Final Drainage Report

for

Rolling Hills Ranch Filing 2

at

Meridian Ranch

EL PASO COUNTY, COLORADO

November 2020

Prepared For:

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

Prepared By:
Tech Contractors
11886 Stapleton Drive
Falcon, CO 80831
719.495.7444

PCD Project No. SF-20-020

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.

COLORADO REGISTERED THOMAS A. KERBY 31429 PROFESSIONAL ENGINEER

Thomas A. Kerby, P.E. #31429

11-3-2020
Date

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
GTL Development, Inc.
P.O. Box 80036
San Diego, CA 92138

November 3, 2020
Date

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.

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

Date

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

Table of Contents

Figures

Tables

Appendices:

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 Filing 2 at Meridian Ranch (RHR2) development. 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).

This report based on the current version of the Meridian Ranch Sketch Plan amendment as adopted by the El Paso County Board of Commissioners on March 13, 2018. 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 convention 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, interim and future conditions for the 2-yr, 5-yr, 10-yr, 50-yr, and 100-yr design storm frequencies. The interim and the future conditions include detention facilities sized and modeled such that *"frequent and infrequent inflows are released at rates approximating undeveloped conditions"*

RHR2 encompasses 88.2± acres and is located in Sections 20 and 29, Township 12 South, Range 64 West of the 6th Principal Meridian. It is approximately 12 miles northeast of the city of Colorado Springs, 2.5 miles north of the unincorporated town of Falcon, and immediately north of the Woodmen Hills development.

Rolling Hills Ranch is located within Gieck Ranch Drainage Basin. The Gieck Ranch Basin has been studied but has not received final approval from El Paso County.

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 Report (FDR) is to present proposed changes to the drainage patterns as a result of the development of RHR2. 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.

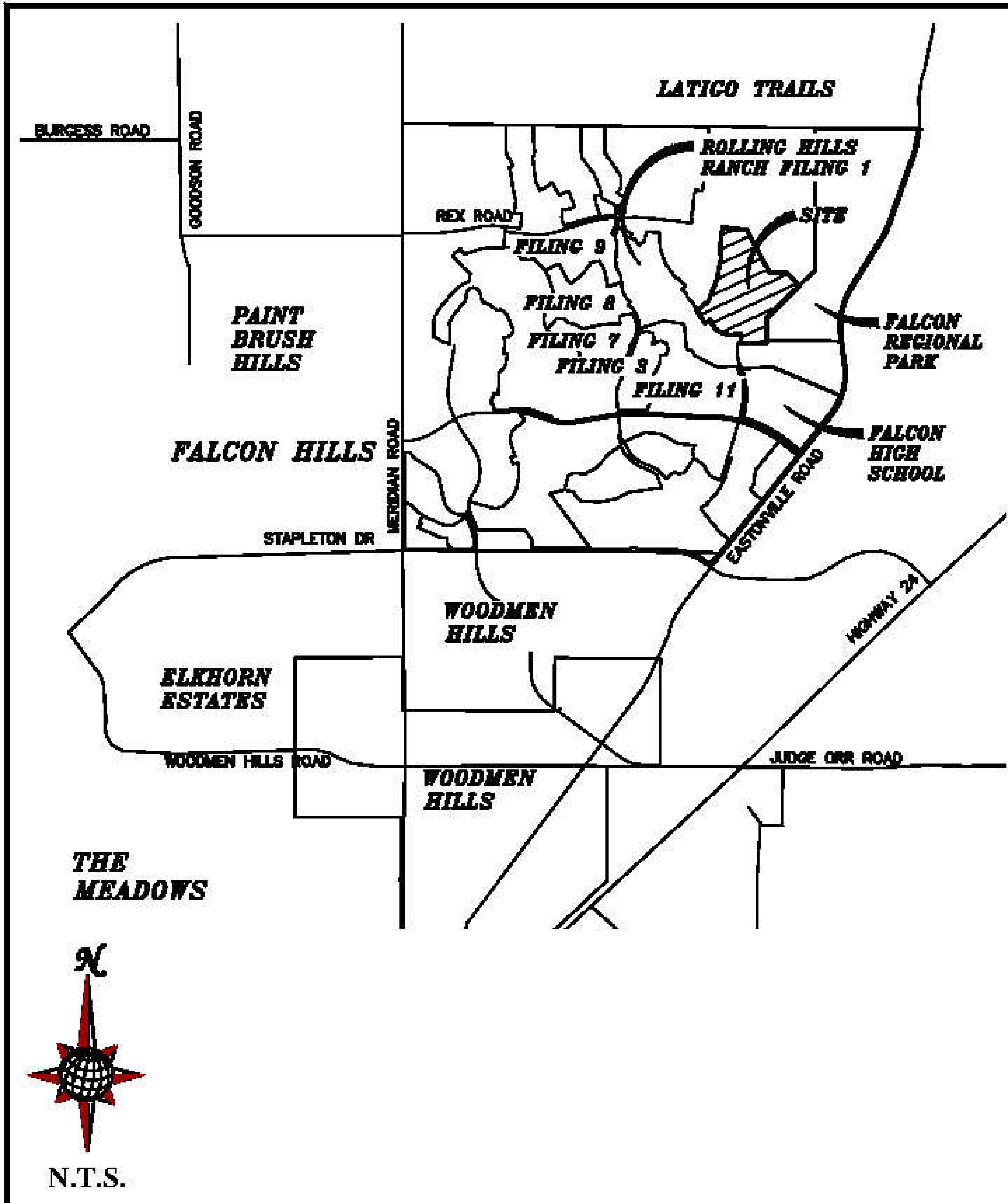
Background

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 eight 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.

No development has occurred downstream of this project except for portions of the Falcon Regional Park providing ballparks and associated parking. The Meridian Ranch MDDP and this report indicate the Eastonville Road culvert crossing located downstream of this project does not provide enough capacity for the historic flow rates. It is anticipated that this culvert will be upgraded at the time of the Eastonville Road construction.

Figure 1: Vicinity Map



ROLLING HILLS RANCH FILING 2 AT MERIDIAN RANCH VICINITY MAP	TECH CONTRACTORS 11886 STAPLETON DRIVE FALCON, CO 80831
FIGURE 1	TELEPHONE: 719.495.7444 FAX: 719.495.2457

EXISTING CONDITIONS

General Location

RHR2 project encompasses 88.2± acres and is located in Sections 20 and 29, Township 12 South, Range 64 West of the 6th Principal Meridian. It is approximately 12 miles northeast of the city of Colorado Springs, 2.5 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, currently urbanization has occurred in the general vicinity. Most notably, urbanization is occurring to the north with Latigo Trails, to the south in the Woodmen Hills Subdivision, to the east in Four Way Ranch, to the west in the Falcon Hills subdivision, and to the northwest in the Paint Brush Hills subdivision.

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 the project is not located within a designated floodplain. Please see Figure 2: 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 Columbine (2 ac.) and Stapleton series (93 ac.). These series are categorized in the Hydrological Soil Groups A & B.

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.

Figure 2: FEMA Floodplain Map

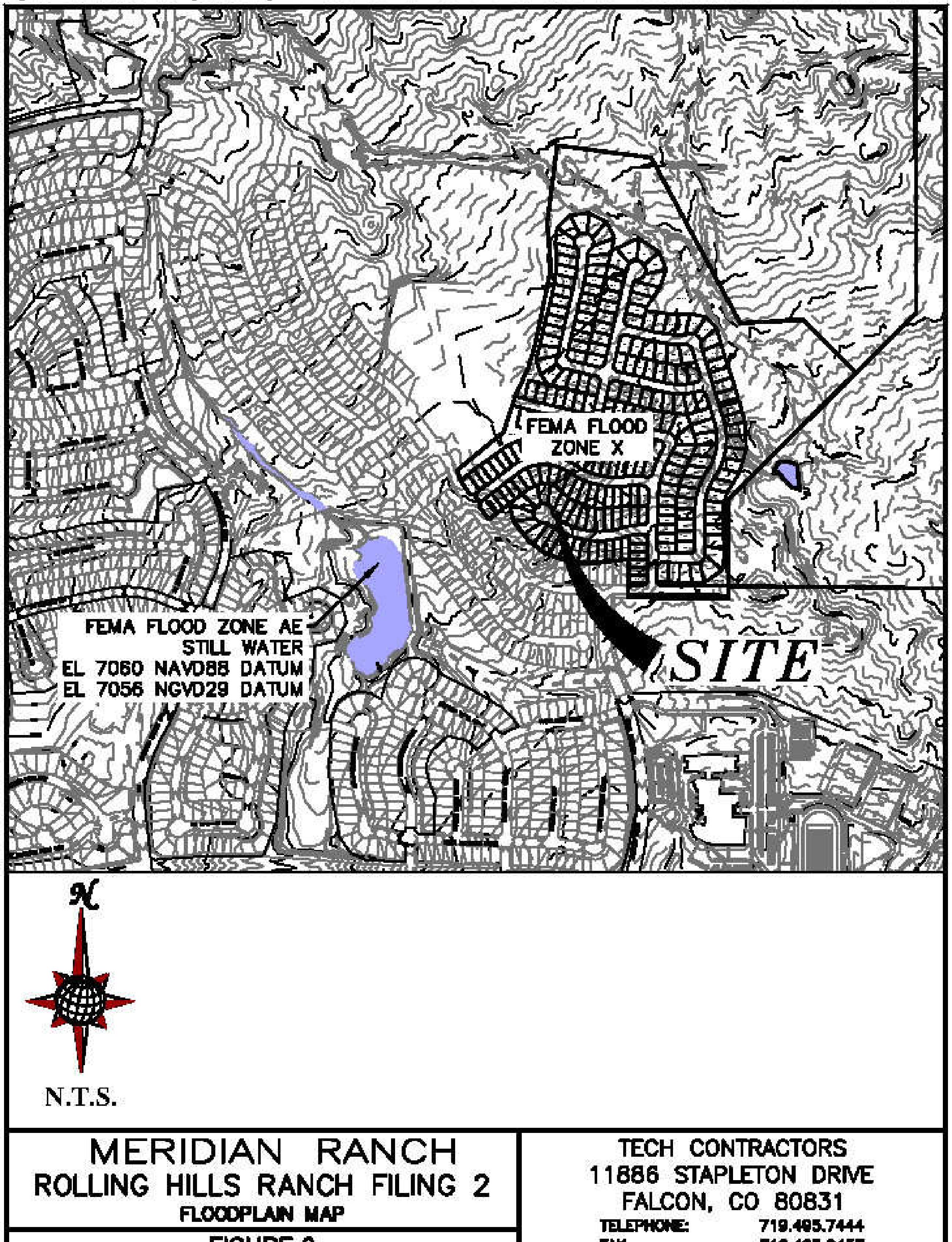
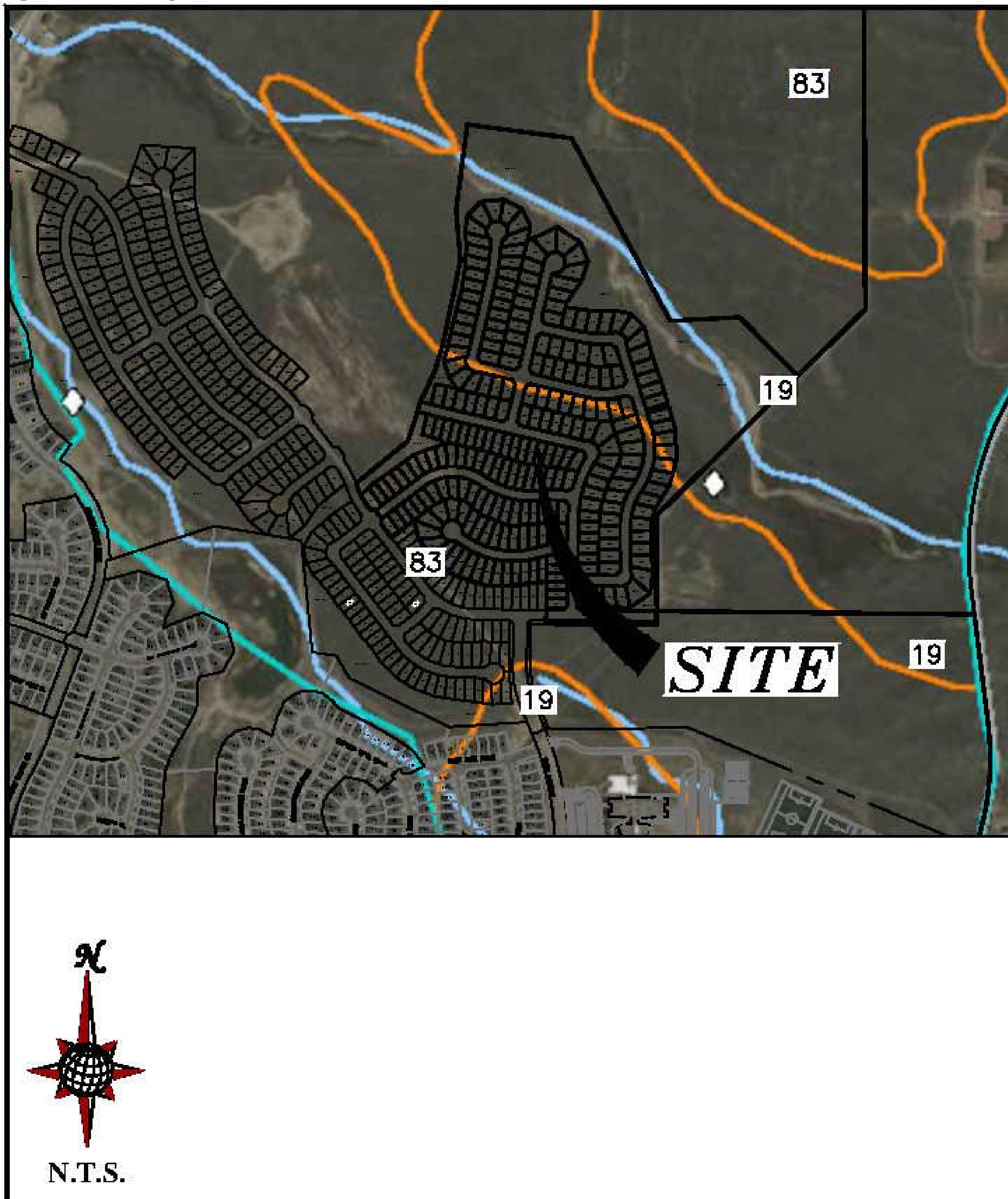


Figure 3: Soils Map



MERIDIAN RANCH ROLLING HILLS RANCH FILING 2 SOILS MAP	TECH CONTRACTORS 11886 STAPLETON DRIVE FALCON, CO 80831 TELEPHONE: 719.495.7444 FAX: 719.495.2457
FIGURE 3	

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.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.

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.

Note: (#) indicates Soil Conservation Survey soil classification number. See Figure 3 RHR2 – 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 within portions of Meridian Ranch.

Three 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 is the interim conditions scenario and it consists of the current existing conditions for all tributary areas whether developed or undeveloped/historic with the addition of RHR2 in the proposed developed condition. The current existing conditions assume all approved projects tributary to Rolling Hills Ranch Filing 2 are at full buildout. This condition was analyzed to ensure the full spectrum of historic flow rates exiting the Meridian Ranch development are maintained after the development of RHR2 is completed.

The interim scenario was analyzed to ensure that the historic flow rates at the outlets of the proposed Pond G (Design Point G12) located upstream of and adjacent to the Falcon Regional Park and Pond E (Design Points H08 & H09) located along Eastonville Road were maintained. The development of Rolling Hills Ranch will complete the development of the areas tributary to Ponds D & E.

The final scenario analyzes the future build out conditions for the entirety of Meridian Ranch to ensure the storm drain facilities located at the discharge points of the project are able to properly convey the full spectrum of historic peak flow rates as the storm drainage exits the Meridian Ranch project along Eastonville Road and/or the 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 1 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 design of existing Pond E and Pond G outlet control structures meets or exceeds the intent and spirit of the concept.

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 existing and proposed storm drain networks to existing and proposed detention ponds. Portions of the site are tributary the existing Detention Pond E; runoff will be directed to an existing storm drain system located at the northern terminus of Lambert Road, then conveyed via the existing storm drain system to the pond. Portions of the site tributary to the proposed Detention Pond G will be conveyed via a storm drain system directly into the pond. Additionally, the proposed detention Pond G will be utilized as a combination sedimentation/detention pond until such time as the tributary areas establish sufficient ground cover or development in the area is complete.

The detention facilities have been adequately sized such that the developed flows detained and released will approximate the historic flow rates for the various design storm events as outlined in the El Paso County DCM and those sections of the City of Colorado Springs DCM-1 adopted by the El Paso County Board of County Commissioners. Existing facilities located downstream of the proposed development have been designed and/or constructed to accept the given release flow rates from Meridian Ranch. Those existing facilities have been reviewed sufficiently to verify the capacity to convey the storm flow rates from Meridian Ranch. See approved Meridian Ranch MDDP, dated January 2018.

Rear lots adjacent to the Falcon Regional Park will drain into open space and then will be directed via a shallow swale to the proposed detention pond prior to exiting the site.

The analysis shows the portion of the site ultimately tributary to existing Pond E releasing the developed peak flows below the historic flow rates across Eastonville Rd for the full spectrum of design storms using the adopted unit hydrograph from the City DCM-1.

Table 2: Detention Ponds Summary:

EXISTING POND E				
	PEAK INFLOW	PEAK OUTFLOW	PEAK STORAGE	PEAK ELEVATION
	CFS	CFS	AC-FT	FT
INTERIM CONDITIONS				
2-YEAR STORM	63	5.6	8.8	6970.3
5-YEAR STORM	122	13	16.6	6971.2
10-YEAR STORM	190	26	21.8	6971.8
50-YEAR STORM	424	141	35.6	6973.0
100-YEAR STORM	556	231	41.5	6973.5
FUTURE CONDITIONS				
2-YEAR STORM	64	5.8	9.5	6970.4
5-YEAR STORM	126	14	17.2	6971.3
10-YEAR STORM	197	28	22.4	6971.8
50-YEAR STORM	433	149	36.2	6973.0
100-YEAR STORM	618	240	42.2	6973.6

POND G				
	PEAK INFLOW	PEAK OUTFLOW	PEAK STORAGE	PEAK ELEVATION
	CFS	CFS	AC-FT	FT
INTERIM CONDITIONS				
2-YEAR STORM	10	4.0	2.8	7026.1
5-YEAR STORM	40	12	7.1	7027.2
10-YEAR STORM	87	32	9.2	7027.6
50-YEAR STORM	309	218	17.4	7029.0
100-YEAR STORM	491	369	21.4	7029.7
FUTURE CONDITIONS				
2-YEAR STORM	24	5.1	4.6	7026.6
5-YEAR STORM	75	20	8.0	7027.4
10-YEAR STORM	149	51	10.7	7027.8
50-YEAR STORM	451	307	19.7	7029.4
100-YEAR STORM	653	465	24.8	7030.2

Figure 5: Meridian Ranch SCS Calculations – Historic Conditions Map, Figure 6: Meridian Ranch SCS Calculations – Interim Conditions Map and Figure 7: Meridian Ranch SCS Calculations – Future Conditions Map depict the historic, interim and future general drainage patterns for Rolling Hills Ranch Filing 2.

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

SCS Calculations

<u>Historic Drainage - SCS Calculation Method</u>

Following is a tabulation of the surface drainage characteristics under Existing Conditions using the SCS calculation method. Please refer to Figure 5 - Meridian Ranch SCS Calculations - Historic Basin Map.

Table 3: Historic Drainage Basins – SCS

HISTORIC MDDP						
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	81	53	12	3.9	0.5
OS06-G02	0.1313	79	52	12	3.8	0.5
OS05	0.0578	40	26	5.9	1.8	0.2
OS05-G01	0.0578	38	26	5.7	1.8	0.2
HG01	0.0547	33	21	4.8	1.6	0.2
G01	0.1125	71	47	10	3.3	0.5
G01-G02	0.1125	70	47	10	3.3	0.5
HG02	0.0906	46	30	6.9	2.4	0.4
G02	0.3344	194	129	28	9.4	1.4
G02-G03	0.3344	192	127	28	9.3	1.4
HG03	0.1828	79	51	12	4.4	0.8

HISTORIC MDDP						
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)
OS07	0.0328	25	17	4.6	1.7	0.3
OS07-G03	0.0328	24	17	4.4	1.7	0.3
G03	0.55	295	195	44	15	2.4
G03-G04	0.55	286	192	43	15	2.4
OS09	0.1547	92	64	19	8.5	2.0
OS09-G04	0.1547	91	63	19	8.5	2.0
HG04	0.0891	40	27	6.1	2.2	0.4
HG05	0.1125	50	33	7.6	2.7	0.5
OS08	0.0406	36	25	7.9	3.5	0.8
OS08-G04	0.0406	34	24	7.6	3.5	0.8
G04	0.9469	502	336	78	28	4.9
G04-G05	0.9469	496	322	78	28	4.9
HG06A	0.1375	50	33	7.8	2.9	0.5
G05	1.0844	544	355	86	31	5.4
G05-G06	1.0844	530	353	86	31	5.4
HG06B	0.1031	34	22	5.4	2.1	0.4
G06	1.1875	561	375	91	33	5.8
HG07	0.0984	47	31	7.1	2.4	0.4
HG07-G11	0.0984	47	31	7.0	2.4	0.4
HG08	0.1328	73	48	11	3.6	0.5
G11	0.2312	115	75	17	5.7	0.9
G11-G12	0.2312	114	75	17	5.6	0.9
HG09	0.1781	73	48	11	4.1	0.7
G12	0.4093	187	122	28	9.7	1.6
G12-H08	0.4093	183	121	28	9.7	1.6
HG10	0.1375	39	26	6.5	2.6	0.5
H08	0.5468	216	142	34	12	2.1
HG14	0.2297	81	53	13	4.8	0.9
HG13	0.0844	55	37	9.8	3.9	0.7
G07	0.0844	55	37	9.8	3.9	0.7
G07-G08	0.0844	54	37	9.7	3.8	0.7
G08	0.3141	119	78	20	7.6	1.5
HG15	0.2563	70	46	12	4.7	0.9
H13	0.2563	70	46	12	4.7	0.9
HG11	0.2047	77	51	12	4.5	0.8
H09	0.2047	77	51	12	4.5	0.8
HG12	0.1297	57	38	8.7	3.1	0.5
H10	0.1297	57	38	8.7	3.1	0.5

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

Interim Drainage - SCS Calculation Method

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

Table 4: Interim Drainage Basins-SCS

INTERIM MDDP (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	0.5
G1a	0.1313	80	52	12	3.8	0.5
G1a-G2	0.1313	79	52	11	3.6	0.5

INTERIM MDDP (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)
OS05	0.0578	39	26	6	1.8	0.2
OS05-G1	0.0578	39	25	6	1.7	0.2
FG01	0.0531	31	22	7	3.3	0.9
FG01-G1	0.0531	31	22	7	3.3	0.9
G1	0.1109	61	41	11	4.8	1.1
G1-G2	0.1109	60	41	11	4.8	1.1
FG02	0.0391	32	22	6	2.6	0.5
G2	0.2813	166	112	27	10.2	1.9
G2-G3	0.2813	163	108	27	10.1	1.9
FG03	0.0203	24	17	6	3.0	0.8
FG04	0.0172	22	16	6	3.1	0.9
G3	0.3188	184	123	31	12.0	2.4
G3-POND F	0.3188	183	121	31	11.9	2.4
FG06	0.0677	51	36	11	5.3	1.3
FG05	0.0580	45	33	12	6.7	2.4
OS07a	0.0170	14	9	2	0.9	0.1
OS07a-POND F	0.0170	13	9	2	0.9	0.1
POND F IN	0.4615	291	198	54	23.1	5.0
POND F	0.4615	178	121	16	8.1	2.1
POND F-G7	0.4615	177	121	16	8.1	2.1
OS07b	0.0156	15	10	3	1.0	0.1
OS07b-G4	0.0156	14	10	2	0.9	0.1
FG21a	0.0095	6	4	1	0.4	0.1
G4	0.0251	20	14	4	1.4	0.2
G4-G7	0.0251	20	13	3	1.3	0.2
FG21b	0.0150	21	15	6	3.8	1.6
G7	0.5016	190	129	18	8.8	2.3
G7-G8	0.5016	190	129	18	8.8	2.3
FG22	0.1397	119	85	29	14.9	4.3
OS08	0.0397	35	24	8	3.4	0.7
OS08-G8	0.0397	34	23	7	3.4	0.7
FG23a	0.0177	18	13	5	2.7	1.0
G8	0.6987	261	170	46	23.5	6.9
G8-G10	0.6987	260	170	45	23.3	6.6
OS09	0.1527	90	62	18	8.2	1.9
OS09-G9	0.1527	88	62	18	8.1	1.9
FG24	0.1394	63	42	10	3.7	0.7
G9	0.2921	150	102	28	11.8	2.5
G9-G10	0.2921	149	101	28	11.6	2.5
FG23b	0.0359	21	14	3	1.2	0.2
G10	1.0267	413	261	65	29.1	7.3
G10-G11	1.0267	413	257	64	28.8	7.2
FG23c	0.0081	6	5	2	0.7	0.2
G11	1.0348	415	259	65	29.3	7.3
FG28	0.0673	38	26	7	2.7	0.5
FG25a	0.0583	50	35	12	5.7	1.5
FG25a-POND G	0.0583	48	34	11	5.5	1.4
FG25b	0.0506	52	38	16	9.3	3.8
POND G IN	1.2110	491	309	87	39.6	10.2
POND G	1.2110	369	218	32	12.5	4.0
G12	1.2110	369	218	32	12.5	4.0
G12-G06	1.2110	368	217	32	12.5	4.0
FG29	0.0997	60	39	9	2.8	0.4

INTERIM MDDP (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)
FG32	0.0402	29	19	4	1.3	0.2
FG32-G06	0.0402	28	19	4	1.3	0.2
G06	1.3509	388	228	34	13.3	4.3
FG10A	0.0806	103	77	32	19.8	8.6
FG08A	0.0750	116	90	41	26.8	13.4
FG08A-G05	0.0750	110	86	41	26.5	13.1
FG08B	0.0630	86	67	31	20.1	10.2
FG08B-G05	0.0630	84	65	29	19.5	10.0
FG11	0.0625	75	59	28	18.6	9.8
FG09	0.0484	48	36	14	8.3	3.2
FG09-G05	0.0484	48	36	14	8.0	3.2
FG10B	0.0416	42	31	12	7.0	2.7
G05	0.3711	455	347	153	95.2	46.1
FG13	0.0534	34	24	7	3.6	0.9
FG12	0.0328	50	40	20	13.7	7.8
POND D IN	0.4573	531	405	177	110.8	53.4
POND D	0.4573	134	90	18	10.9	3.7
POND D-G17	0.4573	133	90	18	10.9	3.7
FG15	0.0103	15	12	6	3.9	2.1
FG15-G17A	0.0103	15	12	6	3.9	2.1
G17A	0.4676	136	92	18	11.2	3.8
FG14	0.1000	98	74	32	19.9	9.2
G17	0.5676	201	134	42	24.9	11.8
G17-G18	0.5676	199	134	42	24.8	11.7
FG16	0.0791	133	104	50	33.9	18.3
G18	0.6467	247	179	78	50.4	25.3
G18-POND E	0.6467	247	177	77	49.5	24.7
FG31	0.0922	116	92	45	31.0	17.2
FG30	0.0389	30	20	4	1.3	0.2
FG30-PONDHS	0.0389	28	19	4	1.2	0.2
POND HS	0.1311	112	63	28	18.8	10.0
FG17a	0.0694	101	78	35	23.0	11.7
FG17a-POND E	0.0694	99	76	35	22.9	11.6
FG18	0.0644	56	42	18	10.6	4.7
FG18-POND E	0.0644	56	42	17	10.6	4.6
FG19	0.0527	84	66	33	22.9	13.1
FG17c	0.0313	31	22	7	2.9	0.5
FG17b	0.0214	39	31	16	10.8	6.1
POND E IN	1.0170	556	424	190	122.3	62.7
POND E	1.0170	231	141	26	12.8	5.6
H08	1.0170	198	127	20	9.1	3.4
H09	0.0000	33	14	6	3.7	2.2

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

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 6 - Meridian Ranch SCS Calculations – Future Basins Map

Table 5: Future Drainage Basins-SCS

FUTURE MDDP						
	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	0.5
G1a	0.1313	80	52	12	3.8	0.5
G1a-G2	0.1313	79	52	11	3.6	0.5
OS05	0.0578	39	26	6	1.8	0.2
OS05-G1	0.0578	39	25	6	1.7	0.2
FG01	0.0531	31	22	7	3.3	0.9
FG01-G1	0.0531	31	22	7	3.3	0.9
G1	0.1109	61	41	11	4.8	1.1
G1-G2	0.1109	60	41	11	4.8	1.1
FG02	0.0391	32	22	6	2.6	0.5
G2	0.2813	166	112	27	10.2	1.9
G2-G3	0.2813	163	108	27	10.1	1.9
FG03	0.0203	24	17	6	3.0	0.8
FG04	0.0172	22	16	6	3.1	0.9
G3	0.3188	184	123	31	12.0	2.4
G3-POND F	0.3188	183	121	31	11.9	2.4
FG06	0.0677	51	36	11	5.3	1.3
FG05	0.0580	45	33	12	6.7	2.4
OS07a	0.0170	14	9	2	0.9	0.1
OS07a-POND F	0.0170	13	9	2	0.9	0.1
POND F IN	0.4615	291	198	54	23.1	5.0
POND F	0.4615	178	121	16	8.1	2.1
POND F-G7	0.4615	177	121	16	8.1	2.1
OS07b-G4	0.0156	14	10	2	0.9	0.1
FG21a	0.0095	6	4	1	0.4	0.1
G4	0.0251	20	14	4	1.4	0.2
G4-G7	0.0251	20	13	3	1.3	0.2
FG21b	0.0150	21	15	6	3.8	1.6
G7	0.5016	190	129	18	8.8	2.3
G7-G8	0.5016	189	128	18	8.8	2.3
FG22	0.1397	119	85	29	14.9	4.3
OS08	0.0397	35	24	8	3.4	0.7
OS08-G8	0.0397	34	23	7	3.4	0.7
FG23a	0.0216	21	15	5	2.7	0.8
G8	0.7026	271	175	48	24.6	7.3
G8-G10	0.7026	271	174	47	24.0	7.1
OS09	0.1527	90	62	18	8.2	1.9
OS09-G9	0.1527	88	62	18	8.2	1.9
FG24	0.1369	101	72	25	12.8	3.9
G9	0.2896	179	126	38	17.2	4.5
G9-G10	0.2896	179	125	37	17.1	4.5
FG23b	0.0305	27	19	6	2.8	0.7
G10	1.0227	450	281	81	39.4	11.4
G10-G11	1.0227	450	279	80	39.2	11.3
FG23c	0.0122	12	9	3	1.5	0.4
G11	1.0349	453	281	82	39.9	11.5
FG25	0.1086	112	85	36	21.9	9.9

FUTURE MDDP						
	DRAINAGE AREA (SQ. MI.)	PEAK DISCHARGE Q100 (CFS)	PEAK DISCHARGE Q50 (CFS)	PEAK DISCHARGE Q10 (CFS)	PEAK DISCHARGE Q5 (CFS)	PEAK DISCHARGE Q2 (CFS)
FG26	0.0863	78	58	22	12.2	4.6
FG26-POND G	0.0863	77	57	22	12.2	4.5
FG27	0.0500	52	40	17	10.7	5.0
FG28	0.0245	24	17	6	2.7	0.6
POND G IN	1.3043	653	451	149	75.1	24.1
POND G	1.3043	465	307	51	20.0	5.1
G12	1.3043	465	307	51	20.0	5.1
G12-G06	1.3043	464	306	51	20.0	5.1
FG29	0.0997	60	39	9	2.8	0.4
FG32	0.0402	72	57	29	19.8	11.1
FG32-G06	0.0402	69	54	27	18.2	10.5
G06	1.4442	493	324	55	21.7	10.5
FG08A	0.0750	116	90	41	26.8	13.4
FG08A-G05	0.0750	110	86	41	26.5	13.1
FG08B	0.0630	86	67	31	20.1	10.2
FG08B-G05	0.0630	84	65	29	19.5	10.0
FG09	0.0484	48	36	14	8.3	3.2
FG09-G05	0.0484	48	36	14	8.0	3.2
FG10B	0.0416	42	31	12	7.0	2.7
G05	0.2280	282	215	94	58.8	28.7
FG10A	0.0806	103	77	32	19.8	8.6
FG11	0.0625	75	59	28	18.6	9.8
FG13	0.0534	34	24	7	3.6	0.9
FG12	0.0328	50	40	20	13.7	7.8
POND D IN	0.4573	531	405	177	110.8	53.4
POND D	0.4573	134	90	18	10.9	3.7
POND D-G17	0.4573	133	90	18	10.9	3.7
FG15	0.0103	15	12	6	3.9	2.1
FG15-G17A	0.0103	15	12	6	3.9	2.1
G17A	0.4676	136	92	18	11.2	3.8
FG14	0.1000	98	74	32	19.9	9.2
G17	0.5676	201	134	42	24.9	11.8
G17-G18	0.5676	199	134	42	24.8	11.7
FG16	0.0791	133	104	50	33.9	18.3
G18	0.6467	247	179	78	50.4	25.3
G18-POND E	0.6467	247	177	77	49.5	24.7
FG31	0.0922	116	92	45	31.0	17.2
FG30	0.0389	73	57	29	20.1	11.4
FG30-PONDHS	0.0389	70	56	27	18.2	10.9
POND HS	0.1311	153	106	36	26.2	14.8
FG17a	0.0694	101	78	35	23.0	11.7
FG17a-POND E	0.0694	99	76	35	22.9	11.6
FG18	0.0644	56	42	18	10.6	4.7
FG18-POND E	0.0644	56	42	17	10.6	4.6
FG19	0.0527	84	66	33	22.9	13.1
FG17c	0.0313	31	22	7	2.9	0.5
FG17b	0.0214	39	31	16	10.8	6.1
POND E IN	1.0170	618	433	197	125.8	63.6
POND E	1.0170	240	149	28	14.0	5.8
H08	1.0170	204	134	22	10.2	3.5
H09	0.0000	36	15	6	3.8	2.3

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 RHR2 has been designed. The storm drainage facilities have been designed such that the minor storm 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 such that the major storm will be captured by the inlets and conveyed by the storm drain pipes such that the street flow does not exceed the right-of-way widths for residential streets and the hydraulic grade line will be less than one foot below the surface.

The site is located within the Gieck Ranch Drainage Basin; the project will discharge the collected surface flow from the project into existing downstream facilities properly sized to safely convey the storm water flows away from the project without damaging adjacent property.

Rational hydrologic and hydraulic calculations were performed for the project based on full buildout conditions. This is done to ensure the storm drain system is properly sized for future full buildout. The storm drain runoff will be collected by a series of inlets and storm drain pipe then conveyed through the project and discharged either into an existing storm drain system located within Lambert Road discharged into the existing Pond E or directly into existing Pond G.

Rational Narrative

The following is a detailed narrative of the storm drainage system located in RHR2. The description is organized by storm drain system.

<u>Storm Drain System D</u>

Storm Drainage System D meets the requirements of as found in the El Paso County Engineering Criteria Manual I.7.1.C.5. (ECM) for storm water quality and discharge. This catchment discharges the collected stormwater directly into a Regional Detention Facility with WQCV incorporated into the design and construction.

- Basin D01 (6.9 acres, Q_5= 6.8 CFS, Q_{100} = 19 CFS) contains lots in Future Rolling Hills Ranch 3 along east side of Bluffpoint Dr and Crooked Bluff Dr. The surface runoff will sheet flow off the residential lots and directed to the street then to a 15' Type R forced sump inlet located at I19. All of the 5-year storm flow is captured by this inlet (Q_5= 6.8 CFS) and most of the 100-yr storm flow is captured (Q_{100} = 14 CFS) with the remaining flow (Q_{100} = 5.7 CFS) continuing downstream to Design Point 2. The captured flow is conveyed downstream via an 18” RCP to Storm Manhole 15 and via a 24” RCP to Storm Manhole 16.

- Basin D02 (3.8 acres, Q_5= 3.8 CFS, Q_{100} = 11 CFS) contains lots in Future Rolling Hills Ranch 3 along west side of Crooked Bluff Dr. The surface runoff will sheet flow off the residential lots directed to the street to Design Point 2 then combined with flow-by from I19 for a 5-year flow of 3.8 CFS and a 100-year flow of 16 CFS. The surface flow will continue inlet I20.

- Basin D03 (3.8 acres, Q_5= 4.1 CFS, Q_{100} = 12 CFS) contains lots along the west side of Coastal Hills Ln in Future Rolling Hills Ranch 3. The surface runoff will sheet flow off the residential lots and be conveyed to a 20' Type R forced sump inlet located at I20 where it is combined with the surface flow from DP2 for a 5-year flow of 7.1 CFS and a 100-year flow of 20 CFS. All of the 5-year storm flow is captured by this inlet (Q_5= 7.1 CFS) and most of the 100-yr storm flow is captured (Q_{100} = 17 CFS) with the remaining flow (Q_{100} = 2.8 CFS) continuing downstream to Design Point 3. The captured flow is conveyed downstream via an 18" RCP to Storm Manhole 16.

- The total pipe flow conveyed from MH16 to Storm Manhole 17 via a 30" RCP is Q_5= 13 CFS, Q_{100} = 30 CFS.

- Basin D04 (5.3 acres, Q_5= 5.0 CFS, Q_{100} = 14 CFS) contains lots along the west side of Coastal Hills Ln and Bluffpoint Dr in Future Rolling Hills Ranch 3. The surface runoff will sheet flow off the residential lots directed to the street to Design Point 3 then combined with flow-by from I20 for a 5-year flow of 5.0 CFS and a 100-year flow of 16 CFS. The surface flow will continue inlet I21.

- Basin D05 (2.0 acres, Q_5= 2.2 CFS, Q_{100} = 6.3 CFS) contains lots along Crooked Hill Dr and Rolling Ranch Dr in Future Rolling Hills Ranch 3. The surface runoff will sheet flow off the residential lots and be conveyed to a 15' Type R forced sump inlet located at I21 where it is combined with the surface flow from DP3 and flow-by from I22 for a 5-year flow of 6.7 CFS and a 100-year flow of 23 CFS. All of the 5-year storm flow is captured by this inlet (Q_5= 6.7 CFS) and most of the 100-yr storm flow is captured (Q_{100} = 14 CFS) with the remaining flow (Q_{100} = 9.1 CFS) continuing downstream to inlet I26. The captured flow is conveyed downstream via an 18" RCP to Storm Manhole 17.

- The total pipe flow conveyed from MH17 to Storm Manhole 19 via a 30" RCP is Q_5= 19 CFS, Q_{100} = 41 CFS.

- Basin D06 (3.2 acres, Q_5= 3.2 CFS, Q_{100} = 9.0 CFS) contains lots along the east side of Rolling Ranch Dr in Future Rolling Hills Ranch 3. The surface runoff will sheet flow off the residential lots and be conveyed to a 15'Type R flow-by inlet located at I22. Most of the flow is captured by this inlet (Q_5= 2.6 CFS, Q_{100} = 6.2 CFS) with the remaining (Q_5= 0.6 CFS, Q_{100} = 2.8 CFS) continuing downstream to Inlet 21. The captured flow is conveyed downstream via an 18" RCP to Storm Manhole 18.

- Basin D07 (6.6 acres, Q_5= 6.1 CFS, Q_{100} = 17 CFS) contains lots along the west side of Rolling Ranch Dr in Future Rolling Hills Ranch 3. The surface runoff will sheet flow off the residential lots and be conveyed to a 10' Type R forced sump inlet located at I23. All of the 5-year storm flow is captured by this inlet (Q_5= 6.1 CFS) and most of the 100-yr storm flow is captured (Q_{100} = 9.9 CFS) with the remaining flow (Q_{100} = 7.4 CFS) continuing downstream to inlet I24. The captured flow is conveyed downstream via an 18" RCP to Storm Manhole 18.

- The total pipe flow conveyed from MH18 to Storm Manhole 19 via a 24" RCP is Q_5= 8.5 CFS, Q_{100} = 16 CFS.

- Basin D08 (1.6 acres, Q_5= 1.8 CFS, Q_{100} = 5.1 CFS) contains lots along the west side of Rolling Ranch Dr in Future Rolling Hills Ranch 3. The surface runoff will sheet flow off the residential lots and be conveyed to a 10' Type R forced sump inlet located at I24. All of the 5-year storm flow is captured by this inlet (Q_5= 1.8 CFS) and most of the 100-yr storm flow is captured (Q_{100} = 9.9 CFS) with the remaining flow (Q_{100} = 1.0 CFS) continuing downstream to inlet I25. The captured flow is conveyed downstream via an 18" RCP to Storm Manhole 18.

- The total pipe flow conveyed from MH19 to Storm Manhole 20 via a 42" RCP is Q_5= 29 CFS, Q_{100} = 65 CFS.

- Basin D09 (1.6 acres, Q_5= 1.2 CFS, Q_{100} = 3.4 CFS) contains runoff from adjacent lots and open space tract located in Rolling Hills Ranch Filing 2 and future Rolling Hills Ranch 3. The surface runoff will sheet flow off the adjacent residential lots and be conveyed to a Type C grated inlet located at CB2. All of the flow is captured by this inlet and conveyed downstream via an 18" RCP to inlet I25.

- Basin D10 (0.8 acres, Q_5= 0.9 CFS, Q_{100} = 2.5 CFS) contains lots along Crooked Hill Dr and Rolling Ranch Dr in Future Rolling Hills Ranch 3. The surface runoff will sheet flow off the residential lots and be conveyed to a 10' Type R sump inlet located at I25. All of the flow is captured by this inlet and conveyed downstream via an 18" RCP to Storm Manhole 20.

- Basin D11 (4.2 acres, Q_5= 2.4 CFS, Q_{100} = 6.9 CFS) contains runoff from adjacent lots and open space tract located in Rolling Hills Ranch Filing 2 and future Rolling Hills Ranch 3.. The surface runoff will sheet flow off the adjacent residential lots and be conveyed to an 18" flared end section located at ES1. All of the flow is captured by this inlet and conveyed downstream via an 18" RCP to inlet I26.

- Basin D12 (2.7 acres, Q_5= 2.4 CFS, Q_{100} = 6.9 CFS) contains lots along Crooked Hill Dr and Rolling Ranch Dr in Future Rolling Hills Ranch 3. The surface runoff will sheet flow off the residential lots, combine with flow-by (Q_{100} = 9.1 CFS) from inlet I21 and be conveyed to a 20' Type R sump inlet located at I26. All of the flow is captured by this inlet and conveyed downstream via a 24" RCP to Storm Manhole 20.

- The total pipe flow conveyed from MH20 to Storm Manhole 21 via a 42" RCP is Q_5= 29 CFS, Q_{100} = 71 CFS.

- Basin D13 (1.8 acres, Q_5= 2.2 CFS, Q_{100} = 5.8 CFS) contains lots along the west side of Rolling Ranch Dr in Rolling Hills Ranch 2. The surface runoff will sheet flow off the residential lots and be conveyed to a 15'Type R flow-by inlet located at I27. Most of the flow is captured by this inlet (Q_5= 1.7 CFS, Q_{100} = 3.9 CFS) with the remaining (Q_5= 0.4 CFS, Q_{100} = 1.8 CFS) continuing downstream to inlet I33. The captured flow is conveyed downstream via an 18" RCP to Storm Manhole 21.

- The total pipe flow conveyed from MH21 to Storm Manhole 23 via a 42" RCP is Q_5= 29 CFS, Q_{100} = 72 CFS.

- Basin D14 (6.5 acres, Q_5= 6.3 CFS, Q_{100} = 18 CFS) contains lots in Rolling Hills Ranch 2 along Overlook Bluff Ln, Foggy Meadows Dr and Foggy Bend Ln. The surface runoff will sheet flow off the residential lots and directed to the street then to a 10' Type R forced sump inlet located at I28. All of the 5-year storm flow is captured by this inlet (Q_5= 6.3 CFS) and most of the 100-yr storm flow is captured (Q_{100} = 9.9 CFS) with the remaining flow (Q_{100} = 7.9 CFS) continuing downstream to inlet I31. The captured flow is conveyed downstream via an 18" RCP to Storm Manhole 22.

