

**FINAL UTILITY REPORT
FOR
THE MEADOWS D1 TRAINING CENTER
LOT 2A-3A, BLOCK 3, THE MEADOWS FILING NO. 20,
PHASE 1 – AMENDMENT NO. 16**

Prepared for:

**CASTLE ROCK DEVELOPMENT COMPANY
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Prepared by:



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April 8, 2024

RLEG NO. 230902
TOWN NO. SDP24-0008

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APPROVAL BLOCK

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.

Kurt A. Lang, P.E.

Registered Professional Engineer

State of Colorado No. 32249

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.

Owner/Applicant

Date

1. GENERAL LOCATION AND DESCRIPTION

A. General Location

The Meadows D1 Training Center project, hereafter referred to as the Project, will be located on a parcel of land being a part of Lot 2A-3A, Block 3 of The Meadows Filing No. 20, Phase 1, Amendment No. 16 in the northeast quarter of Section 33, Township 7 South, Range 67 West of the 6th Principle Meridian, Town of Castle Rock, County of Douglas and State of Colorado. Meadows Parkway is adjacent to the southern boundary of the property, Bilberry Street exists to the west and Future Street to the east. Ubergrippen Indoor Climbing Crag exists to the north of the Project. A drive lane access to the site exists off Bilberry Street located off the northwest corner of the Project. This private drive lane is shared with the Ubergrippen to the north. Please refer to the vicinity map in Appendix E.

The Project and neighboring area are zoned as the Meadows Fourth Amendment and designated as a Planned Development type on the Castle Rock Zoning Map. The neighboring lots have been developed as both retail, commercial, and residential properties.

B. Description of the Property

Currently, the boundaries of the parcel of land that the project site is located on (Lot 2A-3A, Block 3) is 1.618 acres (70,459 sq. ft.) and is undeveloped, bound by Bilberry Street to the west, Future Street to the east, Meadows Parkway to the south and a drive lane access and Ubergrippen Indoor Climbing Crag to the north. The parcel of land that the project is situated on Lot 2A-3A, Block 3, has current existing topography slopes of approximately 3 percent falling from the southeast to the northwest.

The Project proposes a 9,450 square-foot facility, a parking lot area and surrounding landscaped areas. According to the Project's SDP CLWUR chart, the landscaped area will consist of approximately 20,850 square-feet of non-irrigated native seed and 18,270 square-feet of drip irrigated shrubs. For the water demand calculations of this report, only the area of the drip irrigated shrubs was used. Utility improvements will also take place throughout the site. The project will have 15.75 SFE's at build out (See Appendix A).

Existing utilities are found on and adjacent to the Property. Future Street, to the east, contains an 8-inch PVC water main and an 8-inch PVC sanitary main. Bilberry Street, to the west, contains a 12-inch PVC water main and an 84-inch RCP storm main. The private drive, to the north, contains an 18-inch storm line with an 18-inch stub ending with an 18-inch FES on the Project site. This drive also contains an 8-inch water main with a 1-inch water service stub and a $\frac{3}{4}$ -inch irrigation service stub to the northwest corner of the Project. Gas, electric and fiberoptic exist on the property and run adjacent to Bilberry Street and Meadows Parkway. One electrical line stub exists on the south side of the Project site along Meadows Parkway. No additional wet or dry utilities, other than mentioned above, currently exist on site.

Easement or tracts necessary for utilities will be provided at time of either platting or at time of final design/construction documents, in accordance with Town standards regarding location and size of easements and tracts.

No known existing irrigation facilities, On-Site Wastewater Treatment System (OWTS), or water wells are located onsite.

2. CALCULATED WATER DEMANDS

Average Day Demand (ADD), Max Day Demand (MDD), Peak Hour Demand (PHD), and Irrigation Demand calculations can be found in the *Calculated Water Demands* spreadsheet in Appendix A. All calculations were made in accordance with Chapter 4 of the *Town of Castle Rock Water System Design Criteria Manual*.

A. Average Daily Demand (ADD)

The project includes a facility with a building total floor area of 9,450 square-feet, a parking lot and landscaped area. Information on the irrigation system has not been provided to us at this time and, therefore, is not included in the following calculations. Irrigation will be added to these calculations in a future submittal. ADDs are sub-totaled by land use as a flow rate in gallons per minute (GPM) and gallons per day (GPD), and as an average annual supply in acre-feet per year (AF/YR).

LAND USE	AREA	AVERAGE DAILY DEMAND (ADD)		
		(GPM)	(GPD)	(AF/YR)
Gym/Fitness Center	9,450 SF	3.28	4,725	5.29
Irrigated Area	18,270 SF	1.09	1,573	1.76
TOTAL	27,720 SF	4.37	6,298	7.05

B. Max Daily Demand (MDD)

With a 2.5 peaking factor applied to the ADD, the MDD's are as follows:

LAND USE	AREA	MAX DAILY DEMAND (MDD)		
		(GPM)	(GPD)	(AF/YR)
Gym/Fitness Center	9,450 SF	8.20	11,813	13.23
Irrigated Area	18,270 SF	1.09	1,573	1.76
TOTAL	27,720 SF	9.30	13,385	14.99

Note: Irrigated ADD is added to the calculated MDD and PHD per TOCR 2018 Water Manual Section 4.4.1.2 Demand Factors

The required fire flow for the Project was calculated using the building area of 9,420 square-feet and the building construction type of V-B. These parameters result in a fire flow of 2,750 gallons per minute at 20 psi for a flow duration of 2 hours. Due to fire sprinklers being provided throughout the building, the required fire flow is reduced to 1,500 gallons per minute at 20 psi for a duration of 2 hours. The required storage volume based on MDDs and the required fire flow necessary to serve the development is 193,392 gallons. See Appendix B.

STORAGE	MDD ⁽¹⁾ (gpm)	FIRE FLOW ⁽²⁾ (gpm)	TIME (hr)	STORAGE VOLUME ⁽³⁾ (gallons)
MDD	9.30		24	13,392
Fire Flow		1,500	2	180,000
TOTAL				193,392

REFERENCE: Town of Castle Rock Water System Design Criteria Manual, Sept. 2012. Section 4.4.2

NOTES: ⁽¹⁾ MDD = Maximum Day Demands = see spreadsheet: *Calculated Demands - Water*
⁽²⁾ From IFC see *Fire Flow Calculations* in Appendix B.
⁽³⁾ Storage Volume = MDD Storage + Fire Flow Storage = (MDD*60min*24hr) + (FF*60min*2hr)

C. Peak Hourly Demand (PHD)

With a 5.5 peaking factor applied to the ADD, the PHD's are as follows:

LAND USE	AREA	PEAK HOURLY DEMAND (PHD)		
		(GPM)	(GPD)	(AF/YR)
Gym/Fitness Center	9,450 SF	18.05	25,988	29.11
Irrigated Area	18,270 SF	1.09	1,573	1.76
TOTAL	27,720 SF	19.14	27,560	30.87

Note: Irrigated ADD is added to the calculated MDD and PHD per TOCR 2018 Water Manual Section 4.4.1.2 Demand Factors

3. EXISTING WATER SYSTEM

A. Existing Water Distribution System

An existing 8-inch PVC water main runs along Future Street between Meadows Blvd. and Mercantile Street. Also, a 12-inch PVC water main runs along Bilberry Street. An 8-inch PVC water main also exists in the drive access on the northwest side of the Project. There is a 1-inch water service stub and a $\frac{3}{4}$ -inch irrigation service stub off this 8-inch main that extend approximately 25-feet onto the northwest corner of the Project. The *Utility Plan* can be found in Appendix E. No known shortcomings or bottlenecks associated with the existing distribution system will impact the Town's ability to adequately deliver fire flows and meet the required demand conditions.

B. Existing Water Supply Facilities

This project is served by the yellow water pressure zone. The Filing 20 water system is fed by the yellow zone storage tanks. The capacity of the existing yellow zone tank is 10.0 M.G., 1.208 MGD of which are reserved for the development of Filing 20. Please refer to *Addendum No. 1 to the Final Utility Report for The Meadows Filing 20, Phase 1, Amendment 2, Castle Rock, Colorado (PP 08-002) (PWP 08-013), CVL Consultants of Colorado, Inc., May 15, 2008.*

Pressure Zone Designation	Max HGL Elev.	Top Elev. Served	Low Elev. Served
2 (Yellow)	6352	6230	6065

Table from Section 4.4.3.1 Operating Pressures and Pressure Zone Characteristics from Town of Castle Rock Water System Design Criteria Manual, Dec 2018.

4. PROPOSED WATER SYSTEM

A. Proposed Water Distribution System

A 1-inch domestic service line is proposed to connect to the existing 1-inch stub off the 8-inch water main located in the drive aisle off the northwest corner of the project. The final commercial meter size will be determined at the time of permitting based on the required demand of the total building fixture units provided to the Town of Castle Rock. For irrigation needs for the Project, the point of connection will be at the existing $\frac{3}{4}$ -inch service stub also tapped off the existing 8-inch water main located in the drive aisle. One fire hydrant is proposed off the southwest corner of the northwest parking lot and will be served by a 6-inch DIP fire line that will be tapped from the existing 12-inch PVC main located in Bilberry Street. A 6-inch DIP fire line will also be tapped from the existing 12-inch PVC main in Bilberry Street and connect to the proposed building at its northwest wall. Furthermore, a Fire Department Connection is proposed on the northwest wall of the building. The *Utility Plan* can be found in Appendix E. Any future development of the existing water infrastructure needed to serve this site is the responsibility of the Developer. To the best of our knowledge, this Project complies with the Town of Castle Rock's 2018 Water Collection System Design Criteria Manual and no assumptions need to be reevaluated in order to serve the development.

B. Proposed Water Supply Facilities

No pump stations, wells, PRVs, storage reservoirs, purification facilities, or other elements will be required to adequately serve the development and its requirements.

The Project will be constructed with a fire suppression system. Based on the Type V-B construction, a floor area of 9,450 sft, and the 50% reduction factor due to the building being fully sprinklered, the IFC requires a flow of 1,500 GPM for 2 hours.

C. Water Facilities Land Dedication Requirements

Water Facilities Land Dedication requirements are pursuant to Section 16.08.040 of the Town's *Municipal Code*. The code states that for Retail, office, light industrial and other commercial land uses, 0.0123 acres/acre is required.

5. PROPOSED WATER SYSTEM ANALYSIS AND MODELING

No further analysis or modeling of the proposed water system was made due to the improvements being service line connections and taps only. The proposed water system conforms to the *Town of Castle Rock Water System Design 2018 Criteria Manual Dec. 2018*.

CALCULATED WASTEWATER FLOWS

Average Daily Wastewater Flows (ADF), Peaking Factor, and Peak Design Flow (PDF) calculations can be found in the *Calculated Wastewater Flows* spreadsheet in Appendix C. All calculations were made in accordance with Chapter 4 of the *Town of Castle Rock Wastewater Collection System Design Criteria Manual 2018 Edition*.

A. Average Day Wastewater (ADF)

The project includes a recreational facility with a building floor area of 9,450 square-feet, a parking lot and landscaped area. ADFs are subtotaled by land use as a flow rate in gallons per day (GPD), gallons per minute (GPM), and cubic feet per second (CFS).

LAND USE	AREA	AVERAGE DAY WASTEWATER (ADF)		
		(GPM)	(GPD)	(CFS)
Gym/Fitness Center	9,450 SF	3.28	4,725	0.0073
TOTAL		3.28	4,725	0.0073

B. Peaking Factor and Inflow

A maximum Peaking Factor of 5 was used for this project and Inflow and Infiltration was applied at a rate of $(0.1 * \text{ADF})$ per *Castle Rock Wastewater Collection System Design Criteria Manual*.

C. Peak Design Flows (PDF)

The peak design flow is computed using the following formula from Section 4.4.1.3 from the *Castle Rock Wastewater Collection System Design Criteria Manual*. See Appendix C for ADF and PDF calculations.

The resulting PDF's are as follows:

LAND USE	AREA	PEAK DESIGN FLOW (PDF)		
		(GPM)	(GPD)	(CFS)
Gym/Fitness Center	9,450 SF	16.73	24,098	0.037
TOTAL		16.73	24,098	0.037

Note: PDF values include I&I added to ADF per TOCR 2018 Wastewater Collection Criteria Section 4.4.1.3 Peak Design Flow Rate

6. EXISTING WASTEWATER SYSTEM

A. Existing Wastewater Collection System

The existing collection system for this Project is an 8-inch PVC sanitary sewer main located in Future Street.

PROPOSED WASTEWATER SYSTEM

A. Proposed Wastewater Collection System

This Project is proposing a 6-inch PVC service connection from the existing 8-inch PVC main in Future Street to the facility, particularly the north corner of the northeast wall of the facility. The *Utility Plan* can be found in Appendix E. Any future development of the existing wastewater infrastructure needed to serve this site is the responsibility of the Developer. To the best of our knowledge, this Project complies with the *Town of Castle Rock Wastewater Collection System Design Criteria Manual 2018 Edition* and no assumptions need to be reevaluated in order to serve the development.

B. Proposed Wastewater Facilities

No lift stations, force mains, pretreatment facilities, or other elements will be required to adequately serve the development.

C. Wastewater Facilities Land Dedication Requirements

No land dedication requirements for wastewater facilities were found in the Town's *Municipal Code*.

7. PROPOSED WASTEWATER SYSTEM ANALYSIS AND MODELING

Analysis and modeling for the proposed wastewater system is not anticipated due to the improvements being a single service line connection only. The proposed wastewater system conforms to the *Castle Rock Wastewater Collection System Design Criteria Manual*.

8. POTENTIAL SUBDIVISION IMPROVEMENTS AGREEMENT ITEMS

There are no anticipated SIA items associated with this project as it is only requiring service line connections and taps of existing mains.

9. POTENTIAL PERMITTING REQUIREMENTS

This project is not anticipating any permits other than Town issued construction permits (building, right of way, etc).

10. CONCLUSION

The proposed utility demands and calculations presented herein for the Meadows D1 Training Center project are in conformance with and based upon the current Town of Castle Rock criteria. The proposed water and sanitary sewer services as included in the Overall Utility Plan meet the demands set forth in the previously approved Final Utility Report, 'Addendum No. 1 to the Final Utility Report for The Meadows Filing 20, Phase 1, Amendment 2, Castle Rock, Colorado' (PP 08-002) (PWP 08-013), prepared by CVL Consultants of Colorado, Inc., May 15, 2008.

As shown in Appendix D, the daily demands in the CVL report indicated a water demand of 12.1 GPM for a 1.35-acre area while the calculations herein for the project result in a demand of 3.28 GPM for a slightly larger site of 1.62 acres. Therefore, the Project is in conformance with prior studies.

This project is proposing a 1-inch water service, a ¾-inch irrigation service, a 6-inch fire line to service a proposed hydrant, a 6-inch fire line for the building's sprinkler system, and a 6-inch sanitary sewer service all connecting to existing mains. None of the utility service extensions will affect the system analysis presented in the underlying report.

11. REFERENCES

- Addendum No. 1 to the Final Utility Report for The Meadows Filing 20, Phase 1, Amendment 2,
Castle Rock, Colorado (PP 08-002) (PWP 08-013), CVL Consultants of Colorado, Inc.,
May 15, 2008.
- Overall Utility Plan – Phase I. The Meadows Filing No. 20, Phase 1 – Record Drawings;
RG Consulting Engineers, Inc., August 08, 2006.
- International Fire Code 2018.
- Town of Castle Rock. Utilities Department, External Fire Flow Test Results, August 14,
2019.
- Town of Castle Rock. Wastewater Collection System Design Criteria Manual. Dec. 2018.
- Town of Castle Rock. Water System Design Criteria Manual. Dec. 2018.

APPENDIX A - WATER DEMANDS

CALCULATED DEMANDS - WATER

LAND USE	AREA (ACRES)	AREA (SQFT)	TYPICAL ADD/UNIT ⁽¹⁾	TYPICAL SFEs/UNIT ⁽²⁾	FACTORS ⁽³⁾		ESTIMATED DEMANDS (GPD)		
					MDD FACTOR	PHD FACTOR	ADD ⁽⁴⁾	MDD ⁽⁵⁾	PHD ⁽⁶⁾
Gym/Fitness Center	0.22 AC	9,450 SF	0.50 gpd/SF	0.00125 SFE/SF	2.5	5.5	4,725	11,813	25,988
Irrigated Landscape ⁽⁷⁾	0.42 AC	18,270 SF	3,750 gpd/AC	9.38 SFE/AC	N/A	N/A	1,573	1,573	1,573
TOTAL	0.64 AC	27,720 SF		15.75 SFE			6,298	13,385	27,560

REFERENCE: Town of Castle Rock Water System Design Criteria Manual, Dec. 2018

⁽¹⁾ ADD = Average Daily Demand = Reference Table 4.4.1.1

⁽²⁾ SFE = Single Family Equivalent = Reference Table 4.4.1.1

⁽³⁾ Reference Section 4.4.1.2

⁽⁴⁾ Peaking factors are not applied to irrigation ADD demands

⁽⁵⁾ MDD Total = Maximum Day Demands = ADD * MDD Factor + Irrigation ADD

⁽⁶⁾ PHD Total = Peak Hour Demand = ADD * PHD Factor + Irrigation ADD

⁽⁷⁾ Irrigation values are TBD for a future submittal.

CALCULATED DEMANDS - WATER
MEADOWS D1 TRAINING CENTER

4/8/2024

JJH

LAND USE	AREA	AVERAGE DAILY DEMAND (ADD)		
		(GPM)	(GPD)	(AF/YR)
Gym/Fitness Center	9,450 SF	3.28	4,725	5.29
Irrigated Area	18,270 SF	1.09	1,573	1.76
TOTAL	27,720 SF	4.37	6,298	7.05

LAND USE	AREA	MAX DAILY DEMAND (MDD)		
		(GPM)	(GPD)	(AF/YR)
Gym/Fitness Center	9,450 SF	8.20	11,813	13.23
Irrigated Area	18,270 SF	1.09	1,573	1.76
TOTAL	27,720 SF	9.30	13,385	14.99

Note: Irrigated ADD is added to the calculated MDD and PHD per TOCR 2018 Water Manual
Section 4.4.1.2 Demand Factors

LAND USE	AREA	PEAK HOURLY DEMAND (PHD)		
		(GPM)	(GPD)	(AF/YR)
Gym/Fitness Center	9,450 SF	18.05	25,988	29.11
Irrigated Area	18,270 SF	1.09	1,573	1.76
TOTAL	27,720 SF	19.14	27,560	30.87

Note: Irrigated ADD is added to the calculated MDD and PHD per TOCR 2018 Water Manual
Section 4.4.1.2 Demand Factors

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

4.4.1.1 Water System Average Daily Demands (ADD)

Notes:

- (1) All tabulated ADD rates include irrigation demands with the exception of multi-family residential, car washes, gyms/fitness centers, and schools.
- (2) Irrigation demands shall be in accordance with the Irrigation Plan approved by Castle Rock Water and hours of irrigation shall comply with the latest edition of the Town's Water Use Management Plan. Irrigation demands in this Table are for planning purposes only. Peak irrigation rates for 'Irrigated Land' and 'School Irrigation' categories tabulated above shall be in accordance with the approved Irrigation Plan, and shall not be based on the peaking factors identified in the section below.
- (3) The "Irrigated Land" rate identified above may be higher for active sports fields (e.g., irrigated fields within parks) as determined by the approved Irrigation Plan.
- (4) School sizes in this table are for planning purposes, per the Douglas County School District. Regarding design flows for schools, planned school sizes shall be confirmed with the Douglas County School District and documented in the Utility Report. The tabulated rates shown above shall be applied as appropriate, depending on the information provided by the School District.
- (5) Reasonable engineering judgment shall be used in determining the estimated ADD for commercial, industrial and institutional sites. Individual evaluation and justification, including fixture unit counts, shall be provided when the proposed use is not specifically represented in the table above, or when the proposed demands will be inconsistent with the tabulated values. For example, each car wash's unique operating plan, including recycling of wash water, shall be considered. Justification of all non-residential demands shall be addressed in the Utility Report.

4.4.1.2 Demand Factors

Once the ADD has been computed in accordance with the demand rates tabulated above, Maximum Day Demands (MDD) and Peak Hour Demands (PHD) shall be computed by multiplying the ADD by the following factors:

Maximum Day Demand/Average Day Demand:	2.5	MDD/ADD
Peak Hour Demand/Average Day Demand:	5.5	PHD/ADD

Peaking factors are not applied to irrigation ADD demands. Max Day Demand and Peak Hour Demand are calculated by multiplying the ADD demand by the demand factors. If the site's irrigation demands are calculated using the table in section 4.4.1, the irrigation ADD is added to the calculated MDD and PHD, computed as follows:

$$\begin{aligned}\text{MDD} &= \text{Domestic ADD} \times \text{Maximum Day Factor} + \text{Irrigation ADD} \\ \text{PHD} &= \text{Domestic ADD} \times \text{Peak Hour Factor} + \text{Irrigation ADD}\end{aligned}$$

4.4.1.3 Fire Flows

Fire flows shall conform to the latest edition of the International Fire Code (IFC) and shall be confirmed by the Town's Fire Department, as described in section 3.6.XII of



TOWN OF CASTLE ROCK FIRE FLOW TEST FORM

2/16/2024

F2-2024

klang@rothlang.com

Service Address:

see attached map for location

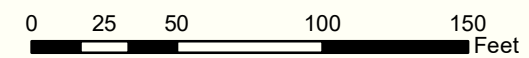
Vacant Plot - Between 3690 Bilberry and Meadows Blvd

Test Conducted By:

Fire flow is estimated with hydraulic model

Pressure Hydrant

Hydrant ID	FH	2913	
Pre-test Static Pressure (Ps1)		85.6	psi
Residual Pressure (Pr)		84.9	psi
Post-test Static Pressure (Ps2)			psi
Flowing Hydrant			
Hydrant ID	FH	4906	
Orifice Side (D)			in
Main Size (Dp)			in
Calculated Flowrate (Qr)		1500	gpm
Estimated Volume Discharged (Q)			gallons



Date: 2/16/2024

1 inch = 66 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 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) 733-6000. Copyright 2024, Town of Castle Rock Utilities Mapping.

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

Document Path: \\crsan1\UTShare\GIS\Standard Maps\10.6\Letter LndScp.mxd



Castle Rock Fire and Rescue Department
300 Perry Street
Castle Rock, CO 80104

February 15, 2024

RE: Confirmation Memo of Required Fire Flow

To Life Safety Division,

Please accept the following required fire flow evaluation based upon the currently adopted 2018 International Fire Code for review and confirmation for the following proposed building.

Building Name: MEADOWS D1 TRAINING FACILITY
Building Address: BILBERRY STREET, CASTLE ROCK, CO
Total Fire Flow Calculation Area: 9,420-square feet
Building Construction Type: V-B
Are fire sprinklers provided throughout this building? YES
Are you proposing a reduction in Required Fire Flow for fire sprinklers? YES 50%
Are Fire walls provided in this building? NO

Reference Appendix B, Table B105.1

Required Fire Flow: 2,750-gpm at 20-psi
Flow Duration: 2-hours
Calculated Fire Flow including reduction for sprinklers: 1500 -gpm at 20-psi
Flow Duration: 2-hours

Reference Appendix C, Table C105.1

Required Number of Fire Hydrants: 1
Maximum Average Spacing: 500
Maximum Distance from Fire Hydrant to Building: 250-feet, as truck would drive
(Note in sprinkled buildings, a hydrant shall be located within 100-ft of the FDC)

Design Engineers Signature:  Date: 2/15/24

The determined Required Fire Flow, Number of Fire Hydrants and Hydrant Spacing as shown above satisfy the fire protection requirements of the Castle Rock Fire and Rescue Department.

Final fire hydrant placement will be determined and approved during the Site Development (SDP) and/or Construction Document (CD) review phase.

Castle Rock Fire Signature: _____ Date: 02/27/2024
Fire Department Plan Review Number: 14375

Digitally signed copy of form has been submitted separately

APPENDIX B - WATER STORAGE

STORAGE REQUIREMENTS - WATER

STORAGE	MDD ⁽¹⁾ (gpm)	FIRE FLOW ⁽²⁾ (gpm)	TIME (hr)	STORAGE VOLUME ⁽³⁾ (gallons)
MDD	9.30		24	13,392
Fire Flow		1,500	2	180,000
TOTAL				193,392

REFERENCE: Town of Castle Rock Water System Design Criteria Manual, Sept. 2012. Section 4.4.2

NOTES:

- ⁽¹⁾ MDD = Maximum Day Demands = see spreadsheet: *Calculated Demands - Water*
- ⁽²⁾ From IFC see *Fire Flow Calculations* in Appendix B.
- ⁽³⁾ Storage Volume = MDD Storage + Fire Flow Storage = (MDD*60min*24hr) + (FF*60min*2hr)



Operating Pressures and Pressure Zone Characteristics

Pressure Zone Designation	Max HGL Elev.	Top Elev. Served	Low Elev. Served
2 (Yellow)	6352	6230	6065

REFERENCE: Town of Castle Rock Water System Design Criteria Manual, Sept. 2012. Section 4.4.3.1

this criteria. A 50 percent reduction in required fire flow may be allowed for approved residential sprinkler systems, and a 75 percent reduction may be allowed for approved commercial sprinkler systems at the discretion of the Town of Castle Rock Fire Chief. The minimum fire flow for the water distribution system is 1,500 gpm, unless otherwise approved by the Fire Department.

4.4.2 Storage Requirements

The required storage volume associated with a particular development shall be computed as follows:

$$\text{Storage Volume (MG)} = \text{Maximum Day Demand (MG)} + \text{Fire Flow (MG)}$$

Example Calculation:

Based on an assumed 1500 gpm two-hour fire and an MDD rate of 75 gpm, the storage requirement would be:

75 gpm x 60 min/hr x 24 hrs =	108,000 gallons
+ 1500 gpm x 60 min/hr x 2 hrs =	<u>180,000 gallons</u>
Total required storage =	288,000 gallons (0.288 MG)

Based on the computed storage volume, Castle Rock Water will evaluate whether the development is compatible with the location and magnitude of the existing and master-planned storage volume within the pressure zone, or if additional storage must be considered to provide the appropriate level of service to the development. Due to hydraulic constraints and limitations within the service area, fire storage within the pressure zone may need to be duplicated as determined by Castle Rock Water.

4.4.3 Minimum Hydraulic Performance Criteria

All mains shall be sized to provide for domestic, irrigation and fire protection demands to all points in the development without violating the pressure, velocity, and headloss criteria set forth herein. The proposed network shall be evaluated by the engineer under the hydraulic conditions stipulated in the following table using an approved hydraulic network analysis model. In some cases, the Town may require the oversizing of certain mains based on required master-planned sizes associated with the overall Town system. Recovery costs of such oversizing shall be in accordance with the Town Municipal Code, and pursuant to applicable executed agreements.

Hydraulic Condition	Pressure (psi)
Minimum static pressure with zero demand (20% tank stage)	43
Maximum static pressure with zero demand (100% tank stage)	125
Minimum dynamic pressures (based on 20% tank stage):	
Max Daily Demand + fire flow (see note below)	20
Peak Hour Demand (see note below)	35

Note: Pressure and Velocity criteria listed above for the MDD plus fire flow and PHD conditions shall be satisfied with one critical distribution loop out of service.

4.4.3.1 Operating Pressures and Pressure Zone Characteristics

The required operating pressures listed above apply to pressures within the mains, and shall be satisfied in accordance with the general pressure zone elevation data tabulated below (Vertical Datum NAVD 88).

Pressure Zone Designation	Max HGL Elev.	Top Elev. Served	Low Elev. Served
1 (Orange)	6192	6072	5915
2 (Yellow)	6352	6230	6065
3a (Blue-east)	6508	6389	6221
3b (Blue-west)	6523	6399	6236
4 (Purple)	6594	6474	6308
5 (Red)	6680	6557	6393
6 (Green)	6824	6700	6537

Notes: (1) Elevations shown above are general guidelines. Engineer shall contact Castle Rock Water to confirm the appropriate numbers for a specific site. (2) Pressure evaluations in areas served solely by PRVs shall be based on the PRV settings, as provided by Castle Rock Water.

4.4.3.2 Assumed Pressures at Existing System Connections

Primary distribution and transmission mains between the supplying storage tank and

APPENDIX C - WASTEWATER FLOWS

CALCULATED FLOWS - WASTEWATER

LAND USE	AREA	ADF/UNIT ⁽¹⁾	SFEs/UNIT ⁽²⁾	SFE's	FACTORS		ESTIMATED FLOW (MGD)	
					PF ⁽³⁾	I/I ⁽⁴⁾	ADF ⁽⁵⁾	PDF ⁽⁶⁾
Gym/Fitness Center	9,450 SF	0.5 gpd/sf	0.00125 /SF	11.8	5	0.00047	0.0047	0.0241
TOTALS				11.8			0.0047	0.0241

REFERENCE: Town of Castle Rock Wastewater Collection System Design Criteria Manual, Dec. 2018

NOTES:

⁽¹⁾ ADF = Average Daily Flow = Reference Table 4.4.1.1

⁽²⁾ SFE = Single Family Equivalent = Reference Table 4.4.1.1

⁽³⁾ PF = Peaking Factor = $(3.65) * (ADF^{-0.168})$ or Max of 5.0

⁽⁴⁾ I/I = Infiltration and Inflow = $(0.1 * ADF)$

⁽⁵⁾ ADF represents winter or dry weather with no allowance for infiltration or inflow

⁽⁶⁾ PDF = Peak Design Flow = ADF * Peaking Factor + I/I

CALCULATED FLOWS - WASTEWATER
MEADOWS D1 TRAINING CENTER
1/25/2024
JJH

		AVERAGE DAY WASTEWATER (ADF)		
LAND USE	AREA	(GPM)	(GPD)	(CFS)
Gym/Fitness Center	9,450 SF	3.28	4,725	0.0073
TOTAL		3.28	4,725	0.0073

		PEAK DESIGN FLOW (PDF)		
LAND USE	AREA	(GPM)	(GPD)	(CFS)
Gym/Fitness Center	9,450 SF	16.73	24,098	0.037
TOTAL		16.73	24,098	0.037

Note: PDF values include I&I added to ADF per TOCR 2018 Wastewater Collection Criteria
Section 4.4.1.3 Peak Design Flow Rate

4.4.1.1 Wastewater System Average Daily Flow (ADF)

Land Use	Typical ADF/Unit	Typical SFEs/Unit
Single Family Residential and Duplexes	200 gpd/dwelling unit	1.00/dwelling unit
Multi-Family Residential (Townhomes and Condos)	130 gpd/dwelling unit	0.65/dwelling unit
Retail/Offices	0.1 gpd/SF	0.0005/SF
Hotels/Motels	75 gpd/room	0.375/room
Restaurants	1.5 gpd/SF	0.0075/SF
Car Washes	5,000 gpd/acre	25.0/acre
Industrial/Other Commercial	600 gpd/acre	3.0/acre
Institutional	400 gpd/acre	2.0/acre
Churches	300 gpd/church	1.5/church
Gym/Fitness Center	0.5 gpd/SF	0.00125 SFE/SF
Irrigated Land	0 gpd/acre	0.0/acre
<u>Rates for Typical Douglas County School Sizes:</u>		
Elementary (10 ac, 675 Students)	3,375 gpd/school	16.88/school
Middle (25 ac, 850 students)	8,500 gpd/school	42.50/school
High (50 ac, 1700 students)	17,000 gpd/school	85.00/school
<u>Rates for Alternate School Sizes:</u>		
Elementary	5 gpd/student	0.025/student
Middle	10 gpd/student	0.050/student
High	10 gpd/student	0.050/student

The demands noted in the table above represent the “winter time” or “dry weather” Average Daily Flow (ADF) with no allowance for infiltration and inflow (I/I). I/I shall be accounted for in accordance with the Peak Design Flow computation discussed in the sections to follow.

Regarding design flows for schools, planned school sizes shall be confirmed with the Douglas County School District and documented in the Utility Report. The tabulated rates

shown above shall be applied as appropriate, depending on the information provided by the School District. Reasonable engineering judgment shall be used in determining the estimated ADF for commercial, industrial and institutional sites. Individual evaluation and justification shall be provided when the proposed use is not specifically represented in the table above, or when the proposed flows will be inconsistent with the tabulated values. Justification of all non-residential flows shall be addressed in the Utility Report.

4.4.1.2 Peaking Factor

The portion of the Peak Design Flow calculation exclusive of I/I shall be determined by multiplying the ADF in the preceding section by a peaking factor (PF). The PF is a function of ADF, and shall be computed as follows: $PF = 3.65 \times [(ADF)^{-0.168}]$.

The maximum PF shall be 5.0, and ADF shall be expressed in units of million gallons per day (MGD).

4.4.1.3 Peak Design Flow Rate

The Peak Design Flow (PDF) shall be computed at all pertinent design points throughout the system, and used to size the corresponding wastewater facilities. The PDF shall be determined by multiplying the ADF by the calculated peaking factor (PF), plus an I/I allowance equal to ten percent of the ADF as expressed by the following formula:

$$PDF = \text{peak base flow} + \text{I/I allowance} = (ADF \times PF) + (0.1 \times ADF)$$

Once computed, the PDF shall be used to determine the sizes of the facilities in accordance with the criteria established below.

4.4.2 Hydraulic Design

Wastewater systems shall be designed to provide a minimum velocity of two feet per second at the Peak Design Flow. In situations where the minimum velocity of 2.0 feet per second cannot be met, an explanation and justification shall be included in the Final Utility Report. The maximum velocity shall not exceed ten feet per second. Drop manholes shall be provided to break steep slopes to limit the velocities in conformance with this criterion. Where drop manholes are impractical for velocity reduction, the sewer must be approved by variance and shall be of PVC or other abrasion resistant material approved by Castle Rock Water.

Where actual flow will be much below normal for several years, the minimum velocity shall be achieved by suitable grades at the partial design flow rate. Care shall be taken to design invert elevations at manholes in such a manner that the energy gradient is consistently falling in the direction of the flow. Sanitary sewers shall be sized to convey the Peak Design Flow while flowing no more than 75 percent of the maximum pipe flow capacity. Computation of velocity of flow shall be based on a coefficient of roughness "n" in the Manning formula of 0.011 for PVC. At all junctions where a smaller diameter main discharges into a larger one, the invert of the larger sanitary sewer shall be lowered so that the energy gradients of the sewers at the junction are at the same level. Generally, this condition will be met by placing the 0.80 depth point of both sewers at

the same elevation. No surcharging of sanitary sewer lines is allowed.

4.4.3 Pipe Sizes and Grades

Sanitary sewer mains shall be a minimum of eight inches in diameter. Service lines shall be a minimum of four inches in diameter. The sanitary sewer shall be designed to carry the PDF within the ranges of grades shown below, unless otherwise approved by variance in accordance with Section 1.9. All changes in pipe size shall occur at a manhole.

Sewer Diameter	Minimum Grade	Maximum Grade
4-inch service line	2.0%	--
6-inch service line	2.0%	--
8 inch	0.40%	7.5%
10 inch	0.28%	5.5%
12 inch	0.22%	4.5%
15 inch	0.15%	3.5%
18 inch	0.11%	2.5%
21 inch	0.09%	2.0%
24 inch	0.08%	1.8%
27 inch	0.07%	1.5%
30 inch or larger	0.06%	1.3%

4.4.4 General Wastewater System Layout Criteria

4.4.4.1 Location

All sanitary sewer mains and appurtenances shall be installed in dedicated right-of-way or dedicated utility easements. Under no circumstances shall sanitary sewer mains or manholes be installed parallel to, and directly below, any concrete such as sidewalks, trails, curbs, or gutters. Mains designed within the street right-of-way shall be located in accordance with the Standard Details available on the Town's website (CRgov.com/codecentral), unless otherwise approved in writing by Castle Rock Water. In general, sanitary sewer mains shall be located in public streets near the center of the south or west lane wherever possible. Sanitary sewer mains and manholes shall not be located in vehicle wheel paths. Under no circumstances shall a main be closer than five feet from a gutter pan.

Sanitary sewer lines and manholes shall not be located within detention pond areas. In areas of fill, sewer lines and manholes shall be subject to the requirements established

APPENDIX D – PREVIOUS UTILITY REPORT

UTILITIES

**Addendum No. 1 to the
Final Utility Report**

For

**The Meadows Filing 20
Phase 1, Amendment 2
Castle Rock, Colorado
(PP 08-002)
(PWP 08-013)**

Prepared for:

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Denver, CO 80206
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Prepared by:

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February 15, 2008

March 17, 2008

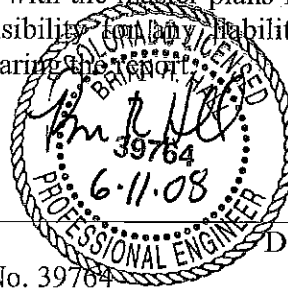
April 22, 2008

Revised: May 15, 2008

**Addendum No. 1 to the Final Utility Report
The Meadows Filing 20, Phase 1, Amendment 2
May 15, 2008**

Engineer's Statement:

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



Brian R. Hall
Colorado P.E. No. 39764

Date

Owner's/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.

Garry Meete

Castle Rock Development

6/19/08

Date

Town of Castle Rock Approvals:

Utilities Department

Development Services

ACCEPTED

P. Clark

Date

DATE 6/13/08

6/20/08

Date

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Introduction

The Meadows Filing 20 is part of a 4000+ acre planned community named “The Meadows” located in the Town of Castle Rock west of Interstate 25 and north of Wolfensberger Road. In general, the project is located in a portion of the southeast quarter of Section 28, a portion of Section 33, and a portion of the northwest quarter of Section 34, Township 7 South, Range 67 West of the Sixth Principal Meridian, Town of Castle Rock, Douglas County, State of Colorado. More specifically, the Meadows Filing 20 is located west of Filing 17 and north of Filing 18 near the intersection of Meadows Boulevard and Meadows Parkway.

A first amendment to the Meadows Filing 20 preliminary plat will be submitted along with this report. At the same time, construction drawings for Ambrosia Street, Future Street, and Mercantile Street along with all necessary utilities in those streets will be also be submitted to the Town. This report addresses all design for both of these plan sets. Where necessary, the text discusses the utility design associated with the preliminary plat and then discusses the utility design associated with the construction drawings in a separate paragraph to eliminate confusion between each plan set.

When the Meadows Filing 20 Phase II final utility report by RG Consultants was approved on October 13, 2005, a few of the commercial and multi-family areas were analyzed for future development as the design plans for these areas had yet to be defined. The portion of this report that addresses the first amendment to the preliminary plat restudies Blocks 1, 2, 3, 10, and 11 of Filing 20 to confirm that the revised or current assumptions for these areas are in line or below demands from the approved final utility report. The first amendment to the Filing 20 Preliminary Plat has divided the 46 acre area defined by Blocks 1, 2, 3, 10, and 11 of Filing 20 into 74 lots with a total demand of 1140 SFE. The purpose of this preliminary plat is to divide these blocks into much smaller conceptual commercial lots to illustrate how these areas could be served by water and sanitary sewer infrastructure.

Additionally, this report addresses the Filing 20 Phase 1, Amendment 2 construction drawings for Ambrosia Street, Mercantile Street, and Future Street and the proposed water, sanitary sewer, and storm sewer in these streets. This portion of the report discusses more specifically the utility design being proposed for construction for this part of Filing 20. The construction plans are part of The Meadows Filing 20 – Phase 2.

Potable Water System

Existing Potable Water System

The site is bordered by existing potable water mains on all sides. More specifically, an existing 16” water main lies along the southern boundary of the site in Meadows Boulevard (South), to the east by an existing 16” water main in Meadows Boulevard, to the north and to the west by a 8” water main located in the following Filing 20 streets: Coriander Street, North Meadows Drive, Elegant Street, Distant Rock Avenue, and

Carmin Street. Additionally, the site has an existing 8" water main in Bilberry Street, Mercantile Street, and Elegant Street. All of these mains are located within the Town of Castle Rock yellow zone and were studied and sized as part of the approved Phase 2 Meadows Filing 20 final utility report.

Design Criteria

The potable water system is designed using the Town of Castle Rock – Public Works Regulations (Ref. 1.), Section 14 in conjunction with the Water Master Plan for the Meadows (Ref. 4.).

Water Demand Criteria:

As outlined in the Public Works Regulations, the land use demand rate for commercial development is 1200 gal/ac/day (3 SFE/acre) and for multi-family residential it is 260 gal/du/day (0.65 SFE/du). Demand factors of 2.65 and 4.5 are used to calculate Maximum Day Demand and Peak-Hour Demand respectively for commercial and multi-family demands, as shown below in Table 1.1.

Table 1.1: Demand Criteria

Land Use	Land Use Demand Rates	Single Family Equivalent	Max. Day Peaking Factor	Peak Hour Peaking Factor
Commercial	1,200 gpad	3 SFE/acre	2.65	4.5
Multi-Family	260 gpd/du	0.65 SFE/du	2.65	4.5

Water Pressure Criteria:

Table 1.2 below presents the criteria for hydraulic performance including system pressure, velocity and head loss.

Table 1.2 System Criteria

	Hydraulic Parameter	Maximum	Minimum
Static	Pressure	125 psi	43 psi
Dynamic	Pressure - Max. Day Demand + Fire Flow*	-	20 psi
	Pressure – Peak Hour Demand*	-	35 psi
	Velocity – Peak Hour Demands	5 fps	-
	Velocity – Max. Day Demands + Fire Flow	15 fps	-
	Head loss through 16-inch	2ft/1000ft	-

*With one critical loop out of service.

Yellow Zone Tank Criteria:

The entire service area for the first amendment to the Filing 20 Preliminary Plat is in the yellow water pressure zone. The Filing 20 water system is fed by the yellow zone storage tanks. The capacity of the existing yellow zone tank is 10.0 M.G., 1.208 MGD of which are reserved for the development of Filing 20 within the limits of the 1st Amendment to the Preliminary Plat. Please refer to Appendix B for the water storage criteria and calculations for this report. The current yellow zone tank's HGL's were obtained from the Town of Castle Rock's Utilities Department and were modeled as reservoir elevations. Refer to Table 1.3.

Table 1.3: Yellow Zone Tank Elevations

	Maximum HGL	Initial HGL	Minimum HGL	Base HGL
100% Full	6349	6349	6326	6325
20% Full	6329.8	6329.8	6326	6325

High elevation served: 6230

Low elevation served: 6072

Fire Flow Criteria:

Future development of these lots will be required to determine fire flows and durations depending on type of construction in conformance with Appendix III of the 2006 Uniform Fire Code (UFC). In following the Meadows Filing 20 Final Utility Report, the fire flow has been held at 3,500 gpm for a two-hour period in accordance with the 2006 Uniform Fire Code and Town of Castle Rock Fire Department. Fire flow requirements will need to be confirmed as each lot is developed. Additionally, the Town has provided a fire flow test on two of the existing hydrants within this area. The results from this test show that the static pressure of these hydrants is at 95 psi and the residual pressure is 80 psi. This information from the Town regarding the anticipated fire flow has been provided in Appendix C. The fire flow test from the Approved Elegant Street Utility report has also been included in Appendix C to compare pressures. That test shows a static pressure of 114 psi and a residual pressure of 110 psi.

