

Tech Contractors
ENGINEERING GROUP

EPC STORMWATER REVIEW COMMENTS ARE
SHOWN IN ORANGE BOXES WITH BLACK TEXT

February 24, 2022

Ed Schoenheit
El Paso County Planning and Community Development
2880 International Cir
Colorado Springs, CO 80910

RE: Drainage Conformance Letter
Building E, Lot 4, the Shops Filing 1 at Meridian Ranch
PCD File No. PPR-223

Dear Mr. Schoenheit

The attached short form drainage report is to serve as a statement of compliance for the development of Building E, Lot 4 of the Shops Filing 1 at Meridian Ranch commercial property with the *Drainage Conformance Letter for Lot 4, the Shops Filing 1 at Meridian Ranch* (the LETTER) prepared by Tech Contractors, dated May 3, 2019, and approved on June 5, 2019, and the *Preliminary/Final Drainage Report for Meridian Ranch Filing 4B, The Shops at Meridian Ranch* (the REPORT) prepared by Tech Contractors, dated April 2014, and approved on September 9, 2014. The REPORT provides hydrologic and hydraulic analysis for the commercial development located at the northeast corner of Meridian Road and Stapleton Drive in El Paso County, Colorado.

Sincerely

Thomas A. Kerby, PE
Tech Contractors
11910 Tourmaline Drive, Suite 130
Falcon, CO 80831
719.495.7444

PCD File No. PPR-223

Telephone No.: 719.495.7444

11910 Tourmaline Dr, #130
Falcon CO. 80831

Billing Address
P. O. Box 80036
San Diego, CA 92138

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.

Please sign for final submission and provide engineer stamp.

Thomas A. Kerby, P.E. #31429

Owner/Developer's Statement:

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

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

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

Introduction

This short report was prepared for the Commercial Building E of Lot 4 of the Shops Filing 1 at Meridian Ranch. The report shows the storm drainage associated with the construction of Building E is in substantial conformance with the updated calculations of the *Drainage Comformance Letter for Lot 4, the Shops Filing 1 at Meridian Ranch* (the LETTER) prepared by Tech Contractors, dated May 3, 2019, and approved on June 5, 2019, and original calculations established with the *Preliminary/Final Drainage Report for Meridian Ranch Filing 4B, The Shops at Meridian Ranch* (the REPORT) prepared by Tech Contractors, dated April 2014, and approved on September 9, 2014. The LETTER and REPORT provides hydrologic and hydraulic analysis for the development located at the northeast corner of Meridian Road and Stapleton Drive in El Paso County, Colorado.

Background

Building E is proposed to be built on Lot 4 and is located near the southeast corner of Tourmaline Dr. and Meridian Rd. The pad site for Building E was graded with Development Plan associated with Lot 4 of the Shops Filing 1 at Meridian Ranch approved on June 6 2019. At that time Building D and the parking lot for the entire Lot 4 development was completed. The building pad for Building E generally slopes in a southerly direction toward Fleece Flower Way and the main roadway for the Shops development. A drainage letter (LETTER) showing Lot 4's compliance with the REPORT was approved by the County on June 5 2019.

The initial phase of commercial construction included the utility and private storm drain system and the construction of the main roadway through the commercial center and the development of Lot 3 of The Shops Filing 1 at Meridian Ranch. A drainage letter showing Lot 3's compliance with the REPORT was approved by the County on August 20, 2015.

The REPORT anticipated runoff from the commercial areas, collectively referred to as The Shops (Lots 1-4, The Shops Filing 1 at Meridian Ranch), to be discharged to the storm drain system constructed as a part of Meridian Ranch Filing 4B. Said storm sewer system will ultimately discharge developed flows from Filing 4B, including The Shops, to the main stem of the Bennett Ranch Channel then convey the flow downstream to the Bennett Regional Detention Pond. The Bennett Regional Detention Pond was designed and constructed as a regional facility providing detention and water quality for all areas within the Bennett Ranch Drainage Basin within the Woodmen Hills Filings 10 & 11 and Meridian Ranch including the flows from The Shops Filing 1 at Meridian Ranch. The Bennett Pond has been adequately sized such that 100 YR developed will be detained and released at (or below) the pre-developed flow rate for the same event.

Water Quality

When regional water quality capture volume facilities are present, BMPs are still required onsite to address water quality and channel stability for the reach of the drainageway upstream of the regional facility. In accordance with MS4 permits and regulations, BMPs must be implemented prior to discharges to a State Water from areas of "New Development and Significant Redevelopment." Therefore, if a regional BMP is utilized downstream of a discharge from a development into a State Water, additional BMPs are required to protect the State Water between the development site and the regional facility. However, these BMPs may not have to be as extensive as would normally be required, as long as they are adequate to protect the State Water upstream of the regional BMP.

Part I.E.4.a.iv.E

Additional water quality for the entirety of Lot 4 was approved by the LETTER by applying the 'Applicable Development Site Draining to a Regional WQCV Facility' rule (20%/10% Rule) found in Part 4.a.IV.A.1 Control Measure Requirements of the El Paso County MS4 Program. The regional WQCV facility is designed to accept drainage from the applicable development site. Stormwater from the site may discharge to a water of the state before being discharged to the regional WQCV facility. Before discharging to a water of the state, 20 percent of the total impervious surface of the applicable development site must first drain to a control measure covering an area equal to 10 percent of the total impervious surface of the applicable development site. The control measure must be designed in accordance with a design manual identified by the permittee. In addition, the stream channel between the discharge point of the applicable development site and the regional WQCV facility must be stabilized.

The project site meets or exceeds the requirements listed above in that the roof top areas (including Building E) discharge to grass lined swales prior to entering into the storm drain system. The storm drainage system is then routed through Meridian Ranch Filing 4b and is discharged into a stabilized stream channel prior to entering the downstream WQCV facility located within the Bennett Ranch Regional Detention Pond.

The total roof top area of the two buildings is 28,820 SQ. FT or 22.2% of the total impervious surface area of the project site. The two buildings discharge the storm runoff to grass lined swales via the roof drains. The total grass lined swale area is 16,735 SQ. FT. or 12.9% of the total impervious surface area of the project site. Please see the Water Quality Exhibit A of the LETTER for a graphic representation of the site.

By applying the 20%/10% Rule for regional WQCV facilities, this project meets or exceeds the requirements for water quality.

Drainage Analysis

The anticipated developed flows from The Shops remain unchanged from the LETTER and the REPORT, therefore the drainage patterns and flow values are in substantial conformance with the previously approved documents and will not adversely impact downstream facilities.

The analysis completed for the initial phase of the Shops, Lot 3 found in the REPORT along with portions of the adjacent roadways, showed 35 cfs during the 5 YR event and 68 cfs for the 100 YR event for the on-site flows discharged to the pipe connection at design point X01.

The storm drainage analysis for this phase of the Shops Filing 1 at Meridian Ranch found in the LETTER yields a 5 YR event flow of 29 cfs and 58 cfs for the 100 YR at the pipe connection at design point X01 entering Meridian Ranch Filing 4B. A comparison of the different flow rates from the various drainage studies can be found in the table below.

Table 1 Design Flow Rates for Design Point X01

	Minor Storm (5-yr/10-yr)	Major Storm (100-yr)
Filing 4B/The Shops - FDR, 2014	38	70
The Shops, Lot 3 - Drainage Letter, 2015	35	68
The Shops, Lot 4 - Drainage Letter, 2018	29	58

Drainage and Bridge Fees

There are no Drainage and Bridge Fees with this project as the fees were paid at the time of the recordation of the Shops Filing 1 at Meridian Ranch on August 12, 2015.

Drainage Calculations from the LETTER

COMPOSITE 'C' FACTORS									
PROJECT:		Lot 4, Shops Filing 1					1/2/2019		
BASIN LAB EL	BASIN DEV.	AREA (AC.)				TOTAL	COMPOSITE FACTOR		Percent Impervious
		UNDEV	2.5 AC	1 DU/AC	2 DU/AC		5-year	100-year	
BASIN DESIGNATION		AREA (AC.)				TOTAL	COMPOSITE FACTOR		Percent Impervious
		UNDEV	PAVEMENT	ROOF	LAWN		5-year	100-year	
Basin 4, Filing 4B/ Shops Filing 1 FDR	A	From Lot 3, Shops Filing 1 at Meridian Ranch Drainage Letter by Olsson Associates, Dated May 7, 2015 Approved August 20, 2015				1.97	0.55	0.70	
	B					1.08	0.47	0.65	
	C					2.25	0.78	0.89	
	E					1.29	0.78	0.89	
	F					0.22	0.78	0.86	
	G					0.06		0.11	
	H	0.84	0.34	0.40	1.58	0.66	0.77		
	I-1	1.58		0.42	2.00	0.73	0.83		
	I-2	0.06	0.40	0.32	0.78	0.48	0.63		
	J				1.30	0.79	0.91		
	K	From Lot 3, Shops Filing 1 at Meridian Ranch Drainage Letter by Olsson Associates, Dated May 7, 2015 Approved August 20, 2015				0.83	0.79	0.87	
	L					1.19	0.73	0.84	
	N					0.41	0.35	0.65	
	OS-1					6.22	0.60	0.73	
OS-2				0.69	0.71	0.81			
TOTAL		2.54	0.74	1.25	15.8	0.67	0.80	90.0%	

TIME OF CONCENTRATION

Rational Calculations

PROJECT: **Lot 4, Shops Filing 1**

DATE: 1/2/2019

TIME OF CONCENTRATION																										
SUBBASIN DATA			INIT./OVERLAND TIME (T _i)				TRAVEL TIME (T _t)						TOTAL T _i +T _t (Min.)	T _c Check (Urbanized Basins)		FINAL T _c (min)										
BASIN DESIGNATION	C _s	AREA (AC)	LENGTH (FT)	ΔH	SLOPE %	T _i (Min.)*	LENGTH (FT)	ΔH	SLOPE %	CONVEYANCE TYPE	VEL (FPS)**	T _t (Min.)***		L (FT)	T _c = (L/180) + 10											
A	0.55	1.97	From Lot 3, Shops Filing 1 at Meridian Ranch Drainage Letter by Olsson Associates, Dated May 7, 2015 Approved August 20, 2015													12.4										
B	0.47	1.08																							6.7	
C	0.78	2.25																							7.3	
E	0.78	1.29																							6.3	
F	0.78	0.22																							5.5	
G	0.38	0.17	71	6.0	8.5%	5.4	75	1	1.0%	p	2.0	0.6	6.1	146.00	10.8	6.1										
H	0.66	1.58	50	2.0	4.0%	3.6	752	17	2.3%	p	3.0	4.2	7.8	802.00	14.5	7.8										
I-1	0.73	2.00	87	3.5	4.0%	4.0	575	14	2.3%	P	3.1	3.1	7.1	662.00	13.7	7.1										
I-2	0.48	0.78	42	5.5	13.1%	3.1	307	4	1.1%	L	0.7	6.8	10.0	349.00	11.9	10.0										
J	0.79	1.30	From Lot 3, Shops Filing 1 at Meridian Ranch Drainage Letter by Olsson Associates, Dated May 7, 2015 Approved August 20, 2015													7.4										
K	0.79	0.83																								7.0
L	0.73	1.19																								7.8
N	0.35	0.41																								11.3
OS-1	0.60	6.22																								11.3
OS-2	0.71	0.69														20.8										

Notes:

