



ADVENTHEALTH CASTLE ROCK MOB

PRELIMINARY UTILITY REPORT

Lot 2, Block 2, Heckendorf Ranch Filing No. 2
Castle Rock, Colorado

Martin/Martin, Inc. Project No.: 24.0241

Town of Castle Rock Project No.: SDP25-0001

May 14, 2025

Prepared For: ADVENTHEALTH
2350 MEADOWS BOULEVARD
CASTLE ROCK, CO 80109
ATTN: DAVID NELSON

Prepared By: MARTIN/MARTIN, INC.
12499 WEST COLFAX AVENUE
LAKEWOOD, COLORADO 80215
303.431.6100

Principal-in-Charge: Peter S. Buckley, PE
Project Manager: Nicole Kontour, PE
Project Engineer: Michael Molina

UTILITY REPORT APPROVAL BLOCKS

Engineer's Statement:

The enclosed utility report, and exhibits, were prepared by me or under my direct supervision and is correct to the best of my knowledge and belief. Said utility report has been prepared in accordance with applicable Town of Castle Rock criteria and is in conformance with the master utility plans for the affected area. I accept responsibility for any liability caused by negligent acts, errors, or omissions on my part in preparing this report.

Signature: _____
Registered Professional Engineer
State of Colorado No. _____
(Affix Seal)

Owner/Developer's Statement:

As Owner/Developer of Land(s) identified within this report; I agree to proceed, implement, and comply with all recommendations and requirements outlined herein.

Name of Developer

Authorized Signature

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I. PROJECT LOCATION AND DESCRIPTION

The AdventHealth Castle Rock MOB Project (hereafter referred to as “PROJECT”) is located within Lot 2, Block 2, Heckendorf Ranch Filing No. 2 and is situated at the western corner of the intersection of Crystal Valley Parkway and Plum Creek Boulevard in Castle Rock, Colorado. The site is bound by Crystal Valley Parkway to the northeast, an undeveloped open space to the west, Plum Creek Blvd to the south, and existing retail center to the northwest.



Figure 1: Vicinity Map

The PROJECT site is approximately 5.17 acres of roughly graded, commercially zoned land. Single-family residential neighborhoods are located southeast of Plum Creek Blvd and east of the Crystal Valley Parkway and Plum Creek Blvd intersection. There is a multi-family development across Crystal Valley Blvd and a recently constructed traffic roundabout at the east corner of the site. Site access is limited to three locations, the existing curb cut on Plum Creek Boulevard at Burnham Trail, access from the existing retail center parking lot at the northern most corner of the site, and a proposed right-in only access along Crystal Valley Parkway.

The PROJECT site consists of Bresser-Truckton Sandy Loams and ranges from 5% to 25% slopes. This soil is part of the Hydrological Soil Group A and Group B. The PROJECT site has an existing Montaine Development sign with an easement on the east corner of the lot that will be preserved.



The proposed site development will consist of a two-story, 24,535 gsf medical office building which will consist of a freestanding emergency department (FSED) on the first floor and a primary care clinic on the second floor. Associated site improvements include the construction of a surface parking lot, access drives, sidewalks, site landscaping, and associated utility infrastructure including but not limited to water, sanitary sewer, and storm sewer infrastructure. In the developed condition, approximately 57.5% of the PROJECT site will be landscaped or remain as open space.

II. CALCULATED WATER DEMANDS

A. Average Day Demands (ADD)

Although the entire PROJECT site is 5.17 acres, it is anticipated that the water demands for the PROJECT are to support the 24,535 gsf proposed medical office building. As such, the PROJECT will require 4,907 gpd for water use (or 12.27 SFE) based on demands calculated using the table provided in Section 4.4.1 of the Town of Castle Rock Water System Design 2018 Criteria Manual. Supporting calculations have been included in Appendix A.

B. Max Day Demand (MDD)

The maximum day demand is 2.5 x ADD which is 12,267.50 gpd (8.52 gpm) for the PROJECT. This flow was determined from the Town of Castle Rock Water System Design 2018 Criteria Manual. Supporting calculations have been included in Appendix A.

The proposed building will have a fire service line to supply sprinkler systems and will be construction Type II-B. According to the International Fire Code Tables B105.1(2) and B105.2, the proposed building will require a fire flow of 1500 gpm and a flow duration of 2 hours. Supporting calculations have been included in Appendix A.

The required storage volume for the PROJECT is 282,267.50 gallons (0.282 MG) per Section 4.4.2 of the criteria. Supporting calculations have been included in Appendix B.

C. Peak Hour Demands (PHD)

The peak hour demand is 5.5 x ADD which is 26,988.50 gpd (18.74 gpm) for the PROJECT. This flow was determined from the Town of Castle Rock Water System Design 2018 Criteria Manual. Supporting calculations have been included in Appendix A.

III. EXISTING WATER SYSTEM

A. Existing Distribution System

Existing water mains adjacent to the proposed developed are limited to a 12-inch PVC water main running along the western portion of the PROJECT site, and additional 12-inch PVC water mains in the Crystal Valley Parkway and Plum Creek Boulevard rights-of-way. The existing water system is located within the Town of Castle Rock's Tank 4 Blue water pressure zone, as illustrated by Figure 2.7 of the



Town of Castle Rock Water Master Plan, dated 2023. Refer to Appendix F of this report for existing utility maps provided by the Castle Rock Utility Department and Figure 2.7.

Refer to the Master Utility Report titled, 'Final Utility Report for Heckendorf Ranch Filing No. 2', dated December 2006, and prepared by EMK Consultants (herein referred to as the Master Utility Report) for further detail on the existing water distribution system.

B. Existing Supply Facilities

There are no existing water system supply facilities within the site. The PROJECT site is served by the existing 1.5-million-gallon Blue Zone Tank in Plum Creek which is connected to the 4-million-gallon Red Zone Tank in Crystal Valley via an existing 16-inch water transmission main. A transmission main was built connecting the 4-million-gallon Green Zone tank with the 4-million-gallon Red Zone tank so the connection between the Blue, Red, and Green Zone tanks will help balance the demand between zones as build-out occurs.

The Blue Zone Tank 4 elevation is 6489.00. The elevations of the Red Zone tanks range from 6650.00 to 6659.00. Elevations in the proposed development will vary between 6366 and 6342, with the higher elevations being in the east corner and lower elevations being in the north corner.

The Master Utility Plan for the property assumed that the use of the property would be Industrial/Other Commercial which has an SFE conversion of 3.0 SFEs per acre. This results in a total of 15.51 SFEs for the full 5.17-acre property.

IV. PROPOSED WATER SYSTEM

A. Proposed Distribution System

The proposed medical office building will be served by a new 2-inch copper domestic water service line and 6-inch DIP fire service line that connect to the existing 12-inch PVC water main within the western access drive of the PROJECT site. To accommodate the grades of the western access drive of the site, the existing 12-inch water main will need to be lowered to provide adequate coverage per the Town of Castle Rock standard criteria. The domestic meter size will be determined based upon the required demand of the total building water supply fixture units and any additional water usage as shown on the fixture unit worksheet to be provided to the Town of Castle Rock at the time of building permitting. Due to the proposed landscaping, a separate irrigation meter will be required. No further improvements to the existing water distribution system are anticipated to support the proposed development.

There are two proposed fire hydrants to be installed. Per coordination with Castle Rock Fire, the proposed FDC is required to be freestanding in a location approved by the Fire Code Official. The existing and proposed water distribution system is shown on the Utility Plan within Appendix F of this report.



Due to the proposed building Retail/Office use, the 12.27 SFE's for the proposed development are less than the 15.51 SFE's assumed in the Master Report based on the industrial/other commercial use assumption. Therefore, the proposed water distribution system is in compliance with the Town of Castle Rock Water Master Plan.

Proposed Supply Facilities

There are no proposed water system supply facilities within the development of the site.

B. Land Dedication Requirements

The existing 12-inch PVC water main is located within an existing utility easement (REC. NO. 2006022149). All proposed fire hydrants and the exterior domestic water meter will be located within a 20-ft wide utility easement which extends a minimum of three feet behind the meter or hydrant. All necessary easements or tracts associated with proposed utilities will be provided at the time of either platting or, final design and issuance of construction documents, in accordance with the Town of Castle Rock standards.

C. Fire Flow Hydrant Test Results

Fire flow test "Crystal Valley Shops, Confirmation Memo of Required Fire Flow. November 3, 2023. Prepared by Sunny Civil." is referenced within this report. The fire flow test was conducted by hydraulic model on November 30, 2022, by Castle Rock Water on fire hydrant number 4595 which is located north of the project site and tapped off of the 12-inch PVC water main running along the western site boundary. Results of this flow test are included in Appendix F of this report.

V. PROPOSED WATER SYSTEM ANALYSIS AND MODELING

A. Hydraulic Models

Per The Town of Castle Rock Water System Design 2018 Criteria Manual, Section 3.5, it has been assumed that hydraulic modeling is not required since the proposed development within the PROJECT site is a commercial structure on a single lot, with a fire flow no greater than 1,500 gpm.

B. Hydraulic Modeling Scenarios

It is assumed that the modeling will not be required per The Town of Castle Rock per Water System Design 2018 Criteria Manual, Section 3.5.

C. Hydraulic Modeling Output & Required Schematics

It is assumed that the modeling will not be required per The Town of Castle Rock Water System Design 2018 Criteria Manual, Section 3.5.



VI. CALCULATED WASTEWATER FLOWS

A. Average Day Flows (ADF)

Although the entire PROJECT site is 5.17 acres, it is anticipated that the wastewater demands for the PROJECT are to support the 24,535 gsf proposed medical office building. As such, the PROJECT will generate 2,453.50 gpd (0.004 cfs) based on demands calculated using the table provided in Section 4.4.1 of the Town of Castle Rock Wastewater Collection Design 2018 Criteria Manual. Supporting calculations have been included in Appendix D.

B. Peaking Factor (PF)

The site has been designed with a peaking factor of 5.0. Supporting calculations have been included in Appendix D.

C. Peak Design Flows (PDF)

The wastewater peak design flow generated by the PROJECT is calculated to be 12,512.85 gpd (0.019cfs). Supporting calculations have been included in Appendix D.

VII. EXISTING WASTEWATER SYSTEM

A. Existing Collection System

There is an existing 8-inch PVC sanitary sewer main running along the western portion of the site and an 8-inch PVC sanitary sewer main within Crystal Valley Parkway right-of-way. The existing utilities map provided by the Castle Rock Utility Department can be found within Appendix F of this report. Refer to the Master Utility Report titled, 'Final Utility Report for Heckendorf Ranch Filing No. 2', dated December 2006, and prepared by EMK Consultants (herein referred to as the Master Utility Report) for further detail on the existing wastewater collection system.

VIII. PROPOSED WASTEWATER SYSTEM

A. Proposed Collection System

For the proposed development of the PROJECT site, a new 6-inch sanitary service line will discharge to the existing 8-inch sanitary sewer main on the western portion of the site. Additionally, a proposed 1,000-gallon decontamination tank will have drain to the existing sanitary main that will discharge non-contaminated water from the tank after standard testing procedures. If testing indicates that the water within the decontamination tank is contaminated, the tank will be pumped out by a third party. The proposed wastewater distribution system is shown on the Utility Plan within Appendix F of this report.

No grease interceptors are proposed for the medical office building.



Due to the proposed building Retail/Office use, the 12.27 SFE's for the proposed development are less than the 15.51 SFE's assumed in the Master Report based on the industrial/other commercial use assumption. Therefore, the proposed wastewater collection system is in compliance with the Town of Castle Rock Water Master Plan. No improvements to the existing wastewater collections system are anticipated for the proposed development of the PROJECT site.

B. Proposed Wastewater Facilities

There are no proposed wastewater system facilities within the development of the site.

C. Land Dedication Requirements

There are no proposed easements for the sanitary sewer service for the PROJECT site.

IX. PROPOSED WASTEWATER SYSTEM ANALYSIS AND MODELING

A. Hydraulic Models

Hydraulic calculations for the existing main and proposed wastewater service lines were completed using Bentley Systems Flow master. The existing wastewater main capacity was analyzed using the existing tributary area detailed in the Master Report.

B. Hydraulic Modeling Scenarios

Hydraulic calculations were completed using the Peak Daily Flow values for the existing wastewater main and proposed service.

C. Hydraulic Modeling Output & Required Schematics

The existing sewer main was analyzed with an existing peak daily flow rate of 0.267 cfs from the Master Utility Report and the calculated peak daily flow from the PROJECT site (0.019 cfs) resulting in a total anticipated flow of 0.286 cfs. Based on the results of the hydraulic calculations, the capacity of the existing wastewater main is not exceeded with additional flows from the proposed development.

The proposed service line will maintain a minimum velocity of 2 ft/s. The design slope of the service line will be further coordinated with the development of the engineering construction documents.

The Hydraulic Modeling Calculations could be found in Appendix E.

X. POTENTIAL PERMITTING REQUIREMENTS

Permits for the proposed development will be applied for through the Town of Castle Rock and the State of Colorado, as applicable. Approved permits will be in place prior to the start of construction.



XI. CONCLUSIONS

A. Compliance with Standards

The proposed water and sanitary sewer site improvements comply with the Town of Castle Rock Water and Wastewater Design Criteria Manuals. Any future improvements to the existing water and wastewater infrastructure needed to serve the PROJECT site are the responsibility of the developer.

B. Variances

No variances are requested at this time.

REFERENCES

1. *Town of Castle Rock Water System Design Criteria 2018 Criteria Manual* published December 4, 2018.
2. *Town of Castle Rock Wastewater Collection Design Criteria 2018 Criteria Manual* published December 4, 2018.
3. *Final Utility Report for Heckendorf Ranch, Filing No. 2*, EMK Consultants, Inc., Revised December 2006.



APPENDICES

APPENDIX A: WATER DEMANDS

AdventHealth Castle Rock MOB Proposed Water Demand Calculations

Water ADD's and SFE's		
	Water	
Land Use	Typical ADD (gpd)	Typical SFEs
Retail/Office (per sf)	0.2	0.0005

Site Parameters		
AdventHealth Castle Rock MOB	Acres	SF
Retail/Office	0.5632	24535.0

Project Design Demands (Domestic)		
	Water	
Land Use	Typical ADD (gpd)	Typical SFEs
Retail/Office (per sf)	4907.00	12.27
Total	4907.00	12.27

Maximum Day Demand (MDD) / Average Day Demand (ADD): 2.5 MDD/ADD	12267.50	gpd	8.52	gpm
Peak Hour Demand (PHD) / Average Day Demand (ADD): 5.5 PHD/ADD	26988.50	gpd	18.74	gpm

Notes:

1. Demands calculated using the table provided in Section 4.4.1 of the Town of Castle Rock Wastewater and Water System Design 2018 Criteria Manuals
2. Tabulated demands in section 4.4.4 of the Town of Castle Rock Wastewater and Water Collection Design 2018 criteria manual include irrigation.

associated with the Town's Concept, Preliminary, and Final Development Packages are documented in Chapter 3 of these Criteria.

4.4.1. Design Demands

The tabulation below provides the Average Daily Demand (ADD) rates that shall be applied to compute the demands associated with the various types of land use within the development. Demands shall be computed for intermediate and full build-out phases of the development, and shall be assigned to the appropriate design points within the model to accurately reflect the geographical distribution of land use throughout the site.

Land Use	Typical ADD/Unit	Typical SFEs/Unit
Single Family Residential and Duplexes	400 gpd/dwelling unit	1.00/dwelling unit
Multi-Family Residential (Townhomes and	260 gpd/dwelling unit	0.65/dwelling unit
Retail/Offices	0.2 gpd/SF	0.0005/SF
Hotels/Motels	75 gpd/room	0.19/room
Restaurants	3.0 gpd/SF	0.0075/SF
Car Washes	5,000 gpd/facility	12.5/facility
Industrial / Other Commercial	1,200 gpd/acre	3.0/acre
Institutional	800 gpd/acre	2.0/acre
Rates for Typical Douglas County		
School Sizes:		
Elementary (10 ac, 675 students)	3,375 gpd/school	8.44/school
Middle (25 ac, 850 students)	8,500 gpd/school	21.25/school
High (50 ac, 1,700 students)	17,000 gpd/school	42.50/school
Rates for Alternate School Sizes:		
Elementary – Domestic	5 gpd/student	0.013/student
Middle – Domestic	10 gpd/student	0.025/student
High – Domestic	10 gpd/student	0.025/student
Elementary Schools – Irrigation	3,000 gpd/total acreage	7.5/total acreage
Middle Schools – Irrigation	5,250 gpd/total acreage	13.1/total acreage
High Schools – Irrigation	4,400 gpd/total acreage	11.0/total acreage
Churches	600 gpd/church	1.5/church
Gym/Fitness Center	0.5 gpd/SF	0.00125 SFE/SF
Irrigated Land (Sports Fields and School Sites Excluded)	3,750 gpd/ irrigated acre	9.38/acre

Water System Demands Heckendorf Ranch Filing No. 1 & 2

Blue Zone

Development Area	Zoning	Area (acres)	Development Type	Density (du/ac)	# of du	#SFE /unit	# of SFE	Pressure Zone	Blue # of SFE	Red # of SFE
PA-C	SF-A	10.912	Residential - Filing No. 1	6.0	31	1.0	31.00	Blue	31.00	
PA-D	SF-A	21.460	Residential - Filing No. 1	3.5	24	1.0	24.00	Red		24.00
PA-E	Co-OF	6.336	Commercial / Light Office			3.0	19.01	Blue	19.01	
PA-F	MF/VC	10.825	Multi-Family/Village Center	15.0		0.65	105.54	Blue	105.54	
PA-G	SF-B	18.534	Residential	7.0	77	1.0	77.00	Red		77.00
PA-H	Co-OF	3.487	Commercial / Light Office			3.0	10.46	Blue	10.46	
PA-I	VC	6.231	Village Center			3.0	18.69	Blue	18.69	
PA-J	SF-B	30.791	Residential	7.0	87	1.0	87.00	Red/Blue	40.00	47.00
PA-K	SF-A	22.269	Residential	5.0	82	1.0	82.00	Red		82.00
Filing 1		0.540	Irrigation			5.0	2.70	Red		2.70
Filing 2		5.720	Irrigation			5.0	28.60	Red/Blue	8.00	20.60
PLD		29.682	Open Space					Red/Blue		
ROW		16.308	Internal ROW					Red/Blue		
ROW		1.470	I-25 ROW					Blue		
TOTAL		178.305			301		486.01		232.71	253.30

Approximate Average Day Demand 232.71 SFE x (400GPD) = 0.09 MG = 65 gpm

Approximate Max Day Demand (2.65 Max Day Factor) = 0.25 MG = 171 gpm

Approximate Peak Hour Demand (4.5 Max Day Factor) = 0.42 MG = 291 gpm

Needed Fire Flow (NFF) = (3000 GPM Fire Flow x 60 min.) x 3 hours = 540,000 Gallons (0.54MG)

Storage volume (MG) = Max Day Demand (MG) + NFF

Approximate Required Blue Storage Volume = 0.25 MG + 0.54 MG = 0.79 MG

TABLE 2

TABLE B105.1(2)
REFERENCE TABLE FOR TABLES B105.1(1) AND B105.2

FIRE-FLOW CALCULATION AREA (square feet)					FIRE FLOW (gallons per minute) ^b	FLOW DURATION (hours)
Type IA and IB ^a	Type IIA and IIIA ^a	Type IV and V-A ^a	Type IIB and IIIB ^a	Type V-B ^a		
0-22,700	0-12,700	0-8,200	0-5,900	0-3,600	1,500	2
22,701-30,200	12,701-17,000	8,201-10,900	5,901-7,900	3,601-4,800	1,750	
30,201-38,700	17,001-21,800	10,901-12,900	7,901-9,800	4,801-6,200	2,000	
38,701-48,300	21,801-24,200	12,901-17,400	9,801-12,600	6,201-7,700	2,250	
48,301-59,000	24,201-33,200	17,401-21,300	12,601-15,400	7,701-9,400	2,500	
59,001-70,900	33,201-39,700	21,301-25,500	15,401-18,400	9,401-11,300	2,750	
70,901-83,700	39,701-47,100	25,501-30,100	18,401-21,800	11,301-13,400	3,000	3
83,701-97,700	47,101-54,900	30,101-35,200	21,801-25,900	13,401-15,600	3,250	
97,701-112,700	54,901-63,400	35,201-40,600	25,901-29,300	15,601-18,000	3,500	
112,701-128,700	63,401-72,400	40,601-46,400	29,301-33,500	18,001-20,600	3,750	
128,701-145,900	72,401-82,100	46,401-52,500	33,501-37,900	20,601-23,300	4,000	4
145,901-164,200	82,101-92,400	52,501-59,100	37,901-42,700	23,301-26,300	4,250	
164,201-183,400	92,401-103,100	59,101-66,000	42,701-47,700	26,301-29,300	4,500	
183,401-203,700	103,101-114,600	66,001-73,300	47,701-53,000	29,301-32,600	4,750	
203,701-225,200	114,601-126,700	73,301-81,100	53,001-58,600	32,601-36,000	5,000	
225,201-247,700	126,701-139,400	81,101-89,200	58,601-65,400	36,001-39,600	5,250	
247,701-271,200	139,401-152,600	89,201-97,700	65,401-70,600	39,601-43,400	5,500	
271,201-295,900	152,601-166,500	97,701-106,500	70,601-77,000	43,401-47,400	5,750	
295,901-Greater	166,501-Greater	106,501-115,800	77,001-83,700	47,401-51,500	6,000	

TABLE B105.2
REQUIRED FIRE FLOW FOR BUILDINGS OTHER THAN ONE- AND TWO-FAMILY DWELLINGS, GROUP R-3 AND R-4 BUILDINGS AND TOWNHOUSES

AUTOMATIC SPRINKLER SYSTEM (Design Standard)	MINIMUM FIRE FLOW (gallons per minute)	FLOW DURATION (hours)
No automatic sprinkler system	Value in Table B105.1(2)	Duration in Table B105.1(2)
Section 903.3.1.1 of the <i>International Fire Code</i>	25% of the value in Table B105.1(2) ^a	Duration in Table B105.1(2) at the reduced flow rate
Section 903.3.1.2 of the <i>International Fire Code</i>	25% of the value in Table B105.1(2) ^b	Duration in Table B105.1(2) at the reduced flow rate

For SI: 1 gallon per minute = 3.785 L/m.

a. The reduced fire flow shall be not less than 1,000 gallons per minute.

b. The reduced fire flow shall be not less than 1,500 gallons per minute.

11/22/2024



12499 West Colfax Avenue
303.431.6100

Lakewood, Colorado 80215
martinmartin.com

**TABLE C102.1
REQUIRED NUMBER AND SPACING OF FIRE HYDRANTS^h**

FIRE-FLOW REQUIREMENT (gpm)	MINIMUM NUMBER OF HYDRANTS	AVERAGE SPACING BETWEEN HYDRANTS^{a, b, c, f, g} (feet)	MAXIMUM DISTANCE FROM ANY POINT ON STREET OR ROAD FRONTAGE TO A HYDRANT^{d, f, g}
1,750 or less	1	500	250
1,751–2,250	2	450	225
2,251–2,750	3	450	225
2,751–3,250	3	400	225
3,251–4,000	4	350	210
4,001–5,000	5	300	180
5,001–5,500	6	300	180
5,501–6,000	6	250	150
6,001–7,000	7	250	150
7,001 or more	8 or more ^e	200	120

For SI: 1 foot = 304.8 mm, 1 gallon per minute = 3.785 L/m.

- a. Reduce by 100 feet for dead-end streets or roads.
- b. Where streets are provided with median dividers that cannot be crossed by fire fighters pulling hose lines, or where arterial streets are provided with four or more traffic lanes and have a traffic count of more than 30,000 vehicles per day, hydrant spacing shall average 500 feet on each side of the street and be arranged on an alternating basis.
- c. Where new water mains are extended along streets where hydrants are not needed for protection of structures or similar fire problems, fire hydrants shall be provided at spacing not to exceed 1,000 feet to provide for transportation hazards.
- d. Reduce by 50 feet for dead-end streets or roads.
- e. One hydrant for each 1,000 gallons per minute or fraction thereof.
- f. A 50-percent spacing increase shall be permitted where the building is equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1 of the *International Fire Code*.
- g. A 25-percent spacing increase shall be permitted where the building is equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.2 or 903.3.1.3 of the *International Fire Code* or Section P2904 of the *International Residential Code*.
- h. The fire code official is authorized to modify the location, number and distribution of fire hydrants based on site-specific constraints and hazards.

11/22/2024



12499 West Colfax Avenue
303.431.6100

Lakewood, Colorado 80215
martinmartin.com



AdventHealth Castle Rock MOB Fire Flow Calculations

BUILDING DESIGN ASSUMPTION

Building Type:	Type IIB
Gross Building Area:	24,535 SF
Is the Building Sprinklered?	YES

Fire Flow (From 2018 IFC)

Minimum Fire Flow:	3250 GPM
Flow Duration:	2 HOUR
Flow Reduction Percent:	75 %

SITE FIRE FLOW: 1500 GPM

FIRE HYDRANTS:

Minimum Number of FHs:	1
Max. Dist Between FHs:	500 Feet
Max. Dist from Road to a FH:	250 Feet

APPENDIX B: WATER STORAGE



AdventHealth Castle Rock MOB
Storage Volume

Design Parameters		
	Water	
Land Use	MDD (gpm)	Fire Flow (gpm)
Retail/Office (per sf)	8.52	1500
Storage Volume = MDD+ Fire Flow		
Storage Volume	282267.50	gallons

0.282	MG
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APPENDIX C: WATER HYDRAULIC ANALYSIS AND MODELING

APPENDIX D: WASTEWATER FLOWS



CRAH Crystal Valley MOB Proposed Wastewater Demand Calculations

Wastewater ADF's and SFE's		
	Wastewater	
Land Use	Typical ADF (gpd)	Typical SFEs
Retail/Office (per sf)	0.1	0.0005

Site Parameters		
	Acres	SF
CRAH Crystal Valley MOB		
Retail Office	0.5632	24535.0

Project Design Demands		
	Wastewater	
Land Use	Typical ADF (gpd)	Typical SFEs
Retail/Office (per sf)	2453.50	12.27
Total	2453.50	12.27

Peak Factor = $3.65 \times [(ADF)^{-0.168}]$	10.02	
*The maximum PF shall be 5.0, and ADF shall be expressed in units of million gallons per day	5.00	
Peak Design Flow Rate (PDF) = peak base flow + I/I allowance = $(ADF \times PF) + (0.1 \times ADF)$	12512.850	gpd
	8.689	gpm
	0.013	MGD
	0.019	CFS

Note: Demands calculated using the table provided in Section 4.4.1 of the Town of Castle Rock Wastewater and Water Collection Design 2018 Criteria Manuals



CRAH Crystal Valley MOB
Proposed Water and Wastewater Demand Summary

Wastewater (ADF) / Water (ADD) and SFE's				
	Wastewater		Water	
Land Use	Typical ADF (gpd)	Typical SFEs	Typical ADD (gpd)	Typical SFEs
Retail/Office (per sf)	0.1	0.0005	0.2	0.0005

Site Parameters		
SQ Castle Rock Site	Acres	SF
Retail Office	0.5632	24535.0

Project Design Demands				
	Wastewater		Water	
Land Use	Typical ADF (gpd)	Typical SFEs	Typical ADD (gpd)	Typical SFEs
Retail/Office (per sf)	2453.50	12.27	4907.00	12.27

Note: Demands calculated using the table provided in Section 4.4.1 of the Town of Castle Rock Wastewater and Water Collection Design 2018 Criteria Manuals

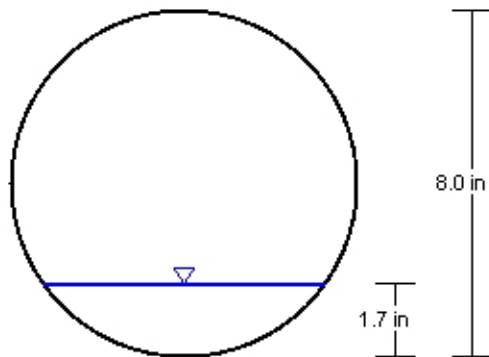
APPENDIX E: WASTEWATER HYDRAULIC MODELING

CRAH Crystal Valley MOB
Wastewater Peak Daily Flow

Wastewater Peak Daily Flow		
	PDF (gpd)	PDF(cfs)
Existing Peak Daily Flow	172380.000	0.267
Proposed Peak Daily Flow	12026.82	0.019
Existing + Proposed Peak Daily Flow	184406.820	0.286

Cross Section for Existing + Proposed Sanitary Flow

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.011
Channel Slope	4.300 %
Normal Depth	1.7 in
Diameter	8.0 in
Discharge	0.29 cfs



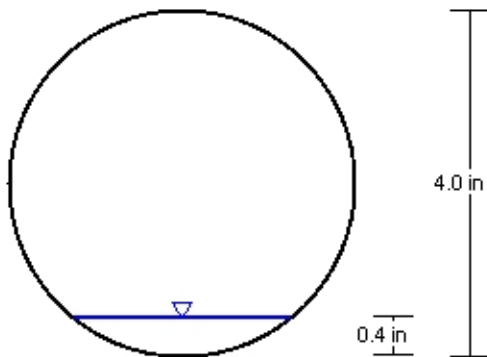
V: 1  H: 1

Existing + Proposed Sanitary Flow

Project Description	
Friction Method	Manning
Solve For	Formula
	Normal Depth
Input Data	
Roughness Coefficient	0.011
Channel Slope	4.300 %
Diameter	8.0 in
Discharge	0.29 cfs
Results	
Normal Depth	1.7 in
Flow Area	0.1 ft ²
Wetted Perimeter	0.6 ft
Hydraulic Radius	1.0 in
Top Width	0.54 ft
Critical Depth	3.0 in
Percent Full	21.0 %
Critical Slope	0.465 %
Velocity	5.37 ft/s
Velocity Head	0.45 ft
Specific Energy	0.59 ft
Froude Number	3.022
Maximum Discharge	3.19 cfs
Discharge Full	2.96 cfs
Slope Full	0.040 %
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	21.0 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	1.7 in
Critical Depth	3.0 in
Channel Slope	4.300 %
Critical Slope	0.465 %

Proposed Sanitary Service Line Flow

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.011
Channel Slope	10.460 %
Normal Depth	0.4 in
Diameter	4.0 in
Discharge	0.02 cfs

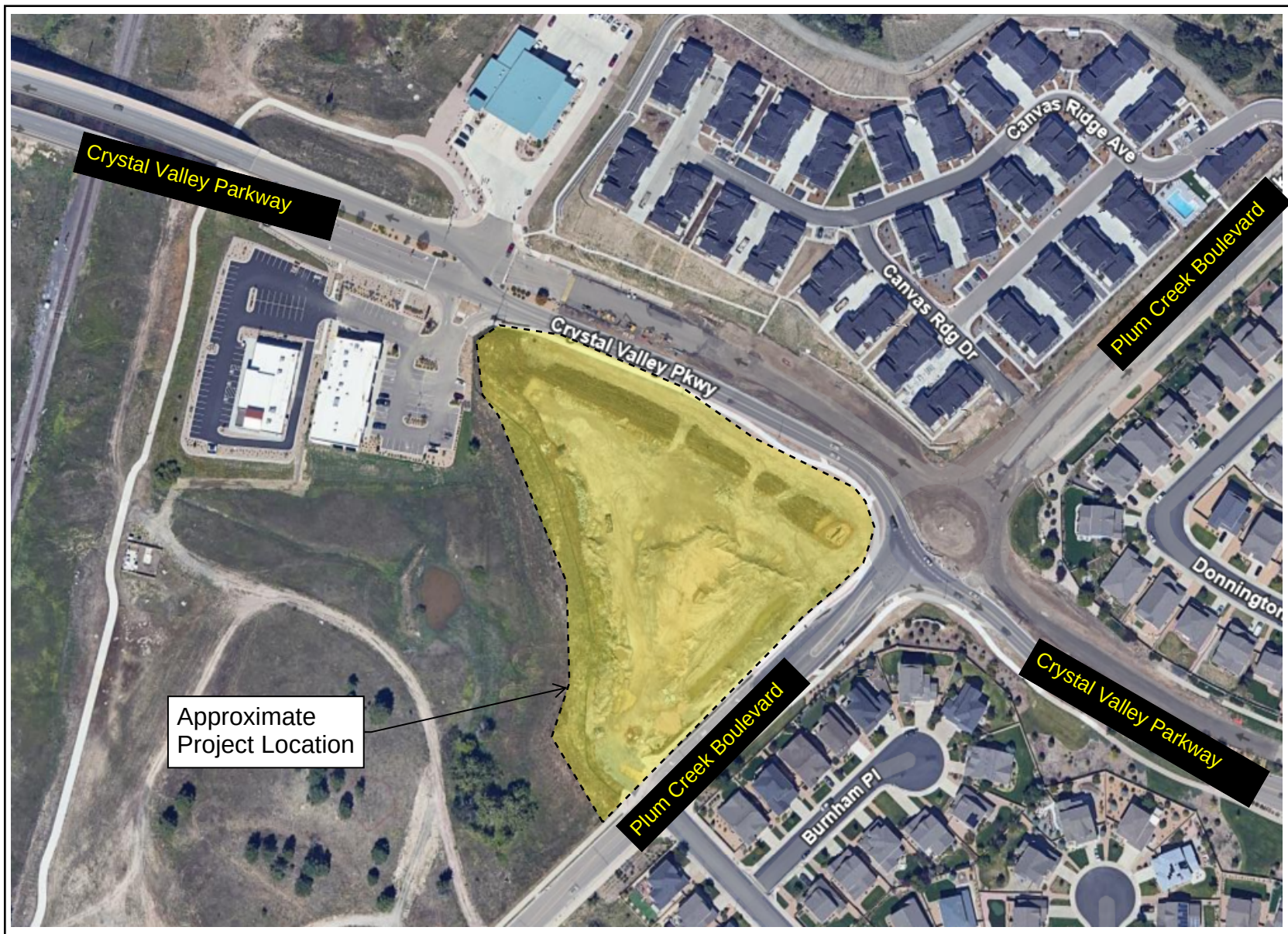


V: 1
H: 1

Proposed Sanitary Service Line Flow

Project Description	
Friction Method	Manning
Solve For	Formula
	Normal Depth
Input Data	
Roughness Coefficient	0.011
Channel Slope	10.460 %
Diameter	4.0 in
Discharge	0.02 cfs
Results	
Normal Depth	0.4 in
Flow Area	0.0 ft ²
Wetted Perimeter	0.2 ft
Hydraulic Radius	0.3 in
Top Width	0.21 ft
Critical Depth	0.9 in
Percent Full	11.1 %
Critical Slope	0.582 %
Velocity	3.57 ft/s
Velocity Head	0.20 ft
Specific Energy	0.24 ft
Froude Number	3.958
Maximum Discharge	0.78 cfs
Discharge Full	0.73 cfs
Slope Full	0.007 %
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	11.1 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.4 in
Critical Depth	0.9 in
Channel Slope	10.460 %
Critical Slope	0.582 %

APPENDIX F: MAPS AND PLANS

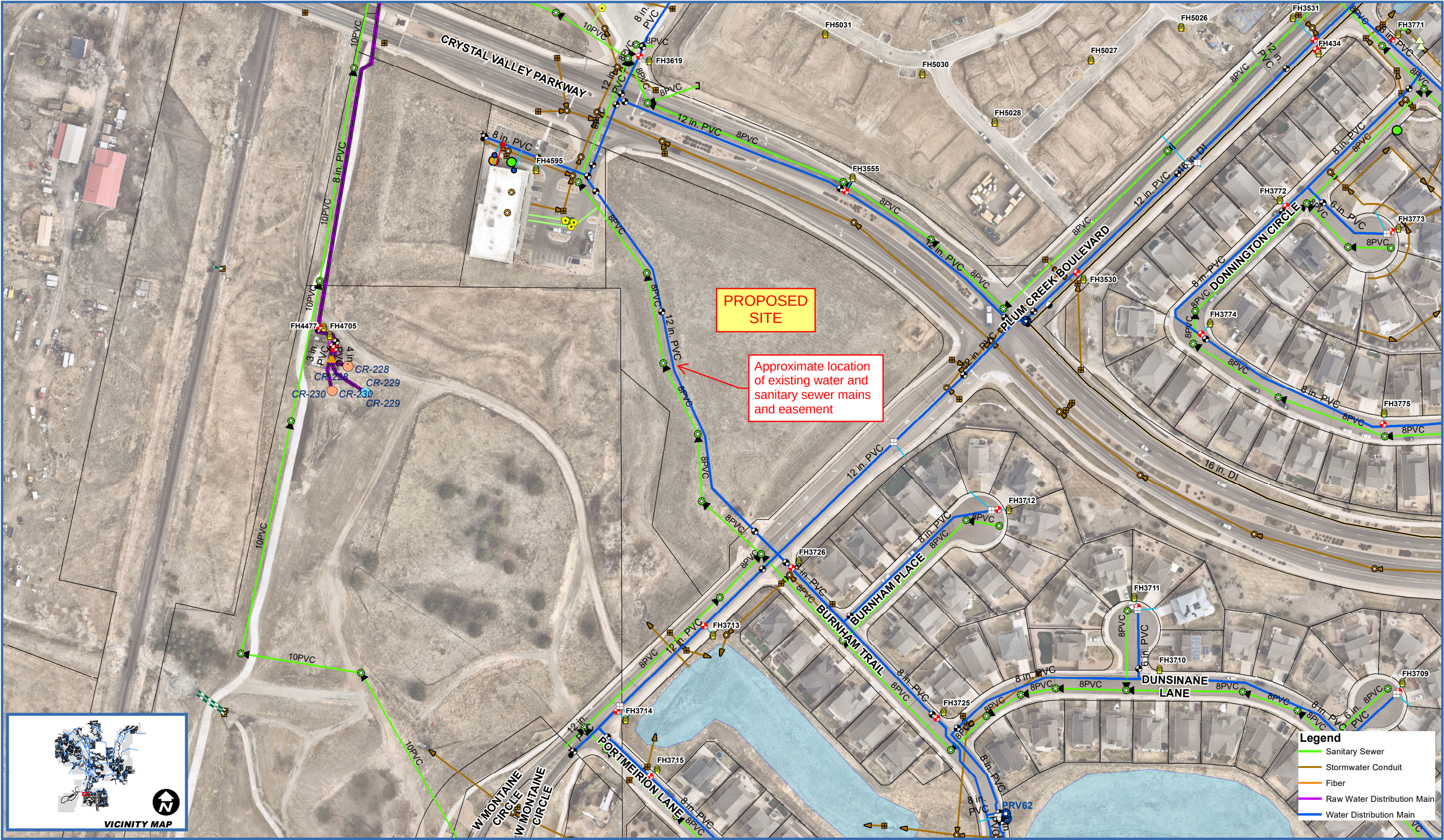


VICINITY MAP



12499 West Colfax Avenue
303.431.6100

Lakewood, Colorado 80215
martinmartin.com



0 75 150 300 450 Feet
1 inch = 150 feet

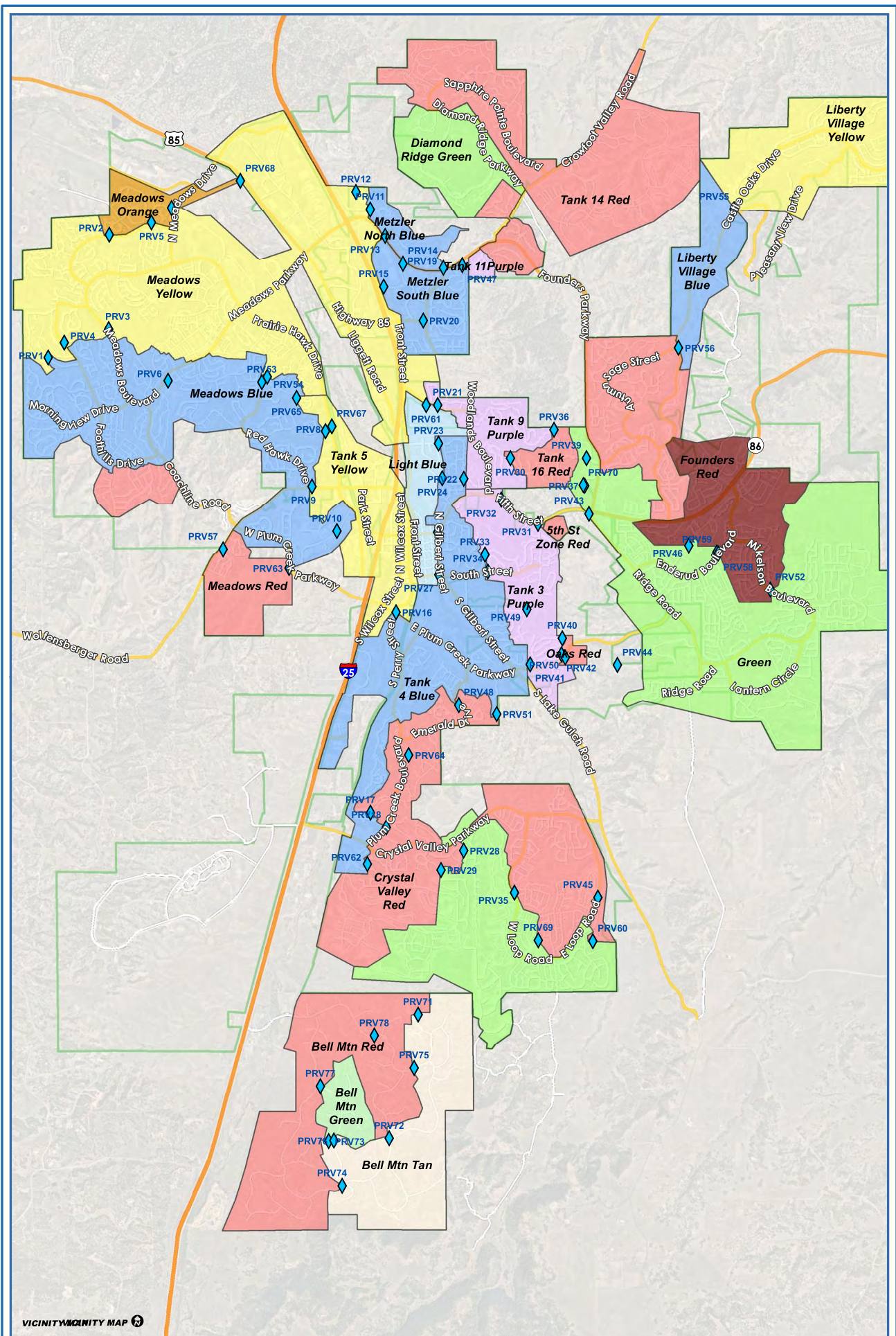
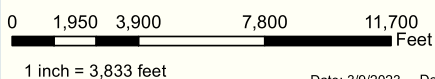


Disclaimer: The data presented has been compiled from various sources, each of which introduces varying degrees of inaccuracies or inconsistencies. Such discrepancies in data are inherent and in supplying this product the Town of Castle Rock assumes no liability for its use or accuracy. Questions or comments regarding the cartographic composition of this map including, but not limited to, errors, omissions, corrections, and/or updates, should be directed to the Utilities Department, Town of Castle Rock, (720) 733-6056. Copyright 2022, Town of Castle Rock Utilities Mapping.

**CASTLE ROCK
UTILITIES MAP
(INTERNAL USE ONLY)**

Document Path: \\CRSAN1\UTUsers\ktorres\Desktop\11x17 LndScp_10.6.1.mxd

Date: 9/14/2022



Disclaimer: The data presented has been compiled from various sources, each of which introduces varying degrees of inaccuracies or inconsistencies. Castle Rock assumes no liability for its use or accuracy. Questions or comments regarding the cartographic composition of this map including, but not limited to, errors, omissions, corrections, and/or updates, should be directed to the Utilities Department, Town of Castle Rock, (720) 733-6056. Copyright 2022, Town of Castle Rock Utilities Mapping.

CASTLE ROCK WATER
FIGURE 2.7
PRESSURE ZONES AND PRVs

To: Castle Rock Fire Department
From: Nicole Kontour

Date: March 25, 2025
Project No.: 24.0241
Project Title: AdventHealth Castle Rock MOB

Re: AdventHealth Castle Rock MOB Required Fire Flow Memo

The extents of the site improvements for the project site consist of 5.17 acres and includes the construction of a two-story, 24,535 square foot medical office building (MOB) facility, associated parking, access drives, sidewalks, site landscaping, water, sanitary, and storm infrastructure. Possible future phases of development to the site include a 17,000 square foot, one-story building addition on the north side of the proposed Phase 1 MOB building and associated parking.

Building	Phase 1 Medical Office Building
Total Square Footage	24,535 sf
Construction Type	II-B
Sprinkled	Yes

Required Fire Flow: 1,500 GPM

Required Fire Flow Duration: 3 hours



Castle Rock Fire and Rescue Department



TOWN OF CASTLE ROCK FIRE FLOW TEST FORM

11/30/2022

Mike Johnson

720-724-3420

F F23-2022
P _____

488 Crystal Valley Pkwy

see attached map for location

Test Conducted By: Hydraulic model

Date: _____
Start Time _____
End Time _____

Pressure Hydrant

Hydrant ID	FH	4595	
Pre-test Static Pressure (Ps1)		70	psi
Residual Pressure (Pr)		62.8	psi
Post-test Static Pressure (Ps2)			psi
Flowing Hydrant			
Hydrant ID	FH	Onsite hydrant	
Orifice Side (D)			in
Main Size (Dp)			in
Calculated Flowrate (Qr)		1500	gpm
Estimated Volume Discharged (Q)			gallons

Notes: Please see map attached

FH 4595



Sanitary Sewer Study Heckendorf Ranch Filing No. 2

Development Summary

Development Area	Zoning	Area (acres)	Development Type	Density (du/ac)	# of du	# of SFE	Flow Rates GPD
PA-C	SF-A	10.912	Residential - Filing No. 1	6.0	31	31.00	6,200
PA-D	SF-A	21.460	Residential - Filing No. 1	3.5	24	24.00	4,800
PA-E	Co-OF	6.336	Commercial / Light Office			19.01	3,802
PA-F	MF/VC	10.825	Multi-Family/Village Center	15.0		105.54	21,109
PA-G	SF-B	18.534	Residential	7.0	77	77.00	15,400
PA-H	Co-OF	3.487	Commercial / Light Office			10.46	2,092
PA-I	VC	6.231	Village Center			18.69	3,739
PA-J	SF-B	30.791	Residential	7.0	87	87.00	17,400
PA-K	SF-A	22.269	Residential	5.0	82	82.00	16,400
PLD		29.682	Open Space				
ROW		16.308	Internal ROW				
ROW		1.470	I-25 ROW				
TOTAL		178.305			301	454.71	90,942

Anticipated sanitary flow from PROJECT site at the time of the Master Utility Study

Tributary sanitary flows from PA-J and PA-K

Total Average Daily Flow = 90,942 GPD
= 0.09 MGD

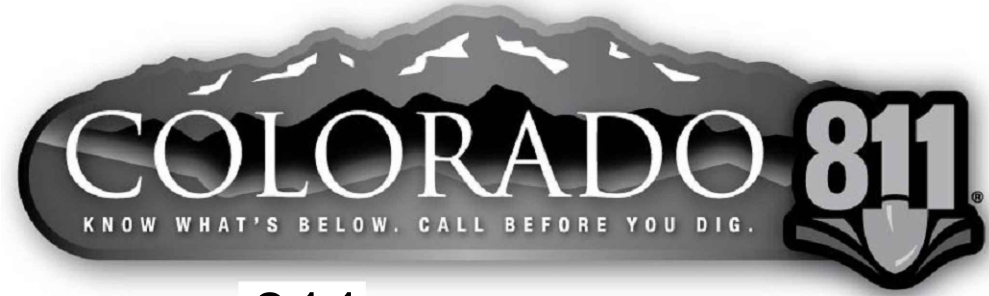
Peak Flow: Total Site

Peaking Factor = $3.79 \times [\text{Average Flow (cfs)}] - 0.168$ maximum PF = 5.0
 $= 3.79 \times [0.1407] - 0.168 = 5.269$ Use 5.0

Average Day Flow x Peaking Factor: $90,942 \text{ gpd} \times 5.0 = 454,710 \text{ gpd}$

Peak Flow = 0.45 MGD

TABLE 4



CALL 811 3-BUSINESS DAYS IN ADVANCE
BEFORE YOU DIG, GRADE OR EXCAVATE FOR
MARKING OF UNDERGROUND MEMBER UTILITIES

MARTIN/MARTIN ASSUMES NO RESPONSIBILITY FOR UTILITY
LOCATIONS. UNLESS OTHERWISE NOTED, THE UTILITIES SHOWN ON
THIS DRAWING ARE BASED ON INFORMATION PROVIDED BY OTHERS
AND DEPICTED AS ASCE (38) QUALITY LEVEL D. IN ACCORDANCE
WITH THE PROVISIONS OF COLORADO REVISED STATUTE, TITLE 9, IT
IS THE CONTRACTORS RESPONSIBILITY TO CALL COLORADO 811
UTILITY LOCATE SERVICE FOR UTILITY LOCATES BEFORE DIGGING,
AND FIELD VERIFY THE SIZE, MATERIAL, HORIZONTAL AND VERTICAL
LOCATION OF ALL EXISTING UTILITIES (DEPICTED OR NOT DEPICTED)
PRIOR TO THE COMMENCEMENT OF ANY CONSTRUCTION.

SUBJECT TO CHANGE
PENDING JURISDICTIONAL APPROVAL

LEGEND

EXISTING		PROPOSED
---	PROPERTY LINE	---
---	RIGHT-OF-WAY LINE	---
---	SECTION LINE	---
---	EASEMENT	---
---	SETBACK LINE	---
---	RETAINING WALL	---
---	CURB & GUTTER	---
---	UTILITY CROSSING	⊗
---	STORM SEWER	ST
⊗	STORM MANHOLE	⊗
---	PERIMETER DRAIN	PD
---	STORM INLET	⬢
<	FLARED END SECTION	⬢
---	SANITARY SEWER	SS
⊗	SANITARY MANHOLE	⊗
⊗	CLEAN OUT	⊗
---	WATER LINE	W
⊗	WATER VALVE	⊗
⊗	FIRE HYDRANT	⊗
⊗	WATER METER	⊗
---	IRRIGATION LINE	IR
IRR	IRRIGATION CONTROL	IRR
---	OVERHEAD ELECTRIC	---
---	ELECTRIC LINE	E
⊗	LIGHT POLE	⊗
⊗	POWER POLE	⊗
ELEC	ELECTRIC METER	⊗
---	TELEPHONE LINE	T
TEL	TELEPHONE PEDESTAL	T
---	CABLE TV	CT
---	GAS LINE	G
---	SIGN	⬢
D.W.	MONITOR WELL	⬢
DRIVE	DESCRIPTIONS	DRIVE

UTILITY NOTES:

1. THIS SITE IS LOCATED WITHIN THE TOWN OF
CASTLE ROCK BLUE ZONE TANK 4 WATER
PRESSURE ZONE.
2. ALL PROPOSED EASEMENTS MUST BE RECORDED
PRIOR TO ISSUANCE OF CONSTRUCTION
PERMITS.
3. ALL UTILITY EASEMENTS FOR WATER AND
WASTEWATER LINES SHALL BE FOR THE
EXCLUSIVE USE OF THE TOWN SO THAT ACCESS
AND MAINTENANCE MAY BE PERFORMED.
4. THE MINIMUM SEPARATION BETWEEN
WATERLINES, SANITARY SEWER AND STORM
SEWER LINES IS 10 FEET.
5. THE MINIMUM SEPARATION BETWEEN WATER
SERVICE LINES IS 5 FEET.
6. ANY TIE-IN, CROSSING OR LOWERING OF TOWN
CRITICAL INFRASTRUCTURE WILL REQUIRE A TIME
AND MATERIALS PERMIT (TMU) WITH FEES
REQUIRED PRIOR TO CONSTRUCTION.

BENCHMARK STATEMENT:

NGS DESIGNATION N 393
FOUND A BRASS DISK STAMPED N 393 1983 IN
ROCK OUTCROPPING BELOW FRONT STREET.

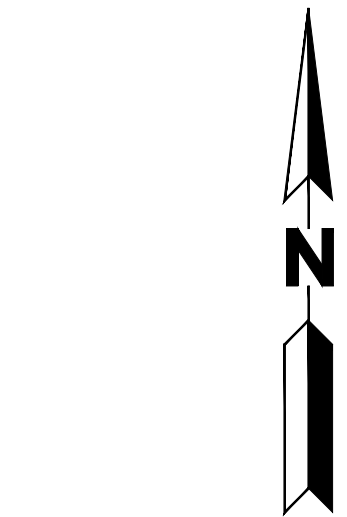
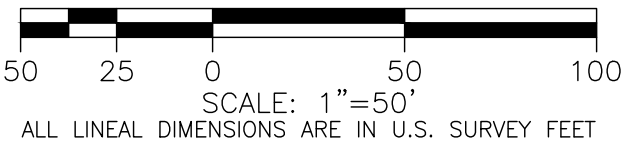
PUBLISHED ELEVATION: 6222.1 (NAVD88)
SITE BENCHMARK: CP99 - X ON SIDEWALK
ELEVATION: 6341.79' (NAVD88)

ELEVATIONS BROUGHT TO THE SITE VIA GPS
OBSERVATIONS USING THE TRIMBLE VRS NETWORK

BASIS OF BEARINGS:

ASSUMING A PORTION OF THE SOUTHEASTERLY LINE OF
BLOCK 2 OF HECKENDORF RANCH FILING NO. 2, AS
MONUMENTED BY A MAG NAIL WITH A 1.0" BRASS TAG
LS 38479 AT THE SOUTHWESTERLY END AND BY A #4
REBAR WITH A 1.0" BLUE PLASTIC CAP LS 38175 AT
THE NORTHEASTERLY END, AS BEARING SOUTH
45°57'12" WEST BEING A GRID BEARING OF THE
COLORADO STATE PLANE COORDINATE SYSTEM, CENTRAL
ZONE, NORTH AMERICAN DATUM 1983 (2011), A
DISTANCE OF 396.74 FEET WITH ALL OTHER BEARINGS
CONTAINED HEREIN RELATIVE THERETO.

THE LINEAL DIMENSIONS AS CONTAINED HEREIN ARE
BASED UPON THE "U.S. SURVEY FOOT."



SITE DEVELOPMENT PLAN
LOT 2, BLOCK 2, HECKENDORF RANCH FILING NO. 2
TOWN OF CASTLE ROCK PROJECT NO. SDP25-0001



BOULDER ASSOCIATES

1426 PEARL STREET, SUITE 300
BOULDER, COLORADO 80302
303.499.7795



MARTIN/MARTIN
CONSULTING ENGINEERS
12499 West Colfax Ave
Lakewood, Colorado 80215
303.431.6100
martinmartin.com

PROJECT 24.0241

ADVENTHEALTH
CASTLE ROCK
MOB - CORE &
SHELL

SITE DEVELOPMENT
PLAN

DATE 05/14/2025

REVISIONS

DESCRIPTION	DATE
-------------	------

SHEET TITLE

OVERALL
UTILITY PLAN

SHEET NUMBER

6 of 13