- Basin D15 (6.4 acres, Q_5= 6.2 CFS, Q_{100} = 18 CFS) contains lots in Rolling Hills Ranch 2 along Overlook Bluff Ln, Foggy Meadows Dr and Foggy Bend Ln. The surface runoff will sheet flow off the residential lots and directed to the street then to a 10' Type R forced sump inlet located at I29. All of the 5-year storm flow is captured by this inlet (Q_5= 6.2 CFS) and most of the 100-yr storm flow is captured (Q_{100} = 9.9 CFS) with the remaining flow (Q_{100} = 7.7 CFS) continuing downstream to inlet I30. The captured flow is conveyed downstream via an 18" RCP to Storm Manhole 22.

- The total pipe flow conveyed from MH22 to Storm Manhole 23 via a 24" RCP is Q_5= 12 CFS, Q_{100} = 20 CFS and combine with the pipe flow from MH21. The total pipe flow conveyed from MH23 to Storm Manhole 24 via a 48" RCP is Q_5= 35 CFS, Q_{100} = 84 CFS.

- Basin D16 (4.0 acres, Q_5= 4.2 CFS, Q_{100} = 12 CFS) contains lots along Morning Hills Dr, Morning Ridge Ln and Foggy Meadows Dr in Rolling Hills Ranch 2. The surface runoff will sheet flow off the residential lots and be conveyed to a 10'Type R forced sump inlet located at I30. All of the 5-year storm flow is captured by this inlet (Q_5= 4.2 CFS) and most of the 100-yr storm flow is captured (Q_{100} = 9.9 CFS) with the remaining flow (Q_{100} = 7.3 CFS) continuing downstream to inlet I31. The captured flow is conveyed downstream via an 18" RCP to Storm Manhole 24

.

- The total pipe flow conveyed from MH24 to Storm Manhole 25 then to Storm Manhole 26 via a 48" RCP is Q_5= 38 CFS, Q_{100} = 90 CFS.

- Basin D17 (5.1 acres, Q_5= 5.3 CFS, Q_{100} = 15 CFS) contains lots in Rolling Hills Ranch 2 along Morning Hills Dr and Foggy Meadows Dr. The surface runoff will sheet flow off the residential lots combined with additional surface flow from I28 and I30, (Q_5= 5.3 CFS, Q_{100} = 27 CFS) then directed along the street then to a 15' Type R sump inlet located at I31. All of the 5-year storm flow is captured by this inlet (Q_5= 5.3 CFS) and most of the 100-yr storm flow is captured (Q_{100} = 24 CFS) with the remaining flow (Q_{100} = 2.5 CFS) continuing downstream to inlet I32. The captured flow is conveyed downstream via a 30" RCP to Storm Manhole 26.

- The total pipe flow conveyed from MH26 to inlet 32 via a 48" RCP is Q_5= 41 CFS, Q_{100} = 107 CFS.

- Basin D18 (3.1 acres, Q_5=3.0 CFS, Q_{100} = 8.4 CFS) contains lots in Rolling Hills Ranch 2 along Morning Hills Dr, Morning Ridge Ln and Overlook Bluff Ln. The surface runoff will sheet flow off the residential lots directed to the street to a 15' Type R sump inlet located at I32 and combined with flow-by from I31. All of the flow (Q_5= 3.0 CFS, Q_{100} = 10 CFS) is captured by this inlet and combined with flow from Storm Manhole 26.

  Should the sump inlets (I31 & I32) become blocked and cannot take capture all the runoff at the sump inlets, the surface flow will travel overland within an open space between lots 441 & 442.

- The pipe flow conveyed from Storm Manhole 26 is Q_5= 41 CFS, Q_{100} = 107 CFS is combined with the surface flow captured by I32 (Q_5= 3.0 CFS, Q_{100} = 10 CFS) for a total 5-year flow of 43 CFS and a total 100-year flow of 114 CFS, then conveyed to existing Pond G constructed with Rolling Hills Ranch Early Grading approved in April 2020.

Storm Drain System E

Storm Drainage System E meets the requirements of as found in the El Paso County Engineering Criteria Manual I.7.1.C.5. (ECM) for storm water quality and discharge. This catchment discharges the collected stormwater directly into a Regional Detention Facility with WQCV incorporated into the design and construction.

- Basin E01 (5.4 acres, Q_5= 6.2 CFS, Q_{100} = 17 CFS) contains lots along Valley Peak Dr, Rolling Ranch Dr and Woods Grove Dr in Rolling Hills Ranch 2. The surface runoff will sheet flow off the residential lots and be conveyed to a 20' Type R forced sump inlet located at I33. All of the flow is captured by this inlet and conveyed downstream via an 18" RCP to Storm Manhole 27 then to Storm Manhole 28.

- Basin E02 (6.5 acres, Q_5= 7.3 CFS, Q_{100} = 19 CFS) contains lots along Valley Peak Dr, Woods Grove Dr and Savannah Falls Ct in Rolling Hills Ranch 2. The surface runoff will sheet flow off the residential lots and be conveyed to a 20' Type R forced sump inlet located at I34. All of the 5-year storm flow is captured by this inlet (Q_5= 7.3 CFS) and most of the 100-yr storm flow is captured (Q_{100} = 17 CFS) with the remaining flow (Q_{100} = 2.3 CFS) continuing downstream to inlet I37. The captured flow is conveyed downstream via an 18" RCP to Storm Manhole 28.

- The total pipe flow conveyed from MH28 to Storm Manhole 29 via a 30" RCP is Q_5= 13 CFS, Q_{100} = 33 CFS.

- Basin E03 (5.8 acres, Q_5= 6.5 CFS, Q_{100} = 17 CFS) contains lots along Rolling Ranch Dr, Woods Grove Dr, New Ranch Ln and Morning Hills Dr in Rolling Hills Ranch 2. The surface runoff will sheet flow off the residential lots and be conveyed to a 15' Type R forced sump inlet located at I35. All of the 5-year storm flow is captured by this inlet (Q_5=6.5 CFS) and most of the 100-yr storm flow is captured (Q_{100} = 14 CFS) with the remaining flow (Q_{100} = 3.7 CFS) continuing downstream to inlet I36. The captured flow is conveyed downstream via an 18" RCP to Storm Manhole 29.

- The total pipe flow conveyed from MH29 to Storm Manhole 30 via a 36" RCP is Q_5= 19 CFS, Q_{100} = 46 CFS.

- Basin E04 (3.1 acres, Q_5= 3.9 CFS, Q_{100} = 9.7 CFS) contains lots along New Ranch Ln and Morning Hills Dr in Rolling Hills Ranch 2. The surface runoff will sheet flow off the residential lots and be conveyed to a 15' Type R forced sump inlet located at I36. All of the flow (Q_5= 3.9 CFS, Q_{100} = 13 CFS) is captured by this inlet and conveyed downstream via an 18" RCP to existing Storm Manhole 30.

- Basin E05 (2.6 acres, Q_5= 2.7 CFS, Q_{100} = 9.3 CFS) contains lots along Woods Grove Dr and Savannah Falls Ct in Rolling Hills Ranch 2. The surface runoff will sheet flow off the residential lots and be conveyed to a 20' Type R flow-by inlet located at I37. Most of the flow is captured by this inlet (Q_5= 2.6 CFS, Q_{100} = 7.1 CFS) with the remaining (Q_5= 0.2 CFS, Q_{100} = 2.2 CFS) continuing downstream to Inlet I41. The captured flow is conveyed downstream via an 18" RCP to existing Storm Manhole 30.

- The total pipe flow conveyed from existing MH30 to existing Storm Manhole 31 and Storm Manhole 36 via a 36" RCP is Q_5= 25 CFS, Q_{100} = 65 CFS.

The following basins are located within Rolling Hills Ranch Filing 1, the Construction Plans and Final Drainage Report for Rolling Hills Ranch Filing 1 were approved in September 2020.

- Basin E06 (1.3 acres, Q_5= 1.4 CFS, Q_{100} = 4.2 CFS) contains lots along Valley Peak Dr in Rolling Hills Ranch 2. The surface runoff will sheet flow off the residential lots and be conveyed to an existing 5' Type R forced sump inlet located at I38. All of the flow is captured by this inlet and conveyed downstream via an existing 18" RCP to Storm Manhole 32 then to Storm Manhole 33.

- Basin E07 (2.1 acres, Q_5= 2.5 CFS, Q_{100} = 6.7 CFS) contains lots along Rolling Peaks Dr and Valley Peak Dr in Rolling Hills Ranch 1 and 2. The surface runoff will sheet flow off the residential lots and be conveyed to an existing 15' Type R flow-by inlet located at I39. Most of the flow is captured by this inlet (Q_5= 2.0 CFS, Q_{100} = 4.5 CFS) with the remaining (Q_5= 0.5 CFS, Q_{100} = 2.2 CFS) continuing downstream to existing Inlet I41. The captured flow is conveyed downstream via an existing 18" RCP to Storm Manhole 33.

- The total pipe flow conveyed from MH33 to Storm Manhole 34 via an existing 18" RCP is Q_5= 3.5 CFS, Q_{100} = 8.5 CFS.

- Basin E08 (4.2 acres, Q_5= 4.8 CFS, Q_{100} = 13 CFS) contains lots surrounded by Rolling Peaks Dr, Valley Peak Dr, Summer Ridge Dr and Bridge Way in Rolling Hills Ranch 1. The surface runoff will sheet flow off the residential lots and be conveyed to an existing 10' Type R forced sump inlet located at I40. All of the 5-year storm flow is captured by this inlet (Q_5=4.8 CFS) and most of the 100-yr storm flow is captured (Q_{100} = 10 CFS) with the remaining flow (Q_{100} = 2.8 CFS) continuing downstream to an existing inlet located at the intersection of Park Gate Dr. with Lambert Rd. The captured flow is conveyed downstream via an existing 18" RCP to Storm Manhole 34.

- The total pipe flow conveyed from MH34 to Storm Manhole 35 then to Storm Manhole 36 via an existing 24" RCP is Q_5= 8.0 CFS, Q_{100} = 18 CFS.

- Basin E09 (5.4 acres, Q_5= 6.2 CFS, Q_{100} = 17 CFS) contains lots along Rolling Peaks Dr in Rolling Hills Ranch 1 and 2. The surface runoff will sheet flow off the residential lots and be conveyed to an existing 15' Type R sump inlet located at I41. All of the 5-year storm flow is captured by this inlet (Q_5=6.2 CFS) and most of the 100-yr storm flow is captured (Q_{100} = 14 CFS) with the remaining flow (Q_{100} = 3.9 CFS) continuing downstream to existing Inlet I43. The captured flow is conveyed downstream via an existing 24" RCP to Storm Manhole 36.

- The total combined pipe flow from MH30, MH34 and I41 is conveyed to Storm Manhole 37 via an existing 42" RCP is Q_5= 35 CFS, Q_{100} = 86 CFS.

- Basin E10 (7.0 acres, Q_5= 7.0 CFS, Q_{100} = 10 CFS) contains lots along Summer Ridge Dr in Rolling Hills Ranch 1. The surface runoff will sheet flow off the residential lots and be conveyed to an existing 20' Type R sump inlet located at I42. All of the flow is captured by this inlet and conveyed downstream via an existing 24" RCP to Storm Manhole 37.

- The total combined pipe flow from MH37 is conveyed to Storm Manhole 38 via an existing 48" RCP is Q_5= 41 CFS, Q_{100} = 102 CFS.

- Basin E11 (13 acres, Q_5= 6.3 CFS, Q_{100} = 18 CFS) contains runoff from an open space tract in Rolling Hills Ranch 1 and rear lots within portions of Meridian Ranch Filing 11B. The surface runoff will sheet flow off the residential lots and be conveyed to a Type C grated inlet located at CB3. All of the flow is captured by this inlet and conveyed downstream via an existing 24" RCP to Storm Manhole 37.

- Basin E12 (1.6 acres, Q_5= 3.6 CFS, Q_{100} = 7.5 CFS) contains runoff from Rolling Peaks Dr and Lambert Rd in Rolling Hills Ranch 1 and 2. The surface runoff will collected in the curb and gutter then conveyed to an existing 20' Type R flow-by inlet located at I43. Most of the flow is captured by this inlet (Q_5= 3.2 CFS, Q_{100} = 7.1 CFS) with the remaining (Q_5= 0.4 CFS, Q_{100} = 2.1 CFS) continuing downstream to existing Inlet I41. The captured flow is conveyed downstream via an existing 18" RCP to Storm Manhole 38.

- The total combined pipe flow from MH38, I43 and CB3 is conveyed to an existing Storm Manhole EJ02 via an existing 54" RCP is Q_5= 52 CFS, Q_{100} = 131 CFS.

- Basin E13 (6.0 acres, Q_5= 8.2 CFS, Q_{100} = 19 CFS) contains runoff from Park Gate Rd, Lambert Rd. found in Meridian Ranch Filing 11A and Rolling Peaks Dr in Rolling Hills Ranch 1 The surface runoff will sheet flow off the residential lots and be conveyed to an existing 15' Type R forced sump inlet constructed with the improvements associated with Meridian Ranch Filing 11A located at EI1. All of the 5-year storm flow is captured by this inlet (Q_5=6.0 CFS) and most of the 100-yr storm flow is captured (Q_{100} = 13 CFS) with the remaining flow (Q_{100} = 6.5 CFS) continuing downstream to an existing inlet located along the west side of Lambert Rd. The captured flow is conveyed downstream via an existing 18" RCP to existing manhole EJ01.

- The existing storm drain system at existing manhole EJ01 conveys storm flow from other parts of Meridian Ranch Filing 11A and the discharge from Pond D. The flow rates upstream of EJ01 as from the SCS model are 12 CFS for the 5-year storm and 136 CFS for the 100-year storm. The coefficient-area (CA) figure from the approved Final Drainage Report for Meridian Ranch Filing 11A and the time of concentration was adjusted to match the flow rate from the SCS Model to replicate the flow rate in the storm drain. The total flow from Meridian Ranch Filing 11A from MH EJ01 to EJ02 is 22 CFS for the 5-year storm and 140 CFS for the 100-year storm.

- The total combined storm flow at MH EJ02 from Rolling Hills Ranch, Meridian Ranch Filing 11A and the discharge from Pond D is 39 CFS for the 5-year storm and 182 CFS for the 100-year storm will ultimately be discharged into the existing Pond E. The existing storm drain located within Lambert Rd was installed with the construction of the Falcon High School in 2007. The anticipated 10-year flow rate at 128 CFS and the 100-year flow rate for the storm drain was 245 CFS per the approved 2007 Londonderry-Lambert Final Drainage Report. The approved Final Drainage Report for Meridian Ranch Filing 11A shows the 5-year flow rate at 63 CFS and 212 CFS for the 100-year storm. These calculations result buildout flow rates (Q_5= 39 CFS, Q_{100} = 182 CFS) below the previously approved drainage reports, therefore this development will not have any adverse impacts on the existing storm drain located in Lambert Road, Londonderry Drive and downstream Pond E.

Various Rear yard discharges to Waters of the State

There are various areas along natural and manmade drainage courses that meet the requirements of as found in the El Paso County Engineering Criteria Manual I.7.1.C.5. (ECM) for storm water quality and discharge into Waters of the State. These rear yards discharge into drainage courses located upstream of a Regional Detention Facility with WQCV incorporated into the design and construction. At least 20 percent of the upstream imperviousness within the catchment must be disconnected from the storm drainage system and drain though a pervious area that makes up at least 10 percent of the disconnected impervious area. The rooftops within this catchment make up more than 20 percent of the total impervious area of the catchment and is discharged via roof downspouts and drains across the front yard pervious areas equaling more than 10 percent of the rooftop area. Please see Appendix E for information and exhibits.

DETENTION PONDS

The storm water runoff from Rolling Hills Ranch Filing 2 is ultimately discharged into existing Detention Pond E and Pond G. Pond E was constructed prior to the passage of Senate Bill 15-212 and is exempt from providing support calculations showing drain time compliance. Pond G was constructed with Rolling Hills Ranch Early Grading permit and the supporting calculations showing drain time compliance has been provided with the Final Drainage Report for Rolling Hills Ranch Filing 1 approved September 2020.

Existing Pond E Detention Storage Criteria

Existing Detention Pond E is located south of Londonderry and west of Eastonville and was constructed as a part of the Meridian Ranch Filing 11 Grading, the pond is owned and maintained by the Meridian Service Metropolitan District (MSMD). It has been in operation since 2013 and a maintenance agreement between the Meridian Service Metropolitan District and El Paso County has been recorded as a part of the Meridian Ranch Filing 11A Final Plat process.

The SCS calculation method was used to determine inflow and outflow from the detention pond to ensure the developed runoff does not overcharge the pond and the discharges do not adversely impact drainage patterns downstream of Eastonville Road. Storm drainage runoff will enter the pond from upstream development via existing pipe networks and overland from existing rear lots adjacent to the pond. The ultimate future build-out design of the tributary areas was analyzed to insure the sizing of the pond would be adequate after development of Meridian Ranch is complete. This SCS calculation can be found in the appendix.

An analysis of the SCS calculations show the development of Rolling Hills Ranch Filing 2 and the discharge flow rates from Pond E approximate those of the historic flow rates at Eastonville Road. No additional improvements or modifications are necessary to this pond as a result of the full buildout of RHR2. Table 6 provides summary data for the various design storms for the completed development for all areas tributary to Pond E including RHR2. Rolling Hills Ranch completes the development of the areas tributary to Pond E.

Table 6: Existing Pond E Summary Data

EXISTING POND E				
	PEAK INFLOW	PEAK OUTFLOW	PEAK STORAGE	PEAK ELEVATION
	CFS	CFS	AC-FT	FT
INTERIM CONDITIONS				
2-YEAR STORM	63	5.6	8.8	6970.3
5-YEAR STORM	122	13	16.6	6971.2
10-YEAR STORM	190	26	21.8	6971.8
50-YEAR STORM	424	141	35.6	6973.0
100-YEAR STORM	556	231	41.5	6973.5
FUTURE CONDITIONS				
2-YEAR STORM	64	5.8	9.5	6970.4
5-YEAR STORM	126	14	17.2	6971.3
10-YEAR STORM	197	28	22.4	6971.8
50-YEAR STORM	433	149	36.2	6973.0
100-YEAR STORM	618	240	42.2	6973.6

A water quality capture volume (WQCV) was added to the required storage volume for the final build out condition. The purpose of the WQCV is to allow particulates to settle out and accumulate over time to improve water quality and to maintain full volume for detention during the life of the facility for a major storm event. The WQCV of 1.5 ac-ft. was added to the detention of the minor storm and half (0.75 ac-ft.) was added to the detention volume of the major storm. This was accomplished with respect to the HEC-HMS computer run by providing a starting detention volume of 1.5 ft. for the 5-year storm and 0.75 ft. for the 100-year storm. The resulting storage elevations remain well below the emergency spillway elevation. See Appendix B for more information.

The WQCV was calculated by using the equations found in Volume 2, of the Drainage Criteria Manual (DCM). The release rate from the WQCV is generally very small, which helps minimize downstream impacts. Detaining the WQCV also serves to cleanse the "first flush" of runoff from the higher initial concentration of sediment and pollutants by allowing for settlement to occur. This greatly improves the quality of runoff, leaving the facility and reduces the potential for erosion. The positive impact on water quality is expected to be significant, particularly during the construction phase of the development.

Existing Pond G Detention Storage Criteria

Existing Detention Pond G is located adjacent and northeast of Rolling Hills Ranch Filing 2 and was constructed with Rolling Hills Ranch Early Grading permit and the supporting calculations showing drain time compliance has been provided with the Final Drainage Report for Rolling Hills Ranch Filing 1 approved September 2020., the pond is owned and maintained by the Meridian Service Metropolitan District (MSMD). There is a maintenance agreement between the Meridian Service Metropolitan District and El Paso County has been recorded as a part of the Rolling Hills Ranch Filing 1 Final Plat process.

The SCS calculation method was used to determine inflow and outflow from the detention pond to ensure the developed runoff does not overcharge the pond and the discharges do not adversely impact drainage patterns within the adjacent Falcon Regional Park and downstream of Eastonville Road. The ultimate future build-out design of the tributary areas was analyzed to insure the sizing of the pond would be adequate after development of Meridian Ranch is complete. This SCS calculation can be found in the appendix.

An analysis of the SCS calculations show the development of Rolling Hills Ranch Filing 2 and the discharge flow rates from Pond G approximate those of the historic flow rates at the project boundary and Eastonville Road. No additional improvements or modifications are necessary to this pond as a result of the full buildout of RHR2. Table 7 provides summary data for the various design storms for the completed development for all areas tributary to Pond G including RHR2.

Table 7: Existing Pond G Summary Data

POND G				
	PEAK INFLOW	PEAK OUTFLOW	PEAK STORAGE	PEAK ELEVATION
	CFS	CFS	AC-FT	FT
INTERIM CONDITIONS				
2-YEAR STORM	10	4.0	2.8	7026.1
5-YEAR STORM	40	12	7.1	7027.2
10-YEAR STORM	87	32	9.2	7027.6
50-YEAR STORM	309	218	17.4	7029.0
100-YEAR STORM	491	369	21.4	7029.7
FUTURE CONDITIONS				
2-YEAR STORM	24	5.1	4.6	7026.6
5-YEAR STORM	75	20	8.0	7027.4
10-YEAR STORM	149	51	10.7	7027.8
50-YEAR STORM	451	307	19.7	7029.4
100-YEAR STORM	653	465	24.8	7030.2

A water quality capture volume (WQCV) was added to the required storage volume for the final build out condition. The purpose of the WQCV is to allow particulates to settle out and accumulate over time to improve water quality and to maintain full volume for detention during the life of the facility for a major storm event. The WQCV of 1.5 ac-ft. was added to the detention of the minor storm and half (0.75 ac-ft.) was added to the detention volume of the major storm. This was accomplished with respect to the HEC-HMS computer run by providing a starting detention volume of 0.90 ft. for the 5-year storm and 0.45 ft. for the 100-year storm. The resulting storage elevations remain well below the emergency spillway elevation. See Appendix B for more information.

The WQCV was calculated by using the equations found in Volume 2, of the Drainage Criteria Manual (DCM). The release rate from the WQCV is generally very small, which helps minimize downstream impacts. Detaining the WQCV also serves to cleanse the "first flush" of runoff from the higher initial concentration of sediment and pollutants by allowing for settlement to occur. This greatly improves the quality of runoff, leaving the facility and reduces the potential for erosion. The positive impact on water quality is expected to be significant, particularly during the construction phase of the development.

Table 8: Key Design Point Comparison – SCS

MERIDIAN RANCH DISCHARGE KEY DESIGN POINTS (INTERIM)					
		PEAK DISCHARGE Q_{100} (CFS)	PEAK DISCHARGE Q_{50} (CFS)	PEAK DISCHARGE Q_{10} (CFS)	PEAK DISCHARGE Q_5 (CFS)
G12 - POND G OUTLET REGIONAL PARK (G05 - HISTORIC)	Historic	544	355	86	31
	Interim	369	218	32	12
	% of Historic	68%	61%	37%	40%
G06 - EASTONVILLE ROAD[1]	Historic	561	375	91	33
	Interim	388	228	34	13
	% of Historic	69%	61%	37%	41%
H08 - EASTONVILLE ROAD (POND E NORTH OUTLET)	Historic	216	142	34	12
	Interim	198	127	20	9.1
	% of Historic	92%	90%	61%	75%
H09 - EASTONVILLE ROAD (POND E SOUTH OUTLET)	Historic	77	51	12	4.5
	Interim	33	14	5.5	3.7
	% of Historic	42%	27%	45%	81%

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)
G12 - POND G OUTLET REGIONAL PARK (G05 - HISTORIC)	Historic	544	355	86	31
	Future	465	307	51	20
	% of Historic	85%	87%	59%	65%
G06 - EASTONVILLE ROAD[1]	Historic	561	375	91	33
	Future	493	324	55	22
	% of Historic	88%	86%	61%	67%
H08 - EASTONVILLE ROAD (POND E NORTH OUTLET)	Historic	216	142	34	12
	Future	204	134	22	10
	% of Historic	95%	95%	66%	84%
H09 - EASTONVILLE ROAD (POND E SOUTH OUTLET)	Historic	77	51	12	4.5
	Future	36	15	5.7	3.8
	% of Historic	47%	30%	47%	85%

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

The developed peak flow rate for the full spectrum of design storms are calculated to be below that of the corresponding historic peak flow rates. See Table 8 for a complete comparative list of the peak flow rates for the key design points impacted by the development of Rolling Hills Ranch Filing 2.

DRAINAGE FEES

The proposed development falls in the Gieck Drainage Basin. The entire development occupies 88.2 acres of residential development of which 46.7 acres are residential development and 13.6 acres are designated as right-of-way, 28.0 open space.

The following is the imperviousness calculation:

	Acres	Assumed Imperviousness	Impervious Acres
Open Space	27.97	3%	0.84
Right-of-way	13.59	85%	11.55
Residential Lots	46.66	45% (237 Lots)	21.00
Total	88.22		33.39=37.8% imperv

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

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

CONCLUSIONS

Based upon the above analysis and calculations, this project will not cause any additional adverse impacts to downstream property nor existing facilities. The existing storm drain system and detention ponds have been designed and properly constructed to accept and convey the storm drain runoff from this project.

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 area devoted to pervious areas. The rights-of-way within Meridian Ranch are 20% wider, 60 ft. instead of 50 ft., creating more landscaped area within the development.

The project has nearly 28 acres of open space, accounting for over 30% of this final plat, creating a lower density development.

Homeowners and builders are encouraged to direct roof drains to the sideyards 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 natural arroyo located adjacent to and north of the project was analyzed with Rolling Hills Ranch Filing 1 for stability and was determined to be mostly stable. Areas of instability were protected with rip-rap along the sides and bottom of the arroyo to reduce velocities and erosion.

Step 3: Provide Water Quality Capture Volume (WQCV)

Existing extended detention ponds with water quality capture volume are located to the east and south of the project that have been designed to accommodate the runoff from this development.

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

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

Temporary Sedimentation Pond

Temporary sedimentation ponds installed during the overlot grading process will act as the primary sediment control for the areas upstream during construction. Runoff will travel overland toward the existing sedimentation ponds, collected and diverted into the proposed storm drain system and discharged into existing downstream systems. The pond will provide initial sediment control over exposed upstream areas.

Detention Pond

The detention ponds will act as the primary water quality control for the areas within the project boundaries. Runoff will be collected by the proposed storm drainage system and diverted into the detention pond where practical. 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 maintaining runoff at or below existing levels.

Silt Fence

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

Erosion bales will be placed ten (10) feet from 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. "Urban Storm Drainage Criteria Manual" September 1969, Revised January 2016.

5. Flood Insurance Rate Study for El Paso County, Colorado and Incorporated Areas. Federal Emergency Management Agency, December 7, 2018.

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

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

8. Revision to Master Development Drainage Plan Meridian Ranch. January 2018. Prepared by Tech Contractors.

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

10. Final Drainage Report for Meridian Ranch Filing 3. August 2011. Prepared by Tech Contractors.

11. Preliminary and Final Drainage Report for Meridian Ranch Filing 7. June 2012. Prepared by Tech Contractors.

12. Final Drainage Report for Meridian Ranch Estates Filing 2. July 2013. Prepared by Tech Contractors.

13. Final Drainage Report for Meridian Ranch Filing 11A. March 2014. Prepared by Tech Contractors.

14. Preliminary and Final Drainage Report for Meridian Ranch Filing 8. December 2014. Prepared by Tech Contractors.

15. Final Drainage Report for Meridian Ranch Filing 9. May 2015. Prepared by Tech Contractors.

16. Final Drainage Report for Meridian Ranch Estates Filing 3. October 2015. Prepared by Tech Contractors.

17. Final Drainage Report for the Vistas Filing 1 at Meridian Ranch. July 2016. Prepared by Tech Contractors.

18. Final Drainage Report for Stonebridge Filing 3 at Meridian Ranch. April 2017. Prepared by Tech Contractors.

19. Interim Drainage Report for WindingWalk Grading. February 2018. Prepared by Tech Contractors.

20. Final Drainage Report Report for WindingWalk Filings 1 & 2 PUD and Final Drainage Report for WindingWalk Filing 1 at Meridian Ranch. April 2018. Prepared by Tech Contractors.

21. Final Drainage Report for WindingWalk Filing 2 at Meridian Ranch. August 2018. Prepared by Tech Contractors.

22. Final Drainage Report for Stonebridge Filing 4 at Meridian Ranch. September 2018. Prepared by Tech Contractors.

23. Preliminary Drainage Report for Rolling Hills Ranch at Meridian Ranch PUD. February 2020. Prepared by Tech Contractors.

24. Final Drainage Report for Estates at Rolling Hills Ranch Filing 1. March 2020. Prepared by Tech Contractors.

Appendices

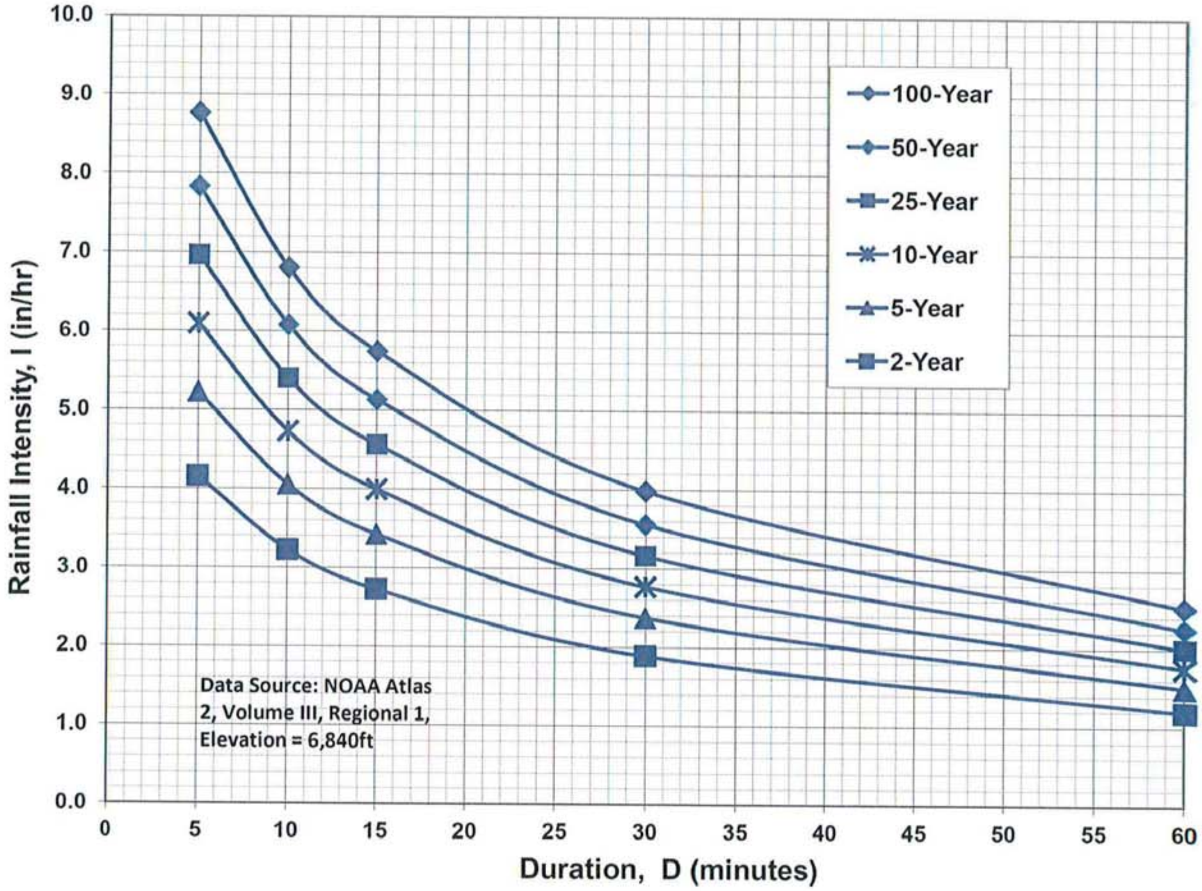
Appendix A – Rational Calculations

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.

COMPOSITE 'C' FACTORS

PROJECT: **Rolling Hills Ranch Filing 2** 11/3/2020

BASIN DESIGNATION	AREA (AC.)						COMPOSITE FACTOR		Percent Impervious
	3 DU/AC	4 DU/AC	5 DU/AC	STREETS	OPEN SPACE PARKS/GC	TOTAL	5-year	100-year	
Future Rolling Hills Ranch Filing 3									
D01	1.0	5.9				6.9	**0.29**	**0.50**	**38.6%**
D02	0.6	3.3				3.8	**0.29**	**0.50**	**38.6%**
D03	0.6	3.3				3.8	**0.29**	**0.50**	**38.6%**
D04	0.8	4.5				5.3	**0.29**	**0.50**	**38.6%**
D05	0.3	1.7				2.0	**0.29**	**0.50**	**38.6%**
D06	0.5	2.7				3.2	**0.29**	**0.50**	**38.6%**
D07	0.9	5.7				6.6	**0.29**	**0.50**	**38.6%**
D08	0.2	1.4				1.6	**0.29**	**0.50**	**38.6%**
D10	0.1	0.7				0.8	**0.29**	**0.50**	**38.5%**
Proposed Rolling Hills Ranch Filing 2									
D09	0.1	0.5			1.1	1.6	**0.26**	**0.44**	**13.9%**
D11	0.4	2.2			1.6	4.2	**0.27**	**0.46**	**24.6%**
D12	0.4	2.3				2.7	**0.29**	**0.50**	**38.6%**
D13		0.9	0.9			1.8	**0.32**	**0.51**	**41.4%**
D14	0.9	5.5				6.5	**0.29**	**0.50**	**38.6%**
D15	0.9	5.4				6.4	**0.29**	**0.50**	**38.6%**
D16	0.6	3.4				4.0	**0.29**	**0.50**	**38.6%**
D17	0.7	4.4				5.1	**0.29**	**0.50**	**38.6%**
D18	0.5	2.7				3.1	**0.29**	**0.50**	**38.6%**
E01		2.8	2.6			5.4	**0.32**	**0.51**	**41.4%**
E02		3.4	3.1			6.5	**0.32**	**0.51**	**41.4%**
E03		3.1	2.8			5.8	**0.32**	**0.51**	**41.4%**
E04		1.4	1.3	0.3	0.2	3.1	**0.37**	**0.54**	**43.8%**
E05		1.3	1.2			2.6	**0.32**	**0.51**	**41.4%**
Existing Rolling Hills Ranch Filing 1									
E06		0.7	0.6			1.3	**0.32**	**0.51**	**41.4%**
E07		1.1	1.0			2.1	**0.32**	**0.51**	**41.4%**
E08		2.2	2.0			4.2	**0.32**	**0.51**	**41.4%**
E09		2.9	2.6			5.4	**0.32**	**0.51**	**41.4%**
E10		3.7	3.3			7.0	**0.32**	**0.51**	**41.4%**
E11		1.0	2.1		9.9	13.0	**0.26**	**0.44**	**11.6%**
E12				1.0	0.6	1.6	**0.64**	**0.74**	**61.4%**
E13		1.3	2.5	1.0	1.2	6.0	**0.41**	**0.57**	**44.0%**
								Composite:	**36.7%**
TOTAL	9	81	26	2	15	133.4	**0.31**	**0.50**	**36.7%**

TIME OF CONCENTRATION

PROJECT: **Rolling Hills Ranch Filing 2** DATE: 11/3/2020

TIME OF CONCENTRATION																	
SUBBASIN DATA			INIT./OVERLAND TIME (T_i)				TRAVEL TIME (T_t)							TOTAL	Tc Check (Urbanized Basins)		FINAL T_c
BASIN DESIGNATION	C_5	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)
D01	0.29	6.9	125	2.5	2.0%	13.1	1060	23	2.2%	P	20	2.9	6.0	19.1	1185.00	16.6	**16.6**
D02	0.29	3.8	260	10.0	3.8%	15.2	880	16	1.8%	P	20	2.7	5.4	20.7	1140.00	16.3	**16.3**
D03	0.29	3.8	40	0.8	2.0%	7.4	1140	28	2.4%	P	20	3.1	6.1	13.5	1180.00	16.6	**13.5**
D04	0.29	5.3	90	1.8	2.0%	11.1	1390	32	2.3%	P	20	3.0	7.6	18.8	1480.00	18.2	**18.2**
D05	0.29	2.0	155	3.1	2.0%	14.6	350	5	1.4%	P	20	2.4	2.4	17.1	505.00	12.8	**12.8**
D06	0.29	3.2	140	2.8	2.0%	13.9	1005	26	2.6%	P	20	3.2	5.2	19.1	1145.00	16.4	**16.4**
D07	0.29	6.6	215	4.3	2.0%	17.2	1420	35	2.5%	P	20	3.1	7.5	24.8	1635.00	19.1	**19.1**
D08	0.29	1.6	150	3.0	2.0%	14.4	405	4	1.0%	P	20	2.0	3.4	17.8	555.00	13.1	**13.1**
D09	0.26	1.6	175	3.5	2.0%	16.2	285	3	1.0%	L	7	0.7	6.8	23.0	NON-URBAN AREA		**23.0**
D10	0.29	0.8	80	1.6	2.0%	10.5	435	4	0.9%	P	20	1.9	3.8	14.3	515.00	12.9	**12.9**
D11	0.27	4.2	195	6.0	3.1%	14.6	975	10	1.0%	L	7	0.7	22.9	37.5	NON-URBAN AREA		**37.5**
D12	0.29	2.7	150	3.0	2.0%	14.4	1565	16	1.0%	P	20	2.0	12.9	27.3	1715.00	19.5	**19.5**
D13	0.32	1.8	145	2.9	2.0%	13.6	405	8	2.0%	P	20	2.8	2.4	16.0	550.00	13.1	**13.1**
D14	0.29	6.5	150	3.0	2.0%	14.4	1120	14	1.3%	P	20	2.2	8.3	22.7	1270.00	17.1	**17.1**
D15	0.29	6.4	145	2.9	2.0%	14.1	1110	15	1.4%	P	20	2.3	8.0	22.1	1255.00	17.0	**17.0**
D16	0.29	4.0	255	5.1	2.0%	18.8	500	13	2.6%	P	20	3.2	2.6	21.3	755.00	14.2	**14.2**
D17	0.29	5.1	245	4.9	2.0%	18.4	660	14	2.1%	P	20	2.9	3.8	22.2	905.00	15.0	**15.0**
D18	0.29	3.1	100	2.0	2.0%	11.7	1390	24	1.7%	P	20	2.6	8.8	20.6	1490.00	18.3	**18.3**
E01	0.32	5.4	165	3.3	2.0%	14.5	672	17	2.5%	P	20	3.2	3.5	18.0	837.00	14.7	**14.7**
E02	0.32	6.5	268	13.0	4.9%	13.8	700	20	2.9%	P	20	3.4	3.5	17.2	968.00	15.4	**15.4**
E03	0.32	5.8	247	6.0	2.4%	16.6	805	6	0.7%	P	20	1.7	7.8	24.4	1052.00	15.8	**15.8**
E04	0.37	3.1	50	1.0	2.0%	7.6	1115	8	0.7%	P	20	1.7	11.0	18.5	1165.00	16.5	**16.5**
E05	0.32	2.6	242	12.0	5.0%	13.0	1135	26	2.3%	P	20	3.0	6.2	19.2	1377.00	17.7	**17.7**
E06	0.32	1.3	140	2.8	2.0%	13.4	307	6	2.0%	P	20	2.8	1.8	15.2	447.00	12.5	**12.5**
E07	0.32	2.1	280	11.0	3.9%	15.1	200	8	4.0%	P	20	4.0	0.8	15.9	480.00	12.7	**12.7**
E08	0.32	4.2	140	2.8	2.0%	13.4	740	16	2.2%	P	20	2.9	4.2	17.6	880.00	14.9	**14.9**
E09	0.32	5.4	255	8.0	3.1%	15.5	625	18	2.9%	P	20	3.4	3.1	18.6	880.00	14.9	**14.9**
E10	0.32	7.0	172	6.0	3.5%	12.3	1583	35	2.2%	P	20	3.0	8.9	21.2	1755.00	19.8	**19.8**
E11	0.26	13.0	182	3.0	1.6%	17.5	1696	35	2.1%	L	7	1.0	28.1	45.6	NON-URBAN AREA		**45.6**
E12	0.64	1.6	25	0.5	2.0%	3.3	1186	12	1.0%	P	20	2.0	9.8	13.2	1211.00	16.7	**13.2**
E13	0.41	6.0	161	6.0	3.7%	10.3	1188	22	1.9%	P	20	2.7	7.3	17.6	1349.00	17.5	**17.5**

Notes:	$* Ti = \frac{* Ti = 0.395\ (1.1\text{-}C5)L^{0.5}}{S^{0.33}}$	
	$V = C_V S_W^{0.5}$	** Tt = L x 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

STORM DRAINAGE SYSTEM DESIGN
(RATIONAL METHOD PROCEDURE)
SURFACE ROUTING

PROJECT: **Rolling Hills Ranch Filing 2** Date: 11/3/2020

DESIGN POINT	DIRECT RUNOFF											TOTAL RUNOFF							OVERLAND TRAVEL TIME						
	BASIN	AREA (AC)	Tc (Min.)	I (in./ hr.) (5 YR)	I (in./ hr.) (100 YR)	COEFF. © (5 YR)	COEFF. © (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)	DESTINATION DP	CONVEYANCE TYPE	COEFFICIENT C_V	SLOPE %	VEL. (FPS)	LENGTH (FT)	TRAVEL TIME Tt
I19	D01	6.9	16.6	3.37	5.66	0.29	0.50	2.01	3.41	6.8	19						**6.8**	**19**	DP2	P	20.0	0.95%	1.9	110	0.9
DP2	D02	3.8	16.3	3.39	5.70	0.29	0.50	1.12	1.90	3.8	11	17.5	3.29	5.52	1.12	2.90	**3.8**	**16**	I20	P	20.0	0.95%	1.9	210	1.8
I20	D03	3.8	13.5	3.67	6.17	0.29	0.50	1.12	1.90	4.1	12	19.3	3.14	5.27	2.25	3.80	**7.1**	**20**	DP3	P	20.0	0.50%	1.4	45	0.5
DP3	D04	5.3	18.2	3.23	5.42	0.29	0.50	1.55	2.63	5.0	14	19.8	3.10	5.20	1.55	3.16	**5.0**	**16**	I21	P	20.0	0.70%	1.7	285	2.8
I21	D05	2.0	12.8	3.76	6.31	0.29	0.50	0.59	0.99	2.2	6.3	22.7	2.90	4.87	2.31	4.65	**6.7**	**23**	I26	P	20.0	0.95%	1.9	215	1.8
I22	D06	3.2	16.4	3.39	5.69	0.29	0.50	0.94	1.59	3.2	9.0						**3.2**	**9.0**	I21	P	20.0	1.40%	2.4	350	2.5
I23	D07	6.6	19.1	3.16	5.30	0.29	0.50	1.93	3.27	6.1	17						**6.1**	**17**	I24	P	20.0	0.95%	1.9	315	2.7
I24	D08	1.6	13.1	3.73	6.26	0.29	0.50	0.48	0.81	1.8	5.1	21.8	2.96	4.97	0.48	2.21	**1.8**	**11**	I25	P	20.0	0.95%	1.9	220	1.9
CB2	D09	1.6	23.0	2.88	4.83	0.26	0.44	0.42	0.71	1.2	3.4						**1.2**	**3.4**							
I25	D10	0.8	12.9	3.75	6.30	0.29	0.50	0.24	0.40	0.9	2.5	23.7	2.84	4.76	0.24	0.61	**0.9**	**2.9**							
ES1	D11	4.2	37.5	2.15	3.60	0.27	0.46	1.13	1.93	2.4	6.9						**2.4**	**6.9**							
I26	D12	2.7	19.5	3.13	5.25	0.29	0.50	0.78	1.32	2.4	6.9	24.5	2.78	4.67	0.78	3.18	**2.4**	**15**							
I27	D13	1.8	13.1	3.73	6.26	0.32	0.51	0.58	0.92	2.2	5.8						**2.2**	**5.8**	I33	P	20.0	2.40%	3.1	706	3.8
I28	D14	6.5	17.1	3.33	5.59	0.29	0.50	1.89	3.20	6.3	18						**6.3**	**18**	I31	P	20.0	2.00%	2.8	803	4.7
I29	D15	6.4	17.0	3.34	5.60	0.29	0.50	1.86	3.15	6.2	18						**6.2**	**18**	I30	P	20.0	2.25%	3.0	622	3.5
I30	D16	4.0	14.2	3.60	6.05	0.29	0.50	1.18	1.99	4.2	12	20.4	3.06	5.13	1.18	3.37	**4.2**	**17**	I31	P	20.0	0.90%	1.9	162	1.4
I31	D17	5.1	15.0	3.52	5.91	0.29	0.50	1.50	2.54	5.3	15	21.9	2.96	4.96	1.50	5.39	**5.3**	**27**	I32	P	20.0	0.50%	1.4	30	0.4
I32	D18	3.1	18.3	3.22	5.41	0.29	0.50	0.92	1.55	3.0	8.4	22.2	2.93	4.92	0.92	2.06	**3.0**	**10**							
I33	E01	5.4	14.7	3.56	5.97	0.32	0.51	1.74	2.77	6.2	17	16.9	3.35	5.62	1.85	3.06	**6.2**	**17**	I34	P	20.0	1.90%	2.8		0.0
I34	E02	6.5	15.4	3.48	5.85	0.32	0.51	2.10	3.33	7.3	19				2.10	3.33	**7.3**	**19**	I37	P	20.0	1.40%	2.4	360	2.5
I35	E03	5.8	15.8	3.44	5.77	0.32	0.51	1.88	2.99	6.5	17						**6.5**	**17**	I36	P	20.0	0.85%	1.8	175	1.6
I36	E04	3.1	16.5	3.38	5.67	0.37	0.54	1.15	1.71	3.9	9.7	17.4	3.30	5.53	1.15	2.35	**3.9**	**13**							
I37	E05	2.6	17.7	3.28	5.50	0.32	0.51	0.83	1.31	2.7	7.2	17.9	3.25	5.46	0.83	1.70	**2.7**	**9.3**	I41	P	20.0	0.90%	1.9	280	2.5
I38	E06	1.3	12.5	3.80	6.37	0.32	0.51	0.41	0.65	1.6	4.2						**1.6**	**4.2**							
I39	E07	2.1	12.7	3.77	6.34	0.32	0.51	0.66	1.05	2.5	6.7						**2.5**	**6.7**	I41	P	20.0	2.80%	3.3	675	3.4
I40	E08	4.2	14.9	3.53	5.93	0.32	0.51	1.35	2.14	4.8	13						**4.8**	**13**	EI1	P	20.0	2.30%	3.0	1290	7.1
I41	E09	5.4	14.9	3.53	5.93	0.32	0.51	1.76	2.80	6.2	17	20.4	3.06	5.14	1.95	3.54	**6.2**	**18**	I43	P	20.0	1.10%	2.1	545	4.3
I42	E10	7.0	19.8	3.11	5.22	0.32	0.51	2.26	3.59	7.0	19						**7.0**	**19**							
CB3	E11	13.0	45.6	1.85	3.11	0.26	0.44	3.42	5.69	6.3	18						**6.3**	**18**							
I43	E12	1.6	13.2	3.72	6.24	0.64	0.74	1.02	1.19	3.8	7.4	24.7	2.77	4.65	1.02	2.09	**3.8**	**9.7**	EI3	P	20.0	1.25%	2.2	1190	8.9
EI1	E13	6.0	17.5	3.29	5.52	0.41	0.57	2.48	3.45	8.2	19	22.0	2.95	4.95	2.48	3.92	**8.2**	**19**	EI2	P	20.0	1.25%	2.2	560	4.2

TYPE OF SURFACE		C_V
HEAVY MEADOW	H	3
TILLAGE/FIELD	T	5
RIPRAP (not buried)	R	7
SHORT PASTURE AND LAWNS	L	7
NEARLY BARE GROUND	B	10
GRASSED WATERWAY	G	15
PAVED AREAS	P	20

STORM DRAINAGE SYSTEM DESIGN
INLET CALCULATIONS

PROJECT: **Rolling Hills Ranch Filing 2** Date: 11/3/2020

								Q_{Total}		$Q_{Capture}$				$Q_{Flow\text{-}by}$				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)
I19	D01	15	PROP	SUMP[1]	2.0%		16.6	6.8	19	6.8	14	2.01	2.40	-	5.7	-	1.00	0.47	0.47		
I20	D03	20	PROP	SUMP[1]	2.0%		19.3	7.1	20	7.1	17	2.25	3.27	-	2.8	-	0.53	0.47	0.47		
I21	D05	15	PROP	SUMP[1]	2.0%		22.7	6.7	23	6.7	14	2.31	2.79	-	9.1	-	1.86	0.47	0.47		
I22	D06	15	PROP	FLOW-BY	2.0%	1.0%	16.4	3.2	9.0	2.6	6.2	0.77	1.09	0.6	2.8	0.17	0.50	0.31	0.41	11.1	16.5
I23	D07	10	PROP	SUMP[1]	2.0%		19.1	6.1	17	6.1	9.9	1.93	1.87	-	7.4	-	1.39	0.47	0.47		
I24	D08	10	PROP	SUMP[1]	2.0%		21.8	1.8	11	1.8	9.9	0.60	2.00	-	1.0	-	0.21	0.47	0.47		
CB2	D09	Type C	PROP	SUMP	2.0%		23.0	1.2	3.4	1.2	3.4	0.42	0.71	-	-	-	-	0.17	0.34		
I25	D10	10	PROP	SUMP	2.0%		23.7	0.9	2.9	0.9	2.9	0.31	0.61	-	-	-	-	0.50	0.70		
ES1	D11	FES	PROP	SUMP	2.0%		37.5	2.4	6.9	2.4	6.9	1.13	1.93	-	-	-	-	0.27	0.47		
I26	D12	20	PROP	SUMP	2.0%		24.5	2.4	15	2.4	15	0.88	3.18	-	-	-	-	0.50	0.70		
I27	D13	15	PROP	FLOW-BY	2.0%	2.0%	13.1	2.2	5.8	1.7	3.9	0.47	0.63	0.4	1.8	0.11	0.29	0.25	0.33	8.5	12.2
I28	D14	10	PROP	SUMP[1]	2.0%		17.1	6.3	18	6.3	9.9	1.89	1.78	-	7.9	-	1.42	0.47	0.47		
I29	D15	10	PROP	SUMP[1]	2.0%		17.0	6.2	18	6.2	9.9	1.86	1.77	-	7.7	-	1.37	0.47	0.47		
I30	D16	10	PROP	SUMP[1]	2.0%		20.4	4.2	17	4.2	9.9	1.39	1.94	-	7.3	-	1.43	0.47	0.47		
I31	D17	15	PROP	SUMP	2.0%		21.9	5.3	27	5.3	24	1.79	4.89	-	2.5	-	0.51	0.50	0.70		
I32	D18	15	PROP	SUMP	2.0%		22.2	3.0	10	3.0	10	1.01	2.06	-	-	-	-	0.50	0.70		
I33	E01	20	PROP	SUMP[1]	2.0%		16.9	6.2	17	6.2	17	1.85	3.06	-	-	-	-	0.47	0.47		
I34	E02	20	PROP	SUMP[1]	2.0%		15.4	7.3	19	7.3	17	2.10	2.95	-	2.3	-	0.39	0.47	0.47		
I35	E03	15	PROP	SUMP[1]	2.0%		15.8	6.5	17	6.5	14	1.88	2.35	-	3.7	-	0.64	0.47	0.47		
I36	E04	15	PROP	SUMP[1]	2.0%		17.4	3.9	13	3.9	13	1.18	2.35	-	-	-	-	0.47	0.47		
I37	E05	20	PROP	FLOW-BY	2.0%	1.0%	17.9	2.7	9.3	2.6	7.1	0.78	1.30	0.2	2.2	0.05	0.40	0.29	0.42	10.5	16.6
I38	E06	5	PROP	SUMP[1]	2.0%		12.5	1.6	4.2	1.6	4.2	0.41	0.65	-	-	-	-	0.47	0.47		
I39	E07	15	PROP	FLOW-BY	2.0%	2.0%	12.7	2.5	6.7	2.0	4.5	0.52	0.70	0.5	2.2	0.14	0.35	0.26	0.34	8.9	12.9
I40	E08	10	PROP	SUMP[1]	2.0%		14.9	4.8	13	4.8	9.9	1.35	1.67	-	2.8	-	0.47	0.47	0.47		
I41	E09	15	PROP	SUMP[1]	2.0%		20.4	6.2	18	6.2	14	2.03	2.64	-	4.6	-	0.90	0.47	0.47		
I42	E10	20	PROP	SUMP	2.0%		19.8	7.0	19	7.0	19	2.26	3.59	-	-	-	-	0.50	0.70		
CB3	E11	Type C	PROP	SUMP	2.0%		45.6	6.3	18	6.3	18	3.42	5.69	-	-	-	-	0.45	0.70		
I43	E12	20	PROP	FLOW-BY	2.0%	1.0%	24.7	3.8	9.7	3.4	7.4	1.22	1.59	0.4	2.3	0.15	0.50	0.32	0.42	11.9	16.9
EI1	E13	15	PROP	SUMP[1]	2.0%		22.0	8.2	19	8.2	13	2.77	2.61	-	6.5	-	1.31	0.45	0.45		

[1] Forced sump at intersection

STORM DRAINAGE SYSTEM DESIGN
(RATIONAL METHOD PROCEDURE)
PIPE ROUTING

PROJECT: **Rolling Hills Ranch Filing 2** Date: 11/3/2020

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
I19	D01	16.6	3.37	5.66	2.01	2.40	6.8	14						**6.8**	**14**	18	0.013	J15	1.03%	54	6	0.1
J15									16.7	3.36	5.64	2.01	2.40	**6.8**	**14**	24	0.013	J16	7.30%	252	20	0.2
I20	D03	19.3	3.14	5.27	2.25	3.27	7.1	17						**7.1**	**17**	18	0.013	J16	0.99%	25	6	0.1
J16									19.3	3.14	5.27	4.26	5.67	**13**	**30**	30	0.013	J17	0.57%	331	6	0.9
I21	D05	22.7	2.90	4.87	2.31	2.79	6.7	14						**6.7**	**14**	18	0.013	J17	0.97%	5.2	6	0.0
J17									22.7	2.90	4.87	6.57	8.46	**19**	**41**	30	0.013	J19	1.02%	25	8	0.0
I22	D06	16.4	3.39	5.69	0.77	1.09	2.6	6.2						**2.6**	**6.2**	18	0.013	J18	3.01%	43	10	0.1
I23	D07	19.1	3.16	5.30	1.93	1.87	6.1	9.9						**6.1**	**9.9**	18	0.013	J18	1.00%	45	6	0.1
J18									19.2	3.15	5.29	2.70	2.96	**8.5**	**16**	24	0.013	J19	0.98%	296	7	0.7
I24	D08	21.8	2.96	4.97	0.60	2.00	1.8	9.9						**1.8**	**9.9**	18	0.013	J19	0.90%	45	6	0.1
J19									22.8	2.90	4.86	9.87	13.42	**29**	**65**	42	0.013	J20	2.78%	204	17	0.2
CB2	D09	23.0	2.88	4.83	0.42	0.71	1.2	3.4						**1.2**	**3.4**	18	0.013	I25	4.21%	32	12	0.0
I25	D10	23.7	2.84	4.76	0.31	0.61	0.9	2.9	23.1	2.88	4.83	0.73	1.32	**2.1**	**6.4**	18	0.013	J20	8.11%	25	17	0.0
ES1	D11	37.5	2.15	3.60	1.13	1.93	2.4	6.9						**2.4**	**6.9**	18	0.013	I26	0.56%	54	4	0.2
I26	D12	24.5	2.78	4.67	0.88	3.18	2.4	15	37.7	2.14	3.59	2.01	5.11	**4.3**	**18**	24	0.013	J20	1.07%	4.7	7	0.0
J20									37.7	2.14	3.59	12.61	19.85	**29**	**71**	42	0.013	J21	0.75%	510	9	0.9
I27	D13	13.1	3.73	6.26	0.47	0.63	1.7	3.9						**1.7**	**3.9**	18	0.013	J21	1.01%	30	6	0.1
J21									38.6	2.10	3.53	13.08	20.48	**29**	**72**	42	0.013	J23	2.59%	301	17	0.3
I28	D14	17.1	3.33	5.59	1.89	1.78	6.3	9.9						**6.3**	**9.9**	18	0.013	J22	1.40%	32	7	0.1
I29	D15	17.0	3.34	5.60	1.86	1.77	6.2	9.9						**6.2**	**9.9**	18	0.013	J22	0.99%	25	6	0.1
J22									17.1	3.32	5.58	3.75	3.55	**12**	**20**	24	0.013	J23	5.17%	24	16	0.0
J23									38.9	2.09	3.51	16.83	24.03	**35**	**84**	48	0.013	J24	2.19%	595	17	0.6
I30	D16	20.4	3.06	5.13	1.39	1.94	4.2	9.9						**4.2**	**9.9**	18	0.013	J24	8.57%	4.7	17	0.0
J24									39.5	2.07	3.47	18.21	25.97	**38**	**90**	48	0.013	J25	1.00%	40	11	0.1
J25									39.6	2.07	3.47	18.21	25.97	**38**	**90**	48	0.013	J26	1.87%	129	16	0.1
I31	D17	21.9	2.96	4.96	1.79	4.89	5.3	24						**5.3**	**24**	30	0.013	J26	6.10%	4.9	21	0.0
J26									39.7	2.06	3.46	20.00	30.86	**41**	**107**	54	0.013	I32	1.03%	24	13	0.0
I32	D18	22.2	2.93	4.92	1.01	2.06	3.0	10	39.7	2.06	3.46	21.01	32.91	**43**	**114**	54	0.013	OS4	0.60%	178	10	0.3
									40.1													

Previous comments were provided on the CD (sheet 8). It appears that the storm sewers on the CD's match the hydraulics calculations but not the pipe routing calculations and table on the drainage map. Please revise so that they are consistent.

UPSTREAM DESIGN POINT	UPSTREAM BASIN	INLET FLOW Tc (Min.)	INLET FLOW I (in./ hr.) (5 YR)	INLET FLOW I (in./ hr.) (100 YR)	INLET FLOW CA (5 YR)	INLET FLOW CA (100 YR)	INLET FLOW Q (5 YR)	INLET FLOW Q (100 YR)	SYSTEM FLOW Sum Tc (min)	SYSTEM FLOW I (in./ hr.) (5 YR)	SYSTEM FLOW I (in./ hr.) (100 YR)	SYSTEM FLOW CA (5 YR)	SYSTEM FLOW CA (100 YR)	SYSTEM FLOW Q (5 YR)	SYSTEM FLOW Q (100 YR)	TRAVEL TIME PIPE DIA	ROUGHNESS (n)	DESTINATION DP	SLOPE %	LENGTH (FT)	VEL. (FPS) (Estimate)*	TRAVEL TIME Tt
I33	E01	16.9	3.35	5.62	1.85	3.06	6.2	17						6.2	17	18	0.013	J27	0.76%	53	5	0.2
J27									17.0	3.33	5.59	1.85	3.06	6.2	17	18	0.013	J28	2.35%	245	9	0.4
I34	E02	15.4	3.48	5.85	2.10	2.95	7.3	17.2						7.3	17	18	0.013	J28	0.99%	25	6	0.1
J28									17.5	3.29	5.53	3.95	6.01	13	33	30	0.013	J29	1.91%	175	12	0.3
I35	E03	15.8	3.44	5.77	1.88	2.35	6.5	13.6						6.5	14	18	0.013	J29	1.00%	45	6	0.1
J29									17.7	3.27	5.49	5.84	8.36	19	46	36	0.013	J30	0.70%	179	8	0.4
I36	E04	17.4	3.30	5.53	1.18	2.35	3.9	13.0						3.9	13	18	0.013	J30	1.01%	25	6	0.1
I37	E05	17.9	3.25	5.46	0.78	1.30	2.6	7.1						2.6	7.1	18	0.013	J30	5.35%	4.7	14	0.0
J30									17.9	3.25	5.46	7.80	12.01	25	66	36	0.013	J31	1.03%	44	10	0.1
J31									18.0	3.25	5.45	7.80	12.01	25	65	42	0.013	J36	0.79%	272	9	0.5
I38	E06	12.5	3.80	6.37	0.41	0.65	1.6	4.2						1.6	4.2	18	0.013	J32	1.16%	90	6	0.2
J32									12.7	3.77	6.33	0.41	0.65	1.5	4.1	18	0.013	J33	4.61%	348	13	0.5
I39	E07	12.7	3.77	6.34	0.52	0.70	2.0	4.5						2.0	4.5	18	0.013	J33	3.70%	26	11	0.0
J33									13.2	3.72	6.24	0.93	1.36	3.5	8.5	18	0.013	J34	1.95%	151	8	0.3
I40	E08	14.9	3.53	5.93	1.35	1.67	4.8	9.9						4.8	9.9	18	0.013	J34	1.04%	24	6	0.1
J34									15.0	3.53	5.92	2.28	3.03	8.0	18	24	0.013	J35	3.02%	478	13	0.6
J35									15.6	3.46	5.81	2.28	3.03	8.0	18	24	0.013	J36	1.29%	62	8	0.1
I41	E09	20.4	3.06	5.14	2.03	2.64	6.2	14						6.2	14	24	0.013	J36	1.03%	24	7	0.1
J36									20.4	3.06	5.13	12.12	17.68	37	91	42	0.013	J37	1.03%	316	11	0.5
I42	E10	19.8	3.11	5.22	2.26	3.59	7.0	19						7.0	19	24	0.013	J37	1.04%	106	7	0.2
J37									20.9	3.02	5.07	14.38	21.27	43	108	48	0.013	J38	1.22%	201	13	0.3
CB3	E11	45.6	1.85	3.11	3.42	5.69	6.3	18						6.3	18	24	0.013	J38	1.52%	112	9	0.2
I43	E12	24.7	2.77	4.65	1.22	1.59	3.4	7.4						3.4	7.4	18	0.013	J38	1.14%	13	6	0.0
J38									24.7	2.77	4.65	19.02	28.55	53	133	54	0.013	EJ01	2.39%	227	19	0.2
EI1	E13	22.0	2.95	4.95	2.77	2.61	8.2	13						8.2	13	18	0.013	EJ02	2.20%	4.5	9	0.0
CA's FROM MERIDIAN RANCH FILING 11A FDR, TIME OF CONCENTRATION ADJUSTED TO MATCH FLOW RATE FROM SCS METHOD									87.5	0.88	1.47	22.47	92.72	20	136							
EJ02									87.5	0.88	1.47	25.24	95.33	22	140	54	0.013	EJ01	0.49%	67	9	0.1

* Velocity estimated for calculation of travel time. Refer to Hydraulics for calculated velocity.

STORM DRAINAGE SYSTEM DESIGN

HYDRAULICS

PROJECT: **Rolling Hills Ranch Filing 2** Date: 11/3/2020

Label	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)	Elev. Ground (Upstrm) (ft)	Hydraulic Grade Line (Upstrm) (ft)	Invert (Upstrm) (ft)	Elev. Ground (Dnstrm) (ft)	Hydraulic Grade Line (Dnstrm) (ft)	Invert (Dnstrm) (ft)
P36	I19	J15	2.40	16.6	14	2.40	16.6	5.66	18	53.6	1.03%	11	14	7.7	7072.63	7069.9	7068.10	7072.32	7068.9	7067.55
P37	J15	J16				2.40	16.7	5.64	24	252.3	0.73%	19	14	6.7	7072.32	7068.4	7067.05	7070.40	7066.9	7065.20
P54	I20	J16	3.27	19.3	17	3.27	19.3	5.28	18	25.2	0.99%	11	17	9.8	7070.45	7067.9	7065.95	7070.40	7067.2	7065.70
P38	J16	J17				5.67	19.3	5.27	30	331.0	0.57%	31	30	7.2	7070.40	7066.7	7064.70	7068.13	7065.1	7062.80
P56	I21	J17	2.79	22.7	14	2.79	22.7	4.87	18	5.17	0.97%	10	14	7.7	7068.34	7066.0	7063.85	7068.13	7065.9	7063.80
P42	J17	J19				8.46	22.7	4.87	30	24.6	1.02%	41	42	9.6	7068.13	7065.0	7062.80	7068.45	7064.9	7062.55
P58	I23	J18	1.87	19.1	10	1.87	19.1	5.30	18	44.9	1.00%	11	10	6.8	7071.39	7068.1	7066.90	7071.49	7067.6	7066.45
P57	I22	J18	1.09	16.4	6.2	1.09	16.4	5.69	18	43.2	3.01%	18	6.2	9.3	7072.25	7068.7	7067.75	7071.49	7067.6	7066.45
P40	J18	J19				2.96	19.2	5.29	24	295.8	0.98%	22	16	7.7	7071.49	7067.4	7065.95	7068.45	7064.3	7063.05
P59	I24	J19	2.00	21.8	10	2.00	21.8	4.97	18	44.7	0.90%	10	10	6.4	7068.44	7065.2	7063.95	7068.45	7064.8	7063.55
P43	J19	J20				13.42	22.8	4.86	42	203.5	2.78%	168	66	16	7068.45	7064.1	7061.55	7066.47	7058.7	7055.90
P62	FES1	I26	1.93	37.5	7.0	1.93	37.5	3.60	18	53.8	0.56%	7.8	7.0	5.0	7062.00	7059.6	7058.25	7066.70	7059.4	7057.95
P63	I26	J20	3.18	24.5	15	5.11	37.7	3.59	24	4.67	1.07%	23	19	8.3	7066.70	7059.4	7057.45	7066.47	7059.4	7057.40
P60	CB2	I25	0.71	23.0	3.5	0.71	23.0	4.83	18	32.1	4.21%	22	3.5	8.9	7064.00	7062.0	7061.25	7066.70	7060.9	7059.90
P61	I25	J20	0.61	23.7	2.9	1.32	23.7	4.76	18	24.7	8.11%	30	6.3	13	7066.70	7060.9	7059.90	7066.47	7059.4	7057.90
P69	J20	J21				19.85	37.7	3.59	42	510.2	0.75%	87	72	10	7066.47	7058.6	7055.90	7059.10	7055.6	7052.05
P64	I27	J21	0.63	13.1	4.0	0.63	13.1	6.25	18	29.6	1.01%	11	4.0	5.6	7058.87	7055.4	7054.35	7059.10	7055.4	7054.05
P48	J21	J23				20.48	38.5	3.53	42	300.8	2.59%	162	73	16	7059.10	7054.7	7052.05	7052.17	7047.3	7044.25
P65	I28	J22	1.78	17.1	10	1.78	17.1	5.58	18	32.2	1.40%	12	10	7.8	7052.48	7049.2	7047.95	7051.98	7048.9	7047.50
P66	I29	J22	1.77	17.0	10	1.77	17.0	5.60	18	25.2	0.99%	11	10	6.7	7052.27	7049.0	7047.75	7051.98	7048.9	7047.50
P47	J22	J23				3.55	17.2	5.57	24	24.2	5.17%	51	20	15	7051.98	7048.6	7047.00	7052.17	7046.8	7045.75
P49	J23	J24				24.03	38.8	3.51	48	594.7	2.19%	213	85	16	7052.17	7046.6	7043.75	7037.93	7034.1	7030.70
P67	I30	J24	1.94	20.4	10	1.94	20.4	5.14	18	4.67	8.57%	31	10	16	7038.10	7034.8	7033.60	7037.93	7034.1	7033.20
P50	J24	J25				25.97	39.5	3.47	48	40.2	1.00%	143	91	12	7037.93	7033.8	7030.70	7037.78	7033.9	7030.30
P51	J25	J26				25.97	39.5	3.47	48	128.5	1.87%	196	91	15	7037.78	7033.2	7030.30	7036.66	7031.5	7027.90
P68	I31	J26	4.89	21.9	24	4.89	21.9	4.96	30	4.92	6.10%	101	24	17	7036.89	7031.4	7029.70	7036.66	7030.7	7029.40
P52	J26	I32				30.86	39.7	3.46	54	24.3	1.03%	200	108	13	7036.66	7030.8	7027.40	7036.89	7030.9	7027.15
P53	I32	OS4	2.06	22.2	10	32.92	39.7	3.46	54	177.6	0.27%	102	115	7.2	7036.89	7030.9	7027.15	7033.42	7029.8	7026.67
P76	I38	J32	0.65	12.5	4.2	0.65	12.5	6.37	18	90.5	1.16%	11	4.2	5.9	7063.08	7059.3	7058.55	7061.76	7058.4	7057.50
P77	J32	J33				0.65	12.8	6.32	18	347.8	4.61%	23	4.1	9.7	7061.76	7058.3	7057.50	7046.59	7042.8	7041.45
P89	I39	J33	0.70	12.7	4.5	0.70	12.7	6.33	18	25.7	3.70%	20	4.5	9.2	7046.92	7043.2	7042.40	7046.59	7042.7	7041.45
P78	J33	J34				1.35	13.4	6.20	18	151.5	1.95%	15	8.4	8.6	7046.59	7042.6	7041.45	7043.51	7039.8	7038.50
P90	I40	J34	1.67	14.9	10	1.67	14.9	5.93	18	24.0	1.04%	11	10	6.9	7043.24	7040.0	7038.75	7043.51	7039.8	7038.50
P79	J34	J35				3.02	15.0	5.92	24	478.1	3.02%	39	18	12	7043.51	7039.5	7038.00	7028.30	7025.9	7023.55
P80	J35	J36				3.02	15.6	5.81	24	62.2	1.29%	26	18	5.6	7028.30	7025.8	7023.55	7027.76	7025.4	7022.75
P70	I33	J27	3.06	16.9	17	3.06	16.9	5.61	18	52.9	0.76%	9.1	17	9.8	7041.12	7039.3	7036.60	7040.47	7037.9	7036.20
P71	J27	J28				3.06	17.0	5.60	18	244.9	2.35%	16	17	10	7040.47	7037.6	7036.20	7035.51	7031.8	7030.45
P85	I34	J28	2.95	15.4	17	2.95	15.4	5.84	18	25.2	0.99%	11	17	9.8	7035.22	7032.8	7030.70	7035.51	7032.1	7030.45
P72	J28	J29				6.01	17.4	5.54	30	175.0	1.91%	57	34	12	7035.51	7031.4	7029.45	7032.24	7030.2	7026.10
P86	I35	J29	2.35	15.8	14	2.35	15.8	5.78	24	45.2	1.00%	23	14	4.4	7032.09	7030.4	7027.05	7032.24	7030.2	7026.60

The pipe routing calcs. indicate 18". So does the Table on the drainage map. Revise accordingly.

PROJECT: **Rolling Hills Ranch Filing 2** Date: 11/3/2020

Label	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)	Elev. Ground (Upstrm) (ft)	Hydraulic Grade Line (Upstrm) (ft)	Invert (Upstrm) (ft)	Elev. Ground (Dnstrm) (ft)	Hydraulic Grade Line (Dnstrm) (ft)	Invert (Dnstrm) (ft)
P73	J29	J30				8.36	17.6	5.50	30	178.5	0.70%	34	46	9.4	7032.24	7029.9	7026.10	7030.40	7027.6	7024.85
P87	I36	J30	2.35	17.4	13	2.35	17.4	5.54	18	24.7	1.01%	11	13	7.4	7030.36	7028.9	7026.10	7030.40	7028.5	7025.85
P88	I37	J30	1.30	17.9	7.2	1.30	17.9	5.47	18	4.67	5.35%	24	7.2	4.1	7030.36	7028.5	7026.10	7030.40	7028.5	7025.85
P74	J30	J31				12.01	18.0	5.46	36	43.7	1.03%	68	66	9.3	7030.40	7027.5	7024.35	7030.41	7027.0	7023.90
P75	J31	J36				12.01	18.0	5.45	42	272.0	0.79%	89	66	10	7030.41	7026.4	7023.40	7027.76	7025.4	7021.25
P91	I41	J36	2.64	20.4	14	2.64	20.4	5.14	24	24.2	1.03%	23	14	7.6	7027.99	7024.3	7023.00	7027.76	7024.4	7022.75
P81	J36	J37				17.67	20.5	5.13	42	315.8	1.03%	102	91	12	7027.76	7024.2	7021.25	7024.27	7020.6	7018.00
P92	I42	J37	3.59	19.8	19	3.59	19.8	5.21	24	106.0	1.04%	23	19	8.2	7026.54	7022.3	7020.60	7024.27	7021.7	7019.50
P82	J37	J38				21.26	20.9	5.08	48	201.2	1.22%	159	109	14	7024.27	7020.7	7017.50	7022.16	7017.5	7015.05
P93	CB3	J38	5.69	45.6	18	5.69	45.6	3.11	24	112.2	1.52%	28	18	9.4	7022.00	7020.3	7018.75	7022.16	7018.2	7017.05
P94	I43	J38	1.59	24.7	7.5	1.59	24.7	4.65	18	13.2	1.14%	11	7.5	6.8	7022.21	7018.8	7017.70	7022.16	7018.5	7017.55
P83	J38	EJ01				28.54	45.8	3.10	54	226.9	2.39%	304	89	17	7022.16	7017.3	7014.55	7018.68	7012.9	7009.12

The pipe routing calcs. indicate a 36" pipe. So does the drainage map. Please revise the pipe routing calcs and drainage map so that they are consistent with the hydraulics calculations and CD.

Appendix B - HEC-HMS Data

Input Data
Rolling Hills Ranch Filing 2

BASIN	AREA (acre)	AREA (mi²)	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
HG07	63	0.0984	61.0	28.3
HG08	85	0.1328	61.0	22.9
HG09	114	0.1781	61.0	35.6
HG10	88	0.1375	61.0	61.4
HG11	131	0.2047	61.0	40.4
HG12	83	0.1297	61.0	32.0
HG13	54	0.0844	63.1	21.2
HG14	147	0.2297	61.0	45.1
HG15	164	0.2563	61.0	65.1
HG18	21	0.0328	61.0	14.1
HG19	3	0.0047	61.0	6.1
HG20	1	0.0016	61.0	6.9
HG21	14	0.0219	61.0	13.8

BASIN	AREA (acre)	AREA (mi²)	CURVE NO.	LAG TIME (min)
INTERIM				
OS05	37	0.0578	61.0	15.2
OS06	84	0.1313	61.0	18.7
OS07a	11	0.0170	63.1	13.9
OS07b	10	0.0156	63.1	10.9
OS08	25	0.0397	65.7	15.9
OS09	98	0.1527	65.0	29.5
FG01	34	0.0531	66.4	33.8
FG02	25	0.0391	64.4	16.1
FG03	13	0.0203	68.0	11.6
FG04	11	0.0172	68.0	7.6
FG05	37	0.0580	70.1	28.7
FG06	43	0.0677	66.1	21.2
FG08A	48	0.0750	76.8	13.3
FG08B	40	0.0630	76.7	16.6
FG09	31	0.0484	71.7	20.8
FG10a	52	0.0806	73.2	14.5
FG10b	27	0.0416	71.4	20.0
FG11	40	0.0625	78.2	23.2
FG12	21	0.0328	80.0	16.1
FG13	34	0.0534	66.3	29.6
FG14	64	0.1000	74.6	26.4
FG15	7	0.0103	78.6	15.6
FG16	51	0.0791	78.8	13.0
FG17a	44	0.0694	76.5	14.4
FG17b	14	0.0214	79.9	11.4
FG17c	20	0.0313	65.2	11.8
FG18	41	0.0644	73.5	29.9
FG19	34	0.0527	80.3	15.3
FG19a	5	0.0077	75.2	16.4
FG20	7	0.0109	92.9	10.1
FG21a	6	0.0095	63.2	21.4
FG21b	10	0.0150	72.9	12.7
FG22	89	0.1397	67.9	20.3
FG23a	14	0.0216	68.6	18.7
FG23b	23	0.0359	61.8	21.5
FG23c	5	0.0081	67.0	20.6
FG24	89	0.1394	61.6	32.3
FG25a	37	0.0583	67.0	19.0
FG25b	32	0.0506	72.4	20.9
FG28	4	0.0063	686.3	25.6
FG29	64	0.0997	61.0	19.1
FG30	25	0.0389	61.0	12.0
FG31	59	0.0922	80.0	24.0
FG32	26	0.0402	61.0	13.6

BASIN	AREA (acre)	AREA (mi²)	CURVE NO.	LAG TIME (min)
FUTURE				
OS05	37	0.0578	61.0	15.2
OS06	84	0.1313	61.0	18.7
OS07a	11	0.0170	63.1	13.9
OS07b	10	0.0156	63.1	10.9
OS08	25	0.0397	65.7	15.9
OS09	98	0.1527	65.0	29.5
FG01	34	0.0531	66.4	33.8
FG02	25	0.0391	64.4	16.1
FG03	13	0.0203	68.0	11.6
FG04	11	0.0172	68.0	7.6
FG05	37	0.0580	70.1	28.7
FG06	43	0.0677	66.1	21.2
FG08A	48	0.0750	76.8	13.3
FG08B	40	0.0630	76.7	16.6
FG09	31	0.0484	71.7	20.8
FG10a	52	0.0806	73.2	14.5
FG10b	27	0.0416	71.4	20.0
FG11	40	0.0625	78.2	23.2
FG12	21	0.0328	80.0	16.1
FG13	34	0.0534	66.3	29.6
FG14	64	0.1000	74.6	26.4
FG15	7	0.0103	78.6	15.6
FG16	51	0.0791	78.8	13.0
FG17a	44	0.0694	76.5	14.4
FG17b	14	0.0214	79.9	11.4
FG17c	20	0.0313	65.2	11.8
FG18	41	0.0644	73.5	29.9
FG19	34	0.0527	80.3	15.3
FG19a	5	0.0077	75.2	16.4
FG20	7	0.0109	92.9	10.1
FG21a	6	0.0095	63.2	21.4
FG21b	10	0.0150	72.9	12.7
FG22	89	0.1397	67.9	20.3
FG23a	14	0.0216	68.6	18.0
FG23b	20	0.0305	66.3	16.5
FG23c	8	0.0122	67.3	14.0
FG24	88	0.1369	68.1	26.2
FG25	70	0.1086	74.1	23.8
FG26	55	0.0863	70.7	23.1
FG27	32	0.0500	74.7	23.9
FG28	16	0.0245	66.6	14.0
FG29	64	0.0997	61.0	19.1
FG30	25	0.0389	80.0	10.9
FG31	59	0.0922	80.0	24.0
FG32	26	0.0402	80.0	12.1

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.

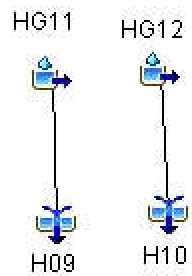
Please refer to NOAA Atlas 14 document for more information.

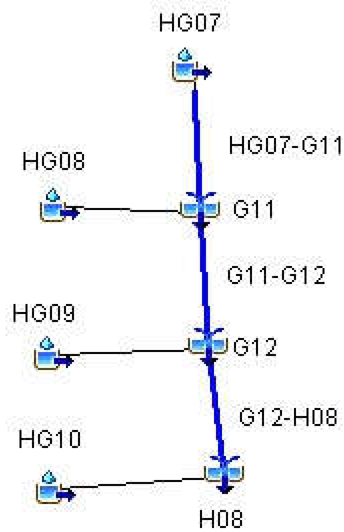
Back to Top

HISTORIC MDDP (100-YEAR)				
HYDROLOGIC ELEMENT	DRAINAGE AREA (SQ. MI.)	DISCHARGE PEAK Q100 (CFS)	TIME OF PEAK	TOTAL VOLUME Q100 (AC. FT.)
OS06	0.1313	81	01Jul2015, 12:12	9.4
OS06-G02	0.1313	79	01Jul2015, 12:24	9.3
OS05	0.0578	40	01Jul2015, 12:12	4.2
OS05-G01	0.0578	38	01Jul2015, 12:12	4.1
HG01	0.0547	33	01Jul2015, 12:12	3.9
G01	0.1125	71	01Jul2015, 12:12	8.0
G01-G02	0.1125	70	01Jul2015, 12:24	7.9
HG02	0.0906	46	01Jul2015, 12:24	6.5
G02	0.3344	194	01Jul2015, 12:24	23.7
G02-G03	0.3344	192	01Jul2015, 12:30	23.4
HG03	0.1828	79	01Jul2015, 12:30	13.1
OS07	0.0328	25	01Jul2015, 12:12	2.6
OS07-G03	0.0328	24	01Jul2015, 12:30	2.5
G03	0.5500	295	01Jul2015, 12:30	38.9
G03-G04	0.5500	286	01Jul2015, 12:30	38.6
OS09	0.1547	92	01Jul2015, 12:24	13.3
OS09-G04	0.1547	91	01Jul2015, 12:30	13.2
HG04	0.0891	40	01Jul2015, 12:30	6.3
HG05	0.1125	50	01Jul2015, 12:30	8.0
OS08	0.0406	36	01Jul2015, 12:12	3.6
OS08-G04	0.0406	34	01Jul2015, 12:30	3.5
G04	0.9469	502	01Jul2015, 12:30	69.6
G04-G05	0.9469	496	01Jul2015, 12:36	69.3
HG06A	0.1375	50	01Jul2015, 12:42	9.7
G05	1.0844	544	01Jul2015, 12:36	79.1
G05-G06	1.0844	530	01Jul2015, 12:36	78.6
HG06B	0.1031	34	01Jul2015, 12:48	7.3
G06	1.1875	561	01Jul2015, 12:36	85.9
HG07	0.0984	47	01Jul2015, 12:24	7.0
HG07-G11	0.0984	47	01Jul2015, 12:30	7.0
HG08	0.1328	73	01Jul2015, 12:18	9.5
G11	0.2312	115	01Jul2015, 12:24	16.5
G11-G12	0.2312	114	01Jul2015, 12:30	16.3
HG09	0.1781	73	01Jul2015, 12:30	12.7
G12	0.4093	187	01Jul2015, 12:30	29.0
G12-H08	0.4093	183	01Jul2015, 12:36	28.3
HG10	0.1375	39	01Jul2015, 13:06	9.6
H08	0.5468	216	01Jul2015, 12:42	38.0
HG14	0.2297	81	01Jul2015, 12:42	16.2
HG13	0.0844	55	01Jul2015, 12:18	6.7
G07	0.0844	55	01Jul2015, 12:18	6.7
G07-G08	0.0844	54	01Jul2015, 12:18	6.6
G08	0.3141	119	01Jul2015, 12:30	22.9
HG15	0.2563	70	01Jul2015, 13:06	17.9
H13	0.2563	70	01Jul2015, 13:06	17.9
HG11	0.2047	77	01Jul2015, 12:36	14.5
H09	0.2047	77	01Jul2015, 12:36	14.5
HG12	0.1297	57	01Jul2015, 12:30	9.2
H10	0.1297	57	01Jul2015, 12:30	9.2

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

HISTORIC

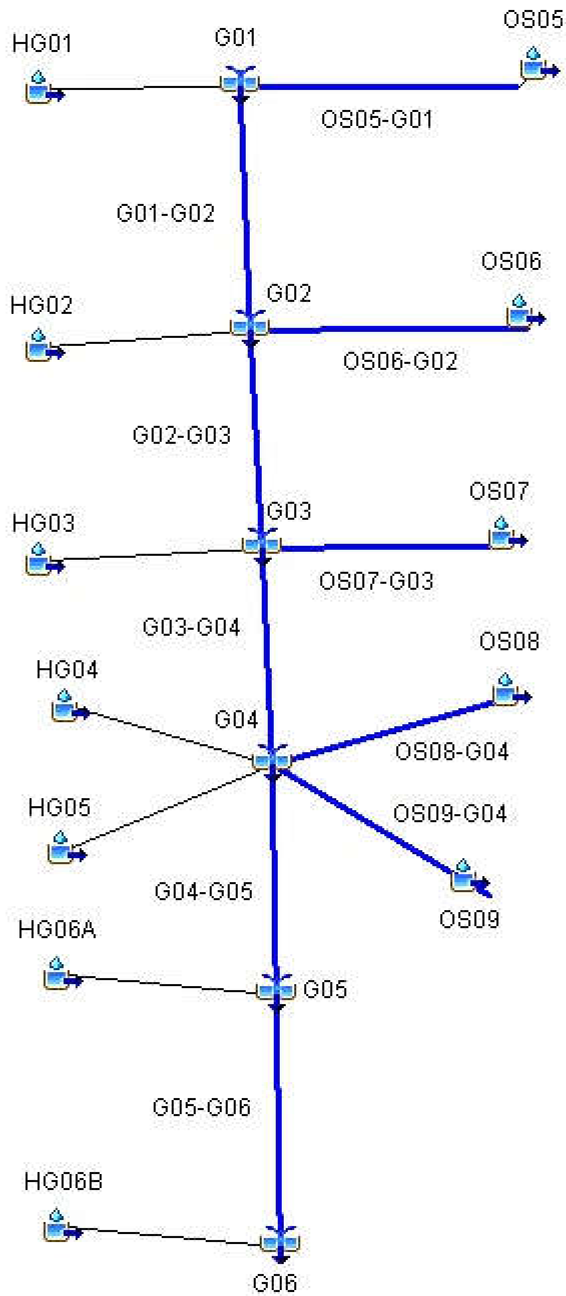

HG11
HG12
H09
H10


HG07
HG07-G11
HG08
G11
G11-G12
HG09
G12
G12-H08
HG10
H08

HISTORIC MDDP (50-YEAR)				
HYDROLOGIC ELEMENT	DRAINAGE AREA (SQ. MI.)	DISCHARGE PEAK Q50 (CFS)	TIME OF PEAK	TOTAL VOLUME Q50 (AC. FT.)
OS06	0.1313	53	01Jul2015, 12:12	6.6
OS06-G02	0.1313	52	01Jul2015, 12:24	6.5
OS05	0.0578	26	01Jul2015, 12:12	2.9
OS05-G01	0.0578	26	01Jul2015, 12:18	2.9
HG01	0.0547	21	01Jul2015, 12:18	2.8
G01	0.1125	47	01Jul2015, 12:18	5.6
G01-G02	0.1125	47	01Jul2015, 12:24	5.5
HG02	0.0906	30	01Jul2015, 12:24	4.5
G02	0.3344	129	01Jul2015, 12:24	16.6
G02-G03	0.3344	127	01Jul2015, 12:30	16.3
HG03	0.1828	51	01Jul2015, 12:30	9.2
OS07	0.0328	17	01Jul2015, 12:12	1.9
OS07-G03	0.0328	17	01Jul2015, 12:30	1.8
G03	0.5500	195	01Jul2015, 12:30	27.3
G03-G04	0.5500	192	01Jul2015, 12:36	27.0
OS09	0.1547	64	01Jul2015, 12:24	9.7
OS09-G04	0.1547	63	01Jul2015, 12:36	9.5
HG04	0.0891	27	01Jul2015, 12:30	4.5
HG05	0.1125	33	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	336	01Jul2015, 12:36	49.1
G04-G05	0.9469	322	01Jul2015, 12:42	48.9
HG06A	0.1375	33	01Jul2015, 12:42	6.8
G05	1.0844	355	01Jul2015, 12:42	55.7
G05-G06	1.0844	353	01Jul2015, 12:42	55.3
HG06B	0.1031	22	01Jul2015, 12:54	5.1
G06	1.1875	375	01Jul2015, 12:42	60.4
HG07	0.0984	31	01Jul2015, 12:24	4.9
HG07-G11	0.0984	31	01Jul2015, 12:30	4.9
HG08	0.1328	48	01Jul2015, 12:18	6.7
G11	0.2312	75	01Jul2015, 12:24	11.6
G11-G12	0.2312	75	01Jul2015, 12:30	11.4
HG09	0.1781	48	01Jul2015, 12:36	8.9
G12	0.4093	122	01Jul2015, 12:30	20.3
G12-H08	0.4093	121	01Jul2015, 12:42	19.8
HG10	0.1375	26	01Jul2015, 13:06	6.7
H08	0.5468	142	01Jul2015, 12:42	26.6
HG14	0.2297	53	01Jul2015, 12:48	11.4
HG13	0.0844	37	01Jul2015, 12:18	4.8
G07	0.0844	37	01Jul2015, 12:18	4.8
G07-G08	0.0844	37	01Jul2015, 12:24	4.7
G08	0.3141	78	01Jul2015, 12:30	16.1
HG15	0.2563	46	01Jul2015, 13:12	12.5
H13	0.2563	46	01Jul2015, 13:12	12.5
HG11	0.2047	51	01Jul2015, 12:42	10.2
H09	0.2047	51	01Jul2015, 12:42	10.2
HG12	0.1297	38	01Jul2015, 12:30	6.5
H10	0.1297	38	01Jul2015, 12:30	6.5