* $T_i = 0.395(1.1 - C_s)L^{0.5}/S^{0.33}$

** $V = C_v S_w^{0.5}$

*** $T_t = L/V$

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: **Lot 4, Shops Filing 1**

Date: 1/2/2019

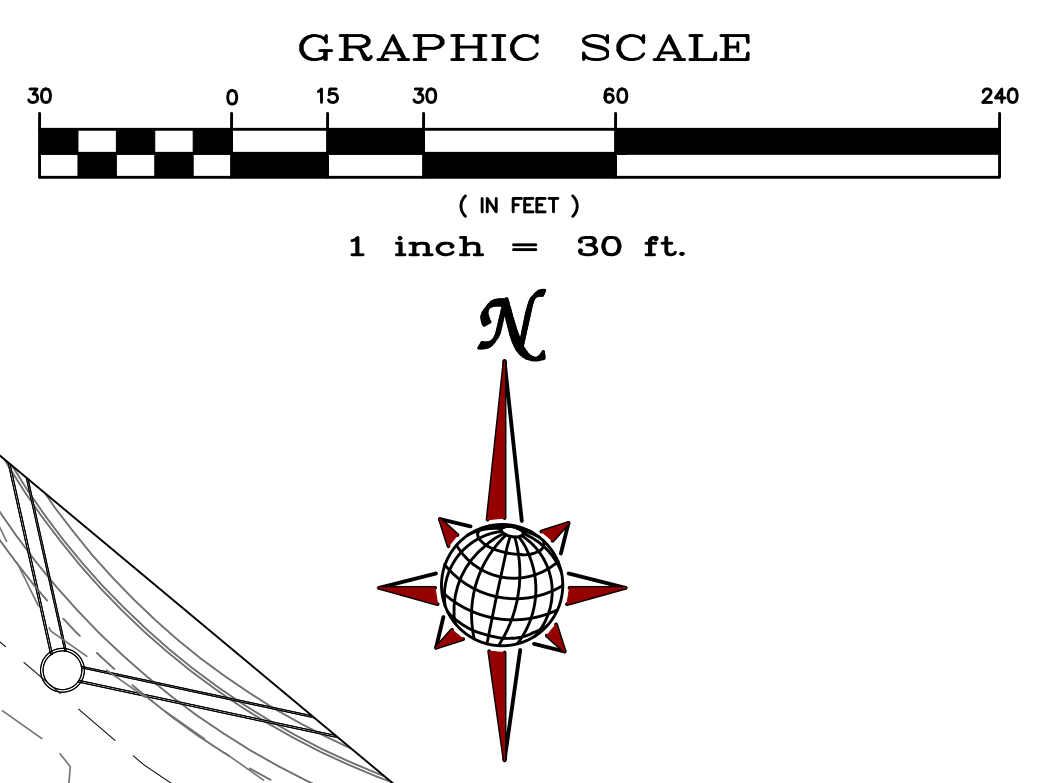
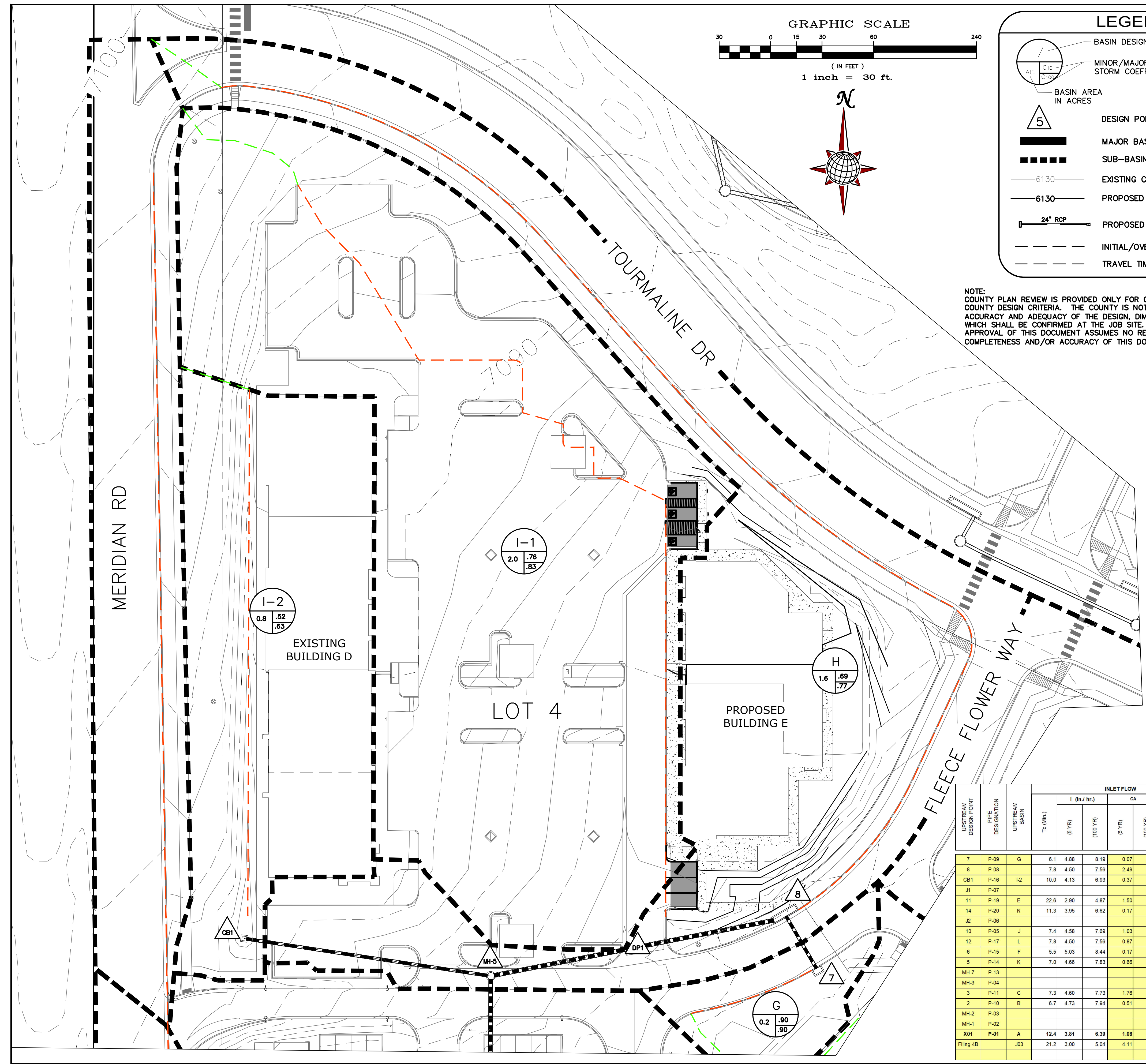
DESIGN POINT	DIRECT RUNOFF											TOTAL RUNOFF						OVERLAND TRAVEL TIME					
	BASIN	AREA (AC)	Tc (Min.)	I (in./ hr.)		COEFF. ©		CA		Q		Sum Tc (min.)	I (in./ hr.)		CA		Q		DESTINATION DP	CONVEYANCE TYPE	COEFFICIENT Cv	SLOPE %	VEL. (FPS)
				(5 YR)	(100 YR)	(5 YR)	(100 YR)	(5 YR)	(100 YR)	(5 YR)	(100 YR)		(5 YR)	(100 YR)	(5 YR)	(100 YR)							
