![OWN logo]

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November 2023

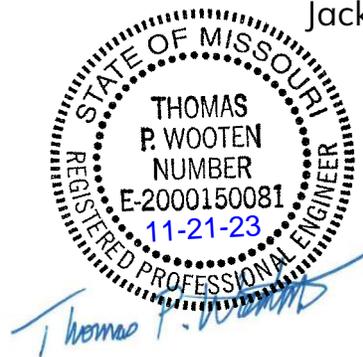# Water Service Demand Report

Client

Townsend Summit, LLC
230 Shilling Court, Suite 120
Hunt Valley, Maryland 21031

Project

Summit Technology Campus
Summit Orchards North
Jackson County, MO

STATE OF MISSOURI
THOMAS P. WOOTEN
NUMBER E-2000150081
REGISTERED PROFESSIONAL ENGINEER
11-21-23

P.N. 23CO10012

Report Prepared By:

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Introduction

This report details the preliminary design of the potable water system to support the Summit Orchards North Preliminary Development Plan (PDP), a mixed-use development, at the Summit Technology Campus (STC) located in Lee's Summit, Missouri. See Figure 1 for a site location map.

Project Description

The Summit Technology Campus is located southeast of the Interstate-470/SW Blue Parkway interchange. The entire development covers approximately 367 acres, and is bordered to the south by Chipman Road, to the north by I-470, to the west by Blue Parkway, and to the east by the Union Pacific Railroad. The Summit Technology Campus is split by Ward Road which was opened to traffic in October 2008.

Townsend Summit LLC proposes improvements to the existing Summit Technology Campus, including the addition of a variety of mixed business commercial and residential uses along Ward Road. In this report, the site for these improvements will be referred to as Summit Orchards North. The current proposed building layout for these lots can be found in the PDP.

Existing Water System

There is an existing 12-inch waterline on the south side of Ward Road, and an 8-inch waterline looped around Innovation Parkway and Tudor Road, connected to the Ward Road 12-inch line.

Proposed Water System

Lots 1A-1, 1A-2, 1B-2 and 1B-3 have frontage along Ward Road, with direct access to the 12-inch main. An 8-inch waterline loop is proposed to serve Lot 1B-3, and will likely be utilized to serve Lots 1B-2 and 1B-3. The proposed 8-inch loop will connect to the existing 12-inch line just east of Missouri Drive, run north across Ward Road and across Lot 1B-2, then turn easterly near the rear of Lot 1B-2, extending east along the south edge of Lot 1B-1, continuing east behind the Holiday Inn to tie into the existing 8-inch line on Innovation Parkway immediately east of the Holiday Inn.

All water facilities will be constructed in accordance with MoDNR and Lee's Summit standards and specifications.

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Design and Methodology

The water system has been modeled and calibrated utilizing the WaterCAD Water Distribution Modeling Software by Haestad Methods, Inc. The model simulates the 12-inch waterline on Ward Road based on information previously provided by the City of Lee's Summit, and the 8-inch loop on Innovation Parkway and Tudor Road based on the previous design model.

The original model used in the 2015 Water Service Demand Report which addressed the initial phase of the proposed development was used as a basis for an updated model that now includes the additional proposed developments.

The maximum daily demand was calculated by increasing the average daily demand by a factor of 2.4. Similarly, the peak hour demand was calculated by multiplying the maximum daily demand by 2.

The required fire flow for commercial areas in Lee's Summit is 1500 gpm while maintaining 20 psi in the water system. Demand for the calibrated system was then analyzed for the peak hour demand combined with fire flow conditions.

Based on the modeling, the existing 12" line along Ward Road, along with the proposed 8" waterline loop between Ward Road and Innovation Parkway will be sufficient to provide both domestic and fire demand for this development. The ability of the water lines to handle this level of demand is significantly enhanced by the presence of the connection to the existing 20" line on Chipman Road. Details of the hydraulic modeling are discussed below.

Details of Additional Hydraulic Modeling:

As noted above, the results of the hydraulic model developed in the 2015 Water Service Demand Report were used as the basis for the additional modeling for the proposed additions. A complete copy of this Report is included as an attachment to this current report and should be referred to as needed. In particular, refer to the WaterCAD Schematic Map shown on page 7 pf the report which identifies the junction numbers and pipe numbers utilized in the original model. These junction and pipe identifications and locations have been retained in the current updated model.

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Unfortunately, while the original report contained detailed junction data (demands and elevations), it did not include any information on the exact lengths of pipes in the original model. Therefore, it was necessary to recreate these elements of the model, using Google Earth aerial photography.

Once this was done, the following steps were taken, in creating the updated model, and the results of these steps are displayed in a series of Tables 1 through 5 that are also attached to this report.

Table 1: This table lists the details for all the junctions, pipes, and the initial assumed HGL's in the recreation of the 2015 model.

Table 2: Once the model was recreated a comparison was made of the pressures calculated at the various junctions when a 1,500 gpm fire flow was assigned between the results as published in the original 2015 report and the present recreation of the 2015 model. As can be seen, while there was not an exact agreement of calculated pressures at every junction, the variances were quite small, generally less than a one psi difference. This indicates a high degree of correlation between the original model and the recreation. Note that as in the original model, in the recreated model all calculated pressures at points of assigned fire flows are in excess of 70 psi.

Table 3: As the next step, additional peak hour domestic demands were developed for the proposed developments in the new phase. These additional demands totaled 229.5 gpm, compared to the original 2015 model total domestic peak hour demand of 457.5 gpm, or a 50% increase.

Table 4: As the next step, additions were made to the original model by adding three additional junctions (17,18, and 19) and three additional pipes (20, 21, and 22). Also, the existing pipe 9 was split into two sections, 9(1) and 9(2).

Pipe 20 is an 8" line extended from the existing junction 15 north and west to the new junction 17. Domestic demands for the proposed developments of Lot 1B-1, 1B-2, and 1B-3 were assigned to this new junction. Pipe 21 is a further 8" extension north and west to a new junction 18, and then pipe 22 is a final 8" extension south and west to tie into the existing junction 9 located on the 12" line on Ward Road. Thus the new 8" pipes create an additional 8" loop in the interior of the development. At the split of existing pipe 9 the a new junction 19 was created, and the domestic demands from the proposed developments on Lot 1A-1 and 1A-2 were assigned to this junction.

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Table 5: Once the additions were made to the recreated model, then hydraulic calculations were made to assess the impact of the proposed additional domestic demands and the additional possible fire demands. Results of these calculations are shown in the table,

As to the domestic demands, there was only a very slight lowering of pressures, with an average of about 0.6 psi. All calculated pressures for domestic demands are greater than 75 psi.