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

GIECK. HISTORIC



HISTORIC MDDP (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	12	01Jul2015, 12:30	2.2
OS05	0.0578	5.9	01Jul2015, 12:12	1.0
OS05-G01	0.0578	5.7	01Jul2015, 12:24	1.0
HG01	0.0547	4.8	01Jul2015, 12:18	0.9
G01	0.1125	10	01Jul2015, 12:18	1.9
G01-G02	0.1125	10	01Jul2015, 12:36	1.8
HG02	0.0906	6.9	01Jul2015, 12:30	1.5
G02	0.3344	28	01Jul2015, 12:30	5.5
G02-G03	0.3344	28	01Jul2015, 12:48	5.4
HG03	0.1828	12	01Jul2015, 12:36	3.1
OS07	0.0328	4.6	01Jul2015, 12:12	0.7
OS07-G03	0.0328	4.4	01Jul2015, 12:42	0.7
G03	0.5500	44	01Jul2015, 12:48	9.1
G03-G04	0.5500	43	01Jul2015, 12:54	9.0
OS09	0.1547	19	01Jul2015, 12:30	3.7
OS09-G04	0.1547	19	01Jul2015, 12:42	3.6
HG04	0.0891	6.1	01Jul2015, 12:36	1.5
HG05	0.1125	7.6	01Jul2015, 12:36	1.9
OS08	0.0406	7.9	01Jul2015, 12:12	1.0
OS08-G04	0.0406	7.6	01Jul2015, 12:48	1.0
G04	0.9469	78	01Jul2015, 12:48	17.0
G04-G05	0.9469	78	01Jul2015, 12:54	16.8
HG06A	0.1375	7.8	01Jul2015, 12:54	2.3
G05	1.0844	86	01Jul2015, 12:54	19.1
G05-G06	1.0844	86	01Jul2015, 13:00	18.9
HG06B	0.1031	5.4	01Jul2015, 13:00	1.7
G06	1.1875	91	01Jul2015, 13:00	20.6
HG07	0.0984	7.1	01Jul2015, 12:30	1.6
HG07-G11	0.0984	7.0	01Jul2015, 12:36	1.6
HG08	0.1328	11	01Jul2015, 12:24	2.2
G11	0.2312	17	01Jul2015, 12:30	3.9
G11-G12	0.2312	17	01Jul2015, 12:42	3.8
HG09	0.1781	11	01Jul2015, 12:42	3.0
G12	0.4093	28	01Jul2015, 12:42	6.8
G12-H08	0.4093	28	01Jul2015, 13:00	6.5
HG10	0.1375	6.5	01Jul2015, 13:18	2.2
H08	0.5468	34	01Jul2015, 13:00	8.8
HG14	0.2297	13	01Jul2015, 12:54	3.8
HG13	0.0844	9.8	01Jul2015, 12:18	1.7
G07	0.0844	9.8	01Jul2015, 12:18	1.7
G07-G08	0.0844	9.7	01Jul2015, 12:30	1.7
G08	0.3141	20	01Jul2015, 12:36	5.5
HG15	0.2563	12	01Jul2015, 13:24	4.2
H13	0.2563	12	01Jul2015, 13:24	4.2
HG11	0.2047	12	01Jul2015, 12:48	3.4
H09	0.2047	12	01Jul2015, 12:48	3.4
HG12	0.1297	8.7	01Jul2015, 12:36	2.2
H10	0.1297	8.7	01Jul2015, 12:36	2.2

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

HISTORIC MDDP (5-YEAR)				
HYDROLOGIC ELEMENT	DRAINAGE AREA (SQ. MI.)	DISCHARGE PEAK Q5 (CFS)	TIME OF PEAK	TOTAL VOLUME Q5 (AC. FT.)
OS06	0.1313	3.9	01Jul2015, 12:24	1.1
OS06-G02	0.1313	3.8	01Jul2015, 12:42	1.1
OS05	0.0578	1.8	01Jul2015, 12:18	0.5
OS05-G01	0.0578	1.8	01Jul2015, 12:30	0.5
HG01	0.0547	1.6	01Jul2015, 12:24	0.5
G01	0.1125	3.3	01Jul2015, 12:30	1.0
G01-G02	0.1125	3.3	01Jul2015, 12:42	0.9
HG02	0.0906	2.4	01Jul2015, 12:36	0.8
G02	0.3344	9.4	01Jul2015, 12:42	2.8
G02-G03	0.3344	9.3	01Jul2015, 13:00	2.7
HG03	0.1828	4.4	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	4.7
G03-G04	0.5500	15	01Jul2015, 13:12	4.5
OS09	0.1547	8.5	01Jul2015, 12:36	2.1
OS09-G04	0.1547	8.5	01Jul2015, 12:48	2.0
HG04	0.0891	2.2	01Jul2015, 12:42	0.8
HG05	0.1125	2.7	01Jul2015, 12:42	1.0
OS08	0.0406	3.5	01Jul2015, 12:12	0.6
OS08-G04	0.0406	3.5	01Jul2015, 13:00	0.6
G04	0.9469	28	01Jul2015, 13:12	8.9
G04-G05	0.9469	28	01Jul2015, 13:18	8.8
HG06A	0.1375	2.9	01Jul2015, 13:00	1.2
G05	1.0844	31	01Jul2015, 13:18	9.9
G05-G06	1.0844	31	01Jul2015, 13:24	9.8
HG06B	0.1031	2.1	01Jul2015, 13:12	0.9
G06	1.1875	33	01Jul2015, 13:24	10.6
HG07	0.0984	2.4	01Jul2015, 12:42	0.8
HG07-G11	0.0984	2.4	01Jul2015, 12:48	0.8
HG08	0.1328	3.6	01Jul2015, 12:30	1.1
G11	0.2312	5.7	01Jul2015, 12:42	2.0
G11-G12	0.2312	5.6	01Jul2015, 12:54	1.9
HG09	0.1781	4.1	01Jul2015, 12:48	1.5
G12	0.4093	9.7	01Jul2015, 12:54	3.4
G12-H08	0.4093	9.7	01Jul2015, 13:18	3.3
HG10	0.1375	2.6	01Jul2015, 13:30	1.1
H08	0.5468	12	01Jul2015, 13:18	4.4
HG14	0.2297	4.8	01Jul2015, 13:06	1.9
HG13	0.0844	3.9	01Jul2015, 12:24	0.9
G07	0.0844	3.9	01Jul2015, 12:24	0.9
G07-G08	0.0844	3.8	01Jul2015, 12:36	0.9
G08	0.3141	7.6	01Jul2015, 12:54	2.8
HG15	0.2563	4.7	01Jul2015, 13:36	2.1
H13	0.2563	4.7	01Jul2015, 13:36	2.1
HG11	0.2047	4.5	01Jul2015, 13:00	1.7
H09	0.2047	4.5	01Jul2015, 13:00	1.7
HG12	0.1297	3.1	01Jul2015, 12:42	1.1
H10	0.1297	3.1	01Jul2015, 12:42	1.1

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

HISTORIC MDDP (2-YEAR)				
HYDROLOGIC ELEMENT	DRAINAGE AREA (SQ. MI.)	DISCHARGE PEAK Q2 (CFS)	TIME OF PEAK	TOTAL VOLUME Q2 (AC. FT.)
OS06	0.1313	0.5	01Jul2015, 13:30	0.4
OS06-G02	0.1313	0.5	01Jul2015, 14:00	0.3
OS05	0.0578	0.2	01Jul2015, 13:18	0.2
OS05-G01	0.0578	0.2	01Jul2015, 13:36	0.2
HG01	0.0547	0.2	01Jul2015, 13:30	0.1
G01	0.1125	0.5	01Jul2015, 13:36	0.3
G01-G02	0.1125	0.5	01Jul2015, 14:00	0.3
HG02	0.0906	0.4	01Jul2015, 13:42	0.2
G02	0.3344	1.4	01Jul2015, 13:54	0.9
G02-G03	0.3344	1.4	01Jul2015, 14:30	0.8
HG03	0.1828	0.8	01Jul2015, 13:48	0.5
OS07	0.0328	0.3	01Jul2015, 12:54	0.1
OS07-G03	0.0328	0.3	01Jul2015, 14:12	0.1
G03	0.5500	2.4	01Jul2015, 14:18	1.4
G03-G04	0.5500	2.4	01Jul2015, 14:36	1.3
OS09	0.1547	2.0	01Jul2015, 12:54	0.8
OS09-G04	0.1547	2.0	01Jul2015, 13:18	0.8
HG04	0.0891	0.4	01Jul2015, 13:48	0.2
HG05	0.1125	0.5	01Jul2015, 13:48	0.3
OS08	0.0406	0.8	01Jul2015, 12:24	0.2
OS08-G04	0.0406	0.8	01Jul2015, 13:36	0.2
G04	0.9469	4.9	01Jul2015, 14:30	2.9
G04-G05	0.9469	4.9	01Jul2015, 14:42	2.8
HG06A	0.1375	0.5	01Jul2015, 14:12	0.4
G05	1.0844	5.4	01Jul2015, 14:42	3.2
G05-G06	1.0844	5.4	01Jul2015, 14:54	3.1
HG06B	0.1031	0.4	01Jul2015, 14:24	0.3
G06	1.1875	5.8	01Jul2015, 14:54	3.4
HG07	0.0984	0.4	01Jul2015, 13:42	0.3
HG07-G11	0.0984	0.4	01Jul2015, 14:00	0.3
HG08	0.1328	0.5	01Jul2015, 13:36	0.4
G11	0.2312	0.9	01Jul2015, 13:48	0.6
G11-G12	0.2312	0.9	01Jul2015, 14:12	0.6
HG09	0.1781	0.7	01Jul2015, 13:54	0.5
G12	0.4093	1.6	01Jul2015, 14:06	1.0
G12-H08	0.4093	1.6	01Jul2015, 14:54	0.9
HG10	0.1375	0.5	01Jul2015, 14:42	0.3
H08	0.5468	2.1	01Jul2015, 14:48	1.3
HG14	0.2297	0.9	01Jul2015, 14:18	0.6
HG13	0.0844	0.7	01Jul2015, 13:00	0.3
G07	0.0844	0.7	01Jul2015, 13:00	0.3
G07-G08	0.0844	0.7	01Jul2015, 13:18	0.3
G08	0.3141	1.5	01Jul2015, 13:54	0.9
HG15	0.2563	0.9	01Jul2015, 14:48	0.6
H13	0.2563	0.9	01Jul2015, 14:48	0.6
HG11	0.2047	0.8	01Jul2015, 14:06	0.5
H09	0.2047	0.8	01Jul2015, 14:06	0.5
HG12	0.1297	0.5	01Jul2015, 13:48	0.3
H10	0.1297	0.5	01Jul2015, 13:48	0.3

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

INTERIM MDDP (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	0.0531	31	01Jul2015, 12:30	4.8
FG01-G1	0.0531	31	01Jul2015, 12:30	4.8
G1	0.1109	61	01Jul2015, 12:18	8.9
G1-G2	0.1109	60	01Jul2015, 12:18	8.9
FG02	0.0391	32	01Jul2015, 12:12	3.3
G2	0.2813	166	01Jul2015, 12:18	21.4
G2-G3	0.2813	163	01Jul2015, 12:18	21.2
FG03	0.0203	24	01Jul2015, 12:06	2.0
FG04	0.0172	22	01Jul2015, 12:00	1.7
G3	0.3188	184	01Jul2015, 12:18	24.9
G3-POND F	0.3188	183	01Jul2015, 12:18	24.9
FG06	0.0677	51	01Jul2015, 12:18	6.1
FG05	0.0580	45	01Jul2015, 12:24	6.1
OS07a	0.0170	14	01Jul2015, 12:06	1.3
OS07a-POND F	0.0170	13	01Jul2015, 12:18	1.3
POND F IN	0.4615	291	01Jul2015, 12:18	38.4
POND F	0.4615	178	01Jul2015, 12:42	36.0
POND F-G7	0.4615	177	01Jul2015, 12:42	35.7
OS07b	0.0156	15	01Jul2015, 12:06	1.2
OS07b-G4	0.0156	14	01Jul2015, 12:12	1.2
FG21a	0.0095	6	01Jul2015, 12:18	0.8
G4	0.0251	20	01Jul2015, 12:12	2.0
G4-G7	0.0251	20	01Jul2015, 12:18	1.9
FG21b	0.0150	21	01Jul2015, 12:06	1.8
G7	0.5016	190	01Jul2015, 12:42	39.5
G7-G8	0.5016	190	01Jul2015, 12:48	39.1
FG22	0.1397	119	01Jul2015, 12:12	13.6
OS08	0.0397	35	01Jul2015, 12:12	3.5
OS08-G8	0.0397	34	01Jul2015, 12:12	3.5
FG23a	0.0177	18	01Jul2015, 12:12	1.9
G8	0.6987	261	01Jul2015, 12:36	58.1
G8-G10	0.6987	260	01Jul2015, 12:42	57.5
OS09	0.1527	90	01Jul2015, 12:24	13.0
OS09-G9	0.1527	88	01Jul2015, 12:36	12.8
FG24	0.1394	63	01Jul2015, 12:30	10.1
G9	0.2921	150	01Jul2015, 12:30	22.9
G9-G10	0.2921	149	01Jul2015, 12:36	22.8
FG23b	0.0359	21	01Jul2015, 12:18	2.6
G10	1.0267	413	01Jul2015, 12:42	82.9
G10-G11	1.0267	413	01Jul2015, 12:42	82.8
FG23c	0.0081	6	01Jul2015, 12:12	0.8
G11	1.0348	415	01Jul2015, 12:42	83.5
FG28	0.0673	38	01Jul2015, 12:18	5.2
FG25a	0.0583	50	01Jul2015, 12:12	5.5

INTERIM MDDP (100-YEAR)				
HYDROLOGIC ELEMENT	DRAINAGE AREA (SQ. MI.)	PEAK DISCHARGE Q100 (CFS)	TIME OF PEAK	TOTAL VOLUME Q100 (AC. FT.)
FG25a-POND G	0.0583	48	01Jul2015, 12:18	5.5
FG25b	0.0506	52	01Jul2015, 12:12	5.9
POND G IN	1.2110	491	01Jul2015, 12:36	100.1
POND G	1.2110	369	01Jul2015, 13:06	90.8
G12	1.2110	369	01Jul2015, 13:06	90.8
G12-G06	1.2110	368	01Jul2015, 13:06	90.2
FG29	0.0997	60	01Jul2015, 12:12	7.1
FG32	0.0402	29	01Jul2015, 12:06	2.9
FG32-G06	0.0402	28	01Jul2015, 12:12	2.8
G06	1.3509	388	01Jul2015, 13:06	100.1
FG10A	0.0806	103	01Jul2015, 12:06	9.7
FG08A	0.0750	116	01Jul2015, 12:06	10.2
FG08A-G05	0.0750	110	01Jul2015, 12:12	10.2
FG08B	0.0630	86	01Jul2015, 12:12	8.5
FG08B-G05	0.0630	84	01Jul2015, 12:12	8.5
FG11	0.0625	75	01Jul2015, 12:18	8.9
FG09	0.0484	48	01Jul2015, 12:12	5.5
FG09-G05	0.0484	48	01Jul2015, 12:18	5.5
FG10B	0.0416	42	01Jul2015, 12:12	4.7
G05	0.3711	455	01Jul2015, 12:12	47.3
FG13	0.0534	34	01Jul2015, 12:24	4.8
FG12	0.0328	50	01Jul2015, 12:12	5.0
POND D IN	0.4573	531	01Jul2015, 12:12	57.1
POND D	0.4573	134	01Jul2015, 12:54	46.3
POND D-G17	0.4573	133	01Jul2015, 13:00	46.3
FG15	0.0103	15	01Jul2015, 12:06	1.5
FG15-G17A	0.0103	15	01Jul2015, 12:12	1.5
G17A	0.4676	136	01Jul2015, 12:54	47.8
FG14	0.1000	98	01Jul2015, 12:18	12.5
G17	0.5676	201	01Jul2015, 12:30	60.3
G17-G18	0.5676	199	01Jul2015, 12:30	60.3
FG16	0.0791	133	01Jul2015, 12:06	11.5
G18	0.6467	247	01Jul2015, 12:24	71.8
G18-POND E	0.6467	247	01Jul2015, 12:24	71.7
FG31	0.0922	116	01Jul2015, 12:18	13.9
FG30	0.0389	30	01Jul2015, 12:06	2.8
FG30-PONDHS	0.0389	28	01Jul2015, 12:18	2.7
POND HS	0.1311	112	01Jul2015, 12:30	16.6
FG17a	0.0694	101	01Jul2015, 12:06	9.4
FG17a-POND E	0.0694	99	01Jul2015, 12:06	9.4
FG18	0.0644	56	01Jul2015, 12:24	7.8
FG18-POND E	0.0644	56	01Jul2015, 12:24	7.8
FG19	0.0527	84	01Jul2015, 12:06	8.1
FG17c	0.0313	31	01Jul2015, 12:06	2.7
FG17b	0.0214	39	01Jul2015, 12:06	3.2
POND E IN	1.0170	556	01Jul2015, 12:12	119.4
POND E	1.0170	231	01Jul2015, 13:36	94.6
H08	1.0170	198	01Jul2015, 13:36	82.9
H09	0.0000	33	01Jul2015, 13:36	11.7

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

INTERIM MDDP (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	0.0531	22	01Jul2015, 12:30	3.5
FG01-G1	0.0531	22	01Jul2015, 12:30	3.5
G1	0.1109	41	01Jul2015, 12:18	6.4
G1-G2	0.1109	41	01Jul2015, 12:18	6.4
FG02	0.0391	22	01Jul2015, 12:12	2.4
G2	0.2813	112	01Jul2015, 12:18	15.2
G2-G3	0.2813	108	01Jul2015, 12:24	15.1
FG03	0.0203	17	01Jul2015, 12:06	1.5
FG04	0.0172	16	01Jul2015, 12:00	1.3
G3	0.3188	123	01Jul2015, 12:18	17.8
G3-POND F	0.3188	121	01Jul2015, 12:18	17.8
FG06	0.0677	36	01Jul2015, 12:18	4.5
FG05	0.0580	33	01Jul2015, 12:24	4.6
OS07a	0.0170	9	01Jul2015, 12:12	1.0
OS07a-POND F	0.0170	9	01Jul2015, 12:18	0.9
POND F IN	0.4615	198	01Jul2015, 12:18	27.8
POND F	0.4615	121	01Jul2015, 12:42	25.8
POND F-G7	0.4615	120.6	01Jul2015, 12:48	25.6
OS07b	0.0156	10	01Jul2015, 12:06	0.9
OS07b-G4	0.0156	10	01Jul2015, 12:12	0.9
FG21a	0.0095	4	01Jul2015, 12:18	0.5
G4	0.0251	14	01Jul2015, 12:12	1.4
G4-G7	0.0251	13	01Jul2015, 12:24	1.4
FG21b	0.0150	15	01Jul2015, 12:06	1.4
G7	0.5016	129	01Jul2015, 12:48	28.3
G7-G8	0.5016	129	01Jul2015, 12:54	28.0
FG22	0.1397	85	01Jul2015, 12:12	10.0
OS08	0.0397	24	01Jul2015, 12:12	2.6
OS08-G8	0.0397	23	01Jul2015, 12:12	2.6
FG23a	0.0177	13	01Jul2015, 12:12	1.4
G8	0.6987	170	01Jul2015, 12:48	42.1
G8-G10	0.6987	169.6	01Jul2015, 12:54	41.5
OS09	0.1527	62	01Jul2015, 12:24	9.4
OS09-G9	0.1527	62	01Jul2015, 12:36	9.3
FG24	0.1394	42	01Jul2015, 12:30	7.1
G9	0.2921	102	01Jul2015, 12:36	16.4
G9-G10	0.2921	101	01Jul2015, 12:36	16.3
FG23b	0.0359	14	01Jul2015, 12:18	1.9
G10	1.0267	261	01Jul2015, 12:48	59.7
G10-G11	1.0267	257	01Jul2015, 12:54	59.6
FG23c	0.0081	5	01Jul2015, 12:18	0.6
G11	1.0348	259	01Jul2015, 12:54	60.1
FG28	0.0673	26	01Jul2015, 12:24	3.7
FG25a	0.0583	35	01Jul2015, 12:12	4.0

INTERIM MDDP (50-YEAR)				
HYDROLOGIC ELEMENT	DRAINAGE AREA (SQ. MI.)	PEAK DISCHARGE Q50 (CFS)	TIME OF PEAK	TOTAL VOLUME Q50 (AC. FT.)
FG25a-POND G	0.0583	34	01Jul2015, 12:18	4.0
FG25b	0.0506	38	01Jul2015, 12:12	4.5
POND G IN	1.2110	309	01Jul2015, 12:30	72.3
POND G	1.2110	218	01Jul2015, 13:18	63.6
G12	1.2110	218	01Jul2015, 13:18	63.6
G12-G06	1.2110	217	01Jul2015, 13:24	63.2
FG29	0.0997	39	01Jul2015, 12:18	5.0
FG32	0.0402	19	01Jul2015, 12:12	2.0
FG32-G06	0.0402	19	01Jul2015, 12:12	2.0
G06	1.3509	228	01Jul2015, 13:24	70.1
FG10A	0.0806	77	01Jul2015, 12:06	7.4
FG08A	0.0750	90	01Jul2015, 12:06	7.9
FG08A-G05	0.0750	86	01Jul2015, 12:12	7.9
FG08B	0.0630	67	01Jul2015, 12:12	6.6
FG08B-G05	0.0630	65	01Jul2015, 12:12	6.6
FG11	0.0625	59	01Jul2015, 12:18	7.0
FG09	0.0484	36	01Jul2015, 12:12	4.1
FG09-G05	0.0484	36	01Jul2015, 12:18	4.1
FG10B	0.0416	31	01Jul2015, 12:12	3.5
G05	0.3711	347	01Jul2015, 12:12	36.4
FG13	0.0534	24	01Jul2015, 12:24	3.5
FG12	0.0328	40	01Jul2015, 12:12	3.9
POND D IN	0.4573	405	01Jul2015, 12:12	43.9
POND D	0.4573	90	01Jul2015, 13:06	34.2
POND D-G17	0.4573	90	01Jul2015, 13:06	34.2
FG15	0.0103	12	01Jul2015, 12:12	1.2
FG15-G17A	0.0103	12	01Jul2015, 12:12	1.2
G17A	0.4676	92	01Jul2015, 13:06	35.3
FG14	0.1000	74	01Jul2015, 12:18	9.6
G17	0.5676	134	01Jul2015, 12:36	45.0
G17-G18	0.5676	134	01Jul2015, 12:36	44.9
FG16	0.0791	104	01Jul2015, 12:06	9.0
G18	0.6467	179	01Jul2015, 12:12	54.0
G18-POND E	0.6467	177	01Jul2015, 12:12	53.9
FG31	0.0922	92	01Jul2015, 12:18	11.0
FG30	0.0389	20	01Jul2015, 12:06	1.9
FG30-PONDHS	0.0389	19	01Jul2015, 12:18	1.9
POND HS	0.1311	63	01Jul2015, 12:36	12.9
FG17a	0.0694	78	01Jul2015, 12:06	7.3
FG17a-POND E	0.0694	76	01Jul2015, 12:06	7.3
FG18	0.0644	42	01Jul2015, 12:24	5.9
FG18-POND E	0.0644	42	01Jul2015, 12:24	5.9
FG19	0.0527	66	01Jul2015, 12:06	6.4
FG17c	0.0313	22	01Jul2015, 12:06	2.0
FG17b	0.0214	31	01Jul2015, 12:06	2.6
POND E IN	1.0170	424	01Jul2015, 12:12	90.8
POND E	1.0170	141	01Jul2015, 14:06	66.9
H08	1.0170	127	01Jul2015, 14:06	58.8
H09	0.0000	14	01Jul2015, 14:06	8.1

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

INTERIM MDDP (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	6	01Jul2015, 12:12	1.0
OS05-G1	0.0578	6	01Jul2015, 12:18	1.0
FG01	0.0531	7	01Jul2015, 12:36	1.4
FG01-G1	0.0531	7	01Jul2015, 12:36	1.4
G1	0.1109	11	01Jul2015, 12:24	2.3
G1-G2	0.1109	11	01Jul2015, 12:30	2.3
FG02	0.0391	6	01Jul2015, 12:12	0.9
G2	0.2813	27	01Jul2015, 12:24	5.3
G2-G3	0.2813	27	01Jul2015, 12:30	5.3
FG03	0.0203	6	01Jul2015, 12:06	0.6
FG04	0.0172	6	01Jul2015, 12:06	0.5
G3	0.3188	31	01Jul2015, 12:30	6.4
G3-POND F	0.3188	31	01Jul2015, 12:30	6.4
FG06	0.0677	11	01Jul2015, 12:18	1.7
FG05	0.0580	12	01Jul2015, 12:24	2.0
OS07a	0.0170	2	01Jul2015, 12:12	0.3
OS07a-POND F	0.0170	2	01Jul2015, 12:24	0.3
POND F IN	0.4615	54	01Jul2015, 12:30	10.4
POND F	0.4615	16	01Jul2015, 13:48	9.1
POND F-G7	0.4615	16	01Jul2015, 14:00	9.0
OS07b	0.0156	2.6	01Jul2015, 12:06	0.3
OS07b-G4	0.0156	2	01Jul2015, 12:18	0.3
FG21a	0.0095	1	01Jul2015, 12:18	0.2
G4	0.0251	3.6	01Jul2015, 12:18	0.5
G4-G7	0.0251	3	01Jul2015, 12:30	0.5
FG21b	0.0150	6	01Jul2015, 12:06	0.6
G7	0.5016	18	01Jul2015, 13:42	10.1
G7-G8	0.5016	18	01Jul2015, 13:48	9.9
FG22	0.1397	29	01Jul2015, 12:18	4.1
OS08	0.0397	7.5	01Jul2015, 12:12	1.0
OS08-G8	0.0397	7.3	01Jul2015, 12:18	1.0
FG23a	0.0177	5	01Jul2015, 12:12	0.6
G8	0.6987	46	01Jul2015, 12:18	15.6
G8-G10	0.6987	45.2	01Jul2015, 12:30	15.2
OS09	0.1527	18	01Jul2015, 12:30	3.5
OS09-G9	0.1527	18	01Jul2015, 12:42	3.5
FG24	0.1394	9.9	01Jul2015, 12:36	2.4
G9	0.2921	28	01Jul2015, 12:42	5.9
G9-G10	0.2921	28	01Jul2015, 12:48	5.8
FG23b	0.0359	3	01Jul2015, 12:24	0.6
G10	1.0267	65	01Jul2015, 12:36	21.6
G10-G11	1.0267	64.5	01Jul2015, 12:42	21.5
FG23c	0.0081	2	01Jul2015, 12:18	0.2
G11	1.0348	65	01Jul2015, 12:42	21.8
FG28	0.0673	7	01Jul2015, 12:24	1.3
FG25a	0.0583	12	01Jul2015, 12:18	1.6

INTERIM MDDP (10-YEAR)				
HYDROLOGIC ELEMENT	DRAINAGE AREA (SQ. MI.)	PEAK DISCHARGE Q10 (CFS)	TIME OF PEAK	TOTAL VOLUME Q10 (AC. FT.)
FG25a-POND G	0.0583	11	01Jul2015, 12:18	1.6
FG25b	0.0506	16	01Jul2015, 12:18	2.0
POND G IN	1.2110	87	01Jul2015, 12:36	26.7
POND G	1.2110	32	01Jul2015, 15:12	19.5
G12	1.2110	32	01Jul2015, 15:12	19.5
G12-G06	1.2110	32	01Jul2015, 15:24	19.3
FG29	0.0997	9	01Jul2015, 12:18	1.6
FG32	0.0402	4	01Jul2015, 12:12	0.7
FG32-G06	0.0402	4	01Jul2015, 12:18	0.7
G06	1.3509	33.9	01Jul2015, 15:18	21.6
FG10A	0.0806	32	01Jul2015, 12:12	3.3
FG08A	0.0750	41	01Jul2015, 12:06	3.8
FG08A-G05	0.0750	41	01Jul2015, 12:12	3.8
FG08B	0.0630	31	01Jul2015, 12:12	3.2
FG08B-G05	0.0630	29.5	01Jul2015, 12:18	3.2
FG11	0.0625	28.1	01Jul2015, 12:18	3.4
FG09	0.0484	14	01Jul2015, 12:18	1.8
FG09-G05	0.0484	14	01Jul2015, 12:18	1.8
FG10B	0.0416	12	01Jul2015, 12:18	1.5
G05	0.3711	153	01Jul2015, 12:12	17.1
FG13	0.0534	7	01Jul2015, 12:30	1.4
FG12	0.0328	20	01Jul2015, 12:12	2.0
POND D IN	0.4573	177	01Jul2015, 12:12	20.5
POND D	0.4573	18	01Jul2015, 14:24	13.9
POND D-G17	0.4573	18	01Jul2015, 14:30	13.9
FG15	0.0103	6	01Jul2015, 12:12	0.6
FG15-G17A	0.0103	6	01Jul2015, 12:12	0.6
G17A	0.4676	18	01Jul2015, 14:18	14.4
FG14	0.1000	32	01Jul2015, 12:24	4.5
G17	0.5676	42	01Jul2015, 12:24	18.9
G17-G18	0.5676	42	01Jul2015, 12:30	18.9
FG16	0.0791	50	01Jul2015, 12:06	4.5
G18	0.6467	78.4	01Jul2015, 12:12	23.4
G18-POND E	0.6467	77	01Jul2015, 12:12	23.4
FG31	0.0922	45	01Jul2015, 12:18	5.6
FG30	0.0389	4	01Jul2015, 12:12	0.7
FG30-PONDHS	0.0389	4	01Jul2015, 12:24	0.6
POND HS	0.1311	28	01Jul2015, 12:42	6.2
FG17a	0.0694	35	01Jul2015, 12:06	3.5
FG17a-POND E	0.0694	35	01Jul2015, 12:12	3.5
FG18	0.0644	18	01Jul2015, 12:24	2.7
FG18-POND E	0.0644	17	01Jul2015, 12:30	2.7
FG19	0.0527	33	01Jul2015, 12:12	3.3
FG17c	0.0313	7	01Jul2015, 12:06	0.8
FG17b	0.0214	16	01Jul2015, 12:06	1.3
POND E IN	1.0170	189.7	01Jul2015, 12:12	41.1
POND E	1.0170	26	01Jul2015, 18:24	20.7
H08	1.0170	20	01Jul2015, 18:24	16.0
H09	0.0000	6	01Jul2015, 18:24	4.7

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

INTERIM MDDP (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	3.6	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	0.0531	3.3	01Jul2015, 12:36	0.8
FG01-G1	0.0531	3.3	01Jul2015, 12:36	0.8
G1	0.1109	4.8	01Jul2015, 12:36	1.3
G1-G2	0.1109	4.8	01Jul2015, 12:36	1.3
FG02	0.0391	2.6	01Jul2015, 12:18	0.5
G2	0.2813	10	01Jul2015, 12:30	2.9
G2-G3	0.2813	10	01Jul2015, 12:42	2.8
FG03	0.0203	3.0	01Jul2015, 12:06	0.4
FG04	0.0172	3.1	01Jul2015, 12:06	0.3
G3	0.3188	12	01Jul2015, 12:36	3.5
G3-POND F	0.3188	12	01Jul2015, 12:42	3.5
FG06	0.0677	5.3	01Jul2015, 12:24	1.0
FG05	0.0580	6.7	01Jul2015, 12:30	1.2
OS07a	0.0170	0.9	01Jul2015, 12:12	0.2
OS07a-POND F	0.0170	0.9	01Jul2015, 12:36	0.2
POND F IN	0.4615	23.1	01Jul2015, 12:36	5.9
POND F	0.4615	8.1	01Jul2015, 14:18	4.8
POND F-G7	0.4615	8.1	01Jul2015, 14:24	4.8
OS07b	0.0156	1.0	01Jul2015, 12:12	0.2
OS07b-G4	0.0156	0.9	01Jul2015, 12:24	0.2
FG21a	0.0095	0.4	01Jul2015, 12:24	0.1
G4	0.0251	1.4	01Jul2015, 12:24	0.3
G4-G7	0.0251	1.3	01Jul2015, 12:36	0.3
FG21b	0.0150	3.8	01Jul2015, 12:06	0.4
G7	0.5016	8.8	01Jul2015, 14:18	5.4
G7-G8	0.5016	8.8	01Jul2015, 14:30	5.3
FG22	0.1397	14.9	01Jul2015, 12:18	2.5
OS08	0.0397	3.4	01Jul2015, 12:12	0.6
OS08-G8	0.0397	3.4	01Jul2015, 12:18	0.6
FG23a	0.0177	3	01Jul2015, 12:18	0.4
G8	0.6987	24	01Jul2015, 12:24	8.7
G8-G10	0.6987	23.3	01Jul2015, 12:36	8.5
OS09	0.1527	8	01Jul2015, 12:36	2.0
OS09-G9	0.1527	8	01Jul2015, 12:54	2.0
FG24	0.1394	3.7	01Jul2015, 12:42	1.3
G9	0.2921	12	01Jul2015, 12:48	3.2
G9-G10	0.2921	12	01Jul2015, 13:00	3.2
FG23b	0.0359	1	01Jul2015, 12:30	0.3
G10	1.0267	29	01Jul2015, 12:48	12.0
G10-G11	1.0267	28.8	01Jul2015, 12:48	11.9
FG23c	0.0081	1	01Jul2015, 12:18	0.1
G11	1.0348	29	01Jul2015, 12:48	12.0
FG28	0.0673	3	01Jul2015, 12:30	0.7
FG25a	0.0583	6	01Jul2015, 12:18	1.0

INTERIM MDDP (5-YEAR)				
HYDROLOGIC ELEMENT	DRAINAGE AREA (SQ. MI.)	PEAK DISCHARGE Q5 (CFS)	TIME OF PEAK	TOTAL VOLUME Q5 (AC. FT.)
FG25a-POND G	0.0583	5	01Jul2015, 12:18	0.9
FG25b	0.0506	9	01Jul2015, 12:18	1.3
POND G IN	1.2110	40	01Jul2015, 12:42	15.0
POND G	1.2110	12	01Jul2015, 18:24	8.4
G12	1.2110	12	01Jul2015, 18:24	8.4
G12-G06	1.2110	12	01Jul2015, 18:36	8.2
FG29	0.0997	3	01Jul2015, 12:24	0.9
FG32	0.0402	1	01Jul2015, 12:18	0.3
FG32-G06	0.0402	1	01Jul2015, 12:24	0.3
G06	1.3509	13	01Jul2015, 18:30	9.4
FG10A	0.0806	20	01Jul2015, 12:12	2.2
FG08A	0.0750	27	01Jul2015, 12:06	2.6
FG08A-G05	0.0750	27	01Jul2015, 12:12	2.6
FG08B	0.0630	20	01Jul2015, 12:12	2.2
FG08B-G05	0.0630	19	01Jul2015, 12:18	2.2
FG11	0.0625	19	01Jul2015, 12:18	2.4
FG09	0.0484	8	01Jul2015, 12:18	1.2
FG09-G05	0.0484	8	01Jul2015, 12:24	1.2
FG10B	0.0416	7	01Jul2015, 12:18	1.0
G05	0.3711	95	01Jul2015, 12:12	11.4
FG13	0.0534	4	01Jul2015, 12:30	0.8
FG12	0.0328	14	01Jul2015, 12:12	1.4
POND D IN	0.4573	111	01Jul2015, 12:12	13.6
POND D	0.4573	11	01Jul2015, 14:48	8.2
POND D-G17	0.4573	11	01Jul2015, 14:48	8.2
FG15	0.0103	4	01Jul2015, 12:12	0.4
FG15-G17A	0.0103	4	01Jul2015, 12:12	0.4
G17A	0.4676	11	01Jul2015, 14:42	8.6
FG14	0.1000	20	01Jul2015, 12:24	3.0
G17	0.5676	25	01Jul2015, 12:24	11.6
G17-G18	0.5676	25	01Jul2015, 12:24	11.6
FG16	0.0791	34	01Jul2015, 12:06	3.1
G18	0.6467	50	01Jul2015, 12:12	14.7
G18-POND E	0.6467	50	01Jul2015, 12:12	14.7
FG31	0.0922	31	01Jul2015, 12:18	3.9
FG30	0.0389	1	01Jul2015, 12:12	0.3
FG30-PONDHS	0.0389	1	01Jul2015, 12:36	0.3
POND HS	0.1311	19	01Jul2015, 12:42	4.3
FG17a	0.0694	23	01Jul2015, 12:12	2.4
FG17a-POND E	0.0694	23	01Jul2015, 12:12	2.4
FG18	0.0644	11	01Jul2015, 12:30	1.8
FG18-POND E	0.0644	11	01Jul2015, 12:30	1.8
FG19	0.0527	23	01Jul2015, 12:12	2.3
FG17c	0.0313	3	01Jul2015, 12:12	0.4
FG17b	0.0214	11	01Jul2015, 12:06	0.9
POND E IN	1.0170	122	01Jul2015, 12:12	26.7
POND E	1.0170	13	01Jul2015, 21:54	10.1
H08	1.0170	9	01Jul2015, 21:54	7.1
H09	0.0000	4	01Jul2015, 21:54	3.1

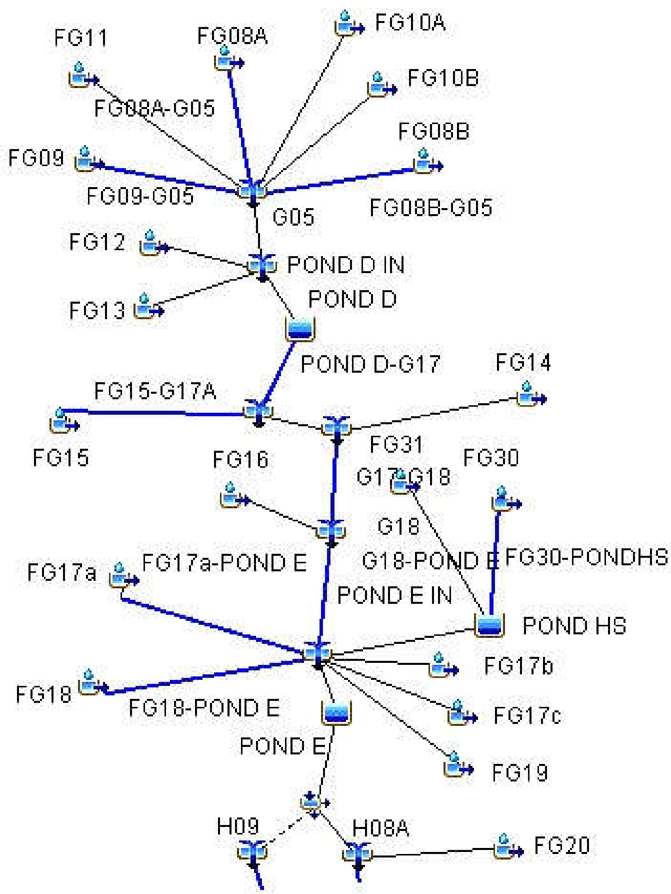
Highlighted green rows reference key design points (Typical all charts this section)

INTERIM MDDP (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	0.3
G1a	0.1313	0.5	01Jul2015, 13:30	0.3
G1a-G2	0.1313	0.5	01Jul2015, 13:48	0.3
OS05	0.0578	0.2	01Jul2015, 13:24	0.2
OS05-G1	0.0578	0.2	01Jul2015, 13:30	0.2
FG01	0.0531	0.9	01Jul2015, 12:48	0.3
FG01-G1	0.0531	0.9	01Jul2015, 12:48	0.3
G1	0.1109	1.1	01Jul2015, 12:54	0.5
G1-G2	0.1109	1.1	01Jul2015, 13:00	0.5
FG02	0.0391	0.5	01Jul2015, 12:36	0.2
G2	0.2813	1.9	01Jul2015, 13:18	1.0
G2-G3	0.2813	1.9	01Jul2015, 13:30	1.0
FG03	0.0203	0.8	01Jul2015, 12:12	0.2
FG04	0.0172	0.9	01Jul2015, 12:06	0.1
G3	0.3188	2.4	01Jul2015, 13:24	1.3
G3-POND F	0.3188	2.4	01Jul2015, 13:30	1.3
FG06	0.0677	1.3	01Jul2015, 12:30	0.4
FG05	0.0580	2.4	01Jul2015, 12:30	0.6
OS07a	0.0170	0.1	01Jul2015, 12:48	0.1
OS07a-POND F	0.0170	0.1	01Jul2015, 13:24	0.1
POND F IN	0.4615	5.0	01Jul2015, 12:54	2.4
POND F	0.4615	2.1	01Jul2015, 17:54	1.6
POND F-G7	0.4615	2.1	01Jul2015, 18:06	1.5
OS07b	0.0156	0.1	01Jul2015, 12:48	0.1
OS07b-G4	0.0156	0.1	01Jul2015, 13:06	0.1
FG21a	0.0095	0.1	01Jul2015, 13:00	0.0
G4	0.0251	0.2	01Jul2015, 13:06	0.1
G4-G7	0.0251	0.2	01Jul2015, 13:30	0.1
FG21b	0.0150	1.6	01Jul2015, 12:12	0.2
G7	0.5016	2.3	01Jul2015, 17:42	1.8
G7-G8	0.5016	2.3	01Jul2015, 18:00	1.7
FG22	0.1397	4.3	01Jul2015, 12:24	1.1
OS08	0.0397	0.7	01Jul2015, 12:24	0.2
OS08-G8	0.0397	0.7	01Jul2015, 12:30	0.2
FG23a	0.0177	1.0	01Jul2015, 12:18	0.2
G8	0.6987	6.9	01Jul2015, 12:30	3.3
G8-G10	0.6987	6.6	01Jul2015, 12:54	3.1
OS09	0.1527	1.9	01Jul2015, 12:54	0.8
OS09-G9	0.1527	1.9	01Jul2015, 13:18	0.8
FG24	0.1394	0.7	01Jul2015, 13:42	0.4
G9	0.2921	2.5	01Jul2015, 13:24	1.2
G9-G10	0.2921	2.5	01Jul2015, 13:36	1.1
FG23b	0.0359	0.2	01Jul2015, 13:18	0.1
G10	1.0267	7.3	01Jul2015, 13:18	4.4
G10-G11	1.0267	7.2	01Jul2015, 13:24	4.3
FG23c	0.0081	0	01Jul2015, 12:24	0.1
G11	1.0348	7	01Jul2015, 13:24	4.4
FG28	0.0673	0	01Jul2015, 13:12	0.3
FG25a	0.0583	1.5	01Jul2015, 12:24	0.4

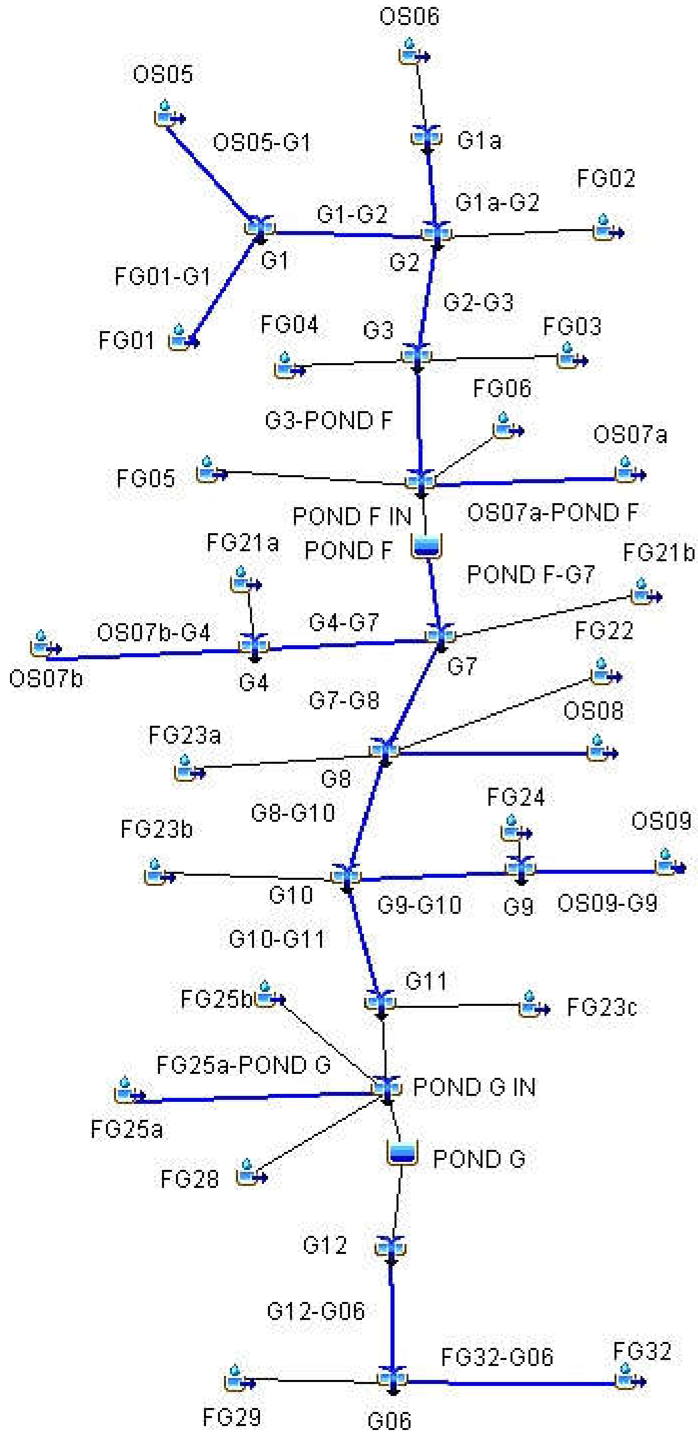
INTERIM MDDP (2-YEAR)				
HYDROLOGIC ELEMENT	DRAINAGE AREA (SQ. MI.)	PEAK DISCHARGE Q2 (CFS)	TIME OF PEAK	TOTAL VOLUME Q2 (AC. FT.)
FG25a-POND G	0.0583	1	01Jul2015, 12:30	0.4
FG25b	0.0506	4	01Jul2015, 12:18	0.7
POND G IN	1.2110	10	01Jul2015, 13:00	5.7
POND G	1.2110	4	02Jul2015, 00:00	2.9
G12	1.2110	4	02Jul2015, 00:00	2.9
G12-G06	1.2110	4	02Jul2015, 00:00	2.8
FG29	0.0997	0	01Jul2015, 13:36	0.3
FG32	0.0402	0	01Jul2015, 13:18	0.1
FG32-G06	0.0402	0	01Jul2015, 13:30	0.1
G06	1.3509	4	01Jul2015, 23:48	3.1
FG10A	0.0806	9	01Jul2015, 12:12	1.2
FG08A	0.0750	13	01Jul2015, 12:12	1.5
FG08A-G05	0.0750	13	01Jul2015, 12:18	1.5
FG08B	0.0630	10	01Jul2015, 12:12	1.2
FG08B-G05	0.0630	10	01Jul2015, 12:18	1.2
FG11	0.0625	10	01Jul2015, 12:18	1.4
FG09	0.0484	3	01Jul2015, 12:18	0.6
FG09-G05	0.0484	3	01Jul2015, 12:24	0.6
FG10B	0.0416	3	01Jul2015, 12:18	0.5
G05	0.3711	46	01Jul2015, 12:18	6.3
FG13	0.0534	1	01Jul2015, 12:42	0.3
FG12	0.0328	8	01Jul2015, 12:12	0.8
POND D IN	0.4573	53	01Jul2015, 12:18	7.5
POND D	0.4573	4	01Jul2015, 19:54	3.0
POND D-G17	0.4573	4	01Jul2015, 19:54	3.0
FG15	0.0103	2	01Jul2015, 12:12	0.2
FG15-G17A	0.0103	2	01Jul2015, 12:12	0.2
G17A	0.4676	4	01Jul2015, 19:48	3.3
FG14	0.1000	9	01Jul2015, 12:24	1.6
G17	0.5676	12	01Jul2015, 12:24	4.9
G17-G18	0.5676	12	01Jul2015, 12:30	4.9
FG16	0.0791	18	01Jul2015, 12:06	1.9
G18	0.6467	25	01Jul2015, 12:12	6.7
G18-POND E	0.6467	25	01Jul2015, 12:12	6.7
FG31	0.0922	17	01Jul2015, 12:18	2.4
FG30	0.0389	0	01Jul2015, 13:18	0.1
FG30-PONDHS	0.0389	0	01Jul2015, 13:48	0.1
POND HS	0.1311	10	01Jul2015, 12:42	2.5
FG17a	0.0694	12	01Jul2015, 12:12	1.3
FG17a-POND E	0.0694	12	01Jul2015, 12:12	1.3
FG18	0.0644	5	01Jul2015, 12:30	0.9
FG18-POND E	0.0644	5	01Jul2015, 12:30	0.9
FG19	0.0527	13	01Jul2015, 12:12	1.4
FG17c	0.0313	1	01Jul2015, 12:18	0.2
FG17b	0.0214	6	01Jul2015, 12:06	0.6
POND E IN	1.0170	63	01Jul2015, 12:12	13.5
POND E	1.0170	6	02Jul2015, 00:00	4.7
H08	1.0170	3	02Jul2015, 00:00	2.8
H09	0.0000	2	02Jul2015, 00:00	1.9

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

INTERIM CONDITIONS
POND D & E NETWORK



INTERIM CONDITIONS
POND F & G NETWORK



FUTURE MDDP (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	0.0531	31	01Jul2015, 12:30	4.8
FG01-G1	0.0531	31	01Jul2015, 12:30	4.8
G1	0.1109	61	01Jul2015, 12:18	8.9
G1-G2	0.1109	60	01Jul2015, 12:18	8.9
FG02	0.0391	32	01Jul2015, 12:12	3.3
G2	0.2813	166	01Jul2015, 12:18	21.4
G2-G3	0.2813	163	01Jul2015, 12:18	21.2
FG03	0.0203	24	01Jul2015, 12:06	2.0
FG04	0.0172	22	01Jul2015, 12:00	1.7
G3	0.3188	184	01Jul2015, 12:18	24.9
G3-POND F	0.3188	183	01Jul2015, 12:18	24.9
FG06	0.0677	51	01Jul2015, 12:18	6.1
FG05	0.0580	45	01Jul2015, 12:24	6.1
OS07a	0.0170	14	01Jul2015, 12:06	1.3
OS07a-POND F	0.0170	13	01Jul2015, 12:18	1.3
POND F IN	0.4615	291	01Jul2015, 12:18	38.4
POND F	0.4615	178	01Jul2015, 12:42	36.0
POND F-G7	0.4615	177	01Jul2015, 12:42	35.7
OS07b-G4	0.0156	14	01Jul2015, 12:12	1.2
FG21a	0.0095	6	01Jul2015, 12:18	0.8
G4	0.0251	20	01Jul2015, 12:12	2.0
G4-G7	0.0251	20	01Jul2015, 12:18	1.9
FG21b	0.0150	21	01Jul2015, 12:06	1.8
G7	0.5016	190	01Jul2015, 12:42	39.5
G7-G8	0.5016	189	01Jul2015, 12:42	39.3
FG22	0.1397	119	01Jul2015, 12:12	13.6
OS08	0.0397	35	01Jul2015, 12:12	3.5
OS08-G8	0.0397	34	01Jul2015, 12:12	3.5
FG23a	0.0216	21	01Jul2015, 12:12	2.2
G8	0.7026	271	01Jul2015, 12:30	58.6
G8-G10	0.7026	271	01Jul2015, 12:36	58.0
OS09	0.1527	90	01Jul2015, 12:24	13.0
OS09-G9	0.1527	88	01Jul2015, 12:36	12.8
FG24	0.1369	101	01Jul2015, 12:18	13.4
G9	0.2896	179	01Jul2015, 12:30	26.2
G9-G10	0.2896	179	01Jul2015, 12:30	26.1
FG23b	0.0305	27	01Jul2015, 12:12	2.8
G10	1.0227	450	01Jul2015, 12:36	86.9
G10-G11	1.0227	450	01Jul2015, 12:36	86.7
FG23c	0.0122	12	01Jul2015, 12:06	1.2
G11	1.0349	453	01Jul2015, 12:36	87.8
FG25	0.1086	112	01Jul2015, 12:18	13.4
FG26	0.0863	78	01Jul2015, 12:18	9.4
FG26-POND G	0.0863	77	01Jul2015, 12:18	9.4

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

FUTURE MDDP (100-YEAR)				
HYDROLOGIC ELEMENT	DRAINAGE AREA (SQ. MI.)	PEAK DISCHARGE Q100 (CFS)	TIME OF PEAK	TOTAL VOLUME Q100 (AC. FT.)
FG27	0.0500	52	01Jul2015, 12:18	6.3
FG28	0.0245	24	01Jul2015, 12:06	2.3
POND G IN	1.3043	653	01Jul2015, 12:24	119.1
POND G	1.3043	465	01Jul2015, 12:54	109.6
G12	1.3043	465	01Jul2015, 12:54	109.6
G12-G06	1.3043	464	01Jul2015, 13:00	108.9
FG29	0.0997	60	01Jul2015, 12:12	7.1
FG32	0.0402	72	01Jul2015, 12:06	6.1
FG32-G06	0.0402	69	01Jul2015, 12:06	6.1
G06	1.4442	493	01Jul2015, 12:54	122.0
FG08A	0.0750	116	01Jul2015, 12:06	10.2
FG08A-G05	0.0750	110	01Jul2015, 12:12	10.2
FG08B	0.0630	86	01Jul2015, 12:12	8.5
FG08B-G05	0.0630	84	01Jul2015, 12:12	8.5
FG09	0.0484	48	01Jul2015, 12:12	5.5
FG09-G05	0.0484	48	01Jul2015, 12:18	5.5
FG10B	0.0416	42	01Jul2015, 12:12	4.7
G05	0.2280	282	01Jul2015, 12:12	28.8
FG10A	0.0806	103	01Jul2015, 12:06	9.7
FG11	0.0625	75	01Jul2015, 12:18	8.9
FG13	0.0534	34	01Jul2015, 12:24	4.8
FG12	0.0328	50	01Jul2015, 12:12	5.0
POND D IN	0.4573	531	01Jul2015, 12:12	57.1
POND D	0.4573	134	01Jul2015, 12:54	46.3
POND D-G17	0.4573	133	01Jul2015, 13:00	46.3
FG15	0.0103	15	01Jul2015, 12:06	1.5
FG15-G17A	0.0103	15	01Jul2015, 12:12	1.5
G17A	0.4676	136	01Jul2015, 12:54	47.8
FG14	0.1000	98	01Jul2015, 12:18	12.5
G17	0.5676	201	01Jul2015, 12:30	60.3
G17-G18	0.5676	199	01Jul2015, 12:30	60.3
FG16	0.0791	133	01Jul2015, 12:06	11.5
G18	0.6467	247	01Jul2015, 12:24	71.8
G18-POND E	0.6467	247	01Jul2015, 12:24	71.7
FG31	0.0922	116	01Jul2015, 12:18	13.9
FG30	0.0389	73	01Jul2015, 12:06	5.9
FG30-PONDHS	0.0389	70	01Jul2015, 12:12	5.8
POND HS	0.1311	153	01Jul2015, 12:24	19.7
FG17a	0.0694	101	01Jul2015, 12:06	9.4
FG17a-POND E	0.0694	99	01Jul2015, 12:06	9.4
FG18	0.0644	56	01Jul2015, 12:24	7.8
FG18-POND E	0.0644	56	01Jul2015, 12:24	7.8
FG19	0.0527	84	01Jul2015, 12:06	8.1
FG17c	0.0313	31	01Jul2015, 12:06	2.7
FG17b	0.0214	39	01Jul2015, 12:06	3.2
POND E IN	1.0170	618	01Jul2015, 12:18	122.5
POND E	1.0170	240	01Jul2015, 13:30	97.7
H08	1.0170	204	01Jul2015, 13:30	85.3
H09	0.0000	36	01Jul2015, 13:30	12.3

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

FUTURE MDDP (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	0.0531	22	01Jul2015, 12:30	3.5
FG01-G1	0.0531	22	01Jul2015, 12:30	3.5
G1	0.1109	41	01Jul2015, 12:18	6.4
G1-G2	0.1109	41	01Jul2015, 12:18	6.4
FG02	0.0391	22	01Jul2015, 12:12	2.4
G2	0.2813	112	01Jul2015, 12:18	15.2
G2-G3	0.2813	108	01Jul2015, 12:24	15.1
FG03	0.0203	17	01Jul2015, 12:06	1.5
FG04	0.0172	16	01Jul2015, 12:00	1.3
G3	0.3188	123	01Jul2015, 12:18	17.8
G3-POND F	0.3188	121	01Jul2015, 12:18	17.8
FG06	0.0677	36	01Jul2015, 12:18	4.5
FG05	0.0580	33	01Jul2015, 12:24	4.6
OS07a	0.0170	9	01Jul2015, 12:12	1.0
OS07a-POND F	0.0170	9	01Jul2015, 12:18	0.9
POND F IN	0.4615	198	01Jul2015, 12:18	27.8
POND F	0.4615	121	01Jul2015, 12:42	25.8
POND F-G7	0.4615	121	01Jul2015, 12:48	25.6
OS07b-G4	0.0156	10	01Jul2015, 12:12	0.9
FG21a	0.0095	4	01Jul2015, 12:18	0.5
G4	0.0251	14	01Jul2015, 12:12	1.4
G4-G7	0.0251	13	01Jul2015, 12:24	1.4
FG21b	0.0150	15	01Jul2015, 12:06	1.4
G7	0.5016	129	01Jul2015, 12:48	28.3
G7-G8	0.5016	128	01Jul2015, 12:48	28.2
FG22	0.1397	85	01Jul2015, 12:12	10.0
OS08	0.0397	24	01Jul2015, 12:12	2.6
OS08-G8	0.0397	23	01Jul2015, 12:12	2.6
FG23a	0.0216	15	01Jul2015, 12:12	1.6
G8	0.7026	175	01Jul2015, 12:42	42.4
G8-G10	0.7026	174	01Jul2015, 12:48	41.9
OS09	0.1527	62	01Jul2015, 12:24	9.4
OS09-G9	0.1527	62	01Jul2015, 12:36	9.3
FG24	0.1369	72	01Jul2015, 12:24	9.9
G9	0.2896	126	01Jul2015, 12:30	19.2
G9-G10	0.2896	125.0	01Jul2015, 12:30	19.1
FG23b	0.0305	19	01Jul2015, 12:12	2.0
G10	1.0227	281	01Jul2015, 12:42	63.1
G10-G11	1.0227	279	01Jul2015, 12:42	62.9
FG23c	0.0122	9	01Jul2015, 12:06	0.9
G11	1.0349	281	01Jul2015, 12:42	63.7
FG25	0.1086	85	01Jul2015, 12:18	10.3
FG26	0.0863	58	01Jul2015, 12:18	7.1
FG26-POND G	0.0863	57	01Jul2015, 12:18	7.0

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

FUTURE MDDP (50-YEAR)				
HYDROLOGIC ELEMENT	DRAINAGE AREA (SQ. MI.)	PEAK DISCHARGE Q50 (CFS)	TIME OF PEAK	TOTAL VOLUME Q50 (AC. FT.)
FG27	0.0500	40	01Jul2015, 12:18	4.8
FG28	0.0245	17	01Jul2015, 12:06	1.7
POND G IN	1.3043	451	01Jul2015, 12:24	87.5
POND G	1.3043	307	01Jul2015, 13:00	78.6
G12	1.3043	307	01Jul2015, 13:00	78.6
G12-G06	1.3043	306	01Jul2015, 13:06	78.0
FG29	0.0997	39	01Jul2015, 12:18	5.0
FG32	0.0402	57	01Jul2015, 12:06	4.8
FG32-G06	0.0402	54	01Jul2015, 12:06	4.8
G06	1.4442	324	01Jul2015, 13:06	87.8
FG08A	0.0750	90	01Jul2015, 12:06	7.9
FG08A-G05	0.0750	86	01Jul2015, 12:12	7.9
FG08B	0.0630	67	01Jul2015, 12:12	6.6
FG08B-G05	0.0630	65	01Jul2015, 12:12	6.6
FG09	0.0484	36	01Jul2015, 12:12	4.1
FG09-G05	0.0484	36	01Jul2015, 12:18	4.1
FG10B	0.0416	31	01Jul2015, 12:12	3.5
G05	0.2280	215	01Jul2015, 12:12	22.1
FG10A	0.0806	77	01Jul2015, 12:06	7.4
FG11	0.0625	59	01Jul2015, 12:18	7.0
FG13	0.0534	24	01Jul2015, 12:24	3.5
FG12	0.0328	40	01Jul2015, 12:12	3.9
POND D IN	0.4573	405	01Jul2015, 12:12	43.9
POND D	0.4573	90	01Jul2015, 13:06	34.2
POND D-G17	0.4573	90	01Jul2015, 13:06	34.2
FG15	0.0103	12	01Jul2015, 12:12	1.2
FG15-G17A	0.0103	12	01Jul2015, 12:12	1.2
G17A	0.4676	92	01Jul2015, 13:06	35.3
FG14	0.1000	74	01Jul2015, 12:18	9.6
G17	0.5676	134	01Jul2015, 12:36	45.0
G17-G18	0.5676	134	01Jul2015, 12:36	44.9
FG16	0.0791	104	01Jul2015, 12:06	9.0
G18	0.6467	179	01Jul2015, 12:12	54.0
G18-POND E	0.6467	177	01Jul2015, 12:12	53.9
FG31	0.0922	92	01Jul2015, 12:18	11.0
FG30	0.0389	57	01Jul2015, 12:06	4.7
FG30-PONDHS	0.0389	56	01Jul2015, 12:12	4.6
POND HS	0.1311	106	01Jul2015, 12:30	15.5
FG17a	0.0694	78	01Jul2015, 12:06	7.3
FG17a-POND E	0.0694	76	01Jul2015, 12:06	7.3
FG18	0.0644	42	01Jul2015, 12:24	5.9
FG18-POND E	0.0644	42	01Jul2015, 12:24	5.9
FG19	0.0527	66	01Jul2015, 12:06	6.4
FG17c	0.0313	22	01Jul2015, 12:06	2.0
FG17b	0.0214	31	01Jul2015, 12:06	2.6
POND E IN	1.0170	433	01Jul2015, 12:12	93.5
POND E	1.0170	149	01Jul2015, 14:00	69.5
H08	1.0170	134	01Jul2015, 14:00	61.1
H09	0.0000	15	01Jul2015, 14:00	8.3

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

FUTURE MDDP (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	6	01Jul2015, 12:12	1.0
OS05-G1	0.0578	6	01Jul2015, 12:18	1.0
FG01	0.0531	7	01Jul2015, 12:36	1.4
FG01-G1	0.0531	7	01Jul2015, 12:36	1.4
G1	0.1109	11	01Jul2015, 12:24	2.3
G1-G2	0.1109	11	01Jul2015, 12:30	2.3
FG02	0.0391	6	01Jul2015, 12:12	0.9
G2	0.2813	27	01Jul2015, 12:24	5.3
G2-G3	0.2813	27	01Jul2015, 12:30	5.3
FG03	0.0203	6	01Jul2015, 12:06	0.6
FG04	0.0172	6	01Jul2015, 12:06	0.5
G3	0.3188	31	01Jul2015, 12:30	6.4
G3-POND F	0.3188	31	01Jul2015, 12:30	6.4
FG06	0.0677	11	01Jul2015, 12:18	1.7
FG05	0.0580	12	01Jul2015, 12:24	2.0
OS07a	0.0170	2	01Jul2015, 12:12	0.3
OS07a-POND F	0.0170	2	01Jul2015, 12:24	0.3
POND F IN	0.4615	54	01Jul2015, 12:30	10.4
POND F	0.4615	16	01Jul2015, 13:48	9.1
POND F-G7	0.4615	16	01Jul2015, 14:00	9.0
OS07b-G4	0.0156	2	01Jul2015, 12:18	0.3
FG21a	0.0095	1	01Jul2015, 12:18	0.2
G4	0.0251	4	01Jul2015, 12:18	0.5
G4-G7	0.0251	3	01Jul2015, 12:30	0.5
FG21b	0.0150	6	01Jul2015, 12:06	0.6
G7	0.5016	18	01Jul2015, 13:42	10.1
G7-G8	0.5016	18	01Jul2015, 13:42	10.0
FG22	0.1397	29	01Jul2015, 12:18	4.1
OS08	0.0397	8	01Jul2015, 12:12	1.0
OS08-G8	0.0397	7	01Jul2015, 12:18	1.0
FG23a	0.0216	5	01Jul2015, 12:12	0.7
G8	0.7026	48	01Jul2015, 12:18	15.7
G8-G10	0.7026	47	01Jul2015, 12:24	15.4
OS09	0.1527	18	01Jul2015, 12:30	3.5
OS09-G9	0.1527	18	01Jul2015, 12:42	3.5
FG24	0.1369	25	01Jul2015, 12:24	4.0
G9	0.2896	38	01Jul2015, 12:36	7.5
G9-G10	0.2896	37.1	01Jul2015, 12:36	7.5
FG23b	0.0305	6	01Jul2015, 12:12	0.8
G10	1.0227	81	01Jul2015, 12:30	23.6
G10-G11	1.0227	80	01Jul2015, 12:36	23.5
FG23c	0.0122	3	01Jul2015, 12:12	0.3
G11	1.0349	82	01Jul2015, 12:36	23.8
FG25	0.1086	36.0	01Jul2015, 12:18	4.7
FG26	0.0863	22	01Jul2015, 12:18	3.0
FG26-POND G	0.0863	22	01Jul2015, 12:24	3.0

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

FUTURE MDDP (10-YEAR)				
HYDROLOGIC ELEMENT	DRAINAGE AREA (SQ. MI.)	PEAK DISCHARGE Q10 (CFS)	TIME OF PEAK	TOTAL VOLUME Q10 (AC. FT.)
FG27	0.0500	17	01Jul2015, 12:18	2.3
FG28	0.0245	6	01Jul2015, 12:12	0.7
POND G IN	1.3043	149	01Jul2015, 12:30	34.5
POND G	1.3043	51	01Jul2015, 14:00	27.1
G12	1.3043	51	01Jul2015, 14:00	27.1
G12-G06	1.3043	51	01Jul2015, 14:12	26.8
FG29	0.0997	9	01Jul2015, 12:18	1.6
FG32	0.0402	29	01Jul2015, 12:06	2.5
FG32-G06	0.0402	27	01Jul2015, 12:06	2.4
G06	1.4442	55	01Jul2015, 14:06	30.9
FG08A	0.0750	41	01Jul2015, 12:06	3.8
FG08A-G05	0.0750	41	01Jul2015, 12:12	3.8
FG08B	0.0630	31	01Jul2015, 12:12	3.2
FG08B-G05	0.0630	29	01Jul2015, 12:18	3.2
FG09	0.0484	14	01Jul2015, 12:18	1.8
FG09-G05	0.0484	14	01Jul2015, 12:18	1.8
FG10B	0.0416	12	01Jul2015, 12:18	1.5
G05	0.2280	94	01Jul2015, 12:12	10.3
FG10A	0.0806	32	01Jul2015, 12:12	3.3
FG11	0.0625	28	01Jul2015, 12:18	3.4
FG13	0.0534	7	01Jul2015, 12:30	1.4
FG12	0.0328	19.9	01Jul2015, 12:12	2.0
POND D IN	0.4573	177.4	01Jul2015, 12:12	20.5
POND D	0.4573	18	01Jul2015, 14:24	13.9
POND D-G17	0.4573	18	01Jul2015, 14:30	13.9
FG15	0.0103	6	01Jul2015, 12:12	0.6
FG15-G17A	0.0103	6	01Jul2015, 12:12	0.6
G17A	0.4676	18	01Jul2015, 14:18	14.4
FG14	0.1000	32	01Jul2015, 12:24	4.5
G17	0.5676	42	01Jul2015, 12:24	18.9
G17-G18	0.5676	42	01Jul2015, 12:30	18.9
FG16	0.0791	50	01Jul2015, 12:06	4.5
G18	0.6467	78	01Jul2015, 12:12	23.4
G18-POND E	0.6467	77	01Jul2015, 12:12	23.4
FG31	0.0922	45	01Jul2015, 12:18	5.6
FG30	0.0389	29	01Jul2015, 12:06	2.4
FG30-PONDHS	0.0389	27	01Jul2015, 12:12	2.3
POND HS	0.1311	36	01Jul2015, 12:42	7.9
FG17a	0.0694	35	01Jul2015, 12:06	3.5
FG17a-POND E	0.0694	35	01Jul2015, 12:12	3.5
FG18	0.0644	18	01Jul2015, 12:24	2.7
FG18-POND E	0.0644	17	01Jul2015, 12:30	2.7
FG19	0.0527	33	01Jul2015, 12:12	3.3
FG17c	0.0313	7	01Jul2015, 12:06	0.8
FG17b	0.0214	16	01Jul2015, 12:06	1.3
POND E IN	1.0170	197	01Jul2015, 12:12	42.8
POND E	1.0170	28	01Jul2015, 18:06	22.2
H08	1.0170	22	01Jul2015, 18:06	17.3
H09	0.0000	6	01Jul2015, 18:06	4.9

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

FUTURE MDDP (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	3.6	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	0.0531	3.3	01Jul2015, 12:36	0.8
FG01-G1	0.0531	3.3	01Jul2015, 12:36	0.8
G1	0.1109	4.8	01Jul2015, 12:36	1.3
G1-G2	0.1109	4.8	01Jul2015, 12:36	1.3
FG02	0.0391	2.6	01Jul2015, 12:18	0.5
G2	0.2813	10	01Jul2015, 12:30	2.9
G2-G3	0.2813	10	01Jul2015, 12:42	2.8
FG03	0.0203	3.0	01Jul2015, 12:06	0.4
FG04	0.0172	3.1	01Jul2015, 12:06	0.3
G3	0.3188	12	01Jul2015, 12:36	3.5
G3-POND F	0.3188	12	01Jul2015, 12:42	3.5
FG06	0.0677	5.3	01Jul2015, 12:24	1.0
FG05	0.0580	6.7	01Jul2015, 12:30	1.2
OS07a	0.0170	0.9	01Jul2015, 12:12	0.2
OS07a-POND F	0.0170	0.9	01Jul2015, 12:36	0.2
POND F IN	0.4615	23.1	01Jul2015, 12:36	5.9
POND F	0.4615	8.1	01Jul2015, 14:18	4.8
POND F-G7	0.4615	8.1	01Jul2015, 14:24	4.8
OS07b-G4	0.0156	0.9	01Jul2015, 12:24	0.2
FG21a	0.0095	0.4	01Jul2015, 12:24	0.1
G4	0.0251	1.4	01Jul2015, 12:24	0.3
G4-G7	0.0251	1	01Jul2015, 12:36	0.3
FG21b	0.0150	3.8	01Jul2015, 12:06	0.4
G7	0.5016	8.8	01Jul2015, 14:18	5.4
G7-G8	0.5016	8.8	01Jul2015, 14:24	5.4
FG22	0.1397	15	01Jul2015, 12:18	2.5
OS08	0.0397	3	01Jul2015, 12:12	0.6
OS08-G8	0.0397	3.4	01Jul2015, 12:18	0.6
FG23a	0.0216	2.7	01Jul2015, 12:18	0.4
G8	0.7026	25	01Jul2015, 12:18	8.8
G8-G10	0.7026	24	01Jul2015, 12:30	8.6
OS09	0.1527	8	01Jul2015, 12:36	2.0
OS09-G9	0.1527	8.2	01Jul2015, 12:48	2.0
FG24	0.1369	13	01Jul2015, 12:24	2.4
G9	0.2896	17	01Jul2015, 12:48	4.4
G9-G10	0.2896	17.1	01Jul2015, 12:48	4.4
FG23b	0.0305	3	01Jul2015, 12:18	0.5
G10	1.0227	39	01Jul2015, 12:30	13.4
G10-G11	1.0227	39.2	01Jul2015, 12:36	13.3
FG23c	0.0122	1.5	01Jul2015, 12:12	0.2
G11	1.0349	39.9	01Jul2015, 12:36	13.5
FG25	0.1086	21.9	01Jul2015, 12:18	3.1
FG26	0.0863	12	01Jul2015, 12:24	1.9
FG26-POND G	0.0863	12	01Jul2015, 12:24	1.9

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

FUTURE MDDP (5-YEAR)				
HYDROLOGIC ELEMENT	DRAINAGE AREA (SQ. MI.)	PEAK DISCHARGE Q5 (CFS)	TIME OF PEAK	TOTAL VOLUME Q5 (AC. FT.)
FG27	0.0500	11	01Jul2015, 12:18	1.5
FG28	0.0245	3	01Jul2015, 12:12	0.4
POND G IN	1.3043	75.1	01Jul2015, 12:36	20.4
POND G	1.3043	20	01Jul2015, 15:48	13.6
G12	1.3043	20	01Jul2015, 15:48	13.6
G12-G06	1.3043	20	01Jul2015, 15:54	13.4
FG29	0.0997	3	01Jul2015, 12:24	0.9
FG32	0.0402	20	01Jul2015, 12:06	1.7
FG32-G06	0.0402	18	01Jul2015, 12:12	1.7
G06	1.4442	22	01Jul2015, 15:54	16.0
FG08A	0.0750	27	01Jul2015, 12:06	2.6
FG08A-G05	0.0750	27	01Jul2015, 12:12	2.6
FG08B	0.0630	20.1	01Jul2015, 12:12	2.2
FG08B-G05	0.0630	19.5	01Jul2015, 12:18	2.2
FG09	0.0484	8.3	01Jul2015, 12:18	1.2
FG09-G05	0.0484	8	01Jul2015, 12:24	1.2
FG10B	0.0416	7.0	01Jul2015, 12:18	1.0
G05	0.2280	59	01Jul2015, 12:18	6.9
FG10A	0.0806	20	01Jul2015, 12:12	2.2
FG11	0.0625	19	01Jul2015, 12:18	2.4
FG13	0.0534	4	01Jul2015, 12:30	0.8
FG12	0.0328	13.7	01Jul2015, 12:12	1.4
POND D IN	0.4573	110.8	01Jul2015, 12:12	13.6
POND D	0.4573	11	01Jul2015, 14:48	8.2
POND D-G17	0.4573	11	01Jul2015, 14:48	8.2
FG15	0.0103	4	01Jul2015, 12:12	0.4
FG15-G17A	0.0103	4	01Jul2015, 12:12	0.4
G17A	0.4676	11	01Jul2015, 14:42	8.6
FG14	0.1000	20	01Jul2015, 12:24	3.0
G17	0.5676	25	01Jul2015, 12:24	11.6
G17-G18	0.5676	25	01Jul2015, 12:24	11.6
FG16	0.0791	34	01Jul2015, 12:06	3.1
G18	0.6467	50	01Jul2015, 12:12	14.7
G18-POND E	0.6467	50	01Jul2015, 12:12	14.7
FG31	0.0922	31	01Jul2015, 12:18	3.9
FG30	0.0389	20	01Jul2015, 12:06	1.7
FG30-PONDHS	0.0389	18	01Jul2015, 12:12	1.6
POND HS	0.1311	26	01Jul2015, 12:36	5.6
FG17a	0.0694	23	01Jul2015, 12:12	2.4
FG17a-POND E	0.0694	22.9	01Jul2015, 12:12	2.4
FG18	0.0644	11	01Jul2015, 12:30	1.8
FG18-POND E	0.0644	11	01Jul2015, 12:30	1.8
FG19	0.0527	23	01Jul2015, 12:12	2.3
FG17c	0.0313	3	01Jul2015, 12:12	0.4
FG17b	0.0214	11	01Jul2015, 12:06	0.9
POND E IN	1.0170	126	01Jul2015, 12:12	28.0
POND E	1.0170	14	01Jul2015, 20:36	11.1
H08	1.0170	10.2	01Jul2015, 20:36	7.8
H09	0.0000	3.8	01Jul2015, 20:36	3.2

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

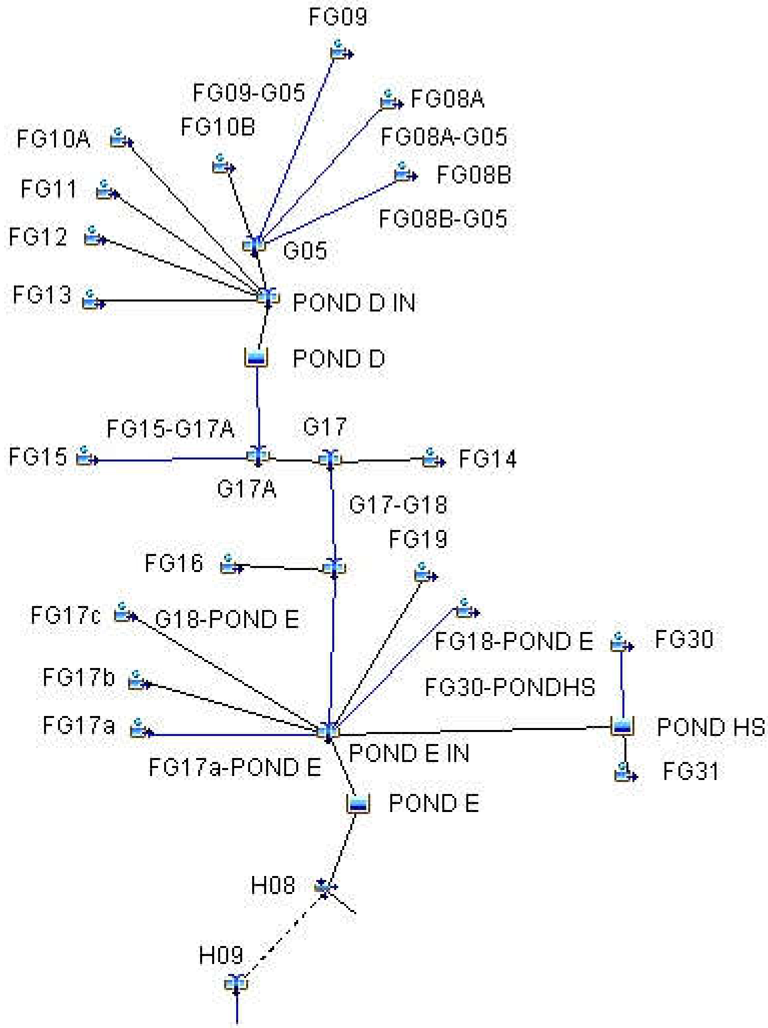
FUTURE MDDP (2-YEAR)				
HYDROLOGIC ELEMENT	DRAINAGE AREA (SQ. MI.)	PEAK DISCHARGE Q2 (CFS)	TIME OF PEAK	TOTAL VOLUME Q2 (AC. FT.)
OS06	0.1313	0.5	01Jul2015, 13:30	0.3
G1a	0.1313	0.5	01Jul2015, 13:30	0.3
G1a-G2	0.1313	0.5	01Jul2015, 13:48	0.3
OS05	0.0578	0.2	01Jul2015, 13:24	0.2
OS05-G1	0.0578	0.2	01Jul2015, 13:30	0.2
FG01	0.0531	0.9	01Jul2015, 12:48	0.3
FG01-G1	0.0531	0.9	01Jul2015, 12:48	0.3
G1	0.1109	1.1	01Jul2015, 12:54	0.5
G1-G2	0.1109	1.1	01Jul2015, 13:00	0.5
FG02	0.0391	0.5	01Jul2015, 12:36	0.2
G2	0.2813	1.9	01Jul2015, 13:18	1.0
G2-G3	0.2813	1.9	01Jul2015, 13:30	1.0
FG03	0.0203	0.8	01Jul2015, 12:12	0.2
FG04	0.0172	0.9	01Jul2015, 12:06	0.1
G3	0.3188	2.4	01Jul2015, 13:24	1.3
G3-POND F	0.3188	2.4	01Jul2015, 13:30	1.3
FG06	0.0677	1.3	01Jul2015, 12:30	0.4
FG05	0.0580	2.4	01Jul2015, 12:30	0.6
OS07a	0.0170	0.1	01Jul2015, 12:48	0.1
OS07a-POND F	0.0170	0.1	01Jul2015, 13:24	0.1
POND F IN	0.4615	5.0	01Jul2015, 12:54	2.4
POND F	0.4615	2.1	01Jul2015, 17:54	1.6
POND F-G7	0.4615	2.1	01Jul2015, 18:06	1.5
OS07b-G4	0.0156	0.1	01Jul2015, 13:06	0.1
FG21a	0.0095	0.1	01Jul2015, 13:00	0.0
G4	0.0251	0.2	01Jul2015, 13:06	0.1
G4-G7	0.0251	0.2	01Jul2015, 13:30	0.1
FG21b	0.0150	1.6	01Jul2015, 12:12	0.2
G7	0.5016	2.3	01Jul2015, 17:42	1.8
G7-G8	0.5016	2.3	01Jul2015, 17:48	1.8
FG22	0.1397	4.3	01Jul2015, 12:24	1.1
OS08	0.0397	0.7	01Jul2015, 12:24	0.2
OS08-G8	0.0397	0.7	01Jul2015, 12:30	0.2
FG23a	0.0216	0.8	01Jul2015, 12:18	0.2
G8	0.7026	7.3	01Jul2015, 12:24	3.3
G8-G10	0.7026	7.1	01Jul2015, 12:42	3.2
OS09	0.1527	1.9	01Jul2015, 12:54	0.8
OS09-G9	0.1527	1.9	01Jul2015, 13:18	0.8
FG24	0.1369	4	01Jul2015, 12:30	1.1
G9	0.2896	4	01Jul2015, 13:12	1.9
G9-G10	0.2896	4.5	01Jul2015, 13:12	1.9
FG23b	0.0305	1	01Jul2015, 12:24	0.2
G10	1.0227	11.4	01Jul2015, 12:42	5.2
G10-G11	1.0227	11.3	01Jul2015, 12:48	5.2
FG23c	0.0122	0.4	01Jul2015, 12:18	0.1
G11	1.0349	11.5	01Jul2015, 12:48	5.2
FG25	0.1086	9.9	01Jul2015, 12:24	1.7
FG26	0.0863	5	01Jul2015, 12:24	1.0
FG26-POND G	0.0863	4.5	01Jul2015, 12:30	0.9

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

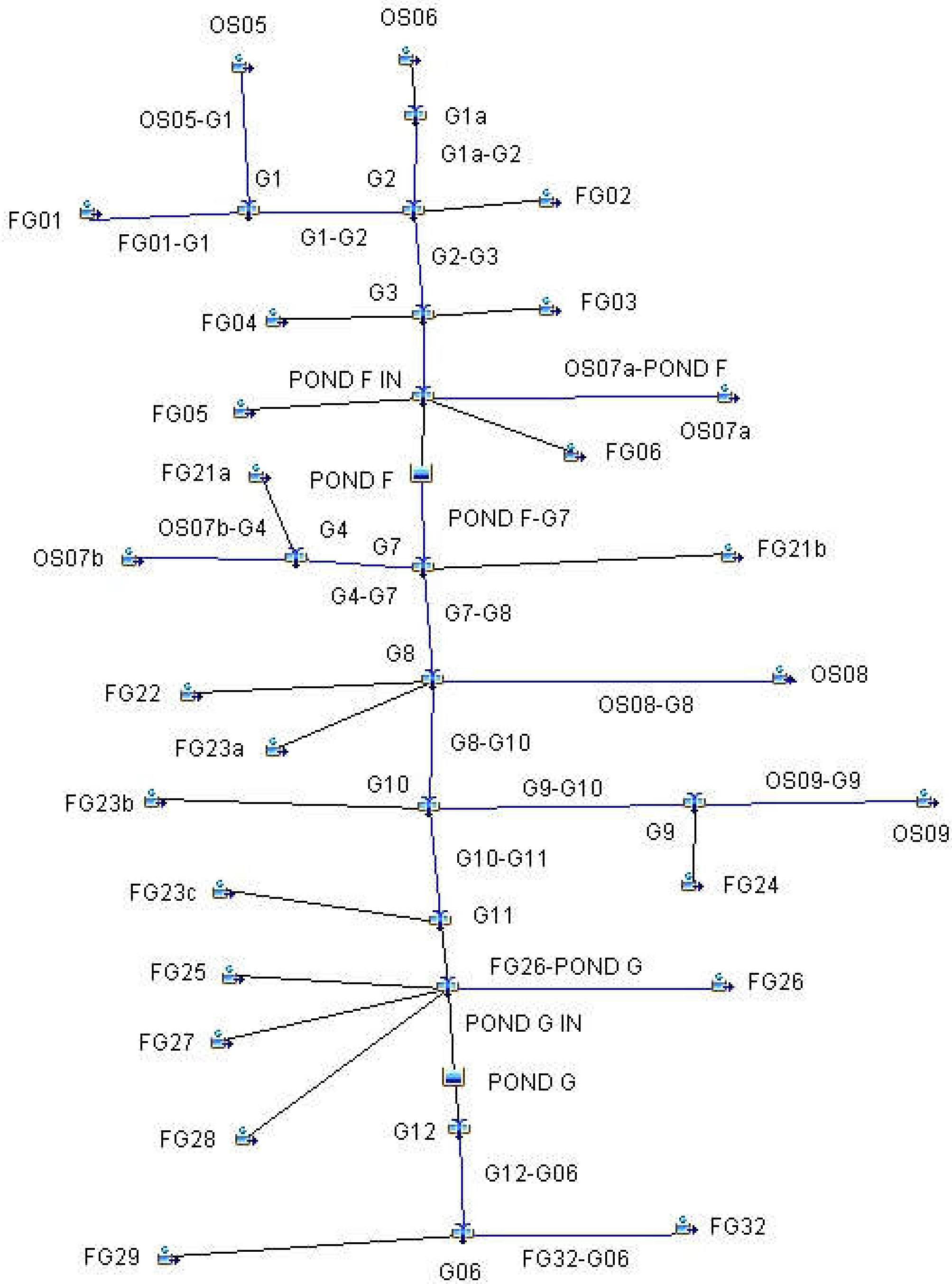
FUTURE MDDP (2-YEAR)				
HYDROLOGIC ELEMENT	DRAINAGE AREA (SQ. MI.)	PEAK DISCHARGE Q2 (CFS)	TIME OF PEAK	TOTAL VOLUME Q2 (AC. FT.)
FG27	0.0500	5.0	01Jul2015, 12:24	0.8
FG28	0.0245	0.6	01Jul2015, 12:18	0.2
POND G IN	1.3043	24.1	01Jul2015, 12:48	8.8
POND G	1.3043	5	02Jul2015, 00:00	4.2
G12	1.3043	5	02Jul2015, 00:00	4.2
G12-G06	1.3043	5	02Jul2015, 00:00	4.1
FG29	0.0997	0.4	01Jul2015, 13:36	0.3
FG32	0.0402	11	01Jul2015, 12:06	1.0
FG32-G06	0.0402	11	01Jul2015, 12:12	1.0
G06	1.4442	11	01Jul2015, 12:12	5.4
FG08A	0.0750	13	01Jul2015, 12:12	1.5
FG08A-G05	0.0750	13.1	01Jul2015, 12:18	1.5
FG08B	0.0630	10.2	01Jul2015, 12:12	1.2
FG08B-G05	0.0630	10.0	01Jul2015, 12:18	1.2
FG09	0.0484	3.2	01Jul2015, 12:18	0.6
FG09-G05	0.0484	3	01Jul2015, 12:24	0.6
FG10B	0.0416	2.7	01Jul2015, 12:18	0.5
G05	0.2280	28.7	01Jul2015, 12:18	3.8
FG10A	0.0806	9	01Jul2015, 12:12	1.2
FG11	0.0625	9.8	01Jul2015, 12:18	1.4
FG13	0.0534	0.9	01Jul2015, 12:42	0.3
FG12	0.0328	7.8	01Jul2015, 12:12	0.8
POND D IN	0.4573	53.4	01Jul2015, 12:18	7.5
POND D	0.4573	3.7	01Jul2015, 19:54	3.0
POND D-G17	0.4573	3.7	01Jul2015, 19:54	3.0
FG15	0.0103	2	01Jul2015, 12:12	0.2
FG15-G17A	0.0103	2	01Jul2015, 12:12	0.2
G17A	0.4676	4	01Jul2015, 19:48	3.3
FG14	0.1000	9	01Jul2015, 12:24	1.6
G17	0.5676	12	01Jul2015, 12:24	4.9
G17-G18	0.5676	12	01Jul2015, 12:30	4.9
FG16	0.0791	18	01Jul2015, 12:06	1.9
G18	0.6467	25	01Jul2015, 12:12	6.7
G18-POND E	0.6467	25	01Jul2015, 12:12	6.7
FG31	0.0922	17	01Jul2015, 12:18	2.4
FG30	0.0389	11	01Jul2015, 12:06	1.0
FG30-PONDHS	0.0389	10.9	01Jul2015, 12:18	1.0
POND HS	0.1311	14.8	01Jul2015, 12:42	3.3
FG17a	0.0694	12	01Jul2015, 12:12	1.3
FG17a-POND E	0.0694	11.6	01Jul2015, 12:12	1.3
FG18	0.0644	4.7	01Jul2015, 12:30	0.9
FG18-POND E	0.0644	5	01Jul2015, 12:30	0.9
FG19	0.0527	13.1	01Jul2015, 12:12	1.4
FG17c	0.0313	0.5	01Jul2015, 12:18	0.2
FG17b	0.0214	6.1	01Jul2015, 12:06	0.6
POND E IN	1.0170	63.6	01Jul2015, 12:12	14.4
POND E	1.0170	5.8	02Jul2015, 00:00	4.9
H08	1.0170	3.5	02Jul2015, 00:00	3.0
H09	0.0000	2.3	02Jul2015, 00:00	2.0

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

FUTURE CONDITIONS
POND D & E NETWORK



FUTURE CONDITIONS
POND F & G NETWORK



Appendix C - Detention Pond Information

STAGE/STORAGE/DISCHARGE CURVES FOR DETENTION POND ANALYSIS

Meridian Ranch Proposed Detention Pond D - Interim AS-BUILT

Geick Basin - El Paso County, Colorado

Data for spillway and embankment:

embankment length =	710
embankment elev =	7060
spillway length =	100
spillway elevation =	7058
100 year storage elev.=	7057.0
100 year storage vol.=	25.3
100 year discharge=	134
5 year storage elev.=	7053.8
5 year storage vol.=	7.1
5 year discharge=	11
WQCV storage vol.=	1.0
WQCV depth =	2.42
1/2 WQCV storage vol.=	0.50

Data for outlet pipe and grate:

Type		Dimensions Width (ft.)	X Height (ft.)	Dia.(in)		(sqft)		
Rectangular	Orifice 1:	0.03	2.42		Area =	0.072	Elev to cl =	7050.21
Circular	Orifice 2:			8	Area =	0.349	Elev to cl =	7051.42
Rectangular	Orifice 3:	5	0.5		Area =	2.500	Elev to cl =	7053.35
None Selected	Orifice 4:				Area =	0.000	Elev to cl =	

Stand Pipe Dimensions

Rec Grate	6	x	4.25	Elev =	7054.9
Circ. Grate		dia.		Elev =	

Outlet Culvert Dimensions

	Width (ft.)		Height (ft.)	Dia. (ft.)	Type
Outlet Culvert		x		4	**Circular**
Area	12.6		TOP		
Outlet I. E.	7048.1		7052.5		
Wall Thick.	5	in.			