1	A	1.97	12.4	3.81	6.39	0.55	0.70	1.08	1.38	4.1	8.8						4.1	8.8					
2	B	1.08	6.7	4.73	7.94	0.47	0.65	0.51	0.70	2.4	5.6						2.4	5.6					
3	C	2.25	7.3	4.60	7.73	0.78	0.89	1.76	2.00	8	15						8.1	15					
11	E	1.29	6.3	4.82	8.10	0.78	0.89	1.01	1.15	4.9	9.3	22.6	2.90	4.87	1.50	1.71	4.9	9.3					
6	F	0.22	5.5	5.03	8.44	0.78	0.86	0.17	0.19	0.9	1.6						0.9	1.6					
7	G	0.17	6.1	4.88	8.19	0.38	0.57	0.07	0.10	0.3	0.8						0.3	0.8					
8	H	1.58	7.8	4.50	7.56	0.66	0.77	1.04	1.22	4.7	9.3						4.7	9.3					
DP1	I-1	2.00	7.1	4.63	7.78	0.73	0.83	1.45	1.66	6.7	13						6.7	13	8	P	20.0	1.20%	2.2
8												7.8	4.50	7.56	2.49	2.89	11	22					
CB1	I-2	0.78	10.0	4.13	6.93	0.48	0.63	0.37	0.49	1.5	3.4						1.5	3.4					
10	J	1.30	7.4	4.58	7.69	0.79	0.91	1.03	1.18	4.7	9.1						4.7	9.1					
5	K	0.83	7.0	4.66	7.83	0.79	0.87	0.66	0.72	3.1	5.7						3.1	5.7					
12	L	1.19	7.8	4.50	7.56	0.73	0.84	0.87	1.00	3.9	7.6						3.9	7.6					
14	N	0.41	11.3	3.95	6.62	0.35	0.65	0.14	0.27	0.6	1.8						0.6	1.8					
OS	OS-1	6.22	11.3	3.95	6.62	0.60	0.73	3.73	4.54	15	30						15	30					
DP2	OS-2	0.69	20.8	3.03	5.09	0.71	0.81	0.49	0.56	1.5	2.8						1.5	2.8	11	P	20.0	3.25%	3.6

TYPE OF SURFACE		Cv
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

APPENDIX

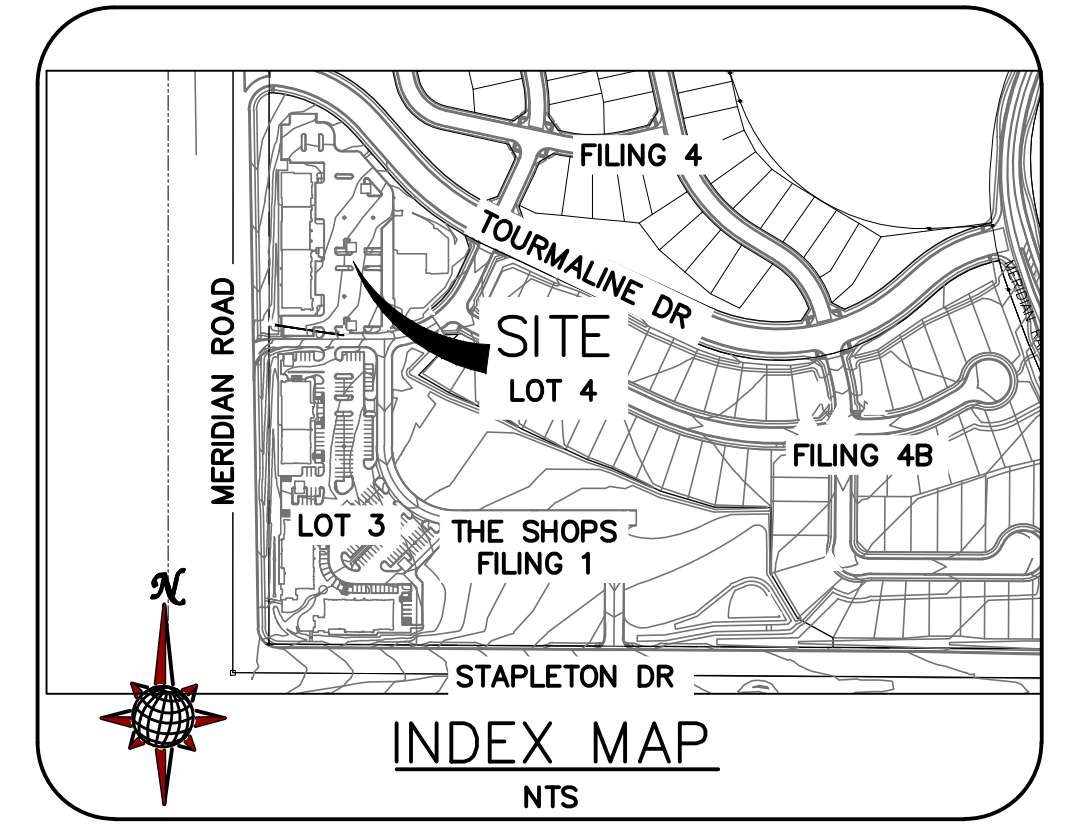
Appendix A – Drainage Map

S:\OneDrive\Civil\Projects\Shops Phase 2\DWG\Plan Sheets\Basin Maps\DR-SHOPS-2_BLDG E RAT.dwg, 2/24/2022 11:22:15 AM



LEGEND

- BASIN DESIGNATION
- MINOR/MAJOR STORM COEFFICIENT
- BASIN AREA IN ACRES
- DESIGN POINT DESIGNATION
- MAJOR BASIN BOUNDARY
- SUB-BASIN BOUNDARY
- EXISTING CONTOUR
- PROPOSED CONTOUR
- PROPOSED STORM SEWER
- INITIAL/OVERLAND TIME (Ti)
- TRAVEL TIME (Tt)



PROJECT BENCHMARK
 INTERSECTION OF WOODMEN RD AND MERIDIAN ROAD AT SW CORNER (BRASS CAP W/ NO. GF-9)
 ELEVATION = 6874.00

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

BASIN LAB EL.	DEV.	AREA (AC.)				COMPOSITE FACTOR	
		UNDEV	2.5 AC	1 DU/AC	2 DU/AC	TOTAL	5-year
BASIN DESIGNATION		AREA (AC.)				COMPOSITE FACTOR	
UNDEV	PAVEMENT	ROOF	LAWN	TOTAL	5-year	100-year	

BASIN DESIGNATION	AREA (AC.)			COMPOSITE FACTOR			
	UNDEV	PAVEMENT	ROOF	LAWN	TOTAL		
A					1.97	0.55	0.70
B	From Lot 3, Shops Filing 1 at Meridian Ranch Drainage Letter by Olsson Associates, Dated May 7, 2015				1.08	0.47	0.65
C	Approved August 20, 2015				2.25	0.78	0.89
E					1.29	0.78	0.89
F					0.22	0.78	0.86
G	0.06		0.11		0.17	0.38	0.57
H	0.84	0.34	0.40		1.58	0.66	0.77
I-1	1.58		0.42		2.00	0.73	0.83
I-2	0.06	0.40	0.32		0.78	0.48	0.63
J					1.30	0.79	0.91
K	From Lot 3, Shops Filing 1 at Meridian Ranch Drainage Letter by Olsson Associates, Dated May 7, 2015				0.83	0.79	0.87
L					1.19	0.73	0.84
N					0.41	0.35	0.65

UPSTREAM DESIGN POINT	PIPE DESIGNATION	UPSTREAM BASIN	INLET FLOW						SYSTEM FLOW						TRAVEL TIME								
			Tc (Min.)	I (in./hr.)		CA		Q		Sum Tc (min.)	I (in./hr.)		CA		PIPE DIA.	ROUGHNESS (n)	DESTINATION	SLOPE %	LENGTH (FT)	VEL. (FPS)	TRAVEL TIME (Tt)		
				(5 YR)	(100 YR)	(5 YR)	(100 YR)	(5 YR)	(100 YR)		(5 YR)	(100 YR)	(5 YR)	(100 YR)									
7	P-09	G	6.1	4.88	8.19	0.07	0.10	0.3	0.8					0.3	0.8	18	0.013	8	1.00%	34	6.0	0.1	
8	P-08		7.8	4.50	7.58	2.49	2.89	11.2	21.8	7.8	4.50	7.58	2.58	2.99	12	0.013	MH-5	0.60%	176	5.8	0.5		
CB1	P-16	I-2	10.0	4.13	8.93	0.37	0.49	1.5	3.4					1.5	3.4	18	0.013	MH-5	7.58%	142	16.4	0.1	
J1	P-07							10.1	4.11	6.90	2.93	3.48			12	0.013	MH-4	0.40%	276	4.6	1.0		
11	P-19	E	22.6	2.90	4.87	1.50	1.71	4.3	8.3					4.3	8.3	18	0.013	MH-4	1.00%	65	6.0	0.2	
14	P-20	N	11.3	3.95	6.62	0.17	0.19	0.7	1					0.7	1.3	18	0.013	MH-4	1.00%	181	6.0	0.5	
J2	P-06							22.8	2.89	4.85	4.60	5.37			10	0.013	MH-3	0.50%	270	5.9	0.8		
10	P-05	J	7.4	4.58	7.69	1.03	1.18	4.7	9.1	23.6	2.84	4.77	5.62	6.56	16	0.013	MH-3	2.80%	211	14.0	0.3		
12	P-17	L	7.8	4.50	7.58	0.87	1.00	3.9	7.6					3.9	7.6	18	0.013	6	1.00%	59	6.0	0.2	
6	P-15	F	5.5	5.03	8.44	0.17	0.19	0.9	1.6	8.0	4.47	7.51	1.04	1.19	4.7	8.9	18	0.013	5	1.80%	32	8.0	0.1
5	P-14	K	7.0	4.66	7.83	0.66	0.72	3.1	5.7	8.0	4.46	7.48	1.70	1.91	7.6	14	18	0.013	MH-7	2.40%	57	9.2	0.1
MH-7	P-13							8.1	4.44	7.45	1.70	1.91			7.5	14	18	0.013	MH-3	2.50%	115	9.4	0.2
MH-3	P-04							23.8	2.83	4.74	7.32	8.47			21	40	30	0.013	MH-2	2.10%	257	12.1	0.4
3	P-11	C	7.3	4.60	7.73	1.76	2.00	8.1	15.5					8	15	24	0.013	2	0.20%	40	3.2	0.2	
2	P-10	B	6.7	4.73	7.94	0.51	0.70	2.4	5.6	7.5	4.56	7.66	2.26	2.70	10	21	24	0.013	MH-2	0.50%	97	5.1	0.3
MH-2	P-03							24.2	2.80	4.71	9.58	11.17			27	53	36	0.013	MH-1	0.50%	175	6.7	0.4
MH-1	P-02							24.6	2.78	4.66	9.58	11.17			27	52	36	0.013	J01	0.30%	171	5.2	0.5
X01	P-01	A	12.4	3.81	6.39	1.08	1.38	4.1	8.8	25.2	2.74	4.61	10.67	12.55	29	58	42	0.013	Filing 4B	0.40%	25	6.6	0.1
Filing 4B	J03		21.2	3.00	5.04	4.11	4.68	12	24	25.2	2.74	4.60	14.78	17.23	40	79	48	0.013	J04	0.50%	447	8.1	0.9

Scale	AS SHOWN	Drawn by	TK	Checked by	RG	Date	FEB 2022
Sheet Number	DRI	BUILDING E LOT 4 - THE SHOPS FILING 1 FINAL DRAINAGE PLAN		FIGURE A		MERIDIAN RANCH	
TECH CONTRACTORS		11910 TOURMALINE DR. SITE 130		FALCON, CO 80831		TELEPHONE 719.495.7444	
No.	Revisions	Date	Init.	Appr.	Date		