As to pressures at the various points of 1,500 gpm fire flows, there is very little change caused by the proposed additions. While some pressures are lowered slightly by less than one psi, some pressures are increased by up to one psi. This reflects the benefit resulting from the additional proposed 8" interior loop. Again, all pressures at fire flow points are greater than 70 psi.
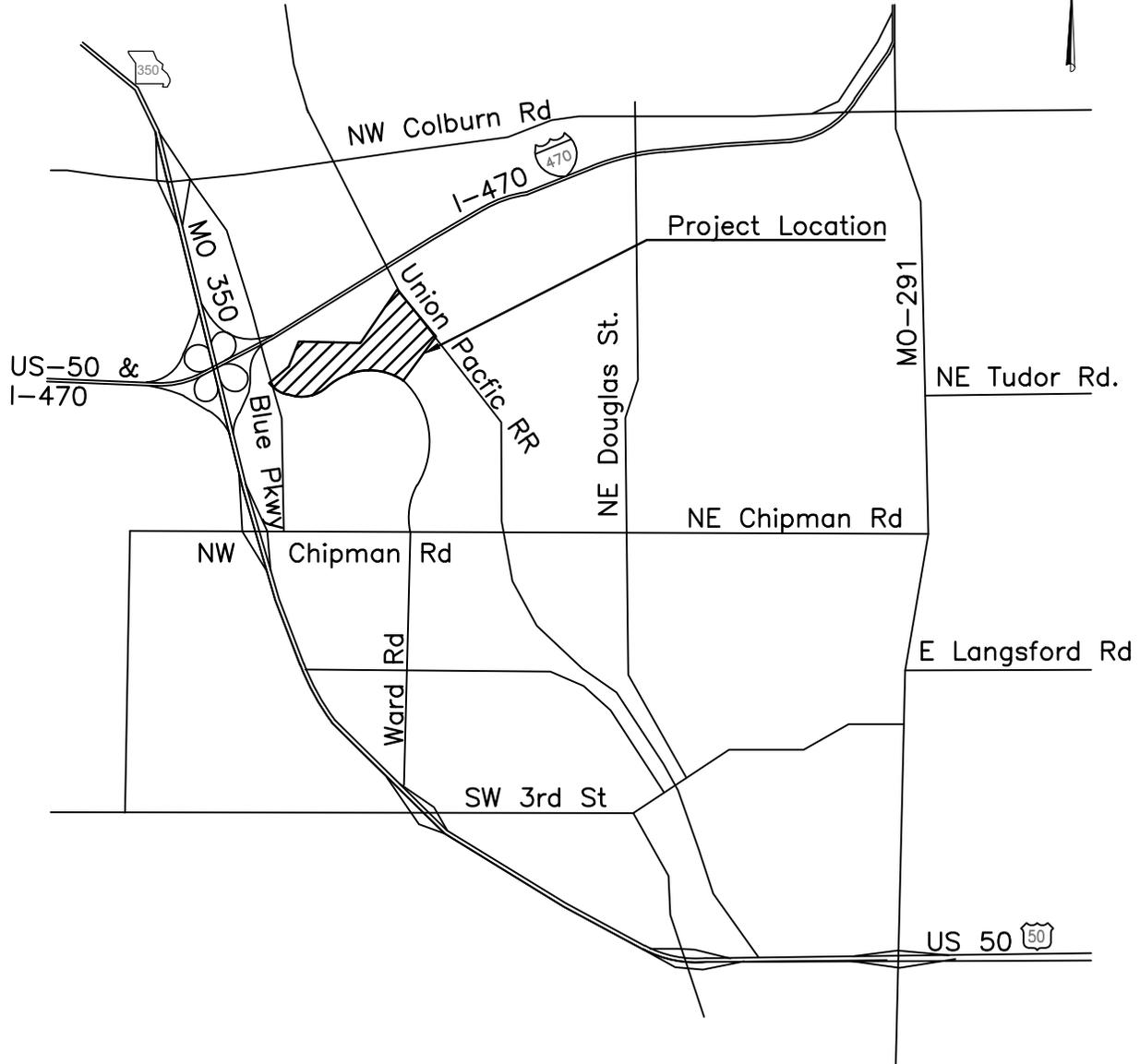
SITE LOCATION MAP

MO 350

NW Colburn Rd

I-470

Project Location

Union Pacific RR

US-50 & I-470

Blue Pkwy

NE Douglas St.

MO-291

NE Tudor Rd.

NE Chipman Rd

NW Chipman Rd

Ward Rd

E Langsford Rd

SW 3rd St

US 50

TOWNSEND - SUMMIT ORCHARDS NORTH PDP

1201 & 1151 NW WARD RD.,
LEE'S SUMMIT, MO

DRAWN BY:
CVM
DATE:
11-15-2023

SUMMIT ORCHARDS NORTH PDP
TABLE NO. 1
RECREATION OF 2015 WATERCAD MODEL

	Junctions				Pipes			
Number	Elevation (MSL)	Demands (gpm)		Number	J From	J To	Dia	Length
		Peak Dome	Fire Flow					
1	1000	0		1	1	2	11.538	530
2	1006	67	1500	2	2	3	11.538	520
3	1003	0		3	3	4	11.538	500
4	990	40	1500	4	4	5	11.538	300
5	980	0		5	5	6	11.538	310
6	970	40	1500	6	6	7	11.538	730
7	978	0		7	7	8	11.538	500
8	977	0		8	8	9	11.538	640
9	980	0		9	9	10	11.538	900
10	980	0		10	5	11	7.803	620
11	980	0		11	11	12	7.803	320
12	980	146.4	1500	12	12	13	7.803	340
13	980	16.5	1500	13	13	14	7.803	430
14	980	60	1500	14	14	15	7.803	260
15	980	52	1500	16	T1	1	**20**	183 (Fictious)
16	980	35.6	1500	17	T2	10	**20**	28500 (Fictious)
	Total =	457.5		18	15	16	7.803	130
				19	7	16	7.803	270

All Pipe C-Values = 140

20" Line on Chipman at J-1   Assumed HGL, T1 = 1181
12" Line on Blue Parkway at J-10   Assumed HGL, T2 = 1165

Hydrant near J-1
Elevation   1000
Static   78.33   1180.786
Flow   18290.3
Residual   75.19
Delta P   3.14   DP = K x Q^1.85   K =DP/Q^1.85   3.14   76755328.3   20"
                                                                          4.0909E-08   183'
                                                                                         C = 140

