FINAL WATER RESOURCE REPORT

The Citizen on Constitution

Southwest corner of Constitution Ave and Marksheffel Rd
El Paso County, Colorado

Prepared for:

The Citizen on Constitution, LLC
c/o The Garrett Companies, Inc.
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Project #: 096481004
Prepared: January 25, 2022

Kimley»Horn

CITIZEN ON CONSTITUTION

SOUTHWEST CORNER OF CONSTITUTION AVE AND MARKSHEFFLE ROAD EL PASO COUNTY, COLORADO

WATER RESOURCE REPORT

JANUARY 25, 2024

Prepared by:

Kimley»Horn

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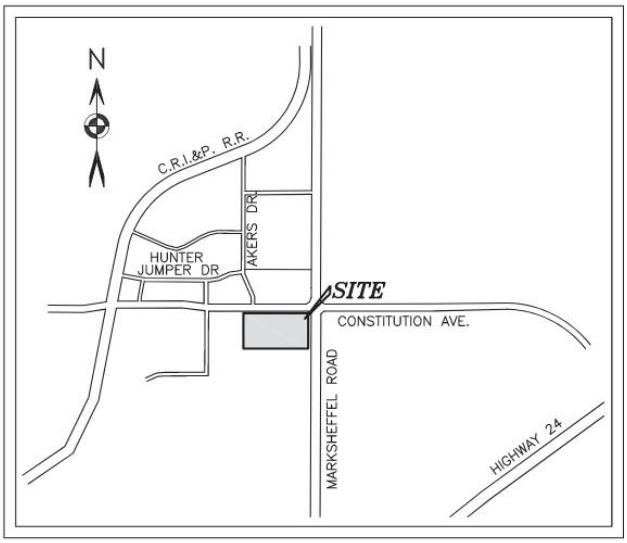
SUMMARY OF THE PROPOSED SUBDIVISION

SITE LOCATION

The Site is located at the southwest corner of Constitution Avenue and Marksheffel Road and currently consists of Parcel A (10.54 AC) and Parcel B (1.72 AC). The Site is bounded by Constitution Avenue to the north, Marksheffel Road to the east, developed land to the south with an existing surface parking lot, and vacant land adjacent to a commercial building to the west. A vicinity map is provided below for reference:



DESCRIPTION OF PROPERTY

The overall site is approximately 12.26 acres of undeveloped land. The site development is anticipated to consist of two 3-story buildings with approximately 226 for rent residential units. A proposed extension of Akers Drive will be provided as an access road into the site.

The existing topography generally drains from north to south. The overall site varies in elevation from a low of approximately 6413 feet to a high of approximately 6446.

There are two points of connection for proposed water service to the Site. One connection will be to the 16-line line within Constitution Avenue near the northwest corner of the Project. The other connection will be to the 12-inch line within Marksheffel Road near the southeast corner of the Project. Refer to **Appendix A** for an overview of the water system and points of connection.

The water design presented herein will focus on the water demands anticipated with development of the Site.

INFORMATION REGARDING SUFFICIENT QUANITY OF WATER

CALCULATION OF WATER DEMAND

The water system demands were based on a formal letter of Commitment sent by the CMD for The Citizen on Constitution dated November 29, 2021. See **Appendix B** for reference.

Demand Factors/Allowed Flows:

- Domestic Annual Water Demand
  - 45.2 AF/yr
- Irrigation Annual Water Demand
  - 5.4 AF/yr
- Average Day Demand
  - 102.82 GPD per Bedroom
- Maximum Day Demand
  - 195.36 GPD per Bedroom

Based on this information, the domestic water demand was calculated as follows:

DOMESTIC WATER DEMAND CALCULATIONS						
Type	Associated Junctions	Bedroom Count	Average Day Demand	Average Day Demand	Max Day Demand	Max Day Demand
		Total	GPD/Bed	GPD	GPD/Bed	GPD
Building A	BLDG A – DOM	200	102.82	20,564	195.36	39,071
Building B	BLDG B – DOM	191	102.82	19,638	195.36	37,313
Garage	GARAGE	-	-	150	-	285
Irrigation	IRR	-	-	24,437	-	46,430
		Total Flow Rates:	*Average Day*	*64,789*	*Max Day*	*123,100*

Section 2.6 of the Colorado Springs Utilities (CSU) standards was used to analyze the proposed water system. CSU standards and Water distribution systems design scenarios is as follows:

- Static Scenario
  - No demands on the system.
  - Maximum Design Working Pressure for PVC C900 = 170 psi.
- Average Day Scenario
  - Average demands on the system based on conversion listed above.
  - Minimum pressure = 50 psi.
- Maximum Day + Fire Flow Scenario
  - Fire Flow demand of 1,750 GPM at each hydrant.
  - Minimum pressure = 20 psi

Pipe Sizing Calculations:

- WaterCAD was used to size water mains.
- Minimum Diameter = 8 inches for water mains
- Fire service line = 8 inches outside of building
- Domestic service line = 4 inches outside of building
- Garage service line = ¾ inches outside of building

The proposed water main will be tapping into existing water lines in two (2) locations. One connection will be to the 16-line line within Constitution Avenue near the northwest corner of the Project. The other connection will be to the 12-inch line within Marksheffel Road near the southeast corner of the Project.

