1.55-2.24)	**2.19** (1.83-2.64)	**2.79** (2.31-3.36)	**3.33** (2.75-4.04)	**4.15** (3.35-5.30)	**4.85** (3.81-6.25)	**5.59** (4.25-7.39)	**6.40** (4.67-8.70)	**7.55** (5.30-10.6)	**8.49** (5.77-12.0)
3-day	**2.04** (1.71-2.45)	**2.41** (2.01-2.88)	**3.05** (2.54-3.66)	**3.63** (3.01-4.38)	**4.51** (3.65-5.71)	**5.24** (4.14-6.72)	**6.03** (4.59-7.92)	**6.87** (5.03-9.29)	**8.07** (5.69-11.2)	**9.04** (6.18-12.7)
4-day	**2.20** (1.85-2.62)	**2.58** (2.16-3.08)	**3.25** (2.72-3.89)	**3.86** (3.21-4.63)	**4.77** (3.87-6.01)	**5.53** (4.38-7.06)	**6.34** (4.85-8.31)	**7.22** (5.31-9.73)	**8.46** (5.98-11.7)	**9.46** (6.50-13.2)
7-day	**2.60** (2.20-3.08)	**3.00** (2.54-3.56)	**3.71** (3.13-4.41)	**4.36** (3.65-5.20)	**5.33** (4.36-6.67)	**6.14** (4.89-7.78)	**7.00** (5.40-9.11)	**7.93** (5.87-10.6)	**9.26** (6.59-12.8)	**10.3** (7.14-14.4)
10-day	**2.96** (2.51-3.48)	**3.39** (2.88-4.00)	**4.16** (3.52-4.92)	**4.85** (4.08-5.76)	**5.88** (4.82-7.31)	**6.73** (5.38-8.48)	**7.63** (5.91-9.88)	**8.61** (6.39-11.5)	**9.97** (7.13-13.7)	**11.1** (7.70-15.4)
20-day	**3.95** (3.38-4.61)	**4.55** (3.89-5.32)	**5.57** (4.75-6.52)	**6.44** (5.46-7.58)	**7.68** (6.32-9.39)	**8.67** (6.97-10.8)	**9.69** (7.54-12.4)	**10.8** (8.04-14.1)	**12.2** (8.79-16.6)	**13.3** (9.36-18.4)
30-day	**4.75** (4.09-5.51)	**5.49** (4.72-6.38)	**6.70** (5.74-7.81)	**7.72** (6.58-9.04)	**9.12** (7.52-11.1)	**10.2** (8.24-12.6)	**11.3** (8.83-14.3)	**12.4** (9.32-16.2)	**13.9** (10.1-18.7)	**15.0** (10.6-20.6)
45-day	**5.73** (4.96-6.62)	**6.62** (5.72-7.65)	**8.05** (6.93-9.33)	**9.21** (7.89-10.7)	**10.8** (8.91-12.9)	**12.0** (9.68-14.6)	**13.1** (10.3-16.5)	**14.3** (10.7-18.5)	**15.8** (11.4-21.1)	**16.9** (12.0-23.0)
60-day	**6.56** (5.70-7.55)	**7.55** (6.55-8.69)	**9.12** (7.88-10.5)	**10.4** (8.92-12.0)	**12.1** (9.98-14.4)	**13.3** (10.8-16.1)	**14.5** (11.4-18.1)	**15.6** (11.8-20.2)	**17.1** (12.5-22.8)	**18.2** (12.9-24.8)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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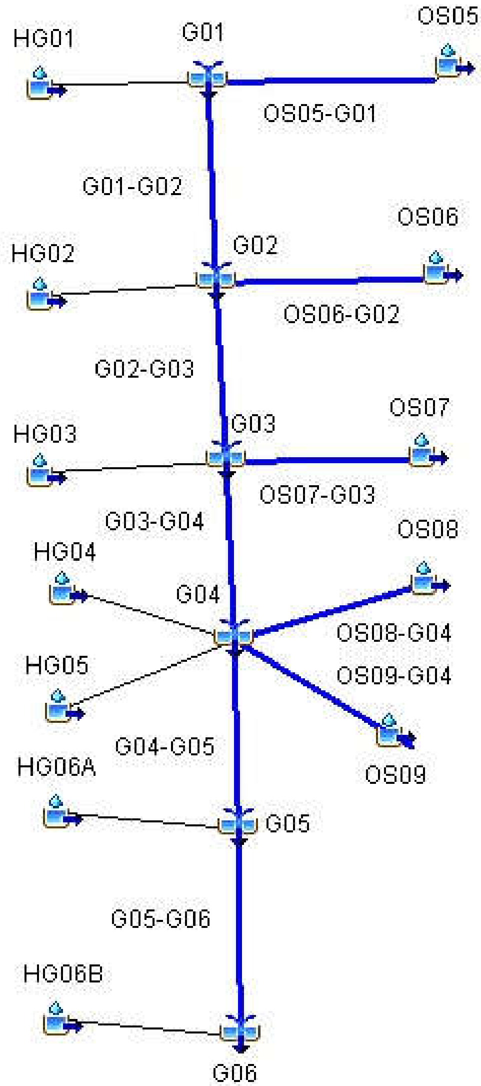
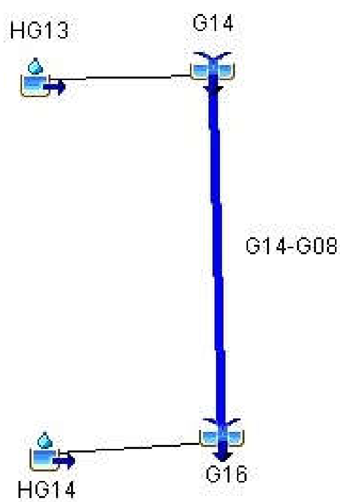
HISTORIC CONDITIONS





HISTORIC SCS (100-YEAR)				
HYDROLOGIC ELEMENT	DRAINAGE AREA (SQ. MI.)	DISCHARGE PEAK Q100 (CFS)	TIME OF PEAK	TOTAL VOLUME Q100 (AC. FT.)
OS06	0.1313	80	01Jul2015, 12:12	9.3
OS06-G02	0.1313	77	01Jul2015, 12:24	9.2
OS05	0.0578	39	01Jul2015, 12:12	4.1
OS05-G01	0.0578	38	01Jul2015, 12:12	4.1
HG01	0.0547	32	01Jul2015, 12:12	3.9
G01	0.1125	70	01Jul2015, 12:12	7.9
G01-G02	0.1125	68	01Jul2015, 12:24	7.8
HG02	0.0906	45	01Jul2015, 12:24	6.4
G02	0.3344	191	01Jul2015, 12:24	23
G02-G03	0.3344	190	01Jul2015, 12:30	23
HG03	0.1828	77	01Jul2015, 12:30	13
OS07	0.0328	25	01Jul2015, 12:12	2.6
OS07-G03	0.0328	24	01Jul2015, 12:30	2.5
G03	0.5500	291	01Jul2015, 12:30	38
G03-G04	0.5500	281	01Jul2015, 12:30	38
OS09	0.1547	91	01Jul2015, 12:24	13
OS09-G04	0.1547	90	01Jul2015, 12:30	13
HG04	0.0891	40	01Jul2015, 12:30	6.3
HG05	0.1125	49	01Jul2015, 12:30	7.9
OS08	0.0406	35	01Jul2015, 12:12	3.6
OS08-G04	0.0406	34	01Jul2015, 12:30	3.5
G04	0.9469	493	01Jul2015, 12:30	69
G04-G05	0.9469	488	01Jul2015, 12:36	68
HG06A	0.1375	49	01Jul2015, 12:42	9.6
G05	1.0844	536	01Jul2015, 12:36	78
G05-G06	1.0844	520	01Jul2015, 12:36	78
HG06B	0.1031	33	01Jul2015, 12:48	7.2
G06	1.1875	551	01Jul2015, 12:42	85
HG14	0.2297	79	01Jul2015, 12:42	16
HG13	0.1053	38	01Jul2015, 12:42	7.4
G14	0.1053	38	01Jul2015, 12:42	7.4
G14-G16	0.1053	37	01Jul2015, 12:48	7.3
G16	0.3350	116	01Jul2015, 12:48	23

HISTORIC SCS (50-YEAR)				
HYDROLOGIC ELEMENT	DRAINAGE AREA (SQ. MI.)	DISCHARGE PEAK Q50 (CFS)	TIME OF PEAK	TOTAL VOLUME Q50 (AC. FT.)
OS06	0.1313	52	01Jul2015, 12:12	6.5
OS06-G02	0.1313	52	01Jul2015, 12:24	6.4
OS05	0.0578	26	01Jul2015, 12:12	2.9
OS05-G01	0.0578	25	01Jul2015, 12:18	2.9
HG01	0.0547	21	01Jul2015, 12:18	2.7
G01	0.1125	46	01Jul2015, 12:18	5.6
G01-G02	0.1125	46	01Jul2015, 12:24	5.5
HG02	0.0906	30	01Jul2015, 12:24	4.5
G02	0.3344	127	01Jul2015, 12:24	16
G02-G03	0.3344	125	01Jul2015, 12:30	16
HG03	0.1828	51	01Jul2015, 12:30	9.1
OS07	0.0328	17	01Jul2015, 12:12	1.9
OS07-G03	0.0328	17	01Jul2015, 12:30	1.8
G03	0.5500	192	01Jul2015, 12:30	27
G03-G04	0.5500	189	01Jul2015, 12:36	27
OS09	0.1547	63	01Jul2015, 12:24	9.6
OS09-G04	0.1547	62	01Jul2015, 12:36	9.4
HG04	0.0891	26	01Jul2015, 12:30	4.4
HG05	0.1125	32	01Jul2015, 12:30	5.6
OS08	0.0406	25	01Jul2015, 12:12	2.6
OS08-G04	0.0406	24	01Jul2015, 12:36	2.5
G04	0.9469	332	01Jul2015, 12:36	49
G04-G05	0.9469	318	01Jul2015, 12:42	48
HG06A	0.1375	32	01Jul2015, 12:42	6.7
G05	1.0844	350	01Jul2015, 12:42	55
G05-G06	1.0844	348	01Jul2015, 12:42	55
HG06B	0.1031	22	01Jul2015, 12:54	5.0
G06	1.1875	369	01Jul2015, 12:42	60
HG14	0.2297	52	01Jul2015, 12:48	11
HG13	0.1053	25	01Jul2015, 12:42	5.2
G14	0.1053	25	01Jul2015, 12:42	5.2
G14-G16	0.1053	25	01Jul2015, 12:48	5.1
G16	0.3350	77	01Jul2015, 12:48	16

HISTORIC SCS (10-YEAR)				
HYDROLOGIC ELEMENT	DRAINAGE AREA (SQ. MI.)	DISCHARGE PEAK Q10 (CFS)	TIME OF PEAK	TOTAL VOLUME Q10 (AC. FT.)
OS06	0.1313	12	01Jul2015, 12:18	2.2
OS06-G02	0.1313	11	01Jul2015, 12:30	2.1
OS05	0.0578	5.6	01Jul2015, 12:12	1.0
OS05-G01	0.0578	5.5	01Jul2015, 12:24	0.9
HG01	0.0547	4.7	01Jul2015, 12:18	0.9
G01	0.1125	10	01Jul2015, 12:24	1.9
G01-G02	0.1125	10	01Jul2015, 12:36	1.8
HG02	0.0906	6.7	01Jul2015, 12:30	1.5
G02	0.3344	27	01Jul2015, 12:36	5.4
G02-G03	0.3344	27	01Jul2015, 12:48	5.3
HG03	0.1828	12	01Jul2015, 12:42	3.0
OS07	0.0328	4.5	01Jul2015, 12:12	0.7
OS07-G03	0.0328	4.3	01Jul2015, 12:48	0.7
G03	0.5500	42	01Jul2015, 12:48	8.9
G03-G04	0.5500	42	01Jul2015, 12:54	8.8
OS09	0.1547	19	01Jul2015, 12:30	3.6
OS09-G04	0.1547	18	01Jul2015, 12:42	3.5
HG04	0.0891	5.9	01Jul2015, 12:36	1.5
HG05	0.1125	7.4	01Jul2015, 12:36	1.8
OS08	0.0406	7.7	01Jul2015, 12:12	1.0
OS08-G04	0.0406	7.4	01Jul2015, 12:48	1.0
G04	0.9469	76	01Jul2015, 12:54	17
G04-G05	0.9469	76	01Jul2015, 12:54	16
HG06A	0.1375	7.6	01Jul2015, 12:54	2.2
G05	1.0844	84	01Jul2015, 12:54	19
G05-G06	1.0844	83	01Jul2015, 13:00	19
HG06B	0.1031	5.3	01Jul2015, 13:00	1.7
G06	1.1875	88	01Jul2015, 13:00	20
HG14	0.2297	12	01Jul2015, 12:54	3.7
HG13	0.1053	5.8	01Jul2015, 12:54	1.7
G14	0.1053	5.8	01Jul2015, 12:54	1.7
G14-G16	0.1053	5.8	01Jul2015, 13:00	1.7
G16	0.3350	18	01Jul2015, 13:00	5.4

HISTORIC SCS (5-YEAR)				
HYDROLOGIC ELEMENT	DRAINAGE AREA (SQ. MI.)	DISCHARGE PEAK Q5 (CFS)	TIME OF PEAK	TOTAL VOLUME Q5 (AC. FT.)
OS06	0.1313	3.8	01Jul2015, 12:24	1.1
OS06-G02	0.1313	3.7	01Jul2015, 12:42	1.1
OS05	0.0578	1.8	01Jul2015, 12:18	0.5
OS05-G01	0.0578	1.7	01Jul2015, 12:30	0.5
HG01	0.0547	1.5	01Jul2015, 12:24	0.5
G01	0.1125	3.2	01Jul2015, 12:30	1.0
G01-G02	0.1125	3.2	01Jul2015, 12:48	0.9
HG02	0.0906	2.3	01Jul2015, 12:36	0.8
G02	0.3344	9.0	01Jul2015, 12:42	2.8
G02-G03	0.3344	9.0	01Jul2015, 13:00	2.7
HG03	0.1828	4.3	01Jul2015, 12:48	1.6
OS07	0.0328	1.7	01Jul2015, 12:18	0.4
OS07-G03	0.0328	1.7	01Jul2015, 13:00	0.4
G03	0.5500	15	01Jul2015, 13:00	4.6
G03-G04	0.5500	14	01Jul2015, 13:12	4.5
OS09	0.1547	8.3	01Jul2015, 12:36	2.1
OS09-G04	0.1547	8.3	01Jul2015, 12:48	2.0
HG04	0.0891	2.1	01Jul2015, 12:42	0.8
HG05	0.1125	2.6	01Jul2015, 12:42	0.9
OS08	0.0406	3.4	01Jul2015, 12:12	0.6
OS08-G04	0.0406	3.4	01Jul2015, 13:00	0.6
G04	0.9469	28	01Jul2015, 13:12	8.7
G04-G05	0.9469	27	01Jul2015, 13:18	8.6
HG06A	0.1375	2.9	01Jul2015, 13:00	1.1
G05	1.0844	30	01Jul2015, 13:18	9.8
G05-G06	1.0844	30	01Jul2015, 13:24	9.6
HG06B	0.1031	2.0	01Jul2015, 13:12	0.9
G06	1.1875	32	01Jul2015, 13:24	10
HG14	0.2297	4.7	01Jul2015, 13:06	1.9
HG13	0.1053	2.2	01Jul2015, 13:00	0.9
G14	0.1053	2.2	01Jul2015, 13:00	0.9
G14-G16	0.1053	2.2	01Jul2015, 13:18	0.9
G16	0.3350	6.8	01Jul2015, 13:12	2.8

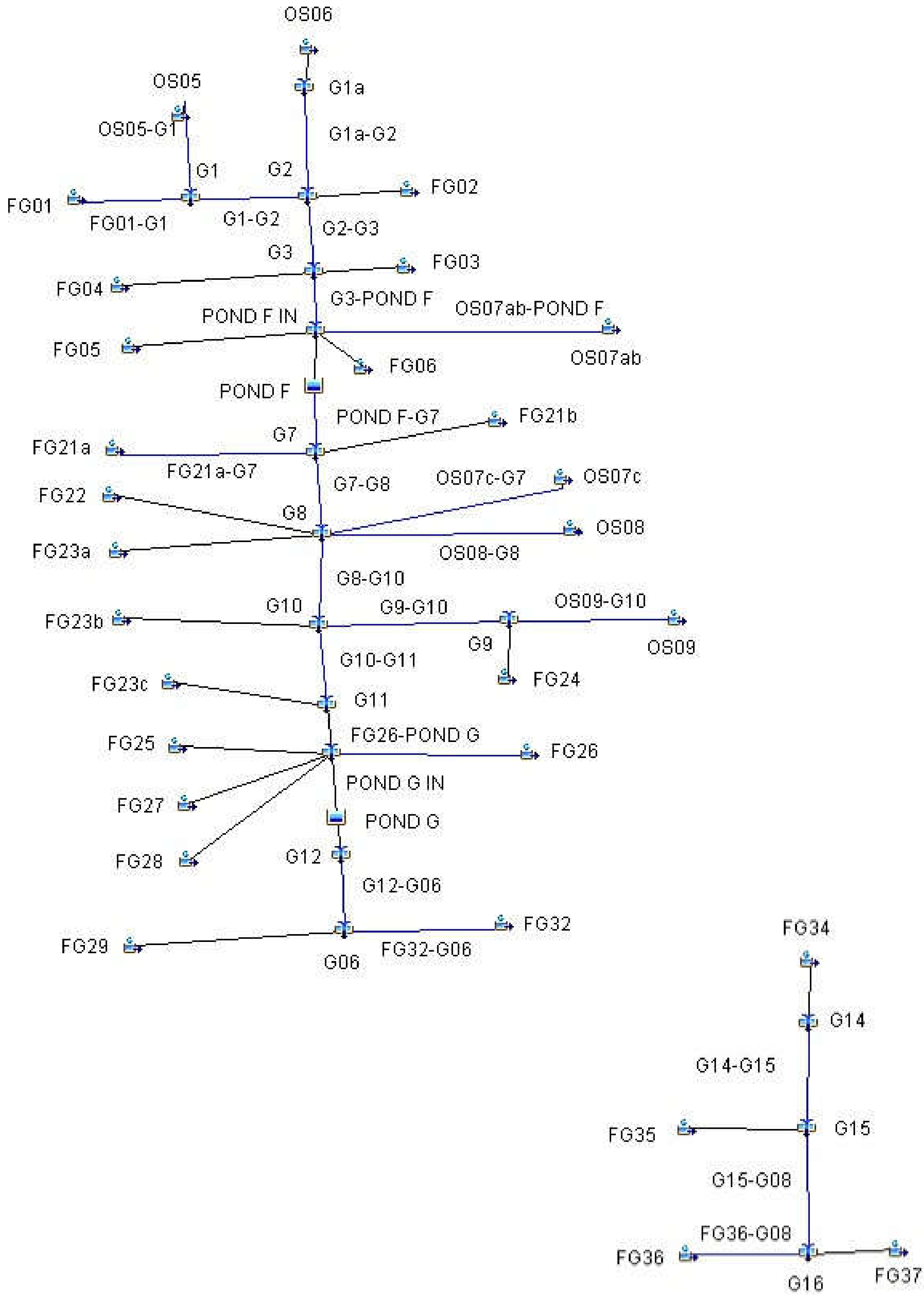
HISTORIC SCS (2-YEAR)				
HYDROLOGIC ELEMENT	DRAINAGE AREA (SQ. MI.)	DISCHARGE PEAK Q2 (CFS)	TIME OF PEAK	TOTAL VOLUME Q2 (AC. FT.)
OS06	0.1313	0.52	01Jul2015, 13:30	0.3
OS06-G02	0.1313	0.52	01Jul2015, 14:00	0.3
OS05	0.0578	0.23	01Jul2015, 13:24	0.2
OS05-G01	0.0578	0.23	01Jul2015, 13:42	0.2
HG01	0.0547	0.22	01Jul2015, 13:36	0.1
G01	0.1125	0.45	01Jul2015, 13:36	0.3
G01-G02	0.1125	0.45	01Jul2015, 14:06	0.3
HG02	0.0906	0.36	01Jul2015, 13:42	0.2
G02	0.3344	1.3	01Jul2015, 14:00	0.8
G02-G03	0.3344	1.3	01Jul2015, 14:30	0.8
HG03	0.1828	0.72	01Jul2015, 13:54	0.5
OS07	0.0328	0.26	01Jul2015, 12:54	0.1
OS07-G03	0.0328	0.26	01Jul2015, 14:12	0.1
G03	0.5500	2.3	01Jul2015, 14:24	1.4
G03-G04	0.5500	2.3	01Jul2015, 14:42	1.3
OS09	0.1547	1.9	01Jul2015, 12:54	0.8
OS09-G04	0.1547	1.9	01Jul2015, 13:18	0.8
HG04	0.0891	0.34	01Jul2015, 13:48	0.2
HG05	0.1125	0.43	01Jul2015, 13:54	0.3
OS08	0.0406	0.72	01Jul2015, 12:24	0.2
OS08-G04	0.0406	0.72	01Jul2015, 13:36	0.2
G04	0.9469	4.7	01Jul2015, 14:36	2.8
G04-G05	0.9469	4.7	01Jul2015, 14:48	2.8
HG06A	0.1375	0.51	01Jul2015, 14:12	0.3
G05	1.0844	5.2	01Jul2015, 14:48	3.1
G05-G06	1.0844	5.2	01Jul2015, 15:00	3.0
HG06B	0.1031	0.37	01Jul2015, 14:24	0.3
G06	1.1875	5.5	01Jul2015, 15:00	3.3
HG14	0.2297	0.84	01Jul2015, 14:18	0.6
HG13	0.1053	0.39	01Jul2015, 14:12	0.3
G14	0.1053	0.39	01Jul2015, 14:12	0.3
G14-G16	0.1053	0.39	01Jul2015, 14:36	0.3
G16	0.3350	1.2	01Jul2015, 14:24	0.8

Highlighted green rows reference key design points (Typical all charts this section)

FUTURE SCS (100-YEAR)				
HYDROLOGIC ELEMENT	DRAINAGE AREA (SQ. MI.)	PEAK DISCHARGE Q100 (CFS)	TIME OF PEAK	TOTAL VOLUME Q100 (AC. FT.)
OS06	0.1313	80	01Jul2015, 12:12	9.3
G1a	0.1313	80	01Jul2015, 12:12	9.3
G1a-G2	0.1313	79	01Jul2015, 12:18	9.2
OS05	0.0578	39	01Jul2015, 12:12	4.1
OS05-G1	0.0578	39	01Jul2015, 12:12	4.1
FG01	0.0538	31	01Jul2015, 12:30	4.9
FG01-G1	0.0538	31	01Jul2015, 12:30	4.9
G1	0.1116	61	01Jul2015, 12:18	9.0
G1-G2	0.1116	61	01Jul2015, 12:18	9.0
FG02	0.0391	32	01Jul2015, 12:12	3.3
G2	0.2820	167	01Jul2015, 12:18	21
G2-G3	0.2820	162	01Jul2015, 12:18	21
FG03	0.0203	24	01Jul2015, 12:06	2.0
FG04	0.0172	22	01Jul2015, 12:00	1.7
G3	0.3195	184	01Jul2015, 12:18	25
FG06	0.0675	56	01Jul2015, 12:12	6.1
FG05	0.0580	45	01Jul2015, 12:24	6.1
OS07ab	0.0170	12	01Jul2015, 12:06	1.2
OS07ab-POND F	0.0170	12	01Jul2015, 12:18	1.2
POND F IN	0.4620	292	01Jul2015, 12:18	38
POND F	0.4620	177	01Jul2015, 12:42	36
POND F-G7	0.4620	177	01Jul2015, 12:42	36
OS07c	0.0296	19	01Jul2015, 12:12	2.1
OS07c-G4	0.0296	18	01Jul2015, 12:18	2.1
FG21a	0.0095	5.9	01Jul2015, 12:18	0.7
G4	0.0391	24	01Jul2015, 12:18	2.8
G4-G7	0.0391	23	01Jul2015, 12:18	2.8
FG21b	0.0150	21	01Jul2015, 12:06	1.8
G7	0.5161	194	01Jul2015, 12:42	40
G7-G8	0.5161	194	01Jul2015, 12:42	40
FG22	0.1354	121	01Jul2015, 12:12	14
OS08a	0.0251	16	01Jul2015, 12:12	1.8
OS08-G8	0.0251	16	01Jul2015, 12:18	1.8
FG23a	0.0216	21	01Jul2015, 12:12	2.2
OS07d	0.0034	2.5	01Jul2015, 12:06	0.2
OS07d-G8	0.0034	2.4	01Jul2015, 12:12	0.2
G8	0.7016	276	01Jul2015, 12:30	58
G8-G10	0.7016	275	01Jul2015, 12:36	58
FG24b	0.0589	52	01Jul2015, 12:24	7.1
FG24a	0.0348	24	01Jul2015, 12:18	2.9
OS08b	0.0165	9.5	01Jul2015, 12:18	1.2
OS08b-G9a	0.0165	9.4	01Jul2015, 12:30	1.1
OS09a	0.0093	5.3	01Jul2015, 12:18	0.7
OS09a-G9a	0.0093	5.2	01Jul2015, 12:30	0.6
G9a	0.1195	87	01Jul2015, 12:24	12

FUTURE SCS (100-YEAR)				
HYDROLOGIC ELEMENT	DRAINAGE AREA (SQ. MI.)	PEAK DISCHARGE Q100 (CFS)	TIME OF PEAK	TOTAL VOLUME Q100 (AC. FT.)
G9a-G9b	0.1195	85	01Jul2015, 12:24	12
FG24c	0.0291	40	01Jul2015, 12:06	3.7
FG24d	0.0262	39	01Jul2015, 12:06	3.5
G9b	0.1748	137	01Jul2015, 12:12	19
REX RD WQCV	0.1748	136	01Jul2015, 12:18	19
G9b-G10	0.1748	135	01Jul2015, 12:18	19
FG23b	0.0236	17	01Jul2015, 12:12	1.7
G10	0.9000	391	01Jul2015, 12:30	78
G10-G11	0.9000	389	01Jul2015, 12:36	78
FG23c	0.0109	9.2	01Jul2015, 12:12	0.9
G11	0.9109	393	01Jul2015, 12:36	79
FG25	0.1084	111	01Jul2015, 12:18	13
FG28	0.0184	15	01Jul2015, 12:12	1.5
POND G IN-WEST	1.0377	485	01Jul2015, 12:30	94
FG27	0.0679	98	01Jul2015, 12:12	11
FG26	0.0567	58	01Jul2015, 12:18	7.2
G13	0.0567	58	01Jul2015, 12:18	7.2
G13-POND G	0.0567	57	01Jul2015, 12:24	7.2
POND G IN-EAST	0.1246	153	01Jul2015, 12:18	19
POND G	1.1623	444	01Jul2015, 12:54	102
G12	1.1623	444	01Jul2015, 12:54	102
G12-G06	1.1623	444	01Jul2015, 12:54	102
FG29	0.0983	60	01Jul2015, 12:12	7.0
FG32	0.0406	17	01Jul2015, 12:30	2.9
FG32-G06	0.0406	17	01Jul2015, 12:30	2.8
G06	1.3012	475	01Jul2015, 12:48	111
OS09b	0.0435	19	01Jul2015, 12:30	3.1
OS09b-G14	0.0435	18	01Jul2015, 12:36	3.0
FG34	0.0275	18	01Jul2015, 12:18	2.2
G14	0.0710	32	01Jul2015, 12:24	5.2
G14-G15	0.0710	32	01Jul2015, 12:30	5.1
FG35	0.0292	25	01Jul2015, 12:12	2.5
G15	0.1002	45	01Jul2015, 12:24	7.7
G15-G16	0.1002	44	01Jul2015, 12:30	7.6
FG37	0.0754	46	01Jul2015, 12:18	5.6
FG36	0.0295	19	01Jul2015, 12:18	2.5
G15a-G16	0.0295	19	01Jul2015, 12:24	2.5
G16	0.2051	103	01Jul2015, 12:24	16

FUTURE CONDITIONS



FUTURE SCS (50-YEAR)				
HYDROLOGIC ELEMENT	DRAINAGE AREA (SQ. MI.)	PEAK DISCHARGE Q50 (CFS)	TIME OF PEAK	TOTAL VOLUME Q50 (AC. FT.)
OS06	0.1313	52	01Jul2015, 12:12	6.5
G1a	0.1313	52	01Jul2015, 12:12	6.5
G1a-G2	0.1313	52	01Jul2015, 12:18	6.5
OS05	0.0578	26	01Jul2015, 12:12	2.9
OS05-G1	0.0578	25	01Jul2015, 12:12	2.9
FG01	0.0538	22	01Jul2015, 12:30	3.6
FG01-G1	0.0538	22	01Jul2015, 12:30	3.6
G1	0.1116	41	01Jul2015, 12:18	6.4
G1-G2	0.1116	41	01Jul2015, 12:18	6.4
FG02	0.0391	22	01Jul2015, 12:12	2.4
G2	0.2820	112	01Jul2015, 12:18	15
G2-G3	0.2820	109	01Jul2015, 12:24	15
FG03	0.0203	17	01Jul2015, 12:06	1.5
FG04	0.0172	16	01Jul2015, 12:00	1.3
G3	0.3195	122	01Jul2015, 12:18	18
FG06	0.0675	40	01Jul2015, 12:12	4.4
FG05	0.0580	33	01Jul2015, 12:24	4.6
OS07ab	0.0170	7.9	01Jul2015, 12:12	0.9
OS07ab-POND F	0.0170	7.6	01Jul2015, 12:24	0.8
POND F IN	0.4620	199	01Jul2015, 12:18	28
POND F	0.4620	121	01Jul2015, 12:42	26
POND F-G7	0.4620	120	01Jul2015, 12:48	26
OS07c	0.0296	12	01Jul2015, 12:12	1.5
OS07c-G4	0.0296	12	01Jul2015, 12:18	1.5
FG21a	0.0095	4.0	01Jul2015, 12:18	0.5
G4	0.0391	16	01Jul2015, 12:18	2.0
G4-G7	0.0391	16	01Jul2015, 12:24	2.0
FG21b	0.0150	16	01Jul2015, 12:06	1.4
G7	0.5161	131	01Jul2015, 12:48	29
G7-G8	0.5161	130	01Jul2015, 12:48	29
FG22	0.1354	88	01Jul2015, 12:12	10
OS08a	0.0251	11	01Jul2015, 12:12	1.3
OS08-G8	0.0251	10	01Jul2015, 12:18	1.2
FG23a	0.0216	15	01Jul2015, 12:12	1.6
OS07d	0.0034	1.6	01Jul2015, 12:06	0.2
OS07d-G8	0.0034	1.6	01Jul2015, 12:18	0.2
G8	0.7016	176	01Jul2015, 12:42	42
G8-G10	0.7016	175	01Jul2015, 12:48	42
FG24b	0.0589	39	01Jul2015, 12:24	5.4
FG24a	0.0348	16	01Jul2015, 12:18	2.1
OS08b	0.0165	6.3	01Jul2015, 12:18	0.8
OS08b-G9a	0.0165	6.0	01Jul2015, 12:36	0.8
OS09a	0.0093	3.5	01Jul2015, 12:18	0.5
OS09a-G9a	0.0093	3.4	01Jul2015, 12:30	0.5
G9a	0.1195	61	01Jul2015, 12:24	8.7

FUTURE SCS (50-YEAR)				
HYDROLOGIC ELEMENT	DRAINAGE AREA (SQ. MI.)	PEAK DISCHARGE Q50 (CFS)	TIME OF PEAK	TOTAL VOLUME Q50 (AC. FT.)
G9a-G9b	0.1195	60	01Jul2015, 12:30	8.7
FG24c	0.0291	30	01Jul2015, 12:06	2.9
FG24d	0.0262	30	01Jul2015, 12:06	2.7
G9b	0.1748	101	01Jul2015, 12:12	14
REX RD WQCV	0.1748	100	01Jul2015, 12:18	14
G9b-G10	0.1748	99	01Jul2015, 12:18	14
FG23b	0.0236	11	01Jul2015, 12:12	1.2
G10	0.9000	243	01Jul2015, 12:24	57
G10-G11	0.9000	243	01Jul2015, 12:24	57
FG23c	0.0109	6.5	01Jul2015, 12:12	0.7
G11	0.9109	247	01Jul2015, 12:24	57
FG25	0.1084	84	01Jul2015, 12:18	10
FG28	0.0184	10	01Jul2015, 12:12	1.1
POND G IN-WEST	1.0377	333	01Jul2015, 12:24	69
FG27	0.0679	79	01Jul2015, 12:12	9.1
FG26	0.0567	44	01Jul2015, 12:18	5.6
G13	0.0567	44	01Jul2015, 12:18	5.6
G13-POND G	0.0567	43	01Jul2015, 12:24	5.5
POND G IN-EAST	0.1246	121	01Jul2015, 12:18	15
POND G	1.1623	289	01Jul2015, 13:00	74
G12	1.1623	289	01Jul2015, 13:00	74
G12-G06	1.1623	287	01Jul2015, 13:00	73
FG29	0.0983	39	01Jul2015, 12:18	5.0
FG32	0.0406	11	01Jul2015, 12:30	2.0
FG32-G06	0.0406	11	01Jul2015, 12:36	2.0
G06	1.3012	307	01Jul2015, 13:00	80
OS09b	0.0435	12	01Jul2015, 12:30	2.2
OS09b-G14	0.0435	12	01Jul2015, 12:36	2.1
FG34	0.0275	12	01Jul2015, 12:18	1.6
G14	0.0710	21	01Jul2015, 12:24	3.7
G14-G15	0.0710	21	01Jul2015, 12:36	3.6
FG35	0.0292	18	01Jul2015, 12:12	1.9
G15	0.1002	29	01Jul2015, 12:30	5.5
G15-G16	0.1002	29	01Jul2015, 12:36	5.4
FG37	0.0754	31	01Jul2015, 12:18	4.0
FG36	0.0295	13	01Jul2015, 12:24	1.8
G15a-G16	0.0295	13	01Jul2015, 12:30	1.8
G16	0.2051	67	01Jul2015, 12:24	11

FUTURE SCS (10-YEAR)				
HYDROLOGIC ELEMENT	DRAINAGE AREA (SQ. MI.)	PEAK DISCHARGE Q10 (CFS)	TIME OF PEAK	TOTAL VOLUME Q10 (AC. FT.)
OS06	0.1313	12	01Jul2015, 12:18	2.2
G1a	0.1313	12	01Jul2015, 12:18	2.2
G1a-G2	0.1313	11	01Jul2015, 12:24	2.1
OS05	0.0578	5.6	01Jul2015, 12:12	1.0
OS05-G1	0.0578	5.5	01Jul2015, 12:18	1.0
FG01	0.0538	7.0	01Jul2015, 12:36	1.4
FG01-G1	0.0538	7.0	01Jul2015, 12:36	1.4
G1	0.1116	11	01Jul2015, 12:24	2.3
G1-G2	0.1116	11	01Jul2015, 12:30	2.3
FG02	0.0391	6.4	01Jul2015, 12:12	0.9
G2	0.2820	27	01Jul2015, 12:24	5.4
G2-G3	0.2820	27	01Jul2015, 12:30	5.3
FG03	0.0203	5.9	01Jul2015, 12:06	0.6
FG04	0.0172	5.8	01Jul2015, 12:06	0.5
G3	0.3195	31	01Jul2015, 12:30	6.4
FG06	0.0675	12	01Jul2015, 12:18	1.7
FG05	0.0580	12	01Jul2015, 12:24	2.0
OS07ab	0.0170	1.8	01Jul2015, 12:12	0.3
OS07ab-POND F	0.0170	1.7	01Jul2015, 12:30	0.3
POND F IN	0.4620	53	01Jul2015, 12:30	10
POND F	0.4620	16	01Jul2015, 13:48	9.0
POND F-G7	0.4620	16	01Jul2015, 13:54	8.9
OS07c	0.0296	2.7	01Jul2015, 12:18	0.5
OS07c-G4	0.0296	2.7	01Jul2015, 12:30	0.5
FG21a	0.0095	1.0	01Jul2015, 12:24	0.2
G4	0.0391	3.5	01Jul2015, 12:30	0.7
G4-G7	0.0391	3.5	01Jul2015, 12:30	0.7
FG21b	0.0150	6.5	01Jul2015, 12:06	0.6
G7	0.5161	18	01Jul2015, 13:36	10
G7-G8	0.5161	18	01Jul2015, 13:42	10
FG22	0.1354	32	01Jul2015, 12:18	4.3
OS08a	0.0251	2.3	01Jul2015, 12:18	0.4
OS08-G8	0.0251	2.3	01Jul2015, 12:24	0.4
FG23a	0.0216	5.2	01Jul2015, 12:12	0.7
OS07d	0.0034	0.36	01Jul2015, 12:12	0.06
OS07d-G8	0.0034	0.35	01Jul2015, 12:24	0.06
G8	0.7016	46	01Jul2015, 12:18	16
G8-G10	0.7016	45	01Jul2015, 12:24	15
FG24b	0.0589	16	01Jul2015, 12:24	2.5
FG24a	0.0348	4.5	01Jul2015, 12:18	0.8
OS08b	0.0165	1.4	01Jul2015, 12:18	0.3
OS08b-G9a	0.0165	1.4	01Jul2015, 12:42	0.3
OS09a	0.0093	0.8	01Jul2015, 12:24	0.2
OS09a-G9a	0.0093	0.8	01Jul2015, 12:42	0.2
G9a	0.1195	21	01Jul2015, 12:24	3.6

FUTURE SCS (10-YEAR)				
HYDROLOGIC ELEMENT	DRAINAGE AREA (SQ. MI.)	PEAK DISCHARGE Q10 (CFS)	TIME OF PEAK	TOTAL VOLUME Q10 (AC. FT.)
G9a-G9b	0.1195	20	01Jul2015, 12:30	3.6
FG24c	0.0291	13	01Jul2015, 12:12	1.3
FG24d	0.0262	14	01Jul2015, 12:06	1.3
G9b	0.1748	40	01Jul2015, 12:12	6.3
REX RD WQCV	0.1748	40	01Jul2015, 12:18	6.1
G9b-G10	0.1748	39	01Jul2015, 12:18	6.1
FG23b	0.0236	2.7	01Jul2015, 12:12	0.4
G10	0.9000	84	01Jul2015, 12:24	22
G10-G11	0.9000	82	01Jul2015, 12:30	22
FG23c	0.0109	1.9	01Jul2015, 12:12	0.3
G11	0.9109	83	01Jul2015, 12:30	22
FG25	0.1084	36	01Jul2015, 12:18	4.7
FG28	0.0184	3.0	01Jul2015, 12:12	0.4
POND G IN-WEST	1.0377	116	01Jul2015, 12:30	27
FG27	0.0679	42	01Jul2015, 12:18	4.9
FG26	0.0567	19	01Jul2015, 12:18	2.6
G13	0.0567	19	01Jul2015, 12:18	2.6
G13-POND G	0.0567	19	01Jul2015, 12:24	2.6
POND G IN-EAST	0.1246	60	01Jul2015, 12:18	7.5
POND G	1.1623	51	01Jul2015, 13:54	26
G12	1.1623	51	01Jul2015, 13:54	26
G12-G06	1.1623	50	01Jul2015, 14:00	26
FG29	0.0983	8.9	01Jul2015, 12:18	1.7
FG32	0.0406	2.6	01Jul2015, 12:36	0.7
FG32-G06	0.0406	2.6	01Jul2015, 12:42	0.7
G06	1.3012	54	01Jul2015, 13:54	28
OS09b	0.0435	2.8	01Jul2015, 12:36	0.7
OS09b-G14	0.0435	2.8	01Jul2015, 12:48	0.7
FG34	0.0275	3.1	01Jul2015, 12:24	0.6
G14	0.0710	5.0	01Jul2015, 12:30	1.3
G14-G15	0.0710	4.9	01Jul2015, 12:48	1.2
FG35	0.0292	5.5	01Jul2015, 12:12	0.7
G15	0.1002	7.1	01Jul2015, 12:42	1.9
G15-G16	0.1002	7.0	01Jul2015, 12:54	1.9
FG37	0.0754	7.3	01Jul2015, 12:24	1.4
FG36	0.0295	3.9	01Jul2015, 12:24	0.7
G15a-G16	0.0295	3.8	01Jul2015, 12:36	0.7
G16	0.2051	16	01Jul2015, 12:24	4.0

FUTURE SCS (5-YEAR)				
HYDROLOGIC ELEMENT	DRAINAGE AREA (SQ. MI.)	PEAK DISCHARGE Q5 (CFS)	TIME OF PEAK	TOTAL VOLUME Q5 (AC. FT.)
OS06	0.1313	3.8	01Jul2015, 12:24	1.1
G1a	0.1313	3.8	01Jul2015, 12:24	1.1
G1a-G2	0.1313	3.7	01Jul2015, 12:36	1.1
OS05	0.0578	1.8	01Jul2015, 12:18	0.5
OS05-G1	0.0578	1.7	01Jul2015, 12:24	0.5
FG01	0.0538	3.4	01Jul2015, 12:36	0.8
FG01-G1	0.0538	3.4	01Jul2015, 12:36	0.8
G1	0.1116	4.9	01Jul2015, 12:36	1.3
G1-G2	0.1116	4.8	01Jul2015, 12:36	1.3
FG02	0.0391	2.7	01Jul2015, 12:18	0.5
G2	0.2820	10	01Jul2015, 12:30	2.9
G2-G3	0.2820	10	01Jul2015, 12:42	2.9
FG03	0.0203	3.0	01Jul2015, 12:06	0.4
FG04	0.0172	3.1	01Jul2015, 12:06	0.3
G3	0.3195	12	01Jul2015, 12:42	3.5
FG06	0.0675	5.8	01Jul2015, 12:18	1.0
FG05	0.0580	6.7	01Jul2015, 12:30	1.2
OS07ab	0.0170	0.5	01Jul2015, 12:18	0.2
OS07ab-POND F	0.0170	0.5	01Jul2015, 12:42	0.1
POND F IN	0.4620	23	01Jul2015, 12:36	5.9
POND F	0.4620	8.0	01Jul2015, 14:18	4.8
POND F-G7	0.4620	8.0	01Jul2015, 14:24	4.8
OS07c	0.0296	0.9	01Jul2015, 12:24	0.3
OS07c-G4	0.0296	0.9	01Jul2015, 12:36	0.2
FG21a	0.0095	0.4	01Jul2015, 12:24	0.1
G4	0.0391	1.2	01Jul2015, 12:36	0.3
G4-G7	0.0391	1.2	01Jul2015, 12:42	0.3
FG21b	0.0150	3.9	01Jul2015, 12:06	0.4
G7	0.5161	8.9	01Jul2015, 14:18	5.5
G7-G8	0.5161	8.9	01Jul2015, 14:18	5.5
FG22	0.1354	17	01Jul2015, 12:18	2.6
OS08a	0.0251	0.7	01Jul2015, 12:24	0.2
OS08-G8	0.0251	0.7	01Jul2015, 12:30	0.2
FG23a	0.0216	2.7	01Jul2015, 12:18	0.4
OS07d	0.0034	0.11	01Jul2015, 12:18	0.03
OS07d-G8	0.0034	0.11	01Jul2015, 12:30	0.03
G8	0.7016	24	01Jul2015, 12:18	8.7
G8-G10	0.7016	24	01Jul2015, 12:30	8.5
FG24b	0.0589	9.8	01Jul2015, 12:24	1.6
FG24a	0.0348	2.0	01Jul2015, 12:24	0.43
OS08b	0.0165	0.5	01Jul2015, 12:24	0.14
OS08b-G9a	0.0165	0.5	01Jul2015, 13:00	0.13
OS09a	0.0093	0.3	01Jul2015, 12:30	0.08
OS09a-G9a	0.0093	0.3	01Jul2015, 12:54	0.08
G9a	0.1195	12	01Jul2015, 12:24	2.2

FUTURE SCS (5-YEAR)				
HYDROLOGIC ELEMENT	DRAINAGE AREA (SQ. MI.)	PEAK DISCHARGE Q5 (CFS)	TIME OF PEAK	TOTAL VOLUME Q5 (AC. FT.)
G9a-G9b	0.1195	12	01Jul2015, 12:30	2.2
FG24c	0.0291	8.4	01Jul2015, 12:12	0.9
FG24d	0.0262	8.7	01Jul2015, 12:06	0.9
G9b	0.1748	23	01Jul2015, 12:12	4.0
REX RD WQCV	0.1748	23	01Jul2015, 12:18	3.9
G9b-G10	0.1748	23	01Jul2015, 12:18	3.9
FG23b	0.0236	0.9	01Jul2015, 12:18	0.2
G10	0.9000	45	01Jul2015, 12:30	13
G10-G11	0.9000	44	01Jul2015, 12:36	12
FG23c	0.0109	0.8	01Jul2015, 12:18	0.2
G11	0.9109	44	01Jul2015, 12:36	13
FG25	0.1084	22	01Jul2015, 12:18	3.1
FG28	0.0184	1.2	01Jul2015, 12:12	0.2
POND G IN-WEST	1.0377	61	01Jul2015, 12:36	16
FG27	0.0679	30	01Jul2015, 12:18	3.5
FG26	0.0567	12	01Jul2015, 12:24	1.7
G13	0.0567	12	01Jul2015, 12:24	1.7
G13-POND G	0.0567	12	01Jul2015, 12:24	1.7
POND G IN-EAST	0.1246	41	01Jul2015, 12:18	5.3
POND G	1.1623	19	01Jul2015, 15:42	14
G12	1.1623	19	01Jul2015, 15:42	14
G12-G06	1.1623	19	01Jul2015, 15:54	14
FG29	0.0983	2.9	01Jul2015, 12:24	0.9
FG32	0.0406	0.9	01Jul2015, 12:48	0.3
FG32-G06	0.0406	0.9	01Jul2015, 12:54	0.3
G06	1.3012	21	01Jul2015, 15:54	15
OS09b	0.0435	1.0	01Jul2015, 12:48	0.4
OS09b-G14	0.0435	1.0	01Jul2015, 13:00	0.4
FG34	0.0275	1.3	01Jul2015, 12:24	0.3
G14	0.0710	1.9	01Jul2015, 12:48	0.7
G14-G15	0.0710	1.9	01Jul2015, 13:06	0.6
FG35	0.0292	2.4	01Jul2015, 12:12	0.4
G15	0.1002	2.8	01Jul2015, 12:54	1.0
G15-G16	0.1002	2.8	01Jul2015, 13:12	1.0
FG37	0.0754	2.7	01Jul2015, 12:24	0.7
FG36	0.0295	1.8	01Jul2015, 12:30	0.4
G15a-G16	0.0295	1.7	01Jul2015, 12:42	0.4
G16	0.2051	6.5	01Jul2015, 12:30	2.1

FUTURE SCS (2-YEAR)				
HYDROLOGIC ELEMENT	DRAINAGE AREA (SQ. MI.)	PEAK DISCHARGE Q2 (CFS)	TIME OF PEAK	TOTAL VOLUME Q2 (AC. FT.)
OS06	0.1313	0.5	01Jul2015, 13:30	0.05
G1a	0.1313	0.5	01Jul2015, 13:30	0.05
G1a-G2	0.1313	0.5	01Jul2015, 13:48	0.05
OS05	0.0578	0.2	01Jul2015, 13:24	0.05
OS05-G1	0.0578	0.2	01Jul2015, 13:30	0.05
FG01	0.0538	0.9	01Jul2015, 12:48	0.12
FG01-G1	0.0538	0.9	01Jul2015, 12:48	0.12
G1	0.1116	1.1	01Jul2015, 12:54	0.08
G1-G2	0.1116	1.1	01Jul2015, 13:00	0.08
FG02	0.0391	0.5	01Jul2015, 12:30	0.09
G2	0.2820	1.9	01Jul2015, 13:18	0.1
G2-G3	0.2820	1.9	01Jul2015, 13:30	0.07
FG03	0.0203	0.8	01Jul2015, 12:12	0.15
FG04	0.0172	0.9	01Jul2015, 12:06	0.15
G3	0.3195	2.4	01Jul2015, 13:24	0.1
FG06	0.0675	1.3	01Jul2015, 12:24	0.12
FG05	0.0580	2.4	01Jul2015, 12:30	0.19
OS07ab	0.0170	0.1	01Jul2015, 13:18	0.05
OS07ab-POND F	0.0170	0.1	01Jul2015, 14:06	0.05
POND F IN	0.4620	5.0	01Jul2015, 12:48	0.1
POND F	0.4620	2.1	01Jul2015, 17:54	0.1
POND F-G7	0.4620	2.1	01Jul2015, 18:06	0.1
OS07c	0.0296	0.1	01Jul2015, 13:30	0.05
OS07c-G4	0.0296	0.1	01Jul2015, 13:54	0.05
FG21a	0.0095	0.1	01Jul2015, 13:06	0.07
G4	0.0391	0.2	01Jul2015, 13:42	0.05
G4-G7	0.0391	0.2	01Jul2015, 13:48	0.05
FG21b	0.0150	1.7	01Jul2015, 12:12	0.27
G7	0.5161	2.3	01Jul2015, 17:48	0.1
G7-G8	0.5161	2.3	01Jul2015, 17:54	0.1
FG22	0.1354	5.4	01Jul2015, 12:24	0.2
OS08a	0.0251	0.1	01Jul2015, 13:30	0.05
OS08-G8	0.0251	0.1	01Jul2015, 13:36	0.05
FG23a	0.0216	0.8	01Jul2015, 12:18	0.16
OS07d	0.0034	0.01	01Jul2015, 13:18	0.05
OS07d-G8	0.0034	0.01	01Jul2015, 13:36	0.05
G8	0.7016	7.7	01Jul2015, 12:18	0.1
G8-G10	0.7016	7.6	01Jul2015, 12:42	0.1
FG24b	0.0589	4.3	01Jul2015, 12:30	0.27
FG24a	0.0348	0.4	01Jul2015, 12:48	0.09
OS08b	0.0165	0.1	01Jul2015, 13:36	0.05
OS08b-G9a	0.0165	0.1	01Jul2015, 14:24	0.04
OS09a	0.0093	0.04	01Jul2015, 13:36	0.05
OS09a-G9a	0.0093	0.04	01Jul2015, 14:24	0.04
G9a	0.1195	4.7	01Jul2015, 12:30	0.2

FUTURE SCS (2-YEAR)				
HYDROLOGIC ELEMENT	DRAINAGE AREA (SQ. MI.)	PEAK DISCHARGE Q2 (CFS)	TIME OF PEAK	TOTAL VOLUME Q2 (AC. FT.)
G9a-G9b	0.1195	4.6	01Jul2015, 12:36	0.2
FG24c	0.0291	4.0	01Jul2015, 12:12	0.3
FG24d	0.0262	4.4	01Jul2015, 12:12	0.4
G9b	0.1748	10.1	01Jul2015, 12:18	0.2
REX RD WQCV	0.1748	9.7	01Jul2015, 12:24	0.2
G9b-G10	0.1748	9.6	01Jul2015, 12:24	0.2
FG23b	0.0236	0.1	01Jul2015, 13:06	0.1
G10	0.9000	16	01Jul2015, 12:42	0.1
G10-G11	0.9000	16	01Jul2015, 12:48	0.1
FG23c	0.0109	0.2	01Jul2015, 12:24	0.1
G11	0.9109	16	01Jul2015, 12:48	0.1
FG25	0.1084	9.9	01Jul2015, 12:24	0.3
FG28	0.0184	0.2	01Jul2015, 12:36	0.1
POND G IN-WEST	1.0377	22	01Jul2015, 12:48	0.1
FG27	0.0679	18	01Jul2015, 12:18	0.6
FG26	0.0567	5.6	01Jul2015, 12:24	0.3
G13	0.0567	5.6	01Jul2015, 12:24	0.3
G13-POND G	0.0567	5.6	01Jul2015, 12:30	0.3
POND G IN-EAST	0.1246	23	01Jul2015, 12:18	0.5
POND G	1.1623	5.2	02Jul2015, 00:00	0.1
G12	1.1623	5.2	02Jul2015, 00:00	0.1
G12-G06	1.1623	5.2	02Jul2015, 00:00	0.1
FG29	0.0983	0.4	01Jul2015, 13:30	0.1
FG32	0.0406	0.2	01Jul2015, 13:54	0.1
FG32-G06	0.0406	0.2	01Jul2015, 14:06	0.1
G06	1.3012	5.5	01Jul2015, 23:48	0.1
OS09b	0.0435	0.2	01Jul2015, 13:54	0.1
OS09b-G14	0.0435	0.2	01Jul2015, 14:12	0.1
FG34	0.0275	0.2	01Jul2015, 13:00	0.1
G14	0.0710	0.3	01Jul2015, 13:48	0.1
G14-G15	0.0710	0.3	01Jul2015, 14:12	0.1
FG35	0.0292	0.5	01Jul2015, 12:24	0.1
G15	0.1002	0.6	01Jul2015, 14:00	0.1
G15-G16	0.1002	0.6	01Jul2015, 14:24	0.1
FG37	0.0754	0.4	01Jul2015, 13:12	0.1
FG36	0.0295	0.4	01Jul2015, 12:48	0.1
G15a-G16	0.0295	0.4	01Jul2015, 13:00	0.1
G16	0.2051	1.2	01Jul2015, 13:00	0.1

Highlighted green rows reference key design points (Typical all charts this section)

