



Preliminary Utility Report Checklist

The Preliminary 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 Preliminary Utility Report, information contained in the Concept Utility Letter shall be updated to reflect the latest projections for land use and densities. Hydraulic modeling shall only be required for the site proposed in the Site Development Plan (SDP). This modeling may be waived on a case-by-case basis at the discretion of the Utilities Department if it is adequately demonstrated that the SDP is already consistent with the Town's Water/Wastewater Master Plans and that the existing adjacent water/wastewater infrastructure is adequate to support the development without modifications or if the SDP is for a commercial structure on a single lot. The modeling shall accurately reflect the sizes and locations of all proposed water mains associated with the SDP layout. In addition to providing updated land use and density information, the following items shall be specifically addressed:

- Further analysis of any concerns raised in the Concept Utility Letter regarding the Town's ability to serve the development.
- Updated discussion of appurtenant water/wastewater facilities other than distribution mains that will be necessary to serve the development, and the principal design parameters that will be utilized in the final design of such facilities.
- Status of any variances that have been obtained, or will be pursued.
- Updated discussion of maintenance access and any associated concerns.
- Updated status of permitting requirements.
- Updated appendices.

The following outline sets forth the **required minimum** content to be provided in the Preliminary Utility Report that shall be submitted with the SDP. 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 Preliminary 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

Preliminary Utility Report – Formatting Checklist

Included	N/A	
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)
X		C. Peak Hour Demands (PHD)
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. Land Dedication Requirements Land dedication requirements not anticipated at this time.
	X	PROPOSED WATER SYSTEM ANALYSIS AND MODELING Hydraulic models not anticipated at this time due to size of service line and analysis
	X	A. Hydraulic Models
	X	B. Hydraulic Modeling Scenarios
	X	C. Hydraulic Modeling Output and Required Schematics
X		CALCULATED WASTEWATER FLOWS
X		A. Average Day Wastewater Flows (ADF)
X		B. Peaking Factor
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 Land dedication requirements not anticipated at this time.
	X	PROPOSED WASTEWATER SYSTEM ANALYSIS AND MODELING Hydraulic models not anticipated at this time. Calcs provided in narrative
	X	A. Hydraulic Models
	X	B. Hydraulic Modeling Scenarios
	X	C. Hydraulic Modeling Output and Required Schematics

Preliminary Utility Report – Formatting Checklist

Included	N/A	
X		POTENTIAL PERMITTING REQUIREMENTS See conclusions section
X		REFERENCES
X		APPENDICES
	X	Appendix A — Water Demands Demands included in report narrative
	X	Appendix B — Water Storage
	X	Appendix C — Water Hydraulic Analysis and Modeling Modeling not anticipated to be needed due to size of proposed service line
	X	Appendix D — Wastewater Flows Demands and flows included in report narrative
	X	Appendix E — Wastewater Hydraulic Modeling Pipe sizing included in narrative
X		Appendix F — Maps and Plans
X		A. Vicinity Map
X		B. Utility Map(s) provided by the Utilities Department
X		C. Site Development Plan
X		D. Water/Wastewater Utility Plan(s)

Notes/Comments:

Preliminary Utility Report

For



**Proposed Walmart Fuel Station 00984-543
133 Sam Walton Lane
Lot 1 Milestone Filing No. 4, 1st Amendment
Town of Castle Rock, County of Douglas, State of Colorado
SDP24-0021**

**Owner/Developer:
Walmart, Inc.
2608 Southeast J Street
Bentonville, AR 72716**

Prepared By:



**CEI Engineering Associates, Inc.
710 W. Pinedale Avenue
Fresno, CA 93711
559-447-3119**

**Rev-1
Project No. 32644.0
November 25, 2024**

DISTRIBUTION:
Town of Castle Rock
Client/File-ECL

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FOR THE PROPOSED WALMART FUEL STATION #00984-543
133 SAM WALTON LANE
CASTLE ROCK, CO

November 25, 2024
CEI Project No. 32644.0

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Engineer's Statement:

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

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

Owner/Developer's Statement:

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

Name of Developer

Authorized Signature



I. Introduction

The purpose of this Utility Report is to outline the proposed utility design for the proposed Walmart Fuel Facility, which is located at 133 Sam Walton Lane, Castle Rock, CO. The owner is Walmart Real Estate Trust, located at 2608 SE J St. Bentonville, AR 72716. This Utility Report will demonstrate that the proposed utility design is in compliance with the Town of Castle Rock Water System Design 2018 Criteria Manual, the Town of Castle Rock Wastewater Collection Design 2018 Criteria Manual, and the existing Master Utility Report titled “Water and Sanitary Sewer Study for Milestone Filing No. 4”, prepared by CLC Associates Inc., Revised June 24, 2003.

A. Site Location

The proposed site is located in the southwest corner of the parking lot for the Walmart Supercenter located along Front St. (Attachment A). There is one (1) access points off Milestone Lane and one (1) access point off Sam Walton Lane to the Walmart parcel. There are no known fire hydrants within the proposed fuel station immediate area, however there is one existing hydrant in front of the existing Walmart supercenter which is approximately 250ft southeast of the proposed fuel station area. Please refer to Appendix B for the approximate location of the existing fire hydrant. One (1) storm drain inlet is located in the most southwest part of the proposed fuel station area. The proposed site is within Flood Zone A, Map Number 08035C0188G. The proposed site is identified as Parcel Number 235126303003 and has a zoning designation of Commercial Planned Development (PD). The proposed area of the fueling station development is approximately 77,865 square feet (1.79 acres).

B. Project Description

The improvements include a six (12) pump fueling station with an approximate 1,618 square foot convenience store and three (3) underground storage tanks. This project is located within the Metzler South Blue water pressure zone and is currently served by Town utilities and accounts. As shown on the attached utility map (Attachment C), an existing 8-inch public water distribution main provided by Town of Castle Rock bisects the site near the center of the lot and continues as a looped water main around the existing building and adjacent lots. There is also an existing 8-inch sanitary sewer main provided by Town of Castle Rock located in the parking lot approximately 175-feet east of the proposed building. The project proposes the following utilities, as shown on the attached utility plan included in the Utility Plan (Attachment B): a two-inch water service line connecting to the 8-inch line east of the site. And a 4-inch sanitary sewer service line connecting to the 8-inch line east of the site.

Any future development of the existing water and wastewater infrastructure needed to serve this site is the responsibility of the developer.

II. Existing Water System

A. Existing Distribution System

The existing water distribution system was designed per the “Water and Sanitary Sewer Study for Milestone Filing No. 4”, prepared by CLC Associates Inc., Revised June 24, 2003. The existing system was designed as a looped system which connects to the existing town facilities at three locations. These



connections are at the intersection of Founders Parkway and Trail Boss Drive, the existing Trail Boss Drive dead-end south of the site, and the intersection of the south Wal-Mart access drive and Front Street.

The existing distribution system consists of 12" and 8" mains. The proposed Walmart Fuel Station will connect to one of the 8" main lines directly in front of the existing supercenter site. Please refer to Appendix F for additional information on the existing distribution system.

III. Proposed Water System

A. Proposed Water Service Line

The proposed water system consists of a single 2" domestic service line which connects to the existing 8" main in front of the existing Walmart Supercenter. The 2" line shall be type K copper and shall include an associated tap, corp. stop, curb stop, meter, and backflow preventer per Town of Castle Rock standard plan number W-3.

B. Calculated Water Demands

Estimated domestic water demand for the proposed fueling station is based on past utility information from previous fuel station projects and utility bills. Per this information, estimated average domestic daily demand is anticipated to be approximately 300 gallons per day (GPD). Using the Town of Castle Rock Water System Design 2018 Criteria Manual maximum day demand and peak hour demand factors, the maximum day demand and peak hour demand can be calculated as follows:

$$\text{Max Day Demand} = 2.5 \times \text{ADD} = 300\text{gpd} \times 2.5 = 750\text{gpd or } 0.521\text{gpm}$$

$$\text{Peak Hour Demand} = 5.5 \times \text{ADD} = 300\text{gpd} \times 5.5 = 1650\text{gpd or } 1.15\text{gpm}$$

Irrigation demand is calculated in accordance with Section 4.4.1 of the Town of Castle Rock Water System Design 2018 Criteria Manual. The irrigation demand values can be found in the following table:



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

Source: Town of Castle Rock Water System Design 2018 Criteria Manual.

The total landscape area on site is anticipated to be approximately 0.1 acres. Using the Irrigated Land Average Day Demand calculations from Section 4.4.1, the calculated average day demand can be found below:

Average Day Demand = 0.1 acres x 3,750gpd/acre = 375gpd or 0.26gpm

Using the calculated domestic and irrigation average day demand values, the combined demand values can be found below:

Average Day Demand = 300gpd(domestic) + 375gpd(irrigation) = 675gpd or 0.47gpm

Max Day Demand = 750gpd(domestic) + 375gpd(irrigation) = 1125gpd or 0.78gpm

Peak Hour Demand = 1650gpd(domestic) + 375gpd(irrigation) = 2025gpd or 1.41gpm



Per the existing water and sewer study, the entire 64.25acre development associated with Filing No. 4 was considered to be commercial land use with an estimated demand of 1200gpd/acre. Max Day Demand factor utilized in the existing study was 2.65 and the Peak Hour Demand factor utilized was 4.5. Given the proposed Walmart Fuel Station currently represents approximately 1.79acres of associated disturbance/development, the allotted demand for the acreage associated with the fuel station development would be:

$$\text{Allotted Average Day Demand} = 1.79\text{acres} \times 1200\text{gpd/acre} = 2148\text{gpd or } 1.49\text{gpm}$$

$$\text{Allotted Max Day Demand} = 2148\text{gpd} \times 2.65 = 5692\text{gpd or } 3.95\text{gpm}$$

$$\text{Allotted Peak Hour Demand} = 2148\text{gpd} \times 4.5 = 9666\text{gpd or } 6.71\text{gpm}$$

The calculated demand for the existing site is within the allotted demand per the existing water and sanitary sewer study.

C. Fire Flow Requirements

The necessary fire flows for the proposed site are based on the Town of Castle Rock municipal code, the 2018 International Building Code, and the 2018 International Fire Code. Per the 2018 International Building Code, fire flows are based on a 4,860SF fuel canopy and a 1,618SF convenience store. The Canopy falls under Type II-B construction and the convenience store falls under Type V-B construction. Per the 2018 International Fire Code, both the canopy and convenience store require only 1500gpm fire flows. These fire flows can be provided by existing hydrants located within the parking lot for the existing Walmart Supercenter. Please refer to Appendix B for an exhibit displaying the closest fire hydrant location to the proposed fuel station site.

D. Storage Requirements

The site's required storage volume is based on the Town of Castle Rock Water System Design 2018 Criteria Manual, section 4.4.2. The required storage volume is calculated per the equation below:

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

Based on the maximum day demand previously calculated at 1125gpd and a two-hour 1500gpm required fire flow, the required storage volume for the proposed fuel station would equal:

$$\text{Storage Volume (gal)} = 1125 \text{ gallons} + 1500\text{gpm} \times 60\text{min/hr} \times 2\text{hrs} = 181,125 \text{ gallons} \\ \text{(0.181MG)}$$

Per the "Water and Sanitary Sewer Study for Milestone Filing No. 4", the existing Walmart Supercenter had been analyzed as the largest storage requirement for the existing water distribution system at a required 924,000 gallons (0.924MG). This required storage volume could be met by the supply from the 1 million gallon "purple zone" tank as referenced in the existing water and sewer study. Therefore, the proposed fuel station storage volume requirements should be adequately met by this existing tank supply.



IV. Existing Wastewater System

A. Existing Collection System

The existing collection system was designed per the “Water and Sanitary Sewer Study for Milestone Filing No. 4”, prepared by CLC Associates Inc., Revised June 24, 2003. The existing system was designed as internal service mains only intended to connect to the existing regional mains along Front Street or adjacent to the south property line of the existing Walmart Supercenter lot.

Per the existing water and sanitary sewer study, the proposed fuel station development would fall within Basin D of the existing Sanitary Basin Map. Basin D consists of 21.8 acres of proposed commercial sanitary flows which are to be collected by an 8” PVC service main. The proposed Walmart Fuel Station will connect to this existing main by means of a 6” gravity sanitary sewer service line. Please refer to Appendix F for additional information on the existing collection system.

V. Proposed Wastewater System

A. Proposed Collection System

The proposed wastewater collection system consists of a single 6” sanitary sewer service line which connects to the existing 8” PVC service main system in front of the existing Walmart Supercenter. The 6” line shall be SDR 35 PVC and shall include an associated tap at the existing sanitary manhole per Town of Castle Rock standard specifications.

B. Calculated Wastewater Flows

Estimated sewer flows for the proposed fueling station is based on past utility information from previous fuel station projects and utility bills and is considered to be approximately 90% of the domestic water demand. Per this information, estimated average daily sewer flow is anticipated to be approximately 270 gallons per day (GPD). Using section 4.4.1 of the Town of Castle Rock Wastewater Collection Design 2018 Criteria Manual, the peaking factor is calculated below:

$$PF = (3.65 \times [(ADF)^{-0.168}])$$

$$PF = (3.65 \times [(270\text{gpd})^{-0.168}]) = 1.43$$

Applying the peak design flow rate equation from section 4.4.1.3 of the Town of Castle Rock Wastewater Collection Design 2018 Criteria Manual, the peak design flow rate is calculated below:

$$PDF = (ADF \times PF) + (0.1 \times AFD)$$

$$PDF = (270\text{gpd} \times 1.43) + (0.1 \times 270\text{gpd}) = 413\text{gpd or } 0.001\text{CFS}$$

Per the existing water and sewer study, the proposed site lies within sanitary Basin D which comprises a total area of approximately 21.8 acres. The estimated average daily sewer flows per acre were calculated



to be approximately 600gpd/acre. Using the 1.79acre site development, the allotted sewer demand/flows for the proposed site are calculated below:

$$\text{ADF} = 1.79\text{acres} \times 600\text{gpd/acre} = 1074\text{gpd}$$

Per the existing water and sewer study, the max peak factor of 5.0 was utilized for the peak flow design. Incorporating the peak factor of 5.0, the allotted peak sewer flows for the proposed site are calculated below:

$$\text{PDF} = \text{ADF} \times \text{PF}$$

$$\text{PDF} = 1074\text{gpd} \times 5.0 = 5370\text{gpd or } 0.008\text{CFS}$$

The calculated flows for the existing site are within the allotted flows per the existing water and sanitary sewer study.

C. Proposed Wastewater Pipe Sizing

The proposed wastewater service line for the fuel station site shall be a 6" SDR 35 PVC pipe which shall connect to the existing 8" PVC service main system in front of the existing Walmart Supercenter. The 6" PVC pipe is sloped at 1.64%. Using a Manning's roughness coefficient of 0.011 for PVC, the estimated sewer flows and velocities are calculated below:

Pipe Size (In.)	Slope (%)	Design Peak Flow (CFS)	Full Flow Capacity (Manning's) (CFS)	Design Peak Flow Velocity (FPS)	Full Capacity Flow Velocity (FPS)
6	1.64	0.001	0.849	0.37	4.34

The proposed wastewater service line will have capacity for proposed flows. Due to the size of the design peak flows, a minimum velocity of 2ft/s is not able to be achieved for the proposed domestic service line. However, the service line shall have plenty of capacity for the design flows based on the calculations provided.

VI. Conclusions

The proposed site's water demand and sewer flows are within the allotted amounts per the existing Master Utility Report titled "Water and Sanitary Sewer Study for Milestone Filing No. 4", prepared by CLC Associates Inc., Revised June 24, 2003. There shall be no negative impacts to downstream water mains or sanitary sewer mains based on anticipated demand and flows.

Based on the scope of work for the proposed fuel station, local permit requirements are anticipated which include commercial construction permit, temporary erosion and sediment control permit, and building permit. All necessary permits shall be obtained prior to site construction.



VII. References

1. Town of Castle Rock Water System Design 2018 Criteria Manual, Published by the Town of Castle Rock, December 4, 2018.
2. Town of Castle Rock Wastewater Collection Design 2018 Criteria Manual, Published by the Town of Castle Rock, December 4, 2018.
3. “Water and Sanitary Sewer Study for Milestone Filing No. 4”, prepared by CLC Associates Inc., Revised June 24, 2003.
4. The International Building Code, 2018 Edition, prepared by the International Code Council, Inc.
5. The International Fire Code, 2018 Edition, prepared by the International Code Council, Inc.



APPENDIX A – VICINITY MAP

Vicinity Map

WM Fuel Station 00984-543, Castle Rock, CO

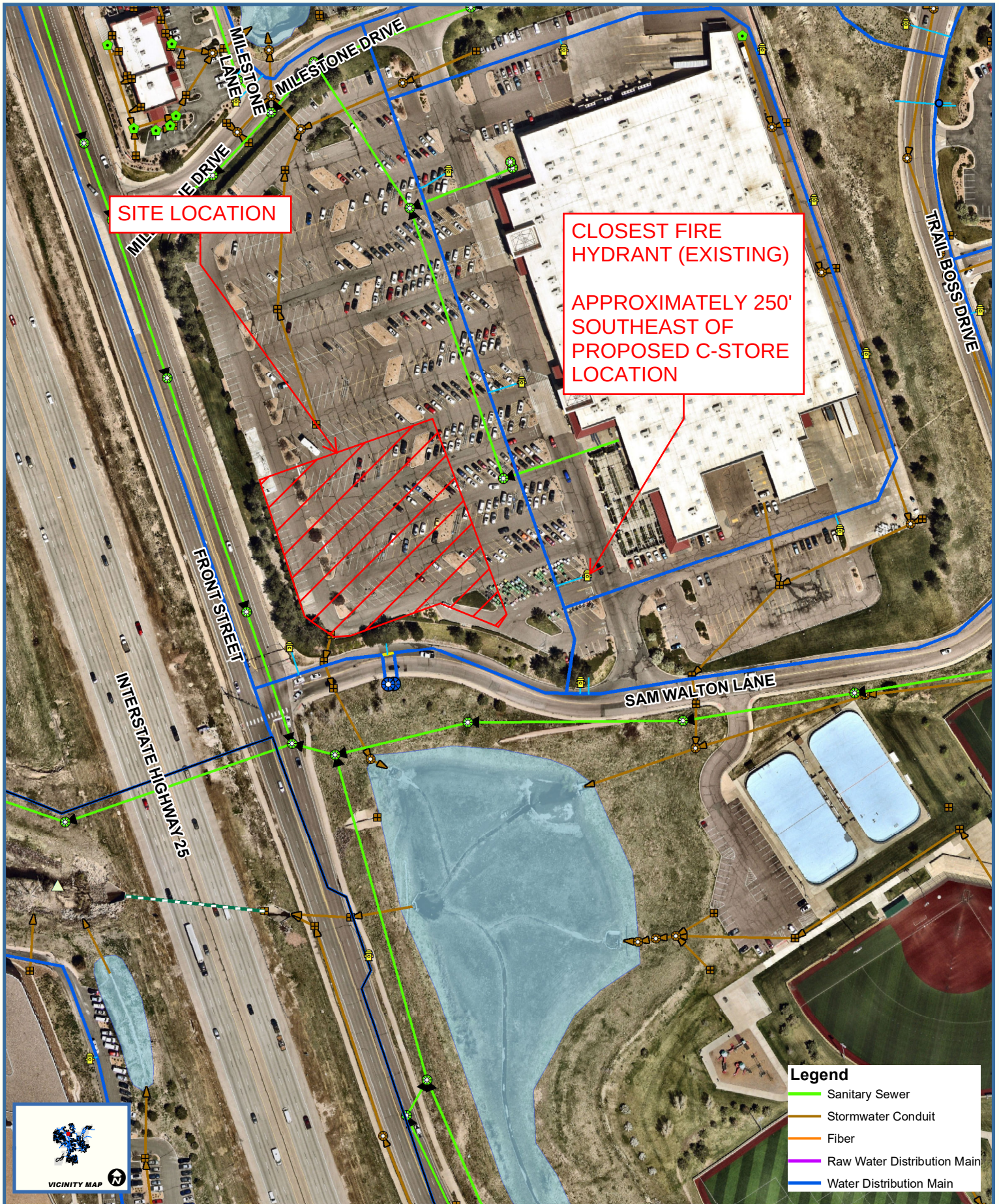
Legend

 133 Sam Walton Ln





APPENDIX B – TOWN OF CASTLE ROCK UTILITY MAP



SITE LOCATION

CLOSEST FIRE
HYDRANT (EXISTING)

APPROXIMATELY 250'
SOUTHEAST OF
PROPOSED C-STORE
LOCATION

Legend

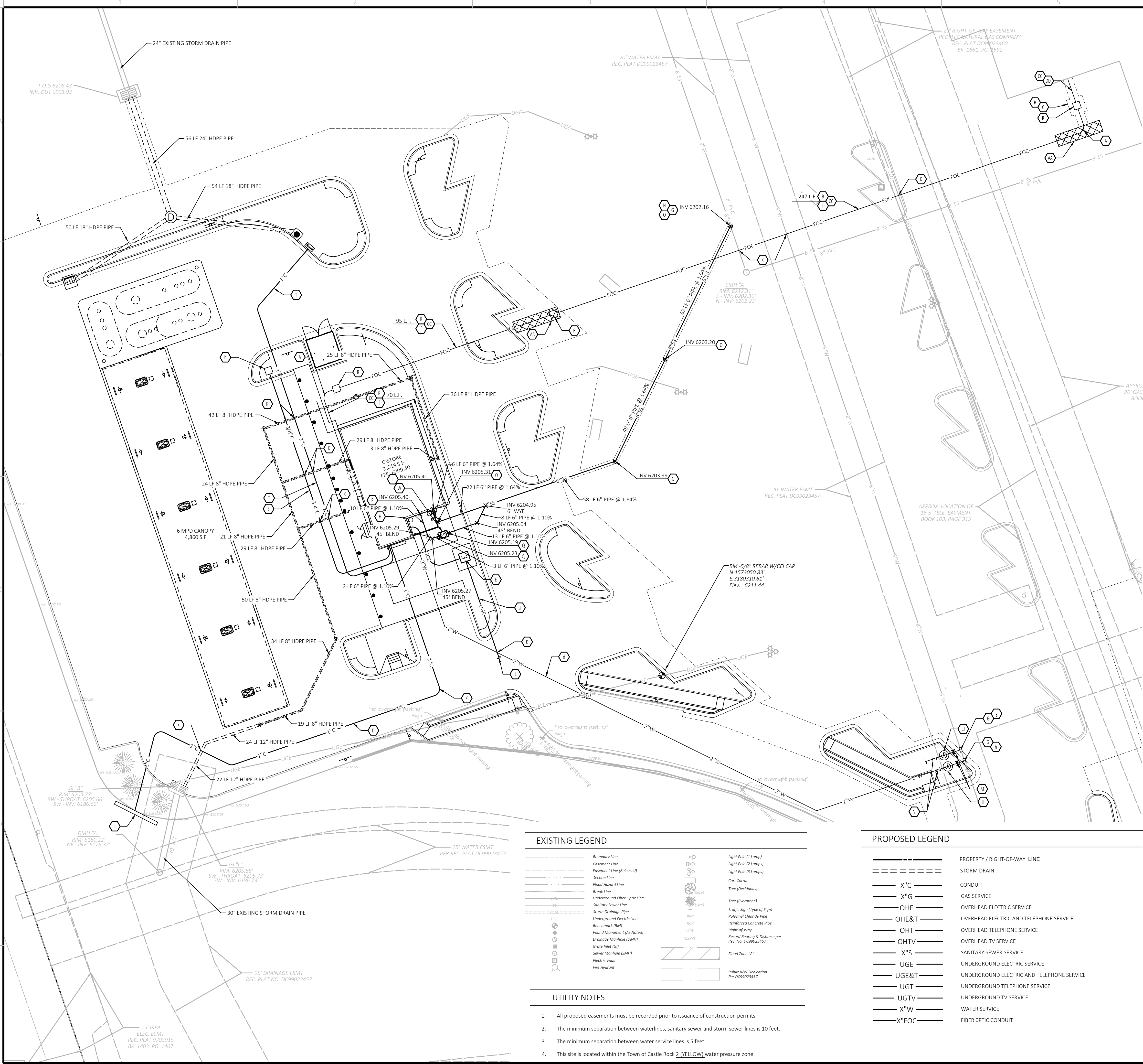
- Sanitary Sewer
- Stormwater Conduit
- Fiber
- Raw Water Distribution Main
- Water Distribution Main





APPENDIX C – UTILITY PLAN

DRAWING LOCATION - P:\3200\32644\0\DRAWINGS\DESIGN\WORKING\32644 - UP.DWG - SAVED BY - DVONG



UTILITY LEGEND

- A INSTALL 3" SWEEP, MINIMUM RADIUS SHALL BE 10 TIMES CONDUCTOR DIAMETER (MINIMUM FIVE (5) INCH RADIUS).
- B FIBER OPTIC CONDUIT TO CONVENIENCE STORE:
- ONE BY 3" DIAMETER CONDUITS FOR FIBER OPTIC CABLES AND TELEPHONE LINES REQUIRED FROM BUILDING TO GAS LOT AS NECESSARY. COORDINATE WITH CURRENT UDCP. THE CONDUITS SHALL BE 3" DIAMETER CARLON TYPE "DB" DIRECT BURIAL TELEPHONE DUCT OR 3" SCHEDULE 40 PVC. INSTALL GALVANIZED PULL WIRE OR PURPLE PROPYL-POLYETHYLENE ROPE WITH A MINIMUM PULLING TENSION OF 100 POUNDS IN EACH CONDUIT. THE MINIMUM BURIAL DEPTH SHALL BE 24". INSTALL AN ORANGE DETECTABLE HAZARD TAPE WITH INTEGRAL "BURIED FIBER OPTIC CABLE" WORDING, 12" ABOVE THE CONDUITS.
- C CONCRETE SIDEWALK CUT / REPAIR, SEE ARCH PLANS.
- D 1" CONDUIT TO FUEL PRICE READER.
- E PROPOSED LOCATION OF TRANSFORMER PAD. CONTRACTOR TO VERIFY EXACT LOCATION AND SIZE WITH POWER COMPANY PRIOR TO INSTALLATION. CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLATION OF CONCRETE PAD, CONDUIT AND PIPE BOLLARDS AS REQUIRED BY THE ELECTRIC COMPANY. CONTRACTOR SHALL COORDINATE SAID WORK WITH THE ELECTRIC COMPANY. FINAL LOCATION OF TRANSFORMER AND BOLLARD CANNOT CONFLICT WITH TRUCK ACCESS TO UNDERGROUND STORAGE TANKS.
- F CONCRETE ENCASEMENT FOR DI AND PVC PIPES, SEE DETAIL SHEETS.
- G LOCATION FOR THIS UTILITY AS SHOWN IS FOR DRAWING PURPOSES ONLY. CONTRACTOR SHALL VERIFY THE EXACT LOCATION AND DEPTH IN FIELD PRIOR TO THE CONSTRUCTION OF THE PROPOSED UTILITY LINE TO BE CONNECTED. CONTRACTOR SHALL NOTIFY CEI ENGINEERING IF THE DESIGN AS SHOWN IS NOT ACHIEVABLE.
- H DOMESTIC WATER BUILDING ENTRY, SEE ARCH / MEP PLANS FOR CONTINUATION.
- I SANITARY SEWER ENTRY, (PER ARCH PLANS).
- J POINT OF CONNECTION - ELECTRICAL SERVICE TO BE DETERMINED (PER ELECTRICAL COMPANY REQUIREMENTS).
- K MAINTAIN 18 INCHES VERTICAL SEPARATION.
- L PROPOSED MOUNTED SIGN, (PER SIGN PACKAGE).
- M INSTALL CURB STOP
- N POINT OF CONNECTION - SANITARY SEWER SERVICE.
- O PRIVATE SANITARY SEWER CLEANOUT, SEE DETAIL SHEETS.
- P SANITARY SEWER LINE FOR FUTURE GREASE TRAP POINT OF ENTRY (PER ARCH PLANS).
- Q SANITARY STUB OUT FOR FUTURE GREASE TRAP CONNECTION/INSTALLATION
- R 17" X 30" X 28" "QUAZITE" PGI1730BA28 BOX WITH PGI1730HHDD LID, OR APPROVED EQUAL.
- S 3/4" CONDUIT TO AIR STATION.
- T 1" CONDUIT TO E-STOP AT TANK VENT.
- U CONDUITS FOR 400 AMP ELECTRIC SERVICE, REF UTILITY COMPANY PLANS / REQUIREMENTS.
- V INSTALL BACKFLOW PREVENTOR
- W FUTURE GREASE TRAP
- b AIR STATION, REF ARCH PLANS.
- d 2" DOMESTIC WATER LINE
- f DIRECTIONAL DRILL PATH (OR OPEN TRENCH) FOR ONE BY THREE (3) INCH FIBER OPTIC CONDUIT. CONTRACTOR SHALL HAVE CONSTRUCTION METHOD APPROVED BY WALMART PRIOR TO ANY WORK BEING PERFORMED ON FIBER OPTIC CONDUITS. IF OPEN TRENCH IS APPROVED, BACKFILL MATERIAL IN TRENCH SHALL BE FLOWABLE FILL PER ASTM D4832 IN LIEU OF COMPACTING SOIL MATERIAL FROM TRENCH EXCAVATION.
- B POINT OF CONNECTION - 1 INCH IRRIGATION WATER SERVICE PER CASTLE ROCK, CO DETAIL PLAN NO. IR-9
- h POINT OF CONNECTION - 2 INCH POTABLE WATER SERVICE PER CASTLE ROCK, CO DETAIL PLAN NO. W-3
- AA BORING PIT.
- CC CONTRACTOR SHALL COORDINATE FIBER OPTIC CONDUIT INSTALLATION WITH STORE MANAGER TO LIMIT DISTURBANCE TO STORE OPERATION.
- DD FIBER OPTIC AND TELEPHONE POINT OF CONNECTION, CONTRACTOR SHALL COORDINATE WITH ARCHITECT AND STORE MANAGER FOR FINAL BUILDING ENTRANCE LOCATION.
- II 2 INCH POTABLE WATER METER PER CASTLE ROCK, CO DETAIL PLAN NO. W-3
- JJ 1 INCH IRRIGATION WATER METER PER CASTLE ROCK, CO DETAIL PLAN NO. W-4A

UTILITY NOTES

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

SITE DEVELOPMENT PLAN
LOT 1, MILESTONE FILING NO. 4, 1ST AMENDMENT
TOWN OF CASTLE ROCK PROJECT NO. SDP24-0021

EXISTING LEGEND

- | | |
|------------------------------|---|
| Boundary Line | Light Pole (1 Lamp) |
| Easement Line | Light Pole (2 Lamps) |
| Easement Line (Released) | Light Pole (3 Lamps) |
| Section Line | Cart Corral |
| Flood Hazard Line | Tree (Deciduous) |
| Break Line | Tree (Evergreen) |
| Underground Fiber Optic Line | Traffic Sign (Type of Sign) |
| Sanitary Sewer Line | Polyvinyl Chloride Pipe |
| Storm Drainage Pipe | Reinforced Concrete Pipe |
| Underground Electric Line | Right-of-Way |
| Benchmark (BM) | Record Bearing & Distance per Rec. No. DC99023457 |
| Found Monument (As Noted) | Flood Zone "A" |
| Drainage Manhole (DMH) | Public R/W Dedication Per DC99023457 |
| Grate Inlet (GI) | |
| Sewer Manhole (SMH) | |
| Electric Vault | |
| Fire Hydrant | |

UTILITY NOTES

- All proposed easements must be recorded prior to issuance of construction permits.
- The minimum separation between waterlines, sanitary sewer and storm sewer lines is 10 feet.
- The minimum separation between water service lines is 5 feet.
- This site is located within the Town of Castle Rock 2 (YELLOW) water pressure zone.

PROPOSED LEGEND

- | | |
|-------|--|
| --- | PROPERTY / RIGHT-OF-WAY LINE |
| == | STORM DRAIN |
| --- | CONDUIT |
| X"C | GAS SERVICE |
| X"G | OVERHEAD ELECTRIC SERVICE |
| OHE | OVERHEAD ELECTRIC AND TELEPHONE SERVICE |
| OHE&T | OVERHEAD TELEPHONE SERVICE |
| OHT | OVERHEAD TV SERVICE |
| OHTV | SANITARY SEWER SERVICE |
| X"S | UNDERGROUND ELECTRIC SERVICE |
| UGE | UNDERGROUND ELECTRIC AND TELEPHONE SERVICE |
| UGE&T | UNDERGROUND TELEPHONE SERVICE |
| UGT | UNDERGROUND TV SERVICE |
| UGTV | WATER SERVICE |
| X"W | FIBER OPTIC CONDUIT |
| X"FOC | |



CEI ENGINEERING ASSOC., INC.

710 W PINEDALE AVE
FRESNO, CA 93711
PHONE: (559) 447-3119
FAX: (559) 447-3129

REVISION

NO.	DESCRIPTION	DATE

WALMART FUEL STATION #984-543

133 SAM WALTON LANE
CASTLE ROCK, COLORADO



PROFESSIONAL OF RECORD	TAB
PROJECT MANAGER	JAP
DESIGNER	MD
CEI PROJECT NUMBER	32644
DATE	12/4/2024
REVISION	----

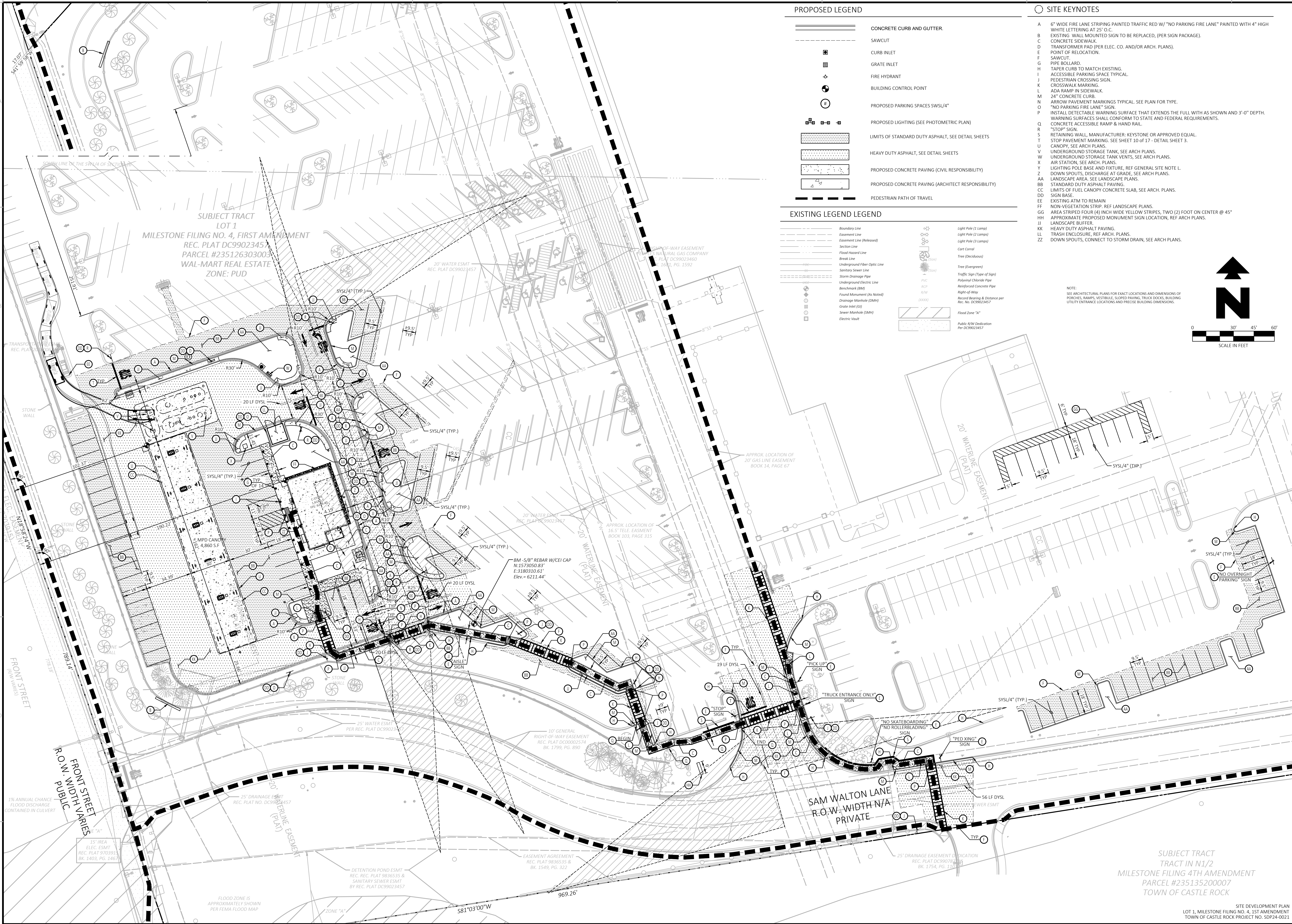
UTILITY PLAN

SHEET TITLE
SHEET NUMBER

8 of 13

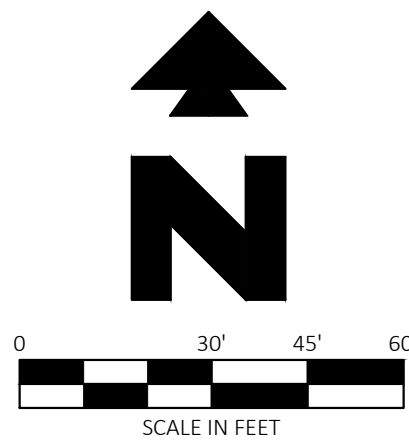


APPENDIX D – SITE DEVELOPMENT PLAN



CEI ENGINEERING ASSOC., INC.
710 W PINEDALE AVE
FRESNO, CA 93711
PHONE: (559) 447-3119
FAX: (559) 447-3129

REVISION		
NO.	DESCRIPTION	DATE



WALMART FUEL STATION #984-543

133 SAM WALTON LANE
CASTLE ROCK, COLORADO



12/06/2024

PROFESSIONAL OF RECORD	TAB
PROJECT MANAGER	JAP
DESIGNER	MD
CEI PROJECT NUMBER	32644
DATE	12/5/2024
REVISION	----

SITE PLAN

SHEET TITLE
SHEET NUMBER

4 of 13



APPENDIX E – EXISTING MASTER UTILITY REPORT

1105

**WATER AND SANITARY SEWER STUDY
FOR
MILESTONE FILING NO. 4
TOWN OF CASTLE ROCK, COLORADO**

RECEIVED
JUL - 9 2009

**WATER AND SANITARY SEWER STUDY
FOR
MILESTONE FILING No. 4**

TOWN OF CASTLE ROCK, COLORADO

September 20, 2001
Revised June 24, 2003

Prepared for:

Crowfoot Castle Rock, LLC
7600 East Arapahoe Road, Ste. 211
Englewood, Colorado 80112
Ph. (303) 771-3344
Mr. Glen Smith, Manager

Prepared by:

Joel D. Tompkins, PE
CLC Associates, Inc.
8480 E. Orchard Rd. #2000
Greenwood Village, CO 80111



(CLC Job No. 00.0475)

**WATER AND SANITARY SEWER STUDY
FOR
MILESTONE FILING No. 4**

TOWN OF CASTLE ROCK, COLORADO

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Appendix A - Water System Data

Appendix B - Sanitary Sewer System Data

BACK POCKET - SANITARY BASIN MAP

**WATER AND SANITARY SEWER STUDY
FOR
MILESTONE FILING No. 4**

TOWN OF CASTLE ROCK, COLORADO

CERTIFICATION

ENGINEER'S STATEMENT:

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


Joel Dean Tompkins
Colorado P.E. No. 32415
For and on behalf of CLC Associates, Inc.



**WATER AND SANITARY SEWER STUDY
FOR
MILESTONE FILING No. 4**

TOWN OF CASTLE ROCK, COLORADO

1.00 GENERAL LOCATION AND DESCRIPTION

1.01 Location

Milestone Filing No. 4, Lot 3 is a portion of the south one-half of Section 26 and the north one half of Section 35, Township 7 South, Range 87 West of the Sixth Principal Meridian in the Town of Castle Rock, County of Douglas, State of Colorado. The site lies in the northerly city limits of the Town of Castle Rock. It can be accessed by going east at the Founders Parkway exit of Interstate 25 approximately one-quarter mile to the intersection of Founders Parkway and Front Street. The property in question lies in the south-west quadrant of this intersection with frontage on both streets.

1.02 Description

Milestone Filing No. 4 is a 64.25 acre commercial development which is zoned PD. The 1st Amendment of the plat, recorded in 1998, created 3 lots; one of which (Lot 1) was subsequently developed and is occupied by a Wal-Mart SuperCenter. The 2nd Amendment further subdivides Lot 3 into 5 smaller parcels and a tract. Lot 2 will, for the time being, remain as is.

1.03 Adjacent Properties

As mentioned, the property fronts on Founders Parkway to the east and Front Street to the north and west. Adjacent properties to the south consist of The Town of Castle Rock School / Park Site, Metzler Ranch Filing No. 1 (residential), and Metzler Ranch Parcel 4 (commercial). To the east is the Founders Parkway ROW while the north and west abuts the ROW of Front Street.

1.04 Proposed Development

All existing and proposed development will continue in accordance with the Planned Development on file with the Town of Castle Rock. That document provides for commercial development meeting the use and density requirements associated with commercial zoning in the town's public works regulations as regards to water demands, sanitary flows, and other utility service requirements.

2.00 WATER SYSTEM ANALYSIS

2.01 Description

Milestone Filing No. 4 will be served by a looped water system which connects to the existing town facilities at three locations. All connections to those facilities have been made as a part of the improvements in-place on Lot 1. Those connections are at the intersection of Founders Parkway and Trail Boss Drive, the Trail Boss Drive at the south end of the site, and the intersection of Milestone Drive and Front Street.

**WATER AND SANITARY SEWER STUDY
FOR
MILESTONE FILING No. 4**

TOWN OF CASTLE ROCK, COLORADO

The system lies in the "blue-zone" as defined by the Town of Castle Rock Public Works Department. That zone is designed to provide domestic and fire service to structures between elevations of 6232 and 6396 mean sea level. The connections at Trail Boss are to purple-zone lines. *Existing PRV's within filing No. 4 provide the necessary zone separation.* It will be necessary to provide pressure reducing valves on the domestic service lines for all existing and proposed buildings. Please refer to the included "Water Service Plan" for depiction of existing and proposed water lines in or affecting Milestone Filing No. 4.

2.02 Modeling Assumptions

For purposes of modeling the system the following assumptions were made:

- Roughness factors for ductile iron pipe were used throughout ($C=120.0$). This will provide a level of conservativeness when analyzing those pipes less than 12 inches in diameter which are or will be PVC.
- All three points of connection to the town system were considered; two in the purple zone and one in the yellow zone.
- Domestic maximum daily and peak demands were distributed evenly throughout nodes within the Filing.

The average water demand was determined using the land use demand rate of 1200 gpad for commercial properties, as printed in the Town's Public Works Regulations. From the same publication factors of 2.65 and 4.5 were applied to the average rate to determine the maximum day demand and peak hour demands, respectively. Thus, for the 64.25 acres of Milestone Filing No. 4 the average demand was determined to be 77,100 gallons per day. The maximum day flow will be 141.9 gpm and peak day flow will be 240.9 gpm. All calculations are presented in the appendices.

**WATER AND SANITARY SEWER STUDY
FOR
MILESTONE FILING No. 4**

TOWN OF CASTLE ROCK, COLORADO

2.03 Design Scenarios

The calculated peak hourly demand of 240.9 gpm was distributed evenly through the 40 nodes provided in the modeled system. To determine adequacy for fire flow conditions five different configurations were used supplying 3750 gpm from three hydrants while maintaining maximum day demand. Refer to design data provided in the appendix of this report.

2.04 Volume

The calculations in the appendix demonstrate a need for 924,000 gallons of storage to provide for combined domestic and fire fighting needs associated with Milestone Filing No. 4. Supply is currently provided by the 1 million gallon "purple zone" tank. An additional 2 million gallons of storage is being constructed in the "red zone" as part of the improvements associated with Mahar Ranch development. That storage will be available to the "blue zone" through PRV's and pump stations being installed in the Diamond Ridge development.

2.05 Conclusion

Peak hour demands and fire flows can be serviced within Milestone Filing No. 4 in compliance with the residual pressure and velocity requirements established in the Public Works Regulations of the Town of Castle Rock.

3.00 SANITARY SEWER SYSTEM ANALYSIS

3.01 Description

The sanitary sewer design for Milestone Filing No. 4 consists of the construction of internal sanitary service mains only. The internal lines will be connected to existing regional mains in Front Street or adjacent to the south property line. Approximately 9.8 acres of commercial development will contribute to the Front Street 8-inch sanitary sewer main just upstream of the contributing point for Milestone Filing No. 1. The bulk of Filing No. 4 will contribute to that same line downstream of the Filing No. 1 contribution point, but upstream of the main confluence. The remainder of the lot will contribute sanitary flows to the 12-inch main on the south property boundary upstream of the contribution point for the Metzler School Site. Flows were determined using 3 SFE per acre of commercial area; no portions of Filing No. 4 being excluded. Refer to the enclosed *Sanitary Basin Map* in the back pocket of this report.

All on-site sanitary lines will provide adequate capacity for conveyance of sanitary flows to the receiving mains. Minimum and maximum grades anticipated have been analyzed in the appendix of this report to demonstrate that velocity restraints have

**WATER AND SANITARY SEWER STUDY
FOR
MILESTONE FILING No. 4**

TOWN OF CASTLE ROCK, COLORADO

been met. As long as future sanitary lines are installed within the grade ranges presented those velocity restraints will be adhered to.

The existing sewer main in Front Street is an 8-inch line which collects effluent from portions of Metzler Ranch, Cooper-Hook, Emerald Pointe, as well as portions of Milestone. That line has a minimum grade of 0.40 percent which has been identified as insufficient for a fully developed upstream condition. The Town and the prior study for Metzler Ranch Filing No. 3 have identified this capacity deficit and it is our understanding that the town has long range plans for upgrading the system in Front Street. Along the south property boundary of Milestone Filing No. 4 the existing line is a 12-inch diameter PVC with a minimum grade of 0.90 percent. Contributing basins include portions of Maher Ranch, Brookwood, Metzler Ranch and Milestone Filing No. 4. This line appears to have adequate capacity for build out of its contributing basin.

The capacity analysis of the mains adjacent to Filing No. 4 have been included in the appendix of this report. The TST study of Metzler Ranch Filing No. 4 identified ultimate peaks of 1.313 cfs and 3.721 cfs for the 8-inch and 12-inch mains, respectively. This study came up with respective anticipated flows of 1.048 cfs and 2.647 cfs using the peaking factor as published in the City and County of Denver Wastewater Criteria. Our estimates of flow have not been verified and do not take any precedence over estimates provided in the TST study or any other prior reports.

3.02 Conclusion

Only the existing line in Front Street demonstrates a deficient capacity for the future condition. This situation has been identified in prior utility studies and the town is aware of the potential problem. However, the contribution of those portions of Milestone Filing No. 4 to the deficient line take precedence over the contributions to effluent rates from upstream properties which were filed after improvement agreements were in place between the Town and the owner/developer of Milestone properties.

In the instance of the on-site service mains, both existing and proposed, no lines will be exceeded in capacity at the time of build out. The lines will be installed in full compliance with the public works specifications of the Town of Castle Rock.

4.00 OTHER UTILITIES

4.01 Design Agreement

Agencies providing electric, gas, and communications services have been contacted regarding the development of Milestone Filing No. 4. All are agreeable to providing

**WATER AND SANITARY SEWER STUDY
FOR
MILESTONE FILING No. 4

TOWN OF CASTLE ROCK, COLORADO**

said services and will develop plans as the project, or its phases, approaches construction.

**WATER AND SANITARY SEWER STUDY
FOR
MILESTONE FILING No. 4**

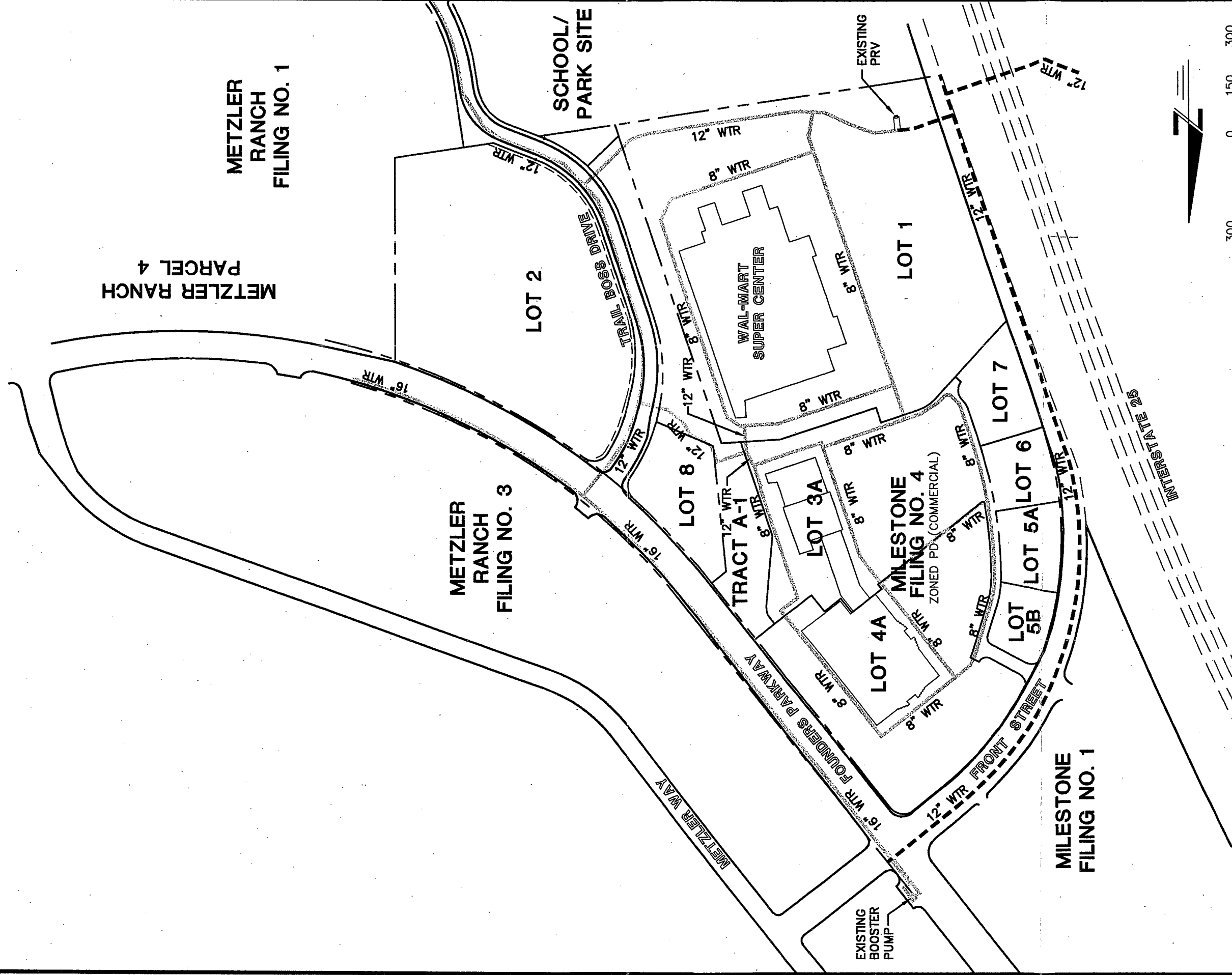
TOWN OF CASTLE ROCK, COLORADO

5.00 REFERENCES

- A. Public Works Regulations, Town of Castle Rock, February 12, 1999.
- B. Sanitary Sewer Analysis for Milestone Filing No. 1, prepared by Rocky Mountain Consultants, Inc., dated February 1995.
- C. Water and Sanitary Sewer Study, Metzler Ranch Filing No. 3, as Part of Metzler Ranch, prepared by TST, Inc. of Denver, dated June 14, 2000.
- D. Master Sanitary Sewer Plan for Metzler Ranch, prepared by Inter-Mountain Engineering, Ltd., dated November 1996
- E. Town of Castle Rock Sanitary Sewer Facility Plan, prepared by HDR Engineering, Inc., dated July 1998.

Appendix A
Water System Data

WATER SERVICE PLAN MILESTONE FILING NO. 4



LEGEND

- PURPLE ZONE
- YELLOW ZONE



1 INCH = 300 FEET

8480 E. Orchard Rd., Suite 2000
Englewood, Colorado 80111
Phone: (303) 770-5600
Fax: (303) 770-2349



Associates, Inc.



An affiliate of Colorado Land Consultants, Inc.

PROJECT MILESTONE FILING No. 4 DATE JUNE 13, 2001
SUBJECT WATER SUPPLY DEMAND BY _____ JOB. NO. _____

TOTAL ACREAGE FIL. NO. 4 = 64.25 ACRE

FROM PWR

LAND USE DEMAND RATE, COMMERCIAL = 1200 gpad

MAX DAY / AVERAGE DAY = 2.65

PEAK HOUR / AVERAGE DAY = 4.5

AVERAGE DAY = 1200 * 64.25 = 77,100 gpad

MAX DAY = 77100 * 2.65 = 204,135 $\Rightarrow 204135 / (24 \text{ hr} \cdot 60 \text{ min/hr}) = 141.9 \text{ gpm}$

PEAK DAY = 77100 * 4.5 = 346,950 gpad $\Rightarrow 346950 / (24 \text{ hr} \cdot 60 \text{ min/hr}) = 240.9 \text{ gpm}$

DIVIDE EQUALLY PER NODE

NODES = 40

MDD PER NODE = 141.9 / 40 = 3.55 gpm

PHD PER NODE = 240.9 / 40 = 6.02 gpm

STORAGE REQUIREMENT

STORAGE VOLUME (mg) = MDD (mg) + NFF (mg)

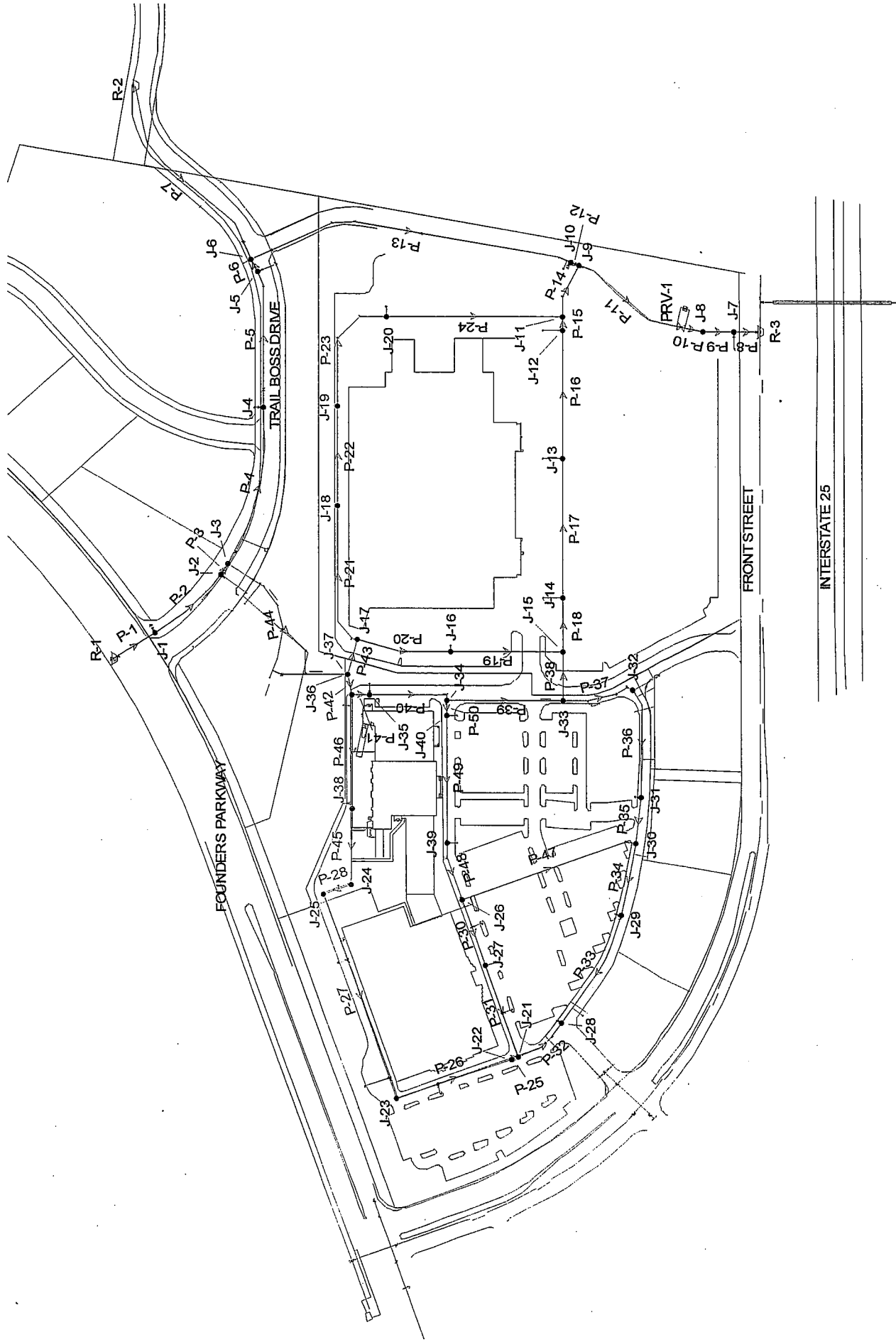
FROM UFC APPENDIX III - A DURATION = 4 HRS (WORST CASE)*

NFF = 3000 gpm * 4 HRS * 60 MIN/HR = 720,000

STORAGE VOLUME = 0.204 mg + 0.72 mg = 0.924 mg

* ASSUMES WAL*MART BUILDING WILL BE LARGEST FACILITY (SPRINKLERED)

Scenario: PEAK HOUR DEMAND



Scenario: PEAK HOUR DEMAND

Fire Flow Analysis

Junction Report

Label	Elevation (ft)	Zone	Type	Demand (gpm)	Pattern	Demand (Calculated) (gpm)	Calculated Hydraulic Grade (ft)	Pressure (psi)
J-1	6,265.25	Blue	Demand	6.02	Fixed	6.02	6,509.96	105.88
J-2	6,257.25	Blue	Demand	6.02	Fixed	6.02	6,509.91	109.31
J-3	6,255.75	Blue	Demand	6.02	Fixed	6.02	6,509.89	109.96
J-4	6,238.50	Blue	Demand	6.02	Fixed	6.02	6,509.89	117.42
J-5	6,230.00	Blue	Demand	6.02	Fixed	6.02	6,509.89	121.10
J-6	6,230.00	Blue	Demand	6.02	Fixed	6.02	6,509.89	121.10
J-7	6,178.00	Yellow	Demand	6.02	Fixed	6.02	6,349.02	73.99
J-8	6,178.00	Yellow	Demand	6.02	Fixed	6.02	6,349.04	74.00
J-9	6,206.00	Blue	Demand	6.02	Fixed	6.02	6,509.69	131.39
J-10	6,208.00	Blue	Demand	6.02	Fixed	6.02	6,509.70	130.53
J-11	6,209.00	Blue	Demand	6.02	Fixed	6.02	6,509.71	130.10
J-12	6,210.00	Blue	Demand	6.02	Fixed	6.02	6,509.71	129.67
J-13	6,210.00	Blue	Demand	6.02	Fixed	6.02	6,509.72	129.67
J-14	6,210.00	Blue	Demand	6.02	Fixed	6.02	6,509.74	129.68
J-15	6,210.00	Blue	Demand	6.02	Fixed	6.02	6,509.75	129.69
J-16	6,211.00	Blue	Demand	6.02	Fixed	6.02	6,509.77	129.26
J-17	6,212.00	Blue	Demand	6.02	Fixed	6.02	6,509.79	128.84
J-18	6,212.00	Blue	Demand	6.02	Fixed	6.02	6,509.76	128.83
J-19	6,212.00	Blue	Demand	6.02	Fixed	6.02	6,509.74	128.82
J-20	6,211.50	Blue	Demand	6.02	Fixed	6.02	6,509.73	129.03
J-21	6,215.00	Blue	Demand	6.02	Fixed	6.02	6,509.74	127.52
J-22	6,215.50	Blue	Demand	6.02	Fixed	6.02	6,509.74	127.30
J-23	6,216.50	Zone-1	Demand	6.02	Fixed	6.02	6,509.74	126.87
J-24	6,216.50	Zone-1	Demand	6.02	Fixed	6.02	6,509.76	126.88
J-25	6,216.50	Zone-1	Demand	6.02	Fixed	6.02	6,509.76	126.88
J-26	6,216.50	Blue	Demand	6.02	Fixed	6.02	6,509.74	126.87
J-27	6,216.25	Blue	Demand	6.02	Fixed	6.02	6,509.74	126.98
J-28	6,210.75	Blue	Demand	6.02	Fixed	6.02	6,509.74	129.36
J-29	6,204.50	Blue	Demand	6.02	Fixed	6.02	6,509.74	132.06
J-30	6,201.00	Blue	Demand	6.02	Fixed	6.02	6,509.74	133.58
J-31	6,201.00	Blue	Demand	6.02	Fixed	6.02	6,509.74	133.58
J-32	6,200.00	Blue	Demand	6.02	Fixed	6.02	6,509.74	134.01
J-33	6,207.00	Blue	Demand	6.02	Fixed	6.02	6,509.75	130.98
J-34	6,216.50	Blue	Demand	6.02	Fixed	6.02	6,509.75	126.88
J-35	6,216.50	Blue	Demand	6.02	Fixed	6.02	6,509.79	126.89
J-36	6,216.50	Blue	Demand	6.02	Fixed	6.02	6,509.79	126.89
J-37	6,224.00	Blue	Demand	6.02	Fixed	6.02	6,509.80	123.65
J-38	6,216.50	Blue	Demand	6.02	Fixed	6.02	6,509.78	126.89
J-39	6,216.00	Blue	Demand	6.02	Fixed	6.02	6,509.74	127.09
J-40	6,215.75	Blue	Demand	6.02	Fixed	6.02	6,509.75	127.20

Scenario: PEAK HOUR DEMAND

Fire Flow Analysis

Pipe Report

Label	Length (ft)	Diameter (in)	Material	Hazen- Williams C	Minor Loss Coefficient	Discharge (gpm)	Upstream Calculated Pressure (psi)	Downstream Calculated Pressure (psi)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)	Velocity (ft/s)
P-1	112.00	12.0	Ductile Iron	120.0	0.39	289.12	0.00	105.88	0.04	0.33	0.82
P-2	198.00	12.0	Ductile Iron	120.0	0.00	283.10	105.88	109.31	0.06	0.28	0.80
P-3	31.00	12.0	Ductile Iron	120.0	0.39	277.08	109.31	109.96	0.01	0.39	0.79
P-4	369.00	12.0	Ductile Iron	120.0	0.39	34.46	109.96	117.42	2.44e-3	0.01	0.10
P-5	310.00	12.0	Ductile Iron	120.0	0.49	28.44	117.42	121.10	9.77e-4	3.15e-3	0.08
P-6	32.00	12.0	Ductile Iron	120.0	0.39	22.42	121.10	121.10	4.88e-4	0.02	0.06
P-7	491.00	12.0	Ductile Iron	120.0	0.54	-243.11	121.10	0.00	0.11	0.22	0.69
P-8	59.00	12.0	Ductile Iron	120.0	0.39	-291.43	0.00	73.99	0.02	0.37	0.83
P-9	72.00	12.0	Ductile Iron	120.0	0.00	-297.45	73.99	74.00	0.02	0.31	0.84
P-10	50.00	12.0	Ductile Iron	120.0	0.10	-303.47	74.00	74.01	0.02	0.34	0.86
P-11	273.00	12.0	Ductile Iron	120.0	0.00	-303.47	143.47	131.39	0.09	0.32	0.86
P-12	20.00	12.0	Ductile Iron	120.0	0.39	-253.49	131.39	130.53	0.01	0.39	0.72
P-13	752.00	12.0	Ductile Iron	120.0	0.88	-259.51	130.53	121.10	0.19	0.25	0.74
P-14	124.00	8.0	PVC	120.0	0.59	-56.00	131.39	130.10	0.01	0.11	0.36
P-15	33.00	8.0	PVC	120.0	0.39	-26.95	130.10	129.67	1.46e-3	0.04	0.17
P-16	289.00	8.0	PVC	120.0	0.39	-32.97	129.67	129.67	0.01	0.04	0.21
P-17	318.00	8.0	PVC	120.0	0.39	-38.99	129.67	129.68	0.02	0.05	0.25
P-18	121.00	8.0	PVC	120.0	0.39	-45.01	129.68	129.69	0.01	0.07	0.29
P-19	257.00	8.0	PVC	120.0	0.39	-50.20	129.69	129.26	0.02	0.09	0.32
P-20	219.00	8.0	PVC	120.0	0.44	-56.22	129.26	128.84	0.02	0.11	0.36
P-21	324.00	8.0	PVC	120.0	0.79	53.12	128.84	128.83	0.03	0.10	0.34
P-22	226.00	8.0	PVC	120.0	0.39	47.10	128.83	128.82	0.02	0.08	0.30
P-23	284.00	8.0	PVC	120.0	0.79	41.08	128.82	129.03	0.02	0.06	0.26
P-24	405.00	8.0	PVC	120.0	0.39	35.06	129.03	130.10	0.02	0.04	0.22
P-25	16.00	8.0	PVC	120.0	0.00	-4.03	127.52	127.30	0.00	0.00	0.03
P-26	279.00	6.0	Ductile Iron	130.0	0.00	10.05	126.87	127.30	4.39e-3	0.02	0.11
P-27	489.00	6.0	Ductile Iron	130.0	0.00	-16.07	126.87	126.88	0.02	0.03	0.18
P-28	64.00	6.0	Ductile Iron	130.0	0.00	22.09	126.88	126.88	3.91e-3	0.06	0.25
P-30	158.00	8.0	PVC	120.0	0.39	11.32	126.87	126.98	4.88e-4	3.09e-3	0.07
P-31	219.00	8.0	PVC	120.0	0.39	5.29	126.98	127.52	4.88e-4	2.23e-3	0.03
P-32	128.00	8.0	PVC	120.0	0.44	3.30	127.52	129.36	0.00	0.00	0.02
P-33	281.00	8.0	PVC	120.0	0.00	-2.72	129.36	132.06	0.00	0.00	0.02
P-34	167.00	8.0	PVC	120.0	0.44	-8.74	132.06	133.58	4.88e-4	2.92e-3	0.06
P-35	106.00	8.0	PVC	120.0	0.39	-9.44	133.58	133.58	4.88e-4	4.61e-3	0.06
P-36	249.00	8.0	PVC	120.0	0.05	-15.46	133.58	134.01	2.44e-3	0.01	0.10
P-37	164.00	8.0	PVC	120.0	0.69	-21.48	134.01	130.98	2.93e-3	0.02	0.14
P-38	112.00	8.0	PVC	120.0	0.39	0.84	130.98	129.69	0.00	0.00	0.01
P-39	267.00	8.0	PVC	120.0	0.39	-28.34	130.98	126.88	0.01	0.03	0.18
P-40	191.00	8.0	PVC	120.0	1.19	-69.05	126.88	126.89	0.03	0.17	0.44
P-41	40.00	8.0	PVC	120.0	0.00	-75.07	126.89	126.89	0.01	0.18	0.48
P-42	47.00	12.0	Ductile Iron	120.0	0.39	-115.22	126.89	123.65	2.93e-3	0.06	0.33
P-43	81.00	12.0	Ductile Iron	120.0	0.39	115.36	123.65	128.84	4.88e-3	0.06	0.33
P-44	422.00	12.0	Ductile Iron	120.0	1.78	-236.60	123.65	109.96	0.10	0.23	0.67
P-45	174.00	6.0	Ductile Iron	130.0	0.00	28.11	126.89	126.88	0.02	0.10	0.32
P-46	258.00	8.0	PVC	120.0	0.39	-34.13	126.89	126.89	0.01	0.04	0.22
P-47	418.00	8.0	PVC	120.0	0.49	-5.32	133.58	126.87	4.88e-4	1.17e-3	0.03
P-48	134.00	8.0	PVC	120.0	0.44	-22.66	126.87	127.09	2.93e-3	0.02	0.14
P-49	289.00	8.0	PVC	120.0	0.39	-28.68	127.09	127.20	0.01	0.03	0.18
P-50	34.00	8.0	PVC	120.0	0.39	-34.70	127.20	126.88	1.46e-3	0.04	0.22

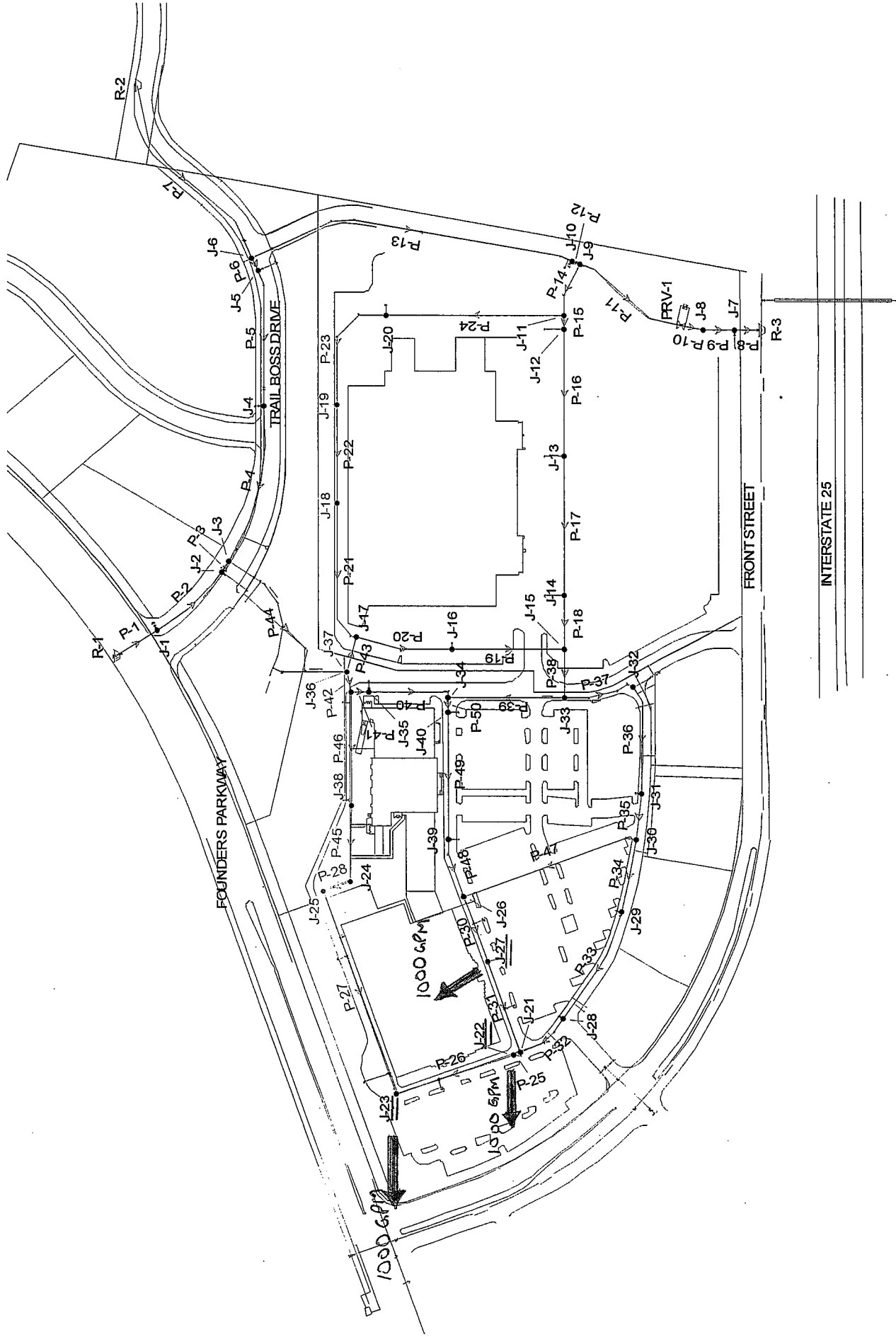
Scenario: PEAK HOUR DEMAND

Fire Flow Analysis

Fire Flow Report

Label	Zone	Fire Flow Balanced?	Satisfies Fire Flow Constraints?	Total Flow Needed (gpm)	Calculated Residual Pressure (psi)	Calculated Minimum Zone Pressure (psi)	Minimum Zone Junction	Calculated Minimum System Pressure (psi)	Minimum System Junction
J-1	Blue	true	true	6.02	104.34	107.92	J-2	73.99	J-7
J-2	Blue	true	true	6.02	106.49	104.75	J-1	73.99	J-7
J-3	Blue	true	true	6.02	106.90	104.82	J-1	73.99	J-7
J-4	Blue	true	true	6.02	113.14	105.04	J-1	73.99	J-7
J-5	Blue	true	true	6.02	117.41	105.22	J-1	73.99	J-7
J-6	Blue	true	true	6.02	117.63	105.26	J-1	73.99	J-7
J-7	Yellow	true	true	6.02	73.55	73.81	J-8	73.81	J-8
J-8	Yellow	true	true	6.02	73.61	73.79	J-7	73.79	J-7
J-9	Blue	true	true	6.02	120.61	105.11	J-1	73.99	J-7
J-10	Blue	true	true	6.02	119.99	105.11	J-1	73.99	J-7
J-11	Blue	true	true	6.02	116.39	105.04	J-1	73.99	J-7
J-12	Blue	true	true	6.02	113.79	105.03	J-1	73.99	J-7
J-13	Blue	true	true	6.02	106.63	105.01	J-1	73.99	J-7
J-14	Blue	true	true	6.02	109.14	104.99	J-1	73.99	J-7
J-15	Blue	true	true	6.02	113.70	104.98	J-1	73.99	J-7
J-16	Blue	true	true	6.02	111.32	104.97	J-1	73.99	J-7
J-17	Blue	true	true	6.02	119.86	104.95	J-1	73.99	J-7
J-18	Blue	true	true	6.02	103.21	104.99	J-1	73.99	J-7
J-19	Blue	true	true	6.02	99.42	105.00	J-1	73.99	J-7
J-20	Blue	true	true	6.02	100.94	105.01	J-1	73.99	J-7
J-21	Blue	true	true	6.02	91.97	91.87	J-22	73.99	J-7
J-22	Blue	true	true	6.02	90.84	92.26	J-21	73.99	J-7
J-26	Blue	true	true	6.02	97.39	99.12	J-27	73.99	J-7
J-27	Blue	true	true	6.02	92.04	97.67	J-22	73.99	J-7
J-28	Blue	true	true	6.02	91.06	94.82	J-22	73.99	J-7
J-29	Blue	true	true	6.02	95.32	98.38	J-28	73.99	J-7
J-30	Blue	true	true	6.02	103.29	102.15	J-27	73.99	J-7
J-31	Blue	true	true	6.02	103.01	104.43	J-27	73.99	J-7
J-32	Blue	true	true	6.02	107.62	104.97	J-1	73.99	J-7
J-33	Blue	true	true	6.02	113.38	104.97	J-1	73.99	J-7
J-34	Blue	true	true	6.02	109.31	104.96	J-1	73.99	J-7
J-35	Blue	true	true	6.02	115.09	104.95	J-1	73.99	J-7
J-36	Blue	true	true	6.02	117.90	104.95	J-1	73.99	J-7
J-37	Blue	true	true	6.02	115.52	104.94	J-1	73.99	J-7
J-38	Blue	true	true	6.02	96.01	104.95	J-1	73.99	J-7
J-39	Blue	true	true	6.02	97.95	101.70	J-26	73.99	J-7
J-40	Blue	true	true	6.02	106.78	104.97	J-1	73.99	J-7
J-24	Zone-1	true	true	6.02	67.69	71.11	J-25	71.11	J-25
J-25	Zone-1	true	true	6.02	61.12	72.65	J-24	72.65	J-24
J-23	Zone-1	true	true	6.02	55.97	93.79	J-25	73.99	J-7

Scenario: FIRE FLOW SCENARIO ONE



Scenario: FIRE FLOW SCENARIO ONE

Fire Flow Analysis

Junction Report

Label	Elevation (ft)	Zone	Type	Demand (gpm)	Pattern	Demand (Calculated) (gpm)	Calculated Hydraulic Grade (ft)	Pressure (psi)
J-1	6,265.25	Blue	Demand	3.55	Fixed	3.55	6,508.74	105.35
J-2	6,257.25	Blue	Demand	3.55	Fixed	3.55	6,506.83	107.98
J-3	6,255.75	Blue	Demand	3.55	Fixed	3.55	6,506.35	108.42
J-4	6,238.50	Blue	Demand	3.55	Fixed	3.55	6,506.53	115.96
J-5	6,230.00	Blue	Demand	3.55	Fixed	3.55	6,506.69	119.71
J-6	6,230.00	Blue	Demand	3.55	Fixed	3.55	6,506.71	119.72
J-7	6,178.00	Yellow	Demand	3.55	Fixed	3.55	6,349.02	73.99
J-8	6,178.00	Yellow	Demand	3.55	Fixed	3.55	6,349.04	74.00
J-9	6,206.00	Blue	Demand	3.55	Fixed	3.55	6,503.61	128.76
J-10	6,208.00	Blue	Demand	3.55	Fixed	3.55	6,503.75	127.96
J-11	6,209.00	Blue	Demand	3.55	Fixed	3.55	6,501.48	126.54
J-12	6,210.00	Blue	Demand	3.55	Fixed	3.55	6,501.14	125.96
J-13	6,210.00	Blue	Demand	3.55	Fixed	3.55	6,498.82	124.96
J-14	6,210.00	Blue	Demand	3.55	Fixed	3.55	6,496.31	123.87
J-15	6,210.00	Blue	Demand	3.55	Fixed	3.55	6,495.31	123.44
J-16	6,211.00	Blue	Demand	3.55	Fixed	3.55	6,497.57	123.98
J-17	6,212.00	Blue	Demand	3.55	Fixed	3.55	6,499.53	124.40
J-18	6,212.00	Blue	Demand	3.55	Fixed	3.55	6,500.03	124.61
J-19	6,212.00	Blue	Demand	3.55	Fixed	3.55	6,500.37	124.77
J-20	6,211.50	Blue	Demand	3.55	Fixed	3.55	6,500.83	125.18
J-21	6,215.00	Blue	Demand	3.55	Fixed	3.55	6,468.67	109.75
J-22	6,215.50	Blue	Demand	1,000.00	Fixed	1,000.00	6,468.13	109.30
J-23	6,216.50	Zone-1	Demand	1,000.00	Fixed	1,000.00	6,466.19	108.03
J-24	6,216.50	Zone-1	Demand	3.55	Fixed	3.55	6,488.59	117.72
J-25	6,216.50	Zone-1	Demand	3.55	Fixed	3.55	6,485.98	116.59
J-26	6,216.50	Blue	Demand	3.55	Fixed	3.55	6,477.00	112.71
J-27	6,216.25	Blue	Demand	1,000.00	Fixed	1,000.00	6,469.79	109.69
J-28	6,210.75	Blue	Demand	3.55	Fixed	3.55	6,470.77	112.50
J-29	6,204.50	Blue	Demand	3.55	Fixed	3.55	6,475.01	117.04
J-30	6,201.00	Blue	Demand	3.55	Fixed	3.55	6,477.74	119.73
J-31	6,201.00	Blue	Demand	3.55	Fixed	3.55	6,480.71	121.02
J-32	6,200.00	Blue	Demand	3.55	Fixed	3.55	6,487.05	124.19
J-33	6,207.00	Blue	Demand	3.55	Fixed	3.55	6,491.77	123.20
J-34	6,216.50	Blue	Demand	3.55	Fixed	3.55	6,491.73	119.08
J-35	6,216.50	Blue	Demand	3.55	Fixed	3.55	6,497.87	121.74
J-36	6,216.50	Blue	Demand	3.55	Fixed	3.55	6,498.96	122.21
J-37	6,224.00	Blue	Demand	3.55	Fixed	3.55	6,499.58	119.23
J-38	6,216.50	Blue	Demand	3.55	Fixed	3.55	6,495.76	120.82
J-39	6,216.00	Blue	Demand	3.55	Fixed	3.55	6,481.38	114.82
J-40	6,215.75	Blue	Demand	3.55	Fixed	3.55	6,490.35	118.81

Scenario: FIRE FLOW SCENARIO ONE

Fire Flow Analysis

Pipe Report

Label	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Minor Loss Coefficient	Discharge (gpm)	Upstream Calculated Pressure (psi)	Downstream Calculated Pressure (psi)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)	Velocity (ft/s)
P-1	112.00	12.0	Ductile Iron	120.0	0.39	1,904.52	0.00	105.35	1.26	11.27	5.40
P-2	198.00	12.0	Ductile Iron	120.0	0.00	1,900.97	105.35	107.98	1.91	9.66	5.39
P-3	31.00	12.0	Ductile Iron	120.0	0.39	1,897.42	107.98	108.42	0.47	15.29	5.38
P-4	369.00	12.0	Ductile Iron	120.0	0.39	-369.88	108.42	115.96	0.18	0.48	1.05
P-5	310.00	12.0	Ductile Iron	120.0	0.49	-373.43	115.96	119.71	0.16	0.50	1.06
P-6	32.00	12.0	Ductile Iron	120.0	0.39	-376.98	119.71	119.72	0.02	0.70	1.07
P-7	491.00	12.0	Ductile Iron	120.0	0.54	-1,520.50	119.72	0.00	3.29	6.70	4.31
P-8	59.00	12.0	Ductile Iron	120.0	0.39	-293.67	0.00	73.99	0.02	0.37	0.83
P-9	72.00	12.0	Ductile Iron	120.0	0.00	-297.22	73.99	74.00	0.02	0.31	0.84
P-10	50.00	12.0	Ductile Iron	120.0	0.10	-300.77	74.00	74.01	0.02	0.34	0.85
P-11	273.00	12.0	Ductile Iron	120.0	0.00	-300.77	140.84	128.76	0.09	0.32	0.85
P-12	20.00	12.0	Ductile Iron	120.0	0.39	-1,136.42	128.76	127.96	0.14	6.88	3.22
P-13	752.00	12.0	Ductile Iron	120.0	0.88	-1,139.97	127.96	119.72	2.96	3.94	3.23
P-14	124.00	8.0	PVC	120.0	0.59	832.10	128.76	126.54	2.13	17.16	5.31
P-15	33.00	8.0	PVC	120.0	0.39	583.81	126.54	125.96	0.34	10.36	3.73
P-16	289.00	8.0	PVC	120.0	0.39	580.26	125.96	124.96	2.32	8.02	3.70
P-17	318.00	8.0	PVC	120.0	0.39	576.71	124.96	123.87	2.51	7.90	3.68
P-18	121.00	8.0	PVC	120.0	0.39	573.16	123.87	123.44	1.00	8.22	3.66
P-19	257.00	8.0	PVC	120.0	0.39	-607.16	123.44	123.98	2.25	8.76	3.88
P-20	219.00	8.0	PVC	120.0	0.44	-610.71	123.98	124.40	1.97	8.97	3.90
P-21	324.00	8.0	PVC	120.0	0.79	-234.09	124.40	124.61	0.49	1.52	1.49
P-22	226.00	8.0	PVC	120.0	0.39	-237.64	124.61	124.77	0.35	1.54	1.52
P-23	284.00	8.0	PVC	120.0	0.79	-241.19	124.77	125.18	0.46	1.62	1.54
P-24	405.00	8.0	PVC	120.0	0.39	-244.74	125.18	126.54	0.65	1.60	1.56
P-25	16.00	8.0	PVC	120.0	0.00	1,278.93	109.75	109.30	0.53	33.42	8.16
P-26	279.00	6.0	Ductile Iron	130.0	0.00	-278.93	108.03	109.30	1.94	6.97	3.17
P-27	489.00	6.0	Ductile Iron	130.0	0.00	-721.07	108.03	116.59	19.79	40.48	8.18
P-28	64.00	6.0	Ductile Iron	130.0	0.00	724.62	117.72	116.59	2.61	40.85	8.22
P-30	158.00	8.0	PVC	120.0	0.39	1,453.61	112.71	109.69	7.21	45.65	9.28
P-31	219.00	8.0	PVC	120.0	0.39	453.61	109.69	109.75	1.12	5.13	2.90
P-32	128.00	8.0	PVC	120.0	0.44	-828.87	109.75	112.50	2.11	16.46	5.29
P-33	281.00	8.0	PVC	120.0	0.00	-832.42	112.50	117.04	4.24	15.08	5.31
P-34	167.00	8.0	PVC	120.0	0.44	-835.97	117.04	119.73	2.73	16.37	5.34
P-35	106.00	8.0	PVC	120.0	0.39	-1,097.68	119.73	121.02	2.97	27.98	7.01
P-36	249.00	8.0	PVC	120.0	0.05	-1,101.23	121.02	124.19	6.34	25.48	7.03
P-37	164.00	8.0	PVC	120.0	0.69	-1,104.78	124.19	123.20	4.71	28.73	7.05
P-38	112.00	8.0	PVC	120.0	0.39	-1,176.77	123.20	123.44	3.55	31.69	7.51
P-39	267.00	8.0	PVC	120.0	0.39	68.44	123.20	119.08	0.04	0.15	0.44
P-40	191.00	8.0	PVC	120.0	1.19	-1,141.21	119.08	121.74	6.15	32.19	7.28
P-41	40.00	8.0	PVC	120.0	0.00	-1,144.76	121.74	122.21	1.09	27.21	7.31
P-42	47.00	12.0	Ductile Iron	120.0	0.39	-1,880.03	122.21	119.23	0.62	13.13	5.33
P-43	81.00	12.0	Ductile Iron	120.0	0.39	380.18	119.23	124.40	0.05	0.58	1.08
P-44	422.00	12.0	Ductile Iron	120.0	1.78	-2,263.75	119.23	108.42	6.77	16.05	6.42
P-45	174.00	6.0	Ductile Iron	130.0	0.00	728.17	120.82	117.72	7.17	41.22	8.26
P-46	258.00	8.0	PVC	120.0	0.39	-731.72	120.82	122.21	3.20	12.39	4.67
P-47	418.00	8.0	PVC	120.0	0.49	258.16	119.73	112.71	0.74	1.77	1.65
P-48	134.00	8.0	PVC	120.0	0.44	-1,199.00	112.71	114.82	4.37	32.63	7.65
P-49	289.00	8.0	PVC	120.0	0.39	-1,202.55	114.82	118.81	8.97	31.05	7.68
P-50	34.00	8.0	PVC	120.0	0.39	-1,206.10	118.81	119.08	1.38	40.53	7.70

Project Engineer: Kurt Mahnken

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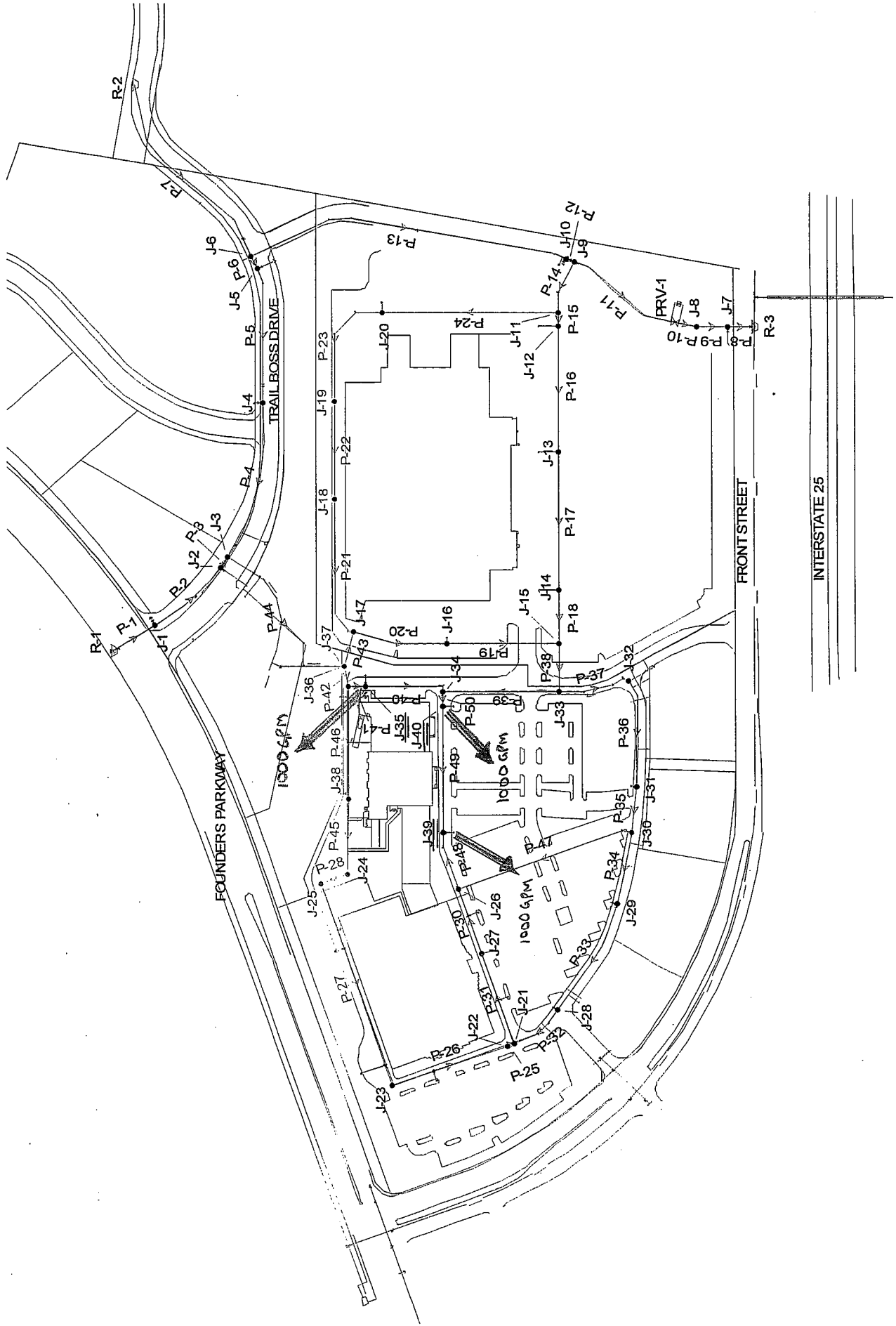
Scenario: FIRE FLOW SCENARIO ONE

Fire Flow Analysis

Fire Flow Report

Label	Zone	Fire Flow Balanced?	Satisfies Fire Flow Constraints?	Total Flow Needed (gpm)	Calculated Residual Pressure (psi)	Calculated Minimum Zone Pressure (psi)	Minimum Zone Junction	Calculated Minimum System Pressure (psi)	Minimum System Junction
J-1	Blue	true	true	3.55	102.34	105.46	J-2	73.99	J-7
J-2	Blue	true	true	3.55	102.44	103.07	J-3	73.99	J-7
J-3	Blue	true	true	3.55	102.41	102.79	J-2	73.99	J-7
J-4	Blue	true	true	3.55	109.32	103.40	J-3	73.99	J-7
J-5	Blue	true	true	3.55	113.66	103.88	J-1	73.99	J-7
J-6	Blue	true	true	3.55	113.86	103.93	J-1	73.99	J-7
J-7	Yellow	true	true	3.55	73.55	73.81	J-8	73.81	J-8
J-8	Yellow	true	true	3.55	73.61	73.79	J-7	73.79	J-7
J-9	Blue	true	true	3.55	113.02	98.70	J-22	73.99	J-7
J-10	Blue	true	true	3.55	112.50	98.92	J-22	73.99	J-7
J-11	Blue	true	true	3.55	106.28	95.08	J-22	73.99	J-7
J-12	Blue	true	true	3.55	102.95	93.98	J-22	73.99	J-7
J-13	Blue	true	true	3.55	92.01	89.54	J-22	73.99	J-7
J-14	Blue	true	true	3.55	90.77	85.98	J-22	73.99	J-7
J-15	Blue	true	true	3.55	93.28	84.26	J-22	73.99	J-7
J-16	Blue	true	true	3.55	94.76	88.09	J-22	73.99	J-7
J-17	Blue	true	true	3.55	106.66	92.99	J-22	73.99	J-7
J-18	Blue	true	true	3.55	91.70	94.59	J-22	73.99	J-7
J-19	Blue	true	true	3.55	88.10	95.05	J-22	73.99	J-7
J-20	Blue	true	true	3.55	89.79	95.29	J-22	73.99	J-7
J-21	Blue	true	true	3.55	37.76	37.52	J-22	37.52	J-22
J-22	Blue	true	true	1,000.00	35.81	38.25	J-21	38.25	J-21
J-26	Blue	true	true	3.55	53.12	52.89	J-27	52.89	J-27
J-27	Blue	true	true	1,000.00	40.27	44.21	J-22	44.21	J-22
J-28	Blue	true	true	3.55	39.83	40.70	J-22	40.70	J-22
J-29	Blue	true	true	3.55	49.16	47.42	J-22	47.42	J-22
J-30	Blue	true	true	3.55	60.82	54.52	J-22	54.52	J-22
J-31	Blue	true	true	3.55	63.72	58.31	J-22	58.31	J-22
J-32	Blue	true	true	3.55	75.19	67.78	J-22	67.78	J-22
J-33	Blue	true	true	3.55	88.45	79.42	J-22	73.99	J-7
J-34	Blue	true	true	3.55	83.91	79.05	J-27	73.99	J-7
J-35	Blue	true	true	3.55	98.47	89.39	J-22	73.99	J-7
J-36	Blue	true	true	3.55	103.67	92.01	J-22	73.99	J-7
J-37	Blue	true	true	3.55	102.42	93.19	J-22	73.99	J-7
J-38	Blue	true	true	3.55	72.07	82.35	J-22	72.09	J-24
J-39	Blue	true	true	3.55	58.58	58.50	J-27	58.50	J-27
J-40	Blue	true	true	3.55	78.34	75.33	J-27	73.99	J-7
J-24	Zone-1	true	true	3.55	33.25	34.51	J-25	34.51	J-25
J-25	Zone-1	true	true	3.55	23.17	36.81	J-23	36.81	J-23
J-23	Zone-1	true	true	1,000.00	20.00	73.98	J-25	63.22	J-22

Scenario: FIRE FLOW SCENARIO TWO



Scenario: FIRE FLOW SCENARIO TWO

Fire Flow Analysis

Junction Report

Label	Elevation (ft)	Zone	Type	Demand (gpm)	Pattern	Demand (Calculated) (gpm)	Calculated Hydraulic Grade (ft)	Pressure (psi)
J-1	6,265.25	Blue	Demand	3.55	Fixed	3.55	6,508.73	105.34
J-2	6,257.25	Blue	Demand	3.55	Fixed	3.55	6,506.81	107.97
J-3	6,255.75	Blue	Demand	3.55	Fixed	3.55	6,506.33	108.41
J-4	6,238.50	Blue	Demand	3.55	Fixed	3.55	6,506.53	115.96
J-5	6,230.00	Blue	Demand	3.55	Fixed	3.55	6,506.71	119.72
J-6	6,230.00	Blue	Demand	3.55	Fixed	3.55	6,506.73	119.73
J-7	6,178.00	Yellow	Demand	3.55	Fixed	3.55	6,349.02	73.99
J-8	6,178.00	Yellow	Demand	3.55	Fixed	3.55	6,349.04	74.00
J-9	6,206.00	Blue	Demand	3.55	Fixed	3.55	6,503.80	128.84
J-10	6,208.00	Blue	Demand	3.55	Fixed	3.55	6,503.93	128.04
J-11	6,209.00	Blue	Demand	3.55	Fixed	3.55	6,501.83	126.69
J-12	6,210.00	Blue	Demand	3.55	Fixed	3.55	6,501.56	126.14
J-13	6,210.00	Blue	Demand	3.55	Fixed	3.55	6,499.70	125.34
J-14	6,210.00	Blue	Demand	3.55	Fixed	3.55	6,497.70	124.47
J-15	6,210.00	Blue	Demand	3.55	Fixed	3.55	6,496.91	124.13
J-16	6,211.00	Blue	Demand	3.55	Fixed	3.55	6,498.21	124.26
J-17	6,212.00	Blue	Demand	3.55	Fixed	3.55	6,499.35	124.32
J-18	6,212.00	Blue	Demand	3.55	Fixed	3.55	6,499.98	124.60
J-19	6,212.00	Blue	Demand	3.55	Fixed	3.55	6,500.43	124.79
J-20	6,211.50	Blue	Demand	3.55	Fixed	3.55	6,501.01	125.26
J-21	6,215.00	Blue	Demand	3.55	Fixed	3.55	6,492.17	119.92
J-22	6,215.50	Blue	Demand	3.55	Fixed	3.55	6,492.19	119.71
J-23	6,216.50	Zone-1	Demand	3.55	Fixed	3.55	6,493.79	119.97
J-24	6,216.50	Zone-1	Demand	3.55	Fixed	3.55	6,497.05	121.38
J-25	6,216.50	Zone-1	Demand	3.55	Fixed	3.55	6,496.66	121.21
J-26	6,216.50	Blue	Demand	3.55	Fixed	3.55	6,491.17	118.84
J-27	6,216.25	Blue	Demand	3.55	Fixed	3.55	6,491.59	119.13
J-28	6,210.75	Blue	Demand	3.55	Fixed	3.55	6,492.19	121.77
J-29	6,204.50	Blue	Demand	3.55	Fixed	3.55	6,492.24	124.49
J-30	6,201.00	Blue	Demand	3.55	Fixed	3.55	6,492.28	126.02
J-31	6,201.00	Blue	Demand	3.55	Fixed	3.55	6,492.74	126.22
J-32	6,200.00	Blue	Demand	3.55	Fixed	3.55	6,493.75	127.09
J-33	6,207.00	Blue	Demand	3.55	Fixed	3.55	6,494.50	124.39
J-34	6,216.50	Blue	Demand	3.55	Fixed	3.55	6,492.61	119.46
J-35	6,216.50	Blue	Demand	1,000.00	Fixed	1,000.00	6,496.01	120.93
J-36	6,216.50	Blue	Demand	3.55	Fixed	3.55	6,498.61	122.05
J-37	6,224.00	Blue	Demand	3.55	Fixed	3.55	6,499.37	119.14
J-38	6,216.50	Blue	Demand	3.55	Fixed	3.55	6,498.12	121.84
J-39	6,216.00	Blue	Demand	1,000.00	Fixed	1,000.00	6,489.85	118.48
J-40	6,215.75	Blue	Demand	1,000.00	Fixed	1,000.00	6,490.86	119.03

Scenario: FIRE FLOW SCENARIO TWO

Fire Flow Analysis

Pipe Report

Label	Length (ft)	Diameter (in)	Material	Hazen- Williams C	Minor Loss Coefficient	Discharge (gpm)	Upstream Calculated Pressure (psi)	Downstream Calculated Pressure (psi)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)	Velocity (ft/s)
P-1	112.00	12.0	Ductile Iron	120.0	0.39	1,910.98	0.00	105.34	1.27	11.34	5.42
P-2	198.00	12.0	Ductile Iron	120.0	0.00	1,907.43	105.34	107.97	1.92	9.72	5.41
P-3	31.00	12.0	Ductile Iron	120.0	0.39	1,903.88	107.97	108.41	0.48	15.39	5.40
P-4	369.00	12.0	Ductile Iron	120.0	0.39	-396.57	108.41	115.96	0.20	0.55	1.12
P-5	310.00	12.0	Ductile Iron	120.0	0.49	-400.12	115.96	119.72	0.18	0.57	1.14
P-6	32.00	12.0	Ductile Iron	120.0	0.39	-403.67	119.72	119.73	0.03	0.79	1.15
P-7	491.00	12.0	Ductile Iron	120.0	0.54	-1,514.04	119.73	0.00	3.27	6.65	4.30
P-8	59.00	12.0	Ductile Iron	120.0	0.39	-293.67	0.00	73.99	0.02	0.37	0.83
P-9	72.00	12.0	Ductile Iron	120.0	0.00	-297.22	73.99	74.00	0.02	0.31	0.84
P-10	50.00	12.0	Ductile Iron	120.0	0.10	-300.77	74.00	74.01	0.02	0.34	0.85
P-11	273.00	12.0	Ductile Iron	120.0	0.00	-300.77	140.92	128.84	0.09	0.32	0.85
P-12	20.00	12.0	Ductile Iron	120.0	0.39	-1,103.27	128.84	128.04	0.13	6.47	3.13
P-13	752.00	12.0	Ductile Iron	120.0	0.88	-1,106.82	128.04	119.73	2.80	3.73	3.14
P-14	124.00	8.0	PVC	120.0	0.59	798.95	128.84	126.69	1.97	15.90	5.10
P-15	33.00	8.0	PVC	120.0	0.39	517.89	126.69	126.14	0.27	8.27	3.31
P-16	289.00	8.0	PVC	120.0	0.39	514.34	126.14	125.34	1.85	6.41	3.28
P-17	318.00	8.0	PVC	120.0	0.39	510.79	125.34	124.47	2.01	6.31	3.26
P-18	121.00	8.0	PVC	120.0	0.39	507.24	124.47	124.13	0.79	6.55	3.24
P-19	257.00	8.0	PVC	120.0	0.39	-452.80	124.13	124.26	1.31	5.08	2.89
P-20	219.00	8.0	PVC	120.0	0.44	-456.35	124.26	124.32	1.14	5.22	2.91
P-21	324.00	8.0	PVC	120.0	0.79	-266.85	124.32	124.60	0.63	1.94	1.70
P-22	226.00	8.0	PVC	120.0	0.39	-270.40	124.60	124.79	0.44	1.96	1.73
P-23	284.00	8.0	PVC	120.0	0.79	-273.95	124.79	125.26	0.58	2.06	1.75
P-24	405.00	8.0	PVC	120.0	0.39	-277.50	125.26	126.69	0.82	2.02	1.77
P-25	16.00	8.0	PVC	120.0	0.00	-247.16	119.92	119.71	0.03	1.59	1.58
P-26	279.00	6.0	Ductile Iron	130.0	0.00	250.71	119.97	119.71	1.60	5.72	2.84
P-27	489.00	6.0	Ductile Iron	130.0	0.00	-254.26	119.97	121.21	2.87	5.87	2.89
P-28	64.00	6.0	Ductile Iron	130.0	0.00	257.81	121.38	121.21	0.39	6.02	2.93
P-30	158.00	8.0	PVC	120.0	0.39	-313.95	118.84	119.13	0.42	2.63	2.00
P-31	219.00	8.0	PVC	120.0	0.39	-317.50	119.13	119.92	0.58	2.64	2.03
P-32	128.00	8.0	PVC	120.0	0.44	-73.89	119.92	121.77	0.02	0.18	0.47
P-33	281.00	8.0	PVC	120.0	0.00	-77.44	121.77	124.49	0.05	0.18	0.49
P-34	167.00	8.0	PVC	120.0	0.44	-80.99	124.49	126.02	0.04	0.21	0.52
P-35	106.00	8.0	PVC	120.0	0.39	-404.68	126.02	126.22	0.46	4.35	2.58
P-36	249.00	8.0	PVC	120.0	0.05	-408.23	126.22	127.09	1.01	4.05	2.61
P-37	164.00	8.0	PVC	120.0	0.69	-411.78	127.09	124.39	0.75	4.55	2.63
P-38	112.00	8.0	PVC	120.0	0.39	-956.49	124.39	124.13	2.41	21.53	6.11
P-39	267.00	8.0	PVC	120.0	0.39	541.17	124.39	119.46	1.89	7.06	3.45
P-40	191.00	8.0	PVC	120.0	1.19	-831.85	119.46	120.93	3.40	17.79	5.31
P-41	40.00	8.0	PVC	120.0	0.00	-1,831.85	120.93	122.05	2.60	64.99	11.69
P-42	47.00	12.0	Ductile Iron	120.0	0.39	-2,100.31	122.05	119.14	0.76	16.20	5.96
P-43	81.00	12.0	Ductile Iron	120.0	0.39	193.04	119.14	124.32	0.01	0.16	0.55
P-44	422.00	12.0	Ductile Iron	120.0	1.78	-2,296.90	119.14	108.41	6.96	16.49	6.52
P-45	174.00	6.0	Ductile Iron	130.0	0.00	261.36	121.84	121.38	1.08	6.18	2.97
P-46	258.00	8.0	PVC	120.0	0.39	-264.91	121.84	122.05	0.48	1.88	1.69
P-47	418.00	8.0	PVC	120.0	0.49	320.14	126.02	118.84	1.11	2.65	2.04
P-48	134.00	8.0	PVC	120.0	0.44	630.53	118.84	118.48	1.32	9.84	4.02
P-49	289.00	8.0	PVC	120.0	0.39	-369.47	118.48	119.03	1.00	3.47	2.36
P-50	34.00	8.0	PVC	120.0	0.39	-1,369.47	119.03	119.46	1.75	51.53	8.74

Project Engineer: Kurt Mahnken

WaterCAD v4.5 [4.5014]

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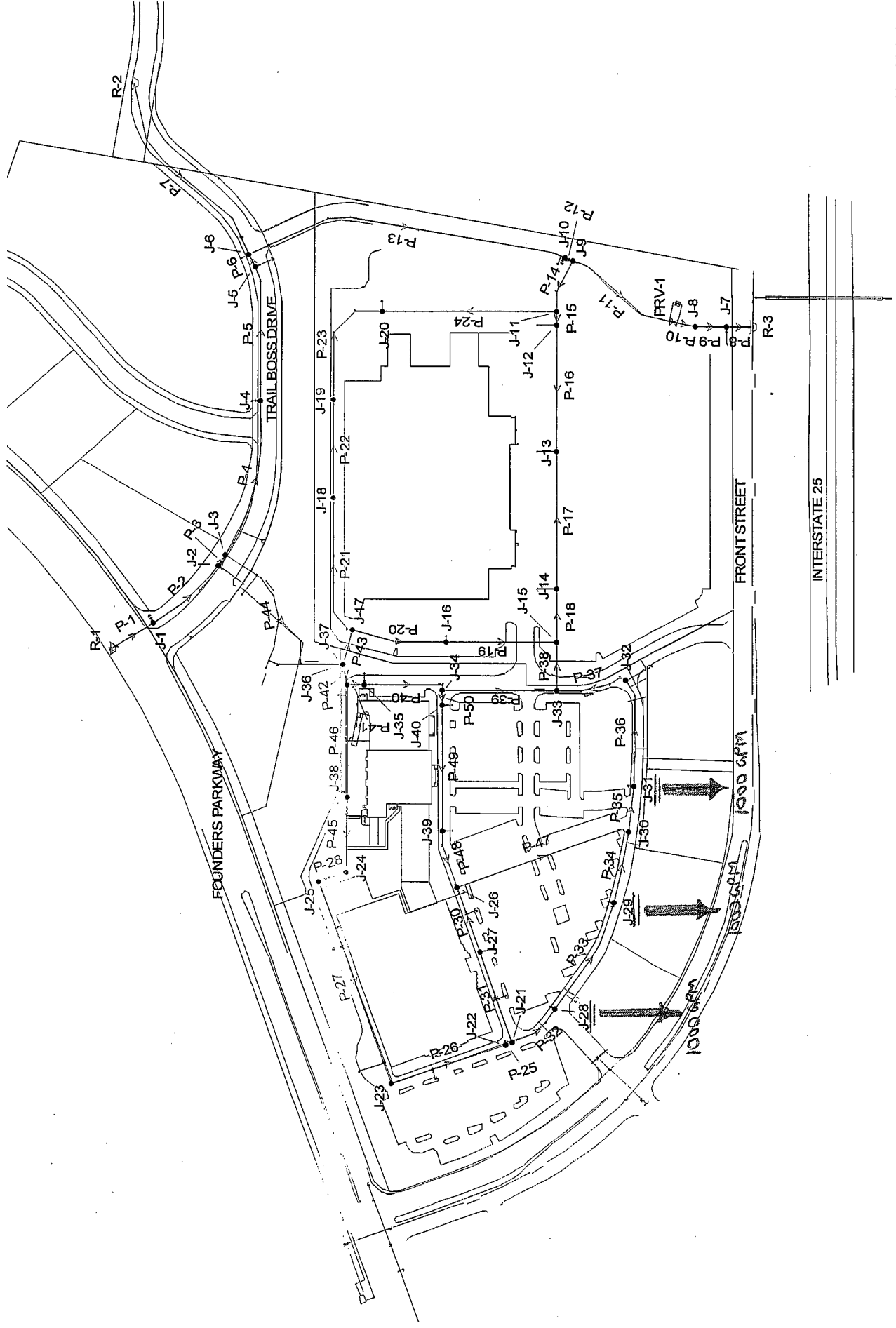
Scenario: FIRE FLOW SCENARIO TWO

Fire Flow Analysis

Fire Flow Report

Label	Zone	Fire Flow Balanced?	Satisfies Fire Flow Constraints?	Total Flow Needed (gpm)	Calculated Residual Pressure (psi)	Calculated Minimum Zone Pressure (psi)	Minimum Zone Junction	Calculated Minimum System Pressure (psi)	Minimum System Junction
J-1	Blue	true	true	3.55	102.33	105.44	J-2	73.99	J-7
J-2	Blue	true	true	3.55	102.41	103.04	J-3	73.99	J-7
J-3	Blue	true	true	3.55	102.38	102.76	J-2	73.99	J-7
J-4	Blue	true	true	3.55	109.32	103.37	J-3	73.99	J-7
J-5	Blue	true	true	3.55	113.68	103.87	J-1	73.99	J-7
J-6	Blue	true	true	3.55	113.89	103.92	J-1	73.99	J-7
J-7	Yellow	true	true	3.55	73.55	73.81	J-8	73.81	J-8
J-8	Yellow	true	true	3.55	73.61	73.79	J-7	73.79	J-7
J-9	Blue	true	true	3.55	113.38	103.66	J-3	73.99	J-7
J-10	Blue	true	true	3.55	112.86	103.67	J-3	73.99	J-7
J-11	Blue	true	true	3.55	106.78	103.57	J-3	73.99	J-7
J-12	Blue	true	true	3.55	103.56	103.28	J-39	73.99	J-7
J-13	Blue	true	true	3.55	93.39	98.89	J-39	73.99	J-7
J-14	Blue	true	true	3.55	93.12	95.30	J-39	73.99	J-7
J-15	Blue	true	true	3.55	96.12	93.46	J-39	73.99	J-7
J-16	Blue	true	true	3.55	96.06	97.42	J-39	73.99	J-7
J-17	Blue	true	true	3.55	106.75	101.98	J-39	73.99	J-7
J-18	Blue	true	true	3.55	91.77	96.63	J-19	73.99	J-7
J-19	Blue	true	true	3.55	88.23	96.93	J-18	73.99	J-7
J-20	Blue	true	true	3.55	90.05	96.96	J-19	73.99	J-7
J-21	Blue	true	true	3.55	66.93	66.88	J-22	66.88	J-22
J-22	Blue	true	true	3.55	65.90	67.19	J-21	67.19	J-21
J-26	Blue	true	true	3.55	70.11	72.67	J-39	72.67	J-39
J-27	Blue	true	true	3.55	65.94	72.55	J-26	72.55	J-26
J-28	Blue	true	true	3.55	65.75	69.81	J-22	69.81	J-22
J-29	Blue	true	true	3.55	69.88	72.86	J-28	72.86	J-28
J-30	Blue	true	true	3.55	78.05	75.62	J-26	73.99	J-7
J-31	Blue	true	true	3.55	78.58	78.09	J-26	73.99	J-7
J-32	Blue	true	true	3.55	84.94	83.23	J-26	73.99	J-7
J-33	Blue	true	true	3.55	92.73	88.84	J-39	73.99	J-7
J-34	Blue	true	true	3.55	85.63	85.77	J-40	73.99	J-7
J-35	Blue	true	true	1,000.00	97.01	96.74	J-39	73.99	J-7
J-36	Blue	true	true	3.55	103.41	100.99	J-39	73.99	J-7
J-37	Blue	true	true	3.55	102.34	102.23	J-39	73.99	J-7
J-38	Blue	true	true	3.55	80.65	96.66	J-27	73.99	J-7
J-39	Blue	true	true	1,000.00	68.13	74.71	J-26	73.99	J-7
J-40	Blue	true	true	1,000.00	80.38	81.55	J-39	73.99	J-7
J-24	Zone-1	true	true	3.55	51.01	54.06	J-25	54.06	J-25
J-25	Zone-1	true	true	3.55	43.99	56.18	J-24	56.18	J-24
J-23	Zone-1	true	true	3.55	34.98	77.29	J-25	73.99	J-7

Scenario: FIRE FLOW SCENARIO THREE



Scenario: FIRE FLOW SCENARIO THREE

Fire Flow Analysis

Junction Report

Label	Elevation (ft)	Zone	Type	Demand (gpm)	Pattern	Demand (Calculated) (gpm)	Calculated Hydraulic Grade (ft)	Pressure (psi)
J-1	6,265.25	Blue	Demand	3.55	Fixed	3.55	6,508.74	105.35
J-2	6,257.25	Blue	Demand	3.55	Fixed	3.55	6,506.83	107.98
J-3	6,255.75	Blue	Demand	3.55	Fixed	3.55	6,506.36	108.43
J-4	6,238.50	Blue	Demand	3.55	Fixed	3.55	6,506.53	115.96
J-5	6,230.00	Blue	Demand	3.55	Fixed	3.55	6,506.68	119.70
J-6	6,230.00	Blue	Demand	3.55	Fixed	3.55	6,506.70	119.71
J-7	6,178.00	Yellow	Demand	3.55	Fixed	3.55	6,349.02	73.99
J-8	6,178.00	Yellow	Demand	3.55	Fixed	3.55	6,349.04	74.00
J-9	6,206.00	Blue	Demand	3.55	Fixed	3.55	6,503.53	128.73
J-10	6,208.00	Blue	Demand	3.55	Fixed	3.55	6,503.67	127.92
J-11	6,209.00	Blue	Demand	3.55	Fixed	3.55	6,501.33	126.48
J-12	6,210.00	Blue	Demand	3.55	Fixed	3.55	6,500.96	125.88
J-13	6,210.00	Blue	Demand	3.55	Fixed	3.55	6,498.42	124.79
J-14	6,210.00	Blue	Demand	3.55	Fixed	3.55	6,495.67	123.60
J-15	6,210.00	Blue	Demand	3.55	Fixed	3.55	6,494.58	123.12
J-16	6,211.00	Blue	Demand	3.55	Fixed	3.55	6,497.26	123.85
J-17	6,212.00	Blue	Demand	3.55	Fixed	3.55	6,499.60	124.43
J-18	6,212.00	Blue	Demand	3.55	Fixed	3.55	6,500.04	124.62
J-19	6,212.00	Blue	Demand	3.55	Fixed	3.55	6,500.35	124.75
J-20	6,211.50	Blue	Demand	3.55	Fixed	3.55	6,500.76	125.15
J-21	6,215.00	Blue	Demand	3.55	Fixed	3.55	6,474.24	112.16
J-22	6,215.50	Blue	Demand	3.55	Fixed	3.55	6,474.34	111.99
J-23	6,216.50	Zone-1	Demand	3.55	Fixed	3.55	6,480.61	114.27
J-24	6,216.50	Zone-1	Demand	3.55	Fixed	3.55	6,493.23	119.73
J-25	6,216.50	Zone-1	Demand	3.55	Fixed	3.55	6,491.75	119.09
J-26	6,216.50	Blue	Demand	3.55	Fixed	3.55	6,477.18	112.78
J-27	6,216.25	Blue	Demand	3.55	Fixed	3.55	6,475.92	112.35
J-28	6,210.75	Blue	Demand	1,000.00	Fixed	1,000.00	6,470.77	112.50
J-29	6,204.50	Blue	Demand	1,000.00	Fixed	1,000.00	6,470.71	115.18
J-30	6,201.00	Blue	Demand	3.55	Fixed	3.55	6,473.96	118.10
J-31	6,201.00	Blue	Demand	1,000.00	Fixed	1,000.00	6,474.32	118.25
J-32	6,200.00	Blue	Demand	3.55	Fixed	3.55	6,483.61	122.70
J-33	6,207.00	Blue	Demand	3.55	Fixed	3.55	6,490.52	122.66
J-34	6,216.50	Blue	Demand	3.55	Fixed	3.55	6,490.59	118.59
J-35	6,216.50	Blue	Demand	3.55	Fixed	3.55	6,497.83	121.72
J-36	6,216.50	Blue	Demand	3.55	Fixed	3.55	6,499.10	122.27
J-37	6,224.00	Blue	Demand	3.55	Fixed	3.55	6,499.67	119.27
J-38	6,216.50	Blue	Demand	3.55	Fixed	3.55	6,497.29	121.48
J-39	6,216.00	Blue	Demand	3.55	Fixed	3.55	6,481.16	114.72
J-40	6,215.75	Blue	Demand	3.55	Fixed	3.55	6,489.33	118.37

Scenario: FIRE FLOW SCENARIO THREE

Fire Flow Analysis

Pipe Report

Label	Length (ft)	Diameter (in)	Material	Hazen- Williams C	Minor Loss Coefficient	Discharge (gpm)	Upstream Calculated Pressure (psi)	Downstream Calculated Pressure (psi)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)	Velocity (ft/s)
P-1	112.00	12.0	Ductile Iron	120.0	0.39	1,901.89	0.00	105.35	1.26	11.24	5.40
P-2	198.00	12.0	Ductile Iron	120.0	0.00	1,898.34	105.35	107.98	1.91	9.63	5.39
P-3	31.00	12.0	Ductile Iron	120.0	0.39	1,894.79	107.98	108.43	0.47	15.25	5.38
P-4	369.00	12.0	Ductile Iron	120.0	0.39	-358.50	108.43	115.96	0.17	0.46	1.02
P-5	310.00	12.0	Ductile Iron	120.0	0.49	-362.05	115.96	119.70	0.15	0.47	1.03
P-6	32.00	12.0	Ductile Iron	120.0	0.39	-365.60	119.70	119.71	0.02	0.66	1.04
P-7	491.00	12.0	Ductile Iron	120.0	0.54	-1,523.14	119.71	0.00	3.30	6.73	4.32
P-8	59.00	12.0	Ductile Iron	120.0	0.39	-293.67	0.00	73.99	0.02	0.37	0.83
P-9	72.00	12.0	Ductile Iron	120.0	0.00	-297.22	73.99	74.00	0.02	0.31	0.84
P-10	50.00	12.0	Ductile Iron	120.0	0.10	-300.77	74.00	74.01	0.02	0.34	0.85
P-11	273.00	12.0	Ductile Iron	120.0	0.00	-300.77	140.80	128.73	0.09	0.32	0.85
P-12	20.00	12.0	Ductile Iron	120.0	0.39	-1,150.43	128.73	127.92	0.14	7.06	3.26
P-13	752.00	12.0	Ductile Iron	120.0	0.88	-1,153.98	127.92	119.71	3.03	4.03	3.27
P-14	124.00	8.0	PVC	120.0	0.59	846.11	128.73	126.48	2.19	17.70	5.40
P-15	33.00	8.0	PVC	120.0	0.39	612.68	126.48	125.88	0.37	11.35	3.91
P-16	289.00	8.0	PVC	120.0	0.39	609.13	125.88	124.79	2.54	8.78	3.89
P-17	318.00	8.0	PVC	120.0	0.39	605.58	124.79	123.60	2.75	8.65	3.87
P-18	121.00	8.0	PVC	120.0	0.39	602.03	123.60	123.12	1.09	9.02	3.84
P-19	257.00	8.0	PVC	120.0	0.39	-667.07	123.12	123.85	2.68	10.44	4.26
P-20	219.00	8.0	PVC	120.0	0.44	-670.62	123.85	124.43	2.34	10.68	4.28
P-21	324.00	8.0	PVC	120.0	0.79	-219.23	124.43	124.62	0.44	1.35	1.40
P-22	226.00	8.0	PVC	120.0	0.39	-222.78	124.62	124.75	0.31	1.37	1.42
P-23	284.00	8.0	PVC	120.0	0.79	-226.33	124.75	125.15	0.41	1.44	1.44
P-24	405.00	8.0	PVC	120.0	0.39	-229.88	125.15	126.48	0.58	1.42	1.47
P-25	16.00	8.0	PVC	120.0	0.00	-521.52	112.16	111.99	0.10	6.35	3.33
P-26	279.00	6.0	Ductile Iron	130.0	0.00	525.07	114.27	111.99	6.28	22.49	5.96
P-27	489.00	6.0	Ductile Iron	130.0	0.00	-528.62	114.27	119.09	11.14	22.78	6.00
P-28	64.00	6.0	Ductile Iron	130.0	0.00	532.17	119.73	119.09	1.48	23.06	6.04
P-30	158.00	8.0	PVC	120.0	0.39	567.97	112.78	112.35	1.25	7.93	3.63
P-31	219.00	8.0	PVC	120.0	0.39	564.42	112.35	112.16	1.69	7.71	3.60
P-32	128.00	8.0	PVC	120.0	0.44	1,082.39	112.16	112.50	3.47	27.08	6.91
P-33	281.00	8.0	PVC	120.0	0.00	82.39	112.50	115.18	0.06	0.21	0.53
P-34	167.00	8.0	PVC	120.0	0.44	-917.61	115.18	118.10	3.25	19.47	5.86
P-35	106.00	8.0	PVC	120.0	0.39	-352.46	118.10	118.25	0.36	3.36	2.25
P-36	249.00	8.0	PVC	120.0	0.05	-1,352.46	118.25	122.70	9.28	37.29	8.63
P-37	164.00	8.0	PVC	120.0	0.69	-1,356.01	122.70	122.66	6.91	42.13	8.66
P-38	112.00	8.0	PVC	120.0	0.39	-1,265.55	122.66	123.12	4.06	36.29	8.08
P-39	267.00	8.0	PVC	120.0	0.39	-94.01	122.66	118.59	0.07	0.27	0.60
P-40	191.00	8.0	PVC	120.0	1.19	-1,244.89	118.59	121.72	7.24	37.89	7.95
P-41	40.00	8.0	PVC	120.0	0.00	-1,248.44	121.72	122.27	1.28	31.96	7.97
P-42	47.00	12.0	Ductile Iron	120.0	0.39	-1,791.25	122.27	119.27	0.56	11.98	5.08
P-43	81.00	12.0	Ductile Iron	120.0	0.39	454.94	119.27	124.43	0.07	0.81	1.29
P-44	422.00	12.0	Ductile Iron	120.0	1.78	-2,249.74	119.27	108.43	6.69	15.86	6.38
P-45	174.00	6.0	Ductile Iron	130.0	0.00	535.72	121.48	119.73	4.06	23.34	6.08
P-46	258.00	8.0	PVC	120.0	0.39	-539.27	121.48	122.27	1.81	7.03	3.44
P-47	418.00	8.0	PVC	120.0	0.49	-568.70	118.10	112.78	3.21	7.69	3.63
P-48	134.00	8.0	PVC	120.0	0.44	-1,140.23	112.78	114.72	3.98	29.71	7.28
P-49	289.00	8.0	PVC	120.0	0.39	-1,143.78	114.72	118.37	8.17	28.29	7.30
P-50	34.00	8.0	PVC	120.0	0.39	-1,147.33	118.37	118.59	1.25	36.88	7.32

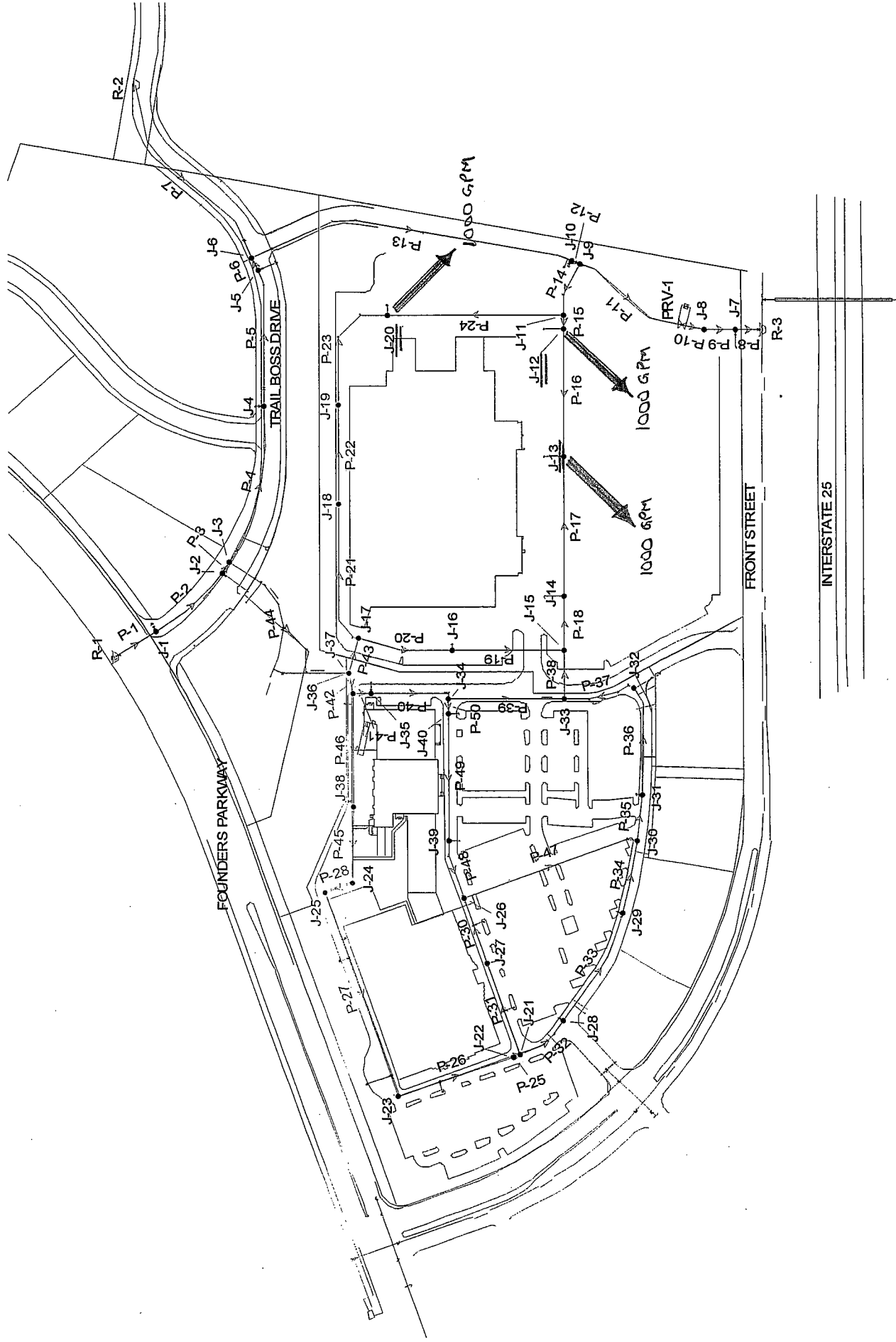
Scenario: FIRE FLOW SCENARIO THREE

Fire Flow Analysis

Fire Flow Report

Label	Zone	Fire Flow Balanced?	Satisfies Fire Flow Constraints?	Total Flow Needed (gpm)	Calculated Residual Pressure (psi)	Calculated Minimum Zone Pressure (psi)	Minimum Zone Junction	Calculated Minimum System Pressure (psi)	Minimum System Junction
J-1	Blue	true	true	3.55	102.34	105.47	J-2	73.99	J-7
J-2	Blue	true	true	3.55	102.45	103.08	J-3	73.99	J-7
J-3	Blue	true	true	3.55	102.42	102.80	J-2	73.99	J-7
J-4	Blue	true	true	3.55	109.32	103.41	J-3	73.99	J-7
J-5	Blue	true	true	3.55	113.65	103.89	J-1	73.99	J-7
J-6	Blue	true	true	3.55	113.85	103.93	J-1	73.99	J-7
J-7	Yellow	true	true	3.55	73.55	73.81	J-8	73.81	J-8
J-8	Yellow	true	true	3.55	73.61	73.79	J-7	73.79	J-7
J-9	Blue	true	true	3.55	112.80	101.47	J-22	73.99	J-7
J-10	Blue	true	true	3.55	112.28	101.70	J-22	73.99	J-7
J-11	Blue	true	true	3.55	106.01	97.72	J-22	73.99	J-7
J-12	Blue	true	true	3.55	102.63	96.57	J-22	73.99	J-7
J-13	Blue	true	true	3.55	91.42	91.97	J-22	73.99	J-7
J-14	Blue	true	true	3.55	89.84	88.31	J-22	73.99	J-7
J-15	Blue	true	true	3.55	92.19	86.57	J-22	73.99	J-7
J-16	Blue	true	true	3.55	94.19	90.54	J-22	73.99	J-7
J-17	Blue	true	true	3.55	106.64	95.73	J-22	73.99	J-7
J-18	Blue	true	true	3.55	91.67	96.45	J-19	73.99	J-7
J-19	Blue	true	true	3.55	88.04	96.88	J-18	73.99	J-7
J-20	Blue	true	true	3.55	89.66	96.79	J-19	73.99	J-7
J-21	Blue	true	true	3.55	43.49	43.54	J-22	43.54	J-22
J-22	Blue	true	true	3.55	42.64	43.73	J-21	43.73	J-21
J-26	Blue	true	true	3.55	54.42	54.78	J-27	54.78	J-27
J-27	Blue	true	true	3.55	46.14	49.64	J-21	49.64	J-21
J-28	Blue	true	true	1,000.00	38.40	47.68	J-21	47.68	J-21
J-29	Blue	true	true	1,000.00	42.39	46.37	J-28	46.37	J-28
J-30	Blue	true	true	3.55	55.74	54.25	J-29	54.25	J-29
J-31	Blue	true	true	1,000.00	56.51	57.64	J-28	57.64	J-28
J-32	Blue	true	true	3.55	70.66	68.32	J-28	68.32	J-28
J-33	Blue	true	true	3.55	86.87	81.26	J-28	73.99	J-7
J-34	Blue	true	true	3.55	83.22	80.70	J-27	73.99	J-7
J-35	Blue	true	true	3.55	98.37	92.06	J-22	73.99	J-7
J-36	Blue	true	true	3.55	103.78	94.77	J-22	73.99	J-7
J-37	Blue	true	true	3.55	102.47	95.92	J-22	73.99	J-7
J-38	Blue	true	true	3.55	77.48	84.04	J-22	73.99	J-7
J-39	Blue	true	true	3.55	59.35	59.95	J-26	59.95	J-26
J-40	Blue	true	true	3.55	77.79	76.73	J-26	73.99	J-7
J-24	Zone-1	true	true	3.55	44.47	46.70	J-25	46.70	J-25
J-25	Zone-1	true	true	3.55	36.37	50.19	J-24	50.19	J-24
J-23	Zone-1	true	true	3.55	20.00	71.77	J-25	55.03	J-22

Scenario: FIRE FLOW SCENARIO FOUR



Scenario: FIRE FLOW SCENARIO FOUR

Fire Flow Analysis

Junction Report

Label	Elevation (ft)	Zone	Type	Demand (gpm)	Pattern	Demand (Calculated) (gpm)	Calculated Hydraulic Grade (ft)	Pressure (psi)
J-1	6,265.25	Blue	Demand	3.55	Fixed	3.55	6,508.81	105.38
J-2	6,257.25	Blue	Demand	3.55	Fixed	3.55	6,507.00	108.06
J-3	6,255.75	Blue	Demand	3.55	Fixed	3.55	6,506.55	108.51
J-4	6,238.50	Blue	Demand	3.55	Fixed	3.55	6,506.51	115.96
J-5	6,230.00	Blue	Demand	3.55	Fixed	3.55	6,506.48	119.62
J-6	6,230.00	Blue	Demand	3.55	Fixed	3.55	6,506.47	119.62
J-7	6,178.00	Yellow	Demand	3.55	Fixed	3.55	6,349.02	73.99
J-8	6,178.00	Yellow	Demand	3.55	Fixed	3.55	6,349.04	74.00
J-9	6,206.00	Blue	Demand	3.55	Fixed	3.55	6,499.67	127.06
J-10	6,208.00	Blue	Demand	3.55	Fixed	3.55	6,499.98	126.33
J-11	6,209.00	Blue	Demand	3.55	Fixed	3.55	6,493.80	123.22
J-12	6,210.00	Blue	Demand	1,000.00	Fixed	1,000.00	6,492.63	122.28
J-13	6,210.00	Blue	Demand	1,000.00	Fixed	1,000.00	6,492.51	122.23
J-14	6,210.00	Blue	Demand	3.55	Fixed	3.55	6,498.04	124.62
J-15	6,210.00	Blue	Demand	3.55	Fixed	3.55	6,500.28	125.59
J-16	6,211.00	Blue	Demand	3.55	Fixed	3.55	6,501.41	125.65
J-17	6,212.00	Blue	Demand	3.55	Fixed	3.55	6,502.39	125.64
J-18	6,212.00	Blue	Demand	3.55	Fixed	3.55	6,498.63	124.01
J-19	6,212.00	Blue	Demand	3.55	Fixed	3.55	6,496.07	122.90
J-20	6,211.50	Blue	Demand	1,000.00	Fixed	1,000.00	6,492.80	121.71
J-21	6,215.00	Blue	Demand	3.55	Fixed	3.55	6,501.46	123.94
J-22	6,215.50	Blue	Demand	3.55	Fixed	3.55	6,501.46	123.72
J-23	6,216.50	Zone-1	Demand	3.55	Fixed	3.55	6,501.75	123.42
J-24	6,216.50	Zone-1	Demand	3.55	Fixed	3.55	6,502.37	123.68
J-25	6,216.50	Zone-1	Demand	3.55	Fixed	3.55	6,502.30	123.65
J-26	6,216.50	Blue	Demand	3.55	Fixed	3.55	6,501.46	123.29
J-27	6,216.25	Blue	Demand	3.55	Fixed	3.55	6,501.46	123.39
J-28	6,210.75	Blue	Demand	3.55	Fixed	3.55	6,501.43	125.76
J-29	6,204.50	Blue	Demand	3.55	Fixed	3.55	6,501.37	128.44
J-30	6,201.00	Blue	Demand	3.55	Fixed	3.55	6,501.34	129.94
J-31	6,201.00	Blue	Demand	3.55	Fixed	3.55	6,501.24	129.90
J-32	6,200.00	Blue	Demand	3.55	Fixed	3.55	6,501.05	130.25
J-33	6,207.00	Blue	Demand	3.55	Fixed	3.55	6,500.92	127.17
J-34	6,216.50	Blue	Demand	3.55	Fixed	3.55	6,501.59	123.35
J-35	6,216.50	Blue	Demand	3.55	Fixed	3.55	6,502.52	123.75
J-36	6,216.50	Blue	Demand	3.55	Fixed	3.55	6,502.69	123.82
J-37	6,224.00	Blue	Demand	3.55	Fixed	3.55	6,502.75	120.60
J-38	6,216.50	Blue	Demand	3.55	Fixed	3.55	6,502.59	123.78
J-39	6,216.00	Blue	Demand	3.55	Fixed	3.55	6,501.49	123.52
J-40	6,215.75	Blue	Demand	3.55	Fixed	3.55	6,501.58	123.67

Scenario: FIRE FLOW SCENARIO FOUR

Fire Flow Analysis

Pipe Report

Label	Length (ft)	Diameter (in)	Material	Hazen- Williams C	Minor Loss Coefficient	Discharge (gpm)	Upstream Calculated Pressure (psi)	Downstream Calculated Pressure (psi)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)	Velocity (ft/s)
P-1	112.00	12.0	Ductile Iron	120.0	0.39	1,846.90	0.00	105.38	1.19	10.64	5.24
P-2	198.00	12.0	Ductile Iron	120.0	0.00	1,843.35	105.38	108.06	1.81	9.12	5.23
P-3	31.00	12.0	Ductile Iron	120.0	0.39	1,839.80	108.06	108.51	0.45	14.41	5.22
P-4	369.00	12.0	Ductile Iron	120.0	0.39	171.61	108.51	115.96	0.04	0.12	0.49
P-5	310.00	12.0	Ductile Iron	120.0	0.49	168.06	115.96	119.62	0.04	0.11	0.48
P-6	32.00	12.0	Ductile Iron	120.0	0.39	164.51	119.62	119.62	4.39e-3	0.14	0.47
P-7	491.00	12.0	Ductile Iron	120.0	0.54	-1,578.12	119.62	0.00	3.53	7.18	4.48
P-8	59.00	12.0	Ductile Iron	120.0	0.39	-293.67	0.00	73.99	0.02	0.37	0.83
P-9	72.00	12.0	Ductile Iron	120.0	0.00	-297.22	73.99	74.00	0.02	0.31	0.84
P-10	50.00	12.0	Ductile Iron	120.0	0.10	-300.77	74.00	74.01	0.02	0.34	0.85
P-11	273.00	12.0	Ductile Iron	120.0	0.00	-300.77	139.13	127.06	0.09	0.32	0.85
P-12	20.00	12.0	Ductile Iron	120.0	0.39	-1,735.54	127.06	126.33	0.31	15.50	4.92
P-13	752.00	12.0	Ductile Iron	120.0	0.88	-1,739.09	126.33	119.62	6.49	8.63	4.93
P-14	124.00	8.0	PVC	120.0	0.59	1,431.21	127.06	123.22	5.87	47.32	9.14
P-15	33.00	8.0	PVC	120.0	0.39	1,118.32	123.22	122.28	1.17	35.41	7.14
P-16	289.00	8.0	PVC	120.0	0.39	118.32	122.28	122.23	0.12	0.42	0.76
P-17	318.00	8.0	PVC	120.0	0.39	-881.68	122.23	124.62	5.53	17.38	5.63
P-18	121.00	8.0	PVC	120.0	0.39	-885.23	124.62	125.59	2.24	18.50	5.65
P-19	257.00	8.0	PVC	120.0	0.39	-418.39	125.59	125.65	1.13	4.39	2.67
P-20	219.00	8.0	PVC	120.0	0.44	-421.94	125.65	125.64	0.99	4.51	2.69
P-21	324.00	8.0	PVC	120.0	0.79	697.76	125.64	124.01	3.77	11.63	4.45
P-22	226.00	8.0	PVC	120.0	0.39	694.21	124.01	122.90	2.55	11.30	4.43
P-23	284.00	8.0	PVC	120.0	0.79	690.66	122.90	121.71	3.27	11.51	4.41
P-24	405.00	8.0	PVC	120.0	0.39	-309.34	121.71	123.22	1.00	2.47	1.97
P-25	16.00	8.0	PVC	120.0	0.00	-96.51	123.94	123.72	4.39e-3	0.27	0.62
P-26	279.00	6.0	Ductile Iron	130.0	0.00	100.06	123.42	123.72	0.29	1.04	1.14
P-27	489.00	6.0	Ductile Iron	130.0	0.00	-103.61	123.42	123.65	0.54	1.11	1.18
P-28	64.00	6.0	Ductile Iron	130.0	0.00	107.16	123.68	123.65	0.08	1.18	1.22
P-30	158.00	8.0	PVC	120.0	0.39	-4.72	123.29	123.39	4.88e-4	3.09e-3	0.03
P-31	219.00	8.0	PVC	120.0	0.39	-8.27	123.39	123.94	4.88e-4	2.23e-3	0.05
P-32	128.00	8.0	PVC	120.0	0.44	84.69	123.94	125.76	0.03	0.23	0.54
P-33	281.00	8.0	PVC	120.0	0.00	81.14	125.76	128.44	0.06	0.20	0.52
P-34	167.00	8.0	PVC	120.0	0.44	77.59	128.44	129.94	0.03	0.20	0.50
P-35	106.00	8.0	PVC	120.0	0.39	170.26	129.94	129.90	0.09	0.87	1.09
P-36	249.00	8.0	PVC	120.0	0.05	166.71	129.90	130.25	0.19	0.77	1.06
P-37	164.00	8.0	PVC	120.0	0.69	163.16	130.25	127.17	0.13	0.81	1.04
P-38	112.00	8.0	PVC	120.0	0.39	470.38	127.17	125.59	0.64	5.73	3.00
P-39	267.00	8.0	PVC	120.0	0.39	-310.78	127.17	123.35	0.67	2.52	1.98
P-40	191.00	8.0	PVC	120.0	1.19	-416.47	123.35	123.75	0.93	4.87	2.66
P-41	40.00	8.0	PVC	120.0	0.00	-420.02	123.75	123.82	0.17	4.25	2.68
P-42	47.00	12.0	Ductile Iron	120.0	0.39	-537.83	123.82	120.60	0.06	1.24	1.53
P-43	81.00	12.0	Ductile Iron	120.0	0.39	1,123.25	120.60	125.64	0.36	4.41	3.19
P-44	422.00	12.0	Ductile Iron	120.0	1.78	-1,664.64	120.60	108.51	3.80	9.01	4.72
P-45	174.00	6.0	Ductile Iron	130.0	0.00	110.71	123.78	123.68	0.22	1.26	1.26
P-46	258.00	8.0	PVC	120.0	0.39	-114.26	123.78	123.82	0.10	0.39	0.73
P-47	418.00	8.0	PVC	120.0	0.49	-96.22	129.94	123.29	0.12	0.28	0.61
P-48	134.00	8.0	PVC	120.0	0.44	-95.04	123.29	123.52	0.04	0.29	0.61
P-49	289.00	8.0	PVC	120.0	0.39	-98.59	123.52	123.67	0.09	0.30	0.63
P-50	34.00	8.0	PVC	120.0	0.39	-102.14	123.67	123.35	0.01	0.37	0.65

Scenario: FIRE FLOW SCENARIO FOUR

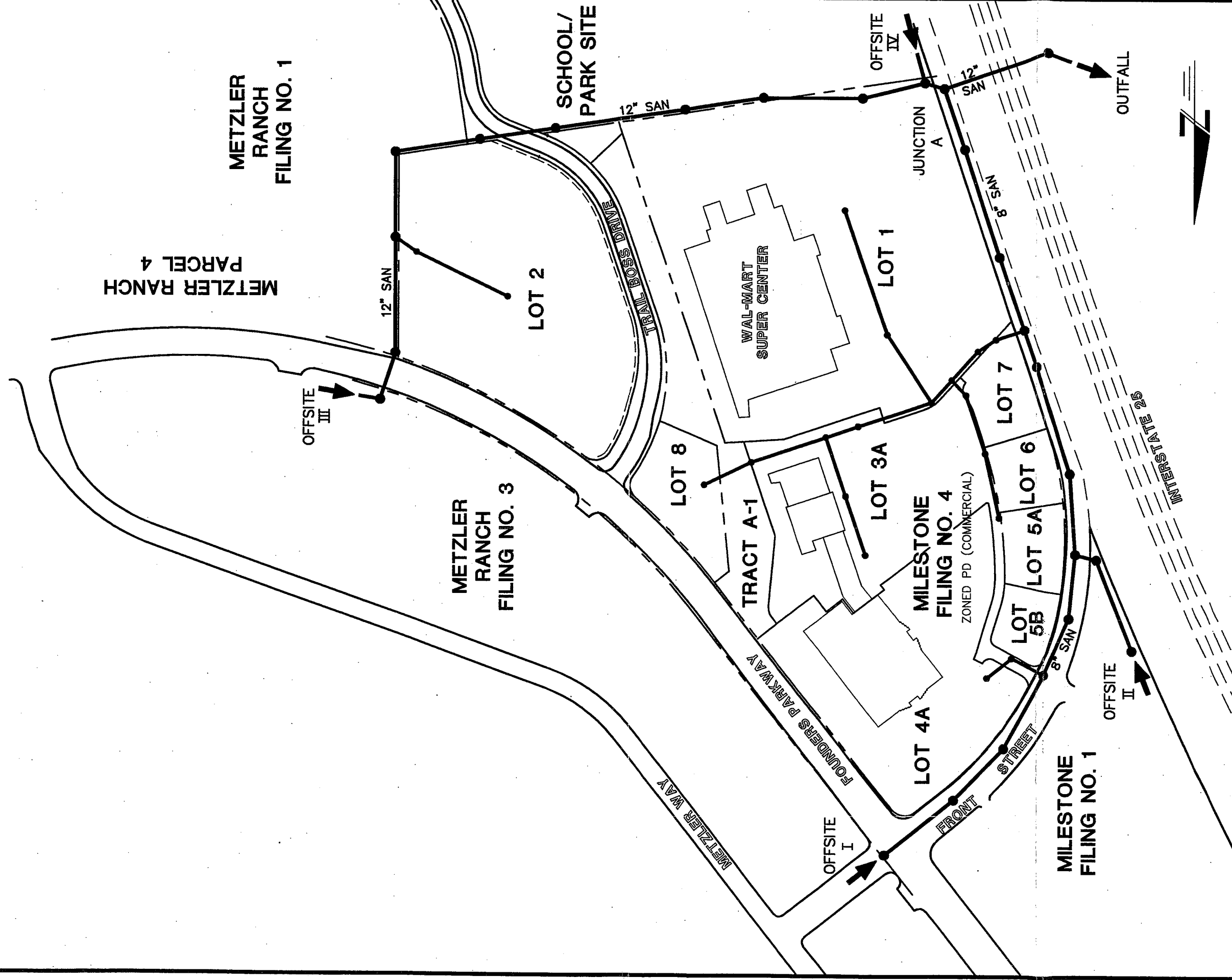
Fire Flow Analysis

Fire Flow Report

Label	Zone	Fire Flow Balanced?	Satisfies Fire Flow Constraints?	Total Flow Needed (gpm)	Calculated Residual Pressure (psi)	Calculated Minimum Zone Pressure (psi)	Minimum Zone Junction	Calculated Minimum System Pressure (psi)	Minimum System Junction
J-1	Blue	true	true	3.55	102.52	105.71	J-2	73.99	J-7
J-2	Blue	true	true	3.55	102.85	103.28	J-1	73.99	J-7
J-3	Blue	true	true	3.55	102.87	103.18	J-2	73.99	J-7
J-4	Blue	true	true	3.55	109.27	103.78	J-1	73.99	J-7
J-5	Blue	true	true	3.55	113.12	104.05	J-1	73.99	J-7
J-6	Blue	true	true	3.55	113.23	104.09	J-1	73.99	J-7
J-7	Yellow	true	true	3.55	73.55	73.81	J-8	73.81	J-8
J-8	Yellow	true	true	3.55	73.61	73.79	J-7	73.79	J-7
J-9	Blue	true	true	3.55	107.41	103.82	J-1	73.99	J-7
J-10	Blue	true	true	3.55	107.10	103.83	J-1	73.99	J-7
J-11	Blue	true	true	3.55	96.71	96.27	J-12	73.99	J-7
J-12	Blue	true	true	1,000.00	92.12	95.18	J-13	73.99	J-7
J-13	Blue	true	true	1,000.00	83.10	97.33	J-12	73.99	J-7
J-14	Blue	true	true	3.55	92.37	94.35	J-13	73.99	J-7
J-15	Blue	true	true	3.55	99.62	99.83	J-14	73.99	J-7
J-16	Blue	true	true	3.55	98.84	103.48	J-3	73.99	J-7
J-17	Blue	true	true	3.55	108.70	103.40	J-3	73.99	J-7
J-18	Blue	true	true	3.55	86.46	88.56	J-19	73.99	J-7
J-19	Blue	true	true	3.55	79.33	84.47	J-20	73.99	J-7
J-20	Blue	true	true	1,000.00	75.99	88.71	J-19	73.99	J-7
J-21	Blue	true	true	3.55	80.08	79.98	J-22	73.99	J-7
J-22	Blue	true	true	3.55	78.95	80.35	J-21	73.99	J-7
J-26	Blue	true	true	3.55	85.30	87.08	J-27	73.99	J-7
J-27	Blue	true	true	3.55	80.04	85.78	J-22	73.99	J-7
J-28	Blue	true	true	3.55	79.11	82.95	J-22	73.99	J-7
J-29	Blue	true	true	3.55	83.30	86.46	J-28	73.99	J-7
J-30	Blue	true	true	3.55	91.18	90.20	J-27	73.99	J-7
J-31	Blue	true	true	3.55	90.81	92.54	J-26	73.99	J-7
J-32	Blue	true	true	3.55	95.11	96.99	J-26	73.99	J-7
J-33	Blue	true	true	3.55	100.42	100.71	J-26	73.99	J-7
J-34	Blue	true	true	3.55	97.26	97.77	J-40	73.99	J-7
J-35	Blue	true	true	3.55	104.14	103.40	J-3	73.99	J-7
J-36	Blue	true	true	3.55	107.14	103.37	J-3	73.99	J-7
J-37	Blue	true	true	3.55	104.88	103.36	J-3	73.99	J-7
J-38	Blue	true	true	3.55	85.26	103.39	J-3	73.99	J-7
J-39	Blue	true	true	3.55	85.82	89.61	J-26	73.99	J-7
J-40	Blue	true	true	3.55	94.69	96.92	J-39	73.99	J-7
J-24	Zone-1	true	true	3.55	56.87	60.24	J-25	60.24	J-25
J-25	Zone-1	true	true	3.55	50.26	61.87	J-24	61.87	J-24
J-23	Zone-1	true	true	3.55	44.60	83.15	J-25	73.99	J-7

Appendix B
Sanitary Sewer System Data

SANITARY SERVICE PLAN MILESTONE FILING NO. 4



MILESTONE FILING NO. 4

- (A) SANITARY SEWER OUTFALL LOCATION
- (B) WATER P.O.C. YELLOW ZONE
- (C) WATER P.O.C. PURPLE ZONE
- (D) YELLOW/PURPLE PRV SEPARATION



8480 E. Orchard Rd., Suite 2000
Englewood, Colorado 80111
Phone: (303) 770-5600
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Associates, Inc.

Milestone Filing No. 4 - Utility Report Modification											
Sewer Flows for the Milestone, Metzler, and Maher Ranch Areas											
8" Outfall Along North Front Street											
Parcel Name	Land Use	Units or Acres	SFE/unit	SFEs	Base Flow per SFE (gpd)	Avg. Day Flows (gpd)	Avg. Day Flows (cfs)	Cummulative Avg. Day Flows (cfs)	Peak Factor	Cummulative Peak Flow (gpd)	Cummulative Peak Flow (cfs)
Metzler Filing #3 - Lot 1	Commercial	4.2	3 / Acre	12.6	200	2,520	0.004	0.004	5.00	12,600	0.020
Metzler Filing #3 - Lot 2	Commercial	9.8	3 / Acre	29.4	200	5,880	0.009	0.013	5.00	42,000	0.065
Metzler Filing #4 (Parcel 8)	Multi-Family	340	.65 / Acre	221.0	200	44,200	0.068	0.081	5.00	263,000	0.407
Metzler Filing #7 (Parcel 9)	Multi-Family	103	.65 / Acre	67.0	200	13,390	0.021	0.102	5.00	329,950	0.511
Metzler Filing #7 (Parcel 9)	Single-Family	34	1 / Acre	34.0	200	6,800	0.011	0.113	5.00	363,950	0.564
Milestone Filing #4 - Lot 3	Commercial	27.3	3 / Acre	81.9	200	16,380	0.025	0.138	5.00	445,850	0.690
Cooper-Hook #1, Lot 1 (Home Depot)	Commercial	11.7	3 / Acre	35.1	200	7,020	0.011	0.149	5.00	480,950	0.745
Cooper-Hook #1 Lot 2-3 (Retail Center)	Commercial	10.4	3 / Acre	31.2	200	6,240	0.010	0.159	5.00	512,150	0.793
Cooper-Hook #1 Lot 4 (Retail Center)	Commercial	7.4	3 / Acre	22.2	200	4,440	0.007	0.166	5.00	534,350	0.828
Emerald Pointe Lot A (Walgreens)	Commercial	3	3 / Acre	9.0	200	1,800	0.003	0.168	5.00	543,350	0.841
Emerald Pointe Lot B (Retail Center)	Commercial	5.4	3 / Acre	16.2	200	3,240	0.005	0.173	5.00	559,550	0.867
Milestone Filing #3 (Auto Serviceplex)	Commercial	3	3 / Acre	9.0	200	1,800	0.003	0.176	5.00	568,550	0.880
Milestone Filing #4 (Basin A)	Commercial	9.8	3 / Acre	29.4	200	5,880	0.009	0.185	5.00	597,950	0.926
Milestone Filing #1	Commercial	14.6	3 / Acre	43.8	200	8,760	0.014	0.199	5.00	641,750	0.994
Milestone Filing #4 (Basin B, C, D, & E)	Commercial	21.8	3 / Acre	65.4	200	13,080	0.020	0.219	4.90	705,848	1.093
Cummulative Totals				707.2		141,430	0.219	0.219		705,848	1.093
12" Outfall Along Founders Prkwy and South of Milestone #4, to Front Street											
Parcel Name	Land Use	Units or Acres	SFE/unit	SFEs	Base Flow per SFE (gpd)	Avg. Day Flows (gpd)	Avg. Day Flows (cfs)	Cummulative Avg. Day Flows (cfs)	Peak Factor	Cummulative Peak Flow (gpd)	Cummulative Peak Flow (cfs)
Maher Ranch	Single-family	868	1 / Acre	868.0	200	173,600	0.269	0.269	4.73	821,932	1.273
Maher Ranch Fire Station and School	Single-family	52	1 / Acre	52.0	200	10,400	0.016	0.285	4.69	870,693	1.348
Brookwood Development	Single-family	72	1 / Acre	72.0	200	14,400	0.022	0.307	4.63	937,359	1.452

Metzler Filing #6	Single-family	57	1 / Acre	57.0	200	11,400	0.018	0.325	4.59	989,643	1.533
Metzler Filing #5	Single-family	62	1 / Acre	62.0	200	12,400	0.019	0.344	4.54	1,045,968	1.620
Metzler Ranch - Parcel 13	Single-family	400	1 / Acre	400.0	200	80,000	0.124	0.468	4.31	1,391,057	2.154
Metzler Ranch - Parcel 4	Commercial	9.1	3 / Acre	27.3	200	5,460	0.008	0.476	4.30	1,414,538	2.191
Metzler Ranch - Parcel 5	Commercial	5	3 / Acre	15.0	200	3,000	0.005	0.481	4.29	1,427,419	2.211
Metzler Ranch - Parcel 6	Commercial	3	3 / Acre	9.0	200	1,800	0.003	0.484	4.29	1,435,140	2.222
Metzler Filing #3 - Lot 3 (Target)	Commercial	13.5	3 / Acre	40.5	200	8,100	0.013	0.496	4.27	1,469,736	2.276
Metzler Filing #3 - Lot 4	Commercial	6.8	3 / Acre	20.4	200	4,080	0.006	0.503	4.26	1,487,125	2.303
Metzler Filing #1 - North Half	Single-family	230	1 / Acre	230.0	200	46,000	0.071	0.574	4.17	1,678,861	2.600
Milestone Filing #4 (Basin F)	Commercial	13.3	3 / Acre	39.9	200	7,980	0.012	0.586	4.15	1,712,005	2.651
Cummulative Totals				1893.1		378,620	0.586	0.586		1,712,005	2.651
12" Outfall Along Hwy 85 Extension											
Parcel Name	Land Use	Units or Acres	SFE/unit	SFEs	Base Flow per SFE (gpd)	Avg. Day Flows (gpd)	Avg. Day Flows (cfs)	Cummulative Avg. Day Flows (cfs)	Peak Factor	Cummulative Peak Flow (gpd)	Cummulative Peak Flow (cfs)
Metzler Filing #1 - South Half	Single-family	205	1 / Acre	205.0	200	41,000	0.063	0.063	5.00	205,000	0.317
Metzler Filing #8 (Parcel 7)	Multi-Family	260	.65 / Acre	169	200	33,800	0.052	0.116	5.00	374,000	0.579
Metzler Filing #8 (Parcel 7) - Clubhouse	Commercial	1	3 / Acre	3	200	600	0.001	0.117	5.00	377,000	0.584
Hazen-Moore - Commercial	Commercial	21.3	3 / Acre	64	200	12,800	0.020	0.137	5.00	441,000	0.683
Hazen-Moore - Single Family	Single-family	83	1 / Acre	83	200	16,600	0.026	0.162	5.00	524,000	0.811
Metzler School Site	School	1	47	47	200	9,400	0.015	0.177	5.00	571,000	0.884
Cummulative Totals				571.0		114,200	0.177	0.177		571,000	0.884
12" Outfall Along Hwy 85 Extension											
Grand Total (Outfall @ I-25)				3171.3		634250.0	0.982	0.982	3.81	2,415,522	3.741

Sanitary Sewer Calculations

Milestone Filing No. 4

Castle Rock, Colorado

Sanitary Line ID	Acres	Average Day Flow (gpd)	Peak Factor	Design Peak Flow (gpd)	Design Peak Flow (cfs)	Grade (percent)	Pipe Dia., D (inches)	Velocities (ft/s) @ Full Flow (fps)	Velocities (ft/s) @ Design Peak (fps)
A	9.8	5880	5	29400	0.0455	min 0.50 max 7.50	8 8	2.89 11.20	1.46 3.77
B	2.1	1260	5	6300	0.0097	min 1.00 max 18.40	6 6	4.09 17.60	1.17 3.21
C	7.6	4560	5	22800	0.0353	min 0.50 max 7.50	8 8	2.89 11.20	1.35 3.49
D	21.8	13080	5	65400	0.1012	min 0.50 max 7.50	8 8	2.89 11.20	1.85 4.79
E	3.5	2100	5	10500	0.0162	min 0.50 max 7.50	8 8	2.89 11.20	1.07 2.75
F	13.3	7980	5	39900	0.0617	min 0.50 max 7.50	8 8	2.89 11.20	1.60 4.13

SANITARY SEWER CAPACITY ANALYSIS
SOUTH PROPERTY BOUNDARY - MILESTONE FILING No. 4

CIRCULAR CHANNEL ANALYSIS
NORMAL DEPTH COMPUTATION

EXISTING 12" PVC

March 9, 2001

ULTIMATE FLOW

PROGRAM INPUT DATA

DESCRIPTION	VALUE
Flow Rate (cfs).....	2.65
Channel Bottom Slope (ft/ft).....	0.009
Manning's Roughness Coefficient (n-value).....	0.011
Channel Diameter (ft).....	1.0

COMPUTATION RESULTS

DESCRIPTION	VALUE
Normal Depth (ft).....	0.59
Flow Velocity (fps).....	5.44
Froude Number.....	1.363
Velocity Head (ft).....	0.46
Energy Head (ft).....	1.06
Cross-Sectional Area of Flow (sq ft).....	0.49
Top Width of Flow (ft).....	0.98

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Dodson & Associates, Inc., 5629 FM 1960 West, Suite 314, Houston, TX 77069
Phone: (281) 440-3787, Fax: (281) 440-4742, Email: software@dodson-hydro.com
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SANITARY SEWER CAPACITY ANALYSIS

FRONT STREET

CIRCULAR CHANNEL ANALYSIS NORMAL DEPTH COMPUTATION

EXISTING 8" PVC
March 9, 2001
90% FULL

PROGRAM INPUT DATA	
DESCRIPTION	VALUE
Flow Rate (cfs).....	0.97
Channel Bottom Slope (ft/ft).....	0.004
Manning's Roughness Coefficient (n-value).....	0.011
Channel Diameter (ft).....	0.67

COMPUTATION RESULTS	
DESCRIPTION	VALUE
Normal Depth (ft).....	0.6
Flow Velocity (fps).....	2.92
Froude Number.....	0.579
Velocity Head (ft).....	0.13
Energy Head (ft).....	0.73
Cross-Sectional Area of Flow (sq ft).....	0.33
Top Width of Flow (ft).....	0.42

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Phone: (281)440-3787, Fax: (281)440-4742, Email: software@dodson-hydro.com
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THE ABOVE ANALYSIS SHOWS THE OPERATING CHARACTERISTICS OF THE EXISTING LINE IN FRONT STREET AT 90% FULL FLOW. THE RESULT IS A CAPACITY DEFICIT AS OUR ANALYSIS SHOWS A REQUIREMENT FOR 1.073 CFS AND THE METZLER RANCH FILING NO. 3 STUDY SHOWS A NEED FOR 1.313 CFS CAPACITY.

Back Pocket

Associates, Inc.

Planning
Engineering
Architecture
Landscape Surveying

8480 E. Orchard Rd., Suite 2000
Englewood, Colorado 80111
Phone: (303) 770-5600
Fax: (303) 770-2349

Date

03/15/01

Description

ORIGINAL PREPARATION

Project Number: 99,135

Drawn By: JLS

Designed By: JDT

Checked By: JDT

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SANITARY BASIN MAP

MILESTONE FILING NO. 4

UTILITY REPORT

CASTLE ROCK, COLORADO

Sheet Title

Sanitary Basin Map

SS-1

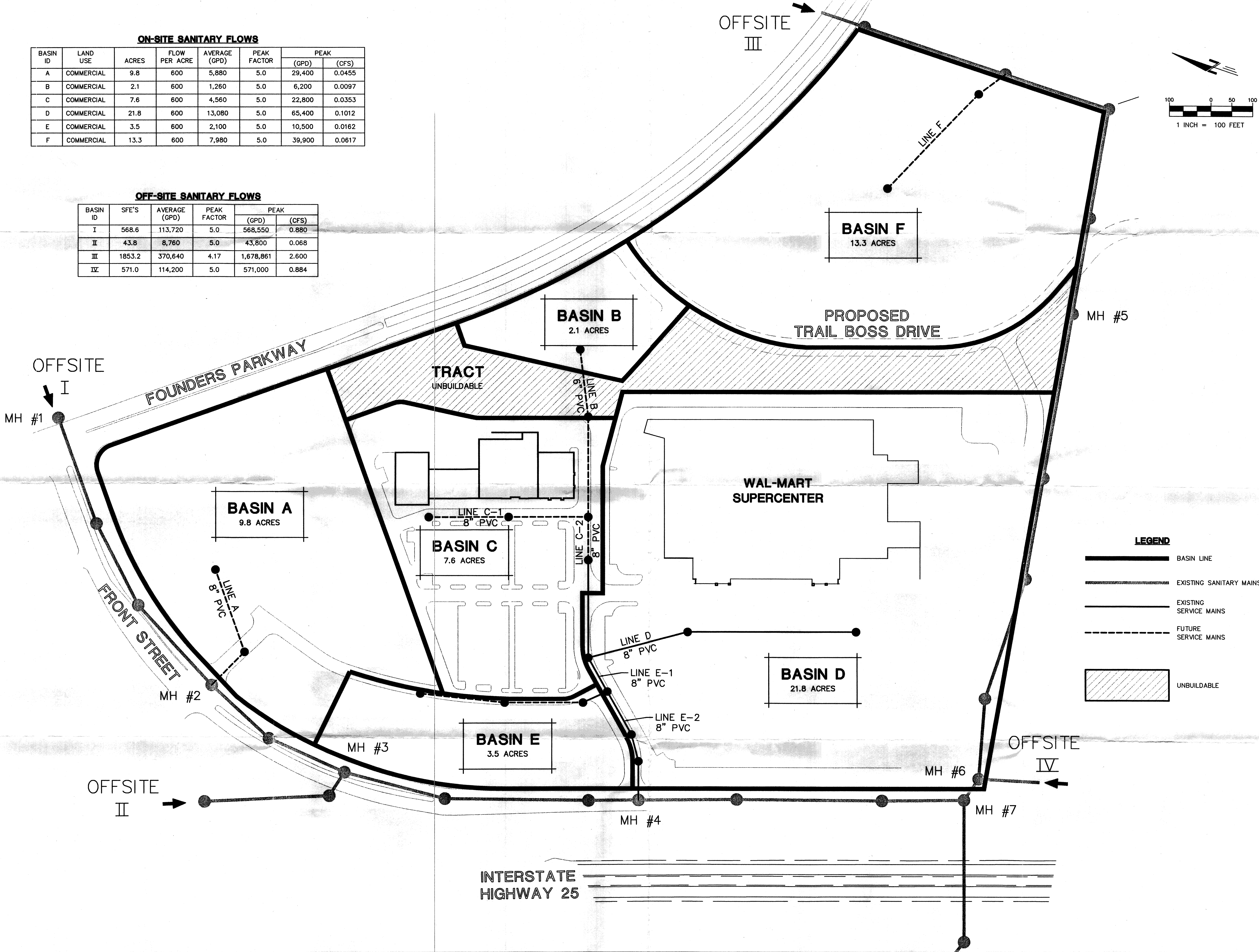
Sheet Number

ON-SITE SANITARY FLOWS

BASIN ID	LAND USE	ACRES	FLOW PER ACRE	AVERAGE (GPD)	PEAK FACTOR	PEAK	
						(GPD)	(CFS)
A	COMMERCIAL	9.8	600	5,880	5.0	29,400	0.0455
B	COMMERCIAL	2.1	600	1,260	5.0	6,200	0.0097
C	COMMERCIAL	7.6	600	4,560	5.0	22,800	0.0353
D	COMMERCIAL	21.8	600	13,080	5.0	65,400	0.1012
E	COMMERCIAL	3.5	600	2,100	5.0	10,500	0.0162
F	COMMERCIAL	13.3	600	7,980	5.0	39,900	0.0617

OFF-SITE SANITARY FLOWS

BASIN ID	SFE'S	AVERAGE (GPD)	PEAK FACTOR	PEAK	
				(GPD)	(CFS)
I	568.6	113,720	5.0	568,550	0.880
II	43.8	8,760	5.0	43,800	0.068
III	1853.2	370,640	4.17	1,678,861	2.600
IV	571.0	114,200	5.0	571,000	0.884





APPENDIX F – PCWRA/CRW-GREASE INTERCEPTOR ACKNOWLEDGEMENT 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.

Walmart Fuel Station #984-543

Name of Project

133 Sam Walton Lane. Castle Rock, CO 80104

Address of property, if known

Signed by:

47AAB7AE9A435...

Signature

10/16/2024

Date



Industry Information Questionnaire

In order to properly evaluate, process, and issue a connection approval to discharge into the sanitary sewer, an Industry Information Questionnaire must be completed online.

HANDWRITTEN COPIES WILL NOT BE ACCEPTED.

(Additional applications may be required.)

PROPOSED LOCATION OF COMMERCIAL, PRODUCTION OR MANUFACTURING FACILITY

Proposed Facility Name * Walmart Fuel Station #984
Name of new or existing business

Street Address * Sam Walton Lane

City * Castle Rock

State CO

Postal Code * 80104

Is this a multi-tenant building? * ☐ Yes ☒ No

COMPANY OWNERS INFORMATION

Company Name * Walmart Real Estate Business Trust

Mailing Address * 2608 SE J Street

City * Bentonville

State * AR

Postal Code * 72716

Contact Name * Trent Rachel

Phone Number * (479)-273-4000

Contact Email * SGAFuel@SGADesignGroup.com

PROPERTY OWNER OF THE PROPOSED LOCATION

Property Owner Name * Walmart Real Estate Business Trust

Property Owner Mailing Address * 2608 SE J Street

City * Bentonville

State * AR

Postal Code * 72716

Property Owner Contact Name * Trent Rachel

Phone Number * (479)-273-4000

Email * SGAFuel@SGADesignGroup.com

AUTHORIZED REPRESENTATIVE IN OFFICIAL DEALINGS WITH PCWRA

Authorized Representative Name * Andru Ihli

Title (i.e. Owner, Manager, General Contractor, etc.) * Project Manager

Phone Number *

(479)-802-6102

Email *

SGAFuel@SGADesignGroup.com

BUSINESS INFORMATION



Will this be a new build? *

- ☒ Yes
☐ No

Provide a brief description of the commercial, manufacturing, or service activities your business plans to conduct: *

Fuel Station and Convenience Store to have the following available but not limited to for customers to purchase and/or have access to: Fuel, snacks, drinks, Alcohol, tobacco, self-serve beverages, Free water, and restroom use.

When did/will the business begin operations? *

11/19/2025

Comments

"Business begin operations" date is a proposed Ceremony/ Grand opening date.

Business Category *

- ☐ Assembly
☒ Auto Services
☐ Dental (please provide NAICS or SIC code below)
☐ Food Processing/Service
☐ Industrial (please provide NAICS or SIC code below)
☐ Manufacturing (please provide NAICS or SIC code below)
☐ Medical (please provide NAICS or SIC code below)
☐ Office (Not Medical)
☐ Retail
☐ Vehicle/Equipment Wash
☐ Warehouse/Storage
☐ Other

Comments

Fuel Station and Convenience Store

Will there be other businesses leasing or occupying space at this facility? *

- ☐ Yes ☒ No

Will the business dispose of any chemicals or hazardous waste? *

- ☐ Yes ☒ No

Permit number assigned by Building Division if applicable

Signature *

I have personally examined and am familiar with the information submitted in this document and attachments. Based upon my inquiry of those individuals immediately responsible for obtaining the information reported herein, I believe that the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of a fine and/or imprisonment.