The site falls within the CMD which uses groundwater for the water system. A fire flow test was performed and provided by Cherokee Metro District on a hydrant east of the intersection of Constitution Avenue and Marksheffel Road. The flow hydrant was tested at 1,289 GPM which resulted in a static line pressure of 138 psi. The static pressure of 138 psi and site elevations ranging between approximately 6,435 and 6,446 were used to set the HGL of the constant head reservoir in the WaterCAD model. The full hydraulic analysis using WaterCAD can be reviewed in **Appendix A** of this report.

The system will have an average day demand of 64,789 GPD (approximately 45 GPM) and a max day demand of 123,100 GPD (approximately 85 GPM) based on the Cherokee Metro District Commitment Letter. Based on the results of the WaterCAD analysis, it is anticipated that the existing system has capacity for the proposed development.

The buildings within the development shall be constructed per the 2018 International Fire Code (IFC) and 2018 International Building Code (IBC), or most current code. The proposed buildings will require fire flows per the International Fire Code. The buildings will be sprinkled and be type V-A.

Water main design calculations and the WaterCAD pipe network Model are provided in **Appendix A**.

CALCULATION OF QUANITY OF WATER AVAILABLE

Cherokee Metro District has a “Water Provider’s Report for Citizen on Constitution” included in **Appendix C**. The supplemental information confirms the availability of water to service this project. This project will be served by Cherokee Metro District water mains only and does not include any groundwater sources.

With 4,411.5 AFY of exportable supply and 4,238.9 AFY of commitments, CMD has a water balance of 176.6 AFY before the subject development. After commitment of 50.6 AFY to this development, the District will have 126.0 AFY remaining for additional commitments. Below is a table showing the district’s water balance with the new development.

Water Balance Before New Commitment	176.6 AFY
New Commitment: Watermark at Akers Drive	50.6 AFY
Water Balance Remaining	126.0 AFY

INFORMATION REGARDING SUFFICIENT DEPENDABLITY OF WATER SUPPLY

Currently Cherokee Metro District serves approximately 8000 residential taps and 600 commercial taps in addition to bulk users in eastern El Paso County including Schriever Air Force Base.

Cherokee Metro District water is sourced entirely from groundwater in two regions. The majority is recovered from the alluvial Upper Black Squirrel (UBS) Aquifer in eastern El Paso County via 21 wells. The remainder is sourced from two wells in deep bedrock aquifers in the northern part of the county on the "Sundance Ranch" property. Water from eight of the 21 wells in the eastern part of the county can only be used to serve a fixed list of customers. Water for the main service area of CMD comes only from the remaining 12 wells in UBS along with the two wells at the Sundance Ranch.

The supplement to the Water Resource Report provided by Cherokee Metro District provides a description of the water supply, calculations demonstrating quantity, and evidence of water system source.

INFORMATION REGARDING SUFFICIENT QUALITY

Cherokee Metro District uses a water system based on groundwater sources. Filtration processes are used in the water treatment facility plant to ensure water quality. Additional information is provided in the providers supplement to this Report.

PUBLIC AND PRIVATE COMMERICAL WATER PROVIDERS

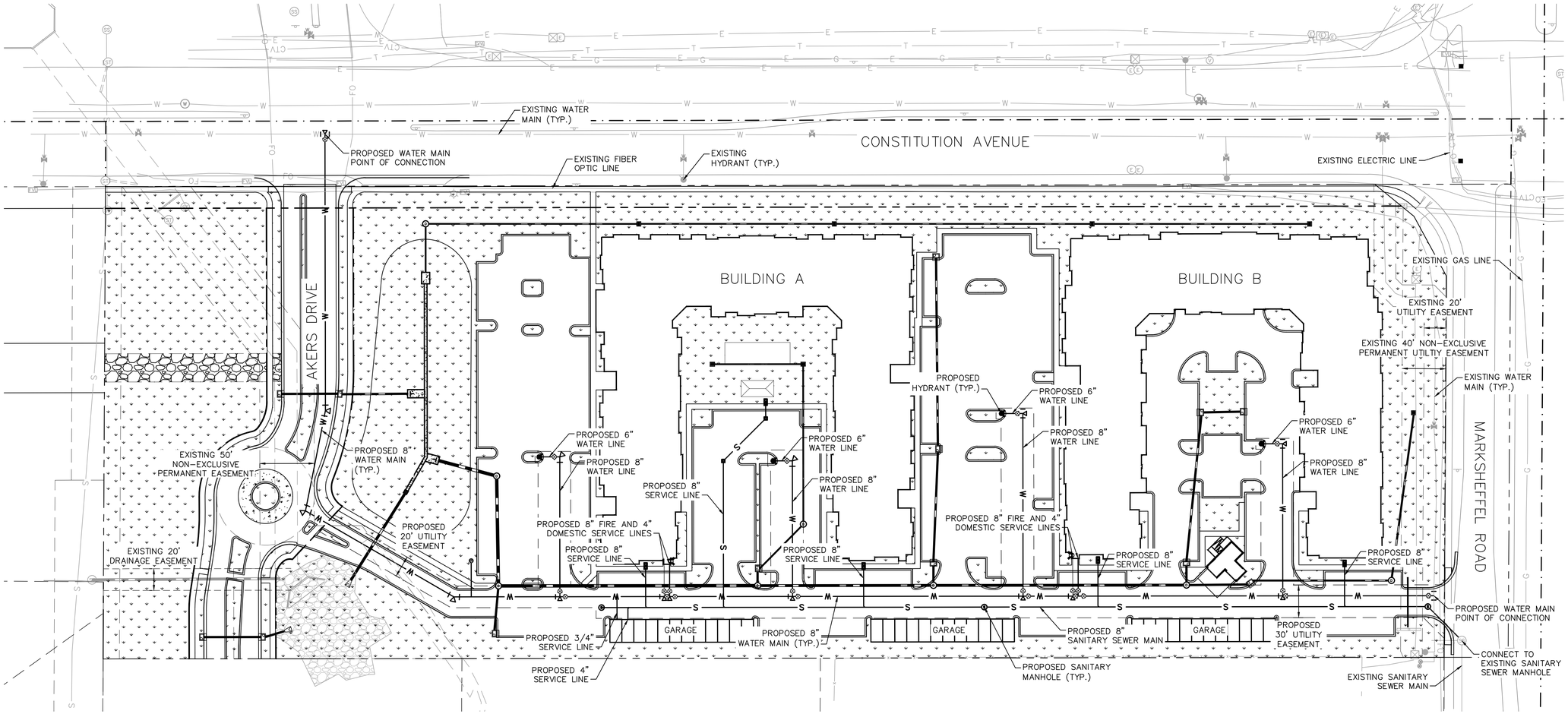
Cherokee Metro District has a "Water Provider's Report for Citizen on Constitution" included in **Appendix C**. This supplement provides content that meets or exceeds the provided content provided in this Water Resource Report.

REFERENCES

Colorado Springs Utilities Water Line Extension & Service Standards 2019, City of Colorado Springs; July 1, 2019.

Cherokee Metropolitan District. "Water and Sewer Service to The Citizen on Constitution. Commitment Letter No. 2021-15." November 29, 2021.

Cherokee Metropolitan District. "Water Provider's Report for Citizen on Constitution Apartments." December 7, 2021.



LEGEND:

- PROPERTY LINE
- EXISTING EASEMENT LINE
- PROPOSED EASEMENT LINE
- EXISTING SANITARY SEWER
- PROPOSED SANITARY SEWER
- SANITARY SEWER MANHOLE
- EXISTING SANITARY MANHOLE
- PROPOSED STORM MANHOLE
- PROPOSED STORM SEWER
- PROPOSED WATER LINE
- PROPOSED FIRE HYDRANT
- PROPOSED STORM INLET

NORTH

GRAPHIC SCALE IN FEET
0 25 50 100

THE CITIZEN AT CONSTITUTION
UTILITY PLAN EXHIBIT
JANUARY 25, 2022

Kimley»Horn

2 NORTH NEVADA AVENUE, SUITE 300, COLORADO SPRINGS, COLORADO
PHONE: (719) 453-0180

DOMESTIC WATER DEMAND CALCULATIONS[1]

Building	Building Type	Bedroom Count[3]	Average Day Demand	Average Day Demand[4]	Max Day Demand[5]	Max Day Demand
			GPD/Bed	GPD	GPD/Bed	GPD
A	Residential	200	102.82	20,564	195.36	39,071
B	Residential	191	102.82	19,638	195.36	37,313
Garage	Garage/Dog Wash	-	-	150	-	285
N/A	Irrigation[2]	-	-	24,437	-	46,430
		Total Flow Rates:	***Average Day***	***64,789.4***	***Max Day***	***123,099.9***

1. Cherokee Metro District provided Letter of Commitment for water service of 45.2 AF/yr for domestic use and 5.4 AF/yr for irrigation. Average Day and Max Day demands were calculated using the annual domestic demand from Cherokee Metro and number of bedrooms per building. The garage demand is part of the domestic demand. Irrigation use was determined using the irrigation demand from Cherokee Metro, see note 2 for further information.

2. Irrigation demand was calculated based on the Cherokee Metro District annual irrigation demand of 5.4 AF distributed over the 72-day irrigation season. The irrigation season is May 1st through October 15th (per Water-wise guidelines) and the irrigation system can be utilized 3 days per week which leads to 72 days per year.

3. Building A has 43 1-bedroom units, 54 2-bedroom units, and 17 3-bedroom units. Building B has 51 1-bedroom units, 43 2-bedroom units, and 18 3-bedroom units.

4. Garage average day demand calculated per CDPHE Regulation No. 43 and assumes no consumptive use. The average day demand per person is 75 GPD and it is assumed that two people will use the bathroom/dog wash per day.

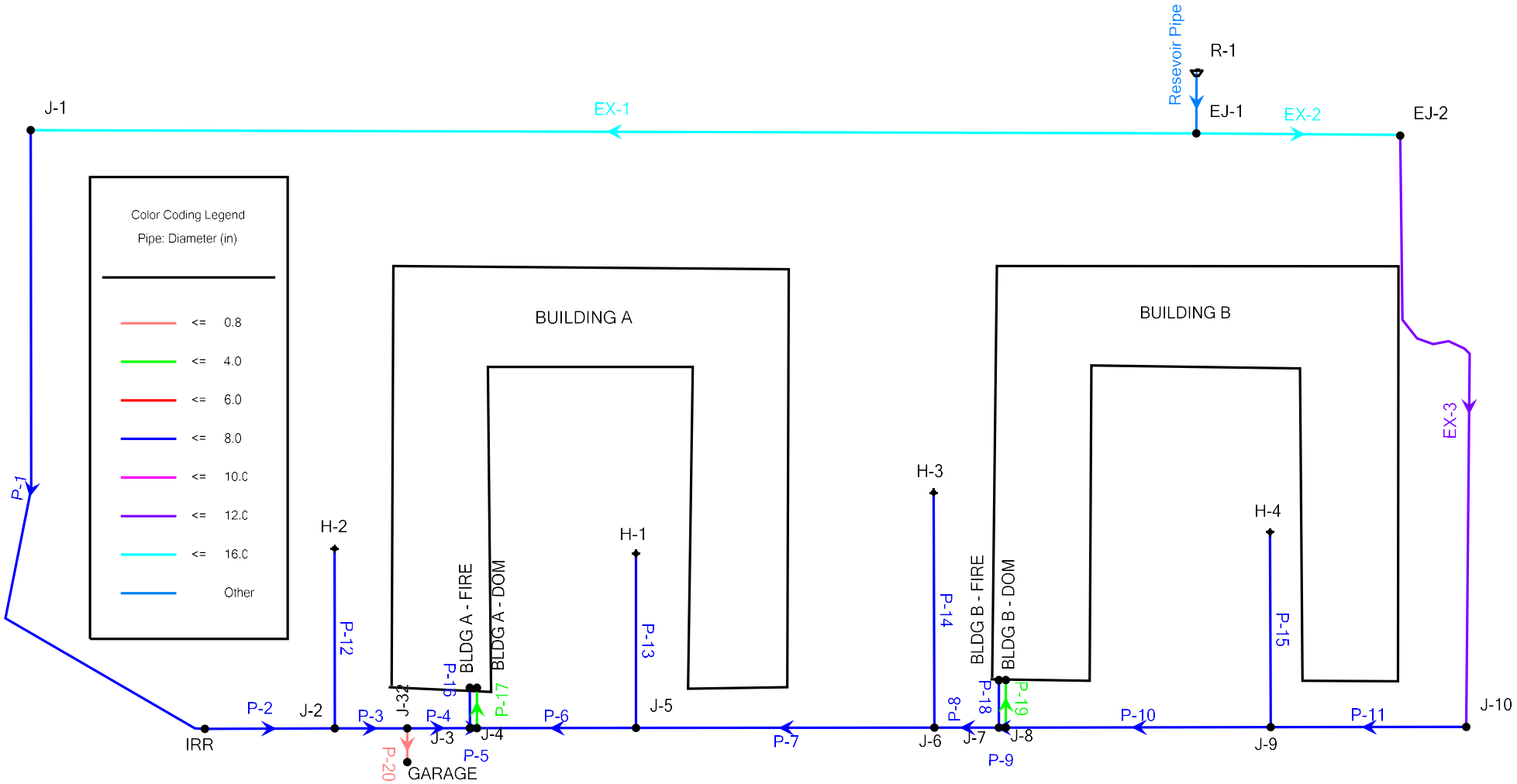
5. Max Day peaking factor is 1.9.

FIRE FLOW CALCULATIONS

Building Name	Building Type	Type of Construction	Estimated Gross Floor Area	Pre-Reduction Fire Flow[1]	Percent Reduction[2]	Post Reduction Fire Flow
			SF	GPM		GPM
A	Residential/Multi-family	V-A	151,315	7,000	75%	1,750
B	Residential/Multi-family	V-A	153,421	7,000	75%	1,750

1. Based on the 2018 IFC Table B105.1(2)
2. Based on the 2018 IFC Table B105.2

Citizen at Constitution WaterCAD Model



Citizen at Constitution WaterCAD Model

Static Scenario

Pipe Table - Time: 0.00 hours

Label	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Length (ft)	Flow (Absolute) (gpm)	Velocity (ft/s)	Headloss (ft)
EX-1	J-1	EJ-1	16.0	PVC	150.0	828	0	0.00	0.00
EX-2	EJ-1	EJ-2	16.0	PVC	150.0	145	0	0.00	0.00
EX-3	EJ-2	J-10	12.0	PVC	150.0	453	0	0.00	0.00
P-5	J-3	J-4	8.0	PVC	150.0	5	0	0.00	0.00
P-6	J-4	J-5	8.0	PVC	150.0	113	0	0.00	0.00
P-8	J-6	J-7	8.0	PVC	150.0	46	0	0.00	0.00
P-9	J-7	J-8	8.0	PVC	150.0	5	0	0.00	0.00
P-10	J-8	J-9	8.0	PVC	150.0	188	0	0.00	0.00
P-11	J-9	J-10	8.0	PVC	150.0	139	0	0.00	0.00
P-12	J-2	H-2	8.0	PVC	150.0	128	0	0.00	0.00
P-13	J-5	H-1	8.0	PVC	150.0	124	0	0.00	0.00
P-14	J-6	H-3	8.0	PVC	150.0	167	0	0.00	0.00
P-15	J-9	H-4	8.0	PVC	150.0	138	0	0.00	0.00
P-16	J-3	BLDG A - FIRE	8.0	Ductile Iron	150.0	29	0	0.00	0.00
P-17	J-4	BLDG A - DOM	4.0	HDPE	140.0	29	0	0.00	0.00
P-18	J-7	BLDG B - FIRE	8.0	Ductile Iron	150.0	34	0	0.00	0.00
P-19	J-8	BLDG B - DOM	4.0	HDPE	140.0	34	0	0.00	0.00
Resevoir Pipe	R-1	EJ-1	20.0	PVC	150.0	43	0	0.00	0.00

Junction Table - Time: 0.00 hours

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
BLDG A - DOM	6,438.00	0	6,764.37	141
BLDG A - FIRE	6,438.00	0	6,764.37	141
BLDG B - DOM	6,441.00	0	6,764.37	140
BLDG B - FIRE	6,441.00	0	6,764.37	140
EJ-1	6,445.59	0	6,764.37	138
EJ-2	6,446.28	0	6,764.37	138
J-1	6,441.47	0	6,764.37	140
J-2	6,436.39	0	6,764.37	142
J-3	6,435.90	0	6,764.37	142
J-4	6,435.87	0	6,764.37	142
J-5	6,436.58	0	6,764.37	142
J-6	6,438.82	0	6,764.37	141
J-7	6,439.14	0	6,764.37	141
J-8	6,439.01	0	6,764.37	141
J-9	6,438.40	0	6,764.37	141
J-10	6,439.33	0	6,764.37	141

Reservoir Table - Time: 0.00 hours

Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
R-1	6,764.37	0	6,764.37

Hydrant Table - Time: 0.00 hours

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
H-1	6,436.33	0	6,764.37	142

Citizen at Constitution WaterCAD Model

Static Scenario

Hydrant Table - Time: 0.00 hours

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
H-2	6,436.41	0	6,764.37	142
H-3	6,438.58	0	6,764.37	141
H-4	6,439.93	0	6,764.37	140

Citizen at Constitution WaterCAD Model

Average Day Scenario

Pipe Table - Time: 0.00 hours

Label	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Length (ft)	Flow (Absolute) (gpm)	Velocity (ft/s)	Headloss (ft)
EX-1	J-1	EJ-1	16.0	PVC	150.0	828	22	0.03	0.00
EX-2	EJ-1	EJ-2	16.0	PVC	150.0	145	23	0.04	0.00
EX-3	EJ-2	J-10	12.0	PVC	150.0	453	23	0.07	0.00
P-5	J-3	J-4	8.0	PVC	150.0	5	4	0.03	0.00
P-6	J-4	J-5	8.0	PVC	150.0	113	10	0.06	0.00
P-8	J-6	J-7	8.0	PVC	150.0	46	10	0.06	0.00
P-9	J-7	J-8	8.0	PVC	150.0	5	10	0.06	0.00
P-10	J-8	J-9	8.0	PVC	150.0	188	23	0.15	0.00
P-11	J-9	J-10	8.0	PVC	150.0	139	23	0.15	0.00
P-12	J-2	H-2	8.0	PVC	150.0	128	0	0.00	0.00
P-13	J-5	H-1	8.0	PVC	150.0	124	0	0.00	0.00
P-14	J-6	H-3	8.0	PVC	150.0	167	0	0.00	0.00
P-15	J-9	H-4	8.0	PVC	150.0	138	0	0.00	0.00
P-16	J-3	BLDG A - FIRE	8.0	Ductile Iron	150.0	29	0	0.00	0.00
P-17	J-4	BLDG A - DOM	4.0	HDPE	140.0	29	14	0.36	0.00
P-18	J-7	BLDG B - FIRE	8.0	Ductile Iron	150.0	34	0	0.00	0.00
P-19	J-8	BLDG B - DOM	4.0	HDPE	140.0	34	14	0.35	0.01
Resevoir Pipe	R-1	EJ-1	20.0	PVC	150.0	43	45	0.05	0.00

Junction Table - Time: 0.00 hours

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
BLDG A - DOM	6,438.00	14	6,764.36	141
BLDG A - FIRE	6,438.00	0	6,764.36	141
BLDG B - DOM	6,441.00	14	6,764.36	140
BLDG B - FIRE	6,441.00	0	6,764.36	140
EJ-1	6,445.59	0	6,764.37	138
EJ-2	6,446.28	0	6,764.37	138
J-1	6,441.47	0	6,764.37	140
J-2	6,436.39	0	6,764.36	142
J-3	6,435.90	0	6,764.36	142
J-4	6,435.87	0	6,764.36	142
J-5	6,436.58	0	6,764.36	142
J-6	6,438.82	0	6,764.36	141
J-7	6,439.14	0	6,764.36	141
J-8	6,439.01	0	6,764.36	141
J-9	6,438.40	0	6,764.37	141
J-10	6,439.33	0	6,764.37	141

Reservoir Table - Time: 0.00 hours

Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
R-1	6,764.37	45	6,764.37

Hydrant Table - Time: 0.00 hours

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
H-1	6,436.33	0	6,764.36	142

Citizen at Constitution WaterCAD Model

Average Day Scenario

Hydrant Table - Time: 0.00 hours

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
H-2	6,436.41	0	6,764.36	142
H-3	6,438.58	0	6,764.36	141
H-4	6,439.93	0	6,764.37	140

Citizen at Constitution WaterCAD Model

Max Day Scenario

Pipe Table - Time: 0.00 hours

Label	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Length (ft)	Flow (Absolute) (gpm)	Velocity (ft/s)	Headloss (ft)
EX-1	J-1	EJ-1	16.0	PVC	150.0	828	41	0.07	0.00
EX-2	EJ-1	EJ-2	16.0	PVC	150.0	145	45	0.07	0.00
EX-3	EJ-2	J-10	12.0	PVC	150.0	453	45	0.13	0.00
P-5	J-3	J-4	8.0	PVC	150.0	5	8	0.05	0.00
P-6	J-4	J-5	8.0	PVC	150.0	113	19	0.12	0.00
P-8	J-6	J-7	8.0	PVC	150.0	46	19	0.12	0.00
P-9	J-7	J-8	8.0	PVC	150.0	5	19	0.12	0.00
P-10	J-8	J-9	8.0	PVC	150.0	188	45	0.28	0.01
P-11	J-9	J-10	8.0	PVC	150.0	139	45	0.28	0.01
P-12	J-2	H-2	8.0	PVC	150.0	128	0	0.00	0.00
P-13	J-5	H-1	8.0	PVC	150.0	124	0	0.00	0.00
P-14	J-6	H-3	8.0	PVC	150.0	167	0	0.00	0.00
P-15	J-9	H-4	8.0	PVC	150.0	138	0	0.00	0.00
P-16	J-3	BLDG A - FIRE	8.0	Ductile Iron	150.0	29	0	0.00	0.00
P-17	J-4	BLDG A - DOM	4.0	HDPE	140.0	29	27	0.69	0.02
P-18	J-7	BLDG B - FIRE	8.0	Ductile Iron	150.0	34	0	0.00	0.00
P-19	J-8	BLDG B - DOM	4.0	HDPE	140.0	34	26	0.66	0.02
Resevoir Pipe	R-1	EJ-1	20.0	PVC	150.0	43	86	0.09	0.00

Junction Table - Time: 0.00 hours

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
BLDG A - DOM	6,438.00	27	6,764.33	141
BLDG A - FIRE	6,438.00	0	6,764.35	141
BLDG B - DOM	6,441.00	26	6,764.33	140
BLDG B - FIRE	6,441.00	0	6,764.35	140
EJ-1	6,445.59	0	6,764.37	138
EJ-2	6,446.28	0	6,764.37	138
J-1	6,441.47	0	6,764.37	140
J-2	6,436.39	0	6,764.35	142
J-3	6,435.90	0	6,764.35	142
J-4	6,435.87	0	6,764.35	142
J-5	6,436.58	0	6,764.35	142
J-6	6,438.82	0	6,764.35	141
J-7	6,439.14	0	6,764.35	141
J-8	6,439.01	0	6,764.35	141
J-9	6,438.40	0	6,764.36	141
J-10	6,439.33	0	6,764.37	141

Reservoir Table - Time: 0.00 hours

Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
R-1	6,764.37	86	6,764.37

Hydrant Table - Time: 0.00 hours

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
H-1	6,436.33	0	6,764.35	142

Citizen at Constitution WaterCAD Model

Max Day Scenario

Hydrant Table - Time: 0.00 hours

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
H-2	6,436.41	0	6,764.35	142
H-3	6,438.58	0	6,764.35	141
H-4	6,439.93	0	6,764.36	140

Citizen at Constitution WaterCAD Model

Max Day + Fire Flow Scenario

Fire Flow Report - Time: 0.00 hours

Label	Satisfies Fire Flow Constraints ?	Fire Flow (Needed) (gpm)	Fire Flow (Available) (gpm)	Pressure (Calculated Residual) (psi)	Velocity of Maximum Pipe (ft/s)	Pipe w/ Maximum Velocity
BLDG B - FIRE	True	0	1,751	136	11.18	P-18
BLDG A - FIRE	True	0	1,751	137	11.18	P-16
H-4	True	0	1,751	136	11.18	P-15
H-3	True	0	1,751	135	11.18	P-14
H-1	True	0	1,751	136	11.18	P-13
H-2	True	0	1,751	136	11.18	P-12

CHEROKEE METROPOLITAN DISTRICT

6250 Palmer Park Blvd., Colorado Springs, CO 80915-2842
Telephone: (719) 597-5080 Fax: (719) 597-5145

November 29th, 2021
The Garrett Companies
1051 Greenwood Springs Blvd., Suite 101
Greenwood, IN 46143

Sent via email: Raimere.Fitzpatrick@kimley-horn.com

Re: Water and Sewer Service to **The Citizen on Constitution (Apartments)**
Commitment Letter No. **2021-15**

Dear The Garrett Companies,

As requested, this document will serve is as a formal Letter of Commitment from the Cherokee Metropolitan District to provide municipal water and sewer services for The Citizen on Constitution located at the southwest corner of Constitution Avenue and Marksheffel Road. The proposed location for this development is located within the District's established boundaries and therefore is eligible for service connections from the District.

Cherokee Metropolitan District staff, along with the developer, have determined that the following will be the total water demand required by this development:

Type of Use	Demand (AF/yr)
Domestic	45.2
Irrigation	5.4
Total	**50.6**

Based on a conservatively low 0% consumptive use of domestic water, the development is expected to produce 45,000 gallons of wastewater per day, representing 1.7% of CMD's wastewater capacity. This usage is in line with anticipated wastewater demand for this area of the District.

This water commitment is hereby made exclusively for this specific development project at this site within the District. To confirm this commitment you must provide the District with a copy of the final plat approval from El Paso County Development Services within 12 months of the date of this letter. Otherwise, the District may use this allocation for other developments requesting a water commitment. If the subject project is re-platted, you must submit a new commitment request prior to submitting the re-plat to El Paso County, which may result in a recalculation of the water demand for the project.

If I may be of further assistance please contact me at your convenience.

Sincerely,

Amy Lathen
General Manager

Cc: Peter Johnson; Water Counsel w/ encl: sent via email
Steve Hasbrouck; Board President w/ encl: sent via email
Jeff Munger; Water Resource Engineer: sent via email
Kevin Brown; Jr. Engineer: sent via email

CHEROKEE METROPOLITAN DISTRICT

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Water Provider's Supplementary Report for Citizen on Constitution

December 7th, 2021

This document was prepared to satisfy the requirements of El Paso County for a Water Provider's Report in support of **Citizen on Constitution** at the **Southwest corner of Marksheffel Road & Constitution Avenue.**

Introduction

Cherokee Metropolitan District (CMD) is a Title 32 special District which provides water and wastewater to an approximately 5000-acre enclave of unincorporated El Paso county surrounded by the City of Colorado Springs. Currently CMD serves approximately 8000 residential taps and 600 commercial taps in addition to bulk users in eastern El Paso County including Schriever Air Force Base.

CMD water is sourced entirely from groundwater in two regions. The majority is recovered from the alluvial Upper Black Squirrel (UBS) Aquifer in eastern El Paso County through 20 wells. The remainder is sourced from two wells in deep bedrock aquifers in the northern part of the county on the "Sundance Ranch" property. Water from eight of the 20 wells in the eastern part of the county can only be used to serve a fixed set of customers. Water for the main service area of CMD comes only from the remaining 12 wells in UBS along with the two wells in Black Forest.

Calculation of Anticipated Water Demand

Estimated water demand for the proposed apartment complex was calculated in two parts: domestic use and irrigation use. The El Paso County presumptive water use value for multifamily developments is 0.2 AFY/SFE. This value is 25% higher than CMD's per-account multifamily use, but it will be used in order to produce a conservative estimate. The proposed development will include 226 units which yields an expected water supply requirement of 45.2 AFY. Using the county estimate of 2.43 feet of water for traditionally irrigated areas and the developer's estimate of 2.2 acres of fully irrigated terrain with none of the project area designated for reduced watering yields an outdoor watering demand estimate of 5.4 AFY. The total expected water demand for this development is 50.6 AFY.

Water Supplies

Cherokee has eight wells that are restricted to serving a maximum of 653 AFY to specified in-basin customers. Excess allocation for these wells is unavailable for new developments, even if they are inside the Basin, so this water is tracked separately from CMD's general supply portfolio. CMD's other alluvial wells are available for export outside the UBS basin. The total annual volume available to CMD from these exportable supplies is 3,953.5 AFY (Table 1). The physical yield of these wells is significantly higher than their annual appropriation, allowing flexibility in satisfying peaking demand.

Table 1: Water rights and tributary status of Exportable Wells

Well Number	Water Right (AFY)	2020 Use (AFY)	Permit Number	Aquifer	Aquifer Status
Well 9	176	175	14145-FP-R	UBS Alluvium	Tributary
Well 10	176	143	14146-FP-R	UBS Alluvium	Tributary
Well 11	244	174	6821-FP-R	UBS Alluvium	Tributary
Well 12	244	166	11198-FP	UBS Alluvium	Tributary
Well 13	1268	830	49988-F	UBS Alluvium	Tributary
Well 14	0	0	52429-F	UBS Alluvium	Tributary
Well 15*	281	117	54070-F	UBS Alluvium	Tributary
Well 16*	219	115	54069-F	UBS Alluvium	Tributary
Well 17*	175	123	63094-F	UBS Alluvium	Tributary
Well 18	225	161	16253-RFP-R	UBS Alluvium	Tributary
Well 19	95	65	20567-RFP-R	UBS Alluvium	Tributary
Well 20	400	94	4332-RFP	UBS Alluvium	Tributary
Well 21	258.5	224	81782-F	UBS Alluvium	Tributary
DN-4**	110	88	78315-F	Denver Aquifer	Non-Tributary
AR-1***	347.7	306	75881-F	Arapahoe Aquifer	Non-Tributary
Total	**4153.2**	**2464**			

*Wells 15-17 can produce a total of 609 AFY instead of their nominal total of 675 AFY. This limitation is reflected in the 3984.7 AFY total available production.

**CMD holds additional water rights in the Denver Aquifer associated with the Sundance Ranch property but this particular well has a maximum annual recorded yield of 110 AFY.

***As of December 2019 AR-1 has 2040 AF of banked water which allows actual pumping to exceed allocation on a limited basis.

CMD is developing owned water supplies to increase available water and improve flexibility in provision of summer peak flows. The District has a set of owned but undeveloped water rights which can contribute 458 AFY of capacity to the CMD system (Table 2) as they are completed for a total of 4,443.0 AFY. Since 2011, actual demand from CMD customers has fallen 30-35% below commitments, partially due to some currently committed developments being incomplete but largely due to water saving measures undertaken by CMD customers.

Table 2: New water supplies available for connection to system

Well Number	Water Right (AFY)	Permit Number	Aquifer	Aquifer Status
Well 22	153.5	27571-FP	UBS Alluvium	Tributary
DA-1	40.3	83604-F	Dawson	Not Non-Tributary
DA-4	64.5	83603-F	Dawson	Not Non-Tributary
Total	**258.3**			

CMD has 4,411.5 AFY of exportable water supply available in its portfolio from alluvial and deep bedrock aquifers. Further development in the Denver Basin is not planned at this time and instead CMD is focusing on acquiring new renewable supplies proximate to existing infrastructure.

Water Commitments

CMD's water commitments stand at 4238.9 AFY before the addition of the proposed development (Table 3). The Tipton and Kane commitments are related to an arrangement from the mid-2000's where developers reserved commitments on two new wells. The water from these wells is considered fully committed to these developers even if they have not yet begun the projects associated with the reserved commitments. Due to a complex legal history, the "Kane" water right was not tied to a specific physical water well but instead operates as a commitment served from CMD's general supply portfolio. The "Tipton" water right corresponds to CMD's Well 18.

Table 3: CMD Commitments before addition of new development

Commitments	AFY
In-District (2015)	2693
Committed Since 2015	533.9
Schriever Air Force Base	537
Kane	200
Tipton	225
Construction	25
Parks	25
Total	**4238.9**

Water Balance

With 4,411.5 AFY of exportable supply and 4,238.9 AFY of commitments, CMD has a water balance of 176.6 AFY before the subject development. After commitment of 50.6 AFY to this development, the District will have 126.0 AFY remaining for additional commitments.

Table 4: Water balance with new development

Water Balance Before New Commitment	176.6 AFY
New Commitment: Citizen on Constitution	50.6 AFY
Water Balance Remaining	**112.2 AFY**

Other Relevant Information

Recent Water Acquisitions/Losses

CMD has not acquired any new water rights since 2015 but has been developing owned water rights. CMD has not engaged in any water trades nor lost any water rights in the last year. The District is not currently under contract to purchase new water rights although CMD is investigating purchases of renewable water rights proximate to its existing infrastructure on an ongoing basis.

New Augmentation Plans

CMD is currently pursuing a replacement plan in partnership with Meridian Service Metropolitan District (MSMD) in order to maximize the efficiency of its water supplies.

Major Water System Capital Improvements

CMD has been actualizing owned water by drilling wells and beginning production on several well sites. In February of 2020 CMD brought its well 21 (81782-F) online after a year of planning and construction. The District recently completed drilling of the Albrecht Well (Well 22) which after connection to the system will contribute 153.5 AFY annually.

CMD is currently preparing to install pumps in two existing wells in the Dawson Aquifer (83603-F & 83604-F). Beyond these projects, additional well construction in the Denver Basin is not anticipated at this time, although CMD has a substantial amount of undeveloped water rights in the Denver Basin Aquifers.

Smaller-scale improvements to the distribution system to improve reliability and resiliency have been ongoing and include deeper computer integration, upgrades to treatment systems, rehabilitation of tanks, and emergency generator refurbishment.