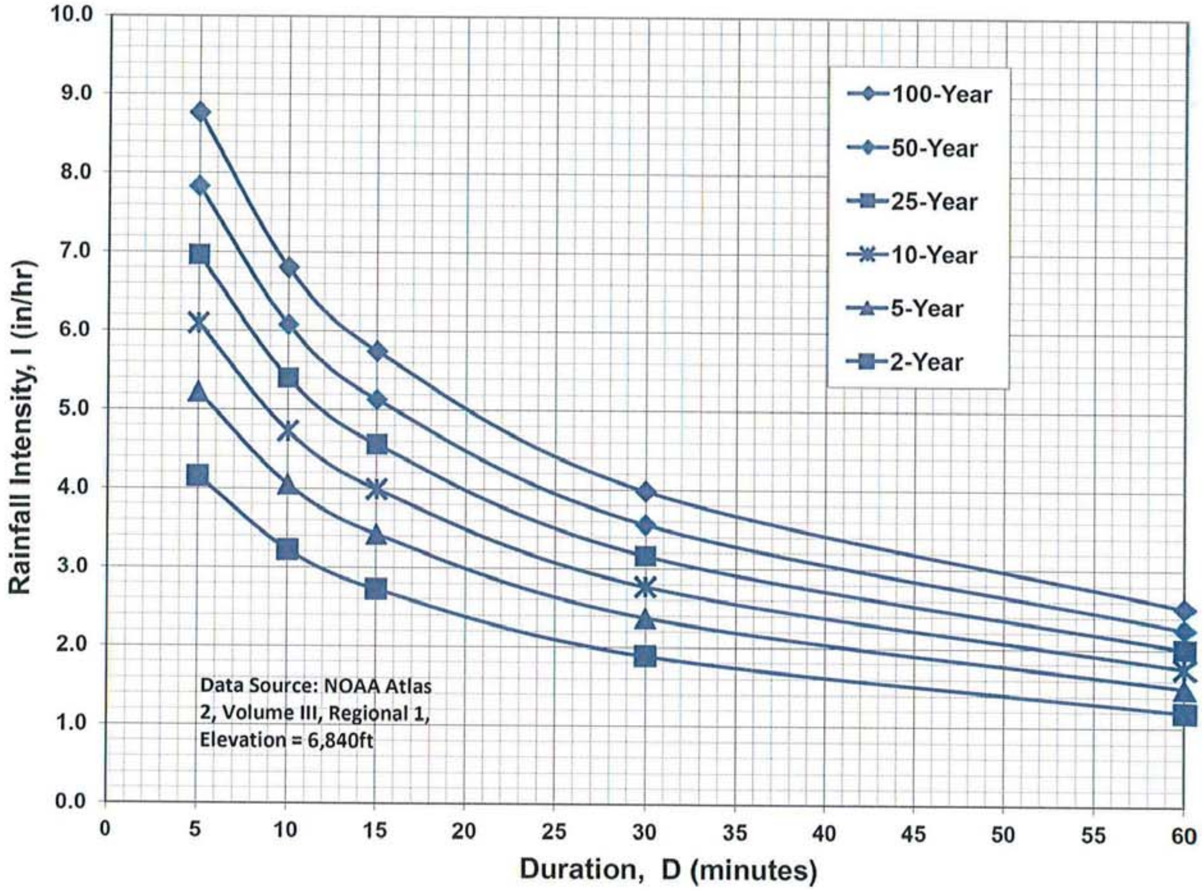
Appendix B – Developed Rational Calculations

Table 6-6. Runoff Coefficients for Rational Method

(Source: UDFCD 2001)

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

Figure 6-5. Colorado Springs Rainfall Intensity Duration Frequency



IDF Equations

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

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

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

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

$I_{5} = -1.50 \ln(D) + 7.583$

$I_{2} = -1.19 \ln(D) + 6.035$

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

FINAL COMPOSITE 'C' FACTORS

PROJECT: **Rolling Hills Ranch North Filing 2 FDR** 7/23/2024

BASIN DESIGNATION	AREA (AC.)										COMPOSITE FACTOR		Percent Impervious
	UNDEV	1 DU/AC	2 DU/AC	3 DU/AC	4 DU/AC	5 DU/AC	STREETS	OPEN SPACE PARKS/GC LAWNS	COMM	TOTAL	5-year	100-year	
OS1		4.1								4.1	**0.20**	**0.44**	**20.0%**
OS2	1.5	1.2	0.3				0.5	0.7	1.3	5.3	**0.39**	**0.57**	**37.6%**
OS4	34				2.3	2.4				39	**0.12**	**0.38**	**5.1%**
A01				5.4						5.4	**0.25**	**0.47**	**30.0%**
A02					3.0					3.0	**0.30**	**0.50**	**40.0%**
A03				3.2						3.2	**0.25**	**0.47**	**30.0%**
A04			0.4	2.9						3.4	**0.25**	**0.47**	**29.3%**
A05			2.2		3.5			0.1		5.8	**0.27**	**0.48**	**33.9%**
A06					4.1					4.1	**0.30**	**0.50**	**40.0%**
A07						3.6				3.6	**0.35**	**0.53**	**43.0%**
A08	0.2				3.4	2.1				5.7	**0.31**	**0.51**	**39.9%**
A09							0.2			0.2	**0.90**	**0.96**	**100.0%**
B01						6.4				6	**0.35**	**0.53**	**43.0%**
B02						6.2				6.2	**0.35**	**0.53**	**43.0%**
B03						4.6				4.6	**0.35**	**0.53**	**43.0%**
B04						9.5				9.5	**0.35**	**0.53**	**43.0%**
B05						3.0				3.0	**0.35**	**0.53**	**43.0%**
B06						6.6				6.6	**0.35**	**0.53**	**43.0%**
										118.8		**Composite:**	**27.6%**
TOTAL	35.7	5.2	3.0	11.5	16.3	44.3	0.7	0.7	1.3	118.8	**0.25**	**0.47**	**27.6%**

Please provide one decimal place for the basin area; otherwise, Basin A09 will show as zero acres, which is not accurate.

REVISED

FINAL TIME OF CONCENTRATION

PROJECT: **Rolling Hills Ranch North Filing 2 FDR** DATE: 7/23/2024

TIME OF CONCENTRATION

SUBBASIN DATA			INIT./OVERLAND TIME (T_i)				TRAVEL TIME (T_t)							TOTAL	Tc Check (Urbanized Basins)		FINAL T_c
BASIN DESIGNATION	C5	AREA (AC)	LENGTH (FT)	ΔH	SLOPE %	Ti (Min.)*	LENGTH (FT)	ΔH	SLOPE %	CONVEYANCE TYPE	CONVEYANCE COEF.	VEL. (FPS)	Tt (Min.)**	Ti+Tt (Min.)	L (FT)	Tc = (L/180) + 10	(min)
OS1	0.29	4	335	16.0	4.8%	17.9	230	4	1.7%	L	7	0.9	4.2	22.1	565.00	13.1	**13.1**
OS2	0.39	5	405	16.0	4.0%	16.6	1400	37	2.6%	P	20	3.3	7.2	23.8	1805.00	20.0	**20.0**
OS4	0.12	39	420	20.0	4.8%	21.9	3270	73	2.2%	G	15	2.2	24.3	46.2	3690.00	30.5	**30.5**
A01	0.25	5	145	5.5	3.8%	12.0	855	19.5	2.3%	P	20	3.0	4.7	16.8	1000.00	15.6	**15.6**
A02	0.30	3	25	0.5	2.0%	5.8	680	14.0	2.1%	P	20	2.9	3.9	9.8	705.00	13.9	**9.8**
A03	0.25	3	150	8.0	5.3%	10.9	705	16.5	2.3%	P	20	3.1	3.8	14.8	855.00	14.8	**14.8**
A04	0.25	3	220	7.0	3.2%	15.8	390	10.5	2.7%	P	20	3.3	2.0	17.8	610.00	13.4	**13.4**
A05	0.27	6	330	10.0	3.0%	19.1	675	16.0	2.4%	P	20	3.1	3.7	22.8	1005.00	15.6	**15.6**
A06	0.30	4	25	0.5	2.0%	5.8	830	12.0	1.4%	P	20	2.4	5.8	11.6	855.00	14.8	**11.6**
A07	0.35	4	75	1.5	2.0%	9.5	1095	26.0	2.4%	P	20	3.1	5.9	15.4	1170.00	16.5	**15.4**
A08	0.31	6	145	4.0	2.8%	12.4	1625	33.0	2.0%	P	20	2.9	9.5	21.9	1770.00	19.8	**19.8**
A09	0.90	0	15	0.3	2.0%	5.0	165	1.0	0.6%	P	20	1.6	1.8	6.8	180.00	11.0	**6.8**
B01	0.35	6	140	3.5	2.5%	12.0	1180	28.0	2.4%	P	20	3.1	6.4	18.4	1320.00	17.3	**17.3**
B02	0.35	6	235	9.0	3.8%	13.5	800	21.0	2.6%	P	20	3.2	4.1	17.6	1035.00	15.8	**15.8**
B03	0.35	5	75	1.5	2.0%	9.5	990	23.5	2.4%	P	20	3.1	5.4	14.8	1065.00	15.9	**14.8**
B04	0.35	9	200	4.0	2.0%	15.4	1540	30.0	1.9%	P	20	2.8	9.2	24.6	1740.00	19.7	**19.7**
B05	0.35	3	45	1.0	2.2%	7.1	1545	34.0	2.2%	P	20	3.0	8.7	15.7	1590.00	18.8	**15.7**
B06	0.35	7	125	2.5	2.0%	12.2	2430	54.0	2.2%	P	20	3.0	13.6	25.8	2555.00	24.2	**24.2**

Notes:

$$* \; T_i = \frac{0.395\,(1.1 - C5)\,L^{0.5}}{S^{0.33}}$$

$$V = C_V S_W^{0.5}$$

$$** \; T_t = L \times V$$

TYPE OF SURFACE		C_V
HEAVY MEADOW	H	2.5
TILLAGE/FIELD	T	5
RIPRAP (not buried)	R	6.5
SHORT PASTURE AND LAWNS	L	7
NEARLY BARE GROUND	B	10
GRASSED WATERWAY	G	15
PAVED AREAS	P	20

The initial length for rural areas must be 300 feet or less. Please revise the calculations accordingly.

REVISED

STORM DRAINAGE SYSTEM DESIGN
(RATIONAL METHOD PROCEDURE)
FINAL SURFACE ROUTING

PROJECT: **Rolling Hills Ranch North Filing 2 FDR** Date: 7/23/2024

DESIGN POINT	DIRECT RUNOFF											TOTAL RUNOFF							OVERLAND TRAVEL TIME						
				I (in./ hr.)		COEFF. ©		CA		Q			I (in./ hr.)		CA		Q								
	BASIN	AREA (AC)	Tc (Min.)	(5 YR)	(100 YR)	(5 YR)	(100 YR)	(5 YR)	(100 YR)	(5 YR)	(100 YR)	Sum Tc (min.)	(5 YR)	(100 YR)	(5 YR)	(100 YR)	**(5 YR)**	**(100 YR)**	DESTINATION DP	CONVEYANCE TYPE	COEFFICIENT C_V	SLOPE %	VEL. (FPS)	LENGTH (FT)	TRAVEL TIME Tt
DEVELOPED																									
I01	A01	5.4	15.6	3.47	5.82	0.25	0.47	1.36	2.55	4.7	15						**4.7**	**15**	EI08	P	20.0	1.74%	2.6	1090	6.9
I02	A02	3.0	9.8	4.16	6.99	0.30	0.50	0.90	1.51	3.8	11						**3.8**	**11**	EI05	P	20.0	1.50%	2.4	335	2.3
DP1	OS1	4.1	13.1	3.72	6.24	0.20	0.44	0.81	1.79	3.0	11						**3.0**	**11**	I03	P	20.0	2.35%	3.1	680	3.7
I03	A03	3.2	14.8	3.55	5.95	0.25	0.47	0.79	1.48	2.8	8.8	16.8	3.35	5.62	1.60	3.27	**5.4**	**18**	104	P	20.0	2.30%	3.0	305	1.7
I04	A04	3.4	13.4	3.69	6.20	0.25	0.47	0.83	1.59	3.1	9.8	18.5	3.21	5.38	1.09	2.63	**3.5**	**14**	EI05	P	20.0	2.30%	3.0	260	1.4
ExI6	OS2	5.3	20.0	3.09	5.18	0.39	0.57	2.08	3.02	6.4	16						**6.4**	**16**	EI05	P	20.0	2.04%	2.9	735	4.3
EI05	A05	5.8	15.6	3.46	5.81	0.27	0.48	1.56	2.81	5.4	16	24.3	2.80	4.69	1.94	3.71	**5.4**	**17**	EI06	P	20.0	1.22%	2.2	615	4.6
EI06	A06	4.1	11.6	3.91	6.56	0.30	0.50	1.23	2.04	4.8	13	12.0	3.85	6.46	1.23	2.16	**4.8**	**14**	EI08	P	20.0	1.00%	2.0	220	1.8
EI07	A07	3.6	15.4	3.48	5.85	0.35	0.53	1.25	1.90	4.4	11						**4.4**	**11**	EI08	P	20.0	2.25%	3.0	355	2.0
DP2	OS4	39	30.5	2.46	4.12	0.12	0.38	4.61	14.71	11	61						**11**	**61**							
EI08	A08	5.7	19.8	3.10	5.21	0.31	0.51	1.76	2.86	5.5	15	22.4	2.92	4.90	1.76	3.90	**5.5**	**19**	EI09	P	20.0	0.50%	1.4	15	0.2
EI09	A09	0.2	6.8	4.72	7.92	0.90	0.96	0.22	0.23	1.0	1.8	22.6	2.90	4.88	0.22	0.64	**1.0**	**3.1**							
I10	B01	6.4	17.3	3.30	5.55	0.35	0.53	2.22	3.37	7.3	19						**7.3**	**19**	EI11	P	20.0	0.92%	1.9	325	2.8
EI11	B02	6.2	15.8	3.45	5.79	0.35	0.53	2.18	3.30	7.5	19	20.2	3.08	5.17	2.18	4.22	**7.5**	**22**	EI12	P	20.0	1.27%	2.3	315	2.3
EI12	B03	4.6	14.8	3.54	5.94	0.35	0.53	1.59	2.42	5.6	14	22.5	2.91	4.89	1.59	3.29	**5.6**	**16**							
EI13	B04	9.5	19.7	3.11	5.23	0.35	0.53	3.32	5.03	10	26				3.32	5.03	**10**	**26**	EI14	P	20.0	1.29%	2.3	155	1.1
ExI1	B05	3.0	15.7	3.45	5.79	0.35	0.53	1.05	1.60	3.6	9.2	20.8	3.03	5.09	1.05	3.32	**3.6**	**17**							
ExI2	B06	6.6	24.2	2.80	4.71	0.35	0.53	2.31	3.50	6.5	16.5				2.31	3.50	**6.5**	**16**							

STORM DRAINAGE SYSTEM DESIGN
FINAL INLET CALCULATIONS

PROJECT: **Rolling Hills Ranch North Filing 2 FDR** Date: 7/23/2024

								Q_{Total}		$Q_{Capture}$				$Q_{Flow-by}$				DEPTH (max)		SPREAD	
DP	BASIN	Inlet size L(i)	Proposed or Existing	INLET TYPE	CROSS SLOPE	STREET SLOPE	T_c	Q_5 (cfs)	Q_{100} (cfs)	Q_5 (cfs)	Q_{100} (cfs)	$CA_{eqv.}$ (5-yr)	$CA_{eqv.}$ (100-yr)	Q_5 (cfs)	Q_{100} (cfs)	$CA_{eqv.}$ (5-yr)	$CA_{eqv.}$ (100-yr)	Q_5 (ft)	Q_{100} (ft)	Q_5 (ft)	Q_{100} (ft)
I01	A01	15	PR	SUMP[1]	2.0%		15.6	4.7	15	4.7	14	1.36	2.336	-	1.2	-	0.21	0.47	0.47		
I02	A02	10	PR	SUMP[1]	2.0%		9.8	3.8	11	3.8	9.9	0.90	1.422	-	0.6	-	0.09	0.47	0.47		
I03	A03	20	PR	FLOWBY	2.0%	1.0%	16.8	5.4	18	4.5	13	1.35	2.234	0.9	5.9	0.25	1.04	0.36	0.51	13.5	21.5
I04	A04	20	PR	SUMP[1]	2.0%		18.5	3.5	14	3.5	14	1.09	2.629	-	-	-	-	0.47	0.47		
ExI6	OS2	20	PR	FLOWBY	2.0%	1.0%	20.0	6.4	16	5.2	11	1.69	2.119	1.2	4.7	0.38	0.90	0.37	0.49	14.5	20.2
EI05	A05	20	PR	SUMP[1]	2.0%		24.3	5.4	17	5.4	17	1.94	3.676	-	0.2	-	0.03	0.47	0.47		
EI06	A06	10	PR	SUMP[1]	2.0%		12.0	4.8	14	4.8	9.9	1.25	1.538	-	4.0	-	0.62	0.47	0.47		
EI07	A07	10	PR	SUMP[1]	2.0%		15.4	4.4	11	4.4	9.9	1.25	1.700	-	1.2	-	0.20	0.47	0.47		
EI08	A08	15	PR	SUMP	2.0%		22.4	5.5	19	5.5	17	1.88	3.487	-	2.0	-	0.41	0.50	0.55		
EI09	A09	10	PR	SUMP	2.0%		22.6	1.0	3.1	1.0	3.1	0.35	0.644	-	-	-	-	0.50	0.70		
I10	B01	15	PR	SUMP[1]	2.0%		17.3	7.3	19	7.3	14	2.22	2.451	-	5.1	-	0.92	0.47	0.47		
EI11	B02	20	PR	SUMP[1]	2.0%		20.2	7.5	22	7.5	17	2.44	3.339	-	4.5	-	0.88	0.47	0.47		
EI12	B03	20	PR	SUMP[1]	2.0%		22.5	5.6	16	5.6	16	1.94	3.292	-	-	-	-	0.47	0.47		
EI13	B04	20	PR	SUMP[1]	2.0%		19.7	10	26	10	17	3.32	3.300	-	9.0	-	1.73	0.47	0.47		
ExI1	B05	15	EX	SUMP	2.0%		20.8	3.6	17	3.6	17	1.20	3.323	-	-	-	-	0.50	0.55		
ExI2	B06	15	EX	SUMP	2.0%		24.2	6.5	16	6.5	16	2.31	3.500	-	-	-	-	0.50	0.70		

[1] Forced sump at intersection

STORM DRAINAGE SYSTEM DESIGN
(RATIONAL METHOD PROCEDURE)
FINAL PIPE ROUTING

PROJECT: **Rolling Hills Ranch North Filing 2 FDR** Date: 7/23/2024

UPSTREAM DESIGN POINT	UPSTREAM BASIN	INLET FLOW							SYSTEM FLOW							TRAVEL TIME						
			I (in./ hr.)		CA		Q			I (in./ hr.)		CA		Q								
		Tc (Min.)	(5 YR)	(100 YR)	(5 YR)	(100 YR)	(5 YR)	(100 YR)	Sum Tc (min.)	(5 YR)	(100 YR)	(5 YR)	(100 YR)	**(5 YR)**	**(100 YR)**	PIPE DIA	ROUGHNESS (n)	DESTINATION DP	SLOPE %	LENGTH (FT)	VEL. (FPS) (Estimate)*	TRAVEL TIME Tt
I01	A01	15.6	3.47	5.82	1.36	2.34	4.7	14						**4.7**	**14**	18	0.013	J01	1.05%	52	6.1	0.1
J01									15.7	3.45	5.80	1.36	2.34	**4.7**	**14**	18	0.013	J02	3.84%	157	11.7	0.2
J02									15.9	3.43	5.76	1.36	2.34	**4.7**	**13**	18	0.013	J03	2.26%	277	9	0.5
I02	A02	9.8	4.16	6.99	0.90	1.42	3.8	10						**3.8**	**9.9**	18	0.013	J03	1.92%	26	8.3	0.1
J03									16.4	3.38	5.68	2.26	3.76	**7.6**	**21**	24	0.013	EJ08	1.36%	352	8.4	0.7
I03	A03	16.8	3.35	5.62	1.35	2.23	4.5	13						**4.5**	**13**	18	0.013	J04	5.32%	56	13.7	0.1
J04									16.9	3.34	5.61	1.35	2.23	**4.5**	**13**	18	0.013	J05	2.23%	216	8.9	0.4
I04	A04	18.5	3.21	5.38	1.09	2.63	3.5	14						**3.5**	**14**	18	0.013	J05	1.19%	25	6.5	0.1
J05									18.6	3.20	5.37	2.44	4.86	**7.8**	**26**	24	0.013	EJ06	2.01%	274	10	0.4
EI05	A05	24.3	2.80	4.69	1.94	3.68	5.4	17						**5.4**	**17**	24	0.013	EJ06	2.90%	5	12	0.0
EJ06									24.3	2.80	4.69	4.38	8.54	**12**	**40**	30	0.013	EJ07A	1.05%	38	8.6	0.1
EJ07A									24.4	2.79	4.68	4.38	8.54	**12**	**40**	30	0.013	EJ07B	1.85%	163	11.4	0.2
EJ07B									24.6	2.78	4.66	4.38	8.54	**12**	**40**	30	0.013	EJ09	1.03%	398	8.5	0.8
EI06	A06	12.0	3.85	6.46	1.25	1.54	4.8	9.9						**4.8**	**9.9**	24	0.013	EJ08	0.97%	5	7	0.0
EJ08									17.1	3.32	5.58	3.51	5.30	**12**	**30**	30	0.013	EJ09	1.01%	25	8	0.0
EJ09									25.4	2.73	4.58	7.88	13.83	**22**	**63**	42	0.013	EJ11	1.00%	221	10.5	0.4
EI07	A07	15.4	3.48	5.85	1.25	1.70	4.4	9.9						**4.4**	**9.9**	18	0.013	EJ10	2.01%	52	8.5	0.1
EJ10									15.5	3.47	5.83	1.25	1.70	**4.4**	**9.9**	18	0.013	EJ11	2.01%	311	8.5	0.6
DP2	OS4	30.5	2.46	4.12	4.61	14.71	11.3	61						**11**	**61**	48	0.013	EI08	2.10%	48	17	0.0
EI08	A08	22.4	2.92	4.90	1.88	3.49	5.5	17	30.5	2.45	4.12	6.48	18.20	**16**	**75**	48	0.013	EJ11	1.20%	4	13	0.0
EJ11									30.6	2.45	4.12	15.62	33.73	**38**	**139**	48	0.013	EI09	1.03%	24	12	0.0
EI09	A09	22.6	2.90	4.88	0.35	0.64	1.0	3.1	30.6	2.45	4.12	15.97	34.38	**39**	**141**	48	0.013	ES01	0.98%	46	11	0.1

UPSTREAM DESIGN POINT	UPSTREAM BASIN	INLET FLOW							SYSTEM FLOW							TRAVEL TIME						
		Tc (Min.)	I (in./ hr.) (5 YR)	I (in./ hr.) (100 YR)	CA (5 YR)	CA (100 YR)	Q (5 YR)	Q (100 YR)	Sum Tc (min.)	I (in./ hr.) (5 YR)	I (in./ hr.) (100 YR)	CA (5 YR)	CA (100 YR)	Q **(5 YR)**	Q **(100 YR)**	PIPE DIA	ROUGHNESS (n)	DESTINATION DP	SLOPE %	LENGTH (FT)	VEL. (FPS) (Estimate)*	TRAVEL TIME Tt
I10	B01	17.3	3.30	5.55	2.22	2.45	7.3	14						**7.3**	**14**	24	0.013	J12	1.02%	54	7.3	0.1
J12									17.5	3.29	5.53	2.22	2.45	**7.3**	**14**	24	0.013	EJ13	1.12%	259	7.6	0.6
EI11	B02	20.2	3.08	5.17	2.44	3.34	7.5	17						**7.5**	**17**	18	0.013	EJ13	1.39%	25	7.0	0.1
EJ13									20.2	3.07	5.16	4.66	5.79	**14**	**30**	30	0.013	EJ14	1.32%	295	9.6	0.5
EI12	B03	22.5	2.91	4.89	1.94	3.29	5.6	16						**5.6**	**16**	18	0.013	EJ14	1.03%	25	6.0	0.1
EJ14									22.6	2.91	4.88	6.60	9.08	**19**	**44**	30	0.013	EJ15	3.46%	316	16	0.3
EI13	B04	19.7	3.11	5.23	3.32	3.30	10	17						**10**	**17**	24	0.013	EJ15	1.06%	24	7.4	0.1
EJ15									22.9	2.89	4.85	9.92	12.38	**29**	**60**	36	0.013	EJ01	1.61%	165	12	0.2
ExI1	B05	20.8	3.03	5.09	1.20	3.32	3.6	17						**3.6**	**17**	18	0.013	EJ01	4.26%	5	12	0.0
ExI2	B06	24.2	2.80	4.71	2.31	3.50	6.5	16						**6.5**	**16**	18	0.013	EJ01	0.81%	25	5.4	0.1
EJ01									24.3	2.80	4.70	13.43	19.20	**38**	**90**	42	0.013	Sancturary	0.94%	138	10.2	0.2

STORM DRAINAGE SYSTEM DESIGN

FINAL HYDRAULICS

PROJECT: **Rolling Hills Ranch North Filing 2 FDR** Date: 7/23/2024

Label	Basin	Upstrm Node	Dnstrm Node	Intlet CA (acres)	Inlet Tc (min)	Inlet Flow (ft³/s)	System CA (acres)	System Flow Time (min)	System Intensity (in/hr)	Section Size (in)	Length (ft)	Slope (%)	Capacity (Full Flow) (ft³/s)	System Flow (ft³/s)	Velocity (Ave) (ft/s)	Elevation Ground (Upstrm) (ft)	Hydraulic Grade Line (Upstrm) (ft)	Invert (Upstrm) (ft)	Elevation Ground (Dnstrm) (ft)	Hydraulic Grade Line (Dnstrm) (ft)	Invert (Dnstrm) (ft)
1	A01	I01	J01	2.34	15.6	14	2.34	15.6	5.82	18.0	52	1.05%	11	14	7.8	7106.52	7104.5	7102.00	7105.85	7103.6	7101.45
2		J01	J02				2.34	15.7	5.80	18.0	157	3.84%	21	14	13	7105.85	7102.8	7101.45	7101.64	7096.9	7095.40
3		J02	J03				2.34	15.9	5.77	18.0	277	2.26%	16	14	10	7101.64	7096.8	7095.40	7093.99	7090.2	7089.15
4	A02	I02	J03	1.42	9.8	10	1.42	9.8	6.99	18.0	26	0.96%	10	10	6.6	7093.90	7090.7	7089.40	7093.99	7090.6	7089.15
5		J03	EJ08				3.76	16.3	5.70	24.0	352	1.36%	26	22	9.4	7093.99	7090.3	7088.65	7088.71	7086.2	7083.85
6	A03	I03	J04	2.23	16.8	13	2.23	16.8	5.62	18.0	56	5.32%	24	13	14	7109.40	7106.2	7104.90	7107.14	7103.8	7101.90
7		J04	J05				2.23	16.9	5.61	18.0	216	2.23%	16	13	9.9	7107.14	7103.2	7101.90	7102.00	7098.7	7097.10
8	A04	I04	J05	2.63	18.5	14	2.63	18.5	5.38	18.0	25	1.19%	12	14	8.1	7101.89	7099.3	7097.40	7102.00	7098.8	7097.10
9		J05	EJ06				4.86	18.6	5.37	24.0	274	2.01%	32	26	11	7102.00	7098.4	7096.60	7095.92	7093.6	7091.10
10	A05	EI05	EJ06	3.68	24.3	17	3.68	24.3	4.69	24.0	5	2.90%	39	17	5.5	7096.19	7093.6	7091.15	7095.92	7093.6	7091.00
11		EJ06	EJ07A				8.54	24.3	4.69	30.0	38	1.05%	42	40	8.2	7095.92	7093.1	7090.60	7095.70	7092.8	7090.20
11B		EJ07A	EJ07B				8.54	24.4	4.68	30.0	163	1.85%	56	40	12	7095.70	7092.3	7090.20	7092.47	7089.4	7087.20
12		EJ07B	EJ09				8.54	24.6	4.66	30.0	398	1.03%	42	40	9.7	7092.47	7089.3	7087.20	7088.92	7085.5	7083.10
13	A06	EI06	EJ08	1.54	12.0	10	1.54	12.1	6.46	24.0	5	0.97%	22	10	3.2	7088.92	7086.2	7083.90	7088.71	7086.2	7083.85
14		EJ08	EJ09				5.30	17.0	5.60	30.0	25	1.01%	41	30	6.1	7088.71	7086.1	7083.35	7088.92	7086.0	7083.10
15		EJ09	EJ11				13.84	25.3	4.59	42.0	221	0.50%	71	64	8.4	7088.92	7085.4	7082.10	7087.13	7084.6	7081.00
16	A07	EI07	EJ10	1.70	15.4	10	1.70	15.4	5.85	18.0	52	2.01%	15	10	9.0	7094.84	7091.5	7090.30	7094.19	7090.6	7089.25
17		EJ10	EJ11				1.70	15.5	5.83	18.0	311	2.01%	15	10	9.0	7094.19	7090.5	7089.25	7087.13	7085.6	7083.00
18	OS4	DP2	EI08	14.71	30.5	61	14.71	30.5	4.12	48.0	48	2.10%	208	61	14	7087.70	7083.9	7081.56	7087.36	7084.3	7080.55
19	A08	EI08	EJ11	3.49	22.4	17	18.20	30.6	4.12	48.0	4	1.20%	157	76	12	7087.36	7084.3	7080.55	7087.13	7084.3	7080.50
20		EJ11	EI09				33.73	30.6	4.12	48.0	24	1.03%	146	140	13	7087.13	7084.0	7080.50	7087.36	7083.8	7080.25
21	A09	EI09	ES01	0.64	22.6	3	34.38	30.6	4.12	48.0	46	0.98%	142	143	13	7087.36	7083.8	7080.25	7087.70	7083.2	7079.80
23	B01	I10	J12	2.45	17.3	14	2.45	17.3	5.55	24.0	54	1.02%	23	14	7.6	7077.95	7074.3	7072.95	7077.58	7073.9	7072.40
24		J12	EJ13				2.45	17.5	5.53	24.0	259	1.12%	24	14	7.9	7077.58	7073.7	7072.40	7074.95	7071.0	7069.50
25	B02	EI11	EJ13	3.34	20.2	17	3.34	20.2	5.17	18.0	25	1.39%	12	17	9.8	7074.85	7072.2	7070.35	7074.95	7071.5	7070.00
26		EJ13	EJ14				5.79	20.2	5.16	30.0	295	1.32%	47	30	10	7074.95	7070.9	7069.00	7070.96	7067.5	7065.10
28	B03	EI12	EJ14	3.29	22.5	16	3.29	22.5	4.89	18.0	25	1.03%	11	16	9.2	7070.86	7069.0	7066.36	7070.96	7068.4	7066.10
30		EJ14	EJ15				9.08	22.5	4.89	30.0	316	3.46%	76	45	16	7070.96	7067.3	7065.10	7060.22	7055.5	7054.15
31	B04	EI13	EJ15	3.30	19.7	17	3.30	19.7	5.23	24.0	24	1.06%	23	17	5.5	7059.92	7057.3	7054.90	7060.22	7057.1	7054.65
32		EJ15	EJ01				12.38	22.9	4.85	36.0	164	1.61%	85	61	13	7060.22	7056.2	7053.65	7057.00	7053.6	7051.00
33	B05	ExI1	EJ01	3.32	20.8	17	3.32	20.8	5.09	18.0	5	4.26%	22	17	9.6	7057.22	7054.7	7052.70	7057.00	7054.6	7052.50
34	B06	ExI2	EJ01	3.50	24.2	17	3.50	24.2	4.71	18.0	25	0.81%	9.5	17	9.4	7057.22	7055.2	7052.70	7057.00	7054.6	7052.50
35		EJ01	Sanctuary				19.21	24.2	4.70	42.0	138	0.94%	98	91	12	7057.00	7053.5	7050.50	7056.24	7052.3	7049.20

Appendix C - Detention Pond Information

STAGE/STORAGE/DISCHARGE CURVES FOR DETENTION POND ANALYSIS

Meridian Ranch Proposed Detention Pond G-FUTURE CONDITIONS (G12)

Gieck Basin - El Paso County, Colorado

Data for spillway and embankment:

embankment length =	500
embankment elev =	7033.5
spillway length =	130
spillway elevation =	7031.5
100 year storage elev.=	7030.1
100 year storage vol.=	24.5
100 year discharge=	444
5 year storage elev.=	7027.5
5 year storage vol.=	8.8
5 year discharge=	19
WQCV storage elev.=	7025.2
WQCV storage vol.=	0.9
1/2 WQCV storage elev.=	7024.8
1/2 WQCV storage vol.=	0.45

Data for outlet pipe and grate:

Type		H or V	Dimensions Width (ft.)	X Height (ft.)	Dia.(in)		(sqft)		
Circular	Orifice 1a:	V			1.75	Area =	0.017	Elev to cl =	7023.50
Circular	Orifice 1b:	V			1.75	Area =	0.017	Elev to cl =	7024.10
Circular	Orifice 1c:	V			1.75	Area =	0.017	Elev to cl =	7024.80
Rectangular	Orifice 2:	V	8.6	1.04		Area =	8.944	Elev to cl =	7027.62
Rectangular	Orifice 3:	V	2	0.43		Area =	0.860	Elev to cl =	7025.44
Rectangular	Orifice 4:	V	4.1	0.64		Area =	2.624	Elev to cl =	7027.82
Rectangular	Orifice 5:	V	8.6	1.04		Area =	8.944	Elev to cl =	7027.62

Stand Pipe Dimensions

Rec Grate	20	x	8	Elev =	7028.14
Circ. Grate		dia.		Elev =	7028.14

Outlet Culvert Dimensions

	Width (ft.)		Height (ft.)	Dia. (ft.)	Type
Outlet Culvert	10	x	4		**Rectangular**
Area	40.0		TOP		
Outlet I. E.	7022.5		7027.50		
Wall Thick.	12	in.			

50 year storage vol.=	19.9
50 year storage elev.=	7029.4
50 year discharge=	289
10 year storage vol.=	11.3
10 year storage elev.=	7027.9
10 year discharge=	51
2 year storage vol.=	5.5
2 year storage elev.=	7026.8
2 year discharge=	5.2

STAGE		STORAGE				DISCHARGE													
ELEV	HEIGHT	AREA sqft	acre	VOLUME acft	cum acft	TOP OF BANK	SPILLWAY	ORIFICE 1a	1b	1c	2	3	4	(max outflow) 5	GRATE (max outflow) Rectangular	PIPE 1	2	REALIZED CULVERT OUTFLOW	TOTAL FLOW
7023	0	0	0.00	0.0	0.000			-	-	-	-	-	-	-	-	10		-	-
7024	1	2285	0.05	0.0	0.026	-	-	0.06	-	-	-	-	-	-	-	51		0.1	0.06
7025	2	42192	0.97	0.5	0.537	-	-	0.10	0.08	0.04	-	-	-	-	-	111		0.2	0.21
7026	3	127336	2.92	1.9	2.483	-	-	0.13	0.11	0.09	-	3.1	-	-	-	184		3.4	3.44
7026.5	3.5	169390	3.89	3.6	4.180	-	-	0.14	0.12	0.10	-	4.3	-	-	-	224		4.6	4.64
7027	4	211444	4.85	2.2	6.365	-	-	0.15	0.14	0.12	-	5.2	-	-	-	268		5.6	5.59
7027.5	4.5	234356	5.38	4.6	8.814	-	-	0.16	0.15	0.13	6.5	6.0	-	6.5	-	304		19	19.45
7028	5	257267	5.91	5.4	11.745	-	-	0.17	0.16	0.14	22.0	6.6	4.3	22.0	-	337		56	55.51
7028.5	5.5	264583	6.07	5.7	14.541	-	-	0.18	0.17	0.15	40.4	7.2	10.4	40.4	23	373		122	122.30
7029	6	271899	6.24	6.1	17.819	-	-	0.19	0.18	0.16	50.6	7.8	13.7	50.6	86	406		209	209.39
7029.5	6.5	277060	6.36	11.7	20.555	-	-	0.21	0.19	0.17	59.0	8.3	16.4	59.0	171	436		315	314.68
7030	7	282220	6.48	9.4	23.956	-	-	0.21	0.20	0.18	66.4	8.8	18.7	66.4	274	464		435	434.93
7030.5	7.5	287904	6.61	6.5	27.039	-	-	0.21	0.20	0.19	73.1	9.3	20.7	73.1	392	491		491	490.92
7031	8	293587	6.74	6.6	30.565	-	-	0.22	0.21	0.20	79.2	9.8	22.5	79.2	522	516		516	516.22
7031.5	8.5	297735	6.84	6.7	33.762	-	-	0.23	0.22	0.21	84.8	10.2	24.2	84.8	665	540		540	540.33
7032	9	301883	6.93	3.4	37.203	137.9	137.9	0.23	0.23	0.22	90.1	10.6	25.8	90.1	819	563		563	701.30
7032.5	9.5	309236	7.10	7.0	40.729	390.0	390.0	0.24	0.23	0.22	95.1	11.0	27.3	95.1	983	586		586	975.59
7033	10	316589	7.27	3.6	44.320	716.5	716.5	0.25	0.24	0.23	99.9	11.4	28.8	99.9	1,157	607		607	1,323.43

Notes:
1) Top-of-bank and spillway flows are weir equations from section 11.3.1 in the DCM. Q=CLH^1.5 (C=3.0)
2) Orifice flows are also from section 11.3.1. Q=CA(2gH)^.5 (C=.6)
3) Grate flows are determined from equations 7-2 and 7-3. Weir Flow Q=(3PH^1.5)/F, Orifice Flow Q=4.815*AH^0.5)
4) Pipe flows use the lesser of: 1) Inlet control equations 27 & 28, page 146 of HDS No. 5 - or - 2) Allowable Pipe Flow equation on page 11-9 of the DCM. Use Table 9, page 147-148, HDS No. 5 for formulas 26 & 27.

Simulation Run: F-100 YR Reservoir: POND G

Start of Run:	01Jul2015, 00:00	Basin Model:	Future SCS
End of Run:	02Jul2015, 00:00	Meteorologic Model:	SCS TYPE IIA 100YR
		Control Specifications:	24 HR-2 MIN.
		Volume Units:	AC-FT

Computed Results:

Peak Inflow:	625 (CFS)	Date/Time of Peak Inflow:	01Jul2015, 12:24
Peak Outflow:	444 (CFS)	Date/Time of Peak Outflow:	01Jul2015, 12:54
Total Inflow:	112.2 (AC-FT)	Peak Storage:	24.5 (AC-FT)
Total Outflow:	102.2 (AC-FT)	Peak Elevation:	7030.1 (FT)

Simulation Run: F-005 YR Reservoir: POND G

Start of Run:	01Jul2015, 00:00	Basin Model:	Future SCS
End of Run:	02Jul2015, 00:00	Meteorologic Model:	SCS TYPE IIA 005YR
		Control Specifications:	24 HR-2 MIN.
		Volume Units:	AC-FT

Computed Results:

Peak Inflow:	94 (CFS)	Date/Time of Peak Inflow:	01Jul2015, 12:30
Peak Outflow:	19 (CFS)	Date/Time of Peak Outflow:	01Jul2015, 15:48
Total Inflow:	21.2 (AC-FT)	Peak Storage:	8.8 (AC-FT)
Total Outflow:	14.0 (AC-FT)	Peak Elevation:	7027.5 (FT)

Appendix D – Street Flow

Worksheet for Ramp Full Street Section

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Channel Slope	0.00500	ft/ft
Normal Depth	0.75	ft

Section Definitions

Station (ft)	Elevation (ft)
0+00	0.00
0+13	-0.25
0+14	-0.75
0+15	-0.59
0+30	-0.29
0+45	-0.59
0+46	-0.75
0+48	-0.25
0+60	0.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.00)	(0+13, -0.25)	0.030
(0+13, -0.25)	(0+15, -0.59)	0.013
(0+15, -0.59)	(0+45, -0.59)	0.015
(0+45, -0.59)	(0+48, -0.25)	0.013
(0+48, -0.25)	(0+60, 0.00)	0.030
<None>	(0+60, 0.00)	0.030

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Worksheet for Ramp Full Street Section

Results

Discharge		42.54	ft³/s
Elevation Range	-0.75 to 0.00 ft		
Flow Area		19.32	ft²
Wetted Perimeter		60.21	ft
Hydraulic Radius		0.32	ft
Top Width		60.00	ft
Normal Depth		0.75	ft
Critical Depth		0.66	ft
Critical Slope		0.01121	ft/ft
Velocity		2.20	ft/s
Velocity Head		0.08	ft
Specific Energy		0.83	ft
Froude Number		0.68	
Flow Type	Subcritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.75	ft
Critical Depth	0.66	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.01121	ft/ft

Cross Section for Ramp Full Street Section

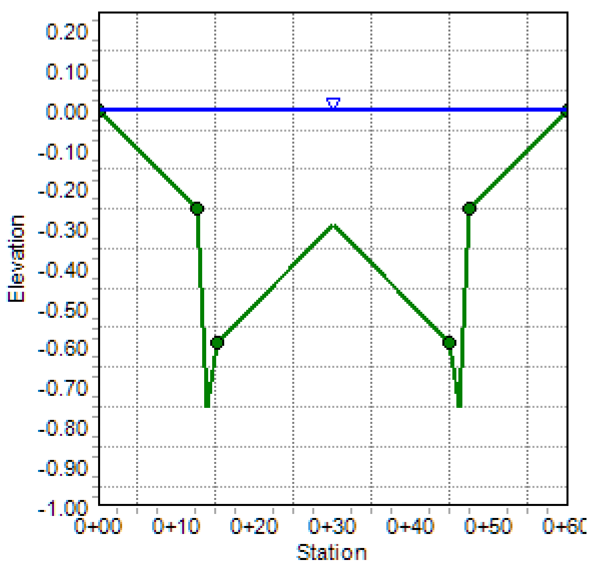
Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Channel Slope	0.00500	ft/ft
Normal Depth	0.75	ft
Discharge	42.54	ft³/s

Cross Section Image



RESIDENTIAL STREET SECTION
RAMP CURB

5-Year Storm Event Maximum Allowable Street Flows (Maximum Flow to Top of Curb)										
Channel Slope (ft/ft)	Full Street Width					Half Street Width				
	Discharge (ft³/s)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)	Discharge (ft³/s)	Velocity (ft/s)	Flow Area (ft²)	Top Width (ft)	
0.0050	19	2.5	7.45	35.2	35.0	9.4	2.5	3.7	17.5	
0.0063	21	2.8	7.45	35.2	35.0	11	2.8	3.7	17.5	
0.0075	23	3.1	7.45	35.2	35.0	12	3.1	3.7	17.5	
0.0088	25	3.4	7.45	35.2	35.0	12	3.3	3.7	17.5	
0.0100	27	3.6	7.45	35.2	35.0	13	3.6	3.7	17.5	
0.0113	28	3.8	7.45	35.2	35.0	14	3.8	3.7	17.5	
0.0125	30	4.0	7.45	35.2	35.0	15	4.0	3.7	17.5	
0.0138	31	4.2	7.45	35.2	35.0	16	4.2	3.7	17.5	
0.0150	33	4.4	7.45	35.2	35.0	16	4.4	3.7	17.5	
0.0163	34	4.6	7.45	35.2	35.0	17	4.5	3.7	17.5	
0.0175	35	4.7	7.45	35.2	35.0	18	4.7	3.7	17.5	
0.0188	37	4.9	7.45	35.2	35.0	18	4.9	3.7	17.5	
0.0200	38	5.1	7.45	35.2	35.0	19	5.0	3.7	17.5	
0.0213	39	5.2	7.45	35.2	35.0	19	5.2	3.7	17.5	
0.0225	40	5.4	7.45	35.2	35.0	20	5.4	3.7	17.5	
0.0238	41	5.5	7.45	35.2	35.0	20	5.5	3.7	17.5	
0.0250	42	5.7	7.45	35.2	35.0	21	5.6	3.7	17.5	
0.0263	43	5.8	7.45	35.2	35.0	22	5.8	3.7	17.5	
0.0275	44	5.9	7.45	35.2	35.0	22	5.9	3.7	17.5	
0.0288	45	6.1	7.45	35.2	35.0	23	6.0	3.7	17.5	
0.0300	46	6.2	7.45	35.2	35.0	23	6.2	3.7	17.5	
0.0313	47	6.3	7.45	35.2	35.0	23	6.3	3.7	17.5	
0.0325	48	6.5	7.45	35.2	35.0	24	6.4	3.7	17.5	
0.0338	49	6.6	7.45	35.2	35.0	24	6.6	3.7	17.5	
0.0350	50	6.7	7.45	35.2	35.0	25	6.7	3.7	17.5	
0.0363	51	6.8	7.45	35.2	35.0	25	6.8	3.7	17.5	
0.0375	52	6.9	7.45	35.2	35.0	26	6.9	3.7	17.5	
0.0388	53	7.1	7.45	35.2	35.0	26	7.0	3.7	17.5	
0.0400	53	7.2	7.45	35.2	35.0	27	7.1	3.7	17.5	

100-Year Storm Event Maximum Allowable Street Flows (Maximum Flow to Right-of-Way)									
Channel Slope (ft/ft)	Full Street Width					Half Street Width			
	Discharge (ft³/s)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)	Discharge (ft³/s)	Velocity (ft/s)	Flow Area (ft²)	Top Width (ft)
0.0050	43	2.2	19.32	60.2	60.0	21	2.2	9.7	30
0.0063	48	2.5	19.32	60.2	60.0	24	2.4	9.7	30
0.0075	52	2.7	19.32	60.2	60.0	26	2.7	9.7	30
0.0088	56	2.9	19.32	60.2	60.0	28	2.9	9.7	30
0.0100	60	3.1	19.32	60.2	60.0	30	3.1	9.7	30
0.0113	64	3.3	19.32	60.2	60.0	32	3.3	9.7	30
0.0125	67	3.5	19.32	60.2	60.0	33	3.5	9.7	30
0.0138	71	3.7	19.32	60.2	60.0	35	3.6	9.7	30
0.0150	74	3.8	19.32	60.2	60.0	36	3.8	9.7	30
0.0163	77	4.0	19.32	60.2	60.0	38	3.9	9.7	30
0.0175	80	4.1	19.32	60.2	60.0	39	4.1	9.7	30
0.0188	82	4.3	19.32	60.2	60.0	41	4.2	9.7	30
0.0200	85	4.4	19.32	60.2	60.0	42	4.4	9.7	30
0.0213	88	4.5	19.32	60.2	60.0	43	4.5	9.7	30
0.0225	90	4.7	19.32	60.2	60.0	45	4.6	9.7	30
0.0238	93	4.8	19.32	60.2	60.0	46	4.8	9.7	30
0.0250	95	4.9	19.32	60.2	60.0	47	4.9	9.7	30
0.0263	97	5.0	19.32	60.2	60.0	48	5.0	9.7	30
0.0275	100	5.2	19.32	60.2	60.0	49	5.1	9.7	30
0.0288	102	5.3	19.32	60.2	60.0	50	5.2	9.7	30
0.0300	104	5.4	19.32	60.2	60.0	52	5.3	9.7	30
0.0313	106	5.5	19.32	60.2	60.0	53	5.5	9.7	30
0.0325	108	5.6	19.32	60.2	60.0	54	5.6	9.7	30
0.0338	111	5.7	19.32	60.2	60.0	55	5.7	9.7	30
0.0350	113	5.8	19.32	60.2	60.0	56	5.8	9.7	30
0.0363	115	5.9	19.32	60.2	60.0	57	5.9	9.7	30
0.0375	117	6.0	19.32	60.2	60.0	58	6.0	9.7	30
0.0388	118	6.1	19.32	60.2	60.0	59	6.1	9.7	30
0.0400	120	6.2	19.32	60.2	60.0	60	6.2	9.7	30

Street Flows Ramp Curb (Maximum Flow to Crown of Roadway)										
Channel Slope (ft/ft)	Full Street Width					Half Street Width				
	Discharge (ft^3/s)	Velocity (ft/s)	Flow Area (ft^2)	Wetted Perimeter (ft)	Top Width (ft)	Discharge (ft^3/s)	Velocity (ft/s)	Flow Area (ft^2)	Top Width (ft)
0.0050	13	2.2	6.05	35.0	34.8	6.7	2.2	3.0	17.4
0.0063	15	2.5	6.05	35.0	34.8	7.5	2.5	3.0	17.4
0.0075	16	2.7	6.05	35.0	34.8	8.2	2.7	3.0	17.4
0.0088	18	2.9	6.05	35.0	34.8	8.9	2.9	3.0	17.4
0.0100	19	3.1	6.05	35.0	34.8	9.5	3.1	3.0	17.4
0.0113	20	3.3	6.05	35.0	34.8	10	3.3	3.0	17.4
0.0125	21	3.5	6.05	35.0	34.8	11	3.5	3.0	17.4
0.0138	22	3.7	6.05	35.0	34.8	11	3.7	3.0	17.4
0.0150	23	3.8	6.05	35.0	34.8	12	3.8	3.0	17.4
0.0163	24	4.0	6.05	35.0	34.8	12	4.0	3.0	17.4
0.0175	25	4.1	6.05	35.0	34.8	13	4.1	3.0	17.4
0.0188	26	4.3	6.05	35.0	34.8	13	4.3	3.0	17.4
0.0200	27	4.4	6.05	35.0	34.8	13	4.4	3.0	17.4
0.0213	28	4.6	6.05	35.0	34.8	14	4.6	3.0	17.4
0.0225	28	4.7	6.05	35.0	34.8	14	4.7	3.0	17.4
0.0238	29	4.8	6.05	35.0	34.8	15	4.8	3.0	17.4
0.0250	30	5.0	6.05	35.0	34.8	15	5.0	3.0	17.4
0.0263	31	5.1	6.05	35.0	34.8	15	5.1	3.0	17.4
0.0275	31	5.2	6.05	35.0	34.8	16	5.2	3.0	17.4
0.0288	32	5.3	6.05	35.0	34.8	16	5.3	3.0	17.4
0.0300	33	5.4	6.05	35.0	34.8	16	5.4	3.0	17.4
0.0313	34	5.5	6.05	35.0	34.8	17	5.5	3.0	17.4
0.0325	34	5.7	6.05	35.0	34.8	17	5.6	3.0	17.4
0.0338	35	5.8	6.05	35.0	34.8	17	5.8	3.0	17.4
0.0350	35	5.9	6.05	35.0	34.8	18	5.9	3.0	17.4
0.0363	36	6.0	6.05	35.0	34.8	18	6.0	3.0	17.4
0.0375	37	6.1	6.05	35.0	34.8	18	6.1	3.0	17.4
0.0388	37	6.2	6.05	35.0	34.8	19	6.2	3.0	17.4
0.0400	38	6.3	6.05	35.0	34.8	19	6.3	3.0	17.4

Worksheet for Vertical Full Street Section

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Channel Slope	0.00500	ft/ft
Normal Depth	0.75	ft
Section Definitions		

Station (ft)	Elevation (ft)
0+00	0.00
0+13	-0.25
0+13	-0.25
0+13	-0.75
0+15	-0.58
0+30	-0.28
0+45	-0.58
0+47	-0.75
0+47	-0.25
0+48	-0.25
0+60	0.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.00)	(0+13, -0.25)	0.030
(0+13, -0.25)	(0+15, -0.58)	0.013
(0+15, -0.58)	(0+45, -0.58)	0.015
(0+45, -0.58)	(0+48, -0.25)	0.013
(0+48, -0.25)	(0+60, 0.00)	0.030
<None>	(0+60, 0.00)	0.030

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method

Worksheet for Vertical Full Street Section

Options

Closed Channel Weighting Method	Pavlovskii's Method

Results

Discharge		41.33	ft³/s
Elevation Range	-0.75 to 0.00 ft		
Flow Area		19.04	ft²
Wetted Perimeter		61.02	ft
Hydraulic Radius		0.31	ft
Top Width		60.00	ft
Normal Depth		0.75	ft
Critical Depth		0.66	ft
Critical Slope		0.01143	ft/ft
Velocity		2.17	ft/s
Velocity Head		0.07	ft
Specific Energy		0.82	ft
Froude Number		0.68	
Flow Type	Subcritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.75	ft
Critical Depth	0.66	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.01143	ft/ft

Cross Section for Vertical Full Street Section

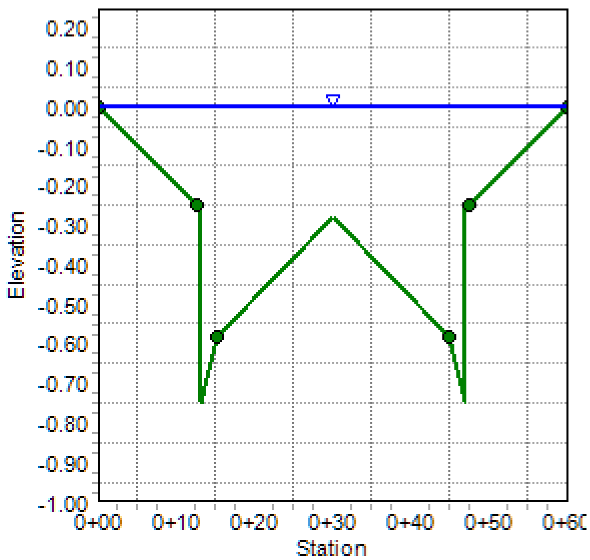
Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Channel Slope	0.00500	ft/ft
Normal Depth	0.75	ft
Discharge	41.33	ft³/s

Cross Section Image



RESIDENTIAL STREET SECTION
VERTICAL CURB

5-Year Storm Event Maximum Allowable Street Flows (Maximum Flow to Top of Curb)									
Channel Slope (ft/ft)	Full Street Width					Half Street Width			
	Discharge (ft^3/s)	Velocity (ft/s)	Flow Area (ft^2)	Wetted Perimeter (ft)	Top Width (ft)	Discharge (ft^3/s)	Velocity (ft/s)	Flow Area (ft^2)	Top Width (ft)
0.0050	18	2.5	7.17	35.0	34.0	8.9	2.5	3.6	17
0.0063	20	2.8	7.17	35.0	34.0	9.9	2.8	3.6	17
0.0075	22	3.0	7.17	35.0	34.0	11	3.0	3.6	17
0.0088	23	3.3	7.17	35.0	34.0	12	3.3	3.6	17
0.0100	25	3.5	7.17	35.0	34.0	13	3.5	3.6	17
0.0113	27	3.7	7.17	35.0	34.0	13	3.7	3.6	17
0.0125	28	3.9	7.17	35.0	34.0	14	3.9	3.6	17
0.0138	29	4.1	7.17	35.0	34.0	15	4.1	3.6	17
0.0150	31	4.3	7.17	35.0	34.0	15	4.3	3.6	17
0.0163	32	4.5	7.17	35.0	34.0	16	4.5	3.6	17
0.0175	33	4.6	7.17	35.0	34.0	17	4.6	3.6	17
0.0188	34	4.8	7.17	35.0	34.0	17	4.8	3.6	17
0.0200	36	5.0	7.17	35.0	34.0	18	5.0	3.6	17
0.0213	37	5.1	7.17	35.0	34.0	18	5.1	3.6	17
0.0225	38	5.3	7.17	35.0	34.0	19	5.3	3.6	17
0.0238	39	5.4	7.17	35.0	34.0	19	5.4	3.6	17
0.0250	40	5.5	7.17	35.0	34.0	20	5.5	3.6	17
0.0263	41	5.7	7.17	35.0	34.0	20	5.7	3.6	17
0.0275	42	5.8	7.17	35.0	34.0	21	5.8	3.6	17
0.0288	43	5.9	7.17	35.0	34.0	21	5.9	3.6	17
0.0300	43	6.1	7.17	35.0	34.0	22	6.1	3.6	17
0.0313	44	6.2	7.17	35.0	34.0	22	6.2	3.6	17
0.0325	45	6.3	7.17	35.0	34.0	23	6.3	3.6	17
0.0338	46	6.4	7.17	35.0	34.0	23	6.4	3.6	17
0.0350	47	6.6	7.17	35.0	34.0	23	6.6	3.6	17
0.0363	48	6.7	7.17	35.0	34.0	24	6.7	3.6	17
0.0375	49	6.8	7.17	35.0	34.0	24	6.8	3.6	17
0.0388	49	6.9	7.17	35.0	34.0	25	6.9	3.6	17
0.0400	50	7.0	7.17	35.0	34.0	25	7.0	3.6	17

100-Year Storm Event Maximum Allowable Street Flows (Maximum Flow to Right-of-Way)									
Channel Slope (ft/ft)	Full Street Width					Half Street Width			
	Discharge (ft^3/s)	Velocity (ft/s)	Flow Area (ft^2)	Wetted Perimeter (ft)	Top Width (ft)	Discharge (ft^3/s)	Velocity (ft/s)	Flow Area (ft^2)	Top Width (ft)
0.0050	41	2.2	19.04	61.0	60.0	21	2.2	9.5	30
0.0063	46	2.4	19.04	61.0	60.0	23	2.4	9.5	30
0.0075	51	2.7	19.04	61.0	60.0	25	2.7	9.5	30
0.0088	55	2.9	19.04	61.0	60.0	27	2.9	9.5	30
0.0100	58	3.1	19.04	61.0	60.0	29	3.1	9.5	30
0.0113	62	3.3	19.04	61.0	60.0	31	3.2	9.5	30
0.0125	65	3.4	19.04	61.0	60.0	33	3.4	9.5	30
0.0138	69	3.6	19.04	61.0	60.0	34	3.6	9.5	30
0.0150	72	3.8	19.04	61.0	60.0	36	3.8	9.5	30
0.0163	75	3.9	19.04	61.0	60.0	37	3.9	9.5	30
0.0175	77	4.1	19.04	61.0	60.0	39	4.1	9.5	30
0.0188	80	4.2	19.04	61.0	60.0	40	4.2	9.5	30
0.0200	83	4.3	19.04	61.0	60.0	41	4.3	9.5	30
0.0213	85	4.5	19.04	61.0	60.0	42	4.5	9.5	30
0.0225	88	4.6	19.04	61.0	60.0	44	4.6	9.5	30
0.0238	90	4.7	19.04	61.0	60.0	45	4.7	9.5	30
0.0250	92	4.9	19.04	61.0	60.0	46	4.8	9.5	30
0.0263	95	5.0	19.04	61.0	60.0	47	5.0	9.5	30
0.0275	97	5.1	19.04	61.0	60.0	48	5.1	9.5	30
0.0288	99	5.2	19.04	61.0	60.0	49	5.2	9.5	30
0.0300	101	5.3	19.04	61.0	60.0	50	5.3	9.5	30
0.0313	103	5.4	19.04	61.0	60.0	51	5.4	9.5	30
0.0325	105	5.5	19.04	61.0	60.0	52	5.5	9.5	30
0.0338	107	5.6	19.04	61.0	60.0	53	5.6	9.5	30
0.0350	109	5.7	19.04	61.0	60.0	54	5.7	9.5	30
0.0363	111	5.8	19.04	61.0	60.0	55	5.8	9.5	30
0.0375	113	5.9	19.04	61.0	60.0	56	5.9	9.5	30
0.0388	115	6.0	19.04	61.0	60.0	57	6.0	9.5	30
0.0400	117	6.1	19.04	61.0	60.0	58	6.1	9.5	30

Street Flows Veritcal Curb (Maximum Flow to Crown of Roadway)									
Channel Slope (ft/ft)	Full Street Width					Half Street Width			
	Discharge (ft^3/s)	Velocity (ft/s)	Flow Area (ft^2)	Wetted Perimeter (ft)	Top Width (ft)	Discharge (ft^3/s)	Velocity (ft/s)	Flow Area (ft^2)	Top Width (ft)
0.0050	14	2.2	6.15	35.0	34.0	6.7	2.2	3.0	17
0.0063	15	2.5	6.15	35.0	34.0	7.5	2.5	3.0	17
0.0075	17	2.7	6.15	35.0	34.0	8.2	2.7	3.0	17
0.0088	18	3.0	6.15	35.0	34.0	8.8	2.9	3.0	17
0.0100	19	3.2	6.15	35.0	34.0	9.4	3.1	3.0	17
0.0113	21	3.4	6.15	35.0	34.0	10	3.3	3.0	17
0.0125	22	3.5	6.15	35.0	34.0	11	3.5	3.0	17
0.0138	23	3.7	6.15	35.0	34.0	11	3.7	3.0	17
0.0150	24	3.9	6.15	35.0	34.0	12	3.8	3.0	17
0.0163	25	4.0	6.15	35.0	34.0	12	4.0	3.0	17
0.0175	26	4.2	6.15	35.0	34.0	12	4.1	3.0	17
0.0188	27	4.3	6.15	35.0	34.0	13	4.3	3.0	17
0.0200	28	4.5	6.15	35.0	34.0	13	4.4	3.0	17
0.0213	28	4.6	6.15	35.0	34.0	14	4.6	3.0	17
0.0225	29	4.8	6.15	35.0	34.0	14	4.7	3.0	17
0.0238	30	4.9	6.15	35.0	34.0	15	4.8	3.0	17
0.0250	31	5.0	6.15	35.0	34.0	15	4.9	3.0	17
0.0263	32	5.1	6.15	35.0	34.0	15	5.1	3.0	17
0.0275	32	5.3	6.15	35.0	34.0	16	5.2	3.0	17
0.0288	33	5.4	6.15	35.0	34.0	16	5.3	3.0	17
0.0300	34	5.5	6.15	35.0	34.0	16	5.4	3.0	17
0.0313	34	5.6	6.15	35.0	34.0	17	5.5	3.0	17
0.0325	35	5.7	6.15	35.0	34.0	17	5.6	3.0	17
0.0338	36	5.8	6.15	35.0	34.0	17	5.7	3.0	17
0.0350	36	5.9	6.15	35.0	34.0	18	5.9	3.0	17
0.0363	37	6.0	6.15	35.0	34.0	18	6.0	3.0	17
0.0375	38	6.1	6.15	35.0	34.0	18	6.1	3.0	17
0.0388	38	6.2	6.15	35.0	34.0	19	6.2	3.0	17
0.0400	39	6.3	6.15	35.0	34.0	19	6.3	3.0	17

Appendix E – Runoff Reduction

RUNOFF REDUCTION

The following requirements apply for the design, construction, and maintenance of runoff reduction permanent control measures (PCMs):

- The RPAs are considered PCMs and therefore require a Maintenance Agreement and an O&M Manual.
- The RPAs are located within a tract shown on the final plats and identified this drainage report and the GEC Plans.
- Vegetation in RPAs should have a uniform density of at least 80%.
- The soils found on the project site are from the Hydrologic Soil Group B and therefore are suitable for runoff reduction per recommendations in MHFD.
- Signage shall be posted in RPAs and should provide text that identifies the RPA as a water quality treatment area stating RR that the area is to remain vegetated and maintained per the site's O&M Manual.

Updated to match Water Quality Site Map

Design Procedure Form: Runoff Reduction

UD-BMP (Version 3.07, March 2018)

Sheet 1 of 1

Designer: Thomas A Kerby, PE
Company: Tech Contractors
Date: July 23, 2024
Project: Rolling Hills Ranch North
Location: Falcon, CO

SITE INFORMATION (User Input in Blue Cells)

WQCV Rainfall Depth: 0.60 inches
Depth of Average Runoff Producing Storm, d_6 = 0.43 inches (for Watersheds Outside of the Denver Region, Figure 3-1 in USDCM Vol. 3)

Area Type	UIA:RPA											
Area ID	A											
Downstream Design Point ID	A											
Downstream BMP Type	None											
DCIA (ft^2)	--											
UIA (ft^2)	12,000											
RPA (ft^2)	7,175											
SPA (ft^2)	--											
HSG A (%)	0%											
HSG B (%)	100%											
HSG C/D (%)	0%											
Average Slope of RPA (ft/ft)	0.020											
UIA:RPA Interface Width (ft)	65.00											

CALCULATED RUNOFF RESULTS

Area ID	A											
UIA:RPA Area (ft^2)	19,175											
L / W Ratio	4.54											
UIA / Area	0.6258											
Runoff (in)	0.00											
Runoff (ft^3)	0											
Runoff Reduction (ft^3)	500											

CALCULATED WQCV RESULTS

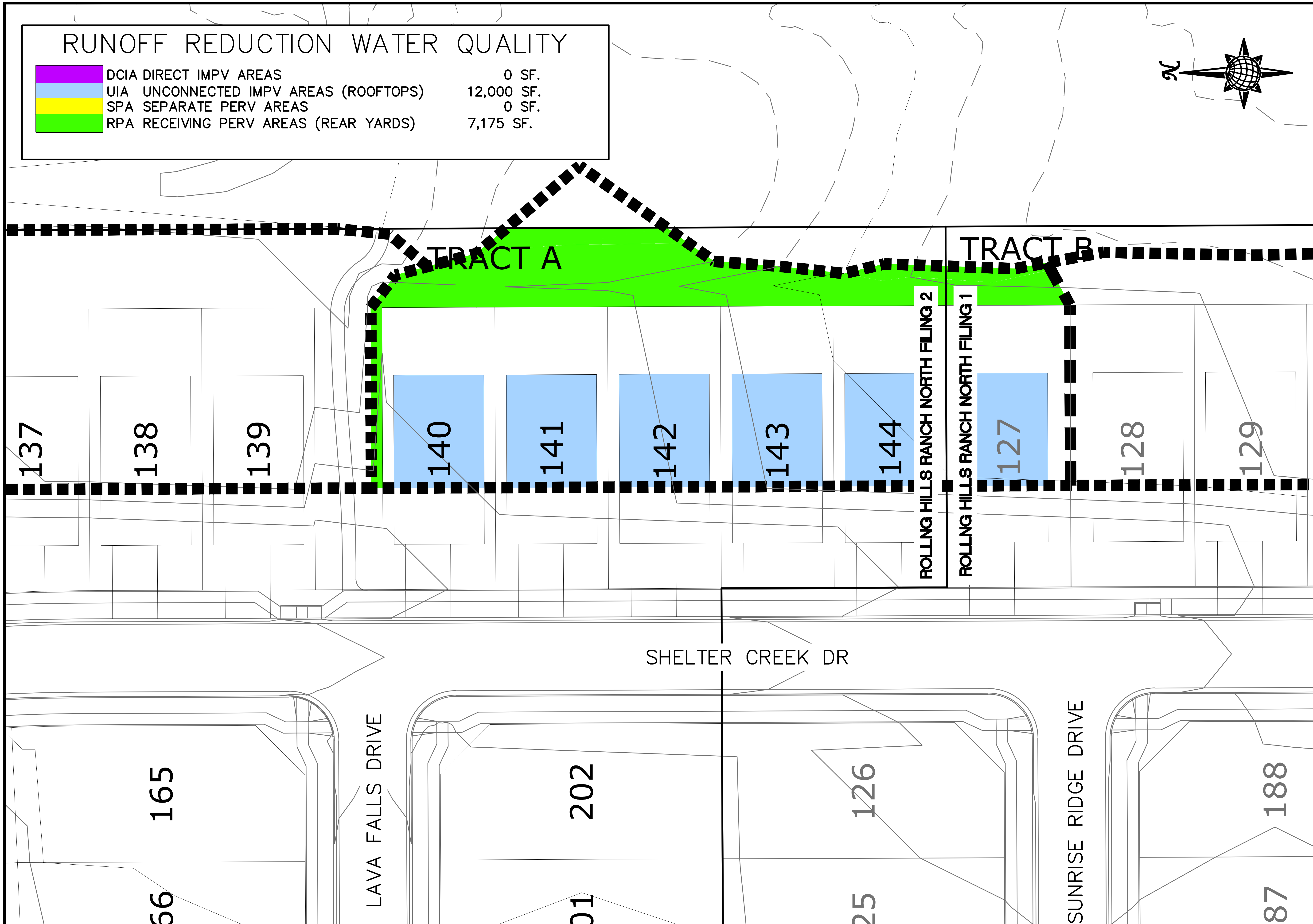
Area ID	A											
WQCV (ft^3)	500											
WQCV Reduction (ft^3)	500											
WQCV Reduction (%)	100%											
Untreated WQCV (ft^3)	0											

CALCULATED DESIGN POINT RESULTS (sums results from all columns with the same Downstream Design Point ID)

Downstream Design Point ID	A											
DCIA (ft^2)	0											
UIA (ft^2)	12,000											
RPA (ft^2)	7,175											
SPA (ft^2)	0											
Total Area (ft^2)	19,175											
Total Impervious Area (ft^2)	12,000											
WQCV (ft^3)	500											
WQCV Reduction (ft^3)	500											
WQCV Reduction (%)	100%											
Untreated WQCV (ft^3)	0											

CALCULATED SITE RESULTS (sums results from all columns in worksheet)

Total Area (ft^2)	19,175
Total Impervious Area (ft^2)	12,000
WQCV (ft^3)	500
WQCV Reduction (ft^3)	500
WQCV Reduction (%)	100%
Untreated WQCV (ft^3)	0



TECH CONTRACTORS
11910 TOURMALINE, #130
FALCON, CO 80831
TELEPHONE 719.495.7444

RUNOFF REDUCTION
CATCHMENT AREA 2
ROLLING HILLS RANCH NORTH FILING 2

Drawn by	TJK
Checked by	-
Date	XXX 2024
Scale	1"=40'
Sheet Number	1

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Design Procedure Form: Runoff Reduction

UD-BMP (Version 3.07, March 2018)

Designer: Thomas A Kerby, PE
Company: Tech Contractors
Date: July 23, 2024
Project: Rolling Hills Ranch North
Location: Falcon, CO

SITE INFORMATION (User Input in Blue Cells)

WQCV Rainfall Depth: 0.60 inches
Depth of Average Runoff Producing Storm, d_6 = 0.43 inches (for Watersheds Outside of the Denver Region, Figure 3-1 in USDCM Vol. 3)

Area Type	UIA:RPA										
Area ID	B										
Downstream Design Point ID	B										
Downstream BMP Type	None										
DCIA (ft^2)	--										
UIA (ft^2)	20,000										
RPA (ft^2)	30,970										
SPA (ft^2)	--										
HSG A (%)	0%										
HSG B (%)	100%										
HSG C/D (%)	0%										
Average Slope of RPA (ft/ft)	0.020										
UIA:RPA Interface Width (ft)	280.00										

CALCULATED RUNOFF RESULTS

Area ID	B										
UIA:RPA Area (ft^2)	50,970										
L / W Ratio	0.65										
UIA / Area	0.3924										
Runoff (in)	0.00										
Runoff (ft^3)	0										
Runoff Reduction (ft^3)	833										

CALCULATED WQCV RESULTS

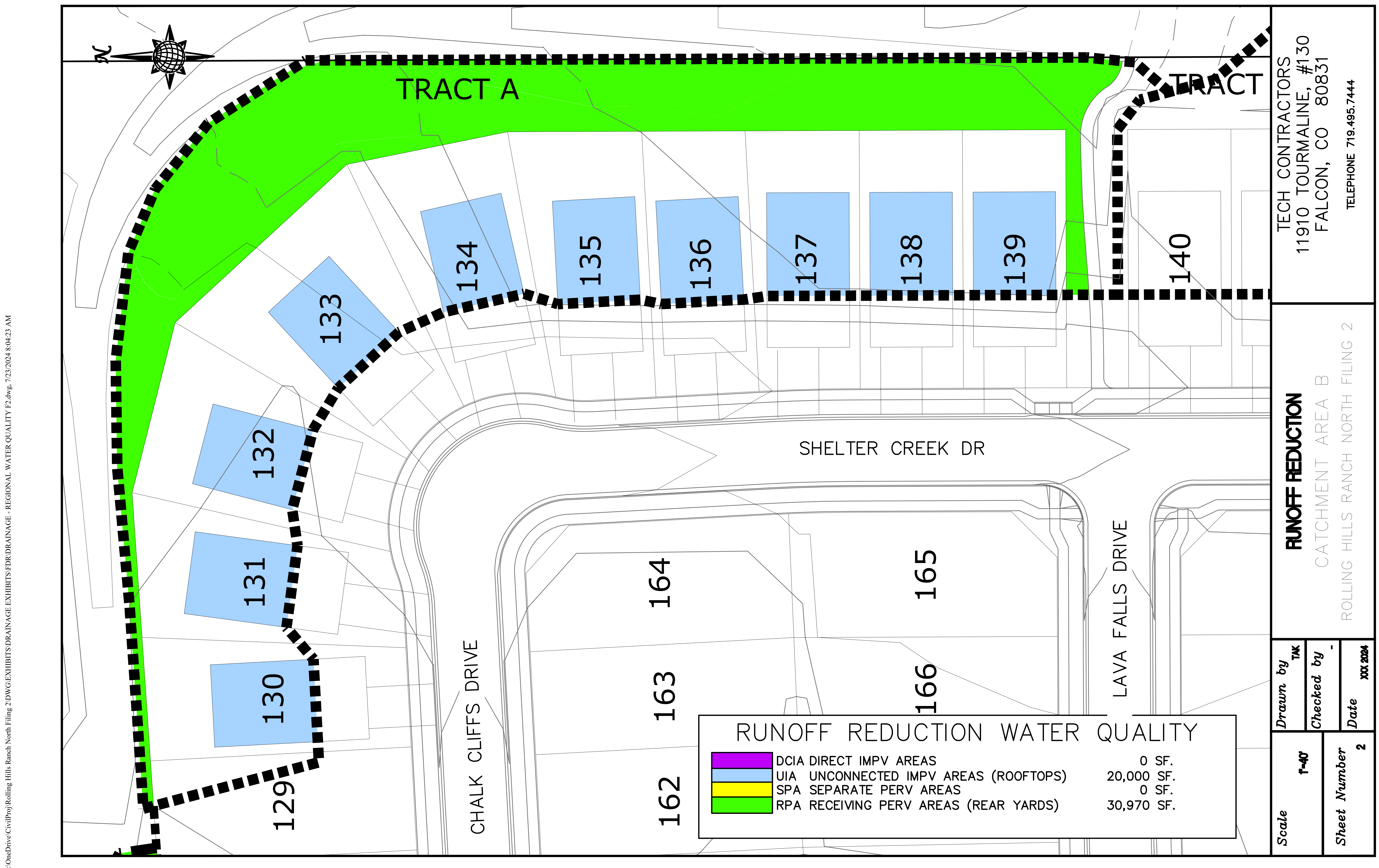
Area ID	B										
WQCV (ft^3)	833										
WQCV Reduction (ft^3)	833										
WQCV Reduction (%)	100%										
Untreated WQCV (ft^3)	0										

CALCULATED DESIGN POINT RESULTS (sums results from all columns with the same Downstream Design Point ID)

Downstream Design Point ID	B										
DCIA (ft^2)	0										
UIA (ft^2)	20,000										
RPA (ft^2)	30,970										
SPA (ft^2)	0										
Total Area (ft^2)	50,970										
Total Impervious Area (ft^2)	20,000										
WQCV (ft^3)	833										
WQCV Reduction (ft^3)	833										
WQCV Reduction (%)	100%										
Untreated WQCV (ft^3)	0										

CALCULATED SITE RESULTS (sums results from all columns in worksheet)

Total Area (ft^2)	50,970
Total Impervious Area (ft^2)	20,000
WQCV (ft^3)	833
WQCV Reduction (ft^3)	833
WQCV Reduction (%)	100%
Untreated WQCV (ft^3)	0



TRACT A
TRACT
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SHELTER CREEK DR
CHALK CLIFFS DRIVE
LAVA FALLS DRIVE
RUNOFF REDUCTION WATER QUALITY
DCIA DIRECT IMPV AREAS 0 SF.
UIA UNCONNECTED IMPV AREAS (ROOFTOPS) 20,000 SF.
SPA SEPARATE PERV AREAS 0 SF.
RPA RECEIVING PERV AREAS (REAR YARDS) 30,970 SF.
TECH CONTRACTORS
11910 TOURMALINE, #130
FALCON, CO 80831
TELEPHONE 719.495.7444
RUNOFF REDUCTION
CATCHMENT AREA B
ROLLING HILLS RANCH NORTH FILING 2
Drawn by TJK
Checked by -
Date XXX 2024
Scale 1"=40'
Sheet Number 2
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Design Procedure Form: Runoff Reduction

UD-BMP (Version 3.07, March 2018)

Designer: **Thomas A Kerby, PE**
Company: **Tech Contractors**
Date: **July 23, 2024**
Project: **Rolling Hills Ranch North**
Location: **Falcon, CO**

SITE INFORMATION (User Input in Blue Cells)

WQCV Rainfall Depth: 0.60 inches
Depth of Average Runoff Producing Storm, d_6 = 0.43 inches (for Watersheds Outside of the Denver Region, Figure 3-1 in USDCM Vol. 3)

Area Type	UIA:RPA											
Area ID	C											
Downstream Design Point ID	C											
Downstream BMP Type	None											
DCIA (ft^2)	--											
UIA (ft^2)	23,665											
RPA (ft^2)	56,000											
SPA (ft^2)	--											
HSG A (%)	0%											
HSG B (%)	100%											
HSG C/D (%)	0%											
Average Slope of RPA (ft/ft)	0.020											
UIA:RPA Interface Width (ft)	168.00											

CALCULATED RUNOFF RESULTS

Area ID	C											
UIA:RPA Area (ft^2)	79,665											
L / W Ratio	2.82											
UIA / Area	0.2971											
Runoff (in)	0.00											
Runoff (ft^3)	0											
Runoff Reduction (ft^3)	986											

CALCULATED WQCV RESULTS

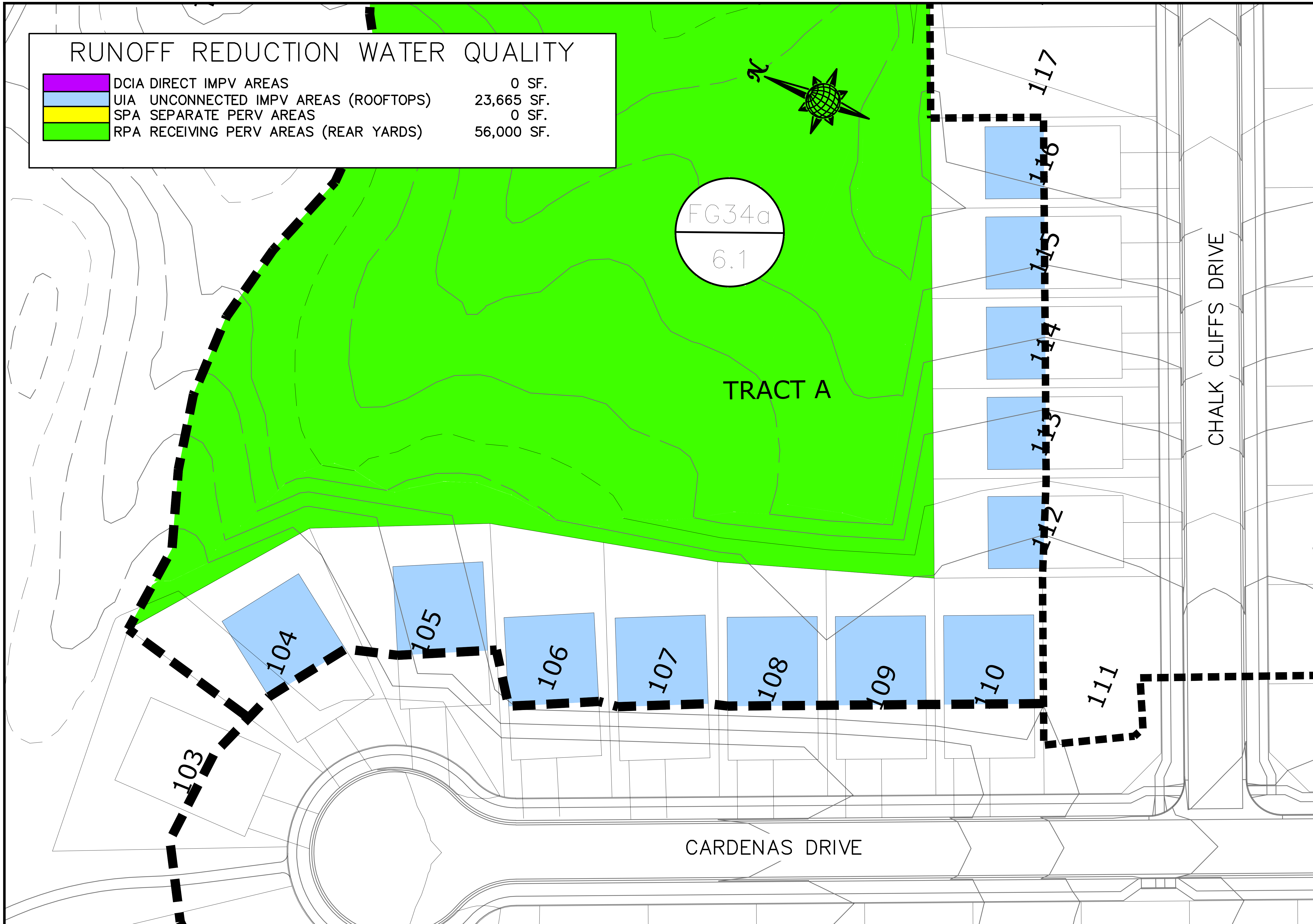
Area ID	C											
WQCV (ft^3)	986											
WQCV Reduction (ft^3)	986											
WQCV Reduction (%)	100%											
Untreated WQCV (ft^3)	0											

CALCULATED DESIGN POINT RESULTS (sums results from all columns with the same Downstream Design Point ID)

Downstream Design Point ID	C											
DCIA (ft^2)	0											
UIA (ft^2)	23,665											
RPA (ft^2)	56,000											
SPA (ft^2)	0											
Total Area (ft^2)	79,665											
Total Impervious Area (ft^2)	23,665											
WQCV (ft^3)	986											
WQCV Reduction (ft^3)	986											
WQCV Reduction (%)	100%											
Untreated WQCV (ft^3)	0											

CALCULATED SITE RESULTS (sums results from all columns in worksheet)

Total Area (ft^2)	79,665
Total Impervious Area (ft^2)	23,665
WQCV (ft^3)	986
WQCV Reduction (ft^3)	986
WQCV Reduction (%)	100%
Untreated WQCV (ft^3)	0



TECH CONTRACTORS
11910 TOURMALINE, #130
FALCON, CO 80831
TELEPHONE 719.495.7444

RUNOFF REDUCTION
CATCHMENT AREA C
ROLLING HILLS RANCH NORTH FILING 2

Drawn by TAK
Checked by -
Date XXX 2024
Scale 1"=50'
Sheet Number 3

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Appendix F – Soil Resource Report

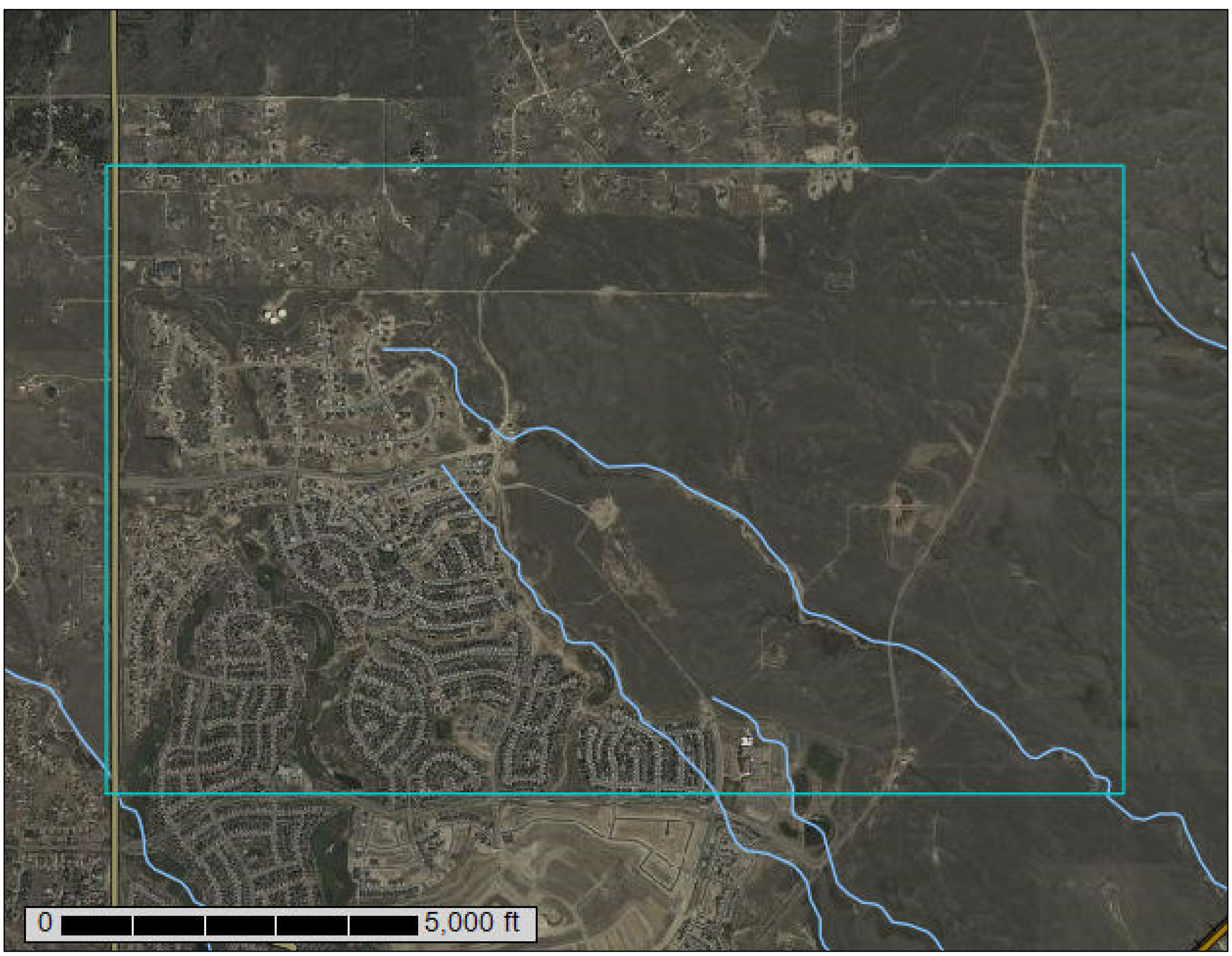
USDA United States Department of Agriculture

NRCS Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for

El Paso County Area, Colorado



March 10, 2022

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

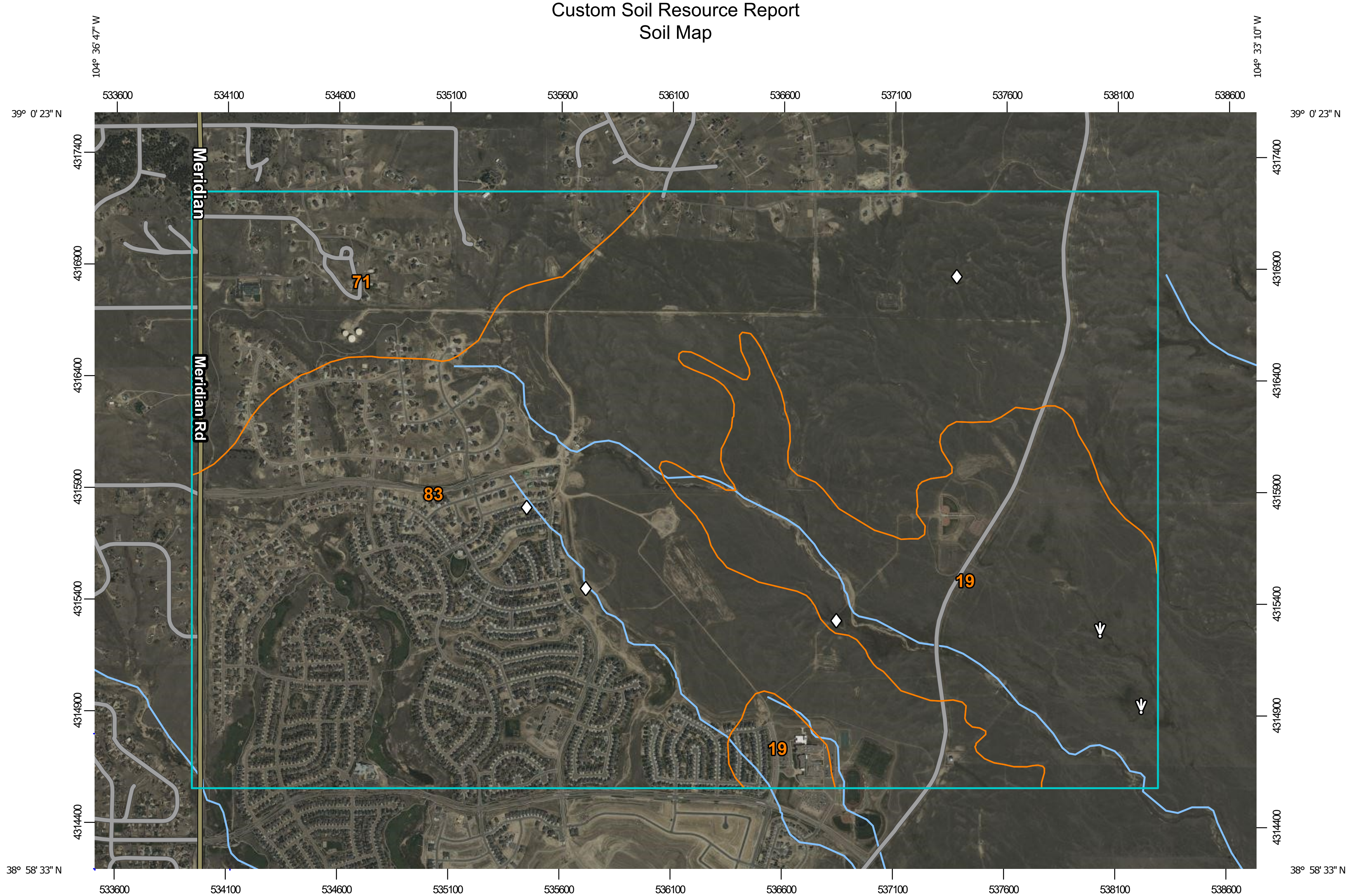
Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Soil Map



Map Scale: 1:23,900 if printed on A landscape (11" x 8.5") sheet.

Meters: 0, 350, 700, 1400, 2100

Feet: 0, 1000, 2000, 4000, 6000

N

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

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Unit Polygons

Soil Map Unit Lines

Soil Map Unit Points

Special Point Features

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh or swamp

Mine or Quarry

Miscellaneous Water

Perennial Water

Rock Outcrop

Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot

Spoil Area

Stony Spot

Very Stony Spot

Wet Spot

Other

Special Line Features

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Date(s) aerial images were photographed: Sep 11, 2018—Oct 20, 2018

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
19	Columbine gravelly sandy loam, 0 to 3 percent slopes	575.5	20.0%
71	Pring coarse sandy loam, 3 to 8 percent slopes	339.8	11.8%
83	Stapleton sandy loam, 3 to 8 percent slopes	1,964.3	68.2%
Totals for Area of Interest		**2,879.9**	**100.0%**

Map Unit Descriptions

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

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

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

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

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

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

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

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

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

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

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

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

El Paso County Area, Colorado

19—Columbine gravelly sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 367p
Elevation: 6,500 to 7,300 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 125 to 145 days
Farmland classification: Not prime farmland

Map Unit Composition

Columbine and similar soils: 97 percent
Minor components: 3 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Columbine

Setting

Landform: Flood plains, fan terraces, fans
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

A - 0 to 14 inches: gravelly sandy loam
C - 14 to 60 inches: very gravelly loamy sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.5 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Ecological site: R049XY214CO - Gravelly Foothill
Hydric soil rating: No

Minor Components

Fluvaquentic haplaquolls

Percent of map unit: 1 percent
Landform: Swales
Hydric soil rating: Yes

Other soils

Percent of map unit: 1 percent
Hydric soil rating: No

Pleasant

Percent of map unit: 1 percent
Landform: Depressions
Hydric soil rating: Yes

71—Pring coarse sandy loam, 3 to 8 percent slopes

Map Unit Setting

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

Map Unit Composition

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

Description of Pring

Setting

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

Typical profile

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

Properties and qualities

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

Interpretive groups

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

Minor Components

Pleasant

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

Other soils

Percent of map unit:
Hydric soil rating: No

83—Stapleton sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 369z
Elevation: 6,500 to 7,300 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 125 to 145 days
Farmland classification: Not prime farmland

Map Unit Composition

Stapleton and similar soils: 97 percent
Minor components: 3 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Stapleton

Setting

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

Typical profile

A - 0 to 11 inches: sandy loam
Bw - 11 to 17 inches: gravelly sandy loam
C - 17 to 60 inches: gravelly loamy sand

Properties and qualities

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

Available water supply, 0 to 60 inches: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: R049XY214CO - Gravelly Foothill
Hydric soil rating: No

Minor Components

Fluvaquentic haplaquolls

Percent of map unit: 1 percent
Landform: Swales
Hydric soil rating: Yes

Other soils

Percent of map unit: 1 percent
Hydric soil rating: No

Pleasant

Percent of map unit: 1 percent
Landform: Depressions
Hydric soil rating: Yes

References

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

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

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

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

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

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

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

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

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

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

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

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

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

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

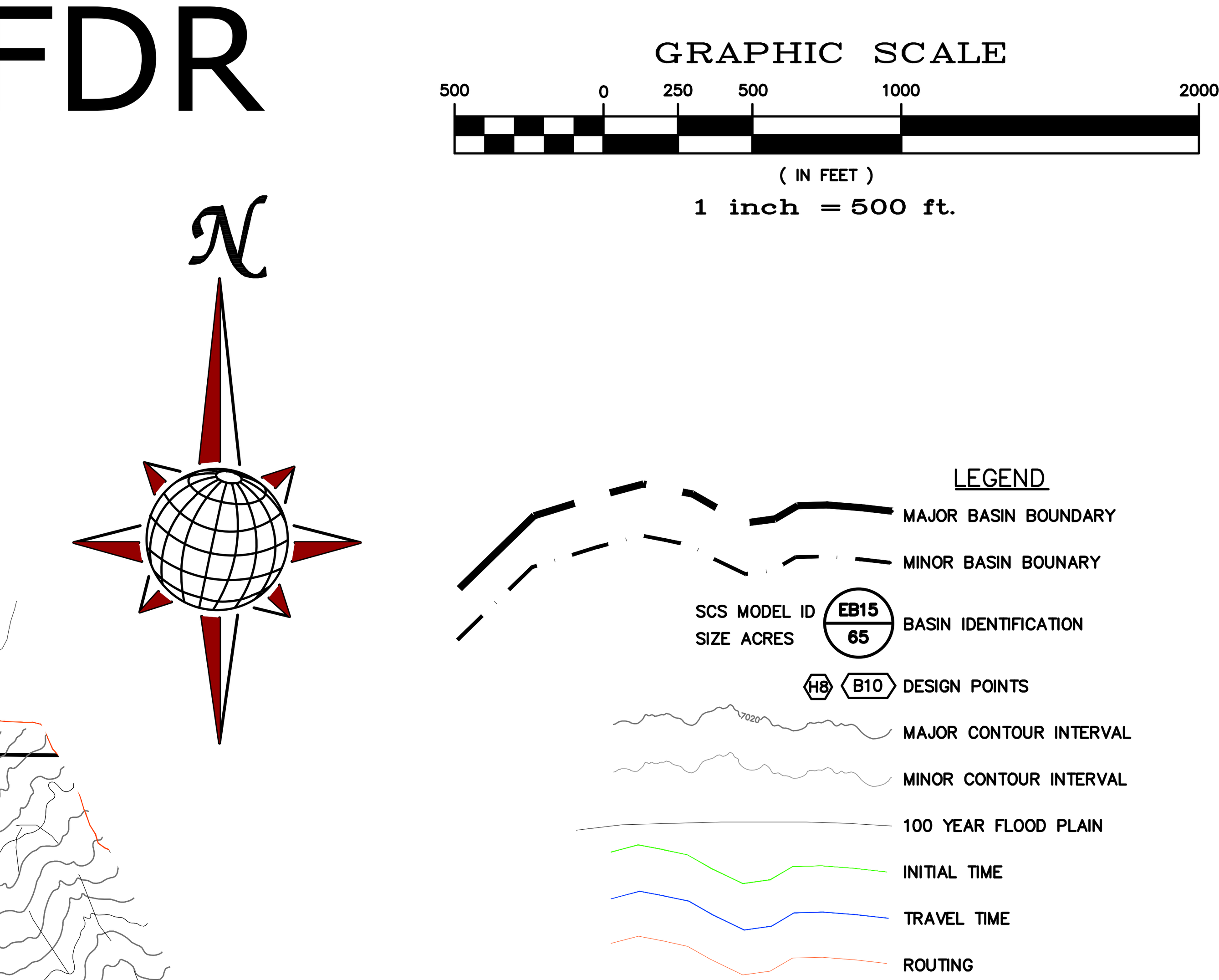
United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

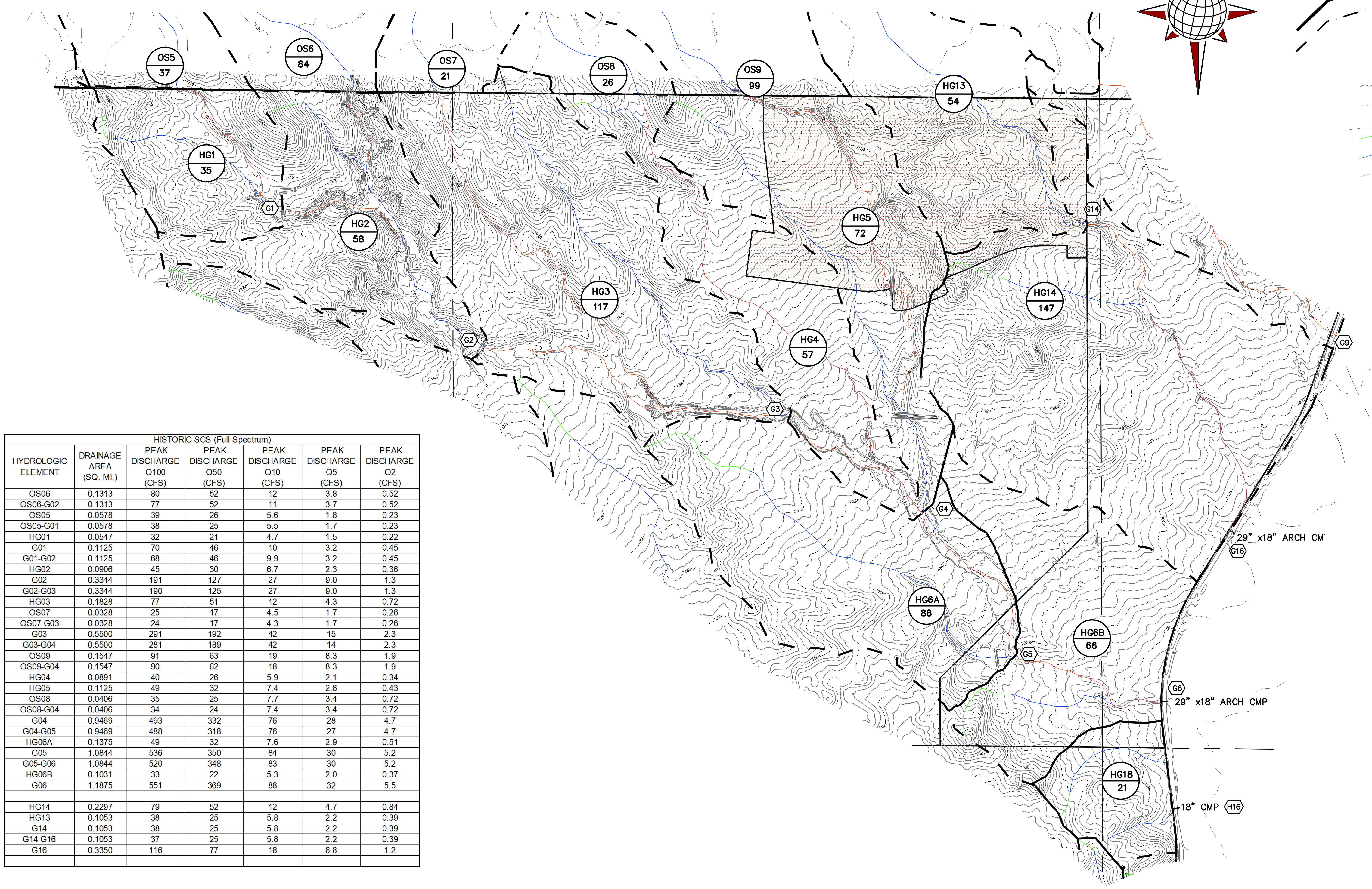
United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

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

Appendix G – Drainage Maps

ROLLING HILLS RANCH NORTH FILING 2 - FDR





HISTORIC SCS (Full Spectrum)						
HYDROLOGIC ELEMENT	DRAINAGE AREA (SQ. MI.)	PEAK DISCHARGE Q100 (CFS)	PEAK DISCHARGE Q50 (CFS)	PEAK DISCHARGE Q10 (CFS)	PEAK DISCHARGE Q5 (CFS)	PEAK DISCHARGE Q2 (CFS)
OS06	0.1313	80	52	12	3.8	0.52
OS06-G02	0.1313	77	52	11	3.7	0.52
OS05	0.0578	39	26	5.6	1.8	0.23
OS05-G01	0.0578	38	25	5.5	1.7	0.23
HG01	0.0547	32	21	4.7	1.5	0.22
G01	0.1125	70	46	10	3.2	0.45
G01-G02	0.1125	68	46	9.9	3.2	0.45
HG02	0.0906	45	30	6.7	2.3	0.36
G02	0.3344	191	127	27	9.0	1.3
G02-G03	0.3344	190	125	27	9.0	1.3
HG03	0.1828	77	51	12	4.3	0.72
OS07	0.0328	25	17	4.5	1.7	0.26
OS07-G03	0.0328	24	17	4.3	1.7	0.26
G03	0.5500	291	192	42	15	2.3
G03-G04	0.5500	281	189	42	14	2.3
OS09	0.1547	91	63	19	8.3	1.9
OS09-G04	0.1547	90	62	18	8.3	1.9
HG04	0.0891	40	26	5.9	2.1	0.34
HG05	0.1125	49	32	7.4	2.6	0.43
OS08	0.0406	35	25	7.7	3.4	0.72
OS08-G04	0.0406	34	24	7.4	3.4	0.72
G04	0.9469	493	332	76	28	4.7
G04-G05	0.9469	488	318	76	27	4.7
HG06A	0.1375	49	32	7.6	2.9	0.51
G05	1.0844	536	350	84	30	5.2
G05-G06	1.0844	520	348	83	30	5.2
HG06B	0.1031	33	22	5.3	2.0	0.37
G06	1.1875	551	369	88	32	5.5
HG14	0.2297	79	52	12	4.7	0.84
HG13	0.1053	38	25	5.8	2.2	0.39
G14	0.1053	38	25	5.8	2.2	0.39
G14-G16	0.1053	37	25	5.8	2.2	0.39
G16	0.3350	116	77	18	6.8	1.2

HISTORIC CONDITIONS - SCS MAP

FIGURE 4

No.	Revisions	Date	Init.	Appr.	Date
-	-	-			

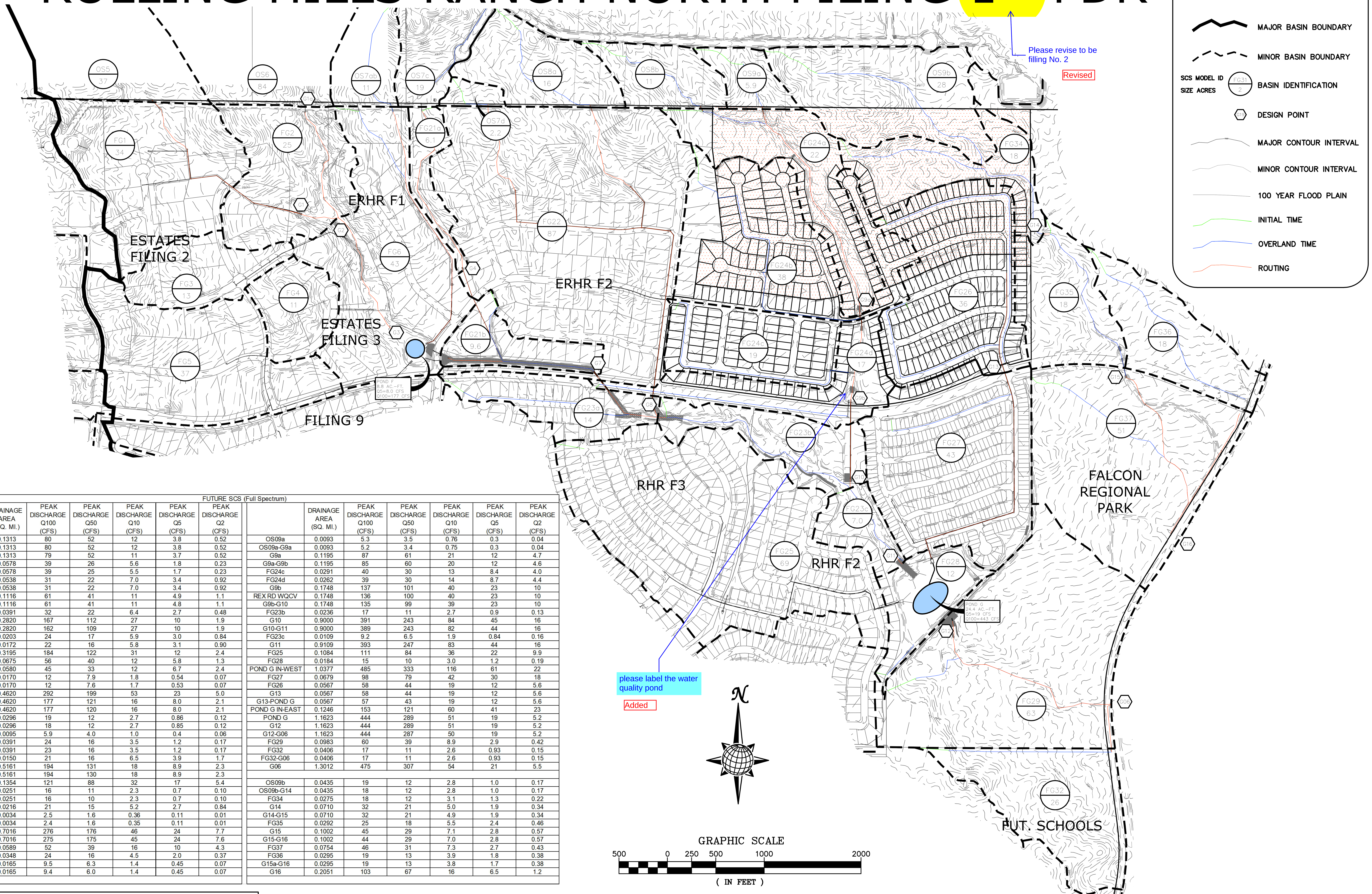
TECH CONTRACTORS
11886 STAPLETON DRIVE
FALCON, CO 80831
TELEPHONE: 719.495.7444
FAX: 719.495.3349

MERIDIAN RANCH

HISTORIC CONDITIONS - SCS MAP
ROLLING HILLS RANCH NORTH FILING 2 - FDR

Drawn by TJK
Checked by RG
Date XXX 2024
Scale AS SHOWN
- of -

ROLLING HILLS RANCH NORTH FILING 1 - FDR



FUTURE SCS (Full Spectrum)

	DRAINAGE AREA (SQ. MI.)	PEAK DISCHARGE Q100 (CFS)	PEAK DISCHARGE Q50 (CFS)	PEAK DISCHARGE Q10 (CFS)	PEAK DISCHARGE Q5 (CFS)	PEAK DISCHARGE Q2 (CFS)
OS06	0.1313	80	52	12	3.8	0.52
G1a	0.1313	80	52	12	3.8	0.52
G1a-G2	0.1313	79	52	11	3.7	0.52
OS05	0.0578	39	26	5.6	1.8	0.23
OS05-G1	0.0578	39	25	5.5	1.7	0.23
FG01	0.0538	31	22	7.0	3.4	0.92
FG01-G1	0.0538	31	22	7.0	3.4	0.92
G1	0.1116	61	41	11	4.9	1.1
G1-G2	0.1116	61	41	11	4.8	1.1
FG02	0.0391	32	22	6.4	2.7	0.48
G2	0.2820	167	112	27	10	1.9
G2-G3	0.2820	162	109	27	10	1.9
FG03	0.0203	24	17	5.9	3.0	0.84
FG04	0.0172	22	16	5.8	3.1	0.90
G3	0.3195	184	122	31	12	2.4
FG06	0.0675	56	40	12	5.8	1.3
FG05	0.0580	45	33	12	6.7	2.4
OS07ab	0.0170	12	7.9	1.8	0.54	0.07
OS07ab-POND F	0.0170	12	7.6	1.7	0.53	0.07
POND F IN	0.4620	292	199	53	23	5.0
POND F	0.4620	177	121	16	8.0	2.1
POND F-G7	0.4620	177	120	16	8.0	2.1
OS07c	0.0296	19	12	2.7	0.86	0.12
OS07c-G4	0.0296	18	12	2.7	0.85	0.12
FG21a	0.0095	5.9	4.0	1.0	0.4	0.06
G4	0.0391	24	16	3.5	1.2	0.17
G4-G7	0.0391	23	16	3.5	1.2	0.17
FG21b	0.0150	21	16	6.5	3.9	1.7
G7	0.5161	194	131	18	8.9	2.3
G7-G8	0.5161	194	130	18	8.9	2.3
FG22	0.1354	121	88	32	17	5.4
OS08a	0.0251	16	11	2.3	0.7	0.10
OS08-G8	0.0251	16	10	2.3	0.7	0.10
FG23a	0.0216	21	15	5.2	2.7	0.84
OS07d	0.0034	2.5	1.6	0.36	0.11	0.01
OS07d-G8	0.0034	2.4	1.6	0.35	0.11	0.01
G8	0.7016	276	176	46	24	7.7
G8-G10	0.7016	275	175	45	24	7.6
FG24b	0.0589	52	39	16	10	4.3
FG24a	0.0348	24	16	4.5	2.0	0.37
OS08b	0.0165	9.5	6.3	1.4	0.45	0.07
OS08b-G9a	0.0165	9.4	6.0	1.4	0.45	0.07

	DRAINAGE AREA (SQ. MI.)	PEAK DISCHARGE Q100 (CFS)	PEAK DISCHARGE Q50 (CFS)	PEAK DISCHARGE Q10 (CFS)	PEAK DISCHARGE Q5 (CFS)	PEAK DISCHARGE Q2 (CFS)
OS09a	0.0093	5.3	3.5	0.76	0.3	0.04
OS09a-G9a	0.0093	5.2	3.4	0.75	0.3	0.04
G9a	0.1195	87	61	21	12	4.7
G9a-G9b	0.1195	85	60	20	12	4.6
FG24c	0.0291	40	30	13	8.4	4.0
FG24d	0.0262	39	30	14	8.7	4.4
G9b	0.1748	137	101	40	23	10
REX RD WQCV	0.1748	136	100	40	23	10
G9b-G10	0.1748	135	99	39	23	10
FG23b	0.0236	17	11	2.7	0.9	0.13
G10	0.9000	391	243	84	45	16
G10-G11	0.9000	389	243	82	44	16
FG23c	0.0109	9.2	6.5	1.9	0.84	0.16
G11	0.9109	393	247	83	44	16
FG25	0.1084	111	84	36	22	9.9
FG28	0.0184	15	10	3.0	1.2	0.19
POND G IN-WEST	1.0377	485	333	116	61	22
FG27	0.0679	98	79	42	30	18
FG26	0.0567	58	44	19	12	5.6
G13	0.0567	58	44	19	12	5.6
G13-POND G	0.0567	57	43	19	12	5.6
POND G IN-EAST	0.1246	153	121	60	41	23
POND G	1.1623	444	289	51	19	5.2
G12	1.1623	444	289	51	19	5.2
G12-G06	1.1623	444	287	50	19	5.2
FG29	0.0983	60	39	8.9	2.9	0.42
FG32	0.0406	17	11	2.6	0.93	0.15
FG32-G06	0.0406	17	11	2.6	0.93	0.15
G06	1.3012	475	307	54	21	5.5
OS09b	0.0435	19	12	2.8	1.0	0.17
OS09b-G14	0.0435	18	12	2.8	1.0	0.17
FG34	0.0275	18	12	3.1	1.3	0.22
G14	0.0710	32	21	5.0	1.9	0.34
G14-G15	0.0710	32	21	4.9	1.9	0.34
FG35	0.0292	25	18	5.5	2.4	0.46
G15	0.1002	45	29	7.1	2.8	0.57
G15-G16	0.1002	44	29	7.0	2.8	0.57
FG37	0.0754	46	31	7.3	2.7	0.43
FG36	0.0295	19	13	3.9	1.8	0.38
G15a-G16	0.0295	19	13	3.8	1.7	0.38
G16	0.2051	103	67	16	6.5	1.2

*NOTE: PRELIMINARY STORAGE VOLUMES AND OUTFLOW QUANTITIES HAVE BEEN PROVIDED FOR EACH OF THE FUTURE DETENTION FACILITIES LOCATED WITHIN THE DEVELOPMENT. THE ACTUAL STORAGE VOLUMES AND DISCHARGE RATES WILL BE DETERMINED UPON A COMPLETE ANALYSIS FOR EACH DETENTION FACILITY PRIOR TO CONSTRUCTION. THE VALUES GIVEN FOR DISCHARGE AND VOLUME ARE ESTIMATES FOR PLANNING PURPOSES ONLY.

FUTURE CONDITIONS - SCS MAP

FIGURE 5

No. | Revisions | Date | Init. | Appr. | Date

TECH CONTRACTORS
11910 TOURMALINE DR #130
FALCON, CO 80831
TELEPHONE: 719.495.7444

MERIDIAN RANCH

FUTURE CONDITIONS - SCS MAP
ROLLING HILLS RANCH NORTH FILING 2 - FDR

Drawn by TAK
Checked by
Date XXX 2022
Scale AS SHOWN
- of -

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)

1 inch = 100 ft.

G01 — BASIN DESIGNATION
SUB-WATERSHED DESIGNATION
MINOR/MAJOR STORM COEFFICIENT
BASIN AREA IN ACRES

61 — DESIGN POINT DESIGNATION

MAJOR BASIN BOUNDARY

SUB-BASIN BOUNDARY

6130 — EXISTING CONTOUR

6130 — PROPOSED COUNTOUR

PROPOSED STORM SEWER

INITIAL OVERLAND TIME (Ti)

TRAVEL TIME (Tt)

OVERLAND TIME (To)

BENCH MARK:

INTERSECTION OF WOODMEN RD AND MERIDIAN ROAD AT SW CORNER (BRASS CAP W/ NO. GF-9)

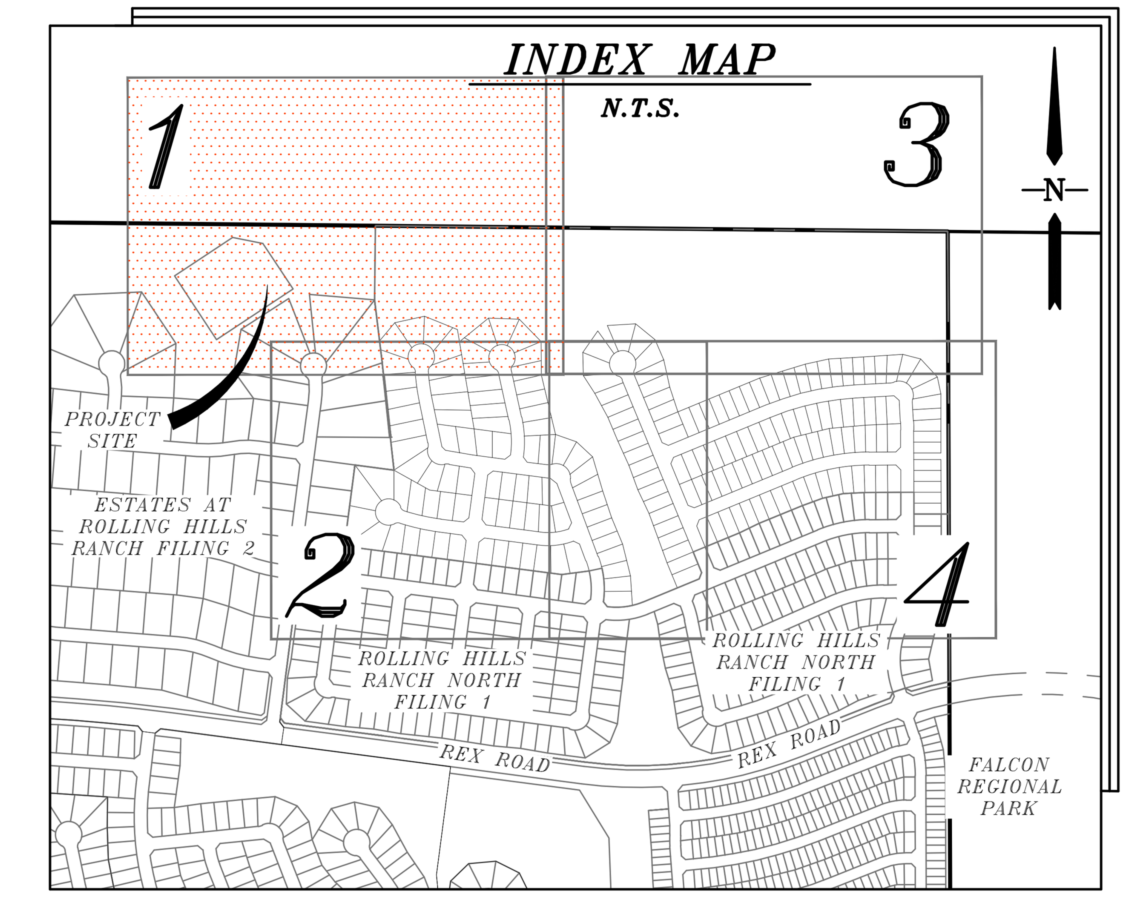
ELEVATION = 6874.00

NOTE:

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

UPSTREAM DP	BASIN	AREA (AC)	Q(5) (CFS)	Q(100) (CFS)	INLET	Q(5) (CFS)	Q(100) (CFS)	PIPE	DOWNSTREAM DP
I01	A01	5.4	4.7	15	PR 15 ' SUMP	4.7	14	18 " RCP	J01
J01						4.7	14	18 " RCP	J02
J02						4.7	13	18 " RCP	J03
I02	A02	3.0	3.8	11	PR 10 ' SUMP	3.8	10	18 " RCP	J03
J03						7.6	21	24 " RCP	EJ08
I03	A03	3.2	5.4	18	PR 20 ' FLOWBY	4.5	13	18 " RCP	J04
J04						4.5	13	18 " RCP	J05
I04	A04	3.4	3.5	14	PR 20 ' SUMP	3.5	14	18 " RCP	J05
J05						7.8	26	24 " RCP	EJ06
EI05	A05	5.8	5.4	17	PR 20 ' SUMP	5.4	17	24 " RCP	EJ06
EJ06						12	40	30 " RCP	EJ07A
EJ07A						12	40	30 " RCP	EJ07B
EJ07B						12	40	30 " RCP	EJ09
EI06	A06	4.1	4.8	14	PR 10 ' SUMP	4.8	10	24 " RCP	EJ08
EJ08						12	30	30 " RCP	EJ09
EJ09						22	63	42 " RCP	EJ11
EI07	A07	3.6	4.4	11	PR 10 ' SUMP	4.4	10	18 " RCP	EJ10

UPSTREAM DP	BASIN	AREA (AC)	Q(5) (CFS)	Q(100) (CFS)	INLET	Q(5) (CFS)	Q(100) (CFS)	PIPE	DOWNSTREAM DP
EJ10						4.4	10	18 " RCP	EJ11
DP2	OS4	39	11	61		11	61	48 " RCP	EI08
EI08	A08	5.7	5.5	19	PR 15 ' SUMP	16	75	48 " RCP	EJ11
EJ11						38	139	48 " RCP	EI09
EI09	A09	0.2	1.0	3.1	PR 10 ' SUMP	39	141	48 " RCP	ES01
I10	B01	6.4	7.3	19	PR 15 ' SUMP	7.3	14	24 " RCP	J12
J12						7.3	14	24 " RCP	EJ13
EI11	B02	6.2	7.5	22	PR 20 ' SUMP	7.5	17	18 " RCP	EJ13
EJ13						14	30	30 " RCP	EJ14
EI12	B03	4.6	5.6	16	PR 20 ' SUMP	5.6	16	18 " RCP	EJ14
EJ14						19	44	30 " RCP	EJ15
EI13	B04	9.5	10	26	PR 20 ' SUMP	10	17	24 " RCP	EJ15
EJ15						29	60	36 " RCP	EJ01
ExI1	B05	3.0	3.6	17	EX 15 ' SUMP	3.6	17	18 " RCP	EJ01
ExI2	B06	6.6	6.5	16	EX 15 ' SUMP	6.5	16	18 " RCP	EJ01
EJ01						38	90	42 " RCP	Sancturary



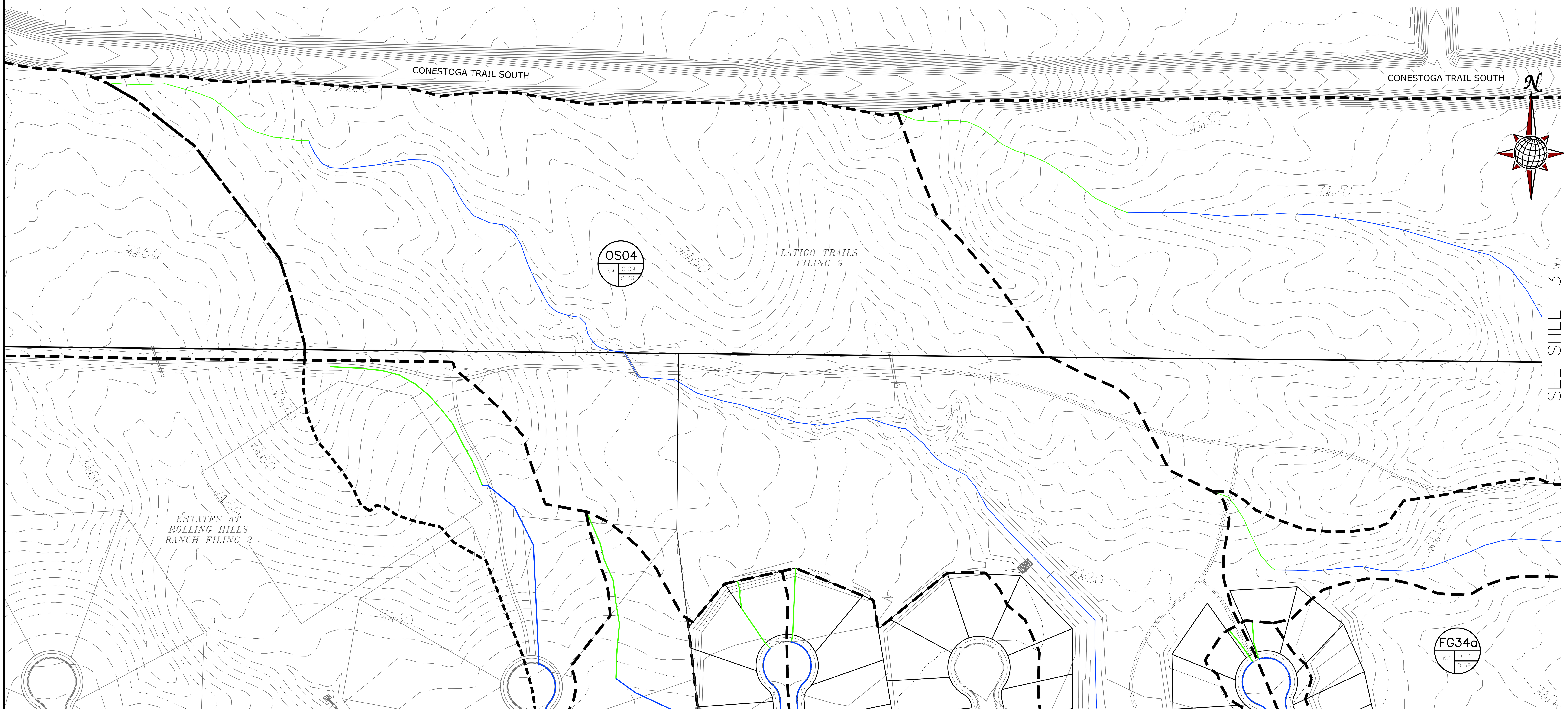


FIGURE 6

No.	Revisions	Date	Init.	Appr.	Date

TECH CONTRACTORS
11886 STAPLETON DRIVE
FALCON, CO 80831
TELEPHONE: 719.495.7444
FAX: 719.495.3349

MERIDIAN RANCH

RATIONAL DRAINAGE MAP
FINAL DRAINAGE REPORT
ROLLING HILLS RANCH NORTH FILING 2
AT MERIDIAN RANCH

Drawn by TJK
Checked by -
Date XXX 2022
Scale 1" = 100'
1 of 4

NOTE:

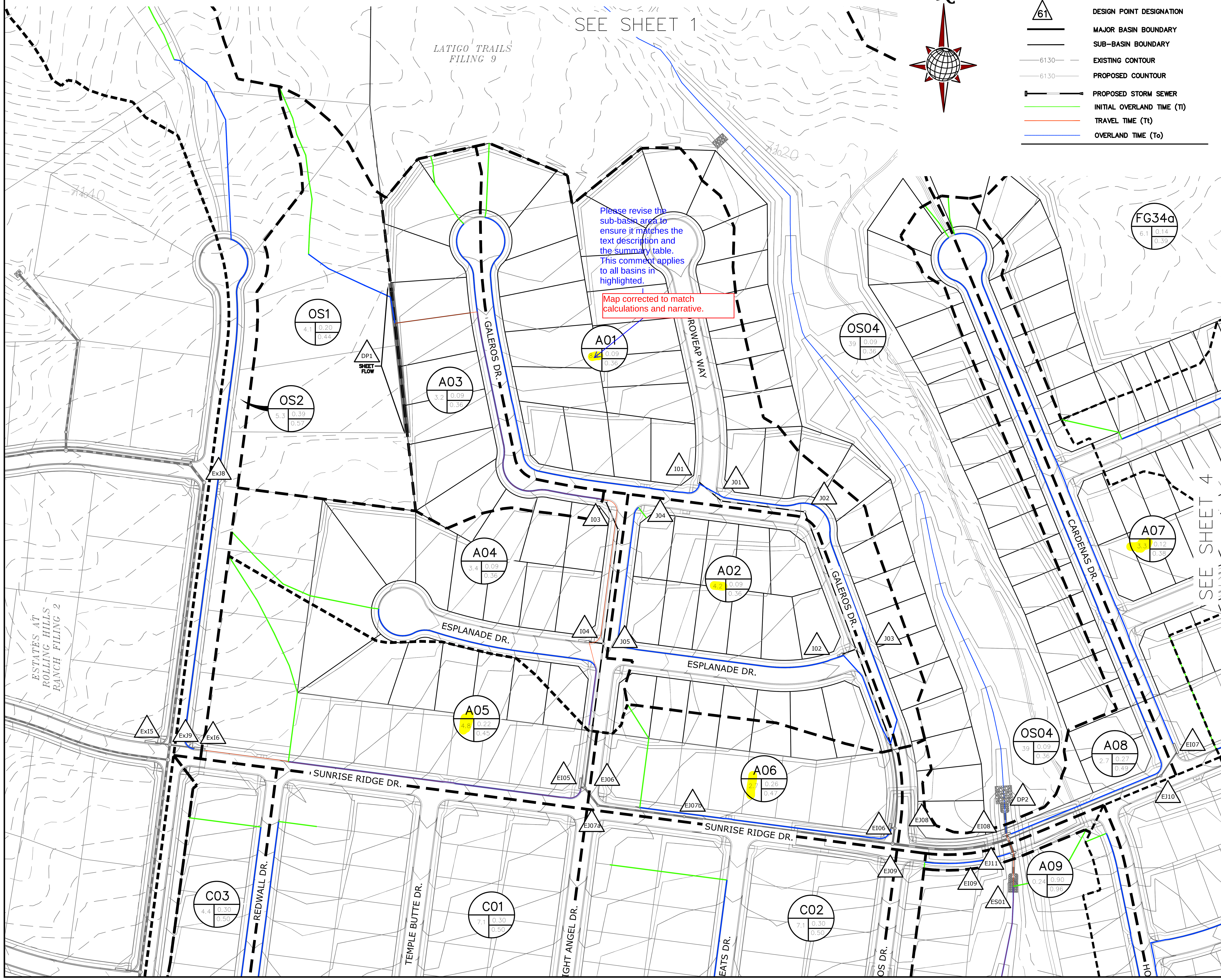
COUNTY PLAN REVIEW IS PROVIDED ONLY FOR GENERAL CONFORMANCE WITH COUNTY DESIGN CRITERIA. THE COUNTY IS NOT RESPONSIBLE FOR THE ACCURACY AND ADEQUACY OF THE DESIGN, DIMENSIONS, AND/OR ELEVATIONS WHICH SHALL BE CONFIRMED AT THE JOB SITE. THE COUNTY THROUGH THE APPROVAL OF THIS DOCUMENT ASSUMES NO RESPONSIBILITY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

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)

1 inch = 100 ft.



BASIN DESIGNATION

SUB-WATERSHED DESIGNATION

MINOR/MAJOR STORM COEFFICIENT

BASIN AREA IN ACRES

DESIGN POINT DESIGNATION

MAJOR BASIN BOUNDARY

SUB-BASIN BOUNDARY

EXISTING CONTOUR

PROPOSED COUNTOUR

PROPOSED STORM SEWER

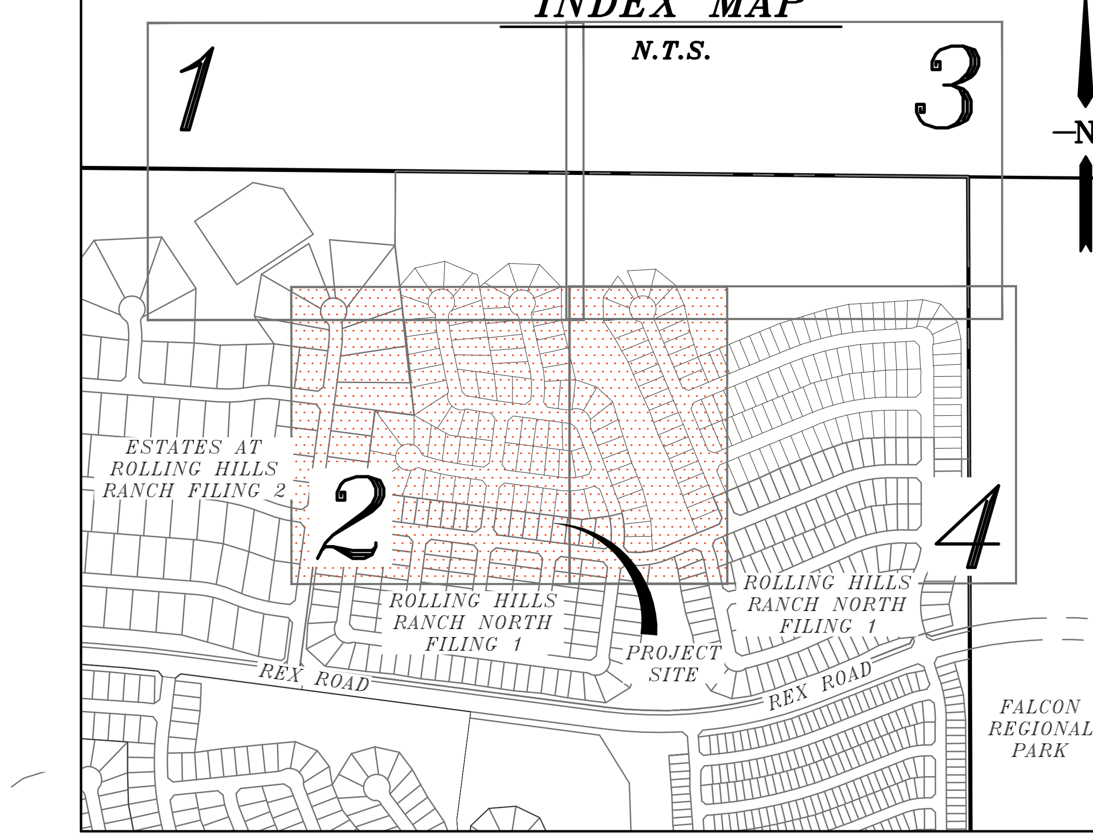
INITIAL OVERLAND TIME (Ti)

TRAVEL TIME (Tt)

OVERLAND TIME (To)

INDEX MAP

N.T.S.



UPSTREAM DP	BASIN	AREA (AC)	Q(5) (CFS)	Q(100) (CFS)	INLET	Q(5) (CFS)	Q(100) (CFS)	PIPE	DOWNSTREAM DP
I01	A01	5.4	4.7	14.8	PR 15 ' SUMP	4.7	14	18 " RCP	J01
J01						4.7	14	18 " RCP	J02
J02						4.7	13	18 " RCP	J03
I02	A02	3.0	3.8	10.5	PR 10 ' SUMP	3.8	9.9	18 " RCP	J03
J03						7.6	21	24 " RCP	EJ08
I03	A03	3.2	5.4	18.4	PR 20 ' FLOWBY	4.5	13	18 " RCP	J04
J04						4.5	13	18 " RCP	J05
I04	A04	3.4	3.5	14	PR 20 ' SUMP	3.5	14	18 " RCP	J05
J05						7.8	26	24 " RCP	EJ06
EI05	A05	5.8	5.4	17.4	PR 20 ' SUMP	5.4	17	24 " RCP	EJ06
EJ06						12	40	30 " RCP	EJ07A
EJ07A						12	40	30 " RCP	EJ07B
EJ07B						12	40	30 " RCP	EJ09
EI06	A06	4.1	4.8	14.0	PR 10 ' SUMP	4.8	10	24 " RCP	EJ08
EJ08						12	30	30 " RCP	EJ09
EJ09						22	63	42 " RCP	EJ11
EI07	A07	3.6	4.4	11.1	PR 10 ' SUMP	4.4	9.9	18 " RCP	EJ10
EJ10						4.4	9.9	18 " RCP	EJ11
DP2	OS4	39	11	61		11	61	48 " RCP	EI08
EI08	A08	5.7	5.5	19.1	PR 15 ' SUMP	16	75	48 " RCP	EJ11
EJ11						38	139	48 " RCP	EI09
EI09	A09	0.2	1.0	3.1	PR 10 ' SUMP	39	141	48 " RCP	ES01
I10	B01	6.4	7.3	19	PR 15 ' SUMP	7.3	14	24 " RCP	J12
J12						7.3	14	24 " RCP	EJ13
EI11	B02	6.2	7.5	22	PR 20 ' SUMP	7.5	17	18 " RCP	EJ13
EJ13						14	30	30 " RCP	EJ14
EI12	B03	4.6	5.6	16	PR 20 ' SUMP	5.6	16	18 " RCP	EJ14
EJ14						19	44	30 " RCP	EJ15
EI13	B04	9.5	10	26	PR 20 ' SUMP	10	17	24 " RCP	EJ15
EJ15						29	60	36 " RCP	EJ01
ExI1	B05	3.0	3.6	17	EX 15 ' SUMP	3.6	17	18 " RCP	EJ01
ExI2	B06	6.6	6.5	16	EX 15 ' SUMP	6.5	16	18 " RCP	EJ01
EJ01						38	90	42 " RCP	Sancturary

Missing sub-basins OS1, OS2

The chart shows data from the storm drain system and does not include surface runoff. No change

BENCH MARK:

INTERSECTION OF WOODMEN RD AND MERIDIAN ROAD AT SW CORNER (BRASS CAP W/ NO. GF-9)

ELEVATION = 6874.00

FIGURE 6

No.	Revisions	Date	Init.	Appr.	Date

TECH CONTRACTORS
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MERIDIAN RANCH

RATIONAL DRAINAGE MAP
FINAL DRAINAGE REPORT
ROLLING HILLS RANCH NORTH FILING 2
AT MERIDIAN RANCH

Drawn by TAK
Checked by -
Date XXX 2022
Scale 1" = 100'
2 of 4

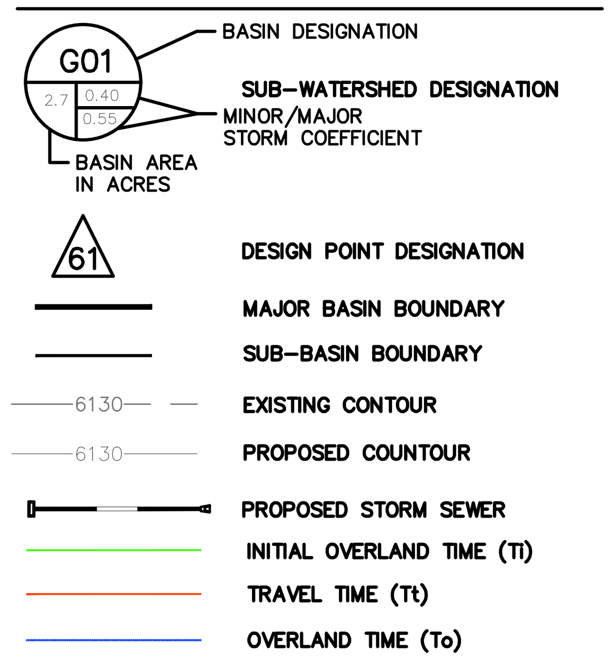
S:\OneDrive\Civil\Proj\Rolling Hills Ranch North Filing 2\DWG\PLAN SHEETS\DRAINAGE MAPS\FDR\6 RHR NORTH 2 FDR - RATIONAL MAP.dwg, 4/22/2024 8:05:48 AM

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)

1 inch = 100 ft.



BENCH MARK:

INTERSECTION OF WOODMEN RD AND MERIDIAN ROAD AT SW CORNER (BRASS CAP W/ NO. GF-9)

ELEVATION = 6874.00

NOTE:

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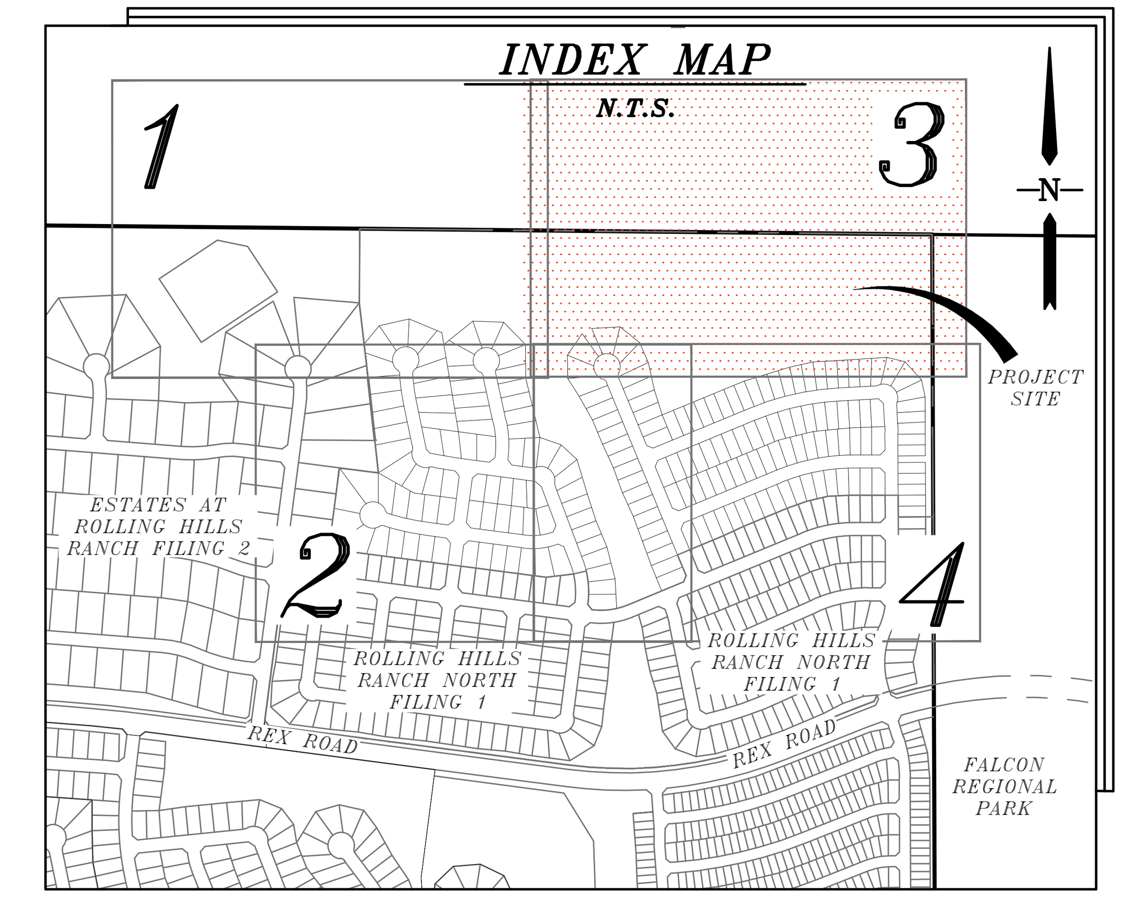
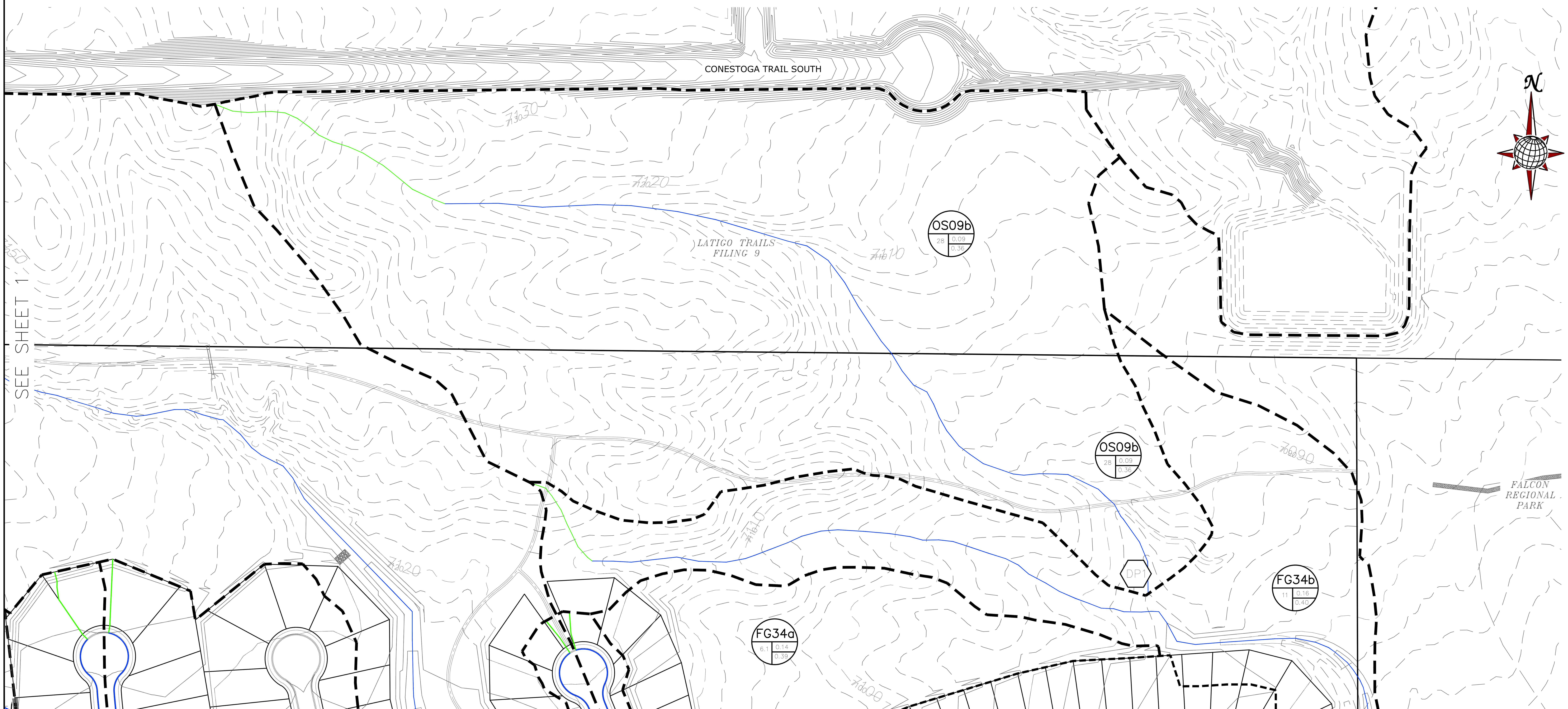
UPSTREAM DP	BASIN	AREA (AC)	Q(5) (CFS)	Q(100) (CFS)	INLET	Q(5) (CFS)	Q(100) (CFS)	PIPE	DOWNSTREAM DP
I01	A01	5.4	4.7	15	PR 15 ' SUMP	4.7	14	18 " RCP	J01
J01						4.7	14	18 " RCP	J02
J02						4.7	13	18 " RCP	J03
I02	A02	3.0	3.8	11	PR 10 ' SUMP	3.8	10	18 " RCP	J03
J03						7.6	21	24 " RCP	EJ08
I03	A03	3.2	5.4	18	PR 20 ' FLOWBY	4.5	13	18 " RCP	J04
J04						4.5	13	18 " RCP	J05
I04	A04	3.4	3.5	14	PR 20 ' SUMP	3.5	14	18 " RCP	J05
J05						7.8	26	24 " RCP	EJ06
EI05	A05	5.8	5.4	17	PR 20 ' SUMP	5.4	17	24 " RCP	EJ06
EJ06						12	40	30 " RCP	EJ07A
EJ07A						12	40	30 " RCP	EJ07B
EJ07B						12	40	30 " RCP	EJ09
EI06	A06	4.1	4.8	14	PR 10 ' SUMP	4.8	10	24 " RCP	EJ08
EJ08						12	30	30 " RCP	EJ09
EJ09						22	63	42 " RCP	EJ11
EI07	A07	3.6	4.4	11	PR 10 ' SUMP	4.4	10	18 " RCP	EJ10

UPSTREAM DP	BASIN	AREA (AC)	Q(5) (CFS)	Q(100) (CFS)	INLET	Q(5) (CFS)	Q(100) (CFS)	PIPE	DOWNSTREAM DP
EJ10						4.4	10	18 " RCP	EJ11
DP2	OS4	39	11	61		11	61	48 " RCP	EI08
EI08	A08	5.7	5.5	19	PR 15 ' SUMP	16	75	48 " RCP	EJ11
EJ11						38	139	48 " RCP	EI09
EI09	A09	0.2	1.0	3.1	PR 10 ' SUMP	39	141	48 " RCP	ES01
I10	B01	6.4	7.3	19	PR 15 ' SUMP	7.3	14	24 " RCP	J12
J12						7.3	14	24 " RCP	EJ13
EI11	B02	6.2	7.5	22	PR 20 ' SUMP	7.5	17	18 " RCP	EJ13
EJ13						14	30	30 " RCP	EJ14
EI12	B03	4.6	5.6	16	PR 20 ' SUMP	5.6	16	18 " RCP	EJ14
EJ14						19	44	30 " RCP	EJ15
EI13	B04	9.5	10	26	PR 20 ' SUMP	10	17	24 " RCP	EJ15
EJ15						29	60	36 " RCP	EJ01
ExI1	B05	3.0	3.6	17	EX 15 ' SUMP	3.6	17	18 " RCP	EJ01
ExI2	B06	6.6	6.5	16	EX 15 ' SUMP	6.5	16	18 " RCP	EJ01
EJ01						38	90	42 " RCP	Sancturary





TECH CONTRACTORS
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FAX: 719.495.3349

MERIDIAN RANCH

RATIONAL DRAINAGE MAP
FINAL DRAINAGE REPORT
ROLLING HILLS RANCH FILING 2
AT MERIDIAN RANCH

No.	Revisions	Date	Init.	Appr.	Date

Drawn by TJK
Checked by -
Date XXX 2022
Scale 1" = 100'
3 of 4

FIGURE 6

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)

1 inch = 100 ft.

BENCH MARK:

INTERSECTION OF WOODMEN RD AND MERIDIAN ROAD AT SW CORNER (BRASS CAP W/ NO. GF-9)

ELEVATION = 6874.00

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G01 — BASIN DESIGNATION
SUB-WATERSHED DESIGNATION
MINOR/MAJOR STORM COEFFICIENT
BASIN AREA IN ACRES

61 — DESIGN POINT DESIGNATION

MAJOR BASIN BOUNDARY

SUB-BASIN BOUNDARY

6130 — EXISTING CONTOUR

6130 — PROPOSED COUNTOUR

PROPOSED STORM SEWER

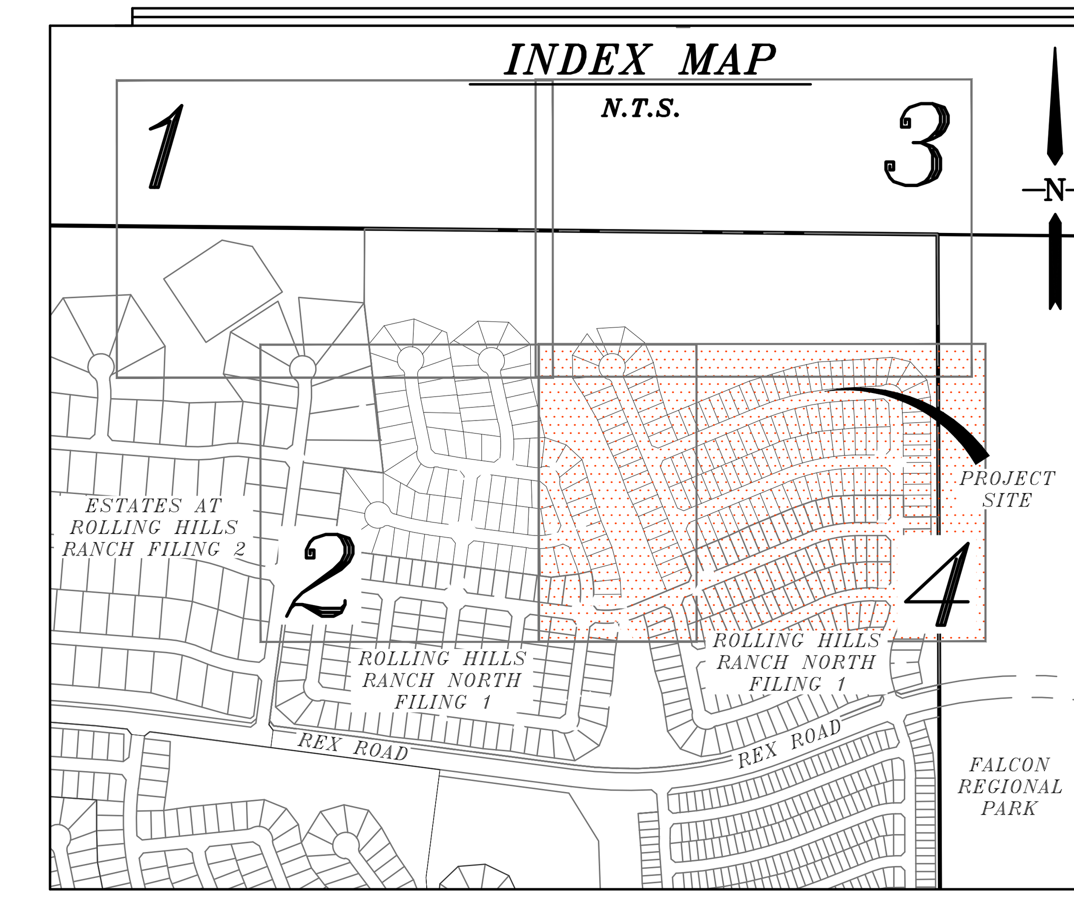
INITIAL OVERLAND TIME (Ti)

TRAVEL TIME (Tt)

OVERLAND TIME (To)

UPSTREAM DP	BASIN	AREA (AC)	Q(5) (CFS)	Q(100) (CFS)	INLET	Q(5) (CFS)	Q(100) (CFS)	PIPE	DOWNSTREAM DP
I01	A01	5.4	4.7	15	PR 15 ' SUMP	4.7	14	18 " RCP	J01
J01						4.7	14	18 " RCP	J02
J02						4.7	13	18 " RCP	J03
I02	A02	3.0	3.8	11	PR 10 ' SUMP	3.8	10	18 " RCP	J03
J03						7.6	21	24 " RCP	EJ08
I03	A03	3.2	5.4	18	PR 20 ' FLOWBY	4.5	13	18 " RCP	J04
J04						4.5	13	18 " RCP	J05
I04	A04	3.4	3.5	14	PR 20 ' SUMP	3.5	14	18 " RCP	J05
J05						7.8	26	24 " RCP	EJ06
EI05	A05	5.8	5.4	17	PR 20 ' SUMP	5.4	17	24 " RCP	EJ06
EJ06						12	40	30 " RCP	EJ07A
EJ07A						12	40	30 " RCP	EJ07B
EJ07B						12	40	30 " RCP	EJ09
EI06	A06	4.1	4.8	14	PR 10 ' SUMP	4.8	10	24 " RCP	EJ08
EJ08						12	30	30 " RCP	EJ09
EJ09						22	63	42 " RCP	EJ11
EI07	A07	3.6	4.4	11	PR 10 ' SUMP	4.4	10	18 " RCP	EJ10

UPSTREAM DP	BASIN	AREA (AC)	Q(5) (CFS)	Q(100) (CFS)	INLET	Q(5) (CFS)	Q(100) (CFS)	PIPE	DOWNSTREAM DP
EJ10						4.4	10	18 " RCP	EJ11
DP2	OS4	39	11	61		11	61	48 " RCP	EI08
EI08	A08	5.7	5.5	19	PR 15 ' SUMP	16	75	48 " RCP	EJ11
EJ11						38	139	48 " RCP	EI09
EI09	A09	0.2	1.0	3.1	PR 10 ' SUMP	39	141	48 " RCP	ES01
I10	B01	6.4	7.3	19	PR 15 ' SUMP	7.3	14	24 " RCP	J12
J12						7.3	14	24 " RCP	EJ13
EI11	B02	6.2	7.5	22	PR 20 ' SUMP	7.5	17	18 " RCP	EJ13
EJ13						14	30	30 " RCP	EJ14
EI12	B03	4.6	5.6	16	PR 20 ' SUMP	5.6	16	18 " RCP	EJ14
EJ14						19	44	30 " RCP	EJ15
EI13	B04	9.5	10	26	PR 20 ' SUMP	10	17	24 " RCP	EJ15
EJ15						29	60	36 " RCP	EJ01
ExI1	B05	3.0	3.6	17	EX 15 ' SUMP	3.6	17	18 " RCP	EJ01
ExI2	B06	6.6	6.5	16	EX 15 ' SUMP	6.5	16	18 " RCP	EJ01
EJ01						38	90	42 " RCP	Sancturary



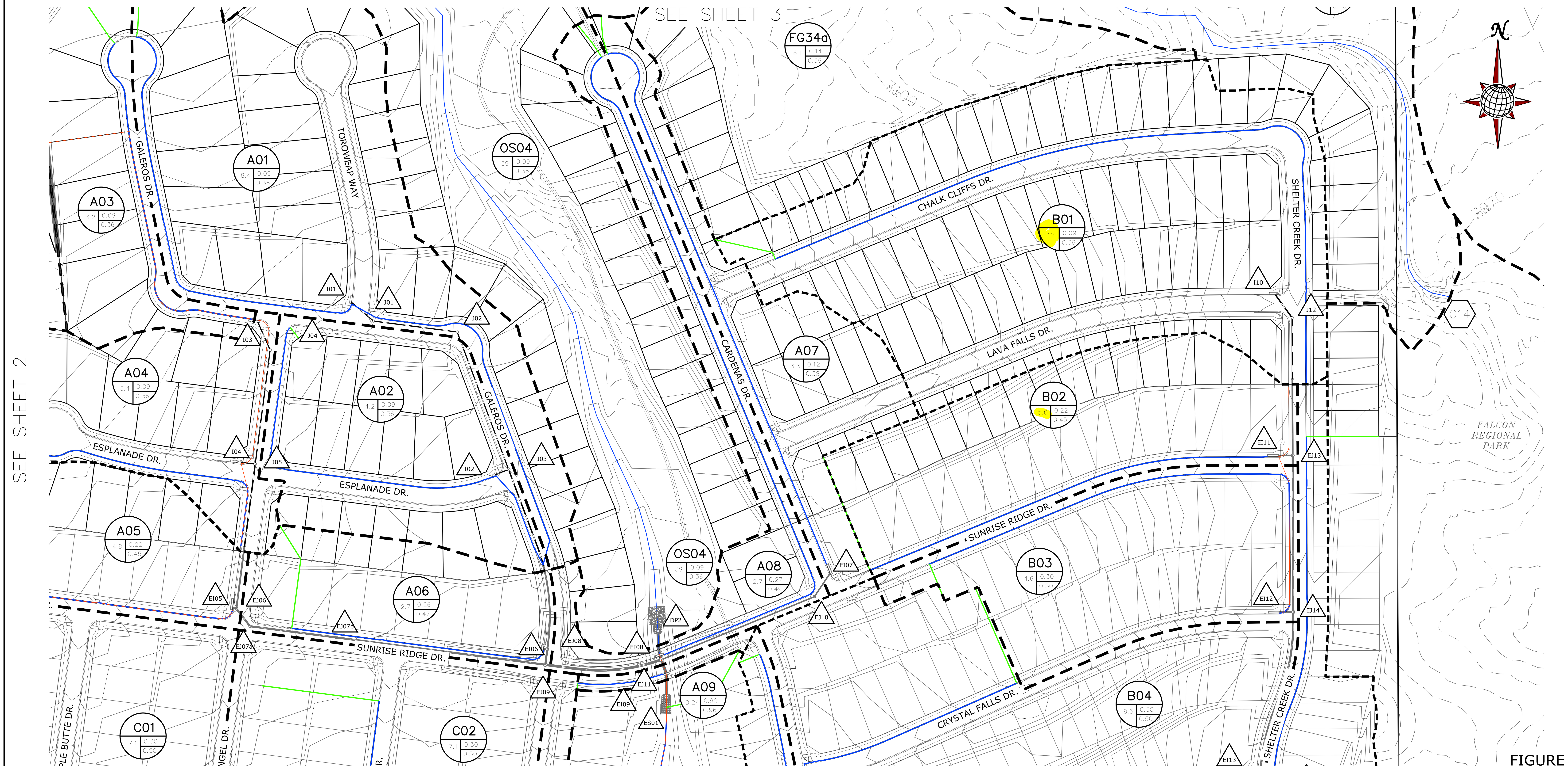


FIGURE 6

TECH CONTRACTORS
11886 STAPLETON DRIVE
FALCON, CO 80831
TELEPHONE: 719.495.7444
FAX: 719.495.3349

MERIDIAN RANCH

RATIONAL DRAINAGE MAP
FINAL DRAINAGE REPORT
ROLLING HILLS RANCH NORTH FILING 2
AT MERIDIAN RANCH

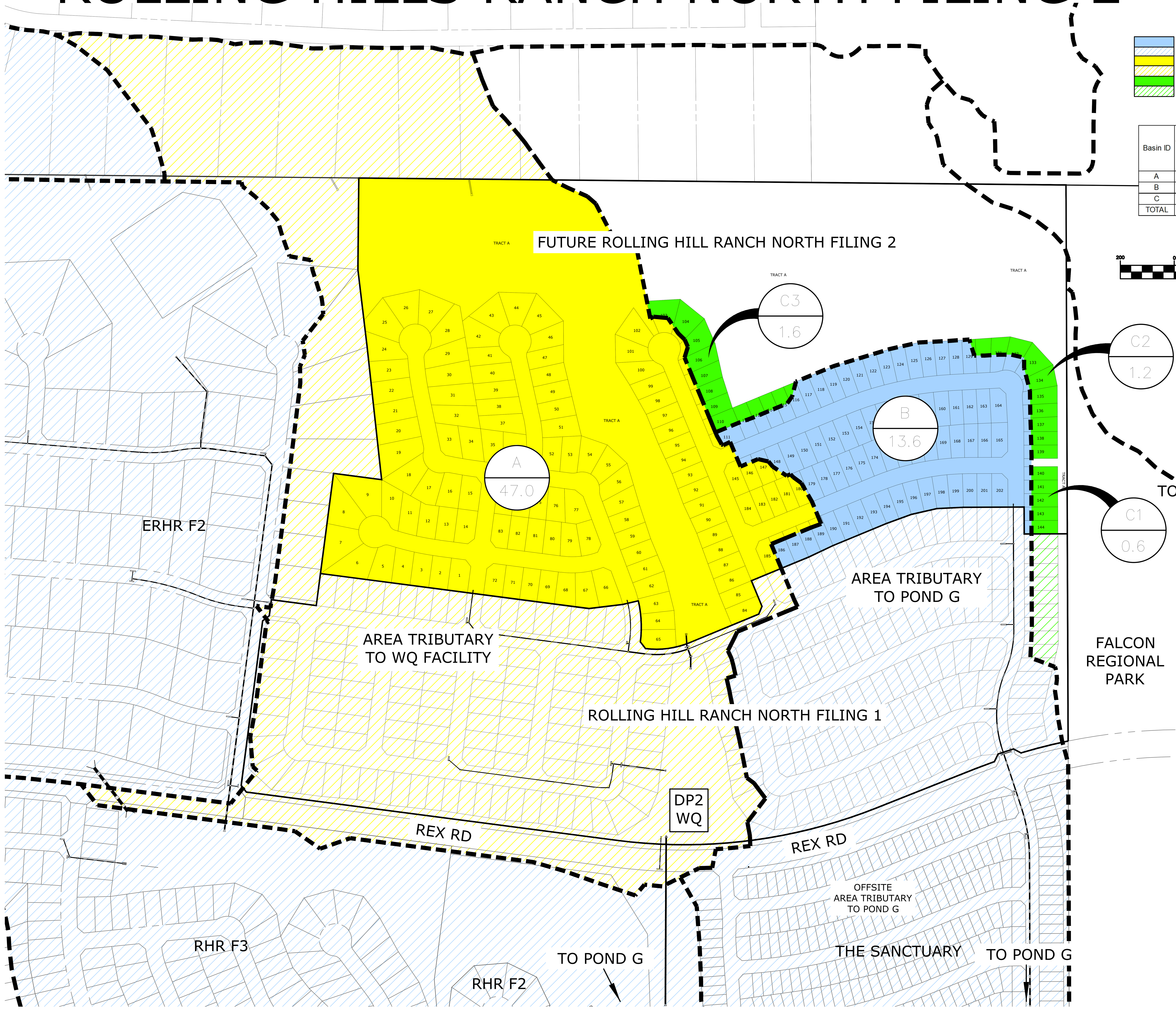
No.	Revisions	Date	Init.	Appr.	Date
-					

Drawn by TJK
Checked by -
Date XXX 2022
Scale 1" = 100'
4 of 4

ROLLING HILLS RANCH NORTH FILING 2

No change per conversation with Daniel (Oct 29, 2024)

And then detention pond G



LEGEND

- AREA TRIBUTARY TO POND G
- OFFSITE AREA TRIBUTARY TO POND G
- AREA TRIBUTARY TO WATER QUALITY FACILITY
- OFFSITE AREA TRIBUTARY TO WATER QUALITY FACILITY
- AREAS SUBJECT TO RUNOFF REDUCTION
- OFFSITE AREA SUBJECT TO RUNOFF REDUCTION

Basin ID	Total Area (ac)	Area Tributary to Pond G (ac)	Area Tributary to WQ Facility (ac)	Disturbed Area Treated via Runoff Reduction
A	47.0		47.0	
B	13.6	13.6		
C	3.4			3.4
TOTAL	64.0	13.6	47.0	3.4

GRAPHIC SCALE

200 0 50 100 200 400

(IN FEET)
1 INCH = 200 ft.

N

TECH CONTRACTORS
11910 TOURMALINE DR #130
FALCON, CO 80831
TELEPHONE: 719.495.7444

MERIDIAN RANCH

WATER QUALITY SITE MAP
ROLLING HILLS RANCH NORTH FILING 2
FINAL DRAINAGE REPORT

Drawn by TMK
Checked by
Date JULY 2024
Scale AS SHOWN
- of -

No. | Revisions | Date | Init. | Appr. | Date

WATER QUALITY SITE MAP

FIGURE 7