Gun Club Business Park Development

MASTER UTILITY REPORT

E-470 TO S. GUN CLUB ROAD
CITY OF AURORA, COLORADO

Martin/Martin, Inc. Project No.: 23.1060

November 21, 2023

Approved For One Year From This Date

Aurora Water – Utility Division	Date
Fire and Life Safety Department	Date

Prepared For: Westside Investment Partners, Inc.
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Attn: Megan Waldschmidt

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Project Manager: Greg Proulx, PE
Project Engineer: Ben Meis, PE
Design Engineer: Trevor Steenerson, EIT

SIGNATURE AND APPROVAL

Signature of Preparer

This utility study ("Gun Club Business Park – Master Utility Report") was prepared under my direct supervision in accordance with the provisions of the Aurora Water Standards and Specifications Regarding Water, Sanitary Sewer and Storm Drainage Infrastructure. I understand that the City of Aurora does not and will not assume liability for facilities designed by others.

_____

David M. Le, P.E.
State of Colorado Registration No. 43827

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TABLE OF CONTENTS

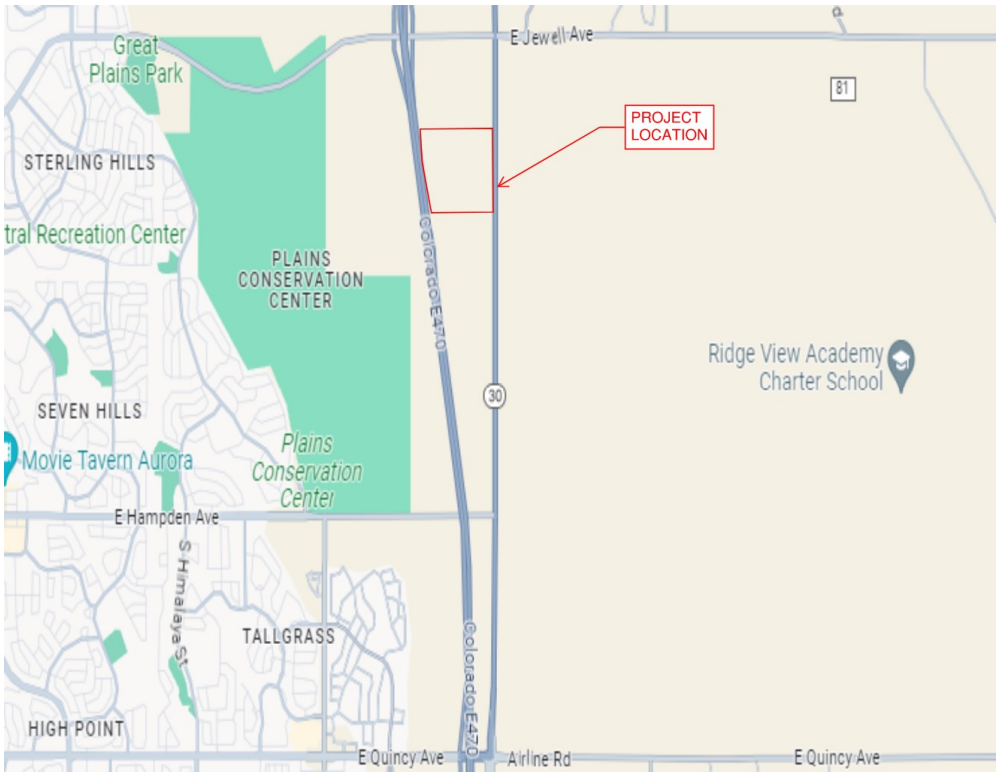
APPENDICES

I. INTRODUCTION

This report is prepared to provide the necessary analysis of the Gun Club Business Park overall water and sanitary systems and provide the anticipated proposed water and sanitary sewer demands. The operation of these on-site systems relies heavily upon neighboring developments and their associated master utility reports, which include parcels surrounding the site to the north and south sides. As part of this report the capacity of each system has been analyzed in accordance with standard engineering practice and City of Aurora standards.

A. Location

The property is located in the East half of Section 25, Township 4 South, Range 66 West, of the Sixth Principal Meridian, City of Aurora, Arapahoe County, Colorado. The site is bounded to the south by the Aspen Park development, to the north by the Jewell Marketplace development, to the west by E-470, and to the east by Gun Club Road. The vicinity map is included in Appendix A of this report.



B. Site Description

The property is currently zoned as Mixed Use Regional District on the north side of the property and Airport District (AD) on the south side of the property, to take advantage of the nearby regional and national transportation hubs and infrastructure. The development will included a mix of heavy industrial, light industrial, and commercial buildings.

C. Phases

Phasing of the Gun Club Business Park site will more than likely be developed into smaller phases aligned with the planning areas outlined in Framework Development Plan and the Public Improvement Plan. Looped water to support public fire hydrants and private fire suppression systems are required with each phase of development. A sewer outfall must be constructed to serve any individual planning area. If the off-site sanitary sewer system infrastructure has not yet been installed, the developing planning area will be responsible for building the necessary off-site sanitary sewer required to support the planning area. The planning area shall work with the City of Aurora to determine the best option for connecting to the city's existing sanitary sewer system. At the time of this report, it is known that the phases shall consist of PA-1 through PA-7, as well as open space and drainage channel improvements. Additional information pertaining to the required improvements associated with each planning area can be found within the Public Improvement Plan exhibits and narrative. The actual sequential development of this project shall more than likely be determined by market demands. Furthermore, dependent upon market needs, and associated infrastructure improvement costs, identified planning areas may be combined or partially skipped as needed. This report is focused on the anticipated master water and sanitary sewer infrastructure that would be needed to support the full buildout of the development.

II. SANITARY SEWER SYSTEM

A. Existing Off-site Sanitary Sewer System

The following reports were used to determine existing conditions, previous design assumptions, and potential offsite flows for the Gun Club Business Park project. The Aspen Business Park property is located to the south and is associated with the Master Utility Report dated 04/12/2023, herein referred to as the ASPEN PARK WM REPORT (Ref. No. 1). The Jewell Marketplace property is located to the north and is associated with Master Utility Report dated 06/14/2007, herein referred to as the JEWELL MARKETPLACE CLC REPORT (Ref. No. 2).

If the off-site sanitary sewer system infrastructure has not yet been installed, the developing planning area will be responsible for building the necessary off-site sanitary sewer required to support the planning area. The Planning Area shall work with the City of Aurora to determine the best option for connecting to the city's existing sanitary sewer system.

Per the ASPEN PARK WM REPORT, a sanitary main will convey flows from the Aspen Business Park property to the north into the Gun Club Business Park property. The design and sizing of this main was determined in said report. It is anticipated that approximately 1.97 MGD from Aspen Business Park property will be routed into the Gun Club Business Park property. Although currently the ASPEN PARK WM REPORT shows the sanitary main entering the Gun Club Business Park property on the west side adjacent to E-470, the plans will be amended to show that the sanitary main will enter the Gun Club Business Park property on the east side adjacent to S. Gun Club Road. The Sanitary Sewer Map of the Aspen Business Park property is included in Appendix A of this report.

B. Proposed Sanitary Sewer Design Criteria

Updated criteria was provided by the City of Aurora. The updated criteria simplified the recommended sewer loading rates for different types of developments. A copy of the updated City of Aurora Master Utility Design Criteria for Water and Sanitary Sewer dated January 2023 has been included in Appendix A of this report for reference.

Analysis of the updated proposed sanitary flows consists of calculating the acreage for each planning area and applying demands based on types of land usage. The land usage and associated size of each planning area was provided by PCS Group CO in the Gun Club Business Park Framework Development Plan Land Use Map, which is included in Appendix D of this report.

C. Pipe Sizing Criteria and Sanitary Sewer Routing

Analysis of the hydraulic capacity and characteristics of the pipe assumed open channel flow (not pressurized) and was completed using Manning's Equation. Bentley Flow Master was utilized for computations. Based on Aurora Water's Requirements, a minimum slope of

0.40% was used for the basis of design and a Manning's n value of 0.011 was used for PVC pipe unless specified differently. The depth of flow in the pipes shall not exceed 75% of capacity for pipes 12 inches or smaller and 80% for pipes larger than 12 inches. Peak factors were calculated by using the equation:

Peaking Factor = $5 \div p^{0.167}$

where p = population in thousands. A minimum peaking factor of 1.7 and a maximum peaking factor of 4 was used for the calculations. Infiltration and inflow was calculated at 10% of average day flows and added to the peaked flows.

Due to meetings with the Aspen Business Park owners after the approval of the ASPEN PARK WM REPORT was written, the off-site flows from the Aspen Business Park property is assumed to be conveyed at Node B, which is located near the intersection of S. Gun Club Road and S. Addison Way. Since approved the approved Aspen Park Plans show the sanitary sewer on the west side of the property, a plan amendment will be submitted showing the sanitary sewer on the east instead. Offsite existing flows from Aspen Business Park as approved is 1.97 GPD.

FlowMaster software was used to calculate the pipe velocities and pipe sizes for each segment of pipe between the design nodes. In general, the Gun Club Business Park property needs pipe sizes verifying from 6" through 15"to meet proposed Gun Club Business Park demands, increased pipe size based on the COA comments, other offsite COA tributary flows, etc. The calculated demands, routing assumptions, peak flows, and pipe cross sections are provided in Appendix B.

III. WATER SUPPLY SYSTEM

A. Existing Off-Site Water System

An existing 12" water transmission main can be found near the intersection of S. Gun Club Road and S. Addison Way. There is another existing 8" transmission main located within S. Gun Club Road that runs east from the intersection of S. Gun Club Road and E. Asbury Place.

B. Proposed Water Distribution Design Criteria

Updated criteria was provided by the City of Aurora. The updated criteria simplified the water demand per zoning classification for different types of developments. Water demands for residential water use are based on a criteria of 2.77 people per unit and an average day per capita flow of 101 gallon per day. Non-residential demands were generated using the criteria in the table below:

Land Use	Ave Day (gpd/acre)	Max Day (gpd/acre)	Peak Hour (gpd/acre)
Commercial	1,500	4,200	6,750
Industrial	1,200	3,360	5,400
Parks and Greenbelts	1,800	5,040	N/A

Water mains in the system were analyzed in the model and were compared to the following City of Aurora Criteria for pipe size, velocity, and head loss:

Pipe Diameter (in)	Max Velocity (fps)	Max Head Loss (ft/1,000 ft)
6	2.5	5
8 to 12	3	5
16-24	4.5	5
Over 24	7.8	4

According to City of Aurora Criteria, the system was analyzed to meet the maximum day plus fire flow demand (as determined by ISO criteria) with a residual pressure of no less than 20 psi at any point in the water distribution system. The fire flow demands by land use type used for the system modeling are summarized in the table below:

Use Classification	Fire Flow Demand
Residential	1500 gpm for 2 hours
Commercial/Multifamily	2500 gpm for 2 hours
Industrial	3500 gpm for 3 hours

A copy of the updated City of Aurora Master Utility Design Criteria for Water and Sanitary Sewer dated January 2023 has been included in Appendix A of this report for reference.

C. Proposed On-Site Water System

The Gun Club Business Park site is located within Zone 4 of the City of Aurora water network. Pressure Reducing Valves (PRVs) will need to be located within the site at connection points where a pressure zone change occurs. The location of the PRVs is shown on the Overall Utility Water Plan MUS-W located in Appendix D On-site water pressures range from 64 psi to 127 psi across the site in the built-out condition. Individual building PRVs may be necessary to reduce supplied water pressure and will need to be further evaluated with each site plan process.

The proposed development within Fulenwider will provide a proposed offsite water line within South Gun Club Road. Specifically, included with proposed Gun Club Business Park development are proposed 12-inch diameter PVC (C900) water lines which will loop the system for each planning area. Refer to the Overall Utility Water Plan MUS-W, in Appendix D for the water line locations and sizes.

D. Proposed Water System Analysis

WaterCAD software was used to analyze the proposed water system for build-out supply. The water model and output calculations for the average day demand (ADD), maximum day demand (MDD), maximum hour demand (MHD), and maximum day demand plus the fire flow (MDD+FF) modeled at each node based on the domestic and fire demand for each corresponding development zoning classification are provided within the Appendix C. The updated City criteria yields ADD, MDD, MHD, and MDD+FF demands in gallons per day per acre. These values were then converted to gallons per minute and then applied to the corresponding node that was nearest the planning area.

The table below summarizes the results from the water model analysis:

WATER MODEL RESULTS SUMMARY	
Maximum Pressure	94 psi (Junction J-15, J-16, J-30, Avg. Daily Demand)
Minimum Residual Pressure	63 psi (Junction J-5 J-9, Max Day Demand plus Fire flow of 3500gpm at J-9)
Maximum Pipe Velocity	0.63 ft/sec (Pipe P-32, Max Hour Demand)
Maximum Fire Flow Velocity	6.32 ft/sec (Pipe P-32, Max Day Demand plus Fire flow of 3500gpm at J-9)

The results of the different demand scenarios and additional water model results for the pipes and junction nodes are included in Appendix C.

IV. CONCLUSION

The proposed water system is designed to provide adequate fire protection and the domestic demands of each type of use classification. The proposed sanitary sewer system has been designed to accommodate the anticipated flows for the planning areas and assumptions outlined in this report.

REFERENCES

1. Aspen Business Park Master Utility Report, (2023). Aurora, Colorado, Ware Malcomb.

2. Jewell Marketplace Master Utility Report, (2007). Aurora, Colorado, CLC Associates.

APPENDICES

APPENDIX A

Aspen Business Park Master Utility Report

Jewell Marketplace Master Utility Report

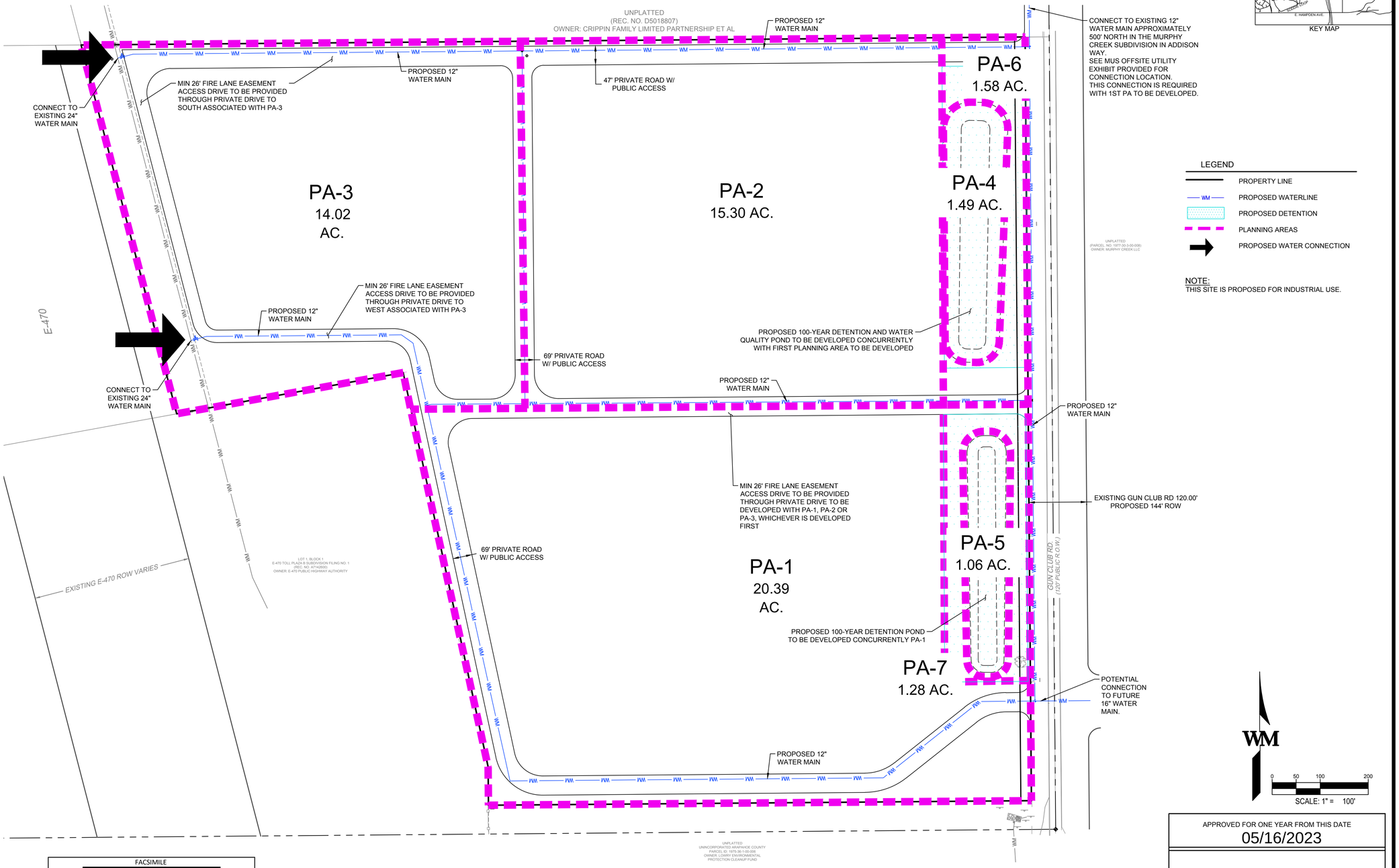
CAUTION: IF THIS SHEET IS NOT 24"x36" IT IS A REDUCED PRINT

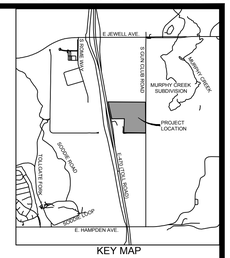
1

223117

MASTER PLAN
ASPEN BUSINESS PARK

SE QUARTER OF SECTION 25, TOWNSHIP 4 SOUTH, RANGE 66 WEST OF THE 6TH P.M.,
CITY OF AURORA, COUNTY OF ARAPAHOE, STATE OF COLORADO





KEY MAP

LEGEND

- PROPERTY LINE
- WM PROPOSED WATERLINE
- PROPOSED DETENTION
- PLANNING AREAS
- PROPOSED WATER CONNECTION

NOTE:
THIS SITE IS PROPOSED FOR INDUSTRIAL USE.

WM

0 50 100 200
SCALE: 1" = 100'

FACSIMILE

This electronic plan is a facsimile of the signed and sealed pdf set

04.12.2023

Signature Date

APPROVED FOR ONE YEAR FROM THIS DATE
05/16/2023

Chloe Ho 05/15/2023
WATER DEPARTMENT DATE

Mark Apodaca 05/15/2023
FIRE & LIFE SAFETY DEPARTMENT DATE

APPROVED ON 05/16/2023

W:\DCS\21\411400\Civil\CAD\Sheets\Planning\Overall Util\DCS21-4114_Overall Wat Util Plan.dwg 1/17/2022 2:51 PM JCARANO 1:1

WARE MALCOMB
LEADING DESIGN FOR COMMERCIAL REAL ESTATE
900 south broadway
suite 320
denver, co 80209
p. 303.561.3333
waremalcomb.com

FOR AND ON BEHALF OF WARE MALCOMB

ASPEN BUSINESS PARK
YALE AVE & S GUN CLUB RD.
AURORA, CO
OVERALL UTILITY PLAN (WATER)

NO.	DATE	REMARKS

JOB NO.:	DCS21-4114
PA / PM:	JKC
DESIGNED:	JRR
DATE:	01/17/2021
PLOT DATE:	

SHEET
C1
Sheet

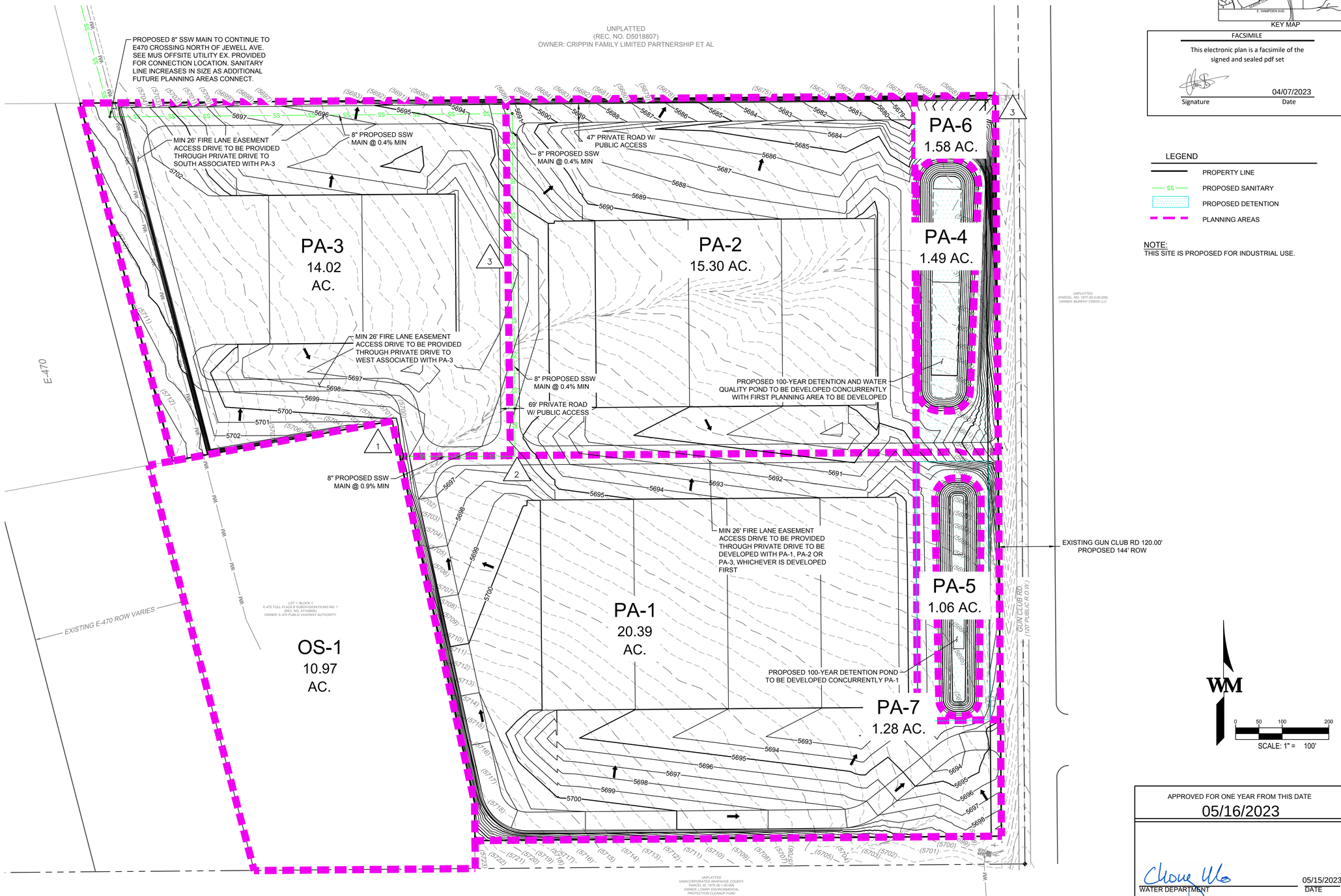
CAUTION: IF THIS SHEET IS NOT 24"x36" IT IS A REDUCED PRINT

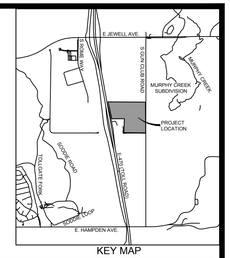
2

223117

MASTER PLAN
ASPEN BUSINESS PARK

SE QUARTER OF SECTION 25, TOWNSHIP 4 SOUTH, RANGE 66 WEST OF THE 6TH P.M.,
CITY OF AURORA, COUNTY OF ARAPAHOE, STATE OF COLORADO





KEY MAP

FACSIMILE

This electronic plan is a facsimile of the signed and sealed pdf set

Signature — Date: 04/07/2023

LEGEND

- PROPERTY LINE
- SS — PROPOSED SANITARY
- PROPOSED DETENTION
- PLANNING AREAS

NOTE:
THIS SITE IS PROPOSED FOR INDUSTRIAL USE.

SCALE: 1" = 100'

APPROVED FOR ONE YEAR FROM THIS DATE
05/16/2023

WATER DEPARTMENT — 05/15/2023 DATE

APPROVED ON 05/16/2023

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FOR AND ON BEHALF OF WARE MALCOMB

ASPEN BUSINESS PARK
YALE AVE & S GUN CLUB RD.
AURORA, CO
OVERALL UTILITY PLAN (SANITARY)

NO.	DATE	REMARKS

JOB NO.:	DCS21-4114
PA / PM:	JKC
DESIGNED:	JRR
DATE:	01/17/2021
PLOT DATE:	

SHEET
C2
Sheet

NOT FOR CONSTRUCTION

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q207091 1

EXISTING 60" CULVERT TO REMAIN

PROPOSED 12" SS
REFER TO THE JEWELL COMMONS PARCEL MASTER UTILITY MAP FOR CONTINUATION

PROPOSED 12" SS

MH-1

75' E-470 MULTI-USE EASEMENT REC. NO. A7051461

EXISTING 24" WTR

EAST JEWELL AVENUE
144'-156' ROW
(ULTIMATE)

PROPOSED 15" SS
REFER TO THE JEWELL COMMONS PARCEL MASTER UTILITY MAP FOR CONTINUATION

MH-11

EXISTING 24" CULVERT TO BE REMOVED

EXISTING 24" STL WTR

PROPOSED 12" WTR

PROPOSED 12" SS

MH-2

PRIVATE ROAD

PROPOSED 8" WTR

MH-3

PROPOSED 8" SS

MH-4

PROPOSED 15" SS

PROPOSED 12" WTR

PROPOSED 8" WTR

PROPOSED 8" SS

MH-5

E-470 OFF RAMP

GUN CLUB ROAD
144' ROW
(ULTIMATE)

1	2	3	4	5	6	7	8	9	10	11
26.95	3.95	4.12	2.92	2.18	2.15	4.46	5.23	7.57	3.61	4.14
0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23
0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30

COMMERCIAL USES
26.95 ACRES

COMMERCIAL USES
40.33 ACRES

75' E-470 MULTI-USE EASEMENT REC. NO. A7051461

100' HIGHWAY EASEMENT BK462 PG 409

E-470 ROW

PROPOSED 12" SS

MH-6

PRIVATE ROAD

MH-7

PROPOSED 8" SS

PROPOSED 12" WTR

PROPOSED 8" WTR

MH-8

PROPOSED 8" SS

PRIVATE ROAD

MH-9

PROPOSED 15" SS

MH-10

PROPOSED 12" SS
SS STUB-1

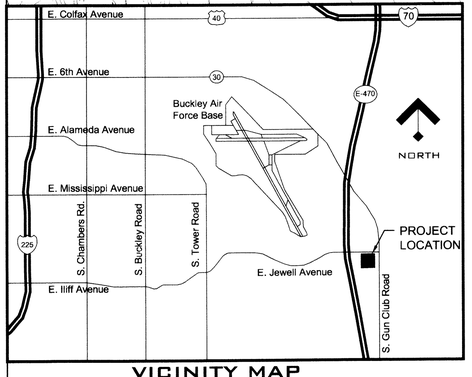
PROPOSED 12" WTR
WTR STUB-1

PROPOSED 15" SS
SS STUB-2

EXISTING 24" STL WTR

OS-1
69.4 | 0.23 | 0.30

OS-2
363.3 | 0.23 | 0.30



VICINITY MAP
NOT TO SCALE

LEGEND

A — BASIN DESIGNATION
29.9 | 0.23 | 0.30 — F.A.R. (WATER) / F.A.R. (SANITARY) / BASIN AREA IN ACRES

PROPERTY BOUNDARY
PROPOSED ROADS
BASIN BOUNDARY
EXISTING CONTOUR
PROPOSED WATER LINE
PROPOSED SANITARY SEWER LINE

NOTES:

1. THE SANITARY SEWER AND WATER LAYOUTS SHOWN ON THIS PLAN ARE CONCEPTUAL ONLY. ACTUAL LAYOUTS WILL BE DETERMINED AT THE TIME OF THE FINAL DEVELOPMENT LAYOUT.
2. REFER TO THE MASTER DRAINAGE REPORT FOR THE STORM SEWER INFORMATION.
3. REFER TO THE PUBLIC IMPROVEMENTS PHASING MAP FOR UTILITY PHASING INFORMATION.
4. FUTURE LAND USES FOR ALL BASINS AND SEWER LOADS ARE AS SHOWN IN THE CITY OF AURORA WASTE WATER UTILITY PLAN.

NORTH 100 0 50 100
SCALE: 1" = 100'-0"

CITY OF AURORA PLAN REVIEW IS ONLY FOR GENERAL CONFORMANCE WITH CITY OF AURORA DESIGN CRITERIA AND THE CITY CODE. THE CITY IS NOT RESPONSIBLE FOR THE ACCURACY AND ADEQUACY OF THE DESIGN, OF DIMENSIONS AND ELEVATIONS WHICH SHALL BE CONFIRMED AND CORRELATED AT THE JOB SITE. THE CITY OF AURORA, THROUGH THE APPROVAL OF THIS DOCUMENT, ASSUMES NO RESPONSIBILITY OF THE COMPLETENESS AND/OR ACCURACY OF THIS DOCUMENT.

APPROVED ONE YEAR FROM THIS DATE
07.18.07

CITY ENGINEER — DATE 7/18/07

UTILITIES DEPARTMENT — DATE 6-29-07

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ARCHITECTURE
ENGINEERING PLANNING
LANDSCAPE ARCHITECTURE
LAND SURVEYING

MASTER UTILITY MAP

JEWELL MARKETPLACE SUBDIVISION FILING NO. 1

(EAST JEWELL AVENUE & E 470)
AURORA, CO

COLORADO REGISTERED PROFESSIONAL ENGINEER
TIFFANY D. WATSON
40360

PREPARED UNDER THE TIFFANY D. WATSON COLORADO REGISTRATION NO. 40360 FOR AND ON BEHALF OF CLC ASSOCIATES

DATE	DESCRIPTION
-	-
03/05/07	FDP SUBMITTAL 1
06/15/07	MYLAR SUBMITTAL

PROJECT #:06.0044
DRAWN BY: TDW
DESIGNED BY: TDW
CHECKED BY: KDM

APPENDIX B
SANITARY SEWER DEMAND AND CAPACITY CALCUATIONS

GUN CLUB BUSINESS PARK

SANITARY SEWER AVERAGE FLOWS AND POPULATION

Planning Area	Area (Ac)	Type of Development	Avg. Daily Flow/Ac (gpd/ac)	Avg. Daily Flow (MGD)	Equivalent Population /Ac	Population
PA-1	2.4	DETENTION / OPEN SPACE	SANITARY DEMANDS NOT APPLICABLE TO PARKS, OPEN SPACE, DRAINAGE CHANNEL….			
PA-2	59.9	AIR-DIST	1200	0.072	18	1,079
PA-3	23.7	MU-INDUSTIRAL	1200	0.028	18	426
PA4	5.2	MU-COMM	1500	0.008	22	114
PA-5	19.7	AIR-DIST	1200	0.024	18	354
PA-6	7.1	DETENTION / OPEN SPACE	SANITARY DEMANDS NOT APPLICABLE TO PARKS, OPEN SPACE, DRAINAGE CHANNEL, OR LAND ACQUISITION AREAS			
PA-7	0.5	DETENTION / OPEN SPACE				

SANITARY SEWER AVERAGE FLOWS AND POPULATION

GUN CLUB BUSINESS PARK
SANITARY SEWER AVERAGE OFFSITE APPROXIMATE FLOWS

Planning Area	Area (Ac)	Type of Development	Avg. Daily Flow/Ac (gpd/ac)	Avg. Daily Flow (MGD)	Equivalent Population /Ac	Population
ASPEN PARK PA-1	22.9	M-O	1200	0.027	18	412
ASPEN PARK PA-2	18.2	M-O	1200	0.022	18	328
ASPEN PARK PA-3	14.0	M-O	1200	0.017	18	252
ASPEN PARK OS01	11.0	M-O	1500	0.017	18	198
ASPEN PARK OS02	119.0	M-O	1200	0.143	18	2,142
APSEN PARK OS03	61.2	M-O	1500	0.092	22	1,346
ASPEN PARK OS04	148.8	M-O	1500	0.223	22	3,274

GUN CLUB BUSINESS PARK

SANITARY SEWER PEAK FLOW CALCULATIONS

Node	Basins Added to System	Total Avg. Daily Flow @ Node (MGD)	Total Upstream Population	Peaking Factor = 5/p^0.167	Peak Flow (MGD)	Infiltration (MGD)	Peak Flow + Infiltration (MGD)	Peak Flow + Infiltration (cfs)
A	PA-02 (25%)	0.018	270	4.00	0.072	0.002	0.074	0.114
B	ASPEN PARK OFFSITE	0.558	8,222	3.52	1.964	0.056	2.020	3.125
C	PA-05 (75%)	0.576	8,487	3.50	2.015	0.058	2.073	3.207
D	PA-05 (25%)	0.582	8,576	3.49	2.033	0.058	2.091	3.235
E	PA-02 (25%)	0.018	270	4.00	0.072	0.002	0.074	0.114
F	PA-02 (15%)	0.029	432	4.00	0.115	0.003	0.118	0.183
G	PA-02 (15%)	0.011	162	4.00	0.043	0.001	0.044	0.068
H	PA-02 (20%)	0.054	809	4.00	0.216	0.005	0.221	0.342
I	PA-03 (20%)	0.006	4	4.00	0.023	0.001	0.023	0.036
J	PA-03 (60%)	0.605	8,590	3.49	2.111	0.060	2.172	3.360
K	PA-03 (20%)	0.060	813	4.00	0.239	0.006	0.244	0.378
L	PA-04 (50%)	0.609	8,647	3.49	2.123	0.061	2.183	3.378
M	PA-04 (50%)	0.064	870	4.00	0.254	0.006	0.260	0.403
N	NODE L + NODE M	0.672	9,517	3.43	2.307	0.067	2.374	3.673

FROM Node	TO Node	Peak Flow + Infiltration (MGD)	Peak Flow + Infiltration (cfs)	Required Pipe Size (in)	Pipe Percent Full
A	B	0.07	0.11	6	32.0
B	C	2.02	3.12	15	58.6
C	D	2.07	3.21	15	59.6
E	F	0.07	0.11	6	32.0
F	H	0.12	0.18	8	30.5
G	H	0.04	0.07	6	22.2
I	J	0.02	0.04	6	14.6
D	J	2.09	3.23	15	59.9
H	K	0.22	0.34	15	61.4
K	M	0.24	0.38	15	61.6
J	L	2.17	3.36	6	68.7
L	N	2.18	3.38	8	45.1
M	N	0.26	0.40	8	46.8
N	CONNECTION	2.37	3.67	15	65.3

GUN CLUB BUSINESS PARK

SANITARY SEWER ROUTING CALCULATIONS

From Node:	To Node:	Basins Added to System	Total Flow Flow (cfs)	Velocity (ft/s)	Required Pipe Size (in)	Minimum Slope* (%)	Maximum Slope* (%)	Percentage Full (%)
						(see note below)		
A	B	PA-02 (25%)	0.114	2.11	6	0.60	8.77	32.0
B	C	ASPEN PARK OFFSITE	3.125	4.18	15	0.40	2.58	58.6
C	D	PA-05 (75%)	3.207	4.21	15	0.40	2.58	59.6
E	F	PA-05 (25%)	0.114	2.11	6	0.60	8.77	32.0
F	H	PA-02 (25%)	0.183	2.03	8	0.40	5.97	30.5
G	H	PA-02 (15%)	0.068	2.09	6	0.90	8.77	22.2
I	J	PA-02 (15%)	0.036	2.02	6	1.40	8.77	14.6
D	J	PA-02 (20%)	3.235	4.22	15	0.40	2.58	59.9
H	K	PA-03 (20%)	0.342	2.38	6	0.40	8.77	68.7
K	M	PA-03 (60%)	0.378	2.47	8	0.40	5.97	45.1
J	L	PA-03 (20%)	3.360	4.25	15	0.40	2.58	61.4
L	N	PA-04 (50%)	3.378	4.26	15	0.40	2.58	61.6
M	N	PA-04 (50%)	0.403	2.51	8	0.40	5.97	46.8
N	CONNECTION	NODE L + NODE M	3.673	4.33	15	0.40	2.58	65.3

Node A - B 6" pipe

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.011
Channel Slope	0.120 ft/ft
Diameter	6.0 in
Discharge	0.11 cfs

Results	
Normal Depth	0.9 in
Flow Area	0.0 ft²
Wetted Perimeter	0.4 ft
Hydraulic Radius	0.6 in
Top Width	0.36 ft
Critical Depth	2.0 in
Percent Full	15.2 %
Critical Slope	0.005 ft/ft
Velocity	6.08 ft/s
Velocity Head	0.57 ft
Specific Energy	0.65 ft
Froude Number	4.690
Maximum Discharge	2.47 cfs
Discharge Full	2.30 cfs
Slope Full	0.000 ft/ft
Flow Type	Supercritical

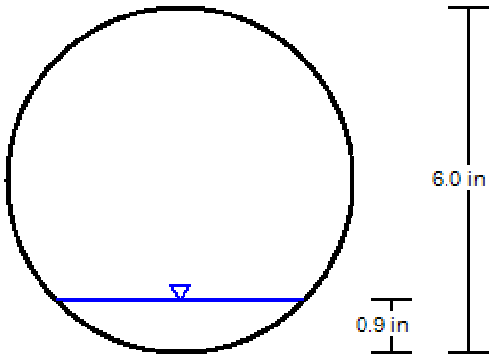
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

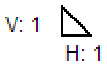
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	15.2 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.9 in
Critical Depth	2.0 in
Channel Slope	0.120 ft/ft
Critical Slope	0.005 ft/ft

Cross Section for Node A - B 6" pipe

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.011
Channel Slope	0.120 ft/ft
Normal Depth	0.9 in
Diameter	6.0 in
Discharge	0.11 cfs





Worksheet for Node B - C 15" pipe

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.011
Channel Slope	0.004 ft/ft
Diameter	15.0 in
Discharge	3.13 cfs

Results	
Normal Depth	8.8 in
Flow Area	0.7 ft²
Wetted Perimeter	2.2 ft
Hydraulic Radius	4.1 in
Top Width	1.23 ft
Critical Depth	8.5 in
Percent Full	58.6 %
Critical Slope	0.004 ft/ft
Velocity	4.18 ft/s
Velocity Head	0.27 ft
Specific Energy	1.00 ft
Froude Number	0.947
Maximum Discharge	5.19 cfs
Discharge Full	4.83 cfs
Slope Full	0.002 ft/ft
Flow Type	Subcritical

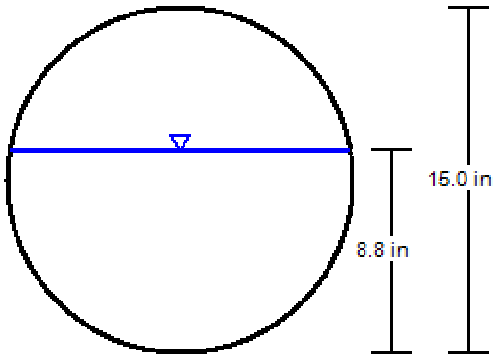
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	21.6 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	8.8 in
Critical Depth	8.5 in
Channel Slope	0.004 ft/ft
Critical Slope	0.004 ft/ft

Cross Section for Node B - C 15" pipe

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.011
Channel Slope	0.004 ft/ft
Normal Depth	8.8 in
Diameter	15.0 in
Discharge	3.13 cfs



V: 1
H: 1

Worksheet for Node C - D 15" pipe

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data		
Roughness Coefficient	0.011	
Channel Slope	0.004	ft/ft
Diameter	15.0	in
Discharge	3.21	cfs

Results		
Normal Depth	8.9	in
Flow Area	0.8	ft^2
Wetted Perimeter	2.2	ft
Hydraulic Radius	4.1	in
Top Width	1.23	ft
Critical Depth	8.7	in
Percent Full	59.6	%
Critical Slope	0.004	ft/ft
Velocity	4.21	ft/s
Velocity Head	0.28	ft
Specific Energy	1.02	ft
Froude Number	0.941	
Maximum Discharge	5.19	cfs
Discharge Full	4.83	cfs
Slope Full	0.002	ft/ft
Flow Type	Subcritical	

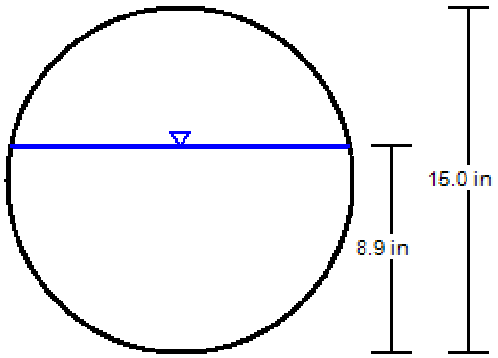
GVF Input Data		
Downstream Depth	0.0	in
Length	0.0	ft
Number Of Steps	0	

GVF Output Data		
Upstream Depth	0.0	in
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.0	%
Normal Depth Over Rise	21.8	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	8.9	in
Critical Depth	8.7	in
Channel Slope	0.004	ft/ft
Critical Slope	0.004	ft/ft

Cross Section for Node C - D 15" pipe

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.011
Channel Slope	0.004 ft/ft
Normal Depth	8.9 in
Diameter	15.0 in
Discharge	3.21 cfs



V: 1
H: 1

Worksheet for Node E - F 6" pipe

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data		
Roughness Coefficient	0.011	
Channel Slope	0.006	ft/ft
Diameter	6.0	in
Discharge	0.11	cfs

Results		
Normal Depth	1.9	in
Flow Area	0.1	ft^2
Wetted Perimeter	0.6	ft
Hydraulic Radius	1.1	in
Top Width	0.47	ft
Critical Depth	2.0	in
Percent Full	32.0	%
Critical Slope	0.005	ft/ft
Velocity	2.11	ft/s
Velocity Head	0.07	ft
Specific Energy	0.23	ft
Froude Number	1.090	
Maximum Discharge	0.55	cfs
Discharge Full	0.51	cfs
Slope Full	0.000	ft/ft
Flow Type	Supercritical	

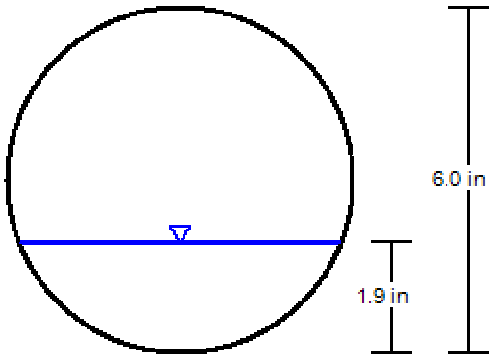
GVF Input Data		
Downstream Depth	0.0	in
Length	0.0	ft
Number Of Steps	0	

GVF Output Data		
Upstream Depth	0.0	in
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.0	%
Normal Depth Over Rise	32.0	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.9	in
Critical Depth	2.0	in
Channel Slope	0.006	ft/ft
Critical Slope	0.005	ft/ft

Cross Section for Node E - F 6" pipe

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.011
Channel Slope	0.006 ft/ft
Normal Depth	1.9 in
Diameter	6.0 in
Discharge	0.11 cfs



V: 1
H: 1

Worksheet for Node F - H 8" pipe

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.011
Channel Slope	0.004 ft/ft
Diameter	8.0 in
Discharge	0.18 cfs

Results	
Normal Depth	2.4 in
Flow Area	0.1 ft²
Wetted Perimeter	0.8 ft
Hydraulic Radius	1.4 in
Top Width	0.61 ft
Critical Depth	2.4 in
Percent Full	30.5 %
Critical Slope	0.005 ft/ft
Velocity	2.03 ft/s
Velocity Head	0.06 ft
Specific Energy	0.27 ft
Froude Number	0.932
Maximum Discharge	0.97 cfs
Discharge Full	0.90 cfs
Slope Full	0.000 ft/ft
Flow Type	Subcritical

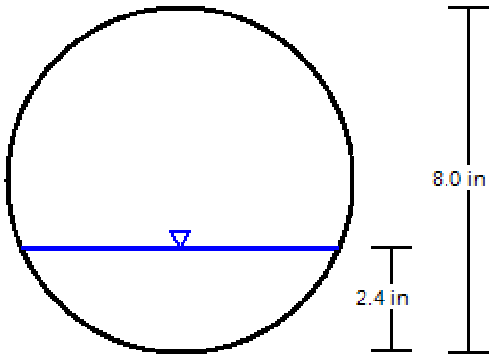
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

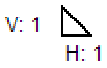
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	57.3 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	2.4 in
Critical Depth	2.4 in
Channel Slope	0.004 ft/ft
Critical Slope	0.005 ft/ft

Cross Section for Node F - H 8" pipe

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.011
Channel Slope	0.004 ft/ft
Normal Depth	2.4 in
Diameter	8.0 in
Discharge	0.18 cfs





Worksheet for Node G - H 6" pipe

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.011
Channel Slope	0.009 ft/ft
Diameter	6.0 in
Discharge	0.07 cfs

Results	
Normal Depth	1.3 in
Flow Area	0.0 ft²
Wetted Perimeter	0.5 ft
Hydraulic Radius	0.8 in
Top Width	0.42 ft
Critical Depth	1.5 in
Percent Full	22.2 %
Critical Slope	0.005 ft/ft
Velocity	2.09 ft/s
Velocity Head	0.07 ft
Specific Energy	0.18 ft
Froude Number	1.322
Maximum Discharge	0.68 cfs
Discharge Full	0.63 cfs
Slope Full	0.000 ft/ft
Flow Type	Supercritical

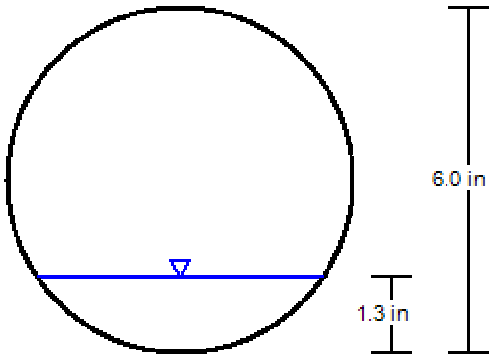
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	22.2 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	1.3 in
Critical Depth	1.5 in
Channel Slope	0.009 ft/ft
Critical Slope	0.005 ft/ft

Cross Section for Node G - H 6" pipe

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.011
Channel Slope	0.009 ft/ft
Normal Depth	1.3 in
Diameter	6.0 in
Discharge	0.07 cfs



V: 1
H: 1

Worksheet for Node I - J 6" pipe

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.011
Channel Slope	0.014 ft/ft
Diameter	6.0 in
Discharge	0.04 cfs

Results	
Normal Depth	0.9 in
Flow Area	0.0 ft²
Wetted Perimeter	0.4 ft
Hydraulic Radius	0.5 in
Top Width	0.35 ft
Critical Depth	1.1 in
Percent Full	14.6 %
Critical Slope	0.005 ft/ft
Velocity	2.02 ft/s
Velocity Head	0.06 ft
Specific Energy	0.14 ft
Froude Number	1.589
Maximum Discharge	0.84 cfs
Discharge Full	0.78 cfs
Slope Full	0.000 ft/ft
Flow Type	Supercritical

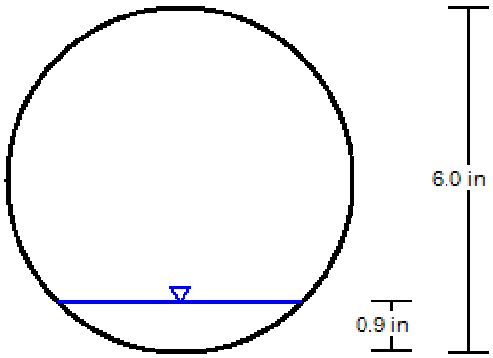
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

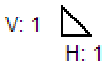
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	14.6 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.9 in
Critical Depth	1.1 in
Channel Slope	0.014 ft/ft
Critical Slope	0.005 ft/ft

Cross Section for Node I - J 6" pipe

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.011
Channel Slope	0.014 ft/ft
Normal Depth	0.9 in
Diameter	6.0 in
Discharge	0.04 cfs





Worksheet for Node D - J 15" pipe

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.011
Channel Slope	0.004 ft/ft
Diameter	15.0 in
Discharge	3.24 cfs

Results	
Normal Depth	9.0 in
Flow Area	0.8 ft²
Wetted Perimeter	2.2 ft
Hydraulic Radius	4.2 in
Top Width	1.23 ft
Critical Depth	8.7 in
Percent Full	59.9 %
Critical Slope	0.004 ft/ft
Velocity	4.22 ft/s
Velocity Head	0.28 ft
Specific Energy	1.03 ft
Froude Number	0.939
Maximum Discharge	5.19 cfs
Discharge Full	4.83 cfs
Slope Full	0.002 ft/ft
Flow Type	Subcritical

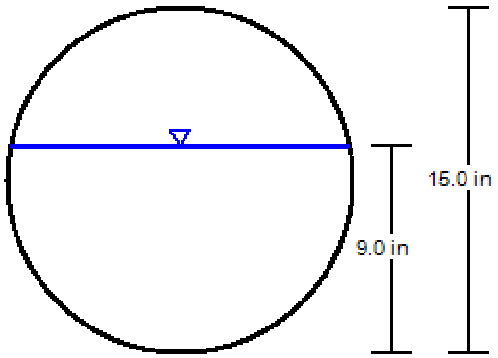
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	28.8 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	9.0 in
Critical Depth	8.7 in
Channel Slope	0.004 ft/ft
Critical Slope	0.004 ft/ft

Cross Section for Node D - J 15" pipe

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.011
Channel Slope	0.004 ft/ft
Normal Depth	9.0 in
Diameter	15.0 in
Discharge	3.24 cfs



V: 1
H: 1

Worksheet for Node H - K 6" pipe

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.011
Channel Slope	0.004 ft/ft
Diameter	6.0 in
Discharge	0.34 cfs

Results	
Normal Depth	4.1 in
Flow Area	0.1 ft²
Wetted Perimeter	1.0 ft
Hydraulic Radius	1.8 in
Top Width	0.46 ft
Critical Depth	3.6 in
Percent Full	68.7 %
Critical Slope	0.006 ft/ft
Velocity	2.38 ft/s
Velocity Head	0.09 ft
Specific Energy	0.43 ft
Froude Number	0.754
Maximum Discharge	0.45 cfs
Discharge Full	0.42 cfs
Slope Full	0.003 ft/ft
Flow Type	Subcritical

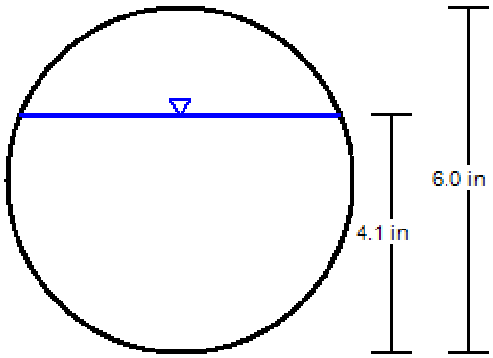
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	44.6 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	4.1 in
Critical Depth	3.6 in
Channel Slope	0.004 ft/ft
Critical Slope	0.006 ft/ft

Cross Section for Node H - K 6" pipe

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.011
Channel Slope	0.004 ft/ft
Normal Depth	4.1 in
Diameter	6.0 in
Discharge	0.34 cfs



V: 1
H: 1

Worksheet for Node K - M 8" pipe

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.011
Channel Slope	0.004 ft/ft
Diameter	8.0 in
Discharge	0.38 cfs

Results	
Normal Depth	3.6 in
Flow Area	0.2 ft²
Wetted Perimeter	1.0 ft
Hydraulic Radius	1.9 in
Top Width	0.66 ft
Critical Depth	3.4 in
Percent Full	45.1 %
Critical Slope	0.005 ft/ft
Velocity	2.47 ft/s
Velocity Head	0.10 ft
Specific Energy	0.40 ft
Froude Number	0.909
Maximum Discharge	0.97 cfs
Discharge Full	0.90 cfs
Slope Full	0.001 ft/ft
Flow Type	Subcritical

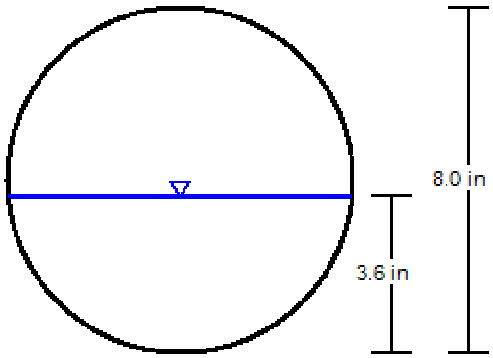
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	58.9 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	3.6 in
Critical Depth	3.4 in
Channel Slope	0.004 ft/ft
Critical Slope	0.005 ft/ft

Cross Section for Node K - M 8" pipe

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.011
Channel Slope	0.004 ft/ft
Normal Depth	3.6 in
Diameter	8.0 in
Discharge	0.38 cfs



V: 1
H: 1

Worksheet for Node J - L 15" pipe

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.011
Channel Slope	0.004 ft/ft
Diameter	15.0 in
Discharge	3.36 cfs

Results	
Normal Depth	9.2 in
Flow Area	0.8 ft²
Wetted Perimeter	2.3 ft
Hydraulic Radius	4.2 in
Top Width	1.22 ft
Critical Depth	8.9 in
Percent Full	61.4 %
Critical Slope	0.004 ft/ft
Velocity	4.25 ft/s
Velocity Head	0.28 ft
Specific Energy	1.05 ft
Froude Number	0.930
Maximum Discharge	5.19 cfs
Discharge Full	4.83 cfs
Slope Full	0.002 ft/ft
Flow Type	Subcritical

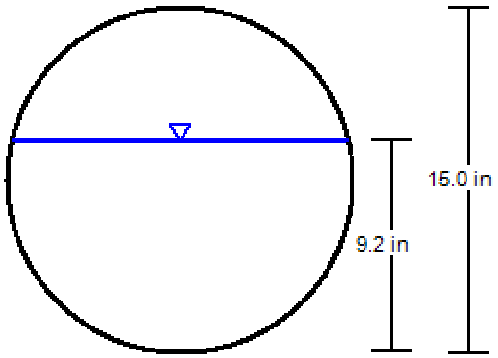
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

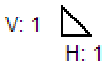
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	77.4 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	9.2 in
Critical Depth	8.9 in
Channel Slope	0.004 ft/ft
Critical Slope	0.004 ft/ft

Cross Section for Node J - L 15" pipe

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.011
Channel Slope	0.004 ft/ft
Normal Depth	9.2 in
Diameter	15.0 in
Discharge	3.36 cfs





Worksheet for Node L - N 15" pipe

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.011
Channel Slope	0.004 ft/ft
Diameter	15.0 in
Discharge	3.38 cfs

Results	
Normal Depth	9.2 in
Flow Area	0.8 ft²
Wetted Perimeter	2.3 ft
Hydraulic Radius	4.2 in
Top Width	1.22 ft
Critical Depth	8.9 in
Percent Full	61.6 %
Critical Slope	0.004 ft/ft
Velocity	4.26 ft/s
Velocity Head	0.28 ft
Specific Energy	1.05 ft
Froude Number	0.928
Maximum Discharge	5.19 cfs
Discharge Full	4.83 cfs
Slope Full	0.002 ft/ft
Flow Type	Subcritical

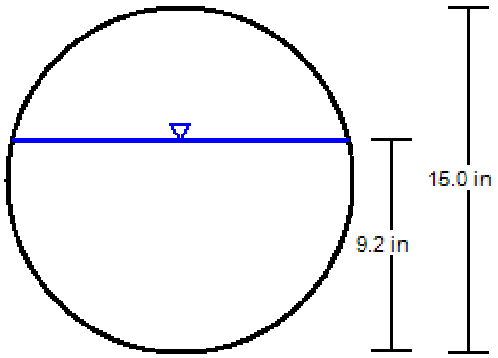
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	30.3 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	9.2 in
Critical Depth	8.9 in
Channel Slope	0.004 ft/ft
Critical Slope	0.004 ft/ft

Cross Section for Node L - N 15" pipe

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.011
Channel Slope	0.004 ft/ft
Normal Depth	9.2 in
Diameter	15.0 in
Discharge	3.38 cfs



V: 1
H: 1

Worksheet for Node M - N 8" pipe

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.011
Channel Slope	0.004 ft/ft
Diameter	8.0 in
Discharge	0.40 cfs

Results	
Normal Depth	3.7 in
Flow Area	0.2 ft²
Wetted Perimeter	1.0 ft
Hydraulic Radius	1.9 in
Top Width	0.67 ft
Critical Depth	3.5 in
Percent Full	46.8 %
Critical Slope	0.005 ft/ft
Velocity	2.51 ft/s
Velocity Head	0.10 ft
Specific Energy	0.41 ft
Froude Number	0.903
Maximum Discharge	0.97 cfs
Discharge Full	0.90 cfs
Slope Full	0.001 ft/ft
Flow Type	Subcritical

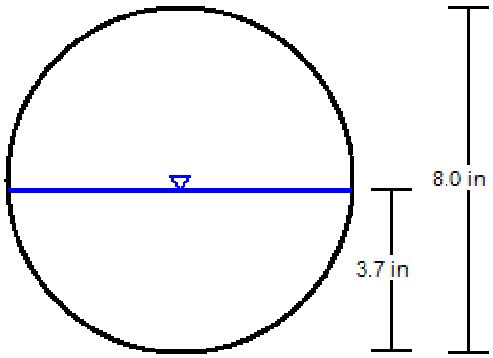
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	19.5 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	3.7 in
Critical Depth	3.5 in
Channel Slope	0.004 ft/ft
Critical Slope	0.005 ft/ft

Cross Section for Node M - N 8" pipe

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.011
Channel Slope	0.004 ft/ft
Normal Depth	3.7 in
Diameter	8.0 in
Discharge	0.40 cfs



V: 1
H: 1

Worksheet for Node N - CONNECTION 15" pipe

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.011
Channel Slope	0.004 ft/ft
Diameter	15.0 in
Discharge	3.67 cfs

Results	
Normal Depth	9.8 in
Flow Area	0.8 ft²
Wetted Perimeter	2.4 ft
Hydraulic Radius	4.3 in
Top Width	1.19 ft
Critical Depth	9.3 in
Percent Full	65.3 %
Critical Slope	0.005 ft/ft
Velocity	4.33 ft/s
Velocity Head	0.29 ft
Specific Energy	1.11 ft
Froude Number	0.904
Maximum Discharge	5.19 cfs
Discharge Full	4.83 cfs
Slope Full	0.002 ft/ft
Flow Type	Subcritical

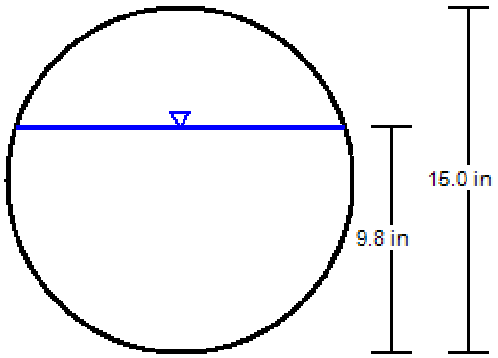
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	48.1 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	9.8 in
Critical Depth	9.3 in
Channel Slope	0.004 ft/ft
Critical Slope	0.005 ft/ft

Cross Section for Node N - CONNECTION 15" pipe

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.011
Channel Slope	0.004 ft/ft
Normal Depth	9.8 in
Diameter	15.0 in
Discharge	3.67 cfs



V: 1
H: 1

APPENDIX C
WATER DEMAND AND CAPACITY CALCUATIONS

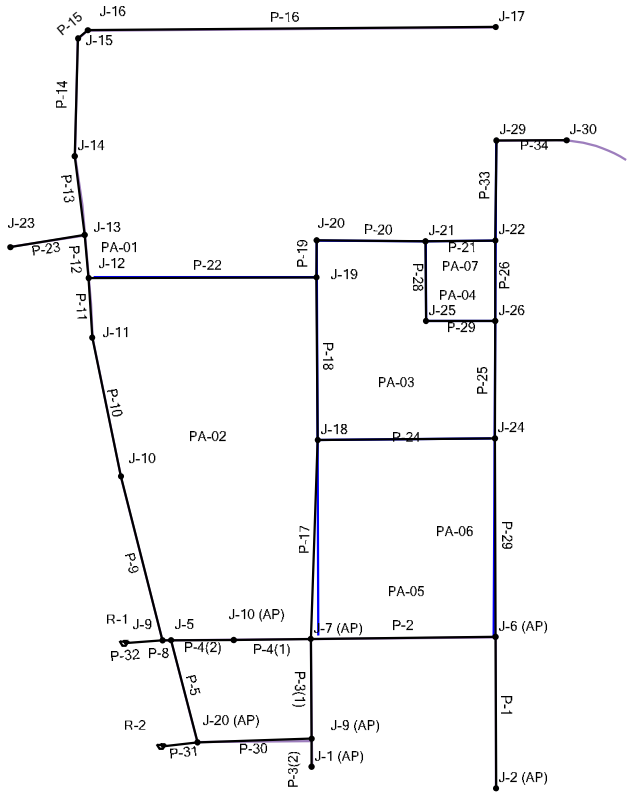
GUN CLUB BUSINESS PARK

WATER CALCULATIONS

Average & Maximum Demand Calculation

Type of Development	Planning Area	Water Model Node for Applied Demand	Total Acres	AVG DAY DEMAND (GPD/AC) Based On Land Use	AVG DAY DEMAND (GPD/AC)	AVG DAY DEMAND (GPM)	MAX DAY DEMAND (GPD/AC) Based On Land Use	MAX DAY DEMAND (GPD/AC)	MAX DAY DEMAND (GPM)	MAX HOUR DEMAND (GPD/AC) Based On Land Use	MAX HOUR DEMAND (GPD/AC)	MAX HOUR DEMAND (GPM))	REQUIRED FIRE FLOW (GPM)	MAX DAY DEMAND + FIRE FLOW (GPM)
DETENTION	PA-1		2.4	WATER DEMANDS NOT APPLICABLE TO DRAINAGE CHANNEL OR LAND ACQUISITION AREAS										
AIR-DIST (IND.)	PA-2		59.9	1,200	71,880	50	3,360	201,264	140	5,400	323,460	225	3500	3,640
MU-INDUSTRIAL	PA-3		23.7	1,200	28,440	20	3,360	79,632	55	5,400	127,980	89	3500	3,555
MU-COMM	PA-4		5.2	1,500	7,800	5	4,200	21,840	15	6,750	35,100	24	2500	2,515
AIR-DIST (IND.)	PA-5		19.7	1,200	23,640	16	3,360	66,192	46	5,400	106,380	74	3500	3,546
DETENTION	PA-6		7.1	WATER DEMANDS NOT APPLICABLE TO DRAINAGE CHANNEL OR LAND ACQUISITION AREAS										
DETENTION	PA-7		0.5											

CRIPPEN WATERCAD.wtg
Scenario: STATIC
Active Scenario: STATIC



CRIPPEN WATERCAD.wtg

FlexTable: Pipe Table

Active Scenario: STATIC

Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
P-1	874	J-2 (AP)	J-6 (AP)	12.0	PVC	150.0	0	0.00
P-2	1,067	J-6 (AP)	J-7 (AP)	12.0	PVC	150.0	0	0.00
P-5	609	J-5	J-20 (AP)	12.0	PVC	150.0	0	0.00
P-8	49	J-5	J-9	12.0	PVC	150.0	0	0.00
P-9	977	J-9	J-10	12.0	PVC	150.0	0	0.00
P-10	817	J-10	J-11	12.0	PVC	150.0	0	0.00
P-11	344	J-11	J-12	12.0	PVC	150.0	0	0.00
P-12	250	J-12	J-13	12.0	PVC	150.0	0	0.00
P-13	458	J-13	J-14	24.0	PVC	150.0	0	0.00
P-14	680	J-14	J-15	24.0	PVC	150.0	0	0.00
P-15	74	J-15	J-16	24.0	PVC	150.0	0	0.00
P-16	2,357	J-16	J-17	24.0	PVC	150.0	0	0.00
P-17	1,148	J-7 (AP)	J-18	12.0	PVC	150.0	0	0.00
P-18	939	J-18	J-19	12.0	PVC	150.0	0	0.00
P-19	213	J-19	J-20	12.0	PVC	150.0	0	0.00
P-20	629	J-20	J-21	12.0	PVC	150.0	0	0.00
P-21	403	J-21	J-22	12.0	PVC	150.0	0	0.00
P-22	1,317	J-19	J-12	12.0	PVC	150.0	0	0.00
P-23	435	J-13	J-23	24.0	PVC	150.0	0	0.00
P-24	1,024	J-18	J-24	12.0	PVC	150.0	0	0.00
P-28	460	J-21	J-25	12.0	PVC	150.0	0	0.00
P-25	677	J-24	J-26	12.0	PVC	150.0	0	0.00
P-26	464	J-26	J-22	12.0	PVC	150.0	0	0.00
P-29	400	J-25	J-26	12.0	PVC	150.0	0	0.00
P-29	1,145	J-6 (AP)	J-24	12.0	PVC	150.0	0	0.00
P-4(1)	446	J-7 (AP)	J-10 (AP)	12.0	PVC	150.0	0	0.00
P-4(2)	362	J-10 (AP)	J-5	12.0	PVC	150.0	0	0.00
P-3(1)	576	J-7 (AP)	J-9 (AP)	12.0	PVC	150.0	0	0.00
P-3(2)	161	J-9 (AP)	J-1 (AP)	12.0	PVC	150.0	0	0.00
P-30	660	J-20 (AP)	J-9 (AP)	12.0	PVC	150.0	0	0.00
P-31	211	R-2	J-20 (AP)	12.0	PVC	150.0	0	0.00
P-32	223	R-1	J-9	12.0	PVC	150.0	0	0.00
P-33	577	J-22	J-29	12.0	PVC	150.0	0	0.00
P-34	406	J-29	J-30	8.0	PVC	150.0	0	0.00

CRIPPEN WATERCAD.wtg
FlexTable: Junction Table
Active Scenario: STATIC

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-2 (AP)	5,682.45	0	5,850.00	72
J-6 (AP)	5,670.25	0	5,850.00	78
J-7 (AP)	5,686.28	0	5,850.00	71
J-1 (AP)	5,697.51	0	5,850.00	66
J-5	5,701.75	0	5,850.00	64
J-20 (AP)	5,701.94	0	5,850.00	64
J-9	5,703.18	0	5,850.00	64
J-10	5,695.43	0	5,850.00	67
J-11	5,687.75	0	5,850.00	70
J-12	5,677.00	0	5,850.00	75
J-13	5,671.34	0	5,850.00	77
J-14	5,658.71	0	5,850.00	83
J-15	5,633.04	0	5,850.00	94
J-16	5,633.87	0	5,850.00	94
J-17	5,634.16	0	5,850.00	93
J-18	5,670.48	0	5,850.00	78
J-19	5,677.49	0	5,850.00	75
J-20	5,668.90	0	5,850.00	78
J-21	5,656.02	0	5,850.00	84
J-22	5,645.44	0	5,850.00	89
J-23	5,681.10	0	5,850.00	73
J-24	5,653.33	0	5,850.00	85
J-25	5,661.66	0	5,850.00	81
J-26	5,650.42	0	5,850.00	86
J-10 (AP)	5,692.15	0	5,850.00	68
J-9 (AP)	5,691.90	0	5,850.00	68
J-29	5,638.38	0	5,850.00	92
J-30	5,633.85	0	5,850.00	94

CRIPPEN WATERCAD.wtg
FlexTable: Reservoir Table
Active Scenario: STATIC

ID	Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
102	R-1	5,850.00	0	5,850.00
103	R-2	5,850.00	0	5,850.00

CRIPPEN WATERCAD.wtg

FlexTable: Pipe Table

Active Scenario: AVG DAY DEMAND

Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
P-1	874	J-2 (AP)	J-6 (AP)	12.0	PVC	150.0	0	0.00
P-2	1,067	J-6 (AP)	J-7 (AP)	12.0	PVC	150.0	-16	0.05
P-5	609	J-5	J-20 (AP)	12.0	PVC	150.0	-15	0.04
P-8	49	J-5	J-9	12.0	PVC	150.0	-15	0.04
P-9	977	J-9	J-10	12.0	PVC	150.0	35	0.10
P-10	817	J-10	J-11	12.0	PVC	150.0	10	0.03
P-11	344	J-11	J-12	12.0	PVC	150.0	10	0.03
P-12	250	J-12	J-13	12.0	PVC	150.0	0	0.00
P-13	458	J-13	J-14	24.0	PVC	150.0	0	0.00
P-14	680	J-14	J-15	24.0	PVC	150.0	0	0.00
P-15	74	J-15	J-16	24.0	PVC	150.0	0	0.00
P-16	2,357	J-16	J-17	24.0	PVC	150.0	0	0.00
P-17	1,148	J-7 (AP)	J-18	12.0	PVC	150.0	24	0.07
P-18	939	J-18	J-19	12.0	PVC	150.0	-4	0.01
P-19	213	J-19	J-20	12.0	PVC	150.0	-4	0.01
P-20	629	J-20	J-21	12.0	PVC	150.0	-4	0.01
P-21	403	J-21	J-22	12.0	PVC	150.0	-2	0.01
P-22	1,317	J-19	J-12	12.0	PVC	150.0	-10	0.03
P-23	435	J-13	J-23	24.0	PVC	150.0	0	0.00
P-24	1,024	J-18	J-24	12.0	PVC	150.0	-7	0.02
P-28	460	J-21	J-25	12.0	PVC	150.0	-2	0.01
P-25	677	J-24	J-26	12.0	PVC	150.0	4	0.01
P-26	464	J-26	J-22	12.0	PVC	150.0	2	0.01
P-29	400	J-25	J-26	12.0	PVC	150.0	-2	0.01
P-29	1,145	J-6 (AP)	J-24	12.0	PVC	150.0	16	0.05
P-4(1)	446	J-7 (AP)	J-10 (AP)	12.0	PVC	150.0	-30	0.08
P-4(2)	362	J-10 (AP)	J-5	12.0	PVC	150.0	-30	0.08
P-3(1)	576	J-7 (AP)	J-9 (AP)	12.0	PVC	150.0	-26	0.08
P-3(2)	161	J-9 (AP)	J-1 (AP)	12.0	PVC	150.0	0	0.00
P-30	660	J-20 (AP)	J-9 (AP)	12.0	PVC	150.0	26	0.08
P-31	211	R-2	J-20 (AP)	12.0	PVC	150.0	42	0.12
P-32	223	R-1	J-9	12.0	PVC	150.0	49	0.14
P-33	577	J-22	J-29	12.0	PVC	150.0	0	0.00
P-34	406	J-29	J-30	8.0	PVC	150.0	0	0.00

CRIPPEN WATERCAD.wtg

FlexTable: Junction Table

Active Scenario: AVG DAY DEMAND

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-2 (AP)	5,682.45	0	5,850.00	72
J-6 (AP)	5,670.25	0	5,850.00	78
J-7 (AP)	5,686.28	16	5,850.00	71
J-1 (AP)	5,697.51	0	5,850.00	66
J-5	5,701.75	0	5,850.00	64
J-20 (AP)	5,701.94	0	5,850.00	64
J-9	5,703.18	0	5,850.00	64
J-10	5,695.43	25	5,849.99	67
J-11	5,687.75	0	5,849.99	70
J-12	5,677.00	0	5,849.99	75
J-13	5,671.34	0	5,849.99	77
J-14	5,658.71	0	5,849.99	83
J-15	5,633.04	0	5,849.99	94
J-16	5,633.87	0	5,849.99	94
J-17	5,634.16	0	5,849.99	93
J-18	5,670.48	35	5,849.99	78
J-19	5,677.49	10	5,849.99	75
J-20	5,668.90	0	5,849.99	78
J-21	5,656.02	0	5,849.99	84
J-22	5,645.44	0	5,849.99	89
J-23	5,681.10	0	5,849.99	73
J-24	5,653.33	5	5,849.99	85
J-25	5,661.66	0	5,849.99	81
J-26	5,650.42	0	5,849.99	86
J-10 (AP)	5,692.15	0	5,850.00	68
J-9 (AP)	5,691.90	0	5,850.00	68
J-29	5,638.38	0	5,849.99	92
J-30	5,633.85	0	5,849.99	94

CRIPPEN WATERCAD.wtg

FlexTable: Reservoir Table

Active Scenario: AVG DAY DEMAND

ID	Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
102	R-1	5,850.00	49	5,850.00
103	R-2	5,850.00	42	5,850.00

CRIPPEN WATERCAD.wtg

FlexTable: Pipe Table

Active Scenario: MAX DAY DEMAND

Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
P-1	874	J-2 (AP)	J-6 (AP)	12.0	PVC	150.0	0	0.00
P-2	1,067	J-6 (AP)	J-7 (AP)	12.0	PVC	150.0	-45	0.13
P-5	609	J-5	J-20 (AP)	12.0	PVC	150.0	-43	0.12
P-8	49	J-5	J-9	12.0	PVC	150.0	-41	0.12
P-9	977	J-9	J-10	12.0	PVC	150.0	97	0.28
P-10	817	J-10	J-11	12.0	PVC	150.0	27	0.08
P-11	344	J-11	J-12	12.0	PVC	150.0	27	0.08
P-12	250	J-12	J-13	12.0	PVC	150.0	0	0.00
P-13	458	J-13	J-14	24.0	PVC	150.0	0	0.00
P-14	680	J-14	J-15	24.0	PVC	150.0	0	0.00
P-15	74	J-15	J-16	24.0	PVC	150.0	0	0.00
P-16	2,357	J-16	J-17	24.0	PVC	150.0	0	0.00
P-17	1,148	J-7 (AP)	J-18	12.0	PVC	150.0	68	0.19
P-18	939	J-18	J-19	12.0	PVC	150.0	-7	0.02
P-19	213	J-19	J-20	12.0	PVC	150.0	-7	0.02
P-20	629	J-20	J-21	12.0	PVC	150.0	-7	0.02
P-21	403	J-21	J-22	12.0	PVC	150.0	-9	0.02
P-22	1,317	J-19	J-12	12.0	PVC	150.0	-27	0.08
P-23	435	J-13	J-23	24.0	PVC	150.0	0	0.00
P-24	1,024	J-18	J-24	12.0	PVC	150.0	-22	0.06
P-28	460	J-21	J-25	12.0	PVC	150.0	2	0.00
P-25	677	J-24	J-26	12.0	PVC	150.0	22	0.06
P-26	464	J-26	J-22	12.0	PVC	150.0	9	0.02
P-29	400	J-25	J-26	12.0	PVC	150.0	-13	0.04
P-29	1,145	J-6 (AP)	J-24	12.0	PVC	150.0	45	0.13
P-4(1)	446	J-7 (AP)	J-10 (AP)	12.0	PVC	150.0	-84	0.24
P-4(2)	362	J-10 (AP)	J-5	12.0	PVC	150.0	-84	0.24
P-3(1)	576	J-7 (AP)	J-9 (AP)	12.0	PVC	150.0	-75	0.21
P-3(2)	161	J-9 (AP)	J-1 (AP)	12.0	PVC	150.0	0	0.00
P-30	660	J-20 (AP)	J-9 (AP)	12.0	PVC	150.0	75	0.21
P-31	211	R-2	J-20 (AP)	12.0	PVC	150.0	118	0.33
P-32	223	R-1	J-9	12.0	PVC	150.0	138	0.39
P-33	577	J-22	J-29	12.0	PVC	150.0	0	0.00
P-34	406	J-29	J-30	8.0	PVC	150.0	0	0.00

CRIPPEN WATERCAD.wtg

FlexTable: Junction Table

Active Scenario: MAX DAY DEMAND

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-2 (AP)	5,682.45	0	5,849.97	72
J-6 (AP)	5,670.25	0	5,849.97	78
J-7 (AP)	5,686.28	46	5,849.97	71
J-1 (AP)	5,697.51	0	5,849.98	66
J-5	5,701.75	0	5,849.99	64
J-20 (AP)	5,701.94	0	5,849.99	64
J-9	5,703.18	0	5,849.99	64
J-10	5,695.43	70	5,849.96	67
J-11	5,687.75	0	5,849.96	70
J-12	5,677.00	0	5,849.96	75
J-13	5,671.34	0	5,849.96	77
J-14	5,658.71	0	5,849.96	83
J-15	5,633.04	0	5,849.96	94
J-16	5,633.87	0	5,849.96	93
J-17	5,634.16	0	5,849.96	93
J-18	5,670.48	97	5,849.96	78
J-19	5,677.49	28	5,849.96	75
J-20	5,668.90	0	5,849.96	78
J-21	5,656.02	0	5,849.96	84
J-22	5,645.44	0	5,849.96	88
J-23	5,681.10	0	5,849.96	73
J-24	5,653.33	0	5,849.96	85
J-25	5,661.66	15	5,849.96	81
J-26	5,650.42	0	5,849.96	86
J-10 (AP)	5,692.15	0	5,849.98	68
J-9 (AP)	5,691.90	0	5,849.98	68
J-29	5,638.38	0	5,849.96	92
J-30	5,633.85	0	5,849.96	93

CRIPPEN WATERCAD.wtg

FlexTable: Reservoir Table

Active Scenario: MAX DAY DEMAND

ID	Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
102	R-1	5,850.00	138	5,850.00
103	R-2	5,850.00	118	5,850.00

CRIPPEN WATERCAD.wtg

FlexTable: Pipe Table

Active Scenario: MAX HOUR

Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
P-1	874	J-2 (AP)	J-6 (AP)	12.0	PVC	150.0	0	0.00
P-2	1,067	J-6 (AP)	J-7 (AP)	12.0	PVC	150.0	-72	0.20
P-5	609	J-5	J-20 (AP)	12.0	PVC	150.0	-70	0.20
P-8	49	J-5	J-9	12.0	PVC	150.0	-66	0.19
P-9	977	J-9	J-10	12.0	PVC	150.0	157	0.44
P-10	817	J-10	J-11	12.0	PVC	150.0	44	0.12
P-11	344	J-11	J-12	12.0	PVC	150.0	44	0.12
P-12	250	J-12	J-13	12.0	PVC	150.0	0	0.00
P-13	458	J-13	J-14	24.0	PVC	150.0	0	0.00
P-14	680	J-14	J-15	24.0	PVC	150.0	0	0.00
P-15	74	J-15	J-16	24.0	PVC	150.0	0	0.00
P-16	2,357	J-16	J-17	24.0	PVC	150.0	0	0.00
P-17	1,148	J-7 (AP)	J-18	12.0	PVC	150.0	109	0.31
P-18	939	J-18	J-19	12.0	PVC	150.0	-11	0.03
P-19	213	J-19	J-20	12.0	PVC	150.0	-12	0.03
P-20	629	J-20	J-21	12.0	PVC	150.0	-12	0.03
P-21	403	J-21	J-22	12.0	PVC	150.0	-14	0.04
P-22	1,317	J-19	J-12	12.0	PVC	150.0	-44	0.12
P-23	435	J-13	J-23	24.0	PVC	150.0	0	0.00
P-24	1,024	J-18	J-24	12.0	PVC	150.0	-36	0.10
P-28	460	J-21	J-25	12.0	PVC	150.0	2	0.01
P-25	677	J-24	J-26	12.0	PVC	150.0	36	0.10
P-26	464	J-26	J-22	12.0	PVC	150.0	14	0.04
P-29	400	J-25	J-26	12.0	PVC	150.0	-22	0.06
P-29	1,145	J-6 (AP)	J-24	12.0	PVC	150.0	72	0.20
P-4(1)	446	J-7 (AP)	J-10 (AP)	12.0	PVC	150.0	-135	0.38
P-4(2)	362	J-10 (AP)	J-5	12.0	PVC	150.0	-135	0.38
P-3(1)	576	J-7 (AP)	J-9 (AP)	12.0	PVC	150.0	-120	0.34
P-3(2)	161	J-9 (AP)	J-1 (AP)	12.0	PVC	150.0	0	0.00
P-30	660	J-20 (AP)	J-9 (AP)	12.0	PVC	150.0	120	0.34
P-31	211	R-2	J-20 (AP)	12.0	PVC	150.0	190	0.54
P-32	223	R-1	J-9	12.0	PVC	150.0	222	0.63
P-33	577	J-22	J-29	12.0	PVC	150.0	0	0.00
P-34	406	J-29	J-30	8.0	PVC	150.0	0	0.00

CRIPPEN WATERCAD.wtg

FlexTable: Junction Table

Active Scenario: MAX HOUR

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-2 (AP)	5,682.45	0	5,849.92	72
J-6 (AP)	5,670.25	0	5,849.92	78
J-7 (AP)	5,686.28	74	5,849.93	71
J-1 (AP)	5,697.51	0	5,849.96	66
J-5	5,701.75	0	5,849.97	64
J-20 (AP)	5,701.94	0	5,849.98	64
J-9	5,703.18	0	5,849.97	64
J-10	5,695.43	113	5,849.91	67
J-11	5,687.75	0	5,849.91	70
J-12	5,677.00	0	5,849.90	75
J-13	5,671.34	0	5,849.90	77
J-14	5,658.71	0	5,849.90	83
J-15	5,633.04	0	5,849.90	94
J-16	5,633.87	0	5,849.90	93
J-17	5,634.16	0	5,849.90	93
J-18	5,670.48	156	5,849.90	78
J-19	5,677.49	45	5,849.90	75
J-20	5,668.90	0	5,849.90	78
J-21	5,656.02	0	5,849.90	84
J-22	5,645.44	0	5,849.90	88
J-23	5,681.10	0	5,849.90	73
J-24	5,653.33	0	5,849.90	85
J-25	5,661.66	24	5,849.90	81
J-26	5,650.42	0	5,849.90	86
J-10 (AP)	5,692.15	0	5,849.96	68
J-9 (AP)	5,691.90	0	5,849.96	68
J-29	5,638.38	0	5,849.90	92
J-30	5,633.85	0	5,849.90	93

CRIPPEN WATERCAD.wtg
FlexTable: Reservoir Table
Active Scenario: MAX HOUR

ID	Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
102	R-1	5,850.00	222	5,850.00
103	R-2	5,850.00	190	5,850.00

CRIPPEN WATERCAD.wtg

FlexTable: Pipe Table

Active Scenario: MAX DAY DEMAND + FIRE FLOW

Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
P-1	874	J-2 (AP)	J-6 (AP)	12.0	PVC	150.0	0	0.00
P-2	1,067	J-6 (AP)	J-7 (AP)	12.0	PVC	150.0	-109	0.31
P-5	609	J-5	J-20 (AP)	12.0	PVC	150.0	-893	2.53
P-8	49	J-5	J-9	12.0	PVC	150.0	1,145	3.25
P-9	977	J-9	J-10	12.0	PVC	150.0	-128	0.36
P-10	817	J-10	J-11	12.0	PVC	150.0	-128	0.36
P-11	344	J-11	J-12	12.0	PVC	150.0	-128	0.36
P-12	250	J-12	J-13	12.0	PVC	150.0	0	0.00
P-13	458	J-13	J-14	24.0	PVC	150.0	0	0.00
P-14	680	J-14	J-15	24.0	PVC	150.0	0	0.00
P-15	74	J-15	J-16	24.0	PVC	150.0	0	0.00
P-16	2,357	J-16	J-17	24.0	PVC	150.0	0	0.00
P-17	1,148	J-7 (AP)	J-18	12.0	PVC	150.0	159	0.45
P-18	939	J-18	J-19	12.0	PVC	150.0	92	0.26
P-19	213	J-19	J-20	12.0	PVC	150.0	-63	0.18
P-20	629	J-20	J-21	12.0	PVC	150.0	-63	0.18
P-21	403	J-21	J-22	12.0	PVC	150.0	-35	0.10
P-22	1,317	J-19	J-12	12.0	PVC	150.0	128	0.36
P-23	435	J-13	J-23	24.0	PVC	150.0	0	0.00
P-24	1,024	J-18	J-24	12.0	PVC	150.0	-30	0.09
P-28	460	J-21	J-25	12.0	PVC	150.0	-28	0.08
P-25	677	J-24	J-26	12.0	PVC	150.0	78	0.22
P-26	464	J-26	J-22	12.0	PVC	150.0	35	0.10
P-29	400	J-25	J-26	12.0	PVC	150.0	-43	0.12
P-29	1,145	J-6 (AP)	J-24	12.0	PVC	150.0	109	0.31
P-4(1)	446	J-7 (AP)	J-10 (AP)	12.0	PVC	150.0	252	0.72
P-4(2)	362	J-10 (AP)	J-5	12.0	PVC	150.0	252	0.72
P-3(1)	576	J-7 (AP)	J-9 (AP)	12.0	PVC	150.0	-566	1.61
P-3(2)	161	J-9 (AP)	J-1 (AP)	12.0	PVC	150.0	0	0.00
P-30	660	J-20 (AP)	J-9 (AP)	12.0	PVC	150.0	566	1.61
P-31	211	R-2	J-20 (AP)	12.0	PVC	150.0	1,459	4.14
P-32	223	R-1	J-9	12.0	PVC	150.0	2,226	6.32
P-33	577	J-22	J-29	12.0	PVC	150.0	0	0.00
P-34	406	J-29	J-30	8.0	PVC	150.0	0	0.00

CRIPPEN WATERCAD.wtg

FlexTable: Junction Table

Active Scenario: MAX DAY DEMAND + FIRE FLOW

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-2 (AP)	5,682.45	0	5,848.30	72
J-6 (AP)	5,670.25	0	5,848.30	77
J-7 (AP)	5,686.28	46	5,848.34	70
J-1 (AP)	5,697.51	0	5,848.73	65
J-5	5,701.75	0	5,848.21	63
J-20 (AP)	5,701.94	0	5,849.17	64
J-9	5,703.18	3,500	5,848.09	63
J-10	5,695.43	0	5,848.13	66
J-11	5,687.75	0	5,848.17	69
J-12	5,677.00	0	5,848.18	74
J-13	5,671.34	0	5,848.18	77
J-14	5,658.71	0	5,848.18	82
J-15	5,633.04	0	5,848.18	93
J-16	5,633.87	0	5,848.18	93
J-17	5,634.16	0	5,848.18	93
J-18	5,670.48	97	5,848.26	77
J-19	5,677.49	27	5,848.24	74
J-20	5,668.90	0	5,848.24	78
J-21	5,656.02	0	5,848.25	83
J-22	5,645.44	0	5,848.25	88
J-23	5,681.10	0	5,848.18	72
J-24	5,653.33	0	5,848.27	84
J-25	5,661.66	15	5,848.25	81
J-26	5,650.42	0	5,848.25	86
J-10 (AP)	5,692.15	0	5,848.27	68
J-9 (AP)	5,691.90	0	5,848.73	68
J-29	5,638.38	0	5,848.25	91
J-30	5,633.85	0	5,848.25	93

CRIPPEN WATERCAD.wtg

FlexTable: Reservoir Table

Active Scenario: MAX DAY DEMAND + FIRE FLOW

ID	Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
102	R-1	5,850.00	2,226	5,850.00
103	R-2	5,850.00	1,459	5,850.00

APPENDIX D
OVERALL MASTER UTILITY MAPS