Addendum to the Water System

Preliminary Plat:

As stated in the Introduction, this report addresses the first amendment to the preliminary plat associated with Blocks 1, 2, 3, 10, and 11 of Filing 20. This preliminary plat document adds conceptual water mains throughout the five blocks to show how these blocks could be served in the future. For this purpose, conceptual water mains have been added within each of these blocks to show a water main adjacent to each lot.

Construction Plans:

Currently, the only proposed water main in the construction plans is the extension of the 8" water main through the north side of Future Street. An 8" waterline connection from Ambrosia Street to Future Street through Block 2 and an 8" waterline stub into Block 3 off of Ambrosia have been proposed as part of the Block 2 and 3 final utility report. These waterlines and two proposed fire hydrants have been included in the waterCAD model included in this report.

Analysis

Preliminary Plat:

The approved phase 2 final utility report for the Meadows Filing 20 defined Blocks 1, 2, 3, 10, and 11 as super blocks with a mixed use of commercial and multi-family demands. The demand assumptions from the Phase 2 Filing 20 report have been provided below in Table 2.0.

Table 2.0 Approved Demand Assumptions

RG Block Name	Filing 20 Block #	Area (acres)	Multi-Family (du)	Commercial (acres)	Commercial (%)	SFE's
C1	(#11)	14.84	442	7.42	50%	310
C2	(#2)	8.87	400	4.44	50%	273
C3	(#1)	2.33	0	2.33	100%	7
C4	(#10)	11.68	400	5.84	50%	278
C5	(#3)	8.49	400	4.25	50%	273
Totals =		46.21	1642	24.28		1141

* Irrigation demand for the ¾" tap proposed with the Block 2 building has a demand of 11.4 GPM and will be run during off-peak hours. See Irrigation Plans from Block 2 and 3 PD Site Plans in Appendix A.

From this table it is clear that the report accounted for Areas C1, C2, C4, and C5 to be generally split between multi-family and commercial. No new knowledge is available today that would alter these assumptions. There is a likelihood that more commercial projects would populate this area over and beyond what has been shown in Table 2.0. However, this shift towards commercial is acceptable per the approved reports as long as the revised demands maintain or reduce the amount of assumed SFE's. This final utility report is not changing these demand assumptions. These demands will be distributed through the 74 newly proposed preliminary plat lots according to location.

Water System Storage:

The Filing 20 water system is fed by two yellow zone storage tanks located in Filing 11 and Filing 18. The capacity of the existing yellow zone 12A and 12B tanks is 10.07 MG, 1.21 MG of which are reserved for the development of Blocks 1,2,3,10, and 11. The overall required storage for these blocks is 1.63 MG after you add in required fire flow storage. Please refer to Appendix B for the water storage criteria and calculations for this report.

Water System Analysis

A portion of the Filing 20 water system was modeled to verify that the additional mains that are proposed in the Phase 1 construction plans and the Block 2 and 3 construction plans are in conformance with the Town of Castle Rock requirements. The water system modeled the existing water mains adjacent to the preliminary plat amendment 1 boundary as well as the existing and proposed mains that lie within this boundary.

This water system matches into the existing Filing 20 water system and the existing Meadows Boulevard water mains utilizing nine reservoir locations. The HGL's for these reservoirs have been set to match the 20% and 100% levels provided by the Town and create the outside boundary of this water system model. This water system models pipes that match the Filing 20 Phase 1, Block 2 Lot 1A, and Block 3 Lot 1A construction utility plans.

In reference to the approved Filing 20 report, no documents were provided which associated the proposed demands to each junction. The challenge of this report was to review the discharge values at each of these junctions and then back out these assumed demands. As part of this report, a demand calculation worksheet has been included in the appendix that associates the demands to each of the water system junctions.

The results from this analysis show that the water model is in conformance with the Town criteria and the approved final utility report. The pressures range as high as 107 psi in the static scenario and as low as 73 psi during the peak hour scenario. The velocity during the peak hour scenario is as high as 1.43 ft/s as well as reaches 12.8 ft/s during the Max Day plus 3500 gpm FF while one pipe is closed. The WaterCAD map and system results have been provided in the Appendix C.

Sanitary Sewer System

Existing Sanitary Sewer

There are currently a number of existing sanitary sewer mains that are located within or around the Meadows Filing 20 Blocks 1, 2, 3, 10, and 11 that were designed as part of the approved final utility report. These existing sewer mains within or adjacent to these blocks include:

- Ambrosia Street – Existing 8" main from Mercantile Avenue to Meadows Boulevard
- Mercantile Street – Existing 8" main from Bilberry Street to Ambrosia Street
- Saffron Drive – Existing 8" main from N. Meadows Boulevard to Bilberry Street
- N. Meadows Drive – Existing 10" main from Elegant Street to Viridian Drive
- N. Meadows Drive – Existing 15" main from Viridian Drive to Coriander Street
- Coriander Street – Existing 15" main from just west of Meadows Boulevard to Elegant Street

Per the approved final utility report, these existing sewer mains provide sewer service for future development of portions of the overall Filing 20 project, including the blocks studied as part of the addendum to the final utility report.

Addendum to the Sanitary Sewer System

This report addresses the preliminary plat and construction efforts associated with Blocks 1, 2, 3, 10, and 11 of Filing 20. The preliminary plat document adds conceptual sewer main locations within this area to show how each of these blocks could be served. In reality, the only sewer mains proposed within the construction documents include:

- Ambrosia Street – Extending the 8” main east to serve the Block 2 Lot 1 building
- Future Street – Extending the 8” main north to serve future areas within Block 2
- Future Street – Extending the 8” main south to serve future areas within Block 3

In supporting the objectives of the preliminary plat and the construction documents, this addendum report will show that the sanitary sewer line demands are at or below those stated in the final utility report.

Analysis

Preliminary Plat:

The approved final utility report defined Blocks 1, 2, 3, 10, and 11 as super blocks with a mixed use of commercial and multi-family demands. The demand assumptions from the Filing 20 report have been provided below in Table 3.0.

Table 3.0 Approved Demand Assumptions

RG Block Name	Filing 20 Block #	Area (acres)	Multi-Family (du)	Commercial (acres)	Commercial (%)	SFE's
C1	(#11)	14.84	442	7.42	50%	310
C2	(#2)	8.87	400	4.44	50%	273
C3	(#1)	2.33	0	2.33	100%	7
C4	(#10)	11.68	400	5.84	50%	278
C5	(#3)	8.49	400	4.25	50%	273
Totals =		46.21	1642	24.28		1141

From this table it is clear that the report accounted for Areas C1, C2, C4, and C5 to be generally split between multi-family and commercial. No new current knowledge is available today that would alter these assumptions. There is a likelihood that more commercial projects would populate this area over and beyond what has been shown in Table 3.0, however this shift towards commercial is acceptable per the approved reports as long as the revised demands maintain or reduce the amount of assumed SFE's.

Construction Plans:

Sanitary Sewer has been designed in Ambrosia Street and Future Street to provide future service to Blocks 1, 2, and 3. The sanitary sewer pipes have been sized to ensure that they can accommodate future development according to Town of Castle Rock criteria.

Downstream Sanitary Sewer System Capacity

Since no changes are proposed to the demands within this area, this report did not model the downstream sanitary sewer system or recalculate the downstream sewer system capacity. Rather, excerpts from the downstream sewer system capacity section of the approved report have been provided in Appendix E for information only. Please refer to the approved phase 2 report for the Filing 20 sewer modeling parameters and results.

Per the approved report, Filing 20 is located within the Plum Creek Wastewater Authority sanitation district boundary. No wastewater pretreatment or other mitigations measures are proposed by this addendum or by the approved report. All proposed sand/oil interceptors will obtain permits from the Plum Creek Wastewater Authority as part of a separate process.

Phasing

The utility phasing of this area will follow the outlined plan provided on the 1st amendment to the preliminary plat. Phase 1 of Filing 20 Phase 1, Amendment 2 includes the construction of the north half of Future Street, from Mercantile Street north to Meadows Boulevard, Mercantile Street, from Future Street to Ambrosia Street, and Ambrosia Street from Meadows Boulevard to Meadows Boulevard. Along with the streets, all necessary utilities within those portions of those street will be constructed and stubbed into the lots for future service where needed. The sanitary sewer main in Future Street will be stubbed just south of Mercantile Street to provide a connection for the Phase 2 construction of Future Street and the Phase 2 sanitary sewer. Once it becomes necessary to construct phase 2 of Future Street, the sanitary sewer main will be extended south within Future Street to provide service to Block 3.

Conclusion

The proposed utility demands for Blocks 1, 2, 3, 10, and 11 are in conformance with the approved Filing 20 final utility report. The proposed water and sanitary sewer mains included as part of the construction plans have been sized to meet the demands set forth in the Filing 20 final utility report. Additionally this report is in conformance with the Town of Castle Rock's Public Works Regulations, the Town of Castle Rock 2006 Water Facilities Master Plan, dated September, 2006, and the Town of Castle Rock Wastewater and Reclaimed Water Master Plans, dated December 2003.

References

- 1.) Town of Castle Rock – Public Works Regulations, The Town of Castle Rock, Colorado; February 1999.
- 2.) Uniform Fire Code Volume 1 – 11th edition, 2006; International Fire Code Institute, 5360 Workman Mill Road Whittier, California 90601-2298.
- 3.) Uniform Building Code Volume 1, 2006; International Conference of Building Officials, 5360 Workman Mill Road Whittier, California 90601-2298.
- 4.) Water Master Plan for The Meadows; Rocky Mountain Consultants, Inc., February 2002.
- 5.) Final Utility Report for The Meadows Filing No. 20, Phase 2; RG Consulting Engineers, Inc., August 22, 2005.
- 6.) Final Utility Report for The Meadows Filing No. 20; RG Consulting Engineers, Inc., October, 2004.
- 7.) Town of Castle Rock Wastewater and Reclaimed Water Master Plans; CH2MHill, December 2003.
- 8.) Town of Castle Rock 2006 Water Facilities Master Plan, CH2Mhill, September, 2006.