Hydrant near J-10
Elevation   980
Static   80.17   1165.032
Flow   3212.7
Residual   60.62
Delta P   19.55   DP = K x Q^1.85   K =DP/Q^1.85   19.55 3074042.17   20"
                                                                          6.3597E-06   28,500'
                                                                                         C = 140

FIND PRESSURE LOSS FOR A GIVEN FLOW
        20 = PIPE DIAMETER (INCHES)
     28500 = PIPE LENGTH (FEET)
       140 = HAZEN WILLIAMS C VALUE
    3212.7 = FLOW IN GPM
  6.36E-06 = K FACTOR
    19.559 = PRESSURE LOSS (PSI)
    45.141 = PRESSURE LOSS (FEET OF HEAD)

SUMMIT ORCHARDS NORTH PDP
TABLE NO. 2
RECREATION OF 2015 WATERCAD MODEL
COMPARISON OF CALCULATED PRESSURES - ORIGINAL 2015 MODEL VERSUS RECREATION
FIRE FLOWS OF 1500 GPM ASSUMED AT VARIOUS JUNCTIONS

Junction	Calculated Pressure Assumed Fire Flow @ 1500 gpm		
	Original	Recreation	Difference
2	71.2	73.7	2.5
4	75.9	76.8	0.9
6	84.3	84.3	0.0
12	75.5	74.8	-0.7
13	74.6	73.7	-0.9
14	75.5	74.9	-0.6
15	76.4	76.1	-0.3
16	77.7	76.9	-0.8
		Avg =	0.0

Methodology:
Fire flows at junctions are assumed to replace peak demands, peak demands at other junctions
are assumed to remain at original levels.

SUMMIT ORCHARDS NORTH PDP
TABLE NO. 3
ADDITIONAL 2023 WATER DEMAND CALCULATIONS

Average Gallons per Day Estimates
Lot 1A-1, 35,000 sq ft dealership
      200 gpd per 1,000 sq ft = 200 x 35,000 / 1,000 = 7,000 gpd
Lot 1A-2, 35,000 sq ft dealership
      200 gpd per 1,000 sq ft = 200 x 35,000 / 1,000 = 7,000 gpd
Lot 1B-1, Apartments
      Bldg #1, 240 units x 3 persons/unit x 50 gpd per person (apt.) = 36,000 gpd
      Bldg #2, 50 units x 3 persons/unit x 50 gpd per person (apt.) = 7,500 gpd
      Bldg #3, 60 units x 3 persons/unit x 50 gpd per person (apt.) = 9,000 gpd
      Total Lot 1B-1 = 52,500 gpd
Lot 1B-2, General Commercial 8,400 sq ft
      200 gpd per 1,000 sq ft = 200 x 8,400 / 1,000 = 1,680 gpd
Lot 1B-3, General Commercial 3,300 sq ft
      200 gpd per 1,000 sq ft = 200 x 3,300 / 1,000 = 660 gpd

Maximum Daily Demand = Average Daily Demand x 2.4 (gpd)
Peak Hour Demand = Maximum Daily Demand x 2.0 / 1,440 (gpm)

Estimated Peak Hour Demand

Lot	Junction	Avg Day (gpm)	Max Day (gpd)	Peak Hour (gpm)
1A-1	19	7,000	16,800	23.3
1A-2	19	7,000	16,800	23.3
1B-1	17	52,500	126,000	175.0
1B-2	17	1,680	4,032	5.6
1B-3	17	660	1,584	2.2
			Total Additional 2023 Load =	229.5
			Original 2015 Load =	457.5
			New Total Load =	687.0

SUMMIT ORCHARDS NORTH PDP
TABLE NO. 4
CHANGES TO 2015 MODEL TO REFLECT PROPOSED 2023 DEVELOPMENT

	Junctions				Pipes			
Number	Elevation (MSL)	Demands (gpm)		Number	J From	J To	Dia	Length
		Peak Dome	Fire Flow					
1	1000	0		1	1	2	11.538	530
2	1006	67	1500	2	2	3	11.538	520
3	1003	0		3	3	4	11.538	500
4	990	40	1500	4	4	5	11.538	300
5	980	0		5	5	6	11.538	310
6	970	40	1500	6	6	7	11.538	730
7	978	0		7	7	8	11.538	500
8	977	0		8	8	9	11.538	640
9	980	0		**9(1)**	**9**	**19**	**11.538**	**450**
10	980	0		**9(2)**	**10**	**19**	**11.538**	**450**
11	980	0		10	5	11	7.803	620
12	980	146.4	1500	11	11	12	7.803	320
13	980	16.5	1500	12	12	13	7.803	340
14	980	60	1500	13	13	14	7.803	430
15	980	52	1500	14	14	15	7.803	260
16	980	35.6	1500	16	R1	1	**20**	183 (Fictious)
17	**970**	**182.9**	**1500**	17	R2	10	**20**	28500 (Fictious)
18	**975**	**0**	**0**	18	15	16	7.803	130
19	**980**	**46.6**	**1500**	19	7	16	7.803	270
		687		**20**	**15**	**17**	**7.803**	**780**
				21	**17**	**18**	**7.803**	**380**
				22	**9**	**18**	**7.803**	**350**

Data shown in **BOLD** are additions to original 2015 Network

20" Line on Chipman at J-1   Assumed HGL, T1 = 1181
12" Line on Blue Parkway at J-10   Assumed HGL, T2 = 1165

SUMMIT ORCHARDS NORTH PDP
TABLE NO. 5
CHANGES TO CALCULATED PRESSURES - 2015 RECREATION VERSUS 2023 PROPOSED ADDITIONS

Junction	Calculated Pressure Domestic Peak Flows		
	2015 Recreation	2023 Additions	Difference
1	78.3	78.3	0.0
2	75.6	75.4	-0.2
3	76.8	76.5	-0.3
4	82.3	81.8	-0.5
5	86.6	86.0	-0.6
6	90.9	90.3	-0.6
7	87.4	86.7	-0.7
8	87.8	87.1	-0.7
9	86.5	85.8	-0.7
10	86.5	85.8	-0.7
11	86.4	85.8	-0.6
12	86.4	85.7	-0.7
13	86.4	85.7	-0.7
14	86.4	85.7	-0.7
15	86.4	85.7	-0.7
16	86.4	85.7	-0.7
17	N/A	90.0	N/A
18	N/A	87.9	N/A
19	N/A	85.8	N/A
		Avg =	-0.6

Junction	Calculated Pressure Assumed Fire Flow @ 1500 gpm		
	2015 Recreation	2023 Additions	Difference
2	73.7	73.2	-0.5
4	76.8	75.9	-0.9
6	84.3	84.0	-0.3
12	74.8	75.1	0.3
13	73.7	74.1	0.4
14	74.9	75.7	0.8
15	76.1	77.2	1.1
16	76.9	77.5	0.6
17	N/A	80.3	N/A
19	N/A	79.2	N/A
		Avg =	0.2

Additional Calculation

Additional Fire Calculation for proposed new hotel on Ward Road directly across from the existing Holiday Inn.