50 year storage elev.=	7056.3
50 year discharge=	90
50 year storage vol.=	20.0
10 year storage elev.=	7054.6
10 year discharge=	18
10 year storage vol.=	10.7
2 year storage elev.=	7053.1
2 year discharge=	3.7
2 year storage vol.=	4.6

STAGE		STORAGE				DISCHARGE										
ELEV	HEIGHT	AREA		VOLUME		TOP OF	SPILLWAY	ORIFICE (max outflow)				GRATE (max outflow)	PIPE		REALIZED CULVERT OUTFLOW	TOTAL FLOW
		sqft	acre	acft	cum acft	BANK		1	2	3	4	**Rectangular**	1	2		
7049	0	0	0.0	0.00	0.00			-								
7050	1	10705	0.2	0.1	0.12	-	-	0.2	-	-	-	-	13		0.2	0.15
7051	2	36676	0.8	0.5	0.67	-	-	0.3	-	-	-	-	33		0.3	0.31
7052	3	71989	1.7	1.2	1.91	-	-	0.5	1.3	-	-	-	60		1.8	1.8
7053	4	133440	3.1	2.4	4.27	-	-	0.6	2.1	-	-	-	90		2.7	2.7
7054	5	178828	4.1	3.6	7.86	-	-	0.7	2.7	9.7	-	-	119		13.1	13
7055	6	221269	5.1	4.6	12.45	-	-	0.8	3.2	15.5	-	1.4	139		21	21
7055.5	6.5	245509	5.6	2.7	15.13	-	-	0.8	3.4	17.7	-	20.2	148		42	42
7056	7	269749	6.2	5.6	18.08	-	-	0.8	3.6	20	-	50	157		74	74
7058	9	337508	7.7	13.9	32.03	-	-	1.0	4.3	26	-	216	188		188	188
7060	11	405520	9.3	31.0	49.09	-	848.5	1.1	4.9	31	-	277	214		214	1,063
						-	-	-	-	-	-	-			-	-

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.

STAGE/STORAGE/DISCHARGE CURVES FOR DETENTION POND ANALYSIS

Meridian Ranch Existing Detention Pond E- FINAL INTERIM (TOTAL FLOWS)

Gieck Basin - El Paso County, Colorado

embankment length =	1860
embankment elev =	6976
spillway length =	200
spillway elevation =	6974.5
100 year storage elev.=	6973.5
100 year storage vol.=	41.5
100 year discharge=	231
5 year storage elev.=	6971.2
5 year storage vol.=	16.6
5 year discharge=	13
WQCV storage elev.=	6968.9
WQCV storage vol.=	1.5
WQCV depth =	1.9
1/2 WQCV storage elev.=	6968.3
1/2 WQCV storage vol.=	0.75

50 year storage elev.=	6973.0
50 year storage vol.=	35.6
50 year discharge=	141
10 year storage elev.=	6971.8
10 year storage vol.=	21.8
10 year discharge=	26
2 year storage elev.=	6970.3
2 year storage vol.=	8.8
2 year discharge=	5.6

STAGE		STORAGE				TOTAL DISCHARGE											
ELEV	HEIGHT	AREA		VOLUME		TOP OF	SPILLWAY	ORIFICE (max outflow)				GRATE (max outflow)		PIPE		REALIZED CULVERT OUTFLOW	TOTAL FLOW
		sqft	acre	acft	cum acft	BANK		1	2	3	4	**Rectangular**		1	2		
6967	0	1808	0.04	0.0	0.00			-	-	-	-	-	-	1.4	-	-	-
6967.5	0.5	16136.5	0.37	0.1	0.10	-	-	0.0	-	-	-	-	-	13	-	0.03	0.03
6968	1	30465	0.70	0.3	0.37	-	-	0.1	-	-	-	-	-	26	-	0.11	0.11
6968.5	1.5	81028.5	1.86	0.6	1.01	-	-	0.2	-	-	-	-	-	47	-	0.23	0.23
6969	2	131592	3.02	1.2	2.23	-	-	0.4	-	-	-	-	-	77	-	0.4	0.37
6969.5	2.5	201294.5	4.62	1.9	4.14	-	-	0.5	-	3.0	-	-	-	110	-	3.5	3.5
6970	3	270997	6.22	4.6	6.85	-	-	0.6	-	4	-	-	-	146	-	5	4.9
6970.5	3.5	329360	7.56	3.4	10.30	-	-	0.6	0.2	5	-	-	-	183	-	6	6.1
6970.75	3.75	358540.75	8.23	2.0	12.27			0.7	1.2	6	-	-	-	203	-	8	7.6
6971	4	387722	8.90	7.6	14.41	-	-	0.7	3.1	6	-	-	-	218	-	10	9.8
6971.25	4.25	408751	9.38	2.3	16.70	-	-	0.7	5.5	6	0.20	-	-	236	-	13	13
6971.5	4.5	429780	9.87	4.7	19.10	-	-	0.7	8	7	3.0	-	-	252	-	18	18
6971.75	4.75	450809	10.35	2.5	21.63	-	-	0.8	10	7	7.3	-	-	266	-	25	25
6972	5	471838	10.83	5.2	24.28	-	-	0.8	12	7	13	2.4	-	280	-	35	35
6972.25	5.25	482595.75	11.08	2.7	27.02	-	-	0.8	13	8	17	16	-	292	-	54	54
6972.5	5.5	493354	11.33	5.5	29.82	-	-	0.8	14	8	20	35	-	304	-	78	78
6973	6	514869	11.82	5.8	35.60	-	-	0.9	16	9	30	87	-	327	-	142	142
6973.25	6.25	518272	11.90	3.0	38.57	-	-	0.9	17	9	35	121	-	338	-	183	183
6973.5	6.5	521675	11.98	5.9	41.55	-	-	0.9	18	9	41	163	-	349	-	232	232
6974	7	528481	12.13	12.0	47.58	-	-	1.0	20	10	53	259	-	369	-	307	307
6976	9	553685	12.71	24.8	72.42	-	1,102	1.1	25	11	83	729	-	443	-	443	1,545

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.

STAGE/STORAGE/DISCHARGE CURVES FOR DETENTION POND ANALYSIS

Meridian Ranch Existing Detention Pond E-INTERIM FUTURE (H08)

Gieck Basin - El Paso County, Colorado

Data for spillway and embankment:

embankment length =	1860
embankment elev =	6976
spillway length =	200
spillway elevation =	6974
100 year storage elev.=	6973.5
100 year storage vol.=	41.5
100 year discharge=	198
5 year storage elev.=	6971.2
5 year storage vol.=	16.6
5 year discharge=	9
WQCV storage elev.=	6968.9
WQCV storage vol.=	1.5
1/2 WQCV storage elev.=	6968.3
1/2 WQCV storage vol.=	0.8

Data for outlet pipe and grate:

Type		H or V	Dimensions Width (ft.)	X Height (ft.)	Dia.(in)		(sqft)		
Rectangular	Orifice 1:	V	0.0248	1.65		Area =	0.041	Invert Elev =	6967.18
Rectangular	Orifice 2:	V	2	0.8		Area =	1.600	Invert Elev =	6970.40
Circular	Orifice 3:	H			10	Area =	0.545	Invert Elev =	6969.00
Rectangular	Orifice 4:	V	6	0.7		Area =	4.200	Invert Elev =	6971.20

Stand Pipe Dimensions

Rec Grate		11	x	7	Elev =	6971.90
Circ. Grate			dia.		Elev =	6971.90

Outlet Culvert Dimensions

	Width (ft.)		Height (ft.)	Dia. (ft.)	Type
Outlet Culvert		x		3.5	**Circular**
Area	9.6		TOP		
Outlet I. E.	6966.8		6970.58		
Wall Thick.	4	in.			

50 year storage elev.=	6973.0
50 year discharge=	127
10 year storage elev.=	6971.8
10 year discharge=	20
2 year storage elev.=	6970.3
2 year discharge=	3.4

STAGE		STORAGE				DISCHARGE										
ELEV	HEIGHT	AREA		VOLUME		TOP OF	SPILLWAY	ORIFICE (max outflow)				GRATE (max outflow)	PIPE		REALIZED CULVERT	TOTAL
		sqft	acre	acft	cum acft	BANK		1	2	3	4	**Rectangular**	1	2	OUTFLOW	FLOW
6967	0	1808	0.04	0.0	0.0			-	-	-	-	-	0.91		-	-
6967.5	0.5	16136.5	0.37	0.1	0.1			0.0	-	-	-	-	8.0		0.01	0.01
6968	1	30465	0.70	0.3	0.4			0.1	-	-	-	-	18		0.06	0.06
6968.5	1.5	81028.5	1.86	0.6	1.0			0.1	-	-	-	-	30		0.11	0.11
6969	2	131592	3.02	1.2	2.2			0.2	-	-	-	-	52		0.2	0.2
6969.5	2.5	201294.5	4.62	1.9	4.1			0.2	-	1.9	-	-	75		2.1	2.1
6970	3	270997	6.22	4.6	6.9			0.3	-	2.6	-	-	97		2.9	2.9
6970.5	3.5	329359.5	7.56	3.4	10			0.3	0.2	3.2	-	-	122		3.7	3.7
6970.75	3.75	358540.75	8.23	2.0	12.3			0.3	1.2	3.5	-	-	135		5	5.0
6971	4	387722	8.90	7.6	14			0.3	2.8	3.7	-	-	146		7	6.8
6971.25	4.25	408751	9.38	2.3	17			0.4	4.7	3.9	0.2	-	157		9	9.2
6971.5	4.5	429780	9.87	4.7	19			0.4	6.4	4	3.0	-	167		14	14
6971.75	4.75	450809	10.35	2.5	22			0.4	7.5	4	7.3	-	176		20	20
6972	5	471838	10.83	5.2	24			0.4	8	5	13	2	185		29	29
6972.25	5.25	482595.75	11.08	2.7	27			0.4	9	5	17	16	193		47	47
6972.5	5.5	493354	11.33	5.5	30			0.4	10	5	20	35	201		70	70
6973	6	514869	11.82	5.8	36			0.4	11	5	24	87	217		128	128
6973.25	6.25	518272	11.90	3.0	39			0.5	12	5	26	118	224		162	162
6973.5	6.5	521675	11.98	5.9	42			0.5	13	6	28	152	231		199	199
6974	7	528481	12.13	12.0	48			0.5	14	6	32	228	244		244	244
6976	9	553685	12.71	24.8	72			0.6	18	7	43	623	291		291	291

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.

STAGE/STORAGE/DISCHARGE CURVES FOR DETENTION POND ANALYSIS

Meridian Ranch Existing Detention Pond E-INTERIM FUTURE (H09)

Gieck Basin - El Paso County, Colorado

Data for spillway and embankment:

embankment length =	1860
embankment elev =	6976
spillway length =	200
spillway elevation =	6974.5
100 year storage elev.=	6973.5
100 year storage vol.=	41.5
100 year discharge=	33
5 year storage elev.=	6971.2
5 year storage vol.=	16.6
5 year discharge=	3.7
WQCV storage elev.=	6968.9
WQCV storage vol.=	1.5
1/2 WQCV storage elev.=	6968.3
1/2 WQCV storage vol.=	0.75

Data for outlet pipe and grate:

Type		H or V	Dimensions Width (ft.)	X Height (ft.)	Dia.(in)		(sqft)		
Rectangular	Orifice 1:	V	0.0248	1.65		Area =	0.041	Invert Elev =	6967.18
Rectangular	Orifice 2:	V	0.75	1		Area =	0.750	Invert Elev =	6970.75
Circular	Orifice 3:	H			8	Area =	0.349	Invert Elev =	6969.00
Rectangular	Orifice 4:	V	3.5	1.25		Area =	4.375	Invert Elev =	6971.75

Stand Pipe Dimensions

Rec Grate		4.25	x	3	Elev =	6973.00
Circ. Grate			dia.		Elev =	6973.00

50 year storage elev.=	6973.0
50 year discharge=	14
10 year storage elev.=	6971.8
10 year discharge=	5.5
2 year storage elev.=	6970.3
2 year discharge=	2.2

Outlet Culvert Dimensions

	Width (ft.)		Height (ft.)	Dia. (ft.)	Type
Outlet Culvert		x		3.5	**Circular**
Area	9.6		TOP		
Outlet I. E.	6966.8		6970.7		
Wall Thick.	5	in.			

STAGE		STORAGE				DISCHARGE										
ELEV	HEIGHT	AREA		VOLUME		TOP OF	SPILLWAY	ORIFICE (max outflow)				GRATE (max outflow)	PIPE		REALIZED CULVERT	TOTAL
		sqft	acre	acft	cum acft	BANK		1	2	3	4	**Rectangular**	1	2	OUTFLOW	FLOW
6967	0	1808	0.04	0.0	0.0			-	-	-	-	-	0.45		-	-
6967.5	0.5	16136.5	0.37	0.1	0.1			0.0	-	-	-	-	5.0		0.01	0.01
6968	1	30465	0.70	0.3	0.4			0.1	-	-	-	-	8.8		0.06	0.06
6968.5	1.5	81028.5	1.86	0.6	1.0			0.1	-	-	-	-	17		0.11	0.11
6969	2	131592	3.02	1.2	2.2			0.2	-	-	-	-	26		0.2	0.18
6969.5	2.5	201294.5	4.62	1.9	4.1			0.2	-	1.2	-	-	35		1.4	1.4
6970	3	270997	6.22	4.6	6.9			0.3	-	1.7	-	-	48		2.0	2.0
6970.5	3.5	329359.5	7.56	3.4	10.3			0.3	-	2.1	-	-	61		2.4	2.4
6970.75	3.75	358540.75	8.23	2.0	12.3			0.3	-	2.2	-	-	68		2.6	2.6
6971	4	387722	8.90	7.6	14.4			0.3	0.3	2.4	-	-	73		3.0	3.0
6971.25	4.25	408751	9.38	2.3	16.7			0.4	0.8	2.5	-	-	79		3.7	3.7
6971.5	4.5	429780	9.87	4.7	19.1			0.4	1.5	2.7	-	-	85		4.5	4.5
6971.75	4.75	450809	10.35	2.5	21.6			0.4	2.3	2.8	-	-	90		5.4	5.4
6972	5	471838	10.83	5.2	24.3			0.4	3.1	2.9	-	-	95		6.4	6.4
6972.25	5.25	482595.75	11.08	2.7	27.0			0.4	3.6	3.0	-	-	99		7.0	7.0
6972.5	5.5	493354	11.33	5.5	29.8			0.4	4.0	3.1	0.5	-	103		8	8.1
6973	6	514869	11.82	5.8	35.6			0.4	4.8	3.4	5.2	-	111		14	14
6973.25	6.25	518272	11.90	3.0	38.6			0.5	5.1	3.5	8.6	4	114		21	21
6973.5	6.5	521675	11.98	5.9	41.6			0.5	5.4	3.6	13	11	118		33	33
6974	7	528481	12.13	12.0	47.6			0.5	6.0	3.8	22	31	125		63	63
6976	9	553685	12.71	24.8	72.4			0.6	7.9	4.4	40	106	151		151	151

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.

STAGE/STORAGE/DISCHARGE CURVES FOR DETENTION POND ANALYSIS

Meridian Ranch Proposed Detention Pond F INTERIM-Final

Geick Basin - El Paso County, Colorado

Data for spillway and embankment:

embankment length =	285
embankment elev =	7138.5
spillway length =	87
spillway elevation =	7137.5
100 year storage elev.=	7136.0
100 year storage vol.=	8.9
100 year discharge=	178
5 year storage elev.=	7131.2
5 year storage vol.=	1.8
5 year discharge=	8.1
WQCV storage elev.=	7129.1
WQCV storage vol.=	0.3
1/2 WQCV storage elev.=	7128.6
1/2 WQCV storage vol.=	0.15

Data for outlet pipe and grate:

Type		H or V	Dimensions Width (ft.)	X Height (ft.)	Dia.(in)		(sqft)		
Rectangular	Orifice 1:	V	0.0131	1.25		Area =	0.016	Elev to cl =	7128.45
Rectangular	Orifice 2:	V	4	0.5		Area =	2.000	Elev to cl =	7130.75
Circular	Orifice 3:	H			8	Area =	0.349	Elev to cl =	7129.20
None Selected	Orifice 4:					Area =	0.000	Elev to cl =	

Stand Pipe Dimensions

Rec Grate		6	x	3	Elev =	7133
Circ. Grate			dia.		Elev =	7133

Outlet Culvert Dimensions

	Width (ft.)		Height (ft.)	Dia. (ft.)	Type
Outlet Culvert		x		4	**Circular**
Area	12.6		TOP		
Outlet I. E.	7126.6		7131.0		
Wall Thick.	5	in.			

50 year storage elev.=	7134.9
50 year storage vol.=	6.7
50 year discharge=	121
10 year storage elev.=	7132.6
10 year storage vol.=	3.3
10 year discharge=	16
2 year storage elev.=	7130.1
2 year storage vol.=	0.9
2 year discharge=	2.1

STAGE		STORAGE				DISCHARGE										
ELEV	HEIGHT	AREA		VOLUME		TOP OF	SPILLWAY	ORIFICE (max outflow)				GRATE (max outflow)	PIPE		REALIZED CULVERT OUTFLOW	TOTAL FLOW
		sqft	acre	acft	cum acft	BANK		1	2	3	4	**Rectangular**	1	2		
7127.7	0	0	0.00	0.00	0.00			-	-	-	-	-				
7128	0.3	2170	0.05	0.01	0.01	-	-	0.0	-	-	-	-	11		0.003	0.003
7129	1.3	17730	0.41	0.23	0.24	-	-	0.1	-	-	-	-	31		0.050	0.050
7130	2.3	33290	0.76	0.59	0.82	-	-	0.1	-	1.5	-	-	57		1.6	1.6
7131	3.3	39060	0.90	0.83	1.65	-	-	0.1	4.2	2.3	-	-	117		6.6	6.6
7132	4.3	44830	1.03	0.96	2.61	-	-	0.1	10.8	2.8	-	-	117		14	14
7133	5.3	55137.5	1.27	1.15	3.76	-	-	0.2	14.4	3.3	-	-	142		18	18
7134	6.3	65445	1.50	1.38	5.15	-	-	0.2	17.4	3.7	-	36	162		57	57
7135	7.3	79535	1.83	1.66	6.81	-	-	0.2	19.9	4.0	-	102	175		126	126
7136	8.3	93625	2.15	1.99	8.80	-	-	0.2	22.1	4.4	-	150	187		177	177
7137	9.3	111620	2.56	2.36	11.15	-	-	0.2	24.1	4.7	-	173	200		200	200
7138	10.3	129615	2.98	2.77	13.92	-	92.3	0.2	25.9	5.0	-	194	211		211	303
7138.5	10.8					-	261.0	0.3	26.8	5.1	-	203	211		-	261

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.

STAGE/STORAGE/DISCHARGE CURVES FOR DETENTION POND ANALYSIS

Meridian Ranch Proposed Detention Pond G-FINAL INTERIM DESIGN (G12)

Gieck Basin - El Paso County, Colorado

Data for spillway and embankment:

embankment length =	500
embankment elev =	7034
spillway length =	130
spillway elevation =	7031.5
100 year storage elev.=	7029.7
100 year storage vol.=	21.4
100 year discharge=	369
5 year storage elev.=	7027.2
5 year storage vol.=	7.1
5 year discharge=	12
WQCV storage elev.=	7025.8
WQCV storage vol.=	0.9
1/2 WQCV storage elev.=	7024.9
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)			
Rectangular	Orifice 1:	V	0.0263	1.90		Area =	0.050	Elev to cl =		7024.25
Rectangular	Orifice 2:	V	8.5	1.1		Area =	9.350	Elev to cl =		7027.55
Rectangular	Orifice 3:	V	2	0.43		Area =	0.860	Elev to cl =		7025.34
Rectangular	Orifice 4:	V	4	0.6		Area =	2.400	Elev to cl =		7027.80
Rectangular	Orifice 5:	V	8.5	1.1		Area =	9.350	Elev to cl =		7027.55

Stand Pipe Dimensions

Rec Grate		20	x	8	Elev =	7028.10
Circ. Grate			dia.		Elev =	7028.10

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 elev.=	7029.0
50 year storage vol.=	17.4
50 year discharge=	218
10 year storage elev.=	7027.6
10 year storage vol.=	9.2
10 year discharge=	32
2 year storage elev.=	7026.1
2 year storage vol.=	2.8
2 year discharge=	4.0

STAGE		STORAGE				DISCHARGE											
ELEV	HEIGHT	AREA		VOLUME		TOP OF	SPILLWAY	ORIFICE (max outflow)					GRATE (max outflow)	PIPE		REALIZED CULVERT OUTFLOW	TOTAL FLOW
		sqft	acre	acft	cum acft	BANK		1	2	3	4	5	**Rectangular**	1	2		
7023.3	0	0	0.00	0.0	0.00			-	-	-	-	-	-	12		-	-
7024	0.7	2232	0.05	0.0	0.02	-	-	0.05	-	-	-	-	-	51		0.0	0.05
7025	1.7	39917	0.92	0.5	0.50	-	-	0.17	-	-	-	-	-	111		0.2	0.17
7026	2.7	126469	2.90	1.9	2.41	-	-	0.32	-	3.4	-	-	-	184		3.7	3.7
7026.5	3.2	166675	3.83	3.6	4.06	-	-	0.36	-	4.5	-	-	-	224		4.8	4.8
7027	3.7	206880	4.75	2.1	6.20	-	-	0.40	-	5.3	-	-	-	268		5.7	5.7
7027.5	4.2	232032	5.33	4.6	8.64	-	-	0.43	9.0	6.1	-	9.0	-	304		25	25
7028	4.7	257183	5.90	5.3	11.53	-	-	0.47	25.5	6.8	4.2	25.5	-	337		62	62
7028.5	5.2	264196	6.07	5.7	14.33	-	-	0.50	43.9	7.4	9.7	43.9	27	373		133	133
7029	5.7	271209	6.23	6.1	17.59	-	-	0.52	54.2	7.9	12.7	54.2	92	406		222	222
7029.5	6.2	276106	6.34	11.7	20.30	-	-	0.58	62.9	8.5	15.1	62.9	179	436		329	329
7030	6.7	281003	6.45	9.4	23.72	-	-	0.60	70.5	8.9	17.1	70.5	283	464		450	450
7030.5	7.2	286003	6.57	6.5	26.75	-	-	0.60	77.3	9.4	19.0	77.3	402	491		491	491
7031	7.7	291002	6.68	6.6	30.28	-	-	0.63	83.6	9.9	20.7	83.6	533	516		516	516
7031.5	8.2	296443	6.81	6.7	33.44	-	-	0.65	89.5	10.3	22.2	89.5	677	540		540	540
7032	8.7	301883	6.93	3.4	36.87	137.9	137.9	0.67	95.0	10.7	23.7	95.0	832	563		563	701
7032.5	9.2	309236	7.10	7.0	40.39	390.0	390.0	0.69	100.2	11.1	25.1	100.2	997	586		586	976
7033	9.7	316589	7.27	3.6	44.0	716.5	716.5	0.71	105.1	11.5	26.4	105.1	1,171	607		607	1,323

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.

STAGE/STORAGE/DISCHARGE CURVES FOR DETENTION POND ANALYSIS

Meridian Ranch Proposed Detention Pond D - Future AS-BUILT

Geick Basin - El Paso County, Colorado

Data for spillway and embankment:

embankment length =	710
embankment elev =	7060
spillway length =	100
spillway elevation =	7058
100 year storage elev.=	7057.0
100 year storage vol.=	25.3
100 year discharge=	134
5 year storage elev.=	7053.8
5 year storage vol.=	7.1
5 year discharge=	11
WQCV storage vol.=	1.0
WQCV depth =	2.42
1/2 WQCV storage vol.=	0.50

Data for outlet pipe and grate:

Type		Dimensions: Width (ft.)	X Height (ft.)	Dia.(in)		(sqft)		
Rectangular	Orifice 1:	0.03	2.42		Area =	0.072	Elev to cl =	7050.21
Circular	Orifice 2:			8	Area =	0.349	Elev to cl =	7051.42
Rectangular	Orifice 3:	5	0.5		Area =	2.500	Elev to cl =	7053.35
None Selected	Orifice 4:				Area =	0.000	Elev to cl =	

Stand Pipe Dimensions

Rec Grate	6	x	4.25	Elev =	7054.9
Circ. Grate		dia.		Elev =	

Outlet Culvert Dimensions

	Width (ft.)		Height (ft.)	Dia. (ft.)	Type
Outlet Culvert		x		4	**Circular**
Area	12.6		TOP		
Outlet I. E.	7048.1		7052.5		
Wall Thick.	5	in.			

50 year storage elev.=	7056.3
50 year storage vol.=	20.0
50 year discharge=	90
10 year storage elev.=	7054.6
10 year storage vol.=	10.7
10 year discharge=	18
2 year storage elev.=	7053.1
2 year storage vol.=	4.6
2 year discharge=	3.7

STAGE		STORAGE				DISCHARGE										
ELEV	HEIGHT	AREA		VOLUME		TOP OF	SPILLWAY	ORIFICE (max outflow)				GRATE (max outflow)	PIPE		REALIZED CULVERT OUTFLOW	TOTAL FLOW
		sqft	acre	acft	cum acft	BANK		1	2	3	4	**Rectangular**	1	2		
7049	0	0	0.0	0.00	0.00			-								
7050	1	10705	0.2	0.1	0.12	-	-	0.2	-	-	-	-	13		0.2	0.15
7051	2	36676	0.8	0.5	0.67	-	-	0.3	-	-	-	-	33		0.3	0.31
7052	3	71989	1.7	1.2	1.91	-	-	0.5	1.3	-	-	-	60		1.8	1.8
7053	4	133440	3.1	2.4	4.27	-	-	0.6	2.1	-	-	-	90		2.7	2.7
7054	5	178828	4.1	3.6	7.86	-	-	0.7	2.7	9.7	-	-	119		13.1	13
7055	6	221269	5.1	4.6	12.45	-	-	0.8	3.2	15.5	-	1.4	139		21	21
7055.5	6.5	245509	5.6	2.7	15.13	-	-	0.8	3.4	17.7	-	20.2	148		42	42
7056	7	269749	6.2	5.6	18.08	-	-	0.8	3.6	20	-	50	157		74	74
7058	9	337508	7.7	13.9	32.03	-	-	1.0	4.3	26	-	216	188		188	188
7060	11	405520	9.3	31.0	49.09	-	848.5	1.1	4.9	31	-	277	214		214	1,063
						-	-	-	-	-	-	-			-	-

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.

STAGE/STORAGE/DISCHARGE CURVES FOR DETENTION POND ANALYSIS

Meridian Ranch Existing Detention Pond E- FINAL FUTURE (TOTAL FLOWS)

Gieck Basin - El Paso County, Colorado

embankment length =	1860
embankment elev =	6976
spillway length =	200
spillway elevation =	6974.5
100 year storage elev.=	6973.6
100 year storage vol.=	42.2
100 year discharge=	240
5 year storage elev.=	6971.3
5 year storage vol.=	17.2
5 year discharge=	14
WQCV storage elev.=	6968.9
WQCV storage vol.=	1.5
WQCV depth =	1.9
1/2 WQCV storage elev.=	6968.3
1/2 WQCV storage vol.=	0.75

50 year storage elev.=	6973.0
50 year storage vol.=	36.2
50 year discharge=	150
10 year storage elev.=	6971.8
10 year storage vol.=	22.4
10 year discharge=	28
2 year storage elev.=	6970.4
2 year storage vol.=	9.5
2 year discharge=	5.8

STAGE		STORAGE				TOTAL DISCHARGE											
ELEV	HEIGHT	AREA		VOLUME		TOP OF BANK	SPILLWAY	ORIFICE (max outflow)				GRATE (max outflow)		PIPE		REALIZED CULVERT OUTFLOW	TOTAL FLOW
		sqft	acre	acft	cum acft			1	2	3	4	Rectangular		1	2		
6967	0	1808	0.04	0.0	0.00			-	-	-	-	-	-	1.4	-	-	-
6967.5	0.5	16136.5	0.37	0.1	0.10	-	-	0.0	-	-	-	-	-	13	-	0.03	0.03
6968	1	30465	0.70	0.3	0.37	-	-	0.1	-	-	-	-	-	26	-	0.11	0.11
6968.5	1.5	81028.5	1.86	0.6	1.01	-	-	0.2	-	-	-	-	-	47	-	0.23	0.23
6969	2	131592	3.02	1.2	2.23	-	-	0.4	-	-	-	-	-	77	-	0.4	0.37
6969.5	2.5	201294.5	4.62	1.9	4.14	-	-	0.5	-	3.0	-	-	-	110	-	3.5	3.5
6970	3	270997	6.22	4.6	6.85	-	-	0.6	-	4	-	-	-	146	-	5	4.9
6970.5	3.5	329360	7.56	3.4	10.30	-	-	0.6	0.2	5	-	-	-	183	-	6	6.1
6970.75	3.75	358540.75	8.23	2.0	12.27			0.7	1.2	6	-	-	-	203	-	8	7.6
6971	4	387722	8.90	7.6	14.41	-	-	0.7	3.1	6	-	-	-	218	-	10	9.8
6971.25	4.25	408751	9.38	2.3	16.70	-	-	0.7	5.5	6	0.20	-	-	236	-	13	13
6971.5	4.5	429780	9.87	4.7	19.10	-	-	0.7	8	7	3.0	-	-	252	-	18	18
6971.75	4.75	450809	10.35	2.5	21.63	-	-	0.8	10	7	7.3	-	-	266	-	25	25
6972	5	471838	10.83	5.2	24.28	-	-	0.8	12	7	13	2.4	-	280	-	35	35
6972.25	5.25	482595.75	11.08	2.7	27.02	-	-	0.8	13	8	17	16	-	292	-	54	54
6972.5	5.5	493354	11.33	5.5	29.82	-	-	0.8	14	8	20	35	-	304	-	78	78
6973	6	514869	11.82	5.8	35.60	-	-	0.9	16	9	30	87	-	327	-	142	142
6973.25	6.25	518272	11.90	3.0	38.57	-	-	0.9	17	9	35	121	-	338	-	183	183
6973.5	6.5	521675	11.98	5.9	41.55	-	-	0.9	18	9	41	163	-	349	-	232	232
6974	7	528481	12.13	12.0	47.58	-	-	1.0	20	10	53	259	-	369	-	307	307
6976	9	553685	12.71	24.8	72.42	-	1,102	1.1	25	11	83	729	-	443	-	443	1,545

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.

STAGE/STORAGE/DISCHARGE CURVES FOR DETENTION POND ANALYSIS

Meridian Ranch Existing Detention Pond E-FINAL FUTURE (H08)

Gieck Basin - El Paso County, Colorado

Data for spillway and embankment:

embankment length =	1860
embankment elev =	6976
spillway length =	200
spillway elevation =	6974
100 year storage elev.=	6973.6
100 year storage vol.=	42.2
100 year discharge=	204
5 year storage elev.=	6971.3
5 year storage vol.=	17.2
5 year discharge=	10
WQCV storage elev.=	6968.9
WQCV storage vol.=	1.5
1/2 WQCV storage elev.=	6968.3
1/2 WQCV storage vol.=	0.75

Data for outlet pipe and grate:

Type		H or V	Dimensions Width (ft.)	X Height (ft.)	Dia.(in)		(sqft)		
Rectangular	Orifice 1:	V	0.0248	1.65		Area =	0.041	Invert Elev =	6967.18
Rectangular	Orifice 2:	V	2	0.8		Area =	1.600	Invert Elev =	6970.40
Circular	Orifice 3:	H			10	Area =	0.545	Invert Elev =	6969.00
Rectangular	Orifice 4:	V	6	0.7		Area =	4.200	Invert Elev =	6971.20

Stand Pipe Dimensions

Rec Grate		11	x	7	Elev =	6971.90
Circ. Grate			dia.		Elev =	6971.90

50 year storage elev.=	6973.0
50 year discharge=	134
10 year storage elev.=	6971.8
10 year discharge=	22
2 year storage elev.=	6970.4
2 year discharge=	3.5

Outlet Culvert Dimensions

	Width (ft.)		Height (ft.)	Dia. (ft.)	Type
Outlet Culvert		x		3.5	**Circular**
Area	9.6		TOP		
Outlet I. E.	6966.8		6970.58		
Wall Thick.	4	in.			

STAGE		STORAGE				DISCHARGE										
ELEV	HEIGHT	AREA		VOLUME		TOP OF	SPILLWAY	ORIFICE (max outflow)				GRATE (max outflow)	PIPE		REALIZED CULVERT OUTFLOW	TOTAL FLOW
		sqft	acre	acft	cum acft	BANK		1	2	3	4	Rectangular	1	2		
6967	0	1808	0.04	0.0	0.0			-	-	-	-	-	0.91		-	-
6967.5	0.5	16136.5	0.37	0.1	0.1			0.0	-	-	-	-	8.0		0.01	0.01
6968	1	30465	0.70	0.3	0.4			0.1	-	-	-	-	18		0.06	0.06
6968.5	1.5	81028.5	1.86	0.6	1.0			0.1	-	-	-	-	30		0.11	0.11
6969	2	131592	3.02	1.2	2.2			0.2	-	-	-	-	52		0.2	0.2
6969.5	2.5	201294.5	4.62	1.9	4.1			0.2	-	1.9	-	-	75		2.1	2.1
6970	3	270997	6.22	4.6	6.9			0.3	-	2.6	-	-	97		2.9	2.9
6970.5	3.5	329359.5	7.56	3.4	10			0.3	0.2	3.2	-	-	122		3.7	3.7
6970.75	3.75	358540.75	8.23	2.0	12.3			0.3	1.2	3.5	-	-	135		5	5.0
6971	4	387722	8.90	7.6	14			0.3	2.8	3.7	-	-	146		7	6.8
6971.25	4.25	408751	9.38	2.3	17			0.4	4.7	3.9	0.2	-	157		9	9.2
6971.5	4.5	429780	9.87	4.7	19			0.4	6.4	4	3.0	-	167		14	14
6971.75	4.75	450809	10.35	2.5	22			0.4	7.5	4	7.3	-	176		20	20
6972	5	471838	10.83	5.2	24			0.4	8	5	13	2	185		29	29
6972.25	5.25	482595.75	11.08	2.7	27			0.4	9	5	17	16	193		47	47
6972.5	5.5	493354	11.33	5.5	30			0.4	10	5	20	35	201		70	70
6973	6	514869	11.82	5.8	36			0.4	11	5	24	87	217		128	128
6973.25	6.25	518272	11.90	3.0	39			0.5	12	5	26	118	224		162	162
6973.5	6.5	521675	11.98	5.9	42			0.5	13	6	28	152	231		199	199
6974	7	528481	12.13	12.0	48			0.5	14	6	32	228	244		244	244
6976	9	553685	12.71	24.8	72			0.6	18	7	43	623	291		291	291

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.

STAGE/STORAGE/DISCHARGE CURVES FOR DETENTION POND ANALYSIS

Meridian Ranch Existing Detention Pond E-FINAL FUTURE (H09)

Gieck Basin - El Paso County, Colorado

Data for spillway and embankment:

embankment length =	1860
embankment elev =	6976
spillway length =	200
spillway elevation =	6974.5
100 year storage elev.=	6973.6
100 year storage vol.=	42.2
100 year discharge=	36
5 year storage elev.=	6971.3
5 year storage vol.=	17.2
5 year discharge=	3.8
WQCV storage elev.=	6968.9
WQCV storage vol.=	1.5
1/2 WQCV storage elev.=	6968.3
1/2 WQCV storage vol.=	0.8

Data for outlet pipe and grate:

Type		H or V	Dimensions Width (ft.)	X Height (ft.)	Dia.(in)		(sqft)		
Rectangular	Orifice 1:	V	0.0248	1.65		Area =	0.041	Invert Elev =	6967.18
Rectangular	Orifice 2:	V	0.75	1		Area =	0.750	Invert Elev =	6970.75
Circular	Orifice 3:	H			8	Area =	0.349	Invert Elev =	6969.00
Rectangular	Orifice 4:	V	3.5	1.25		Area =	4.375	Invert Elev =	6971.75

Stand Pipe Dimensions

Rec Grate		4.25	x	3	Elev =	6973.00
Circ. Grate			dia.		Elev =	6973.00

50 year storage elev.=	6973.0
50 year discharge=	15
10 year storage elev.=	6971.8
10 year discharge=	5.7
2 year storage elev.=	6970.4
2 year discharge=	2.3

Outlet Culvert Dimensions

	Width (ft.)		Height (ft.)	Dia. (ft.)	Type
Outlet Culvert		x		3.5	**Circular**
Area	9.6		TOP		
Outlet I. E.	6966.8		6970.7		
Wall Thick.	5	in.			

STAGE		STORAGE				DISCHARGE										
ELEV	HEIGHT	AREA		VOLUME		TOP OF	SPILLWAY	ORIFICE (max outflow)				GRATE (max outflow)	PIPE		REALIZED CULVERT OUTFLOW	TOTAL FLOW
		sqft	acre	acft	cum acft	BANK		1	2	3	4	**Rectangular**	1	2		
6967	0	1808	0.04	0.0	0.0			-	-	-	-	-	0.45		-	-
6967.5	0.5	16136.5	0.37	0.1	0.1			0.0	-	-	-	-	5.0		0.01	0.01
6968	1	30465	0.70	0.3	0.4			0.1	-	-	-	-	8.8		0.06	0.06
6968.5	1.5	81028.5	1.86	0.6	1.0			0.1	-	-	-	-	17		0.11	0.11
6969	2	131592	3.02	1.2	2.2			0.2	-	-	-	-	26		0.2	0.18
6969.5	2.5	201294.5	4.62	1.9	4.1			0.2	-	1.2	-	-	35		1.4	1.4
6970	3	270997	6.22	4.6	6.9			0.3	-	1.7	-	-	48		2.0	2.0
6970.5	3.5	329359.5	7.56	3.4	10.3			0.3	-	2.1	-	-	61		2.4	2.4
6970.75	3.75	358540.75	8.23	2.0	12.3			0.3	-	2.2	-	-	68		2.6	2.6
6971	4	387722	8.90	7.6	14.4			0.3	0.3	2.4	-	-	73		3.0	3.0
6971.25	4.25	408751	9.38	2.3	16.7			0.4	0.8	2.5	-	-	79		3.7	3.7
6971.5	4.5	429780	9.87	4.7	19.1			0.4	1.5	2.7	-	-	85		4.5	4.5
6971.75	4.75	450809	10.35	2.5	21.6			0.4	2.3	2.8	-	-	90		5.4	5.4
6972	5	471838	10.83	5.2	24.3			0.4	3.1	2.9	-	-	95		6.4	6.4
6972.25	5.25	482595.75	11.08	2.7	27.0			0.4	3.6	3.0	-	-	99		7.0	7.0
6972.5	5.5	493354	11.33	5.5	29.8			0.4	4.0	3.1	0.5	-	103		8	8.1
6973	6	514869	11.82	5.8	35.6			0.4	4.8	3.4	5.2	-	111		14	14
6973.25	6.25	518272	11.90	3.0	38.6			0.5	5.1	3.5	8.6	4	114		21	21
6973.5	6.5	521675	11.98	5.9	41.6			0.5	5.4	3.6	13	11	118		33	33
6974	7	528481	12.13	12.0	47.6			0.5	6.0	3.8	22	31	125		63	63
6976	9	553685	12.71	24.8	72.4			0.6	7.9	4.4	40	106	151		151	151

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.

STAGE/STORAGE/DISCHARGE CURVES FOR DETENTION POND ANALYSIS

Meridian Ranch Proposed Detention Pond F-Final

Geick Basin - El Paso County, Colorado

Data for spillway and embankment:

embankment length =	285
embankment elev =	7138.5
spillway length =	87
spillway elevation =	7137.5
100 year storage elev.=	7136.0
100 year storage vol.=	8.9
100 year discharge=	178
5 year storage elev.=	7131.2
5 year storage vol.=	1.8
5 year discharge=	8.1
WQCV storage elev.=	7129.1
WQCV storage vol.=	0.3
1/2 WQCV storage elev.=	7128.6
1/2 WQCV storage vol.=	0.15

Data for outlet pipe and grate:

Type		H or V	Dimensions Width (ft.)	X Height (ft.)	Dia.(in)		(sqft)		
Rectangular	Orifice 1:	V	0.0131	1.25		Area =	0.016	Elev to cl =	7128.45
Rectangular	Orifice 2:	V	4	0.5		Area =	2.000	Elev to cl =	7130.75
Circular	Orifice 3:	H			8	Area =	0.349	Elev to cl =	7129.20
None Selected	Orifice 4:					Area =	0.000	Elev to cl =	

Stand Pipe Dimensions

Rec Grate		6	x	3	Elev =	7133
Circ. Grate			dia.		Elev =	7133

Outlet Culvert Dimensions

	Width (ft.)		Height (ft.)	Dia. (ft.)	Type
Outlet Culvert		x		4	**Circular**
Area	12.6		TOP		
Outlet I. E.	7126.6		7131.0		
Wall Thick.	5	in.			

50 year storage elev.=	7134.9
50 year storage vol.=	6.7
50 year discharge=	121
10 year storage elev.=	7132.6
10 year storage vol.=	3.3
10 year discharge=	16
2 year storage elev.=	7130.1
2 year storage vol.=	0.9
2 year discharge=	2.1

STAGE		STORAGE				DISCHARGE										
ELEV	HEIGHT	AREA		VOLUME		TOP OF	SPILLWAY	ORIFICE (max outflow)				GRATE (max outflow)	PIPE		REALIZED CULVERT OUTFLOW	TOTAL FLOW
		sqft	acre	acft	cum acft	BANK		1	2	3	4	**Rectangular**	1	2		
7127.7	0	0	0.00	0.00	0.00			-	-	-	-	-				
7128	0.3	2170	0.05	0.01	0.01	-	-	0.0	-	-	-	-	11		0.0	0.003
7129	1.3	17730	0.41	0.23	0.24	-	-	0.1	-	-	-	-	31		0.1	0.050
7130	2.3	33290	0.76	0.59	0.82	-	-	0.1	-	1.5	-	-	57		1.6	1.6
7131	3.3	39060	0.90	0.83	1.65	-	-	0.1	4.2	2.3	-	-	117		6.6	6.6
7132	4.3	44830	1.03	0.96	2.61	-	-	0.1	10.8	2.8	-	-	117		14	14
7133	5.3	55137.5	1.27	1.15	3.76	-	-	0.2	14.4	3.3	-	-	142		18	18
7134	6.3	65445	1.50	1.38	5.15	-	-	0.2	17.4	3.7	-	36	162		57	57
7135	7.3	79535	1.83	1.66	6.81	-	-	0.2	19.9	4.0	-	102	175		126	126
7136	8.3	93625	2.15	1.99	8.80	-	-	0.2	22.1	4.4	-	150	187		177	177
7137	9.3	111620	2.56	2.36	11.15	-	-	0.2	24.1	4.7	-	173	200		200	200
7138	10.3	129615	2.98	2.77	13.92	-	92.3	0.2	25.9	5.0	-	194	211		211	303
7138.5	10.8					-	261.0	0.3	26.8	5.1	-	203	211		-	261

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.

STAGE/STORAGE/DISCHARGE CURVES FOR DETENTION POND ANALYSIS

Meridian Ranch Proposed Detention Pond G-FINAL FUTURE DESIGN (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.=	7030.2
100 year storage vol.=	24.8
100 year discharge=	465
5 year storage elev.=	7027.4
5 year storage vol.=	8.0
5 year discharge=	20
WQCV storage elev.=	7025.2
WQCV storage vol.=	0.9
1/2 WQCV storage elev.=	7024.9
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)			
Rectangular	Orifice 1:	V	0.0263	1.90		Area =	0.050	Elev to cl =		7024.25
Rectangular	Orifice 2:	V	8.5	1.1		Area =	9.350	Elev to cl =		7027.55
Rectangular	Orifice 3:	V	2	0.43		Area =	0.860	Elev to cl =		7025.34
Rectangular	Orifice 4:	V	4	0.6		Area =	2.400	Elev to cl =		7027.80
Rectangular	Orifice 5:	V	8.5	1.1		Area =	9.350	Elev to cl =		7027.55

Stand Pipe Dimensions

Rec Grate		20	x	8	Elev =	7028.10
Circ. Grate			dia.		Elev =	7028.10

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 elev.=	7029.4
50 year storage vol.=	19.7
50 year discharge=	307
10 year storage elev.=	7027.8
10 year storage vol.=	10.7
10 year discharge=	51
2 year storage elev.=	7026.6
2 year storage vol.=	4.6
2 year discharge=	5.1

STAGE		STORAGE				DISCHARGE											
ELEV	HEIGHT	AREA		VOLUME		TOP OF	SPILLWAY	ORIFICE (max outflow)					GRATE (max outflow)	PIPE		REALIZED CULVERT OUTFLOW	TOTAL FLOW
		sqft	acre	acft	cum acft	BANK		1	2	3	4	5	**Rectangular**	1	2		
7023.3	0	0	0.00	0.0	0.00			-	-	-	-	-	-	12		-	-
7024	0.7	2232	0.05	0.0	0.02	-	-	0.05	-	-	-	-	-	51		0.0	0.05
7025	1.7	39917	0.92	0.5	0.50	-	-	0.17	-	-	-	-	-	111		0.2	0.17
7026	2.7	126469	2.90	1.9	2.41	-	-	0.32	-	3.4	-	-	-	184		3.7	3.7
7026.5	3.2	166675	3.83	3.6	4.06	-	-	0.36	-	4.5	-	-	-	224		4.8	4.8
7027	3.7	206880	4.75	2.1	6.20	-	-	0.40	-	5.3	-	-	-	268		5.7	5.7
7027.5	4.2	232032	5.33	4.6	8.64	-	-	0.43	9.0	6.1	-	9.0	-	304		25	25
7028	4.7	257183	5.90	5.3	11.5	-	-	0.47	25.5	6.8	4.2	25.5	-	337		62	62
7028.5	5.2	264196	6.07	5.7	14.3	-	-	0.50	43.9	7.4	9.7	43.9	27	373		133	133
7029	5.7	271209	6.23	6.1	17.6	-	-	0.52	54.2	7.9	12.7	54.2	92	406		222	222
7029.5	6.2	276106	6.34	11.7	20.3	-	-	0.58	62.9	8.5	15.1	62.9	179	436		329	329
7030	6.7	281003	6.45	9.4	23.7	-	-	0.60	70.5	8.9	17.1	70.5	283	464		450	450
7030.5	7.2	286003	6.57	6.5	26.8	-	-	0.60	77.3	9.4	19.0	77.3	402	491		491	491
7031	7.7	291002	6.68	6.6	30.3	-	-	0.63	83.6	9.9	20.7	83.6	533	516		516	516
7031.5	8.2	296443	6.81	6.7	33.4	-	-	0.65	89.5	10.3	22.2	89.5	677	540		540	540
7032	8.7	301883	6.93	3.4	36.9	137.9	137.9	0.67	95.0	10.7	23.7	95.0	832	563		563	701
7032.5	9.2	309236	7.10	7.0	40.4	390.0	390.0	0.69	100.2	11.1	25.1	100.2	997	586		586	976
7033	9.7	316589	7.27	3.6	44.0	716.5	716.5	0.71	105.1	11.5	26.4	105.1	1,171	607		607	1,323

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.

RHR FILING 2 INTERIM CONDITION

Simulation Run: RHRF2-100 YR Reservoir: POND D

Start of Run:	01Jul2015, 00:00	Basin Model:	WW Grading
End of Run:	02Jul2015, 00:00	Meteorologic Model:	SCS TYPE IIA 100YR
Compute Time:	14Mar2018 13:11:34	Control Specifications:	24 HR-2 MIN.

Volume Units: AC-FT

Computed Results:

Peak Inflow:	531(CFS)	Date/Time of Peak Inflow:	01Jul2015, 12:12
Peak Outflow:	134 (CFS)	Date/Time of Peak Outflow:	01Jul2015, 13:00
Total Inflow :	57.1 (AC-FT)	Peak Storage:	25.3 (AC-FT)
Total Outflow:	46.3 (AC-FT)	Peak Elevation:	7057.0 (FT)

Simulation Run: RHRF2-005 YR Reservoir: POND D

Start of Run:	01Jul2015, 00:00	Basin Model:	WW Grading
End of Run:	02Jul2015, 00:00	Meteorologic Model:	SCS TYPE IIA 005YR
Compute Time:	14Mar2018 13:11:34	Control Specifications:	24 HR-2 MIN.

Volume Units: AC-FT

Computed Results:

Peak Inflow:	111 (CFS)	Date/Time of Peak Inflow:	01Jul2015, 12:18
Peak Outflow:	11 (CFS)	Date/Time of Peak Outflow:	01Jul2015, 14:36
Total Inflow :	13.6 (AC-FT)	Peak Storage:	7.1 (AC-FT)
Total Outflow:	8.2 (AC-FT)	Peak Elevation:	7053.8 (FT)

Simulation Run: RHRF2-100 YR Reservoir: POND E

Start of Run:	01Jul2015, 00:00	Basin Model:	WW Grading
End of Run:	02Jul2015, 00:00	Meteorologic Model:	SCS TYPE IIA 100YR
Compute Time:	14Mar2018 13:11:34	Control Specifications:	24 HR-2 MIN.

Volume Units: AC-FT

Computed Results:

Peak Inflow:	556 (CFS)	Date/Time of Peak Inflow:	01Jul2015, 12:18
Peak Outflow:	231 (CFS)	Date/Time of Peak Outflow:	01Jul2015, 13:30
Total Inflow :	119.4 (AC-FT)	Peak Storage:	41.5 (AC-FT)
Total Outflow:	94.6 (AC-FT)	Peak Elevation:	6973.5 (FT)

Simulation Run: RHRF2-005 YR Reservoir: POND E

Start of Run:	01Jul2015, 00:00	Basin Model:	WW Grading
End of Run:	02Jul2015, 00:00	Meteorologic Model:	SCS TYPE IIA 005YR
Compute Time:	14Mar2018 13:11:34	Control Specifications:	24 HR-2 MIN.

Volume Units: AC-FT

Computed Results:

Peak Inflow:	122 (CFS)	Date/Time of Peak Inflow:	01Jul2015, 12:12
Peak Outflow:	13 (CFS)	Date/Time of Peak Outflow:	01Jul2015, 20:00
Total Inflow :	26.7 (AC-FT)	Peak Storage:	16.6 (AC-FT)
Total Outflow:	10.1 (AC-FT)	Peak Elevation:	6971.2 (FT)

Simulation Run: RHRF2-100 YR Reservoir: POND G

Start of Run:	01Jul2015, 00:00	Basin Model:	WW Grading
End of Run:	02Jul2015, 00:00	Meteorologic Model:	SCS TYPE IIA 100YR
Compute Time:	14Mar2018 13:11:34	Control Specifications:	24 HR-2 MIN.

Volume Units: AC-FT

Computed Results:

Peak Inflow:	491 (CFS)	Date/Time of Peak Inflow:	01Jul2015, 12:18
Peak Outflow:	369 (CFS)	Date/Time of Peak Outflow:	01Jul2015, 13:30
Total Inflow :	100.1 (AC-FT)	Peak Storage:	21.4 (AC-FT)
Total Outflow:	90.8 (AC-FT)	Peak Elevation:	7029.7 (FT)

Simulation Run: RHRF2-005 YR Reservoir: POND G

Start of Run:	01Jul2015, 00:00	Basin Model:	WW Grading
End of Run:	02Jul2015, 00:00	Meteorologic Model:	SCS TYPE IIA 005YR
Compute Time:	14Mar2018 13:11:34	Control Specifications:	24 HR-2 MIN.

Volume Units: AC-FT

Computed Results:

Peak Inflow:	40 (CFS)	Date/Time of Peak Inflow:	01Jul2015, 12:12
Peak Outflow:	13 (CFS)	Date/Time of Peak Outflow:	01Jul2015, 20:00
Total Inflow :	15.0 (AC-FT)	Peak Storage:	7.1 (AC-FT)
Total Outflow:	8.4 (AC-FT)	Peak Elevation:	7025.8 (FT)

RHR FILING 1 FUTURE CONDITION
Simulation Run: F-100 YR Reservoir: POND D

Start of Run:	01Jul2015, 00:00	Basin Model:	Future SCS
End of Run:	02Jul2015, 00:00	Meteorologic Model:	SCS TYPE IIA 100YR
Compute Time:	14Mar2018 13:11:34	Control Specifications:	24 HR-2 MIN.

Volume Units: AC-FT

Computed Results:

Peak Inflow:	531(CFS)	Date/Time of Peak Inflow:	01Jul2015, 12:12
Peak Outflow:	134 (CFS)	Date/Time of Peak Outflow:	01Jul2015, 13:00
Total Inflow :	57.1 (AC-FT)	Peak Storage:	25.3 (AC-FT)
Total Outflow:	46.3 (AC-FT)	Peak Elevation:	7057.0 (FT)

Simulation Run: F-005 YR Reservoir: POND D

Start of Run:	01Jul2015, 00:00	Basin Model:	Future SCS
End of Run:	02Jul2015, 00:00	Meteorologic Model:	SCS TYPE IIA 005YR
Compute Time:	14Mar2018 13:26:34	Control Specifications:	24 HR-2 MIN.

Volume Units: AC-FT

Computed Results:

Peak Inflow:	111 (CFS)	Date/Time of Peak Inflow:	01Jul2015, 12:18
Peak Outflow:	11 (CFS)	Date/Time of Peak Outflow:	01Jul2015, 14:36
Total Inflow :	13.6 (AC-FT)	Peak Storage:	7.1 (AC-FT)
Total Outflow:	8.2 (AC-FT)	Peak Elevation:	7053.8 (FT)

Simulation Run: F-100 YR Reservoir: POND E

Start of Run:	01Jul2015, 00:00	Basin Model:	Future SCS
End of Run:	02Jul2015, 00:00	Meteorologic Model:	SCS TYPE IIA 100YR
Compute Time:	14Mar2018 13:11:34	Control Specifications:	24 HR-2 MIN.

Volume Units: AC-FT

Computed Results:

Peak Inflow:	618 (CFS)	Date/Time of Peak Inflow:	01Jul2015, 12:18
Peak Outflow:	240 (CFS)	Date/Time of Peak Outflow:	01Jul2015, 13:30
Total Inflow :	122.5 (AC-FT)	Peak Storage:	42.2 (AC-FT)
Total Outflow:	97.7 (AC-FT)	Peak Elevation:	6973.6 (FT)

Simulation Run: F-005 YR Reservoir: POND E

Start of Run:	01Jul2015, 00:00	Basin Model:	Future SCS
End of Run:	02Jul2015, 00:00	Meteorologic Model:	SCS TYPE IIA 005YR
Compute Time:	14Mar2018 13:26:34	Control Specifications:	24 HR-2 MIN.

Volume Units: AC-FT

Computed Results:

Peak Inflow:	126 (CFS)	Date/Time of Peak Inflow:	01Jul2015, 12:12
Peak Outflow:	14 (CFS)	Date/Time of Peak Outflow:	01Jul2015, 20:00
Total Inflow :	28.0 (AC-FT)	Peak Storage:	17.2 (AC-FT)
Total Outflow:	11.1 (AC-FT)	Peak Elevation:	6971.3 (FT)

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
Compute Time:	14Mar2018 13:11:34	Control Specifications:	24 HR-2 MIN.

Volume Units: AC-FT

Computed Results:

Peak Inflow:	653 (CFS)	Date/Time of Peak Inflow:	01Jul2015, 12:06
Peak Outflow:	465 (CFS)	Date/Time of Peak Outflow:	01Jul2015, 12:32
Total Inflow :	119.1 (AC-FT)	Peak Storage:	24.8 (AC-FT)
Total Outflow:	109.6 (AC-FT)	Peak Elevation:	7030.2 (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
Compute Time:	14Mar2018 13:26:34	Control Specifications:	24 HR-2 MIN.

Volume Units: AC-FT

Computed Results:

Peak Inflow:	75 (CFS)	Date/Time of Peak Inflow:	01Jul2015, 12:30
Peak Outflow:	20 (CFS)	Date/Time of Peak Outflow:	01Jul2015, 15:24
Total Inflow :	20.4 (AC-FT)	Peak Storage:	8.0 (AC-FT)
Total Outflow:	13.6 (AC-FT)	Peak Elevation:	7027.4 (FT)

Appendix D – Outlet Protection Design

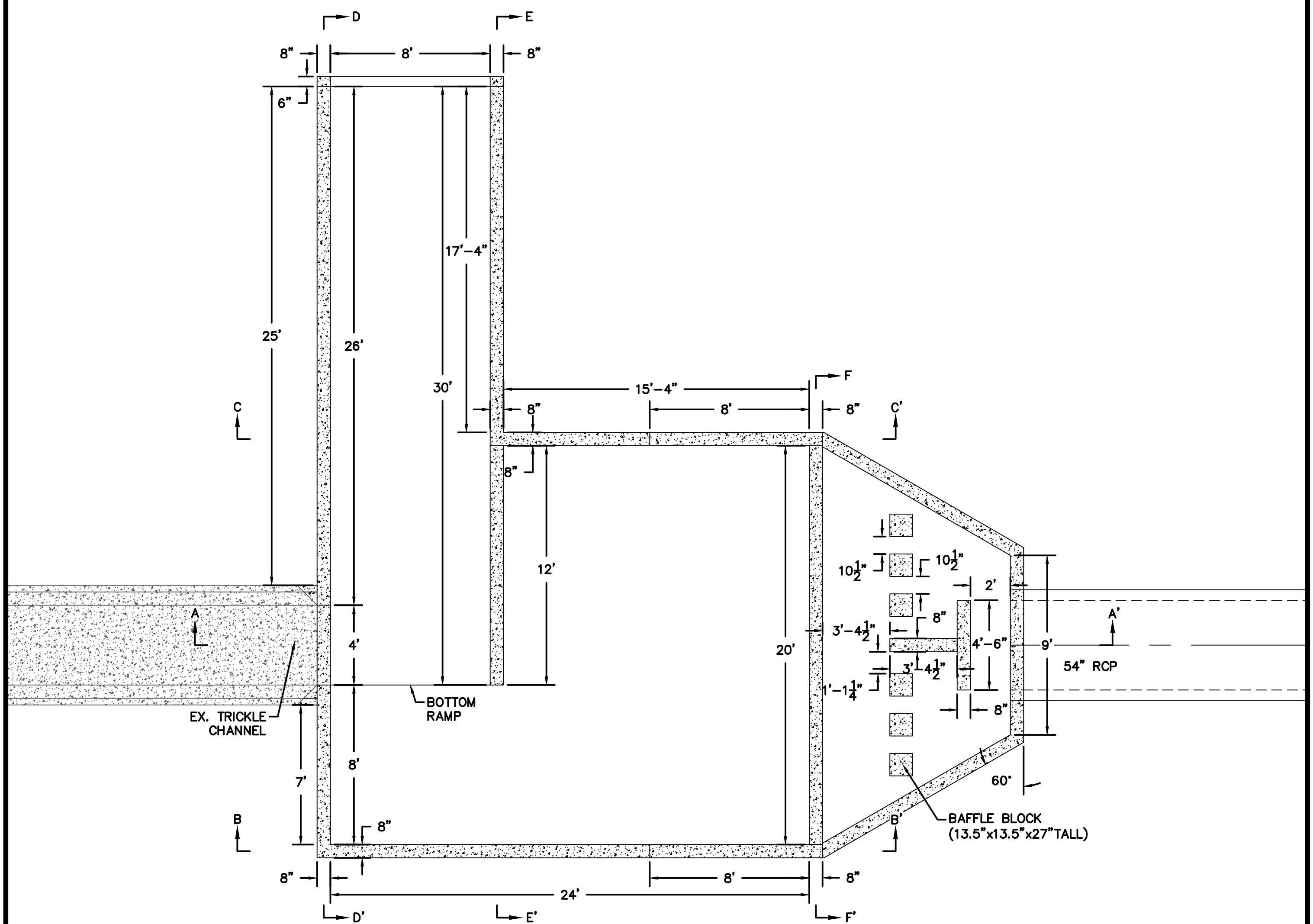
TYPE VI IMPACT BASIN

Urban Drainage & Flood Control District Pipe Outlet Design

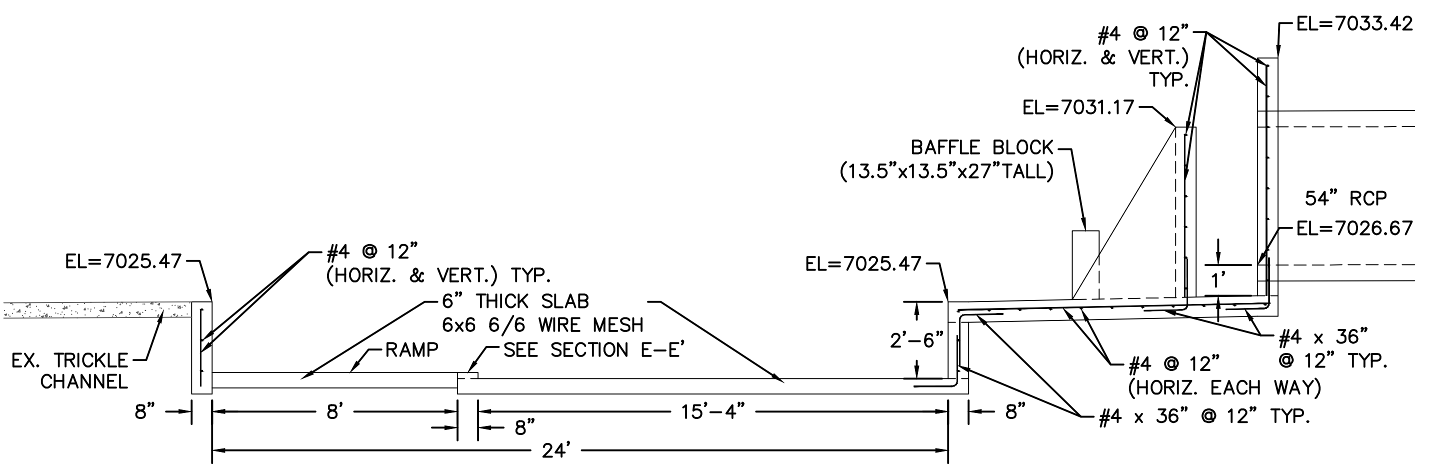
OUTLET # OS-4

Outlet Size (D) :	54	in.	Discharge (q):	115	CFS
Capacity (Q): (full flow)	153	CFS	Flow Depth (d):	32.8	in.
			Slope:	0.0073	in/in
			Mannings (n)	0.013	

$\theta=$	155.2	DEGREES	
WP=	8.04	FT	
R=	1.26	FT	
A_{FLOW} =	10.11	SF	
V_{FLOW} =	11.38	FPS	
$D=(A)^{0.5}$	3.18		
W	9.98	$W=2.94d[V/(gD)^{0.5}]^{0.556}$	
Use	10.00	FT	
H	7.50	FT	
L	13.33	FT	
a	5.00	FT	
b	3.75	FT	
c	5	FT	
d	1.667	FT	
e	0.833	FT	
f	1.25	FT	
t	0.833	FT	Suggested Min



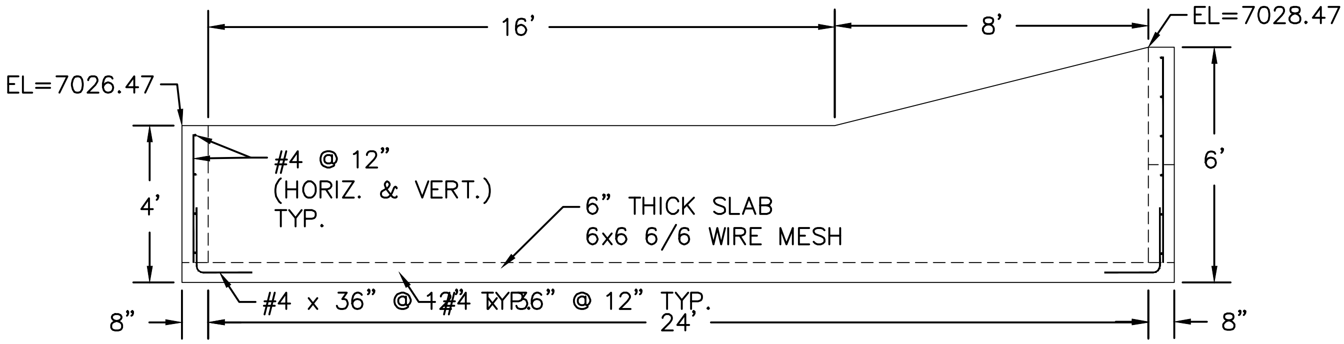
MODIFIED IMPACT STILLING BASIN



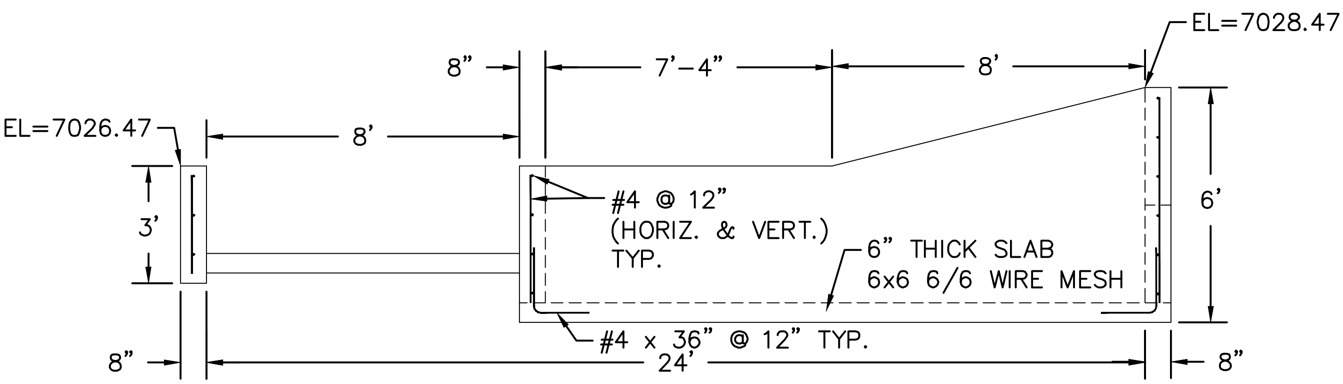
SECTION A-A

1	SCALE: N.T.S. DATE: NOV 2020 DRAWN: LCG CHECK: TAK	**IMPACT STILLING BASIN** MILE HIGH FLOOD DISTRICT Modified for 54" RCP, Fig 9-43, 44	TECH CONTRACTORS 11886 STAPLETON DRIVE FALCON, CO 80831 TELEPHONE: 719.495.7444

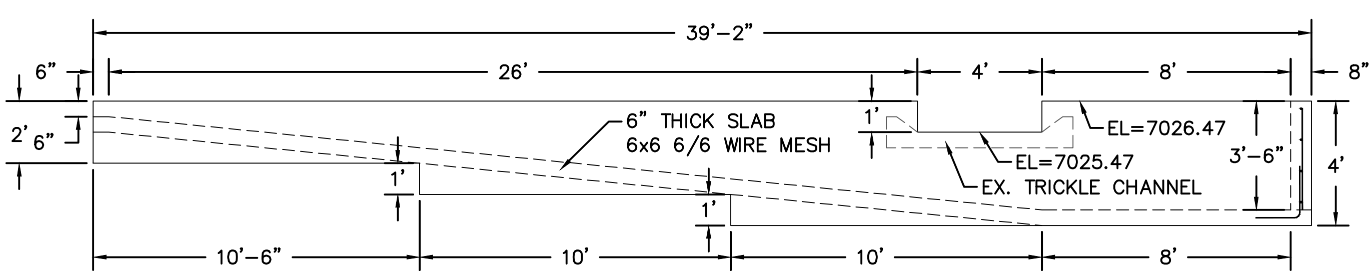
S:\OneDrive\CivilProj\Rolling Hills Filing 2\DWG\Exhibits\DRAINAGE\STILLING WELL DETAIL.dwg, 11/3/2020 8:20:49 AM



SECTION B-B

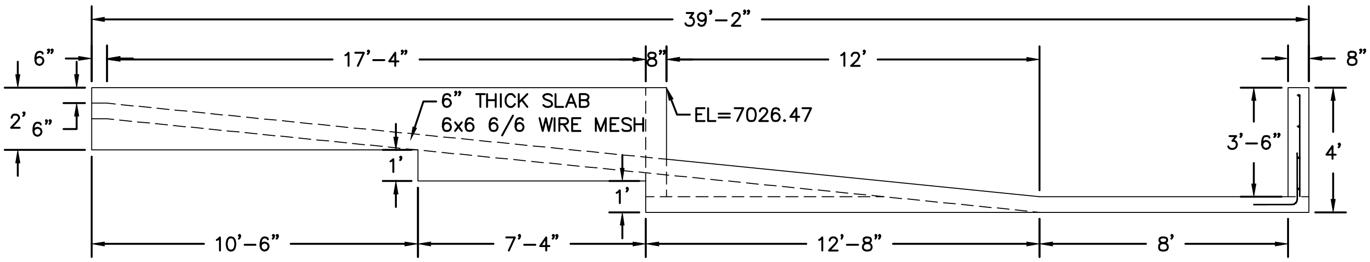


SECTION C-C

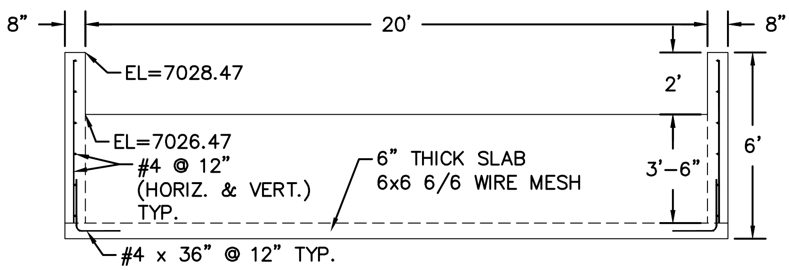


SECTION D-D

2	SCALE: N.T.S. DATE: NOV 2020 DRAWN: LCG CHECK: TAK	**IMPACT STILLING BASIN** MILE HIGH FLOOD DISTRICT Modified for 54" RCP, Fig 9-43, 44	TECH CONTRACTORS 11886 STAPLETON DRIVE FALCON, CO 80831 TELEPHONE: 719.495.7444



SECTION E-E



SECTION F-F

3	SCALE: N.T.S. DATE: NOV 2020 DRAWN: LCG CHECK: TAK	**IMPACT STILLING BASIN** MILE HIGH FLOOD DISTRICT Modified for 54" RCP, Fig 9-43, 44	TECH CONTRACTORS 11886 STAPLETON DRIVE FALCON, CO 80831 TELEPHONE: 719.495.7444

Appendix E – Regional Water Quality Analysis

This analysis appears to be missing. Please include. Please be sure to address the previous minor comment provided.

United States Department of Agriculture

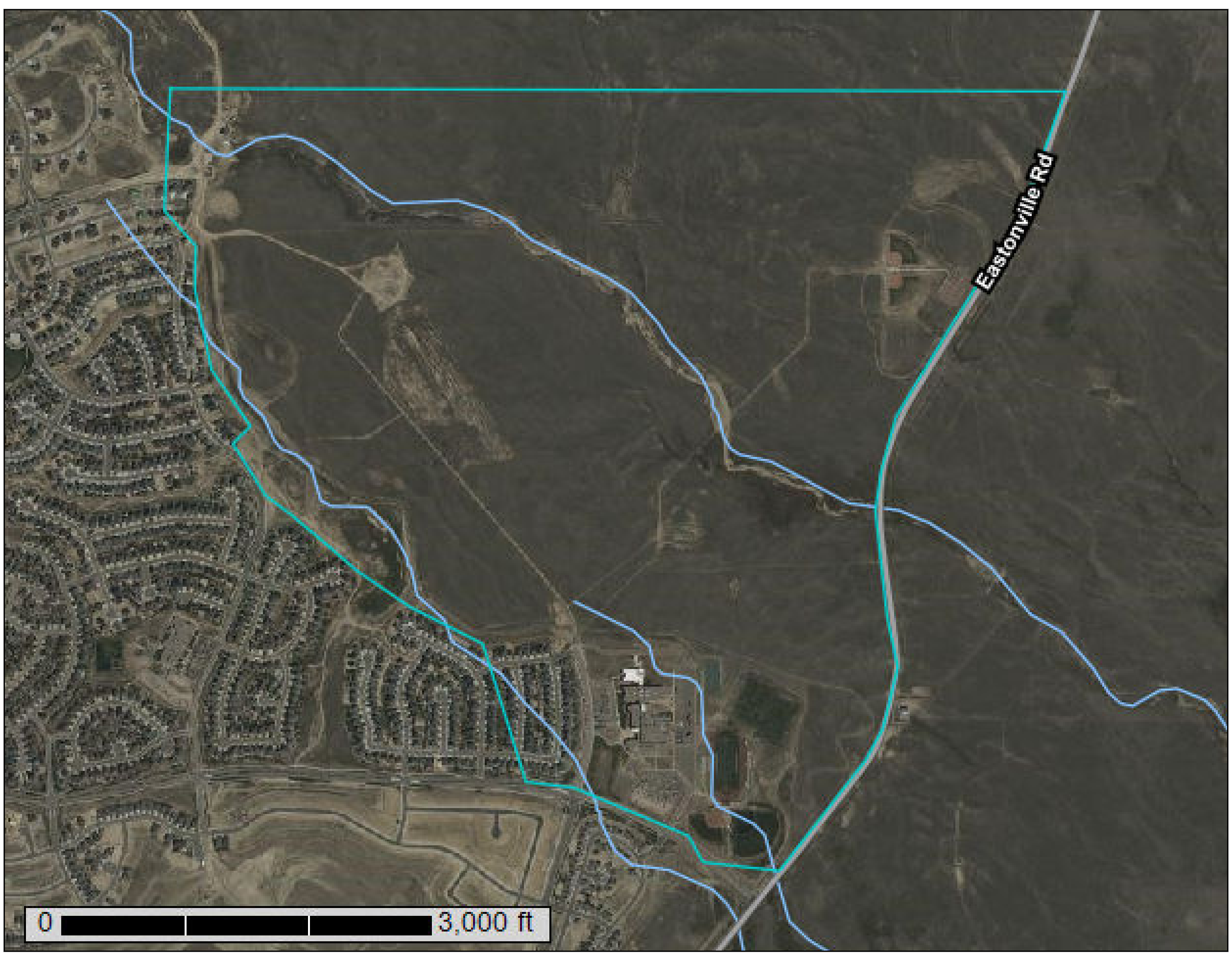
NRCS

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



August 3, 2020

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.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

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: 1:16,400 if printed on A landscape (11" x 8.5") sheet.

Meters: 0, 200, 400, 800, 1200

Feet: 0, 500, 1000, 2000, 3000

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 18, Jun 5, 2020

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	272.0	39.4%
83	Stapleton sandy loam, 3 to 8 percent slopes	417.9	60.6%
Totals for Area of Interest		**689.9**	**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: Fans, flood plains, fan terraces
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 capacity: Very low (about 2.5 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Ecological site: R049XB215CO - Gravelly Foothill
Hydric soil rating: No

Minor Components

Pleasant

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

Other soils

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

Fluvaquentic haplaquolls

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

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 capacity: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: R049XB215CO - Gravelly Foothill
Hydric soil rating: No

Minor Components

Pleasant

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

Other soils

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

Fluvaquentic haplaquolls

Percent of map unit: 1 percent
Landform: Swales
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 F – Soil Resource Report

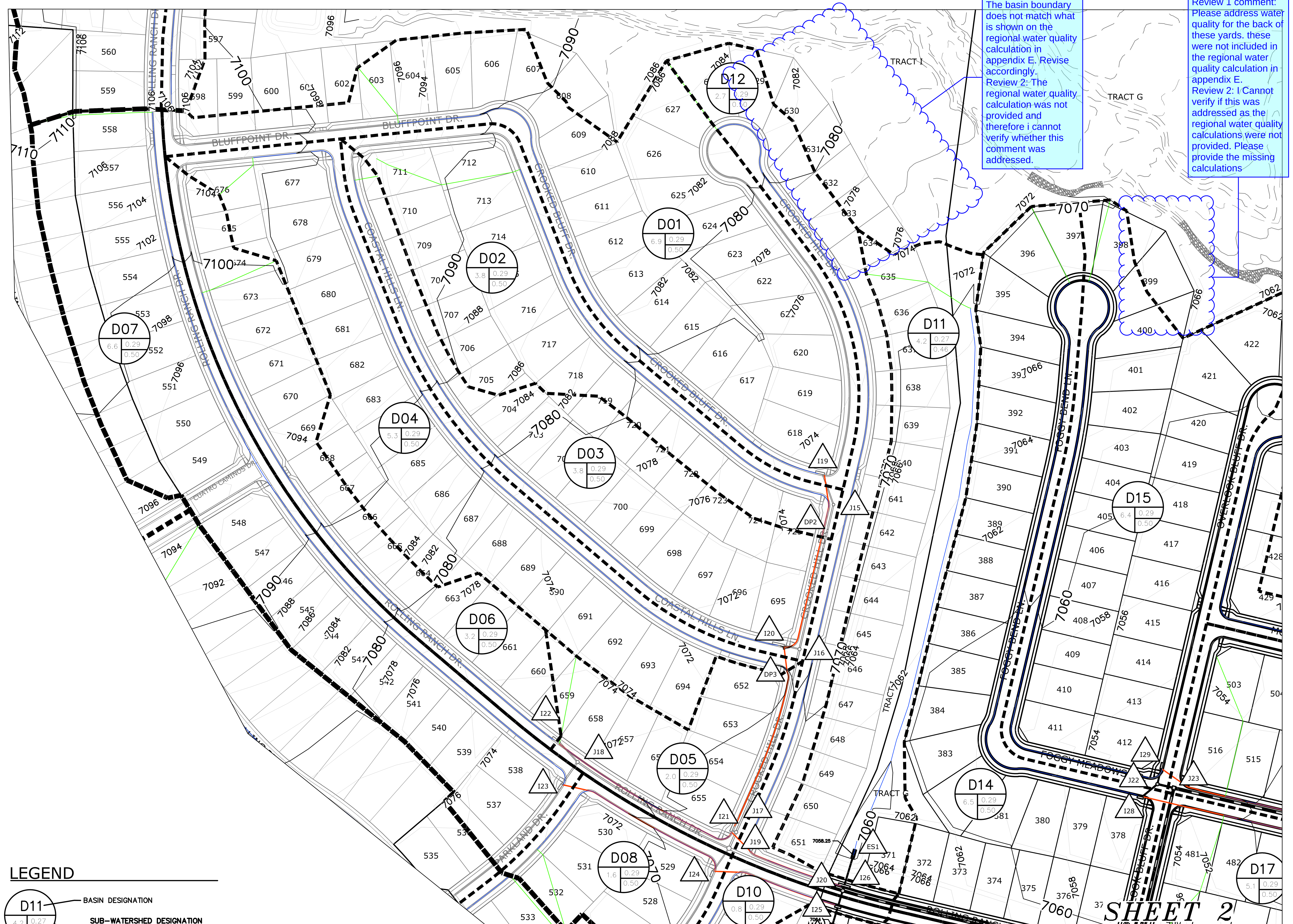
The soil resource report is in the previous pages.

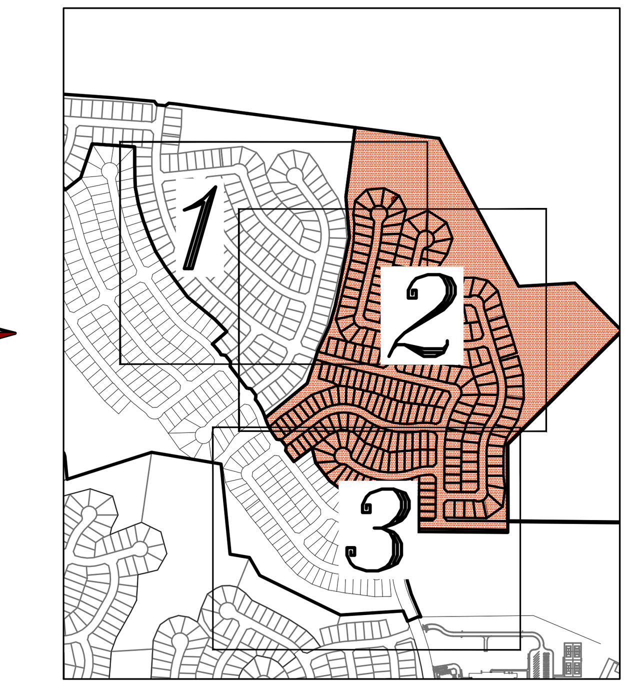
INSERT SOILS REPORT PDF FILE

Appendix G – Drainage Maps

Review 1 comment: The basin boundary does not match what is shown on the regional water quality calculation in appendix E. Revise accordingly.
Review 2: The regional water quality calculation was not provided and therefore i cannot verify whether this comment was addressed.

Review 1 comment: Please address water quality for the back of these yards. these were not included in the regional water quality calculation in appendix E.
Review 2: I Cannot verify if this was addressed as the regional water quality calculations were not provided. Please provide the missing calculations





INDEX MAP

N.T.S.

DP	BASIN	AREA (AC)	Q(5) (CFS)	Q(100) (CFS)	INLET	Q(5) (CFS)	Q(100) (CFS)	PIPE
I19	D01	6.87	6.8	19	PR 15 ' FORCED SUMP	6.8	14	18 " RCP
J15						6.8	14	24 " RCP
DP2	D02	3.83	3.8	16				
I20	D03	3.84	7.1	20	PR 20 ' FORCED SUMP	7.1	17	18 " RCP
J16						13.4	30	30 " RCP
DP3	D04	5.30	5.0	16				
I21	D05	2.00	6.7	23	PR 15 ' FORCED SUMP	6.7	14	18 " RCP
J17						19.0	41	30 " RCP
I22	D06	3.20	3.2	9	PR 15 ' FLOW-BY	2.6	6.2	18 " RCP
I23	D07	6.59	6.1	17	PR 10 ' FORCED SUMP	6.1	9.9	18 " RCP
J18						8.5	16	24 " RCP
I24	D08	1.64	1.8	11	PR 10 ' FORCED SUMP	1.8	9.9	18 " RCP
J19						28.6	65	42 " RCP
CB2	D09	1.63	1.2	3.4	PR Type C	1.2	3.4	18 " RCP
I25	D10	0.81	0.9	2.9	PR 10 ' SUMP	2.1	6.4	18 " RCP
ES1	D11	4.16	2.4	6.9	" FES	2.4	6.9	18 " RCP
I26	D12	2.67	2.4	15	PR 20 ' SUMP	4.3	18	24 " RCP
J20						28.6	71	42 " RCP
I27	D13	1.79	2.2	5.8	PR 15 ' FLOW-BY	1.7	3.9	18 " RCP
J21						28.6	72	42 " RCP
I28	D14	6.45	6.3	18	PR 10 ' FORCED SUMP	6.3	9.9	18 " RCP
I29	D15	6.35	6.2	18	PR 10 ' FORCED SUMP	6.2	9.9	18 " RCP
J22						12.5	20	24 " RCP
J23						35.2	84	48 " RCP
I30	D16	4.02	4.2	17	PR 10 ' FORCED SUMP	4.2	9.9	18 " RCP
J24						37.7	90	48 " RCP
J25						37.6	90	48 " RCP
I31	D17	5.13	5.3	27	PR 15 ' SUMP	5.3	24	30 " RCP
J26						41.2	107	54 " RCP
I32	D18	3.13	3.0	10	PR 15 ' SUMP	43.3	114	54 " RCP
I33	E01	5.38	6.2	17	PR 20 ' FORCED SUMP	6.2	17	18 " RCP
J27						6.2	17	18 " RCP
I34	E02	6.48	7.3	19	PR 20 ' FORCED SUMP	7.3	17	18 " RCP
J28						13.0	33	30 " RCP
I35	E03	5.82	6.5	17	PR 15 ' FORCED SUMP	6.5	14	18 " RCP
J29						19.1	46	36 " RCP
I36	E04	3.14	3.9	13	PR 15 ' FORCED SUMP	3.9	13	18 " RCP
I37	E05	2.55	2.7	9.3	PR 20 ' FLOW-BY	2.6	7.1	18 " RCP
J30						25.4	66	36 " RCP
J31						25.3	65	42 " RCP
I38	E06	1.27	1.6	4.2	PR 5 ' FORCED SUMP	1.6	4.2	18 " RCP
J32						1.5	4.1	18 " RCP
I39	E07	2.05	2.5	6.7	PR 15 ' FLOW-BY	2.0	4.5	18 " RCP
J33						3.5	8.5	18 " RCP
I40	E08	4.17	4.8	13	PR 10 ' FORCED SUMP	4.8	9.9	18 " RCP
J34						8.0	18	24 " RCP
J35						8.0	18	24 " RCP
I41	E09	5.44	6.2	18	PR 15 ' FORCED SUMP	6.2	14	24 " RCP
J36						37.0	91	42 " RCP
I42	E10	6.98	7.0	19	PR 20 ' SUMP	7.0	19	24 " RCP
J37						43.4	108	48 " RCP
CB3	E11	13.04	6.3	18	PR Type C	6.3	18	24 " RCP
I43	E12	1.60	3.8	9.7	PR 20 ' FLOW-BY	3.4	7.4	18 " RCP
J38						52.7	133	54 " RCP
EI1	E13	6.02	8.2	19	EX 15 ' FORCED SUMP	8.2	13	18 " RCP

LEGEND

- D11 — BASIN DESIGNATION
- 4.2 / 0.27 / 0.46 — SUB-WATERSHED DESIGNATION; MINOR/MAJOR STORM COEFFICIENT; BASIN AREA IN ACRES
- DP2 (triangle) — DESIGN POINT DESIGNATION
- MAJOR BASIN BOUNDARY
- SUB-BASIN BOUNDARY
- 6130 — EXISTING CONTOUR
- 6130 — PROPOSED CONTOUR
- PROPOSED STORM SEWER
- INITIAL OVERLAND TIME (TI)
- TRAVEL TIME (Tt)
- OVERLAND TIME (To)

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)

1 inch = 100 ft.