Appendix A:
Water Demands

THE MEADOWS
FILING 20 - PRELIMINARY PLAT, AMENDMENT 1
TOWN OF CASTLE ROCK
TABLE 1.0: WATER DEMAND CALCULATIONS

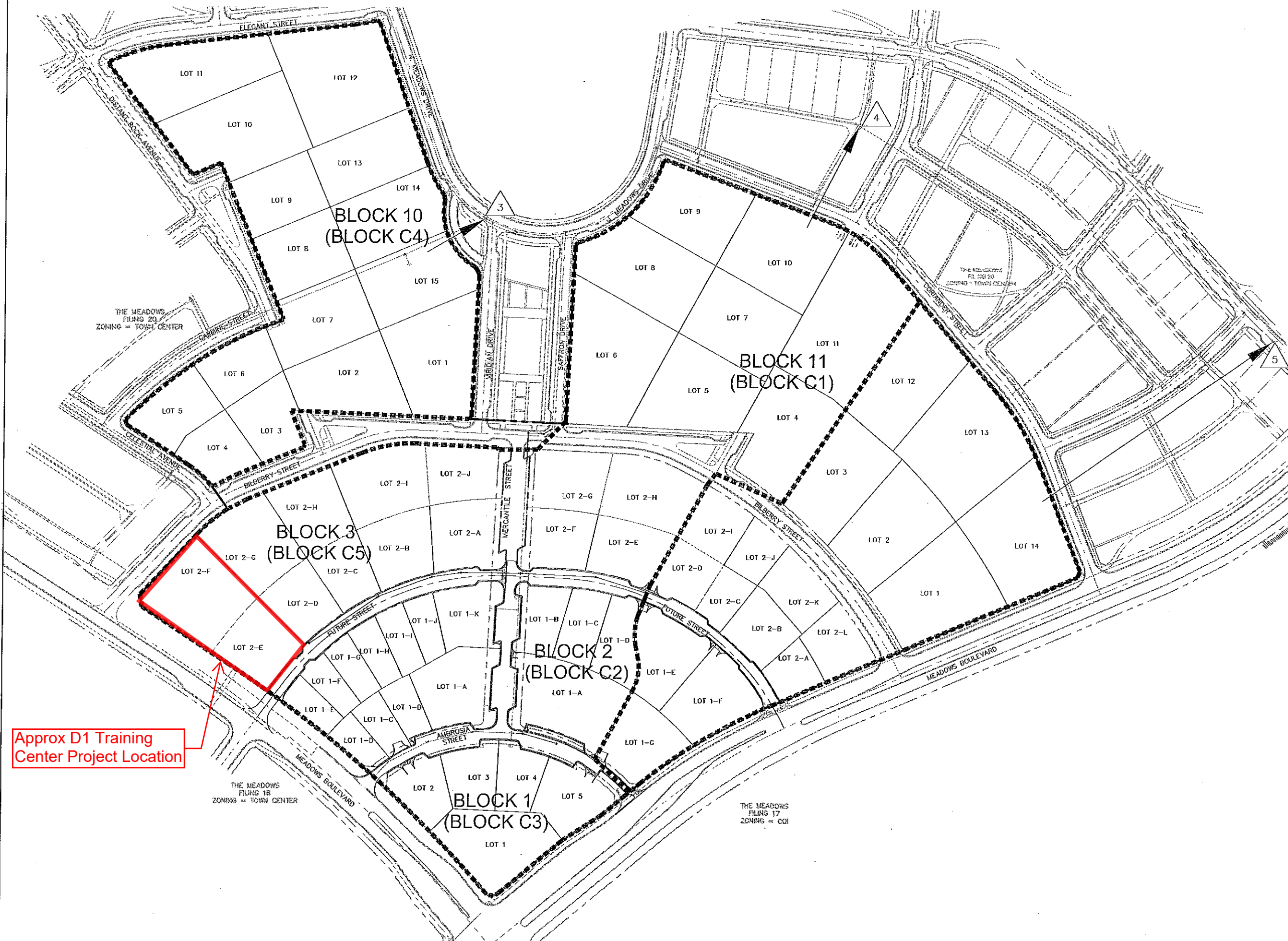
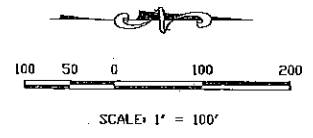
Max Day Demand 2.65 x Avg. Day Demand
Peak Hour Demand 4.5 x Avg. Day Demand
Commercial Land Use Demand 3.0 SFE/ac
Multi-Family Land Use Demand 0.65 SFE/DU

	Gross Area	Commercial Land Use	Commercial Demand Rate	Commercial Demand	Multifamily	Multifamily Land Use Demand Rate	Multifamily Demand	Total Demand	Total Average Day Demand	Total Max Day Demand	Total Peak Hour Demand	Commercial Equivalent Demand
	(Acres)	(Acres)	(GPD)	(GPD)	(DU)	(GPD/DU)	(GPD)	(GPD)	(GPM)	(GPM)	(GPM)	(SFE)
Block 1, Lot 1	0.79	0.79	1200	948	0	260	0	948	0.7	1.7	3.0	2.4
Block 1, Lot 2	0.37	0.37	1200	444	0	260	0	444	0.3	0.8	1.4	1.1
Block 1, Lot 3	0.36	0.36	1200	432	0	260	0	432	0.3	0.8	1.4	1.1
Block 1, Lot 4	0.32	0.41	1200	492	0	260	0	492	0.3	0.9	1.5	1.2
Block 1, Lot 5	0.49	0.40	1200	480	0	260	0	480	0.3	0.9	1.5	1.2
	2.33	2.33			0							7.0
Block 2, Lot 1A	0.90	0.46	1200	553	41.5	260	10796	11349	7.9	20.9	35.5	28
Block 2, Lot 1B	0.36	0.18	1200	221	16.8	260	4318	4540	3.2	8.4	14.2	11
Block 2, Lot 1C	0.34	0.17	1200	209	15.7	260	4078	4287	3.0	7.9	13.4	11
Block 2, Lot 1D	0.37	0.19	1200	227	17.1	260	4438	4666	3.2	8.6	14.6	12
Block 2, Lot 1E	0.59	0.30	1200	363	27.2	260	7077	7440	5.2	13.7	23.2	19
Block 2, Lot 1F	0.63	0.32	1200	387	29.1	260	7557	7944	5.6	14.6	24.8	20
Block 2, Lot 1G	0.57	0.29	1200	350	26.3	260	6837	7188	5.0	13.2	22.5	18
Block 2, Lot 2A	0.26	0.13	1200	160	12.0	260	3119	3279	2.3	6.0	10.2	8
Block 2, Lot 2B	0.41	0.21	1200	252	18.9	260	4918	5170	3.6	9.6	16.2	13
Block 2, Lot 2C	0.24	0.12	1200	147	11.1	260	2879	3026	2.1	5.6	9.5	8
Block 2, Lot 2D	0.35	0.18	1200	215	16.1	260	4198	4413	3.1	8.1	13.8	11
Block 2, Lot 2E	0.51	0.26	1200	313	23.5	260	6118	6431	4.5	11.8	20.1	16
Block 2, Lot 2F	0.48	0.25	1200	295	22.1	260	5758	6053	4.2	11.1	18.9	15
Block 2, Lot 2G	0.53	0.27	1200	326	24.5	260	6358	6683	4.6	12.3	20.9	17
Block 2, Lot 2H	0.68	0.35	1200	418	31.4	260	8157	8575	6.0	15.8	26.8	21
Block 2, Lot 2I	0.38	0.19	1200	234	17.5	260	4558	4792	3.3	8.8	15.0	12
Block 2, Lot 2J	0.27	0.14	1200	166	12.5	260	3239	3405	2.4	6.3	10.6	9
Block 2, Lot 2K	0.41	0.21	1200	252	18.9	260	4918	5170	3.6	9.6	16.2	13
Block 2, Lot 2L	0.39	0.20	1200	240	18.0	260	4678	4918	3.4	9.1	15.4	12
	8.67	4.44			400.0							273
Block 3, Lot 1A	0.62	0.31	1200	372	29.2	260	7595	7967	5.6	14.7	24.9	20
Block 3, Lot 1B	0.21	0.11	1200	126	9.9	260	2572	2699	1.9	5.0	8.4	7
Block 3, Lot 1C	0.21	0.11	1200	126	9.9	260	2572	2699	1.9	5.0	8.4	7
Block 3, Lot 1D	0.19	0.10	1200	114	9.0	260	2327	2442	1.7	4.5	7.6	6
Block 3, Lot 1E	0.19	0.10	1200	114	9.0	260	2327	2442	1.7	4.5	7.6	6
Block 3, Lot 1F	0.20	0.10	1200	120	9.4	260	2450	2570	1.8	4.7	8.0	6
Block 3, Lot 1G	0.21	0.11	1200	126	9.9	260	2572	2699	1.9	5.0	8.4	7
Block 3, Lot 1H	0.21	0.11	1200	126	9.9	260	2572	2699	1.9	5.0	8.4	7
Block 3, Lot 1I	0.22	0.11	1200	132	10.4	260	2695	2827	2.0	5.2	8.9	7
Block 3, Lot 1J	0.20	0.10	1200	120	9.4	260	2450	2570	1.8	4.7	8.0	6
Block 3, Lot 1K	0.42	0.21	1200	252	19.8	260	5145	5397	3.7	9.9	16.9	13
Block 3, Lot 2A	0.54	0.27	1200	324	25.4	260	6615	6939	4.8	12.8	21.7	17
Block 3, Lot 2B	0.51	0.26	1200	306	24.0	260	6247	6554	4.6	12.1	20.5	16
Block 3, Lot 2C	0.38	0.19	1200	228	17.9	260	4655	4883	3.4	9.0	15.3	12
Block 3, Lot 2D	0.43	0.22	1200	258	20.3	260	5267	5526	3.8	10.2	17.3	14
Block 3, Lot 2E	0.51	0.26	1200	306	24.0	260	6247	6554	4.6	12.1	20.5	16
Block 3, Lot 2F	0.84	0.42	1200	505	39.6	260	10290	10794	7.5	19.9	33.7	27
Block 3, Lot 2G	0.70	0.35	1200	420	33.0	260	8575	8995	6.2	16.6	28.1	22
Block 3, Lot 2H	0.53	0.27	1200	318	25.0	260	6492	6811	4.7	12.5	21.3	17
Block 3, Lot 2I	0.89	0.35	1200	414	32.5	260	8452	8867	6.2	16.3	27.7	22
Block 3, Lot 2J	0.48	0.24	1200	288	22.8	260	5880	6168	4.3	11.4	19.1	15
	8.49	4.25			400.0							278
Total Area = 1.35 AC												
Block 10, Lot 3	0.47	0.24	1200	282	18.1	260	4185	4467	3.1	8.2	14.0	11
Block 10, Lot 4	0.42	0.21	1200	252	14.4	260	3740	3992	2.8	7.3	12.6	10
Block 10, Lot 5	0.51	0.26	1200	306	17.5	260	4541	4847	3.4	8.9	15.1	12
Block 10, Lot 6	0.46	0.23	1200	276	15.8	260	4096	4372	3.0	8.0	13.7	11
Block 10, Lot 7	0.74	0.37	1200	444	25.3	260	6589	7033	4.9	12.9	22.0	18
Block 10, Lot 8	0.65	0.33	1200	390	22.3	260	5788	6178	4.3	11.4	19.3	15
Block 10, Lot 9	0.67	0.34	1200	402	22.9	260	5966	6368	4.4	11.7	19.9	16
Block 10, Lot 10	1.15	0.58	1200	690	39.4	260	10240	10930	7.6	20.1	34.2	27
Block 10, Lot 11	1.02	0.51	1200	612	34.9	260	9082	9694	6.7	17.8	30.3	24
Block 10, Lot 12	1.30	0.65	1200	780	44.5	260	11575	12355	8.6	22.7	38.6	31
Block 10, Lot 13	0.86	0.43	1200	516	29.5	260	7658	8174	6.7	15.0	25.5	20
Block 10, Lot 14	0.82	0.41	1200	492	28.1	260	7301	7793	6.4	14.3	24.4	19
Block 10, Lot 15	0.80	0.40	1200	480	27.4	260	7123	7603	6.3	14.0	23.8	19
	11.68	5.84			400.0							278
Block 11, Lot 1	1.09	0.55	1200	654	32.5	260	8441	8936	6.3	16.7	28.4	23
Block 11, Lot 2	0.96	0.48	1200	576	28.6	260	7434	8010	5.8	14.7	25.0	20
Block 11, Lot 3	0.88	0.44	1200	528	26.2	260	6815	7343	5.1	13.5	22.9	18
Block 11, Lot 4	0.95	0.48	1200	570	28.3	260	7413	7983	5.5	14.7	24.9	20
Block 11, Lot 5	0.95	0.48	1200	570	28.3	260	7357	7927	5.5	14.6	24.8	20
Block 11, Lot 6	1.28	0.64	1200	768	38.1	260	9912	10680	7.4	19.7	33.4	27
Block 11, Lot 7	0.88	0.44	1200	528	26.2	260	6815	7343	5.1	13.5	22.9	18
Block 11, Lot 8	1.05	0.53	1200	630	31.3	260	8131	8781	6.1	16.1	27.4	22
Block 11, Lot 9	0.82	0.41	1200	492	24.4	260	6350	6842	4.8	12.6	21.4	17
Block 11, Lot 10	1.03	0.52	1200	618	30.7	260	7976	8594	6.0	15.8	26.9	21
Block 11, Lot 11	1.48	0.74	1200	888	44.1	260	11461	12349	8.6	22.7	38.6	31
Block 11, Lot 12	0.99	0.50	1200	594	29.5	260	7666	8260	5.7	15.2	25.8	21
Block 11, Lot 13	1.33	0.67	1200	798	39.6	260	10299	11097	7.7	20.4	34.7	28
Block 11, Lot 14	1.15	0.58	1200	690	34.3	260	8906	9596	6.7	17.7	30.0	24
	14.84	7.42			442.0							310
TOTALS	46.01						456113		316.7	839.4	1425.4	1140