The closest junction is Junction 7.

Assume all new domestic demand from proposed 2023 development is also in place.

An assumed fire flow of 2,000 gpm results in a calculated pressure of 73.5 psi.

As assumed fire flow of 4,000 gpm results in a calculated pressure of 60.8 psi.

WATER SERVICE DEMAND REPORT

City of Lee's Summit

Jackson County, Missouri

Summit Technology Campus
Summit Innovation Center

March, 2015

I certify that this report was prepared by me or under my direct supervision, and that I am a duly registered Professional Engineer under the law of the State of Missouri.
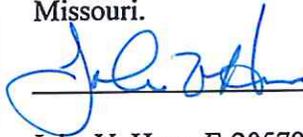
John V. Huss, E-20579
Expiration 12.31.2015

3/18/2015

Date

State of Missouri Registered Professional Engineer seal: JOHN V. HUSS, NUMBER E-20579

3/18/2015

Prepared by:

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THHinc

. . . . *about the possibilities*

Introduction

This report details the preliminary design of the potable water system to support the Summit Innovation Center Preliminary Development Plan (PDP), a mixed-use development, at the Summit Technology Campus (STC) located in Lee's Summit, Missouri. See Figure 1 for a site location map.

Project Description

The Summit Technology Campus is located southeast of the Interstate-470/State Highway 50 interchange. The entire development covers approximately 367 acres, and is bordered to the south by Chipman Road, to the north by I-470, to the west by Blue Parkway, and to the east by the Union Pacific Railroad. The Summit Technology Campus is split by Ward Road which was opened to traffic in October 2008.

Townsend Capital LLC proposes improvements to the existing Summit Technology Campus, including the addition of a variety of mixed business commercial and residential uses along Ward Road. In this report, the site for these improvements will be referred to as the "35 Acre Tract." The current proposed building layout for the 35 Acre Tract can be found in the PDP.

Existing Water System

There are several existing waterlines on Chipman Road. These include a 20 inch, 12 inch, 10 inch and a 6 inch water line. There are 8 inch and 12 inch waterlines that extend from Chipman Road to Ward Road on Old Blue Parkway. There is also a 12 inch waterline running on the east side of Blue Parkway, north to Ward Road, and then west on Ward Road.

Proposed Water Facilities:

To support this development, we proposed to construct a new 12 inch water line from the existing 20 inch water line on Chipman Road, just east of Outerview Drive to the southeast corner of Southwest Blue parkway and Ward Road. The 12 inch waterline will parallel the west side of Ward Road approximately 4,850 feet to the proposed tie in at the existing 12 inch waterline at SW Blue Parkway. To serve the buildings in Summit Innovation center we propose an 8 inch waterline loop along Innovation parkway and Tudor Road to and from the 12" waterline. Figure 2 depicts a schematic layout of the proposed water systems and tie in points.

All water facilities will be constructed in accordance with MoDNR and Lee's Summit standards and specifications.

Design and Methodology:

The water system has been modeled and calibrated utilizing the WaterCad Water Distribution Modeling Software by Haestad Methods, Inc. The model simulates the connection point to the existing 20 inch waterline on Chipman Road and the 12 inch waterline at Ward Road and the STC site.

Flow test data and model information provided by the City of Lee's Summit was used to calibrate the system model. A tank was placed with a hydraulic grade line equal to the measured static conditions for the given fire hydrants. The system was calibrated for friction losses and demands between the supply tank and the connection point by placing fictitious demands on the fire hydrants where data was taken, then adjusting to match the residual pressures measured during testing.

Table 1: Hydrant flow data from the City of Lee's Summit

Hydrant No.	Location	Static	Residual	Flow at Residual
689	Near intersection of Chipman Rd & Outer View Rd	78.33 psi	75.19 psi	18,290.33 gpm
6238	Near intersection of Chipman Rd & Blue Pkwy	68.42 psi	63.31 psi	8,943.13 gpm
6240	NE Corner of Northern Xing & Blue Pkwy	74.97 psi	54.56 psi	2,819.79 gpm
6242	SE Corner of Blue Pkwy & Ward Rd	80.17 psi	60.62 psi	3,212.70 gpm

Results of Analysis:

To calculate average daily water demand, the City of Lee's Summit assumes 100-GPD per employee for commercial and industrial uses. However, the number of employees is unknown for this development. For the 90 room hotel located on Lot 2 we used MoDNR estimation method of 50-GPD per guest. We assumed 3 guests per hotel room. The average daily demand for the remaining commercial properties was assumed to be 200 gallons per day per 1000 square feet of building space.

The maximum daily demand was calculated by increasing the average daily demand by a factor of 2.4. Similarly the peak hour demand was calculated by multiplying the maximum daily demand by 2.

The required fire flow for commercial areas in Lee's Summit is 1500 gpm while maintaining 20 psi in the water system. Demand for the calibrated system was then analyzed for the peak hour demand combined with fire flow conditions.

The commercial fire flow was superimposed on the peak hour demand at the proposed hydrant locations. Under fire flow conditions the critical hydrant locations were at Junction 2. The pressure at Junction 2 will be 71.03 psi during fire flow conditions. These results indicate that the proposed system as designed will meet the required pressure and demand criteria for full build out during ultimate fire flow conditions. A full packet of the water system analysis can be found in the appendix.

Based on the modeling, the proposed 12" and 8" waterlines are sufficient to provide both domestic and fire demand for this development. Attached is the results of the hydraulic modeling.

APPENDIX

SITE LOCATION MAP

NW Colburn Rd

I-470

MO 350

US-50 & I-470

Union Pacific RR

Blue Pkwy

Project Loacation

NE Douglas St.

MO-291

NE Tudor Rd.