FIGURE 4

No.	Revisions	Date	Init.	Appr.	Date
1					
2					
3					
4					

TECH CONTRACTORS
11886 STAPLETON DRIVE
FALCON, CO 80831
TELEPHONE: 719.495.7444
FAX: 719.495.2457

MERIDIAN RANCH

ROLLING HILLS RANCH FILING 2 AT MERIDIAN RANCH

RATIONAL MAPS

Drawn by CJT

Checked by TAK

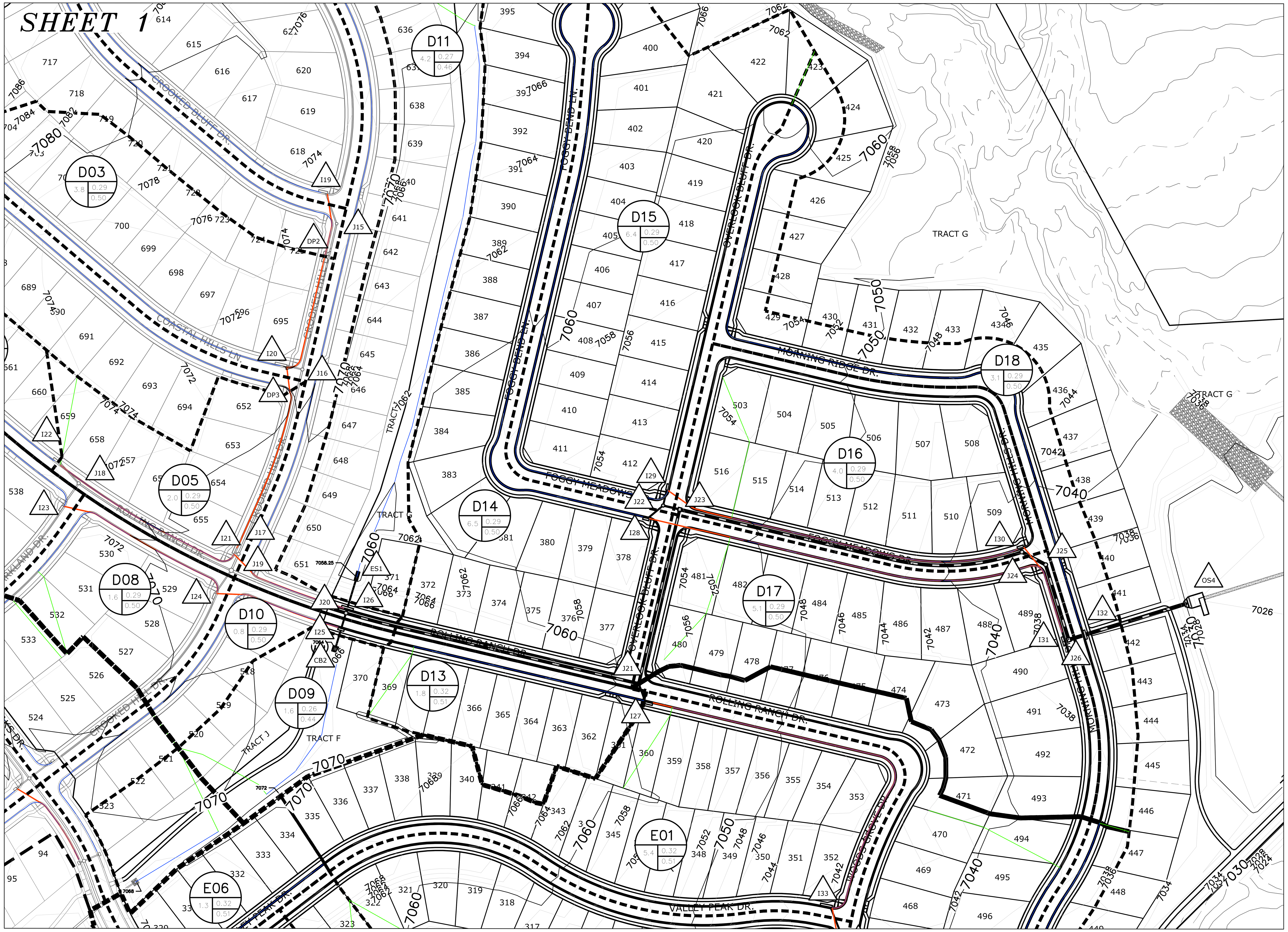
Date OCT 2020

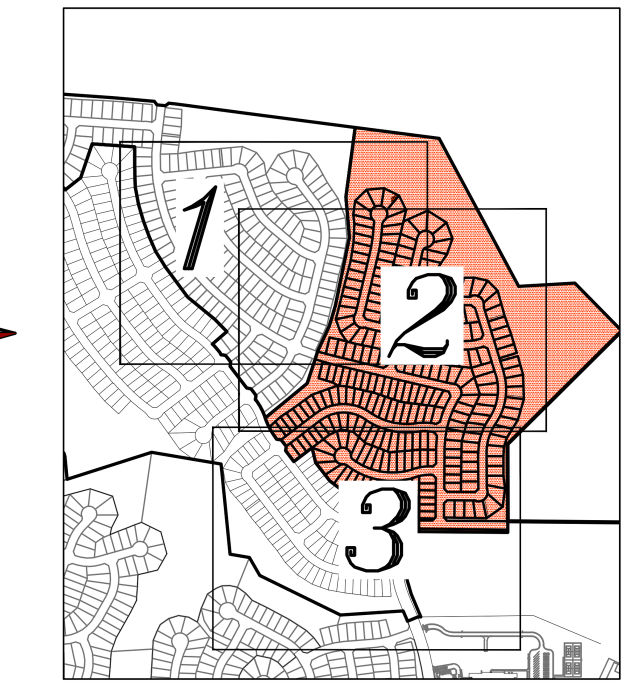
Scale AS SHOWN

SHEET 1

PCD PROJECT NO. EGP-XX-XXX

S:\OneDrive\Civil\Proj\Rolling Hills Filing 2\DWG\Plan Sheets\Drainage Maps\FDR\ROLLING HILLS RANCH FILING 2 FDR - RATIONAL MAP.dwg 10/30/2020 10:31:54 AM





INDEX MAP

N.T.S.

DP	BASIN	AREA (AC)	Q(5) (CFS)	Q(100) (CFS)	INLET	Q(5) (CFS)	Q(100) (CFS)	PIPE
I19	D01	6.87	6.8	19	PR 15 ' FORCED SUMP	6.8	14	18 " RCP
J15						6.8	14	24 " RCP
DP2	D02	3.83	3.8	16				
I20	D03	3.84	7.1	20	PR 20 ' FORCED SUMP	7.1	17	18 " RCP
J16						13.4	30	30 " RCP
DP3	D04	5.30	5.0	16				
I21	D05	2.00	6.7	23	PR 15 ' FORCED SUMP	6.7	14	18 " RCP
J17						19.0	41	30 " RCP
I22	D06	3.20	3.2	9	PR 15 ' FLOW-BY	2.6	6.2	18 " RCP
I23	D07	6.59	6.1	17	PR 10 ' FORCED SUMP	6.1	9.9	18 " RCP
J18						8.5	16	24 " RCP
I24	D08	1.64	1.8	11	PR 10 ' FORCED SUMP	1.8	9.9	18 " RCP
J19						28.6	65	42 " RCP
CB2	D09	1.63	1.2	3.4	PR Type C	1.2	3.4	18 " RCP
I25	D10	0.81	0.9	2.9	PR 10 ' SUMP	2.1	6.4	18 " RCP
ES1	D11	4.16	2.4	6.9	" FES	2.4	6.9	18 " RCP
I26	D12	2.67	2.4	15	PR 20 ' SUMP	4.3	18	24 " RCP
J20						28.6	71	42 " RCP
I27	D13	1.79	2.2	5.8	PR 15 ' FLOW-BY	1.7	3.9	18 " RCP
J21						28.6	72	42 " RCP
I28	D14	6.45	6.3	18	PR 10 ' FORCED SUMP	6.3	9.9	18 " RCP
I29	D15	6.35	6.2	18	PR 10 ' FORCED SUMP	6.2	9.9	18 " RCP
J22						12.5	20	24 " RCP
J23						35.2	84	48 " RCP
I30	D16	4.02	4.2	17	PR 10 ' FORCED SUMP	4.2	9.9	18 " RCP
J24						37.7	90	48 " RCP
J25						37.6	90	48 " RCP
I31	D17	5.13	5.3	27	PR 15 ' SUMP	5.3	24	30 " RCP
J26						41.2	107	54 " RCP
I32	D18	3.13	3.0	10	PR 15 ' SUMP	43.3	114	54 " RCP
I33	E01	5.38	6.2	17	PR 20 ' FORCED SUMP	6.2	17	18 " RCP
J27						6.2	17	18 " RCP
I34	E02	6.48	7.3	19	PR 20 ' FORCED SUMP	7.3	17	18 " RCP
J28						13.0	33	30 " RCP
I35	E03	5.82	6.5	17	PR 15 ' FORCED SUMP	6.5	14	18 " RCP
J29						19.1	46	36 " RCP
I36	E04	3.14	3.9	13	PR 15 ' FORCED SUMP	3.9	13	18 " RCP
I37	E05	2.55	2.7	9.3	PR 20 ' FLOW-BY	2.6	7.1	18 " RCP
J30						25.4	66	36 " RCP
J31						25.3	65	42 " RCP
I38	E06	1.27	1.6	4.2	PR 5 ' FORCED SUMP	1.6	4.2	18 " RCP
J32						1.5	4.1	18 " RCP
I39	E07	2.05	2.5	6.7	PR 15 ' FLOW-BY	2.0	4.5	18 " RCP
J33						3.5	8.5	18 " RCP
I40	E08	4.17	4.8	13	PR 10 ' FORCED SUMP	4.8	9.9	18 " RCP
J34						8.0	18	24 " RCP
J35						8.0	18	24 " RCP
I41	E09	5.44	6.2	18	PR 15 ' FORCED SUMP	6.2	14	24 " RCP
J36						37.0	91	42 " RCP
I42	E10	6.98	7.0	19	PR 20 ' SUMP	7.0	19	24 " RCP
J37						43.4	108	48 " RCP
CB3	E11	13.04	6.3	18	PR Type C	6.3	18	24 " RCP
I43	E12	1.60	3.8	9.7	PR 20 ' FLOW-BY	3.4	7.4	18 " RCP
J38						52.7	133	54 " RCP
EI1	E13	6.02	8.2	19	EX 15 ' FORCED SUMP	8.2	13	18 " RCP

LEGEND

D11 — BASIN DESIGNATION; 0.27 / 0.46 — SUB-WATERSHED DESIGNATION, MINOR/MAJOR STORM COEFFICIENT; 4.2 — BASIN AREA IN ACRES

DP2 — 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)

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)

1 inch = 100 ft.

FIGURE 4

No.	Revisions	Date	Init.	Appr.	Date
1	.				
2	.				
3	.				
4	.				

TECH CONTRACTORS
11886 STAPLETON DRIVE
FALCON, CO 80831
TELEPHONE: 719.495.7444
FAX: 719.495.2457

MERIDIAN RANCH

ROLLING HILLS RANCH FILING 2 AT MERIDIAN RANCH
RATIONAL MAPS

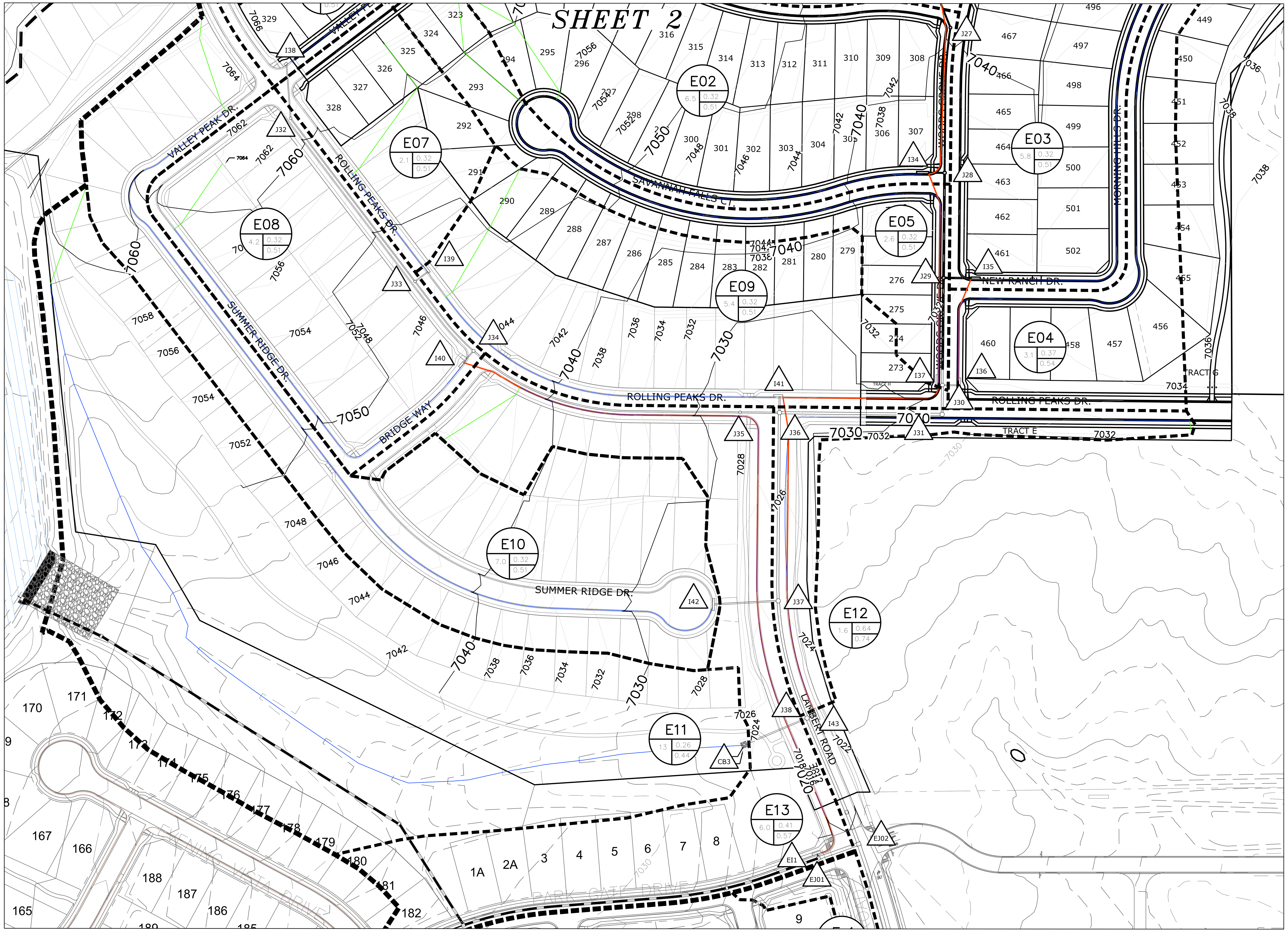
Drawn by CJT
Checked by TAK
Date OCT 2020

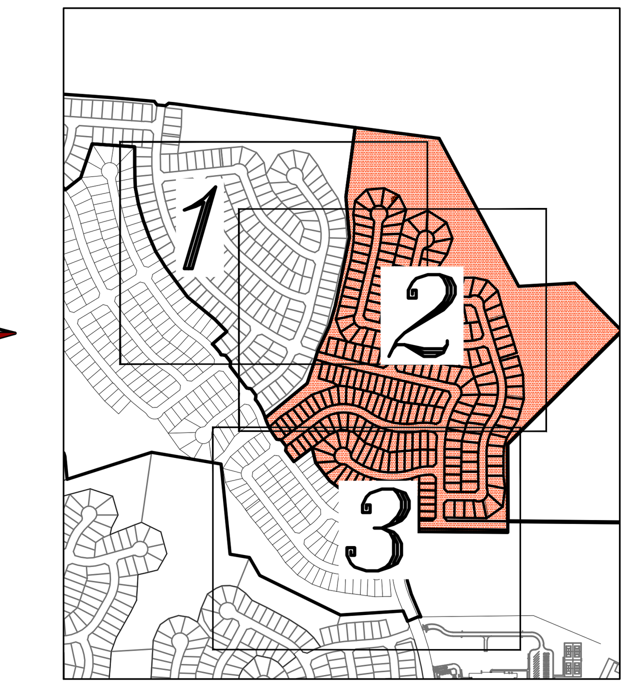
Scale AS SHOWN

SHEET 2

PCD PROJECT NO. EGP-XX-XXX

S:\OneDrive\CivilProj\Rolling Hills Filing 2\DWG\Plan Sheets\Drainage Maps\FDR\ROLLING HILLS RANCH FILING 2 FDR - RATIONAL MAP.dwg 10/30/2020 10:25:53 AM





INDEX MAP
N.T.S.

DP	BASIN	AREA (AC)	Q(5) (CFS)	Q(100) (CFS)	INLET	Q(5) (CFS)	Q(100) (CFS)	PIPE
I19	D01	6.87	6.8	19	PR 15 ' FORCED SUMP	6.8	14	18 " RCP
J15						6.8	14	24 " RCP
DP2	D02	3.83	3.8	16				
I20	D03	3.84	7.1	20	PR 20 ' FORCED SUMP	7.1	17	18 " RCP
J16						13.4	30	30 " RCP
DP3	D04	5.30	5.0	16				
I21	D05	2.00	6.7	23	PR 15 ' FORCED SUMP	6.7	14	18 " RCP
J17						19.0	41	30 " RCP
I22	D06	3.20	3.2	9	PR 15 ' FLOW-BY	2.6	6.2	18 " RCP
I23	D07	6.59	6.1	17	PR 10 ' FORCED SUMP	6.1	9.9	18 " RCP
J18						8.5	16	24 " RCP
I24	D08	1.64	1.8	11	PR 10 ' FORCED SUMP	1.8	9.9	18 " RCP
J19						28.6	65	42 " RCP
CB2	D09	1.63	1.2	3.4	PR Type C	1.2	3.4	18 " RCP
I25	D10	0.81	0.9	2.9	PR 10 ' SUMP	2.1	6.4	18 " RCP
ES1	D11	4.16	2.4	6.9	" FES	2.4	6.9	18 " RCP
I26	D12	2.67	2.4	15	PR 20 ' SUMP	4.3	18	24 " RCP
J20						28.6	71	42 " RCP
I27	D13	1.79	2.2	5.8	PR 15 ' FLOW-BY	1.7	3.9	18 " RCP
J21						28.6	72	42 " RCP
I28	D14	6.45	6.3	18	PR 10 ' FORCED SUMP	6.3	9.9	18 " RCP
I29	D15	6.35	6.2	18	PR 10 ' FORCED SUMP	6.2	9.9	18 " RCP
J22						12.5	20	24 " RCP
J23						35.2	84	48 " RCP
I30	D16	4.02	4.2	17	PR 10 ' FORCED SUMP	4.2	9.9	18 " RCP
J24						37.7	90	48 " RCP
J25						37.6	90	48 " RCP
I31	D17	5.13	5.3	27	PR 15 ' SUMP	5.3	24	30 " RCP
J26						41.2	107	54 " RCP
I32	D18	3.13	3.0	10	PR 15 ' SUMP	43.3	114	54 " RCP
I33	E01	5.38	6.2	17	PR 20 ' FORCED SUMP	6.2	17	18 " RCP
J27						6.2	17	18 " RCP
I34	E02	6.48	7.3	19	PR 20 ' FORCED SUMP	7.3	17	18 " RCP
J28						13.0	33	30 " RCP
I35	E03	5.82	6.5	17	PR 15 ' FORCED SUMP	6.5	14	18 " RCP
J29						19.1	46	36 " RCP
I36	E04	3.14	3.9	13	PR 15 ' FORCED SUMP	3.9	13	18 " RCP
I37	E05	2.55	2.7	9.3	PR 20 ' FLOW-BY	2.6	7.1	18 " RCP
J30						25.4	66	36 " RCP
J31						25.3	65	42 " RCP
I38	E06	1.27	1.6	4.2	PR 5 ' FORCED SUMP	1.6	4.2	18 " RCP
J32						1.5	4.1	18 " RCP
I39	E07	2.05	2.5	6.7	PR 15 ' FLOW-BY	2.0	4.5	18 " RCP
J33						3.5	8.5	18 " RCP
I40	E08	4.17	4.8	13	PR 10 ' FORCED SUMP	4.8	9.9	18 " RCP
J34						8.0	18	24 " RCP
J35						8.0	18	24 " RCP
I41	E09	5.44	6.2	18	PR 15 ' FORCED SUMP	6.2	14	24 " RCP
J36						37.0	91	42 " RCP
I42	E10	6.98	7.0	19	PR 20 ' SUMP	7.0	19	24 " RCP
J37						43.4	108	48 " RCP
CB3	E11	13.04	6.3	18	PR Type C	6.3	18	24 " RCP
I43	E12	1.60	3.8	9.7	PR 20 ' FLOW-BY	3.4	7.4	18 " RCP
J38						52.7	133	54 " RCP
EI1	E13	6.02	8.2	19	EX 15 ' FORCED SUMP	8.2	13	18 " RCP

These do not match the hydraulic calculations nor the CD's

LEGEND

- D11 — BASIN DESIGNATION; SUB-WATERSHED STORM COEFFICIENT; MINOR/MAJOR STORM COEFFICIENT; BASIN AREA IN ACRES
- DP2 — 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)

GRAPHIC SCALE
100 0 50 100 200 400
(IN FEET)
1 inch = 100 ft.

FIGURE 4

TECH CONTRACTORS
11886 STAPLETON DRIVE
FALCON, CO 80831
TELEPHONE: 719.495.7444
FAX: 719.495.2457

MERIDIAN RANCH

ROLLING HILLS RANCH FILING 2 AT MERIDIAN RANCH
RATIONAL MAPS

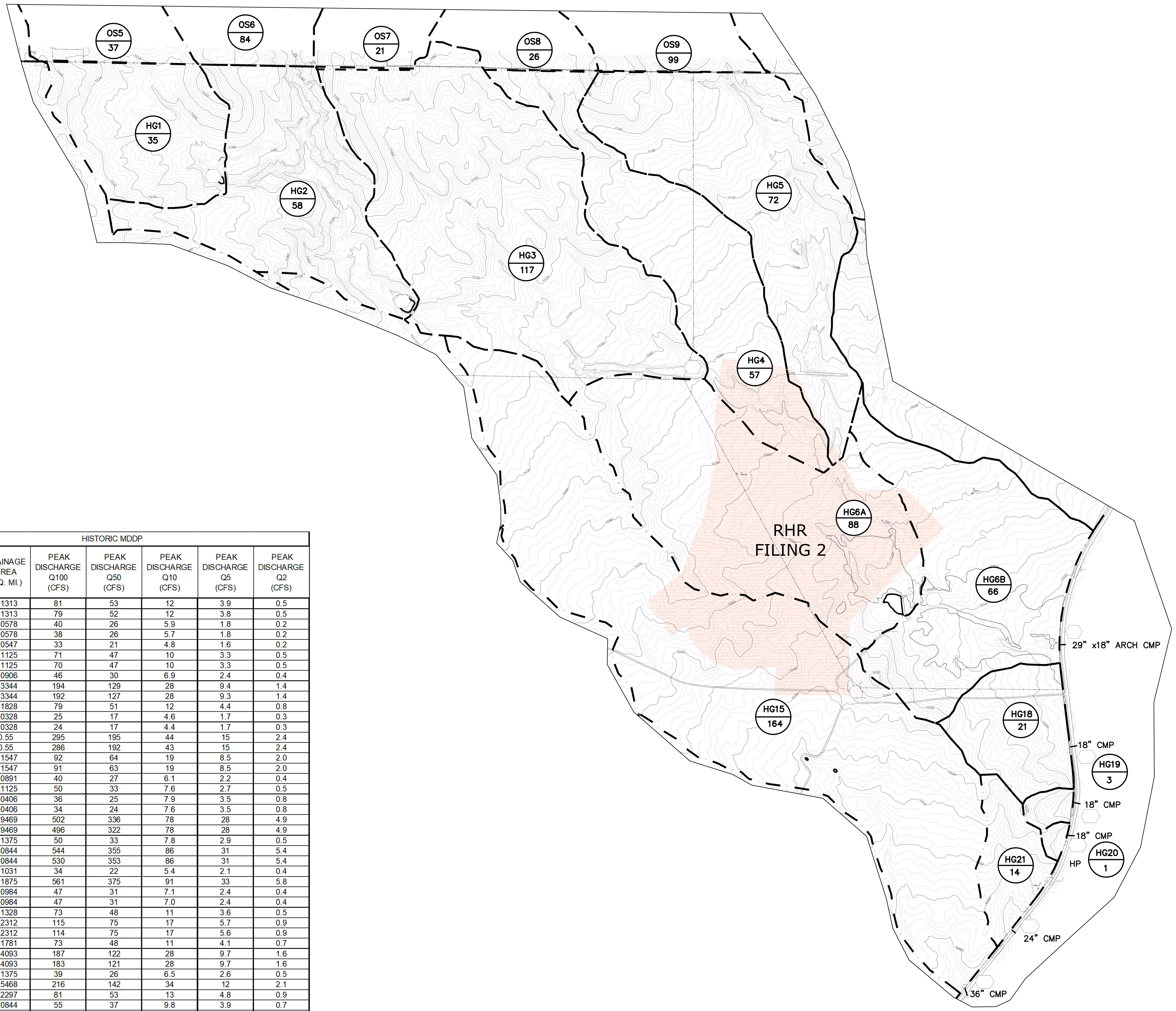
No.	Revisions	Date	Init.	Appr.	Date
1		.			
2		.			
3		.			
4		.			

Drawn by CJT | Checked by TAK | Date OCT 2020
Scale AS SHOWN | SHEET 3

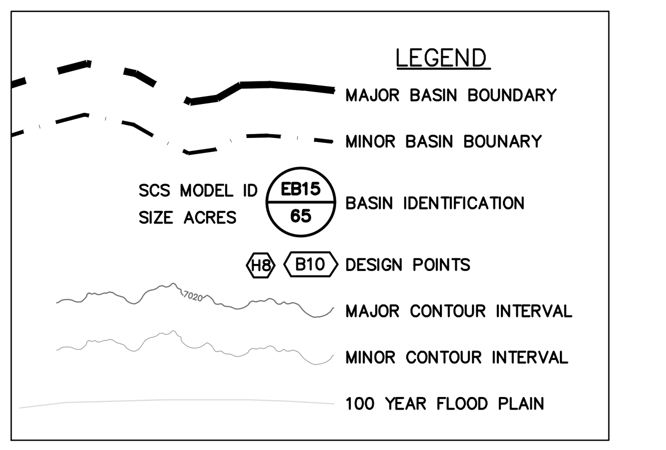
PCD PROJECT NO. EGP-XX-XXX

S:\OneDrive\Civil\Proj\Rolling Hills Filing 2\DWG\Plan Sheets\Drainage Maps\FDR\ROLLING HILLS RANCH FILING 2 FDR - RATIONAL MAP.dwg, 10/30/2020 10:28:39 AM

ROLLING HILL RANCH FILING 2
MERIDIAN RANCH



HISTORIC MDDP						
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	81	53	12	3.9	0.5
OS06-G02	0.1313	79	52	12	3.8	0.5
OS05	0.0578	40	26	5.9	1.8	0.2
OS05-G01	0.0578	38	26	5.7	1.8	0.2
HG01	0.0547	33	21	4.8	1.6	0.2
G01	0.1125	71	47	10	3.3	0.5
G01-G02	0.1125	70	47	10	3.3	0.5
HG02	0.0906	46	30	6.9	2.4	0.4
G02	0.3344	194	129	28	9.4	1.4
G02-G03	0.3344	192	127	28	9.3	1.4
HG03	0.1828	79	51	12	4.4	0.8
OS07	0.0328	25	17	4.6	1.7	0.3
OS07-G03	0.0328	24	17	4.4	1.7	0.3
G03	0.55	295	195	44	15	2.4
G03-G04	0.55	286	192	43	15	2.4
OS09	0.1547	92	64	19	8.5	2.0
OS09-G04	0.1547	91	63	19	8.5	2.0
HG04	0.0891	40	27	6.1	2.2	0.4
HG05	0.1125	50	33	7.6	2.7	0.5
OS08	0.0406	36	25	7.9	3.5	0.8
OS08-G04	0.0406	34	24	7.6	3.5	0.8
G04	0.9469	502	336	78	28	4.9
G04-G05	0.9469	496	322	78	28	4.9
HG06A	0.1375	50	33	7.8	2.9	0.5
G05	1.0844	544	355	86	31	5.4
G05-G06	1.0844	530	353	86	31	5.4
HG06B	0.1031	34	22	5.4	2.1	0.4
G06	1.1875	561	375	91	33	5.8
HG07	0.0984	47	31	7.1	2.4	0.4
HG07-G11	0.0984	47	31	7.0	2.4	0.4
HG08	0.1328	73	48	11	3.6	0.5
G11	0.2312	115	75	17	5.7	0.9
G11-G12	0.2312	114	75	17	5.6	0.9
HG09	0.1781	73	48	11	4.1	0.7
G12	0.4093	187	122	28	9.7	1.6
G12-H08	0.4093	183	121	28	9.7	1.6
HG10	0.1375	39	26	6.5	2.6	0.5
H08	0.5468	216	142	34	12	2.1
HG14	0.2297	81	53	13	4.8	0.9
HG13	0.0844	55	37	9.8	3.9	0.7
G07	0.0844	55	37	9.8	3.9	0.7
G07-G08	0.0844	54	37	9.7	3.8	0.7
G08	0.3141	119	78	20	7.6	1.5
HG15	0.2563	70	46	12	4.7	0.9
H13	0.2563	70	46	12	4.7	0.9
HG11	0.2047	77	51	12	4.5	0.8
H09	0.2047	77	51	12	4.5	0.8
HG12	0.1297	57	38	8.7	3.1	0.5
H10	0.1297	57	38	8.7	3.1	0.5



HISTORICAL CONDITIONS - SCS MAP

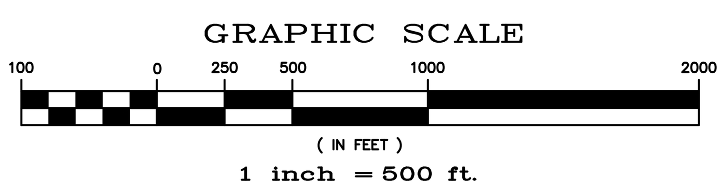


FIGURE 5

S:\OneDrive\Civil\Proj\Rolling Hills Filing 2\DWG\Plan Sheets\Drainage Maps\FDR\ROLLING HILLS RANCH FILING2-SCS - HIST.dwg, 10/30/2020 10:35:25 AM

ROLLING HILL RANCH FILING 2
MERIDIAN RANCH

INTERIM MDDP (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	0.5
G1a	0.1313	80	52	12	3.8	0.5
G1a-G2	0.1313	79	52	11	3.6	0.5
OS05	0.0578	39	26	6	1.8	0.2
OS05-G1	0.0578	39	25	6	1.7	0.2
FG01	0.0531	31	22	7	3.3	0.9
FG01-G1	0.0531	31	22	7	3.3	0.9
G1	0.1109	61	41	11	4.8	1.1
G1-G2	0.1109	60	41	11	4.8	1.1
FG02	0.0391	32	22	6	2.6	0.5
G2	0.2813	166	112	27	10.2	1.9
G2-G3	0.2813	163	108	27	10.1	1.9
FG03	0.0203	24	17	6	3.0	0.8
FG04	0.0172	22	16	6	3.1	0.9
G3	0.3188	184	123	31	12.0	2.4
G3-POND F	0.3188	183	121	31	11.9	2.4
FG06	0.0677	51	36	11	5.3	1.3
FG05	0.0580	45	33	12	6.7	2.4
OS07a	0.0170	14	9	2	0.9	0.1
OS07a-POND F	0.0170	13	9	2	0.9	0.1
POND F IN	0.4615	291	198	54	23.1	5.0
POND F	0.4615	178	121	16	8.1	2.1
POND F-G7	0.4615	177	121	16	8.1	2.1
OS07b	0.0156	15	10	3	1.0	0.1
OS07b-G4	0.0156	14	10	2	0.9	0.1
FG21a	0.0095	6	4	1	0.4	0.1
G4	0.0251	20	14	4	1.4	0.2
G4-G7	0.0251	20	13	3	1.3	0.2
FG21b	0.0150	21	15	6	3.8	1.6
G7	0.5016	190	129	18	8.8	2.3
G7-G8	0.5016	190	129	18	8.8	2.3
FG22	0.1397	119	85	29	14.9	4.3
OS08	0.0397	35	24	8	3.4	0.7
OS08-G8	0.0397	34	23	7	3.4	0.7
FG23a	0.0177	18	13	5	2.7	1.0
G8	0.6987	261	170	46	23.5	6.9
G8-G10	0.6987	260	170	45	23.3	6.6
OS09	0.1527	90	62	18	8.2	1.9
OS09-G9	0.1527	88	62	18	8.1	1.9
FG24	0.1394	63	42	10	3.7	0.7
G9	0.2921	150	102	28	11.8	2.5
G9-G10	0.2921	149	101	28	11.6	2.5
FG23b	0.0359	21	14	3	1.2	0.2
G10	1.0267	413	261	65	29.1	7.3
G10-G11	1.0267	413	257	64	28.8	7.2
FG23c	0.0081	6	5	2	0.7	0.2
G11	1.0348	415	259	65	29.3	7.3
FG28	0.0673	38	26	7	2.7	0.5
FG25a	0.0583	50	35	12	5.7	1.5
FG25a-POND G	0.0583	48	34	11	5.5	1.4
FG25b	0.0506	52	38	16	9.3	3.8
POND G IN	1.2110	491	309	87	39.6	10.2
POND G	1.2110	369	218	32	12.5	4.0
G12	1.2110	369	218	32	12.5	4.0
G12-G06	1.2110	368	217	32	12.5	4.0
FG29	0.0997	60	39	9	2.8	0.4
FG32	0.0402	29	19	4	1.3	0.2
FG32-G06	0.0402	28	19	4	1.3	0.2
G06	1.3509	388	228	34	13.3	4.3
FG10A	0.0806	103	77	32	19.8	8.6
FG08A	0.0750	116	90	41	26.8	13.4
FG08A-G05	0.0750	110	86	41	26.5	13.1
FG08B	0.0630	86	67	31	20.1	10.2
FG08B-G05	0.0630	84	65	29	19.5	10.0
FG11	0.0625	75	59	28	18.6	9.8
FG09	0.0484	48	36	14	8.3	3.2
FG09-G05	0.0484	48	36	14	8.0	3.2
FG10B	0.0416	42	31	12	7.0	2.7
G05	0.3711	455	347	153	95.2	46.1
FG13	0.0534	34	24	7	3.6	0.9
FG12	0.0328	50	40	20	13.7	7.8
POND D IN	0.4573	531	405	177	110.8	53.4
POND D	0.4573	134	90	18	10.9	3.7
POND D-G17	0.4573	133	90	18	10.9	3.7
FG15	0.0103	15	12	6	3.9	2.1
FG15-G17A	0.0103	15	12	6	3.9	2.1
G17A	0.4676	136	92	18	11.2	3.8
FG14	0.1000	98	74	32	19.9	9.2
G17	0.5676	201	134	42	24.9	11.8
G17-G18	0.5676	199	134	42	24.8	11.7
FG16	0.0791	133	104	50	33.9	18.3
G18	0.6467	247	179	78	50.4	25.3
G18-POND E	0.6467	247	177	77	49.5	24.7
FG31	0.0922	116	92	45	31.0	17.2
FG30	0.0389	30	20	4	1.3	0.2
FG30-PONDHS	0.0389	28	19	4	1.2	0.2
POND HS	0.1311	112	63	28	18.8	10.0
FG17a	0.0694	101	78	35	23.0	11.7
FG17a-POND E	0.0694	99	76	35	22.9	11.6
FG18	0.0644	56	42	18	10.6	4.7
FG18-POND E	0.0644	56	42	17	10.6	4.6
FG19	0.0527	84	66	33	22.9	13.1
FG17c	0.0313	31	22	7	2.9	0.5
FG17b	0.0214	39	31	16	10.8	6.1
POND E IN	1.0170	556	424	190	122.3	62.7
POND E	1.0170	231	141	26	12.8	5.6
H08	1.0170	198	127	20	9.1	3.4
H09	0.0000	33	14	6	3.7	2.2

LEGEND
MAJOR BASIN BOUNDARY
MINOR BASIN BOUNARY
SCS MODEL ID
SIZE ACRES
BASIN IDENTIFICATION
DESIGN POINTS
MAJOR CONTOUR INTERVAL
MINOR CONTOUR INTERVAL
100 YEAR FLOOD PLAIN

GRAPHIC SCALE

100 0 250 500 1000 2000

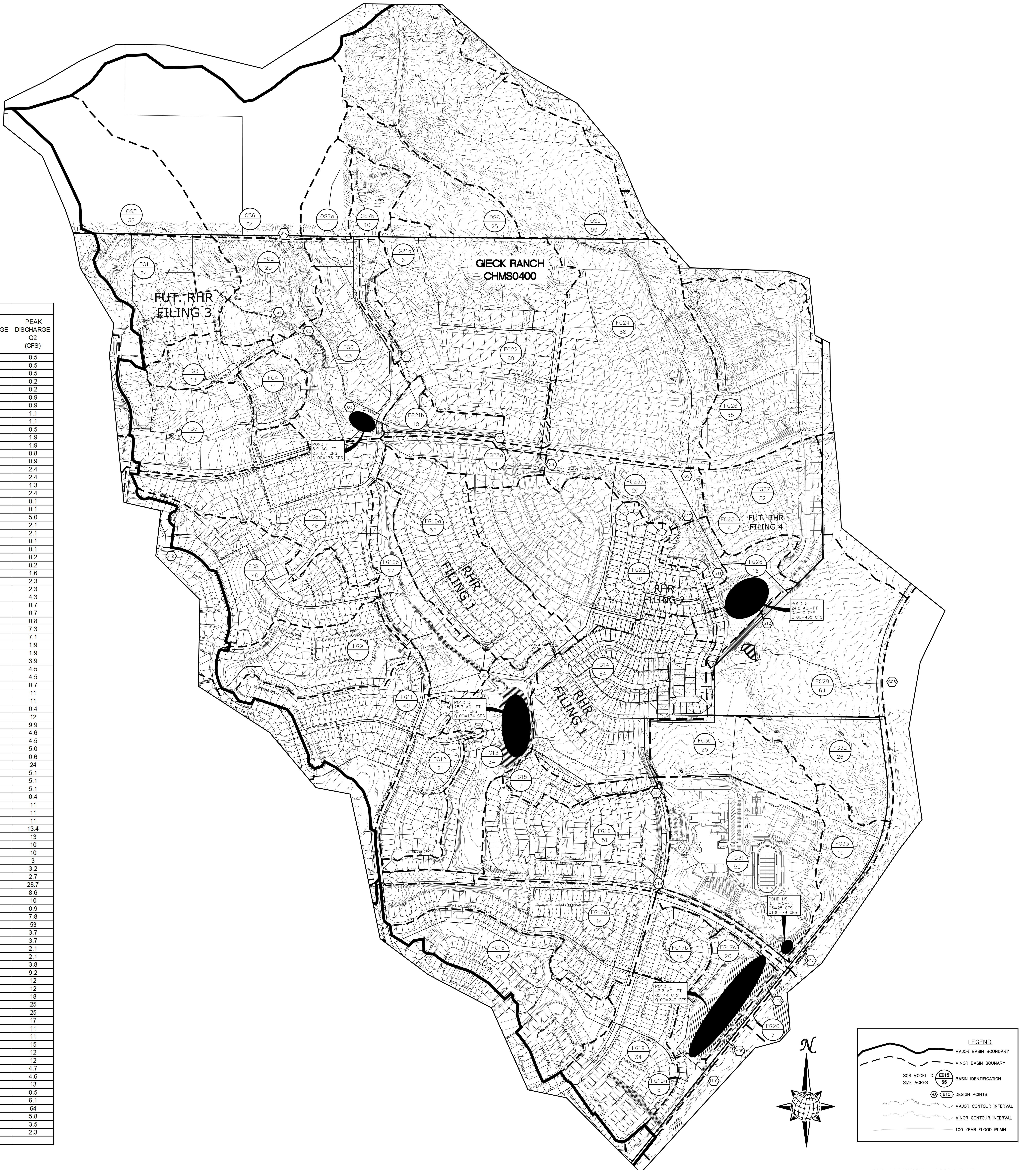
(IN FEET)
1 inch = 500 ft.

INTERIM CONDITIONS - SCS MAP

FIGURE 6

ROLLING HILL RANCH FILING 2
MERIDIAN RANCH

FUTURE MDDP (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	0.5
G1a	0.1313	80	52	12	3.8	0.5
G1a-G2	0.1313	79	52	11	3.6	0.5
OS05	0.0578	39	26	6	1.8	0.2
OS05-G1	0.0578	39	25	6	1.7	0.2
FG01	0.0531	31	22	7	3.3	0.9
FG01-G1	0.0531	31	22	7	3.3	0.9
G1	0.1109	61	41	11	4.8	1.1
G1-G2	0.1109	60	41	11	4.8	1.1
FG02	0.0391	32	22	6	2.6	0.5
G2	0.2813	166	112	27	10	1.9
G2-G3	0.2813	163	108	27	10	1.9
FG03	0.0203	24	17	6	3.0	0.8
FG04	0.0172	22	16	6	3.1	0.9
G3	0.3188	184	123	31	12	2.4
G3-POND F	0.3188	183	121	31	12	2.4
FG06	0.0677	51	36	11	5.3	1.3
FG05	0.0580	45	33	12	6.7	2.4
OS07a	0.0170	14	9.2	2.5	0.9	0.1
OS07a-POND F	0.0170	13	9.1	2.3	0.9	0.1
POND F IN	0.4615	291	198	54	23	5.0
POND F	0.4615	178	121	16	8.1	2.1
POND F-G7	0.4615	177	121	16	8.1	2.1
OS07b-G4	0.0156	14	10	2	0.9	0.1
FG21a	0.0095	6.1	4.2	1.1	0.4	0.1
G4	0.0251	20.2	13.5	3.6	1.4	0.2
G4-G7	0.0251	20	13	3	1.3	0.2
FG21b	0.0150	21	15	6	3.8	1.6
G7	0.5016	190	129	18	9	2.3
G7-G8	0.5016	189	128	18	8.8	2.3
FG22	0.1397	119	85	29	14.9	4.3
OS08	0.0397	35	24	8	3.4	0.7
OS08-G8	0.0397	34	23	7.3	3.4	0.7
FG23a	0.0216	21	14.9	5.2	2.7	0.8
G8	0.7026	271	175	48	25	7.3
G8-G10	0.7026	271	174	47	24	7.1
OS09	0.1527	90	62	18	8.2	1.9
OS09-G9	0.1527	88	62	18	8.2	1.9
FG24	0.1369	101	72	25	13	3.9
G9	0.2896	179	126	38	17	4.5
G9-G10	0.2896	179	125	37	17	4.5
FG23b	0.0305	27	19	6	2.8	0.7
G10	1.0227	450	281	81	39	11
G10-G11	1.0227	450	279	80	39	11
FG23c	0.0122	12	8.7	3.0	1.5	0.4
G11	1.0349	453	281	82	40	12
FG25	0.1086	112	85	36	22	9.9
FG26	0.0863	78	58	22	12	4.6
FG26-POND G	0.0863	77	57	22	12	4.5
FG27	0.0500	52	40	17	11	5.0
FG28	0.0245	24	17	5.5	2.7	0.6
POND G IN	1.3043	653	451	149	75	24
POND G	1.3043	465	307	51	20	5.1
G12	1.3043	465	307	51	20	5.1
G12-G06	1.3043	464	306	51	20	5.1
FG29	0.0997	60	39	9	2.8	0.4
FG32	0.0402	72	57	29	20	11
FG32-G06	0.0402	69	54	27	18	11
G06	1.4442	493	324	55	22	11
FG08A	0.0750	116	90	41	27	13.4
FG08A-G05	0.0750	110	86	41	27	13
FG08B	0.0630	86	67	31	20	10
FG08B-G05	0.0630	84	65	29	19	10
FG09	0.0484	48	36	14	8	3
FG09-G05	0.0484	48	36	14	8	3.2
FG10B	0.0416	42	31	12	7.0	2.7
G05	0.2280	282	215	94	58.8	28.7
FG10A	0.0806	103	77	32	19.8	8.6
FG11	0.0625	75	59	28	19	10
FG13	0.0534	34	24	7	3.6	0.9
FG12	0.0328	50	40	20	14	7.8
POND D IN	0.4573	531	405	177	111	53
POND D	0.4573	134	90	18	11	3.7
POND D-G17	0.4573	133	90	18	11	3.7
FG15	0.0103	15	12	5.8	3.9	2.1
FG15-G17A	0.0103	15	12	5.8	3.9	2.1
G17A	0.4676	136	92	18	11	3.8
FG14	0.1000	98	74	32	20	9.2
G17	0.5676	201	134	42	25	12
G17-G18	0.5676	199	134	42	25	12
FG16	0.0791	133	104	50	34	18
G18	0.6467	247	179	78	50	25
G18-POND E	0.6467	247	177	77	50	25
FG31	0.0922	116	92	45	31	17
FG30	0.0389	73	57	29	20	11
FG30-PONDHS	0.0389	70	56	27	18	11
POND HS	0.1311	153	106	36	26	15
FG17a	0.0694	101	78	35	23	12
FG17a-POND E	0.0694	99	76	35	23	12
FG18	0.0644	56	42	18	11	4.7
FG18-POND E	0.0644	56	42	17	11	4.6
FG19	0.0527	84	66	33	23	13
FG17c	0.0313	31	22	7	2.9	0.5
FG17b	0.0214	39	31	16	11	6.1
POND E IN	1.0170	618	433	197	126	64
POND E	1.0170	240	149	28	14	5.8
H08	1.0170	204	134	22	10	3.5
H09	0.0000	36	15	6	4	2.3



FUTURE CONDITIONS - SCS MAP
(FULL BUILDOUT)

FIGURE 7