*Land use demands are per "Town of Castle Rock Public Works Regulations, Chapter 14"

Note: 50% of site is assumed for multifamily, so it was also assumed to use 90 units/acre. So the total multifamily units = 1642 and is consistent with the Meadows Filing 20 Report by RG.

MEADOWS FILING 20, PHASE 1, AMENDMENT 2
COMPARISON SANITARY SEWER MAP



N:\Projects\30101307\Docs\Utility\Sanitary Sewer drawing 2.dwg, 5/14/2008 4:16:31 PM

MAY 15, 2008

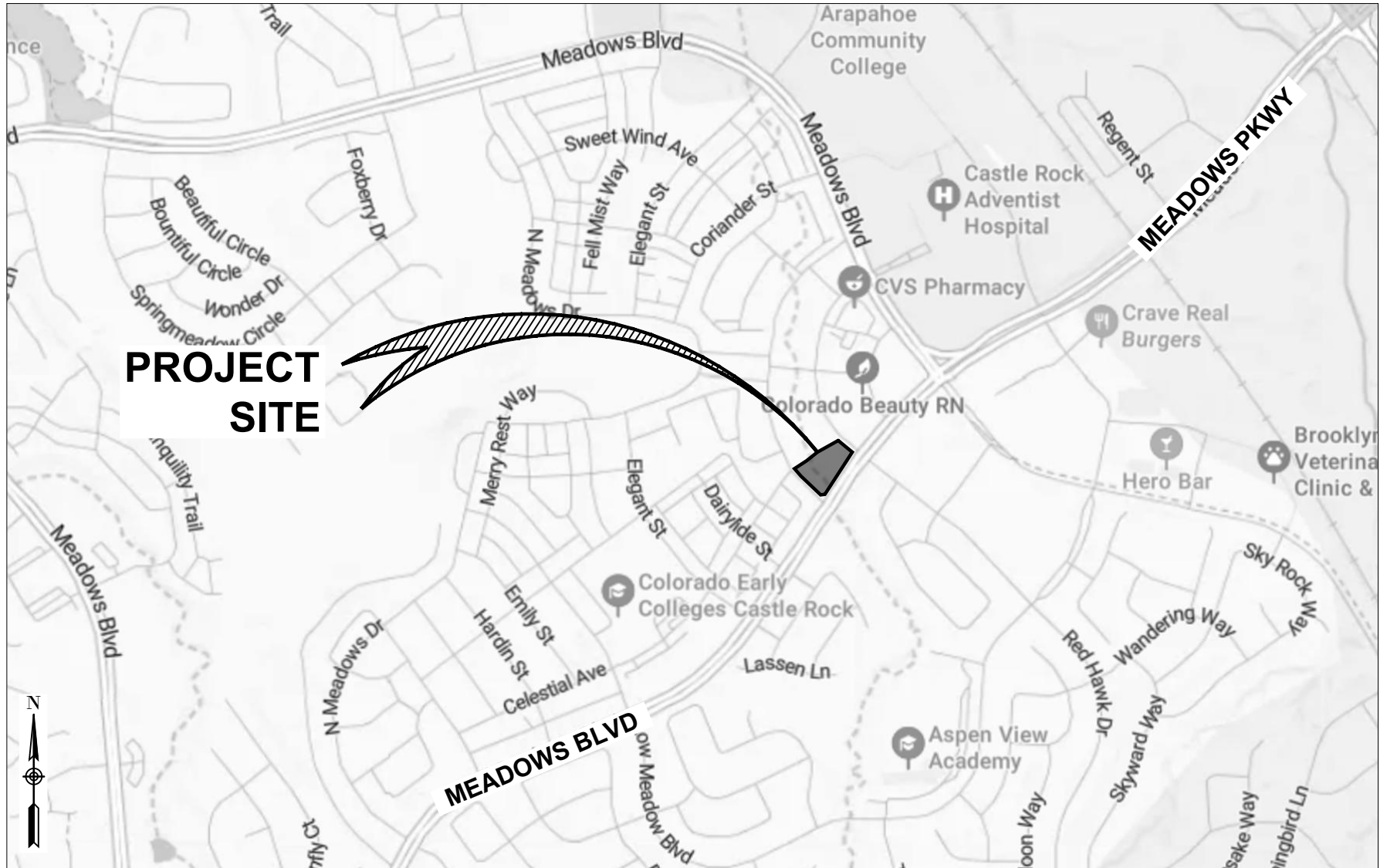
CVL
CONSULTANTS OF COLORADO, INC.
CIVIL ENGINEERING • LAND SURVEYING • LAND PLANNING

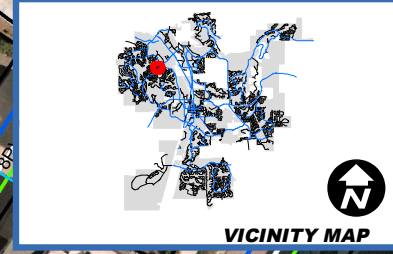
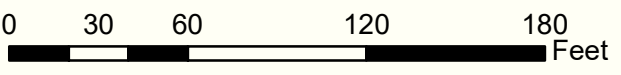
7901 E. Belview Avenue
Suite 150
Englewood, CO 80111
Tel: (720) 482-9526
Fax: (720) 482-9546

APPENDIX E – MAPS AND PLANS

VICINITY MAP

SCALE: 1" = 1000'





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 in and in supplying this product the Town of Castle Rock assumes no liability for it's 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) 733-6900. Copyright 2023, Town of Castle Rock Utilities Mapping.

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

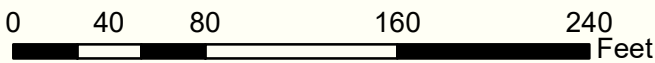


Legend

- Sanitary Sewer
- Stormwater Conduit
- Fiber
- Raw Water Distribution Main
- Water Distribution Main