NE Chipman Rd

NW   Chipman Rd

Ward Rd

SW 3rd St

E Langsford Rd

US 50

REVISIONS

Townsend Capitol, LLC
Summit Technology Campus
35 Acre Tract PDP

Site Location Map

Client Proj #	0000
THHinc Proj #	4907
Engineer:	TPW
Designer:	TBB
Drafter:	GRK
Plotted:	3/26/2009

DWG. **Fig 1**

SHT. *1* OF *1*

FIGURE 2
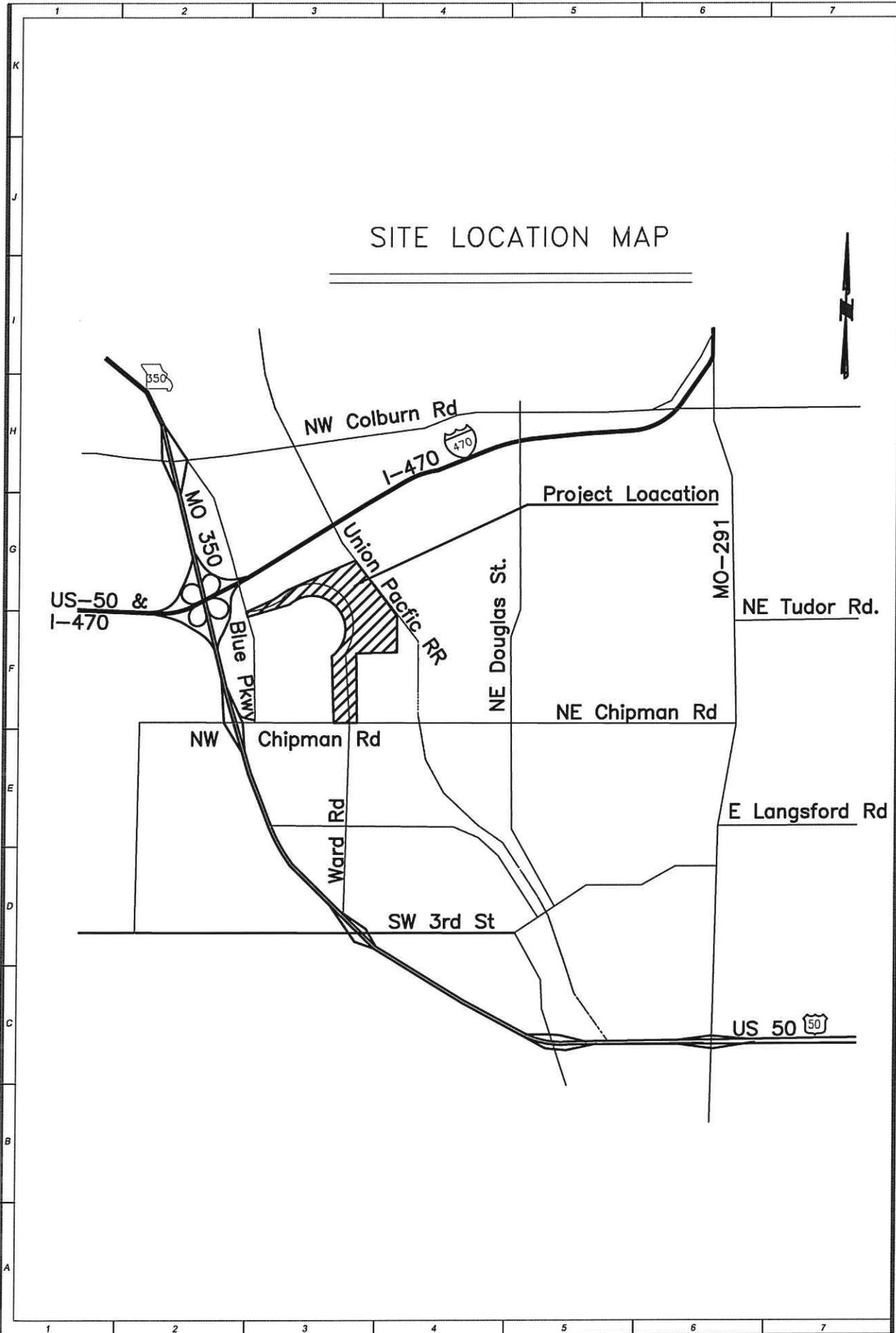
Description
Ward & Chipman Commercial Property
Future Senior Care Facility
Office/Retail Property West of Ward Road
35 Acre Tract — Lot 5
35 Acre Tract — Lot 4
35 Acre Tract — Lot 3
35 Acre Tract — Lot 1
35 Acre Tract — Lot 2

Haestad Junction
J2
J4
J6
J13
J14
J15
J16

8" Waterline

12" Waterline

Connect to Existing
12" Waterline

Connect to Existing
20" Waterline
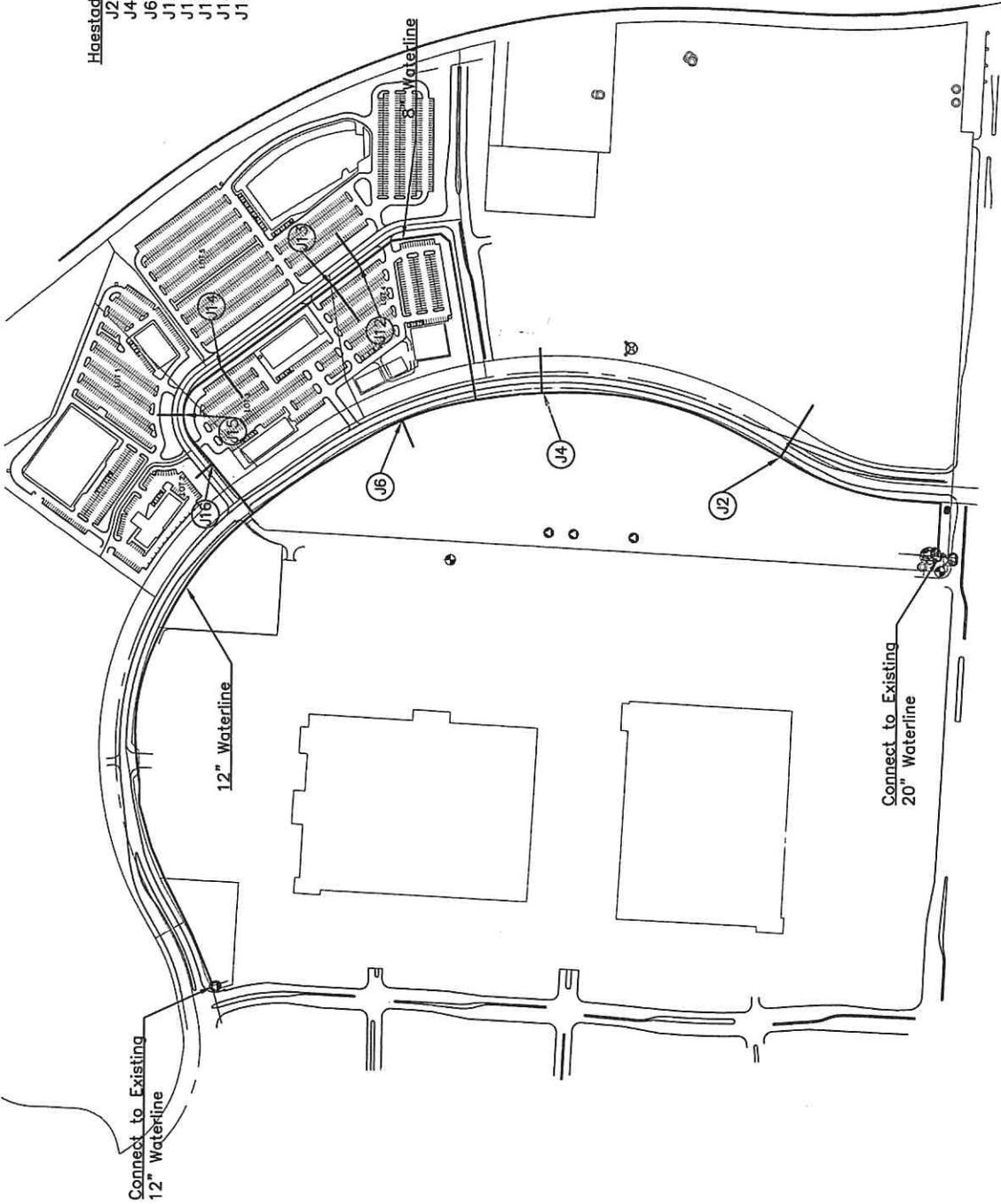
THHinc *Trabue, Hansen & Hinshaw, Inc.*
Consulting Engineers

Steady State Analysis
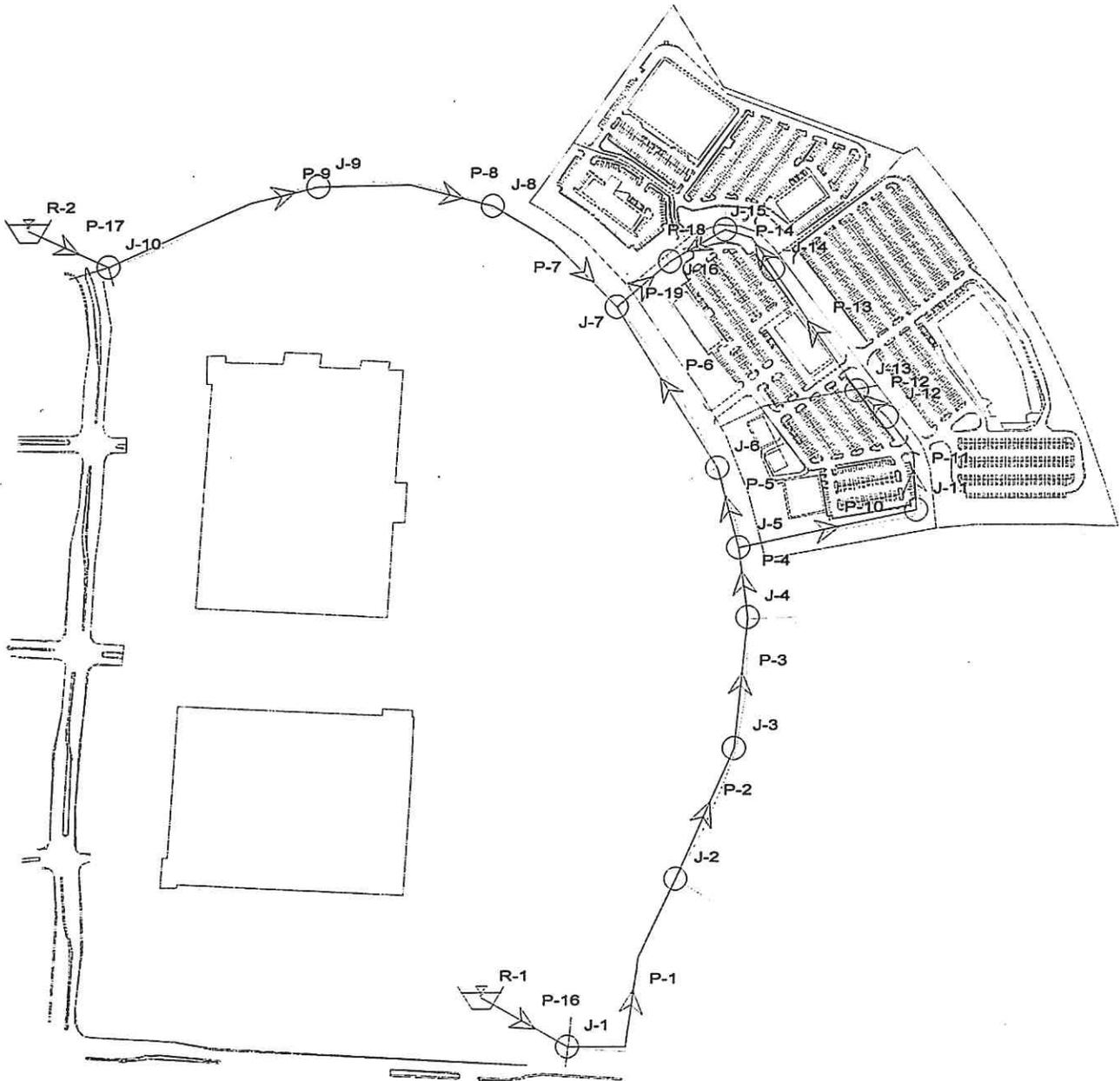
Project Title: 7895-MIC PDP
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03/17/15 11:09:06 AM   © Haestad Methods, Inc.   Trabue Hansen Hinshaw   37 Brookside Road   Waterbury, CT 06708 USA   (203) 755-1666

Project Engineer: John V. Huss
WaterCAD v1.5 [041]
Page 1 of 1

Steady State Analysis
Junction Report

Node Label	Elevation (ft)	Demand Pattern	Demand Type	Demand (gpm)	Calculated Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-1	1,000.00	Fixed	Demand	0.00	0.00	1,180.77	78.17
J-2	1,006.00	Fixed	Demand	67.00	67.00	1,176.93	73.92
J-3	1,003.00	Fixed	Demand	0.00	0.00	1,174.83	74.31
J-4	990.00	Fixed	Demand	40.00	40.00	1,172.91	79.09
J-5	980.00	Fixed	Demand	0.00	0.00	1,171.91	82.99
J-6	970.00	Fixed	Demand	40.00	40.00	1,171.20	87.00
J-7	978.00	Fixed	Demand	0.00	0.00	1,169.66	82.88
J-8	977.00	Fixed	Demand	0.00	0.00	1,168.33	82.74
J-9	980.00	Fixed	Demand	0.00	0.00	1,167.01	80.87
J-10	980.00	Fixed	Demand	0.00	0.00	1,165.01	80.01
J-11	980.00	Fixed	Demand	0.00	0.00	1,170.74	82.48
J-12	980.00	Fixed	Demand	146.40	146.40	1,170.06	82.19
J-13	980.00	Fixed	Demand	16.50	16.50	1,169.98	82.15
J-14	980.00	Fixed	Demand	60.00	60.00	1,169.72	82.04
J-15	980.00	Fixed	Demand	52.00	52.00	1,169.67	82.02
J-16	980.00	Fixed	Demand	35.60	35.60	1,169.66	82.02

Project Title: 7895-MIC PDP
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WaterCAD v1.5 [041]
Page 1 of 1

Steady State Analysis
Junction Report

Node Label	Elevation (ft)	Demand Pattern	Demand Type	Demand (gpm)	Calculated Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-1	1,000.00	Fixed	Demand	0.00	0.00	1,180.76	78.17
J-2	1,006.00	Fixed	Demand	1,500.00	1,500.00	1,170.70	71.22
J-3	1,003.00	Fixed	Demand	0.00	0.00	1,169.57	72.03
J-4	990.00	Fixed	Demand	40.00	40.00	1,168.53	77.20
J-5	980.00	Fixed	Demand	0.00	0.00	1,168.01	81.30
J-6	970.00	Fixed	Demand	40.00	40.00	1,167.64	85.47
J-7	978.00	Fixed	Demand	0.00	0.00	1,166.88	81.68
J-8	977.00	Fixed	Demand	0.00	0.00	1,166.34	81.88
J-9	980.00	Fixed	Demand	0.00	0.00	1,165.81	80.35
J-10	980.00	Fixed	Demand	0.00	0.00	1,165.01	80.00
J-11	980.00	Fixed	Demand	0.00	0.00	1,167.32	81.00
J-12	980.00	Fixed	Demand	146.40	146.40	1,166.93	80.84
J-13	980.00	Fixed	Demand	16.50	16.50	1,166.91	80.82
J-14	980.00	Fixed	Demand	60.00	60.00	1,166.84	80.80
J-15	980.00	Fixed	Demand	52.00	52.00	1,166.84	80.80
J-16	980.00	Fixed	Demand	35.60	35.60	1,166.85	80.80

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Steady State Analysis
Junction Report

Node Label	Elevation (ft)	Demand Pattern	Demand Type	Demand (gpm)	Calculated Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-1	1,000.00	Fixed	Demand	0.00	0.00	1,180.76	78.17
J-2	1,006.00	Fixed	Demand	67.00	67.00	1,173.52	72.44
J-3	1,003.00	Fixed	Demand	0.00	0.00	1,169.46	71.98
J-4	990.00	Fixed	Demand	1,500.00	1,500.00	1,165.72	75.99
J-5	980.00	Fixed	Demand	0.00	0.00	1,165.54	80.24
J-6	970.00	Fixed	Demand	40.00	40.00	1,165.43	84.51
J-7	978.00	Fixed	Demand	0.00	0.00	1,165.23	80.96
J-8	977.00	Fixed	Demand	0.00	0.00	1,165.17	81.37
J-9	980.00	Fixed	Demand	0.00	0.00	1,165.10	80.04
J-10	980.00	Fixed	Demand	0.00	0.00	1,165.01	80.00
J-11	980.00	Fixed	Demand	0.00	0.00	1,165.22	80.09
J-12	980.00	Fixed	Demand	146.40	146.40	1,165.03	80.01
J-13	980.00	Fixed	Demand	16.50	16.50	1,165.03	80.01
J-14	980.00	Fixed	Demand	60.00	60.00	1,165.03	80.01
J-15	980.00	Fixed	Demand	52.00	52.00	1,165.05	80.02
J-16	980.00	Fixed	Demand	35.60	35.60	1,165.11	80.05

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Steady State Analysis
Junction Report

Node Label	Elevation (ft)	Demand Pattern	Demand Type	Demand (gpm)	Calculated Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-1	1,000.00	Fixed	Demand	0.00	0.00	1,180.76	78.17
J-2	1,006.00	Fixed	Demand	67.00	67.00	1,174.64	72.93
J-3	1,003.00	Fixed	Demand	0.00	0.00	1,171.23	72.75
J-4	990.00	Fixed	Demand	40.00	40.00	1,168.09	77.01
J-5	980.00	Fixed	Demand	0.00	0.00	1,166.45	80.63
J-6	970.00	Fixed	Demand	1,500.00	1,500.00	1,165.02	84.33
J-7	978.00	Fixed	Demand	0.00	0.00	1,165.01	80.87
J-8	977.00	Fixed	Demand	0.00	0.00	1,165.01	81.30
J-9	980.00	Fixed	Demand	0.00	0.00	1,165.01	80.00
J-10	980.00	Fixed	Demand	0.00	0.00	1,165.01	80.00
J-11	980.00	Fixed	Demand	0.00	0.00	1,165.63	80.27
J-12	980.00	Fixed	Demand	146.40	146.40	1,165.16	80.07
J-13	980.00	Fixed	Demand	16.50	16.50	1,165.12	80.05
J-14	980.00	Fixed	Demand	60.00	60.00	1,165.01	80.00
J-15	980.00	Fixed	Demand	52.00	52.00	1,165.00	80.00
J-16	980.00	Fixed	Demand	35.60	35.60	1,165.00	80.00

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Steady State Analysis
Junction Report

Node Label	Elevation (ft)	Demand Pattern	Demand Type	Demand (gpm)	Calculated Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-1	1,000.00	Fixed	Demand	0.00	0.00	1,180.76	78.17
J-2	1,006.00	Fixed	Demand	67.00	67.00	1,174.76	72.98
J-3	1,003.00	Fixed	Demand	0.00	0.00	1,171.42	72.83
J-4	990.00	Fixed	Demand	40.00	40.00	1,168.35	77.12
J-5	980.00	Fixed	Demand	0.00	0.00	1,166.75	80.76
J-6	970.00	Fixed	Demand	40.00	40.00	1,166.21	84.85
J-7	978.00	Fixed	Demand	0.00	0.00	1,165.07	80.90
J-8	977.00	Fixed	Demand	0.00	0.00	1,165.05	81.32
J-9	980.00	Fixed	Demand	0.00	0.00	1,165.04	80.02
J-10	980.00	Fixed	Demand	0.00	0.00	1,165.01	80.00
J-11	980.00	Fixed	Demand	0.00	0.00	1,158.96	77.39
J-12	980.00	Fixed	Demand	1,500.00	1,500.00	1,154.52	75.47
J-13	980.00	Fixed	Demand	16.50	16.50	1,155.40	75.85
J-14	980.00	Fixed	Demand	60.00	60.00	1,158.85	77.34
J-15	980.00	Fixed	Demand	52.00	52.00	1,160.71	78.14
J-16	980.00	Fixed	Demand	35.60	35.60	1,162.71	79.01

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Steady State Analysis
Junction Report

Node Label	Elevation (ft)	Demand Pattern	Demand Type	Demand (gpm)	Calculated Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-1	1,000.00	Fixed	Demand	0.00	0.00	1,180.76	78.17
J-2	1,006.00	Fixed	Demand	67.00	67.00	1,174.71	72.96
J-3	1,003.00	Fixed	Demand	0.00	0.00	1,171.34	72.80
J-4	990.00	Fixed	Demand	40.00	40.00	1,168.24	77.08
J-5	980.00	Fixed	Demand	0.00	0.00	1,166.63	80.70
J-6	970.00	Fixed	Demand	40.00	40.00	1,166.11	84.80
J-7	978.00	Fixed	Demand	0.00	0.00	1,165.01	80.87
J-8	977.00	Fixed	Demand	0.00	0.00	1,165.01	81.30
J-9	980.00	Fixed	Demand	0.00	0.00	1,165.01	80.00
J-10	980.00	Fixed	Demand	0.00	0.00	1,165.01	80.00
J-11	980.00	Fixed	Demand	0.00	0.00	1,158.44	77.16
J-12	980.00	Fixed	Demand	146.40	146.40	1,153.77	75.15
J-13	980.00	Fixed	Demand	1,500.00	1,500.00	1,152.46	74.58
J-14	980.00	Fixed	Demand	60.00	60.00	1,157.05	76.56
J-15	980.00	Fixed	Demand	52.00	52.00	1,159.46	77.61
J-16	980.00	Fixed	Demand	35.60	35.60	1,162.02	78.71

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Steady State Analysis
Junction Report

Node Label	Elevation (ft)	Demand Pattern	Demand Type	Demand (gpm)	Calculated Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-1	1,000.00	Fixed	Demand	0.00	0.00	1,180.76	78.17
J-2	1,006.00	Fixed	Demand	67.00	67.00	1,174.92	73.05
J-3	1,003.00	Fixed	Demand	0.00	0.00	1,171.67	72.94
J-4	990.00	Fixed	Demand	40.00	40.00	1,168.68	77.27
J-5	980.00	Fixed	Demand	0.00	0.00	1,167.13	80.92
J-6	970.00	Fixed	Demand	40.00	40.00	1,166.45	84.95
J-7	978.00	Fixed	Demand	0.00	0.00	1,165.01	80.87
J-8	977.00	Fixed	Demand	0.00	0.00	1,165.01	81.30
J-9	980.00	Fixed	Demand	0.00	0.00	1,165.01	80.00
J-10	980.00	Fixed	Demand	0.00	0.00	1,165.01	80.00
J-11	980.00	Fixed	Demand	0.00	0.00	1,161.56	78.51
J-12	980.00	Fixed	Demand	146.40	146.40	1,158.40	77.14
J-13	980.00	Fixed	Demand	16.50	16.50	1,157.58	76.79
J-14	980.00	Fixed	Demand	1,500.00	1,500.00	1,154.68	75.54
J-15	980.00	Fixed	Demand	52.00	52.00	1,157.85	76.91
J-16	980.00	Fixed	Demand	35.60	35.60	1,161.17	78.34

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Steady State Analysis
Junction Report

Node Label	Elevation (ft)	Demand Pattern	Demand Type	Demand (gpm)	Calculated Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-1	1,000.00	Fixed	Demand	0.00	0.00	1,180.76	78.17
J-2	1,006.00	Fixed	Demand	67.00	67.00	1,175.02	73.09
J-3	1,003.00	Fixed	Demand	0.00	0.00	1,171.83	73.01
J-4	990.00	Fixed	Demand	40.00	40.00	1,168.89	77.36
J-5	980.00	Fixed	Demand	0.00	0.00	1,167.36	81.02
J-6	970.00	Fixed	Demand	40.00	40.00	1,166.61	85.02
J-7	978.00	Fixed	Demand	0.00	0.00	1,165.00	80.86
J-8	977.00	Fixed	Demand	0.00	0.00	1,165.00	81.30
J-9	980.00	Fixed	Demand	0.00	0.00	1,165.01	80.00
J-10	980.00	Fixed	Demand	0.00	0.00	1,165.01	80.00
J-11	980.00	Fixed	Demand	0.00	0.00	1,162.85	79.07
J-12	980.00	Fixed	Demand	146.40	146.40	1,160.28	77.96
J-13	980.00	Fixed	Demand	16.50	16.50	1,159.65	77.69
J-14	980.00	Fixed	Demand	60.00	60.00	1,157.44	76.73
J-15	980.00	Fixed	Demand	1,500.00	1,500.00	1,156.65	76.39
J-16	980.00	Fixed	Demand	35.60	35.60	1,160.53	78.07

Steady State Analysis
Junction Report

Node Label	Elevation (ft)	Demand Pattern	Demand Type	Demand (gpm)	Calculated Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-1	1,000.00	Fixed	Demand	0.00	0.00	1,180.76	78.17
J-2	1,006.00	Fixed	Demand	67.00	67.00	1,175.14	73.14
J-3	1,003.00	Fixed	Demand	0.00	0.00	1,172.02	73.09
J-4	990.00	Fixed	Demand	40.00	40.00	1,169.14	77.47
J-5	980.00	Fixed	Demand	0.00	0.00	1,167.65	81.15
J-6	970.00	Fixed	Demand	40.00	40.00	1,166.80	85.10
J-7	978.00	Fixed	Demand	0.00	0.00	1,164.97	80.85
J-8	977.00	Fixed	Demand	0.00	0.00	1,164.98	81.29
J-9	980.00	Fixed	Demand	0.00	0.00	1,164.99	80.00
J-10	980.00	Fixed	Demand	0.00	0.00	1,165.01	80.00
J-11	980.00	Fixed	Demand	0.00	0.00	1,164.28	79.69
J-12	980.00	Fixed	Demand	146.40	146.40	1,162.37	78.86
J-13	980.00	Fixed	Demand	16.50	16.50	1,161.94	78.68
J-14	980.00	Fixed	Demand	60.00	60.00	1,160.46	78.04
J-15	980.00	Fixed	Demand	52.00	52.00	1,159.96	77.82
J-16	980.00	Fixed	Demand	1,500.00	1,500.00	1,159.62	77.67

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