



March 11, 2025

Town of Castle Rock Development Services
100 North Wilcox Street
Castle Rock, CO 80104

**RE: The Brinkerhoff & Bar Hummingbird Restaurants – Southwest of Castle Rock Parkway & Promenade Parkway, Castle Rock CO; SDP22-0049 Now SDP25-0007
Drainage Conformance Letter**

The intent of this letter is to provide information showing that the design for the proposed improvements to the project site known as Lot 1A-3A, Block 2 of Promenade at Castle Rock Filing No. 1, Amendment No. 13 complies with previously approved drainage reports. The site has been analyzed as part of the following approved drainage report:

- *Phase III Drainage Report Amendment for Block 2, Phase I, Promenade at Castle Rock, Prepared by Bowman Consulting, dated October 19, 2017.*

This letter aims to demonstrate conformance with the previous drainage study above.

The project site is generally located within the Southwest Quarter of Section 22, Township 7 South, Range 67 West of the 6th Principal Meridian, Town of Castle Rock, Douglas County, State of Colorado. More specifically, the site is located at the Southwest of Castle Rock Parkway and Promenade Parkway. Improvements to the site are as follows:

- Construction of 2 restaurant buildings (The Brinkerhoff – 9,052 s.f., & Bar Hummingbird - 2,664 s.f.)
- Construction of sidewalks, pedestrian access and ramps, landscape area, patios, and miscellaneous site amenities
- Construction of associated storm, sanitary sewer, and water services along with required dry utilities

All proposed storm drainage infrastructure for this project is to be private and is the responsibility of the owner to operate and maintain.

Per the Bowman report, the site ultimately discharges to Design Point 10, with allowable 5 and 100 year release rates of 20.4 cfs and 22.5 cfs, respectively. Design point 10 from the Bowman report corresponds to Design Point 19 in this report. Proposed 5 and 100 year release rates are 21.304 and 22.339 cfs, respectively. Although the proposed 5-year release rate is higher than the approved release rate from the Bowman report, it is a small increase of approximately 4.4%, and per the Bowman report, the downstream storm system will have capacity for this negligible increase. The proposed 100-year release rate is below the approved value and therefore conforms with the Bowman report. 5-year flows are greater than 100-year flows in this scenario because the ultimate design point is downstream of an existing underground detention facility that detains the 100-year storm to a value of 16.30 cfs, but does not detain the 5-year storm, which results in a 5-year flow of 18.9 cfs.

Additionally, per the Bowman report, the regional detention facility assumed an impervious value of 85% for the site, with the proposed value being 75.2%, therefore the regional detention pond will have capacity for this development. Additionally, per the Bowman report, the basins located on the site (C4, C5, C10, & C12) have a composite imperviousness of 86%, with the proposed site having a composite imperviousness being 75.2%, therefore the site conforms to that metric.

Additionally, an underground detention system is located on the property that was constructed as part of the overall development and for which design was included in the Bowman report. Basins C4 and C5 in the Bowman report are tributary to the underground detention system and correspond to proposed basins C4 and C5. Basin C4 has allowable 5 year and 100 year release rates of 3.4 cfs and 7.0 cfs respectively and an imperviousness value of 94%. Proposed Basin C4 has 5 and 100 year release rates of 2.23 cfs and 4.48 cfs respectively, and an imperviousness value of 90.4%, therefore Basin C4 conforms with the design laid out in the Bowman Report. Basin C5 has allowable 5 year and 100 year release rates of 3.4 cfs and 6.2 cfs respectively

and an imperviousness value of 93%. Proposed Basin C5 has 5 and 100 year release rates of 2.59 cfs and 5.44 cfs respectively, and an imperviousness value of 83.1%, therefore Basin C5 conforms with the design laid out in the Bowman Report. The proposed development will not have an adverse impact on the underground detention system.

Detailed calculations and reference information are included in the appendices.

Stormwater Quality Four Step Process

Step 1: Reduce Runoff Volume to the Maximum Extent Practicable

Runoff is reduced to the maximum extent practicable by proposing landscape areas that disconnect impervious areas as well as conveying runoff via grass drainage swales.

Step 2: Provide Water Quality Capture Volume and Flood Control Detention Via Full-Spectrum Detention

Per the Bowman report, water quality capture volume and full-spectrum detention are provided for the site by a regional detention pond located at intersection of Castle Rock Parkway and State Highway 85.

Step 3: Utilize Stream Channel Stabilization Techniques

There are no known existing streams or drainageways on-site, therefore channel stabilization will not be necessary as a part of this development. All runoff from the site is conveyed via the proposed storm drain system which connects to the existing storm drain system located in Castle Rock Parkway.

Step 4: Undertake Source Control

Structural controls utilized on this site to control illicit discharges include the use of a grease interceptor to collect restaurant waste to prevent it from entering the sanitary sewer system.

Non-structural controls utilized on this site to control illicit discharges include good housekeeping and preventative maintenance of the storm sewer system.

Shoveled snow from the pedestrian and amenity areas adjacent to the building will be stored west of the site in landscaped areas. Snow shoveled from the parking area will be stored on the existing landscape islands in said area. Snow will be placed to promote infiltration and reduce runoff.

Thank you for your time and assistance as we move forward with this project!

Tim Stackhouse, PE

R&R Engineers-Surveyors, Inc.
Senior Project Manager
(303) 753-6730
tstackhouse@rrengineers.com

APPENDIX A – HYDROLOGIC CALCULATIONS

Summary of Site Hydrology
Hummingbird & Nest Restaurants Castle Rock, CO

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Tips for using spreadsheet

1. if you need to override any values/equations in this spreadsheet - go to review tab, and choose "unprotect sheet" (this will make cells unlocked)
2. These equations are based on Mile High Flood District Volume 1 from August 2018 (please check MHFD for most recent version)

<http://udfcd.org/volume-one>

3. Hide rows and columns as necessary for storm intervals that don't need to be analyzed.

4. Replace equations as necessary when not following MHFD Criteria. Remove images showing MHFD equations and replace with the appropriate equation.

5. You'll probably have to "Set Print Area" on each worksheet before you print to ensure they each fit on one page and no data is getting cut off.

6. There are some hidden columns on the "C Coeff" worksheet that may be unhidden to use to add coverage types (like gravel, for example)

7. The "2-YR Q"/"5-YR Q"/etc spreadsheets are used to route flows through the site, including pipe and street travel time. If not using these columns, feel free to hide them so that the reviewer doesn't get confused. This is an alternative to using SSA.

[illegible]

POST-DEVELOPMENT C VALUES

Designer: TJS
 Company: R&R Engineers-Surveyors
 Date: 3/11/2025
 Project: Hummingbird & Nest Restaurants
 Location: Castle Rock, CO



Global Parameters ¹	
Land Use	% Imp.
Open Space/Landscaping	2
Hardscape	100
Roof	90
Gravel	40

Summary	
Total Area (ac)	5.09
Composite Impervious	74.0%
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Cells of this color are for optional user-input	

¹ From Table 6-3 in MHFD Volume 1
² From Table 6-4 in MHFD Volume 1

Basin Name	Area (ac)	NRCS Hydrologic Soil Group	Open Space/Landscaping		Hardscape		Roof		Gravel		% Check	Percent Imperviousness	Runoff Coefficient, C ²			
			Area (ac)	%	Area (ac)	%	Area (ac)	%	Area (ac)	%			2-yr	5-yr	10-yr	100-yr
C-1	0.13	D	0.00	0.0%	0.10	76.9%	0.00	0.0%	0.03	23.1%	100.00%	86.2%	0.71	0.74	0.77	0.84
C-2	0.01	D	0.01	59.9%	0.01	40.1%	0.00	0.0%	0.00	0.0%	100.00%	41.3%	0.31	0.37	0.44	0.65
C-3	0.03	D	0.01	33.3%	0.02	66.7%	0.00	0.0%	0.00	0.0%	100.00%	67.3%	0.54	0.58	0.63	0.76
C-4	0.61	D	0.06	9.8%	0.55	90.2%	0.00	0.0%	0.00	0.0%	100.00%	90.4%	0.74	0.77	0.80	0.85
C-5	0.81	D	0.14	17.3%	0.67	82.7%	0.00	0.0%	0.00	0.0%	100.00%	83.1%	0.68	0.71	0.74	0.82
C-6	0.01	D	0.01	100.0%	0.00	0.0%	0.00	0.0%	0.00	0.0%	100.00%	2.0%	0.01	0.05	0.15	0.49
C-7	0.04	D	0.04	100.0%	0.00	0.0%	0.00	0.0%	0.00	0.0%	100.00%	2.0%	0.01	0.05	0.15	0.49
C-8	0.05	D	0.03	57.6%	0.00	1.1%	0.00	0.0%	0.02	41.4%	100.00%	18.8%	0.13	0.19	0.27	0.56
C-9	0.14	D	0.03	21.4%	0.11	78.6%	0.00	0.0%	0.00	0.0%	100.00%	79.0%	0.64	0.68	0.71	0.81
C-10	0.11	D	0.01	6.4%	0.00	0.0%	0.00	0.0%	0.10	93.6%	100.00%	37.6%	0.28	0.34	0.41	0.64
C-11	0.02	D	0.02	100.0%	0.00	0.0%	0.00	0.0%	0.00	0.0%	100.00%	2.0%	0.01	0.05	0.15	0.49
C-12	0.01	D	0.01	100.0%	0.00	0.0%	0.00	0.0%	0.00	0.0%	100.00%	2.0%	0.01	0.05	0.15	0.49
C-13	0.03	D	0.03	100.0%	0.00	0.0%	0.00	0.0%	0.00	0.0%	100.00%	2.0%	0.01	0.05	0.15	0.49
C-14	0.12	D	0.09	75.0%	0.03	25.0%	0.00	0.0%	0.00	0.0%	100.00%	26.5%	0.19	0.25	0.33	0.59
C-15	0.04	D	0.00	2.2%	0.04	97.8%	0.00	0.0%	0.00	0.0%	100.00%	97.9%	0.81	0.83	0.85	0.88
RF-1.1	0.06	D	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.00%	.0%	0.00	0.04	0.13	0.48
RF-1.2	0.03	D	0.00	0.0%	0.00	0.0%	0.03	100.0%	0.00	0.0%	100.00%	90.0%	0.74	0.77	0.79	0.85
RF-2.1	0.13	D	0.00	0.0%	0.00	0.0%	0.13	100.0%	0.00	0.0%	100.00%	90.0%	0.74	0.77	0.79	0.85
RF-2.2	0.10	D	0.00	0.0%	0.00	0.0%	0.10	100.0%	0.00	0.0%	100.00%	90.0%	0.74	0.77	0.79	0.85
OS-1	0.13	D	0.02	12.0%	0.11	88.0%	0.00	0.0%	0.00	0.0%	100.00%	88.2%	0.72	0.75	0.78	0.84

TIME OF CONCENTRATION

Designer: TJS
Company: R&R Engineers-Surveyors
Date: 3/11/2025
Project: Hummingbird & Nest Restaurants
Location: Castle Rock, CO

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

$$\text{Computed } t_c = t_i + t_t$$

$$t_{\text{minimum}} = 5 \text{ (urban)}$$

$$t_{\text{minimum}} = 10 \text{ (non-urban)}$$

$$t_t = \frac{L_t}{60K\sqrt{S_t}} = \frac{L_t}{60V_t}$$

$$\text{Selected } t_c = \max\{t_{\text{minimum}}, \min(\text{Computed } t_c, \text{Regional } t_c)\}$$

$$\text{Regional } t_c = (26 - 17i) + \frac{L_t}{60(14i + 9)\sqrt{S_t}}$$

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**ENGINEERS
SURVEYORS** INC

Subbasin Data				Overland (Initial) Flow Time			Channelized (Travel) Flow Time					Time of Concentration			
Basin	Area	% Impervious	C5	Overland Flow Length L _i (ft)	Overland Flow Slope S _i (ft/ft)	Overland Flow Time t _i (min)	Channelized Flow Length L _t (ft)	Channelized Flow Slope S _t (ft/ft)	NRCS Conveyance Factor K	Channelized Flow Velocity V _t (ft/sec)	Channelized Flow Time t _t (min)	Computed t _c (min)	Regional t _c (min)	Selected t _c (min)	Remarks
C-1	0.13	86.2%	0.74	136.34	0.019	6.21	62.53	0.015	20	2.44	0.43	6.64	11.76	6.64	
C-2	0.01	41.3%	0.37	32.34	0.043	4.61					0.00	4.61		5.00	
C-3	0.03	67.3%	0.58	29.84	0.042	3.17					0.00	3.17		5.00	
C-4	0.61	90.4%	0.77	182.29	0.032	5.46					0.00	5.46		5.46	
C-5	0.81	83.1%	0.71	204.94	0.036	6.57					0.00	6.57		6.57	
C-6	0.01	2.0%	0.05	20.32	0.050	5.02					0.00	5.02		5.02	
C-7	0.04	2.0%	0.05	43.91	0.051	7.33					0.00	7.33		7.33	
C-8	0.05	18.8%	0.19	42.88	0.020	8.64	66.40	0.012	20	2.15	0.51	9.15	23.69	9.15	
C-9	0.14	79.0%	0.68	39.66	0.020	3.81	203.62	0.044	20	4.20	0.81	4.62	13.38	5.00	
C-10	0.11	37.6%	0.34	21.50	0.050	3.73					0.00	3.73		5.00	
C-11	0.02	2.0%	0.05	107.85	0.011	18.88					0.00	18.88		18.88	
C-12	0.01	2.0%	0.05	113.04	0.010	20.13					0.00	20.13		20.13	
C-13	0.03	2.0%	0.05	72.74	0.024	12.10					0.00	12.10		12.10	
C-14	0.12	26.5%	0.25	90.30	0.056	8.25					0.00	8.25		8.25	
RF-1.1	0.06	.0%	0.04	30.00	0.020	8.38					0.00	8.38		8.38	
RF-1.2	0.03	90.0%	0.77	24.00	0.020	2.33					0.00	2.33		5.00	
RF-2.1	0.13	90.0%	0.77	61.00	0.020	3.72						3.72		5.00	
RF-2.2	0.10	90.0%	0.77	50.25	0.020	3.38						3.38		5.00	
OS-1	0.13	88.2%	0.75	235.50	0.040	6.06					0.00	6.06		6.06	
C-15	0.04	97.9%	0.83	86.83	0.030	3.13					0.00	3.13		5.00	

STORM DRAINAGE SYSTEM DESIGN - 5-YEAR DESIGN STORM

Designer: TJS
 Company: R&R Engineers-Surveyors
 Date: 3/11/2025
 Project: Hummingbird & Nest Restaurants
 Location: Castle Rock, CO

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 Cells of this color are for optional user-input

$$I = \frac{28.5P_1}{(10 + t_c)^{0.786}}$$



DESIGN POINT	STREET/ CONTRIBUTING BASINS	DIRECT RUNOFF							TOTAL RUNOFF					STREET BYPASS				PIPE			TRAVEL TIME			Remarks
		Basin Name	Area (ac)	Coeff C	Tc (min)	C*A (ac)	I	Q (cfs)	Tc (min)	Sum Area (ac)	Sum C*A (ac)	I in/hr	Q cfs	Street Q cfs	Street Slope %	Length ft	Street Tt min	Design Q cfs	Slope %	PIPE SIZE	L ft	VEL ft/sec	Tt min	
		C-2	0.01	0.37	5.0	0.00	4.85	0.023										0.0						
		C-3	0.03	0.58	5.0	0.02	4.85	0.085																
		RF-1.2	0.03	0.77	5.0	0.02	4.85	0.114																
1	C-2,C-3,RF-1.2								5.0	0.1	0.0	4.85	0.222					0.2						
		C-6	0.01	0.05	5.0	0.00	4.85	0.002										0.0						
2	DP1,C-6								5.0	0.1	0.0	4.85	0.224					0.2						
		RF-2.2	0.10	0.77	5.0	0.07	4.85	0.355																
3	DP3,RF-2.2								5.0	0.2	0.1	4.85	0.579											
		C-7	0.04	0.05	7.3	0.00	4.33	0.009										0.0						
4	DP3.1,C-7								7.3	0.2	0.1	4.33	0.526					0.5						
		C-1	0.13	0.74	6.6	0.10	4.47	0.428										0.4						
		RF-1.1	0.06	0.04	8.4	0.00	4.13	0.008																
5	C-1,RF-1.1								8.4	0.2	0.1	4.13	0.404					0.4						
		C-10	0.11	0.34	5.0	0.04	4.85	0.182										0.2						
6	DP5,C-10								8.4	0.3	0.1	4.13	0.559					0.6						
		C-8	0.05	0.19	9.2	0.01	4.00	0.038										0.0						
7	DP6,C-8								9.2	0.3	0.1	4.00	0.579					0.6						
		C-13	0.03	0.05	12.1	0.00	3.58	0.006										0.0						
8	DP7,C-13								12.1	0.4	0.1	3.58	0.524					0.5						
		RF-2.1	0.13	0.77	5.0	0.10	4.85	0.491										0.5						
8.1	DP8,RF-2.1								12.1	0.5	0.2	3.58	0.886											
9	DP4,DP8.1								12.1	0.7	0.4	3.58	1.321					1.3						
		C-9	0.14	0.68	5.0	0.10	4.85	0.461										0.5						
		OS-1	0.13	0.75	6.1	0.10	4.60	0.451																
10	C-9,OS-1								6.1	0.3	0.2	4.60	0.887					0.9						
EX													18.900					18.9						
11	DP9,DP10,DPEX												21.108					21.1						CORRESPONDS TO DP8 IN EX. REPORT
		C-11	0.02	0.05	18.9	0.00	2.90	0.003										0.0						
		C-12	0.01	0.05	20.1	0.00	2.80	0.002																
		C-14	0.12	0.25	8.3	0.03	4.16	0.125																
12	DP11,C-11,C-12,C-14												21.239					21.2						
		C-4	0.61	0.77	5.5	0.47	4.74	2.229										2.2						
		C-5	0.81	0.71	6.6	0.58	4.48	2.586										2.6						
		C-15	0.04	0.83	5.0	0.03	4.85	0.162										0.2						
13	C-15								5.0	0.0	0.0	4.85	0.162					0.2						

Location: Castle Rock, CO

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$$I = \frac{28.5P_1}{(10 + t_c)^{0.786}}$$

DESIGN POINT	STREET/ CONTRIBUTING BASINS	DIRECT RUNOFF							TOTAL RUNOFF					STREET BYPASS				PIPE			TRAVEL TIME				
		Basin Name	Area (ac)	Coeff C	Tc (min)	C*A (ac)	I	Q (cfs)	Tc (min)	Sum Area (ac)	Sum C*A (ac)	I in/hr	Q cfs	Street Q cfs	Street Slope %	Length ft	Street Tt min	Design Q cfs	Slope %	PIPE SIZE	L ft	VEL ft/sec	Tt min	Remarks	
		C-2	0.01	0.65	5.0	0.01	8.82	0.074									0.1								
		C-3	0.03	0.76	5.0	0.02	8.82	0.201																	
		RF-1.2	0.03	0.85	5.0	0.03	8.82	0.230																	
1	C-2,C-3,RF-1.2								5.0	0.1	0.1	8.82	0.504				0.5								
		C-6	0.01	0.49	5.0	0.00	8.81	0.043									0.0								
2	DP1,C-6								5.0	0.1	0.1	8.81	0.547				0.5								
		RF-2.2	0.10	0.85	5.0	0.08	8.82	0.716									0.7								
3	DP3,RF-2.2								5.0	0.2	0.1	8.81	1.263												
		C-7	0.04	0.49	7.3	0.02	7.87	0.155																	
4	DP3.1,C-7								7.3	0.2	0.2	7.87	1.283				1.3								
		C-1	0.13	0.84	6.6	0.11	8.13	0.884									0.9								
		RF-1.1	0.06	0.48	8.4	0.03	7.52	0.201																	
5	C-1,RF-1.1								8.4	0.2	0.1	7.52	1.018				1.0								
		C-10	0.11	0.64	5.0	0.07	8.82	0.619									0.6								
6	DP5,C-10								8.4	0.3	0.2	7.52	1.546				1.5								
		C-8	0.05	0.56	9.2	0.03	7.28	0.205									0.2								
7	DP6,C-8								9.2	0.3	0.2	7.28	1.702				1.7								
		C-13	0.03	0.49	12.1	0.02	6.50	0.103									0.1								
8	DP7,C-13								12.1	0.4	0.2	6.50	1.624				1.6								
		RF-2.1	0.13	0.85	5.0	0.11	8.82	0.991																	
8.1	DP8,RF-2.1								12.1	0.5	0.4	6.50	2.355												
9	DP4,DP8.1								12.1	0.7	0.5	6.50	3.415				3.4								
		C-9	0.14	0.81	5.0	0.11	8.82	0.996									1.0								
		OS-1	0.13	0.84	6.1	0.11	8.36	0.918																	
10	C-9,OS-1								6.1	0.3	0.2	8.36	1.862				1.9								
EX													16.300				16.3						CORRESPONDS TO DP8 IN EX. REPORT		
11	DP9,DP10,DPEX												21.577				21.6								
		C-11	0.02	0.49	18.9	0.01	5.27	0.053									0.1								
		C-12	0.01	0.49	20.1	0.01	5.10	0.034																	
		C-14	0.12	0.59	8.3	0.07	7.56	0.537																	
12	DP11,C-11,C-12,C-14												22.201				22.2								
		C-4	0.61	0.85	5.5	0.52	8.61	4.485									4.5								
		C-5	0.81	0.82	6.6	0.67	8.15	5.441																	
		C-15	0.04	0.88	5.0	0.04	8.82	0.312									0.3								
13	c-15								5.0	0.0	0.0	8.82	0.312												

Rainfall Data
Hummingbird & Nest Restaurants
Castle Rock, CO

Recurrence Interval (yrs)	1-hr Rainfall Depth (in)
2	1.06
5	1.43
10	1.66
25	
50	2.26
100	2.60

APPENDIX B – HYDRAULIC CALCULATIONS



Nyloplast Inlet Capacity Table

DISCLAIMER: SAFETY FACTORS ARE NOT INCLUDED IN THESE CALCULATIONS. ACTUAL CALCULATIONS SHOULD BE CARRIED OUT AND VERIFIED BY THE DESIGN ENGINEER TAKING INTO ACCOUNT ALL LOCAL CONDITIONS. NYLOPLAST RECOMMENDS USING A MINIMUM SAFETY FACTOR OF 1.25 FOR PAVED AREAS AND 2.0 FOR TURF AREAS. ADS/NYLOPLAST IS NOT RESPONSIBLE FOR MISUSE OF THIS TOOL.

INLET C-1 - Q100=1.12 CFS

Input	
Type of Grate	15" Drop In
Head (ft)	0.3
Properties	
Orifice Flow Area (in)	62.03
Orifice Flow Area (ft)	0.43
Weir Flow Perimeter (in)	41.15
Weir Flow Perimeter (ft)	3.43
Solution	
Capacity (cfs)	1.13
Capacity (gpm)	506.39

ponding
depth at
Q100

$$Q_{weir} = CLH^{3/2}$$

$C = 3.33$ Weir Discharge Coefficient

$L =$ Perimeter of Grate Opening (ft)

$H =$ Flow Height of Water Surface Above Weir (ft)

$$Q_{orifice} = CA\sqrt{2gh}$$

$C = 0.60$ Orifice Discharge Coefficient

$A =$ Area of the Orifice (ft²)

$g =$ Gravitational Constant $\left(32.2 \frac{ft}{s^2}\right)$

$H =$ Depth of Water Above Center of Orifice (ft)

REV 2.1.21



Nyloplast Inlet Capacity Table

DISCLAIMER: SAFETY FACTORS ARE NOT INCLUDED IN THESE CALCULATIONS. ACTUAL CALCULATIONS SHOULD BE CARRIED OUT AND VERIFIED BY THE DESIGN ENGINEER TAKING INTO ACCOUNT ALL LOCAL CONDITIONS. NYLOPLAST RECOMMENDS USING A MINIMUM SAFETY FACTOR OF 1.25 FOR PAVED AREAS AND 2.0 FOR TURF AREAS. ADS/NYLOPLAST IS NOT RESPONSIBLE FOR MISUSE OF THIS TOOL.

INLET C-2 - Q100=0.074 CFS

Input	
Type of Grate	12" Drop In
Head (ft)	0.04
Properties	
Orifice Flow Area (in)	39.75
Orifice Flow Area (ft)	0.27
Weir Flow Perimeter (in)	33.31
Weir Flow Perimeter (ft)	2.78
Solution	
Capacity (cfs)	0.07
Capacity (gpm)	33.19

ponding
depth at
Q100

$$Q_{weir} = CLH^{3/2}$$

$C = 3.33$ Weir Discharge Coefficient

L = Perimeter of Grate Opening (ft)

H = Flow Height of Water Surface Above Weir (ft)

$$Q_{orifice} = CA\sqrt{2gh}$$

$C = 0.60$ Orifice Discharge Coefficient

A = Area of the Orifice (ft²)

g = Gravitational Constant $\left(32.2 \frac{ft}{s^2}\right)$

H = Depth of Water Above Center of Orifice (ft)

REV 2.1.21



Nyloplast Inlet Capacity Table

DISCLAIMER: SAFETY FACTORS ARE NOT INCLUDED IN THESE CALCULATIONS. ACTUAL CALCULATIONS SHOULD BE CARRIED OUT AND VERIFIED BY THE DESIGN ENGINEER TAKING INTO ACCOUNT ALL LOCAL CONDITIONS. NYLOPLAST RECOMMENDS USING A MINIMUM SAFETY FACTOR OF 1.25 FOR PAVED AREAS AND 2.0 FOR TURF AREAS. ADS/NYLOPLAST IS NOT RESPONSIBLE FOR MISUSE OF THIS TOOL.

INLET C-3 - Q100=0.24 CFS

Input	
Type of Grate	12" Drop In
Head (ft)	0.09
Properties	
Orifice Flow Area (in)	39.75
Orifice Flow Area (ft)	0.27
Weir Flow Perimeter (in)	33.31
Weir Flow Perimeter (ft)	2.78
Solution	
Capacity (cfs)	0.25
Capacity (gpm)	112.01

ponding
depth at
Q100

$$Q_{weir} = CLH^{3/2}$$

$C = 3.33$ Weir Discharge Coefficient

$L =$ Perimeter of Grate Opening (ft)

$H =$ Flow Height of Water Surface Above Weir (ft)

$$Q_{orifice} = CA\sqrt{2gh}$$

$C = 0.60$ Orifice Discharge Coefficient

$A =$ Area of the Orifice (ft²)

$g =$ Gravitational Constant $\left(32.2 \frac{ft}{s^2}\right)$

$H =$ Depth of Water Above Center of Orifice (ft)

REV 2.1.21



Nyloplast Inlet Capacity Table

DISCLAIMER: SAFETY FACTORS ARE NOT INCLUDED IN THESE CALCULATIONS. ACTUAL CALCULATIONS SHOULD BE CARRIED OUT AND VERIFIED BY THE DESIGN ENGINEER TAKING INTO ACCOUNT ALL LOCAL CONDITIONS. NYLOPLAST RECOMMENDS USING A MINIMUM SAFETY FACTOR OF 1.25 FOR PAVED AREAS AND 2.0 FOR TURF AREAS. ADS/NYLOPLAST IS NOT RESPONSIBLE FOR MISUSE OF THIS TOOL.

INLET C-6 - Q100=0.043 CFS

Input	
Type of Grate	12" Drop In
Head (ft)	0.025
Properties	
Orifice Flow Area (in)	39.75
Orifice Flow Area (ft)	0.27
Weir Flow Perimeter (in)	33.31
Weir Flow Perimeter (ft)	2.78
Solution	
Capacity (cfs)	0.04
Capacity (gpm)	16.40

ponding
depth at
Q100

$$Q_{weir} = CLH^{3/2}$$

$C = 3.33$ Weir Discharge Coefficient

$L =$ Perimeter of Grate Opening (ft)

$H =$ Flow Height of Water Surface Above Weir (ft)

$$Q_{orifice} = CA\sqrt{2gh}$$

$C = 0.60$ Orifice Discharge Coefficient

$A =$ Area of the Orifice (ft²)

$g =$ Gravitational Constant $\left(32.2 \frac{ft}{s^2}\right)$

$H =$ Depth of Water Above Center of Orifice (ft)

REV 2.1.21



Nyloplast Inlet Capacity Table

DISCLAIMER: SAFETY FACTORS ARE NOT INCLUDED IN THESE CALCULATIONS. ACTUAL CALCULATIONS SHOULD BE CARRIED OUT AND VERIFIED BY THE DESIGN ENGINEER TAKING INTO ACCOUNT ALL LOCAL CONDITIONS. NYLOPLAST RECOMMENDS USING A MINIMUM SAFETY FACTOR OF 1.25 FOR PAVED AREAS AND 2.0 FOR TURF AREAS. ADS/NYLOPLAST IS NOT RESPONSIBLE FOR MISUSE OF THIS TOOL.

INLET C-7 - Q100=0.16 CFS

Input	
Type of Grate	12" Drop In
Head (ft)	0.067
Properties	
Orifice Flow Area (in)	39.75
Orifice Flow Area (ft)	0.27
Weir Flow Perimeter (in)	33.31
Weir Flow Perimeter (ft)	2.78
Solution	
Capacity (cfs)	0.16
Capacity (gpm)	71.95

ponding
depth at
Q100

$$Q_{weir} = CLH^{3/2}$$

$C = 3.33$ Weir Discharge Coefficient

$L =$ Perimeter of Grate Opening (ft)

$H =$ Flow Height of Water Surface Above Weir (ft)

$$Q_{orifice} = CA\sqrt{2gh}$$

$C = 0.60$ Orifice Discharge Coefficient

$A =$ Area of the Orifice (ft²)

$g =$ Gravitational Constant $\left(32.2 \frac{ft}{s^2}\right)$

$H =$ Depth of Water Above Center of Orifice (ft)

REV 2.1.21



Nyloplast Inlet Capacity Table

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INLET C-8- Q100=0.205 CFS

Input	
Type of Grate	12" Drop In
Head (ft)	0.08
Properties	
Orifice Flow Area (in)	39.75
Orifice Flow Area (ft)	0.27
Weir Flow Perimeter (in)	33.31
Weir Flow Perimeter (ft)	2.78
Solution	
Capacity (cfs)	0.21
Capacity (gpm)	93.87

ponding
depth at
Q100

$$Q_{weir} = CLH^{3/2}$$

$C = 3.33$ Weir Discharge Coefficient

$L =$ Perimeter of Grate Opening (ft)

$H =$ Flow Height of Water Surface Above Weir (ft)

$$Q_{orifice} = CA\sqrt{2gh}$$

$C = 0.60$ Orifice Discharge Coefficient

$A =$ Area of the Orifice (ft²)

$g =$ Gravitational Constant $\left(32.2 \frac{ft}{s^2}\right)$

$H =$ Depth of Water Above Center of Orifice (ft)

REV 2.1.21



Nyloplast Inlet Capacity Table

DISCLAIMER: SAFETY FACTORS ARE NOT INCLUDED IN THESE CALCULATIONS. ACTUAL CALCULATIONS SHOULD BE CARRIED OUT AND VERIFIED BY THE DESIGN ENGINEER TAKING INTO ACCOUNT ALL LOCAL CONDITIONS. NYLOPLAST RECOMMENDS USING A MINIMUM SAFETY FACTOR OF 1.25 FOR PAVED AREAS AND 2.0 FOR TURF AREAS. ADS/NYLOPLAST IS NOT RESPONSIBLE FOR MISUSE OF THIS TOOL.

INLET C-10- Q100=0.10 CFS

Input	
Type of Grate	12" Drop In
Head (ft)	0.05
Properties	
Orifice Flow Area (in)	39.75
Orifice Flow Area (ft)	0.27
Weir Flow Perimeter (in)	33.31
Weir Flow Perimeter (ft)	2.78
Solution	
Capacity (cfs)	0.10
Capacity (gpm)	46.38

ponding
depth at
Q100

$$Q_{weir} = CLH^{3/2}$$

$C = 3.33$ Weir Discharge Coefficient

$L =$ Perimeter of Grate Opening (ft)

$H =$ Flow Height of Water Surface Above Weir (ft)

$$Q_{orifice} = CA\sqrt{2gh}$$

$C = 0.60$ Orifice Discharge Coefficient

$A =$ Area of the Orifice (ft²)

$g =$ Gravitational Constant $\left(32.2 \frac{ft}{s^2}\right)$

$H =$ Depth of Water Above Center of Orifice (ft)

REV 2.1.21



Nyloplast Inlet Capacity Table

DISCLAIMER: SAFETY FACTORS ARE NOT INCLUDED IN THESE CALCULATIONS. ACTUAL CALCULATIONS SHOULD BE CARRIED OUT AND VERIFIED BY THE DESIGN ENGINEER TAKING INTO ACCOUNT ALL LOCAL CONDITIONS. NYLOPLAST RECOMMENDS USING A MINIMUM SAFETY FACTOR OF 1.25 FOR PAVED AREAS AND 2.0 FOR TURF AREAS. ADS/NYLOPLAST IS NOT RESPONSIBLE FOR MISUSE OF THIS TOOL.

INLET C-13- Q100=0.103 CFS

Input	
Type of Grate	12" Drop In
Head (ft)	0.05
Properties	
Orifice Flow Area (in)	39.75
Orifice Flow Area (ft)	0.27
Weir Flow Perimeter (in)	33.31
Weir Flow Perimeter (ft)	2.78
Solution	
Capacity (cfs)	0.10
Capacity (gpm)	46.38

ponding
depth at
Q100

$$Q_{weir} = CLH^{3/2}$$

$C = 3.33$ Weir Discharge Coefficient

$L =$ Perimeter of Grate Opening (ft)

$H =$ Flow Height of Water Surface Above Weir (ft)

$$Q_{orifice} = CA\sqrt{2gh}$$

$C = 0.60$ Orifice Discharge Coefficient

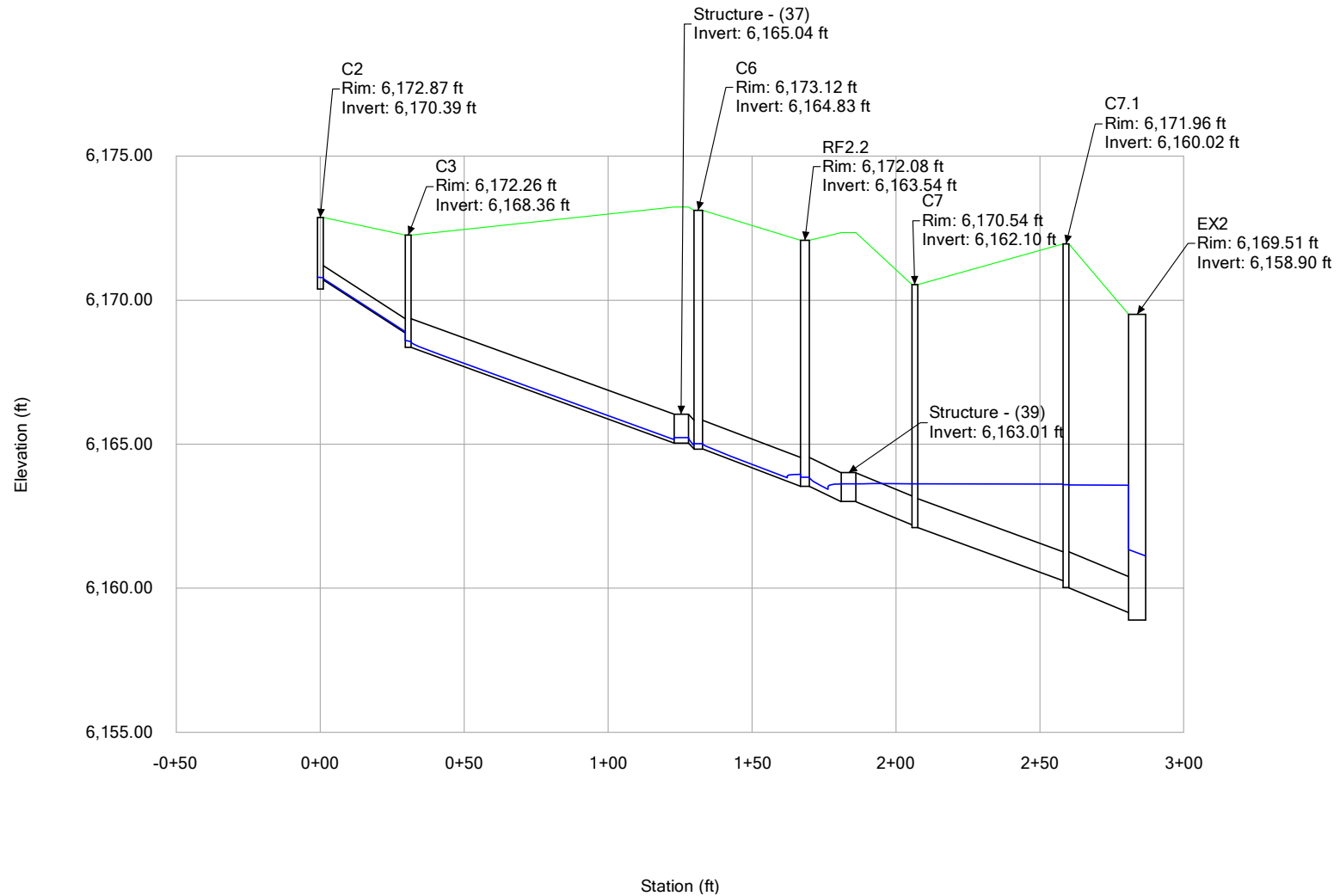
$A =$ Area of the Orifice (ft²)

$g =$ Gravitational Constant $\left(32.2 \frac{ft}{s^2}\right)$

$H =$ Depth of Water Above Center of Orifice (ft)

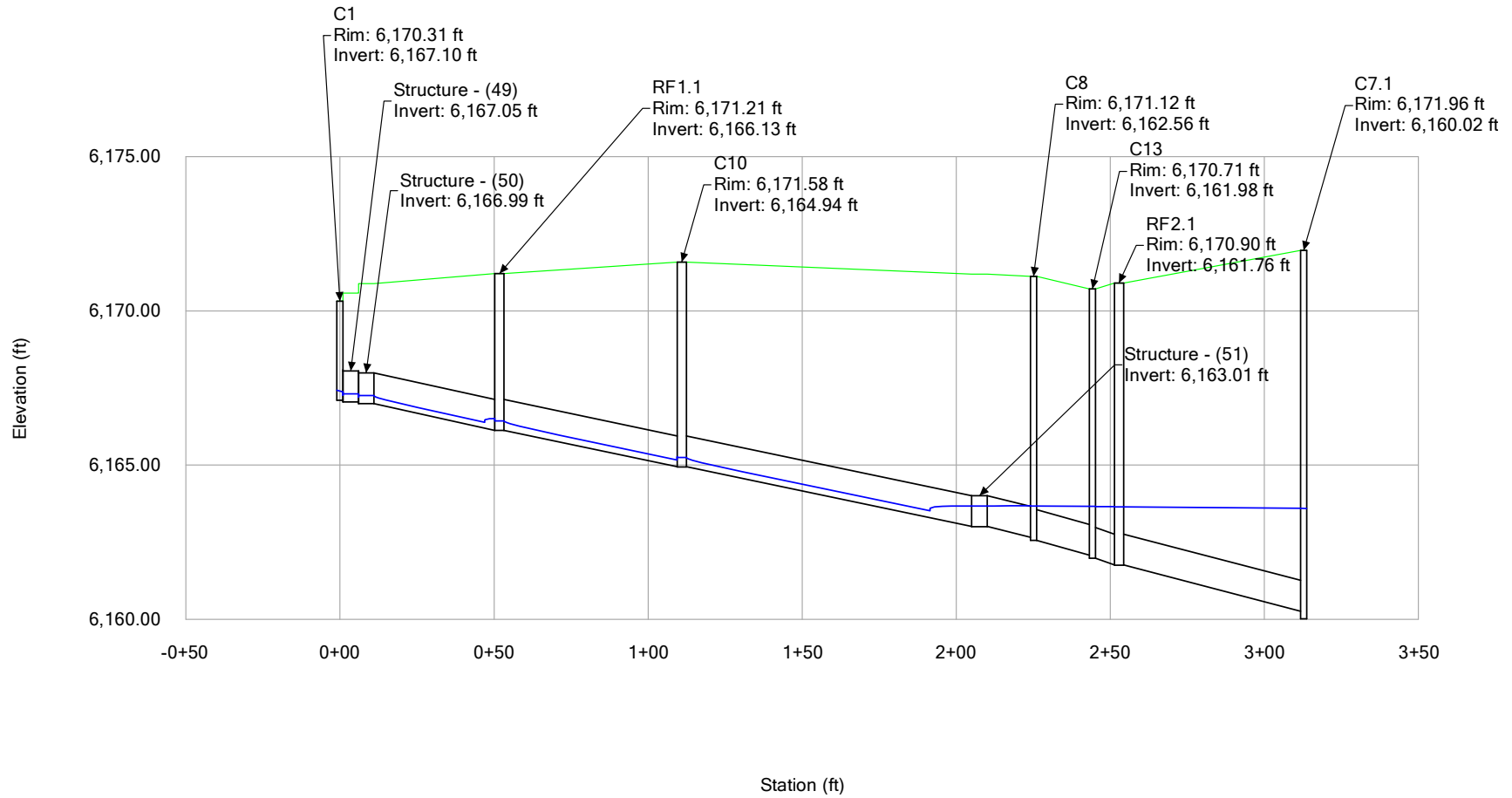
REV 2.1.21

Profile Report **Engineering Profile - STMA (BR21318 StormCAD.stsw)**

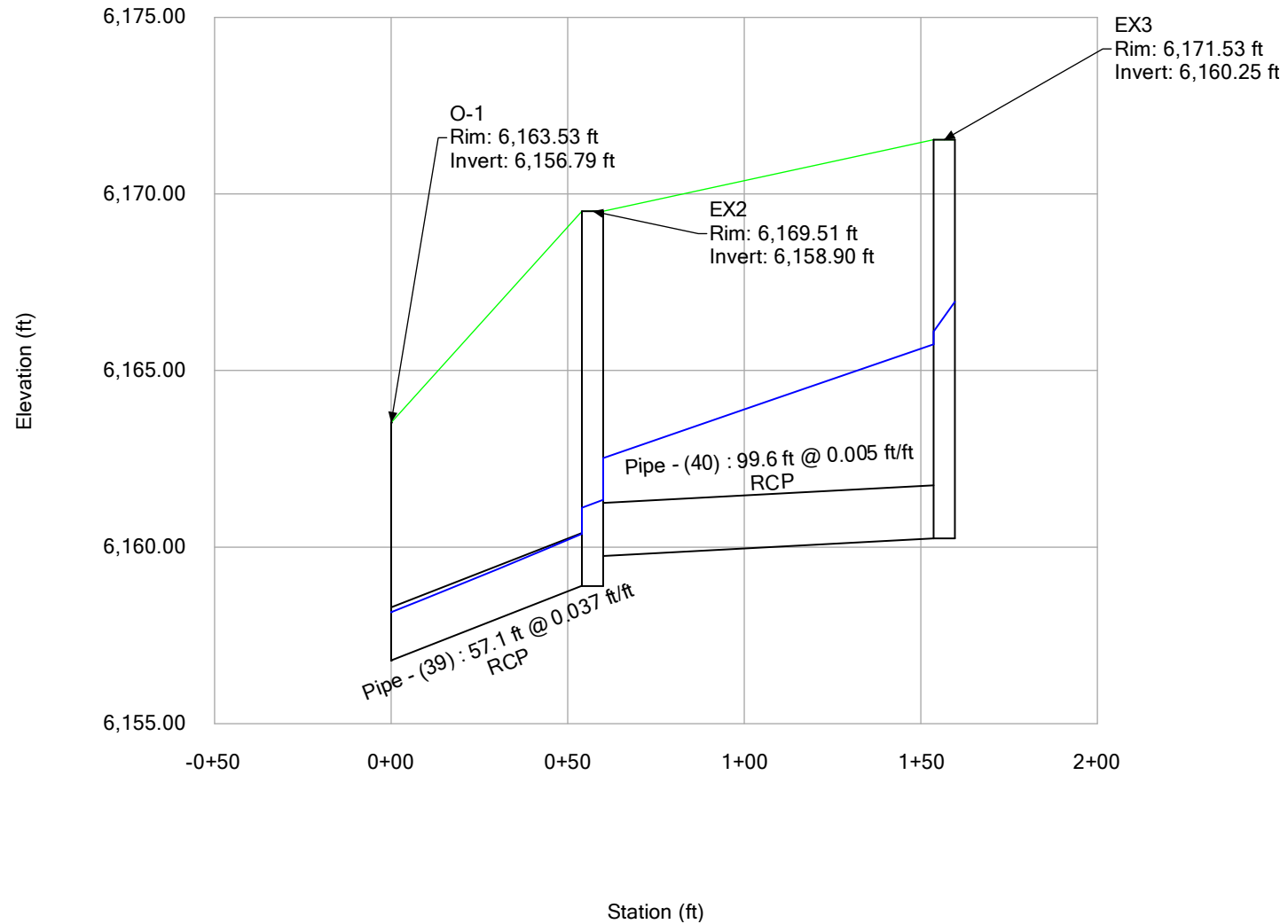


Profile Report

Engineering Profile - STMB (BR21318 StormCAD.stsw)

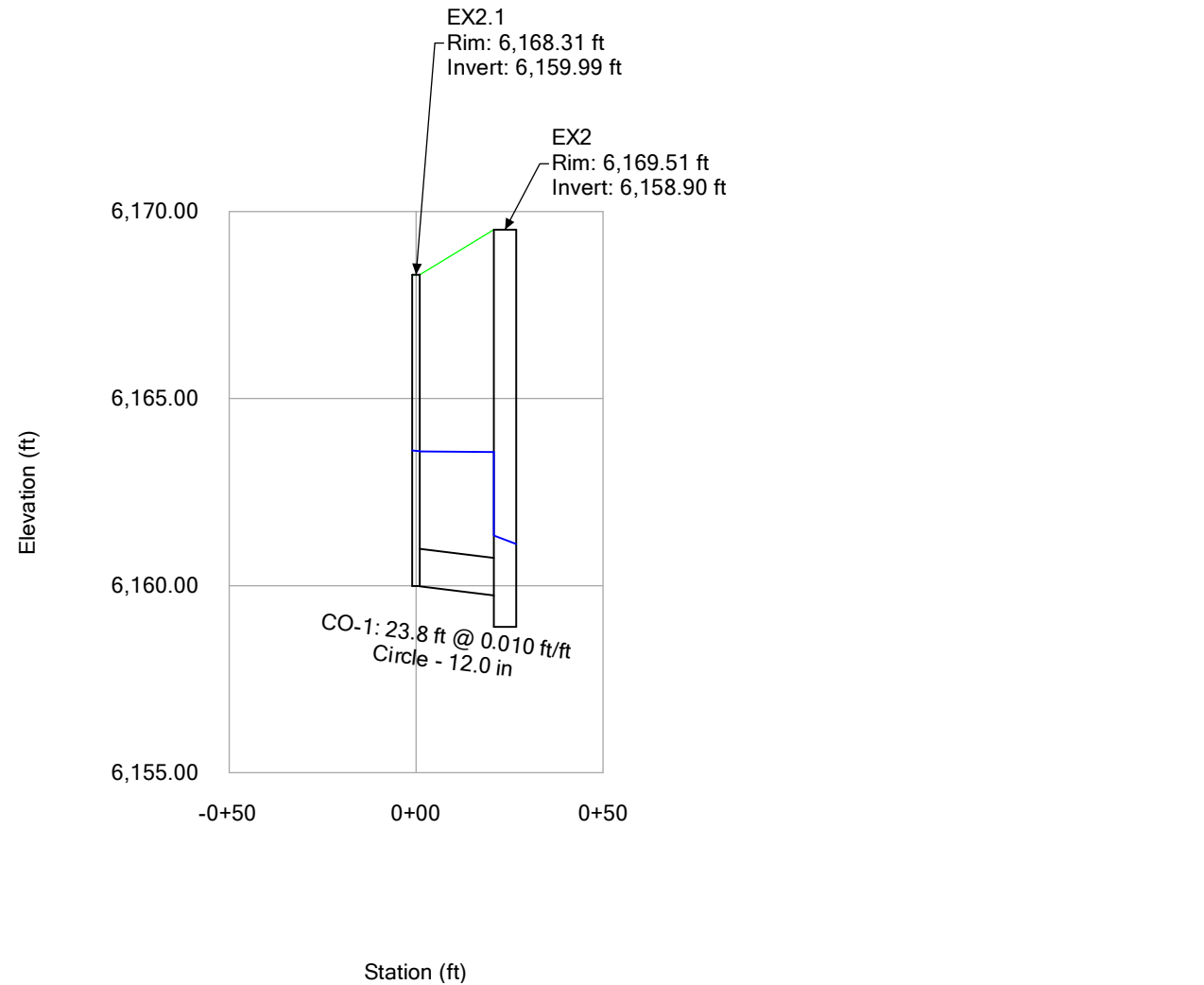


Profile Report **Engineering Profile - EX1 (BR21318 StormCAD.stsw)**

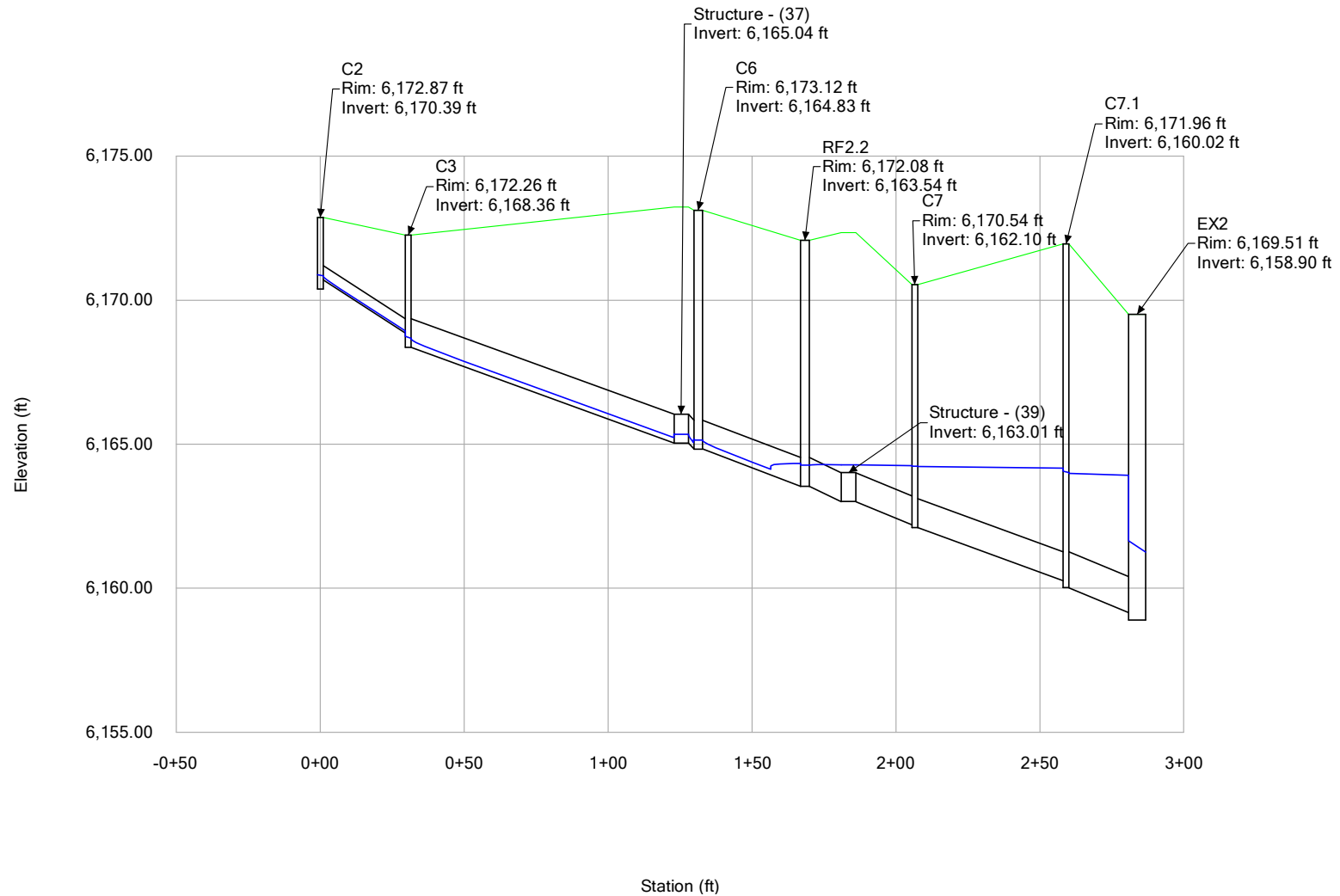


Profile Report

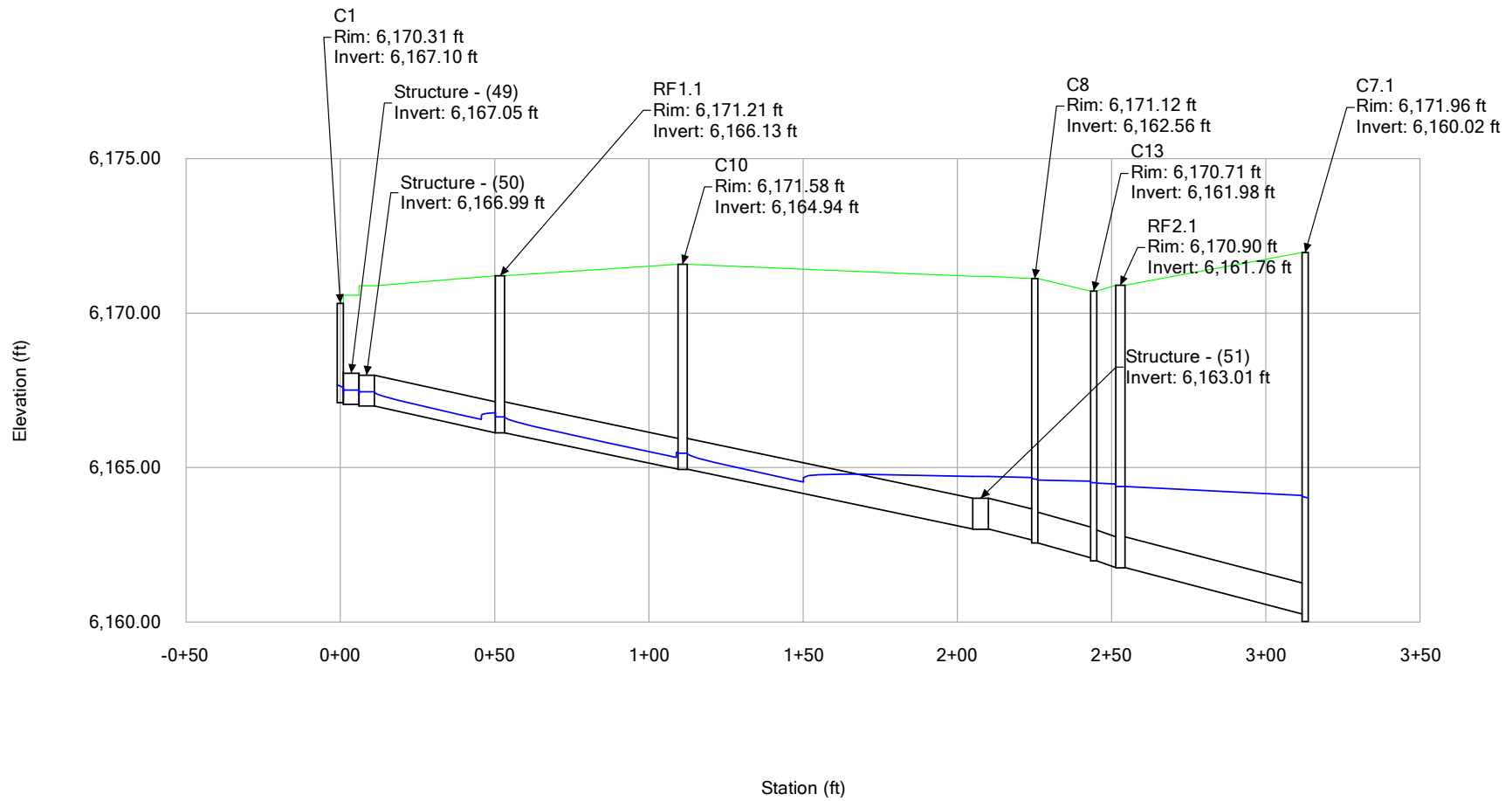
Engineering Profile - EX2 (BR21318 StormCAD.stsw)



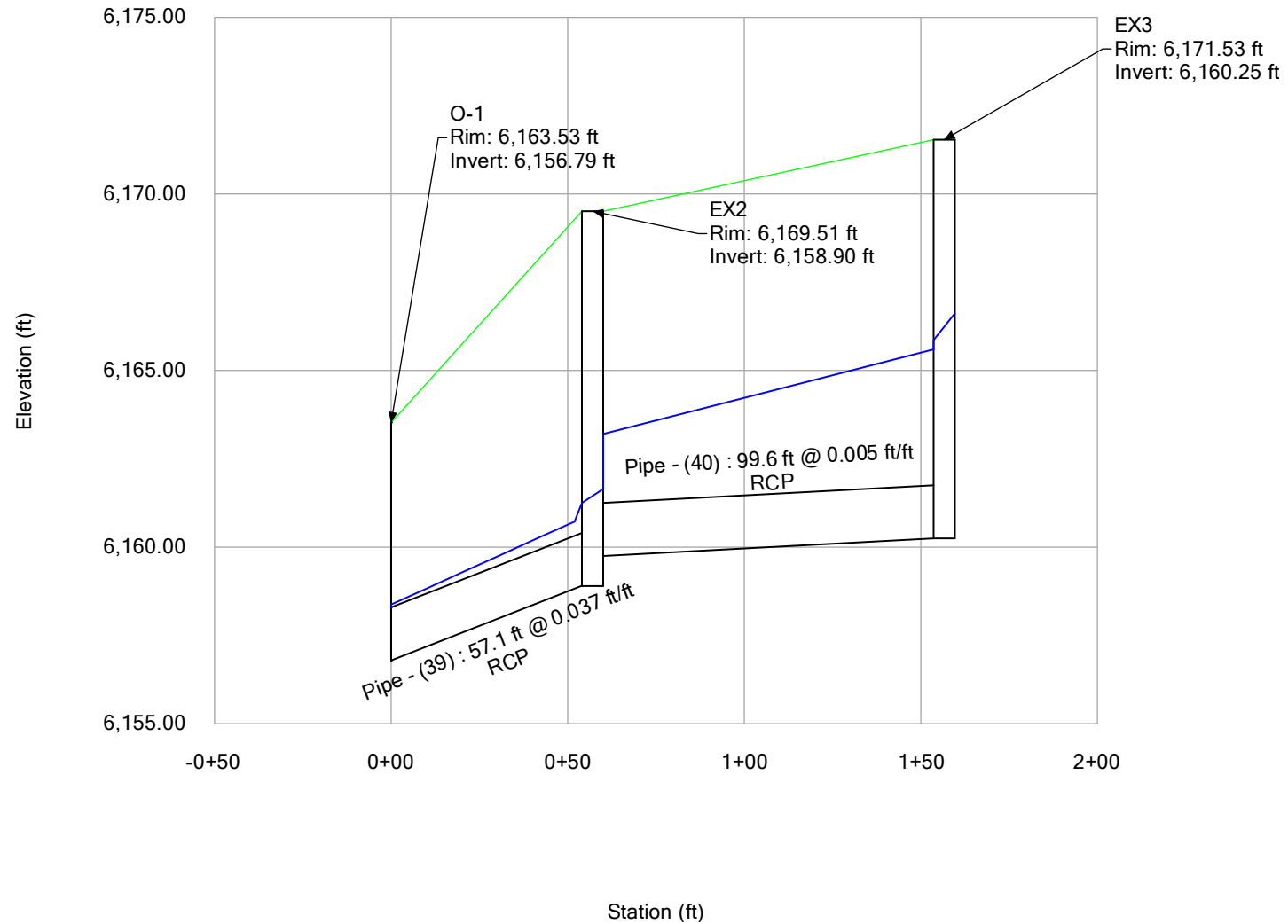
Profile Report **Engineering Profile - STMA (BR21318 StormCAD.stsw)**



Profile Report **Engineering Profile - STMB (BR21318 StormCAD.stsw)**

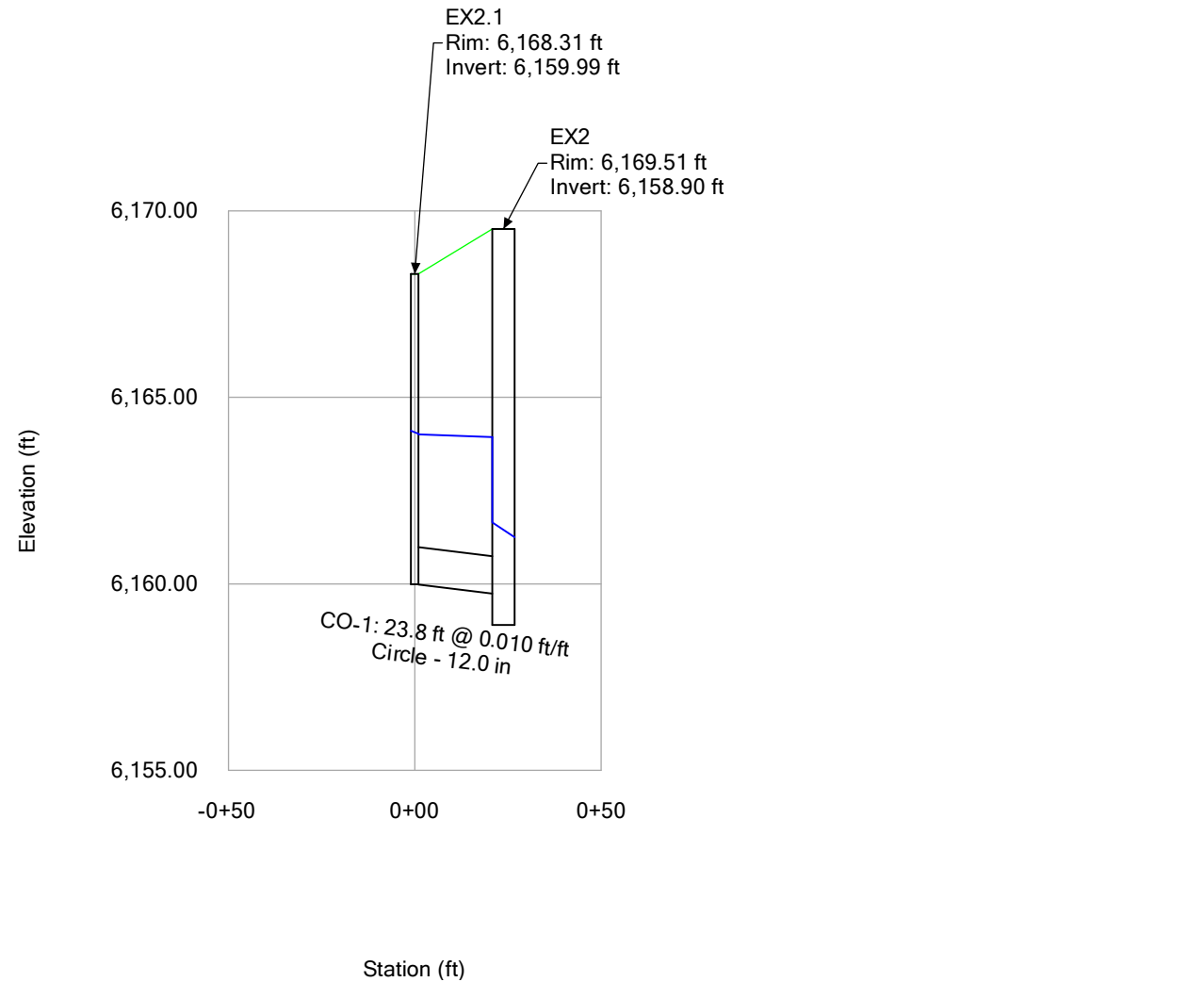


Profile Report **Engineering Profile - EX1 (BR21318 StormCAD.stsw)**



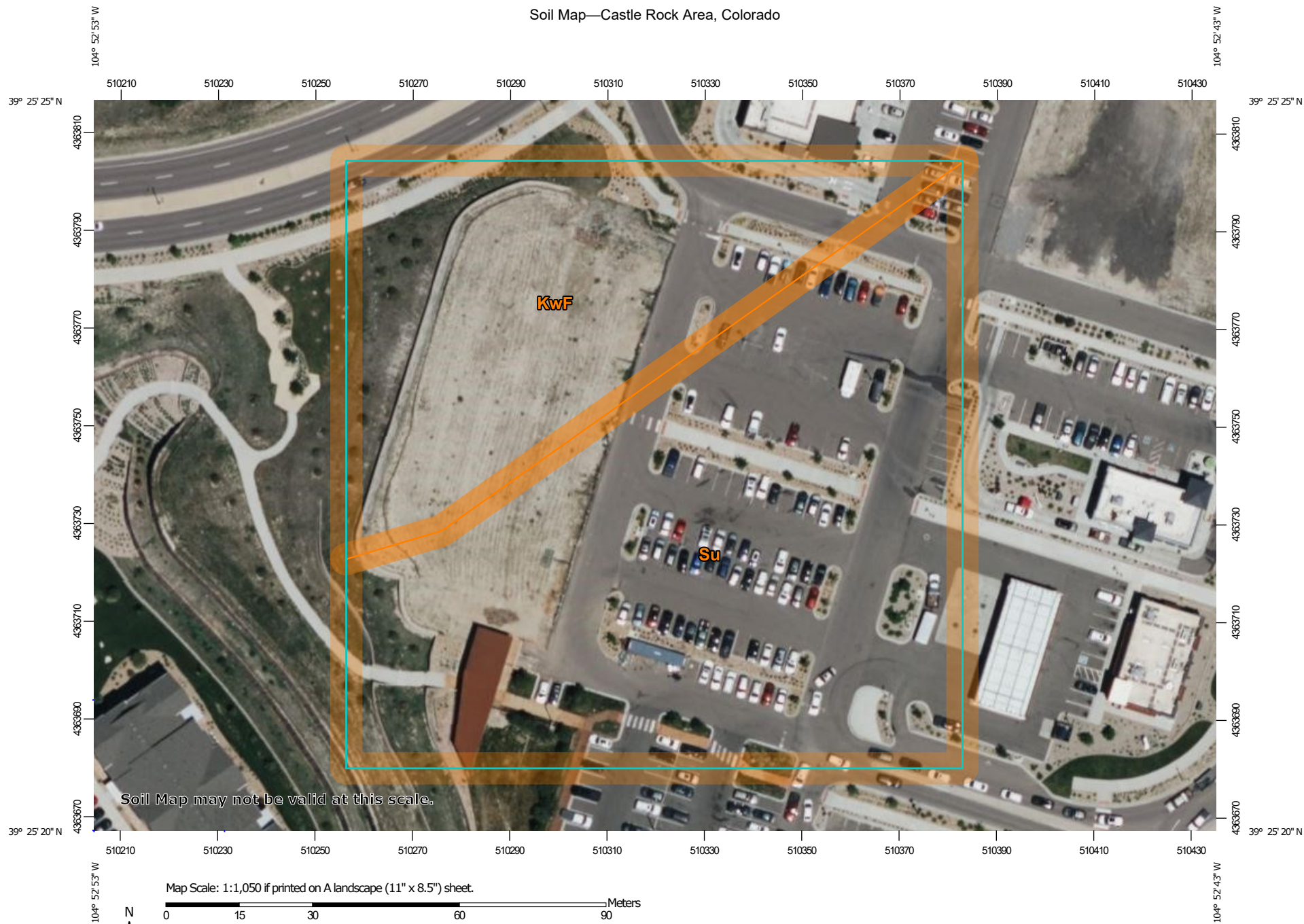
Profile Report

Engineering Profile - EX2 (BR21318 StormCAD.stsw)



APPENDIX C – REFERENCES

Soil Map—Castle Rock Area, Colorado



**Natural Resources
Conservation Service**

Web Soil Survey
National Cooperative Soil Survey

6/2/2022
Page 1 of 3

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 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

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

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: Castle Rock Area, Colorado

Survey Area Data: Version 14, Aug 31, 2021

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

Date(s) aerial images were photographed: Jun 9, 2021—Jun 12, 2021

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.

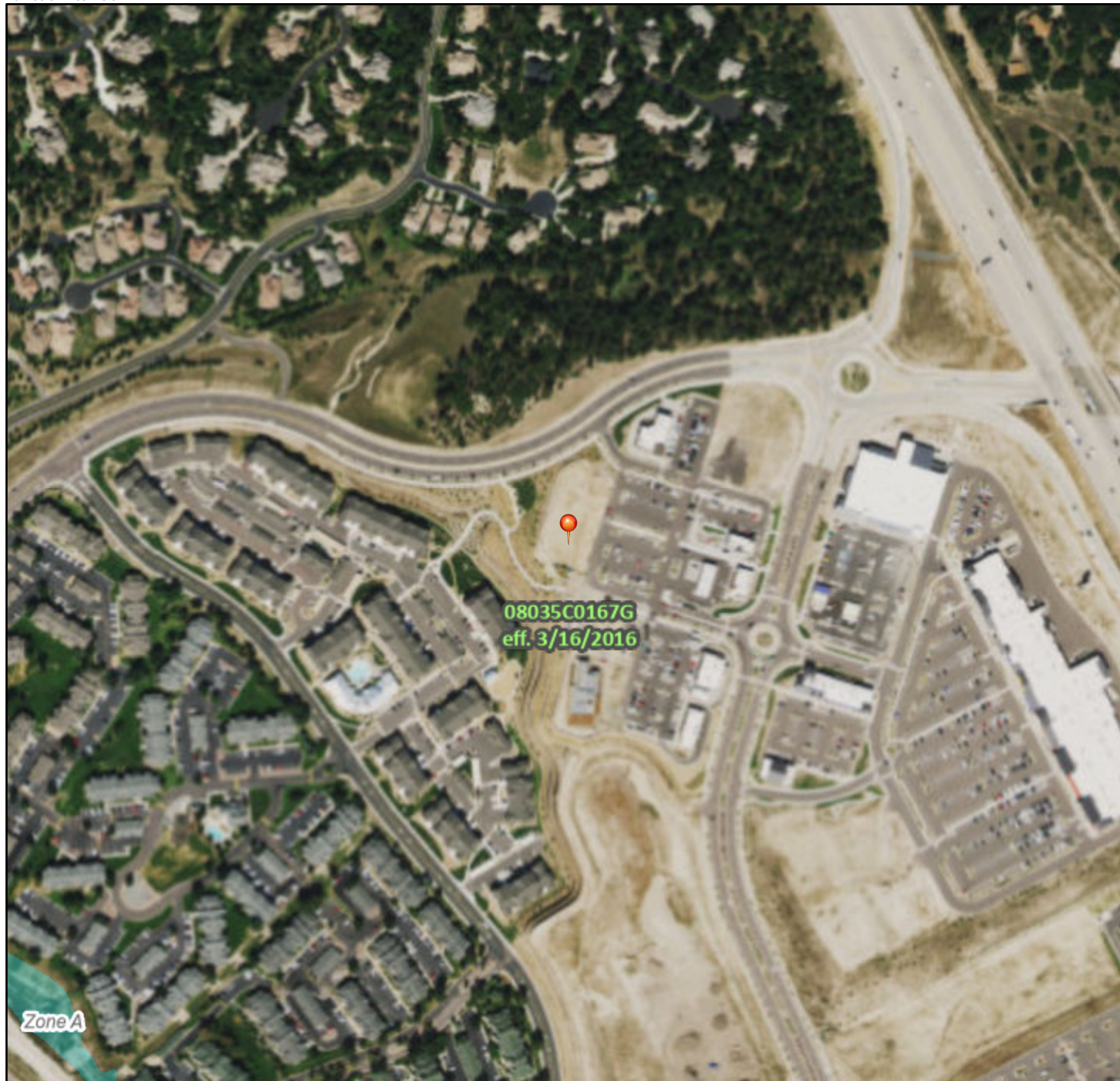
Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
KwF	Kutch-Newlin-Stapleton complex, 8 to 40 percent slopes	1.4	35.6%
Su	Stony rough land	2.5	64.4%
Totals for Area of Interest		3.9	100.0%

National Flood Hazard Layer FIRMette



104°53'8"W 39°25'37"N



0 250 500 1,000 1,500 2,000 Feet

1:6,000

104°52'31"W 39°25'9"N

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) Zone A, V, A99
		With BFE or Depth Zone AE, AO, AH, VE, AR
		Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD		0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
		Future Conditions 1% Annual Chance Flood Hazard Zone X
		Area with Reduced Flood Risk due to Levee. See Notes. Zone X
		Area with Flood Risk due to Levee Zone D
OTHER AREAS		NO SCREEN Area of Minimal Flood Hazard Zone X
		Effective LOMRs
		Area of Undetermined Flood Hazard Zone D
GENERAL STRUCTURES		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall
OTHER FEATURES		20.2 Cross Sections with 1% Annual Chance Water Surface Elevation
		17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
		Coastal Transect
		Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary
		Coastal Transect Baseline
MAP PANELS		Digital Data Available
		No Digital Data Available
		Unmapped



The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on **6/2/2022 at 5:20 PM** and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

APPENDIX D – PAST REPORTS

**PHASE III DRAINAGE REPORT AMENDMENT
FOR BLOCK 2, PHASE I
PROMENADE AT CASTLE ROCK**
(PROMENADE AT CASTLE ROCK, FILING NO. 1, AMENDMENT NO. 7, BLOCK 2)

CASTLE ROCK, CO

*Project Number: CD16-0049
FCO17-0129*

Prepared for:

PROMENADE CASTLE ROCK, LLC
5750 DTC Parkway, Suite 210
Greenwood Village, Colorado 80111

Contact: Peter Cudlip
Phone: 303.771.4004

Prepared by:

BOWMAN CONSULTING
603 Park Point Drive, Suite 100
Golden, Colorado 80401

Contact: Clif Dayton, P.E.
Phone: 303.674.7355

JN: 020029-01-009
October 19, 2017

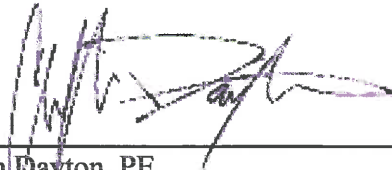


DEVELOPMENT SERVICES
APPROVED

by kjohnston
on 11/15/2017

**Approved FCO17-0129-PHASE III
DRAINAGE .PDF
Record Document on File**

I affirm that this report and plan for the Phase III drainage design of the Promenade at Castle Rock, Block 2, Phase 1 was prepared by me (or under my direct supervision) in accordance with the provisions of the Town of Castle Rock Drainage Design and Technical Criteria for the owners thereof. I understand that the Town of Castle Rock does not and will not assume liability for drainage facilities designed by others.



Clifton Dayton, PE
State of Colorado No. 48189
For and on behalf of Bowman Consulting



Promenade at Castle Rock, LLC hereby certifies that the drainage facilities for Promenade at Castle Rock, Block 2, Phase 1 shall be constructed according to the design presented in this report. I understand that the Town of Castle Rock does not and will not assume liability for the drainage facilities designed and/or certified by my engineer and that the Town of Castle Rock reviews drainage plans pursuant to the Municipal Code; but cannot, on behalf of Promenade at Castle Rock, LLC, guarantee that final drainage design review will absolve Promenade at Castle Rock, LLC and/or their successors and/or assigns of future liability for improper design.

Peter Cudlip

Name of Developer



Authorized Signature

routed to the Regional Pond located near the Castle Rock Pkwy and State Highway 85 interchange via Promenade Pkwy storm sewer system. ($Q_5=0.5$ cfs, $Q_{100}=1.8$ cfs).

3 Drainage Design Criteria

3.1 Regulations

This drainage report was prepared in accordance with the Town of Castle Rock Storm Drainage Design and Technical Criteria Manual (ToCR Drainage Manual) and the Urban Drainage and Flood Control District (UDFCD), Drainage Criteria Manuals.

3.2 Drainage Studies, Master Plans, Site Constraints

One study has previously analyzed the Site.

- Phase III Drainage Report for Promenade at Castle Filing No. 1 Castle Rock, CO, July 22, 2015

The Phase III Drainage Report for Promenade at Castle Rock prepared by Bowman Consulting provided an analysis of the overall development. The Site is within Basin 61, as identified by the Phase III Drainage Report for Promenade at Castle Rock, see excerpts in Appendix C. This Basin has an existing composite imperviousness of 2%, an anticipated developed composite impervious of 85% and generally bounded by Castle Rock Parkway to the North Promenade Parkway to the east, Tract D to the south and west. Water quality and detention for this site are provided within the Regional Detention Pond near the Castle Rock Pkwy and State Highway 85 interchange according to this report.

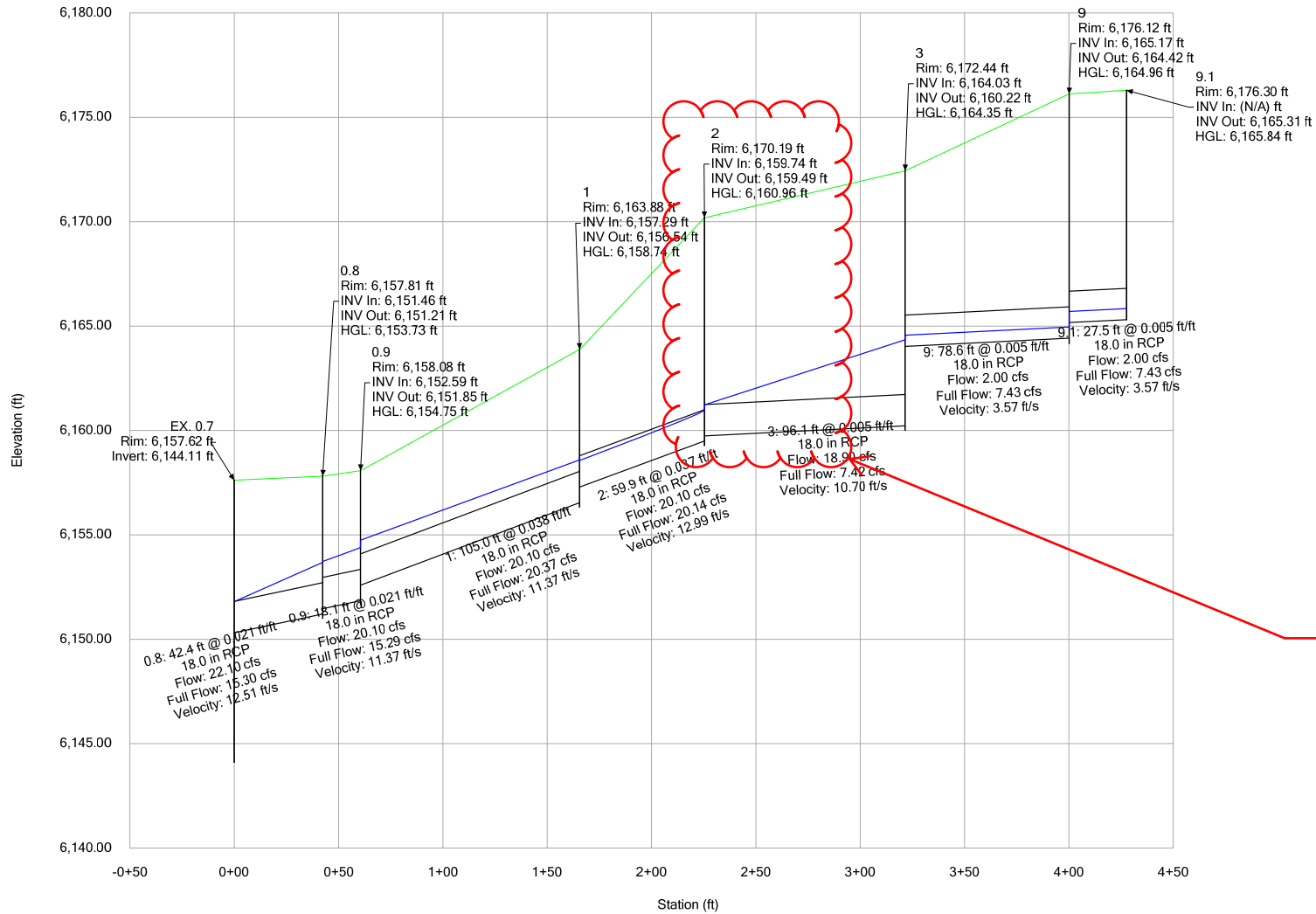
3.3 Hydrology

Regional detention pond
assumes 85% for the site.

The minor storm was calculated for the 5-year recurrence interval and the major storm was calculated at the 100-year recurrence interval for consistency with the previous studies. The Rational Method was used for determining peak runoff discharges for the development. Runoff coefficients were calculated for each on-site basin using values from the UDFCD's Tables 6-3 and 6-4.

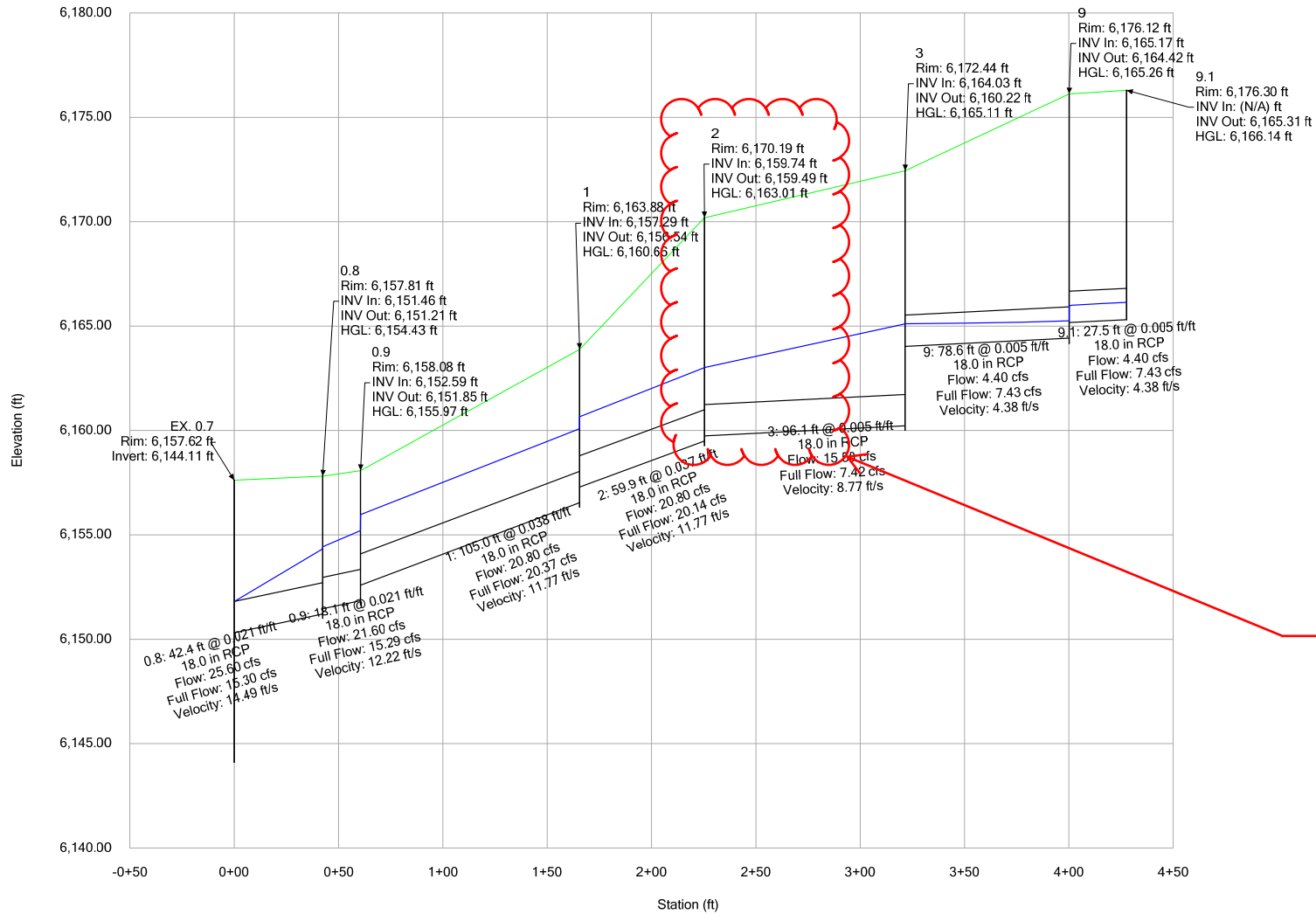
The project design rainfall intensities were determined using Figure 6-1 of the ToCR Drainage Manual. The developed time of concentrations for the basins at the design points were calculated using a spreadsheet version of the Town's "SF-2" form, included in Appendix A, in accordance with the procedures outlined in Chapter 6 of the ToCR Drainage Manual. The initial overland flow time was calculated using UDFCD's Equation 6-3. Travel times were calculated using Equation 6-4 of the UDFCD Drainage Criteria Manuals and a conveyance coefficient of 20.

Profile Report
Engineering Profile - Profile - 1 (020029_BK 2 STORM REDESIGN FULL.stsw)
Active Scenario: 5-yr

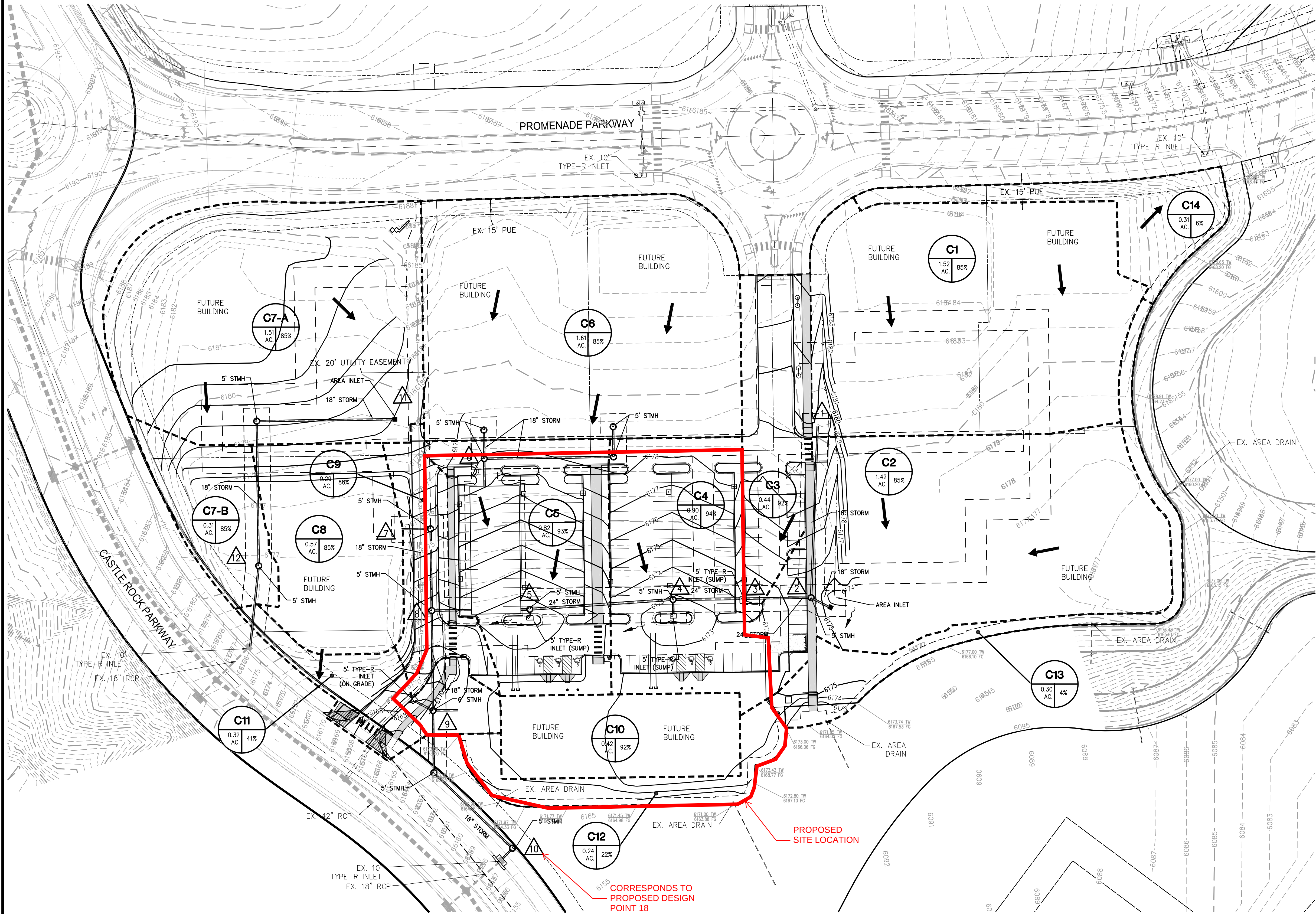


MH2 in this profile corresponds to the tie-in point (EX2) of the proposed project. This manhole was designed to be in a surcharge condition in both the minor and major storms, which causes a tailwater condition to the proposed site.

Profile Report
Engineering Profile - Profile - 1 (020029_BK 2 STORM REDESIGN FULL.stsw)
Active Scenario: 100-yr



MH2 in this profile corresponds to the tie-in point (EX2) of the proposed project. This manhole was designed to be in a surcharge condition in both the minor and major storms, which causes a tailwater condition to the proposed site.



LEGEND:

DESIGN POINT

PROPOSED BASIN BOUNDARY

FLOW DIRECTION

EMERGENCY OVERFLOW PATH FOR SUMP INLETS

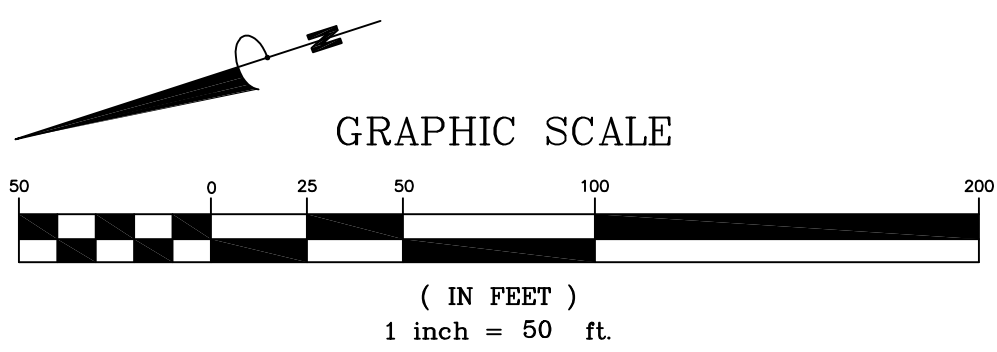
BASIN DESIGNATION

BASIN AREA

PERCENT IMPERVIOUS

DESIGN POINT SUMMARY TABLE				
Design Point	Contributing Basins	Area (acres)	5-Year (cfs)	100-Year (cfs)
1	C1	1.52	4.8	10.5
2	C1-C2	2.94	7.6	16.3
3	C1-C3	3.38	8.6	18.9
4	C1-C4	4.28	11.2	24.1
5	C1-C5	5.10	13.3	28.2
6	C6	1.61	5.0	9.9
7	C8	0.57	2.0	4.4
8	C1-C6, C8	7.28	18.9	16.3
9	C1-C6, C8-C10	7.99	20.1	21.6
10	C1-C6, C8-C10, C12	8.23	20.4	22.5
11	C7-A	1.51	4.8	10.3
12	C7-A&B	1.82	5.5	12.2

BASIN SUMMARY TABLE			
Basin	Area (acres)	5-Year (cfs)	100-Year (cfs)
C1	1.52	4.8	10.5
C2	1.42	3.6	7.8
C3	0.44	1.4	3.2
C4	0.90	3.4	7.0
C5	0.82	3.4	6.2
C6	1.61	5.0	9.9
C7-A	1.51	4.8	10.3
C7-B	0.31	1.0	2.6
C8	0.57	2.0	4.4
C9	0.29	1.0	1.8
C10	0.42	1.5	3.5
C11	0.32	0.5	1.8
C12	0.24	0.5	0.9
C13	0.30	0.5	1.8
C14	0.31	0.5	1.8

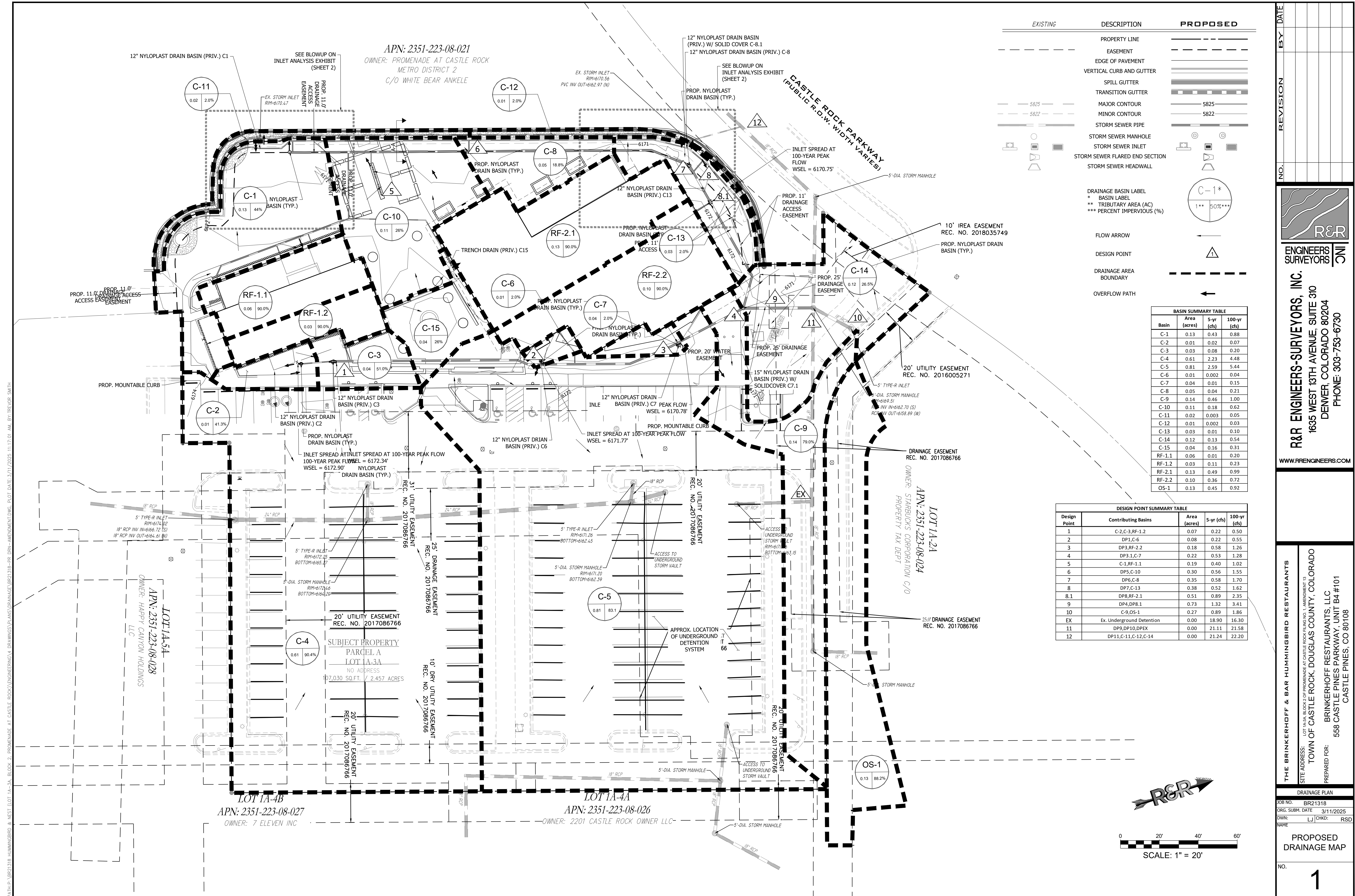


BENCHMARK:
(KK1334) BRASS DISK IN THE CENTER OF THE EAST END OF A 10' BY 15' EXPOSED AREA OF OUTCROPPING BEDROCK, 149.9' EAST OF THE NEAR RAIL, 50.9' WEST OF THE CENTERLINE OF COUNTY ROAD 25, 0.7' WEST OF THE EAST EDGE OF OUTCROP, AND EAST OF THE EXTENDED CENTER OF INTERSTATE 25 EXIT 162, 10' BELOW THE ROAD, AND 1' FT NORTH OF A FIBERGLASS WITNESS POST.
DATUM-NAVD88
ELEVATION-6222.12

REVISION	REVISIONS	
	DATE	DESCRIPTION

DESIGN	DRAWN	CHKD
		LJT
SCALE	H: 1" = 50' V: NA	
JOB No.	020029-01-009	
DATE :	10/23/2017	
SHEET	DM1	

APPENDIX E – DRAINAGE MAPS



APPENDIX F – PERMANENT WATER QUALITY WORKSHEET

Permanent Water Quality Determination Worksheet (Taken from 2019 SDDTCM Sections 13.1.4 and 13.1.5)

Project:		Project#	SDP22-0049	Applicant:	
Section	Questions	Response	Check those that apply	Instructions	
1	Non-applicable Sites				
1.1	Will the project result in a temporary disturbance of greater than one acre?	No Yes	☐ ☒	Proceed to section 1.2. Proceed to section 2.	
1.2	Is the project part of a larger common plan of development or sale where multiple separate and distinct construction activities may be taking place at different times on different schedules, but remain related and are within 1/4 mile of each other? (A common plan of development will generally be documented on a site development plan, master plan, or equivalent, for the property/project)	No Yes	☐ ☐	Proceed to section 1.3. Proceed to section 2.	
1.3	Is the project within the Cherry Creek Watershed?	Yes No	☐ ☐	Permanent water quality control measures may be required. Refer to Water Quality Control Regulation 72.7 for details and allowable exclusions. Permanent water quality control measures are not required.	
2	Applicable Site Types and Exclusions by Variance				
2.1	Does the project have more than 35% impervious area on the existing site?	No Yes	☐ ☒	Project is an applicable Development Site. Proceed to section 3. Proceed to 2.2.	
2.2	Does the project have greater than 75% impervious area on the existing site?	No Yes	☐ ☒	Project is an applicable Redevelopment Site. Proceed to section 3. Project is an applicable Constrained Redevelopment Site. Proceed to 2.3.	
2.3	Will 100% of the runoff from the existing and proposed site be captured and treated using one or more of the allowable design standards for permanent water quality?	Yes No	☒ ☐	No further action required. Proceed to 2.4.	
2.4	Do any other water quality exclusions apply to the site?	No Yes	☐ ☐	Portions of the project are excluded. Proceed with design in accordance with Constrained Redevelopment standards and apply for variance for <u>Constrained Redevelopment Sites</u> . Proceed to section 3. Following approval of other exclusions, design remaining site in accordance with Constrained Redevelopment standards and apply for variance for <u>Constrained Redevelopment Sites</u> .	
3	Applicable Sites with Other Exclusions by Variance				
3.1	Category 1: Roadways, bridges and trails only				
3.1.1	Is the project a bike or pedestrian trail?	Yes No	☐ ☐	Proceed to next line. Proceed to 3.1.2.	
	Is the trail for a roadway?	Yes No	☐ ☐	Proceed to 3.1.2. Project is excluded. Submit variance for <u>Trails Excluded from Permanent Water Quality Requirements</u> .	
3.1.2	Is the project primarily used for parking or access to parking?	Yes No	☐ ☐	This exclusion does not apply. Permanent water quality is required. Proceed to 3.1.3.	
3.1.3	Does the project add impervious area?	No Yes	☐ ☐	Project is excluded. Submit variance for <u>Pavement Management Sites Excluded from Permanent Water Quality Requirements</u> . Proceed to 3.1.4.	

Section	Questions	Response	Check those that apply	Instructions
3.1.4	Does the project add more than 8.25 feet of paved width at any location to the existing roadway?	No Yes	☐ ☐	Project is excluded. Submit variance for <u>Roadway Redevelopment Sites Excluded from Permanent Water Quality Requirements</u> . Proceed to next line.
	Does the project add more than one acre of paved area per mile to an existing roadway?	No Yes	☐ ☐	Project is excluded. Submit variance for <u>Roadway Redevelopment Sites Excluded from Permanent Water Quality Requirements</u> . Proceed to next line.
	Does the project increase the width by two times or more, on average, of the original roadway area?	No Yes	☐ ☐	Existing areas of site are excluded only. Submit variance for <u>Existing Roadway Surfaces Only Excluded from Permanent Water Quality Requirements</u> . This exclusion does not apply. Permanent water quality is required.
3.2	Category 2: Non-residential and non-commercial projects only			
3.2.1	Is the project associated with oil and gas exploration, production, processing, or treatment operations or transmission facilities, including activities necessary to prepare a site for drilling and the movement and placement of drilling equipment?	Yes No	☐ ☐	Project is excluded. Submit variance for <u>Oil and Gas Exploration Sites Excluded from Permanent Water Quality Requirements</u> . Proceed to 3.2.2.
3.2.2	Is the project for stream stabilization?	Yes No	☐ ☐	Project is excluded. Submit variance for <u>Stream Stabilization Sites Excluded from Permanent Water Quality Requirements</u> . Proceed to 3.2.3.
3.2.3	Is the project for installation or maintenance of aboveground or underground utilities or infrastructure that does not permanently alter the terrain, ground cover, or drainage patterns from those present prior to the construction activity including activities to install, replace or maintain utilities under roadways or other paved areas that return the surface to the same condition?	Yes No	☐ ☐	Project is excluded. Submit variance for <u>Aboveground and Underground Utilities Excluded from Permanent Water Quality Requirements</u> . Proceed to 3.2.4.
3.2.4	Is the project on undeveloped land (land with no human-made structures such as buildings or pavement) that will remain undeveloped after the project?	Yes No	☐ ☐	Project is excluded. Submit variance for <u>Sites with Land Disturbances to Undeveloped Land that will Remain Undeveloped Excluded from Permanent Water Quality Requirements</u> . Proceed to 3.2.5.
3.2.5	Will the post-project condition result in surface water discharge during the 80th percentile storm runoff event?	No Yes	☐ ☐	Project is excluded. Submit study along with variance for <u>Non-residential and Non-commercial Infiltration Conditions Excluded from Permanent Water Quality Requirements</u> . This exclusion does not apply. Permanent water quality is required.
3.3	Category 3: Residential, Agricultural and Commercial projects			
3.3.1	Is the project a single-family residential lot, or agricultural zoned lands, greater than or equal to 2.5 acres in size per dwelling unit?	Yes No	☐ ☐	Proceed to next line. Proceed to 3.3.2.
	Is the project site greater than 10% impervious?	No Yes	☐ ☐	Project is excluded. Submit variance for <u>Large Lot Single Family Sites Excluded from Permanent Water Quality Requirements</u> . Proceed to next line.
	Is the project site greater than 20% impervious?	Yes No	☐ ☐	This exclusion does not apply. Permanent water quality is required. Proceed to next line.
	Will the post-project condition result in surface water discharge during the 80th percentile storm runoff event?	No Yes	☐ ☐	Project is excluded. Submit study along with variance for <u>Large Lot Single Family Sites Excluded from Permanent Water Quality Requirements</u> . This exclusion does not apply. Permanent water quality is required.

Section	Questions	Response	Check those that apply	Instructions
3.3.2	Will 100% of the runoff from the residential or commercial site be captured?	Yes No	☒ ☐	This exclusion does not apply. Permanent water quality is required. Proceed to next line.
	Is all or a portion of the site undeveloped or will it remain undeveloped after construction?	Yes No	☐ ☐	This portion of the project is excluded. Submit variance for <u>Sites with Land Disturbance to Undeveloped Land that will Remain Undeveloped Excluded from Permanent Water Quality Requirements</u> . Proceed to next line. Proceed to next line.
	Is the remaining untreated impervious area greater than 20% of the site?	Yes No	☐ ☐	This exclusion does not apply. Permanent water quality is required. Proceed to next line.
	Is the remaining untreated impervious area greater than one acre?	Yes No	☐ ☐	This exclusion does not apply. Permanent water quality is required. Proceed to next line.
	Is it practicable to capture runoff from portions of the site that will not drain to a control measure?	No Yes	☐ ☐	Document justification demonstrating that it is not practicable to capture runoff from this portion of the site in the drainage report . No further action is needed. This exclusion does not apply. Permanent water quality is required.

APPENDIX G – MS4 PERMIT FORM



Summary of Water Quality Conformance to MS4 Permit

The purpose of this worksheet is to document conformance with the Town of Castle Rock's MS4 permit with regard to permanent water quality on land disturbance projects.

Project Name Hummingbird & Nest Restaurants

Project Owner Mark Brinkerhoff, Brinkerhoff Restaurant Group

Project Location 700' SW of intersection of Castle Rock Parkway & Promenade Parkway

ToCR Project Number SDP22-0049

Total Site Area 2.46 acres

Total Size of Common Plan of Development N/A acres

Check all that apply:

☒ **Project within Plum Creek Basin**

☐ **Project within Cherry Creek Basin**

Estimated construction completion date Winter 2023

1. The water quality control measure(s) for applicable development sites shall meet one of the following base design standards as per the SDDTCM Section 14.4. Please select all design standards that were applied to meet conformance with the MS4 on this site.

- ☐ WQCV standard
- ☐ Pollutant removal standard
- ☐ Runoff reduction standard
- ☒ Applicable site draining to regional WQVC control measure (accepts drainage prior to discharging to WOTS)
- ☐ Applicable site draining to regional WQVC control facility (with receiving pervious area control measure upstream of WOTS)
- ☐ Constrained redevelopment sites standard
 - Imperviousness of existing site _____/_____ (Imp. Ac/Site Ac) = ____%
 - Variance required TCV No. _____
- ☐ Existing control measure with WQCV per previous criteria standards
 - Reference Construction Permit No. _____
- ☐ Cherry Creek Basin only, choose one: ☐ Tier 1 ☐ Tier 2 ☐ Tier 3
- ☐ No control measures provided (See Permanent WQ Worksheet for applicability)

Summary of Water Quality Conformance to MS4 Permit

2. Was an exclusion to water quality applied as per SDDTCM Section 13.1.5? ☐ Yes ☐ No

i. If yes, please select all that apply, provide total excluded impervious area(s) and submit variance, as applicable: TCV No. _____

- ☐ Pavement management site
Excluded impervious area: _____ acres
- ☐ Excluded roadway redevelopment
Excluded impervious area: _____ acres
- ☐ Excluded existing roadway areas
Excluded impervious area: _____ acres
- ☐ Above ground and below ground utilities
- ☐ Large lot single family home
- ☐ Non-residential and non-commercial infiltration
Excluded impervious area: _____ acres
- ☐ Land disturbance for land to remain undeveloped
Excluded impervious area: _____ acres
- ☐ Stream Stabilization Sites
Excluded impervious area: _____ acres
- ☐ Trails
Excluded impervious area: _____ acres
- ☐ Oil and Gas Exploration

3. For Development and Redevelopment sites, following any exclusions claimed above, was any portion of the site excluded up to 20% of the site and not to exceed one acre? ☐ Yes ☐ No

If yes, complete the following:

Excluded area: _____ acres
Total Site area: _____ acres, _____ % site excluded

4. For Constrained sites, was any portion of the site excluded up to 50% of the site and not to exceed 50% of the impervious area? ☐ Yes ☐ No

If yes, complete the following:

Excluded area: _____ acres
Excluded impervious area: _____ acres
Total Site area: _____ acres, _____ % site excluded
Total Impervious area: _____ acres, _____ % impervious excluded