Date: 12/8/2023



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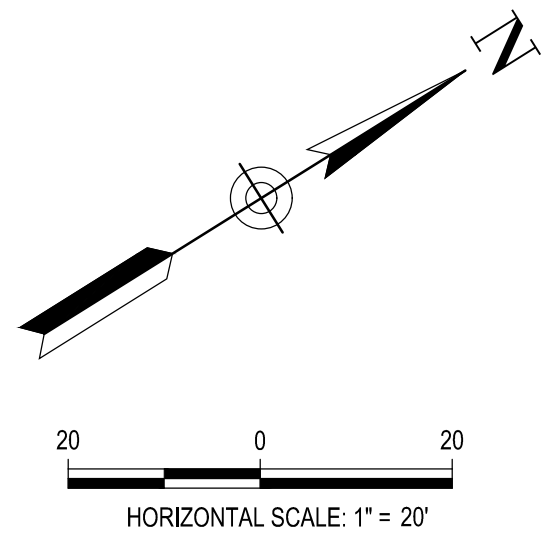
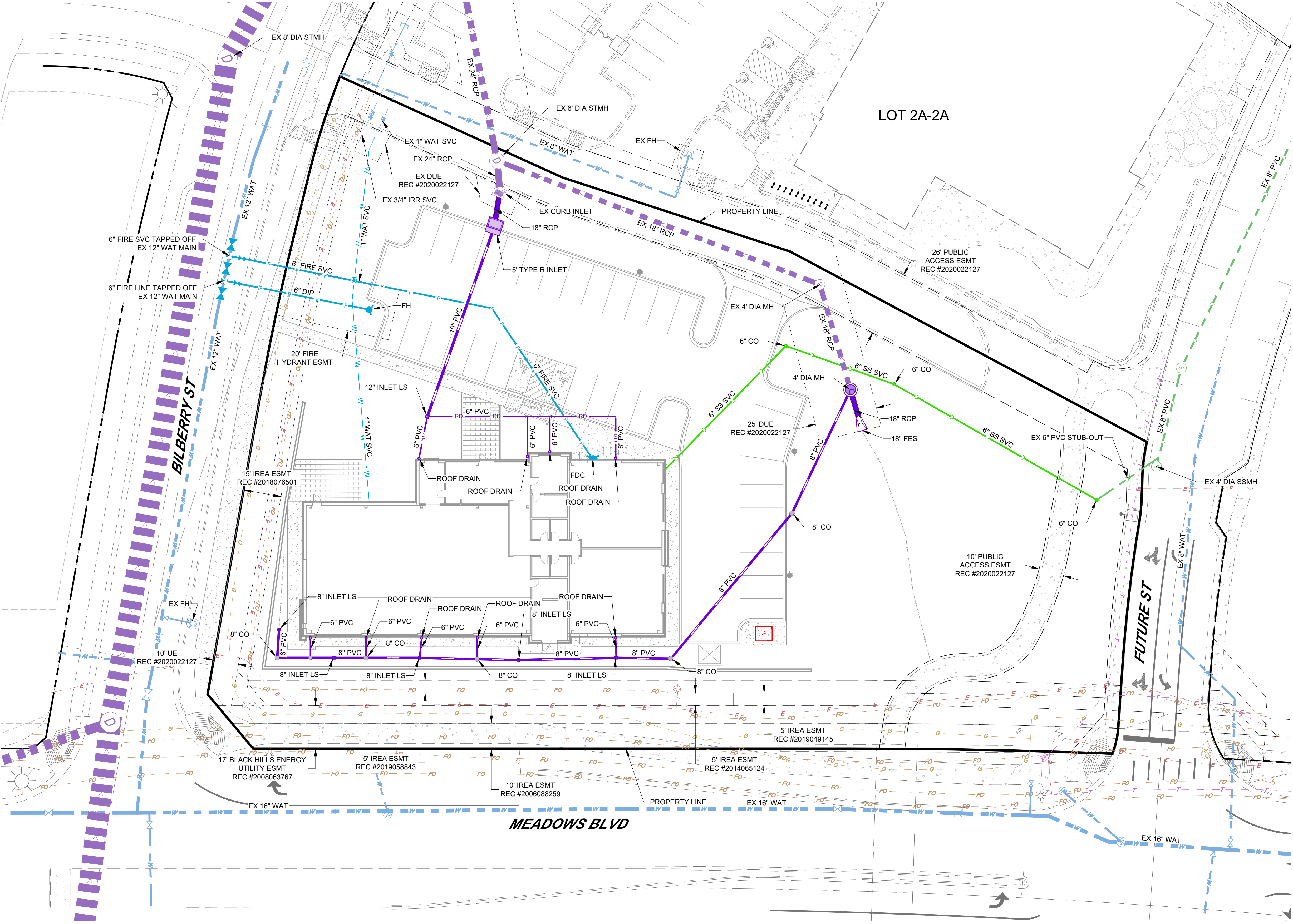
**CASTLE ROCK
UTILITIES MAP
(INTERNAL USE ONLY)**

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THE MEADOWS D1 TRAINING CENTER

SITE DEVELOPMENT PLAN

LOT 2A-3A, BLOCK 3, THE MEADOWS FILING NO. 20 PHASE 1 - AMENDMENT NO. 16
LOCATED IN THE NORTHEAST QUARTER OF SECTION 33,
TOWNSHIP 7 SOUTH, RANGE 67 WEST OF THE SIXTH PRINCIPAL MERIDIAN,
TOWN OF CASTLE ROCK, COUNTY OF DOUGLAS,
STATE OF COLORADO



LINETYPE LEGEND	
PROPOSED	EXISTING
CABLE TV	CABLE TV
ELECTRIC - UNDERGROUND	ELECTRIC - UNDERGROUND
FIBER OPTIC LINE	FIBER OPTIC LINE
FIRE SERVICE	FIRE SERVICE
GAS LINE	GAS LINE
IRRIGATION	IRRIGATION
OVERHEAD POWER	OVERHEAD POWER
ROOF DRAIN	ROOF DRAIN
SANITARY SEWER	SANITARY SEWER
STORM SEWER	STORM SEWER
TELEPHONE	TELEPHONE
UNDERDRAIN	UNDERDRAIN
WATER LINE	WATER LINE
SYMBOLS LEGEND	
CLEANOUT	CLEANOUT
CURB STOP/ CORP STOP	CURB STOP/ CORP STOP
ELECTRIC METER	ELECTRIC METER
FIRE DEPARTMENT CONNECTION	FIRE DEPARTMENT CONNECTION
FIRE HYDRANT	FIRE HYDRANT
GAS METER	GAS METER
GATE VALVE	GATE VALVE
LIGHT POLE	LIGHT POLE
ROOF DRAIN	ROOF DRAIN
SANITARY MANHOLE	SANITARY MANHOLE
STORM INLET	STORM INLET
STORM MANHOLE	STORM MANHOLE
TRANSFORMER	TRANSFORMER
UTILITY POLE	UTILITY POLE
WATER METER	WATER METER

- UTILITY NOTES:**
1. ALL PROPOSED EASEMENTS MUST BE RECORDED PRIOR TO ISSUANCE OF CONSTRUCTION PERMITS.
 2. THE MINIMUM SEPARATION BETWEEN WATERLINES, SANITARY SEWER AND STORM SEWER LINES IS 10 FEET.
 3. THE MINIMUM SEPARATION BETWEEN WATER SERVICE LINES IS 5 FEET.
 4. THIS SITE IS LOCATED WITHIN THE TOWN OF CASTLE ROCK YELLOW WATER PRESSURE ZONE.
 5. ANY FUTURE DEVELOPMENT OF THE EXISTING WATER OR WASTEWATER INFRASTRUCTURE NEEDED TO SERVE THIS SITE IS THE RESPONSIBILITY OF THE DEVELOPER

- NOTES:**
1. ANY TEMPORARY STRUCTURES PLACED IN AN EASEMENT, INCLUDING PAVING AND FENCING, SHALL BE REMOVED AND REPLACED BY THE OWNER UPON THE REQUEST OF CASTLE ROCK WATER SO THAT MAINTENANCE MAY BE PERFORMED. THE OWNER OF THE LAND SHALL AGREE TO HOLD THE TOWN HARMLESS FOR ANY LOSS OF PROPERTY OR LANDSCAPING AND IRRIGATION REMOVED FROM THE EASEMENT OR DAMAGED DUE TO MAINTENANCE ACTIVITIES, AND ALL ASSOCIATED COSTS.

ROTH LANG
ENGINEERING GROUP, LLC
6855 S. HAVANA STREET, SUITE 600
CENTENNIAL, CO 80112
PHONE: 303-841-9365

SITE DEVELOPMENT PLAN
A PORTION OF LOT 2A-2A, BLOCK 3, THE
MEADOWS FILING NO. 20 PHASE 1 -
AMENDMENT NO. 14

PROJECT NO. SDP24-0008

04/08/24

UTILITY PLAN

SHEET NUMBER:

4

4 of 10

**Final Utility Report Checklist**

The Final Utility Report must be in conformance with the latest Town of Castle Rock Water and Wastewater System Design Criteria Manuals, available on the Town's website.

For the Final Utility Report, the Preliminary Utility Report and associated hydraulic modeling shall be thoroughly updated to reflect the final design and layout of all water/wastewater system facilities and mains since the approval of the Site Development Plan (SDP), and as now shown on the Construction Drawings (CDs). The Final Utility Report shall describe adherence to the Preliminary Utility Report or describe deviations, and shall resolve any outstanding issues regarding the Town's ability to serve the development. As applicable, hydraulic modeling shall be provided for both the initial phase of development represented on the CDs, and for full build-out of the overall site. The Final Utility Report shall include a discussion of applicable SCADA requirements.

The following outline sets forth the **required minimum** content to be provided in the Final Utility Report that shall be submitted with the CDs. This report must be prepared by, or the report preparation supervised by a registered Professional Engineer licensed in Colorado. A copy of this checklist must be submitted with the Final Utility Report.

Please check off the following items to assure your report is complete. Appropriate notations shall be provided with the checklist. For example, if a specific item is not addressed or not applicable, an explanation needs to be provided.

Included	N/A	
		TITLE SHEET
		A. Name of Project, including legal name of development
		B. Address
		C. Owner
		D. Developer
		E. Engineer
		F. Submittal date and revision dates as applicable
		APPROVAL BLOCK SHEET (Available on Town's website)
		TABLE OF CONTENTS
		PROJECT LOCATION AND DESCRIPTION
		A. Site Location
		B. Description of Property and Land Use
		CALCULATED WATER DEMANDS
		A. Average Day Demands (ADD)
		B. Max Day Demands (MDD)

Final Utility Report – Formatting Checklist

Included	N/A	
		CALCULATED WATER DEMANDS (CONT.)
		C. Peak Hour Demands (PHD)
		D. Irrigation Demands
		EXISTING WATER SYSTEM
		A. Existing Distribution System
		B. Existing Supply Facilities
		PROPOSED WATER SYSTEM
		A. Proposed Distribution System
		B. Proposed Supply Facilities
		C. Required Fire Flows
		D. Land Dedication Requirements
		PROPOSED WATER SYSTEM ANALYSIS AND MODELING
		A. Hydraulic Models
		B. Hydraulic Modeling Scenarios
		C. Hydraulic Modeling Output and Required Schematics
		D. Fire Flow Test Results
		CALCULATED WASTEWATER FLOWS
		A. Average Day Wastewater Flows (ADF)
		B. Peaking Factor (PF)
		C. Peak Design Flows (PDF)
		EXISTING WASTEWATER SYSTEM
		A. Existing Collection System
		PROPOSED WASTEWATER SYSTEM
		A. Proposed Collection System
		B. Proposed Wastewater Facilities
		C. Land Dedication Requirements
		PROPOSED WASTEWATER SYSTEM ANALYSIS AND MODELING
		A. Hydraulic Models
		B. Hydraulic Modeling Scenarios
		C. Hydraulic Modeling Output and Required Schematics
		POTENTIAL SUBDIVISION IMPROVEMENTS AGREEMENT (SIA) ITEMS
		POTENTIAL PERMITTING REQUIREMENTS
		REFERENCES

Final Utility Report – Formatting Checklist

Included	N/A	
		APPENDICES
		Appendix A — Water Demands
		Water Fixture Unit Counts and Tap/Meter Sizing Calculations
		Irrigation Demands
		Hydraulic Worksheet(s) and Irrigation Chart(s)
		Appendix B — Water Storage
		Confirmation Memo for Required Fire Flow
		Appendix C — Water Hydraulic Analysis and Modeling
		Fire Flow Test Results
		Appendix D — Wastewater Flows
		Appendix E — Wastewater Hydraulic Modeling
		Appendix F — Maps and Plans
		A. Vicinity Map
		B. Utility Map(s) provided by the Utilities Department
		C. Overall Utility Plan from the CDs
		D. Water/Wastewater Utility Plan(s)

Notes/Comments: