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Affinity at Castle Rock

Final Utility Report

January 2023
HR Green Project No: 211400
Town Project No: CD22-0053

Prepared For:
Castle Rock Development Company
3033 East 1st Avenue, Suite 305
Denver, CO 80206
Contact: R.C. Hanisch
303-394-5139

Prepared By:
HR Green Development, LLC
Contact: Kristine House, PE
khouse@hrgreen.com
720-602-4938

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.

_____

Kristine L. House, P.E. Date
State of Colorado No. 38890
For and on behalf of HR Green Development, LLC

Owner/Developer's Statement:

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

_____

Name of Developer Date

_____

Authorized Signature

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A. Project Location and Description

1. Site Location

a) *Site Vicinity Map.* See Appendix F for Vicinity Map.

b) Township, Range, Section, and ¼ Section. The Affinity at Castle Rock development is located the south half of Section 27, and the north half of Section 34, Township 7 South, Range 67 West of the 6th Principal Meridian in the Town of Castle Rock, Douglas County, State of Colorado.

c) Streets, Roadways, and Highways adjacent to the proposed development, or within the area served by the proposed drainage improvements. The site is bordered to the to the northwest by Meadows Parkway, to the west by the Atchison, Topeka, & Santa Fe Railroad, to the east by East Plum Creek. The existing site address is 1360 Meadows Parkway at the time of report publication.

d) Names of surrounding or adjacent developments. The commercial development Meadows Filing No. 17 is north, west, and south of the site.

2. Description of Property and Land Use

a) Area in Acres. The site is a parcel of approximately 17.4 acres. The site consists of undeveloped land with native grasses and two stands of trees. There is an existing dirt drive that provides access to Meadows Parkway. There is a one-story brick building on the south end of the site which is the Meadows A-12 Wellhouse. At the north corner of the site, there is an existing parking facility for the East Plum Creek Trail Trailhead. A gravel maintenance access road leads from this trailhead to the existing Meadows A-12 Wellhouse.

b) Discussion of project phasing, if applicable. This project is not anticipated to be phased at this time. However, there will be future development of commercial properties on the north side of the site to be completed by others.

c) Total number of SFE's proposed for the development at build-out with a breakdown of units by type projected by phase (if applicable) calculated by utilizing the table in Section 4.4.1. The proposed Affinity at Castle Rock development includes the construction of a multifamily age-qualified living facility and all the relevant infrastructure for the development in addition to 4 commercial pads on the north side of the parcel. See Appendix A for the calculated SFEs per Section 4.4.1.

d) Area (acres) and land use for all parcels to be served within the development boundaries (initial and future phases, if applicable) and number of lots if available. The Affinity at Castle Rock includes one active adult multi-residential building, community amenities (garden, dog park, etc.), parking and private access roadway on approximately 6 acres. An additional 5 acres will be utilized for future commercial development by others. It is anticipated that there will be 4 future commercial lots; one car wash, two restaurants, and one convenience store. The proposed building will be on Lot 1 and all future development will be on Lots 2 and 3. The remaining portion of the site will remain undisturbed, which includes portions within the Preble Mouse Jumping Mouse habitat setback, an existing detention pond and a pump house.

e) Easements/tracts may not be known at this time; however, provide a statement that 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. Easements necessary for public Town utilities are now shown on the final

design/construction documents, in accordance with Town standards regarding the location and size of easements.

f) *Navigable waterways, major and minor drainageways and floodplains.* East Plum Creek runs south to north, east of the property. There is a minor drainageway in the central portion of the site that discharges into a storm culvert that ultimately outfalls into East Plum Creek. There is a FEMA designated 100-year floodplain associated with East Plum Creek with defined base flood elevations (BFEs). This floodplain runs adjacent to the eastern property boundary but does not spill onto the property.

g) *List proposed site accesses.* Access will be provided along Meadows Parkway at two points. Both access points direct traffic onto Regent Circle which loops the site and exits back onto Meadows Parkway. Internal streets, sidewalks, and parking lots will also be constructed.

h) *Significant geologic features and topography.* At the south end of the site, there is an existing detention pond facility with side slopes at 4:1 approximately 10 feet deep. Moving north, there is a 10-foot tall stockpile hill on the west side of the site, whereas the east side slopes down at grades varying from 1.5% to 8% towards an existing drainageway that starts in the central portion of the site running northeast. The drainageway has side slopes as steep as 2:1. North of the drainageway bank, the site slopes down gently until reaching a sharp drop at 4:1 or steeper down to Meadows Parkway. The railroad to the southwest is set above the site, with slopes down into the site varying from 7% to 3:1. The east edge of the site has several points where drainageways into plum creek begin to form, flowing offsite.

i) *Existing On-Site Wastewater Treatment System (OWTS).* There are no existing OWTS facilities on site.

j) *Existing water wells.* There are three existing wells in the vicinity of the site, with two of them on site. Well A12/CR223 and Well DA15/CR225 are at the south end of the site, and Well D14/CR224 south of the property line. The two on -site wells are part of Castle Rock Water's 2022 Denver Basin Well Rehabilitation Project.

B. Calculated Water Demands

1. Average Day Demands (ADD)

a) *Tabulate the ADDs for the initial and future phases, if applicable, of all development types for the SDP development areas in accordance with the Demand Rates presented in Chapter 4 of these Criteria. ADDs shall be sub-totaled by DAland 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). Existing and proposed land uses within the basin if known.* The Average Day Demand Rates were calculated per the Water Manual Section 4.4.1 and supporting calculations can be found in Appendix A. The table below depicts a summary of the tabulated results.

Land Use	Dwelling Units	Area (SF)	ADD (GPD)	ADD (GPM)
Multi-Family Residential	174	N/A	45,240	31.4
Gym/Fitness Center	1	6,300	3,150	2.2
Restaurants	2	4,700	14,100	9.8
Car Washes	1	N/A	5,000	3.5
Retail/Offices	1	3,600	720	0.5
Irrigation Tap	N/A	39,953	3,439	2.4
Total			**71,649**	**50**

2. Max Day Demands (MDD)

a) *Tabulate the MDDs for the initial and future phases, if applicable, of all development types for the SDP development areas in accordance with the demand rates and peaking factors presented in Chapter 4 of these Criteria. MDDs shall be subtotaled by land use as a flow rate (gpm, gpd).* The Max Day Demand Rates were calculated per the Water Manual Section 4.4.1.2 and supporting calculations can be found in Appendix A. The table below depicts a summary of the tabulated results.

Land Use	Dwelling Units	Area (SF)	MDD (GPD)	MDD (GPM)
Multi-Family Residential	174	N/A	113,100	78.5
Gym/Fitness Center	1	6,300	7,875	5.5
Restaurants	2	4,700	35,250	24.5
Car Washes	1	N/A	12,500	8.7
Retail/Offices	1	3600	1,800	1.3
Irrigation Tap	N/A	39,953	3,439	2.4
Total			**173,964**	**121**

b) *In accordance with the demand rates and peaking factors presented in Chapter 4 of these Criteria, compute the required storage volume (MG) based on MDDs and the required fire flows necessary to serve the development.* Storage requirements for the proposed development are included in Appendix B. The required storage volume for the site is 1.17 MG.

3. Peak Hour Demands (PHD)

a) *Tabulate PHDs (gpm, gpd) for the initial and future phases, if applicable, of all development types for the SDP development areas in accordance with the demand rates and peaking factors presented in Chapter 4 of these Criteria. PHDs shall be subtotaled by land use as a flow rate (gpm, gpd).* The Peak Hour Demand Rates were calculated per the Water Manual Section 4.4.1.2 and supporting calculations can be found in Appendix A. The table below depicts a summary of the tabulated results.

Land Use	Dwelling Units	Area (SF)	PHD (GPD)	PHD (GPM)
Multi-Family Residential	174	N/A	248,820	177.7
Gym/Fitness Center	1	6,300	17,325	12.4
Restaurants	2	4,700	77,550	55.4
Car Washes	1	N/A	27,500	19.6
Retail/Offices	1	3,600	3,960	2.8
Irrigation Tap	N/A	39,953	3,439	2.4
Total			**378,594**	**270**

4. Irrigation Demands

a.) Discuss the irrigation demand from the highest demand zone and include approved irrigation watering schedule. The Irrigation Demand was calculated per the Water Manual Section 4.4.1 and supporting calculations can be found in Appendix A. Irrigation was included in demand calculations above.

C. Existing Water System

1. Existing Distribution System

a) *Discuss the existing transmission and distribution lines in the vicinity of the development, including sizes and locations that will need to be extended to serve the proposed development.* The proposed development will be served by the Town of Castle Rock's water infrastructure. Currently, a 16-inch ductile iron main line runs along Meadows Parkway in the Meadows Yellow zone. The proposed Affinity at Castle Rock development will connect into the Meadows Yellow zone, and a hydraulic model has been provided to show acceptable pressures. The development will be connecting to a 12" PVC stub located at the northwest corner of the site that is included in the Meadows Intersection Improvements project.

b) *Discuss any known shortcomings or bottlenecks associated with the existing distribution system that may impact the Town's ability to adequately deliver fire flows and meet the required demand conditions.* There are no known bottlenecks or constraints that would impact the Town's ability to meet the required demand.

c) *Define existing Town of Castle Rock pressure zones at the proposed connection points to the existing water system.* The project lies entirely in the yellow pressure zone with a maximum 100% HGL elevation of 6,352 and a minimum 20% HGL elevation of 6,334. According to the Water Manual Section 4.4.3.1, for a yellow pressure zone designation, the maximum HGL elevation is 6,352, the top elevation served is 6,230 and the lowest elevation served in 6,065. The area is served by Tanks 12A and 12B.

2. Existing Supply Facilities

a) *Describe how service to the proposed development area was addressed in the Town's Water Master Plan, including a general discussion of which tanks, pumps, PRVs, and purification facilities would be relied upon to provide service to the development.* The proposed development will be served by Tanks 12A and 12B.

b) *Identify the existing or master-planned pressure zone(s) that encompass the proposed development. Discuss the highest and lowest elevations of the site and the anticipated maximum and minimum static water pressures.* The existing pressure zone is 2 (yellow) with corresponding hydraulic parameters designated by the *Town of Castle Rock Water System Design Criteria Manual Table* 4.4.3.1 of maximum HGL elevation of 6352', top elevation served as 6230' and lowest elevation served of 6065'.

The highest elevation of the site served is approximately 6,090' and the lowest elevation of the site served is 6,066'. This corresponds to the anticipated maximum static water pressure of 124 psi and the minimum static water pressure is 106 psi.

c) *Identify volume and location of existing storage tanks to serve the development. State the required storage volume for the project and refer to Appendix B. Compare the required storage at full build-out (based on MDDs and maximum fire storage) with the total existing and master-planned volumes available within the pressure zone.* The site will be served by Tanks 12A and 12B. The required storage volume for the project is 1.13 MG. Refer to Appendix B for the storage requirement calculation. The total existing and master-planned volumes available within the yellow pressure zone are unknown.

D. Proposed Water System

1. Proposed Distribution System

a) *Provide a general overview of the anticipated distribution system for the SDP layout including the proposed line sizes. Describe the tie-ins to the existing water system and the sizes and lengths of any extensions necessary to serve the development. Include a statement that "Any future development of the existing water infrastructure needed to serve this site is the responsibility of the developer."* The proposed development will utilize both 8-inch & 12-inch internal loops that run through the private roads within the development. These internal lines will connect to the larger Town of Castle Rock infrastructure at 2 locations: the 16-inch DIP stub at the northeast property line and the 12-inch PVC stub at the northwest property line within Regent Circle. Proposed buildings will be served by a single water meter inside of each building per section 4.4.10.5 of the TOCR Water Manual. The final water meter sizes will be determined at the time of building permitting based on the required demand of the total building fixture units provided to the Town of Castle Rock. Any future development of the existing water infrastructure needed to serve this site will be the responsibility of the developer.

The final Landscape and Irrigation Plans included with the Construction Document package show areas of irrigated turfgrass, trees and shrubs as well as a turf dog park and community garden. Landscaping around the living facility is served by a single irrigation tap on the west side of the building. Other site landscaping is to be served by connections to the existing on-site irrigation system and a new connection in the northeast corner of the site. Irrigation charts and schedules are included in Appendix F, note these are not final and subject to change.

b) Discuss looping as required by Castle Rock Water, particularly as it pertains to each successive phase of development anticipated for the project. The proposed facilities shall conform to the Town's Water Master Plan unless otherwise approved by variance; therefore, identify any proposed facilities that are not consistent with the Master Plan. If the proposed SFEs exceed the number used in the Town's Water Master Plan hydraulic modeling, then include additional information on what Improvements this project will need (either on-site or off-site) to show that the system will be able to handle this higher proposed SFE demand. To comply with requirements, the water system will loop around the entire Affinity at Castle Rock building and connect to Meadows Parkway waterline in 2 locations as previously described.

c) *Identify any assumptions made in the Town's Water Master Plan regarding the proposed development area that may need to be reevaluated in order to serve the development.* No assumptions in the Water Master Plan are incongruous with the proposed development.

2. Proposed Supply Facilities

a) *Discuss any pump stations, wells, PRVs, storage reservoirs, purification facilities, etc., that will likely be required to adequately serve the development.* Analysis of the proposed water system at 100% tank storage and 20% tank storage yielded pressures within the allowable static pressure requirements. The internal water system plan can be found in Appendix C.

3. Required Fire Flows

b) *Provide hydrant fire flow requirements.* The minimum fire flow for the water distribution system was determined following 2015 International Fire Code (IFC) criteria to be 4,000 gpm. See Appendix B for applicable IFC excerpts.

4. Land Dedication Requirements

a) *Generally, comment on any portion of the proposed water system that will be potentially difficult for the Town to access or maintain. Information shall be provided regarding the nature of the difficulty, and how the particular concern will be addressed.* According to Section 16.08.040 of the Town of Castle Rock municipal code, the land dedication requirement for this development will be the following: Constraints would be access to the water loop along the back of the building, where the grades of the ground surface above the water line were 5-8% in a cross-slope condition and were up to 4:1 in certain spots as the waterline crosses daylight embankments. This area has been re-graded to meet utility easement requirements which include a maximum cross slope of 4% and a maximum longitudinal slope of 10%.

E. Proposed Water System Analysis and Modeling

1. Hydraulic Models

a) *Unless specifically approved by Castle Rock Water, acceptable network hydraulic models shall be EPANET, WaterCAD, or InfoWater, or other approved models.* The proposed water system was modeled using WaterGEMs. Supporting calculations can be found in Appendix C.

All dynamic water modeling was performed at 20% tank storage. For the yellow zone, the 20% tank full HGL elevation is 6,334'. The 100% max HGL elevation is 6,352'.

A Hazen-Williams 'C' factor of 120 was used for all pipes.

b) *Anticipated primary distribution lines and connections to the existing system shall be represented in the model. At the discretion of Castle Rock Water, existing transmission mains and primary distribution mains between the supplying storage tank and the development may be required in the model to account for headloss between the supply source and the general location of the development. In lieu of this information, Castle Rock Water may provide the Engineer with assumed pressures or HGL elevations as the necessary boundary conditions at the connections to the existing system.* Primary distribution lines and connections to the existing system are represented in the model. A plan view schematic exhibit of the model is included in Appendix C.

2. Hydraulic Modeling Scenarios

a) *Static development pressures (zero demands) with the supplying storage tank at twenty percent and 100 percent full. Hydraulic modeling under static conditions is required.*

The following scenarios were modeled, and results can be found in Appendix C:

- Static development pressures with the supplying tank at 20% and 100% full.

b) *All dynamic water modeling shall be performed at minimum (twenty percent) tank stage.*

The following scenarios were modeled performed at 20% tank storage; results can be found in Appendix C:

- Average Day Demand for the full build-out of the development
- Max Day Demand plus Fire Flow for the full build-out of the development
- Max Day Demand plus Fire Flow for the full build-out of the development (one loop out)
- Peak Hour Demand for the full build-out of the development

c) *MDD (which includes irrigation) plus fire flow, as required in Chapter 4 of these Criteria for initial and full build-out of the development. Closed pipes and fire junction node IDs shall be clearly stated and shown. The complete fire flow demand shall be applied at a single hydrant location. The fire flow demand shall also be applied at a location where the pressure is the lowest within the proposed water system and/or at the end of a long dead end pipe.*

Information provided by the Castle Rock Fire and Rescue Department (Included in Appendix B) instructs the fire flow requirement (4,000 gpm) to be from four fire hydrants. Therefore, the fire flow has been split evenly in the Max Day Demand modeling analysis found in Appendix C.

d) *PHD (which includes irrigation) as required in Chapter 4 of these Criteria, in accordance with the assumptions for initial and full build-out of the development.*

Peak Hour Demand modeling analysis can be found in Appendix C.

e) *A water quality aging analysis and/or model may be required at the discretion of Castle Rock Water.*

No water quality aging analysis or model has been included at this time.

3. Hydraulic Modeling Output and Required Schematics

a) *Junction reports that identify junction ID, demand and residual pressure for each scenario.*

Junction reports are provided in Appendix C.

b) *Total demand supplied by the model for each scenario.*

Total demands for each scenario are provided in Appendix C.

c) *Pipe reports that identify pipe ID, pipe size, Hazen-Williams 'C' factor, computed velocity, flow, and headloss gradient for each scenario.*

Pipe reports are provided in Appendix C.

d) *Schematics shall be provided that depict the modeled network with pipe and junction IDs, superimposed on a street layout, or other recognizable base map, that generally corresponds to the proposed water network. The schematics shall clearly identify which pipes are open and closed.*

A schematic of the modeled network is provided in Appendix C.

e) *Summary narrative discussing the modeling results as compared to the required hydraulic design criteria set forth in Chapter 4 of these Criteria.*

Per the Water Manual (Section 4.4.3), the acceptable pressure ranges are as follows:

- Minimum static pressure with zero demand (20% tank storage) – 43 psi
- Maximum static pressure with zero demand (100% tank storage) – 125 psi
- Minimum dynamic pressures (based on 20% tank storage)
    - Max Daily Demand + Fire Flow – 20 psi
    - Peak Hour Demand – 35 psi

Acceptable velocities are noted below:

- Maximum velocity with Peak Hour Demands: 10 fps
- Maximum velocity with Max Day Demands: 5 fps
- Maximum velocity with Max Day + Fire Flow Demands 15 fps

The total demand supplied by the model for each scenario can be found in Appendix A. The Maximum Day Demand + Fire Flow scenario was calculated by adding the required Fire Flow (per 2018 IFC) and the Maximum Day Demand (See Section B.2). Per the Castle Rock Fire and Rescue Department, the fire flow demand is applied at four hydrants, where the pressure is the lowest within the proposed water system.

All modeled scenarios fall within the acceptable pressure ranges. Schematics and junction and pipe reports are located in Appendix C.

f) *Fire Flow Test Results.* The fire flow modeling results (with and without one loop out) result in acceptable pressures and velocities within the system. See Appendix C for full results.

F. Calculated Wastewater Flows

1. Average Daily Wastewater Flows (ADF)

a) *Tabulate the ADFs for the initial and future phases, if applicable, of all development types for the SDP development areas in accordance with the flow rates presented in Chapter 4 of these Criteria. ADFs shall be subtotaled by land use as a flow rate in gallons per day (gpd), gallons per minute (gpm), and cubic feet per second (cfs).* Typical values for wastewater ADFs according to land use were taken from the *Town of Castle Rock, Wastewater Collection Design Criteria Manual* (WCDCM) Section 4.4.1.1, and are as follows:

- Multi-family residential = 130 gpd/dwelling unit
- Car Wash = 5,000 gpd/acre
- Retail/Offices = 0.1 gpd/square-foot
- Restaurants = 1.5 gpd/ square-foot
- Gym/fitness center (the pool amenity) = 0.5 gpd / square-foot

Land Use	ADF (gpm)	ADF (gpd)	ADF (cfs)
Car Wash	3.5	5,000	0.008
Retail	0.3	360	0.001
Multi-Family	15.7	22,620	0.035
Fitness	2.2	3,150	0.005
Restaurant	4.9	7,050	0.011
Total	26.6	38,180	0.059

2. Peaking Factor

a) *Compute the wastewater Peaking Factor based on the ADF of the development in accordance with Section 4.4.1.1.* The peaking factor (PF) is defined by the following equation, $PF = 3.65 \times (ADF)^{-0.168}$ where ADF is expressed in million gallons per day. The maximum PF is 5.0. The PF was calculated to be between 4.6 and 5.0 for this site, please see Appendix D for complete calculations.

3. Peak Design Flows (PDF)

a) *Tabulate the PDFs for the initial and future phases, if applicable, of all development types for the SDP development areas using the equation set forth in Section 4.4.1.2 of these Criteria. PDFs shall be subtotaled by land use as a flow rate (gpd, gpm, and cfs).* The following expression was used for calculating peak design flow (PDF), PDF = (ADF x PF) + (0.1 x ADF).

Land Use	PDF (gpm)	PDF (gpd)	PDF (cfs)
Car Wash	17.7	25,500	0.039
Retail	1.3	1,836	0.003
Multi-Family	80.1	115,362	0.178
Fitness	11.2	16,065	0.025
Restaurant	25.0	35,955	0.056
Total	135.2	194,718	0.301

G. Existing Wastewater System

1. Existing Collection System

a) *Discuss the existing sanitary sewer mains, interceptors, lift stations, and force mains in the vicinity of the development, including sizes and locations that will need to be extended to serve the proposed development.* The proposed sanitary sewer network for the site will connect to an existing 12-in main line running along the east property boundary from south to north. This line ultimately runs to the Meadows 17 Lift Station. See Appendix F for a GIS Utility Map provided by the Town of Castle Rock.

b) *Identify the existing or master-planned wastewater collection subbasin(s) that encompass the proposed development.* The Affinity at Castle Rock site was identified as Lot 7 in the *Preliminary Utility Report for The Meadows Filing No. 17* prepared by CVL Consultants, see Appendix F for excerpts from this report. Table B of the Meadows Report includes Lot 7 within Basin OS 1-5, Lots 5-8 and calculates wastewater demands based on commercial land use.

c) *Describe how service to the proposed development area was addressed in the Town's Wastewater Master Plan, including a general discussion of which sanitary sewer mains, interceptors, lift stations, force mains, and wastewater treatment facilities would be relied upon to provide service to the development.* The Affinity at Castle Rock site is shown within the *Town of Castle Rock Wastewater Master Plan 2016* as being served by the Meadows 17 Lift Station. The site is adjacent to an existing wastewater main, and no main extensions will be required for the development of this project. The Meadows 17 Lift Station indicates a Single-Family Equivalent (SFE) capacity of 1,346.

d) *Discuss any known shortcomings or bottlenecks associated with the existing collection system that may impact the Town's ability to adequately serve the development.* There are no shortcomings or bottlenecks identified with the existing system at this time.

H. Proposed Wastewater System

1. Proposed Collection System

a) *Provide a general overview of the anticipated collection system for the SDP layout, including the proposed line sizes. Describe the tie-ins to the existing wastewater system and the sizes and lengths of any extensions necessary to serve the development. Include a statement that -in Any future development of the existing wastewater infrastructure needed to serve this site is the responsibility of the developer-in.* The proposed sanitary sewer system will be located in the internal private drives with services for the residential building as well as the future commercial developments. An 8-in Sanitary sewer main will convey wastewater from the residential building and clubhouse to the existing 10-inch and 12-inch sanitary sewer running along the project's east boundary. Any future development of the existing wastewater infrastructure needed to serve this site is the responsibility of the developer.

b) *Discuss how the project complies with the Town's Wastewater Master Plan. The proposed facilities shall conform to the Town's Wastewater Master Plan unless otherwise approved by variance; therefore, identify any proposed facilities that are not consistent with the Master Plan. If the proposed SFEs exceed the number used in the Town's Wastewater Master Plan hydraulic modeling, then include additional information on what improvements this project will need (either on-site or off-site) to show that the system will be able to handle this higher proposed SFE demand.* The Affinity at Castle Rock site is shown within the *Town of Castle Rock Wastewater Master Plan 2016* as being served by

the Meadows 17 Lift Station. The Meadows 17 Lift Station is noted as having a capacity of 1.18 mgd and a Single Family Equivalent (SFE) capacity of 1,346. It is not clear how many SFE's were included in the Town's Wastewater Master Plan for the site. The *Preliminary Utility Report for The Meadows Filing No. 17* anticipated approximately 54 SFEs (based on commercial use) for this parcel.

c) *Identify any assumptions made in the Town's Wastewater Master Plan regarding the proposed development area that may need to be reevaluated in order to serve the development.* Additional information regarding previous assumptions of site land use should be provided by the Town for further analysis.

2. Proposed Wastewater Facilities

a) *Discuss any lift stations, force mains, pretreatment, facilities, etc., that will likely be required to adequately serve the development.* No lift stations, force mains, or pretreatment are anticipated to be required at this time. A separate sanitary service (grease interceptor) is not needed for improvements associated with this phase of construction.

It is understood that all Commercial Business Building Permits for new business and construction of new buildings, remodels, or tenant improvement permits will be required to comply with Town Code 13.05, Grease Interceptors Required. When future commercial buildings are constructed, applicants will be required to submit an Industry Information Questionnaire through Plum Creek Water Reclamation Authority (PCWRA) to verify if the business will require an oil/grease interceptor.

3. Land Dedication Requirements

a) *Generally, comment on any portion of the proposed wastewater system that will be potentially difficult for the Town to access or maintain. Information shall be provided regarding the nature of the difficulty, and how the particular concern will be addressed.* Easements will be dedicated to the Town in order to access and maintain the proposed wastewater system. All wastewater improvements may be accessed by the private roadway or parking areas.

I. Proposed Wastewater System Analysis and Modeling

1. Hydraulic Models

a) *Unless specifically approved by Castle Rock Water, acceptable network hydraulic models shall be EPA SWMM 5.0, FlowMaster, SewerCAD, or InfoSewer, other approved models, and Excel spreadsheet for smaller basins.* Bently FlowMaster was utilized for all wastewater hydraulic calculations associated with the Affinity at Castle Rock site.

b) *Anticipated primary collection lines and connections to the existing system shall be represented in the model. The developer shall evaluate all downstream sewer segments that Castle Rock Water determine need to be evaluated.* Primary collection lines and the connection to the existing system were modeled at this time. Additional downstream segments will be modeled upon request.

2. Hydraulic Modeling Scenarios

a) *Average Daily Flow (ADF) in accordance with the assumptions for initial and full build-out of the development.* Average Daily Flow calculations for the full build-out condition are included in Appendix E.

b) *Peak Design Flow (PDF) in accordance with the assumptions for initial and full build-out of the development.* Peak Design Flow calculations for the full build-out condition are included in Appendix E.

3. Hydraulic Modeling Output and Required Schematics

a) *Pipe reports that identify pipe material, Manning's-n coefficient (See Section 4.4.2), pipe size, design slope, and computed velocities (including velocity at PDF) for each scenario.* All noted requirements are included in the reports, see Appendix E.

b) *Pipe segment tabulation identifying the total number of tributary SFEs, upstream and downstream manhole ID, ADF, Peaking Factor (See Section 4.4.1.1), PDF, full pipe flow, maximum capacity (75 percent of full pipe flow) and the ratio of PDF divided by maximum capacity expressed as a percentage. Flow information may be expressed in either cfs or gpm. Pipe size, slope, manhole identification, etc., shall match the corresponding information shown on the Utility Plan/CDs.* Pipe segment tabulation is included in Appendix E with associated hydraulic reports included in Appendix F. Pipe slopes are set at the minimum allowable at slope of 0.40%.

c) *Schematics shall be provided that depict the modeled network with pipe and junction IDs (Design Points), superimposed on a street layout or other recognizable base map that generally corresponds to the proposed wastewater system. Pipe size, slope, manhole identification, etc., shall match the corresponding information shown on the Utility Plan/CDs.* A Preliminary Wastewater plan is included in Appendix F. Pipe slopes have been set to the Town of Castle Rock's minimum standard of 0.40%.

d) *Summary narrative discussing the modeling results as compared to the required hydraulic design criteria set forth in Chapter 4 of these Criteria.* Wastewater modeling results indicate that all hydraulic design criteria are met. There is adequate capacity available in the existing 12-in system for proposed and future demands from the Affinity at Castle Rock site. The existing pipe is estimated to be flowing at 68.3% full during the Peak Design Flow condition. Proposed 8-in pipes are well under the maximum percentage full of 75%.

J. Potential Permitting Requirements

1. Identify other potential local, State, and Federal permitting requirements.

No additional permitting requirements are anticipated for this development beyond those required by the Town of Castle Rock.

K. References

1. 2010 Wastewater Master Plan Update, Castle Rock Water Engineering, 2016

2. 2010 Water Master Plan Update, Castle Rock Water Engineering, 2017

3. Wastewater Collection Design Criteria Manual, Town of Castle Rock, December 2018

4. Water System Design Criteria Manual, Town of Castle Rock, December 2018

5. Plum Creek, West Plum Creek, and East Plum Creek, Major Drainageway Plan, Enginuity Engineering Solutions, September 2016.

6. The Meadows Filing No. 17 Preliminary Utility Report, Castle Rock Development Company, December 2003.

APPENDIX A

WATER DEMANDS

DOMESTIC WATER DEMAND GENERATION

HRGreen

Project #: 211400
Project: Affinity Castle Rock
Location: Castle Rock, CO
Plan Date:

By: K House
Checked: A Zara
Date: 11/14/2022

	DEMAND		SINGLE-FAMILY EQUIVALENT (SFE)	
MULTIFAMILY	260	GPD/UNIT	0.65	SFE/UNIT
GYM / FITNESS CENTER	0.5	GPD/SF	0.00125	SFE/SF
RESTAURANTS	3.0	GPD/SF	0.01	SFE/SF
CAR WASH	5,000	GPD/FACILITY	12.50	SFE/FACILITY
RETAIL / OFFICES	0.2	GPD/SF	0.0005	SFE/SF
IRRIGATION	3,750	GPD/IRR. ACRE	9.38	SFE/ACRE

PEAKING FACTORS	
MAX. DAY / AVG. DAY	2.5
PEAK HOUR / FLOW RATIO	5.5

BUILDING NUMBER	BUILDING TYPE	DWELLING UNITS	TOTAL SQUARE-FEET	SINGLE FAMILY EQUIVALENT UNITS	AVERAGE DAY DEMAND (ADD)		MAXIMUM DAY DEMAND (MDD)		PEARK HOUR DEMAND (PHD)	
					GPD	GPM	GPD	GPM	GPD	GPM
MFR-1	MULTIFAMILY RESIDENTIAL	174	N/A	113.1	45,240	31.42	113,100	78.54	248,820	177.73
MFR-2	GYM/FITNESS CENTER	1	6,300	7.9	3,150	2.19	7,875	5.47	17,325	12.38
Comm-3/Comm-4	RESTAURANTS	2	4,700	35.3	14,100	9.79	35,250	24.48	77,550	55.39
Comm-1	CAR WASHES	1	N/A	12.5	5,000	3.47	12,500	8.68	27,500	19.64
Comm-2	RETAIL / OFFICES	1	3,600	1.8	720	0.50	1,800	1.25	3,960	2.83
Irrigation Tap	IRRIGATION	N/A	39,953	8.6	3,439	2.39	3,439	2.39	3,439	2.39
TOTALS				***179***	***71,649***	***50***	***173,964***	***121***	***378,594***	***270***

APPENDIX B

WATER STORAGE

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

FIRE-FLOW CALCULATION AREA (square feet)					FIRE-FLOW (gallons per minute)[b]	FLOW DURATION (hours)
Type IA and IB[a]	Type IIA and IIIA[a]	Type IV and V-A[a]	Type IIB and IIIB[a]	Type V-B[a]		
0-22,700	0-12,700	0-8,200	0-5,900	0-3,600	1,500	2
22,701-30,200	12,701-17,000	8,201-10,900	5,901-7,900	3,601-4,800	1,750	
30,201-38,700	17,001-21,800	10,901-12,900	7,901-9,800	4,801-6,200	2,000	
38,701-48,300	21,801-24,200	12,901-17,400	9,801-12,600	6,201-7,700	2,250	
48,301-59,000	24,201-33,200	17,401-21,300	12,601-15,400	7,701-9,400	2,500	
59,001-70,900	33,201-39,700	21,301-25,500	15,401-18,400	9,401-11,300	2,750	
70,901-83,700	39,701-47,100	25,501-30,100	18,401-21,800	11,301-13,400	3,000	3
83,701-97,700	47,101-54,900	30,101-35,200	21,801-25,900	13,401-15,600	3,250	
97,701-112,700	54,901-63,400	35,201-40,600	25,901-29,300	15,601-18,000	3,500	
112,701-128,700	63,401-72,400	40,601-46,400	29,301-33,500	18,001-20,600	3,750	
128,701-145,900	72,401-82,100	46,401-52,500	33,501-37,900	20,601-23,300	4,000	4
145,901-164,200	82,101-92,400	52,501-59,100	37,901-42,700	23,301-26,300	4,250	
164,201-183,400	92,401-103,100	59,101-66,000	42,701-47,700	26,301-29,300	4,500	
183,401-203,700	103,101-114,600	66,001-73,300	47,701-53,000	29,301-32,600	4,750	
203,701-225,200	114,601-126,700	73,301-81,100	53,001-58,600	32,601-36,000	5,000	
225,201-247,700	126,701-139,400	81,101-89,200	58,601-65,400	36,001-39,600	5,250	
247,701-271,200	139,401-152,600	89,201-97,700	65,401-70,600	39,601-43,400	5,500	
271,201-295,900	152,601-166,500	97,701-106,500	70,601-77,000	43,401-47,400	5,750	
295,901-Greater	166,501-Greater	106,501-115,800	77,001-83,700	47,401-51,500	6,000	
—	—	115,801-125,500	83,701-90,600	51,501-55,700	6,250	
—	—	125,501-135,500	90,601-97,900	55,701-60,200	6,500	
—	—	135,501-145,800	97,901-106,800	60,201-64,800	6,750	
—	—	145,801-156,700	106,801-113,200	64,801-69,600	7,000	
—	—	156,701-167,900	113,201-121,300	69,601-74,600	7,250	
—	—	167,901-179,400	121,301-129,600	74,601-79,800	7,500	
—	—	179,401-191,400	129,601-138,300	79,801-85,100	7,750	
—	—	191,401-Greater	138,301-Greater	85,101-Greater	8,000	

For SI: 1 square foot = 0.0929 m^2, 1 gallon per minute = 3.785 L/m, 1 pound per square inch = 6.895 kPa.
a. Types of construction are based on the *International Building Code*.
b. Measured at 20 psi residual pressure.

Type V-A construction with a total of 258,227 gross area per architect

sprinklered, so 50% reduction allowed per Town of Castle Rock. Fire Flow = 4,000 gpm

REQUIRED NUMBER AND SPACING OF FIRE HYDRANTS

TABLE C102.1

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

REQUIRED NUMBER OF FIRE HYDRANTS

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

a. Reduce by 100 feet for dead-end streets or roads.

b. Where streets are provided with median dividers that cannot be crossed by fire fighters pulling hose lines, or where arterial streets are provided with four or more traffic lanes and have a traffic count of more than 30,000 vehicles per day, hydrant spacing shall average 500 feet on each side of the street and be arranged on an alternating basis.

c. Where new water mains are extended along streets where hydrants are not needed for protection of structures or similar fire problems, fire hydrants shall be provided at spacing not to exceed 1,000 feet to provide for transportation hazards.

d. Reduce by 50 feet for dead-end streets or roads.

e. One hydrant for each 1,000 gallons per minute or fraction thereof.

f. A 50-percent spacing increase shall be permitted where the building is equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1 of the *International Fire Code*.

g. A 25-percent spacing increase shall be permitted where the building is equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.2 or 903.3.1.3 of the *International Fire Code* or Section P2904 of the *International Residential Code*.

PLAN REVIEW # 13656

Castle Rock Fire and Rescue Department

300 Perry Street - Castle Rock, CO 80104
(303) 660-1066

PLAN REVIEW

PROJECT LOCATION	PROJECT #
PRE18-0028 - 1360 Meadows Parkway - Meadows F-17 Senior Housing - NEW]	3207
PROJECT DESCRIPTION	**OCCUPANCY ID**
PRE18-0028 - 1360 Meadows Parkway - Meadows F-17 Senior Housing - NEW PROJECT	
AREA INVOLVED IN ENTIRE PROJECT	**ALTERNATE ID**
PRE18-0028 - 1360 Meadows Parkway - Meadows F-17 Senior Housing - NEW PROJECT	

PERMIT #	PERMIT DESCRIPTION		
13656	Fire Flow Evaluation		
AREA AFFECTED BY THIS PERMIT		**SQUARE FEET**	**VALUE OF WORK**
SDP22-0036 - Meadows 17 Plaza Resort Lifestyle - Affinity & Meadows Pkv			
CONTACT NAME	**NOTIFY BY**	**NOTIFY AT**	
REASON FOR SUBMITTAL	**PLAN REVIEWER**	**SUBMITTED**	**COMPLETED**
Review Only	ssullivan	12/06/2022	12/09/2022

CONTRACTOR	BUSINESS PHONE	FAX NUMBER
See Trakit (ID 3577)		
STREET ADDRESS	**CITY, STATE, ZIP**	
E-MAIL ADDRESS	**STATE LICENSE NUMBER**	

CASTLE ROCK FIRE AND RESCUE DEPARTMENT

**** PLAN REVIEW LETTER ****

<< PLEASE READ THE FOLLOWING CAREFULLY >>

On 12-09-2022 a review was conducted on the submitted FIRE FLOW requirements for the Affinity at Castle Rock, located on (no exact address designated) Meadows PKWY. The following comments pertain to the project:

CODE USED IN REVIEW:

The submitted plans have been reviewed for compliance to the 2018 edition of the International Fire Code (IFC).

REVIEW COMMENTS:

INFORMATION ON THE PROJECT:

The project consists of a new medical office building that will be fully sprinkler protected. From the information currently known to the fire department the following comments pertain to the required fire flows:

The largest proposed building is a 4-Story, 258,277 square foot building, constructed of Type V-A construction, with a full NFPA 13 Fire Sprinkler system. The base required fire flow as noted in the 2018 IFC - Table B105.1, would be: 8,000 gpm, the code provides an allowance for sprinkler systems, and based on the knowledge of this building the fire department will allow a 50% reduction bringing the required fire flow to: 4000 gpm for a duration of 4-Hours

FINAL FIRE FLOW REQUIRED:

2018 International Fire Code (IFC), Appendix B, as amended by the Town of Castle Rock

requires a MINIMUM fire flow requirement of 4000 gpm @ 20 psi for a duration of 4-hours. This fire flow shall be from 4 fire hydrants within 210 feet of the structure.

Fire requires that one fire hydrant be within 100 feet of the FDC.

BUILDING INFORMATION:

Type of Construction: The proposed project is shown as being located in a building of V-B

Occupancy Classification: The proposed occupancy classification for this project has been reviewed for compliance with the 2018 IFC and IBC. The occupancy classification of the project is shown as being a Group "R-2" Occupancy.

ACTION TAKEN BY THE FIRE DEPARTMENT:

Approval of the above fire flow is based on the information known to the fire department as of the date of this review, as the result of additional information or inspections if the fire flow changes, corrective action may be required.

Should you have any questions please feel free to contact me.

Kevin Sullivan - Fire Prevention Officer - Ksullivan@crgov.com

DATE RECEIVED	BY:		
DATE FEE PAID	PLAN REVIEW FEE	CHECK #	RECEIPT #
12/09/2022	0.00		

PICKED UP BY	COMPANY	DATE

HRGreen
DEVELOPMENT

5619 DTC Parkway | Suite 1150
Greenwood Village, CO 80111
Main 720.602.4999 + **Fax** 713.965.0044

HRGREEN.COM

FIRE FLOW REVIEW 13656

Castle Rock Fire & Rescue Department

These plans have been reviewed and accepted subject to any/all corrections in compliance with the International Fire Code as amended and adopted by the Town of Castle Rock.

Comments and Corrections will be in the attached plan review letter and/or marked on the plans.

All projects are subject to changes in the field in accordance with the current codes and ordinances.

Completed by:

Kevin Sullivan
ICC FIRE INSPECTOR II : 9533547
COLORADO FIRE INSPECTOR III: 216312661

December 6, 2022

Kevin Sullivan
Fire Prevention Officer
Castle Rock Fire and Rescue Department
300 Perry Street
Castle Rock, CO 80104

Re: Affinity at Castle Rock – Final Utility Report
Confirmation Memo for Required Fire Flow

Dear Mr. Sullivan,

The Affinity at Castle Rock development is bordered to the to the northwest by Meadows Parkway, to the west by the Atchison, Topeka, & Santa Fe Railroad, to the east by East Plum Creek. The proposed Affinity at Castle Rock development includes the construction of a single multifamily age-qualified living facility and all the relevant infrastructure for the development in addition to four commercial pads on the north side of the parcel.

The total square footage for the single Multifamily Residential building along with building type and if the building will be sprinklered are included below:

Total Fire Flow Calculation Area: 258,277 sq-ft
Building Construction Type: Type V-A
Sprinklered: Yes

Detailed information on the future commercial pads beyond a general commercial land use (restaurant, car wash, and retail) is not know at this time.

Required Fire Flow and Duration: 4,000 GPM for 4 hours

Castle Rock Fire and Rescue Department's signature: _____ Date: 12-09-2022

Sincerely,

HR GREEN, INC.

Kristine House, P.E., CFM
Associate | Lead Engineer

STORAGE REQUIREMENTS

Project #:	211400	By:	A Zara
Project:	Affinity Castle Rock	Checked:	K House
Location:	Castle Rock, CO	Date:	11/14/2022
Plan Date:			

Storage Volume (MG) = Maximum Day Demand (MG) + Fire Flow (MG)

Maximum Day Demand (MDD)

121 GPM

173,964 Gal

Fire Flow (FF)

4,000 GPM

4 hr

960,000 Gal

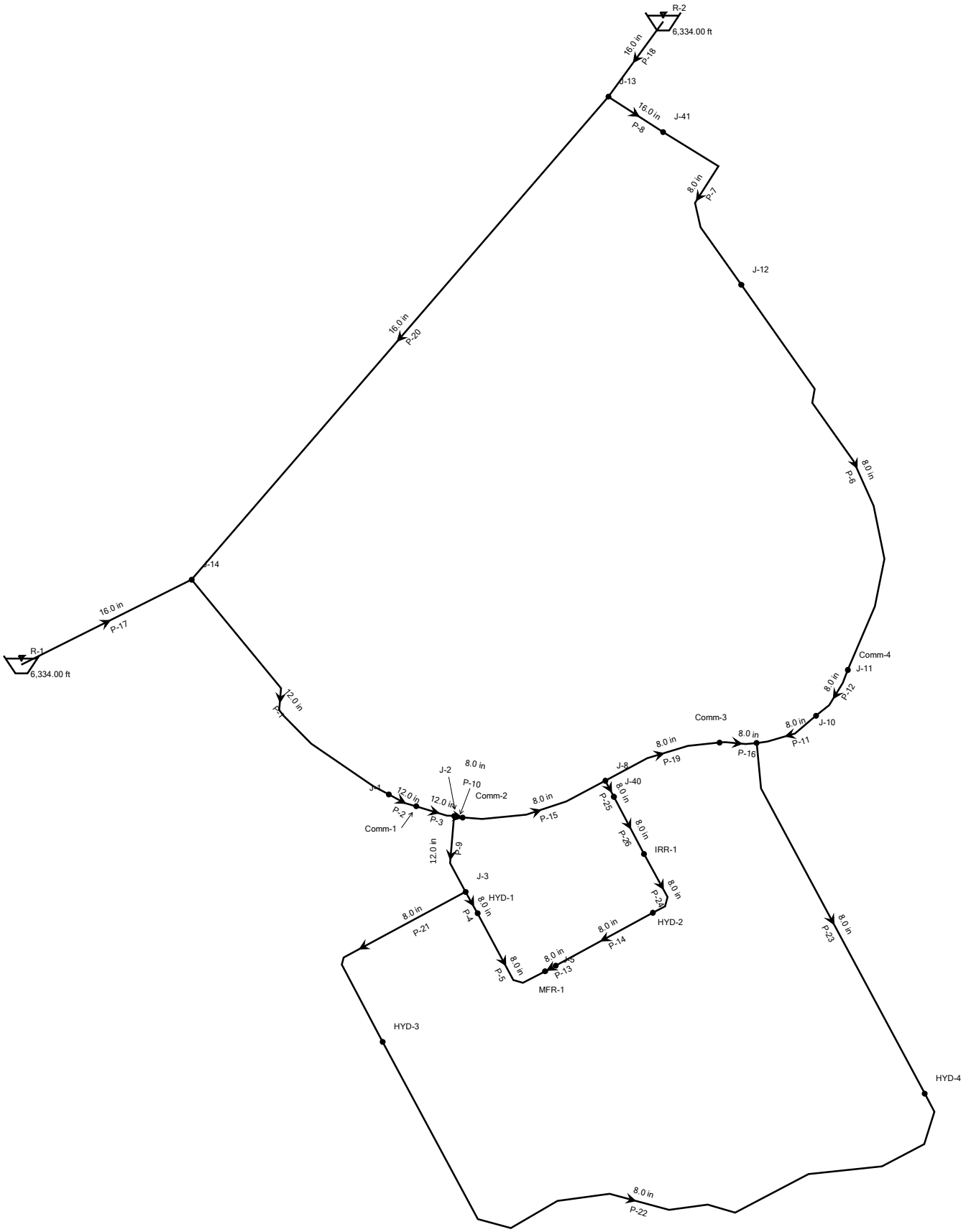
Storage Volume

1.134 MG

APPENDIX C

WATER HYDRAULIC ANALYSIS AND MODELING

Affinity at Castle Rock



Affinity at Castle Rock

FlexTable: Junction Table - 20% Tank Storage

Active Scenario: Static

ID	Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
31	J-1	6,078.87	0.00	6,334.00	110
32	J-2	6,082.32	0.00	6,334.00	109
33	J-3	6,083.59	0.00	6,334.00	108
34	HYD-1	6,083.93	0.00	6,334.00	108
35	MFR-1	6,085.39	0.00	6,334.00	108
36	J-5	6,085.70	0.00	6,334.00	107
37	HYD-2	6,085.13	0.00	6,334.00	108
38	J-8	6,085.42	0.00	6,334.00	108
39	HYD-3	6,090.08	0.00	6,334.00	106
40	Comm-3	6,086.66	0.00	6,334.00	107
41	J-10	6,085.74	0.00	6,334.00	107
42	J-11	6,083.81	0.00	6,334.00	108
43	Comm-4	6,082.10	0.00	6,334.00	109
44	J-12	6,068.93	0.00	6,334.00	115
45	J-14	6,069.00	0.00	6,334.00	115
47	Comm-1	6,080.61	0.00	6,334.00	110
50	Comm-2	6,082.57	0.00	6,334.00	109
87	J-13	6,066.00	0.00	6,334.00	116
125	IRR-1	6,084.64	0.00	6,334.00	108
132	HYD-4	6,087.26	0.00	6,334.00	107
135	J-40	6,085.25	0.00	6,334.00	108
141	J-41	6,066.71	0.00	6,334.00	116

Affinity at Castle Rock

FlexTable: Pipe Table - 20% Tank Storage

Active Scenario: Static

ID	Label	Length (Scaled) (ft)	Diameter (in)	Material	Hazen-Williams C	Velocity (ft/s)	Headloss (ft)	Flow (gpm)	Is Closed?
46	P-1	306	12.0	PVC	120.0	0.00	0.00	0.00	False
48	P-2	31	12.0	PVC	120.0	0.00	0.00	0.00	False
49	P-3	40	12.0	PVC	120.0	0.00	0.00	0.00	False
51	P-10	9	8.0	PVC	120.0	0.00	0.00	0.00	False
52	P-15	153	8.0	PVC	120.0	0.00	0.00	0.00	False
82	P-19	124	8.0	PVC	120.0	0.00	0.00	0.00	False
83	P-16	38	8.0	PVC	120.0	0.00	0.00	0.01	False
84	P-11	68	8.0	PVC	120.0	0.00	0.00	0.00	False
85	P-12	58	8.0	PVC	120.0	0.00	0.00	0.00	False
86	P-6	441	8.0	PVC	120.0	0.00	0.00	0.00	False
89	P-9	81	12.0	PVC	120.0	0.00	0.00	0.00	False
90	P-4	25	8.0	PVC	120.0	0.00	0.00	0.00	False
91	P-5	112	8.0	PVC	120.0	0.00	0.00	0.00	False
92	P-13	12	8.0	PVC	120.0	0.00	0.00	0.00	False
93	P-14	112	8.0	PVC	120.0	0.00	0.00	0.00	False
95	P-21	237	8.0	PVC	120.0	0.00	0.00	0.00	False
104	P-17	193	16.0	Ductile Iron	120.0	0.00	0.00	0.00	False
105	P-20	648	16.0	Ductile Iron	120.0	0.00	0.00	0.00	False
106	P-18	94	16.0	Ductile Iron	120.0	0.00	0.00	0.00	False
126	P-24	74	8.0	PVC	120.0	0.00	0.00	0.00	False
133	P-22	742	8.0	PVC	120.0	0.00	0.00	0.00	False
134	P-23	398	8.0	PVC	120.0	0.00	0.00	0.00	False
136	P-25	18	8.0	PVC	130.0	0.00	0.00	0.00	False
137	P-26	66	8.0	PVC	130.0	0.00	0.00	0.00	False
142	P-7	207	8.0	PVC	120.0	0.00	0.00	0.00	False
143	P-8	66	16.0	PVC	120.0	0.00	0.00	0.00	False

Affinity at Castle Rock

FlexTable: Junction Table - 20% Tank Storage

Active Scenario: Static

ID	Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
31	J-1	6,078.87	0.00	6,352.00	118
32	J-2	6,082.32	0.00	6,352.00	117
33	J-3	6,083.59	0.00	6,352.00	116
34	HYD-1	6,083.93	0.00	6,352.00	116
35	MFR-1	6,085.39	0.00	6,352.00	115
36	J-5	6,085.70	0.00	6,352.00	115
37	HYD-2	6,085.13	0.00	6,352.00	115
38	J-8	6,085.42	0.00	6,352.00	115
39	HYD-3	6,090.08	0.00	6,352.00	113
40	Comm-3	6,086.66	0.00	6,352.00	115
41	J-10	6,085.74	0.00	6,352.00	115
42	J-11	6,083.81	0.00	6,352.00	116
43	Comm-4	6,082.10	0.00	6,352.00	117
44	J-12	6,068.93	0.00	6,352.00	122
45	J-14	6,069.00	0.00	6,352.00	122
47	Comm-1	6,080.61	0.00	6,352.00	117
50	Comm-2	6,082.57	0.00	6,352.00	117
87	J-13	6,066.00	0.00	6,352.00	124
125	IRR-1	6,084.64	0.00	6,352.00	116
132	HYD-4	6,087.26	0.00	6,352.00	115
135	J-40	6,085.25	0.00	6,352.00	115
141	J-41	6,066.71	0.00	6,352.00	123

Affinity at Castle Rock

FlexTable: Pipe Table - 20% Tank Storage

Active Scenario: Static

ID	Label	Length (Scaled) (ft)	Diameter (in)	Material	Hazen-Williams C	Velocity (ft/s)	Headloss (ft)	Flow (gpm)	Is Closed?
46	P-1	306	12.0	PVC	120.0	0.00	0.00	0.00	False
48	P-2	31	12.0	PVC	120.0	0.00	0.00	0.00	False
49	P-3	40	12.0	PVC	120.0	0.00	0.00	0.00	False
51	P-10	9	8.0	PVC	120.0	0.00	0.00	0.00	False
52	P-15	153	8.0	PVC	120.0	0.00	0.00	0.00	False
82	P-19	124	8.0	PVC	120.0	0.00	0.00	0.00	False
83	P-16	38	8.0	PVC	120.0	0.00	0.00	0.00	False
84	P-11	68	8.0	PVC	120.0	0.00	0.00	0.00	False
85	P-12	58	8.0	PVC	120.0	0.00	0.00	0.00	False
86	P-6	441	8.0	PVC	120.0	0.00	0.00	0.00	False
89	P-9	81	12.0	PVC	120.0	0.00	0.00	0.00	False
90	P-4	25	8.0	PVC	120.0	0.00	0.00	0.00	False
91	P-5	112	8.0	PVC	120.0	0.00	0.00	0.00	False
92	P-13	12	8.0	PVC	120.0	0.00	0.00	0.00	False
93	P-14	112	8.0	PVC	120.0	0.00	0.00	0.00	False
95	P-21	237	8.0	PVC	120.0	0.00	0.00	0.00	False
104	P-17	193	16.0	Ductile Iron	120.0	0.00	0.00	0.01	False
105	P-20	648	16.0	Ductile Iron	120.0	0.00	0.00	0.00	False
106	P-18	94	16.0	Ductile Iron	120.0	0.00	0.00	0.01	False
126	P-24	74	8.0	PVC	120.0	0.00	0.00	0.00	False
133	P-22	742	8.0	PVC	120.0	0.00	0.00	0.00	False
134	P-23	398	8.0	PVC	120.0	0.00	0.00	0.00	False
136	P-25	18	8.0	PVC	130.0	0.00	0.00	0.00	False
137	P-26	66	8.0	PVC	130.0	0.00	0.00	0.00	False
142	P-7	207	8.0	PVC	120.0	0.00	0.00	0.00	False
143	P-8	66	16.0	PVC	120.0	0.00	0.00	0.00	False

Affinity at Castle Rock

FlexTable: Junction Table - 20% Tank Storage

Active Scenario: Average Day

ID	Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
31	J-1	6,078.87	0.00	6,334.00	110
32	J-2	6,082.32	0.00	6,334.00	109
33	J-3	6,083.59	0.00	6,334.00	108
34	HYD-1	6,083.93	0.00	6,334.00	108
35	MFR-1	6,085.39	33.61	6,333.99	108
36	J-5	6,085.70	0.00	6,333.99	107
37	HYD-2	6,085.13	0.00	6,334.00	108
38	J-8	6,085.42	0.00	6,334.00	108
39	HYD-3	6,090.08	0.00	6,334.00	106
40	Comm-3	6,086.66	4.90	6,334.00	107
41	J-10	6,085.74	0.00	6,334.00	107
42	J-11	6,083.81	0.00	6,334.00	108
43	Comm-4	6,082.10	4.90	6,334.00	109
44	J-12	6,068.93	0.00	6,334.00	115
45	J-14	6,069.00	0.00	6,334.00	115
47	Comm-1	6,080.61	3.47	6,334.00	110
50	Comm-2	6,082.57	0.50	6,334.00	109
87	J-13	6,066.00	0.00	6,334.00	116
125	IRR-1	6,084.64	4.10	6,334.00	108
132	HYD-4	6,087.26	0.00	6,334.00	107
135	J-40	6,085.25	0.00	6,334.00	108
141	J-41	6,066.71	0.00	6,334.00	116

Affinity at Castle Rock

FlexTable: Pipe Table - 20% Tank Storage

Active Scenario: Average Day

ID	Label	Length (Scaled) (ft)	Diameter (in)	Material	Hazen-Williams C	Velocity (ft/s)	Headloss (ft)	Flow (gpm)	Is Closed?
46	P-1	306	12.0	PVC	120.0	0.11	0.00	40.18	False
48	P-2	31	12.0	PVC	120.0	0.11	0.00	40.18	False
49	P-3	40	12.0	PVC	120.0	0.10	0.00	36.71	False
51	P-10	9	8.0	PVC	120.0	0.08	0.00	12.24	False
52	P-15	153	8.0	PVC	120.0	0.07	0.00	11.74	False
82	P-19	124	8.0	PVC	120.0	0.03	0.00	-4.00	False
83	P-16	38	8.0	PVC	120.0	0.06	0.00	-8.90	False
84	P-11	68	8.0	PVC	120.0	0.04	0.00	-6.40	False
85	P-12	58	8.0	PVC	120.0	0.04	0.00	-6.40	False
86	P-6	441	8.0	PVC	120.0	0.07	0.00	-11.30	False
89	P-9	81	12.0	PVC	120.0	0.07	0.00	24.47	False
90	P-4	25	8.0	PVC	120.0	0.14	0.00	21.97	False
91	P-5	112	8.0	PVC	120.0	0.14	0.00	21.97	False
92	P-13	12	8.0	PVC	120.0	0.07	0.00	-11.64	False
93	P-14	112	8.0	PVC	120.0	0.07	0.00	-11.64	False
95	P-21	237	8.0	PVC	120.0	0.02	0.00	2.50	False
104	P-17	193	16.0	Ductile Iron	120.0	0.05	0.00	28.35	False
105	P-20	648	16.0	Ductile Iron	120.0	0.02	0.00	-11.83	False
106	P-18	94	16.0	Ductile Iron	120.0	0.04	0.00	-23.13	False
126	P-24	74	8.0	PVC	120.0	0.07	0.00	-11.64	False
133	P-22	742	8.0	PVC	120.0	0.02	0.00	2.50	False
134	P-23	398	8.0	PVC	120.0	0.02	0.00	2.50	False
136	P-25	18	8.0	PVC	130.0	0.10	0.00	15.74	False
137	P-26	66	8.0	PVC	130.0	0.10	0.00	15.74	False
142	P-7	207	8.0	PVC	120.0	0.07	0.00	-11.30	False
143	P-8	66	16.0	PVC	120.0	0.02	0.00	-11.30	False

Affinity at Castle Rock

FlexTable: Junction Table - 20% Tank Storage

Active Scenario: Max Day

ID	Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
31	J-1	6,078.87	0.00	6,333.99	110
32	J-2	6,082.32	0.00	6,333.98	109
33	J-3	6,083.59	0.00	6,333.98	108
34	HYD-1	6,083.93	0.00	6,333.98	108
35	MFR-1	6,085.39	84.01	6,333.97	108
36	J-5	6,085.70	0.00	6,333.97	107
37	HYD-2	6,085.13	0.00	6,333.98	108
38	J-8	6,085.42	0.00	6,333.98	108
39	HYD-3	6,090.08	0.00	6,333.98	106
40	Comm-3	6,086.66	12.25	6,333.98	107
41	J-10	6,085.74	0.00	6,333.98	107
42	J-11	6,083.81	0.00	6,333.98	108
43	Comm-4	6,082.10	12.25	6,333.98	109
44	J-12	6,068.93	0.00	6,333.99	115
45	J-14	6,069.00	0.00	6,334.00	115
47	Comm-1	6,080.61	8.68	6,333.99	110
50	Comm-2	6,082.57	1.25	6,333.98	109
87	J-13	6,066.00	0.00	6,334.00	116
125	IRR-1	6,084.64	4.10	6,333.98	108
132	HYD-4	6,087.26	0.00	6,333.98	107
135	J-40	6,085.25	0.00	6,333.98	108
141	J-41	6,066.71	0.00	6,334.00	116

Affinity at Castle Rock

FlexTable: Pipe Table - 20% Tank Storage

Active Scenario: Max Day

ID	Label	Length (Scaled) (ft)	Diameter (in)	Material	Hazen-Williams C	Velocity (ft/s)	Headloss (ft)	Flow (gpm)	Is Closed?
46	P-1	306	12.0	PVC	120.0	0.27	0.01	95.68	False
48	P-2	31	12.0	PVC	120.0	0.27	0.00	95.68	False
49	P-3	40	12.0	PVC	120.0	0.25	0.00	87.00	False
51	P-10	9	8.0	PVC	120.0	0.18	0.00	28.09	False
52	P-15	153	8.0	PVC	120.0	0.17	0.00	26.84	False
82	P-19	124	8.0	PVC	120.0	0.05	0.00	-8.05	False
83	P-16	38	8.0	PVC	120.0	0.13	0.00	-20.30	False
84	P-11	68	8.0	PVC	120.0	0.09	0.00	-14.61	False
85	P-12	58	8.0	PVC	120.0	0.09	0.00	-14.61	False
86	P-6	441	8.0	PVC	120.0	0.17	0.01	-26.86	False
89	P-9	81	12.0	PVC	120.0	0.17	0.00	58.91	False
90	P-4	25	8.0	PVC	120.0	0.34	0.00	53.21	False
91	P-5	112	8.0	PVC	120.0	0.34	0.01	53.21	False
92	P-13	12	8.0	PVC	120.0	0.20	0.00	-30.80	False
93	P-14	112	8.0	PVC	120.0	0.20	0.00	-30.80	False
95	P-21	237	8.0	PVC	120.0	0.04	0.00	5.69	False
104	P-17	193	16.0	Ductile Iron	120.0	0.11	0.00	67.50	False
105	P-20	648	16.0	Ductile Iron	120.0	0.04	0.00	-28.18	False
106	P-18	94	16.0	Ductile Iron	120.0	0.09	0.00	-55.04	False
126	P-24	74	8.0	PVC	120.0	0.20	0.00	-30.80	False
133	P-22	742	8.0	PVC	120.0	0.04	0.00	5.69	False
134	P-23	398	8.0	PVC	120.0	0.04	0.00	5.69	False
136	P-25	18	8.0	PVC	130.0	0.22	0.00	34.90	False
137	P-26	66	8.0	PVC	130.0	0.22	0.00	34.90	False
142	P-7	207	8.0	PVC	120.0	0.17	0.01	-26.86	False
143	P-8	66	16.0	PVC	120.0	0.04	0.00	-26.86	False

Affinity at Castle Rock

FlexTable: Junction Table - 20% Tank Storage

Active Scenario: Peak Hour

ID	Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
31	J-1	6,078.87	0.00	6,333.94	110
32	J-2	6,082.32	0.00	6,333.93	109
33	J-3	6,083.59	0.00	6,333.93	108
34	HYD-1	6,083.93	0.00	6,333.92	108
35	MFR-1	6,085.39	190.11	6,333.87	108
36	J-5	6,085.70	0.00	6,333.87	107
37	HYD-2	6,085.13	0.00	6,333.89	108
38	J-8	6,085.42	0.00	6,333.92	108
39	HYD-3	6,090.08	0.00	6,333.93	106
40	Comm-3	6,086.66	27.70	6,333.92	107
41	J-10	6,085.74	0.00	6,333.92	107
42	J-11	6,083.81	0.00	6,333.92	108
43	Comm-4	6,082.10	27.70	6,333.92	109
44	J-12	6,068.93	0.00	6,333.97	115
45	J-14	6,069.00	0.00	6,334.00	115
47	Comm-1	6,080.61	19.64	6,333.94	110
50	Comm-2	6,082.57	2.83	6,333.93	109
87	J-13	6,066.00	0.00	6,334.00	116
125	IRR-1	6,084.64	4.10	6,333.90	108
132	HYD-4	6,087.26	0.00	6,333.92	107
135	J-40	6,085.25	0.00	6,333.91	108
141	J-41	6,066.71	0.00	6,334.00	116

Commercial Business Building Permit

Grease Interceptor Requirement

All Commercial Business Building Permits for new business and construction of new buildings, remodels, or tenant improvement permits will be required to comply with Town Code 13.05, Grease Interceptors Required. Applicant will be required to submit an Industry Information Questionnaire through Plum Creek Water Reclamation Authority (PCWRA) to verify if the business will require an oil/grease interceptor. Please go to the PCWRA website at:

https://www.pcwracolorado.org/pretreatment/commercial_businesses/index.php

CONSTRUCTION DRAWINGS

Please note PCWRA requires all new commercial buildings to provide a stub-out for a separate waste line for future interceptor installation, if not proposed with the project. All drainage fixtures and grease waste lines that are tied to the oil/grease must be shown in the construction drawings as well as the location of the oil/grease.

ACKNOWLEDGEMENT

The applicant must sign and date this form to acknowledge that the applicant has read and understands the Town's Code requirement regarding Grease Interceptors, PCWRA's requirement to complete an Industry Information Questionnaire and Food Service Application, and the Town's requirement that a letter from PCWRA must be provided with the Town of Castle Rock Building Permit. This signed form is required to be included in the Utility Report with the Predevelopment Plan (PDP), Site Development Plan (SDP) and Construction Document (CD) submittals.

Affinity at Castle Rock

Name of Project

1360 Meadows Parkway, Castle Rock, CO 80109

Address of property, if known

Robert Ketner Digitally signed by Robert Ketner DN: C=US, E=robertk@inlandconstruction.com, O=Inland Group, OU=Development, CN=Robert Ketner Date: 2022.11.23 06:25:37-08'00'

Signature

11/23/22

Date

Affinity at Castle Rock

FlexTable: Pipe Table - 20% Tank Storage

Active Scenario: Peak Hour

ID	Label	Length (Scaled) (ft)	Diameter (in)	Material	Hazen-Williams C	Velocity (ft/s)	Headloss (ft)	Flow (gpm)	Is Closed?
46	P-1	306	12.0	PVC	120.0	0.60	0.05	212.50	False
48	P-2	31	12.0	PVC	120.0	0.60	0.01	212.50	False
49	P-3	40	12.0	PVC	120.0	0.55	0.01	192.86	False
51	P-10	9	8.0	PVC	120.0	0.39	0.00	61.42	False
52	P-15	153	8.0	PVC	120.0	0.37	0.02	58.59	False
82	P-19	124	8.0	PVC	120.0	0.11	0.00	-16.56	False
83	P-16	38	8.0	PVC	120.0	0.28	0.00	-44.26	False
84	P-11	68	8.0	PVC	120.0	0.20	0.00	-31.88	False
85	P-12	58	8.0	PVC	120.0	0.20	0.00	-31.88	False
86	P-6	441	8.0	PVC	120.0	0.38	0.05	-59.58	False
89	P-9	81	12.0	PVC	120.0	0.37	0.01	131.44	False
90	P-4	25	8.0	PVC	120.0	0.76	0.01	119.06	False
91	P-5	112	8.0	PVC	120.0	0.76	0.05	119.06	False
92	P-13	12	8.0	PVC	120.0	0.45	0.00	-71.05	False
93	P-14	112	8.0	PVC	120.0	0.45	0.02	-71.05	False
95	P-21	237	8.0	PVC	120.0	0.08	0.00	12.38	False
104	P-17	193	16.0	Ductile Iron	120.0	0.24	0.00	149.90	False
105	P-20	648	16.0	Ductile Iron	120.0	0.10	0.00	-62.60	False
106	P-18	94	16.0	Ductile Iron	120.0	0.19	0.00	-122.18	False
126	P-24	74	8.0	PVC	120.0	0.45	0.01	-71.05	False
133	P-22	742	8.0	PVC	120.0	0.08	0.00	12.38	False
134	P-23	398	8.0	PVC	120.0	0.08	0.00	12.38	False
136	P-25	18	8.0	PVC	130.0	0.48	0.00	75.15	False
137	P-26	66	8.0	PVC	130.0	0.48	0.01	75.15	False
142	P-7	207	8.0	PVC	120.0	0.38	0.02	-59.58	False
143	P-8	66	16.0	PVC	120.0	0.10	0.00	-59.58	False

Affinity at Castle Rock

FlexTable: Junction Table - 20% Tank Storage

Active Scenario: Max Day + Fire Flow

ID	Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
31	J-1	6,078.87	0.00	6,325.26	107
32	J-2	6,082.32	0.00	6,323.40	104
33	J-3	6,083.59	0.00	6,322.04	103
34	HYD-1	6,083.93	1,000.00	6,321.03	103
35	MFR-1	6,085.39	84.01	6,320.54	102
36	J-5	6,085.70	0.00	6,320.51	102
37	HYD-2	6,085.13	1,000.00	6,320.19	102
38	J-8	6,085.42	0.00	6,321.64	102
39	HYD-3	6,090.08	1,000.00	6,315.65	98
40	Comm-3	6,086.66	12.25	6,321.63	102
41	J-10	6,085.74	0.00	6,321.63	102
42	J-11	6,083.81	0.00	6,322.68	103
43	Comm-4	6,082.10	12.25	6,323.56	104
44	J-12	6,068.93	0.00	6,330.50	113
45	J-14	6,069.00	0.00	6,333.35	114
47	Comm-1	6,080.61	8.68	6,324.45	106
50	Comm-2	6,082.57	1.25	6,323.31	104
87	J-13	6,066.00	0.00	6,333.79	116
125	IRR-1	6,084.64	4.10	6,320.92	102
132	HYD-4	6,087.26	1,000.00	6,315.24	99
135	J-40	6,085.25	0.00	6,321.48	102
141	J-41	6,066.71	0.00	6,333.76	116

Affinity at Castle Rock

FlexTable: Pipe Table - 20% Tank Storage

Active Scenario: Max Day + Fire Flow

ID	Label	Length (Scaled) (ft)	Diameter (in)	Material	Hazen-Williams C	Velocity (ft/s)	Headloss (ft)	Flow (gpm)	Is Closed?
46	P-1	306	12.0	PVC	120.0	9.28	8.09	3,270.91	False
48	P-2	31	12.0	PVC	120.0	9.28	0.81	3,270.91	False
49	P-3	40	12.0	PVC	120.0	9.25	1.05	3,262.23	False
51	P-10	9	8.0	PVC	120.0	4.47	0.10	700.60	False
52	P-15	153	8.0	PVC	120.0	4.46	1.67	699.35	False
82	P-19	124	8.0	PVC	120.0	0.21	0.00	33.67	False
83	P-16	38	8.0	PVC	120.0	0.14	0.00	21.42	False
84	P-11	68	8.0	PVC	120.0	5.36	1.05	-839.38	False
85	P-12	58	8.0	PVC	120.0	5.36	0.88	-839.38	False
86	P-6	441	8.0	PVC	120.0	5.44	6.93	-851.63	False
89	P-9	81	12.0	PVC	120.0	7.27	1.36	2,561.63	False
90	P-4	25	8.0	PVC	120.0	9.08	1.01	1,422.43	False
91	P-5	112	8.0	PVC	120.0	2.70	0.48	422.43	False
92	P-13	12	8.0	PVC	120.0	2.16	0.03	338.42	False
93	P-14	112	8.0	PVC	120.0	2.16	0.32	338.42	False
95	P-21	237	8.0	PVC	120.0	7.27	6.39	1,139.20	False
104	P-17	193	16.0	Ductile Iron	120.0	3.67	0.65	2,298.49	False
105	P-20	648	16.0	Ductile Iron	120.0	1.55	0.45	-972.43	False
106	P-18	94	16.0	Ductile Iron	120.0	2.91	0.21	-1,824.05	False
126	P-24	74	8.0	PVC	120.0	4.22	0.73	-661.58	False
133	P-22	742	8.0	PVC	120.0	0.89	0.41	139.20	False
134	P-23	398	8.0	PVC	120.0	5.49	6.39	-860.80	False
136	P-25	18	8.0	PVC	130.0	4.25	0.16	665.68	False
137	P-26	66	8.0	PVC	130.0	4.25	0.57	665.68	False
142	P-7	207	8.0	PVC	120.0	5.44	3.26	-851.63	False
143	P-8	66	16.0	PVC	120.0	1.36	0.04	-851.63	False

Affinity at Castle Rock

FlexTable: Junction Table - 20% Tank Storage

Active Scenario: Max Day + Fire Flow (One Loop Out)

ID	Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
31	J-1	6,078.87	0.00	6,344.17	115
32	J-2	6,082.32	0.00	6,342.51	113
33	J-3	6,083.59	0.00	6,341.79	112
34	HYD-1	6,083.93	1,000.00	6,340.19	111
35	MFR-1	6,085.39	84.01	6,338.55	110
36	J-5	6,085.70	0.00	6,338.40	109
37	HYD-2	6,085.13	1,000.00	6,337.06	109
38	J-8	6,085.42	0.00	6,337.33	109
39	HYD-3	6,090.08	1,000.00	6,287.88	86
40	Comm-3	6,086.66	12.25	6,334.80	107
41	J-10	6,085.74	0.00	6,334.04	107
42	J-11	6,083.81	0.00	6,335.58	109
43	Comm-4	6,082.10	12.25	6,336.87	110
44	J-12	6,068.93	0.00	6,346.97	120
45	J-14	6,069.00	0.00	6,351.40	122
47	Comm-1	6,080.61	8.68	6,343.45	114
50	Comm-2	6,082.57	1.25	6,342.23	112
87	J-13	6,066.00	0.00	6,351.77	124
125	IRR-1	6,084.64	4.10	6,337.20	109
132	HYD-4	6,087.26	1,000.00	6,303.60	94
135	J-40	6,085.25	0.00	6,337.30	109
141	J-41	6,066.71	0.00	6,351.72	123

Affinity at Castle Rock

FlexTable: Pipe Table - 20% Tank Storage

Active Scenario: Max Day + Fire Flow (One Loop Out)

ID	Label	Length (Scaled) (ft)	Diameter (in)	Material	Hazen-Williams C	Velocity (ft/s)	Headloss (ft)	Flow (gpm)	Is Closed?
46	P-1	306	12.0	PVC	120.0	8.73	7.23	3,079.07	False
48	P-2	31	12.0	PVC	120.0	8.73	0.72	3,079.07	False
49	P-3	40	12.0	PVC	120.0	8.71	0.94	3,070.39	False
51	P-10	9	8.0	PVC	120.0	7.99	0.28	1,252.49	False
52	P-15	153	8.0	PVC	120.0	7.99	4.90	1,251.24	False
82	P-19	124	8.0	PVC	120.0	6.26	2.53	981.03	False
83	P-16	38	8.0	PVC	120.0	6.18	0.75	968.78	False
84	P-11	68	8.0	PVC	120.0	6.58	1.53	-1,031.22	False
85	P-12	58	8.0	PVC	120.0	6.58	1.29	-1,031.22	False
86	P-6	441	8.0	PVC	120.0	6.66	10.10	-1,043.47	False
89	P-9	81	12.0	PVC	120.0	5.16	0.72	1,817.91	False
90	P-4	25	8.0	PVC	120.0	11.60	1.60	1,817.91	False
91	P-5	112	8.0	PVC	120.0	5.22	1.64	817.91	False
92	P-13	12	8.0	PVC	120.0	4.68	0.15	733.90	False
93	P-14	112	8.0	PVC	120.0	4.68	1.34	733.90	False
95	P-21	237	8.0	PVC	120.0	0.00	0.00	0.00	True
104	P-17	193	16.0	Ductile Iron	120.0	3.51	0.60	2,197.52	False
105	P-20	648	16.0	Ductile Iron	120.0	1.41	0.37	-881.55	False
106	P-18	94	16.0	Ductile Iron	120.0	3.07	0.23	-1,925.02	False
126	P-24	74	8.0	PVC	120.0	1.70	0.13	-266.10	False
133	P-22	742	8.0	PVC	120.0	6.38	15.71	-1,000.00	False
134	P-23	398	8.0	PVC	120.0	12.77	30.45	-2,000.00	False
136	P-25	18	8.0	PVC	130.0	1.72	0.03	270.20	False
137	P-26	66	8.0	PVC	130.0	1.72	0.11	270.20	False
142	P-7	207	8.0	PVC	120.0	6.66	4.75	-1,043.47	False
143	P-8	66	16.0	PVC	120.0	1.67	0.05	-1,043.47	False

Affinity at Castle Rock

FlexTable: Junction Table - 20% Tank Storage

Active Scenario: Max Day + Fire Flow (One Loop Out)

ID	Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
31	J-1	6,078.87	0.00	6,342.71	114
32	J-2	6,082.32	0.00	6,340.74	112
33	J-3	6,083.59	0.00	6,338.72	110
34	HYD-1	6,083.93	1,000.00	6,338.02	110
35	MFR-1	6,085.39	84.01	6,337.93	109
36	J-5	6,085.70	0.00	6,337.93	109
37	HYD-2	6,085.13	1,000.00	6,337.90	109
38	J-8	6,085.42	0.00	6,340.56	110
39	HYD-3	6,090.08	1,000.00	6,320.60	100
40	Comm-3	6,086.66	12.25	6,341.97	110
41	J-10	6,085.74	0.00	6,342.42	111
42	J-11	6,083.81	0.00	6,343.22	112
43	Comm-4	6,082.10	12.25	6,343.90	113
44	J-12	6,068.93	0.00	6,349.26	121
45	J-14	6,069.00	0.00	6,351.31	122
47	Comm-1	6,080.61	8.68	6,341.86	113
50	Comm-2	6,082.57	1.25	6,340.73	112
87	J-13	6,066.00	0.00	6,351.80	124
125	IRR-1	6,084.64	4.10	6,339.24	110
132	HYD-4	6,087.26	1,000.00	6,304.89	94
135	J-40	6,085.25	0.00	6,340.27	110
141	J-41	6,066.71	0.00	6,351.78	123

Affinity at Castle Rock

FlexTable: Pipe Table - 20% Tank Storage

Active Scenario: Max Day + Fire Flow (One Loop Out)

ID	Label	Length (Scaled) (ft)	Diameter (in)	Material	Hazen-Williams C	Velocity (ft/s)	Headloss (ft)	Flow (gpm)	Is Closed?
46	P-1	306	12.0	PVC	120.0	9.59	8.60	3,381.63	False
48	P-2	31	12.0	PVC	120.0	9.59	0.86	3,381.63	False
49	P-3	40	12.0	PVC	120.0	9.57	1.12	3,372.95	False
51	P-10	9	8.0	PVC	120.0	1.31	0.01	205.98	False
52	P-15	153	8.0	PVC	120.0	1.31	0.17	204.73	False
82	P-19	124	8.0	PVC	120.0	4.57	1.41	-716.41	False
83	P-16	38	8.0	PVC	120.0	4.65	0.45	-728.66	False
84	P-11	68	8.0	PVC	120.0	4.65	0.81	-728.66	False
85	P-12	58	8.0	PVC	120.0	4.65	0.68	-728.66	False
86	P-6	441	8.0	PVC	120.0	4.73	5.36	-740.91	False
89	P-9	81	12.0	PVC	120.0	8.98	2.02	3,166.97	False
90	P-4	25	8.0	PVC	120.0	7.45	0.70	1,166.97	False
91	P-5	112	8.0	PVC	120.0	1.07	0.09	166.97	False
92	P-13	12	8.0	PVC	120.0	0.53	0.00	82.96	False
93	P-14	112	8.0	PVC	120.0	0.53	0.02	82.96	False
95	P-21	237	8.0	PVC	120.0	12.77	18.12	2,000.00	False
104	P-17	193	16.0	Ductile Iron	120.0	3.76	0.69	2,358.20	False
105	P-20	648	16.0	Ductile Iron	120.0	1.63	0.49	-1,023.44	False
106	P-18	94	16.0	Ductile Iron	120.0	2.82	0.20	-1,764.34	False
126	P-24	74	8.0	PVC	120.0	5.85	1.33	-917.04	False
133	P-22	742	8.0	PVC	120.0	6.38	15.71	1,000.00	False
134	P-23	398	8.0	PVC	120.0	0.00	0.00	0.00	True
136	P-25	18	8.0	PVC	130.0	5.88	0.29	921.14	False
137	P-26	66	8.0	PVC	130.0	5.88	1.03	921.14	False
142	P-7	207	8.0	PVC	120.0	4.73	2.52	-740.91	False
143	P-8	66	16.0	PVC	120.0	1.18	0.03	-740.91	False

APPENDIX D

WASTEWATER FLOWS

SANITARY SEWER DEMAND CALCULATIONS

HRGreen

Project #: 211400 | Location: Castle Rock, CO | By A Zara | Date 12/8/2022

Project: Affinity at Castle Rock | Plan Date: Final | Checked R Littleton | Date

				Residential					Commercial (Office / Small Business / Restaurant)					Totals						Pipe Parameters							
Design Point	Location	Land Use	Area (sq-ft)	Units	Single Family Equivalent (SFE)	Average Day Flow (gpm)	Average Day Flow (mgd)	Average Day Flow (cfs)	Units	Single Family Equivalent (SFE)	Average Day Flow (gpm)	Average Day Flow (mgd)	Average Day Flow (cfs)	Peaking Factor	Peak Flow (gpm)	Infiltration / Inflow (gpm)	Peak Flow + I/I (gpm)	Peak Flow + I/I (mgpd)	Peak Flow + I/I (cfs)	Total SFE	Upstream MH ID	Downstream MH ID	Pipe Slope (%)	Pipe Size (in)	Full Pipe flow (gpm)	Maximum Capacity 75% full (gpm)	Ratio PDF/ 75% Capacity
1	Comm 1	Car Wash	5,000						1	25.0	3.5	0.005	0.008	5.0	17.4	0.3	**17.7**	0.026	0.039								
	Comm 2	Retail	3,600						1	1.8	0.3	0.000	0.001	5.0	1.3	0.0	**1.3**	0.002	0.003								
	Total at Desigh Point								2	26.8	3.7	0.005	0.008	5.0	18.6	0.4	**19.0**	0.027	0.042	26.8	SS-10	SS-9	0.4	8	405.4	369.7	5.1%
2	MFR 1	Multi-Family		174	113.1	15.7	0.023	0.035						5.0	78.5	1.6	**80.1**	0.115	0.178								
	MFR 2	Fitness	6,300						1	7.9	2.2	0.003	0.005	5.0	10.9	0.2	**11.2**	0.016	0.025								
	Total at Desigh Point			174	113.1	15.7	0.023	0.035	3	34.7	5.9	0.009	0.013	5.0	108.1	2.2	**110.3**	0.159	0.246	147.8	SS-12	SS-7	0.4	8	405.4	369.7	29.8%
3	Comm 3/4	Restaurant	4,700						1	35.3	4.9	0.007	0.011	5.0	24.5	0.5	**25.0**	0.036	0.056								
	Total at Desigh Point			174	113.1	15.7	0.023	0.035	4	69.9	10.8	0.016	0.024	5.0	132.6	2.7	**135.2**	0.195	0.301	183.0	SS-2	SS-1	0.4	8	405.4	369.7	36.6%
4	Total Upstream Demands (DP 2, F17 Report)					151.0	0.217	0.336						4.6	688.6	15.1	**703.7**	1.013	1.568								
	Total in Existing Pipe			174	113.1	166.7	0.240	0.371	4	69.9	10.8	0.016	0.024	4.6	814.8	17.8	**832.5**	1.199	1.855		SS-1	SS-0	0.5	12	1336.2	1218.5	68.3%

APPENDIX E

WASTEWATER HYDRAULIC MODELING

Worksheet for 8-in Pipe - 75% Full

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.011	
Channel Slope	0.40	%
Normal Depth	6.0	in
Diameter	8	in

Results

Discharge	369.7	gal/min
Flow Area	0.28	ft²
Wetted Perimeter	1.40	ft
Hydraulic Radius	2.4	in
Top Width	0.58	ft
Critical Depth	0.43	ft
Percent Full	75.0	%
Critical Slope	0.60	%
Velocity	2.93	ft/s
Velocity Head	0.13	ft
Specific Energy	0.63	ft
Froude Number	0.74	
Maximum Discharge	436.1	gal/min
Discharge Full	405.4	gal/min
Slope Full	0.33	%
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.0	in
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.0	in
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	75.00	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	6.0	in
Critical Depth	0.43	ft
Channel Slope	0.40	%
Critical Slope	0.60	%

Worksheet for 8-in Pipe - Full Flow

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.011	
Channel Slope	0.40	%
Normal Depth	8.0	in
Diameter	8	in
Discharge	405.4	gal/min

Results

Discharge	405.4	gal/min
Normal Depth	8.0	in
Flow Area	0.35	ft²
Wetted Perimeter	2.09	ft
Hydraulic Radius	2.0	in
Top Width	0.00	ft
Critical Depth	0.45	ft
Percent Full	100.0	%
Critical Slope	0.63	%
Velocity	2.59	ft/s
Velocity Head	0.10	ft
Specific Energy	0.77	ft
Froude Number	0.00	
Maximum Discharge	436.1	gal/min
Discharge Full	405.4	gal/min
Slope Full	0.40	%
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.0	in
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.0	in
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	100.00	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	8.0	in
Critical Depth	0.45	ft
Channel Slope	0.40	%
Critical Slope	0.63	%

Worksheet for 12-in Pipe - 75% Full

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.011	
Channel Slope	0.50	%
Normal Depth	9.0	in
Diameter	12	in

Results

Discharge	1218.5	gal/min
Flow Area	0.63	ft²
Wetted Perimeter	2.09	ft
Hydraulic Radius	3.6	in
Top Width	0.87	ft
Critical Depth	0.71	ft
Percent Full	75.0	%
Critical Slope	0.58	%
Velocity	4.30	ft/s
Velocity Head	0.29	ft
Specific Energy	1.04	ft
Froude Number	0.89	
Maximum Discharge	1437.4	gal/min
Discharge Full	1336.2	gal/min
Slope Full	0.42	%
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.0	in
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.0	in
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	75.00	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	9.0	in
Critical Depth	0.71	ft
Channel Slope	0.50	%
Critical Slope	0.58	%

Worksheet for 12-in Pipe - Full Flow

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.011	
Channel Slope	0.50	%
Normal Depth	12.0	in
Diameter	12	in
Discharge	1336.2	gal/min

Results

Discharge	1336.2	gal/min
Normal Depth	12.0	in
Flow Area	0.79	ft²
Wetted Perimeter	3.14	ft
Hydraulic Radius	3.0	in
Top Width	0.00	ft
Critical Depth	0.74	ft
Percent Full	100.0	%
Critical Slope	0.62	%
Velocity	3.79	ft/s
Velocity Head	0.22	ft
Specific Energy	1.22	ft
Froude Number	0.00	
Maximum Discharge	1437.4	gal/min
Discharge Full	1336.2	gal/min
Slope Full	0.50	%
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.0	in
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.0	in
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	100.00	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	12.0	in
Critical Depth	0.74	ft
Channel Slope	0.50	%
Critical Slope	0.62	%

Worksheet for Design Point 1 (SS-10 to SS-9) ADF

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.011	
Channel Slope	0.40	%
Diameter	8	in
Discharge	3.7	gal/min

Results

Normal Depth	0.5	in
Flow Area	0.01	ft²
Wetted Perimeter	0.35	ft
Hydraulic Radius	0.4	in
Top Width	0.34	ft
Critical Depth	0.04	ft
Percent Full	6.8	%
Critical Slope	0.61	%
Velocity	0.80	ft/s
Velocity Head	0.01	ft
Specific Energy	0.06	ft
Froude Number	0.81	
Maximum Discharge	436.1	gal/min
Discharge Full	405.4	gal/min
Slope Full	0.00	%
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.0	in
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.0	in
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	6.79	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.5	in
Critical Depth	0.04	ft
Channel Slope	0.40	%
Critical Slope	0.61	%

Worksheet for Design Point 1 (SS-10 to SS-9) PDF

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.011	
Channel Slope	0.40	%
Diameter	8	in
Discharge	3.7	gal/min

Results

Normal Depth	0.5	in
Flow Area	0.01	ft²
Wetted Perimeter	0.35	ft
Hydraulic Radius	0.4	in
Top Width	0.34	ft
Critical Depth	0.04	ft
Percent Full	6.8	%
Critical Slope	0.61	%
Velocity	0.80	ft/s
Velocity Head	0.01	ft
Specific Energy	0.06	ft
Froude Number	0.81	
Maximum Discharge	436.1	gal/min
Discharge Full	405.4	gal/min
Slope Full	0.00	%
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.0	in
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.0	in
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	6.79	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.5	in
Critical Depth	0.04	ft
Channel Slope	0.40	%
Critical Slope	0.61	%

Worksheet for Design Point 2 (SS-12 to SS-7) ADF

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.011	
Channel Slope	0.40	%
Diameter	8	in
Discharge	21.6	gal/min

Results

Normal Depth	1.3	in
Flow Area	0.04	ft²
Wetted Perimeter	0.54	ft
Hydraulic Radius	0.8	in
Top Width	0.48	ft
Critical Depth	0.10	ft
Percent Full	15.7	%
Critical Slope	0.50	%
Velocity	1.37	ft/s
Velocity Head	0.03	ft
Specific Energy	0.13	ft
Froude Number	0.90	
Maximum Discharge	436.1	gal/min
Discharge Full	405.4	gal/min
Slope Full	0.00	%
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.0	in
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.0	in
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	15.68	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.3	in
Critical Depth	0.10	ft
Channel Slope	0.40	%
Critical Slope	0.50	%

Worksheet for Design Point 2 (SS-12 to SS-7) PDF

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.011	
Channel Slope	0.40	%
Diameter	8	in
Discharge	110.3	gal/min

Results

Normal Depth	2.9	in
Flow Area	0.11	ft²
Wetted Perimeter	0.85	ft
Hydraulic Radius	1.6	in
Top Width	0.64	ft
Critical Depth	0.23	ft
Percent Full	35.7	%
Critical Slope	0.46	%
Velocity	2.20	ft/s
Velocity Head	0.08	ft
Specific Energy	0.31	ft
Froude Number	0.93	
Maximum Discharge	436.1	gal/min
Discharge Full	405.4	gal/min
Slope Full	0.03	%
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.0	in
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.0	in
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	35.67	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	2.9	in
Critical Depth	0.23	ft
Channel Slope	0.40	%
Critical Slope	0.46	%

Worksheet for Design Point 3 (SS-2 to SS-1) ADF

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.011	
Channel Slope	0.40	%
Diameter	8	in
Discharge	26.5	gal/min

Results

Normal Depth	1.4	in
Flow Area	0.04	ft²
Wetted Perimeter	0.57	ft
Hydraulic Radius	0.8	in
Top Width	0.50	ft
Critical Depth	0.11	ft
Percent Full	17.3	%
Critical Slope	0.49	%
Velocity	1.46	ft/s
Velocity Head	0.03	ft
Specific Energy	0.15	ft
Froude Number	0.91	
Maximum Discharge	436.1	gal/min
Discharge Full	405.4	gal/min
Slope Full	0.00	%
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.0	in
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.0	in
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	17.32	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.4	in
Critical Depth	0.11	ft
Channel Slope	0.40	%
Critical Slope	0.49	%

Worksheet for Design Point 3 (SS-2 to SS-1)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.011	
Channel Slope	0.40	%
Diameter	8	in
Discharge	135.2	gal/min

Results

Normal Depth	3.2	in
Flow Area	0.13	ft²
Wetted Perimeter	0.91	ft
Hydraulic Radius	1.7	in
Top Width	0.65	ft
Critical Depth	0.25	ft
Percent Full	39.8	%
Critical Slope	0.47	%
Velocity	2.33	ft/s
Velocity Head	0.08	ft
Specific Energy	0.35	ft
Froude Number	0.92	
Maximum Discharge	436.1	gal/min
Discharge Full	405.4	gal/min
Slope Full	0.04	%
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.0	in
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.0	in
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	39.81	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	3.2	in
Critical Depth	0.25	ft
Channel Slope	0.40	%
Critical Slope	0.47	%

Worksheet for Design Point 4 (EXISTING) ADF

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.011	
Channel Slope	0.50	%
Diameter	12	in
Discharge	177.5	gal/min

Results

Normal Depth	3.0	in
Flow Area	0.15	ft²
Wetted Perimeter	1.04	ft
Hydraulic Radius	1.7	in
Top Width	0.86	ft
Critical Depth	0.26	ft
Percent Full	24.6	%
Critical Slope	0.40	%
Velocity	2.63	ft/s
Velocity Head	0.11	ft
Specific Energy	0.35	ft
Froude Number	1.11	
Maximum Discharge	1437.4	gal/min
Discharge Full	1336.2	gal/min
Slope Full	0.01	%
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.0	in
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.0	in
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	24.62	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	3.0	in
Critical Depth	0.26	ft
Channel Slope	0.50	%
Critical Slope	0.40	%

Worksheet for Design Point 4 (EXISTING) PDF

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.011	
Channel Slope	0.50	%
Diameter	12	in
Discharge	832.5	gal/min

Results

Normal Depth	6.9	in
Flow Area	0.46	ft²
Wetted Perimeter	1.71	ft
Hydraulic Radius	3.2	in
Top Width	0.99	ft
Critical Depth	0.58	ft
Percent Full	57.2	%
Critical Slope	0.48	%
Velocity	4.00	ft/s
Velocity Head	0.25	ft
Specific Energy	0.82	ft
Froude Number	1.03	
Maximum Discharge	1437.4	gal/min
Discharge Full	1336.2	gal/min
Slope Full	0.19	%
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.0	in
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.0	in
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	57.17	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	6.9	in
Critical Depth	0.58	ft
Channel Slope	0.50	%
Critical Slope	0.48	%

APPENDIX F

MAPS AND PLANS

HRGreen

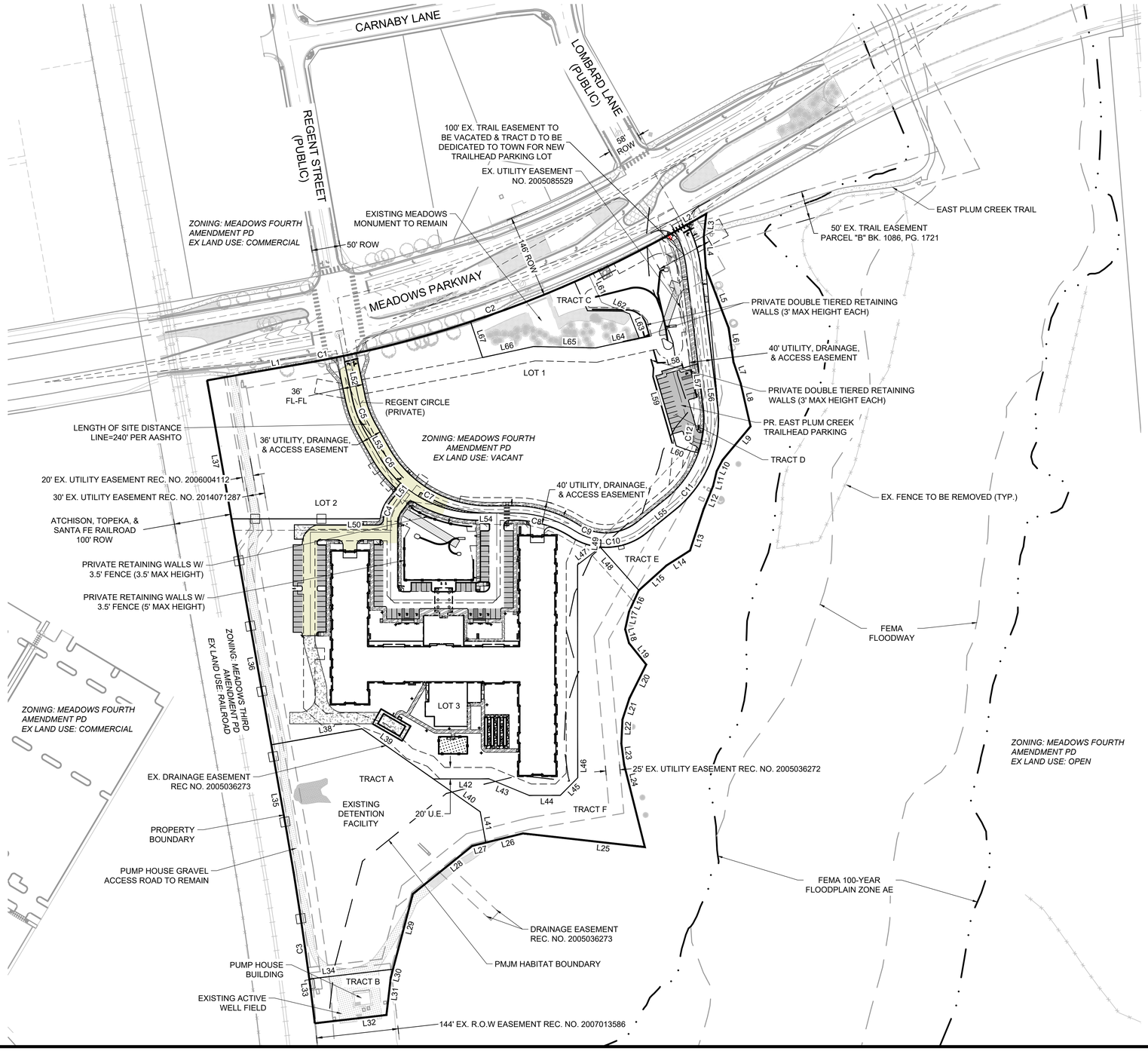
HRGreen.com

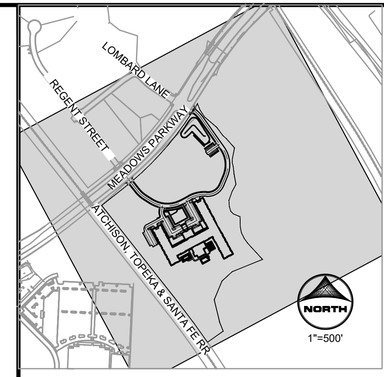
AFFINITY AT CASTLE ROCK
PRELIM. UTILITY REPORT
VICINITY MAP

SHEET
1

SCALE: 1"=500'
DATE: 12/2022

HR GREEN Xrefs: xx-XV-Aerial; xv-row; xc-dsgn; xv-FEMA; xv-FEMA-original





KEYMAP:

CONSTRUCTION NOTES:

1. WHERE CONSTRUCTION DETAILS AND SPECIFICATIONS ARE NOTED ON THESE PLANS, USE THE TOWN OF CASTLE ROCK STANDARDS AND SPECIFICATIONS FOR DESIGN AND CONSTRUCTION.
2. ALL STREETS INTERNAL TO THE SITE ARE PRIVATE.
3. REFER TO SHEET 2 FOR GENERAL NOTES.
4. REFER TO SHEET 3 FOR TYPICAL SECTIONS AND PAVEMENT SECTIONS. PAVEMENT SECTIONS SHALL UTILIZE THE SOIL TYPES 1 & 3 ASPHALT SECTION, UNLESS NOTED OTHERWISE. PROPOSED PAVEMENT SECTIONS ARE BASED ON GEOTECHNICAL RECOMMENDATIONS AS PREPARED BY ENTECH ENGEERING, INC., DATED JULY 31, 2022.
5. BUILDING, HARDSCAPE, AND DECORATIVE PAVING IS SHOWN FOR INFORMATION ONLY. REFER TO ARCHITECTURAL AND LANDSCAPE PLANS FOR INFORMATION BETWEEN THE BACK OF CURB OR SIDEWALK AND THE BUILDING.

LEGEND

- ROW/PROPERTY LINE
- PROPERTY BOUNDARY
- EASEMENT
- SETBACK
- SIGHT DISTANCE LINE
- SAFETY TRIANGLE
- ADA ACCESSIBLE ROUTE
- FIRE HYDRANT
- STREET LIGHT
- EXISTING STREET LIGHT
- FEMA 100-YR FLOODPLAIN
- FEMA FLOODWAY
- 100' OFFSET PMJM HABITAT BOUNDARY
- SECTION LINE
- SOIL TYPES 2 & 4 ASPHALT SECTION
- PARKING STALL ASPHALT SECTION
- CONCRETE PAVEMENT SECTION

TOWN OF CASTLE ROCK APPROVAL
PLANS ARE HEREBY APPROVED FOR ONE YEAR FROM DATE OF DEVELOPMENT SERVICES APPROVAL

APPROVED BY:

DEVELOPMENT SERVICES DATE

PROFESSIONAL ENGINEER CERTIFICATION:

I HEREBY AFFIRM THAT THESE FINAL CONSTRUCTION PLANS WERE PREPARED UNDER MY DIRECT SUPERVISION, IN ACCORDANCE WITH ALL APPLICABLE TOWN OF CASTLE ROCK AND STATE OF COLORADO STANDARDS AND STATUTES, RESPECTIVELY; AND THAT I AM FULLY RESPONSIBLE FOR ALL DESIGN AND REVISIONS RELATIVE TO SAID PLANS.

ALEX ZARA, PE
STATE OF COLORADO No. 55811
EMAIL: AZARA@HRGREEN.COM
FOR AND ON BEHALF OF HR GREEN DEVELOPMENT, LLC

NO.	DATE	BY	REVISION DESCRIPTION

HR GREEN - DENVER
5619 DTC PARKWAY
SUITE 1150
DENVER CO 80111
PHONE: 720.602.4999
FAX: 844.273.1057
HRGreen

CONSTRUCTION DRAWINGS
GENERAL SITE PLAN

AFFINITY AT CASTLE ROCK
CASTLE ROCK DEVELOPMENT CO.
CASTLE ROCK, COLORADO

CAD DATE: 1/26/2023
CAD FILE: J:\2021\211400\CAD\Dwgs\C\CDs\01-Overall_SITE_Plan

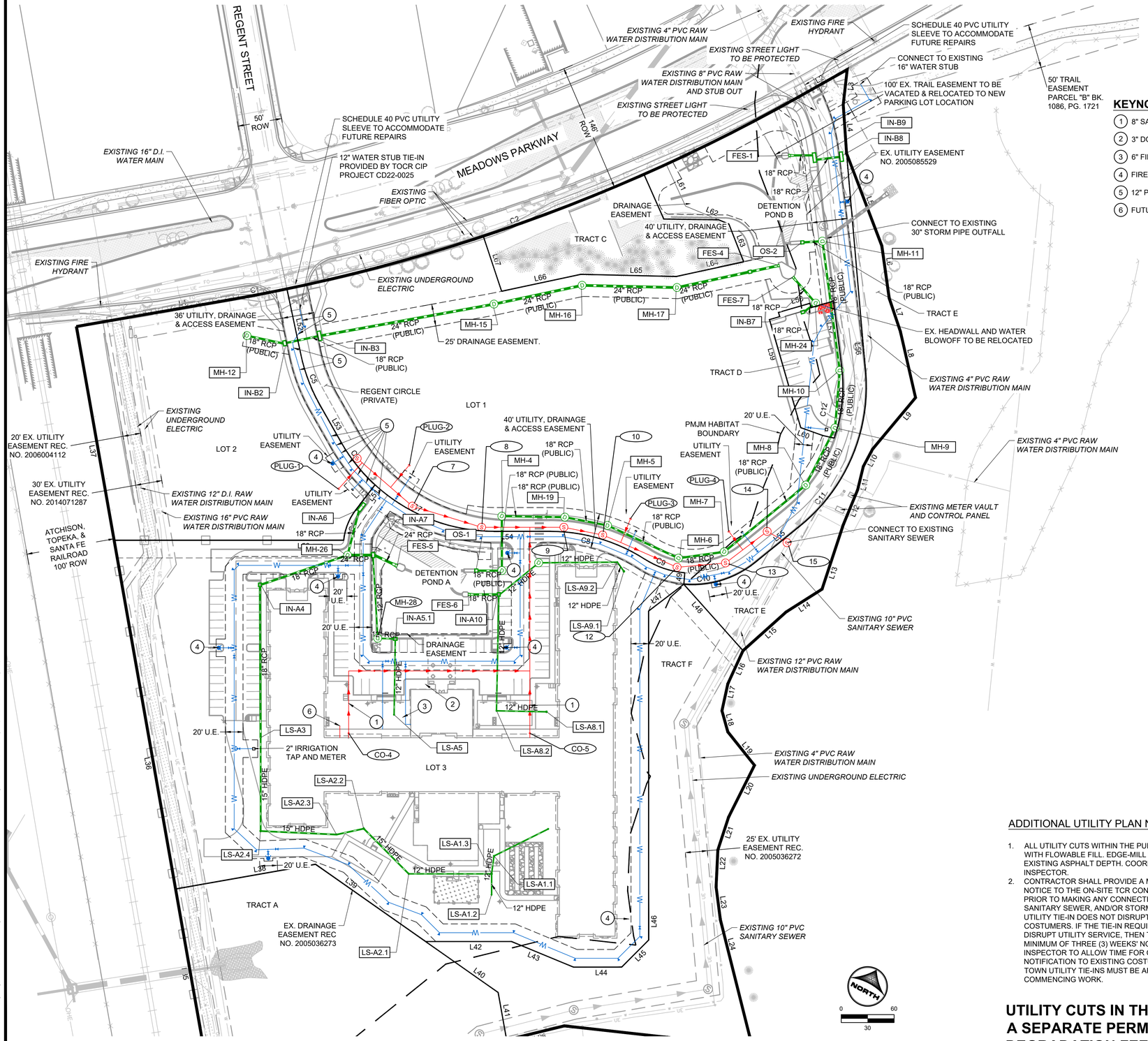
BAR IS ONE INCH ON OFFICIAL DRAWINGS
0 1"
IF NOT ONE INCH, ADJUST SCALE ACCORDINGLY

DRAWN BY:	STM
APPROVED:	AJZ
JOB DATE:	1/18/2023
JOB NO:	211400

SHEET SP1

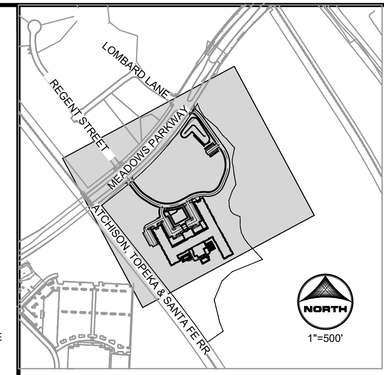
6 OF 81

HR GREEN Xrefs: xx-dwgn: xg-1-ARCH-DV01; xc-dwgn: xc-row: xx-row: xx-FEMA: xx-FEMA-original: XG-LineCurve: xg-1-DV01-CD: XG-keymap-CD-OSP: XG-keymap



KEYNOTES

1. 8" SANITARY SEWER SERVICE
2. 3" DOMESTIC WATER SERVICE
3. 6" FIRE SERVICE
4. FIRE HYDRANT
5. 12" PVC WATERMAIN
6. FUTURE INTERCEPTOR INSTALLATION SERVICE



KEYMAP:

NOTES

1. ALL PROPOSED EASEMENTS MUST BE RECORDED PRIOR TO ISSUANCE OF CONSTRUCTION PERMITS.
2. THE MINIMUM SEPARATION BETWEEN WATERLINES, SANITARY 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 MEADOWS YELLOW WATER PRESSURE ZONE.
5. STORM SEWER IS PRIVATE UNLESS OTHERWISE NOTED.
6. ALL SANITARY SEWER IS 8" PVC AND PUBLIC UNLESS OTHERWISE NOTED.
7. ALL WATER IS 8" PVC AND PUBLIC UNLESS OTHERWISE NOTED.

LEGEND

- PR. STORM MANHOLE
- PR. STORM INLET
- PR. STORM SEWER
- PR. SANITARY SEWER MANHOLE
- PR. SANITARY SEWER
- PR. WATERMAIN
- EX. STORM MANHOLE
- EX. STORM INLET
- EX. STORM SEWER
- EX. SANITARY SEWER MANHOLE
- EX. SANITARY SEWER
- EX. WATERMAIN
- EX. FIRE HYDRANT
- PR. FIRE HYDRANT
- PR. WATER VALVE
- PR. THRUST BLOCK
- PR. WATER METER
- FLOW ARROW
- STORM STRUCTURE CALLOUT (SD-X)
- SANITARY STRUCTURE CALLOUT (SS-X)

TOWN OF CASTLE ROCK APPROVAL
PLANS ARE HEREBY APPROVED FOR ONE YEAR FROM DATE OF DEVELOPMENT SERVICES APPROVAL

APPROVED BY:

DEVELOPMENT SERVICES DATE

PROFESSIONAL ENGINEER CERTIFICATION:

I HEREBY AFFIRM THAT THESE FINAL CONSTRUCTION PLANS WERE PREPARED UNDER MY DIRECT SUPERVISION, IN ACCORDANCE WITH ALL APPLICABLE TOWN OF CASTLE ROCK AND STATE OF COLORADO STANDARDS AND STATUTES, RESPECTIVELY; AND THAT I AM FULLY RESPONSIBLE FOR ALL DESIGN AND REVISIONS RELATIVE TO SAID PLANS.

ALEX ZARA, PE
STATE OF COLORADO No. 55811
EMAIL: AZARA@HRGREEN.COM
FOR AND ON BEHALF OF HR GREEN DEVELOPMENT, LLC

ADDITIONAL UTILITY PLAN NOTES:

1. ALL UTILITY CUTS WITHIN THE PUBLIC RIGHT-OF-WAY SHALL BE FILLED WITH FLOWABLE FILL. EDGE-MILL PERIMETER OF SAWCUT. MATCH EXISTING ASPHALT DEPTH. COORDINATE WITH PUBLIC WORKS INSPECTOR.
2. CONTRACTOR SHALL PROVIDE A MINIMUM SEVENTY TWO (72) HOURS' NOTICE TO THE ON-SITE TCR CONSTRUCTION INSPECTOR, (720) 733-2200, PRIOR TO MAKING ANY CONNECTIONS OR TIE-INS TO EXISTING WATER, SANITARY SEWER, AND/OR STORM SEWER SYSTEMS PROVIDED THAT THE UTILITY TIE-IN DOES NOT DISRUPT SERVICE TO EXISTING CR WATER COSTUMERS. IF THE TIE-IN REQUIRES A LINE SHUTDOWN, OR WILL DISRUPT UTILITY SERVICE, THEN THE CONTRACTOR SHALL PROVIDE A MINIMUM OF THREE (3) WEEKS' NOTICE TO THE TCR CONSTRUCTION INSPECTOR TO ALLOW TIME FOR CR WATER TO PROVIDE WRITTEN NOTIFICATION TO EXISTING COSTUMERS AFFECTED BY THE TIE-IN. ALL TOWN UTILITY TIE-INS MUST BE APPROVED BY CR WATER PRIOR TO COMMENCING WORK.

UTILITY CUTS IN THE ROW REQUIRE A SEPARATE PERMIT. ROADWAY DEGRADATION FEES WILL BE APPLIED.

NO.	DATE	BY	REVISION DESCRIPTION

HR GREEN - DENVER
5619 DTC PARKWAY
SUITE 1150
DENVER CO 80111
PHONE: 720.602.4999
FAX: 844.273.1057
HRGreen

CONSTRUCTION DRAWINGS
GENERAL UTILITY PLAN

AFFINITY AT CASTLE ROCK
CASTLE ROCK DEVELOPMENT CO.
CASTLE ROCK, COLORADO

CAD DATE: 1/26/2023
CAD FILE: J:\2021\211400\CAD\Dwgs\CtDs\01-General_Utility_Plan

BAR IS ONE INCH ON OFFICIAL DRAWINGS
0 1"
IF NOT ONE INCH, ADJUST SCALE ACCORDINGLY

DRAWN BY:	STM
APPROVED:	AJZ
JOB DATE:	1/26/2023
JOB NO:	211400

SHEET UT1

21 OF 81

HR GREEN Xrefs: xv-dsgn: xgl-1-ARCH-DV01 ; xc-dsgn: xc-row: xv-row: xv-util1: xv-util2: XG-LineCurve: xgl-1-DV01-CD: XG-keymap-CD-OUP: XG-keymap

PUBLIC AND PRIVATE IMPROVEMENT CONSTRUCTION PLANS
AFFINITY AT CASTLE ROCK
THE MEADOWS FILING NO. 17, AREA NO. 3
A PARCEL LOCATED IN THE SOUTH HALF OF SECTION 27, AND THE NORTH HALF OF SECTION 34, TOWNSHIP 7 SOUTH, RANGE 67 WEST OF THE 6TH PRINCIPAL MERIDIAN, TOWN OF CASTLE ROCK, DOUGLAS COUNTY, STATE OF COLORADO
TOWN OF CASTLE ROCK PROJECT NO. CD22-0053

MPi Designs
PO BOX 369 • AULT, CO • 80610
970-402-3047
Michelle@MPiDesignsllc.com

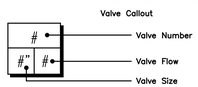
IRRIGATION_SCHEDULE

SYMBOL	MANUFACTURER/MODEL/DESCRIPTION	PSI
15 Q, 15 T, 15 H, 15 TT, 15 TQ, 15 F	HUNTER PROS-12-PRS30-CV 15` RADIUS TURF SPRAY, 30 PSI REGULATED 12" POP-UP. WITH FACTORY INSTALLED DRAIN CHECK VALVE. CO-MOLDED WIPER SEAL WITH UV RESISTANT MATERIAL.	30
17 Q, 17 H	HUNTER PROS-12-PRS30-CV 17` RADIUS TURF SPRAY, 30 PSI REGULATED 12" POP-UP. WITH FACTORY INSTALLED DRAIN CHECK VALVE. CO-MOLDED WIPER SEAL WITH UV RESISTANT MATERIAL.	30
M, L, O	HUNTER MP1000 PROS-12-PRS40-CV TURF ROTATOR, 12" POP-UP WITH CHECK VALVE, PRESSURE REGULATED TO 40 PSI, MP ROTATOR NOZZLE ON PRS40 BODY. M=MAROON ADJ ARC 90 TO 210, L=LIGHT BLUE 210 TO 270 ARC, O=OLIVE 360 ARC.	40
K, G, R	HUNTER MP2000 PROS-12-PRS40-CV TURF ROTATOR, 12" POP-UP WITH FACTORY INSTALLED CHECK VALVE, PRESSURE REGULATED TO 40 PSI, MP ROTATOR NOZZLE ON PRS40 BODY. K=BLACK ADJ ARC 90-210, G=GREEN ADJ ARC 210-270, R=RED 360 ARC.	40
B, Y, A	HUNTER MP3000 PROS-12-PRS40-CV TURF ROTATOR, 12" POP-UP WITH FACTORY INSTALLED CHECK VALVE, PRESSURE REGULATED TO 40 PSI, MP ROTATOR NOZZLE ON PRS40 BODY. B=BLUE ADJ ARC 90-210, Y=YELLOW ADJ ARC 210-270, A=GRAY 360 ARC.	40
LB	HUNTER MP3500 PROS-12-PRS40-CV TURF ROTATOR, 12" POP-UP WITH FACTORY INSTALLED CHECK VALVE, PRESSURE REGULATED TO 40 PSI, MP ROTATOR NOZZLE ON PRS40 BODY. LB=LIGHT BROWN ADJUSTABLE ARC, 90-210. *SPRAY HEADS IN TURF AREAS TO BE 6" RISERS*	40

SYMBOL	MANUFACTURER/MODEL/DESCRIPTION
	RAIN BIRD XCZ-100-PRB-COM WIDE FLOW DRIP CONTROL KIT FOR COMMERCIAL APPLICATIONS. 1" BALL VALVE WITH 1" PESB VALVE AND 1" PRESSURE REGULATING 40PSI QUICK-CHECK BASKET FILTER 0.3 GPM-20 GPM
	DRIP FLUSH VALVE 3/4" PVC BALL VALVE - OPERATIONAL INDICATOR TO BE INSTALLED ON EACH ZONE PER TofCR DETAILS.

SYMBOL	MANUFACTURER/MODEL/DESCRIPTION
	REMOTE CONTROL VALVE ASSEMBLY HUNTER ICV-G-FS: 1", 1-1/2", 2", AND 3" PLASTIC ELECTRIC REMOTE CONTROL VALVES, GLOBE CONFIGURATION, WITH NPT THREADED INLET/OUTLET, FOR COMMERCIAL/MUNICIPAL USE. WITH FILTER SENTRY.
	QUICK COUPLER ASSEMBLY RAIN BIRD 5-RC: 1" BRASS QUICK-COUPLING VALVE, WITH CORROSION-RESISTANT STAINLESS STEEL SPRING, THERMOPLASTIC RUBBER COVER, AND 1-PIECE BODY.
	ISOLATION GATE VALVE ASSEMBLY MATCO-NORCA 514TX: 1/2"-4" BRASS GATE VALVE, FULL PORT, WITH SOLID WEDGE. IPS. CROSS HANDLE. SAME SIZE AS MAINLINE PIPE.
	MASTER VALVE ASSEMBLY BUCKNER-SUPERIOR 3100-PRS: NORMALLY OPEN BRASS MASTER VALVE THAT PROVIDES DIRTY WATER PROTECTION. SIZE PER POC. PRESSURE REGULATION FEATURE. REGULATE TO 70 PSI. ADJUST AS NECESSARY.
	REDUCED PRESSURE BACKFLOW PREVENTER FEBCO 825YA: SIZED TO MATCH POC METER SIZE. REDUCED PRESSURE BACKFLOW PREVENTER IN STRONG BOX SBBC-30AL: LOW PROFILE BACKFLOW ENCLOSURE, WITH MARINE GRADE ALUMINUM. 30"L, 30"H, 16.25"W (76.2CM L, 76.2CM H, 41.275CM W).
A	PEDESTAL MOUNT 2-WIRE CONTROLLER HUNTER PED-SS-A2C-75D-SS:75-STATION DECODER CONTROLLER IN AN OUTDOOR STAINLESS STEEL PEDESTAL. INSTALL WIRELESS RAIN SENSOR AND SOLAR SYNC
B	PEDESTAL MOUNT TRADITIONAL HUNTER A2C-2400-SS: 24-STATION CONTROLLER WITH TWO (2) A2M-600 MODULES IN AN OUTDOOR STAINLESS STEEL PEDSTAL. INSTALL WIRELESS RAIN SENSOR AND SOLAR SYNC
F	CREATIVE SENSOR TECHNOLOGY FSI-T 1" PVC TEE TYPE FLOW SENSOR W/SOCKET ENDS, CUSTOM MOUNTING TEE AND ULTRA-LIGHTWEIGHT IMPELLER ENHANCES LOW FLOW MEASUREMENT. 2 WIRE DIGITAL OUTPUT. FLOW RANGE: .86-52 GPM.
	IRRIGATION LATERAL LINE: PVC CLASS 200 SDR 21 PVC CLASS 200 IRRIGATION PIPE. ONLY LATERAL TRANSITION PIPE SIZES 1 1/4" AND ABOVE ARE INDICATED ON THE PLAN, WITH ALL OTHERS BEING 1" IN SIZE.
	PLANTING BED DRIP IRRIGATION LATERAL LINE: 3/4-INCH BLANK UV RADIATION RESISTANT POLYETHYLENE PIPE TO SINGLE OUTLET EMITTERS PER ADJACENT EMITTER CHART. OPERATIONAL INDICATOR TO BE INSTALLED ON EACH ZONE PER TofCR DETAILS.
	NATIVE PLANTING DRIP IRRIGATION LATERAL LINE: 3/4-INCH BLANK UV RADIATION RESISTANT POLYETHYLENE PIPE TO TREE RINGS, NETAFIM INLINE DRIP TUBING MODEL TLCV6-18, AND SINGLE OUTLET EMITTERS FOR SHRUBS PER ADJACENT EMITTER CHART
	IRRIGATION MAINLINE: PVC CLASS 200 SDR 21 1.25-INCH UNLESS OTHERWISE NOTED.
	PIPE SLEEVE: PVC SCHEDULE 40 INSTALL AS SHOWN ON DESIGN OR TWICE THE SIZE OF THE PIPE OR WIRE RUNNING THRU IT. NO TWO PIPES OR WIRE BUNDLES SHALL SHARE THE SAME SLEEVE.

Valve Callout



REFERENCE NOTES SCHEDULE

SYMBOL	DESCRIPTION
1	THE IRRIGATION SYSTEM POINT-OF-CONNECTION (POC) SHALL BE DOWNSTREAM OF THE WATER TAP AND METER AT THE APPROXIMATE LOCATION SHOWN (REFER TO CIVIL PLANS FOR EXACT LOCATION). INSTALL BACKFLOW PREVENTION UNIT, MASTER VALVE ASSEMBLY, AND FLOW SENSOR AS INDICATED. VERIFY EXACT LOCATION OF POC WITH OWNER`S REPRESENTATIVE. VERIFY PRESSURE AND FLOW ON SITE PRIOR TO CONSTRUCTION. CONTRACTOR TO INSTALL BACKFLOW PER NATIONAL PLUMBERS CODE AND PER LOCAL CODE. BACKFLOW SHALL BE TESTED UPON INSTALLATION AND ANNUALLY THEREAFTER.
2	PEDESTAL MOUNT THE IRRIGATION CONTROLLER AT THE APPROXIMATE LOCATION SHOWN. COORDINATE ELECTRICAL POWER TO THE CONTROLLER WITH THE OWNER`S REPRESENTATIVE. CARE SHOULD BE TAKEN TO INSTALL THE IRRIGATION CONTROLLER IN A LOCATION THAT IS ACCESSIBLE FOR MAINTENANCE, AND SCREENED FROM VIEW EITHER BEHIND ENTRY WALLS, NEXT TO BUILDINGS, OR BEHIND PLANT MATERIAL. FINAL LOCATION TO BE APPROVED BY OWNER`S REPRESENTATIVE. CONTROLLER TO BE INSTALLED PER NATIONAL ELECTRIC CODE.
4	MAINLINE, SPRINKLER LATERAL, AND/OR DRIP LATERAL SHOWN SLEEVED TOGETHER IS FOR CLARITY ONLY. CONTRACTOR SHALL INSTALL MAINLINE, CONTROL WIRES, AND LATERAL LINES IN SEPARATE SLEEVES.

INSTALLATION GENERAL NOTES

1. DESIGN ASSUMES A MINIMUM DYNAMIC PRESSURE FOR THE IRRIGATION SYSTEM (PER DESIGN TEAM) OF 116 PSI, AT A MINIMUM FLOW OF 18 GPM AT THE 1-INCH POINT-OF-CONNECTION (POC) AND 10 GPM AT THE 3/4" POC. VERIFY PRESSURE AND FLOW ON SITE PRIOR TO CONSTRUCTION. CONTACT GENERAL CONTRACTOR OR OWNER'S REPRESENTATIVE IMMEDIATELY IF FLOW OR PRESSURE ARE LOWER THAN LISTED ABOVE.
   1.1. TOWN OF CASTLE ROCK PROVIDES A MINIMUM OF 43 PSI AT THE TAP.
   1.2. VELOCITY SHALL NOT EXCEED 7.5 FPS THROUGH THE WATER METER.
2. INSTALLING CONTRACTOR SHALL CONTACT THE TOWN OF CASTLE ROCK UTILITIES DEPARTMENT AT 720-733-6017 TO SCHEDULE A PRE-CONSTRUCTION MEETING BEFORE BEGINNING THE INSTALLATION OF THE IRRIGATION SYSTEM.
3. IRRIGATION SHALL BE INSTALLED BY A TOWN OF CASTLE ROCK REGISTERED LANDSCAPE CONTRACT PROFESSIONAL.
   3.1. IRRIGATION DESIGN HAS BEEN APPROVED BY THE TOWN OF CASTLE ROCK AND TOWN AND/OR DESIGNER SHALL BE NOTIFIED IMMEDIATELY OF ANY CHANGES TO THE DESIGN.
4. IRRIGATION SYSTEM MUST BE DESIGNED TO OPERATE WITHIN THE TOWN OF CASTLE ROCK WATER USE MANAGEMENT PLAN. CURRENT COMMERCIAL HOURS OF OPERATE ARE EVERY THIRD DAY 10 PM TO 6AM.
5. CONTRACTOR SHALL BECOME FAMILIAR WITH THE SPECIFICATIONS AND INSTALLATION DETAILS FOR THIS AND RELATED WORK PRIOR TO CONSTRUCTION. FOR CLARIFICATION, CONTACT IRRIGATION DESIGNER PRIOR TO CONSTRUCTION.
6. COORDINATE UTILITY LOCATES OF UNDERGROUND UTILITIES PRIOR TO CONSTRUCTION ("811-CALL BEFORE YOU DIG") .
7. IF DISCREPANCIES ARE NOTED IN THE FIELD BETWEEN SITE CONDITIONS AND PROVIDED DESIGNS, CONTRACTOR SHALL NOTIFY OWNER'S REPRESENTATIVE OR GENERAL CONTRACTOR IMMEDIATELY. DO NOT PROCEED WITH THE INSTALLATION OF THE IRRIGATION SYSTEM IF SUCH DISCREPANCIES IN THE FIELD AFFECT THE PROVIDED DESIGN, DETAILS, OR SPECIFICATIONS.
8. ALL IRRIGATION COMPONENTS (MAINLINE, WIRES, LATERAL LINES, ETC.) SHALL BE INSTALLED IN LANDSCAPED AREAS WHENEVER POSSIBLE, EVEN THOUGH SAID IRRIGATION COMPONENTS MAY BE SHOWN OUTSIDE PLANTING AREAS FOR CLARITY.
9. AVOID CONFLICTS BETWEEN THE IRRIGATION SYSTEM, PLANTING MATERIALS, AND ARCHITECTURAL FEATURES WHENEVER POSSIBLE. COORDINATE POTENTIAL RELOCATION OF BOULDERS AND TREES IN TURF AREAS WITH LANDSCAPE ARCHITECT PRIOR TO SPRINKLER LAYOUT. IF LANDSCAPE MATERIAL CANNOT BE REOLOCATED,ADDITIONAL SPRINKLERS MAY BE REQUIRED.
10. CROSS FITTINGS ARE NOT ALLOWS, ONLY STANDARD TEES AND ELBOWS.
11. CONTRACTOR SHALL INSTALL NOZZLES PER PLAN, UNLESS IRRIGATED AREA CHANGED IN SIZE OR PLANT MATERIAL TYPE CHANGES. IF NOZZLE CHANGES ARE REQUIRED AND ARE SIGNIFICANT IN SIZE, CONTRACTOR SHALL CONTACT IRRIGATION DESIGNER FOR APPROVAL.
12. CONTRACTOR SHALL FIELD LOCATE ANY EXISTING SLEEVES ON SITE PRIOR TO CONSTRUCTION WITH THE AID OF THE GENERAL CONTRACTOR. MISSING SLEEVES SHALL BE REPORTED IMMEDIATELY. NEW SLEEVES SHOWN ON PLANS ARE REQUIRED FOR BOTH PIPING AND ELECTRICAL WIRING AT EACH HARDSCAPE CROSSING. COORDINATE INSTALLATION OF SLEEVING WITH OTHER TRADES. ANY PIPE OR WIRE WHICH PASSES BENEATH EXISTING HARDSCAPE WHERE SLEEVING WAS NOT INSTALLED WILL REQUIRE HORIZONTAL BORING BY THE IRRIGATION CONTRACTOR.
13. INSTALL ALL ELECTRICAL POWER TO THE IRRIGATION CONTROL SYSTEM IN ACCORDANCE WITH THE NATIONAL ELECTRIC CODE AND ALL APPLICABLE LOCAL ELECTRIC UTILITY CODES.
14. THE FOLLOWING SHOULD BE NOTED REGARDING PIPE SIZING: IF A SECTION OF UNSIZED PIPE IS LOCATED BETWEEN THE IDENTICALLY SIZED SECTIONS, THE UNSIZED PIPE IS THE SAME NOMINAL SIZE AS THE TWO SIZED SECTIONS. THE UNSIZED PIPE SHOULD NOT BE CONFUSED WITH THE DEFAULT PIPE SIZE NOTED IN THE LEGEND.
15. TWO-WIRE CONTROL CABLE DOES NOT REQUIRE ADDITIONAL SPARE WIRES TO BE ROUTED WITH MAINLINE.
    15.1. TWO-WIRE CONTROL SURGE ARRESTORS SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS. ARRESTORS ARE NOT DEPICTED ON PLANS
16. INSTALL THREE (3) #14 AWG CONTROL WIRES FROM CONTROLLER LOCATION TO EACH DEAD-END OF MAINLINE FOR USE AS SPARES INCASE OF CONTROL WIRE FAILURE. COIL 3 FEET OF WIRE IN VALVE BOX.
17. TREES IN TURF ARE NOT IRRIGATED BY DRIP SYSTEM. DRIP LATERAL ROUTED NEAR TREES IN TURF ARE NOT TO RECEIVE DRIP IRRIGATION. TREES IN NATIVE SEEDED AREAS ARE IRRIGATED ON DRIP SYSTEM.
18. SPRINKLERS IN NATIVE SEED SHALL UTILIZE 12-INCH RISERS. SPRINKLERS IN SOD AREAS SHALL UTILIZE 6-IN RISERS.
19. BACKFLOW TO BE TESTED BY A CERTIFIED TECHNICIAN APPROVED BY THE UTILITY DEPARTMENT WITHIN 10 DAYS OF THE IRRIGATION METER INSTALLATION AND ANNUALLY THEREAFTER.
    19.1. IRRIGATION BACKFLOW TYPE AND INSTALLATION TO COMPLY WITH THE COLORADO CROSS CONNECTION MANUAL FIFTH EDITION.
    19.2. IRRIGATION SYSTEMS ARE TO BE WINTERIZED ANNUALLY IN THE FALL.
20. PLEASE NOTE THAT THE IRRIGATION TAP, LINE, METER, AND BACKFLOW PREVENTION ASSEMBLY MUST BE THE SAME SIZE FROM THE TAP TO A MINIMUM DISTANCE OF 10 PIPE DIAMETERS PAST THE BACKFLOW PREVENTION ASSEMBLY AND WINTERIZATION TEE.
21. ALL SPRINKLER HEADS TO BE ADJUSTED TO MINIMIZE/ELIMINATE OVER SPRAY ON TO HARD SURFACES OR UNINTENDED AREAS. PER TOWN OF CASTLE ROCK WATER USE MANAGEMENT PLAN WATER WASTE IS NOT ALLOWED.
22. OVERHEAD IRRIGATION INSTALLED ON SLOPES STEEPER THAN 3:1 WILL NOT BE APPROVED BY TOWN OF CASTLE ROCK INSPECTORS.
23. OVERHEAD IRRIGATION INSTALLED IN AREAS LESS THAN 10 FEET IN WIDTH WILL NOT BE APPROVED BY TOWN OF CASTLE ROCK INSPECTORS.
24. TEMPORARY IRRIGATION IS REQUIRED TO BE ABOVE GROUND AND SHALL FOLLOW THE TOWN OF CASTLE ROCK TEMPORARY IRRIGATION FOR NATIVE AREAS CRITERIA.
    24.1. ALL LATERAL PIPE SHALL BE INSTALLED ON GRADE AND STAKED IN PLACE PER DETAILS.
    24.2. LATERAL LINES CROSSING HARDSCAPE SHALL BE SLEEVED AS SHOWN.
    24.3. SPRINKLER HEADS SHALL BE 6" RISER HEIGHT TO ACHIEVE 12" TOTAL POP-UP HEIGHT WHEN OPERATIONAL.
25. BASED ON APPROVED PLANT MATERIAL, DESIGN IS ABLE TO UTILIZE THE APPROVED TAP WATERING ON A THREE DAY/WEEK SCHEDULE, FROM 10PM TO 6AM.
26. IRRIGATION EXEMPTION MUST BE OBTAINED FROM THE UTILITY DEPARTMENT IF IRRIGATING THE NATIVE SEED AND/OR THE SOD ON A DAILY BASIS FOR ESTABLISHMENT DURING THE MONTHS OF MAY, JUNE, AUGUST, OR SEPTEMBER. EXEMPTIONS WILL NOT BE ISSUED IN THE MONTH OF JULY.
27. ALL IRRIGATION INSTALLATIONS MUST MEET TOWN OF CASTLE ROCK DETAILS AND BE INSTALLED BY A TOWN OF CASTLE ROCK REGISTERED LANDSCAPE CONTRACT PROFESSIONAL.
28. A COPY OF THE STAMPED AND TOWN APPROVED IRRIGATION PLANS IS TO BE AVAILABLE ON-SITE DURING IRRIGATION INSPECTIONS.

EMITTER SCHEDULE

PLANT TYPE	EMITTER TYPE	GPH/OUTLET	N0. OF EMITTERS	TOTAL FLOW
GROUNDCOVER	SINGLE OUTLET	1 GPH	1	1 GPH
PERENNIALS	SINGLE OUTLET	1 GPH	1	1 GPH
1 GAL. SHRUB	SINGLE OUTLET	1 GPH	1	1 GPH
5 GAL. SHRUB	SINGLE OUTLET	1 GPH	2	2 GPH
TREE IN SHRUB BED	SINGLE OUTLET	1 GPH	4-8	4-8 GPH
TREE IN NATIVE SEED	INLINE DRIP	0.6 GPH	N/A	N/A

NOTES:
1. MULTIPLE OUTLET EMITTERS CAN BE UTILIZED IN DENSELY PLANTED AREAS AND FOR TREES IN SHRUB BEDS.
2. NETAFIM TECHLINE CV DRIP TUBING MODEL TLCV6-18 FOR NATIVE TREE RINGS.

TOWN OF CASTLE ROCK REGISTRATION INFORMATION:
CERTIFIED IRRIGATION DESIGNER MICHELLE PETERSON
TOWN OF CASTLE ROCK REGISTRATION NUMBER #15-1098

TOWN OF CASTLE ROCK APPROVAL
PLANS ARE HEREBY APPROVED FOR ONE YEAR FROM DATE OF DEVELOPMENT SERVICES APPROVAL

Approved By:

Development Services *Date:*

0 15 30 60

NORTH

NO.	DATE	BY	REVISION DESCRIPTION
1	01-27-23	MLP	REVISION
2	02/14/23	MLP	COMMENTS

HR GREEN - DENVER
5619 DTC PARKWAY
SUITE 1150
DENVER, CO 80111
PHONE: 720.602.4699
FAX: 844.273.1057
HRGreen

CONSTRUCTION DRAWINGS
IRRIGATION LEGEND & NOTES

AFFINITY AT CASTLE ROCK
AFFINITY CASTLE ROCK, LLC
CASTLE ROCK, COLORADO

CAD DATE:
CAD FILE:

BAR IS ONE INCH ON OFFICIAL DRAWINGS.
0 1"
IF NOT ONE INCH, ADJUST SCALE ACCORDINGLY

DRAWN BY:	MLP
APPROVED:	MLP
JOB DATE:	11/28/22
JOB NO:	

SHEET IR0.1

69 OF 81

PUBLIC AND PRIVATE IMPROVEMENT CONSTRUCTION PLANS

AFFINITY AT CASTLE ROCK

THE MEADOWS FILING NO. 17, AREA NO. 3
A PARCEL LOCATED IN THE SOUTH HALF OF SECTION 27, AND THE NORTH HALF OF SECTION 34, TOWNSHIP 7 SOUTH, RANGE 67 WEST OF THE 6TH PRINCIPAL MERIDIAN, TOWN OF CASTLE ROCK, DOUGLAS COUNTY, STATE OF COLORADO
TOWN OF CASTLE ROCK PROJECT NO. CD22-0053

IRRIGATION CHART-POC #1(CONTROLLER A)

Registered Professional __Michelle Peterson_____ Registration # ___15-1098_____ Date 02/14/23_____

Company Name _____MPi Designs_____ Address __PO Box 369, Ault, CO 80610_____

Phone __970-402-3047_____ Email __irrigationlady@gmail.com_____ Clock Make _Hunter _____ Model ___ACC2 w/ Centralus_____

____ Circle ____ Diamond ____ Square _X___ Design ____ Maintenance

Zone	Hydrozone (Low (5'-10') Med. (10'-15') High (>15'))	Plant Type (Turf, Native, Shrubs, Perennials, Trees, Annuals, etc.)	Head Type (Rotors, Sprays, Bubblers, Drip, SDI, etc.)	Nozzle (Nozzle/ Emmitter size)	App. Rate (inches/hour)	GPM (Per Zone)	Inches/Month (Peak not to exceed 6"/month or 1.5"/week)	Run Time (Minutes/ Month)	Run Time (Minutes/Every -other-day)	Water Usage (Gallons per month)
Ex: 1	*High*	*Blue Grass*	*RB 1806 SAM PRS*	*15'*	*1.83*	*15*	*6*	*197*	*20*	*2951*
Ex: 2	*low*	*Buffalo Grass*	*Hunter I-20*	*3*	*0.40*	*15*	*2.1*	*315*	*32*	*4725*
A1	LOW	envirotturf	Hunter PROS30	Hunter fixed	1.33	13.80	4.50	203	14	2802
A2	LOW	envirotturf	Hunter PROS30	Hunter fixed	1.63	16.68	4.50	166	11	2763
A3	LOW	shrubs/trees	point source	RB XB-10PC	0.10	4.17	0.60	360	24	1500
A4	LOW	shrubs/trees	point source	RB XB-10PC	0.10	4.67	0.60	360	24	1680
A5	LOW	shrubs/trees	point source	RB XB-10PC	0.10	6.58	0.60	360	24	2370
A6	LOW	shrubs/trees	point source	RB XB-10PC	0.10	2.30	0.60	360	24	828
A7	LOW	shrubs/trees	point source	RB XB-10PC	0.10	5.35	0.60	360	24	1926
A8	LOW	shrubs/trees	point source	RB XB-10PC	0.10	2.93	0.60	360	24	1056
A9	LOW	shrubs/trees	point source	RB XB-10PC	0.10	2.93	0.60	360	24	1056
A10	LOW	buffalo grass	MPRotators	1000-3500	0.19	16.91	1.50	477	32	8074
A11	LOW	buffalo grass	MPRotators	1000-3500	0.20	16.11	1.50	450	30	7242
A12	LOW	buffalo grass	MPRotators	1000-3500	0.27	11.70	1.50	339	23	3968
A13	LOW	buffalo grass	MPRotators	1000-3500	0.27	16.10	1.50	331	22	5321
A14	LOW	buffalo grass	MPRotators	1000-3500	0.21	17.83	1.50	432	29	7711
A15	LOW	buffalo grass	MPRotators	1000-3500	0.16	10.92	1.50	550	37	6011
A16	LOW	buffalo grass	MPRotators	1000-3500	0.17	17.63	1.50	516	34	9103
A17	LOW	buffalo grass	MPRotators	1000-3500	0.17	15.76	1.50	543	36	8560
A18	LOW	buffalo grass	MPRotators	1000-2000	0.18	17.60	1.50	495	33	8708
A19	LOW	buffalo grass	MPRotators	1000-2000	0.20	14.72	1.50	444	30	6536
A20	LOW	buffalo grass	MPRotators	1000-2000	0.20	7.17	1.50	460	31	3296
A21	LOW	buffalo grass	MPRotators	1000-2000	0.23	10.03	1.50	393	26	3940
A22	LOW	shrubs/trees	point source	RB XB-10PC	0.10	0.95	0.60	360	24	342
A23	LOW	buffalo grass	MPRotators	1000-3500	0.22	7.17	1.50	414	28	2968
A24	LOW	buffalo grass	MPRotators	1000-3500	0.22	7.47	1.50	407	27	3039
A25	LOW	buffalo grass	MPRotators	1000-3500	0.24	10.34	1.50	381	25	3937
Total								**7001**	**467**	**93979**
								Min/Month	**Min/cycle**	**Gallons/Month**
								not including drip	*not including drip*	*not including drip*

NOTE: For questions about the various columns, please hover over the column heading.

Project Name:	***AFFINITY AT CR***
Project Location:	***MEADOWS PARKWAY***
MPi Designs, LLC	***Windsor, Colorado***
Prepared by:	***Michelle Peterson***
Current TOCR Registration #	15-1098
Date:	***September 22, 2022***
Revised:	***November 14, 2022***
Tap Size	***1"***
Static Water Pressure:	***116.00***

From: Julia Wells
of: Town of Castle Rock

Hydraulic Grade At Zone: A2

	Ft. of Copper		Pipe Size (K Copper)	Loss From Chart	Flow-GPM	Loss/Gain
Svc Line (tap to meter):	22.00 LF	1"	" K Copper	10.47 /100 FT	18	2.30
Water Meter:					18	1.50
Svc Line (meter to backflow):	5.00 LF	1"	" K Copper	10.47 /100 FT	18	0.52
Backflow:					18	12.00
Master Valve:					18	1.60
Pressure Required at Head:						40.00
Lateral Allowance:						4.00
Control Valve allowance:						1.60
Mainline allowances:						
	871 LF CL200BE	1.25 "@	9 GPM – Looped	0.37 /100 FT		3.22
	0 LF CL200BE	0.00 "@	0 GPM	0.00 /100 FT		0.00
	0 LF CL200BE	0.00 "@	0 GPM	0.00 /100 FT		0.00
Elevation:						
	Tap elev.	6094	High/Low:	6098		1.73

Total System requirements (PSI)	***68.48***
Available System Pressure (PSI)	***116.00***
Difference (PSI)	***47.52***
Booster Pump boost (PSI)	***0.00***
Total difference (PSI)	***47.52***

Town of Castle Rock provides a minimum of 43 psi
Total irrigation area for tap # 1 is 82,000 sq.ft

IRRIGATION CHART-POC #2 (CONTROLLER B)

Registered Professional __Michelle Peterson_____ Registration # ___15-1098_____ Date 02/14/23_____

Company Name _____MPi Designs_____ Address __PO Box 369, Ault, CO 80610_____

Phone __970-402-3047_____ Email __irrigationlady@gmail.com_____ Clock Make _Hunter _____ Model ___ACC2 w/ Centralus_____

____ Circle ____ Diamond ____ Square _X___ Design ____ Maintenance

Zone	Hydrozone (Low (5'-10') Med. (10'-15') High (>15'))	Plant Type (Turf, Native, Shrubs, Perennials, Trees, Annuals, etc.)	Head Type (Rotors, Sprays, Bubblers, Drip, SDI, etc.)	Nozzle (Nozzle/ Emmitter size)	App. Rate (inches/hour)	GPM (Per Zone)	Inches/Month (Peak not to exceed 6"/month or 1.5"/week)	Run Time (Minutes/ Month)	Run Time (Minutes/Every -other-day)	Water Usage (Gallons per month)
Ex: 1	*High*	*Blue Grass*	*RB 1806 SAM PRS*	*15'*	*1.83*	*15*	*6*	*197*	*20*	*2951*
Ex: 2	*low*	*Buffalo Grass*	*Hunter I-20*	*3*	*0.40*	*15*	*2.1*	*315*	*32*	*4725*
B1	LOW	shrubs/trees	point source	RB XB-10PC	0.10	1.6	0.60	360	24	570
B2	LOW	shrubs/trees	point source	RB XB-10PC	0.10	2.6	0.60	360	24	936
B3	LOW	shrubs/trees	point source	RB XB-10PC	0.10	4.6	0.60	360	24	1644
B4	LOW	buffalo grass	MPRotators	1000-3500	0.23	10.4	1.50	396	26	4106
B5	LOW	buffalo grass	MPRotators	1000-3500	0.23	10.2	1.50	399	27	4066
B6	LOW	buffalo grass	MPRotators	1000-3500	0.21	9.7	1.50	435	29	4213
B7	LOW	buffalo grass	MPRotators	1000-3500	0.21	10.0	1.50	438	29	4384
B8	LOW	buffalo grass	MPRotators	1000-3500	0.24	7.6	1.50	377	25	2843
B9	LOW	buffalo grass	MPRotators	1000-3500	0.20	8.7	1.50	440	29	3835
B10	LOW	buffalo grass	MPRotators	1000-3500	0.20	9.7	1.50	459	31	4433
B11	LOW	buffalo grass	MPRotators	1000-3500	0.18	9.1	1.50	506	34	4611
B12	LOW	buffalo grass	MPRotators	1000-2000	0.20	10.0	1.50	442	29	4418
Total								**3892**	**259**	**36909**
								Min/Month	**Min/cycle**	**Gallons/Month**
								not including drip	*not including drip*	*not including drip*

NOTE: For questions about the various columns, please hover over the column heading.

Project Name:	***AFFINITY AT CR***
Project Location:	***MEADOWS PARKWAY***
MPi Designs, LLC	***Windsor, Colorado***
Prepared by:	***Michelle Peterson***
Current TOCR Registration #	15-1098
Date:	***September 22, 2022***
Revised:	***November 14, 2022***
Tap Size	***3/4"***
Static Water Pressure:	***116.00***

From: Julia Wells
of: Town of Castle Rock

Hydraulic Grade At Zone: B9

	Ft. of Copper		Pipe Size (K Copper)	Loss From Chart	Flow-GPM	Loss/Gain
Svc Line (tap to meter):	25.00 LF	3/4"	" K Copper	14.41 /100 FT	10	3.60
Water Meter:					10	1.50
Svc Line (meter to backflow):	5.00 LF	3/4"	" K Copper	14.41 /100 FT	10	0.72
Backflow:					10	12.00
Master Valve:					10	1.60
Pressure Required at Head:						40.00
Lateral Allowance:						4.00
Control Valve allowance:						1.60
Mainline allowances:						
	296 LF CL200BE	1.25 "@	5 GPM – Looped	0.12 /100 FT		0.35
	160 LF CL200BE	1.25 "@	10 GPM	0.45 /100 FT		0.72
	0 LF CL200BE	0.00 "@	0 GPM	0.00 /100 FT		0.00
Elevation:						
	Tap elev.	6078	High/Low:	6085		3.03

Total System requirements (PSI)	***69.13***
Available System Pressure (PSI)	***116.00***
Difference (PSI)	***46.87***
Booster Pump boost (PSI)	***0.00***
Total difference (PSI)	***46.87***

Town of Castle Rock provides a minimum of 43 psi
Total irrigation area for tap # 2 is 38,000 sq.ft

TOWN OF CASTLE ROCK APPROVAL
PLANS ARE HEREBY APPROVED FOR ONE YEAR FROM DATE OF DEVELOPMENT SERVICES APPROVAL

Approved By:

Development Services *Date:*

MPi Designs
PO BOX 369 • AULT, CO • 80610
970-402-3047
Michelle@MPiDesignsllc.com

TOWN OF CASTLE ROCK REGISTRATION INFORMATION:
CERTIFIED IRRIGATION DESIGNER MICHELLE PETERSON
TOWN OF CASTLE ROCK REGISTRATION NUMBER #15-1098

0 15 30 60

NORTH

NO.	DATE	BY	REVISION DESCRIPTION
1	01-27-23	MLP	REVISION
2	02/14/23	MLP	COMMENTS

HR GREEN - DENVER
5619 DTC PARKWAY
SUITE 1150
DENVER, CO 80111
PHONE: 720.602.4699
FAX: 844.273.1057
HRGreen

CONSTRUCTION DRAWINGS
IRRIGATION CITY NOTES

AFFINITY AT CASTLE ROCK
AFFINITY CASTLE ROCK, LLC
CASTLE ROCK, COLORADO

CAD DATE:
CAD FILE:

BAR IS ONE INCH ON OFFICIAL DRAWINGS
0 1"
IF NOT ONE INCH, ADJUST SCALE ACCORDINGLY

DRAWN BY:	MLP
APPROVED:	MLP
JOB DATE:	11/28/22
JOB NO:	

SHEET IR0.2

70 OF 81

PUBLIC AND PRIVATE IMPROVEMENT CONSTRUCTION PLANS
AFFINITY AT CASTLE ROCK
THE MEADOWS FILING NO. 17, AREA NO. 3
A PARCEL LOCATED IN THE SOUTH HALF OF SECTION 27, AND THE NORTH HALF OF SECTION 34, TOWNSHIP 7 SOUTH, RANGE 67 WEST OF THE 6TH PRINCIPAL MERIDIAN, TOWN OF CASTLE ROCK, DOUGLAS COUNTY, STATE OF COLORADO
TOWN OF CASTLE ROCK PROJECT NO. CD22-XXXX

MPi Designs
PO BOX 369 • AULT, CO • 80610
970-402-3047
Michelle@MPiDesignsllc.com

www.tfgdesign.com
FRONTERRA LANDSCAPE ARCHITECTURE PLANNING

TFG Design, LLC
P.O. Box
Loveland CO 80539
(970) 669.3737

josh@fronterra.design

IRRIGATION CHART-POC #1

[redacted]

Zone	Hydrozone Low (5"-10") Med. (10"-15") High (>15")	Plant Type (Turf, Native, Shrubs, Perennials, Trees, Annuals, etc.)	Head Type (Rotors, Sprays, Bubblers, Drip, SDI, etc.)	Nozzle (Nozzle/ Emmitter size)	App. Rate (inches/hour)	GPM (Per Zone)	Inches/Month (Peak not to exceed 6"/month or 1.5"/week)	Run Time (Minutes/ Month)	Run Time (Minutes/Every-other-day)	Water Usage (Gallons per month)
Ex: 1	*High*	*Blue Grass*	*RB 1806 SAM PRS*	*15'*	*1.83*	*15*	*6*	*197*	*20*	*2951*
Ex: 2	*low*	*Buffalo Grass*	*Hunter I-20*	*3*	*0.40*	*15*	*2.1*	*315*	*32*	*4725*
1	LOW	envirotturf	Hunter PROS30	Hunter fixed	1.33	13.8	4.50	203	14	2802
2	LOW	envirotturf	Hunter PROS30	Hunter fixed	1.63	16.7	4.50	166	11	2763
3	LOW	shrubs/trees	point source	RB XB-10PC	0.10	4.2	0.60	360	24	1500
4	LOW	shrubs/trees	point source	RB XB-10PC	0.10	4.7	0.60	360	24	1680
5	LOW	shrubs/trees	point source	RB XB-10PC	0.10	1.8	0.60	360	24	636
6	LOW	shrubs/trees	point source	RB XB-10PC	0.10	5.0	0.60	360	24	1794
7	LOW	shrubs/trees	point source	RB XB-10PC	0.10	2.8	0.60	360	24	1008
8	LOW	shrubs/trees	point source	RB XB-10PC	0.10	2.8	0.60	360	24	1008
9	LOW	shrubs/trees	point source	RB XB-10PC	0.10	2.8	0.60	360	24	1008
10	LOW	buffalo grass	MPRotators	1000-3500	0.19	16.9	2.10	663	44	11214
11	LOW	buffalo grass	MPRotators	1000-3500	0.20	16.1	2.10	630	42	10149
12	LOW	buffalo grass	MPRotators	1000-3500	0.27	11.7	2.10	467	31	5460
13	LOW	buffalo grass	MPRotators	1000-3500	0.27	16.1	2.10	467	31	7513
14	LOW	buffalo grass	MPRotators	1000-3500	0.21	17.8	2.10	600	40	10698
15	LOW	buffalo grass	MPRotators	1000-3500	0.16	10.9	2.10	788	53	8600
16	LOW	buffalo grass	MPRotators	1000-3500	0.17	17.6	2.10	741	49	13067
17	LOW	buffalo grass	MPRotators	1000-3500	0.17	15.8	2.10	741	49	11681
18	LOW	buffalo grass	MPRotators	1000-2000	0.18	17.6	2.10	700	47	12320
19	LOW	buffalo grass	MPRotators	1000-2000	0.20	14.7	2.10	630	42	9274
20	LOW	buffalo grass	MPRotators	1000-3500	0.20	7.2	2.10	630	42	4517
21	LOW	buffalo grass	MPRotators	1000-3500	0.20	13.4	2.10	630	42	8448
22	LOW	buffalo grass	MPRotators	1000-3500	0.19	14.6	2.10	663	44	9656
23	LOW	buffalo grass	MPRotators	1000-3500	0.20	5.8	2.10	630	42	3673
Total								**11868**	**791**	**140468**
								Min/Month	**Min/cycle**	**Gallons/Month**
								not including drip	*not including drip*	*not including drip*

NOTE: For questions about the various columns, please hover over the column heading.

Project Name:	***AFFINITY AT CR***		
Project Location:	***MEADOWS PARKWAY***		
MPi Designs, LLC	***Windsor, Colorado***		
Prepared by:	***Michelle Peterson***		
Current TOCR Registration #	15-1098		
Date:	***September 22, 2022***		
Revised:	***November 14, 2022***		
Tap Size	***1"***		
Static Water Pressure:		***116.00***	***From: Julia Wells***
			of: Town of Castle Rock

Hydraulic Grade At Zone: A2

	Ft. of Copper		Pipe Size (K Copper)	Loss From Chart	Flow-GPM	Loss/Gain
Svc Line (tap to meter):	22.00 LF	1"	" K Copper	10.47 /100 FT	18	2.30
Water Meter:					18	1.50
Svc Line (meter to backflow):	5.00 LF	1"	" K Copper	10.47 /100 FT	18	0.52
Backflow:					18	12.00
Master Valve:					18	1.60
Pressure Required at Head:						40.00
Lateral Allowance:						4.00
Control Valve allowance:						1.60
Mainline allowances:						
	871 LF CL200BE	1.25 "@	9 GPM – Looped	0.37 /100 FT		3.22
	0 LF CL200BE	0.00 "@	0 GPM	0.00 /100 FT		0.00
	0 LF CL200BE	0.00 "@	0 GPM	0.00 /100 FT		0.00
Elevation:						
	Tap elev.	6094	High/Low: 6098			1.73
Total System requirements (PSI)						***68.48***
			Available System Pressure (PSI)			***116.00***
			Difference (PSI)			***47.52***
			Booster Pump boost (PSI)			***0.00***
			Total difference (PSI)			***47.52***

Town of Castle Rock provides a minimum of 43 psi
Total irrigation area for tap # 1 is 82,000 sq.ft

IRRIGATION CHART-POC #2

[redacted]

Zone	Hydrozone Low (5"-10") Med. (10"-15") High (>15")	Plant Type (Turf, Native, Shrubs, Perennials, Trees, Annuals, etc.)	Head Type (Rotors, Sprays, Bubblers, Drip, SDI, etc.)	Nozzle (Nozzle/ Emmitter size)	App. Rate (inches/hour)	GPM (Per Zone)	Inches/Month (Peak not to exceed 6"/month or 1.5"/week)	Run Time (Minutes/ Month)	Run Time (Minutes/Every-other-day)	Water Usage (Gallons per month)
Ex: 1	*High*	*Blue Grass*	*RB 1806 SAM PRS*	*15'*	*1.83*	*15*	*6*	*197*	*20*	*2951*
Ex: 2	*low*	*Buffalo Grass*	*Hunter I-20*	*3*	*0.40*	*15*	*2.1*	*315*	*32*	*4725*
1	LOW	shrubs/trees	point source	RB XB-10PC	0.10	1.6	0.60	360	24	564
2	LOW	shrubs/trees	point source	RB XB-10PC	0.10	1.9	0.60	360	24	690
3	LOW	shrubs/trees	point source	RB XB-10PC	0.10	3.5	0.60	360	24	1242
4	LOW	buffalo grass	MPRotators	1000-3500	0.14	7.3	2.10	900	60	6552
5	LOW	buffalo grass	MPRotators	1000-3500	0.19	10.2	2.10	663	44	6751
6	LOW	buffalo grass	MPRotators	1000-3500	0.19	9.2	2.10	663	44	6081
7	LOW	buffalo grass	MPRotators	1000-3500	0.15	7.3	2.10	840	56	6115
8	LOW	buffalo grass	MPRotators	1000-3500	0.19	8.5	2.10	663	44	5657
9	LOW	buffalo grass	MPRotators	1000-3500	0.14	7.3	2.10	900	60	6552
10	LOW	buffalo grass	MPRotators	1000-3500	0.19	9.1	2.10	663	44	6061
11	LOW	buffalo grass	MPRotators	1000-3500	0.14	7.3	2.10	900	60	6552
12	LOW	buffalo grass	MPRotators	1000-3500	0.20	10.5	2.10	630	42	6609
13	LOW	buffalo grass	MPRotators	1000-3500	0.21	10.3	2.10	600	40	6204
14	LOW	buffalo grass	MPRotators	1000-3500	0.19	9.3	2.10	663	44	6174
15	LOW	buffalo grass	MPRotators	1000-3500	0.18	9.8	2.10	700	47	6888
16	LOW	buffalo grass	MPRotators	1000-2000	0.20	5.1	2.10	630	42	3232
Total								**10496**	**700**	**81924**
								Min/Month	**Min/cycle**	**Gallons/Month**
								not including drip	*not including drip*	*not including drip*

NOTE: For questions about the various columns, please hover over the column heading.

Project Name:	***AFFINITY AT CR***		
Project Location:	***MEADOWS PARKWAY***		
MPi Designs, LLC	***Windsor, Colorado***		
Prepared by:	***Michelle Peterson***		
Current TOCR Registration #	15-1098		
Date:	***September 22, 2022***		
Revised:	***November 14, 2022***		
Tap Size	***3/4"***		
Static Water Pressure:		***116.00***	***From: Julia Wells***
			of: Town of Castle Rock

Hydraulic Grade At Zone: B9

	Ft. of Copper		Pipe Size (K Copper)	Loss From Chart	Flow-GPM	Loss/Gain
Svc Line (tap to meter):	25.00 LF	3/4"	" K Copper	14.41 /100 FT	10	3.60
Water Meter:					10	1.50
Svc Line (meter to backflow):	5.00 LF	3/4"	" K Copper	14.41 /100 FT	10	0.72
Backflow:					10	12.00
Master Valve:					10	1.60
Pressure Required at Head:						40.00
Lateral Allowance:						4.00
Control Valve allowance:						1.60
Mainline allowances:						
	296 LF CL200BE	1.25 "@	5 GPM – Looped	0.12 /100 FT		0.35
	160 LF CL200BE	1.25 "@	10 GPM	0.45 /100 FT		0.72
	0 LF CL200BE	0.00 "@	0 GPM	0.00 /100 FT		0.00
Elevation:						
	Tap elev.	6078	High/Low: 6085			3.03
Total System requirements (PSI)						***69.13***
			Available System Pressure (PSI)			***116.00***
			Difference (PSI)			***46.87***
			Booster Pump boost (PSI)			***0.00***
			Total difference (PSI)			***46.87***

Town of Castle Rock provides a minimum of 43 psi
Total irrigation area for tap # 2 is 38,000 sq.ft

CLWUR (Composite landscape water use rating) Chart

Project Name: AFFINITY AT CASTLE ROCK

Site Development Plan (SDP) Number: SDP22-0036

Irrigation Spray or Drip?	Plant Name (Common)	Appl. Rate (inches/month)	Zone (VL,L,Mod,HW)	% of Total Area	IA Irrigated area (in sq. ft. for each zone)	LWUR Landscape Water Use Rating	TA Total Area of all Irrigated Landscape Zones	CLWUR (LWUR x IA) /TA
DRIP	TREES	10	L	47%	18,762	2		0.939203564
DRIP	SHRUBS	10	L	31%	12,220	2		0.61171877
DRIP	HERBACEOUS PLANTS	10	L	19%	7,471	2		0.373989438
SPRAY	TURFGRASS	15	H	4%	1,500	4.5		0.168948515
							39,953	0
							Total of the CLWUR	**2.093860286**

Reference Chapter 13.20 of the Castle Rock Municipal Code

REFER TO LANDCSAPE DRAWINGS-SHOWN FOR REFERENCE ONLY

TOWN OF CASTLE ROCK APPROVAL
PLANS ARE HEREBY APPROVED FOR ONE YEAR FROM DATE OF DEVELOPMENT SERVICES APPROVAL

Approved By:

Development Services *Date:*

0 15 30 60

NORTH

PRELIMINARY NOT FOR BIDDING OR CONSTRUCTION

NO.	DATE	BY	REVISION DESCRIPTION

HR GREEN - DENVER
5619 DTC PARKWAY
SUITE 1150
GREENWOOD VILLAGE, CO 80111
PHONE: 720.902.4999
FAX: 844.273.1067

CONSTRUCTION DRAWINGS
IRRIGATION CITY NOTES

AFFINITY AT CASTLE ROCK
AFFINITY CASTLE ROCK, LLC
CASTLE ROCK, COLORADO

CAD DATE:
CAD FILE:

BAR IS ONE INCH ON OFFICIAL DRAWINGS
0 1"
IF NOT ONE INCH, ADJUST SCALE ACCORDINGLY

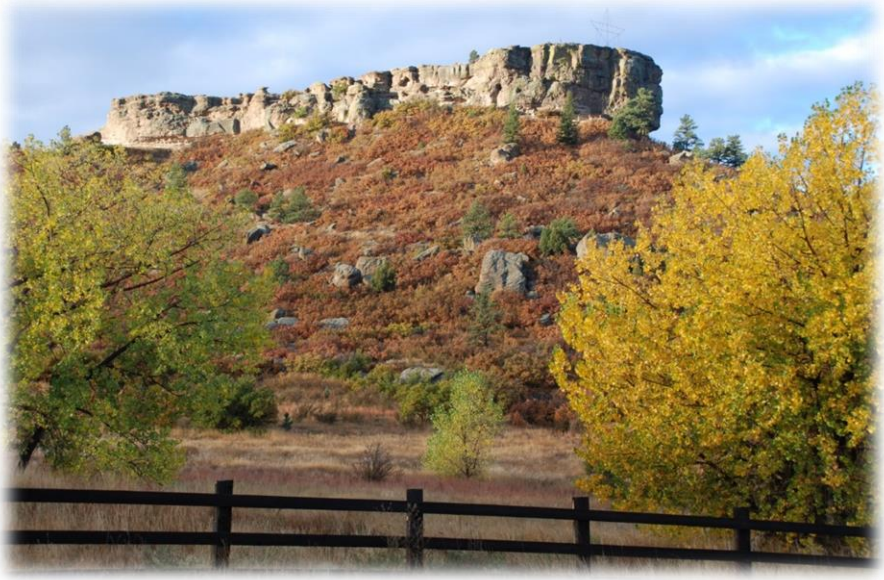
DRAWN BY:	MLP
APPROVED:	MLP
JOB DATE:	11/28/22
JOB NO:	

SHEET IR0.2

66 OF 76

Wastewater Master Plan

2016



Engineering Division

Town of Castle Rock
Utilities Department
Wastewater Facilities Inventory

Table 3.2

Lift Stations

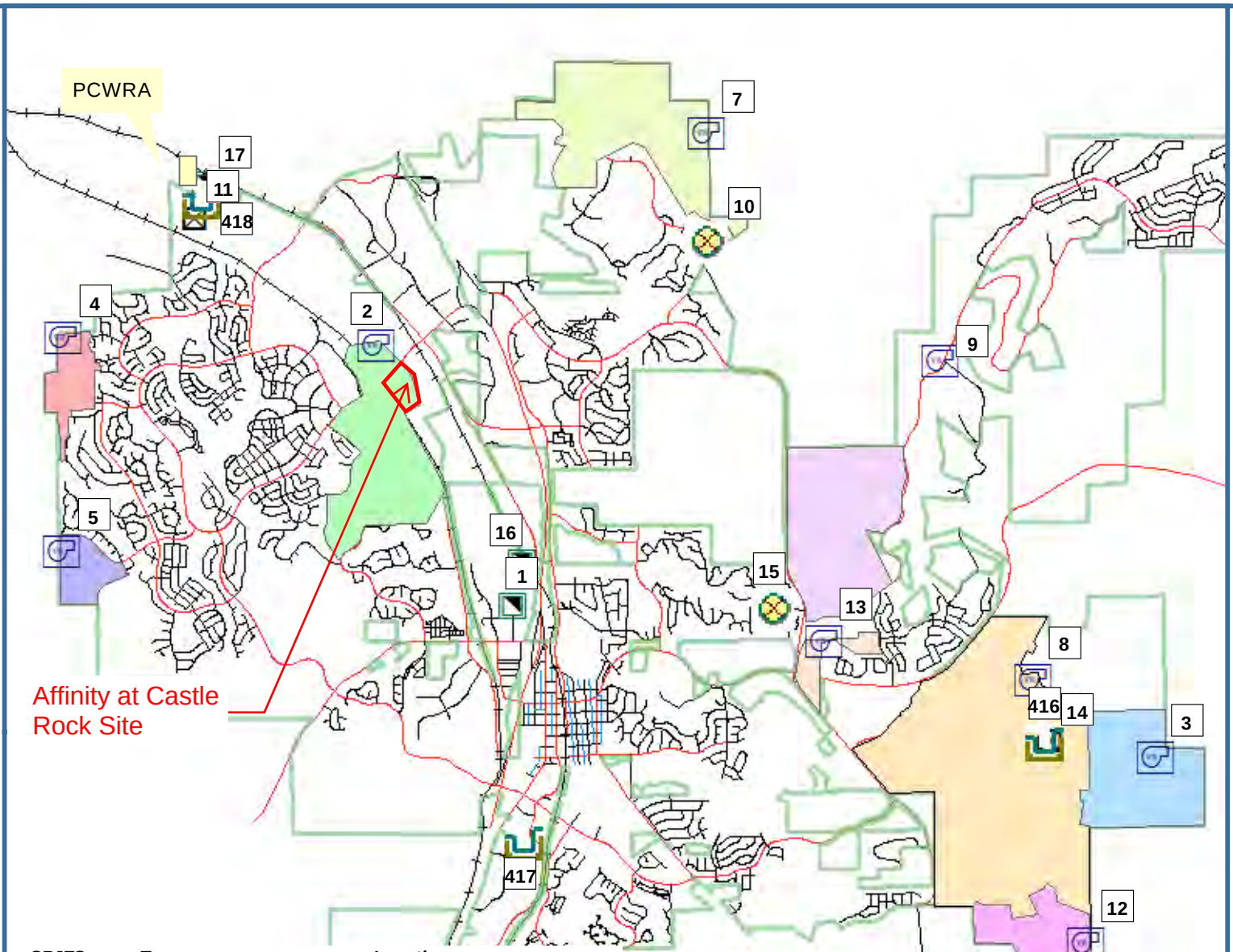
ID	Physical Address	Year Built	Capacity (mgd)	Wet Well (gallons)	Wet Wells	Pumps	HP	GPM	Total Dynamic Head (ft)	Ultimate Capacity (mgd)	Total Dynamic Head (ft)	Force Main Size	Force Main Length (ft)	Flume	Discharge Flow Meter	Standby Power	Type	Standby Power (kW)	Standby Power LS Capacity	Overflow Basin (gal)	Comments	SFE Capacity	2016 SFE Used	Build Out Capacity
Maher Ranch Lift Station	7012 Fire Opal Ln	2003	0.85	2,800	8' dia x 23.2'	2	60	590	174	0.85	174	8" PVC	4,857	No	Yes	Yes	Diesel	140	Full Flow	None		864	844	864
Mitchell Creek Lift Station	5708 Wagon Wheel	2004	4.30	75,500	(1) 16.8'x24.8'x16.1' (1) 12.2'x16.8'x16.1'	3	125	2986	152	4.30	152	10" PVC 16" PVC	11,296 11,296	No	Yes	Yes	Diesel	400	Full Flow	128,000	Trimmed impellars may need to be replaced to pump build out flows.	2495	2054	2495
Seller's Gulch Lift Station	2970 Crystal Vly Pkwy	2005	2.56	3,100	(1) 6'x16'x18' (1) 24'x37.5'x11.3'	3	30	1800	54	2.56	54	12" DIP	2,480	Yes	Yes	Yes	Natural Gas		Full Flow	55,000		3021	419	3021
Meadows Filing 5 Lift Station	5193 Rocky Mountain Drive	1989	0.24	424	6' dia x 23.1'	2	10	167	81	0.24	81	6"	1,150	No	No	Yes	Diesel	45	Full Flow	12,351	The head is estimated from 35 feet of elevation head and an additional 15% for the dynamic head.	111	143.5	111
Meadows Filing 15 Lift Station	5300 Summerville	2005	0.31	1,672	(1) 7' dia x 14.9' (2) 8' dia x 17.8'	2.00	15	215	81	0.31	81	4" PVC	670	No	Yes	Yes	Natural Gas		Full Flow	7,520		223	223	223
Meadows Filing 17 Lift Station	1465 Meadows Parkway	2005	1.18	21,127	(2) 11.5'x21'x14'	2	50	820	95	1.18	95	8" PVC	1,526	No	Yes	Yes	Natural Gas		Full Flow	83,000		1346	688	1346
Castle Oaks Lift Station	3013 Castle Oaks Drive	2005	1.18	16,400	(2) 8'x14'x19.25'	4 - 2 pair in series	55	820	331	2.28	386	12" DIP	11,719	Yes	Yes	Yes	Diesel	350	Full Flow	380,000	Initial SFE capacity of the pumps is 1250. The pumps will need to be replaced with larger pumps beyond 1250 SFES.	1250	921	2760
Castlewood Ranch Lift Station #1	2210 Lost Canyon Ct	2004	0.15	885	5' dia x 14.7'	4 - 2 pair in series	15.00	105	177	0.15	177	4" PVC	2,875	No	Yes	Yes	Natural Gas		Full Flow	None		110	94	110
Castlewood Ranch Lift Station #2	7254 Weaver Ct.	2004	0.54	1,400	8' dia x 15.2'	2	26	315	95	0.54	95	8" PVC	1,237	No	Yes	Yes	Natural Gas		Full Flow	None		505	477	505
RWTP Temporary Lift Station	1282 Castle Oaks Drive	2005	0.13	1,500	5' dia x 19.9'	2	10	90	117	0.13	117	4" PVC	170	No	Yes	Yes	Part of RWTP Back-up power			33,000	This is a temporary lift station. The flows to this lift station will eventually be routed to the Castle Oaks lift station. The ultimate flow will come directly from the RWRWTC backwash pumps and be pumped into the Founders Force Main	183.6	183.6	183.6
Total Treatment Capacity			**11.43**							**12.53**												**10109**	**6047**	**11619**

Flow Metering Stations

ID	Physical Address	Year Built	Type	SCADA	Service Area
Meadows Flume	4255 N US Highway 85	1987	Parshall	Y	Meadows
Main Flume	Old wastewater plant	1990	Parshall	Y	Downtown, Plum Creek, Crystall Valley Ranch, Citadel
North Flume	North of old wastewater plant, near PCWPF	1987	Parshall	Y	Founders, Woodlands
PCWRA	4255 N US Highway 85	1989	Parshall	Y	Town except Cobblestone Ranch

Grinder Facilities

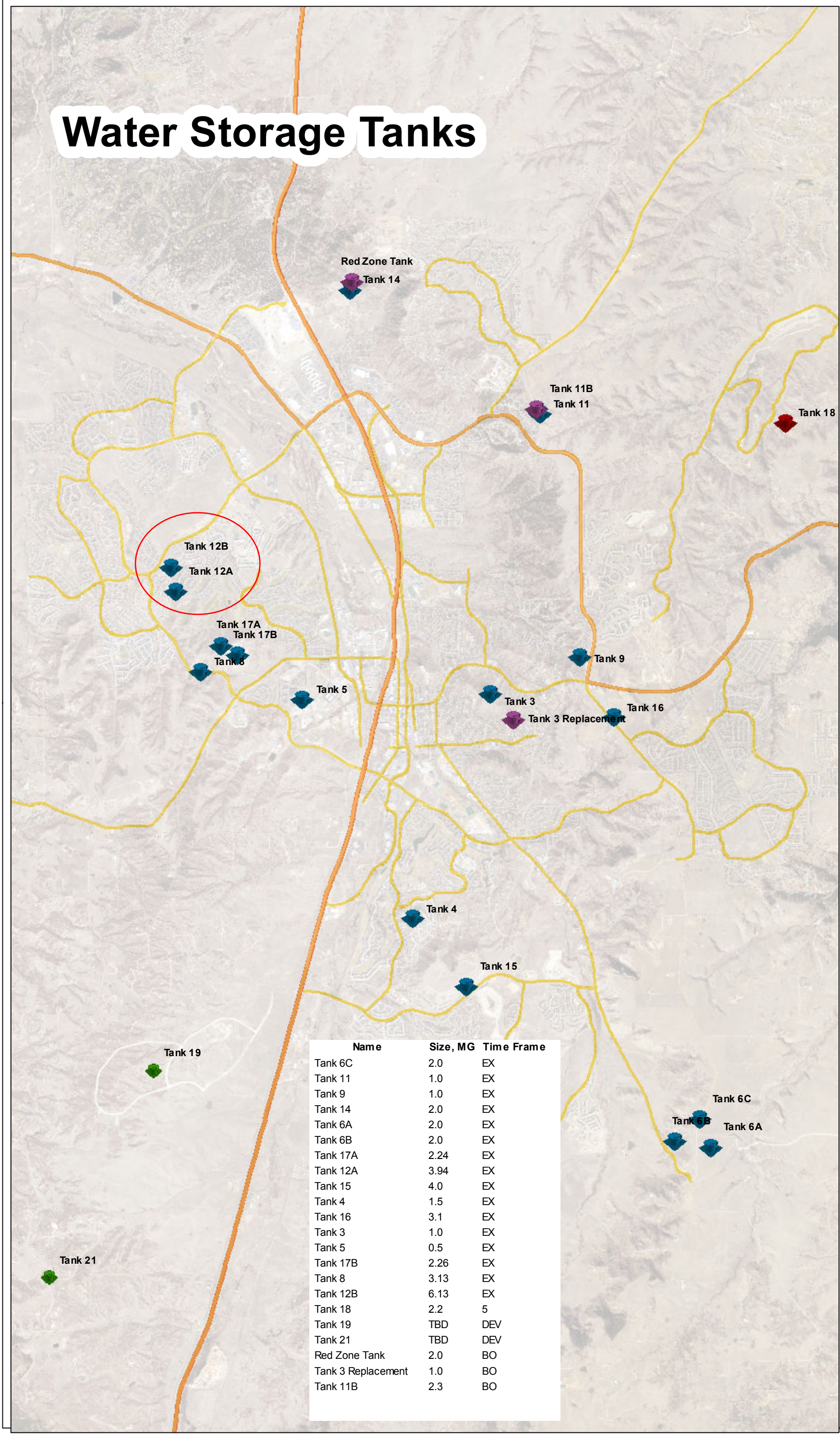
ID	Physical Address	Year Built	Number of Grinders	Standby Power	Comments
Meadows Grinder	5880 Plum Creek Dr.	2004	1	No	
Mitchell Street	6120 Vista Canyon Pl	2009	1	No	



OBJEC	Type	Location
1	Flume	Main Flume
2	Lift Station	Meadows 17 Lift Station
3	Lift Station	Castlewood 2 Lift Station
4	Lift Station	Meadows 5 Lift Station
5	Lift Station	Meadows 15 Lift Station
6	Lift Station	Sellars Gulch Lift Station
7	Lift Station	Maher Ranch Lift Station
8	Lift Station	Mitchell Creek Lift Station
9	Lift Station	Castle Oaks Lift Station
10	Odor Control	Maher Ranch Odor Control
11	Grinder	Meadows Grinder
12	Lift Station	Castlewood 1 Lift Station
13	Lift Station	Ray Waterman Lift Station
14	Grinder	Mitchell Street Depressed Sewer & Grinder
15	Odor Control	Woodlands Odor Control
16	Flume	North Flume
17	Flume	Meadows Flume
416	Inverted Siphon	Castlewood Ranch
417	Inverted Siphon	Plum Creek
418	Inverted Siphon	Meadows

CASTLE ROCK
LIFT STATION BASINS
AND WASTEWATER FACILITIES
FIGURE 3.1

Water Storage Tanks



Name	Size, MG	Time Frame
Tank 6C	2.0	EX
Tank 11	1.0	EX
Tank 9	1.0	EX
Tank 14	2.0	EX
Tank 6A	2.0	EX
Tank 6B	2.0	EX
Tank 17A	2.24	EX
Tank 12A	3.94	EX
Tank 15	4.0	EX
Tank 4	1.5	EX
Tank 16	3.1	EX
Tank 3	1.0	EX
Tank 5	0.5	EX
Tank 17B	2.26	EX
Tank 8	3.13	EX
Tank 12B	6.13	EX
Tank 18	2.2	5
Tank 19	TBD	DEV
Tank 21	TBD	DEV
Red Zone Tank	2.0	BO
Tank 3 Replacement	1.0	BO
Tank 11B	2.3	BO

Figure 3.1

Table 3-2 Finished Water Storage Tank Inventory

Tank ID	Year Built	Capacity (MG)	Diameter (ft)	Height (ft)	Pressure Zone	Status
Tank 1						Demolished
Tank 3	1969	1.04	92.6	19.1	Purple	Active
Tank 4	1984	1.51	118.0	18.6	Blue	Active
Tank 5[1]	1984	(0.5)	66.0	19.4	Yellow	Not in Service
Tank 6A	1986	2.0	120.0	23.5	Green	Active
Tank 6B[2]	1997	(2.0)	120.0	23.5	Green	Not in Service
Tank 6C	2010	2.22	120.0	23.5	Green	Active
Tank 7[3]	1986	(2.0)	122.0	22.7	Red	Not in Service
Tank 8	1987	3.13	147.0	24.8	Blue	Active
Tank 9	1989	1.0	96.0	19.3	Purple	Active
Tank 11	1998	1.0	92.5	24.0	Purple	Active
Tank 12A	1999	3.94	172.0	22.8	Yellow	Active
Tank 12B	2007	6.13	172.0	22.8	Yellow	Active
Tank 14	2001	2.0	121.0	23.3	Red	Active
Tank 15	2002	4.03	174.0	22.7	Red	Active
Tank 16	2004	3.11	140.0	27.0	Red	Active
Tank 17A	2005	2.24	136.0	20.6	Red	Active
Tank 17B	2009	2.26	136.0	20.6	Red	Active
Total Active Storage Capacity		35.6				

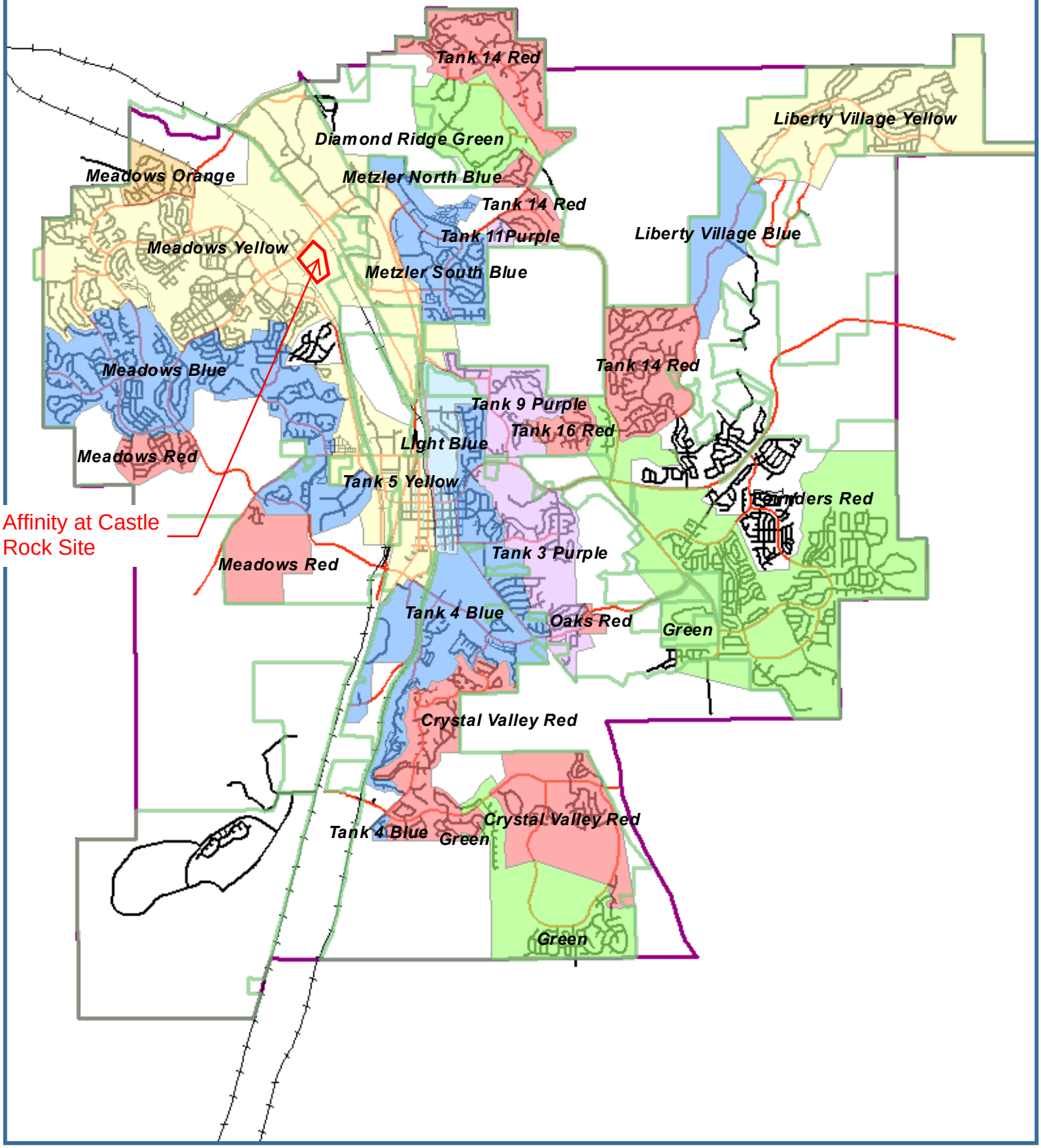
1 Tank 5 is located in Citadel Station and currently is not in service. It has been physically disconnected from the distribution system and its future use will be evaluated.

2 Tank 6B has been removed from service due to a structural failure. This tank is scheduled for demolition in the 5-year CIP.

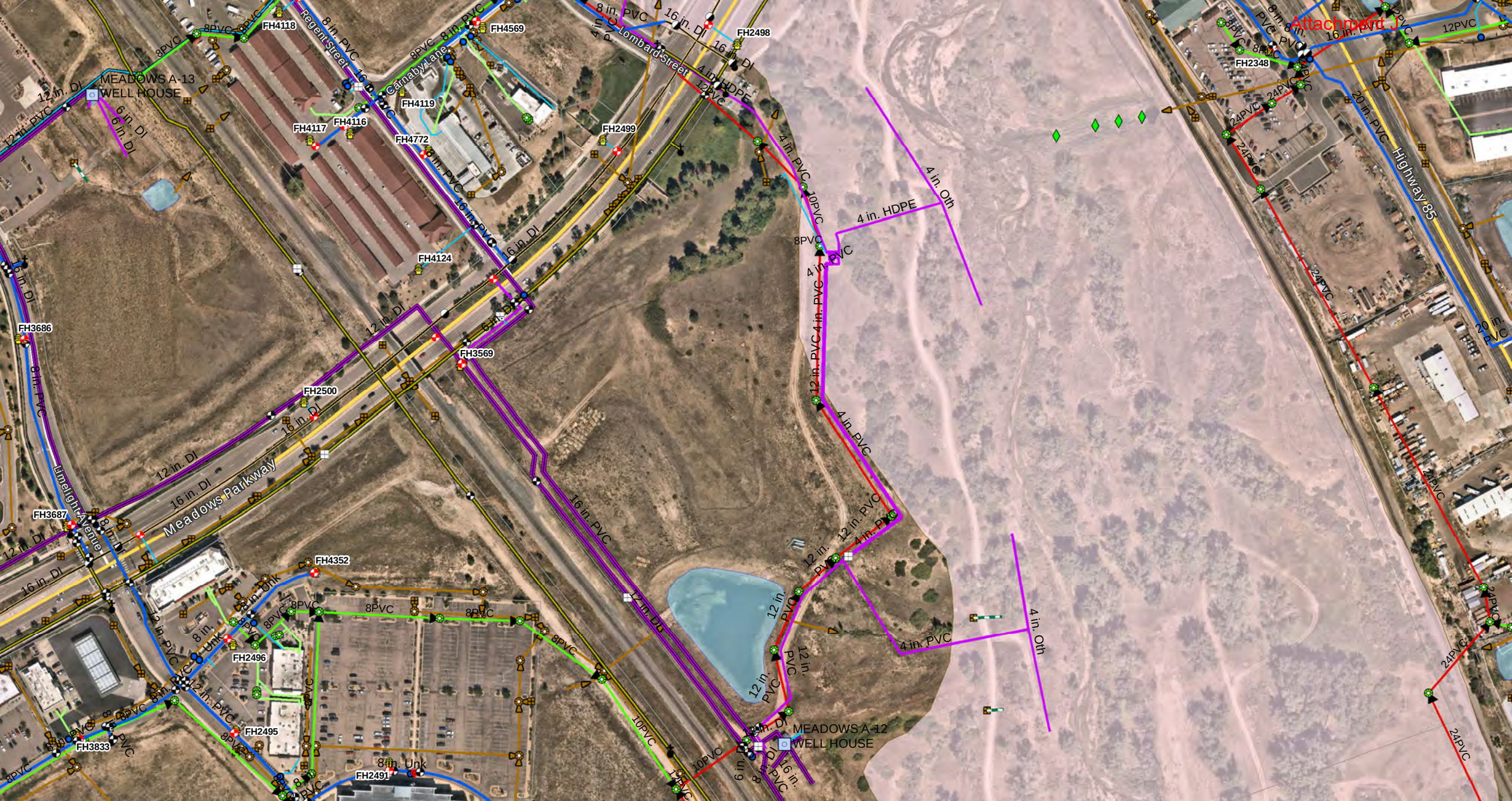
3 Tank 7 is located in Dawson Ridge and currently is not in service. This tank will need to be evaluated to determine if it can be used for future use.

Pressure Zones

Figure 7.1



CASTLE ROCK WATER DISTRIBUTION SYSTEM PRESSURE ZONES


Attachment J
MEADOWS A-13
WELL HOUSE
MEADOWS A-12
WELL HOUSE
Meadows Parkway
Highway 85
Regent Street
Canaby Lane
Lombard Street
Limelight Avenue
FH4118
FH4569
FH4119
FH4117
FH4116
FH4772
FH2498
FH2499
FH4124
FH3686
FH3569
FH2500
FH3687
FH4352
FH2496
FH2495
FH3833
FH2491
FH2348
12 in. DI
16 in. DI
8 in. PVC
12 in. PVC
16 in. PVC
8PVC
12PVC
24PVC
20 in. PVC
4 in. HDPE
4 in. Oth
4 in. PVC
10PVC
6 in. DI
8 in. DI
8 in. Unk

CASTLE ROCK Qwater
Securing our future drop by drop

0 100 200 400 600 Feet

1 inch = 205 feet

Disclaimer: The data presented has been compiled from various sources, each of which introduces varying degrees of inaccuracies or inconsistencies. Such discrepancies in data are inherent and in supplying this product the Town of Castle Rock assumes no liability for 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) 733-6087. Copyright 2019, Town of Castle Rock Utilities Mapping.

CASTLE ROCK UTILITIES MAP (INTERNAL USE ONLY)

Date: 12/20/2021

Document Path: \\CRSAN1\UTUsers\tclose\Desktop\11x17 LndScp_10.6.mxd

APPENDIX G

GREASE INTERCEPTOR REQUIREMENT FORM

Commercial Business Building Permit

Grease Interceptor Requirement

All Commercial Business Building Permits for new business and construction of new buildings, remodels, or tenant improvement permits will be required to comply with Town Code 13.05, Grease Interceptors Required. Applicant will be required to submit an Industry Information Questionnaire through Plum Creek Water Reclamation Authority (PCWRA) to verify if the business will require an oil/grease interceptor. Please go to the PCWRA website at:

https://www.pcwracolorado.org/pretreatment/commercial_businesses/index.php

CONSTRUCTION DRAWINGS

Please note PCWRA requires all new commercial buildings to provide a stub-out for a separate waste line for future interceptor installation, if not proposed with the project. All drainage fixtures and grease waste lines that are tied to the oil/grease must be shown in the construction drawings as well as the location of the oil/grease.

ACKNOWLEDGEMENT

The applicant must sign and date this form to acknowledge that the applicant has read and understands the Town's Code requirement regarding Grease Interceptors, PCWRA's requirement to complete an Industry Information Questionnaire and Food Service Application, and the Town's requirement that a letter from PCWRA must be provided with the Town of Castle Rock Building Permit. This signed form is required to be included in the Utility Report with the Predevelopment Plan (PDP), Site Development Plan (SDP) and Construction Document (CD) submittals.

Affinity at Castle Rock

Name of Project

1360 Meadows Parkway, Castle Rock, CO 80109

Address of property, if known

Robert Ketner Digitally signed by Robert Ketner DN: C=US, E=robertk@inlandconstruction.com, O=Inland Group, OU=Development, CN=Robert Ketner Date: 2022.11.23 06:25:37-08'00'

Signature

11/23/22

Date

Castle Rock Water
175 Kellogg Court, Castle Rock CO 80109
720-733-6000

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

Final Utility Report – Formatting Checklist

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

Final Utility Report – Formatting Checklist

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

Notes/Comments: