

WATER & SANITATION REPORT

FOR

ADVENTHEALTH PARKER HOSPITAL EXPANSION

June 2024

Prepared For:

AdventHealth Parker

Prepared By:

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Consulting Engineers
4582 S Ulster St., Suite 750
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S. A. Miro Job No. 23079

ENGINEER'S STATEMENT

This Water and Sanitation Report for the design of AdventHealth Parker Hospital Expansion was prepared by me or under my direct supervision in accordance with the provisions of the Parker Water and Sanitation District (District) Standards and Specifications for the responsible parties thereof. I understand that the district does not and shall not assume liability for utility facilities designed by others.

Megan H. Vogt, P.E.
Registered Professional Engineer
State of Colorado No. 47666

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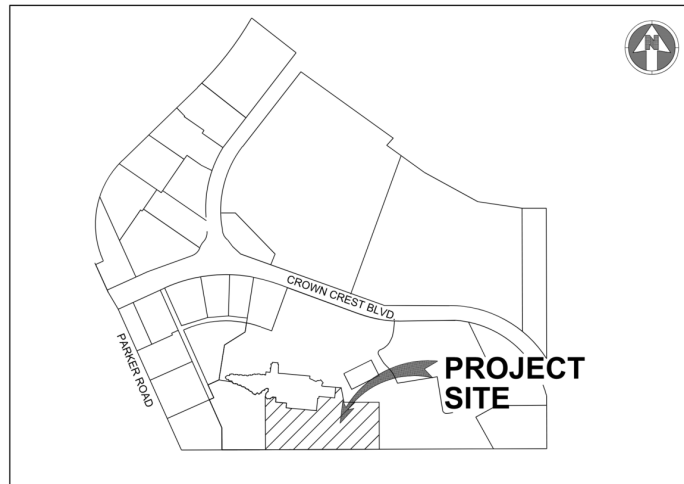
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I. GENERAL LOCATION AND SITE CONDITION

A. LOCATION

The proposed AdventHealth Parker Hospital Expansion project (hereby referred to as “the project”) is located at 9395 Crown Crest Blvd Parker, Colorado. The expansion will extend the existing main hospital building to the southeast.



VICINITY MAP
SCALE: NTS

B. DESCRIPTION OF PROPERTY

Present on the existing site is the currently operating hospital campus, which is comprised of several buildings, drives and parking areas, sidewalks, and landscaped areas within the parking lots and around the perimeter.

The project consists of the expansion of the hospital as well as revisions to the associated drive lanes, parking areas, helipad, utility infrastructure, and landscaping elements to support the development. The expansion consists of a five-story addition southeast of the existing hospital building, which is anticipated to total an additional 137,819 square feet.

C. EXISTING UTILITY CONDITIONS

Existing Water

The existing hospital is surrounded by existing water mains, including an existing 12" water main which will be relocated to accommodate the proposed expansion. Several existing hydrants are present on site and will be protected or replaced as necessary.

The existing hospital is currently served by an existing domestic service and a fire service at the southeast corner of the existing building. The existing water meter will be relocated as a part of this project.

Existing Sanitary Sewer

There are no existing sanitary sewer services near the location of the proposed addition. Existing sanitary mains are present within the existing private drive west of the hospital and to the north of

the site in Crown Crest Blvd.

The existing hospital is currently served by a sanitary service which discharges to the west main within the private drive. No other sanitary flows appear to be conveyed to this existing stub at this point.

II. SITE UTILITY DESIGN

A. PROPOSED WATER

Proposed System

To accommodate the proposed addition, the existing water meter will be relocated exterior to the building. The water entry room will remain in place and the meter size itself will remain, as it has been determined to be sufficient to serve the addition as well as the existing facility.

A new fire service line and two new hydrants are proposed to serve the addition.

Fire Flow Demand

Fire flow demands are calculated based on 2018 IFC Criteria with Appendices B, C and D, per South Metro's Fire Rescue's adopted fire code within the Town of Parker. The following summarizes the fire flow demand, with complete calculations provided within the appendix.

Fire Flow Calculation	
Construction Type	IA
Fire Flow Calculation Area per Section B104.3	80,280
GPM Req'd per Table B105.1	4,000
50% Reduction for Fully Sprinklered Bldg.	2,000
Hydrants Required per Table C105.1	2

Two new hydrants will be installed on site to provide coverage around the expansion and to satisfy the requirements of the adopted fire code and South Metro's Fire Rescue's requirements on hydrant distribution and spacing.

B. PROPOSED SANITARY

Proposed System

A new 12" sanitary service is proposed to serve the expansion. The new line will tie in at the existing main within the private drive west of the site. The existing service lines will remain and will continue to serve the existing portions of the site.

System Capacity Verification

While Cottonwood Water and Sanitation District's Standards do not contain criteria to estimate sanitary demand for new developments, Parker Water and Sanitation District's 2020 Water and Wastewater Master Plan (*Master Plan*) contains various methodologies and sources used within the master plan to estimate future demand.

Similarly to the master plan, this study opts to utilize City and County of Denver's Sanitary Sewer Design Technical Manual to calculate demand for the proposed addition and to verify the existing

system capacity for additional flows. Average flow rates for the medical facility are based on the total square footage added and the following formulas:

$$Q_{avg} = (GSF \times GPD/1000)$$
$$\text{Peaking Factor (PF)} = 2.6 \times Q_{avg}^{-0.16} \text{ [Maximum PF} = 4\text{]}$$
$$Q_{req} = ((PF \times Q_{avg}) + I) / 0.86$$

Where:

$$Q_{avg} = \text{Average Daily Flow}$$
$$GSF = \text{Gross Building Square Footage}$$
$$Q_{req} = \text{Required Sewer Capacity}$$
$$I = \text{Infiltration/inflow} = (500 \text{ gal/acre})(\text{Site Acreage})(1.55 \times 10^{-6})$$

For the purposes of this calculation, the proposed and existing buildings have been modeled as a medical building with a flow factor of 300 gpd/1,000 sf, resulting in a peak flow of **0.30 cfs** from the proposed addition, and **0.38 cfs** from the existing hospital, for a total of **0.68 cfs** at the west connection to the private main. The 0.68 cfs of flow from the site corresponds to a 35.5% full 12" pipe at 0.5% slope, indicating that there is sufficient capacity for the project at the discharge point. Detailed calculations are included in the appendix.

III. CONCLUSION

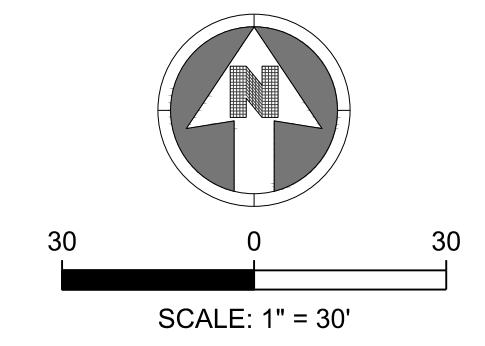
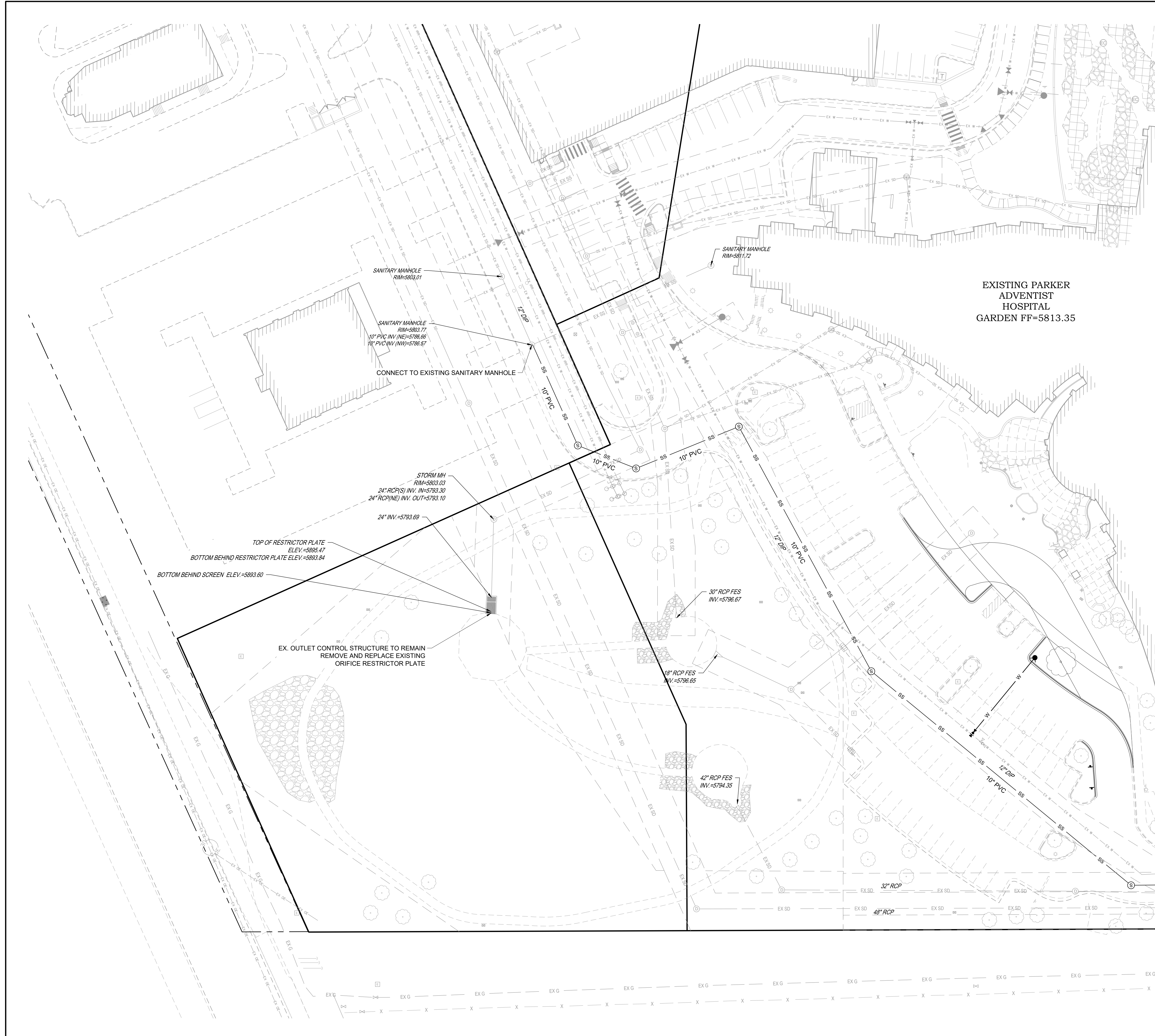
The proposed water and sanitary sewer are expected to operate within the District Standards. Please refer to the appendix for additional information and documentation.

IV. REFERENCES

- 1.) *Parker Water and Sanitation District 2020 Water and Wastewater Master Plan*, Parker Water and Sanitation District, 2020
- 2.) *2018 International Fire Code*
- 3.) *Sanitary Sewer Design Technical Manual*, City and County of Denver, revised March 2008

APPENDIX

APPENDIX A: UTILITY PLAN



NOTES:

- INSTALL 4" PERFORATED PERIMETER DRAIN PIPE ENCASES IN GRANULAR ROCK AND DRAINAGE FABRIC AROUND THE PERIMETER OF THE PROPOSED ADDITION. CONNECT TO EXISTING PERIMETER DRAIN SYSTEM OR PIPE TO STORM MAIN AS NECESSARY. CONTRACTOR SHALL LOCATE AND IDENTIFY SIZES AND DEPTHS OF EXISTING PERIMETER DRAIN SYSTEMS PRIOR TO CONSTRUCTION TO ESTABLISH FINAL OUTFALL LOCATIONS. THE PIPE SHALL BE SLOPED AT 0.5% MINIMUM.

LEGEND:

---	EXE	EXISTING SURVEYED ELECTRICAL LINE
---	EX FO	EXISTING SURVEYED FIBER OPTIC LINE
---	EX G	EXISTING SURVEYED GAS LINE
---	EX T	EXISTING SURVEYED TELEPHONE LINE
---	EX SS	EXISTING SURVEYED SANITARY LINE
---	EX SD	EXISTING SURVEYED STORM LINE
---	EX W	EXISTING SURVEYED WATER LINE
---	EX UE	EXISTING DESIGNED ELECTRICAL LINE
---	EX GAB	EXISTING DESIGNED GAS LINE
---	EX SS	EXISTING DESIGNED SANITARY LINE
---	EX SD	EXISTING DESIGNED STORM LINE
---	EX W	EXISTING DESIGNED WATER LINE
---	---	EXISTING EASEMENT
		EXISTING STORM INLET
		EXISTING CLEANOUT
		EXISTING FIRE HYDRANT
		EXISTING WATER VALVE
		EXISTING MANHOLES
---	E	PROPOSED ELECTRICAL LINE
---	FO	PROPOSED FIBER OPTIC LINE
---	G	PROPOSED GAS LINE
---	T	PROPOSED TELEPHONE LINE
---	SS	PROPOSED SANITARY LINE
---	SS	PROPOSED STORM LINE
---	W	PROPOSED WATER LINE
		PROPOSED STORM INLET
		PROPOSED CLEANOUT
		PROPOSED FIRE HYDRANT
		PROPOSED WATER VALVE
		PROPOSED WATER FITTINGS
		PROPOSED MANHOLES

SEE SHEET C512



DATE	DESCRIPTION	NO.
5/31/2024	1ST SITE PLAN	1

PROJECT: **ADVENT HEALTH PARKER EXPANSION
 PARKER, CO 80138**

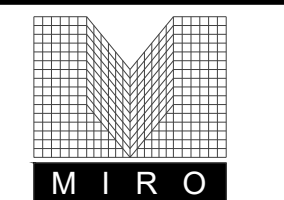
DRAWING TITLE: **UTILITY PLAN**

FILE PATH:

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DESIGNED BY: RJH
 DRAWN BY: ARD
 CHECKED BY: MHV
 MIRO JOB NO. 23079

DRAWING NUMBER:
C511

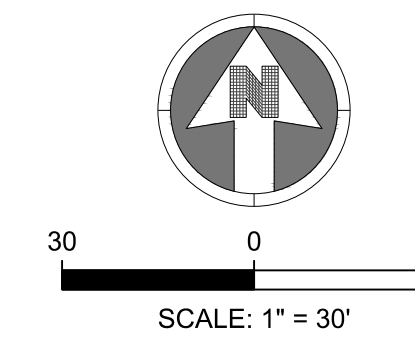


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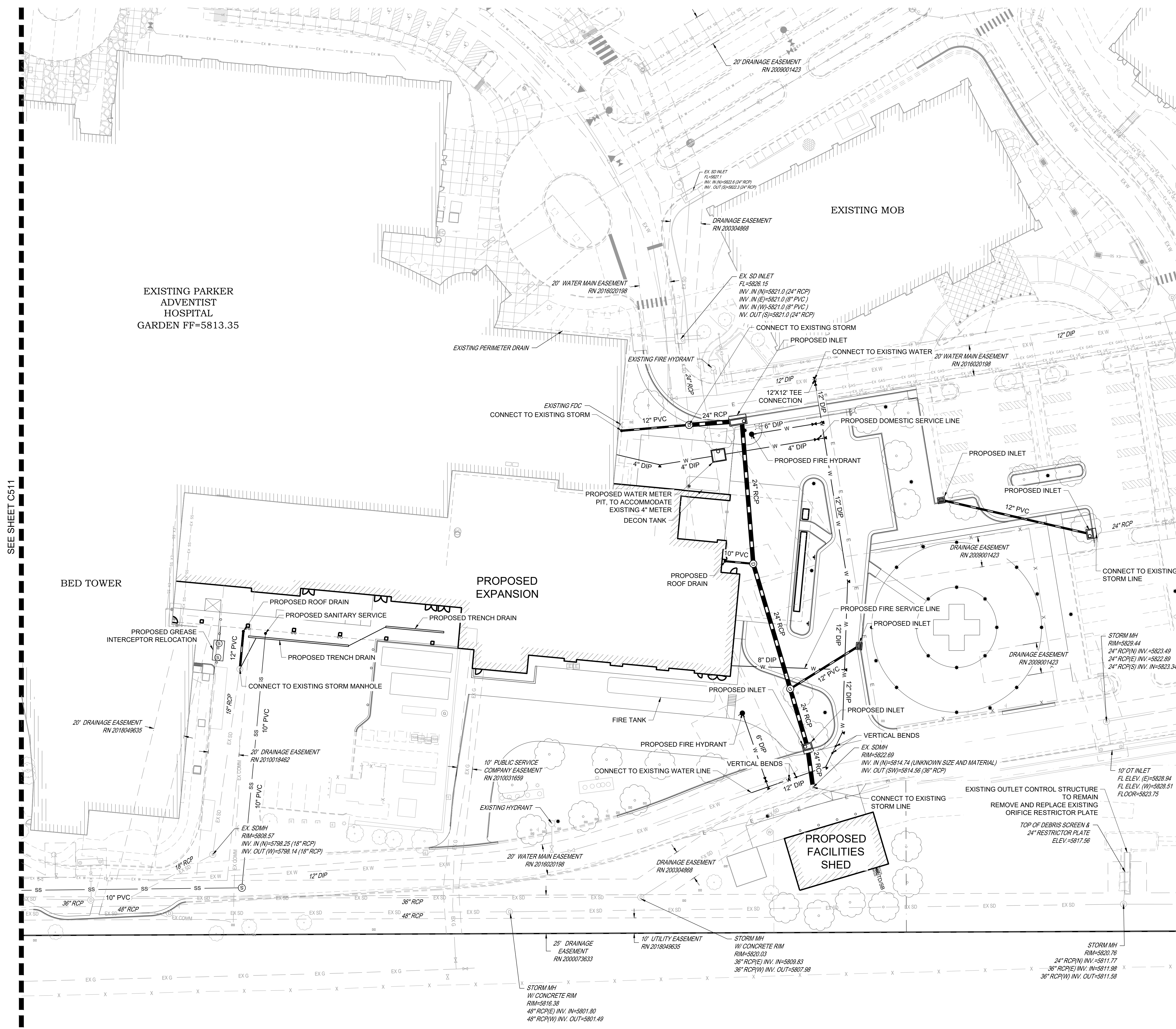


NOTES:

1. INSTALL 4" PERFORATED PERIMETER DRAIN PIPE ENCASES IN GRANULAR ROCK AND DRAINAGE FABRIC AROUND THE PERIMETER OF THE PROPOSED ADDITION. CONNECT TO EXISTING PERIMETER DRAIN SYSTEM OR PIPE TO STORM MAIN AS NECESSARY. CONTRACTOR SHALL LOCATE AND IDENTIFY SIZES AND DEPTHS OF EXISTING PERIMETER DRAIN SYSTEMS PRIOR TO CONSTRUCTION TO ESTABLISH FINAL OUTFALL LOCATIONS. THE PIPE SHALL BE SLOPED AT 0.5% MINIMUM.

LEGEND:

---	EXE	EXISTING SURVEYED ELECTRICAL LINE
---	EXFO	EXISTING SURVEYED FIBER OPTIC LINE
---	EXG	EXISTING SURVEYED GAS LINE
---	EXT	EXISTING SURVEYED TELEPHONE LINE
---	EXSS	EXISTING SURVEYED SANITARY LINE
---	EXSD	EXISTING SURVEYED STORM LINE
---	EXW	EXISTING SURVEYED WATER LINE
---	EXUE	EXISTING DESIGNED ELECTRICAL LINE
---	EXUG	EXISTING DESIGNED GAS LINE
---	EXUS	EXISTING DESIGNED SANITARY LINE
---	EXUSD	EXISTING DESIGNED STORM LINE
---	EXUW	EXISTING DESIGNED WATER LINE
---		EXISTING EASEMENT
		EXISTING STORM INLET
		EXISTING CLEANOUT
		EXISTING FIRE HYDRANT
		EXISTING WATER VALVE
		EXISTING MANHOLES
	E	PROPOSED ELECTRICAL LINE
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	SS	PROPOSED SANITARY LINE
	SD	PROPOSED STORM LINE
	W	PROPOSED WATER LINE
		PROPOSED STORM INLET
		PROPOSED CLEANOUT
		PROPOSED FIRE HYDRANT
		PROPOSED WATER VALVE
		PROPOSED MANHOLES



EXISTING PARKER
ADVENTIST
HOSPITAL
GARDEN FF=5813.35

SEE SHEET C511

DATE	5/31/2024
DESCRIPTION	1ST SITE PLAN
NO.	1

PROJECT: **ADVENT HEALTH PARKER EXPANSION
PARKER, CO 80138**

DRAWING TITLE: **UTILITY PLAN**

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DESIGNED BY: RJH
DRAWN BY: ARD
CHECKED BY: MHV
MIRO JOB NO. 23079

DRAWING NUMBER:
C512

APPENDIX B: DEMAND CALCULATIONS

Appendix 3B – Demand Projection Notes

Non-Residential Water Use

Table 3B-8 | Indoor Water Use by Building Type

	Source 1	Recommended	Source 2 Low	Source 2 High	Source 3	Source 4
Office Buildings	200	100*	48	101		74
Restaurants	500	Per Source 1	356	907	526	426
Bars & Lounges	300	Per Source 1				
Hotels & Motels	350	Per Source 1			329	330
Neighborhood Stores	200	Per Source 1				
Department Stores	200	Per Source 1				
Laundries & Dry Cleaning	1000	Per Source 1				
Banks & Financial Buildings	300	Per Source 1				
Medical Buildings & Clinics	300	Per Source 1				
Warehouses	100	Per Source 1				
Meat & Food Processing Plants	2800	Per Source 1				
Auto Dealer, Repair & Service	20	Per Source 1				
Supermarket	200	Per Source 1	142	175		
Trade Businesses – Plumber, Exterminator, etc.	200	Per Source 1				
Mobile Home Dealer, Lumber Co., Flea Market	300	Per Source 1				
Factories – Manufacturing	800	Per Source 1				
Hospitals (450 gal/bed)						

(1) City and County of Denver 2008 Sanitary Planning Criteria (Table 2.04.3)

(2) Commercial and Industrial End Water Uses, AWWA WRF 2000

(3) Benchmarking Industrial, Commercial, and Institutional Water Use, 2007 Colorado WaterWise Council

(4) Methodology for Evaluating Water Use in Commercial, Industrial, and Institutional Sections, WRF 2015

*200 gpd/1000 sq. ft. is higher than any other reference usage when the sole use is office space. Jacobs believes the City of Denver value assumes a certain degree of cafeteria is included in the flow, which is calculated separately in this demand tool.

Assumed Average Commercial Water Use	119	gpd/1000 sq. ft.
Assumed Average Commercial Water Use	0.119	gpd/sq. ft.
Assumed Average Industrial Water Use	58	gpd/1000 sq. ft.
Assumed Average Industrial Water Use	0.058	gpd/sq. ft.



SANITARY PEAK FLOW CALCULATIONS

Project Name: AdventHealth Parker Hospital Expansion
 Miro Project # 23079

Calculated By: MHV
 Date: 5/29/2024

Commercial	Type of Development	Gross Area (SF)	Commercial Flow Factor ^[1] (GPD/1,000 SF)	Average Daily Flow (GPD)	Average Daily Flow (cfs)
	Medical - Proposed Expansion	137,819	300	41,346	0.064
	Medical - Existing Hospital	227,671	300	68,301	0.106
	Commercial Total:				0.170

Total			Average Daily Flow (cfs)	Peak Factor ^[2]	Required Sewer Capacity ^[3] (cfs)
	Commercial		0.170		
	Residential		0.000		
	Site Total:		0.170	3.45	0.68

Notes:

[1] Flow Rate is based on Table 3B-8 from Parker Water and Sanitation District's 2020 Water and Wastewater Master Plan

[2] Peak Factor = 2.6 x (Average Flow (cfs))^{0.16} (Maximum Peak Factor = 4)

[3] Required Sewer Capacity = ((Peak Factor x Average Flow) + Infiltration/Inflow)/0.86



SANITARY PEAK FLOW CALCULATIONS

Project Name: AdventHealth Parker Hospital Expansion
 Miro Project # 23079

Calculated By: MHV
 Date: 5/29/2024

Commercial	Type of Development	Gross Area (SF)	Commercial Flow Factor ^[1] (GPD/1,000 SF)	Average Daily Flow (GPD)	Average Daily Flow (cfs)
		Medical Building	137,819	300	41,346
Commercial Total:					0.064

Total		Average Daily Flow (cfs)	Peak Factor ^[2]	Required Sewer Capacity ^[3] (cfs)
		Commercial	0.064	
	Residential	0.000		
	Site Total:	0.064	4.00	0.30

Notes:

[1] Flow Rate is based on Table 3B-8 from Parker Water and Sanitation District's 2020 Water and Wastewater Master Plan

[2] Peak Factor = 2.6 x (Average Flow (cfs))^{-0.16} (Maximum Peak Factor = 4)

[3] Required Sewer Capacity = ((Peak Factor x Average Flow) + Infiltration/Inflow)/0.86

Existing and Proposed Hospital

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.013
Channel Slope	0.005 ft/ft
Diameter	12.0 in
Discharge	0.68 cfs
Results	
Normal Depth	4.3 in
Flow Area	0.2 ft ²
Wetted Perimeter	1.3 ft
Hydraulic Radius	2.3 in
Top Width	0.96 ft
Critical Depth	4.1 in
Percent Full	35.5 %
Critical Slope	0.006 ft/ft
Velocity	2.72 ft/s
Velocity Head	0.12 ft
Specific Energy	0.47 ft
Froude Number	0.940
Maximum Discharge	2.71 cfs
Discharge Full	2.52 cfs
Slope Full	0.000 ft/ft
Flow Type	Subcritical
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	0.0 %
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	4.3 in
Critical Depth	4.1 in
Channel Slope	0.005 ft/ft
Critical Slope	0.006 ft/ft

Project Information

Project Name: AdventHealth Parker Expansion
Miro Project No: 23079
Revised Date: 5/31/2024
Calculated By: MHV

Code Used: 2018 IFC (With 2021 Amendments)

Occupancy Group: I-2
Construction Type: 1A

Floor Level	Gross Building Area (SF)
Garden Floor	9,259
Floor 1	30,440
Floor 2	25,700
Floor 3	24,140
Floor 4	24,140
Floor 5	24,140
Occupied Space	137,819

Fire Flow Calculation	
Construction Type	IA
Fire Flow Calculation Area per Section B104.3	80,280
GPM Req'd per Table B105.1	4,000
50% Reduction for Fully Sprinklered Bldg.	2,000
Hydrants Required per Table C105.1	2