**REPORT**

PARE Project No. 08176.01

# WATER SYSTEM MASTER PLAN

**FOR THE**

**TOWN OF SOUTHBOROUGH**

**WATER DEPARTMENT**

**Southborough, MA**

SUBMITTED FEBRUARY 2009

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- Ms. Vera Kolias, A.I.C.P. – Town Planner

# EXECUTIVE SUMMARY

The Southborough Water Department recently engaged Pare Corporation (PARE) to prepare a Water System Master Plan in order to provide an overview of their water system's performance, identify system deficiencies, and provide an evaluation of potential system improvements.

The Town has a population of approximately 9,350 people, of which approximately 93 percent are connected to the water distribution system. The Town's current sole source of supply is the Massachusetts Water Resource Authority (MWRA) via two connections to the Hultman Aqueduct, one connection to the Metrowest Water Supply Tunnel, and one direct connection to the John J. Carroll Water Treatment Plant. Existing customers are served by three water storage tanks, two pump stations, and 86 miles of transmission and distribution piping.

The system is operated as two distinct pressure zones, referred to as the High Service Area and the Low Service Area. The Low Service Area operates at a hydraulic grade line (HGL) of 493 ft mean sea level (MSL) and is served by the Hosmer Pump Station and the Oak Hill and Clear Hill storage tanks. The High Service Area operates at a HGL of 515 ft MSL and is served by the Boland Pump Station and the Tara Road storage tank. There are four pressure-reducing valves in the system that transfers water from the High Service Area to the Low Service Area during periods of peak demand in the Low Service Area.

Based on water system meter records for the years 2005 - 2007, as well as pump station meter records and storage tank charts, average daily water demand in the system is approximately 1.09 million gallons per day (MGD). The maximum day demand over that same time period was 2.76 MGD, and the peak hour demand was 5.65 MGD. Residential water demand is approximately 300 gallons per day (gpd) per service connection and non-residential water demand is approximately 500 gpd/acre (gross lot area).

Future system water demand was estimated by conducting a limited build-out evaluation of the Town. PARE utilized existing water consumption rates established for residential customers (300 gpd/service connection) and non-residential customers (500 gpd/acre) to project future water demand. Based on our build-out evaluation, residential water demand could increase by as much as 219,000 gpd and non-residential water demand could increase by as much as 214,000 gpd.

The total future average daily water demand is estimated to be 1.52 MGD, or 40 percent more than the current average day demand.

The Town's existing hydraulic model was updated in general accordance with American Water Works Association (AWWA) Document M32 – *Distribution Network Analysis for Water Utilities*. The model was used to evaluate system performance. In addition, *Recommended Standards for Water Works (Ten States)* was utilized as a guideline in performing the system evaluation. Ten States recommends that system pressure range from 35-90 psi during normal operating conditions and never below 20 psi during emergency conditions. Both AWWA and Ten States recommend that a water system be capable of supplying the maximum day demand with the largest pump in each pump station off-line.

It appears as though the Town's system operates generally within the recommended pressure of 35-90 psi. The only areas of Town that are below 35-psi on a regular basis are those areas in the vicinity of the Oak Hill and Tara Road storage tanks. There do not appear to be any areas of Town that operate at a pressure below 20 psi on a regular basis. There are some fairly sizable areas of Town that operate above 90 psi, particularly around the Sudbury Reservoir and the Hopkinton town-line. The highest pressure in Town is approximately 125 psi and is located at the base of the Sudbury Reservoir dam. At build-out, system pressures are not anticipated to change significantly from what they are now (less than 1 psi change over current system pressure).

The Town appears to have a deficit in pump capacity in the Low Service Area; however, pump capacity in the High Service Area appears to be adequate, although marginal. Pump capacity in the Low Service Area is approximately 0.79 MGD, while the maximum day demand in the Low Service Area is 1.3 MGD, a deficit of approximately 0.51 MGD. Pump capacity in the High Service Area is 1.58 MGD, while the maximum day demand in the High Service Area is 1.46 MGD. At build-out, the deficit in pump capacity in the Low Service Area is anticipated to increase from 0.51 MGD to 1.01 MGD. At build-out, the High Service Area is anticipated to have a deficit in pump capacity of 0.47 MGD.

The useable storage capacity in the system is approximately 0.98 MG. If we assume storage should be able to provide the maximum day demand and a fire event (refer to PARE's January

28, 2008 Water Tank Siting Research Report), an appropriate amount of storage would be approximately 4.0 MG, a deficit of approximately 3.02 MG. Future storage requirements in the system are anticipated to be approximately 5.0 MG, or 4.0 MG more than what is currently available.

The available fire flow in the system ranges from 625 gpm to more than 5,000 gpm, with 290 out of 328 system nodes in the hydraulic model that have an available fire flow over 1,000 gpm. While fire flow appears to be generally adequate for a primarily residential system like Southborough, there are six locations that Insurance Services Offices, Inc (ISO) has determined require exceptionally high fire flows, up to 3,500 gpm. Those locations include:

1. Marlborough Road at St. Marks School;
2. Trottier School;
3. Mary E. Finn School;
4. Highland Street at Parkerville Road;
5. Mt. Vickery Road at Cordaville Road; and
6. Oregon Road at Woodland Road.

Of these six locations, the required fire flow, as determined in the hydraulic model, is only available at three – Marlborough Road, Highland Street, and Oregon Road. Adequate fire flow is unavailable at the Finn School, the Trottier School, and the Cordaville Road/Mt. Vickery Road.

PARE reviewed the system for critical pipe segments, or segments that provide the sole sources of water to large areas of Town, or that provide a critical path for fire flow. While not currently causing significant adverse impact on the system, there are certain critical pipes that may be undersized or that do not have significant redundancy. Provided below is a list of system pipes that appear to be critical and are either undersized or do not have substantial redundancy.

1. The 12-inch water main along the access road to the Hosmer Station (1,100 lf);
2. The 12-inch water main on Main Street between Northborough and Deerfoot Roads (4,200 lf);
3. The 12-inch water main on Sears Road (3,600 lf);
4. The 12-inch water main on Rt. 9 between Crystal Pond and Deerfoot Roads (1,800 lf);

5. The 12-inch water main that crosses under I-495 on Main Street (400 lf);
6. The 6-inch water main on Rt. 9 between Brook Lane and Oak Hill Road (1,900 lf); and
7. The 8-inch water main that crosses under I-90 at Woodland Road (300 lf).

To address the existing system deficiencies, PARE has three recommendations;

1. Institute a capital improvements program to address the immediate and long-term needs of the system;
2. Perform an evaluation of the Town's flushing program to address water quality concerns in the winter (this could also include the development of a unidirectional flushing program); and
3. Evaluate whether it is more cost effective to construct a new storage facility in the vicinity of Cordaville Road and Mt. Vickery Road to address the inadequate fire flow in this area, or if it is more cost effective to pursue localized upgrades to facilities in this area for the purpose of reducing the fire flow requirement.

The capital improvements program should have the dual purpose of addressing the immediate needs of the distribution system as well as addressing the system's long-term needs. The program should prioritize capital improvements based on which improvements would provide the maximum benefit for the least cost and which ones would address the most critical system deficiencies. At a minimum, the capital improvements should include the following;

- Install a new 12-inch water main between Presidential Drive and Fisher Road;
- Install a new 12-inch water main along the access road to the Hosmer Pump Station;
- Develop a town-wide SCADA system;
- Upgrade existing PRVs and vaults;
- Upgrade the Boland Pump Station;
- Install a new 12-inch water main on Flagg Road between Lovers Lane and Strawberry Hill Road;
- Install a new 12-inch water main on Main Street under I-495;
- Upgrade Hosmer Pump Station;
- Upgrade system storage in the High Service Area;
- Upgrade system storage in the Low Service Area;

- Install a new 8-inch water main on Woodland Road at the I-90 Crossing;
- Install a new 12-inch water main on Rt. 9 between Crystal Pond and Deerfoot Roads; and
- Install parallel 12-inch and 8-inch water mains on Rt. 9 between Willow Street and Winter Street.

It is noted that upgrading the existing PRVs between the High and Low Service Areas, in addition to installing a new SCADA system, could have a substantial benefit to the Town. The PRVs would allow water to be shared from the High Service Area to the Low Service Area, which would increase available fire flow to the Finn School and the Cordaville Road business district. This would also allow the Town to focus their resources on upgrading system storage and pump capacity in the High Service Area, which would effectively increase the water available to the Low Service Area. The Town could then make upgrading storage and pump capacity in the Low Service Area a long-term improvement rather than a critical short-term need.

PARE recommends that the Town perform an evaluation of their flushing program in order to identify the most effective means of circulating water in the southern half of Town by the Hopkinton town-line and along the western half of Rt. 9. The Town could also use this as an opportunity to create a unidirectional flushing (UDF) program, which would optimize the flushing program town-wide, not just in areas of elevated water age.

Finally, PARE recommends that the Town conduct a cost-benefit analysis to identify the most practical means of attaining adequate fire flow in the area of Cordaville and Mt. Vickery Roads. This analysis should consider which is more cost effective; a new storage facility in the vicinity of the DPW Garage or localized improvements to structures in the area that could reduce the overall needed fire flow. PARE recommends that the Town work with the Fire Department and consult with ISO on ways to reduce the needed fire flow in this area.

# SECTION 1.0
# INTRODUCTION AND BACKGROUND

The Southborough Water Department recently engaged Pare Corporation (PARE) to prepare a Water System Master Plan. The purpose of the Plan is to provide an overview of water system performance, identify system deficiencies, and provide an evaluation of potential system improvements to ensure consistent high quality service to the existing and future customer base. The following sections of this Plan will provide the following information:

- System history;
- System description;
- PARE's recent update of the Town's computerized hydraulic model;
- PARE's evaluation of the existing system;
- PARE's build-out analysis of the water distribution system, and
- Possible future capital improvements for the system.

## 1.1 SYSTEM OVERVIEW

The Town of Southborough owns and operates a water distribution system that serves a population of approximately 9,350 people. The Town is characterized by low-density residential development in the north and medium density residential development in the south. While the Town is primarily residential in nature, some dense commercial development exists along the Boston Worcester Turnpike (Rt. 9). Of the Town's current population, approximately 93 percent is connected to the distribution system.

Over the last three years, system-wide consumption averaged approximately 1 million gallons per day (MGD) and increased to approximately 2.8 MGD in the summer. The Town's current sole source of supply is the Massachusetts Water Resource Authority (MWRA) via two connections to the Hultman Aqueduct, one connection to the Metrowest Water Supply Tunnel, and one direct connection to the John J. Carroll Water Treatment Plant. Existing customers are served by three water storage tanks, two pump stations, and 86 miles of transmission and distribution piping.
The system is operated as two distinct pressure zones, referred to as the High Service Area and the Low Service Area. The boundary between the High and Low Service Areas runs generally

north-south along Rt. 85 from the Marlborough town-line to I-90. From I-90, the boundary runs roughly east-west from Rt. 85 to the Westborough town-line. The eastern half of Town and locations south of I-90 are in the Low Service Area. The remaining area north of I-90 and west of Cordaville Road is in the High Service Area (refer to Appendix A – Water System Map).

The Low Service Area encompasses approximately 55 percent of the overall Town by area, and 60 percent of the population. The Low Service Area operates at a hydraulic grade line (HGL) of 493 ft mean sea level (MSL) and is served by the Hosmer Pump Station and the Oak Hill and Clear Hill storage tanks.

The High Service Area encompasses approximately 45 percent of the overall Town by area, and 40 percent of the population. The High Service Area operates at an HGL of 515 ft MSL and is served by the Boland Pump Station and the Tara Road storage tank.

The following sections provide a detailed description of the system's primary components.

### 1.1.1 *Supply Sources*

The Town of Southborough obtains all of its water supply by direct connection to the MWRA's Hultman Aqueduct, Metrowest Water Supply Tunnel (MWWST), and John J. Carroll Treatment Plant. The Hultman Aqueduct and the MWWST are also connected to the John J. Carroll Treatment Plant and transport water from the Plant in Marlborough to the Norumbega storage facility in Weston. The Town currently has a ten-year contract with MWRA that expires at the end of 2016. As of the date of this report (2009), the Town is allowed to purchase up to 450 million gallons per year (MGY), not to exceed 3.6 MGD on a single day. The average annual limit will increase to 475 MGY in 2011. The maximum daily limit will increase to 3.9 MGD in 2014. The average annual and maximum daily limit will remain at 475 MGY and 3.9 MGD, respectively, until 2016. A copy of the MWRA Water Use Agreement is provided as Appendix B.

*Hultman Aqueduct*

Southborough has two connections to the Hultman Aqueduct, one at the Boland Station and one at the Hosmer Station. At the Hosmer Station in the Low Service Area, the aqueduct is reported to be a 14-ft diameter concreted pressure duct. The depth of the aqueduct ranges from 250 to 300 feet below grade. The connection is made through a vertical shaft, referred to as Shaft

No.3, approximately 150 feet north of the station. Inside the shaft is a 20-inch cast iron pipe that connects directly to the aqueduct. Outside the shaft, the 20-inch pipe reduces down to a 16-inch pipe, and maintains that diameter until it enters the station.

At the Boland Station, the Hultman Aqueduct is reported to be a 12.5-ft diameter duct and is relatively shallow compared to its depth at the Hosmer Station. The aqueduct itself is higher than surrounding grade; however, soil is mounded around the aqueduct to maintain a consistent burial depth of approximately 4 ft. The connection is made via a 16-inch pipe that connects directly to the aqueduct. Between the station and the aqueduct the 16-inch pipe reduces down to a 12-inch pipe until in enters the station. The connection to the aqueduct is made approximately 50 ft north of the station.

*Metrowest Water Supply Tunnel*

The Town of Southborough's connection to the MWWST at the Hosmer Station was made in 2003. The MWWST is a 14-ft diameter concrete pressure pipe that ranges in depth from 200 to 500 ft below grade. The connection is made approximately 500 feet south of the station at a vertical shaft above the tunnel. The connection is made via a 24-inch diameter pipe that connects to the 16-inch pipe behind the Station, the same pipe that connects to the Hultman Aqueduct.

*John J. Carroll Water Treatment Plant*

While the water in the Hultman Aqueduct and the MWWST originates at the John J. Carroll Water Treatment Plant (Plant), the Town of Southborough also has a direct connection to the Plant. The Boland Station is connected to the Plant via 6,000 ft of 24-inch ductile iron water main. The 24-inch pipe is connected to the 16-inch pipe between the Hultman Aqueduct and the Station.

### 1.1.2 *Pump Stations*

The Town of Southborough operates two booster pump stations. The purpose of each station is to increase the HGL of the MWRA supply to the HGL of the Southborough system. The following two sections describe each of the pump stations. Table 1-1 provides an overview of the pumps in each station.

*Thomas J. Boland Pump Station*

The Thomas J. Boland Pump Station (Boland) is located off Northborough Road in the northwest section of Town. Boland was constructed in 1960. The station supplies water to the High Service Area and fills the Tara Road Tank. The pumping system in Boland is comprised of two 50 HP horizontal split-case centrifugal pumps, each rated at 550 gpm at 275 ft of head. The station also has a 1,000-gpm gasoline powered emergency backup pump inside the station. The fuel source for that pump is a buried storage tank behind the station. Southborough personnel report that the gasoline powered pump is not automated and that in the event of a power outage the pump needs to be started manually. The incoming HGL of the MWRA supply, as measured in the station, ranges from 295 to 303 ft. The MWRA uses the Boston City Base (BCB) datum when measuring their HGL, which is 5.65 ft lower than the US Geological Survey's MSL, which is the datum that Southborough uses to measure their HGL. Therefore, the HGL of the incoming supply, as measured relative to MSL, is 5.65 ft lower than reported in the station, or in this case 289 to 297 ft MSL.

*Arthur L. Hosmer Pump Station*

The Arthur L. Hosmer Station (Hosmer) is located off of Boston Road in the northeast corner of Town, adjacent to the Sudbury Reservoir. Hosmer was constructed in 1977. The station supplies water to the Low Service Area and fills the Oak Hill and Clear Hill Tanks. The pumping system in Hosmer is comprised of two horizontal split-case centrifugal pumps – one rated for 650 gpm at 250 ft of head, and one rated for 550 gpm at 250 ft of head. In addition, the station is equipped with a propane-fired engine that, when connected to the 650-gpm pump, acts as an emergency backup pump in the station. The fuel source for that pump is an aboveground steel storage tank outside the station. The propane engine is normally disconnected from the 650-gpm pump. In the event of a power failure, Southborough personnel must physically connect the engine drive to the pump shaft and manually start the engine. The incoming HGL of the MWRA supply, as measured in the station, ranges from 291 to 303 ft BCB, or 285 to 297 ft MSL.

| TABLE 1-1: Southborough Distribution Pumps | | | | | | |
|---|---|---|---|---|---|---|
| Station | Flow | Head | Horse Power | Pump Manufacturer | Motor Manufacturer | Date Installed |
| ***Boland*** | | | | | | |
| No.1 | 550 gpm | 275 ft | 50 HP | Gould | GE | 1961 |
| No.2 | 550 gpm | 275 ft | 50 HP | Gould | GE | 1961 |
| Auxiliary | 1,000 gpm | unknown | unknown | unknown | WA Kraft | 1961 |
| ***Hosmer*** | | | | | | |
| No.1 | 650 gpm | 250 ft | 60 HP | unknown | Marathon | 1977 |
| No.2 | 550 gpm | 250 ft | 40 HP | unknown | Marathon | 1977 |
| Auxiliary | NA | NA | 60 HP | unknown | unknown | 1977 |

1.1.3 *Tanks*

The Town of Southborough has three water storage tanks, the Tara Road Tank (Fiddler's Green), the Oak Hill Tank, and the Clear Hill Tank. The Tara Road Tank is located in the High Service Area of Town, while the Oak Hill Tank and the Clear Hill Tank are both located in the Low Service Area of Town. The following table describes the three water storage tanks.

| TABLE 1-2: Southborough System Storage Tanks | | | |
|---|---|---|---|
| | Tara Road (Fiddler's Green) | Clear Hill | Oak Hill |
| Nominal Size | 1.300 MG | 0.460 MG | 0.275 MG |
| Diameter | 67 ft | 40 ft | 25 ft |
| Base Elevation | 467 ft | 451 ft | 418 ft |
| Overflow Elevation | 515.0 ft | 493.3 ft | 492.7 ft |
| Operating Range | 503.0 to 510.0 ft | 482.0 to 488.0 ft | 482.0 to 488.0 ft |
| Style | Standpipe | Standpipe | Standpipe |
| Year Built | 1960 | 1930 | 1930 |
| Location | Tara Road | Overlook Drive | Oak Hill Road |
| Condition* | Very Good | Good | Good |

* Condition provided in tank inspection reports prepared by Underwater Solutions Inc.

The most recent tank inspection reports are provided as Appendix C.

### 1.1.4 *Transmission and Distribution Mains*

The Town of Southborough's water distribution system is made up of approximately 86 miles of water main, ranging in size from 6-inches to 12-inches in diameter. In addition, there are short sections of 16 and 24-inch pipe that feed both pump stations from the MWRA system. Table 1-3 provides a relative breakdown of the piping size as a percentage of the total. Typical pipe material in the system includes ductile iron (DI), unlined cast iron (CI), cement-lined CI, polyvinyl chloride (PVC), and asbestos cement.

**TABLE 1-3: Distribution Piping**

| Size | % of System |
|---|---|
| 6-inch | 11 |
| 8-inch | 51 |
| 10-inch | 8 |
| 12-inch | 29 |
| > 12-inch | <1 |

### 1.1.5 *Pressure-Reducing Valves*

The Town of Southborough's water system has four pressure-reducing valves (PRVs) that, when working properly, transfer water from the High Service Area to the Low Service Area during times of peak water demand. The PRVs were manufactured by Golden Anderson Industries, Inc. and installed over a two-year period around 1990. Each PRV is located within an underground concrete vault with interior dimensions 8 ft by 8 ft, and a 7-ft ceiling height. The Town is currently undergoing a PRV evaluation and replacement program to determine if they are working properly and if replacement is warranted. In addition, the PRV vaults are prone to flooding due to leakage of interior piping and groundwater intrusion. The PRV evaluation is being performed concurrently with the preparation of this Plan.

The following sections describe each of the PRVs.

*Ledge Hill Road PRV*

The Ledge Hill Road PRV vault is located within a landscaped area to the northwest of the intersection of Marlboro Road (Rt. 85) and Ledge Hill Road. The PRV is 12-inches in size,

and the interior piping is 12-inch DI. This represents the northern most PRV in the Town of Southborough.

*Town Square PRV*

The Town Square PRV vault is located in a grassed area within the VFW Memorial Park between Main Street and Common Street. The PRV is 10-inches in size, and the interior piping is 10-inch DI. Flooding within this vault is more significant than at the other three PRV vaults.

*Mount Vickery Road PRV*

The Mount Vickery Road PRV vault is located in a grassed area to the northwest of the intersection of Cordaville Road (Rt. 85) and Mount Vickery Road. The PRV is 6-inches in size, and the interior piping is 6-inch DI.

*Parkerville Road PRV*

The Parkerville Road PRV is located in a grassed area to the northeast of the intersection of Parkerville Road and Richards Road, adjacent to the Finn School. The PRV is 8-inches, and the interior piping is 8-inch DI. This represents the southern most PRV in the Town of Southborough.

## 1.2 SYSTEM HISTORY

Provided below is a brief timeline of the development of the Southborough water supply system.

1898 The Fayville Dam is completed, producing several reservoirs, primary of which is the Sudbury Reservoir. The Sudbury Reservoir is the primary water supply for the Town of Southborough until 1962.

1908 The Wachusett Reservoir in Clinton and Boylston is completed. The Wachusett Reservoir, which was created by the Metropolitan Water District to serve the growing population of Boston, is currently one of two reservoirs that provide water to Boston and Towns west of Boston, including Southborough. The Wachusett Reservoir is currently operated by the Massachusetts Water Resources Authority (MWRA), but the land around the Reservoir is owned and maintained by the

Massachusetts Department of Conservation and Recreation (MA DCR).

1930 The Oak Hill standpipe is completed. The Oak Hill Standpipe is a 0.275 MG storage tank on Oak Hill Road that is still in use today.

1930 The Clear Hill standpipe is completed. The Clear Hill Standpipe is a 0.46 MG storage tank on Overlook Drive that is still in use today.

1930 The Atwood Elevated Tank is completed. The Atwood Elevated Tank was a 150,000-gallon elevated tank on Atwood Street that was demolished in 1990.

1941 The Hultman Aqueduct is completed. The Hultman Aqueduct is one of two aqueducts that transport water from the Wachusett Reservoir to the Norumbega Reservoir in Weston. The Hultman Aqueduct also has a branch that feeds the Weston Reservoir.

1946 The Quabbin Reservoir is completed. The Quabbin Reservoir is the primary water supply for the City of Boston. Like the Wachusett Reservoir, the Quabbin is operated by the MWRA, but the land around the Reservoir is owned and maintained by the MA DCR. The Quabbin Reservoir flows by gravity to the Wachusett Reservoir through the Quabbin Aqueduct.

1959 A report prepared by Whitman and Howard recommended that the Town abandon the Sudbury Reservoir due to poor water quality. The report suggested that that the Town construct a pumping station adjacent to Hultman Aqueduct and make a connection to the aqueduct at Shaft No. 3.

1960 The Tara Road Tank, also referred to as Fiddler's Green Reservoir, is completed. The reservoir, which is a 1.3 MG standpipe, was built with a higher overflow elevation than the other tanks in the system in order to better serve the higher elevations around Tara Road. When the tank was constructed, there were plans to construct a booster pump station to serve the higher tank, which would effectively create a new pressure zone in Town. However, the booster pump station was never constructed. As a result, the tank was operated with only ±26 feet of water in it in

order to match the overflow elevations of the other system water tanks.

1962 The Thomas J. Boland Pump Station is completed. The Boland Station, which is still in service today, originally pumped water solely from the Hultman Aqueduct, but now pumps from the Hultman Aqueduct and from a direct connection to the John J. Carroll Treatment Plant. It is noted that this is not the pump station that Whitman and Howard recommended in 1959; this station is located on the opposite side of Town.

1977 The Arthur L. Hosmer Pump Station is completed. This is the pump station recommended by Whitman and Howard in their 1959 report. The Hosmer Station originally pumped solely from the Hultman Aqueduct from Shaft No.3, but now pumps from both the Hultman Aqueduct and the Metrowest Water Supply Tunnel. The Hosmer Station is still in service today and is the sole source of supply for the Low Service Area in Town.

1978 The Town acquires the property on Fairview Hill for future tank site.

1988 A report prepared by Whitman and Howard recommended that the Town create two pressure zones, which are now the High Service Area and a Low Service Area. The report recommends that the High Service Area be served by the Tara Road Tank, which has an overflow elevation of 515 ft MSL, but has been operating since its construction at an HGL of approximately 493 ft MSL.

1990 The Atwood Tank is demolished. The tank is no longer considered cost effective to maintain.

1990 The Town installs four pressure-reducing valves over a two-year period. The pressure reducing valves effectively divide the Town into two service areas, the High Service Area and the Low Service Area, as recommended in Whitman and Howard's 1988 report. The pressure reducing valves are intended to transfer water from the High Service Area to the Low Service Area in times of peak water demand.

1993 The water main between the Hosmer Pump Station and the Oak Hill standpipe is upgraded from 8-inches to 12-inches.

1997 The MWRA and the Town install water mains along Sears Road, Valley Road, Bigelow Road, Pinehill Road, Johnson Road, and Main Street.

2003 The Metrowest Water Supply Tunnel (MWWST) is completed. The MWWST is the second of two aqueducts that bring water from the Wachusett Reservoir to the Norumbega Reservoir (the Hultman Aqueduct being the first). The Town makes a connection to the MWWST near the Hosmer Station that provides a second source of supply to the station.

# SECTION 2
# HYDRAULIC MODEL UPDATE

An important component to providing a comprehensive evaluation of the distribution system is developing a computerized hydraulic model to assist with the evaluation of complex hydraulic situations. The Town previously had H2O Engineering Consultants, Inc. develop a hydraulic model of the distribution system. PARE utilized that model as a basis for our model development, but updated system demands and the infrastructure database. The hydraulic model was updated in general accordance with American Water Works Association (AWWA) Document M32 – *Distribution Network Analysis for Water Utilities*. PARE updated the Town of Southborough's hydraulic model using Bentley's WaterCAD software, which is CAD-based modeling software. The model components were developed based on record information, including meter records, facility drawings, hydrant flow test records, H2O's original model, and Southborough personnel input. Portions of the model were developed using GIS-based information provided by the Town, which was later converted into CAD-based files and imported into the hydraulic model.

The model was used to evaluate the system's performance relative to guidelines and standards established by AWWA, as well as *Recommended Standards for Water Works (Ten State Standards)* and the Massachusetts Department of Environmental Protection's *2001 Guidelines and Policies for Public Water Systems*.

As part of the system evaluation, PARE evaluated system-wide water demand. From our evaluation of system water demand, PARE updated the demand database in the hydraulic model.

## 2.1 WATER DEMAND EVALUATION / DEMAND DATABASE UPDATE

When evaluating system demand and establishing a demand database, there are three primary water demand scenarios – average day demand (ADD), maximum day demand (MDD), and peak hour demand (PHD). The ADD, as defined by AWWA M32, is "the annual water consumption divided by 365 days" and represents the average water demand that a given water distribution system experiences over a one-day period. The MDD is defined as, "the water consumption, in volume of water used on the highest consumption day in a year." The MDD is typically the most critical water

demand scenario and is usually the scenario by which system adequacy is measured. The PHD is defined as, "the maximum total 1-hour water demand, in units of volume per day, a given distribution system experienced or would experience during a particular year or other time period." The PHD is a higher consumption rate than MDD but given the short duration of high water demand (i.e., 1-hour), it is not considered as critical as the MDD.

PARE reviewed the following information provided by the Town as part of our water demand evaluation and demand database update:

- Customer meter records for the years 2005, 2006, and 2007;
- Pump station pumping records for the years 2005, 2006, and 2007 as reported in the Town's Annual Statistical Reports to the Massachusetts Department of Environmental Protection (MA DEP), and information provided by MWRA (refer to Appendix D & E); and
- Tank chart records from two of the three water storage tanks – the Tara Road Tank and the Oak Hill Tank, for select days during the years 2005, 2006, and 2007 (refer to Appendix F). Please note that chart records are not maintained for the Clear Hill Tank, which is presumed to fill and drain in conjunction with the Oak Hill Tank.

### 2.1.1 *Average Day Demand*

Based on the information provided in the Annual Statistical Reports, the Town pumped a total of 1,192 million gallons (MG) from the MWRA between 2005 and 2007. The average daily pumpage, which was used for the average day demand (ADD), was **1.09 MGD**, or 757 gpm.

### 2.1.2 *Maximum Day Demand*

The maximum day demand was obtained by identifying the single highest day of purchased water from the MWRA between 2005 and 2007, which occurred on August 13, 2005. On that day, the MWRA supplied 2.77 MG. In addition, over the course of that day, the system storage tanks filled by a net volume of 13,200 gallons. The total water supplied less the amount going into the system tanks is the total system demand on a maximum day, in this case **2.76 MGD** or 1,916 gpm. The maximum day multiplier for the system is calculated by dividing the maximum day demand by the average day demand, in this case 2.53. Therefore, PARE used a maximum day multiplier of 2.53 in

the hydraulic model.

### 2.1.3 *Peak Hour Demand*

The peak hour demand is typically a time when system water sources are supplying water at full, or near full capacity and system storage tanks are draining at their highest, or near highest rates. The single highest hour of water demand between 2005 and 2007 occurred on August 13, 2005 between 5:00 am and 6:00 am. Over that hour, the MWRA supplied water at a rate of approximately 1,955 gpm, and the system storage tanks drained at a rate of approximately 1,966 gpm, for a net system demand of approximately **3,921 gpm,** or 5.65 MGD. The peak hour multiplier for the system is the peak hour demand divided by the average day demand, in this case 5.18. Therefore, PARE used a peak hour multiplier of 5.18 in the hydraulic model.

The table below summarizes Southborough's water demand and the demand scenarios PARE utilized as part of the hydraulic model development.

**TABLE 2-1: Southborough Water System Demand**

| | **Water Demand (2005-2007)** | |
|---|---|---|
| | Total Volume (MGD) | System Demand (gpm) |
| Average Day | 1.09 | 757 |
| Maximum Day | 2.76 | 1,916 |
| Peak Hour | 5.65 | 3,921 |

## 2.2 SERVICE AREAS

To further define system demand patterns, PARE subdivided the system in the model into two (2) service areas, the High Service Area and the Low Service Area. PARE distributed the total system demand into each of the service areas based on the percentage of total metered water use in that area. The customers in High Service Area used approximately 53 percent of the total metered water use in the system between 2005 and 2007. Therefore, PARE allocated 53 percent of the total system demand to the High Service Area and 47 percent to the Low Service Area.

Table 2-2 provides the total water demand for each service area for an average day, maximum day,

and peak hour.

| TABLE 2-2: Southborough Water demand by Service Area | | | |
|---|---|---|---|
| | Average Day (GPD) | Maximum Day (GPD) | Peak Hour (GPD) |
| High Service Area | 577,000 | 1,462,000 | 2,992,000 |
| Low Service Area | 512,000 | 1,297,000 | 2,654,000 |
| **TOTAL** | **1,089,000** | **2,759,000** | **5,646,000** |

System-wide, residential customers consumed approximately 78 percent of the total water demand, or 849,000 gpd. Non-residential customers consumed approximately 22 percent of the total water, or approximately 240,000 gpd. The total number of residential customers, based on meter records provided by the Town is 2,848. Therefore, the average residential water demand in Southborough system is approximately 300 gpd per service connection. Based on the current population, approximately 9,350, the average residential per capita water demand is approximately 91 gpd. Please note that in the Town's contract with MWRA, the Town is required to reduce the residential per capita water demand to 65 gpd by the end of 2016.

The total area in Town that is currently developed for non-residential use is 520 acres, out of a total of 948 acres zoned for non-residential use. Therefore, the average non-residential water demand in Southborough system is approximately 500 gpd/acre (gross lot area).

The per service water demand for residential customers and per acre water demand for non-residential customers identified here will be used to project future water demand as part of our system buildout evaluation.

## 2.3 UNACCOUNTED / UNMETERED WATER USE

In any system there is some unaccounted or unmetered water use. In order to ensure that Southborough's unaccounted/unmetered water use was included in the model, PARE utilized the meter records from the MWRA (in the Annual Statistical Reports), not the customer meter records, to establish the actual system demand. However, PARE distributed water use throughout the system based on customer meter records and address information. Therefore, each area is assigned a portion of the total unaccounted/unmetered water, based solely on how much water

they consumed as a percentage to the total system demand. For example, customers in the High Service Area consumed approximately 492,000 gpd, based on their metered water use, which is 53 percent of total metered water use. The total water supplied to the system is 1,089,000 gpd of which 53 percent equals 577,000 gpd, a difference of approximately 85,000 gpd. The difference is High Service Area's share of the unaccounted/unmetered water use, based on their percentage of total water consumed.

The total unaccounted/unmetered water use that PARE estimated for the model is approximately 15 percent of the total system use. Please note that this should not be considered unaccounted water in the same sense as the MA DEP indicates in their Water System Annual Statistical Reports. This is the percentage of total water supplied to the system that PARE could not assign to a specific node in the model. A portion of this unaccounted/unmetered water is attributable to normal system operations, such as hydrant flushing, water main breaks, temporary construction services, etc. The actual unaccounted for water in the system, as defined by MA DEP, is slightly lower than 15 percent.

## 2.4 MAJOR USERS

An important component of the hydraulic model development is an evaluation of major users, which are customers that use over 1 million gallons per year (MGY). Major users represent large load centers in the model, which can have a substantial impact on system hydraulics. In some cases, major users might use so much water that they dictate the size and/or configuration of certain infrastructure components, such as pipes, tanks, pumps, etc. Based on the meter records provided by the Town, there are currently 19 major users in the Town of Southborough. The table on the following page is a list of the system major users, their location, usage type, and designation in the model.

Based on meter records, and as illustrated in Table 2-3, major users consume approximately 19 percent of total water use. Thirteen (13) of the nineteen (19) major users are located in the Low Service Area and six (6) major users are in the High Service Area. It is noted that the EMC property, which is located in the High Service Area, used 17 percent of the total water used by major users between 2005 and 2007.

| TABLE 2-3: Southborough Major Users | | | | | | |
|---|---|---|---|---|---|---|
| Name | Address | Junction Node | Service Area | Use Type | Water Use | |
| | | | | | MGY | GPD |
| Fay School | 48 Main Street | 1022 | High | School | 3.99 | 10,932 |
| Superintendent of Schools | 49 Parkerville Road | 1072 | High | School | 1.00 | 2,740 |
| EMC | Coslin Drive | 1079 | High | Office Park | 10.98 | 30,082 |
| 371 Turnpike Road LLC | 2 Park Central Drive | 1039 | High | Commercial | 1.75 | 4,795 |
| Paradigm Properties | 352 Turnpike Road | 1062 | High | Commercial | 1.19 | 3,260 |
| Red Roof Inn | 367 Turnpike Road | 1045 | High | Hotel | 3.78 | 10,356 |
| Carriage Hill Condos | 2 Carriage Hill Circle | 2157 | Low | Residential | 3.54 | 9,690 |
| Southborough Meadows | 16 Blueberry Land | 2069 | Low | Residential | 1.21 | 3,310 |
| Joe Sullivan Golf Course | 70 Valley Road | 2154 | Low | Recreational | 1.60 | 4,384 |
| St. Marks Golf Club | 36 Cordaville Road | 2042 | Low | Recreational | 1.32 | 3,616 |
| NE Center for Children | 33 Turnpike Road | 2057 | Low | School | 2.23 | 6,110 |
| St. Marks School | Marlboro Rd and School St | 2002 | Low | School | 7.89 | 21,616 |
| 153 Cordaville Road LLC | 153 Cordaville Rd | 2073 | Low | Commercial | 1.27 | 3,479 |
| Allied Cold Storage | 1 Harvest Lane | 2127 | Low | Commercial | 1.48 | 4,055 |
| Capital Group Companies | 162 Cordaville Road | 2072 | Low | Commercial | 1.16 | 3,178 |
| Southborough Motor Lodge | 44-48 Turnpike Road | 2064 | Low | Motel/Hotel | 1.49 | 4,082 |
| Nstar Services Co. | 157 Cordaville Road | 2073 | Low | Commercial | 1.64 | 4,493 |
| Realty Ass. Fund VI LT | 120 Turnpike Road | 2052 | Low | Commercial | 1.09 | 2,986 |
| Shrubs and Trees | 110 Turnpike Road | 2052 | Low | Comm./Agri. | 5.28 | 14,466 |

# SECTION 3.0
# EXISTING SYSTEM EVALUATION

After updating the demand information in the model, PARE used the hydraulic model to evaluate system performance. PARE evaluated an average day demand (ADD) scenario, a maximum day demand (MDD) scenario, a peak hour (PH) demand scenario, and a fire flow analysis. PARE evaluated the available pressure throughout the system, as well as the available fire flow. PARE also evaluated the performance of the system pump stations and the rate at which the system storage tanks either filled or drained during each scenario.

AWWA Document M32 – *Distribution Network Analysis for Water Utilities* and *Recommended Standards for Water Works (Ten State Standards)* were used as guidelines in performing the hydraulic analysis. These documents dictate that the maximum day demands should be afforded through the system's source capacity, not distribution storage. Distribution storage shall provide the additional peak hour demands and fire flow. These documents also dictate that the fire flow at any given point in the system would be the rate of flow of water obtainable at a minimum residual pressure of 20 psi. Furthermore, these documents require that all points in the distribution system also maintain a minimum residual pressure of 20 psi during fire flow conditions.

PARE conducted two types of hydraulic analyses for the Town of Southborough, a steady-state analysis and an extended period analysis. A description of each analysis is provided below.

## 3.1 STEADY STATE ANALYSIS

The most common type of hydraulic model analysis is a steady state analysis. A steady state analysis provides a "snap shot" or an overview of system performance during an average day, maximum day, or peak hour demand scenario. A steady-state analysis is a useful tool because it provides a reasonable representation of system performance during each of the demand scenarios. PARE created a steady state demand scenario for the ADD, MDD, and PHD demand scenarios. The demand scenarios were established by dividing the total system demand for the ADD, MDD, and PHD over the entire model network.

There are 133 nodes in the High Service Area, six of which represent major users (note that nodes inside pump stations were not counted because they are not assigned a water demand). The ADD for the High Service Area is approximately 577,000 gpd, of which 73,000 gpd is attributed to major users. The remaining 504,000 gpd was distributed over 127 nodes in the High Service area (i.e., 2.76 gpm/per node). Each of the six major users has one node assigned to them, and their ADD was assigned to that node. For example, the Fay School, which is represented by node J-1022, averages approximately 10,900 gpd (7.57 gpm). Therefore, node J-1022 was assigned an ADD of 7.57 gpm.

There are 195 nodes in the Low Service Area, 11 of which represent major users (some major users share the same node). The ADD for the Low Service Area is approximately 512,000 gpd, of which 100,000 gpd is attributed to major users. The remaining 412,000 gpd was distributed over 184 nodes in the Low Service Area (i.e., 1.55 gpm/per node). Each of the 13 major users was assigned their individual ADD.

### 3.1.1 *Hydraulic Evaluation*

PARE used a steady state analysis to evaluate typical system pressures and the net change in system storage for the ADD and MDD scenarios. AWWA M32 recommends that a water system should have the capability of meeting system demands with system operations consisting of removing from service the largest active pump in each pump station. All remaining pumps within the pump stations may be active as required. This is consistent with Ten States, which recommends that system components be sized to provide the peak water demands with one pump in each station off-line. Therefore, PARE evaluated the system with the largest pump in each station off-line. In this case, the 650-gpm pump in the Hosmer Station was turned off. While Hosmer has an emergency backup motor for the 650-gpm pump, the pump itself is not redundant, and therefore the larger of the two pumps in the station was turned of. Both 550-gpm pumps in the Boland Station were left on because that station is equipped with a separate emergency backup pump with a capacity of 1,000-gpm, which technically is the largest pump in the station.

For the steady-state analysis, each of the three water system storage tanks were set to the bottom of their respective equalization levels, or 503 ft for Tara Road, and 482 ft for Oak Hill and Clear Hill.

The results of the steady-state analysis evaluation for existing conditions are summarized in the table below and the hydraulic model reports are attached as Appendix G.

**TABLE 3-1: System Evaluation (Steady State Analysis)**

| | Available Pressure | | | Available Fire Flow |
|---|---|---|---|---|
| | Average Day Demand | Maximum Day Demand | Peak Hour Demand | |
| High Service Area | 23 - 105 psi | 23 - 110 psi | 23 - 106 psi | 650 - 4,000 gpm |
| Low Service Area | 29 - 123 psi | 29 - 123 psi | 29 - 125 psi | 830 - 4,900 gpm |
| Tank Filling Rate (HSA) | 276 gpm | 223 gpm | - 781 gpm | |
| Tank Filling Rate (LSA) | 320 gpm | -235 gpm | -455 gpm | |

Ten States recommends that systems operate within a pressure range of 35 to 90 psi, which is consistent with the MA DEP regulations. Relative to Ten States and MA DEP regulations, it appears as though most of the system is operating within an acceptable pressure range during an ADD, MDD, and PH demand scenarios. The pressure in the High Service Area ranges from 22 to 110 psi, with 7 nodes (out of 133 nodes) falling below 35 psi and 45 nodes above 90 psi on a regular basis. The pressure in the Low Service Area ranges from 29 to 125 psi, with 1 node (out of 195 nodes) falling below 35 psi and 62 nodes above 90 psi on a regular basis.

The area of Town in the Low Service Area with low pressure is along Oak Hill Road, which is in the vicinity of the Oak Hill Tank. The ground elevation in this portion of Town ranges from 400 to 434 ft MSL. The overflow of the Oak Hill Tank is 493 ft MSL and the bottom of the normal operating range is 482, therefore the highest elevation in the Low Service Area that will routinely experience a static pressure as low as 35-psi is approximately 401 feet. Portions of the Low Service Area that experiences high pressure are areas around the Sudbury Reservoir and some areas along the Hopkinton town-line. Portions of the Low Service Area below 285 ft MSL will routinely experience pressure above 90 psi.

The area of Town in the High Service Area with low pressure is along Tara Road, which is in the vicinity of the Tara Road Tank. The ground elevation in this portion of Town ranges from 440 to 450 ft MSL. The overflow of the Tara Road Tank is 515 ft MSL and the bottom of the normal

operating range is 503 ft, therefore the highest elevation in the High Service Area that will routinely experience pressure as low as 35-psi is approximately 422 feet. There are several areas in the High Service Area that experience pressure above 90 psi, including Fisher Road and most of the area between Main Street and Rt. 9, with the exception of the area around the Tara Road tank. Portions of the High Service Area below 307 ft MSL will routinely experience pressure above 90 psi.

Appendix H provides a color-coded system map that indicates available system pressure on a maximum day.

### 3.1.2 *Supply Evaluation*

During an ADD scenario, the system pumps are able to keep up with system demand, as is evident by the net filling rate of the system storage tanks. On a MDD when the largest pump in each station is off-line, demand outpaces the pump stations' ability to supply water, as is evident by the net draining rate of the system storage tanks.

The Boland Station in the High Service Area has a capacity of approximately 1.58 MGD, or 1,100 gpm (with the largest pump off-line). The MDD for the High Service Area is approximately 1.46 MGD, or 92 percent of the station's capacity.

The Hosmer Station, in the Low Service Area, has a capacity of approximately 0.79 MGD, or 550 gpm (with the largest pump off-line). The maximum day demand for the Low Service Area is approximately 1.30 MG, or 165 percent of the station's capacity.

Based on these results, it appears as though the Boland Station has adequate, although marginal, capacity to supply the maximum day demand to the High Service Area with one-pump off-line. However, the Hosmer Station has a significant capacity deficit during a maximum day demand scenario with one pump off-line. With both pumps on-line, the station capacity of Hosmer is approximately 1.73 MGD, which is adequate for a maximum day, but provides no redundancy in the system. When the existing PRVs between the High Service Area and the Low Service Area allow water to be shared between the two service areas, the total pump station capacity in the system would be approximately 2.37 MGD, still 0.39 MGD short of the total system demand on a

maximum day (i.e., 2.76 MGD). Therefore, even if the PRVs allowed water to be shared between the two services areas, the system would have a deficit in pump station capacity.

### 3.1.3 *Storage Tank Evaluation*

The distribution system currently has 2.04 MG of storage capacity in three tanks, the Tara Road tank in the High Service Area, and the Oak Hill and Clear Hill tanks in the Low Service Area. PARE evaluated the useable storage volume in both service areas. The useable volume is defined by AWWA as the volume above an elevation that would provide a minimum of 20 psi to the entire service area. To determine the useable storage, PARE took the elevation of the highest service connection and added 46 feet (i.e., 20 psi x 2.31) to establish the minimum useable water level in the system tanks. In the High Service Area, that elevation is 450 ft. In the Low Service Area, that elevation is 415 ft. Therefore, the total useable storage area in the High Service Area is 0.52 MG, and in the Low Service Area is 0.46 MG. System-wide, useable storage is 0.98 MG, significantly less than the total storage volume.

As stated in PARE's previous report on system storage, there is no set requirement for how much storage a system must have to operate, it is typically considered prudent to size storage for normal use, fire flow events, and emergency conditions. Each system, depending on its size and the adequacy of its supply pumps, will determine how much storage is necessary to satisfy these three requirements. In this case, PARE assumed that the volume of storage dedicated to normal use (also called equalization storage) should equal approximately one-half the maximum day's demand. The portion reserved for fire flow volume should be based on a fire flow rate and duration. Typically 3,500 gpm for three-hour duration is the maximum that would be required for a largely residential system such as Southborough. Finally, a system should have adequate emergency storage to prevent serious disruptions in service in the event of a water main break or other emergency situation. In this case, PARE assumed one-half the maximum day's demand would be adequate for emergency volume.

Therefore, in the High Service Area an appropriate amount of storage would be 2.1 MG (i.e., 0.73 MG + 0.63 MG + 0.73 MG = 2.1 MG). The current useable storage in the High Service Area is 0.52 MG, significantly less than 2.1 MG.

In the Low Service Area, an appropriate amount of storage would be 1.9 MG (i.e., 0.65 MG + 0.63 MG + 0.65 MG). The current useable storage in the Low Service Area is approximately 0.46 MG, significantly less than what would be considered adequate for this service area.

### 3.1.4 *Pipe Evaluation*

AWWA Document M32 was used as a guide in evaluating the adequacy of the piping in the distribution system. AWWA suggests that pipe segments are deficient, or limiting, if the have any of the following conditions:

- Velocities greater than 5 ft/sec;
- Head losses greater than 10 ft/1,000 ft; or
- Large-diameter pipes (i.e., 16-inch or greater) having head losses greater than 3 ft/1,000 ft.

Please note that pipes inside pump stations may routinely exceed the conditions described above, given that these pipes usually carry large volumes of water. However, given that these pipe sections are generally short, the overall impact on the system is generally small, and therefore pipes inside pump stations were not considered in this evaluation.

PARE used the hydraulic model to evaluate the system's piping network. The evaluation was conducted during a PHD scenario, when pipe velocities are anticipated to be at their highest. Based on the model results, there are no water mains in the system that have velocities in excess of 5 ft/ sec. The highest velocity in the system is in the 12-inch main along the service road to Hosmer, which has a velocity of 2.25 ft/sec.

PARE also reviewed the system for critical pipe segments, or segments that provide the sole sources of water to large areas of Town, or that provide a critical path for fire flow. While not currently causing significant adverse impact on the system, there are certain critical pipes that may be undersized or may not have significant redundancy.

Provided below is a list of system pipes that are critical to the system but appear to be either undersized or do not have substantial redundancy:

1. The 12-inch water main along the access road to the Hosmer Station (1,100 lf) – this main is the sole source of supply from the Hosmer Station to the Low Service Area;
2. The 12-inch and short section of 10-inch water main on Main Street between Northborough and Deerfoot Roads (4,200 lf) – while this main does have redundancy in the system, this main provides a significant critical path for fire flow to reach the north-central portion of Town;
3. The 12-inch water main on Sears Road (3,600 lf) – this water main has no system redundancy and is the sole source of supply to the north-central portion of Town;
4. The 12-inch water main on Rt. 9 between Crystal Pond and Deerfoot Roads (1,800 lf) – this water main has some redundancy in the system; however, a break in the main could cause a serious disruption in service to customers along Rt. 9;
5. The 12-inch water main that crosses under I-495 on Main Street (400 lf) – this water main has no redundancy in the system and is the sole source of supply to customers west of I-495;
6. The 6-inch water main on Rt. 9 between Brook Lane and Oak Hill Road (1,900 lf) – this water main has redundancy in the system, but given its small diameter, it appears to be a bottleneck for fire flow in that area of Town; and
7. The 8-inch water main that crosses under I-90 at Woodland Road (300 lf) – this water main appears to be a bottleneck as it is connected to two 8-inch mains on both sides of I-90.

As part of section 6 of this report, PARE evaluated potential capital improvements to either replace these system pipes or install redundant system pipes elsewhere in the system.

Please note that the 8-inch water main on Parkerville Road between Fairview and Middle Roads (600 lf) has no significant redundancy and is the sole source of supply to the southern portion of the High Service Area. However, the Town has recently installed a new 12-inch ductile iron water main along Parkerville Road to replace the existing 8-inch main. While this new main will also be a single connection with no significant redundancy, given its age and material the likelihood of this main breaking and leaving a large portion of the High Service Area without water is low. In addition, in an emergency the Town could backfeed this portion of the High Service Area through the Parkerville Road PRV. During that emergency situation, customers in this part of the High Service Area would experience pressures approximately 10 psi lower than what they currently experience, and fire flow would be significantly reduced. However, given that this would only

occur during a short-term emergency condition, there may be no significant benefit to installing a parallel water main along Parkerville Road. Therefore, PARE is not proposing any capital improvements to address this apparent critical water main.

### 3.1.5 *Fire Flow Evaluation*

A fire flow demand that occurs during a MDD scenario is considered a limiting condition for service pumps and a piping system. Therefore, AWWA recommends that a fire flow analysis be conducted for a MDD scenario, in order to gauge a systems ability to meet critical water demands. PARE evaluated the available fire flow at each node in both service areas. As recommended by AWWA, the water level in each of the system storage tanks were set to the bottom of their equalization volumes, in order to represent a time of day when system storage tanks have been depleted by customer use. Furthermore, AWWA indicates that a water system should have the capability of meeting system demands with any one pump – preferably the largest pump – off line. Therefore, PARE evaluated the available fire flow with the emergency pump off-line in the Boland Station and with the 650-gpm pump off-line in the Hosmer Station.

The results indicated that the available fire flow in the High Service Area ranges from 625 gpm to 3,600 gpm and in the Low Service Area range from 840 gpm to 5,000 gpm. AWWA Document M31 – *Distribution System Requirements for Fire Protection*, indicates that 500 gpm is considered by some experts to be the minimum amount of water that can safely and effectively control any fire. It appears as though the system can provide at least 500 gpm to every node in the model. In addition, 290 of the total 328 system nodes have an available fire flow of 1,000 gpm or greater. Therefore, it appears as though fire flow is generally adequate in most areas of Town. Appendix I provides a color-coded system map that indicates available fire flow system-wide.

PARE conducted a separate fire flow for six specific locations that require significant fire flow volumes above 1,000 gpm. These locations, which are indicated in Table 3-2, were identified by the Insurance Services Office (ISO) as having insufficient fire flow. A copy of ISO's fire flow test reports are provided as Appendix J. Based on the model results, it appears as though the required fire flow is available at 3 of the 6 locations. Of the three locations that fire flow is not available, it appears as though existing piping in the vicinity of the locations may be undersized. In addition, it does not appear as though the PRVs are adequately contributing to the fire flow demand. Section 6 – Capital Improvements, will identify potential system improvements that could be made to provide

adequate fire flow to these locations.

**TABLE 3-2: Summary of Fire Flow Analysis**

| | Location | Needed Fire Flow based on ISO Requirements | Available Fire Flow | | |
|---|---|---|---|---|---|
| | | | Based on ISO's Flow Tests | Based on PARE's 8-07 Flow Tests | Based on Model Results |
| 1. | Marlborough Road @ St. Marks School | 2,500 gpm | 2,100 gpm** | **2,500 gpm** | **2,500 gpm** |
| 2. | Trottier School | 3,000 gpm | 1,900 gpm*** | **3,300 gpm** | 2,500 gpm |
| 3. | Mary E. Finn School | 2,250 gpm | 1,500 gpm** | 1,800 gpm | 1,550 gpm |
| 4. | Highland Street @ Parkerville Road | 1,500 gpm | 1,200 gpm** | 1,350 gpm | **1,550 gpm** |
| 5. | Mt. Vickery Road @ Cordaville Road | 3,500 gpm | 1,600 gpm** | 3,300 gpm | 1,650 gpm |
| 6. | Oregon Road @ Woodland Road | 1,250 gpm | 1,100 gpm*** | **2,100 gpm** | **1,900 gpm** |

* Results in bold text indicate that the required fire flow, as determined by ISO, is available at that location.
** ISO tests conducted in March 2002
*** ISO tests conducted in March 1990

In August of 2007, PARE conducted hydrant flow tests to verify the result of ISO's previous hydrant flow tests. PARE's hydrant flow test reports are provided as Appendix K. PARE's August 2007 hydrant flow tests consistently predicted a higher available fire flow than ISO's hydrant flow tests. The reason for this apparent discrepancy is due to the method used to conduct the hydrant flow tests. ISO uses a single hydrant methodology while PARE utilized a dual hydrant methodology. Both methods are common industry practices. A single hydrant method is generally more conservative because the test measures the drop in pressure at the flow hydrant, which includes 5 to 10 psi of pressure drop due to minor losses in the hydrant and hydrant branch. The dual hydrant method measures the drop in pressure at a residual hydrant upstream of the flow hydrant. This method does not account for losses in the hydrant or hydrant branch, and therefore usually results in a higher available fire flow. However, the dual hydrant test is a better predictor of the actual pressure in the water main, because it does not include losses in the hydrant. ISO's tests conclude that the needed fire flow is unavailable at all six locations. PARE's tests conclude that the needed fire flow is available at three locations.

The hydraulic model software utilizes a slightly different methodology to calculate available fire flow. ISO and PARE (prior to having the hydraulic model) utilized a methodology that only considers the hydrant in question and does not gauge how other areas of the system would respond

to a fire flow event. The hydraulic model considers the system as a whole and estimates the available fire flow at a single hydrant while maintaining 20 psi everywhere in the system. As a result, other areas in the system might fall below 20 psi before the subject hydrant. For example, based on PARE's hydrant flow test, the available fire flow at Mount Vickery Road and Cordaville Road is estimated to be 3,300 gpm. However, the hydraulic model estimates that the available fire flow is 1,650 gpm. The difference is because pressure along Davis Road, approximately 0.25 miles east of Cordaville Road, falls to 20 psi when the hydrant on Cordaville Road flows at 1,650 gpm. Therefore, a more conservative estimate of available fire flow would be 1,650 gpm, even though the fire department could conceivably draw more water from the system at Cordaville Road while maintaining 20 psi at that location. However, customers on Davis Road would experience pressure below 20 psi, and may even experience negative pressure under extreme conditions.

Similar to PARE's hydrant flow tests, the model does not consider losses in the hydrant and hydrant branch, which can lead to a higher available fire flow than ISO's tests. However, the model predicts the pressure in the actual water main, which is more critical to protecting public health than the pressure at the hydrant outlet. Therefore, for the purposes of this evaluation, PARE is going to utilize the results of the hydraulic model to assess which locations fire flow is available and which locations fire flow is unavailable. PARE considers the available fire flow at St. Mark's School, Highland Street, and Oregon Road to be adequate, based on the results of the model evaluation. The available fire flow at Finn School, Trottier School, and Cordaville Road is considered inadequate.

To rectify the insufficient fire flow at these three locations, the Town may need to make certain improvements to the system. These improvements will likely include upgrading certain pipe sections to larger sizes and upgrading the existing PRVs. Such capital improvements are described in detail in section 6.

### 3.1.6 *PRV Evaluation*

PARE is currently conducting an evaluation of the system's existing four PRVs. It is our understanding that the PRVs rarely open during times of peak demand and therefore don't effectively move water from the High Service Area to the Low Service Area. Golden Anderson (GA), the manufacturer of all four PRVs, states that a minimum of 10-psi pressure reduction is required for satisfactory valve operation. The static head difference between the two service areas is 22 feet, or 9.5 psi, and is therefore less than recommended by GA. This may be one reason that the

valves are not working properly. In addition, during peak water demand, the pressure difference at the inlet and outlet of the valve will vary. PARE utilized the hydraulic model, as well as pressure data collected in the field, to evaluate the upstream and downstream pressure at each valve location. Based on the data collected and the results of the hydraulic model, it appears as though typical pressure between the inlet and outlet pressure at all four PRVs ranges from 2 to 9 psi, even less than would be predicted by the static elevations of the system storage tanks.

GA also recommends that the velocity through the valve be 10-20 ft/sec, with a target velocity of 15-ft/sec. As such, PRVs are typically one to two sizes smaller than the actual line size, e.g. a 10-inch pipe might require an 8-inch or 6-inch PRV. Currently, all four PRVs are sized the same as the line size, which may be a contributing factor to their poor operation.

## 3.2 EXTENDED PERIOD ANALYSIS

While a steady state analysis is a valuable tool for evaluating system performance, it is important to understand its limitations. Because a steady state analysis provides only a "snap shot" of system performance, it cannot be used to evaluate tank fill/drain cycles, pump controls, water age, contaminant movement, etc. For these types of analyses an extended period simulation is utilized. An extended period simulation provides a dynamic evaluation of system performance over a fixed time period, usually anywhere from 24 to 72 hours. An extended period simulation can be used to determine how quickly the system tanks fill/drain, when system pumps turn on and off, the age of the water in any given section of the system, and fluctuations in pressure over the course of a given time period. In addition, an extended period simulation can be a valuable tool for predicting contaminant movement within a system, in the event that the Town experiences a contamination event. While an extended period analysis can do all these things, PARE utilized the extended period analysis primarily as a tool to measure water age in the system. However, in the event that the Town needs to conduct any of the other types of analyses described above, the model has the necessary extended period scenarios established for future evaluations.

PARE established an extended period analysis for the average day and maximum day demand scenarios. In addition, PARE created a minimum day demand scenario to evaluate water age. Typically, when system demand is lowest water age is highest, which can result in unpleasant water quality and possibly bacteriological growth at the ends of the system.

In order to perform an extended period analysis, PARE evaluated water demand over a typical

24-hour period. By reviewing pump records and tank charts for several different days between 2005 and 2007, PARE was able to evaluate the amount of water used by the Town for each hour of a typical day. The demands used during our steady state analysis were used as a base demand at each node in the model. For each hour of the day the base demand was adjusted by a peaking factor to represent the typical water demand during that time of day. For example, during the late night and early morning hours when water demand is low, the base demand on each node was multiplied by a factor less than 1 (i.e., 0.3, 0.6, 0.7, etc.). During high water demand times, such as between 7:00 am and 10:00 am and around dinnertime, the base water demand was multiplied by a factor greater than 1 (i.e., 1.25, 1.6, 1.7, etc). PARE established a unique multiplier for each hour of the day by reviewing water meter records and tank charts as described in section 2.1. Table 3-3 shows the hourly multiplier for each hour of a typical minimum, average, and maximum day scenario. Appendix L provides a graph of typical hourly peaking factors for the Town of Southborough over the course of a 24-hour period.

| TABLE 3-3: Hourly Peaking Factors | |
|---|---|
| Hour | Peaking Factor |
| 0-1 | 0.46 |
| 1-2 | 0.63 |
| 2-3 | 0.81 |
| 3-4 | 1.50 |
| 4-5 | 1.93 |
| 5-6 | 2.05 |
| 6-7 | 1.62 |
| 7-8 | 1.20 |
| 8-9 | 1.02 |
| 9-10 | 0.95 |
| 10-11 | 0.88 |
| 11-12 | 0.76 |
| 12-13 | 0.68 |
| 13-14 | 0.84 |
| 14-15 | 0.94 |
| 15-16 | 0.84 |
| 16-17 | 1.07 |
| 17-18 | 1.02 |
| 18-19 | 1.09 |
| 19-20 | 0.81 |
| 20-21 | 0.80 |
| 21-22 | 0.72 |
| 22-23 | 0.77 |
| 23-24 | 0.62 |

### 3.2.1 *Water Age Evaluation*

An important indicator in the overall performance of a system is the age of the water in the pipes, also known as the hydraulic residence time. The US Environmental Protection Agency (EPA) conducted a study in 2002 in which they reported that based on a survey of 800 utilities in the US the average hydraulic residence time was 1.3 days, with a maximum time of 3 days. The report also suggests that water age increases as the size of the system decreases. The EPA study cites one example of a system with a population of 24,000 that has a water age of 12-24 days. While there is no set requirement for minimum or maximum water age, utilities should be cognizant of their system's water age because elevated water age can lead to taste and odor complaints, increases in temperature, increases in disinfection byproducts, decreases in disinfection residual, and other water quality issues. The appropriate water age for any particular system is a function of the age and material of the pipes, the type of disinfection utilized (i.e., chloramines, chlorine, etc.), and the amount of organic matter in the system.

PARE utilized the model to estimate the age of water throughout the Southborough system. During the minimum day scenario, which is generally representative of the winter months, the oldest water in the system is located between Rt. 9 and the Hopkinton town-line, as well as the southern half of the High Service Area. Water along the Hopkinton town-line, which is the oldest in the system, ranges in age from 8-13 days. Water in the southern half of the High Service Area ranges in age from 3-11 days. During an average day scenario, water age along the Hopkinton town-line ranges from 3-5 days, and during a maximum day demand scenario, ranges from 0.5 to 3 days. However, to determine more precisely that actual water age and the impact of water age on water quality, the Town would need to undertake a more comprehensive study of hydraulic residence time, which may include trace analysis for chlorine residual and disinfection byproducts, pH, temperature, and total organic carbon.

It appears as though the age of water in the system in the winter is significantly higher than during the other months of the year. As a result, the Town could experience water quality problems along the Hopkinton town-line and in the southern half of the High Service Area. The reason water age is elevated in the winter months is that there is essentially too much water in the system and not enough demand. To decrease water age, the Town can do two things – reduce the amount of water in the system or increase system demand. It's probably impractical for the Town to reduce the amount of water in the system. In order to reduce the amount of water in the system

the Town would need to eliminate pipes, particularly large diameter pipes. However, this would have an adverse impact on fire protection Town-wide, and would eliminate service to some customers. Therefore, the Town must increase demand in order to reduce hydraulic residence time. The Town cannot mandate that customers increase their water consumption in order to reduce water age, but the Town can artificially increase demand by increasing the frequency of hydrant flushing or installing permanent blow-off valves on dead-end mains.

Therefore, PARE recommends that the Town perform an evaluation of their flushing program in order to identify the most effective means of circulating water in the southern half of Town by the Hopkinton town-line and along the western half of Rt. 9. The evaluation should consider what time of year pipes are flushed, the direction in which pipes are flushed, and the frequency of flushing.

The Town could also use this as an opportunity to create a unidirectional flushing (UDF) program, which would optimize the flushing program town-wide, not just in areas of elevated water age. The purpose of a UDF program is to optimize the Town's existing hydrant flushing program. It focuses on using the minimum amount of water to flush the system while attaining the maximum removal of sediment, bio-film, and stagnant water. The central premise behind a UDF is to move water in one direction, away from the source to the ends of the system by closing specific valves to direct the flow of water in the system. A well planned and executed UDF program can save a substantial amount of water and can significantly increase scouring velocities over a traditional flushing program. Another benefit of a UDF is that in the event of a contamination event, the UDF program can be utilized to effectively isolate and contain the contaminant outbreak and efficiently remove it from the system through flushing.

# SECTION 4.0
# SYSTEM BUILD-OUT EVALUATION

As part of our system evaluation, PARE conducted a limited build-out evaluation of the Town in order to estimate future water demands and evaluate the future needs of the distribution system. This section of the Water System Master Plan describes PARE's limited build-out evaluation of the Town; Section 5 of the Plan describes PARE's evaluation of system performance after build-out.

In order to evaluate the build-out potential of the Town, PARE reviewed several documents provided by the Town and corresponded with Ms. Vera Kolias, AICP, the Southborough Town Planner. The information reviewed by PARE includes Town of Southborough 2008 Master Plan (Town Master Plan) and a document titled 2006 Southborough Build-Out Analysis-Working Document. The Town Master Plan includes a town-wide build-out analysis, which was prepared to accurately assess local growth potential on a parcel-by-parcel basis. This data is based on the 2006 Southborough Build-Out Analysis-Working Document. The Town's parcel-by-parcel methodology reflects local knowledge about existing land use, ownership patterns, and soil conditions (for suitability for on-site septic disposal), as well as zoning (residential zoning is limited to construction of single family dwelling units). PARE used the information provided in these documents, as well as information provided by Ms. Kolias to estimate the future residential build-out in Town and the future non-residential build-out in Town.

## 4.1 RESIDENTIAL BUILD-OUT

The parcel-based analysis for residential development considers two components, maximum build-out based on vacant parcels and maximum build-out of underdeveloped parcels. Based on information presented in the Town Master Plan, at build-out an additional 475 dwelling units may be constructed on vacant parcels and 298 dwelling units may be constructed as infill development for a total additional construction of 773 residential units. Based on the average number of residential (single family) building permits issued over the previous five years (36 per year), full residential build-out will occur around 2030. The Town Master Plan indicates that at build-out, the Town-wide population is expected to be 11,721. This figure does not reflect the construction of any multifamily housing (including "assisted living" units) constructed under the 40B Comprehensive Permit program.

The Planning Department has continued to maintain a build-out database as development has been permitted. The Town reports that they currently have 431 vacant buildable residential parcels, as indicated in Table 4-1, below. This is approximately 44 less than reported in the Town Master Plan, which is a result of building permits being issued since the date of the Town Master Plan. Of the 431 parcels, 222 are located east of Route 85 in the Low Service Area and 209 are located to the west of Rt. 85 in the High Service Area. The Cordaville neighborhood south of I-90, located both east and west of Route 85, is a built-out section of town that is located within the Low Service area. Ms. Kolias indicated that there is more development pressure in the northwestern area of town (High Service Area), an area previously dominated by large agricultural tracts. This is an area with younger families than in the more mature neighborhoods to the east and south.

In 2000, the US Census reported that there were 2,952 households in Southborough. The US Census reports that between 2000 and 2008, 387 residential units were constructed in Town – 233 in the Low Service Area to the east of Rt. 85 and 154 in the High Service Area to the west of Rt. 85. Table 4-1 shows the current vacant lots in Town and the build-out potential of each service area, not including infill development, which is discussed below.

**TABLE 4-1: Existing and Projected Residential Lots**

| Service Area | US Census – Number of Households 2000 | Number of Building Permits Issued 2000 to 2008 | Current Vacant Buildable Residential Parcels | Total Number of Households at Build-out |
|---|---|---|---|---|
| East of Route 85 (Low Service Area) | 1,393 | 233 | 222 | 1,848 |
| West of Route 85 (High Service Area) | 1,559 | 154 | 209 | 1,922 |
| **TOTAL** | **2,952** | **387** | **431** | **3,770** |

To account for the additional 298 units that could be developed as infill development, PARE corresponded with the Ms. Kolias. Approximately 60 percent of the future infill development could occur in the Low Service Area and approximately 40 percent could occur in the High Service Area. Therefore, PARE assigned 179 new residential infill units to the Low Service Area and 119 new residential infill units to the High Service Area. Town-wide future residential development is estimated at 729 new residential units, including 431 currently vacant parcels and 298 potential infill units.

To estimate future residential water demand, PARE utilized the number of future residential service connections, which corresponds to the future potential residential development, or 729 new service connections. PARE made the assumption that future residential customers will use a similar amount of water as existing residential customers, or approximately 300-gpd/service connection (refer to Section 2.2). PARE then applied that water demand to the proposed 729 buildable residential lots to estimate future water demand for residential users. Table 4-2 indicates the build-out potential in the High and Low Service Areas. Town-wide, PARE estimates that future residential water demand will increase by approximately 0.22 MGD.

**TABLE 4-2: Residential Build-out Water demand by Service Area**

| Service Area | Current Vacant Buildable Parcels | Potential Infill Development | Total Number of New Service Connections | Total Future Water demand |
|---|---|---|---|---|
| Low Service Area | 222 | 179 | 401 | 120,300 gpd |
| High Service Area | 209 | 119 | 328 | 98,400 gpd |
| **TOTAL** | **431** | **298** | **729** | **218,700 gpd** |

## 4.2 NON-RESIDENTIAL BUILD-OUT

PARE utilized build-out data in chapter two of the Town Master Plan for the non-residential build-out. Given the highly variable nature of commercial and industrial development, it is difficult to predict the number of new non-residential service connections between now and build-out. Therefore, instead of estimating future non-residential water demand based on the number of new services as we did with residential water demand, PARE estimated water demand based on the land area allocated for future non-residential development. PARE's first step was to evaluate the area of land in the Town that is allocated for future non-residential development. PARE evaluated the potential non-residential build-out by reviewing the current land use and zoning in the Town and comparing that information to the future zoning of Southborough, as provided in the Town Master Plan.

The Town Master Plan concluded that approximately 428 acres of non-residential acreage is available for future development. Given the current non-residential zoning of 948 acres, approximately 45% of non-residential zoned land has significant build-out potential.

In section 2.2, PARE estimated that non-residential users consume approximately 500-gpd/acre (gross lot area). As with our residential build-out, PARE assumed that future non-residential development would be similar in nature to current non-residential development, and therefore water demand would also be similar. Therefore, PARE applied 500-gpd/acre to the proposed non-residential acreage to estimate future water demand by non-residential users. Town-wide, PARE estimates that future non-residential water demand will increase by approximately 0.21 MGD.

Please note that this demand estimate is inclusive of the development proposed on the property behind Park Central, which is located on three contiguous parcels totaling 95 acres. One proposal for this site has includes up to 220 assisted living units and 200,000 square feet (sf) of commercial space. Based on MA DEP estimates of 150 gpd per assisted living unit and an estimate of 75-gpd/1,000 sf for commercial space, PARE estimates that future water average day demand for this proposal would be approximately 48,000 gpd, or 505-gpd/acre, which is consistent with our estimate of 500-gpd/acre.

Table 4-3 illustrates average daily demand at build-out for residential and non-residential users in the Town of Southborough

**TABLE 4-3: Residential and Non-Residential Average Day Demand at Build-Out**

| | Current Water Demand | Future Water Demand | Total Future Water Demand by Type | Increase |
|---|---|---|---|---|
| Residential | 849,000 gpd | 219,000 gpd | 1,068,000 gpd | 26 % |
| Non-Residential | 240,000 gpd | 214,000 gpd | 454,000 gpd | 89 % |
| **TOTAL** | **1,089,000 gpd** | **433,000 gpd** | **1,522,000 gpd** | **40 %** |

Based on our evaluation of future land use, it appears as though water demand in Southborough may increase by almost 40 percent when the Town reaches its build-out. Currently average daily water demand is approximately 1.09 MGD, and may increase to 1.52 MGD at full build-out.

# SECTION 5.0
# FUTURE SYSTEM EVALUATION

After entering the build-out information into the model, PARE used the model to evaluate future system performance. As with the existing system evaluation, PARE evaluated an ADD, a MDD, and a PH demand scenario, as well as a fire flow analysis for a build-out condition. PARE evaluated the available pressure throughout the system, as well as the available fire flow. PARE also evaluated the performance of the system pump stations and the rate at which the system storage tanks either filled or drained during each scenario.

## 5.1 DEMAND DATABASE

PARE updated the hydraulic model demand database to reflect the addition of future water demand town-wide. In order to more accurately reflect the distribution of future water demand in the system, PARE addressed residential and non-residential water demand in two different ways.

### 5.1.1 *Residential Demand*

The future water demand added to the High Service Area for the ADD is approximately 98,400 gpd, which was distributed over the 133 nodes in the High Service area (i.e., 0.51 gpm/per node) in addition to any existing demand on those nodes. The future water demand added to the Low Service Area for the ADD is approximately 120,300 gpd, which was distributed over the 195 nodes in the Low Service Area (i.e., 0.43 gpm/per node).

### 5.1.2 *Non-Residential Demand*

To update the non-residential demand for the future system analysis, PARE assumed that the future non-residential build-out would occur only in areas currently zoned for business and/or industry and in addition would be generally limited to the parcels abutting Rt. 9. There are 43 nodes in the model along Rt. 9 that PARE assumed would represent future non-residential use. As indicated in Table 4-3, the ADD for non-residential water demand at build-out is approximately 214,000 gpd, which was distributed over 43 nodes along Rt. 9 (i.e., 3.46 gpm/per node) in addition to any existing demand on those nodes. After PARE applied the non-residential

water demand to the 43 nodes along Rt. 9, PARE utilized the same methodology as was used in the existing system evaluation to apply the future residential water demand by service area. The future water demand was subdivided in the model into the two (2) service areas, the High Service Area and the Low Service Area.

### 5.1.3 *Future Peak Demands*

PARE utilized the same peaking factors established in the sections 2.1.2 and 2.1.3 for the maximum day (2.53) and the peak hour (5.18) water demands. Table 5-1 provides the total water demand for each service area for an average day, maximum day, and peak hour demand scenario.

**TABLE 5-1: Future Water demand in Southborough by Service Area**

| | Average Day (GPD) | Maximum Day (GPD) | Peak Hour (GPD) |
|---|---|---|---|
| High Service Area | 810,000 | 2,049,000 | 4,196,000 |
| Low Service Area | 712,000 | 1,802,000 | 3,688,000 |
| **TOTAL** | **1,522,000** | **3,851,000** | **7,884,000** |

Under the existing contract with MWRA, the average annual and maximum daily limit on water withdrawals will be 475 MGY and 3.9 MGD by the end of this contract in 2016. If Southborough reaches build-out before 2016, which it is not anticipated to do, the average annual demand of the system (i.e., 556 MGY, or 1.52 MGD) would exceed the limit imposed by MWRA of 475 MGY. However, the Town will be slightly below the maximum daily limit of 3.9 MGD.

## 5.2 STEADY STATE ANALYSIS

PARE created a steady state demand scenario for the ADD, MDD, and PHD future demand scenarios. The same methodology was utilized to evaluate future build-out of the system as was used for the evaluation of the existing system, i.e., AWWA M32 was used as a guide, the largest pump in each station was off-line, etc.

### 5.2.1 *Hydraulic Evaluation*

As with the existing system evaluation, a steady state analysis was used to evaluate typical system pressures and the net change in system storage for the ADD, MDD, and PHD scenarios for the future system.

The results of the steady-state analysis evaluation are summarized in the table below and the hydraulic model reports are attached as Appendix M.

**TABLE 5-2: Future System Evaluation (Steady State Analysis)**

| | Available Pressure | | | Available Fire Flow |
|---|---|---|---|---|
| | Average Day Demand | Maximum Day Demand | Peak Hour Demand | |
| High Service Area | 23 - 105 psi | 23 - 109 psi | 22 - 105 psi | 640 - 3,600 gpm |
| Low Service Area | 29 - 123 psi | 29 - 122 psi | 28 - 124 psi | 825 - 4,850 gpm |
| Tank Filling Rate (HSA) | 124 gpm | -153 gpm | -1,207 gpm | |
| Tank Filling Rate (LSA) | 174 gpm | -599 gpm | -1,551 gpm | |

It appears as though the increase in system demand at build-out will not have a significant impact on system pressure. The results for the build-out scenario are similar to the results for the existing system. The pressure in the High Service Area ranges from 22 to 105 psi, with 8 nodes (out of 133 nodes) falling below 35 psi and 49 nodes above 90 psi on a regular basis. The pressure in the Low Service Area ranges from 29 to 124 psi, with 1 node (out of 195 nodes) falling below 35 psi and 55 nodes above 90 psi on a regular basis.

### 5.2.2 *Supply Evaluation*

During a future ADD scenario, it appears as though the existing system pumps would be able to keep up with system demand even with the largest pump in each station off-line, as is evident by the net filling rate of the system storage tanks. On a MDD when the largest pump in each station is off-line, demand significantly outpaces the pump stations' ability to supply water, as is evident by the net draining rate of the system storage tanks.

The existing capacity of the Boland Station is approximately 1.58 MGD (with the largest pump off-line). The future MDD for the High Service Area is approximately 2.05 MGD, or 130 percent of the station's capacity.

The existing capacity of the Hosmer Station is approximately 0.79 MGD (with the largest pump off-line). The maximum day demand for the Low Service Area is approximately 1.80 MG, or 228 percent of the station's capacity.

Based on these results, it appears as though both stations have a significant capacity deficit during the future maximum day demand scenario, with one pump off-line. With both pumps on-line, the station capacity of Hosmer is approximately 1.73 MGD, which is still inadequate for the future maximum day demand in the Low Service Area. In the Boland Station, there is an additional emergency backup pump, which was turned-off for this evaluation. With that pump on-line, the total station capacity would be approximately 3.02 MGD, which would be adequate for future demand in the High Service Area. However, it is unlikely that the Town would opt to run that pump in conjunction with the other two pumps, given that it needs to be manually started, which would make it difficult to keep pace with changes in demand. In addition, the station may see a reduction in overall capacity if that pump were run with the other two pumps given that it is so much larger than the other two pumps. It is anticipated that the overall station capacity would be much lower than the sum of the three pumps' rated capacity.

If the existing PRVs between the High Service Area and the Low Service Area allow water to be shared between the two service areas, the total pump station capacity would be approximately 2.37 MGD, still 1.48 MGD short of the total system demand on a maximum day (i.e., 3.85 MGD). Therefore, even if the PRVs allowed water to be shared between the two services areas, the system would have a deficit in pump station capacity.

Based on the results of this evaluation, it appears as though an increasing portion of system demand will be met through system storage. As a result, system storage will become increasingly depleted, which could have an adverse impact on system pressure and water available for fire flow. To rectify this issue, the Town should consider increasing the capacity of both system pump stations.

### 5.2.3 *Storage Tank Evaluation*

The existing deficit in system storage will become worse as the system gets built-out. Based on similar assumptions made in section 3.1.3 (i.e., equalization and emergency storage should equal approximately one-half a maximum day's demand, and fire flow storage should equal approximately 0.63 MG), the future storage requirement in the Low Service Area is approximately 2.4 MG. The future storage requirement in the High Service Area is approximately 2.6 MG. Total future system storage is approximately 5.0 MG, approximately 4.0 MG more than what is currently available system-wide.

### 5.2.4 *Pipe Evaluation*

PARE used the hydraulic model to evaluate the system's piping network after full town-wide build-out. The evaluation was conducted during a PH scenario, which is consistent with our evaluation of the existing system. Based on the model results, there are no water mains in the system that have velocities in excess of 5-ft/sec. The highest velocity in the system is in the 12-inch main along the service road to Hosmer, which has a velocity of 4.03-ft/sec.

In general, the added demand of the system at full build-out does not appear to have a significant impact on the performance of the piping system.

### 5.2.5 *Fire Flow Evaluation*

The model results indicate that the available fire flow in the High Service Area ranges from 580 gpm to 3,150 gpm and in the Low Service Area range from 840 gpm to 5,000 gpm. Therefore, it appears as though fire flow would be generally adequate in most areas of Town after full build-out, even though some areas would experience a slight reduction in available fire flow over what is available now.

# SECTION 6.0
# CAPITAL IMPROVEMENTS

The purpose of this section is to identify potential capital improvements that would help to establish long-term infrastructure redundancy and increase system supply and storage to meet the projected future demands of the system. These capital improvements are divided into two categories – functional improvements that are critical to the immediate and future reliability of the system, and operational improvements that are not critical, but provide beneficial system redundancy or make operating the system easier and more efficient.

## 6.1 FUNCTIONAL CAPITAL IMPROVEMENTS

This section describes capital improvements that are considered critical to the immediate and future reliability of the system. These capital improvements address certain system deficiencies that PARE identified during the course of our system evaluation. The deficiencies that PARE identified include:

1. There is currently a significant deficit in pump capacity in the Low Service Area. The current pump capacity in the Low Service Area is 0.79 MGD while the maximum day demand in the Low Service Area is approximately 1.3 MGD, a deficit of approximately 0.51 MGD.

2. After full town-wide build-out, there will be a substantial deficit in pump capacity in both the Low Service Area and the High Service Area. The future maximum day demand in the Low Service Area is estimated to be 1.8 MGD, approximately 1.0 MGD greater than the current pump capacity in the Low Service Area. The current pump capacity in the High Service Area is 1.58 MGD while the future maximum day demand is estimated to be 2.05 MGD, a deficit of approximately 0.47 MGD.

3. There is currently a deficit in system storage in both service areas. The High Service Area currently has 0.52 MG of useable storage, while it appears as though approximately 2.1 MG would be more appropriate, a deficit of 1.6 MG. The Low Service Area currently has 0.71

MG of useable storage. It appears as though 1.9 MG would be more appropriate for the Low Service Area, a deficit of approximately 1.2 MG.

4. After full town-wide build-out, the deficit in useable storage in the system will increase significantly. In the future, the system should have upwards of 5.0 MG, a deficit of 4.0 MG over what the system has currently.

5. Fire flow system-wide appears to be generally adequate; however, there are several facilities in Town that have significant fire flow demands that the current system cannot meet. Those facilities include the Trottier School, the Finn School, and the business district on Cordaville Road.

6. In section 3.1.4, PARE identified seven pipe segments that the Town should consider replacing or should consider installing redundant mains elsewhere in the system. Of those seven pipe segments, there are 4 that appear to be critical to the system. The pipe on Sears Road is the sole source of supply to a large portion of the High Service Area. The pipe on Main Street between I-495 and Sears Road is a critical path for fire flow to the same portion of the High Service Area. The pipe on Main Street beneath I-495 is the sole source of supply to a small neighborhood west of I-495. The pipe beneath the Hosmer Pump Station access road is the sole source of supply to the entire Low Service Area.

Table 6-1 below provides a summary of each of the deficiencies identified above and the corresponding capital improvement that PARE proposes to resolve these deficiencies.

| TABLE 6-1: Critical System Deficiencies and the Corresponding Capital Improvement | | | |
|---|---|---|---|
| Deficiency | Corresponding Capital Improvement | | |
| | Description | Report Section | Cost |
| 1. Insufficient pump capacity in the Low Service Area | Upgrade Hosmer Station - include (3) 650 gpm pumps, new generator & Automatic Transfer Switch | 6.1.1 | $ 260,000.00 |
| 2. Insufficient pump capacity in the High Service Area | Upgrade Boland Station - include (3) 750 gpm pumps, new generator & Automatic Transfer Switch | 6.1.1 | $ 300,000.00 |
| 3. Insufficient storage in the Low Service Area | Add 2.0 MG of Storage, likely at the Oak Hill and Clear Hill Tank Sites | 6.1.2 | $ 4,400,000.00 |
| 4. Insufficient storage in the High Service Area | Add 2.2 MG of Storage | 6.1.2 | $ 4,100,000.00 |
| 5. Insufficient fire flow at the Trottier School | Upgrade 2,400 lf of existing 8" water main on Flagg Road to 12" | 6.1.7 | $ 460,000.00 |
| 6. Insufficient fire flow at the Finn School | Upgrade PRV on Parkerville Road (plus recent upgrades on Parkerville Road) | 6.2.5 | $ 63,000.00 |
| 7. Insufficient fire flow near the Business District at Cordaville Road | Re-evaluate fire flow requirements and identify if improvements could be made to reduce the needed fire flow | 6.3 | NA |
| 8. No redundancy for the water main on Hosmer Station access road | Install 1,100 lf of parallel 12-inch water main | 6.1.4 | $ 200,000.00 |
| 9. Inadequate redundancy for the water main on Main Street and no redundancy on for Sears Road | Install new 12-inch water main between Presidential Drive and Fisher Road | 6.1.3 | $ 170,000.00 |
| 10. No redundancy for the water main on Main Street beneath I-495 | Install 400 lf of parallel 12-inch water main | 6.1.6 | $ 78,000.00 |

A description of each critical capital improvement, the resulting system benefit, and PARE's opinion of probable construction cost for each improvement are provided in subsequent sections of this report.

### 6.1.1 *Pump Station Upgrades*

*Boland Pump Station*

The Boland Station, which serves the High Service Area, currently has adequate capacity to serve its existing customer base. However, in the future it is anticipated that the station will have a capacity shortage of approximately 0.5 MGD. To meet future maximum day demand, the station capacity should be increased from 1.6 MGD to 2.1 MGD. Currently, the station has two 550-gpm pumps and a 1,000-gpm gasoline-fired backup pump. Given that the backup pump needs to be started manually, the station is not completely emergency-ready. PARE recommends that backup pump be replaced with an electric pump rated for 750 gpm. In addition, PARE recommends that the two 550-gpm pump be replaced with 750-gpm pumps. This would provide a capacity of 1,500 gpm (2.16 MGD) through two pumps, with a third pump for system redundancy. Please note that the pump sizes recommended by PARE are approximate; two 750-gpm pumps running together may provide slightly less than 1,500 gpm. A specific evaluation of the Boland Station would need to be completed to provide an exact pump size.

PARE also recommends that the Town install an emergency backup generator at the Boland Station. A new generator would also require the installation of an automatic transfer switch and electrical upgrades to the station. In addition, PARE recommends that the buried gasoline storage tank behind the station be removed.

PARE's opinion or probable construction cost for this capital improvement is $310,000.00. A breakdown of the cost is provided below.

| TABLE 6-2: Boland Pump Station Upgrades | | | | |
|---|---|---|---|---|
| | Quantity | Unit Price | Unit | Total |
| 1. Pumps | 3 | $ 20,000.00 | /EACH | $ 60,000.00 |
| 2. Generator/ATS | 1 | $ 70,000.00 | /LS | $ 70,000.00 |
| 3. Electrical Upgrades | 1 | $ 50,000.00 | /LS | $ 50,000.00 |
| 4. UST Removal | 1 | $ 15,000.00 | /LS | $ 15,000.00 |
| 5. Minor Structural Repairs | 1 | $ 20,000.00 | /LS | $ 20,000.00 |
| | | Sub-Total | | $ 215,000.00 |
| 6. Mobilization/Demobilization | | | | $ 21,500.00 |
| 7. Engineering/Design/Permitting (10 %) | | | | $ 22,000.00 |
| 8. Contingency (20%) | | | | $ 52,000.00 |
| | | **TOTAL** | | **$ 310,000.00** |

*Hosmer Pump Station*

The Hosmer Station, which serves the Low Service Area, currently has a capacity shortage of 0.5 MG. In the future, the capacity shortage is anticipated to be 1.0 MG. To meet future maximum day demand, the station capacity should be increased from 0.8 MGD to 1.8 MGD. Currently, the station has one 650-gpm pump, one 550-gpm pump, and a propane-fired backup engine that can drive the 650-gpm pump. Given that the backup engine only provides partial redundancy to the station, PARE recommends that engine be replaced with an electric pump with a rated capacity of 650 gpm, and we recommend that the 550-gpm pump be replaced with a 650-gpm pump, so that the station would have a total of three 650-gpm pumps (including the existing 650-gpm pump, which would remain). This would provide a capacity of 1,300 gpm (1.87 MGD) through two pumps, with a third pump for system redundancy. As with Boland, the pump sizes recommended by PARE are approximate; two 650-gpm pumps running together may provide slightly less than 1,300 gpm. A specific evaluation of the Hosmer Station would need to be completed to provide an exact pump size.

PARE would also recommend that the Town install an emergency backup generator at the Hosmer Station. At this station it is unlikely that natural gas is available, and therefore a liquid propane or diesel generator would be required. There is currently a

propane tank on-site (for the existing backup engine), which could make a propane-fired generator more economical than a diesel generator. A new generator would also require the installation of an automatic transfer switch and electrical upgrades to the station.

PARE's opinion or probable construction cost for this capital improvement is $270,000.00. A breakdown of the cost is provided below.

**TABLE 6-3 Hosmer Pump Station Upgrades**

| | Quantity | Unit Price | Unit | Total |
|---|---|---|---|---|
| 1. Pumps | 2 | $ 17,000.00 | /EACH | $ 34,000.00 |
| 2. Generator/ATS | 1 | $ 65,000.00 | /LS | $ 65,000.00 |
| 3. Electrical Upgrades | 1 | $ 50,000.00 | /LS | $ 50,000.00 |
| 4. Minor Structural Repairs | 1 | $ 20,000.00 | /LS | $ 20,000.00 |
| | | Sub-Total | | $ 169,000.00 |
| 5. Mobilization/Demobilization | | | | $ 16,900.00 |
| 6. Engineering/Design/Permitting (10 %) | | | | $ 17,000.00 |
| 7. Contingency (20%) | | | | $ 41,000.00 |
| | | **TOTAL** | | **$ 240,000.00** |

6.1.2 *System Storage Upgrades*

*High Service Area*

Currently, the High Service Area has a storage deficit of 1.6 MG. In the future, the High Service Area's storage deficit is anticipated to increase to 2.2 MG. The useable storage in the High Service Area is currently 0.52 MG, which is only a fraction of the total storage, 1.3 MG. In order to increase the useable storage, PARE recommends that the Town consider increasing the storage capacity in the High Service Area from 0.52 MG to 2.7 MG. In addition, PARE recommends that any new storage be constructed such that the bulk of the storage (at least 2.2 MG) is above an elevation of 450 ft MSL to make the storage useable.

If the Town elects to construct a standpipe style storage facility, the Town will be substantially limited in where they could locate such a tank and still provide the needed

useable storage. The Town would need to locate the tank on a parcel with a ground surface elevation at or above 450 ft. If they were to locate the new standpipe on a parcel with a ground surface elevation of less than 450 ft, the standpipe's overall height would be greater and the portion below 450 ft would be unusable, and therefore less cost-effective.

If the Town elects to construct an elevated spheroid or ellipse style tank, the Town would have more flexibility in where they place the storage facility. If, for practical purposes, we assume a maximum overall height of 100 feet, then the Town could pursue parcels with a ground surface elevation of 415 ft or above, which may open up parcels that would not be practical for a standpipe. However, elevated tanks are limited in their storage volumes and are generally 2-4 times more expensive than standpipes. If the Town opted for an elevated tank, they may need to construct multiple tanks at a much higher cost than a standpipe. Therefore, PARE recommends that the Town construct a standpipe style tank and at a location close to or higher than 450 ft.

PARE's opinion of probable construction cost to upgrade system storage in the High Service Area is $4.1M. A breakdown of the cost is provided below.

**TABLE 6-4 New Storage Tank in the High Service Area**

| | Quantity | Unit Price | Unit | Total |
|---|---|---|---|---|
| 1. Tank | 1 | $ 2,200,000.00 | /LS | $ 2,200,000.00 |
| 2. Property Acquisition | 1 | | -/LS | - |
| 3. Site Work | 1 | $ 250,000.00 | /LS | $ 250,000.00 |
| | Sub-Total | | | $ 2,450,000.00 |
| 4. Mobilization/Demobilization | | | | $ 245,000.00 |
| 5. Engineering/Design/Permitting (7%) | | | | $ 172,000.00 |
| 6. Contingency (20%) | | | | $ 573,000.00 |
| | **TOTAL** | | | **$ 3,400,000.00** |

*Low Service Area*

Currently, the Low Service Area has a storage deficit of 1.5 MG. In the future, the Low Service Area's storage deficit is anticipated to increase to 2.0 MG. The useable storage in the Low Service Area is currently 0.48 MG. In order to increase the useable storage, PARE recommends that the Town consider increasing the storage capacity in the Low Service Area from 0.48 MG to 2.5 MG. In addition, PARE recommends that any new storage be constructed such that the bulk of the storage (at least 2.0 MG) is above an elevation of 415 ft MSL, to make the storage completely useable.

As described in our evaluation of the High Service Area, it would likely be more cost effective to pursue the construction of a standpipe on a parcel with a ground surface elevation of 415 ft or higher than to construct multiple elevated style tanks on parcels with lower ground surface elevations. Therefore, PARE recommends that the Town pursue a standpipe on a parcel at elevation 415 ft.

In addition, it may be most cost-effective to replace one or both of the existing storage facilities with new tanks, rather than add a separate third tank to the system. The benefit would be that the Town already owns both parcels on which the existing tanks are located, which would save the cost of the purchasing a new parcel. Also, the two tanks in the Low Service Area are relatively old (almost 80 years) and relatively small. Therefore, PARE recommends that the Town consider replacing both of the existing storage tanks in the Low Service Area with new 1.25 MG storage facilities.

PARE's opinion of probable construction cost to upgrade storage in the Low Service Area is $4.4M. A breakdown of the cost is provided below.

| TABLE 6-5: New Storage Tank in the Low Service Area | | | | |
|---|---|---|---|---|
| | Quantity | Unit Price | Unit | Total |
| 1. Tank | 2 | $ 1,250,000.00 | /LS | $ 2,500,000.00 |
| 2. Property Acquisition (NA) | 2 | $ - | /LS | $ - |
| 3. Site Work | 2 | $ 300,000.00 | /LS | $ 600,000.00 |
| | | Sub-Total | | $ 3,100,000.00 |
| 4. Mobilization/Demobilization | | | | $ 310,000.00 |
| 5. Engineering/Design/Permitting (7%) | | | | $ 217,000.00 |
| 6. Contingency (20%) | | | | $ 725,000.00 |
| | | **TOTAL** | | **$ 4,400,000.00** |

It is important to note that, unlike the High Service Area, increasing the storage capacity in the Low Service Area may not be critical in the short-term if the Town increases the storage in the High Service Area and upgrades the system's four existing PRVs. If the Town increases storage in the High Service Area by 2.2 MG, which would serve the future needs of the High Service Area, the total useable storage in the system will increase from 1.0 MG to 3.2 MG, which is relatively close to 3.4 MG, which is an appropriate amount of storage for the entire system if it were operated as one service area. However, the Town would need to be able to shift that water from the High Service Area to the Low Service Area in order for it to be an effective solution for the Low Service Area's storage deficit. Therefore, the PRVs would need to be upgraded in order to allow water to flow from the High to the Low during peak water demand, which is when the water is needed the most. This would allow the Town to defer construction of a new storage facility(s) in the Low Service Area and focus their resources on other capital improvements.

If the Town opts to defer construction of new storage facilities in the Low Service Area, the Town could consider combining the two service areas into one service area and eliminate the need for the PRVs entirely. If the Town were able to eliminate the need for two service areas, the water system would be easier to operate and would have more inherent redundancy in piping and pumping. This would also reduce the overall storage requirements in the system because the Town would no longer need to provide separate

fire flow reserves in each area. The downside to combining the service areas is the increase in pressure it would create in areas of the Low Service Area that already have high pressure. Although the static head difference between the two service areas is only about 22 ft, or 9.5 psi, and therefore, the increase in pressure may not be that significant (refer to Appendix N for a combined system pressure plan). Those customers with excessively high pressure could have PRVs installed at their homes or businesses.

### 6.1.3 *Water Main between Presidential Drive and Fisher Road*

This capital improvement consists of installing approximately 1,000 linear feet (lf) of new 12-inch DI water main between the end of Fisher Road and Presidential Drive in the High Service Area. This capital improvement would provide significant system redundancy for two critical system water mains, the 12-inch main on Main Street and the 12-inch main on Sears Road. If the water main on Sears Road were taken off-line, customers north of Main Street in the High Service Area would be entirely without water, making Sears Road a critical water main. If the water main on Main Street were taken off-line, customers in the High Service Area north of Main Street would still have water, but would have substantially reduced fire flow. Currently, the available fire flow in the High Service Area north of Main Street ranges from 625 to 1,600 gpm. Without the water main on Main Street, the available fire flow would be less than 300 gpm. However, with the addition of this capital improvement, the available fire flow would range from 800 to 1,375 gpm without the water main on Main Street; 1,000 to 2,225 gpm with the water main on Main Street. Therefore, this capital improvement would provide a substantial benefit to the water system.

There are three primary challenges to this capital improvement – 1) the Town would need to secure an easement between Fisher Road and Presidential Drive as there is currently no public right-of-way, 2) the Town would need to cross an existing railroad track, which would require coordination with the rail owner, and 3) the anticipated future alignment is densely wooded, which would add cost to the installation.

PARE's opinion or probable construction cost for this capital improvement is $370,000.00, not including the cost to secure an easement across the railroad tracks. A breakdown of the cost is provided below.

| TABLE 6-6: 12" Water Main between Presidential Drive and Fisher Road | | | | | |
|---|---|---|---|---|---|
| | Quantity | Unit Price | Unit | | Total |
| 1. Water Main Installation (Roadway) | 900 | $ 150.00 | /LF | $ | 135,000.00 |
| 2. Clearing and Grubbing | 0.41 | $ 5,000.00 | /ACRE | $ | 2,050.00 |
| 3. Rock Removal | 100 | $ 185.00 | /SY | $ | 18,500.00 |
| 4. Railroad Crossing | 85 | $ 1,000.00 | /LF | $ | 85,000.00 |
| 5. License Agreement with Rail Company | 1 | $ 15,000.00 | /LS | $ | 15,000.00 |
| | | Sub-Total | | $ | 255,550.00 |
| 6. Mobilization/Demobilization | | | | $ | 25,600.00 |
| 7. Engineering/Design/Permitting (10 %) | | | | $ | 26,000.00 |
| 8. Contingency (20%) | | | | $ | 61,000.00 |
| | | **TOTAL** | | **$** | **370,000.00** |

6.1.4 *Water Main on Hosmer Pump Station Access Road*

This capital improvement consists of installing approximately 1,100 lf of 12-inch DI water main along the access road to the Hosmer Station, from the station to the access road south of the golf course. Currently, the existing 12-inch main provides the sole source of supply from the Hosmer Station to the Low Service Area. If this main were off-line, there would be a serious disruption in service to the entire Low Service Area. Therefore, this water is a critical system component. An additional 12-inch water main would provide significant system redundancy.

PARE's opinion or probable construction cost for this capital improvement is $320,000.00. A breakdown of the cost is provided below.

| TABLE 6-7: 12" Water Main beneath Hosmer Station Access Road | | | | | |
|---|---|---|---|---|---|
| | Quantity | Unit Price | Unit | | Total |
| 1. Water Main Installation | 1,100 | $ 150.00 | /LF | $ | 165,000.00 |
| 2. Rock Removal | 122 | $ 185.00 | /CY | $ | 22,570.00 |
| 3. Pavement | 611 | $ 56.00 | /SY | $ | 34,216.00 |
| | | Sub-Total | | $ | 221,786.00 |
| 5. Mobilization/Demobilization | | | | $ | 22,200.00 |
| 6. Engineering/Design/Permitting (10%) | | | | $ | 22,000.00 |
| 7. Contingency (20%) | | | | $ | 53,000.00 |
| | | **TOTAL** | | **$** | **320,000.00** |

6.1.5 *Water Main on Main Street under I-495*

This capital improvement consists of installing approximately 400 lf of new 12-inch DI water main on Main Street beneath the I-495 overpass. This water main is the sole source of supply to a small neighborhood on the west side of I-495. The primary benefit of this water main would be the redundancy it would provide in the event that the existing water main along Main Street were off-line.

PARE's opinion or probable construction cost for this capital improvement is $119,000.00. A breakdown of the cost is provided below.

| TABLE 6-8: 12" Water Main on Main Street at I-495 Crossing | | | | | |
|---|---|---|---|---|---|
| | Quantity | Unit Price | Unit | | Total |
| 1. Water Main Installation | 400 | $ 150.00 | /LF | $ | 60,000.00 |
| 2. Rock Removal | 44 | $ 185.00 | /CY | $ | 8,140.00 |
| 3. Pavement | 222 | $ 56.00 | /SY | $ | 12,432.00 |
| 4. Traffic Protection | 6 | $ 400.00 | /DAY | $ | 2,400.00 |
| | | Sub-Total | | $ | 82,972.00 |
| 5. Mobilization/Demobilization | | | | $ | 8,300.00 |
| 6. Engineering/Design/Permitting (10%) | | | | $ | 8,000.00 |
| 7. Contingency (20%) | | | | $ | 20,000.00 |
| | | **TOTAL** | | **$** | **119,000.00** |

6.1.6 *Water Main on Flagg Road between Lovers Lane and the Trottier School*

This capital improvement consists of replacing approximately 4,300 lf of 8-inch main on Flagg Road between Lovers Lane and Strawberry Hill Road with 12-inch DI pipe. The primary purpose of this capital improvement is to increase fire flow to the Trottier School. Currently, the available fire flow at the School is approximately 2,500 gpm, approximately 500 gpm less than what ISO recommends. Upgrading this pipe to 12-inch diameter pipe will increase the available fire flow at the School to 3,000 gpm.

PARE's opinion or probable construction cost for this capital improvement is $1,280,000.00. A breakdown of the cost is provided below.

| TABLE 6-9 12" Water Main on Flagg Road | | | | | |
|---|---|---|---|---|---|
| | Quantity | Unit Price | Unit | | Total |
| 1. Water Main Installation | 4,300 | $ 150.00 | /LF | $ | 645,000.00 |
| 2. Rock Removal | 478 | $ 185.00 | /CY | $ | 88,430.00 |
| 3. Pavement | 2,389 | $ 56.00 | /SY | $ | 133,784.00 |
| 4. Traffic Protection | 58 | $ 400.00 | /DAY | $ | 23,200.00 |
| | Sub-Total | | | $ | 890,414.00 |
| 5. Mobilization/Demobilization | | | | $ | 89,000.00 |
| 6. Engineering/Design/Permitting (10 %) | | | | $ | 89,000.00 |
| 7. Contingency (20%) | | | | $ | 214,000.00 |
| | **TOTAL** | | | **$** | **1,280,000.00** |

## 6.2 OPERATIONAL CAPITAL IMPROVEMENTS

This section describes capital improvements that are considered non-critical to the immediate and future reliability of the system, but would provide a benefit to the system through additional redundancy, increased efficiency, or ease of maintenance.

### 6.2.1 *SCADA System Installation*

The installation of a Supervisory Control and Data Acquisition (SCADA) System would promote more efficient operation of the distribution system. A SCADA system provides real-time data collection and monitoring of critical system components, such as tanks and pumps. Currently, the Town has no means of collecting real-time data at their pump stations or tanks, other than alarms installed at the pump stations. The Town relies on system operators visiting the pump stations and reading pen-type chart recorders on a daily basis. Then and only then do the system operators have the information necessary to make decisions about system operations, such as manually adding another pump to fill system storage tanks, taking a pump off-line if it appears to be malfunctioning, overriding pump cycles to promote balanced pump use, or manually drawing down a tank to promote water circulation. The current system is labor intensive and is not well suited for making real-time adjustments to meet changes in system demand. A SCADA system would allow the Town to monitoring their facilities from one centralized location and could

facilitate certain system operations remotely, such as the operation of the system's PRVs. A typical SCADA system would allow the Town to manually turn on and off pumps, monitor storage tank levels, open or close the system PRVs, etc. A SCADA system could also be expanded to monitor water quality in the tank, pump stations, or even in the distribution system.

Typical SCADA components can be grouped into essentially three categories, monitoring equipment, communication equipment, and operational equipment. The monitoring equipment typically includes the components used to measure system parameters such as flow, pressure, temperature, run status, etc. Communication equipment typically includes the instrumentation necessary to log field parameters and send that information back to a centralized location. The communication equipment also receives information from a central location and disseminates that information to the process equipment. The operational equipment typically includes the HMI, or Human Machine Interface, which is the apparatus that displays system data to the system operator and allows the operator to remotely control system components.

For the Southborough system, the minimum amount of monitoring equipment that would be required is anticipated to include level transmitters at the three system storage tanks, flow and pressure transmitters at the two pump station, electrical monitoring equipment at the pump stations to determine such parameters as pump run status, and pressure transducers at the PRV vaults. Alarm equipment would also be required, such as fire alarms, intrusion alarms, and various "trouble" alarms that indicate equipment failure. Southborough currently owns much of this equipment, so upgrading to SCADA would require retrofitting this equipment to make it SCADA ready.

The communication equipment that would be required would include five remote telemetry units (RTUs), one at each tank and both pump stations. The RTUs are the SCADA components that send and receive process control signals back and forth between the system components and the operators' control station. The RTUs can communicate through radio, telephone, or Ethernet, depending on which system is most cost-effective for a particular system. All five RTUs would relay information back and forth to a master telemetry unit (MTU), which would be located at central location, such as the DPW Garage. In addition, programmable logic controls (PLCs) would be required at both pump stations to compile the various data signals from the process equipment and disseminate basic logic commands to the process equipment.

The operational equipment required would be an operator workstation at a centralized location, likely the DPW Garage. The workstation would include apparatus to monitor system components and send out process commands. This equipment is usually limited to a computer workstation, with perhaps extra displays to monitor various components at once.

PARE's opinion of probable construction costs to install a SCADA system is $400,000.00. A breakdown of the cost is provided below.

**TABLE 6-10: SCADA Installation**

| | Quantity | Unit Price | Unit | | Total |
|---|---|---|---|---|---|
| 1. SCADA System, complete and installed | 1 | $ 300,000.00 | /LS | $ | 300,000.00 |
| | | Sub-Total | | $ | 300,000.00 |
| 2. Engineering/Design/Permitting (10%) | | | | $ | 30,000.00 |
| 3. Contingency (20%) | | | | $ | 66,000.00 |
| | | **TOTAL** | | **$** | **400,000.00** |

6.2.2 *Water Main on Woodland Road at the I-90 Crossing*

The existing water main on Woodland Road at the I-90 crossing is an 8-inch DI pipe. This main connects to two 8-inch mains on either side of I-90, and therefore appears to be a bottleneck. However, when PARE evaluated the contribution this pipe provides to the Low Service Area, it appears to be fairly small. There are currently three other pipes that cross I-90 and bring water to the southern half of the Low Service Area, although one is a connection to the High Service Area and therefore does not contribute on a regular basis. During normal conditions, the Woodland Road pipe contributes approximately 15 percent of the total flow to the southern half of the Low Service Area. If upgraded to a 12-inch pipe, its relative contribution would remain around 15 percent. This is due in large part to the fact that the closest system storage tank, the Oak Hill Tank, is connected directly to a 12-inch main on Walnut Drive in close proximity to I-90. As a result, a disproportionate amount (i.e., 75 percent) of flow travels through the pipe on Walnut Drive and into the southern half of the Low Service Area.

If the pipe on Walnut Drive were off-line, the relative contribution of the Woodland Road pipe would increase to 68 percent, 70 percent if it were upgraded to 12-inches.

It does not appear as though upgrading the Woodland Road water main will significantly increase the available fire flow to the southern half of the Low Service Area. However, if the 12-inch main on Walnut Drive were off-line, this main would provide important redundancy to the southern half of the Low Service Area.

PARE's opinion of probable construction cost for this capital improvement is $78,000.00. A breakdown of the cost is provided below.

**TABLE 6-11: 8" Water Main on Woodland Road at I-90 Crossing**

| | Quantity | Unit Price | Unit | | Total |
|---|---|---|---|---|---|
| 1. Water Main Installation | 300 | $ 125.00 | /LF | $ | 37,500.00 |
| 2. Rock Removal | 33 | $ 185.00 | /CY | $ | 6,105.00 |
| 3. Pavement | 167 | $ 56.00 | /SY | $ | 9,352.00 |
| 4. Traffic Protection | 4 | $ 400.00 | /DAY | $ | 1,600.00 |
| | | Sub-Total | | $ | 54,557.00 |
| 5. Mobilization/Demobilization | | | | $ | 5,500.00 |
| 6. Engineering/Design/Permitting (10%) | | | | $ | 5,000.00 |
| 7. Contingency (20%) | | | | $ | 13,000.00 |
| | | **TOTAL** | | **$** | **78,000.00** |

6.2.3 *Water Main on Rt. 9 between Crystal Pond and Deerfoot Roads*

This capital improvement consists of installing approximately 1,800 lf of new 12-inch DI water main on the south side of Rt. 9 between Crystal Pond and Deerfoot Roads. This capital improvement would provide redundancy to the existing 12-inch water main on the north side of Rt. 9. If the main on the north side of Rt. 9 were off-line, customers south of Rt. 9 would still get water; however, their available fire flow would be significantly reduced. Currently, the available fire flow south of Rt. 9 ranges from 700 to 1,000 gpm. If the existing water main on the northern side of Rt. 9 were off-line, the available fire flow south of Rt. 9 would be less than 300 gpm. However, it doesn't appear as though the addition of this water main will substantially increase the available fire flow south of Rt. 9 above what it is currently.

The primary challenge of this capital improvement is that the work would need to be done in a State roadway (i.e., Rt. 9). As such, the State would likely require a thicker pavement profile than in a Town roadway and would require controlled density fill (CDF) in lieu of traditional backfill, both of which would add cost to the project. In addition, given the busy nature of Rt. 9, there may be restrictions on the hours during the day that construction can occur, and added traffic protection may be required.

PARE's opinion or probable construction cost for this capital improvement is $760,000.00. A breakdown of the cost is provided below.

**TABLE 6-12: 12" Water Main on Rt. 9 between Crystal Pond and Deerfoot Roads**

| | Quantity | Unit Price | Unit | | Total |
|---|---|---|---|---|---|
| 1. Water Main Installation | 1,800 | $ 150.00 | /LF | $ | 270,000.00 |
| 2. Control Density Fill | 1,000 | $ 150.00 | /SY | $ | 150,000.00 |
| 3. Rock Removal | 200 | $ 185.00 | /CY | $ | 37,000.00 |
| 4. Pavement | 1,000 | $ 56.00 | /SY | $ | 56,000.00 |
| 5. Traffic Protection | 36 | $ 400.00 | /DAY | $ | 14,400.00 |
| | | Sub-Total | | $ | 527,400.00 |
| 6. Mobilization/Demobilization | | | | $ | 52,700.00 |
| 7. Engineering/Design/Permitting (10%) | | | | $ | 53,000.00 |
| 8. Contingency (20%) | | | | $ | 127,000.00 |
| | | **TOTAL** | | **$** | **760,000.00** |

6.2.4 *PRV Upgrades*

All four PRVs, when working properly, would provide a substantial benefit to the system. Fully functioning PRVs would allow the system to act more like one system and less like two separate pressure zones. The PRVs would allow water to be shared between the two service areas, which would reduce the pump capacity and storage deficit that currently exists in the Low Service Area, and would reduce the system-wide pumping and storage deficit that is anticipated at full build-out.

PARE evaluated two PRVs individually because they are anticipated to contribute significantly to a localized fire flow requirement at two locations. The Parkerville Road PRV is adjacent to the Finn School, and the Mt. Vickery Road PRV is located adjacent to the Cordaville Road business district, both of which have the highest fire flow requirements in town.

*Parkerville Road PRV*

The Parkerville Road PRV is an 8-inch PRV located just south of I-90 on Parkerville Road, adjacent to the Finn School. The primary benefit of this PRV is its proximity to the Finn School, which has a high fire flow requirement. Currently, the Finn School requires approximately 2,250 gpm for fire flow, but based on our evaluation only has approximately 2,150 gpm available. It is our understanding that Southborough recently upgraded the water main on Parkerville from an 8-inch to a 12-inch pipe from Rt. 9 to Middle Road. It appears as though this pipe upgrade, along with a working PRV, would contribute enough flow to the Low Service Area during a fire event to supply adequate fire flow to the Finn School. The combination of these two capital improvements would increase the available fire flow at the Finn School to approximately 2,500 gpm.

*Mount Vickery Road PRV*

The Mount Vickery PRV is located in a grassed area to the northwest of the intersection of Cordaville Road (Rt. 85) and Mt. Vickery Road. The primary benefit of this PRV is its proximity to the Cordaville Road business district, including the Public Works garage and the transfer station. Currently, this area requires approximately 3,500 gpm for fire flow, but based on our evaluation only has approximately 1,650 gpm available. A properly functioning PRV could contribute up to 750 gpm to the Cordaville area in a fire event, with the existing piping. While this does not completely make up the difference between what is needed and what is available, this PRV could contribute significantly to the fire flow in that area.

| TABLE 6-13: PRV Upgrades | | | | |
|---|---|---|---|---|
| | Quantity | Unit Price | Unit | Total |
| 1. Ledge Hill Road | 1 | $ 50,000.00 | /LS | $ 50,000.00 |
| 2. Parkerville Road | 1 | $ 50,000.00 | /LS | $ 50,000.00 |
| 3. Town Square | 1 | $ 50,000.00 | /LS | $ 50,000.00 |
| 4. Mount Vickery Road | 1 | $ 50,000.00 | /LS | $ 50,000.00 |
| | | Sub-Total | | $ 200,000.00 |
| 5. Mobilization/Demobilization | | | | $ 20,000.00 |
| 6. Engineering/Design/Permitting (10%) | | | | $ 20,000.00 |
| 7. Contingency (20%) | | | | $ 48,000.00 |
| | | **TOTAL** | | **$ 290,000.00** |

6.2.5 *Water Main on Rt. 9 between Willow Street and Winter Street*

This capital improvement consists of installing approximately 2,400 lf of new 8-inch DI water main on the north side of Rt. 9 between Willow Street and Winter Street. It also consists of upgrading approximately 2,500 lf of existing 6-inch and 8-inch water main on the south side of Rt. 9 to 12-inch pipe. The existing 6-inch water main on the south side of Rt. 9 is from Willow Street to Oak Hill Road and the existing 8-inch water main is from Oak Hill Road to Winter Street. A new 12-inch water main on the north side of Rt. 9 would provide redundancy in the system. This capital improvement will also upgrade the existing water main on the south side of Rt. 9, which would provide an increased flow through this section of water main. However, it does not appear as though the existing water main on the south side of Rt. 9 is a critical system main as there is already some redundancy in the system in that area.

PARE evaluated the available fire flow south of Rt. 9 in the Low Service Area, which ranges from 850 to 5,000 gpm. With the upgrades to the existing water main on the south side of Rt. 9 and the installation of new water main on the north side of Rt. 9, there is little to no increase in the available fire flow. Therefore, it doesn't appear as though this capital improvement will substantially increase the available fire flow south of Rt. 9 above what it is currently.

# SECTION 7.0
# CONCLUSIONS AND RECOMMENDATIONS

## 7.1 CONCLUSIONS

Based on the results of PARE's system evaluation, the Southborough water distribution system is, in general, adequately serving its current customer base. System pressure and fire flow appear to be generally adequate. Most customers experience pressure between 35 and 90 psi and have over 1,000 gpm of available fire flow. However, there are some areas of Town that experience pressure below 35-psi on a regular basis, although those areas are limited to small areas in the immediate vicinity of the system storage tanks. No customers experience pressure below 20-psi on a regular basis. System-wide fire flow ranges from 625 gpm to more than 5,000 gpm, which is generally adequate in a primarily residential system such as Southborough.

However, the results of our evaluation indicate that currently there are three primary system deficiencies, which are;

- There is currently a significant deficit in pump capacity (i.e., 0.51 MGD) in the Low Service Area;
- There is currently a deficit in system storage in both service areas. The High Service Area has a deficit of approximately 1.6 MG. The Low Service Area has a deficit of approximately 1.2 MG; and
- There are three facilities in Town that have significant fire flow demands that the current system cannot meet. Those facilities include the Trottier School, the Finn School, and the business district on Cordaville Road.

In addition, in section 3.1.4, PARE identified nine pipe segments that the Town should consider replacing or should consider installing redundant mains elsewhere in the system. While these mains are not currently adversely impacting system performance, they are either undersized or pose a risk to the system if they are taken off-line. Of those nine pipe segments, there are 5 that appear to be critical to the system. The pipe on Sears Road is the sole source of supply to a large portion of the High Service Area. The pipe on Main Street between I-495 and Sears Road is a critical path for fire flow to the same portion of the High Service Area. The pipe on Main Street

beneath I-495 is the sole source of supply to a small neighborhood west of I-495. The pipe beneath the Hosmer Pump Station access road is the sole source of supply to the entire Low Service Area.

PARE also evaluated the performance of the system after the Town reaches build-out. While the Town is already approaching full build-out under their current zoning ordinance, PARE anticipates that the Town-wide demand could increase by a much as 40 percent. This large increase in water demand is primarily due to the potential build-out of non-residential parcels, particularly along Rt. 9. Water demand among non-residential parcels is anticipated to almost double (i.e., 89 percent increase) at build-out, while residential water demand is anticipated to increase by only 26 percent. The increase in water demand is anticipated to exacerbate the existing system deficiencies. Specifically, after full town-wide build-out, there will be a substantial deficit in pump capacity in both the Low Service Area (i.e., 1.0 MGD) and the High Service Area (i.e., 0.47 MGD). In addition, after full town-wide build-out, the deficit in useable storage in the system will increase significantly, to approximately 4.0 MG over what the system has currently.

## 7.2 RECOMMENDATIONS

PARE has three recommendations for the Town;

1. Institute a capital improvements program to address the immediate and long-term needs of the system;
2. Perform an evaluation of the Town's flushing program to address water quality concerns in the winter (this could also include the development of a unidirectional flushing program); and
3. Evaluate whether it is more cost effective to construct a new storage facility in the vicinity of Cordaville and Mt. Vickery Roads, or if it is more cost effective to pursue localized upgrades to facilities in this area for the purpose of reducing the fire flow requirement.

An expanded explanation of each recommendation is provided below.

### 7.2.1 *Capital Improvement Program*

To address the existing system deficiencies, and to ensure the long-term adequacy and reliability of the distribution system, PARE recommends the Town establish a long-term capital improvements program. The program should have the dual purpose of addressing the immediate needs of the distribution system as well as addressing the system's long-term needs. The program should prioritize capital improvements based on which improvements would provide the maximum benefit for the least cost and which ones would address the most critical system deficiencies. At the top of the list of potential improvements should be the functional capital improvements outlined in section 6.1, followed by the operational capital improvements outlined in section 6.2. However, there may be some operational improvements that could be completed relatively inexpensively that may provide an immediate benefit to the Town. For example, the development of a SCADA system in conjunction with upgrading the PRVs could address, to a degree, the pump capacity deficit in the Low Service Area by allowing the High Service Area to supply the Low Service Area in times of peak demand. For that reason, upgrading the PRVs and developing a SCADA system would be high on the priority list even though both improvements are considered operational rather than functional.

Conversely, there may be some functional capital improvements that are expensive and require extensive planning, such as increasing system storage, which might be given a lower priority in the capital improvements program. The Town may find that their resources are better spent on less expensive system improvements that provide system redundancy and that can be completed in the immediate future, such as a new water main between Fisher Road and Presidential Drive. Also, the Town may opt to wait on constructing new storage facilities until they have a better sense of the disposition of system build-out over the next few years. That would provide the Town the opportunity to better assess the required volume of system storage. In that time, the Town could also assess whether or not it makes sense to combine the Low Service Area and the High Service Area, which would impact both the size and elevation of future system storage tanks.

At a minimum PARE recommends that the Town include the capital improvements listed below in their future capital improvements program. Please note that the order listed below does not necessarily reflect PARE's opinion as to the priority in which these improvements should be completed. We recommend that the Town evaluate these capital improvements, with assistance

from PARE, and determine which improvements would provide the greatest benefit to the Town in the short-term and which are more suitable as long-term improvements.

1. Install a new 12-inch water main between Presidential Drive and Fisher Road;
2. Develop a town-wide SCADA system;
3. Upgrade existing PRVs and vaults;
4. Upgrade the Boland Pump Station;
5. Upgrade system storage in the High Service Area;
6. Upgrade Hosmer Pump Station;
7. Install a new 12-inch water main along the access road to the Hosmer Pump Station;
8. Install a new 12-inch water main on Flagg Road between Lovers Lane and the Trottier School;
9. Install a new 12-inch water main on Main Street across I-495;
10. Upgrade system storage in the Low Service Area;
11. Install a new 8-inch water main on Woodland Road at I-90 Crossing;
12. Install a new 12-inch water main on Rt. 9 between Crystal Pond and Deerfoot Roads; and
13. Install parallel 8-inch and 12-inch water mains on Rt. 9 between Willow Street and Winter Street.

### 7.2.2 *Flushing Program Evaluation*

PARE recommends that the Town perform an evaluation of their flushing program in order to identify the most effective means of circulating water in the southern half of Town by the Hopkinton town-line and along the western half of Rt. 9. The evaluation should consider what time of year pipes are flushed, the direction in which pipes are flushed, and the frequency of flushing.

The Town could also use this as an opportunity to create a unidirectional flushing (UDF) program, which would optimize the flushing program town-wide, not just in areas of elevated water age. A well planned and executed UDF program can save a substantial amount of water and can significantly increase scouring velocities over a traditional flushing program. Another benefit of a UDF is that if the Town experiences a contamination event, the UDF program can be utilized to effectively isolate and contain the contaminant outbreak and efficiently remove it from the system through flushing.

### 7.2.3 *Cordaville Road and Mt. Vickery Road Fire Flow Evaluation*

PARE recommends that the Town conduct a cost-benefit analysis to identify the most practical means of attaining adequate fire flow in the area of Cordaville Road and Mt. Vickery Road. This analysis should consider if it is more cost effective to construct a new storage facility in the vicinity of the DPW Garage or if it is more cost effective to make localized improvements to structures in the area that could reduce the needed fire flow. PARE recommends that the Town work with the Fire Department and consult with ISO on ways to reduce the needed fire flow in this area.

# REFERENCES


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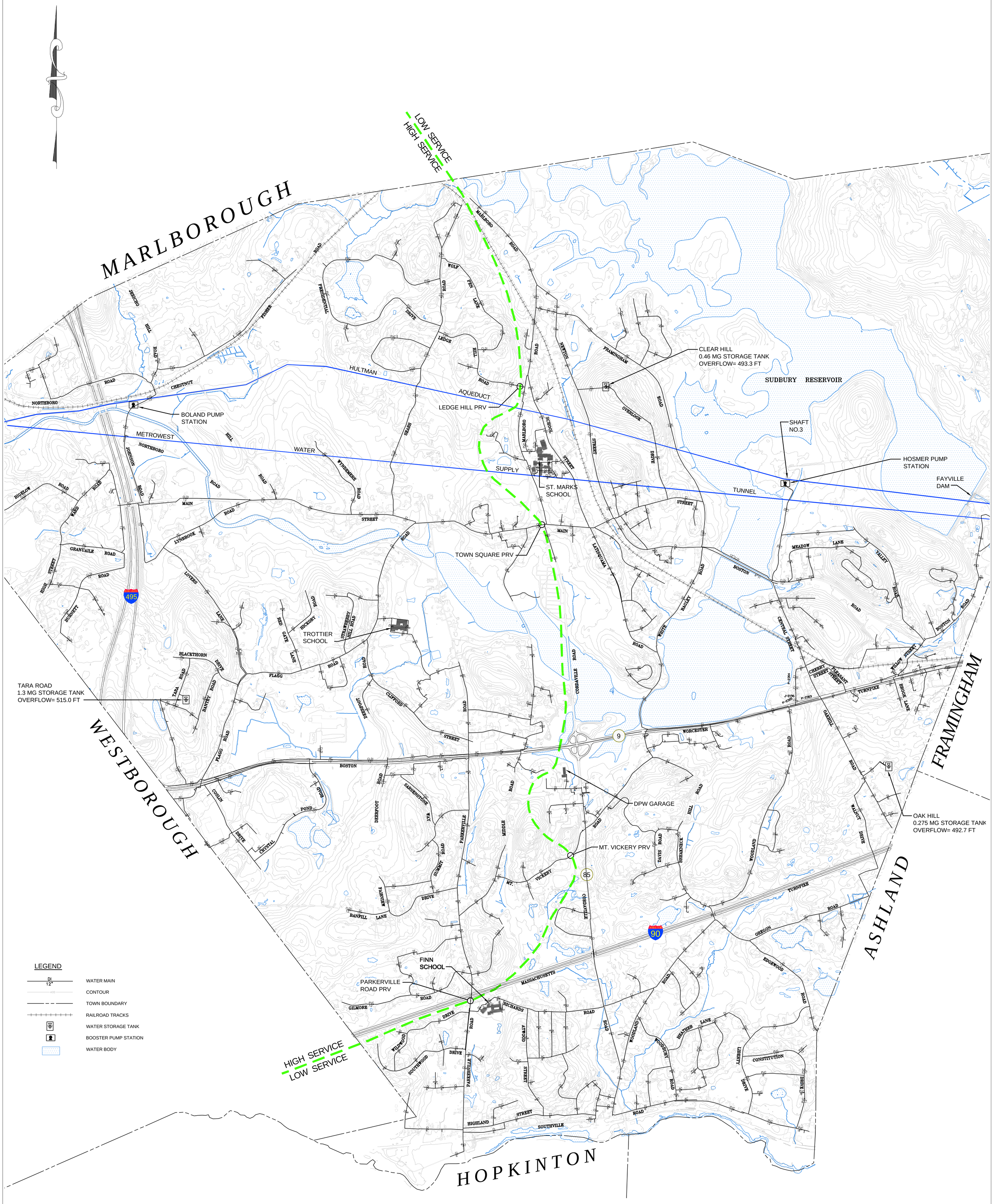
Water Supply Continuation Agreement Between The Massachusetts Water Resources Authority and The Town of Southborough, April 2008

# APPENDIX A

# WATER SYSTEM MAP




PARE CORPORATION
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LINCOLN, RI 02865
401-334-4100

# TOWN OF SOUTHBOROUGH
# WATER SYSTEM MASTER PLAN

SOUTHBOROUGH, MASSACHUSETTS

| REVISIONS: | | |
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| PROJECT NO.: | 08176.01 |
| DATE: | FEBRUARY 2009 |
| SCALE: | 1"=800' |
| DESIGNED BY: | KLM |
| CHECKED BY: | TPT |
| DRAWN BY: | AKL |
| APPROVED BY: | RPS |

DRAWING TITLE:
WATER SYSTEM MAP

DRAWING NO.: 1

SHEET NO. 1 OF 1

# APPENDIX B

# MWRA WATER USE AGREEMENT

# WATER SUPPLY CONTINUATION AGREEMENT

# BETWEEN

# THE MASSACHUSETTS WATER RESOURCES AUTHORITY

# AND

# THE TOWN OF SOUTHBOROUGH

This Water Supply Continuation Agreement ("Agreement") by and between the Massachusetts Water Resources Authority (the "MWRA") and the Town of Southborough (the "Town"), (hereinafter jointly referred to as the "Parties"), documents the intentions and understanding of the Parties regarding the arrangement whereby the MWRA will continue to supply water to the Town and the Town will purchase a portion of its water supply from the MWRA water supply system.

## RECITALS

R.1. Whereas, MWRA was created in 1984 by chapter 372 of the Acts of 1984 (the "Act") to operate, regulate, finance, and modernize the waterworks and sewerage systems serving the greater metropolitan Boston area;

R.2. Whereas, MWRA currently provides water supply and distribution services and wastewater collection and treatment services, to certain cities, towns and special service districts (the "Communities") within its service area;

R.3. Whereas, MWRA desires to continue to provide safe and sufficient water supplies to the Town and to provide system-wide assistance to help protect and conserve water supplies;

R.4. Whereas, Section 8 (d) of the Act permits the MWRA to enter into an arrangement to provide for the continued delivery of water to a Community if specified requirements are met.

R.5. Whereas, a regulation entitled "Continuation of Contract Water Supply", promulgated by the MWRA at 360 C.M.R. 11.00 and most recently revised on November 18, 1994, (the "Regulation") defines more specifically the requirements of section 8(d) of the Act and governs the continued delivery of water by the MWRA to the communities purchasing water from the MWRA;

R.6. Whereas, the Town executed a contract dated January 27, 1977 for the purchase of water from the MDC, which contract, remained in effect until January 26, 1997.

R.7. Whereas, the 1977 contract assured the Town that it could obtain a portion of its water supply from the MWRA system and also provided that the Town was entitled to take a daily quantity of one hundred and fifty thousand gallons of water per day free of charge in accordance with the provision of Chapter 644 of the Acts of 1941;

R.8. Whereas the Town and MWRA entered into a Memorandum of Agreement ("MOA") in 1997 regarding mitigation measures to be implemented by the MWRA in connection with the construction by the MWRA of the MetroWest Water Supply Tunnel in Southborough that provided for the Town's receipt of a total of three hundred thousand gallons of water per day free of charge from the MWRA water supply system.

R.9. Whereas, the Town and MWRA subsequently executed a new contract for the purchase of water from the MWRA in May, 1999, which by its terms, expired on January 26, 2006;

R.10. Whereas, the Town, pursuant to the Regulation, has requested from the MWRA that its water supply be continued and has submitted a continuation request and a Supplementary Report including a supply analysis, a demand analysis, a water management plan, an ordinance for the protection of local sources, and a description of the local user charges system and accounting system which meet the Regulation's requirement for conservation based rates; and

R.11. Whereas, the Town has Drought By-law Provisions, Chapter 162 of the Southborough Code, and has developed a schedule for development of a contingency plan to reduce water in case of drought or emergency;

R.12. Whereas, based on its review of the submittals described in paragraphs R.10 and R. 11, the MWRA finds that the applicable requirements of section 8(d) of the Act have been met as follows:

(1) the safe yield of the watershed system as of the date of this contract and as projected for the term hereof, is sufficient to meet the projected demand of the Town;
(2) No existing or potential water supply source for the Town has been abandoned;
(3) Effective demand management measures have been developed by the Town;
(4) A local water supply source feasible for development has not been identified by either the Town or the Department of Environmental Protection (the "DEP");

(5) A water use survey has been completed which identifies all users within the Town that consume in excess of twenty million gallons a year;

R.13 Whereas, DEP issued MWRA Water Management Act Registrations for 2008-2017 that requires MWRA as a system to meet the Water Resources Commission's performance standards of 65 residential gallons per capita day water use (RGPCD) and 10% unaccounted for water loss (UAW) by December 31, 2017; and

R.14. Whereas, the MWRA and the Town wish to formalize their rights and obligations regarding the supply of water to the Town and therefore enter into this Agreement.

NOW, THEREFORE, in consideration of mutual promises contained herein and for other good and valuable consideration, the MWRA and the Town agree to the following:

1. The term ("Term") of this Agreement shall be ten (10) years effective on January 27, 2007 and ending at midnight on December 31, 2016.

2. The MWRA shall during the Term provide the Town with water on a maximum annual water volume basis, stated in millions of gallons, as follows:

| 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|
| 425 | 425 | 450 | 450 | 475 |
| **2012** | **2013** | **2014** | **2015** | **2016** |
| 475 | 475 | 475 | 475 | 475 |

And on maximum daily water volume basis, stated in millions of gallons per day as follows:

| 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|
| 3.0 | 3.6 | 3.6 | 3.6 | 3.6 |
| **2012** | **2113** | **2014** | **2015** | **2016** |
| 3.6 | 3.6 | 3.9 | 3.9 | 3.9 |

In the event that revised circumstances regarding local demand and/or supply should occur and upon written notice to the MWRA disclosing and explaining such conditions, MWRA agrees that it will use its best efforts to supply the Town with those quantities of water to meet its legitimate needs in excess of the maximum annual water volumes stated above.

3. In the event of that revised circumstances regarding local demand and/or supply should occur and the Town determines that the volume designated in this Agreement to be supplied from the MWRA system is insufficient to meet the

Town's newly projected demand, the Town may petition the MWRA to amend this Agreement pursuant to 360 C.M.R. 11.11.

4. Except for the first three hundred thousand gallons per day, which the MWRA shall provide free of charge pursuant to the MOA, MWRA shall bill the Town and the Town shall timely pay to the MWRA charges for all water supplied under this Agreement in accordance with the MWRA's Community Charge Determination Policy (attached). All billing procedures, due dates, and interest charges for late payments shall be in accordance with the MWRA's standard policies and procedures.

5. The Town agrees to continue a user charge system and an accounting system which meets the Regulation's requirement to a) incorporate a uniform rate or an alternative structure which provides incentives for water conservation and/or is designed to ensure the affordability of water services to low and/or fixed income persons; and b) prohibit rate structures that incorporate descending or declining block rates.

6. The Town shall develop and implement a full cost pricing system within twelve (12) months from the date that all communities listed in section 8(d) of the Act other than those subject to 360 CMR 11.00 have implemented a full cost pricing system.

7. The Town agrees that during the Term it shall continue the implementation of its current and proposed local demand management programs, including but not limited to participation in MWRA conservation programs, and distribution of MWRA-provided materials to all water users, and compliance with MWRA's regulations for town-wide leak detection and repair (360 C.M.R. 12.00).

8. The parties agree that it is a shared goal of MWRA and Town to reach and maintain the MWRA system-wide goal of 65 RGPCD and 10% UAW as set forth in MWRA's Water Management Act registration by 2017.

9. The Town agrees to use its best efforts to develop a contingency plan to reduce water in case of drought or emergency, pursuant to the schedule contained in its Supplementary Report.

10. The Town agrees to notify the MWRA promptly, in writing, at any time that the Town becomes aware that a permanent solution which does not include meeting Massachusetts Drinking Water Standards is proposed for remediation undertaken pursuant to M.G.L. c. 21E and its implementing regulations (the "MCP") for groundwater in or hydrologically connected to an aquifer that has been identified by the Town as a potentially productive drinking water source.

11. Any dispute arising between the MWRA and the Town concerning the calculation of the Town's annual assessment shall be resolved in accordance with MWRA's Rate Basis Data Review and Dispute Resolution process. Any other dispute between MWRA and the Town under terms of this Agreement shall be resolved in accordance with the dispute

resolution process set forth at 360 CMR 11.14 and the administrative procedures set forth at 360 CMR 1.00.

IN WITNESS WHEREOF, the Parties have caused this Agreement to be executed on this 16th day of April, 2008 by their duly authorized representatives.

MASSACHUSETTS WATER RESOURCES AUTHORITY

By: _____
Frederick A. Laskey
Executive Director and not in his individual capacity

Hereunto duly authorized
TOWN OF SOUTHBOROUGH

By: _____
Bonnie J. Phaneuf, Chair

_____
William J. Boland, Member

_____
Salvatore M. Giorlandino, Member

With no personal liability to themselves

# MWRA COMMUNITY CHARGE DETERMINATION

## SEWER CHARGES

The MWRA's sewer rate methodology computes charges for sewer services on the basis of a combination of metered wastewater flows and loads, and population. Operation and Maintenance (O&M) charges are allocated on the basis of the total annual metered wastewater flow, and total annual average strength, septage and high strength flow loads. Capital (debt service) charges are allocated on the basis of a combination of metered wastewater flow and loads, and population. One quarter of capital charges are allocated on the basis of maximum month flow, and total annual average strength, septage and high strength flow loads. The remaining three-quarters of capital charges are allocated on the basis of sewered and census populations.

The sewer rate methodology incorporates an average of the three most recent calendar year's metered wastewater flow as one component in allocating the Authority's sewer rate revenue requirement to user communities. Three-year averaging smoothes the impact of year-to-year changes in each community's share of total system flow, but does not eliminate the long-term impact of changes in each community's relative contribution to total flow. Two measures of flow are used: average daily flow and maximum month flow.

Septage volume data used in the methodology is drawn from manifest information submitted by municipalities to the MWRA's Toxic Reduction and Control Department (TRAC). These manifests contain trip information collected from septage collection trucks that dispose of septage at receiving sites located in communities within the MWRA sewer service area. The sewer rate methodology allocates septage costs according to the location of, and volume handled by each receiving site. These septage volumes are also used to assign septage TSS and BOD loadings.

High strength users in the sewer rate methodology are defined as entities permitted, sampled, and monitored by TRAC whose average wastewater process flows exceed 25,000 gallons per day (gpd), and have an average wastewater total suspended solids (TSS) and/or biochemical oxygen demand (BOD) concentration in excess of 400 milligrams per liter (mg/l).

Table 1 illustrates how a community's O&M charge is calculated. Table 2 illustrates how a community's capital charge is calculated. Table 3 illustrates how each community's total charge is calculated.

## WATER CHARGES

The MWRA's water rate methodology computes charges for water services on the basis of each community's metered water flows. The MWRA annual water rate revenue requirement is allocated according to each community's prior year's water use relative to the system as a whole. The annual rate revenue requirement is comprised of operation and maintenance (O&M) and capital (debt service) charges.

## TABLE 1 – DETERMINATION OF COMMUNITY SEWER SERVICE O&M CHARGE

(Average Strength Volume + High Strength Volume) x (O&M Volume Charge)

+

(Average Strength TSS) x (O&M TSS Charge) + (High Strength TSS) x (O&M TSS Charge) + (Septage TSS) x (O&M TSS Charge)

(Average Strength BOD) x (O&M BOD Charge) + (High Strength BOD) x (O&M BOD Charge) + (Septage BOD) x (O&M BOD Charge)

=

**COMMUNITY O&M CHARGE**

## TABLE 2 – DETERMINATION OF COMMUNITY SEWER SERVICE CAPITAL CHARGE

(Average Strength TSS) x (Capital TSS Charge) + (High Strength TSS) x (Capital TSS Charge) + (Septage TSS) x (Capital TSS Charge)

(Average Strength BOD) x (Capital BOD Charge) + (High Strength BOD) x (Capital BOD Charge) + (Septage BOD) x (Capital BOD Charge)

(Community Share of the System's Total **Maximum Month Flow**) x (Volume based Capital Charge) + (Community Share of the System's Total **Sewered Population**) x (Sewered Population based Capital Charge) + (Community Share of the System's Total **Census Population**) x (Census Population based Capital Charge)

=

**COMMUNITY CAPITAL CHARGE**

## TABLE 3 – DETERMINATION OF COMMUNITY SEWER SERVICE CHARGE

**Community O&M Charge** + **Community Capital Charge**

# RATE BASIS DATA REVIEW AND DISPUTE RESOLUTION PROCESS - CURRENT POLICY

MWRA annually determines preliminary and final assessments for water and sewer services in February and June prior to the beginning of the new fiscal year. These assessments must satisfy the requirement that MWRA fully recover its water and sewer costs by apportioning total costs as assessments among its wholesale water and sewer customers pursuant to its water and sewer rate methodologies and to certain specified-data including:

- Calendar year metered water volume and metered wastewater flow obtained from MWRA's water and wastewater metering systems;
- Federal and state community census statistics, and sewered population estimates and other information supplied on Customer Service Update forms and Municipal Discharge Permits; and
- High strength user monitoring data and estimates of community septage volumes as obtained by MWRA's Toxic Reduction and Control Department.

The review and dispute resolution process provides MWRA's wholesale customers with the opportunity to review and comment on the reasonableness of the data used to calculate preliminary water and sewer assessments. During the year MWRA provides its customers with monthly summaries of water and wastewater flow data distributed, at a minimum, on a bimonthly basis. Because annual metered water and wastewater flows are major components for establishing water and sewer charges for each community, customers are strongly encouraged to review this data closely upon receipt and raise questions with MWRA staff concerning the data. MWRA expects that prompt customer review and comment on meter data will result in the resolution of most water and wastewater metering questions and assure the most consistency between preliminary assessments in February and final assessments announced in June. Community contributions of high strength flow and septage, and population data are made available with the release of preliminary assessments in February.

If after an initial review a community believes that specific data used to calculate assessments should be reevaluated, a community may submit a written objection to the Executive Director with a copy to the Rates Manager or their designee. The objection must be signed by the local official on record with MWRA as responsible for water or sewer services in the city, town, or district. The objection should state the community's concern with the data used to calculate community assessments, and should also include information and technical data to support the community's objection.

In order for any data adjustments to be incorporated into the allocation of final fiscal year assessments, all objections to data used to calculate preliminary assessments must be received no later than the date of the final public hearing on the proposed

budget and preliminary assessments, held pursuant to Section 10 of the MWRA Enabling Act. MWRA staff will review and evaluate the merits of all written objections. Customers are notified in writing of the results of this review prior to the release of final assessments.

Adjustments to preliminary data, if any, are not retroactive beyond the applicable calendar year for proposed assessments. Final fiscal year assessments are calculated incorporating adjustments, if any, resulting from the review and objection process, and final rate revenue requirements as adopted by the Board of Directors.

Written objection(s) may also be submitted following the adoption of final fiscal year assessments, but no later than the end of the fiscal year for which the assessments are applicable. Objections submitted in this manner must also be directed to the Executive Director with a copy to the Rates Manager or their designee.

Following MWRA staff review, adjustments to assessments resulting from the challenge of rate basis data that are submitted following the adoption of final fiscal year assessments will be applied to the subsequent year's assessments. Customers are notified in writing of the results of this review and any assessment adjustments prior to the release of the subsequent year's assessments.

# APPENDIX C

# TANK INSPECTION REPORTS

UNDERWATER SOLUTIONS INC.

# *INSPECTION AND CLEANING OF THE OAK HILL 275,000-GALLON RIVETED STEEL WATER STORAGE TANK*

*TOWN OF SOUTHBOROUGH D.P.W.*
*SOUTHBOROUGH, MASSACHUSETTS*

*NOVEMBER 18, 2005*



**MUNICIPAL DIVING SERVICES** • P.O. Box 208 • Mattapoisett, MA 02739 • Tel: (508) 758-6126 • Fax: (508) 758-6128
www.underwatersolutionsinc.com

UNDERWATER SOLUTIONS INC.

# *INSPECTION AND CLEANING OF THE OAK HILL 275,000-GALLON RIVETED STEEL WATER STORAGE TANK*

## *TOWN OF SOUTHBOROUGH D.P.W. SOUTHBOROUGH, MASSACHUSETTS*

## *NOVEMBER 18, 2005*

*SCOPE:*

On November 18, 2005, Underwater Solutions Inc. conducted an inspection of the Oak Hill 275,000-gallon riveted steel water storage tank to provide information regarding the overall condition and integrity of this structure and removed the sediment accumulation found on the floor of the structure.

*EXTERIOR INSPECTION:*

The entire exterior of this water storage tank (and components) was inspected to include walls and coating, manways, anchor bolts, ladder and safety cage, overflow, roof, vent and hatch.

*Walls and Coating*

The exterior wall surfaces were inspected and found with sound structural conditions while the coating system has weathered heavily since our prior inspection of June 26, 2000.

The lowest row of wall panel surfaces were found with coating adhesion loss on 5% of all panels. This condition has caused exposure of the underlying primer due to peeling and checking of the top coat.

All upper panel surfaces remain with mostly good adhesion value while very chalky weathered secondary coating exists. Mild corrosion and rust staining was found where the roof and top wall panel meet.

One area of pitting was found directly above the easternmost manway where the panels meet and overlap. Below this junction and extending upward into this joint, a small area of fatigue was found which has a mirror image on the interior of the tank.

*Manways*

Two manways were inspected approximately 24" above the ground. The easternmost manway measures 18" by 12" and was found without leakage and with good coating adhesion.

The northern manway has 24" by 18" diameters and mild surface corrosion at its base.

The leakage found within this manway in 2000 no longer exists.

*Anchor Bolts*

Eight 2" anchor bolts secure the base of this water storage tank to its concrete foundation. Each bolt extends up through a chair riveted to the wall plate. All nuts remain securely in place.

*Ladder and Safety Cage*

A ladder and safety cage extends from the ground up to the tank rooftop. This entire structure remains securely attached to the wall and has excellent coating adhesion throughout.

*Overflow*

An 8" overflow pipe exits the base of the overflow box and extends down terminating 8" off the ground. This entire pipe is securely supported by (6) welded standoffs. A good, sound screen was found in place over the end of this overflow pipe.

*Roof*

The entire rooftop of this water storage tank was inspected and found to remain in excellent condition. This fiberglass domed roof shows no signs of fatigue or failure at this time, yet approximately 30% of its' coating has lost adhesion and peeled away.

*Vent*

A rooftop vent located in the center of the dome has a 24" inside diameter, stands 16" tall and has a 40" cap securely in place. The entire circumference of the vent was found with a good, sound screen in place.

*Hatch*

One 24" inside diameter roof hatch was utilized to enter the tank to conduct this inspection. Although no lock exists, two bolts were found securing the hatch in place.

## *INTERIOR INSPECTION:*

The entire interior of this water storage tank (and components) was inspected to include sediment accumulations, floor, manways, piping, walls and coating, overhead, overflow and aesthetic water quality.

*Sediment Accumulations*

A uniform layer of precipitate was found on all floor surfaces of this structure averaging 3" in depth.

Upon completing this inspection, all floor surfaces were vacuumed.

*Floor*

Upon removing all precipitate from the floor, the coating was evaluated and found to remain in excellent condition throughout.

*Manways*

Two manway penetrations were inspected from the interior.

The easternmost manway has inside dimensions of 21" by 15". This manway penetration was found having light blistering of the coating on all lower surfaces of the door.

The northernmost manway has inside dimensions of 26" by 22". This manway was found in good condition and with its gasket evenly spaced, yet with light corrosion on the upper surfaces of the door.

*Inlet/Outlet Pipe*

A 10" inside diameter overflow pipe penetrates the tank floor 13" in from the wall and stands 4" tall. This pipe was found unobstructed and without flow at the time of inspection.

*Walls and Coating*

All interior wall surfaces were inspected beginning at the floor and spiraling the circumference up to the water surface.

These interior wall panel surfaces have suffered a great deal of decline in the condition of the coating system since our prior inspection in 2000. The lowest ten rows of wall panels yield extensive blistering of the coating system as the adhesion has been lost. This condition is mostly contained to the vertical and horizontal lap joints between panels, while several blisters also were found within the panels. These coating blisters have ruptured in many areas causing exposure of the underlying steel substrate.

Surface corrosion and rust staining exists in all areas of fractured blisters while only one area of fatigue of the steel was found. Just above the easternmost manway within a lap joint between panels a 1/8" deep pit in the steel was found.

All wall surfaces yield moderate staining at this time beginning approximately 5' below the rooftop and extending down to the floor. Also found was mild rust staining bleeding down from the junction of where the roof and walls meet.

*Overhead*

The entire overhead of this water storage tank was inspected from the water surface. This fiberglass roof dome remains with good, sound conditions at this time. We found eight 10" by 10" areas where this roof has been cut for construction. Each of these areas were found without sealant along the outer edge, therefore a 1/4" wide gap exits allowing light penetration into the tank.

*Overflow*

The overflow was inspected from the interior and was found to be only a 6" inside diameter opening in the wall which has eight holes around its' circumference. This is believed to be where the pipe was once flanged and bolted to the wall panels prior to the installation of the domed roof and overflow box.

*Aesthetic Water Quality*

The aesthetic water quality within this tank was found to be good. This condition allowed our visibility during this inspection to be unlimited.

## *CONCLUSION:*

It is the opinion of Underwater Solutions Inc. that this water storage tank remains in good structural condition throughout.

The exterior coating system has become thin and now yields failure of adhesion.

The lowest wall panel has exposed primer due to peeling. A moderate mildew accumulation exists on all surfaces of these walls within the lowest 30'.

All components affixed to this structure remain securely in place and structurally sound.

The interior coating has failed on a great deal of the overall surface area causing coating blisters. Many of these areas now yield exposed steel while surface corrosion has begun.

One very obvious area of fatigued steel was found above the easternmost manway within a lap joint. This 1/8" deep pit was leak detected and found free of leakage.

Mild corrosion exists along the roof and wall junction throughout the entire tank circumference.

Daylight shows through the rooftop in eight 10" by 10" areas where sealant was not installed in cutouts.

It is our recommendation that this entire structure be scheduled for a complete coating rehabilitation within 18 to 24 months in an effort to halt corrosion and preserve the structural integrity of the steel.

Upon completing this inspection, all precipitate was vacuumed from the floor.

As always, we recommend reinspection and cleaning of all water storage facilities in accordance with A.W.W.A. Standards and local guidelines.

UNDERWATER SOLUTIONS INC.
Christopher A. Cole, Project Manager

CAC/ljf

UNDERWATER SOLUTIONS INC.

# *INSPECTION AND CLEANING OF THE TARA ROAD 1.3-MILLION GALLON WELDED STEEL WATER STORAGE TANK*

## *TOWN OF SOUTHBOROUGH DEPARTMENT OF PUBLIC WORKS SOUTHBOROUGH, MASSACHUSETTS*

*MAY 31, 2007*



**MUNICIPAL DIVING SERVICES** • P.O. Box 208 • Mattapoisett, MA 02739 • Tel: (508) 758-6126 • Fax: (508) 758-6128
www.underwatersolutionsinc.com

UNDERWATER SOLUTIONS INC.

# *INSPECTION AND CLEANING OF THE TARA ROAD 1.3-MILLION GALLON WELDED STEEL WATER STORAGE TANK*

## *TOWN OF SOUTHBOROUGH DEPARTMENT OF PUBLIC WORKS SOUTHBOROUGH, MASSACHUSETTS*

## *MAY 31, 2007*

### *SCOPE:*

On May 31, 2007, Underwater Solutions Inc. conducted an inspection of the Tara Road 1.3-million gallon welded steel water storage tank to provide information regarding the overall condition and integrity of this structure and removed the sediment accumulation found on the floor of the structure.

### *EXTERIOR INSPECTION:*

The entire exterior of this water storage tank (and components) was inspected to include walls and coating, manways, ladder and safety cage, overflow, roof, vent and hatches.

*Walls and Coating*

The exterior wall surfaces were inspected and found with very sound conditions while the coating system applied to these wall panel and welded surfaces was found with very good adhesion value.

All steel remains encapsulated with the coating system at this time.

A mild mildew accumulation exists on all surfaces of these walls within the lowest 24" of the ground.

*Manways*

Two manways were inspected penetrating the lowest wall panel.

One oval 24" by 18" inside diameter manway is located 28" above the ground having no signs of leakage and with all surfaces properly coated.

One round 30" inside diameter manway is located 20" above the ground and is also free of leakage and properly coated at this time.

A mild mildew accumulation exists on all surfaces of each manway.

*Ladder and Safety Cage*

A ladder and safety cage extend from approximately 12' above the ground up to the roof of the tank supported to the wall with five sets of welded standoffs. This entire structure remains in very good, sound condition and with good coating adhesion on all surfaces.

*Overflow*

The overflow consists of a 6" inside diameter pipe, which extends out of a 10" by 8" by 6" overflow box. This pipe extends down to within 14" of the ground supported by (U) bolts which are bolted to angle iron welded to the tank wall. The end of this pipe was found with a screen properly installed.

*Roof*

The entire rooftop of this water storage tank was found with very sound conditions and with excellent coating adhesion providing good protection of all panels

*Vent*

The vent is located in the center of the domed rooftop having a 12" inside diameter while standing 12" tall. A 26" outside diameter cap was found properly installed over this vent while perimeter screening remains intact preventing access to the interior of the tank.

*Hatches*

Four entry hatches provide access to the tank interior through the roof. Each of the three 24" inside diameter round hatches and the new 30" by 30" inside diameter square hatch remain in good working order and are each secured with locks.

## *INTERIOR INSPECTION:*

The entire interior of this water storage tank (and components) was inspected to include sediment accumulations, floor, manways, piping, walls and coating, overhead, overflow and aesthetic water quality.

*Sediment Accumulations*

A uniform layer of accumulated precipitate was found on these tank floor surfaces averaging 1/4" in depth.

Upon completing this inspection, all floor surfaces were vacuumed.

*Floor*

After removing all accumulated precipitate, these steel floor panel surfaces were inspected. All floor surfaces are uniformly coated while very good adhesion value of this coating remains.

A spotty stain was found on these surfaces as a result of the accumulated precipitate.

*Manways*

Two manways were inspected penetrating the lowest wall panel on opposite sides of the tank.

A 28" by 21" inside diameter oval manway is located 26" above the floor and remains with good coating adhesion on all surfaces.

A 30" inside diameter round manway is located 20" above the tank floor and also is complexly and properly coated at this time.

*Piping*

The inlet/outlet pipe now consists of a tide flex system and has both a standpipe with valves extending up towards the water surface as well as a second pipe extending across the tank floor terminating 6' from the opposite wall. This 12" inside diameter pipe extends up to a "T" with one end extending up through a series of flanges ending 42' above the floor.

A 1/4" opening in an uncoated cap at the top of this pipe was found. Three 6" inside diameter pipes extend out of the 12" inside diameter pipe throughout its length to bolted flanges and tide flex valves. All valves and pipe work is properly secured in place and in good condition.

The other end of the "T" on this 12" inside diameter pipe extends across the floor supported in place with six sets of floor brackets. This pipe, the grates and valves and all floor supports remain in good condition at this time.

*Walls*

All interior wall surfaces were inspected beginning at the floor and spiraling the circumference up to the water surface.

All interior surfaces of all wall panels as well as all horizontal and vertical welds between all panels were found with excellent coating adhesion providing good protection of the entire substrate.

A mild stain exists on all wall surfaces extending from 6' below the junction of the roof and walls down to the floor.

*Overhead*

The entire overhead of this water storage tank was inspected from the water surface. All overhead panels and angle iron support trusses were found with very sound conditions and with very good coating adhesion throughout.

*Overflow*

The overflow consists of a cutout within the tank wall approximately 12" down from the rooftop. This 12" by 4" cutout was unobstructed at the time of this inspection.

*Aesthetic Water Quality*

The aesthetic water quality within this tank was found to be very poor. This condition caused our visibility during this inspection to be limited to approximately 2' to 3' throughout all elevations of the tank due to color and suspended particulate at all elevations.

*CONCLUSION:*

It is the opinion of Underwater Solutions Inc. that this water storage tank remains in very good condition.

All exterior wall panels and roof panel surfaces were found with very good coating adhesion while no exposed steel exists at this time.

All components affiliated with this structure to include the manways, ladder and safety cage, overflow, vent and hatches were found in good condition, properly installed and with all screening and locks in place.

All interior floor, walls and overhead surfaces are uniformly coated at this time and in very good condition.

All piping was found securely in place while no obstructions were found at the time of this inspection.

Upon entering this tank we found very poor aesthetic water quality at all elevations caused by color and suspended particulate.

Upon completing this inspection, all floor surfaces were vacuumed.

As always, we recommend re-inspection and cleaning of all water storage facilities in accordance with A.W.W.A. Standards and local guidelines.

UNDERWATER SOLUTIONS INC.
Christopher A. Cole, Project Manager

*This report, the conclusions, recommendations and comments prepared by Underwater Solutions Inc. are based upon spot examination from readily accessible parts of the tank. Should latent defects or conditions which vary significantly from those described in the report be discovered at a later date, these should be brought to the attention of a qualified individual at that time. These comments and recommendations should be viewed as information to be used by the Owner in determining the proper course of action and not to replace a complete set of specifications. All repairs should be done in accordance with A.W.W.A Standards.*

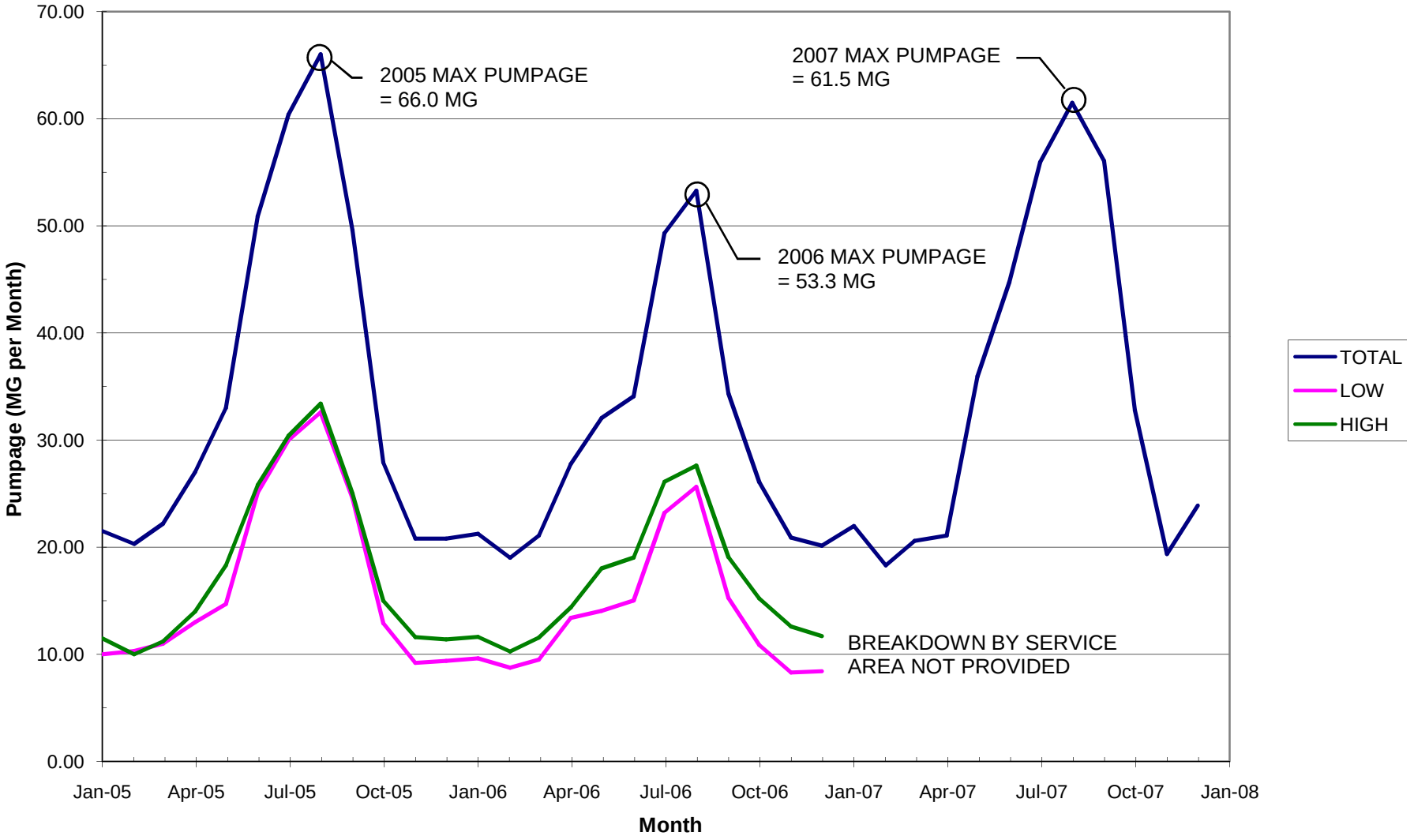
CAC/ljf

# APPENDIX D

# MONTHLY WATER USE GRAPH WITH EXCERPTS

# FROM MA DEP ASRs

## Southborough Monthly Purchased Water by Service Area



*Massachusetts Department of Environmental Protection*
*Bureau of Resource Protection – Drinking Water Program*
***2005 Public Water Supply Annual Statistical Report***
*For Community Public Water Systems-Reporting Period 1/1/2005 – 12/31/2005*

| COMMUNITY | |
|---|---|
| PWSID#: | 2277000 |
| Name: | SOUTHBOROUGH DPW |
| City/Town: | SOUTHBOROUGH |

## D Water Production & Consumption Information

1. Water Production and Consumption Summary for Last Year (2005):

Please identify whether the information provided in column 1 is raw or finished. If you have volumes for both raw and finished please copy and complete the following table for each volume.

[Conversion factor is (# cubic feet)(7.481) = (# of gallons)]

As of 12/31/2001 all systems were required to comply with 310 CMR 22.04(6). Which requires all PWSs to be metered.

| Month | (1) Amount pumped from own sources ☐ Raw or ☐ Finished | (2) Amount purchased from other systems* | (3) Amount sold to other systems** | Net Water Consumption (1)+(2)−(3)=Net |
|---|---|---|---|---|
| Withdrawal Units (check one) | ☐: Gallons (GAL) or ☐ MG | ☐: GAL or ☒ MG | ☐: GAL or ☐ MG | ☐: GAL or ☐ MG |
| January | | 21.495 | | |
| February | | 20.280 | | |
| March | | 22.205 | | |
| April | | 27.083 | | |
| May | | 33.014 | | |
| June | | 50.900 | | |
| July | | 60.387 | | |
| August | | 66.039 | | |
| September | | 49.586 | | |
| October | | 27.909 | | |
| November | | 20.843 | | |
| December | | 20.916 | | |
| TOTAL | | 420.658 | | |

Maximum Daily Consumption:

| 2.719 | ☐: GAL OR ☒ MG | 08/13/2005 |
|---|---|---|
| Volume | | Date (mm/dd/yyyy) |

Please attach additional sheets if necessary.

* If purchasing water, list the systems you purchase from, use the same units as above.

| Name(s) | PWS ID # | Total Amount for Last Year |
|---|---|---|
| MASS WATER RESOURCES AUTHORITY | 193371 | 420.658 |
| | | |
| | | |

** If selling water, list the systems you sell to, use the same units as above.

| Name(s) | PWS ID # | Total Amount for Last Year |
|---|---|---|
| | | |
| | | |
| | | |

*Massachusetts Department of Environmental Protection*
*Bureau of Resource Protection – Drinking Water Program*
***2005 Public Water Supply Annual Statistical Report***
*For Community Public Water Systems-Reporting Period 1/1/2005 – 12/31/2005*

| COMMUNITY | |
|---|---|
| PWSID#: | 2277000 |
| Name: | SOUTHBOROUGH DPW |
| City/Town: | SOUTHBOROUGH |

## E Individual Source Statistics

If you have more than four sources or withdrawal points, please use an extra Section E from the DEP web page or make photocopies of this page.

Please provide data in the adjacent table for all of your sources (Active, Emergency, Inactive, or Abandoned)

| Source Name | BOLAND STATION | HOSMER STAT | | |
|---|---|---|---|---|
| Source ID # | 2277000 | 2277000 | | |
| Source Watershed | | | | |
| Source Availability* (check one) | ☒ Active ☐ Inactive ☐ Emergency ☐ Abandoned | ☒ Active ☐ Inactive ☐ Emergency ☐ Abandoned | ☐ Active ☐ Inactive ☐ Emergency ☐ Abandoned | ☐ Active ☐ Inactive ☐ Emergency ☐ Abandoned |
| Date of Meter Installation | (mm/dd/yyyy) **OR** ☐ no meter | (mm/dd/yyyy) **OR** ☐ no meter | (mm/dd/yyyy) **OR** ☐ no meter | (mm/dd/yyyy) **OR** ☐ no meter |
| Date Last Meter Calibration for this Source | (mm/dd/yyyy) | (mm/dd/yyyy) | (mm/dd/yyyy) | (mm/dd/yyyy) |
| Withdrawal Units (check one) | ☐: GAL or ☒ MG | ☐: GAL or ☒ MG | ☐: GAL or ☐ MG | ☐: GAL or ☐ MG |
| Type of water metered for source | ☐ Raw or ☒ Finished | ☐ Raw or ☒ Finished | ☐ Raw or ☐ Finished | ☐ Raw or ☐ Finished |
| January | 11.5 | 10.0 | | |
| February | 10.0 | 10.3 | | |
| March | 11.2 | 11.0 | | |
| April | 14.0 | 13.0 | | |
| May | 18.3 | 14.7 | | |
| June | 25.8 | 25.1 | | |
| July | 30.4 | 30.0 | | |
| August | 33.4 | 32.6 | | |
| September | 25.0 | 24.6 | | |
| October | 15.0 | 12.9 | | |
| November | 11.6 | 9.2 | | |
| December | 11.4 | 9.4 | | |
| Total Amount Pumped | 217.6 | 202.8 | | |
| Total # of Days Pumped ** | 365 | 365 | | |
| Max. Amount Pumped in a Single Day | 1.39 | 1.43 | | |
| Date Max. Amount Pumped | 08/10/2005 (mm/dd/yyyy) | 08/08/2005 (mm/dd/yyyy) | (mm/dd/yyyy) | (mm/dd/yyyy) |

* The source availability codes are the same as last year's. The following definitions still apply:

Active Source (Formerly: Permanent, Backup, Seasonal, Provisional, Interim) means an approved source(s), monitored and maintained to meet 310 CMR 22.00 and used for primary or backup purposes to meet consumer demand as necessary.

Inactive Source (Other, contaminated) means an approved source(s), which is expected to be off-line for at least one year (12 months). A source may be deemed inactive only upon written approval of the Department. An inactive source may not return to active status without written approval from the Department.

Emergency Source (No change from previous) means any source of water used to supplement or temporarily replace a public water system's active or inactive source(s) when water of sufficient quality or quantity is not available. An emergency source may be placed on-line only after the Department's approval pursuant to a declaration of a state of water emergency under M.G.L. c. 1G § 15-17 or as a requirement of a Department administrative order.

Abandoned Source (Formerly: Other) means a source that is physically disconnected from a public water system and is no longer maintained as an active, inactive, or emergency source. Abandoned source(s) cannot be used as a public water supply source. A source may only be abandoned pursuant to 310 CMR 22.25.

** Total number of days that a source was used during the year.

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***2006 Public Water Supply Annual Statistical Report***
*For Community Public Water Systems-Reporting Period 1/1/2006 – 12/31/2006*

| COMMUNITY | |
|---|---|
| PWSID#: | 2277000 |
| Name: | SOUTHBOROUGH DPW |
| City/Town: | SOUTHBOROUGH |

## D Water Production & Consumption Information

1. Water Production and Consumption Summary for Last Year (2006):

Please identify whether the information provided in column 1 is raw or finished. If you have volumes for both raw and finished please copy and complete the following table for each volume.

[Conversion factor is (# cubic feet)(7.481) = (# of gallons)]

As of 12/31/2001 all systems were required to comply with 310 CMR 22.04(6). Which requires all PWSs to be metered.

| Month | (1) Amount pumped from own sources ☐ Raw or ☐ Finished | (2) Amount purchased from other systems* | (3) Amount sold to other systems** | Net Water Consumption (1)+(2)–(3)=Net |
|---|---|---|---|---|
| Withdrawal Units (check one) | ☐: Gallons (GAL) or ☐ MG | ☐: GAL or ☒ MG | ☐: GAL or ☐ MG | ☐: GAL or ☐ MG |
| January | | 21.24 | | |
| February | | 19.01 | | |
| March | | 21.08 | | |
| April | | 27.76 | | |
| May | | 32.06 | | |
| June | | 34.07 | | |
| July | | 49.31 | | |
| August | | 53.26 | | |
| September | | 34.36 | | |
| October | | 26.09 | | |
| November | | 20.91 | | |
| December | | 21.15 | | |
| TOTAL | | 359.280 | | |

Maximum Daily Consumption:

2.318 (Volume) ☐: GAL or ☒ MG 08/11/2006 (Date (mm/dd/yyyy))

Please attach additional sheets if necessary.

* If purchasing water, list the systems you purchase from, use the same units as above.

| Name(s) | PWS ID # | Total Amount for Last Year |
|---|---|---|
| MASS WATER RESOURCES AUTHORITY | 193371 | 359.280 |
| | | |
| | | |
| | | |

** If selling water, list the systems you sell to, use the same units as above.

| Name(s) | PWS ID # | Total Amount for Last Year |
|---|---|---|
| | | |
| | | |
| | | |

*Massachusetts Department of Environmental Protection*
*Bureau of Resource Protection – Drinking Water Program*
***2006 Public Water Supply Annual Statistical Report***
*For Community Public Water Systems-Reporting Period 1/1/2006 – 12/31/2006*

| COMMUNITY | |
|---|---|
| PWSID#: | 2277000 |
| Name: | SOUTHBOROUGH DPW |
| City/Town: | SOUTHBOROUGH |

## E *Individual Source Statistics*

If you have more than four sources or withdrawal points, please use an extra Section E from the DEP web page or make photocopies of this page.

Please provide data in the adjacent table for all of your sources (Active, Emergency, Inactive, or Abandoned)

| Source Name | BOLAND STATION | HOSMER STA. | | |
|---|---|---|---|---|
| Source ID # | 22770000 | 22770000 | | |
| Source Watershed | | | | |
| Source Availability* (check one) | ☒ Active ☐ Inactive ☐ Emergency ☐ Abandoned | ☒ Active ☐ Inactive ☐ Emergency ☐ Abandoned | ☐ Active ☐ Inactive ☐ Emergency ☐ Abandoned | ☐ Active ☐ Inactive ☐ Emergency ☐ Abandoned |
| Date of Meter Installation | (mm/dd/yyyy) OR ☐ no meter | (mm/dd/yyyy) OR ☐ no meter | (mm/dd/yyyy) OR ☐ no meter | (mm/dd/yyyy) OR ☐ no meter |
| Date Last Meter Calibration for this Source | (mm/dd/yyyy) | (mm/dd/yyyy) | (mm/dd/yyyy) | (mm/dd/yyyy) |
| Withdrawal Units (check one) | ☐: GAL or ☒ MG | ☐: GAL or ☒ MG | ☐: GAL or ☐ MG | ☐: GAL or ☐ MG |
| Type of water metered for source | ☐ Raw or ☒ Finished | ☐ Raw or ☒ Finished | ☐ Raw or ☐ Finished | ☐ Raw or ☐ Finished |
| January | 11.62 | 9.62 | | |
| February | 10.27 | 8.75 | | |
| March | 11.56 | 9.52 | | |
| April | 14.37 | 13.39 | | |
| May | 18.01 | 14.05 | | |
| June | 19.04 | 15.03 | | |
| July | 26.1 | 23.21 | | |
| August | 27.62 | 25.64 | | |
| September | 19.09 | 15.27 | | |
| October | 15.22 | 10.87 | | |
| November | 12.59 | 8.31 | | |
| December | 11.71 | 8.43 | | |
| Total Amount Pumped | 197.2 | 162.09 | | |
| Total # of Days Pumped ** | 365 | 365 | | |
| Max. Amount Pumped in a Single Day | 1.196 | 1.177 | | |
| Date Max. Amount Pumped | 08/01/2006 (mm/dd/yyyy) | 08/11/2006 (mm/dd/yyyy) | (mm/dd/yyyy) | (mm/dd/yyyy) |

* The source availability codes are the same as last year's. The following definitions still apply:

Active Source (Formerly: Permanent, Backup, Seasonal, Provisional, Interim) means an approved source(s), monitored and maintained to meet 310 CMR 22.00 and used for primary or backup purposes to meet consumer demand as necessary.

Inactive Source (Other, contaminated) means an approved source(s), which is expected to be off-line for at least one year (12 months). A source may be deemed inactive only upon written approval of the Department. An inactive source may not return to active status without written approval from the Department.

Emergency Source (No change from previous) means any source of water used to supplement or temporarily replace a public water system's active or inactive source(s) when water of sufficient quality or quantity is not available. An emergency source may be placed on-line only after the Department's approval pursuant to a declaration of a state of water emergency under M.G.L. c. 1G § 15-17 or as a requirement of a Department administrative order.

Abandoned Source (Formerly: Other) means a source that is physically disconnected from a public water system and is no longer maintained as an active, inactive, or emergency source. Abandoned source(s) cannot be used as a public water supply source. A source may only be abandoned pursuant to 310 CMR 22.25.

** Total number of days that a source was used during the year.

*Massachusetts Department of Environmental Protection*
*Bureau of Resource Protection – Drinking Water Program*
***2007 Public Water Supply Annual Statistical Report***
*For Community Public Water Systems Regulated by the Water Management Act*
*Reporting Period 1/1/2007 – 12/31/2007*

| COMMUNITY | |
|---|---|
| PWSID#: | 2277000 |
| Name: | Southborough DPW |
| City/Town: | Southborough |

## D *Water Production & Consumption Information*

### Table D1 FINISHED Water Production and Consumption Summary for Last Year (2007):

Conversion factor is (# cubic ft) x (7.481) = (# of gallons)

As of 12/31/2001 all PWSs were required to be metered, in compliance with 310 CMR 22.04(6).

| Month | (1) Amount of **finished** water from own sources | (2) Amount of **finished** water purchased from other systems | (3) Amount of **finished** water sold to other systems | Net **finished** water that entered your distribution system (1)+(2)–(3)=Net |
|---|---|---|---|---|
| Units (check one) | ☐: Gallons (GAL) or ☐ Million Gallons (MG) | ☐: GAL or ☒ MG | ☐: GAL or ☒ MG | ☐: GAL or ☐ MG |
| January | 0.00 | 21.99 | 0.00 | 21.99 |
| February | 0.00 | 18.31 | 0.00 | 18.31 |
| March | 0.00 | 20.60 | 0.00 | 20.60 |
| April | 0.00 | 21.09 | 0.00 | 21.09 |
| May | 0.00 | 35.94 | 0.00 | 35.94 |
| June | 0.00 | 44.74 | 0.00 | 44.74 |
| July | 0.00 | 55.94 | 0.00 | 55.94 |
| August | 0.00 | 61.47 | 0.00 | 61.47 |
| September | 0.00 | 56.06 | 0.00 | 56.06 |
| October | 0.00 | 32.77 | 0.00 | 32.77 |
| November | 0.00 | 19.37 | 0.00 | 19.37 |
| December | 0.00 | 23.88 | 3.86 | 20.02 |
| TOTAL | 0.00 | 412.15 | 3.86 | 408.29 |

| Maximum Daily Finished Water Consumption: | *(Enter in Table G11) |
|---|---|
| Volume: 2.54 ☐ GAL or ☒ MG | Date: 09/07/2007 (mm/dd/yyyy) |

An explanation of the difference between tables D1 and D2 is available in the Instructions.

### Table D2 RAW Water Production and Consumption Summary for Last Year (2007):

☒ Same as finished water (it is not necessary to complete Table D2 if same volumes as Table D1)

| Month | (1) Amount of raw water pumped from own sources | (2) Amount of raw water purchased from other systems | (3) Amount of raw water sold to other systems | Net raw Water Consumption (1)+(2)–(3)=Net |
|---|---|---|---|---|
| Units (check one) | ☐: GAL or ☐ MG | ☐: GAL or ☐ MG | ☐: GAL or ☐ MG | ☐: GAL or ☐ MG |
| January | | | | |
| February | | | | |
| March | | | | |
| April | | | | |
| May | | | | |
| June | | | | |
| July | | | | |
| August | | | | |
| September | | | | |
| October | | | | |
| November | | | | |
| December | | | | |
| TOTAL | | | | |

| Maximum Daily Raw Water Consumption: | |
|---|---|
| Volume: ☐ GAL or ☐ MG | Date: (mm/dd/yyyy) |

# APPENDIX E

# MWRA MAX DAY PUMPAGE FROM

# HOSMER AND BOLAND PUMP STATIONS

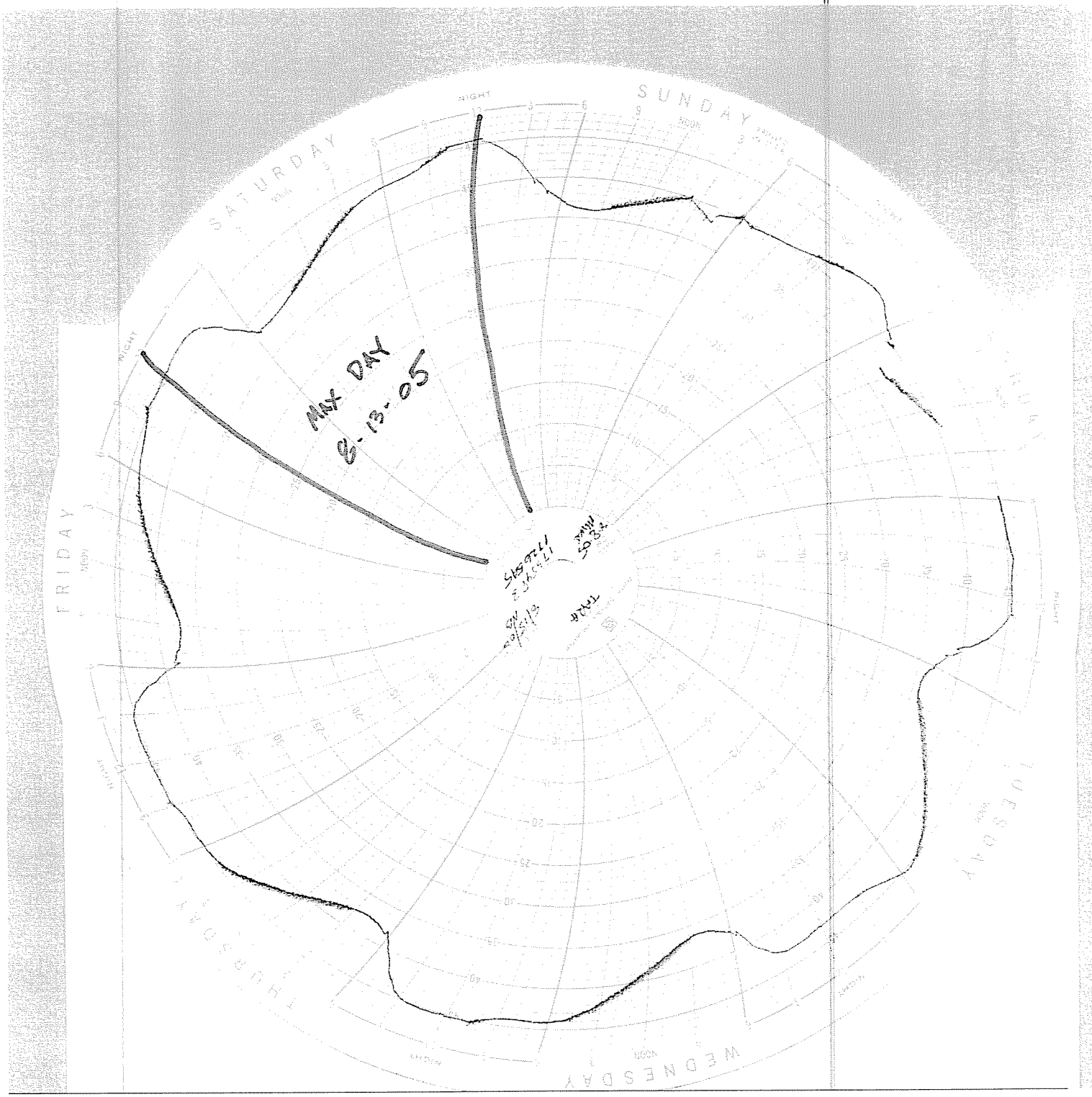
METER 215 = HOSMER
METER 216 = BOLAND

| Time | 215-Elevation (ft) | 0216.216-Elevation (ft) | 215-Flow (MGD) | 0216.216-Flow (MGD) |
|---|---|---|---|---|
| 8/13/2005 0:00 | 298.488 | 298.721 | 0.887 | 0.845 |
| 8/13/2005 0:15 | 298.467 | 299.155 | 0.885 | 0.847 |
| 8/13/2005 0:30 | 298.477 | 299.588 | 0.887 | 0.851 |
| 8/13/2005 0:45 | 298.51 | 299.732 | 0.885 | 0.85 |
| 8/13/2005 1:00 | 298.542 | 300.887 | 0.886 | 0.861 |
| 8/13/2005 1:15 | 298.597 | 300.923 | 0.887 | 0.862 |
| 8/13/2005 1:30 | 298.651 | 300.959 | 0.888 | 0.861 |
| 8/13/2005 1:45 | 298.683 | 300.995 | 0.885 | 0.861 |
| 8/13/2005 2:00 | 298.737 | 301.031 | 0.886 | 0.864 |
| 8/13/2005 2:15 | 298.889 | 301.104 | 0.886 | 0.864 |
| 8/13/2005 2:30 | 298.932 | 301.14 | 0.887 | 0.867 |
| 8/13/2005 2:45 | 298.976 | 301.212 | 0.888 | 0.868 |
| 8/13/2005 3:00 | 299.105 | 301.248 | 0.891 | 0.872 |
| 8/13/2005 3:15 | 299.235 | 301.284 | 0.894 | 0.873 |
| 8/13/2005 3:30 | 299.3 | 301.356 | 0.898 | 0.879 |
| 8/13/2005 3:45 | 299.355 | 301.392 | 0.902 | 0.883 |
| 8/13/2005 4:00 | 299.43 | 301.465 | 0.909 | 0.891 |
| 8/13/2005 4:15 | 299.506 | 301.537 | 0.918 | 0.894 |
| 8/13/2005 4:30 | 299.549 | 300.743 | 0.927 | 0.896 |
| 8/13/2005 4:45 | 298.878 | 300.346 | 1.741 | 0.901 |
| 8/13/2005 5:00 | 298.802 | 300.346 | 1.884 | 0.914 |
| 8/13/2005 5:15 | 298.759 | 300.31 | 1.892 | 0.921 |
| 8/13/2005 5:30 | 298.716 | 300.273 | 1.901 | 0.921 |
| 8/13/2005 5:45 | 298.694 | 300.201 | 1.903 | 0.923 |
| 8/13/2005 6:00 | 298.672 | 300.165 | 1.909 | 0.931 |
| 8/13/2005 6:15 | 298.651 | 300.165 | 1.914 | 0.93 |
| 8/13/2005 6:30 | 298.629 | 300.129 | 1.921 | 0.931 |
| 8/13/2005 6:45 | 298.607 | 299.804 | 1.918 | 1.108 |
| 8/13/2005 7:00 | 298.553 | 298.902 | 1.921 | 1.728 |
| 8/13/2005 7:15 | 298.499 | 298.866 | 1.916 | 1.716 |
| 8/13/2005 7:30 | 298.467 | 298.866 | 1.92 | 1.705 |
| 8/13/2005 7:45 | 298.445 | 298.83 | 1.92 | 1.703 |
| 8/13/2005 8:00 | 298.402 | 298.758 | 1.916 | 1.7 |
| 8/13/2005 8:15 | 298.358 | 298.721 | 1.914 | 1.698 |
| 8/13/2005 8:30 | 298.25 | 298.685 | 1.911 | 1.69 |
| 8/13/2005 8:45 | 298.153 | 298.649 | 1.915 | 1.686 |
| 8/13/2005 9:00 | 298.109 | 298.613 | 1.911 | 1.678 |
| 8/13/2005 9:15 | 297.86 | 297.855 | 1.909 | 1.663 |
| 8/13/2005 9:30 | 297.156 | 296.231 | 1.9 | 1.642 |
| 8/13/2005 9:45 | 297.795 | 295.256 | 1.905 | 1.63 |
| 8/13/2005 10:00 | 298.412 | 294.932 | 1.911 | 1.628 |
| 8/13/2005 10:15 | 298.315 | 295.293 | 1.907 | 1.617 |
| 8/13/2005 10:30 | 298.802 | 295.798 | 1.901 | 1.62 |
| 8/13/2005 10:45 | 299.181 | 296.159 | 1.907 | 1.623 |
| 8/13/2005 11:00 | 299.084 | 296.556 | 1.904 | 1.624 |
| 8/13/2005 11:15 | 299.452 | 296.808 | 1.897 | 1.62 |
| 8/13/2005 11:30 | 299.3 | 297.025 | 1.9 | 1.619 |
| 8/13/2005 11:45 | 298.553 | 297.169 | 1.88 | 1.614 |
| 8/13/2005 12:00 | 297.784 | 297.133 | 1.875 | 1.605 |
| 8/13/2005 12:15 | 297.525 | 297.061 | 1.86 | 1.6 |
| 8/13/2005 12:30 | 296.886 | 297.025 | 1.855 | 1.599 |

| | | | | |
|---|---|---|---|---|
| 8/13/2005 12:45 | 296.366 | 296.917 | 1.846 | 1.598 |
| 8/13/2005 13:00 | 296.323 | 296.881 | 1.834 | 1.594 |
| 8/13/2005 13:15 | 296.279 | 296.917 | 1.834 | 1.592 |
| 8/13/2005 13:30 | 295.933 | 296.917 | 1.823 | 1.586 |
| 8/13/2005 13:45 | 295.868 | 296.953 | 1.817 | 1.587 |
| 8/13/2005 14:00 | 295.954 | 296.989 | 1.807 | 1.591 |
| 8/13/2005 14:15 | 296.03 | 297.097 | 1.802 | 1.59 |
| 8/13/2005 14:30 | 296.128 | 297.205 | 1.798 | 1.593 |
| 8/13/2005 14:45 | 296.258 | 297.314 | 1.748 | 1.591 |
| 8/13/2005 15:00 | 296.962 | 297.386 | 0.881 | 1.589 |
| 8/13/2005 15:15 | 297.07 | 297.458 | 0.883 | 1.586 |
| 8/13/2005 15:30 | 297.091 | 297.53 | 0.885 | 1.582 |
| 8/13/2005 15:45 | 297.2 | 297.603 | 0.887 | 1.583 |
| 8/13/2005 16:00 | 297.265 | 297.675 | 0.888 | 1.584 |
| 8/13/2005 16:15 | 297.319 | 297.711 | 0.889 | 1.59 |
| 8/13/2005 16:30 | 297.405 | 297.819 | 0.891 | 1.598 |
| 8/13/2005 16:45 | 297.449 | 297.855 | 0.893 | 1.598 |
| 8/13/2005 17:00 | 297.535 | 297.891 | 0.895 | 1.606 |
| 8/13/2005 17:15 | 297.644 | 297.963 | 0.897 | 1.604 |
| 8/13/2005 17:30 | 297.579 | 298 | 0.898 | 1.607 |
| 8/13/2005 17:45 | 297.557 | 298.036 | 0.901 | 1.61 |
| 8/13/2005 18:00 | 297.579 | 298.036 | 0.902 | 1.618 |
| 8/13/2005 18:15 | 297.525 | 298.036 | 0.904 | 1.624 |
| 8/13/2005 18:30 | 297.579 | 298.144 | 0.908 | 1.629 |
| 8/13/2005 18:45 | 297.611 | 298.216 | 0.91 | 1.621 |
| 8/13/2005 19:00 | 297.644 | 298.252 | 0.909 | 1.622 |
| 8/13/2005 19:15 | 297.579 | 298.288 | 0.91 | 1.628 |
| 8/13/2005 19:30 | 297.449 | 298.252 | 0.912 | 1.62 |
| 8/13/2005 19:45 | 297.362 | 298.252 | 0.973 | 1.621 |
| 8/13/2005 20:00 | 296.734 | 298.252 | 1.852 | 1.617 |
| 8/13/2005 20:15 | 296.756 | 298.288 | 1.845 | 1.61 |
| 8/13/2005 20:30 | 296.756 | 298.324 | 1.841 | 1.609 |
| 8/13/2005 20:45 | 296.734 | 298.324 | 1.834 | 1.604 |
| 8/13/2005 21:00 | 296.777 | 298.36 | 1.829 | 1.592 |
| 8/13/2005 21:15 | 296.821 | 298.36 | 1.824 | 1.588 |
| 8/13/2005 21:30 | 296.853 | 298.324 | 1.816 | 1.579 |
| 8/13/2005 21:45 | 296.886 | 298.36 | 1.813 | 1.572 |
| 8/13/2005 22:00 | 296.951 | 298.397 | 1.809 | 1.561 |
| 8/13/2005 22:15 | 297.113 | 298.433 | 1.711 | 1.561 |
| 8/13/2005 22:30 | 297.774 | 299.263 | 0.886 | 1.094 |
| 8/13/2005 22:45 | 297.839 | 299.588 | 0.887 | 0.852 |
| 8/13/2005 23:00 | 297.46 | 299.118 | 0.884 | 0.849 |
| 8/13/2005 23:15 | 296.712 | 297.639 | 0.881 | 0.839 |
| 8/13/2005 23:30 | 297.514 | 296.375 | 0.885 | 0.83 |
| 8/13/2005 23:45 | 298.521 | 296.014 | 0.89 | 0.829 |
| Minimum | 295.868 | 294.932 | 0.881 | 0.829 |
| Average | 297.885 | 298.525 | 1.412 | 1.36 |
| Maximum | 299.549 | 301.537 | 1.921 | 1.728 |
| Total | | | | |

# APPENDIX F

# TANK CHARTS


SUNDAY
MONDAY
TUESDAY
WEDNESDAY
THURSDAY
FRIDAY
SATURDAY
NIGHT
NOON
MAY DAY
5-13-05

MAX DAY
8-13-05
FRIDAY
SATURDAY
THURSDAY
SUNDAY
WEDNESDAY
MONDAY
TUESDAY
NOON
MIDNIGHT
AM
PM

# APPENDIX G

# WATERCAD MODEL OUTPUT REPORTS

# (EXISTING CONDITIONS)

# Scenario: ADD
# Steady State Analysis
# Junction Report

| Label | Elevation (ft) | Zone | Base Flow (gpm) | Pattern | Demand (gpm) | Hydraulic Grade (ft) | Pressure (psi) |
|---|---|---|---|---|---|---|---|
| J-1000 | 375.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 506.81 | 57.03 |
| J-1001 | 341.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 506.81 | 71.74 |
| J-1002 | 272.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 506.81 | 101.59 |
| J-1003 | 270.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 506.81 | 102.46 |
| J-1004 | 285.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 506.81 | 95.96 |
| J-1005 | 275.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 506.81 | 100.29 |
| J-1006 | 272.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 509.40 | 102.71 |
| J-1007 | 270.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 510.59 | 104.09 |
| J-1008 | 270.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 510.58 | 104.09 |
| J-1009 | 270.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 510.58 | 104.09 |
| J-1010 | 290.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 506.04 | 93.47 |
| J-1011 | 275.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 506.12 | 100.00 |
| J-1012 | 295.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 505.98 | 91.28 |
| J-1013 | 295.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 505.62 | 91.12 |
| J-1014 | 277.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 505.62 | 98.91 |
| J-1015 | 315.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 510.58 | 84.62 |
| J-1016 | 295.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 510.58 | 93.27 |
| J-1017 | 295.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 510.58 | 93.27 |
| J-1018 | 270.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 505.17 | 101.75 |
| J-1019 | 310.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 505.14 | 84.43 |
| J-1020 | 340.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 505.14 | 71.45 |
| J-1021 | 335.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 505.14 | 73.61 |
| J-1022 | 315.00 | HIGH SERVICE AREA | 8.87 | Fixed | 8.87 | 505.14 | 82.26 |
| J-1023 | 315.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 505.14 | 82.26 |
| J-1024 | 310.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 505.14 | 84.43 |
| J-1025 | 410.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 505.22 | 41.20 |
| J-1026 | 410.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 505.22 | 41.20 |
| J-1027 | 370.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 505.22 | 58.50 |
| J-1028 | 385.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 505.23 | 52.02 |
| J-1029 | 375.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 505.23 | 56.34 |
| J-1030 | 300.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 505.22 | 88.79 |
| J-1031 | 300.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 505.22 | 88.79 |
| J-1032 | 310.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 505.22 | 84.46 |
| J-1033 | 295.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 505.22 | 90.95 |
| J-1034 | 275.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 505.22 | 99.61 |
| J-1035 | 350.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 505.22 | 67.16 |
| J-1036 | 285.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 503.64 | 94.60 |
| J-1037 | 285.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 503.61 | 94.58 |
| J-1038 | 272.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 503.44 | 100.13 |
| J-1039 | 390.00 | HIGH SERVICE AREA | 3.89 | Fixed | 3.89 | 503.05 | 48.91 |
| J-1040 | 450.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 503.06 | 22.96 |
| J-1041 | 450.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 503.17 | 23.00 |
| J-1042 | 410.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 503.27 | 40.35 |
| J-1043 | 385.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 503.44 | 51.25 |
| J-1044 | 337.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 503.69 | 72.12 |
| J-1045 | 355.00 | HIGH SERVICE AREA | 8.40 | Fixed | 8.40 | 503.05 | 64.05 |
| J-1046 | 335.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 503.82 | 73.04 |
| J-1047 | 335.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 504.92 | 73.52 |
| J-1048 | 270.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 503.79 | 101.15 |
| J-1049 | 285.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 503.79 | 94.66 |
| J-1050 | 325.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 503.78 | 77.35 |
| J-1051 | 330.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 503.78 | 75.19 |
| J-1052 | 350.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 503.83 | 66.56 |

# Scenario: ADD
# Steady State Analysis
# Junction Report

| Label | Elevation (ft) | Zone | Base Flow (gpm) | Pattern | Demand (gpm) | Hydraulic Grade (ft) | Pressure (psi) |
|---|---|---|---|---|---|---|---|
| J-1053 | 312.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 503.88 | 83.02 |
| J-1054 | 310.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 503.75 | 83.83 |
| J-1055 | 305.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 503.75 | 85.99 |
| J-1056 | 295.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 503.67 | 90.28 |
| J-1057 | 320.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 503.04 | 79.19 |
| J-1058 | 320.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 503.04 | 79.19 |
| J-1059 | 320.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 503.04 | 79.19 |
| J-1060 | 340.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 503.04 | 70.54 |
| J-1061 | 345.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 503.58 | 68.61 |
| J-1062 | 355.00 | HIGH SERVICE AREA | 2.65 | Fixed | 2.65 | 503.04 | 64.05 |
| J-1063 | 345.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 503.04 | 68.38 |
| J-1064 | 296.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 503.05 | 89.58 |
| J-1065 | 290.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 503.09 | 92.19 |
| J-1066 | 266.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 503.08 | 102.57 |
| J-1067 | 262.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 503.05 | 104.29 |
| J-1068 | 285.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 503.13 | 94.37 |
| J-1069 | 295.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 503.10 | 90.03 |
| J-1070 | 285.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 503.09 | 94.36 |
| J-1071 | 260.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 503.09 | 105.17 |
| J-1072 | 290.00 | HIGH SERVICE AREA | 2.22 | Fixed | 2.22 | 503.31 | 92.29 |
| J-1073 | 295.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 503.44 | 90.18 |
| J-1074 | 265.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 505.14 | 103.90 |
| J-1075 | 377.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 503.04 | 54.53 |
| J-1076 | 380.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 503.04 | 53.24 |
| J-1077 | 320.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 503.04 | 79.19 |
| J-1078 | 325.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 503.04 | 77.03 |
| J-1079 | 380.00 | HIGH SERVICE AREA | 24.41 | Fixed | 24.41 | 503.04 | 53.23 |
| J-1080 | 360.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 503.04 | 61.89 |
| J-1081 | 350.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 503.04 | 66.21 |
| J-1082 | 270.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 503.04 | 100.82 |
| J-1083 | 400.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 503.00 | 44.56 |
| J-1084 | 325.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 503.00 | 77.01 |
| J-1085 | 325.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 502.98 | 77.00 |
| J-1086 | 370.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 502.98 | 57.54 |
| J-1087 | 415.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 502.98 | 38.07 |
| J-1088 | 420.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 502.98 | 35.90 |
| J-1089 | 328.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 502.95 | 75.69 |
| J-1090 | 355.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 502.98 | 64.02 |
| J-1091 | 324.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 502.95 | 77.42 |
| J-1092 | 305.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 502.95 | 85.64 |
| J-1093 | 330.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 502.95 | 74.83 |
| J-1094 | 330.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 502.95 | 74.83 |
| J-1095 | 306.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 502.95 | 85.21 |
| J-1096 | 393.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 502.95 | 47.57 |
| J-1097 | 330.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 502.95 | 74.83 |
| J-1098 | 270.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 510.59 | 104.09 |
| J-1099 | 307.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 505.14 | 85.72 |
| J-1100 | 440.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 503.05 | 27.28 |
| J-1101 | 350.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 503.04 | 66.21 |
| J-1102 | 305.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 510.58 | 88.95 |
| J-1103 | 285.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 505.26 | 95.30 |
| J-1104 | 420.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 503.05 | 35.93 |
| J-1105 | 307.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 510.58 | 88.08 |

# Scenario: ADD
# Steady State Analysis
# Junction Report

| Label | Elevation (ft) | Zone | Base Flow (gpm) | Pattern | Demand (gpm) | Hydraulic Grade (ft) | Pressure (psi) |
|---|---|---|---|---|---|---|---|
| J-1106 | 303.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 510.58 | 89.81 |
| J-1107 | 332.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 510.58 | 77.26 |
| J-1108 | 277.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 510.58 | 101.06 |
| J-1109 | 305.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 510.58 | 88.95 |
| J-1110 | 320.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 510.58 | 82.46 |
| J-1111 | 306.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 505.22 | 86.19 |
| J-1112 | 307.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 505.22 | 85.76 |
| J-1113 | 323.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 505.22 | 78.84 |
| J-1114 | 431.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 505.22 | 32.11 |
| J-1115 | 340.50 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 506.81 | 71.95 |
| J-1116 | 425.50 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 506.81 | 35.18 |
| J-1117 | 435.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 506.80 | 31.07 |
| J-1118 | 319.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 503.79 | 79.95 |
| J-1119 | 332.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 503.79 | 74.32 |
| J-1120 | 384.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 503.83 | 51.85 |
| J-1121 | 400.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 503.04 | 44.58 |
| J-1122 | 443.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 503.16 | 26.03 |
| J-1123 | 327.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 503.67 | 76.44 |
| J-1124 | 264.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 503.04 | 103.42 |
| J-1125 | 272.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 503.04 | 99.96 |
| J-1126 | 278.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 503.04 | 97.36 |
| J-1127 | 282.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 503.04 | 95.63 |
| J-1128 | 282.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 503.04 | 95.63 |
| J-1129 | 284.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 481.93 | 85.64 |
| J-1130 | 306.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 481.93 | 76.12 |
| J-1131 | 312.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 502.95 | 82.61 |
| J-1132 | 372.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 502.95 | 56.66 |
| J-1133 | 418.00 | HIGH SERVICE AREA | 2.76 | Fixed | 2.76 | 502.98 | 36.77 |
| J-2000 | 306.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.78 | 76.48 |
| J-2001 | 331.30 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.77 | 65.53 |
| J-2002 | 331.30 | LOW SERVICE AREA | 17.54 | Fixed | 17.54 | 482.77 | 65.53 |
| J-2003 | 335.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.77 | 63.93 |
| J-2004 | 335.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.76 | 63.93 |
| J-2005 | 270.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.76 | 92.05 |
| J-2006 | 315.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.78 | 72.59 |
| J-2007 | 315.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.79 | 72.60 |
| J-2008 | 320.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.77 | 70.42 |
| J-2009 | 325.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.77 | 68.26 |
| J-2010 | 330.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.76 | 66.09 |
| J-2011 | 300.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.80 | 79.09 |
| J-2012 | 300.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.83 | 79.10 |
| J-2013 | 330.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.83 | 66.12 |
| J-2014 | 330.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.48 | 65.97 |
| J-2015 | 285.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.76 | 85.56 |
| J-2016 | 275.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.76 | 89.89 |
| J-2017 | 265.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.76 | 94.21 |
| J-2018 | 265.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.76 | 94.21 |
| J-2019 | 275.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.76 | 89.89 |
| J-2020 | 295.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.76 | 81.23 |
| J-2021 | 270.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.85 | 92.09 |
| J-2022 | 295.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.98 | 81.33 |
| J-2023 | 290.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.98 | 83.49 |
| J-2024 | 295.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.98 | 81.33 |

# Scenario: ADD
# Steady State Analysis
# Junction Report

| Label | Elevation (ft) | Zone | Base Flow (gpm) | Pattern | Demand (gpm) | Hydraulic Grade (ft) | Pressure (psi) |
|---|---|---|---|---|---|---|---|
| J-2025 | 260.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.98 | 96.47 |
| J-2026 | 325.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.84 | 68.29 |
| J-2027 | 350.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.45 | 57.31 |
| J-2028 | 287.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.84 | 84.73 |
| J-2029 | 282.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 483.24 | 87.07 |
| J-2030 | 335.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 483.57 | 64.28 |
| J-2031 | 320.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 483.24 | 70.63 |
| J-2032 | 260.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 484.22 | 97.01 |
| J-2033 | 270.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 484.65 | 92.87 |
| J-2034 | 285.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 484.77 | 86.43 |
| J-2035 | 259.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.27 | 96.60 |
| J-2036 | 265.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.58 | 94.13 |
| J-2037 | 305.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.58 | 76.83 |
| J-2038 | 265.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.84 | 94.25 |
| J-2039 | 280.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.81 | 87.74 |
| J-2040 | 270.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.80 | 92.07 |
| J-2041 | 275.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.80 | 89.90 |
| J-2042 | 305.00 | LOW SERVICE AREA | 2.93 | Fixed | 2.93 | 482.80 | 76.93 |
| J-2043 | 280.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.79 | 87.74 |
| J-2044 | 280.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.80 | 87.74 |
| J-2045 | 290.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.80 | 83.41 |
| J-2046 | 280.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 483.38 | 87.99 |
| J-2047 | 290.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 483.41 | 83.68 |
| J-2048 | 305.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 483.34 | 77.16 |
| J-2049 | 305.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 483.20 | 77.10 |
| J-2050 | 325.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.93 | 68.33 |
| J-2051 | 325.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.87 | 68.30 |
| J-2052 | 365.00 | LOW SERVICE AREA | 14.16 | Fixed | 14.16 | 482.27 | 50.74 |
| J-2053 | 275.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.27 | 89.68 |
| J-2054 | 265.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.34 | 94.03 |
| J-2055 | 285.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.44 | 85.42 |
| J-2056 | 295.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.42 | 81.09 |
| J-2057 | 295.00 | LOW SERVICE AREA | 4.96 | Fixed | 4.96 | 482.41 | 81.08 |
| J-2058 | 285.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.30 | 85.36 |
| J-2059 | 265.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.50 | 94.10 |
| J-2060 | 280.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 483.69 | 88.13 |
| J-2061 | 265.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 483.69 | 94.62 |
| J-2062 | 280.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 483.69 | 88.13 |
| J-2063 | 360.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 483.69 | 53.52 |
| J-2064 | 280.00 | LOW SERVICE AREA | 3.31 | Fixed | 3.31 | 482.58 | 87.65 |
| J-2065 | 275.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.58 | 89.81 |
| J-2066 | 280.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.58 | 87.65 |
| J-2067 | 280.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.58 | 87.65 |
| J-2068 | 230.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 484.89 | 110.28 |
| J-2069 | 215.00 | LOW SERVICE AREA | 2.69 | Fixed | 2.69 | 484.88 | 116.76 |
| J-2070 | 200.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 484.87 | 123.25 |
| J-2071 | 200.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 484.87 | 123.25 |
| J-2072 | 288.00 | LOW SERVICE AREA | 2.58 | Fixed | 2.58 | 481.94 | 83.91 |
| J-2073 | 275.00 | LOW SERVICE AREA | 6.47 | Fixed | 6.47 | 481.94 | 89.53 |
| J-2074 | 285.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.93 | 85.20 |
| J-2075 | 270.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.94 | 91.69 |
| J-2076 | 295.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.89 | 80.86 |
| J-2077 | 295.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.89 | 80.86 |

# Scenario: ADD
# Steady State Analysis
# Junction Report

| Label | Elevation (ft) | Zone | Base Flow (gpm) | Pattern | Demand (gpm) | Hydraulic Grade (ft) | Pressure (psi) |
|---|---|---|---|---|---|---|---|
| J-2078 | 290.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.89 | 83.02 |
| J-2079 | 393.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.96 | 38.49 |
| J-2080 | 292.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.96 | 82.19 |
| J-2081 | 276.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.19 | 89.21 |
| J-2082 | 320.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.19 | 70.17 |
| J-2083 | 350.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.96 | 57.09 |
| J-2084 | 370.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.96 | 48.44 |
| J-2085 | 350.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.96 | 57.09 |
| J-2086 | 330.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.96 | 65.74 |
| J-2087 | 320.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.96 | 70.07 |
| J-2088 | 340.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.05 | 61.46 |
| J-2089 | 315.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.20 | 72.34 |
| J-2090 | 270.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.27 | 91.84 |
| J-2091 | 280.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.17 | 87.47 |
| J-2092 | 410.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.03 | 31.17 |
| J-2093 | 415.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.02 | 29.00 |
| J-2094 | 400.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.01 | 35.48 |
| J-2095 | 400.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.03 | 35.49 |
| J-2096 | 285.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.81 | 85.15 |
| J-2097 | 287.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.82 | 84.29 |
| J-2098 | 277.50 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.81 | 88.40 |
| J-2099 | 285.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.81 | 85.15 |
| J-2100 | 275.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.81 | 89.48 |
| J-2101 | 280.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.81 | 87.31 |
| J-2102 | 264.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.81 | 94.24 |
| J-2103 | 265.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.81 | 93.80 |
| J-2104 | 280.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.81 | 87.31 |
| J-2105 | 260.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.81 | 95.97 |
| J-2106 | 255.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.81 | 98.13 |
| J-2107 | 280.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.81 | 87.32 |
| J-2108 | 280.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.82 | 87.32 |
| J-2109 | 300.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.83 | 78.67 |
| J-2110 | 370.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.83 | 48.38 |
| J-2111 | 318.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.83 | 70.88 |
| J-2112 | 315.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.83 | 72.18 |
| J-2113 | 368.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.83 | 49.25 |
| J-2114 | 340.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.83 | 61.36 |
| J-2115 | 300.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.81 | 78.66 |
| J-2116 | 300.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.83 | 78.67 |
| J-2117 | 310.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.83 | 74.34 |
| J-2118 | 287.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.84 | 84.30 |
| J-2119 | 271.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.86 | 91.23 |
| J-2120 | 262.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.86 | 95.12 |
| J-2121 | 255.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.85 | 98.15 |
| J-2122 | 265.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.85 | 93.82 |
| J-2123 | 265.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.85 | 93.82 |
| J-2124 | 255.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.85 | 98.15 |
| J-2125 | 265.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.85 | 93.82 |
| J-2126 | 255.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.85 | 98.15 |
| J-2127 | 250.00 | LOW SERVICE AREA | 3.29 | Fixed | 3.29 | 482.68 | 100.67 |
| J-2128 | 305.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.87 | 76.52 |
| J-2129 | 315.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.88 | 72.20 |
| J-2130 | 300.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.88 | 78.69 |

# Scenario: ADD
# Steady State Analysis
# Junction Report

| Label | Elevation (ft) | Zone | Base Flow (gpm) | Pattern | Demand (gpm) | Hydraulic Grade (ft) | Pressure (psi) |
|---|---|---|---|---|---|---|---|
| J-2131 | 320.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.89 | 70.04 |
| J-2132 | 320.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.94 | 70.06 |
| J-2133 | 345.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.94 | 59.25 |
| J-2134 | 285.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.87 | 85.17 |
| J-2135 | 295.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.87 | 80.85 |
| J-2136 | 297.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.87 | 79.98 |
| J-2137 | 260.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.87 | 95.99 |
| J-2138 | 270.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.87 | 91.67 |
| J-2139 | 250.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.88 | 100.32 |
| J-2140 | 250.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.87 | 100.32 |
| J-2141 | 280.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.87 | 87.34 |
| J-2142 | 300.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.87 | 78.69 |
| J-2143 | 295.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.88 | 80.85 |
| J-2144 | 320.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.89 | 70.04 |
| J-2145 | 285.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.89 | 85.18 |
| J-2146 | 320.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.88 | 70.04 |
| J-2147 | 285.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.88 | 85.18 |
| J-2148 | 250.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.88 | 100.33 |
| J-2149 | 245.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.88 | 102.49 |
| J-2150 | 260.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.88 | 96.00 |
| J-2151 | 240.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.88 | 104.65 |
| J-2152 | 245.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.88 | 102.49 |
| J-2153 | 260.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 485.39 | 97.51 |
| J-2154 | 280.00 | LOW SERVICE AREA | 3.56 | Fixed | 3.56 | 485.09 | 88.73 |
| J-2155 | 295.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 485.03 | 82.22 |
| J-2156 | 344.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 484.94 | 60.98 |
| J-2157 | 393.00 | LOW SERVICE AREA | 7.87 | Fixed | 7.87 | 484.94 | 39.78 |
| J-2158 | 384.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 484.95 | 43.67 |
| J-2159 | 307.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.78 | 76.05 |
| J-2160 | 263.50 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.81 | 94.45 |
| J-2161 | 322.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.90 | 69.18 |
| J-2162 | 315.50 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.92 | 72.00 |
| J-2163 | 272.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.84 | 90.79 |
| J-2164 | 295.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.84 | 80.84 |
| J-2165 | 265.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.91 | 93.85 |
| J-2166 | 272.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.91 | 90.82 |
| J-2167 | 341.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.97 | 60.99 |
| J-2168 | 274.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.81 | 89.91 |
| J-2169 | 283.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.81 | 86.02 |
| J-2170 | 285.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.81 | 85.15 |
| J-2171 | 322.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.81 | 69.14 |
| J-2172 | 300.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.81 | 78.66 |
| J-2173 | 288.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.83 | 83.86 |
| J-2174 | 290.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.84 | 83.00 |
| J-2175 | 283.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.81 | 86.02 |
| J-2176 | 347.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.98 | 58.40 |
| J-2177 | 346.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.98 | 58.83 |
| J-2178 | 355.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.98 | 54.94 |
| J-2179 | 339.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 481.98 | 61.86 |
| J-2180 | 405.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.03 | 33.33 |
| J-2181 | 386.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.03 | 41.55 |
| J-2182 | 402.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.03 | 34.63 |
| J-2183 | 396.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.03 | 37.22 |

# Scenario: ADD
# Steady State Analysis
# Junction Report

| Label | Elevation (ft) | Zone | Base Flow (gpm) | Pattern | Demand (gpm) | Hydraulic Grade (ft) | Pressure (psi) |
|---|---|---|---|---|---|---|---|
| J-2184 | 219.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 484.95 | 115.06 |
| J-2185 | 221.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 484.88 | 114.17 |
| J-2186 | 218.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 484.88 | 115.47 |
| J-2187 | 215.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 484.87 | 116.76 |
| J-2188 | 219.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 484.87 | 115.03 |
| J-2189 | 232.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 484.87 | 109.41 |
| J-2190 | 270.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 484.87 | 92.96 |
| J-2191 | 284.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.93 | 86.07 |
| J-2192 | 263.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.93 | 95.15 |
| J-2193 | 342.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.77 | 60.90 |
| J-2194 | 295.00 | LOW SERVICE AREA | 0.00 | Fixed | 0.00 | 482.41 | 81.08 |
| J-2195 | 285.00 | LOW SERVICE AREA | 0.00 | Fixed | 0.00 | 482.33 | 85.38 |
| J-2291 | 275.00 | LOW SERVICE AREA | 1.55 | Fixed | 1.55 | 482.78 | 89.90 |

# Scenario: ADD
# Steady State Analysis
# Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-1000 | 12.0 | J-1102 | J-1015 | 1,245 | 11.04 | 0.00 | 0.00 | 0.03 | 120.0 |
| P-1001 | 12.0 | J-1007 | J-1102 | 1,005 | 13.80 | 0.00 | 0.00 | 0.04 | 120.0 |
| P-1003 | 12.0 | J-1008 | J-1009 | 300 | 2.76 | 0.00 | 0.00 | 0.01 | 100.0 |
| P-1004 | 12.0 | J-1007 | J-1008 | 400 | 19.32 | 0.00 | 0.00 | 0.05 | 100.0 |
| P-1005 | 12.0 | J-1098 | J-1007 | 850 | 35.88 | 0.01 | 0.01 | 0.10 | 110.0 |
| P-1006 | 12.0 | J-1006 | J-1098 | 800 | -635.58 | 1.49 | 1.19 | 1.80 | 110.0 |
| P-1007 | 12.0 | J-1007 | J-1012 | 4,600 | 0.00 | 0.00 | 0.00 | 0.00 | 130.0 |
| P-1008 | 8.0 | J-1030 | J-1031 | 1,650 | -0.41 | 0.00 | 0.00 | 0.00 | 110.0 |
| P-1010 | 12.0 | J-1016 | J-1017 | 1,800 | 5.52 | 0.00 | 0.00 | 0.02 | 120.0 |
| P-1012 | 8.0 | J-1027 | J-1030 | 2,200 | 5.11 | 0.00 | 0.00 | 0.03 | 110.0 |
| P-1013 | 8.0 | J-1034 | J-1033 | 1,350 | -0.45 | 0.00 | 0.00 | 0.00 | 110.0 |
| P-1014 | 12.0 | J-1033 | J-1034 | 1,050 | 2.31 | 0.00 | 0.00 | 0.01 | 110.0 |
| P-1015 | 12.0 | J-1032 | J-1033 | 500 | 3.61 | 0.00 | 0.00 | 0.01 | 110.0 |
| P-1016 | 12.0 | J-1032 | J-1027 | 1,500 | -15.06 | 0.00 | 0.00 | 0.04 | 110.0 |
| P-1017 | 8.0 | J-1033 | J-1035 | 2,100 | -1.91 | 0.00 | 0.00 | 0.01 | 120.0 |
| P-1018 | 12.0 | J-1025 | PRV-4 | 1,183 | 0.00 | 0.00 | 0.00 | 0.00 | 110.0 |
| P-1019 | 12.0 | J-1026 | J-1025 | 450 | 5.52 | 0.00 | 0.00 | 0.02 | 110.0 |
| P-1020 | 12.0 | J-1026 | J-1027 | 1,100 | -12.95 | 0.00 | 0.00 | 0.04 | 110.0 |
| P-1021 | 8.0 | J-1035 | J-1026 | 600 | -4.67 | 0.00 | 0.00 | 0.03 | 120.0 |
| P-1022 | 10.0 | J-1029 | J-1028 | 2,500 | 9.44 | 0.00 | 0.00 | 0.04 | 110.0 |
| P-1023 | 12.0 | J-1028 | J-1027 | 250 | 35.88 | 0.01 | 0.00 | 0.10 | 110.0 |
| P-1024 | 12.0 | J-1029 | J-1028 | 750 | 29.20 | 0.00 | 0.00 | 0.08 | 110.0 |
| P-1025 | 12.0 | J-1103 | J-1029 | 3,500 | 41.40 | 0.01 | 0.03 | 0.12 | 120.0 |
| P-1026 | 10.0 | J-1019 | J-1018 | 1,500 | -28.19 | 0.02 | 0.02 | 0.12 | 90.0 |
| P-1027 | 12.0 | J-1011 | J-1005 | 2,200 | -297.83 | 0.31 | 0.69 | 0.84 | 120.0 |
| P-1028 | 10.0 | J-1013 | J-1014 | 1,950 | 2.76 | 0.00 | 0.00 | 0.01 | 100.0 |
| P-1029 | 12.0 | J-1013 | J-1012 | 2,000 | -204.44 | 0.18 | 0.37 | 0.58 | 110.0 |
| P-1030 | 10.0 | J-1103 | J-1013 | 1,000 | -198.92 | 0.36 | 0.36 | 0.81 | 120.0 |
| P-1031 | 10.0 | J-1018 | J-1103 | 400 | -154.76 | 0.23 | 0.09 | 0.63 | 120.0 |
| P-1032 | 8.0 | J-1053 | J-1018 | 2,080 | -123.81 | 0.62 | 1.29 | 0.79 | 100.0 |
| P-1033 | 8.0 | J-1054 | J-1036 | 500 | 76.99 | 0.22 | 0.11 | 0.49 | 110.0 |
| P-1034 | 8.0 | J-1036 | J-1037 | 650 | 36.32 | 0.05 | 0.03 | 0.23 | 110.0 |
| P-1035 | 8.0 | J-1037 | J-1036 | 600 | -37.92 | 0.06 | 0.03 | 0.24 | 110.0 |
| P-1036 | 8.0 | J-1053 | J-1054 | 400 | 86.97 | 0.32 | 0.13 | 0.56 | 100.0 |
| P-1037 | 8.0 | J-1052 | J-1053 | 800 | -34.07 | 0.06 | 0.05 | 0.22 | 100.0 |
| P-1038 | 8.0 | J-1050 | J-1052 | 1,200 | -28.55 | 0.04 | 0.05 | 0.18 | 100.0 |
| P-1039 | 12.0 | J-1011 | J-1012 | 750 | 207.20 | 0.19 | 0.14 | 0.59 | 110.0 |
| P-1040 | 12.0 | J-1010 | J-1011 | 2,200 | -87.87 | 0.04 | 0.08 | 0.25 | 110.0 |
| P-1041 | 12.0 | J-1047 | J-1010 | 1,800 | -395.26 | 0.62 | 1.11 | 1.12 | 110.0 |
| P-1042 | 8.0 | J-1054 | J-1055 | 500 | 7.22 | 0.00 | 0.00 | 0.05 | 100.0 |
| P-1043 | 12.0 | J-1005 | J-1006 | 1,750 | -632.82 | 1.48 | 2.59 | 1.80 | 110.0 |
| P-1044 | 12.0 | J-1010 | J-1005 | 1,950 | -310.15 | 0.40 | 0.77 | 0.88 | 110.0 |
| P-1045 | 12.0 | J-1001 | J-1004 | 1,500 | -1.95 | 0.00 | 0.00 | 0.01 | 100.0 |
| P-1046 | 12.0 | J-1002 | J-1003 | 1,900 | -8.39 | 0.00 | 0.00 | 0.02 | 100.0 |
| P-1047 | 12.0 | J-1001 | J-1002 | 1,100 | -2.87 | 0.00 | 0.00 | 0.01 | 100.0 |
| P-1048 | 8.0 | J-1000 | J-1001 | 975 | -2.06 | 0.00 | 0.00 | 0.01 | 100.0 |
| P-1049 | 12.0 | J-1004 | J-1000 | 1,400 | 6.22 | 0.00 | 0.00 | 0.02 | 120.0 |
| P-1050 | 12.0 | J-1003 | J-1004 | 1,200 | 10.93 | 0.00 | 0.00 | 0.03 | 100.0 |
| P-1051 | 12.0 | J-1005 | J-1003 | 430 | 22.08 | 0.00 | 0.00 | 0.06 | 100.0 |
| P-1052 | 12.0 | J-1100 | T-3 | 200 | 276.02 | 0.27 | 0.05 | 0.78 | 120.0 |
| P-1053 | 12.0 | J-1100 | J-1040 | 200 | -55.71 | 0.02 | 0.00 | 0.16 | 110.0 |

# Scenario: ADD
# Steady State Analysis
# Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-1054 | 12.0 | J-1042 | J-1100 | 1,000 | 223.07 | 0.21 | 0.21 | 0.63 | 110.0 |
| P-1055 | 8.0 | J-1044 | J-1046 | 350 | -94.28 | 0.37 | 0.13 | 0.60 | 100.0 |
| P-1056 | 8.0 | J-1046 | J-1048 | 1,360 | 21.56 | 0.02 | 0.03 | 0.14 | 100.0 |
| P-1057 | 12.0 | J-1046 | J-1047 | 1,800 | -392.50 | 0.61 | 1.10 | 1.11 | 110.0 |
| P-1058 | 12.0 | J-1044 | J-1046 | 350 | -273.89 | 0.37 | 0.13 | 0.78 | 100.0 |
| P-1059 | 8.0 | J-1044 | J-1061 | 1,100 | 47.30 | 0.10 | 0.11 | 0.30 | 100.0 |
| P-1060 | 12.0 | J-1043 | J-1044 | 600 | -318.12 | 0.41 | 0.25 | 0.90 | 110.0 |
| P-1061 | 12.0 | J-1043 | J-1042 | 800 | 225.83 | 0.22 | 0.18 | 0.64 | 110.0 |
| P-1062 | 8.0 | J-1041 | J-1043 | 1,150 | -89.52 | 0.24 | 0.28 | 0.57 | 120.0 |
| P-1063 | 8.0 | J-1040 | J-1041 | 500 | -84.00 | 0.22 | 0.11 | 0.54 | 120.0 |
| P-1064 | 12.0 | J-1104 | J-1040 | 615 | -25.54 | 0.00 | 0.00 | 0.07 | 100.0 |
| P-1065 | 12.0 | J-1039 | J-1104 | 1,585 | -22.78 | 0.00 | 0.01 | 0.06 | 100.0 |
| P-1066 | 12.0 | J-1101 | J-1079 | 1,326 | 9.85 | 0.00 | 0.00 | 0.03 | 120.0 |
| P-1067 | 12.0 | J-1059 | J-1101 | 1,774 | 12.61 | 0.00 | 0.00 | 0.04 | 120.0 |
| P-1068 | 8.0 | J-1057 | J-1058 | 1,350 | -0.96 | 0.00 | 0.00 | 0.01 | 120.0 |
| P-1069 | 12.0 | J-1058 | J-1057 | 1,870 | 1.80 | 0.00 | 0.00 | 0.01 | 120.0 |
| P-1070 | 8.0 | J-1050 | J-1051 | 1,250 | 2.76 | 0.00 | 0.00 | 0.02 | 120.0 |
| P-1071 | 8.0 | J-1048 | J-1050 | 1,200 | 10.52 | 0.01 | 0.01 | 0.07 | 100.0 |
| P-1072 | 8.0 | J-1048 | J-1049 | 800 | 8.28 | 0.00 | 0.00 | 0.05 | 100.0 |
| P-1073 | 6.0 | J-1061 | J-1045 | 1,400 | 44.54 | 0.38 | 0.53 | 0.51 | 100.0 |
| P-1074 | 12.0 | J-1045 | J-1039 | 550 | -18.89 | 0.00 | 0.00 | 0.05 | 100.0 |
| P-1075 | 12.0 | J-1045 | J-1058 | 2,800 | 14.67 | 0.00 | 0.00 | 0.04 | 100.0 |
| P-1076 | 12.0 | J-1062 | J-1045 | 280 | -40.36 | 0.01 | 0.00 | 0.11 | 100.0 |
| P-1077 | 12.0 | J-1075 | J-1076 | 500 | 2.76 | 0.00 | 0.00 | 0.01 | 110.0 |
| P-1078 | 12.0 | J-1062 | J-1075 | 500 | 5.52 | 0.00 | 0.00 | 0.02 | 100.0 |
| P-1079 | 8.0 | J-1077 | J-1080 | 200 | 2.76 | 0.00 | 0.00 | 0.02 | 120.0 |
| P-1080 | 12.0 | J-1062 | J-1059 | 2,800 | 9.34 | 0.00 | 0.00 | 0.03 | 110.0 |
| P-1081 | 12.0 | J-1078 | J-1062 | 500 | -22.84 | 0.00 | 0.00 | 0.06 | 100.0 |
| P-1082 | 12.0 | J-1077 | J-1078 | 350 | -20.08 | 0.00 | 0.00 | 0.06 | 120.0 |
| P-1083 | 12.0 | J-1079 | J-1077 | 1,200 | -14.56 | 0.00 | 0.00 | 0.04 | 120.0 |
| P-1084 | 12.0 | J-1058 | J-1059 | 300 | 6.02 | 0.00 | 0.00 | 0.02 | 120.0 |
| P-1085 | 12.0 | J-1063 | J-1058 | 1,750 | -3.13 | 0.00 | 0.00 | 0.01 | 110.0 |
| P-1086 | 12.0 | J-1093 | J-1094 | 1,250 | 2.76 | 0.00 | 0.00 | 0.01 | 110.0 |
| P-1087 | 6.0 | J-1092 | J-1093 | 1,600 | 2.71 | 0.00 | 0.00 | 0.03 | 100.0 |
| P-1088 | 8.0 | J-1093 | J-1096 | 1,100 | -2.81 | 0.00 | 0.00 | 0.02 | 110.0 |
| P-1089 | 8.0 | J-1096 | J-1097 | 2,000 | -5.57 | 0.00 | 0.00 | 0.04 | 110.0 |
| P-1090 | 8.0 | J-1092 | J-1097 | 800 | -2.83 | 0.00 | 0.00 | 0.02 | 100.0 |
| P-1091 | 8.0 | J-1089 | J-1092 | 2,000 | 2.63 | 0.00 | 0.00 | 0.02 | 100.0 |
| P-1092 | 8.0 | J-1097 | J-1091 | 650 | -11.17 | 0.01 | 0.00 | 0.07 | 100.0 |
| P-1093 | 8.0 | J-1091 | J-1089 | 600 | 10.91 | 0.01 | 0.00 | 0.07 | 100.0 |
| P-1094 | 8.0 | J-1095 | J-1089 | 840 | -5.52 | 0.00 | 0.00 | 0.04 | 100.0 |
| P-1095 | 6.0 | J-1095 | PRV-2 | 2,322 | 0.00 | 0.00 | 0.00 | 0.00 | 110.0 |
| P-1096 | 8.0 | J-1084 | J-1085 | 1,800 | 15.12 | 0.01 | 0.02 | 0.10 | 100.0 |
| P-1098 | 8.0 | J-1084 | J-1083 | 900 | 5.85 | 0.00 | 0.00 | 0.04 | 110.0 |
| P-1099 | 8.0 | J-1083 | J-1082 | 1,350 | -25.95 | 0.03 | 0.04 | 0.17 | 110.0 |
| P-1100 | 10.0 | J-1086 | J-1083 | 1,150 | -29.04 | 0.01 | 0.02 | 0.12 | 100.0 |
| P-1101 | 10.0 | J-1086 | J-1090 | 515 | 16.30 | 0.00 | 0.00 | 0.07 | 100.0 |
| P-1102 | 10.0 | J-1087 | J-1086 | 1,100 | -9.98 | 0.00 | 0.00 | 0.04 | 110.0 |
| P-1103 | 10.0 | J-1085 | J-1090 | 500 | -15.24 | 0.00 | 0.00 | 0.06 | 100.0 |
| P-1104 | 12.0 | J-1081 | J-1121 | 690 | 2.76 | 0.00 | 0.00 | 0.01 | 120.0 |
| P-1105 | 8.0 | J-1060 | J-1084 | 1,300 | 23.73 | 0.03 | 0.04 | 0.15 | 100.0 |

# Scenario: ADD
# Steady State Analysis
# Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-1106 | 10.0 | J-1088 | J-1087 | 700 | -7.22 | 0.00 | 0.00 | 0.03 | 110.0 |
| P-1107 | 8.0 | J-1091 | J-1085 | 650 | -27.60 | 0.04 | 0.02 | 0.18 | 100.0 |
| P-1108 | 10.0 | J-1090 | J-1088 | 1,100 | -1.70 | 0.00 | 0.00 | 0.01 | 110.0 |
| P-1109 | 8.0 | J-1064 | J-1060 | 300 | 34.42 | 0.04 | 0.01 | 0.22 | 130.0 |
| P-1110 | 8.0 | J-1068 | J-1069 | 1,450 | 20.91 | 0.02 | 0.03 | 0.13 | 100.0 |
| P-1111 | 8.0 | J-1038 | J-1073 | 1,400 | 2.12 | 0.00 | 0.00 | 0.01 | 110.0 |
| P-1112 | 8.0 | J-1068 | J-1072 | 950 | -64.37 | 0.18 | 0.18 | 0.41 | 100.0 |
| P-1113 | 8.0 | J-1065 | J-1068 | 500 | -40.70 | 0.08 | 0.04 | 0.26 | 100.0 |
| P-1114 | 6.0 | J-1073 | J-1065 | 1,700 | 31.86 | 0.20 | 0.35 | 0.36 | 100.0 |
| P-1115 | 6.0 | J-1056 | J-1073 | 1,100 | 32.50 | 0.21 | 0.23 | 0.37 | 100.0 |
| P-1116 | 8.0 | J-1065 | J-1064 | 250 | 59.58 | 0.16 | 0.04 | 0.38 | 100.0 |
| P-1117 | 8.0 | J-1066 | J-1065 | 1,400 | -10.22 | 0.01 | 0.01 | 0.07 | 100.0 |
| P-1118 | 8.0 | J-1064 | J-1067 | 1,250 | -3.53 | 0.00 | 0.00 | 0.02 | 100.0 |
| P-1119 | 12.0 | J-1063 | J-1064 | 1,910 | -25.93 | 0.00 | 0.01 | 0.07 | 110.0 |
| P-1120 | 12.0 | J-1081 | J-1063 | 450 | -26.30 | 0.00 | 0.00 | 0.07 | 110.0 |
| P-1121 | 12.0 | J-1082 | J-1081 | 700 | -20.78 | 0.00 | 0.00 | 0.06 | 110.0 |
| P-1122 | 12.0 | J-1082 | J-1060 | 1,400 | -7.93 | 0.00 | 0.00 | 0.02 | 110.0 |
| P-1123 | 6.0 | J-1069 | J-1070 | 500 | 5.52 | 0.01 | 0.00 | 0.06 | 100.0 |
| P-1124 | 6.0 | J-1069 | J-1066 | 400 | 12.63 | 0.04 | 0.01 | 0.14 | 100.0 |
| P-1125 | 6.0 | J-1067 | J-1066 | 350 | -20.09 | 0.09 | 0.03 | 0.23 | 100.0 |
| P-1126 | 6.0 | J-1070 | J-1071 | 1,000 | 2.76 | 0.00 | 0.00 | 0.03 | 100.0 |
| P-1127 | 8.0 | J-1038 | J-1037 | 900 | -71.47 | 0.19 | 0.17 | 0.46 | 110.0 |
| P-1128 | 8.0 | J-1072 | J-1038 | 800 | -66.59 | 0.16 | 0.13 | 0.43 | 110.0 |
| P-1129 | 8.0 | J-1055 | J-1050 | 650 | -33.56 | 0.06 | 0.04 | 0.21 | 100.0 |
| P-1130 | 8.0 | J-1055 | J-1056 | 1,120 | 38.02 | 0.07 | 0.08 | 0.24 | 100.0 |
| P-1131 | 10.0 | J-1019 | J-1022 | 500 | 17.54 | 0.01 | 0.00 | 0.07 | 90.0 |
| P-1132 | 8.0 | J-1020 | J-1019 | 520 | -7.89 | 0.00 | 0.00 | 0.05 | 100.0 |
| P-1133 | 8.0 | J-1021 | J-1020 | 800 | -2.17 | 0.00 | 0.00 | 0.01 | 100.0 |
| P-1134 | 6.0 | J-1022 | J-1021 | 700 | -2.37 | 0.00 | 0.00 | 0.03 | 100.0 |
| P-1135 | 10.0 | J-1023 | J-1022 | 500 | -11.04 | 0.00 | 0.00 | 0.05 | 90.0 |
| P-1136 | 8.0 | J-1020 | J-1021 | 450 | 2.96 | 0.00 | 0.00 | 0.02 | 100.0 |
| P-1137 | 8.0 | J-1074 | J-1024 | 800 | -0.54 | 0.00 | 0.00 | 0.00 | 100.0 |
| P-1138 | 8.0 | J-1023 | J-1074 | 900 | 2.22 | 0.00 | 0.00 | 0.01 | 100.0 |
| P-1139 | 10.0 | J-1024 | J-1023 | 320 | -6.06 | 0.00 | 0.00 | 0.02 | 90.0 |
| P-1140 | 10.0 | J-1024 | J-1099 | 330 | 2.76 | 0.00 | 0.00 | 0.01 | 90.0 |
| P-1141 | 10.0 | J-1099 | PRV-3 | 5 | 0.00 | 0.00 | 0.00 | 0.00 | 90.0 |
| P-1142 | 8.0 | J-1092 | PRV-1 | 390 | 0.00 | 0.00 | 0.00 | 0.00 | 100.0 |
| P-1143 | 12.0 | J-1015 | J-1105 | 825 | 8.28 | 0.00 | 0.00 | 0.02 | 130.0 |
| P-1144 | 12.0 | J-1105 | J-1106 | 715 | 2.76 | 0.00 | 0.00 | 0.01 | 130.0 |
| P-1145 | 8.0 | J-1105 | J-1107 | 928 | 2.76 | 0.00 | 0.00 | 0.02 | 130.0 |
| P-1146 | 12.0 | J-1008 | J-1108 | 1,077 | 13.80 | 0.00 | 0.00 | 0.04 | 120.0 |
| P-1147 | 8.0 | J-1108 | J-1109 | 757 | 2.76 | 0.00 | 0.00 | 0.02 | 130.0 |
| P-1148 | 8.0 | J-1017 | J-1110 | 1,053 | 2.76 | 0.00 | 0.00 | 0.02 | 130.0 |
| P-1149 | 12.0 | J-1111 | J-1032 | 1,442 | -8.69 | 0.00 | 0.00 | 0.02 | 110.0 |
| P-1150 | 8.0 | J-1111 | J-1112 | 573 | 2.76 | 0.00 | 0.00 | 0.02 | 130.0 |
| P-1151 | 12.0 | J-1031 | J-1111 | 1,858 | -3.17 | 0.00 | 0.00 | 0.01 | 110.0 |
| P-1152 | 8.0 | J-1030 | J-1113 | 439 | 2.76 | 0.00 | 0.00 | 0.02 | 130.0 |
| P-1153 | 8.0 | J-1025 | J-1114 | 459 | 2.76 | 0.00 | 0.00 | 0.02 | 130.0 |
| P-1154 | 12.0 | J-1002 | J-1115 | 2,056 | 2.76 | 0.00 | 0.00 | 0.01 | 130.0 |
| P-1155 | 8.0 | J-1000 | J-1116 | 920 | 2.76 | 0.00 | 0.00 | 0.02 | 130.0 |
| P-1156 | 8.0 | J-1000 | J-1117 | 1,514 | 2.76 | 0.00 | 0.00 | 0.02 | 130.0 |

# Scenario: ADD
# Steady State Analysis
# Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-1157 | 8.0 | J-1049 | J-1118 | 828 | 2.76 | 0.00 | 0.00 | 0.02 | 130.0 |
| P-1158 | 8.0 | J-1049 | J-1119 | 1,231 | 2.76 | 0.00 | 0.00 | 0.02 | 130.0 |
| P-1159 | 10.0 | J-1052 | J-1120 | 698 | 2.76 | 0.00 | 0.00 | 0.01 | 130.0 |
| P-1161 | 6.0 | J-1041 | J-1122 | 338 | 2.76 | 0.00 | 0.00 | 0.03 | 130.0 |
| P-1162 | 6.0 | J-1056 | J-1123 | 932 | 2.76 | 0.00 | 0.00 | 0.03 | 110.0 |
| P-1163 | 6.0 | J-1067 | J-1124 | 388 | 13.80 | 0.03 | 0.01 | 0.16 | 130.0 |
| P-1164 | 6.0 | J-1124 | J-1125 | 150 | 8.28 | 0.01 | 0.00 | 0.09 | 130.0 |
| P-1165 | 6.0 | J-1125 | J-1126 | 100 | 2.76 | 0.00 | 0.00 | 0.03 | 130.0 |
| P-1166 | 6.0 | J-1125 | J-1127 | 224 | 2.76 | 0.00 | 0.00 | 0.03 | 130.0 |
| P-1167 | 6.0 | J-1124 | J-1128 | 747 | 2.76 | 0.00 | 0.00 | 0.03 | 130.0 |
| P-1168 | 8.0 | J-1095 | J-1131 | 773 | 2.76 | 0.00 | 0.00 | 0.02 | 130.0 |
| P-1169 | 8.0 | J-1091 | J-1132 | 885 | 2.76 | 0.00 | 0.00 | 0.02 | 130.0 |
| P-1170 | 8.0 | J-1088 | J-1133 | 1,016 | 2.76 | 0.00 | 0.00 | 0.02 | 130.0 |
| P-2000 | 6.0 | J-2017 | J-2018 | 1,600 | 1.55 | 0.00 | 0.00 | 0.02 | 100.0 |
| P-2001 | 8.0 | J-2016 | J-2019 | 650 | -2.50 | 0.00 | 0.00 | 0.02 | 100.0 |
| P-2002 | 8.0 | J-2016 | J-2017 | 750 | 3.10 | 0.00 | 0.00 | 0.02 | 100.0 |
| P-2003 | 12.0 | J-2020 | J-2016 | 650 | 2.15 | 0.00 | 0.00 | 0.01 | 110.0 |
| P-2004 | 8.0 | J-2015 | J-2021 | 550 | -60.69 | 0.17 | 0.09 | 0.39 | 100.0 |
| P-2005 | 6.0 | J-2020 | J-2015 | 450 | -1.89 | 0.00 | 0.00 | 0.02 | 90.0 |
| P-2006 | 8.0 | J-2019 | J-2015 | 300 | -4.05 | 0.00 | 0.00 | 0.03 | 100.0 |
| P-2007 | 6.0 | J-2005 | J-2020 | 300 | 1.81 | 0.00 | 0.00 | 0.02 | 130.0 |
| P-2008 | 6.0 | J-2191 | J-2192 | 1,093 | 1.55 | 0.00 | 0.00 | 0.02 | 130.0 |
| P-2009 | 8.0 | J-2015 | J-2014 | 2,160 | 53.20 | 0.13 | 0.28 | 0.34 | 100.0 |
| P-2010 | 6.0 | J-2004 | J-2005 | 1,200 | 3.36 | 0.00 | 0.00 | 0.04 | 100.0 |
| P-2011 | 8.0 | J-207 | T-2 | 223 | 210.82 | 1.02 | 0.23 | 1.35 | 130.0 |
| P-2012 | 8.0 | J-2025 | J-2024 | 2,400 | -1.30 | 0.00 | 0.00 | 0.01 | 90.0 |
| P-2013 | 8.0 | J-2023 | J-2025 | 250 | 0.25 | 0.00 | 0.00 | 0.00 | 90.0 |
| P-2014 | 8.0 | J-2024 | J-2023 | 1,300 | 1.80 | 0.00 | 0.00 | 0.01 | 90.0 |
| P-2015 | 8.0 | J-2022 | J-2024 | 250 | 4.65 | 0.00 | 0.00 | 0.03 | 90.0 |
| P-2016 | 10.0 | J-2014 | J-207 | 800 | 139.16 | 0.32 | 0.25 | 0.57 | 90.0 |
| P-2017 | 8.0 | J-207 | J-2027 | 1,200 | -71.66 | 0.19 | 0.23 | 0.46 | 110.0 |
| P-2018 | 10.0 | J-2022 | J-2029 | 3,500 | -71.54 | 0.08 | 0.27 | 0.29 | 100.0 |
| P-2019 | 10.0 | J-2014 | J-2011 | 2,900 | -87.51 | 0.11 | 0.32 | 0.36 | 100.0 |
| P-2020 | 6.0 | J-2010 | J-2004 | 700 | 1.36 | 0.00 | 0.00 | 0.02 | 90.0 |
| P-2021 | 12.0 | PRV-4 | J-2003 | 167 | 0.00 | 0.00 | 0.00 | 0.00 | 110.0 |
| P-2022 | 6.0 | J-2004 | J-2003 | 350 | -3.55 | 0.00 | 0.00 | 0.04 | 90.0 |
| P-2023 | 10.0 | J-2003 | J-2002 | 1,650 | -5.10 | 0.00 | 0.00 | 0.02 | 110.0 |
| P-2024 | 8.0 | J-2009 | J-2002 | 850 | -0.18 | 0.00 | 0.00 | 0.00 | 110.0 |
| P-2025 | 6.0 | J-2008 | J-2001 | 1,200 | 2.18 | 0.00 | 0.00 | 0.02 | 130.0 |
| P-2026 | 8.0 | J-2008 | J-2001 | 1,000 | 4.34 | 0.00 | 0.00 | 0.03 | 110.0 |
| P-2027 | 6.0 | J-2008 | J-2009 | 750 | 4.28 | 0.01 | 0.00 | 0.05 | 90.0 |
| P-2028 | 10.0 | J-2002 | J-2001 | 400 | -24.37 | 0.01 | 0.00 | 0.10 | 110.0 |
| P-2029 | 8.0 | J-2029 | J-2031 | 400 | 1.55 | 0.00 | 0.00 | 0.01 | 110.0 |
| P-2030 | 8.0 | J-2050 | J-2012 | 400 | 76.16 | 0.25 | 0.10 | 0.49 | 100.0 |
| P-2031 | 6.0 | J-2051 | J-2050 | 450 | -25.50 | 0.13 | 0.06 | 0.29 | 100.0 |
| P-2032 | 6.0 | J-2026 | J-2051 | 300 | -23.95 | 0.12 | 0.04 | 0.27 | 100.0 |
| P-2033 | 12.0 | J-2026 | J-2028 | 600 | -18.77 | 0.00 | 0.00 | 0.05 | 120.0 |
| P-2034 | 12.0 | J-2026 | J-2012 | 650 | 36.32 | 0.01 | 0.00 | 0.10 | 120.0 |
| P-2035 | 8.0 | J-2013 | J-2026 | 1,300 | -4.85 | 0.00 | 0.00 | 0.03 | 110.0 |
| P-2036 | 6.0 | J-2012 | J-2013 | 900 | -3.30 | 0.00 | 0.00 | 0.04 | 100.0 |
| P-2037 | 10.0 | J-2011 | J-2012 | 150 | -114.23 | 0.22 | 0.03 | 0.47 | 90.0 |

# Scenario: ADD
# Steady State Analysis
# Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-2038 | 8.0 | J-2028 | J-2029 | 900 | -93.53 | 0.45 | 0.40 | 0.60 | 90.0 |
| P-2039 | 8.0 | J-2027 | J-2028 | 1,950 | -73.21 | 0.20 | 0.38 | 0.47 | 110.0 |
| P-2040 | 8.0 | J-2007 | J-2008 | 1,950 | 12.35 | 0.01 | 0.02 | 0.08 | 90.0 |
| P-2041 | 10.0 | J-2007 | J-2011 | 600 | -25.17 | 0.01 | 0.01 | 0.10 | 90.0 |
| P-2042 | 10.0 | J-2006 | J-2007 | 600 | -25.60 | 0.01 | 0.01 | 0.10 | 90.0 |
| P-2043 | 8.0 | J-2042 | J-2007 | 1,650 | 8.56 | 0.00 | 0.01 | 0.05 | 100.0 |
| P-2044 | 8.0 | J-2007 | J-2043 | 1,450 | -5.76 | 0.00 | 0.00 | 0.04 | 110.0 |
| P-2045 | 10.0 | J-2030 | J-2029 | 1,080 | 168.17 | 0.31 | 0.33 | 0.69 | 110.0 |
| P-2046 | 8.0 | J-2050 | J-2049 | 600 | -103.21 | 0.44 | 0.27 | 0.66 | 100.0 |
| P-2047 | 10.0 | J-2000 | J-2006 | 470 | -24.05 | 0.01 | 0.01 | 0.10 | 90.0 |
| P-2048 | 10.0 | J-2001 | J-2000 | 1,350 | -19.40 | 0.01 | 0.01 | 0.08 | 110.0 |
| P-2049 | 10.0 | PRV-3 | J-2159 | 5 | 0.00 | 0.00 | 0.00 | 0.00 | 90.0 |
| P-2050 | 10.0 | J-2159 | J-2000 | 210 | -1.55 | 0.00 | 0.00 | 0.01 | 90.0 |
| P-2051 | 12.0 | J-2153 | J-208 | 909 | -680.34 | 1.69 | 1.54 | 1.93 | 110.0 |
| P-2052 | 8.0 | J-2036 | J-2038 | 1,250 | -69.17 | 0.21 | 0.26 | 0.44 | 100.0 |
| P-2053 | 8.0 | J-2059 | J-2060 | 1,100 | -150.66 | 1.08 | 1.19 | 0.96 | 90.0 |
| P-2054 | 12.0 | J-2153 | J-2032 | 1,460 | 454.27 | 0.80 | 1.17 | 1.29 | 110.0 |
| P-2055 | 6.0 | J-2032 | J-2033 | 450 | -80.55 | 0.95 | 0.43 | 0.91 | 110.0 |
| P-2056 | 8.0 | J-2060 | J-2062 | 200 | 3.10 | 0.00 | 0.00 | 0.02 | 100.0 |
| P-2057 | 8.0 | J-2030 | J-2032 | 1,800 | -82.72 | 0.36 | 0.64 | 0.53 | 90.0 |
| P-2058 | 8.0 | J-2060 | J-2061 | 800 | 1.55 | 0.00 | 0.00 | 0.01 | 100.0 |
| P-2059 | 8.0 | J-2032 | J-2060 | 450 | 156.86 | 1.17 | 0.53 | 1.00 | 90.0 |
| P-2060 | 12.0 | J-2030 | J-2032 | 1,800 | -293.70 | 0.36 | 0.64 | 0.83 | 110.0 |
| P-2061 | 8.0 | J-2038 | J-2030 | 2,600 | -97.28 | 0.28 | 0.74 | 0.62 | 120.0 |
| P-2062 | 8.0 | J-2039 | J-2038 | 900 | -26.56 | 0.04 | 0.03 | 0.17 | 100.0 |
| P-2063 | 8.0 | J-2042 | J-2041 | 250 | 1.81 | 0.00 | 0.00 | 0.01 | 100.0 |
| P-2064 | 8.0 | J-2039 | J-2042 | 800 | 13.30 | 0.01 | 0.01 | 0.08 | 100.0 |
| P-2065 | 8.0 | J-2040 | J-2039 | 600 | -11.70 | 0.01 | 0.00 | 0.07 | 100.0 |
| P-2066 | 8.0 | J-2041 | J-2040 | 550 | -10.15 | 0.01 | 0.00 | 0.06 | 100.0 |
| P-2067 | 8.0 | J-2044 | J-2041 | 550 | -10.41 | 0.01 | 0.00 | 0.07 | 100.0 |
| P-2068 | 8.0 | J-2044 | J-2045 | 400 | 1.55 | 0.00 | 0.00 | 0.01 | 100.0 |
| P-2069 | 8.0 | J-2043 | J-2044 | 350 | -7.31 | 0.00 | 0.00 | 0.05 | 100.0 |
| P-2070 | 8.0 | J-2046 | J-2047 | 250 | -50.01 | 0.10 | 0.02 | 0.32 | 110.0 |
| P-2071 | 8.0 | J-2048 | J-2046 | 500 | -48.46 | 0.09 | 0.05 | 0.31 | 110.0 |
| P-2072 | 8.0 | J-2047 | J-2030 | 280 | -109.41 | 0.60 | 0.17 | 0.70 | 90.0 |
| P-2073 | 8.0 | J-2048 | J-2047 | 380 | -57.85 | 0.18 | 0.07 | 0.37 | 90.0 |
| P-2074 | 8.0 | J-2049 | J-2048 | 250 | -104.76 | 0.55 | 0.14 | 0.67 | 90.0 |
| P-2075 | 12.0 | J-2184 | J-2068 | 928 | 123.23 | 0.06 | 0.06 | 0.35 | 120.0 |
| P-2076 | 8.0 | J-2157 | J-2158 | 1,800 | -2.39 | 0.00 | 0.00 | 0.02 | 110.0 |
| P-2077 | 12.0 | J-2155 | J-2154 | 900 | -134.60 | 0.07 | 0.06 | 0.38 | 120.0 |
| P-2079 | 8.0 | J-2157 | J-2158 | 600 | -4.32 | 0.00 | 0.00 | 0.03 | 110.0 |
| P-2080 | 8.0 | J-2156 | J-2157 | 300 | 1.16 | 0.00 | 0.00 | 0.01 | 110.0 |
| P-2081 | 6.0 | J-2033 | J-2034 | 900 | -28.19 | 0.14 | 0.12 | 0.32 | 110.0 |
| P-2082 | 12.0 | J-2154 | J-2153 | 1,600 | -224.52 | 0.18 | 0.30 | 0.64 | 120.0 |
| P-2083 | 8.0 | J-2156 | J-2154 | 550 | -86.36 | 0.27 | 0.15 | 0.55 | 110.0 |
| P-2084 | 8.0 | J-2034 | J-2156 | 700 | -83.65 | 0.25 | 0.18 | 0.53 | 110.0 |
| P-2085 | 8.0 | J-2033 | J-2034 | 1,100 | -53.91 | 0.11 | 0.12 | 0.34 | 110.0 |
| P-2086 | 10.0 | J-2062 | J-2063 | 997 | 1.55 | 0.00 | 0.00 | 0.01 | 110.0 |
| P-2087 | 12.0 | J-2055 | J-2059 | 650 | -149.11 | 0.09 | 0.06 | 0.42 | 120.0 |
| P-2088 | 8.0 | J-2054 | J-2053 | 800 | 26.01 | 0.09 | 0.07 | 0.17 | 60.0 |
| P-2089 | 6.0 | J-2055 | J-2054 | 250 | 27.56 | 0.40 | 0.10 | 0.31 | 60.0 |

# Scenario: ADD
# Steady State Analysis
# Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-2092 | 12.0 | J-2055 | J-2056 | 150 | 199.98 | 0.15 | 0.02 | 0.57 | 120.0 |
| P-2093 | 10.0 | J-2127 | J-2055 | 2,560 | 79.98 | 0.09 | 0.24 | 0.33 | 100.0 |
| P-2094 | 6.0 | J-2127 | J-2065 | 350 | 23.32 | 0.29 | 0.10 | 0.26 | 60.0 |
| P-2095 | 6.0 | J-2068 | J-2127 | 450 | 106.59 | 4.91 | 2.21 | 1.21 | 60.0 |
| P-2096 | 8.0 | J-2185 | J-2186 | 628 | 1.55 | 0.00 | 0.00 | 0.01 | 130.0 |
| P-2097 | 12.0 | J-2065 | J-2064 | 200 | 14.87 | 0.00 | 0.00 | 0.04 | 120.0 |
| P-2098 | 12.0 | J-2066 | J-2065 | 450 | -6.90 | 0.00 | 0.00 | 0.02 | 110.0 |
| P-2099 | 12.0 | J-2067 | J-2066 | 200 | -5.35 | 0.00 | 0.00 | 0.02 | 120.0 |
| P-2100 | 12.0 | J-2064 | J-2067 | 450 | -3.80 | 0.00 | 0.00 | 0.01 | 110.0 |
| P-2101 | 6.0 | J-2057 | J-2064 | 1,250 | -15.36 | 0.14 | 0.17 | 0.17 | 60.0 |
| P-2102 | 6.0 | J-2058 | J-2057 | 550 | -18.30 | 0.19 | 0.10 | 0.21 | 60.0 |
| P-2103 | 8.0 | J-2053 | J-2058 | 650 | -19.26 | 0.05 | 0.03 | 0.12 | 60.0 |
| P-2104 | 6.0 | J-2071 | J-2070 | 1,399 | -0.72 | 0.00 | 0.00 | 0.01 | 130.0 |
| P-2105 | 6.0 | J-2070 | J-2071 | 1,081 | 0.83 | 0.00 | 0.00 | 0.01 | 130.0 |
| P-2106 | 8.0 | J-2069 | J-2070 | 1,800 | 3.10 | 0.00 | 0.00 | 0.02 | 110.0 |
| P-2107 | 8.0 | J-2036 | J-2037 | 300 | 1.55 | 0.00 | 0.00 | 0.01 | 100.0 |
| P-2108 | 8.0 | J-2035 | J-2036 | 2,180 | -66.07 | 0.14 | 0.30 | 0.42 | 120.0 |
| P-2109 | 8.0 | J-2035 | J-2052 | 1,300 | 6.80 | 0.00 | 0.00 | 0.04 | 100.0 |
| P-2110 | 8.0 | J-2052 | J-2053 | 2,400 | -3.26 | 0.00 | 0.00 | 0.02 | 100.0 |
| P-2111 | 8.0 | J-2090 | J-2052 | 700 | 4.10 | 0.00 | 0.00 | 0.03 | 110.0 |
| P-2112 | 8.0 | J-2035 | J-2090 | 1,800 | 5.65 | 0.00 | 0.00 | 0.04 | 110.0 |
| P-2113 | 8.0 | J-2081 | J-2035 | 650 | -52.08 | 0.12 | 0.08 | 0.33 | 100.0 |
| P-2114 | 6.0 | J-2081 | J-2082 | 950 | 1.55 | 0.00 | 0.00 | 0.02 | 100.0 |
| P-2115 | 8.0 | J-2080 | J-2081 | 2,050 | -48.98 | 0.11 | 0.23 | 0.31 | 100.0 |
| P-2116 | 8.0 | J-2079 | J-2080 | 2,600 | -7.97 | 0.00 | 0.01 | 0.05 | 130.0 |
| P-2117 | 8.0 | J-2083 | J-2079 | 650 | -3.47 | 0.00 | 0.00 | 0.02 | 100.0 |
| P-2118 | 8.0 | J-2089 | J-2053 | 1,200 | -40.47 | 0.06 | 0.07 | 0.26 | 120.0 |
| P-2119 | 8.0 | J-2088 | J-2089 | 3,000 | -38.92 | 0.05 | 0.16 | 0.25 | 120.0 |
| P-2120 | 12.0 | J-2091 | J-2058 | 1,000 | -188.02 | 0.13 | 0.13 | 0.53 | 120.0 |
| P-2121 | 12.0 | J-2092 | J-2091 | 1,050 | -186.47 | 0.13 | 0.14 | 0.53 | 120.0 |
| P-2122 | 12.0 | T-1 | J-2092 | 700 | -109.44 | 0.05 | 0.03 | 0.31 | 120.0 |
| P-2124 | 12.0 | J-2093 | J-2092 | 550 | -67.73 | 0.02 | 0.01 | 0.19 | 130.0 |
| P-2125 | 12.0 | J-2094 | J-2093 | 1,100 | -66.18 | 0.02 | 0.02 | 0.19 | 130.0 |
| P-2126 | 8.0 | J-2073 | J-2074 | 365 | 4.31 | 0.00 | 0.00 | 0.03 | 110.0 |
| P-2127 | 8.0 | J-2073 | J-2075 | 200 | 1.55 | 0.00 | 0.00 | 0.01 | 100.0 |
| P-2128 | 8.0 | J-2072 | J-2073 | 550 | 15.09 | 0.01 | 0.01 | 0.10 | 100.0 |
| P-2129 | 8.0 | PRV-2 | J-2072 | 238 | 0.00 | 0.00 | 0.00 | 0.00 | 100.0 |
| P-2130 | 8.0 | J-2076 | J-2072 | 1,900 | -21.79 | 0.02 | 0.05 | 0.14 | 100.0 |
| P-2131 | 8.0 | J-2072 | J-2080 | 300 | -39.46 | 0.07 | 0.02 | 0.25 | 100.0 |
| P-2132 | 8.0 | J-2084 | J-2085 | 550 | 1.39 | 0.00 | 0.00 | 0.01 | 110.0 |
| P-2133 | 8.0 | J-2079 | J-2084 | 1,350 | 2.94 | 0.00 | 0.00 | 0.02 | 110.0 |
| P-2134 | 8.0 | J-2085 | J-2083 | 950 | -1.92 | 0.00 | 0.00 | 0.01 | 110.0 |
| P-2135 | 8.0 | J-2086 | J-2085 | 450 | -1.77 | 0.00 | 0.00 | 0.01 | 110.0 |
| P-2136 | 8.0 | J-2087 | J-2086 | 800 | -0.22 | 0.00 | 0.00 | 0.00 | 110.0 |
| P-2137 | 8.0 | J-2087 | J-2088 | 1,360 | -37.37 | 0.07 | 0.09 | 0.24 | 100.0 |
| P-2138 | 8.0 | J-2132 | J-2087 | 300 | -36.03 | 0.05 | 0.02 | 0.23 | 110.0 |
| P-2140 | 12.0 | J-2133 | J-2167 | 2,000 | -56.88 | 0.01 | 0.03 | 0.16 | 120.0 |
| P-2141 | 12.0 | J-2133 | J-2165 | 1,500 | 59.15 | 0.02 | 0.03 | 0.17 | 110.0 |
| P-2142 | 8.0 | J-2132 | J-2133 | 960 | 3.82 | 0.00 | 0.00 | 0.02 | 100.0 |
| P-2143 | 8.0 | J-2078 | J-2076 | 1,000 | -7.25 | 0.00 | 0.00 | 0.05 | 100.0 |
| P-2144 | 8.0 | J-2077 | J-2078 | 1,200 | -5.70 | 0.00 | 0.00 | 0.04 | 100.0 |

# Scenario: ADD
# Steady State Analysis
# Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-2145 | 8.0 | J-2077 | J-2076 | 600 | -12.99 | 0.01 | 0.01 | 0.08 | 100.0 |
| P-2146 | 8.0 | J-2119 | J-2077 | 1,650 | -17.14 | 0.02 | 0.03 | 0.11 | 100.0 |
| P-2147 | 8.0 | J-2162 | J-2132 | 400 | -30.66 | 0.05 | 0.02 | 0.20 | 100.0 |
| P-2148 | 8.0 | J-2161 | J-2162 | 560 | -29.11 | 0.04 | 0.02 | 0.19 | 100.0 |
| P-2149 | 8.0 | J-2131 | J-2161 | 300 | -27.56 | 0.04 | 0.01 | 0.18 | 100.0 |
| P-2150 | 8.0 | J-2134 | J-2135 | 1,050 | -8.15 | 0.00 | 0.00 | 0.05 | 110.0 |
| P-2151 | 8.0 | J-2131 | J-2130 | 1,400 | 7.33 | 0.00 | 0.00 | 0.05 | 100.0 |
| P-2152 | 8.0 | J-2129 | J-2130 | 900 | -5.78 | 0.00 | 0.00 | 0.04 | 100.0 |
| P-2153 | 8.0 | J-2119 | J-2128 | 1,250 | -7.45 | 0.00 | 0.00 | 0.05 | 100.0 |
| P-2154 | 8.0 | J-2129 | J-2131 | 350 | -18.68 | 0.02 | 0.01 | 0.12 | 100.0 |
| P-2155 | 8.0 | J-2128 | J-2129 | 510 | -22.91 | 0.03 | 0.01 | 0.15 | 100.0 |
| P-2156 | 12.0 | J-2134 | J-2128 | 750 | -13.91 | 0.00 | 0.00 | 0.04 | 110.0 |
| P-2157 | 12.0 | J-2120 | J-2134 | 1,250 | -20.52 | 0.00 | 0.00 | 0.06 | 110.0 |
| P-2158 | 8.0 | J-2120 | J-2119 | 1,400 | 0.80 | 0.00 | 0.00 | 0.01 | 100.0 |
| P-2159 | 8.0 | J-2121 | J-2120 | 800 | -18.17 | 0.02 | 0.01 | 0.12 | 100.0 |
| P-2160 | 8.0 | J-2142 | J-2143 | 500 | -9.58 | 0.00 | 0.00 | 0.06 | 120.0 |
| P-2161 | 8.0 | J-2136 | J-2137 | 1,650 | 6.78 | 0.00 | 0.00 | 0.04 | 110.0 |
| P-2162 | 8.0 | J-2142 | J-2141 | 900 | -0.44 | 0.00 | 0.00 | 0.00 | 120.0 |
| P-2163 | 8.0 | J-2135 | J-2142 | 1,250 | -8.47 | 0.00 | 0.00 | 0.05 | 110.0 |
| P-2164 | 8.0 | J-2136 | J-2135 | 200 | 1.23 | 0.00 | 0.00 | 0.01 | 110.0 |
| P-2165 | 8.0 | J-2138 | J-2136 | 750 | 9.56 | 0.01 | 0.00 | 0.06 | 100.0 |
| P-2166 | 8.0 | J-2141 | J-2140 | 750 | 3.02 | 0.00 | 0.00 | 0.02 | 120.0 |
| P-2167 | 8.0 | J-2143 | J-2141 | 1,650 | 5.01 | 0.00 | 0.00 | 0.03 | 120.0 |
| P-2168 | 8.0 | J-2144 | J-2143 | 1,000 | 16.15 | 0.01 | 0.01 | 0.10 | 100.0 |
| P-2169 | 8.0 | J-2165 | J-2166 | 1,200 | 1.55 | 0.00 | 0.00 | 0.01 | 110.0 |
| P-2170 | 12.0 | J-2144 | J-2165 | 1,600 | -56.05 | 0.01 | 0.02 | 0.16 | 120.0 |
| P-2171 | 12.0 | J-2145 | J-2144 | 750 | -38.35 | 0.01 | 0.01 | 0.11 | 120.0 |
| P-2172 | 12.0 | J-2146 | J-2147 | 500 | 12.40 | 0.00 | 0.00 | 0.04 | 120.0 |
| P-2173 | 12.0 | J-2145 | J-2146 | 1,350 | 13.95 | 0.00 | 0.00 | 0.04 | 120.0 |
| P-2174 | 12.0 | J-2148 | J-2145 | 600 | -22.85 | 0.00 | 0.00 | 0.06 | 120.0 |
| P-2175 | 8.0 | J-2147 | J-2148 | 1,450 | -1.97 | 0.00 | 0.00 | 0.01 | 120.0 |
| P-2176 | 8.0 | J-2139 | J-2138 | 250 | 9.64 | 0.01 | 0.00 | 0.06 | 90.0 |
| P-2177 | 8.0 | J-2140 | J-2138 | 1,050 | 1.47 | 0.00 | 0.00 | 0.01 | 120.0 |
| P-2178 | 12.0 | J-2149 | J-2152 | 600 | 17.78 | 0.00 | 0.00 | 0.05 | 120.0 |
| P-2179 | 12.0 | J-2148 | J-2149 | 500 | 19.33 | 0.00 | 0.00 | 0.05 | 120.0 |
| P-2180 | 12.0 | J-2150 | J-2147 | 450 | -12.83 | 0.00 | 0.00 | 0.04 | 120.0 |
| P-2181 | 12.0 | J-2151 | J-2150 | 850 | -11.28 | 0.00 | 0.00 | 0.03 | 120.0 |
| P-2182 | 12.0 | J-2152 | J-2151 | 1,250 | -9.73 | 0.00 | 0.00 | 0.03 | 120.0 |
| P-2183 | 12.0 | J-2139 | J-2152 | 1,800 | -25.95 | 0.00 | 0.01 | 0.07 | 120.0 |
| P-2184 | 8.0 | J-2137 | J-2139 | 800 | -14.77 | 0.01 | 0.01 | 0.09 | 100.0 |
| P-2185 | 8.0 | J-2111 | J-2097 | 550 | 15.84 | 0.01 | 0.01 | 0.10 | 100.0 |
| P-2186 | 6.0 | J-2111 | J-2110 | 1,000 | -3.37 | 0.00 | 0.00 | 0.04 | 100.0 |
| P-2187 | 8.0 | J-2112 | J-2113 | 1,000 | -3.04 | 0.00 | 0.00 | 0.02 | 100.0 |
| P-2188 | 8.0 | J-2116 | J-2114 | 950 | -0.83 | 0.00 | 0.00 | 0.01 | 100.0 |
| P-2189 | 8.0 | J-2110 | J-2109 | 1,200 | 1.44 | 0.00 | 0.00 | 0.01 | 100.0 |
| P-2190 | 8.0 | J-2112 | J-2111 | 300 | 14.02 | 0.01 | 0.00 | 0.09 | 100.0 |
| P-2191 | 8.0 | J-2116 | J-2112 | 300 | 12.53 | 0.01 | 0.00 | 0.08 | 100.0 |
| P-2192 | 8.0 | J-2118 | J-2116 | 339 | 13.25 | 0.01 | 0.00 | 0.08 | 100.0 |
| P-2193 | 8.0 | J-2117 | J-2118 | 850 | -7.48 | 0.00 | 0.00 | 0.05 | 100.0 |
| P-2194 | 8.0 | J-2114 | J-2117 | 300 | -4.38 | 0.00 | 0.00 | 0.03 | 100.0 |
| P-2195 | 8.0 | J-2113 | J-2110 | 300 | 6.36 | 0.00 | 0.00 | 0.04 | 100.0 |

# Scenario: ADD
# Steady State Analysis
# Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-2196 | 8.0 | J-2114 | J-2113 | 300 | 10.94 | 0.01 | 0.00 | 0.07 | 100.0 |
| P-2197 | 8.0 | J-2163 | J-2114 | 1,300 | 8.94 | 0.00 | 0.01 | 0.06 | 100.0 |
| P-2198 | 8.0 | J-2164 | J-2163 | 800 | 9.77 | 0.01 | 0.00 | 0.06 | 100.0 |
| P-2199 | 8.0 | J-2122 | J-2164 | 400 | 11.32 | 0.01 | 0.00 | 0.07 | 100.0 |
| P-2200 | 8.0 | J-2121 | J-2122 | 400 | 11.61 | 0.01 | 0.00 | 0.07 | 110.0 |
| P-2201 | 8.0 | J-2123 | J-2124 | 400 | -9.54 | 0.01 | 0.00 | 0.06 | 100.0 |
| P-2202 | 8.0 | J-2126 | J-2137 | 800 | -20.00 | 0.02 | 0.02 | 0.13 | 100.0 |
| P-2203 | 8.0 | J-2123 | J-2125 | 300 | 6.72 | 0.00 | 0.00 | 0.04 | 100.0 |
| P-2204 | 8.0 | J-2122 | J-2123 | 280 | -1.27 | 0.00 | 0.00 | 0.01 | 100.0 |
| P-2205 | 8.0 | J-2124 | J-2121 | 250 | -5.01 | 0.00 | 0.00 | 0.03 | 100.0 |
| P-2206 | 8.0 | J-2126 | J-2124 | 210 | 6.07 | 0.00 | 0.00 | 0.04 | 100.0 |
| P-2207 | 8.0 | J-2125 | J-2126 | 400 | -12.37 | 0.01 | 0.00 | 0.08 | 100.0 |
| P-2208 | 8.0 | J-2163 | J-2125 | 400 | -17.54 | 0.02 | 0.01 | 0.11 | 100.0 |
| P-2209 | 8.0 | J-2109 | J-2163 | 600 | -16.83 | 0.02 | 0.01 | 0.11 | 100.0 |
| P-2210 | 8.0 | PRV-1 | J-2096 | 660 | 0.00 | 0.00 | 0.00 | 0.00 | 100.0 |
| P-2211 | 8.0 | J-2097 | J-2096 | 400 | 14.29 | 0.01 | 0.00 | 0.09 | 100.0 |
| P-2212 | 8.0 | J-2096 | J-2098 | 200 | 8.80 | 0.00 | 0.00 | 0.06 | 100.0 |
| P-2213 | 8.0 | J-2115 | J-2096 | 2,600 | -3.94 | 0.00 | 0.00 | 0.03 | 110.0 |
| P-2214 | 8.0 | J-2099 | J-2175 | 548 | 3.81 | 0.00 | 0.00 | 0.02 | 110.0 |
| P-2215 | 8.0 | J-2098 | J-2099 | 300 | 7.25 | 0.00 | 0.00 | 0.05 | 100.0 |
| P-2216 | 8.0 | J-2160 | J-2100 | 400 | 1.28 | 0.00 | 0.00 | 0.01 | 100.0 |
| P-2217 | 8.0 | J-2102 | J-2160 | 600 | 2.83 | 0.00 | 0.00 | 0.02 | 100.0 |
| P-2218 | 6.0 | J-2100 | J-2101 | 700 | 1.62 | 0.00 | 0.00 | 0.02 | 100.0 |
| P-2219 | 8.0 | J-2102 | J-2108 | 1,100 | -7.01 | 0.00 | 0.00 | 0.04 | 120.0 |
| P-2220 | 8.0 | J-2108 | J-2109 | 950 | -16.71 | 0.02 | 0.01 | 0.11 | 100.0 |
| P-2221 | 8.0 | J-2107 | J-2108 | 200 | -8.16 | 0.00 | 0.00 | 0.05 | 100.0 |
| P-2222 | 8.0 | J-2102 | J-2107 | 950 | -5.06 | 0.00 | 0.00 | 0.03 | 100.0 |
| P-2223 | 8.0 | J-2099 | J-2100 | 850 | 1.89 | 0.00 | 0.00 | 0.01 | 100.0 |
| P-2224 | 6.0 | J-2105 | J-2106 | 600 | 1.55 | 0.00 | 0.00 | 0.02 | 100.0 |
| P-2225 | 6.0 | J-2102 | J-2105 | 500 | 3.10 | 0.00 | 0.00 | 0.04 | 100.0 |
| P-2226 | 8.0 | J-2103 | J-2102 | 500 | -4.58 | 0.00 | 0.00 | 0.03 | 100.0 |
| P-2227 | 6.0 | J-2104 | J-2103 | 305 | -1.55 | 0.00 | 0.00 | 0.02 | 100.0 |
| P-2228 | 8.0 | J-2101 | J-2103 | 1,900 | -1.48 | 0.00 | 0.00 | 0.01 | 110.0 |
| P-2229 | 6.0 | J-2101 | J-2168 | 376 | 1.55 | 0.00 | 0.00 | 0.02 | 130.0 |
| P-2230 | 6.0 | J-2175 | J-2170 | 369 | 1.55 | 0.00 | 0.00 | 0.02 | 130.0 |
| P-2231 | 6.0 | J-2175 | J-2169 | 373 | 1.55 | 0.00 | 0.00 | 0.02 | 130.0 |
| P-2232 | 8.0 | J-2175 | J-2115 | 1,352 | -0.84 | 0.00 | 0.00 | 0.01 | 110.0 |
| P-2233 | 6.0 | J-2115 | J-2171 | 853 | 1.55 | 0.00 | 0.00 | 0.02 | 130.0 |
| P-2234 | 6.0 | J-2107 | J-2172 | 980 | 1.55 | 0.00 | 0.00 | 0.02 | 130.0 |
| P-2235 | 8.0 | J-2117 | J-2173 | 348 | 1.55 | 0.00 | 0.00 | 0.01 | 130.0 |
| P-2236 | 8.0 | J-2118 | J-2174 | 567 | 1.55 | 0.00 | 0.00 | 0.01 | 130.0 |
| P-2237 | 12.0 | J-2176 | J-2094 | 1,500 | -64.63 | 0.02 | 0.02 | 0.18 | 130.0 |
| P-2238 | 12.0 | J-2178 | J-2176 | 401 | -61.53 | 0.02 | 0.01 | 0.17 | 120.0 |
| P-2239 | 12.0 | J-2167 | J-2178 | 399 | -58.43 | 0.02 | 0.01 | 0.17 | 120.0 |
| P-2240 | 8.0 | J-2176 | J-2177 | 1,030 | 1.55 | 0.00 | 0.00 | 0.01 | 130.0 |
| P-2241 | 8.0 | J-2178 | J-2179 | 580 | 1.55 | 0.00 | 0.00 | 0.01 | 130.0 |
| P-2242 | 8.0 | J-2092 | J-2180 | 501 | 7.75 | 0.00 | 0.00 | 0.05 | 90.0 |
| P-2243 | 8.0 | J-2180 | J-2181 | 581 | 1.55 | 0.00 | 0.00 | 0.01 | 130.0 |
| P-2244 | 8.0 | J-2180 | J-2182 | 291 | 4.65 | 0.00 | 0.00 | 0.03 | 90.0 |
| P-2245 | 6.0 | J-2182 | J-2183 | 295 | 1.55 | 0.00 | 0.00 | 0.02 | 130.0 |
| P-2246 | 8.0 | J-2182 | J-2095 | 308 | 1.55 | 0.00 | 0.00 | 0.01 | 90.0 |

# Scenario: ADD
# Steady State Analysis
# Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-2247 | 12.0 | J-2155 | J-2184 | 1,102 | 133.05 | 0.07 | 0.08 | 0.38 | 120.0 |
| P-2248 | 8.0 | J-2184 | J-2158 | 1,245 | 8.26 | 0.00 | 0.00 | 0.05 | 110.0 |
| P-2249 | 8.0 | J-2068 | J-2185 | 774 | 15.09 | 0.01 | 0.01 | 0.10 | 110.0 |
| P-2250 | 8.0 | J-2185 | J-2069 | 1,326 | 11.99 | 0.01 | 0.01 | 0.08 | 110.0 |
| P-2251 | 6.0 | J-2069 | J-2187 | 442 | 6.20 | 0.01 | 0.00 | 0.07 | 130.0 |
| P-2252 | 6.0 | J-2187 | J-2188 | 292 | 1.55 | 0.00 | 0.00 | 0.02 | 130.0 |
| P-2253 | 6.0 | J-2187 | J-2189 | 535 | 3.10 | 0.00 | 0.00 | 0.04 | 130.0 |
| P-2254 | 8.0 | J-2189 | J-2190 | 905 | 0.73 | 0.00 | 0.00 | 0.00 | 130.0 |
| P-2255 | 8.0 | J-2190 | J-2189 | 723 | -0.82 | 0.00 | 0.00 | 0.01 | 130.0 |
| P-2256 | 8.0 | J-2000 | J-2291 | 921 | 1.55 | 0.00 | 0.00 | 0.01 | 130.0 |
| P-2257 | 6.0 | J-2074 | J-1129 | 1,069 | 2.76 | 0.00 | 0.00 | 0.03 | 130.0 |
| P-2258 | 8.0 | J-2073 | J-1130 | 1,192 | 2.76 | 0.00 | 0.00 | 0.02 | 130.0 |
| P-2259 | 10.0 | J-2191 | J-2022 | 760 | -65.34 | 0.06 | 0.05 | 0.27 | 100.0 |
| P-2260 | 6.0 | J-2002 | J-2193 | 1,425 | 1.55 | 0.00 | 0.00 | 0.02 | 130.0 |
| P-2296 | 10.0 | J-2021 | J-2191 | 1,290 | -62.24 | 0.06 | 0.08 | 0.25 | 100.0 |
| P-2297 | 6.0 | J-2009 | J-2010 | 600 | 2.91 | 0.00 | 0.00 | 0.03 | 90.0 |
| P-2298 | 12.0 | J-2056 | J-2195 | 644 | 190.53 | 0.14 | 0.09 | 0.54 | 120.0 |
| P-2299 | 12.0 | J-2195 | J-2058 | 206 | 190.53 | 0.14 | 0.03 | 0.54 | 120.0 |
| P-2300 | 8.0 | J-2056 | J-2194 | 1,153 | 7.90 | 0.01 | 0.01 | 0.05 | 60.0 |

# Scenario: ADD
# Steady State Analysis
# Pump Report

| Label | Elevation (ft) | Control Status | Intake Pump Grade (ft) | Discharge Pump Grade (ft) | Discharge (gpm) | Pump Head (ft) | Notes |
|---|---|---|---|---|---|---|---|
| PMP-6 | 285.00 | Off | 288.92 | 510.64 | 0.00 | 0.00 | Boland |
| PMP-2 | 285.00 | Off | 288.92 | 510.79 | 0.00 | 0.00 | Boland |
| PMP-1 | 285.00 | On | 287.54 | 539.45 | 674.22 | 251.91 | Boland |
| PMP-4 | 275.00 | On | 283.96 | 489.79 | 680.34 | 205.82 | Hosmer |
| PMP-5 | 275.00 | Off | 284.71 | 487.87 | 0.00 | 0.00 | Hosmer |

# Scenario: ADD
# Steady State Analysis
# Tank Report

| Label | Zone | Base Elevation (ft) | Minimum Elevation (ft) | Initial HGL (ft) | Maximum Elevation (ft) | Tank Diameter (ft) | Inflow (gpm) | Current Status | Calculated Hydraulic Grade (ft) | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| T-1 | Zone | 418.00 | 418.00 | 482.00 | 492.70 | 25.00 | 109.44 | Filling | 482.00 | Oak Hill Tank |
| T-2 | Zone | 451.00 | 451.00 | 482.00 | 493.30 | 40.00 | 210.82 | Filling | 482.00 | Clear Hill Tank |
| T-3 | Zone | 467.00 | 467.00 | 503.00 | 515.00 | 67.00 | 276.02 | Filling | 503.00 | Tara Rd Tank |

# Scenario: MDD
# Steady State Analysis
# Junction Report

| Label | Elevation (ft) | Zone | Base Flow (gpm) | Pattern | Demand (gpm) | Hydraulic Grade (ft) | Pressure (psi) |
|---|---|---|---|---|---|---|---|
| J-1000 | 375.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 512.18 | 59.35 |
| J-1001 | 341.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 512.18 | 74.06 |
| J-1002 | 272.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 512.18 | 103.92 |
| J-1003 | 270.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 512.19 | 104.78 |
| J-1004 | 285.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 512.18 | 98.29 |
| J-1005 | 275.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 512.20 | 102.62 |
| J-1006 | 272.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 519.73 | 107.18 |
| J-1007 | 270.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 523.17 | 109.54 |
| J-1008 | 270.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 523.17 | 109.53 |
| J-1009 | 270.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 523.17 | 109.53 |
| J-1010 | 290.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 510.08 | 95.22 |
| J-1011 | 275.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 510.22 | 101.77 |
| J-1012 | 295.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 509.74 | 92.91 |
| J-1013 | 295.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 508.51 | 92.38 |
| J-1014 | 277.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 508.51 | 100.16 |
| J-1015 | 315.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 523.16 | 90.06 |
| J-1016 | 295.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 523.16 | 98.71 |
| J-1017 | 295.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 523.16 | 98.71 |
| J-1018 | 270.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 507.06 | 102.57 |
| J-1019 | 310.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 506.93 | 85.20 |
| J-1020 | 340.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 506.92 | 72.22 |
| J-1021 | 335.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 506.91 | 74.38 |
| J-1022 | 315.00 | HIGH SERVICE AREA | 22.44 | MDD-EPS | 22.44 | 506.91 | 83.03 |
| J-1023 | 315.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 506.90 | 83.03 |
| J-1024 | 310.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 506.90 | 85.19 |
| J-1025 | 410.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 507.12 | 42.02 |
| J-1026 | 410.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 507.12 | 42.02 |
| J-1027 | 370.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 507.13 | 59.33 |
| J-1028 | 385.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 507.14 | 52.84 |
| J-1029 | 375.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 507.16 | 57.18 |
| J-1030 | 300.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 507.11 | 89.61 |
| J-1031 | 300.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 507.11 | 89.61 |
| J-1032 | 310.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 507.11 | 85.28 |
| J-1033 | 295.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 507.11 | 91.77 |
| J-1034 | 275.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 507.11 | 100.42 |
| J-1035 | 350.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 507.12 | 67.98 |
| J-1036 | 285.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 503.62 | 94.59 |
| J-1037 | 285.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 503.54 | 94.55 |
| J-1038 | 272.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 503.13 | 100.00 |
| J-1039 | 390.00 | HIGH SERVICE AREA | 9.84 | MDD-EPS | 9.84 | 502.60 | 48.72 |
| J-1040 | 450.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 503.03 | 22.94 |
| J-1041 | 450.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 503.23 | 23.03 |
| J-1042 | 410.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 503.45 | 40.43 |
| J-1043 | 385.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 503.79 | 51.40 |
| J-1044 | 337.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 504.29 | 72.38 |
| J-1045 | 355.00 | HIGH SERVICE AREA | 21.25 | MDD-EPS | 21.25 | 502.50 | 63.82 |
| J-1046 | 335.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 504.57 | 73.37 |
| J-1047 | 335.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 507.30 | 74.54 |
| J-1048 | 270.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 504.20 | 101.33 |
| J-1049 | 285.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 504.18 | 94.83 |
| J-1050 | 325.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 504.05 | 77.46 |
| J-1051 | 330.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 504.04 | 75.30 |
| J-1052 | 350.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 504.11 | 66.68 |

# Scenario: MDD
# Steady State Analysis
# Junction Report

| Label | Elevation (ft) | Zone | Base Flow (gpm) | Pattern | Demand (gpm) | Hydraulic Grade (ft) | Pressure (psi) |
|---|---|---|---|---|---|---|---|
| J-1053 | 312.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 504.20 | 83.15 |
| J-1054 | 310.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 503.90 | 83.89 |
| J-1055 | 305.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 503.90 | 86.05 |
| J-1056 | 295.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 503.68 | 90.29 |
| J-1057 | 320.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 502.41 | 78.92 |
| J-1058 | 320.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 502.41 | 78.92 |
| J-1059 | 320.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 502.41 | 78.92 |
| J-1060 | 340.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 502.28 | 70.21 |
| J-1061 | 345.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 503.96 | 68.77 |
| J-1062 | 355.00 | HIGH SERVICE AREA | 6.70 | MDD-EPS | 6.70 | 502.46 | 63.80 |
| J-1063 | 345.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 502.32 | 68.06 |
| J-1064 | 296.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 502.32 | 89.26 |
| J-1065 | 290.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 502.38 | 91.89 |
| J-1066 | 266.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 502.35 | 102.26 |
| J-1067 | 262.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 502.30 | 103.97 |
| J-1068 | 285.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 502.45 | 94.08 |
| J-1069 | 295.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 502.37 | 89.72 |
| J-1070 | 285.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 502.35 | 94.04 |
| J-1071 | 260.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 502.34 | 104.85 |
| J-1072 | 290.00 | HIGH SERVICE AREA | 5.62 | MDD-EPS | 5.62 | 502.84 | 92.08 |
| J-1073 | 295.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 503.13 | 90.05 |
| J-1074 | 265.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 506.90 | 104.66 |
| J-1075 | 377.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 502.46 | 54.28 |
| J-1076 | 380.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 502.46 | 52.98 |
| J-1077 | 320.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 502.43 | 78.93 |
| J-1078 | 325.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 502.44 | 76.77 |
| J-1079 | 380.00 | HIGH SERVICE AREA | 61.76 | MDD-EPS | 61.76 | 502.41 | 52.96 |
| J-1080 | 360.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 502.43 | 61.62 |
| J-1081 | 350.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 502.30 | 65.89 |
| J-1082 | 270.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 502.28 | 100.50 |
| J-1083 | 400.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 502.06 | 44.16 |
| J-1084 | 325.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 502.07 | 76.61 |
| J-1085 | 325.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 501.95 | 76.56 |
| J-1086 | 370.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 501.97 | 57.10 |
| J-1087 | 415.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 501.96 | 37.62 |
| J-1088 | 420.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 501.96 | 35.46 |
| J-1089 | 328.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 501.78 | 75.19 |
| J-1090 | 355.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 501.96 | 63.58 |
| J-1091 | 324.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 501.81 | 76.93 |
| J-1092 | 305.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 501.78 | 85.14 |
| J-1093 | 330.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 501.76 | 74.31 |
| J-1094 | 330.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 501.76 | 74.31 |
| J-1095 | 306.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 501.77 | 84.70 |
| J-1096 | 393.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 501.76 | 47.06 |
| J-1097 | 330.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 501.78 | 74.32 |
| J-1098 | 270.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 523.21 | 109.55 |
| J-1099 | 307.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 506.90 | 86.49 |
| J-1100 | 440.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 503.04 | 27.27 |
| J-1101 | 350.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 502.41 | 65.94 |
| J-1102 | 305.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 523.17 | 94.39 |
| J-1103 | 285.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 507.32 | 96.19 |
| J-1104 | 420.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 502.90 | 35.87 |
| J-1105 | 307.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 523.16 | 93.52 |

# Scenario: MDD
# Steady State Analysis
# Junction Report

| Label | Elevation (ft) | Zone | Base Flow (gpm) | Pattern | Demand (gpm) | Hydraulic Grade (ft) | Pressure (psi) |
|---|---|---|---|---|---|---|---|
| J-1106 | 303.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 523.16 | 95.25 |
| J-1107 | 332.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 523.16 | 82.71 |
| J-1108 | 277.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 523.16 | 106.50 |
| J-1109 | 305.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 523.16 | 94.39 |
| J-1110 | 320.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 523.16 | 87.90 |
| J-1111 | 306.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 507.11 | 87.01 |
| J-1112 | 307.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 507.11 | 86.58 |
| J-1113 | 323.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 507.11 | 79.66 |
| J-1114 | 431.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 507.12 | 32.93 |
| J-1115 | 340.50 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 512.18 | 74.28 |
| J-1116 | 425.50 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 512.18 | 37.50 |
| J-1117 | 435.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 512.18 | 33.39 |
| J-1118 | 319.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 504.18 | 80.12 |
| J-1119 | 332.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 504.17 | 74.49 |
| J-1120 | 384.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 504.11 | 51.97 |
| J-1121 | 400.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 502.30 | 44.26 |
| J-1122 | 443.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 503.23 | 26.06 |
| J-1123 | 327.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 503.68 | 76.44 |
| J-1124 | 264.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 502.24 | 103.08 |
| J-1125 | 272.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 502.23 | 99.61 |
| J-1126 | 278.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 502.23 | 97.02 |
| J-1127 | 282.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 502.23 | 95.28 |
| J-1128 | 282.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 502.24 | 95.29 |
| J-1129 | 284.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 480.32 | 84.94 |
| J-1130 | 306.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 480.33 | 75.42 |
| J-1131 | 312.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 501.77 | 82.11 |
| J-1132 | 372.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 501.80 | 56.16 |
| J-1133 | 418.00 | HIGH SERVICE AREA | 6.98 | MDD-EPS | 6.98 | 501.96 | 36.32 |
| J-2000 | 306.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 481.88 | 76.09 |
| J-2001 | 331.30 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 481.86 | 65.14 |
| J-2002 | 331.30 | LOW SERVICE AREA | 44.38 | MDD-EPS | 44.38 | 481.85 | 65.14 |
| J-2003 | 335.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 481.85 | 63.54 |
| J-2004 | 335.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 481.86 | 63.54 |
| J-2005 | 270.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 481.95 | 91.70 |
| J-2006 | 315.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 481.89 | 72.21 |
| J-2007 | 315.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 481.92 | 72.22 |
| J-2008 | 320.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 481.86 | 70.03 |
| J-2009 | 325.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 481.85 | 67.86 |
| J-2010 | 330.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 481.85 | 65.70 |
| J-2011 | 300.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 482.02 | 78.75 |
| J-2012 | 300.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 482.05 | 78.76 |
| J-2013 | 330.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 482.05 | 65.79 |
| J-2014 | 330.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 482.00 | 65.76 |
| J-2015 | 285.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 482.00 | 85.23 |
| J-2016 | 275.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 481.97 | 89.55 |
| J-2017 | 265.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 481.97 | 93.87 |
| J-2018 | 265.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 481.96 | 93.87 |
| J-2019 | 275.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 481.99 | 89.55 |
| J-2020 | 295.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 481.97 | 80.89 |
| J-2021 | 270.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 482.04 | 91.74 |
| J-2022 | 295.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 482.11 | 80.95 |
| J-2023 | 290.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 482.10 | 83.11 |
| J-2024 | 295.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 482.10 | 80.95 |

# Scenario: MDD
# Steady State Analysis
# Junction Report

| Label | Elevation (ft) | Zone | Base Flow (gpm) | Pattern | Demand (gpm) | Hydraulic Grade (ft) | Pressure (psi) |
|---|---|---|---|---|---|---|---|
| J-2025 | 260.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 482.10 | 96.09 |
| J-2026 | 325.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 482.06 | 67.95 |
| J-2027 | 350.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 482.02 | 57.12 |
| J-2028 | 287.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 482.07 | 84.40 |
| J-2029 | 282.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 482.34 | 86.68 |
| J-2030 | 335.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 482.61 | 63.86 |
| J-2031 | 320.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 482.34 | 70.24 |
| J-2032 | 260.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 483.18 | 96.56 |
| J-2033 | 270.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 483.47 | 92.36 |
| J-2034 | 285.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 483.56 | 85.91 |
| J-2035 | 259.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 481.13 | 96.11 |
| J-2036 | 265.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 481.53 | 93.68 |
| J-2037 | 305.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 481.53 | 76.38 |
| J-2038 | 265.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 481.91 | 93.85 |
| J-2039 | 280.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 481.91 | 87.36 |
| J-2040 | 270.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 481.91 | 91.68 |
| J-2041 | 275.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 481.91 | 89.52 |
| J-2042 | 305.00 | LOW SERVICE AREA | 7.41 | MDD-EPS | 7.41 | 481.91 | 76.54 |
| J-2043 | 280.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 481.91 | 87.36 |
| J-2044 | 280.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 481.91 | 87.36 |
| J-2045 | 290.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 481.91 | 83.03 |
| J-2046 | 280.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 482.45 | 87.59 |
| J-2047 | 290.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 482.47 | 83.27 |
| J-2048 | 305.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 482.41 | 76.76 |
| J-2049 | 305.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 482.31 | 76.71 |
| J-2050 | 325.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 482.12 | 67.98 |
| J-2051 | 325.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 482.08 | 67.96 |
| J-2052 | 365.00 | LOW SERVICE AREA | 35.82 | MDD-EPS | 35.82 | 481.13 | 50.25 |
| J-2053 | 275.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 481.40 | 89.30 |
| J-2054 | 265.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 481.59 | 93.71 |
| J-2055 | 285.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 481.88 | 85.18 |
| J-2056 | 295.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 481.88 | 80.85 |
| J-2057 | 295.00 | LOW SERVICE AREA | 12.55 | MDD-EPS | 12.55 | 481.84 | 80.84 |
| J-2058 | 285.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 481.84 | 85.16 |
| J-2059 | 265.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 481.92 | 93.85 |
| J-2060 | 280.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 482.75 | 87.72 |
| J-2061 | 265.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 482.75 | 94.21 |
| J-2062 | 280.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 482.75 | 87.72 |
| J-2063 | 360.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 482.75 | 53.11 |
| J-2064 | 280.00 | LOW SERVICE AREA | 8.37 | MDD-EPS | 8.37 | 481.88 | 87.34 |
| J-2065 | 275.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 481.88 | 89.51 |
| J-2066 | 280.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 481.88 | 87.34 |
| J-2067 | 280.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 481.88 | 87.34 |
| J-2068 | 230.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 483.63 | 109.74 |
| J-2069 | 215.00 | LOW SERVICE AREA | 6.81 | MDD-EPS | 6.81 | 483.54 | 116.18 |
| J-2070 | 200.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 483.53 | 122.67 |
| J-2071 | 200.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 483.53 | 122.67 |
| J-2072 | 288.00 | LOW SERVICE AREA | 6.53 | MDD-EPS | 6.53 | 480.37 | 83.23 |
| J-2073 | 275.00 | LOW SERVICE AREA | 16.37 | MDD-EPS | 16.37 | 480.33 | 88.84 |
| J-2074 | 285.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 480.33 | 84.51 |
| J-2075 | 270.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 480.33 | 91.00 |
| J-2076 | 295.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 480.21 | 80.13 |
| J-2077 | 295.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 480.20 | 80.13 |

# Scenario: MDD
# Steady State Analysis
# Junction Report

| Label | Elevation (ft) | Zone | Base Flow (gpm) | Pattern | Demand (gpm) | Hydraulic Grade (ft) | Pressure (psi) |
|---|---|---|---|---|---|---|---|
| J-2078 | 290.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 480.20 | 82.29 |
| J-2079 | 393.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 480.48 | 37.85 |
| J-2080 | 292.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 480.46 | 81.54 |
| J-2081 | 276.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 480.95 | 88.67 |
| J-2082 | 320.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 480.94 | 69.63 |
| J-2083 | 350.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 480.49 | 56.46 |
| J-2084 | 370.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 480.49 | 47.80 |
| J-2085 | 350.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 480.50 | 56.46 |
| J-2086 | 330.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 480.52 | 65.12 |
| J-2087 | 320.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 480.56 | 69.47 |
| J-2088 | 340.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 480.79 | 60.92 |
| J-2089 | 315.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 481.21 | 71.91 |
| J-2090 | 270.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 481.13 | 91.35 |
| J-2091 | 280.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 481.83 | 87.32 |
| J-2092 | 410.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 481.83 | 31.08 |
| J-2093 | 415.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 481.72 | 28.87 |
| J-2094 | 400.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 481.51 | 35.26 |
| J-2095 | 400.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 481.82 | 35.40 |
| J-2096 | 285.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 479.87 | 84.31 |
| J-2097 | 287.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 479.89 | 83.45 |
| J-2098 | 277.50 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 479.86 | 87.55 |
| J-2099 | 285.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 479.86 | 84.30 |
| J-2100 | 275.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 479.85 | 88.63 |
| J-2101 | 280.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 479.85 | 86.47 |
| J-2102 | 264.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 479.86 | 93.39 |
| J-2103 | 265.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 479.85 | 92.96 |
| J-2104 | 280.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 479.85 | 86.47 |
| J-2105 | 260.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 479.85 | 95.12 |
| J-2106 | 255.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 479.85 | 97.28 |
| J-2107 | 280.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 479.87 | 86.47 |
| J-2108 | 280.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 479.87 | 86.47 |
| J-2109 | 300.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 479.95 | 77.86 |
| J-2110 | 370.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 479.95 | 47.57 |
| J-2111 | 318.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 479.93 | 70.06 |
| J-2112 | 315.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 479.95 | 71.37 |
| J-2113 | 368.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 479.96 | 48.44 |
| J-2114 | 340.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 479.97 | 60.56 |
| J-2115 | 300.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 479.85 | 77.81 |
| J-2116 | 300.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 479.97 | 77.86 |
| J-2117 | 310.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 479.97 | 73.54 |
| J-2118 | 287.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 479.98 | 83.49 |
| J-2119 | 271.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 480.12 | 90.48 |
| J-2120 | 262.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 480.13 | 94.38 |
| J-2121 | 255.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 480.06 | 97.37 |
| J-2122 | 265.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 480.05 | 93.04 |
| J-2123 | 265.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 480.05 | 93.04 |
| J-2124 | 255.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 480.06 | 97.37 |
| J-2125 | 265.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 480.04 | 93.04 |
| J-2126 | 255.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 480.06 | 97.37 |
| J-2127 | 250.00 | LOW SERVICE AREA | 8.32 | MDD-EPS | 8.32 | 482.01 | 100.38 |
| J-2128 | 305.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 480.16 | 75.78 |
| J-2129 | 315.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 480.23 | 71.49 |
| J-2130 | 300.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 480.24 | 77.98 |

# Scenario: MDD
# Steady State Analysis
# Junction Report

| Label | Elevation (ft) | Zone | Base Flow (gpm) | Pattern | Demand (gpm) | Hydraulic Grade (ft) | Pressure (psi) |
|---|---|---|---|---|---|---|---|
| J-2131 | 320.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 480.26 | 69.34 |
| J-2132 | 320.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 480.55 | 69.46 |
| J-2133 | 345.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 480.69 | 58.71 |
| J-2134 | 285.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 480.15 | 84.43 |
| J-2135 | 295.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 480.20 | 80.13 |
| J-2136 | 297.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 480.20 | 79.26 |
| J-2137 | 260.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 480.18 | 95.26 |
| J-2138 | 270.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 480.23 | 90.96 |
| J-2139 | 250.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 480.25 | 99.62 |
| J-2140 | 250.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 480.23 | 99.61 |
| J-2141 | 280.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 480.24 | 86.63 |
| J-2142 | 300.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 480.24 | 77.98 |
| J-2143 | 295.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 480.25 | 80.15 |
| J-2144 | 320.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 480.35 | 69.38 |
| J-2145 | 285.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 480.32 | 84.50 |
| J-2146 | 320.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 480.31 | 69.36 |
| J-2147 | 285.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 480.30 | 84.50 |
| J-2148 | 250.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 480.30 | 99.64 |
| J-2149 | 245.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 480.30 | 101.80 |
| J-2150 | 260.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 480.30 | 95.31 |
| J-2151 | 240.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 480.30 | 103.96 |
| J-2152 | 245.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 480.29 | 101.80 |
| J-2153 | 260.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 484.23 | 97.01 |
| J-2154 | 280.00 | LOW SERVICE AREA | 9.01 | MDD-EPS | 9.01 | 483.87 | 88.20 |
| J-2155 | 295.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 483.79 | 81.68 |
| J-2156 | 344.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 483.70 | 60.44 |
| J-2157 | 393.00 | LOW SERVICE AREA | 19.91 | MDD-EPS | 19.91 | 483.69 | 39.24 |
| J-2158 | 384.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 483.69 | 43.13 |
| J-2159 | 307.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 481.88 | 75.66 |
| J-2160 | 263.50 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 479.85 | 93.61 |
| J-2161 | 322.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 480.33 | 68.50 |
| J-2162 | 315.50 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 480.45 | 71.37 |
| J-2163 | 272.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 480.00 | 89.99 |
| J-2164 | 295.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 480.03 | 80.05 |
| J-2165 | 265.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 480.51 | 93.24 |
| J-2166 | 272.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 480.50 | 90.21 |
| J-2167 | 341.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 481.07 | 60.60 |
| J-2168 | 274.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 479.85 | 89.06 |
| J-2169 | 283.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 479.85 | 85.17 |
| J-2170 | 285.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 479.85 | 84.30 |
| J-2171 | 322.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 479.85 | 68.29 |
| J-2172 | 300.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 479.86 | 77.82 |
| J-2173 | 288.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 479.97 | 83.06 |
| J-2174 | 290.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 479.98 | 82.20 |
| J-2175 | 283.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 479.85 | 85.17 |
| J-2176 | 347.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 481.23 | 58.07 |
| J-2177 | 346.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 481.23 | 58.51 |
| J-2178 | 355.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 481.14 | 54.58 |
| J-2179 | 339.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 481.14 | 61.50 |
| J-2180 | 405.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 481.82 | 33.24 |
| J-2181 | 386.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 481.82 | 41.46 |
| J-2182 | 402.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 481.82 | 34.53 |
| J-2183 | 396.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 481.82 | 37.13 |

# Scenario: MDD
# Steady State Analysis
# Junction Report

| Label | Elevation (ft) | Zone | Base Flow (gpm) | Pattern | Demand (gpm) | Hydraulic Grade (ft) | Pressure (psi) |
|---|---|---|---|---|---|---|---|
| J-2184 | 219.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 483.70 | 114.52 |
| J-2185 | 221.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 483.59 | 113.61 |
| J-2186 | 218.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 483.59 | 114.91 |
| J-2187 | 215.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 483.52 | 116.18 |
| J-2188 | 219.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 483.52 | 114.45 |
| J-2189 | 232.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 483.52 | 108.82 |
| J-2190 | 270.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 483.52 | 92.38 |
| J-2191 | 284.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 482.08 | 85.70 |
| J-2192 | 263.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 482.07 | 94.78 |
| J-2193 | 342.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 481.85 | 60.50 |
| J-2194 | 295.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 481.84 | 80.84 |
| J-2195 | 285.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 481.85 | 85.17 |
| J-2291 | 275.00 | LOW SERVICE AREA | 3.92 | MDD-EPS | 3.92 | 481.88 | 89.51 |

# Scenario: MDD
# Steady State Analysis
# Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-1000 | 12.0 | J-1102 | J-1015 | 1,245 | 27.93 | 0.00 | 0.00 | 0.08 | 120.0 |
| P-1001 | 12.0 | J-1007 | J-1102 | 1,005 | 34.91 | 0.01 | 0.01 | 0.10 | 120.0 |
| P-1003 | 12.0 | J-1008 | J-1009 | 300 | 6.98 | 0.00 | 0.00 | 0.02 | 100.0 |
| P-1004 | 12.0 | J-1007 | J-1008 | 400 | 48.88 | 0.02 | 0.01 | 0.14 | 100.0 |
| P-1005 | 12.0 | J-1098 | J-1007 | 850 | 90.78 | 0.04 | 0.03 | 0.26 | 110.0 |
| P-1006 | 12.0 | J-1006 | J-1098 | 800 | -1,133.00 | 4.35 | 3.48 | 3.21 | 110.0 |
| P-1007 | 12.0 | J-1007 | J-1012 | 4,600 | 0.00 | 0.00 | 0.00 | 0.00 | 130.0 |
| P-1008 | 8.0 | J-1030 | J-1031 | 1,650 | -1.04 | 0.00 | 0.00 | 0.01 | 110.0 |
| P-1010 | 12.0 | J-1016 | J-1017 | 1,800 | 13.97 | 0.00 | 0.00 | 0.04 | 120.0 |
| P-1012 | 8.0 | J-1027 | J-1030 | 2,200 | 12.92 | 0.01 | 0.02 | 0.08 | 110.0 |
| P-1013 | 8.0 | J-1034 | J-1033 | 1,350 | -1.77 | 0.00 | 0.00 | 0.01 | 110.0 |
| P-1014 | 12.0 | J-1033 | J-1034 | 1,050 | 5.21 | 0.00 | 0.00 | 0.01 | 110.0 |
| P-1015 | 12.0 | J-1032 | J-1033 | 500 | 9.13 | 0.00 | 0.00 | 0.03 | 110.0 |
| P-1016 | 12.0 | J-1032 | J-1027 | 1,500 | -38.10 | 0.01 | 0.01 | 0.11 | 110.0 |
| P-1017 | 8.0 | J-1033 | J-1035 | 2,100 | -4.84 | 0.00 | 0.00 | 0.03 | 120.0 |
| P-1018 | 12.0 | J-1025 | PRV-4 | 1,183 | 0.00 | 0.00 | 0.00 | 0.00 | 110.0 |
| P-1019 | 12.0 | J-1026 | J-1025 | 450 | 13.97 | 0.00 | 0.00 | 0.04 | 110.0 |
| P-1020 | 12.0 | J-1026 | J-1027 | 1,100 | -32.77 | 0.01 | 0.01 | 0.09 | 110.0 |
| P-1021 | 8.0 | J-1035 | J-1026 | 600 | -11.82 | 0.01 | 0.00 | 0.08 | 120.0 |
| P-1022 | 10.0 | J-1029 | J-1028 | 2,500 | 23.88 | 0.01 | 0.02 | 0.10 | 110.0 |
| P-1023 | 12.0 | J-1028 | J-1027 | 250 | 90.78 | 0.04 | 0.01 | 0.26 | 110.0 |
| P-1024 | 12.0 | J-1029 | J-1028 | 750 | 73.88 | 0.03 | 0.02 | 0.21 | 110.0 |
| P-1025 | 12.0 | J-1103 | J-1029 | 3,500 | 104.74 | 0.05 | 0.16 | 0.30 | 120.0 |
| P-1026 | 10.0 | J-1019 | J-1018 | 1,500 | -71.32 | 0.09 | 0.14 | 0.29 | 90.0 |
| P-1027 | 12.0 | J-1011 | J-1005 | 2,200 | -527.14 | 0.90 | 1.98 | 1.50 | 120.0 |
| P-1028 | 10.0 | J-1013 | J-1014 | 1,950 | 6.98 | 0.00 | 0.00 | 0.03 | 100.0 |
| P-1029 | 12.0 | J-1013 | J-1012 | 2,000 | -394.63 | 0.62 | 1.23 | 1.12 | 110.0 |
| P-1030 | 10.0 | J-1103 | J-1013 | 1,000 | -380.66 | 1.19 | 1.19 | 1.56 | 120.0 |
| P-1031 | 10.0 | J-1018 | J-1103 | 400 | -268.94 | 0.63 | 0.25 | 1.10 | 120.0 |
| P-1032 | 8.0 | J-1053 | J-1018 | 2,080 | -190.64 | 1.38 | 2.87 | 1.22 | 100.0 |
| P-1033 | 8.0 | J-1054 | J-1036 | 500 | 128.07 | 0.55 | 0.28 | 0.82 | 110.0 |
| P-1034 | 8.0 | J-1036 | J-1037 | 650 | 59.23 | 0.13 | 0.09 | 0.38 | 110.0 |
| P-1035 | 8.0 | J-1037 | J-1036 | 600 | -61.85 | 0.14 | 0.09 | 0.39 | 110.0 |
| P-1036 | 8.0 | J-1053 | J-1054 | 400 | 136.21 | 0.74 | 0.30 | 0.87 | 100.0 |
| P-1037 | 8.0 | J-1052 | J-1053 | 800 | -47.45 | 0.10 | 0.08 | 0.30 | 100.0 |
| P-1038 | 8.0 | J-1050 | J-1052 | 1,200 | -33.48 | 0.06 | 0.07 | 0.21 | 100.0 |
| P-1039 | 12.0 | J-1011 | J-1012 | 750 | 401.61 | 0.64 | 0.48 | 1.14 | 110.0 |
| P-1040 | 12.0 | J-1010 | J-1011 | 2,200 | -118.55 | 0.07 | 0.15 | 0.34 | 110.0 |
| P-1041 | 12.0 | J-1047 | J-1010 | 1,800 | -647.60 | 1.54 | 2.78 | 1.84 | 110.0 |
| P-1042 | 8.0 | J-1054 | J-1055 | 500 | 1.16 | 0.00 | 0.00 | 0.01 | 100.0 |
| P-1043 | 12.0 | J-1005 | J-1006 | 1,750 | -1,126.02 | 4.30 | 7.53 | 3.19 | 110.0 |
| P-1044 | 12.0 | J-1010 | J-1005 | 1,950 | -536.03 | 1.09 | 2.12 | 1.52 | 110.0 |
| P-1045 | 12.0 | J-1001 | J-1004 | 1,500 | -4.76 | 0.00 | 0.00 | 0.01 | 100.0 |
| P-1046 | 12.0 | J-1002 | J-1003 | 1,900 | -21.23 | 0.00 | 0.01 | 0.06 | 100.0 |
| P-1047 | 12.0 | J-1001 | J-1002 | 1,100 | -7.27 | 0.00 | 0.00 | 0.02 | 100.0 |
| P-1048 | 8.0 | J-1000 | J-1001 | 975 | -5.05 | 0.00 | 0.00 | 0.03 | 100.0 |
| P-1049 | 12.0 | J-1004 | J-1000 | 1,400 | 15.90 | 0.00 | 0.00 | 0.05 | 120.0 |
| P-1050 | 12.0 | J-1003 | J-1004 | 1,200 | 27.65 | 0.01 | 0.01 | 0.08 | 100.0 |
| P-1051 | 12.0 | J-1005 | J-1003 | 430 | 55.86 | 0.02 | 0.01 | 0.16 | 100.0 |
| P-1052 | 12.0 | J-1100 | T-3 | 200 | 223.32 | 0.18 | 0.04 | 0.63 | 120.0 |
| P-1053 | 12.0 | J-1100 | J-1040 | 200 | 87.51 | 0.04 | 0.01 | 0.25 | 110.0 |

# Scenario: MDD
# Steady State Analysis
# Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-1054 | 12.0 | J-1042 | J-1100 | 1,000 | 317.81 | 0.41 | 0.41 | 0.90 | 110.0 |
| P-1055 | 8.0 | J-1044 | J-1046 | 350 | -141.78 | 0.80 | 0.28 | 0.90 | 100.0 |
| P-1056 | 8.0 | J-1046 | J-1048 | 1,360 | 79.98 | 0.28 | 0.38 | 0.51 | 100.0 |
| P-1057 | 12.0 | J-1046 | J-1047 | 1,800 | -640.61 | 1.51 | 2.72 | 1.82 | 110.0 |
| P-1058 | 12.0 | J-1044 | J-1046 | 350 | -411.87 | 0.80 | 0.28 | 1.17 | 100.0 |
| P-1059 | 8.0 | J-1044 | J-1061 | 1,100 | 83.80 | 0.30 | 0.33 | 0.53 | 100.0 |
| P-1060 | 12.0 | J-1043 | J-1044 | 600 | -462.87 | 0.83 | 0.50 | 1.31 | 110.0 |
| P-1061 | 12.0 | J-1043 | J-1042 | 800 | 324.79 | 0.43 | 0.34 | 0.92 | 110.0 |
| P-1062 | 8.0 | J-1041 | J-1043 | 1,150 | -131.09 | 0.49 | 0.57 | 0.84 | 120.0 |
| P-1063 | 8.0 | J-1040 | J-1041 | 500 | -117.13 | 0.40 | 0.20 | 0.75 | 120.0 |
| P-1064 | 12.0 | J-1104 | J-1040 | 615 | -197.65 | 0.20 | 0.13 | 0.56 | 100.0 |
| P-1065 | 12.0 | J-1039 | J-1104 | 1,585 | -190.66 | 0.19 | 0.30 | 0.54 | 100.0 |
| P-1066 | 12.0 | J-1101 | J-1079 | 1,326 | -0.83 | 0.00 | 0.00 | 0.00 | 120.0 |
| P-1067 | 12.0 | J-1059 | J-1101 | 1,774 | 6.15 | 0.00 | 0.00 | 0.02 | 120.0 |
| P-1068 | 8.0 | J-1057 | J-1058 | 1,350 | -3.43 | 0.00 | 0.00 | 0.02 | 120.0 |
| P-1069 | 12.0 | J-1058 | J-1057 | 1,870 | 3.56 | 0.00 | 0.00 | 0.01 | 120.0 |
| P-1070 | 8.0 | J-1050 | J-1051 | 1,250 | 6.98 | 0.00 | 0.00 | 0.04 | 120.0 |
| P-1071 | 8.0 | J-1048 | J-1050 | 1,200 | 52.05 | 0.12 | 0.15 | 0.33 | 100.0 |
| P-1072 | 8.0 | J-1048 | J-1049 | 800 | 20.95 | 0.02 | 0.02 | 0.13 | 100.0 |
| P-1073 | 6.0 | J-1061 | J-1045 | 1,400 | 76.82 | 1.04 | 1.46 | 0.87 | 100.0 |
| P-1074 | 12.0 | J-1045 | J-1039 | 550 | -180.82 | 0.17 | 0.10 | 0.51 | 100.0 |
| P-1075 | 12.0 | J-1045 | J-1058 | 2,800 | 73.92 | 0.03 | 0.09 | 0.21 | 100.0 |
| P-1076 | 12.0 | J-1062 | J-1045 | 280 | -162.47 | 0.14 | 0.04 | 0.46 | 100.0 |
| P-1077 | 12.0 | J-1075 | J-1076 | 500 | 6.98 | 0.00 | 0.00 | 0.02 | 110.0 |
| P-1078 | 12.0 | J-1062 | J-1075 | 500 | 13.97 | 0.00 | 0.00 | 0.04 | 100.0 |
| P-1079 | 8.0 | J-1077 | J-1080 | 200 | 6.98 | 0.00 | 0.00 | 0.04 | 120.0 |
| P-1080 | 12.0 | J-1062 | J-1059 | 2,800 | 58.26 | 0.02 | 0.05 | 0.17 | 110.0 |
| P-1081 | 12.0 | J-1078 | J-1062 | 500 | -83.54 | 0.04 | 0.02 | 0.24 | 100.0 |
| P-1082 | 12.0 | J-1077 | J-1078 | 350 | -76.56 | 0.03 | 0.01 | 0.22 | 120.0 |
| P-1083 | 12.0 | J-1079 | J-1077 | 1,200 | -62.59 | 0.02 | 0.02 | 0.18 | 120.0 |
| P-1084 | 12.0 | J-1058 | J-1059 | 300 | -45.13 | 0.01 | 0.00 | 0.13 | 120.0 |
| P-1085 | 12.0 | J-1063 | J-1058 | 1,750 | -105.09 | 0.05 | 0.09 | 0.30 | 110.0 |
| P-1086 | 12.0 | J-1093 | J-1094 | 1,250 | 6.98 | 0.00 | 0.00 | 0.02 | 110.0 |
| P-1087 | 6.0 | J-1092 | J-1093 | 1,600 | 6.85 | 0.01 | 0.02 | 0.08 | 100.0 |
| P-1088 | 8.0 | J-1093 | J-1096 | 1,100 | -7.11 | 0.00 | 0.00 | 0.05 | 110.0 |
| P-1089 | 8.0 | J-1096 | J-1097 | 2,000 | -14.10 | 0.01 | 0.02 | 0.09 | 110.0 |
| P-1090 | 8.0 | J-1092 | J-1097 | 800 | -7.17 | 0.00 | 0.00 | 0.05 | 100.0 |
| P-1091 | 8.0 | J-1089 | J-1092 | 2,000 | 6.67 | 0.00 | 0.01 | 0.04 | 100.0 |
| P-1092 | 8.0 | J-1097 | J-1091 | 650 | -28.25 | 0.04 | 0.03 | 0.18 | 100.0 |
| P-1093 | 8.0 | J-1091 | J-1089 | 600 | 27.61 | 0.04 | 0.02 | 0.18 | 100.0 |
| P-1094 | 8.0 | J-1095 | J-1089 | 840 | -13.97 | 0.01 | 0.01 | 0.09 | 100.0 |
| P-1095 | 6.0 | J-1095 | PRV-2 | 2,322 | 0.00 | 0.00 | 0.00 | 0.00 | 110.0 |
| P-1096 | 8.0 | J-1084 | J-1085 | 1,800 | 38.22 | 0.07 | 0.13 | 0.24 | 100.0 |
| P-1098 | 8.0 | J-1084 | J-1083 | 900 | 14.58 | 0.01 | 0.01 | 0.09 | 110.0 |
| P-1099 | 8.0 | J-1083 | J-1082 | 1,350 | -65.91 | 0.16 | 0.22 | 0.42 | 110.0 |
| P-1100 | 10.0 | J-1086 | J-1083 | 1,150 | -73.50 | 0.08 | 0.09 | 0.30 | 100.0 |
| P-1101 | 10.0 | J-1086 | J-1090 | 515 | 41.27 | 0.03 | 0.01 | 0.17 | 100.0 |
| P-1102 | 10.0 | J-1087 | J-1086 | 1,100 | -25.25 | 0.01 | 0.01 | 0.10 | 110.0 |
| P-1103 | 10.0 | J-1085 | J-1090 | 500 | -38.59 | 0.02 | 0.01 | 0.16 | 100.0 |
| P-1104 | 12.0 | J-1081 | J-1121 | 690 | 6.98 | 0.00 | 0.00 | 0.02 | 120.0 |
| P-1105 | 8.0 | J-1060 | J-1084 | 1,300 | 59.79 | 0.16 | 0.21 | 0.38 | 100.0 |

# Scenario: MDD
# Steady State Analysis
# Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-1106 | 10.0 | J-1088 | J-1087 | 700 | -18.27 | 0.01 | 0.00 | 0.07 | 110.0 |
| P-1107 | 8.0 | J-1091 | J-1085 | 650 | -69.83 | 0.21 | 0.14 | 0.45 | 100.0 |
| P-1108 | 10.0 | J-1090 | J-1088 | 1,100 | -4.30 | 0.00 | 0.00 | 0.02 | 110.0 |
| P-1109 | 8.0 | J-1064 | J-1060 | 300 | 65.67 | 0.12 | 0.04 | 0.42 | 130.0 |
| P-1110 | 8.0 | J-1068 | J-1069 | 1,450 | 34.61 | 0.06 | 0.08 | 0.22 | 100.0 |
| P-1111 | 8.0 | J-1038 | J-1073 | 1,400 | 3.59 | 0.00 | 0.00 | 0.02 | 110.0 |
| P-1112 | 8.0 | J-1068 | J-1072 | 950 | -97.92 | 0.40 | 0.38 | 0.62 | 100.0 |
| P-1113 | 8.0 | J-1065 | J-1068 | 500 | -56.32 | 0.14 | 0.07 | 0.36 | 100.0 |
| P-1114 | 6.0 | J-1073 | J-1065 | 1,700 | 48.38 | 0.44 | 0.75 | 0.55 | 100.0 |
| P-1115 | 6.0 | J-1056 | J-1073 | 1,100 | 51.77 | 0.50 | 0.55 | 0.59 | 100.0 |
| P-1116 | 8.0 | J-1065 | J-1064 | 250 | 77.68 | 0.26 | 0.07 | 0.50 | 100.0 |
| P-1117 | 8.0 | J-1066 | J-1065 | 1,400 | -20.04 | 0.02 | 0.03 | 0.13 | 100.0 |
| P-1118 | 8.0 | J-1064 | J-1067 | 1,250 | 15.18 | 0.01 | 0.02 | 0.10 | 100.0 |
| P-1119 | 12.0 | J-1063 | J-1064 | 1,910 | 10.15 | 0.00 | 0.00 | 0.03 | 110.0 |
| P-1120 | 12.0 | J-1081 | J-1063 | 450 | -87.95 | 0.04 | 0.02 | 0.25 | 110.0 |
| P-1121 | 12.0 | J-1082 | J-1081 | 700 | -73.99 | 0.03 | 0.02 | 0.21 | 110.0 |
| P-1122 | 12.0 | J-1082 | J-1060 | 1,400 | 1.10 | 0.00 | 0.00 | 0.00 | 110.0 |
| P-1123 | 6.0 | J-1069 | J-1070 | 500 | 13.97 | 0.04 | 0.02 | 0.16 | 100.0 |
| P-1124 | 6.0 | J-1069 | J-1066 | 400 | 13.66 | 0.04 | 0.02 | 0.16 | 100.0 |
| P-1125 | 6.0 | J-1067 | J-1066 | 350 | -26.72 | 0.15 | 0.05 | 0.30 | 100.0 |
| P-1126 | 6.0 | J-1070 | J-1071 | 1,000 | 6.98 | 0.01 | 0.01 | 0.08 | 100.0 |
| P-1127 | 8.0 | J-1038 | J-1037 | 900 | -114.11 | 0.45 | 0.40 | 0.73 | 110.0 |
| P-1128 | 8.0 | J-1072 | J-1038 | 800 | -103.53 | 0.37 | 0.30 | 0.66 | 110.0 |
| P-1129 | 8.0 | J-1055 | J-1050 | 650 | -71.57 | 0.22 | 0.15 | 0.46 | 100.0 |
| P-1130 | 8.0 | J-1055 | J-1056 | 1,120 | 65.74 | 0.19 | 0.22 | 0.42 | 100.0 |
| P-1131 | 10.0 | J-1019 | J-1022 | 500 | 44.37 | 0.04 | 0.02 | 0.18 | 90.0 |
| P-1132 | 8.0 | J-1020 | J-1019 | 520 | -19.96 | 0.02 | 0.01 | 0.13 | 100.0 |
| P-1133 | 8.0 | J-1021 | J-1020 | 800 | -5.49 | 0.00 | 0.00 | 0.04 | 100.0 |
| P-1134 | 6.0 | J-1022 | J-1021 | 700 | -6.00 | 0.01 | 0.01 | 0.07 | 100.0 |
| P-1135 | 10.0 | J-1023 | J-1022 | 500 | -27.93 | 0.02 | 0.01 | 0.11 | 90.0 |
| P-1136 | 8.0 | J-1020 | J-1021 | 450 | 7.49 | 0.00 | 0.00 | 0.05 | 100.0 |
| P-1137 | 8.0 | J-1074 | J-1024 | 800 | -1.36 | 0.00 | 0.00 | 0.01 | 100.0 |
| P-1138 | 8.0 | J-1023 | J-1074 | 900 | 5.62 | 0.00 | 0.00 | 0.04 | 100.0 |
| P-1139 | 10.0 | J-1024 | J-1023 | 320 | -15.33 | 0.01 | 0.00 | 0.06 | 90.0 |
| P-1140 | 10.0 | J-1024 | J-1099 | 330 | 6.98 | 0.00 | 0.00 | 0.03 | 90.0 |
| P-1141 | 10.0 | J-1099 | PRV-3 | 5 | 0.00 | 0.00 | 0.00 | 0.00 | 90.0 |
| P-1142 | 8.0 | J-1092 | PRV-1 | 390 | 0.00 | 0.00 | 0.00 | 0.00 | 100.0 |
| P-1143 | 12.0 | J-1015 | J-1105 | 825 | 20.95 | 0.00 | 0.00 | 0.06 | 130.0 |
| P-1144 | 12.0 | J-1105 | J-1106 | 715 | 6.98 | 0.00 | 0.00 | 0.02 | 130.0 |
| P-1145 | 8.0 | J-1105 | J-1107 | 928 | 6.98 | 0.00 | 0.00 | 0.04 | 130.0 |
| P-1146 | 12.0 | J-1008 | J-1108 | 1,077 | 34.91 | 0.01 | 0.01 | 0.10 | 120.0 |
| P-1147 | 8.0 | J-1108 | J-1109 | 757 | 6.98 | 0.00 | 0.00 | 0.04 | 130.0 |
| P-1148 | 8.0 | J-1017 | J-1110 | 1,053 | 6.98 | 0.00 | 0.00 | 0.04 | 130.0 |
| P-1149 | 12.0 | J-1111 | J-1032 | 1,442 | -21.99 | 0.00 | 0.00 | 0.06 | 110.0 |
| P-1150 | 8.0 | J-1111 | J-1112 | 573 | 6.98 | 0.00 | 0.00 | 0.04 | 130.0 |
| P-1151 | 12.0 | J-1031 | J-1111 | 1,858 | -8.03 | 0.00 | 0.00 | 0.02 | 110.0 |
| P-1152 | 8.0 | J-1030 | J-1113 | 439 | 6.98 | 0.00 | 0.00 | 0.04 | 130.0 |
| P-1153 | 8.0 | J-1025 | J-1114 | 459 | 6.98 | 0.00 | 0.00 | 0.04 | 130.0 |
| P-1154 | 12.0 | J-1002 | J-1115 | 2,056 | 6.98 | 0.00 | 0.00 | 0.02 | 130.0 |
| P-1155 | 8.0 | J-1000 | J-1116 | 920 | 6.98 | 0.00 | 0.00 | 0.04 | 130.0 |
| P-1156 | 8.0 | J-1000 | J-1117 | 1,514 | 6.98 | 0.00 | 0.00 | 0.04 | 130.0 |

# Scenario: MDD
# Steady State Analysis
# Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-1157 | 8.0 | J-1049 | J-1118 | 828 | 6.98 | 0.00 | 0.00 | 0.04 | 130.0 |
| P-1158 | 8.0 | J-1049 | J-1119 | 1,231 | 6.98 | 0.00 | 0.00 | 0.04 | 130.0 |
| P-1159 | 10.0 | J-1052 | J-1120 | 698 | 6.98 | 0.00 | 0.00 | 0.03 | 130.0 |
| P-1161 | 6.0 | J-1041 | J-1122 | 338 | 6.98 | 0.01 | 0.00 | 0.08 | 130.0 |
| P-1162 | 6.0 | J-1056 | J-1123 | 932 | 6.98 | 0.01 | 0.01 | 0.08 | 110.0 |
| P-1163 | 6.0 | J-1067 | J-1124 | 388 | 34.91 | 0.15 | 0.06 | 0.40 | 130.0 |
| P-1164 | 6.0 | J-1124 | J-1125 | 150 | 20.95 | 0.06 | 0.01 | 0.24 | 130.0 |
| P-1165 | 6.0 | J-1125 | J-1126 | 100 | 6.98 | 0.01 | 0.00 | 0.08 | 130.0 |
| P-1166 | 6.0 | J-1125 | J-1127 | 224 | 6.98 | 0.01 | 0.00 | 0.08 | 130.0 |
| P-1167 | 6.0 | J-1124 | J-1128 | 747 | 6.98 | 0.01 | 0.01 | 0.08 | 130.0 |
| P-1168 | 8.0 | J-1095 | J-1131 | 773 | 6.98 | 0.00 | 0.00 | 0.04 | 130.0 |
| P-1169 | 8.0 | J-1091 | J-1132 | 885 | 6.98 | 0.00 | 0.00 | 0.04 | 130.0 |
| P-1170 | 8.0 | J-1088 | J-1133 | 1,016 | 6.98 | 0.00 | 0.00 | 0.04 | 130.0 |
| P-2000 | 6.0 | J-2017 | J-2018 | 1,600 | 3.92 | 0.00 | 0.01 | 0.04 | 100.0 |
| P-2001 | 8.0 | J-2016 | J-2019 | 650 | -22.83 | 0.03 | 0.02 | 0.15 | 100.0 |
| P-2002 | 8.0 | J-2016 | J-2017 | 750 | 7.84 | 0.00 | 0.00 | 0.05 | 100.0 |
| P-2003 | 12.0 | J-2020 | J-2016 | 650 | -11.07 | 0.00 | 0.00 | 0.03 | 110.0 |
| P-2004 | 8.0 | J-2015 | J-2021 | 550 | -39.23 | 0.07 | 0.04 | 0.25 | 100.0 |
| P-2005 | 6.0 | J-2020 | J-2015 | 450 | -15.41 | 0.06 | 0.03 | 0.17 | 90.0 |
| P-2006 | 8.0 | J-2019 | J-2015 | 300 | -26.75 | 0.04 | 0.01 | 0.17 | 100.0 |
| P-2007 | 6.0 | J-2005 | J-2020 | 300 | -22.55 | 0.07 | 0.02 | 0.26 | 130.0 |
| P-2008 | 6.0 | J-2191 | J-2192 | 1,093 | 3.92 | 0.00 | 0.00 | 0.04 | 130.0 |
| P-2009 | 8.0 | J-2015 | J-2014 | 2,160 | -6.85 | 0.00 | 0.01 | 0.04 | 100.0 |
| P-2010 | 6.0 | J-2004 | J-2005 | 1,200 | -18.63 | 0.08 | 0.09 | 0.21 | 100.0 |
| P-2011 | 8.0 | J-207 | T-2 | 223 | 22.61 | 0.02 | 0.00 | 0.14 | 130.0 |
| P-2012 | 8.0 | J-2025 | J-2024 | 2,400 | -3.29 | 0.00 | 0.00 | 0.02 | 90.0 |
| P-2013 | 8.0 | J-2023 | J-2025 | 250 | 0.64 | 0.00 | 0.00 | 0.00 | 90.0 |
| P-2014 | 8.0 | J-2024 | J-2023 | 1,300 | 4.56 | 0.00 | 0.00 | 0.03 | 90.0 |
| P-2015 | 8.0 | J-2022 | J-2024 | 250 | 11.76 | 0.01 | 0.00 | 0.08 | 90.0 |
| P-2016 | 10.0 | J-2014 | J-207 | 800 | 4.08 | 0.00 | 0.00 | 0.02 | 90.0 |
| P-2017 | 8.0 | J-207 | J-2027 | 1,200 | -18.54 | 0.02 | 0.02 | 0.12 | 110.0 |
| P-2018 | 10.0 | J-2022 | J-2029 | 3,500 | -66.69 | 0.07 | 0.23 | 0.27 | 100.0 |
| P-2019 | 10.0 | J-2014 | J-2011 | 2,900 | -14.85 | 0.00 | 0.01 | 0.06 | 100.0 |
| P-2020 | 6.0 | J-2010 | J-2004 | 700 | -5.76 | 0.01 | 0.01 | 0.07 | 90.0 |
| P-2021 | 12.0 | PRV-4 | J-2003 | 167 | 0.00 | 0.00 | 0.00 | 0.00 | 110.0 |
| P-2022 | 6.0 | J-2004 | J-2003 | 350 | 8.95 | 0.02 | 0.01 | 0.10 | 90.0 |
| P-2023 | 10.0 | J-2003 | J-2002 | 1,650 | 5.03 | 0.00 | 0.00 | 0.02 | 110.0 |
| P-2024 | 8.0 | J-2009 | J-2002 | 850 | 4.51 | 0.00 | 0.00 | 0.03 | 110.0 |
| P-2025 | 6.0 | J-2008 | J-2001 | 1,200 | 3.74 | 0.00 | 0.00 | 0.04 | 130.0 |
| P-2026 | 8.0 | J-2008 | J-2001 | 1,000 | 7.45 | 0.00 | 0.00 | 0.05 | 110.0 |
| P-2027 | 6.0 | J-2008 | J-2009 | 750 | 6.59 | 0.01 | 0.01 | 0.07 | 90.0 |
| P-2028 | 10.0 | J-2002 | J-2001 | 400 | -38.76 | 0.02 | 0.01 | 0.16 | 110.0 |
| P-2029 | 8.0 | J-2029 | J-2031 | 400 | 3.92 | 0.00 | 0.00 | 0.03 | 110.0 |
| P-2030 | 8.0 | J-2050 | J-2012 | 400 | 61.36 | 0.17 | 0.07 | 0.39 | 100.0 |
| P-2031 | 6.0 | J-2051 | J-2050 | 450 | -20.53 | 0.09 | 0.04 | 0.23 | 100.0 |
| P-2032 | 6.0 | J-2026 | J-2051 | 300 | -16.61 | 0.06 | 0.02 | 0.19 | 100.0 |
| P-2033 | 12.0 | J-2026 | J-2028 | 600 | -49.66 | 0.01 | 0.01 | 0.14 | 120.0 |
| P-2034 | 12.0 | J-2026 | J-2012 | 650 | 54.22 | 0.01 | 0.01 | 0.15 | 120.0 |
| P-2035 | 8.0 | J-2013 | J-2026 | 1,300 | -8.12 | 0.00 | 0.00 | 0.05 | 110.0 |
| P-2036 | 6.0 | J-2012 | J-2013 | 900 | -4.20 | 0.00 | 0.00 | 0.05 | 100.0 |
| P-2037 | 10.0 | J-2011 | J-2012 | 150 | -115.86 | 0.22 | 0.03 | 0.47 | 90.0 |

# Scenario: MDD
# Steady State Analysis
# Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-2038 | 8.0 | J-2028 | J-2029 | 900 | -76.04 | 0.31 | 0.27 | 0.49 | 90.0 |
| P-2039 | 8.0 | J-2027 | J-2028 | 1,950 | -22.46 | 0.02 | 0.04 | 0.14 | 110.0 |
| P-2040 | 8.0 | J-2007 | J-2008 | 1,950 | 21.71 | 0.03 | 0.06 | 0.14 | 90.0 |
| P-2041 | 10.0 | J-2007 | J-2011 | 600 | -97.09 | 0.16 | 0.10 | 0.40 | 90.0 |
| P-2042 | 10.0 | J-2006 | J-2007 | 600 | -47.17 | 0.04 | 0.03 | 0.19 | 90.0 |
| P-2043 | 8.0 | J-2042 | J-2007 | 1,650 | -11.53 | 0.01 | 0.01 | 0.07 | 100.0 |
| P-2044 | 8.0 | J-2007 | J-2043 | 1,450 | 12.76 | 0.01 | 0.01 | 0.08 | 110.0 |
| P-2045 | 10.0 | J-2030 | J-2029 | 1,080 | 150.56 | 0.25 | 0.27 | 0.62 | 110.0 |
| P-2046 | 8.0 | J-2050 | J-2049 | 600 | -85.81 | 0.31 | 0.19 | 0.55 | 100.0 |
| P-2047 | 10.0 | J-2000 | J-2006 | 470 | -43.25 | 0.04 | 0.02 | 0.18 | 90.0 |
| P-2048 | 10.0 | J-2001 | J-2000 | 1,350 | -31.49 | 0.01 | 0.02 | 0.13 | 110.0 |
| P-2049 | 10.0 | PRV-3 | J-2159 | 5 | 0.00 | 0.00 | 0.00 | 0.00 | 90.0 |
| P-2050 | 10.0 | J-2159 | J-2000 | 210 | -3.92 | 0.00 | 0.00 | 0.02 | 90.0 |
| P-2051 | 12.0 | J-2153 | J-208 | 909 | -683.30 | 1.71 | 1.55 | 1.94 | 110.0 |
| P-2052 | 8.0 | J-2036 | J-2038 | 1,250 | -84.36 | 0.30 | 0.38 | 0.54 | 100.0 |
| P-2053 | 8.0 | J-2059 | J-2060 | 1,100 | -123.95 | 0.76 | 0.83 | 0.79 | 90.0 |
| P-2054 | 12.0 | J-2153 | J-2032 | 1,460 | 428.91 | 0.72 | 1.05 | 1.22 | 110.0 |
| P-2055 | 6.0 | J-2032 | J-2033 | 450 | -65.57 | 0.65 | 0.29 | 0.74 | 110.0 |
| P-2056 | 8.0 | J-2060 | J-2062 | 200 | 7.84 | 0.00 | 0.00 | 0.05 | 100.0 |
| P-2057 | 8.0 | J-2030 | J-2032 | 1,800 | -77.12 | 0.31 | 0.56 | 0.49 | 90.0 |
| P-2058 | 8.0 | J-2060 | J-2061 | 800 | 3.92 | 0.00 | 0.00 | 0.03 | 100.0 |
| P-2059 | 8.0 | J-2032 | J-2060 | 450 | 139.64 | 0.94 | 0.42 | 0.89 | 90.0 |
| P-2060 | 12.0 | J-2030 | J-2032 | 1,800 | -273.80 | 0.31 | 0.56 | 0.78 | 110.0 |
| P-2061 | 8.0 | J-2038 | J-2030 | 2,600 | -94.94 | 0.27 | 0.70 | 0.61 | 120.0 |
| P-2062 | 8.0 | J-2039 | J-2038 | 900 | -6.66 | 0.00 | 0.00 | 0.04 | 100.0 |
| P-2063 | 8.0 | J-2042 | J-2041 | 250 | 4.15 | 0.00 | 0.00 | 0.03 | 100.0 |
| P-2064 | 8.0 | J-2039 | J-2042 | 800 | 0.03 | 0.00 | 0.00 | 0.00 | 100.0 |
| P-2065 | 8.0 | J-2040 | J-2039 | 600 | -2.70 | 0.00 | 0.00 | 0.02 | 100.0 |
| P-2066 | 8.0 | J-2041 | J-2040 | 550 | 1.22 | 0.00 | 0.00 | 0.01 | 100.0 |
| P-2067 | 8.0 | J-2044 | J-2041 | 550 | 0.99 | 0.00 | 0.00 | 0.01 | 100.0 |
| P-2068 | 8.0 | J-2044 | J-2045 | 400 | 3.92 | 0.00 | 0.00 | 0.03 | 100.0 |
| P-2069 | 8.0 | J-2043 | J-2044 | 350 | 8.84 | 0.00 | 0.00 | 0.06 | 100.0 |
| P-2070 | 8.0 | J-2046 | J-2047 | 250 | -46.13 | 0.08 | 0.02 | 0.29 | 110.0 |
| P-2071 | 8.0 | J-2048 | J-2046 | 500 | -42.21 | 0.07 | 0.04 | 0.27 | 110.0 |
| P-2072 | 8.0 | J-2047 | J-2030 | 280 | -101.49 | 0.52 | 0.15 | 0.65 | 90.0 |
| P-2073 | 8.0 | J-2048 | J-2047 | 380 | -51.44 | 0.15 | 0.06 | 0.33 | 90.0 |
| P-2074 | 8.0 | J-2049 | J-2048 | 250 | -89.73 | 0.42 | 0.10 | 0.57 | 90.0 |
| P-2075 | 12.0 | J-2184 | J-2068 | 928 | 132.45 | 0.07 | 0.06 | 0.38 | 120.0 |
| P-2076 | 8.0 | J-2157 | J-2158 | 1,800 | -1.55 | 0.00 | 0.00 | 0.01 | 110.0 |
| P-2077 | 12.0 | J-2155 | J-2154 | 900 | -148.43 | 0.09 | 0.08 | 0.42 | 120.0 |
| P-2079 | 8.0 | J-2157 | J-2158 | 600 | -2.66 | 0.00 | 0.00 | 0.02 | 110.0 |
| P-2080 | 8.0 | J-2156 | J-2157 | 300 | 15.70 | 0.01 | 0.00 | 0.10 | 110.0 |
| P-2081 | 6.0 | J-2033 | J-2034 | 900 | -23.86 | 0.10 | 0.09 | 0.27 | 110.0 |
| P-2082 | 12.0 | J-2154 | J-2153 | 1,600 | -250.47 | 0.23 | 0.36 | 0.71 | 120.0 |
| P-2083 | 8.0 | J-2156 | J-2154 | 550 | -93.03 | 0.31 | 0.17 | 0.59 | 110.0 |
| P-2084 | 8.0 | J-2034 | J-2156 | 700 | -73.41 | 0.20 | 0.14 | 0.47 | 110.0 |
| P-2085 | 8.0 | J-2033 | J-2034 | 1,100 | -45.63 | 0.08 | 0.09 | 0.29 | 110.0 |
| P-2086 | 10.0 | J-2062 | J-2063 | 997 | 3.92 | 0.00 | 0.00 | 0.02 | 110.0 |
| P-2087 | 12.0 | J-2055 | J-2059 | 650 | -120.03 | 0.06 | 0.04 | 0.34 | 120.0 |
| P-2088 | 8.0 | J-2054 | J-2053 | 800 | 44.98 | 0.24 | 0.20 | 0.29 | 60.0 |
| P-2089 | 6.0 | J-2055 | J-2054 | 250 | 48.90 | 1.16 | 0.29 | 0.55 | 60.0 |

# Scenario: MDD
# Steady State Analysis
# Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-2092 | 12.0 | J-2055 | J-2056 | 150 | 122.77 | 0.06 | 0.01 | 0.35 | 120.0 |
| P-2093 | 10.0 | J-2127 | J-2055 | 2,560 | 55.56 | 0.05 | 0.12 | 0.23 | 100.0 |
| P-2094 | 6.0 | J-2127 | J-2065 | 350 | 26.47 | 0.37 | 0.13 | 0.30 | 60.0 |
| P-2095 | 6.0 | J-2068 | J-2127 | 450 | 90.35 | 3.62 | 1.63 | 1.03 | 60.0 |
| P-2096 | 8.0 | J-2185 | J-2186 | 628 | 3.92 | 0.00 | 0.00 | 0.03 | 130.0 |
| P-2097 | 12.0 | J-2065 | J-2064 | 200 | 14.47 | 0.00 | 0.00 | 0.04 | 120.0 |
| P-2098 | 12.0 | J-2066 | J-2065 | 450 | -8.08 | 0.00 | 0.00 | 0.02 | 110.0 |
| P-2099 | 12.0 | J-2067 | J-2066 | 200 | -4.16 | 0.00 | 0.00 | 0.01 | 120.0 |
| P-2100 | 12.0 | J-2064 | J-2067 | 450 | -0.24 | 0.00 | 0.00 | 0.00 | 110.0 |
| P-2101 | 6.0 | J-2057 | J-2064 | 1,250 | -6.33 | 0.03 | 0.03 | 0.07 | 60.0 |
| P-2102 | 6.0 | J-2058 | J-2057 | 550 | -3.54 | 0.01 | 0.00 | 0.04 | 60.0 |
| P-2103 | 8.0 | J-2053 | J-2058 | 650 | -77.80 | 0.68 | 0.44 | 0.50 | 60.0 |
| P-2104 | 6.0 | J-2071 | J-2070 | 1,399 | -1.82 | 0.00 | 0.00 | 0.02 | 130.0 |
| P-2105 | 6.0 | J-2070 | J-2071 | 1,081 | 2.10 | 0.00 | 0.00 | 0.02 | 130.0 |
| P-2106 | 8.0 | J-2069 | J-2070 | 1,800 | 7.84 | 0.00 | 0.01 | 0.05 | 110.0 |
| P-2107 | 8.0 | J-2036 | J-2037 | 300 | 3.92 | 0.00 | 0.00 | 0.03 | 100.0 |
| P-2108 | 8.0 | J-2035 | J-2036 | 2,180 | -76.52 | 0.18 | 0.40 | 0.49 | 120.0 |
| P-2109 | 8.0 | J-2035 | J-2052 | 1,300 | -5.78 | 0.00 | 0.00 | 0.04 | 100.0 |
| P-2110 | 8.0 | J-2052 | J-2053 | 2,400 | -48.60 | 0.11 | 0.26 | 0.31 | 100.0 |
| P-2111 | 8.0 | J-2090 | J-2052 | 700 | -6.99 | 0.00 | 0.00 | 0.04 | 110.0 |
| P-2112 | 8.0 | J-2035 | J-2090 | 1,800 | -3.07 | 0.00 | 0.00 | 0.02 | 110.0 |
| P-2113 | 8.0 | J-2081 | J-2035 | 650 | -81.45 | 0.29 | 0.19 | 0.52 | 100.0 |
| P-2114 | 6.0 | J-2081 | J-2082 | 950 | 3.92 | 0.00 | 0.00 | 0.04 | 100.0 |
| P-2115 | 8.0 | J-2080 | J-2081 | 2,050 | -73.61 | 0.24 | 0.49 | 0.47 | 100.0 |
| P-2116 | 8.0 | J-2079 | J-2080 | 2,600 | 16.21 | 0.01 | 0.02 | 0.10 | 130.0 |
| P-2117 | 8.0 | J-2083 | J-2079 | 650 | 9.85 | 0.01 | 0.00 | 0.06 | 100.0 |
| P-2118 | 8.0 | J-2089 | J-2053 | 1,200 | -70.26 | 0.15 | 0.19 | 0.45 | 120.0 |
| P-2119 | 8.0 | J-2088 | J-2089 | 3,000 | -66.34 | 0.14 | 0.42 | 0.42 | 120.0 |
| P-2120 | 12.0 | J-2091 | J-2058 | 1,000 | -23.07 | 0.00 | 0.00 | 0.07 | 120.0 |
| P-2121 | 12.0 | J-2092 | J-2091 | 1,050 | -19.15 | 0.00 | 0.00 | 0.05 | 120.0 |
| P-2122 | 12.0 | T-1 | J-2092 | 700 | 258.15 | 0.24 | 0.17 | 0.73 | 120.0 |
| P-2124 | 12.0 | J-2093 | J-2092 | 550 | -253.77 | 0.20 | 0.11 | 0.72 | 130.0 |
| P-2125 | 12.0 | J-2094 | J-2093 | 1,100 | -249.85 | 0.19 | 0.21 | 0.71 | 130.0 |
| P-2126 | 8.0 | J-2073 | J-2074 | 365 | 10.90 | 0.01 | 0.00 | 0.07 | 110.0 |
| P-2127 | 8.0 | J-2073 | J-2075 | 200 | 3.92 | 0.00 | 0.00 | 0.03 | 100.0 |
| P-2128 | 8.0 | J-2072 | J-2073 | 550 | 38.18 | 0.07 | 0.04 | 0.24 | 100.0 |
| P-2129 | 8.0 | PRV-2 | J-2072 | 238 | 0.00 | 0.00 | 0.00 | 0.00 | 100.0 |
| P-2130 | 8.0 | J-2076 | J-2072 | 1,900 | -41.18 | 0.08 | 0.15 | 0.26 | 100.0 |
| P-2131 | 8.0 | J-2072 | J-2080 | 300 | -85.89 | 0.32 | 0.09 | 0.55 | 100.0 |
| P-2132 | 8.0 | J-2084 | J-2085 | 550 | -14.20 | 0.01 | 0.01 | 0.09 | 110.0 |
| P-2133 | 8.0 | J-2079 | J-2084 | 1,350 | -10.28 | 0.01 | 0.01 | 0.07 | 110.0 |
| P-2134 | 8.0 | J-2085 | J-2083 | 950 | 13.77 | 0.01 | 0.01 | 0.09 | 110.0 |
| P-2135 | 8.0 | J-2086 | J-2085 | 450 | 31.89 | 0.04 | 0.02 | 0.20 | 110.0 |
| P-2136 | 8.0 | J-2087 | J-2086 | 800 | 35.81 | 0.05 | 0.04 | 0.23 | 110.0 |
| P-2137 | 8.0 | J-2087 | J-2088 | 1,360 | -62.42 | 0.17 | 0.24 | 0.40 | 100.0 |
| P-2138 | 8.0 | J-2132 | J-2087 | 300 | -22.68 | 0.02 | 0.01 | 0.14 | 110.0 |
| P-2140 | 12.0 | J-2133 | J-2167 | 2,000 | -226.32 | 0.19 | 0.38 | 0.64 | 120.0 |
| P-2141 | 12.0 | J-2133 | J-2165 | 1,500 | 165.69 | 0.12 | 0.19 | 0.47 | 110.0 |
| P-2142 | 8.0 | J-2132 | J-2133 | 960 | -56.71 | 0.15 | 0.14 | 0.36 | 100.0 |
| P-2143 | 8.0 | J-2078 | J-2076 | 1,000 | -13.69 | 0.01 | 0.01 | 0.09 | 100.0 |
| P-2144 | 8.0 | J-2077 | J-2078 | 1,200 | -9.77 | 0.01 | 0.01 | 0.06 | 100.0 |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# Scenario: MDD
# Steady State Analysis
# Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-2145 | 8.0 | J-2077 | J-2076 | 600 | -23.57 | 0.03 | 0.02 | 0.15 | 100.0 |
| P-2146 | 8.0 | J-2119 | J-2077 | 1,650 | -29.42 | 0.04 | 0.07 | 0.19 | 100.0 |
| P-2147 | 8.0 | J-2162 | J-2132 | 400 | -75.47 | 0.25 | 0.10 | 0.48 | 100.0 |
| P-2148 | 8.0 | J-2161 | J-2162 | 560 | -71.55 | 0.22 | 0.13 | 0.46 | 100.0 |
| P-2149 | 8.0 | J-2131 | J-2161 | 300 | -67.63 | 0.20 | 0.06 | 0.43 | 100.0 |
| P-2150 | 8.0 | J-2134 | J-2135 | 1,050 | -31.72 | 0.04 | 0.04 | 0.20 | 110.0 |
| P-2151 | 8.0 | J-2131 | J-2130 | 1,400 | 17.98 | 0.02 | 0.02 | 0.11 | 100.0 |
| P-2152 | 8.0 | J-2129 | J-2130 | 900 | -14.06 | 0.01 | 0.01 | 0.09 | 100.0 |
| P-2153 | 8.0 | J-2119 | J-2128 | 1,250 | -22.68 | 0.03 | 0.03 | 0.14 | 100.0 |
| P-2154 | 8.0 | J-2129 | J-2131 | 350 | -45.72 | 0.10 | 0.03 | 0.29 | 100.0 |
| P-2155 | 8.0 | J-2128 | J-2129 | 510 | -55.86 | 0.14 | 0.07 | 0.36 | 100.0 |
| P-2156 | 12.0 | J-2134 | J-2128 | 750 | -29.26 | 0.00 | 0.00 | 0.08 | 110.0 |
| P-2157 | 12.0 | J-2120 | J-2134 | 1,250 | -57.06 | 0.02 | 0.02 | 0.16 | 110.0 |
| P-2158 | 8.0 | J-2120 | J-2119 | 1,400 | 10.00 | 0.01 | 0.01 | 0.06 | 100.0 |
| P-2159 | 8.0 | J-2121 | J-2120 | 800 | -43.13 | 0.09 | 0.07 | 0.28 | 100.0 |
| P-2160 | 8.0 | J-2142 | J-2143 | 500 | -28.06 | 0.03 | 0.01 | 0.18 | 120.0 |
| P-2161 | 8.0 | J-2136 | J-2137 | 1,650 | 16.95 | 0.01 | 0.02 | 0.11 | 110.0 |
| P-2162 | 8.0 | J-2142 | J-2141 | 900 | -2.37 | 0.00 | 0.00 | 0.02 | 120.0 |
| P-2163 | 8.0 | J-2135 | J-2142 | 1,250 | -26.51 | 0.03 | 0.04 | 0.17 | 110.0 |
| P-2164 | 8.0 | J-2136 | J-2135 | 200 | 9.13 | 0.00 | 0.00 | 0.06 | 110.0 |
| P-2165 | 8.0 | J-2138 | J-2136 | 750 | 30.00 | 0.04 | 0.03 | 0.19 | 100.0 |
| P-2166 | 8.0 | J-2141 | J-2140 | 750 | 8.29 | 0.00 | 0.00 | 0.05 | 120.0 |
| P-2167 | 8.0 | J-2143 | J-2141 | 1,650 | 14.58 | 0.01 | 0.01 | 0.09 | 120.0 |
| P-2168 | 8.0 | J-2144 | J-2143 | 1,000 | 46.57 | 0.10 | 0.10 | 0.30 | 100.0 |
| P-2169 | 8.0 | J-2165 | J-2166 | 1,200 | 3.92 | 0.00 | 0.00 | 0.03 | 110.0 |
| P-2170 | 12.0 | J-2144 | J-2165 | 1,600 | -157.85 | 0.10 | 0.15 | 0.45 | 120.0 |
| P-2171 | 12.0 | J-2145 | J-2144 | 750 | -107.36 | 0.05 | 0.04 | 0.30 | 120.0 |
| P-2172 | 12.0 | J-2146 | J-2147 | 500 | 35.12 | 0.01 | 0.00 | 0.10 | 120.0 |
| P-2173 | 12.0 | J-2145 | J-2146 | 1,350 | 39.04 | 0.01 | 0.01 | 0.11 | 120.0 |
| P-2174 | 12.0 | J-2148 | J-2145 | 600 | -64.40 | 0.02 | 0.01 | 0.18 | 120.0 |
| P-2175 | 8.0 | J-2147 | J-2148 | 1,450 | -5.23 | 0.00 | 0.00 | 0.03 | 120.0 |
| P-2176 | 8.0 | J-2139 | J-2138 | 250 | 29.55 | 0.05 | 0.01 | 0.19 | 90.0 |
| P-2177 | 8.0 | J-2140 | J-2138 | 1,050 | 4.37 | 0.00 | 0.00 | 0.03 | 120.0 |
| P-2178 | 12.0 | J-2149 | J-2152 | 600 | 51.33 | 0.01 | 0.01 | 0.15 | 120.0 |
| P-2179 | 12.0 | J-2148 | J-2149 | 500 | 55.25 | 0.01 | 0.01 | 0.16 | 120.0 |
| P-2180 | 12.0 | J-2150 | J-2147 | 450 | -36.42 | 0.01 | 0.00 | 0.10 | 120.0 |
| P-2181 | 12.0 | J-2151 | J-2150 | 850 | -32.50 | 0.01 | 0.00 | 0.09 | 120.0 |
| P-2182 | 12.0 | J-2152 | J-2151 | 1,250 | -28.58 | 0.00 | 0.01 | 0.08 | 120.0 |
| P-2183 | 12.0 | J-2139 | J-2152 | 1,800 | -75.99 | 0.02 | 0.04 | 0.22 | 120.0 |
| P-2184 | 8.0 | J-2137 | J-2139 | 800 | -42.51 | 0.09 | 0.07 | 0.27 | 100.0 |
| P-2185 | 8.0 | J-2111 | J-2097 | 550 | 39.97 | 0.08 | 0.04 | 0.26 | 100.0 |
| P-2186 | 6.0 | J-2111 | J-2110 | 1,000 | -8.63 | 0.02 | 0.02 | 0.10 | 100.0 |
| P-2187 | 8.0 | J-2112 | J-2113 | 1,000 | -7.96 | 0.00 | 0.00 | 0.05 | 100.0 |
| P-2188 | 8.0 | J-2116 | J-2114 | 950 | -2.91 | 0.00 | 0.00 | 0.02 | 100.0 |
| P-2189 | 8.0 | J-2110 | J-2109 | 1,200 | 2.76 | 0.00 | 0.00 | 0.02 | 100.0 |
| P-2190 | 8.0 | J-2112 | J-2111 | 300 | 35.26 | 0.06 | 0.02 | 0.23 | 100.0 |
| P-2191 | 8.0 | J-2116 | J-2112 | 300 | 31.23 | 0.05 | 0.01 | 0.20 | 100.0 |
| P-2192 | 8.0 | J-2118 | J-2116 | 339 | 32.24 | 0.05 | 0.02 | 0.21 | 100.0 |
| P-2193 | 8.0 | J-2117 | J-2118 | 850 | -18.10 | 0.02 | 0.01 | 0.12 | 100.0 |
| P-2194 | 8.0 | J-2114 | J-2117 | 300 | -10.26 | 0.01 | 0.00 | 0.07 | 100.0 |
| P-2195 | 8.0 | J-2113 | J-2110 | 300 | 15.31 | 0.01 | 0.00 | 0.10 | 100.0 |

# Scenario: MDD
# Steady State Analysis
# Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-2196 | 8.0 | J-2114 | J-2113 | 300 | 27.19 | 0.04 | 0.01 | 0.17 | 100.0 |
| P-2197 | 8.0 | J-2163 | J-2114 | 1,300 | 23.77 | 0.03 | 0.04 | 0.15 | 100.0 |
| P-2198 | 8.0 | J-2164 | J-2163 | 800 | 25.42 | 0.03 | 0.03 | 0.16 | 100.0 |
| P-2199 | 8.0 | J-2122 | J-2164 | 400 | 29.34 | 0.04 | 0.02 | 0.19 | 100.0 |
| P-2200 | 8.0 | J-2121 | J-2122 | 400 | 29.27 | 0.04 | 0.01 | 0.19 | 110.0 |
| P-2201 | 8.0 | J-2123 | J-2124 | 400 | -24.80 | 0.03 | 0.01 | 0.16 | 100.0 |
| P-2202 | 8.0 | J-2126 | J-2137 | 800 | -55.54 | 0.14 | 0.11 | 0.35 | 100.0 |
| P-2203 | 8.0 | J-2123 | J-2125 | 300 | 16.89 | 0.02 | 0.00 | 0.11 | 100.0 |
| P-2204 | 8.0 | J-2122 | J-2123 | 280 | -4.00 | 0.00 | 0.00 | 0.03 | 100.0 |
| P-2205 | 8.0 | J-2124 | J-2121 | 250 | -9.94 | 0.01 | 0.00 | 0.06 | 100.0 |
| P-2206 | 8.0 | J-2126 | J-2124 | 210 | 18.78 | 0.02 | 0.00 | 0.12 | 100.0 |
| P-2207 | 8.0 | J-2125 | J-2126 | 400 | -32.84 | 0.05 | 0.02 | 0.21 | 100.0 |
| P-2208 | 8.0 | J-2163 | J-2125 | 400 | -45.80 | 0.10 | 0.04 | 0.29 | 100.0 |
| P-2209 | 8.0 | J-2109 | J-2163 | 600 | -43.53 | 0.09 | 0.05 | 0.28 | 100.0 |
| P-2210 | 8.0 | PRV-1 | J-2096 | 660 | 0.00 | 0.00 | 0.00 | 0.00 | 100.0 |
| P-2211 | 8.0 | J-2097 | J-2096 | 400 | 36.05 | 0.06 | 0.03 | 0.23 | 100.0 |
| P-2212 | 8.0 | J-2096 | J-2098 | 200 | 22.18 | 0.03 | 0.01 | 0.14 | 100.0 |
| P-2213 | 8.0 | J-2115 | J-2096 | 2,600 | -9.95 | 0.00 | 0.01 | 0.06 | 110.0 |
| P-2214 | 8.0 | J-2099 | J-2175 | 548 | 9.66 | 0.00 | 0.00 | 0.06 | 110.0 |
| P-2215 | 8.0 | J-2098 | J-2099 | 300 | 18.26 | 0.02 | 0.01 | 0.12 | 100.0 |
| P-2216 | 8.0 | J-2160 | J-2100 | 400 | 3.32 | 0.00 | 0.00 | 0.02 | 100.0 |
| P-2217 | 8.0 | J-2102 | J-2160 | 600 | 7.24 | 0.00 | 0.00 | 0.05 | 100.0 |
| P-2218 | 6.0 | J-2100 | J-2101 | 700 | 4.08 | 0.00 | 0.00 | 0.05 | 100.0 |
| P-2219 | 8.0 | J-2102 | J-2108 | 1,100 | -17.77 | 0.01 | 0.01 | 0.11 | 120.0 |
| P-2220 | 8.0 | J-2108 | J-2109 | 950 | -42.38 | 0.09 | 0.08 | 0.27 | 100.0 |
| P-2221 | 8.0 | J-2107 | J-2108 | 200 | -20.68 | 0.02 | 0.00 | 0.13 | 100.0 |
| P-2222 | 8.0 | J-2102 | J-2107 | 950 | -12.84 | 0.01 | 0.01 | 0.08 | 100.0 |
| P-2223 | 8.0 | J-2099 | J-2100 | 850 | 4.68 | 0.00 | 0.00 | 0.03 | 100.0 |
| P-2224 | 6.0 | J-2105 | J-2106 | 600 | 3.92 | 0.00 | 0.00 | 0.04 | 100.0 |
| P-2225 | 6.0 | J-2102 | J-2105 | 500 | 7.84 | 0.02 | 0.01 | 0.09 | 100.0 |
| P-2226 | 8.0 | J-2103 | J-2102 | 500 | -11.61 | 0.01 | 0.00 | 0.07 | 100.0 |
| P-2227 | 6.0 | J-2104 | J-2103 | 305 | -3.92 | 0.00 | 0.00 | 0.04 | 100.0 |
| P-2228 | 8.0 | J-2101 | J-2103 | 1,900 | -3.77 | 0.00 | 0.00 | 0.02 | 110.0 |
| P-2229 | 6.0 | J-2101 | J-2168 | 376 | 3.92 | 0.00 | 0.00 | 0.04 | 130.0 |
| P-2230 | 6.0 | J-2175 | J-2170 | 369 | 3.92 | 0.00 | 0.00 | 0.04 | 130.0 |
| P-2231 | 6.0 | J-2175 | J-2169 | 373 | 3.92 | 0.00 | 0.00 | 0.04 | 130.0 |
| P-2232 | 8.0 | J-2175 | J-2115 | 1,352 | -2.10 | 0.00 | 0.00 | 0.01 | 110.0 |
| P-2233 | 6.0 | J-2115 | J-2171 | 853 | 3.92 | 0.00 | 0.00 | 0.04 | 130.0 |
| P-2234 | 6.0 | J-2107 | J-2172 | 980 | 3.92 | 0.00 | 0.00 | 0.04 | 130.0 |
| P-2235 | 8.0 | J-2117 | J-2173 | 348 | 3.92 | 0.00 | 0.00 | 0.03 | 130.0 |
| P-2236 | 8.0 | J-2118 | J-2174 | 567 | 3.92 | 0.00 | 0.00 | 0.03 | 130.0 |
| P-2237 | 12.0 | J-2176 | J-2094 | 1,500 | -245.93 | 0.19 | 0.28 | 0.70 | 130.0 |
| P-2238 | 12.0 | J-2178 | J-2176 | 401 | -238.09 | 0.21 | 0.08 | 0.68 | 120.0 |
| P-2239 | 12.0 | J-2167 | J-2178 | 399 | -230.24 | 0.19 | 0.08 | 0.65 | 120.0 |
| P-2240 | 8.0 | J-2176 | J-2177 | 1,030 | 3.92 | 0.00 | 0.00 | 0.03 | 130.0 |
| P-2241 | 8.0 | J-2178 | J-2179 | 580 | 3.92 | 0.00 | 0.00 | 0.03 | 130.0 |
| P-2242 | 8.0 | J-2092 | J-2180 | 501 | 19.61 | 0.02 | 0.01 | 0.13 | 90.0 |
| P-2243 | 8.0 | J-2180 | J-2181 | 581 | 3.92 | 0.00 | 0.00 | 0.03 | 130.0 |
| P-2244 | 8.0 | J-2180 | J-2182 | 291 | 11.76 | 0.01 | 0.00 | 0.08 | 90.0 |
| P-2245 | 6.0 | J-2182 | J-2183 | 295 | 3.92 | 0.00 | 0.00 | 0.04 | 130.0 |
| P-2246 | 8.0 | J-2182 | J-2095 | 308 | 3.92 | 0.00 | 0.00 | 0.03 | 90.0 |

# Scenario: MDD
# Steady State Analysis
# Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-2247 | 12.0 | J-2155 | J-2184 | 1,102 | 144.51 | 0.08 | 0.09 | 0.41 | 120.0 |
| P-2248 | 8.0 | J-2184 | J-2158 | 1,245 | 8.13 | 0.00 | 0.00 | 0.05 | 110.0 |
| P-2249 | 8.0 | J-2068 | J-2185 | 774 | 38.18 | 0.06 | 0.05 | 0.24 | 110.0 |
| P-2250 | 8.0 | J-2185 | J-2069 | 1,326 | 30.33 | 0.04 | 0.05 | 0.19 | 110.0 |
| P-2251 | 6.0 | J-2069 | J-2187 | 442 | 15.69 | 0.03 | 0.01 | 0.18 | 130.0 |
| P-2252 | 6.0 | J-2187 | J-2188 | 292 | 3.92 | 0.00 | 0.00 | 0.04 | 130.0 |
| P-2253 | 6.0 | J-2187 | J-2189 | 535 | 7.84 | 0.01 | 0.01 | 0.09 | 130.0 |
| P-2254 | 8.0 | J-2189 | J-2190 | 905 | 1.85 | 0.00 | 0.00 | 0.01 | 130.0 |
| P-2255 | 8.0 | J-2190 | J-2189 | 723 | -2.07 | 0.00 | 0.00 | 0.01 | 130.0 |
| P-2256 | 8.0 | J-2000 | J-2291 | 921 | 3.92 | 0.00 | 0.00 | 0.03 | 130.0 |
| P-2257 | 6.0 | J-2074 | J-1129 | 1,069 | 6.98 | 0.01 | 0.01 | 0.08 | 130.0 |
| P-2258 | 8.0 | J-2073 | J-1130 | 1,192 | 6.98 | 0.00 | 0.00 | 0.04 | 130.0 |
| P-2259 | 10.0 | J-2191 | J-2022 | 760 | -51.00 | 0.04 | 0.03 | 0.21 | 100.0 |
| P-2260 | 6.0 | J-2002 | J-2193 | 1,425 | 3.92 | 0.00 | 0.00 | 0.04 | 130.0 |
| P-2296 | 10.0 | J-2021 | J-2191 | 1,290 | -43.16 | 0.03 | 0.04 | 0.18 | 100.0 |
| P-2297 | 6.0 | J-2009 | J-2010 | 600 | -1.84 | 0.00 | 0.00 | 0.02 | 90.0 |
| P-2298 | 12.0 | J-2056 | J-2195 | 644 | 105.17 | 0.05 | 0.03 | 0.30 | 120.0 |
| P-2299 | 12.0 | J-2195 | J-2058 | 206 | 101.25 | 0.04 | 0.01 | 0.29 | 120.0 |
| P-2300 | 8.0 | J-2056 | J-2194 | 1,153 | 13.68 | 0.03 | 0.03 | 0.09 | 60.0 |

# Scenario: MDD
# Steady State Analysis
# Pump Report

| Label | Elevation (ft) | Control Status | Intake Pump Grade (ft) | Discharge Pump Grade (ft) | Discharge (gpm) | Pump Head (ft) | Notes |
|---|---|---|---|---|---|---|---|
| PMP-6 | 285.00 | Off | 288.68 | 523.37 | 0.00 | 0.00 | Boland |
| PMP-2 | 285.00 | On | 287.23 | 553.65 | 601.66 | 266.42 | Boland |
| PMP-1 | 285.00 | On | 287.54 | 548.82 | 629.11 | 261.28 | Boland |
| PMP-4 | 275.00 | On | 283.95 | 488.66 | 683.30 | 204.71 | Hosmer |
| PMP-5 | 275.00 | Off | 284.71 | 486.73 | 0.00 | 0.00 | Hosmer |

# Scenario: MDD
# Steady State Analysis
# Tank Report

| Label | Zone | Base Elevation (ft) | Minimum Elevation (ft) | Initial HGL (ft) | Maximum Elevation (ft) | Tank Diameter (ft) | Inflow (gpm) | Current Status | Calculated Hydraulic Grade (ft) | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| T-1 | Zone | 418.00 | 418.00 | 482.00 | 492.70 | 25.00 | -258.15 | Draining | 482.00 | Oak Hill Tank |
| T-2 | Zone | 451.00 | 451.00 | 482.00 | 493.30 | 40.00 | 22.61 | Filling | 482.00 | Clear Hill Tank |
| T-3 | Zone | 467.00 | 467.00 | 503.00 | 515.00 | 67.00 | 223.32 | Filling | 503.00 | Tara Rd Tank |

# Scenario: PH
# Steady State Analysis
# Junction Report

| Label | Elevation (ft) | Zone | Base Flow (gpm) | Pattern | Demand (gpm) | Hydraulic Grade (ft) | Pressure (psi) |
|---|---|---|---|---|---|---|---|
| J-1000 | 375.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 505.72 | 56.56 |
| J-1001 | 341.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 505.73 | 71.27 |
| J-1002 | 272.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 505.73 | 101.12 |
| J-1003 | 270.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 505.76 | 102.00 |
| J-1004 | 285.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 505.73 | 95.50 |
| J-1005 | 275.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 505.79 | 99.85 |
| J-1006 | 272.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 512.60 | 104.10 |
| J-1007 | 270.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 515.67 | 106.29 |
| J-1008 | 270.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 515.64 | 106.28 |
| J-1009 | 270.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 515.64 | 106.28 |
| J-1010 | 290.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 504.20 | 92.68 |
| J-1011 | 275.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 504.12 | 99.13 |
| J-1012 | 295.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 503.26 | 90.10 |
| J-1013 | 295.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 501.05 | 89.15 |
| J-1014 | 277.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 501.05 | 96.93 |
| J-1015 | 315.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 515.63 | 86.80 |
| J-1016 | 295.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 515.61 | 95.45 |
| J-1017 | 295.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 515.60 | 95.45 |
| J-1018 | 270.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 498.72 | 98.96 |
| J-1019 | 310.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 498.20 | 81.43 |
| J-1020 | 340.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 498.16 | 68.43 |
| J-1021 | 335.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 498.16 | 70.59 |
| J-1022 | 315.00 | HIGH SERVICE AREA | 45.95 | Fixed | 45.95 | 498.13 | 79.23 |
| J-1023 | 315.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 498.10 | 79.22 |
| J-1024 | 310.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 498.09 | 81.38 |
| J-1025 | 410.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 498.26 | 38.18 |
| J-1026 | 410.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 498.26 | 38.19 |
| J-1027 | 370.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 498.28 | 55.50 |
| J-1028 | 385.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 498.32 | 49.03 |
| J-1029 | 375.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 498.40 | 53.39 |
| J-1030 | 300.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 498.22 | 85.76 |
| J-1031 | 300.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 498.22 | 85.76 |
| J-1032 | 310.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 498.24 | 81.44 |
| J-1033 | 295.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 498.24 | 87.93 |
| J-1034 | 275.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 498.24 | 96.58 |
| J-1035 | 350.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 498.25 | 64.14 |
| J-1036 | 285.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 496.90 | 91.68 |
| J-1037 | 285.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 496.81 | 91.64 |
| J-1038 | 272.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 496.44 | 97.11 |
| J-1039 | 390.00 | HIGH SERVICE AREA | 20.15 | Fixed | 20.15 | 498.75 | 47.05 |
| J-1040 | 450.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 502.35 | 22.65 |
| J-1041 | 450.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 502.36 | 22.65 |
| J-1042 | 410.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 502.52 | 40.03 |
| J-1043 | 385.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 502.45 | 50.81 |
| J-1044 | 337.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 502.43 | 71.57 |
| J-1045 | 355.00 | HIGH SERVICE AREA | 43.51 | Fixed | 43.51 | 497.92 | 61.83 |
| J-1046 | 335.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 502.43 | 72.44 |
| J-1047 | 335.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 503.29 | 72.81 |
| J-1048 | 270.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 499.31 | 99.21 |
| J-1049 | 285.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 499.24 | 92.69 |
| J-1050 | 325.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 497.61 | 74.68 |
| J-1051 | 330.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 497.60 | 72.51 |
| J-1052 | 350.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 497.49 | 63.81 |

# Scenario: PH
# Steady State Analysis
# Junction Report

| Label | Elevation (ft) | Zone | Base Flow (gpm) | Pattern | Demand (gpm) | Hydraulic Grade (ft) | Pressure (psi) |
|---|---|---|---|---|---|---|---|
| J-1053 | 312.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 497.47 | 80.24 |
| J-1054 | 310.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 497.22 | 81.00 |
| J-1055 | 305.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 497.24 | 83.17 |
| J-1056 | 295.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 496.94 | 87.37 |
| J-1057 | 320.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 497.23 | 76.68 |
| J-1058 | 320.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 497.23 | 76.68 |
| J-1059 | 320.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 497.27 | 76.70 |
| J-1060 | 340.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 495.89 | 67.44 |
| J-1061 | 345.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 501.57 | 67.74 |
| J-1062 | 355.00 | HIGH SERVICE AREA | 13.73 | Fixed | 13.73 | 497.66 | 61.72 |
| J-1063 | 345.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 496.14 | 65.39 |
| J-1064 | 296.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 495.94 | 86.50 |
| J-1065 | 290.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 495.94 | 89.10 |
| J-1066 | 266.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 495.82 | 99.43 |
| J-1067 | 262.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 495.76 | 101.14 |
| J-1068 | 285.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 495.95 | 91.27 |
| J-1069 | 295.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 495.82 | 86.89 |
| J-1070 | 285.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 495.74 | 91.18 |
| J-1071 | 260.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 495.69 | 101.97 |
| J-1072 | 290.00 | HIGH SERVICE AREA | 11.50 | Fixed | 11.50 | 496.21 | 89.22 |
| J-1073 | 295.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 496.44 | 87.15 |
| J-1074 | 265.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 498.09 | 100.85 |
| J-1075 | 377.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 497.66 | 52.20 |
| J-1076 | 380.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 497.66 | 50.90 |
| J-1077 | 320.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 497.47 | 76.78 |
| J-1078 | 325.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 497.53 | 74.64 |
| J-1079 | 380.00 | HIGH SERVICE AREA | 126.44 | Fixed | 126.44 | 497.31 | 50.76 |
| J-1080 | 360.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 497.47 | 59.48 |
| J-1081 | 350.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 496.03 | 63.18 |
| J-1082 | 270.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 495.91 | 97.74 |
| J-1083 | 400.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 495.07 | 41.13 |
| J-1084 | 325.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 495.11 | 73.60 |
| J-1085 | 325.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 494.63 | 73.39 |
| J-1086 | 370.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 494.73 | 53.96 |
| J-1087 | 415.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 494.69 | 34.48 |
| J-1088 | 420.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 494.68 | 32.31 |
| J-1089 | 328.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 494.02 | 71.83 |
| J-1090 | 355.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 494.68 | 60.43 |
| J-1091 | 324.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 494.10 | 73.60 |
| J-1092 | 305.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 494.00 | 81.77 |
| J-1093 | 330.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 493.92 | 70.92 |
| J-1094 | 330.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 493.92 | 70.92 |
| J-1095 | 306.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 493.98 | 81.33 |
| J-1096 | 393.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 493.94 | 43.67 |
| J-1097 | 330.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 494.01 | 70.96 |
| J-1098 | 270.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 515.80 | 106.34 |
| J-1099 | 307.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 498.09 | 82.68 |
| J-1100 | 440.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 502.63 | 27.10 |
| J-1101 | 350.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 497.29 | 63.73 |
| J-1102 | 305.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 515.64 | 91.14 |
| J-1103 | 285.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 498.99 | 92.59 |
| J-1104 | 420.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 501.31 | 35.18 |
| J-1105 | 307.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 515.62 | 90.26 |

# Scenario: PH
# Steady State Analysis
# Junction Report

| Label | Elevation (ft) | Zone | Base Flow (gpm) | Pattern | Demand (gpm) | Hydraulic Grade (ft) | Pressure (psi) |
|---|---|---|---|---|---|---|---|
| J-1106 | 303.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 515.62 | 91.99 |
| J-1107 | 332.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 515.61 | 79.44 |
| J-1108 | 277.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 515.62 | 103.24 |
| J-1109 | 305.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 515.61 | 91.12 |
| J-1110 | 320.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 515.60 | 84.63 |
| J-1111 | 306.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 498.22 | 83.17 |
| J-1112 | 307.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 498.22 | 82.73 |
| J-1113 | 323.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 498.22 | 75.81 |
| J-1114 | 431.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 498.25 | 29.10 |
| J-1115 | 340.50 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 505.73 | 71.49 |
| J-1116 | 425.50 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 505.72 | 34.71 |
| J-1117 | 435.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 505.71 | 30.59 |
| J-1118 | 319.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 499.24 | 77.98 |
| J-1119 | 332.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 499.24 | 72.35 |
| J-1120 | 384.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 497.48 | 49.10 |
| J-1121 | 400.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 496.03 | 41.55 |
| J-1122 | 443.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 502.35 | 25.68 |
| J-1123 | 327.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 496.91 | 73.51 |
| J-1124 | 264.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 495.54 | 100.18 |
| J-1125 | 272.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 495.51 | 96.70 |
| J-1126 | 278.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 495.51 | 94.10 |
| J-1127 | 282.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 495.50 | 92.37 |
| J-1128 | 282.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 495.52 | 92.38 |
| J-1129 | 284.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 475.70 | 82.94 |
| J-1130 | 306.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 475.73 | 73.44 |
| J-1131 | 312.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 493.98 | 78.73 |
| J-1132 | 372.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 494.10 | 52.83 |
| J-1133 | 418.00 | HIGH SERVICE AREA | 14.30 | Fixed | 14.30 | 494.67 | 33.17 |
| J-2000 | 306.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 481.56 | 75.96 |
| J-2001 | 331.30 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 481.49 | 64.98 |
| J-2002 | 331.30 | LOW SERVICE AREA | 90.86 | Fixed | 90.86 | 481.46 | 64.97 |
| J-2003 | 335.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 481.46 | 63.37 |
| J-2004 | 335.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 481.49 | 63.38 |
| J-2005 | 270.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 481.82 | 91.65 |
| J-2006 | 315.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 481.62 | 72.09 |
| J-2007 | 315.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 481.72 | 72.13 |
| J-2008 | 320.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 481.50 | 69.87 |
| J-2009 | 325.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 481.46 | 67.69 |
| J-2010 | 330.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 481.46 | 65.53 |
| J-2011 | 300.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 482.08 | 78.78 |
| J-2012 | 300.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 482.21 | 78.83 |
| J-2013 | 330.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 482.23 | 65.86 |
| J-2014 | 330.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 482.02 | 65.77 |
| J-2015 | 285.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 482.01 | 85.24 |
| J-2016 | 275.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 481.90 | 89.52 |
| J-2017 | 265.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 481.89 | 93.84 |
| J-2018 | 265.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 481.86 | 93.83 |
| J-2019 | 275.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 481.96 | 89.54 |
| J-2020 | 295.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 481.90 | 80.86 |
| J-2021 | 270.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 482.17 | 91.79 |
| J-2022 | 295.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 482.43 | 81.09 |
| J-2023 | 290.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 482.42 | 83.25 |
| J-2024 | 295.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 482.43 | 81.09 |

# Scenario: PH
# Steady State Analysis
# Junction Report

| Label | Elevation (ft) | Zone | Base Flow (gpm) | Pattern | Demand (gpm) | Hydraulic Grade (ft) | Pressure (psi) |
|---|---|---|---|---|---|---|---|
| J-2025 | 260.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 482.42 | 96.23 |
| J-2026 | 325.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 482.24 | 68.03 |
| J-2027 | 350.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 482.10 | 57.15 |
| J-2028 | 287.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 482.27 | 84.48 |
| J-2029 | 282.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 483.33 | 87.11 |
| J-2030 | 335.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 484.38 | 64.63 |
| J-2031 | 320.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 483.33 | 70.67 |
| J-2032 | 260.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 486.56 | 98.02 |
| J-2033 | 270.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 487.69 | 94.18 |
| J-2034 | 285.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 488.03 | 87.84 |
| J-2035 | 259.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 478.77 | 95.09 |
| J-2036 | 265.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 480.26 | 93.13 |
| J-2037 | 305.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 480.26 | 75.83 |
| J-2038 | 265.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 481.69 | 93.75 |
| J-2039 | 280.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 481.68 | 87.26 |
| J-2040 | 270.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 481.67 | 91.58 |
| J-2041 | 275.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 481.68 | 89.42 |
| J-2042 | 305.00 | LOW SERVICE AREA | 15.18 | Fixed | 15.18 | 481.68 | 76.44 |
| J-2043 | 280.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 481.68 | 87.26 |
| J-2044 | 280.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 481.68 | 87.26 |
| J-2045 | 290.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 481.67 | 82.93 |
| J-2046 | 280.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 483.74 | 88.15 |
| J-2047 | 290.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 483.82 | 83.86 |
| J-2048 | 305.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 483.60 | 77.27 |
| J-2049 | 305.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 483.20 | 77.10 |
| J-2050 | 325.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 482.47 | 68.13 |
| J-2051 | 325.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 482.32 | 68.06 |
| J-2052 | 365.00 | LOW SERVICE AREA | 73.35 | Fixed | 73.35 | 478.78 | 49.23 |
| J-2053 | 275.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 479.78 | 88.60 |
| J-2054 | 265.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 480.53 | 93.25 |
| J-2055 | 285.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 481.63 | 85.07 |
| J-2056 | 295.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 481.60 | 80.73 |
| J-2057 | 295.00 | LOW SERVICE AREA | 25.69 | Fixed | 25.69 | 481.49 | 80.69 |
| J-2058 | 285.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 481.44 | 84.99 |
| J-2059 | 265.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 481.77 | 93.79 |
| J-2060 | 280.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 484.94 | 88.67 |
| J-2061 | 265.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 484.94 | 95.16 |
| J-2062 | 280.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 484.94 | 88.67 |
| J-2063 | 360.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 484.94 | 54.06 |
| J-2064 | 280.00 | LOW SERVICE AREA | 17.15 | Fixed | 17.15 | 481.61 | 87.23 |
| J-2065 | 275.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 481.61 | 89.39 |
| J-2066 | 280.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 481.61 | 87.23 |
| J-2067 | 280.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 481.61 | 87.23 |
| J-2068 | 230.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 488.32 | 111.76 |
| J-2069 | 215.00 | LOW SERVICE AREA | 13.93 | Fixed | 13.93 | 487.96 | 118.10 |
| J-2070 | 200.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 487.94 | 124.58 |
| J-2071 | 200.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 487.94 | 124.58 |
| J-2072 | 288.00 | LOW SERVICE AREA | 13.36 | Fixed | 13.36 | 475.89 | 81.29 |
| J-2073 | 275.00 | LOW SERVICE AREA | 33.51 | Fixed | 33.51 | 475.74 | 86.85 |
| J-2074 | 285.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 475.73 | 82.52 |
| J-2075 | 270.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 475.74 | 89.01 |
| J-2076 | 295.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 475.31 | 78.01 |
| J-2077 | 295.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 475.24 | 77.98 |

# Scenario: PH
# Steady State Analysis
# Junction Report

| Label | Elevation (ft) | Zone | Base Flow (gpm) | Pattern | Demand (gpm) | Hydraulic Grade (ft) | Pressure (psi) |
|---|---|---|---|---|---|---|---|
| J-2078 | 290.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 475.27 | 80.16 |
| J-2079 | 393.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 476.33 | 36.05 |
| J-2080 | 292.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 476.24 | 79.71 |
| J-2081 | 276.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 478.07 | 87.43 |
| J-2082 | 320.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 478.06 | 68.38 |
| J-2083 | 350.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 476.34 | 54.66 |
| J-2084 | 370.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 476.36 | 46.02 |
| J-2085 | 350.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 476.38 | 54.68 |
| J-2086 | 330.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 476.45 | 63.36 |
| J-2087 | 320.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 476.61 | 67.76 |
| J-2088 | 340.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 477.50 | 59.49 |
| J-2089 | 315.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 479.08 | 70.99 |
| J-2090 | 270.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 478.78 | 90.33 |
| J-2091 | 280.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 481.42 | 87.15 |
| J-2092 | 410.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 481.41 | 30.90 |
| J-2093 | 415.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 480.99 | 28.55 |
| J-2094 | 400.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 480.19 | 34.69 |
| J-2095 | 400.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 481.35 | 35.20 |
| J-2096 | 285.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 474.00 | 81.77 |
| J-2097 | 287.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 474.09 | 80.95 |
| J-2098 | 277.50 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 473.98 | 85.01 |
| J-2099 | 285.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 473.96 | 81.75 |
| J-2100 | 275.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 473.95 | 86.08 |
| J-2101 | 280.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 473.94 | 83.91 |
| J-2102 | 264.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 473.96 | 90.84 |
| J-2103 | 265.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 473.95 | 90.40 |
| J-2104 | 280.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 473.94 | 83.91 |
| J-2105 | 260.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 473.93 | 92.56 |
| J-2106 | 255.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 473.92 | 94.72 |
| J-2107 | 280.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 474.00 | 83.93 |
| J-2108 | 280.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 474.01 | 83.94 |
| J-2109 | 300.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 474.32 | 75.42 |
| J-2110 | 370.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 474.32 | 45.13 |
| J-2111 | 318.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 474.25 | 67.60 |
| J-2112 | 315.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 474.32 | 68.93 |
| J-2113 | 368.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 474.34 | 46.01 |
| J-2114 | 340.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 474.38 | 58.14 |
| J-2115 | 300.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 473.95 | 75.26 |
| J-2116 | 300.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 474.38 | 75.44 |
| J-2117 | 310.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 474.38 | 71.12 |
| J-2118 | 287.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 474.44 | 81.10 |
| J-2119 | 271.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 474.97 | 88.25 |
| J-2120 | 262.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 475.01 | 92.16 |
| J-2121 | 255.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 474.74 | 95.07 |
| J-2122 | 265.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 474.69 | 90.72 |
| J-2123 | 265.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 474.69 | 90.72 |
| J-2124 | 255.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 474.73 | 95.07 |
| J-2125 | 265.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 474.67 | 90.71 |
| J-2126 | 255.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 474.75 | 95.08 |
| J-2127 | 250.00 | LOW SERVICE AREA | 17.04 | Fixed | 17.04 | 482.10 | 100.42 |
| J-2128 | 305.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 475.10 | 73.59 |
| J-2129 | 315.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 475.37 | 69.39 |
| J-2130 | 300.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 475.41 | 75.89 |

# Scenario: PH
# Steady State Analysis
# Junction Report

| Label | Elevation (ft) | Zone | Base Flow (gpm) | Pattern | Demand (gpm) | Hydraulic Grade (ft) | Pressure (psi) |
|---|---|---|---|---|---|---|---|
| J-2131 | 320.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 475.50 | 67.28 |
| J-2132 | 320.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 476.58 | 67.74 |
| J-2133 | 345.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 477.11 | 57.16 |
| J-2134 | 285.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 475.09 | 82.24 |
| J-2135 | 295.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 475.25 | 77.99 |
| J-2136 | 297.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 475.25 | 77.12 |
| J-2137 | 260.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 475.17 | 93.10 |
| J-2138 | 270.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 475.38 | 88.86 |
| J-2139 | 250.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 475.43 | 97.53 |
| J-2140 | 250.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 475.38 | 97.51 |
| J-2141 | 280.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 475.39 | 84.54 |
| J-2142 | 300.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 475.39 | 75.88 |
| J-2143 | 295.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 475.45 | 78.07 |
| J-2144 | 320.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 475.83 | 67.42 |
| J-2145 | 285.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 475.69 | 82.50 |
| J-2146 | 320.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 475.66 | 67.35 |
| J-2147 | 285.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 475.65 | 82.48 |
| J-2148 | 250.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 475.65 | 97.63 |
| J-2149 | 245.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 475.63 | 99.78 |
| J-2150 | 260.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 475.64 | 93.30 |
| J-2151 | 240.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 475.62 | 101.94 |
| J-2152 | 245.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 475.60 | 99.77 |
| J-2153 | 260.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 490.59 | 99.76 |
| J-2154 | 280.00 | LOW SERVICE AREA | 18.44 | Fixed | 18.44 | 489.21 | 90.51 |
| J-2155 | 295.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 488.91 | 83.90 |
| J-2156 | 344.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 488.56 | 62.55 |
| J-2157 | 393.00 | LOW SERVICE AREA | 40.77 | Fixed | 40.77 | 488.55 | 41.34 |
| J-2158 | 384.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 488.55 | 45.24 |
| J-2159 | 307.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 481.56 | 75.52 |
| J-2160 | 263.50 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 473.96 | 91.05 |
| J-2161 | 322.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 475.73 | 66.51 |
| J-2162 | 315.50 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 476.21 | 69.53 |
| J-2163 | 272.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 474.52 | 87.62 |
| J-2164 | 295.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 474.62 | 77.71 |
| J-2165 | 265.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 476.41 | 91.47 |
| J-2166 | 272.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 476.40 | 88.44 |
| J-2167 | 341.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 478.52 | 59.50 |
| J-2168 | 274.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 473.94 | 86.50 |
| J-2169 | 283.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 473.95 | 82.61 |
| J-2170 | 285.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 473.95 | 81.75 |
| J-2171 | 322.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 473.94 | 65.74 |
| J-2172 | 300.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 473.99 | 75.28 |
| J-2173 | 288.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 474.38 | 80.64 |
| J-2174 | 290.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 474.44 | 79.80 |
| J-2175 | 283.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 473.95 | 82.61 |
| J-2176 | 347.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 479.12 | 57.16 |
| J-2177 | 346.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 479.12 | 57.60 |
| J-2178 | 355.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 478.81 | 53.57 |
| J-2179 | 339.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 478.81 | 60.49 |
| J-2180 | 405.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 481.36 | 33.04 |
| J-2181 | 386.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 481.36 | 41.26 |
| J-2182 | 402.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 481.35 | 34.33 |
| J-2183 | 396.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 481.35 | 36.93 |

# Scenario: PH
# Steady State Analysis
# Junction Report

| Label | Elevation (ft) | Zone | Base Flow (gpm) | Pattern | Demand (gpm) | Hydraulic Grade (ft) | Pressure (psi) |
|---|---|---|---|---|---|---|---|
| J-2184 | 219.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 488.57 | 116.63 |
| J-2185 | 221.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 488.15 | 115.58 |
| J-2186 | 218.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 488.15 | 116.88 |
| J-2187 | 215.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 487.90 | 118.07 |
| J-2188 | 219.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 487.90 | 116.34 |
| J-2189 | 232.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 487.88 | 110.71 |
| J-2190 | 270.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 487.88 | 94.27 |
| J-2191 | 284.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 482.31 | 85.80 |
| J-2192 | 263.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 482.30 | 94.88 |
| J-2193 | 342.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 481.44 | 60.33 |
| J-2194 | 295.00 | LOW SERVICE AREA | 0.00 | Fixed | 0.00 | 481.50 | 80.69 |
| J-2195 | 285.00 | LOW SERVICE AREA | 0.00 | Fixed | 0.00 | 481.48 | 85.01 |
| J-2291 | 275.00 | LOW SERVICE AREA | 8.03 | Fixed | 8.03 | 481.56 | 89.37 |

# Scenario: PH
# Steady State Analysis
# Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-1000 | 12.0 | J-1102 | J-1015 | 1,245 | 57.19 | 0.01 | 0.02 | 0.16 | 120.0 |
| P-1001 | 12.0 | J-1007 | J-1102 | 1,005 | 71.48 | 0.02 | 0.02 | 0.20 | 120.0 |
| P-1003 | 12.0 | J-1008 | J-1009 | 300 | 14.30 | 0.00 | 0.00 | 0.04 | 100.0 |
| P-1004 | 12.0 | J-1007 | J-1008 | 400 | 100.08 | 0.06 | 0.02 | 0.28 | 100.0 |
| P-1005 | 12.0 | J-1098 | J-1007 | 850 | 185.86 | 0.15 | 0.13 | 0.53 | 110.0 |
| P-1006 | 12.0 | J-1006 | J-1098 | 800 | -1,081.34 | 3.99 | 3.19 | 3.07 | 110.0 |
| P-1007 | 12.0 | J-1007 | J-1012 | 4,600 | 0.00 | 0.00 | 0.00 | 0.00 | 130.0 |
| P-1008 | 8.0 | J-1030 | J-1031 | 1,650 | -2.14 | 0.00 | 0.00 | 0.01 | 110.0 |
| P-1010 | 12.0 | J-1016 | J-1017 | 1,800 | 28.59 | 0.00 | 0.01 | 0.08 | 120.0 |
| P-1012 | 8.0 | J-1027 | J-1030 | 2,200 | 26.46 | 0.03 | 0.07 | 0.17 | 110.0 |
| P-1013 | 8.0 | J-1034 | J-1033 | 1,350 | -3.12 | 0.00 | 0.00 | 0.02 | 110.0 |
| P-1014 | 12.0 | J-1033 | J-1034 | 1,050 | 11.18 | 0.00 | 0.00 | 0.03 | 110.0 |
| P-1015 | 12.0 | J-1032 | J-1033 | 500 | 18.69 | 0.00 | 0.00 | 0.05 | 110.0 |
| P-1016 | 12.0 | J-1032 | J-1027 | 1,500 | -78.01 | 0.03 | 0.05 | 0.22 | 110.0 |
| P-1017 | 8.0 | J-1033 | J-1035 | 2,100 | -9.91 | 0.00 | 0.01 | 0.06 | 120.0 |
| P-1018 | 12.0 | J-1025 | PRV-4 | 1,183 | 0.00 | 0.00 | 0.00 | 0.00 | 110.0 |
| P-1019 | 12.0 | J-1026 | J-1025 | 450 | 28.59 | 0.00 | 0.00 | 0.08 | 110.0 |
| P-1020 | 12.0 | J-1026 | J-1027 | 1,100 | -67.10 | 0.02 | 0.03 | 0.19 | 110.0 |
| P-1021 | 8.0 | J-1035 | J-1026 | 600 | -24.20 | 0.02 | 0.01 | 0.15 | 120.0 |
| P-1022 | 10.0 | J-1029 | J-1028 | 2,500 | 48.88 | 0.03 | 0.08 | 0.20 | 110.0 |
| P-1023 | 12.0 | J-1028 | J-1027 | 250 | 185.86 | 0.15 | 0.04 | 0.53 | 110.0 |
| P-1024 | 12.0 | J-1029 | J-1028 | 750 | 151.27 | 0.10 | 0.08 | 0.43 | 110.0 |
| P-1025 | 12.0 | J-1103 | J-1029 | 3,500 | 214.45 | 0.17 | 0.59 | 0.61 | 120.0 |
| P-1026 | 10.0 | J-1019 | J-1018 | 1,500 | -146.02 | 0.35 | 0.52 | 0.60 | 90.0 |
| P-1027 | 12.0 | J-1011 | J-1005 | 2,200 | -480.78 | 0.76 | 1.67 | 1.36 | 120.0 |
| P-1028 | 10.0 | J-1013 | J-1014 | 1,950 | 14.30 | 0.00 | 0.01 | 0.06 | 100.0 |
| P-1029 | 12.0 | J-1013 | J-1012 | 2,000 | -539.35 | 1.10 | 2.20 | 1.53 | 110.0 |
| P-1030 | 10.0 | J-1103 | J-1013 | 1,000 | -510.75 | 2.06 | 2.06 | 2.09 | 120.0 |
| P-1031 | 10.0 | J-1018 | J-1103 | 400 | -282.01 | 0.69 | 0.27 | 1.15 | 120.0 |
| P-1032 | 8.0 | J-1053 | J-1018 | 2,080 | -121.68 | 0.60 | 1.25 | 0.78 | 100.0 |
| P-1033 | 8.0 | J-1054 | J-1036 | 500 | 137.63 | 0.63 | 0.32 | 0.88 | 110.0 |
| P-1034 | 8.0 | J-1036 | J-1037 | 650 | 60.33 | 0.14 | 0.09 | 0.39 | 110.0 |
| P-1035 | 8.0 | J-1037 | J-1036 | 600 | -63.00 | 0.15 | 0.09 | 0.40 | 110.0 |
| P-1036 | 8.0 | J-1053 | J-1054 | 400 | 125.41 | 0.63 | 0.25 | 0.80 | 100.0 |
| P-1037 | 8.0 | J-1052 | J-1053 | 800 | 18.02 | 0.02 | 0.01 | 0.12 | 100.0 |
| P-1038 | 8.0 | J-1050 | J-1052 | 1,200 | 46.62 | 0.10 | 0.12 | 0.30 | 100.0 |
| P-1039 | 12.0 | J-1011 | J-1012 | 750 | 553.64 | 1.16 | 0.87 | 1.57 | 110.0 |
| P-1040 | 12.0 | J-1010 | J-1011 | 2,200 | 87.17 | 0.04 | 0.08 | 0.25 | 110.0 |
| P-1041 | 12.0 | J-1047 | J-1010 | 1,800 | -356.13 | 0.51 | 0.92 | 1.01 | 110.0 |
| P-1042 | 8.0 | J-1054 | J-1055 | 500 | -26.51 | 0.04 | 0.02 | 0.17 | 100.0 |
| P-1043 | 12.0 | J-1005 | J-1006 | 1,750 | -1,067.04 | 3.89 | 6.82 | 3.03 | 110.0 |
| P-1044 | 12.0 | J-1010 | J-1005 | 1,950 | -457.60 | 0.81 | 1.58 | 1.30 | 110.0 |
| P-1045 | 12.0 | J-1001 | J-1004 | 1,500 | -9.78 | 0.00 | 0.00 | 0.03 | 100.0 |
| P-1046 | 12.0 | J-1002 | J-1003 | 1,900 | -43.47 | 0.01 | 0.02 | 0.12 | 100.0 |
| P-1047 | 12.0 | J-1001 | J-1002 | 1,100 | -14.88 | 0.00 | 0.00 | 0.04 | 100.0 |
| P-1048 | 8.0 | J-1000 | J-1001 | 975 | -10.35 | 0.01 | 0.01 | 0.07 | 100.0 |
| P-1049 | 12.0 | J-1004 | J-1000 | 1,400 | 32.54 | 0.01 | 0.01 | 0.09 | 120.0 |
| P-1050 | 12.0 | J-1003 | J-1004 | 1,200 | 56.61 | 0.02 | 0.02 | 0.16 | 100.0 |
| P-1051 | 12.0 | J-1005 | J-1003 | 430 | 114.37 | 0.07 | 0.03 | 0.32 | 100.0 |
| P-1052 | 12.0 | J-1100 | T-3 | 200 | -781.18 | 1.86 | 0.37 | 2.22 | 120.0 |
| P-1053 | 12.0 | J-1100 | J-1040 | 200 | 611.98 | 1.39 | 0.28 | 1.74 | 110.0 |


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# Scenario: PH
# Steady State Analysis
# Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-1054 | 12.0 | J-1042 | J-1100 | 1,000 | -154.91 | 0.11 | 0.11 | 0.44 | 110.0 |
| P-1055 | 8.0 | J-1044 | J-1046 | 350 | -19.61 | 0.02 | 0.01 | 0.13 | 100.0 |
| P-1056 | 8.0 | J-1046 | J-1048 | 1,360 | 250.96 | 2.29 | 3.12 | 1.60 | 100.0 |
| P-1057 | 12.0 | J-1046 | J-1047 | 1,800 | -341.84 | 0.47 | 0.85 | 0.97 | 110.0 |
| P-1058 | 12.0 | J-1044 | J-1046 | 350 | -56.97 | 0.02 | 0.01 | 0.16 | 100.0 |
| P-1059 | 8.0 | J-1044 | J-1061 | 1,100 | 140.39 | 0.78 | 0.86 | 0.90 | 100.0 |
| P-1060 | 12.0 | J-1043 | J-1044 | 600 | 78.11 | 0.03 | 0.02 | 0.22 | 110.0 |
| P-1061 | 12.0 | J-1043 | J-1042 | 800 | -140.61 | 0.09 | 0.07 | 0.40 | 110.0 |
| P-1062 | 8.0 | J-1041 | J-1043 | 1,150 | -48.20 | 0.08 | 0.09 | 0.31 | 120.0 |
| P-1063 | 8.0 | J-1040 | J-1041 | 500 | -19.61 | 0.01 | 0.01 | 0.13 | 120.0 |
| P-1064 | 12.0 | J-1104 | J-1040 | 615 | -617.29 | 1.69 | 1.04 | 1.75 | 100.0 |
| P-1065 | 12.0 | J-1039 | J-1104 | 1,585 | -602.99 | 1.61 | 2.56 | 1.71 | 100.0 |
| P-1066 | 12.0 | J-1101 | J-1079 | 1,326 | -59.10 | 0.02 | 0.02 | 0.17 | 120.0 |
| P-1067 | 12.0 | J-1059 | J-1101 | 1,774 | -44.81 | 0.01 | 0.02 | 0.13 | 120.0 |
| P-1068 | 8.0 | J-1057 | J-1058 | 1,350 | -6.83 | 0.00 | 0.00 | 0.04 | 120.0 |
| P-1069 | 12.0 | J-1058 | J-1057 | 1,870 | 7.47 | 0.00 | 0.00 | 0.02 | 120.0 |
| P-1070 | 8.0 | J-1050 | J-1051 | 1,250 | 14.30 | 0.01 | 0.01 | 0.09 | 120.0 |
| P-1071 | 8.0 | J-1048 | J-1050 | 1,200 | 193.78 | 1.42 | 1.71 | 1.24 | 100.0 |
| P-1072 | 8.0 | J-1048 | J-1049 | 800 | 42.89 | 0.09 | 0.07 | 0.27 | 100.0 |
| P-1073 | 6.0 | J-1061 | J-1045 | 1,400 | 126.10 | 2.60 | 3.65 | 1.43 | 100.0 |
| P-1074 | 12.0 | J-1045 | J-1039 | 550 | -582.84 | 1.52 | 0.83 | 1.65 | 100.0 |
| P-1075 | 12.0 | J-1045 | J-1058 | 2,800 | 218.97 | 0.25 | 0.69 | 0.62 | 100.0 |
| P-1076 | 12.0 | J-1062 | J-1045 | 280 | -446.45 | 0.93 | 0.26 | 1.27 | 100.0 |
| P-1077 | 12.0 | J-1075 | J-1076 | 500 | 14.30 | 0.00 | 0.00 | 0.04 | 110.0 |
| P-1078 | 12.0 | J-1062 | J-1075 | 500 | 28.59 | 0.01 | 0.00 | 0.08 | 100.0 |
| P-1079 | 8.0 | J-1077 | J-1080 | 200 | 14.30 | 0.01 | 0.00 | 0.09 | 120.0 |
| P-1080 | 12.0 | J-1062 | J-1059 | 2,800 | 175.70 | 0.14 | 0.39 | 0.50 | 110.0 |
| P-1081 | 12.0 | J-1078 | J-1062 | 500 | -228.44 | 0.27 | 0.13 | 0.65 | 100.0 |
| P-1082 | 12.0 | J-1077 | J-1078 | 350 | -214.14 | 0.17 | 0.06 | 0.61 | 120.0 |
| P-1083 | 12.0 | J-1079 | J-1077 | 1,200 | -185.55 | 0.13 | 0.16 | 0.53 | 120.0 |
| P-1084 | 12.0 | J-1058 | J-1059 | 300 | -206.21 | 0.16 | 0.05 | 0.58 | 120.0 |
| P-1085 | 12.0 | J-1063 | J-1058 | 1,750 | -396.58 | 0.62 | 1.09 | 1.13 | 110.0 |
| P-1086 | 12.0 | J-1093 | J-1094 | 1,250 | 14.30 | 0.00 | 0.00 | 0.04 | 110.0 |
| P-1087 | 6.0 | J-1092 | J-1093 | 1,600 | 14.03 | 0.04 | 0.07 | 0.16 | 100.0 |
| P-1088 | 8.0 | J-1093 | J-1096 | 1,100 | -14.57 | 0.01 | 0.01 | 0.09 | 110.0 |
| P-1089 | 8.0 | J-1096 | J-1097 | 2,000 | -28.86 | 0.04 | 0.07 | 0.18 | 110.0 |
| P-1090 | 8.0 | J-1092 | J-1097 | 800 | -14.68 | 0.01 | 0.01 | 0.09 | 100.0 |
| P-1091 | 8.0 | J-1089 | J-1092 | 2,000 | 13.65 | 0.01 | 0.02 | 0.09 | 100.0 |
| P-1092 | 8.0 | J-1097 | J-1091 | 650 | -57.84 | 0.15 | 0.10 | 0.37 | 100.0 |
| P-1093 | 8.0 | J-1091 | J-1089 | 600 | 56.54 | 0.15 | 0.09 | 0.36 | 100.0 |
| P-1094 | 8.0 | J-1095 | J-1089 | 840 | -28.59 | 0.04 | 0.03 | 0.18 | 100.0 |
| P-1095 | 6.0 | J-1095 | PRV-2 | 2,322 | 0.00 | 0.00 | 0.00 | 0.00 | 110.0 |
| P-1096 | 8.0 | J-1084 | J-1085 | 1,800 | 78.17 | 0.26 | 0.48 | 0.50 | 100.0 |
| P-1098 | 8.0 | J-1084 | J-1083 | 900 | 29.09 | 0.04 | 0.03 | 0.19 | 110.0 |
| P-1099 | 8.0 | J-1083 | J-1082 | 1,350 | -135.78 | 0.62 | 0.83 | 0.87 | 110.0 |
| P-1100 | 10.0 | J-1086 | J-1083 | 1,150 | -150.58 | 0.30 | 0.35 | 0.62 | 100.0 |
| P-1101 | 10.0 | J-1086 | J-1090 | 515 | 84.55 | 0.10 | 0.05 | 0.35 | 100.0 |
| P-1102 | 10.0 | J-1087 | J-1086 | 1,100 | -51.73 | 0.03 | 0.04 | 0.21 | 110.0 |
| P-1103 | 10.0 | J-1085 | J-1090 | 500 | -79.09 | 0.09 | 0.05 | 0.32 | 100.0 |
| P-1104 | 12.0 | J-1081 | J-1121 | 690 | 14.30 | 0.00 | 0.00 | 0.04 | 120.0 |
| P-1105 | 8.0 | J-1060 | J-1084 | 1,300 | 121.56 | 0.60 | 0.78 | 0.78 | 100.0 |

# Scenario: PH
# Steady State Analysis
# Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-1106 | 10.0 | J-1088 | J-1087 | 700 | -37.43 | 0.02 | 0.01 | 0.15 | 110.0 |
| P-1107 | 8.0 | J-1091 | J-1085 | 650 | -142.97 | 0.81 | 0.53 | 0.91 | 100.0 |
| P-1108 | 10.0 | J-1090 | J-1088 | 1,100 | -8.84 | 0.00 | 0.00 | 0.04 | 110.0 |
| P-1109 | 8.0 | J-1064 | J-1060 | 300 | 82.60 | 0.18 | 0.05 | 0.53 | 130.0 |
| P-1110 | 8.0 | J-1068 | J-1069 | 1,450 | 43.90 | 0.09 | 0.13 | 0.28 | 100.0 |
| P-1111 | 8.0 | J-1038 | J-1073 | 1,400 | 4.03 | 0.00 | 0.00 | 0.03 | 110.0 |
| P-1112 | 8.0 | J-1068 | J-1072 | 950 | -79.20 | 0.27 | 0.26 | 0.51 | 100.0 |
| P-1113 | 8.0 | J-1065 | J-1068 | 500 | -21.01 | 0.02 | 0.01 | 0.13 | 100.0 |
| P-1114 | 6.0 | J-1073 | J-1065 | 1,700 | 38.90 | 0.30 | 0.50 | 0.44 | 100.0 |
| P-1115 | 6.0 | J-1056 | J-1073 | 1,100 | 49.16 | 0.46 | 0.50 | 0.56 | 100.0 |
| P-1116 | 8.0 | J-1065 | J-1064 | 250 | 3.03 | 0.00 | 0.00 | 0.02 | 100.0 |
| P-1117 | 8.0 | J-1066 | J-1065 | 1,400 | -42.59 | 0.09 | 0.12 | 0.27 | 100.0 |
| P-1118 | 8.0 | J-1064 | J-1067 | 1,250 | 56.49 | 0.14 | 0.18 | 0.36 | 100.0 |
| P-1119 | 12.0 | J-1063 | J-1064 | 1,910 | 150.36 | 0.10 | 0.20 | 0.43 | 110.0 |
| P-1120 | 12.0 | J-1081 | J-1063 | 450 | -231.93 | 0.23 | 0.10 | 0.66 | 110.0 |
| P-1121 | 12.0 | J-1082 | J-1081 | 700 | -203.33 | 0.18 | 0.13 | 0.58 | 110.0 |
| P-1122 | 12.0 | J-1082 | J-1060 | 1,400 | 53.26 | 0.02 | 0.02 | 0.15 | 110.0 |
| P-1123 | 6.0 | J-1069 | J-1070 | 500 | 28.59 | 0.17 | 0.08 | 0.32 | 100.0 |
| P-1124 | 6.0 | J-1069 | J-1066 | 400 | 1.00 | 0.00 | 0.00 | 0.01 | 100.0 |
| P-1125 | 6.0 | J-1067 | J-1066 | 350 | -29.30 | 0.17 | 0.06 | 0.33 | 100.0 |
| P-1126 | 6.0 | J-1070 | J-1071 | 1,000 | 14.30 | 0.05 | 0.05 | 0.16 | 100.0 |
| P-1127 | 8.0 | J-1038 | J-1037 | 900 | -109.03 | 0.41 | 0.37 | 0.70 | 110.0 |
| P-1128 | 8.0 | J-1072 | J-1038 | 800 | -90.70 | 0.29 | 0.23 | 0.58 | 110.0 |
| P-1129 | 8.0 | J-1055 | J-1050 | 650 | -118.57 | 0.57 | 0.37 | 0.76 | 100.0 |
| P-1130 | 8.0 | J-1055 | J-1056 | 1,120 | 77.76 | 0.26 | 0.29 | 0.50 | 100.0 |
| P-1131 | 10.0 | J-1019 | J-1022 | 500 | 90.85 | 0.14 | 0.07 | 0.37 | 90.0 |
| P-1132 | 8.0 | J-1020 | J-1019 | 520 | -40.87 | 0.08 | 0.04 | 0.26 | 100.0 |
| P-1133 | 8.0 | J-1021 | J-1020 | 800 | -11.24 | 0.01 | 0.01 | 0.07 | 100.0 |
| P-1134 | 6.0 | J-1022 | J-1021 | 700 | -12.28 | 0.03 | 0.02 | 0.14 | 100.0 |
| P-1135 | 10.0 | J-1023 | J-1022 | 500 | -57.19 | 0.06 | 0.03 | 0.23 | 90.0 |
| P-1136 | 8.0 | J-1020 | J-1021 | 450 | 15.34 | 0.01 | 0.01 | 0.10 | 100.0 |
| P-1137 | 8.0 | J-1074 | J-1024 | 800 | -2.79 | 0.00 | 0.00 | 0.02 | 100.0 |
| P-1138 | 8.0 | J-1023 | J-1074 | 900 | 11.50 | 0.01 | 0.01 | 0.07 | 100.0 |
| P-1139 | 10.0 | J-1024 | J-1023 | 320 | -31.39 | 0.02 | 0.01 | 0.13 | 90.0 |
| P-1140 | 10.0 | J-1024 | J-1099 | 330 | 14.30 | 0.00 | 0.00 | 0.06 | 90.0 |
| P-1141 | 10.0 | J-1099 | PRV-3 | 5 | 0.00 | 0.00 | 0.00 | 0.00 | 90.0 |
| P-1142 | 8.0 | J-1092 | PRV-1 | 390 | 0.00 | 0.00 | 0.00 | 0.00 | 100.0 |
| P-1143 | 12.0 | J-1015 | J-1105 | 825 | 42.89 | 0.01 | 0.01 | 0.12 | 130.0 |
| P-1144 | 12.0 | J-1105 | J-1106 | 715 | 14.30 | 0.00 | 0.00 | 0.04 | 130.0 |
| P-1145 | 8.0 | J-1105 | J-1107 | 928 | 14.30 | 0.01 | 0.01 | 0.09 | 130.0 |
| P-1146 | 12.0 | J-1008 | J-1108 | 1,077 | 71.48 | 0.02 | 0.02 | 0.20 | 120.0 |
| P-1147 | 8.0 | J-1108 | J-1109 | 757 | 14.30 | 0.01 | 0.01 | 0.09 | 130.0 |
| P-1148 | 8.0 | J-1017 | J-1110 | 1,053 | 14.30 | 0.01 | 0.01 | 0.09 | 130.0 |
| P-1149 | 12.0 | J-1111 | J-1032 | 1,442 | -45.03 | 0.01 | 0.02 | 0.13 | 110.0 |
| P-1150 | 8.0 | J-1111 | J-1112 | 573 | 14.30 | 0.01 | 0.00 | 0.09 | 130.0 |
| P-1151 | 12.0 | J-1031 | J-1111 | 1,858 | -16.43 | 0.00 | 0.00 | 0.05 | 110.0 |
| P-1152 | 8.0 | J-1030 | J-1113 | 439 | 14.30 | 0.01 | 0.00 | 0.09 | 130.0 |
| P-1153 | 8.0 | J-1025 | J-1114 | 459 | 14.30 | 0.01 | 0.00 | 0.09 | 130.0 |
| P-1154 | 12.0 | J-1002 | J-1115 | 2,056 | 14.30 | 0.00 | 0.00 | 0.04 | 130.0 |
| P-1155 | 8.0 | J-1000 | J-1116 | 920 | 14.30 | 0.01 | 0.01 | 0.09 | 130.0 |
| P-1156 | 8.0 | J-1000 | J-1117 | 1,514 | 14.30 | 0.01 | 0.01 | 0.09 | 130.0 |

# Scenario: PH
# Steady State Analysis
# Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-1157 | 8.0 | J-1049 | J-1118 | 828 | 14.30 | 0.01 | 0.01 | 0.09 | 130.0 |
| P-1158 | 8.0 | J-1049 | J-1119 | 1,231 | 14.30 | 0.01 | 0.01 | 0.09 | 130.0 |
| P-1159 | 10.0 | J-1052 | J-1120 | 698 | 14.30 | 0.00 | 0.00 | 0.06 | 130.0 |
| P-1161 | 6.0 | J-1041 | J-1122 | 338 | 14.30 | 0.03 | 0.01 | 0.16 | 130.0 |
| P-1162 | 6.0 | J-1056 | J-1123 | 932 | 14.30 | 0.04 | 0.04 | 0.16 | 110.0 |
| P-1163 | 6.0 | J-1067 | J-1124 | 388 | 71.48 | 0.56 | 0.22 | 0.81 | 130.0 |
| P-1164 | 6.0 | J-1124 | J-1125 | 150 | 42.89 | 0.22 | 0.03 | 0.49 | 130.0 |
| P-1165 | 6.0 | J-1125 | J-1126 | 100 | 14.30 | 0.03 | 0.00 | 0.16 | 130.0 |
| P-1166 | 6.0 | J-1125 | J-1127 | 224 | 14.30 | 0.03 | 0.01 | 0.16 | 130.0 |
| P-1167 | 6.0 | J-1124 | J-1128 | 747 | 14.30 | 0.03 | 0.02 | 0.16 | 130.0 |
| P-1168 | 8.0 | J-1095 | J-1131 | 773 | 14.30 | 0.01 | 0.01 | 0.09 | 130.0 |
| P-1169 | 8.0 | J-1091 | J-1132 | 885 | 14.30 | 0.01 | 0.01 | 0.09 | 130.0 |
| P-1170 | 8.0 | J-1088 | J-1133 | 1,016 | 14.30 | 0.01 | 0.01 | 0.09 | 130.0 |
| P-2000 | 6.0 | J-2017 | J-2018 | 1,600 | 8.03 | 0.02 | 0.03 | 0.09 | 100.0 |
| P-2001 | 8.0 | J-2016 | J-2019 | 650 | -46.49 | 0.10 | 0.07 | 0.30 | 100.0 |
| P-2002 | 8.0 | J-2016 | J-2017 | 750 | 16.06 | 0.01 | 0.01 | 0.10 | 100.0 |
| P-2003 | 12.0 | J-2020 | J-2016 | 650 | -22.40 | 0.00 | 0.00 | 0.06 | 110.0 |
| P-2004 | 8.0 | J-2015 | J-2021 | 550 | -82.12 | 0.29 | 0.16 | 0.52 | 100.0 |
| P-2005 | 6.0 | J-2020 | J-2015 | 450 | -31.38 | 0.24 | 0.11 | 0.36 | 90.0 |
| P-2006 | 8.0 | J-2019 | J-2015 | 300 | -54.52 | 0.14 | 0.04 | 0.35 | 100.0 |
| P-2007 | 6.0 | J-2005 | J-2020 | 300 | -45.75 | 0.25 | 0.07 | 0.52 | 130.0 |
| P-2008 | 6.0 | J-2191 | J-2192 | 1,093 | 8.03 | 0.01 | 0.01 | 0.09 | 130.0 |
| P-2009 | 8.0 | J-2015 | J-2014 | 2,160 | -11.81 | 0.01 | 0.02 | 0.08 | 100.0 |
| P-2010 | 6.0 | J-2004 | J-2005 | 1,200 | -37.72 | 0.28 | 0.33 | 0.43 | 100.0 |
| P-2011 | 8.0 | J-207 | T-2 | 223 | 54.81 | 0.08 | 0.02 | 0.35 | 130.0 |
| P-2012 | 8.0 | J-2025 | J-2024 | 2,400 | -6.73 | 0.00 | 0.01 | 0.04 | 90.0 |
| P-2013 | 8.0 | J-2023 | J-2025 | 250 | 1.30 | 0.00 | 0.00 | 0.01 | 90.0 |
| P-2014 | 8.0 | J-2024 | J-2023 | 1,300 | 9.33 | 0.01 | 0.01 | 0.06 | 90.0 |
| P-2015 | 8.0 | J-2022 | J-2024 | 250 | 24.09 | 0.04 | 0.01 | 0.15 | 90.0 |
| P-2016 | 10.0 | J-2014 | J-207 | 800 | 14.99 | 0.01 | 0.00 | 0.06 | 90.0 |
| P-2017 | 8.0 | J-207 | J-2027 | 1,200 | -39.83 | 0.06 | 0.08 | 0.25 | 110.0 |
| P-2018 | 10.0 | J-2022 | J-2029 | 3,500 | -138.32 | 0.26 | 0.90 | 0.57 | 100.0 |
| P-2019 | 10.0 | J-2014 | J-2011 | 2,900 | -34.82 | 0.02 | 0.06 | 0.14 | 100.0 |
| P-2020 | 6.0 | J-2010 | J-2004 | 700 | -11.64 | 0.04 | 0.03 | 0.13 | 90.0 |
| P-2021 | 12.0 | PRV-4 | J-2003 | 167 | 0.00 | 0.00 | 0.00 | 0.00 | 110.0 |
| P-2022 | 6.0 | J-2004 | J-2003 | 350 | 18.06 | 0.09 | 0.03 | 0.20 | 90.0 |
| P-2023 | 10.0 | J-2003 | J-2002 | 1,650 | 10.03 | 0.00 | 0.00 | 0.04 | 110.0 |
| P-2024 | 8.0 | J-2009 | J-2002 | 850 | 9.16 | 0.00 | 0.00 | 0.06 | 110.0 |
| P-2025 | 6.0 | J-2008 | J-2001 | 1,200 | 7.69 | 0.01 | 0.01 | 0.09 | 130.0 |
| P-2026 | 8.0 | J-2008 | J-2001 | 1,000 | 15.30 | 0.01 | 0.01 | 0.10 | 110.0 |
| P-2027 | 6.0 | J-2008 | J-2009 | 750 | 13.58 | 0.05 | 0.04 | 0.15 | 90.0 |
| P-2028 | 10.0 | J-2002 | J-2001 | 400 | -79.70 | 0.08 | 0.03 | 0.33 | 110.0 |
| P-2029 | 8.0 | J-2029 | J-2031 | 400 | 8.03 | 0.00 | 0.00 | 0.05 | 110.0 |
| P-2030 | 8.0 | J-2050 | J-2012 | 400 | 127.47 | 0.65 | 0.26 | 0.81 | 100.0 |
| P-2031 | 6.0 | J-2051 | J-2050 | 450 | -42.65 | 0.35 | 0.16 | 0.48 | 100.0 |
| P-2032 | 6.0 | J-2026 | J-2051 | 300 | -34.62 | 0.24 | 0.07 | 0.39 | 100.0 |
| P-2033 | 12.0 | J-2026 | J-2028 | 600 | -101.99 | 0.04 | 0.03 | 0.29 | 120.0 |
| P-2034 | 12.0 | J-2026 | J-2012 | 650 | 111.86 | 0.05 | 0.03 | 0.32 | 120.0 |
| P-2035 | 8.0 | J-2013 | J-2026 | 1,300 | -16.71 | 0.01 | 0.02 | 0.11 | 110.0 |
| P-2036 | 6.0 | J-2012 | J-2013 | 900 | -8.69 | 0.02 | 0.02 | 0.10 | 100.0 |
| P-2037 | 10.0 | J-2011 | J-2012 | 150 | -239.99 | 0.87 | 0.13 | 0.98 | 90.0 |

# Scenario: PH
# Steady State Analysis
# Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-2038 | 8.0 | J-2028 | J-2029 | 900 | -157.87 | 1.18 | 1.06 | 1.01 | 90.0 |
| P-2039 | 8.0 | J-2027 | J-2028 | 1,950 | -47.86 | 0.09 | 0.17 | 0.31 | 110.0 |
| P-2040 | 8.0 | J-2007 | J-2008 | 1,950 | 44.60 | 0.11 | 0.22 | 0.28 | 90.0 |
| P-2041 | 10.0 | J-2007 | J-2011 | 600 | -197.14 | 0.60 | 0.36 | 0.81 | 90.0 |
| P-2042 | 10.0 | J-2006 | J-2007 | 600 | -96.86 | 0.16 | 0.10 | 0.40 | 90.0 |
| P-2043 | 8.0 | J-2042 | J-2007 | 1,650 | -22.55 | 0.03 | 0.04 | 0.14 | 100.0 |
| P-2044 | 8.0 | J-2007 | J-2043 | 1,450 | 25.11 | 0.03 | 0.04 | 0.16 | 110.0 |
| P-2045 | 10.0 | J-2030 | J-2029 | 1,080 | 312.25 | 0.97 | 1.05 | 1.28 | 110.0 |
| P-2046 | 8.0 | J-2050 | J-2049 | 600 | -178.14 | 1.22 | 0.73 | 1.14 | 100.0 |
| P-2047 | 10.0 | J-2000 | J-2006 | 470 | -88.83 | 0.14 | 0.06 | 0.36 | 90.0 |
| P-2048 | 10.0 | J-2001 | J-2000 | 1,350 | -64.74 | 0.05 | 0.07 | 0.26 | 110.0 |
| P-2049 | 10.0 | PRV-3 | J-2159 | 5 | 0.00 | 0.00 | 0.00 | 0.00 | 90.0 |
| P-2050 | 10.0 | J-2159 | J-2000 | 210 | -8.03 | 0.00 | 0.00 | 0.03 | 90.0 |
| P-2051 | 12.0 | J-2153 | J-208 | 909 | -1,410.07 | 6.53 | 5.93 | 4.00 | 110.0 |
| P-2052 | 8.0 | J-2036 | J-2038 | 1,250 | -172.35 | 1.14 | 1.43 | 1.10 | 100.0 |
| P-2053 | 8.0 | J-2059 | J-2060 | 1,100 | -255.34 | 2.88 | 3.17 | 1.63 | 90.0 |
| P-2054 | 12.0 | J-2153 | J-2032 | 1,460 | 886.17 | 2.76 | 4.03 | 2.51 | 110.0 |
| P-2055 | 6.0 | J-2032 | J-2033 | 450 | -135.93 | 2.51 | 1.13 | 1.54 | 110.0 |
| P-2056 | 8.0 | J-2060 | J-2062 | 200 | 16.06 | 0.01 | 0.00 | 0.10 | 100.0 |
| P-2057 | 8.0 | J-2030 | J-2032 | 1,800 | -159.68 | 1.21 | 2.17 | 1.02 | 90.0 |
| P-2058 | 8.0 | J-2060 | J-2061 | 800 | 8.03 | 0.00 | 0.00 | 0.05 | 100.0 |
| P-2059 | 8.0 | J-2032 | J-2060 | 450 | 287.45 | 3.59 | 1.61 | 1.83 | 90.0 |
| P-2060 | 12.0 | J-2030 | J-2032 | 1,800 | -566.94 | 1.21 | 2.17 | 1.61 | 110.0 |
| P-2061 | 8.0 | J-2038 | J-2030 | 2,600 | -196.07 | 1.04 | 2.69 | 1.25 | 120.0 |
| P-2062 | 8.0 | J-2039 | J-2038 | 900 | -15.70 | 0.01 | 0.01 | 0.10 | 100.0 |
| P-2063 | 8.0 | J-2042 | J-2041 | 250 | 8.94 | 0.00 | 0.00 | 0.06 | 100.0 |
| P-2064 | 8.0 | J-2039 | J-2042 | 800 | 1.57 | 0.00 | 0.00 | 0.01 | 100.0 |
| P-2065 | 8.0 | J-2040 | J-2039 | 600 | -6.10 | 0.00 | 0.00 | 0.04 | 100.0 |
| P-2066 | 8.0 | J-2041 | J-2040 | 550 | 1.93 | 0.00 | 0.00 | 0.01 | 100.0 |
| P-2067 | 8.0 | J-2044 | J-2041 | 550 | 1.02 | 0.00 | 0.00 | 0.01 | 100.0 |
| P-2068 | 8.0 | J-2044 | J-2045 | 400 | 8.03 | 0.00 | 0.00 | 0.05 | 100.0 |
| P-2069 | 8.0 | J-2043 | J-2044 | 350 | 17.08 | 0.02 | 0.01 | 0.11 | 100.0 |
| P-2070 | 8.0 | J-2046 | J-2047 | 250 | -95.58 | 0.32 | 0.08 | 0.61 | 110.0 |
| P-2071 | 8.0 | J-2048 | J-2046 | 500 | -87.55 | 0.27 | 0.14 | 0.56 | 110.0 |
| P-2072 | 8.0 | J-2047 | J-2030 | 280 | -210.26 | 2.01 | 0.56 | 1.34 | 90.0 |
| P-2073 | 8.0 | J-2048 | J-2047 | 380 | -106.65 | 0.57 | 0.22 | 0.68 | 90.0 |
| P-2074 | 8.0 | J-2049 | J-2048 | 250 | -186.17 | 1.60 | 0.40 | 1.19 | 90.0 |
| P-2075 | 12.0 | J-2184 | J-2068 | 928 | 272.56 | 0.26 | 0.25 | 0.77 | 120.0 |
| P-2076 | 8.0 | J-2157 | J-2158 | 1,800 | -3.35 | 0.00 | 0.00 | 0.02 | 110.0 |
| P-2077 | 12.0 | J-2155 | J-2154 | 900 | -305.66 | 0.33 | 0.29 | 0.87 | 120.0 |
| P-2079 | 8.0 | J-2157 | J-2158 | 600 | -5.67 | 0.00 | 0.00 | 0.04 | 110.0 |
| P-2080 | 8.0 | J-2156 | J-2157 | 300 | 31.75 | 0.04 | 0.01 | 0.20 | 110.0 |
| P-2081 | 6.0 | J-2033 | J-2034 | 900 | -49.43 | 0.39 | 0.35 | 0.56 | 110.0 |
| P-2082 | 12.0 | J-2154 | J-2153 | 1,600 | -515.87 | 0.86 | 1.38 | 1.46 | 120.0 |
| P-2083 | 8.0 | J-2156 | J-2154 | 550 | -191.77 | 1.17 | 0.64 | 1.22 | 110.0 |
| P-2084 | 8.0 | J-2034 | J-2156 | 700 | -151.99 | 0.76 | 0.53 | 0.97 | 110.0 |
| P-2085 | 8.0 | J-2033 | J-2034 | 1,100 | -94.53 | 0.32 | 0.35 | 0.60 | 110.0 |
| P-2086 | 10.0 | J-2062 | J-2063 | 997 | 8.03 | 0.00 | 0.00 | 0.03 | 110.0 |
| P-2087 | 12.0 | J-2055 | J-2059 | 650 | -247.31 | 0.22 | 0.14 | 0.70 | 120.0 |
| P-2088 | 8.0 | J-2054 | J-2053 | 800 | 92.49 | 0.93 | 0.74 | 0.59 | 60.0 |
| P-2089 | 6.0 | J-2055 | J-2054 | 250 | 100.52 | 4.41 | 1.10 | 1.14 | 60.0 |

# Scenario: PH
# Steady State Analysis
# Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-2092 | 12.0 | J-2055 | J-2056 | 150 | 254.08 | 0.23 | 0.03 | 0.72 | 120.0 |
| P-2093 | 10.0 | J-2127 | J-2055 | 2,560 | 115.32 | 0.18 | 0.47 | 0.47 | 100.0 |
| P-2094 | 6.0 | J-2127 | J-2065 | 350 | 53.99 | 1.39 | 0.49 | 0.61 | 60.0 |
| P-2095 | 6.0 | J-2068 | J-2127 | 450 | 186.36 | 13.83 | 6.22 | 2.11 | 60.0 |
| P-2096 | 8.0 | J-2185 | J-2186 | 628 | 8.03 | 0.00 | 0.00 | 0.05 | 130.0 |
| P-2097 | 12.0 | J-2065 | J-2064 | 200 | 29.49 | 0.00 | 0.00 | 0.08 | 120.0 |
| P-2098 | 12.0 | J-2066 | J-2065 | 450 | -16.48 | 0.00 | 0.00 | 0.05 | 110.0 |
| P-2099 | 12.0 | J-2067 | J-2066 | 200 | -8.45 | 0.00 | 0.00 | 0.02 | 120.0 |
| P-2100 | 12.0 | J-2064 | J-2067 | 450 | -0.42 | 0.00 | 0.00 | 0.00 | 110.0 |
| P-2101 | 6.0 | J-2057 | J-2064 | 1,250 | -12.76 | 0.10 | 0.12 | 0.14 | 60.0 |
| P-2102 | 6.0 | J-2058 | J-2057 | 550 | -12.02 | 0.09 | 0.05 | 0.14 | 60.0 |
| P-2103 | 8.0 | J-2053 | J-2058 | 650 | -159.47 | 2.55 | 1.66 | 1.02 | 60.0 |
| P-2104 | 6.0 | J-2071 | J-2070 | 1,399 | -3.74 | 0.00 | 0.00 | 0.04 | 130.0 |
| P-2105 | 6.0 | J-2070 | J-2071 | 1,081 | 4.29 | 0.00 | 0.00 | 0.05 | 130.0 |
| P-2106 | 8.0 | J-2069 | J-2070 | 1,800 | 16.06 | 0.01 | 0.02 | 0.10 | 110.0 |
| P-2107 | 8.0 | J-2036 | J-2037 | 300 | 8.03 | 0.00 | 0.00 | 0.05 | 100.0 |
| P-2108 | 8.0 | J-2035 | J-2036 | 2,180 | -156.29 | 0.68 | 1.48 | 1.00 | 120.0 |
| P-2109 | 8.0 | J-2035 | J-2052 | 1,300 | -12.06 | 0.01 | 0.01 | 0.08 | 100.0 |
| P-2110 | 8.0 | J-2052 | J-2053 | 2,400 | -99.90 | 0.42 | 1.00 | 0.64 | 100.0 |
| P-2111 | 8.0 | J-2090 | J-2052 | 700 | -14.49 | 0.01 | 0.01 | 0.09 | 110.0 |
| P-2112 | 8.0 | J-2035 | J-2090 | 1,800 | -6.46 | 0.00 | 0.00 | 0.04 | 110.0 |
| P-2113 | 8.0 | J-2081 | J-2035 | 650 | -166.78 | 1.08 | 0.70 | 1.06 | 100.0 |
| P-2114 | 6.0 | J-2081 | J-2082 | 950 | 8.03 | 0.02 | 0.02 | 0.09 | 100.0 |
| P-2115 | 8.0 | J-2080 | J-2081 | 2,050 | -150.72 | 0.89 | 1.83 | 0.96 | 100.0 |
| P-2116 | 8.0 | J-2079 | J-2080 | 2,600 | 33.19 | 0.03 | 0.09 | 0.21 | 130.0 |
| P-2117 | 8.0 | J-2083 | J-2079 | 650 | 20.17 | 0.02 | 0.01 | 0.13 | 100.0 |
| P-2118 | 8.0 | J-2089 | J-2053 | 1,200 | -144.04 | 0.59 | 0.70 | 0.92 | 120.0 |
| P-2119 | 8.0 | J-2088 | J-2089 | 3,000 | -136.01 | 0.53 | 1.58 | 0.87 | 120.0 |
| P-2120 | 12.0 | J-2091 | J-2058 | 1,000 | -65.62 | 0.02 | 0.02 | 0.19 | 120.0 |
| P-2121 | 12.0 | J-2092 | J-2091 | 1,050 | -57.59 | 0.01 | 0.02 | 0.16 | 120.0 |
| P-2122 | 12.0 | T-1 | J-2092 | 700 | 509.96 | 0.84 | 0.59 | 1.45 | 120.0 |
| P-2124 | 12.0 | J-2093 | J-2092 | 550 | -519.38 | 0.75 | 0.41 | 1.47 | 130.0 |
| P-2125 | 12.0 | J-2094 | J-2093 | 1,100 | -511.35 | 0.73 | 0.81 | 1.45 | 130.0 |
| P-2126 | 8.0 | J-2073 | J-2074 | 365 | 22.33 | 0.02 | 0.01 | 0.14 | 110.0 |
| P-2127 | 8.0 | J-2073 | J-2075 | 200 | 8.03 | 0.00 | 0.00 | 0.05 | 100.0 |
| P-2128 | 8.0 | J-2072 | J-2073 | 550 | 78.17 | 0.26 | 0.15 | 0.50 | 100.0 |
| P-2129 | 8.0 | PRV-2 | J-2072 | 238 | 0.00 | 0.00 | 0.00 | 0.00 | 100.0 |
| P-2130 | 8.0 | J-2076 | J-2072 | 1,900 | -84.35 | 0.30 | 0.58 | 0.54 | 100.0 |
| P-2131 | 8.0 | J-2072 | J-2080 | 300 | -175.88 | 1.19 | 0.36 | 1.12 | 100.0 |
| P-2132 | 8.0 | J-2084 | J-2085 | 550 | -29.07 | 0.04 | 0.02 | 0.19 | 110.0 |
| P-2133 | 8.0 | J-2079 | J-2084 | 1,350 | -21.04 | 0.02 | 0.03 | 0.13 | 110.0 |
| P-2134 | 8.0 | J-2085 | J-2083 | 950 | 28.20 | 0.03 | 0.03 | 0.18 | 110.0 |
| P-2135 | 8.0 | J-2086 | J-2085 | 450 | 65.30 | 0.16 | 0.07 | 0.42 | 110.0 |
| P-2136 | 8.0 | J-2087 | J-2086 | 800 | 73.33 | 0.20 | 0.16 | 0.47 | 110.0 |
| P-2137 | 8.0 | J-2087 | J-2088 | 1,360 | -127.98 | 0.66 | 0.90 | 0.82 | 100.0 |
| P-2138 | 8.0 | J-2132 | J-2087 | 300 | -46.62 | 0.09 | 0.03 | 0.30 | 110.0 |
| P-2140 | 12.0 | J-2133 | J-2167 | 2,000 | -463.18 | 0.71 | 1.41 | 1.31 | 120.0 |
| P-2141 | 12.0 | J-2133 | J-2165 | 1,500 | 339.19 | 0.47 | 0.70 | 0.96 | 110.0 |
| P-2142 | 8.0 | J-2132 | J-2133 | 960 | -115.96 | 0.55 | 0.53 | 0.74 | 100.0 |
| P-2143 | 8.0 | J-2078 | J-2076 | 1,000 | -28.03 | 0.04 | 0.04 | 0.18 | 100.0 |
| P-2144 | 8.0 | J-2077 | J-2078 | 1,200 | -20.00 | 0.02 | 0.03 | 0.13 | 100.0 |

# Scenario: PH
# Steady State Analysis
# Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-2145 | 8.0 | J-2077 | J-2076 | 600 | -48.28 | 0.11 | 0.07 | 0.31 | 100.0 |
| P-2146 | 8.0 | J-2119 | J-2077 | 1,650 | -60.26 | 0.16 | 0.27 | 0.38 | 100.0 |
| P-2147 | 8.0 | J-2162 | J-2132 | 400 | -154.55 | 0.94 | 0.37 | 0.99 | 100.0 |
| P-2148 | 8.0 | J-2161 | J-2162 | 560 | -146.52 | 0.85 | 0.47 | 0.94 | 100.0 |
| P-2149 | 8.0 | J-2131 | J-2161 | 300 | -138.49 | 0.76 | 0.23 | 0.88 | 100.0 |
| P-2150 | 8.0 | J-2134 | J-2135 | 1,050 | -64.90 | 0.16 | 0.17 | 0.41 | 110.0 |
| P-2151 | 8.0 | J-2131 | J-2130 | 1,400 | 36.83 | 0.07 | 0.09 | 0.24 | 100.0 |
| P-2152 | 8.0 | J-2129 | J-2130 | 900 | -28.80 | 0.04 | 0.04 | 0.18 | 100.0 |
| P-2153 | 8.0 | J-2119 | J-2128 | 1,250 | -46.43 | 0.10 | 0.13 | 0.30 | 100.0 |
| P-2154 | 8.0 | J-2129 | J-2131 | 350 | -93.64 | 0.37 | 0.13 | 0.60 | 100.0 |
| P-2155 | 8.0 | J-2128 | J-2129 | 510 | -114.41 | 0.54 | 0.27 | 0.73 | 100.0 |
| P-2156 | 12.0 | J-2134 | J-2128 | 750 | -59.95 | 0.02 | 0.01 | 0.17 | 110.0 |
| P-2157 | 12.0 | J-2120 | J-2134 | 1,250 | -116.82 | 0.06 | 0.08 | 0.33 | 110.0 |
| P-2158 | 8.0 | J-2120 | J-2119 | 1,400 | 20.47 | 0.02 | 0.03 | 0.13 | 100.0 |
| P-2159 | 8.0 | J-2121 | J-2120 | 800 | -88.33 | 0.33 | 0.27 | 0.56 | 100.0 |
| P-2160 | 8.0 | J-2142 | J-2143 | 500 | -57.45 | 0.11 | 0.05 | 0.37 | 120.0 |
| P-2161 | 8.0 | J-2136 | J-2137 | 1,650 | 34.70 | 0.05 | 0.08 | 0.22 | 110.0 |
| P-2162 | 8.0 | J-2142 | J-2141 | 900 | -4.84 | 0.00 | 0.00 | 0.03 | 120.0 |
| P-2163 | 8.0 | J-2135 | J-2142 | 1,250 | -54.26 | 0.11 | 0.14 | 0.35 | 110.0 |
| P-2164 | 8.0 | J-2136 | J-2135 | 200 | 18.67 | 0.02 | 0.00 | 0.12 | 110.0 |
| P-2165 | 8.0 | J-2138 | J-2136 | 750 | 61.40 | 0.17 | 0.13 | 0.39 | 100.0 |
| P-2166 | 8.0 | J-2141 | J-2140 | 750 | 16.97 | 0.01 | 0.01 | 0.11 | 120.0 |
| P-2167 | 8.0 | J-2143 | J-2141 | 1,650 | 29.85 | 0.03 | 0.05 | 0.19 | 120.0 |
| P-2168 | 8.0 | J-2144 | J-2143 | 1,000 | 95.32 | 0.38 | 0.38 | 0.61 | 100.0 |
| P-2169 | 8.0 | J-2165 | J-2166 | 1,200 | 8.03 | 0.00 | 0.00 | 0.05 | 110.0 |
| P-2170 | 12.0 | J-2144 | J-2165 | 1,600 | -323.13 | 0.36 | 0.58 | 0.92 | 120.0 |
| P-2171 | 12.0 | J-2145 | J-2144 | 750 | -219.78 | 0.18 | 0.13 | 0.62 | 120.0 |
| P-2172 | 12.0 | J-2146 | J-2147 | 500 | 71.84 | 0.02 | 0.01 | 0.20 | 120.0 |
| P-2173 | 12.0 | J-2145 | J-2146 | 1,350 | 79.87 | 0.03 | 0.04 | 0.23 | 120.0 |
| P-2174 | 12.0 | J-2148 | J-2145 | 600 | -131.88 | 0.07 | 0.04 | 0.37 | 120.0 |
| P-2175 | 8.0 | J-2147 | J-2148 | 1,450 | -10.79 | 0.00 | 0.01 | 0.07 | 120.0 |
| P-2176 | 8.0 | J-2139 | J-2138 | 250 | 60.49 | 0.20 | 0.05 | 0.39 | 90.0 |
| P-2177 | 8.0 | J-2140 | J-2138 | 1,050 | 8.94 | 0.00 | 0.00 | 0.06 | 120.0 |
| P-2178 | 12.0 | J-2149 | J-2152 | 600 | 105.03 | 0.05 | 0.03 | 0.30 | 120.0 |
| P-2179 | 12.0 | J-2148 | J-2149 | 500 | 113.06 | 0.05 | 0.03 | 0.32 | 120.0 |
| P-2180 | 12.0 | J-2150 | J-2147 | 450 | -74.60 | 0.02 | 0.01 | 0.21 | 120.0 |
| P-2181 | 12.0 | J-2151 | J-2150 | 850 | -66.57 | 0.02 | 0.02 | 0.19 | 120.0 |
| P-2182 | 12.0 | J-2152 | J-2151 | 1,250 | -58.55 | 0.02 | 0.02 | 0.17 | 120.0 |
| P-2183 | 12.0 | J-2139 | J-2152 | 1,800 | -155.55 | 0.09 | 0.17 | 0.44 | 120.0 |
| P-2184 | 8.0 | J-2137 | J-2139 | 800 | -87.03 | 0.32 | 0.26 | 0.56 | 100.0 |
| P-2185 | 8.0 | J-2111 | J-2097 | 550 | 81.84 | 0.29 | 0.16 | 0.52 | 100.0 |
| P-2186 | 6.0 | J-2111 | J-2110 | 1,000 | -17.67 | 0.07 | 0.07 | 0.20 | 100.0 |
| P-2187 | 8.0 | J-2112 | J-2113 | 1,000 | -16.29 | 0.01 | 0.01 | 0.10 | 100.0 |
| P-2188 | 8.0 | J-2116 | J-2114 | 950 | -5.96 | 0.00 | 0.00 | 0.04 | 100.0 |
| P-2189 | 8.0 | J-2110 | J-2109 | 1,200 | 5.66 | 0.00 | 0.00 | 0.04 | 100.0 |
| P-2190 | 8.0 | J-2112 | J-2111 | 300 | 72.20 | 0.23 | 0.07 | 0.46 | 100.0 |
| P-2191 | 8.0 | J-2116 | J-2112 | 300 | 63.94 | 0.18 | 0.05 | 0.41 | 100.0 |
| P-2192 | 8.0 | J-2118 | J-2116 | 339 | 66.01 | 0.19 | 0.07 | 0.42 | 100.0 |
| P-2193 | 8.0 | J-2117 | J-2118 | 850 | -37.07 | 0.07 | 0.06 | 0.24 | 100.0 |
| P-2194 | 8.0 | J-2114 | J-2117 | 300 | -21.01 | 0.02 | 0.01 | 0.13 | 100.0 |
| P-2195 | 8.0 | J-2113 | J-2110 | 300 | 31.36 | 0.05 | 0.01 | 0.20 | 100.0 |

# Scenario: PH
# Steady State Analysis
# Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-2196 | 8.0 | J-2114 | J-2113 | 300 | 55.68 | 0.14 | 0.04 | 0.36 | 100.0 |
| P-2197 | 8.0 | J-2163 | J-2114 | 1,300 | 48.67 | 0.11 | 0.14 | 0.31 | 100.0 |
| P-2198 | 8.0 | J-2164 | J-2163 | 800 | 52.05 | 0.12 | 0.10 | 0.33 | 100.0 |
| P-2199 | 8.0 | J-2122 | J-2164 | 400 | 60.08 | 0.16 | 0.07 | 0.38 | 100.0 |
| P-2200 | 8.0 | J-2121 | J-2122 | 400 | 59.93 | 0.14 | 0.05 | 0.38 | 110.0 |
| P-2201 | 8.0 | J-2123 | J-2124 | 400 | -50.78 | 0.12 | 0.05 | 0.32 | 100.0 |
| P-2202 | 8.0 | J-2126 | J-2137 | 800 | -113.71 | 0.53 | 0.42 | 0.73 | 100.0 |
| P-2203 | 8.0 | J-2123 | J-2125 | 300 | 34.57 | 0.06 | 0.02 | 0.22 | 100.0 |
| P-2204 | 8.0 | J-2122 | J-2123 | 280 | -8.18 | 0.00 | 0.00 | 0.05 | 100.0 |
| P-2205 | 8.0 | J-2124 | J-2121 | 250 | -20.37 | 0.02 | 0.01 | 0.13 | 100.0 |
| P-2206 | 8.0 | J-2126 | J-2124 | 210 | 38.44 | 0.07 | 0.01 | 0.25 | 100.0 |
| P-2207 | 8.0 | J-2125 | J-2126 | 400 | -67.23 | 0.20 | 0.08 | 0.43 | 100.0 |
| P-2208 | 8.0 | J-2163 | J-2125 | 400 | -93.78 | 0.37 | 0.15 | 0.60 | 100.0 |
| P-2209 | 8.0 | J-2109 | J-2163 | 600 | -89.13 | 0.34 | 0.20 | 0.57 | 100.0 |
| P-2210 | 8.0 | PRV-1 | J-2096 | 660 | 0.00 | 0.00 | 0.00 | 0.00 | 100.0 |
| P-2211 | 8.0 | J-2097 | J-2096 | 400 | 73.81 | 0.24 | 0.10 | 0.47 | 100.0 |
| P-2212 | 8.0 | J-2096 | J-2098 | 200 | 45.42 | 0.10 | 0.02 | 0.29 | 100.0 |
| P-2213 | 8.0 | J-2115 | J-2096 | 2,600 | -20.36 | 0.02 | 0.05 | 0.13 | 110.0 |
| P-2214 | 8.0 | J-2099 | J-2175 | 548 | 19.78 | 0.02 | 0.01 | 0.13 | 110.0 |
| P-2215 | 8.0 | J-2098 | J-2099 | 300 | 37.39 | 0.07 | 0.02 | 0.24 | 100.0 |
| P-2216 | 8.0 | J-2160 | J-2100 | 400 | 6.79 | 0.00 | 0.00 | 0.04 | 100.0 |
| P-2217 | 8.0 | J-2102 | J-2160 | 600 | 14.82 | 0.01 | 0.01 | 0.09 | 100.0 |
| P-2218 | 6.0 | J-2100 | J-2101 | 700 | 8.34 | 0.02 | 0.01 | 0.09 | 100.0 |
| P-2219 | 8.0 | J-2102 | J-2108 | 1,100 | -36.39 | 0.05 | 0.05 | 0.23 | 120.0 |
| P-2220 | 8.0 | J-2108 | J-2109 | 950 | -86.77 | 0.32 | 0.30 | 0.55 | 100.0 |
| P-2221 | 8.0 | J-2107 | J-2108 | 200 | -42.34 | 0.08 | 0.02 | 0.27 | 100.0 |
| P-2222 | 8.0 | J-2102 | J-2107 | 950 | -26.29 | 0.04 | 0.03 | 0.17 | 100.0 |
| P-2223 | 8.0 | J-2099 | J-2100 | 850 | 9.58 | 0.01 | 0.00 | 0.06 | 100.0 |
| P-2224 | 6.0 | J-2105 | J-2106 | 600 | 8.03 | 0.02 | 0.01 | 0.09 | 100.0 |
| P-2225 | 6.0 | J-2102 | J-2105 | 500 | 16.06 | 0.06 | 0.03 | 0.18 | 100.0 |
| P-2226 | 8.0 | J-2103 | J-2102 | 500 | -23.77 | 0.03 | 0.01 | 0.15 | 100.0 |
| P-2227 | 6.0 | J-2104 | J-2103 | 305 | -8.03 | 0.02 | 0.00 | 0.09 | 100.0 |
| P-2228 | 8.0 | J-2101 | J-2103 | 1,900 | -7.71 | 0.00 | 0.01 | 0.05 | 110.0 |
| P-2229 | 6.0 | J-2101 | J-2168 | 376 | 8.03 | 0.01 | 0.00 | 0.09 | 130.0 |
| P-2230 | 6.0 | J-2175 | J-2170 | 369 | 8.03 | 0.01 | 0.00 | 0.09 | 130.0 |
| P-2231 | 6.0 | J-2175 | J-2169 | 373 | 8.03 | 0.01 | 0.00 | 0.09 | 130.0 |
| P-2232 | 8.0 | J-2175 | J-2115 | 1,352 | -4.31 | 0.00 | 0.00 | 0.03 | 110.0 |
| P-2233 | 6.0 | J-2115 | J-2171 | 853 | 8.03 | 0.01 | 0.01 | 0.09 | 130.0 |
| P-2234 | 6.0 | J-2107 | J-2172 | 980 | 8.03 | 0.01 | 0.01 | 0.09 | 130.0 |
| P-2235 | 8.0 | J-2117 | J-2173 | 348 | 8.03 | 0.00 | 0.00 | 0.05 | 130.0 |
| P-2236 | 8.0 | J-2118 | J-2174 | 567 | 8.03 | 0.00 | 0.00 | 0.05 | 130.0 |
| P-2237 | 12.0 | J-2176 | J-2094 | 1,500 | -503.32 | 0.71 | 1.07 | 1.43 | 130.0 |
| P-2238 | 12.0 | J-2178 | J-2176 | 401 | -487.27 | 0.78 | 0.31 | 1.38 | 120.0 |
| P-2239 | 12.0 | J-2167 | J-2178 | 399 | -471.21 | 0.73 | 0.29 | 1.34 | 120.0 |
| P-2240 | 8.0 | J-2176 | J-2177 | 1,030 | 8.03 | 0.00 | 0.00 | 0.05 | 130.0 |
| P-2241 | 8.0 | J-2178 | J-2179 | 580 | 8.03 | 0.00 | 0.00 | 0.05 | 130.0 |
| P-2242 | 8.0 | J-2092 | J-2180 | 501 | 40.15 | 0.09 | 0.05 | 0.26 | 90.0 |
| P-2243 | 8.0 | J-2180 | J-2181 | 581 | 8.03 | 0.00 | 0.00 | 0.05 | 130.0 |
| P-2244 | 8.0 | J-2180 | J-2182 | 291 | 24.09 | 0.04 | 0.01 | 0.15 | 90.0 |
| P-2245 | 6.0 | J-2182 | J-2183 | 295 | 8.03 | 0.01 | 0.00 | 0.09 | 130.0 |
| P-2246 | 8.0 | J-2182 | J-2095 | 308 | 8.03 | 0.00 | 0.00 | 0.05 | 90.0 |

# Scenario: PH
# Steady State Analysis
# Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-2247 | 12.0 | J-2155 | J-2184 | 1,102 | 297.63 | 0.31 | 0.34 | 0.84 | 120.0 |
| P-2248 | 8.0 | J-2184 | J-2158 | 1,245 | 17.05 | 0.01 | 0.02 | 0.11 | 110.0 |
| P-2249 | 8.0 | J-2068 | J-2185 | 774 | 78.17 | 0.22 | 0.17 | 0.50 | 110.0 |
| P-2250 | 8.0 | J-2185 | J-2069 | 1,326 | 62.11 | 0.14 | 0.19 | 0.40 | 110.0 |
| P-2251 | 6.0 | J-2069 | J-2187 | 442 | 32.12 | 0.13 | 0.06 | 0.36 | 130.0 |
| P-2252 | 6.0 | J-2187 | J-2188 | 292 | 8.03 | 0.01 | 0.00 | 0.09 | 130.0 |
| P-2253 | 6.0 | J-2187 | J-2189 | 535 | 16.06 | 0.04 | 0.02 | 0.18 | 130.0 |
| P-2254 | 8.0 | J-2189 | J-2190 | 905 | 3.79 | 0.00 | 0.00 | 0.02 | 130.0 |
| P-2255 | 8.0 | J-2190 | J-2189 | 723 | -4.24 | 0.00 | 0.00 | 0.03 | 130.0 |
| P-2256 | 8.0 | J-2000 | J-2291 | 921 | 8.03 | 0.00 | 0.00 | 0.05 | 130.0 |
| P-2257 | 6.0 | J-2074 | J-1129 | 1,069 | 14.30 | 0.03 | 0.03 | 0.16 | 130.0 |
| P-2258 | 8.0 | J-2073 | J-1130 | 1,192 | 14.30 | 0.01 | 0.01 | 0.09 | 130.0 |
| P-2259 | 10.0 | J-2191 | J-2022 | 760 | -106.21 | 0.16 | 0.12 | 0.43 | 100.0 |
| P-2260 | 6.0 | J-2002 | J-2193 | 1,425 | 8.03 | 0.01 | 0.01 | 0.09 | 130.0 |
| P-2296 | 10.0 | J-2021 | J-2191 | 1,290 | -90.15 | 0.12 | 0.15 | 0.37 | 100.0 |
| P-2297 | 6.0 | J-2009 | J-2010 | 600 | -3.61 | 0.00 | 0.00 | 0.04 | 90.0 |
| P-2298 | 12.0 | J-2056 | J-2195 | 644 | 221.10 | 0.18 | 0.12 | 0.63 | 120.0 |
| P-2299 | 12.0 | J-2195 | J-2058 | 206 | 221.10 | 0.18 | 0.04 | 0.63 | 120.0 |
| P-2300 | 8.0 | J-2056 | J-2194 | 1,153 | 24.95 | 0.08 | 0.09 | 0.16 | 60.0 |

# Scenario: PH
# Steady State Analysis
# Pump Report

| Label | Elevation (ft) | Control Status | Intake Pump Grade (ft) | Discharge Pump Grade (ft) | Discharge (gpm) | Pump Head (ft) | Notes |
|---|---|---|---|---|---|---|---|
| PMP-6 | 285.00 | Off | 288.65 | 515.97 | 0.00 | 0.00 | Boland |
| PMP-2 | 285.00 | On | 287.09 | 548.82 | 626.76 | 261.73 | Boland |
| PMP-1 | 285.00 | On | 287.42 | 543.53 | 654.73 | 256.10 | Boland |
| PMP-4 | 275.00 | On | 283.18 | 501.90 | 645.03 | 218.72 | Hosmer |
| PMP-5 | 275.00 | On | 283.07 | 500.96 | 765.04 | 217.89 | Hosmer |

# Scenario: PH
# Steady State Analysis
# Tank Report

| Label | Zone | Base Elevation (ft) | Minimum Elevation (ft) | Initial HGL (ft) | Maximum Elevation (ft) | Tank Diameter (ft) | Inflow (gpm) | Current Status | Calculated Hydraulic Grade (ft) | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| T-1 | Zone | 418.00 | 418.00 | 482.00 | 492.70 | 25.00 | -509.96 | Draining | 482.00 | Oak Hill Tank |
| T-2 | Zone | 451.00 | 451.00 | 482.00 | 493.30 | 40.00 | 54.81 | Filling | 482.00 | Clear Hill Tank |
| T-3 | Zone | 467.00 | 467.00 | 503.00 | 515.00 | 67.00 | -781.18 | Draining | 503.00 | Tara Rd Tank |

# Scenario: FIRE FLOW
# Fire Flow Analysis
# Fire Flow Report

| Label | Zone | Elevation (ft) | Demand (gpm) | Needed Fire Flow (gpm) | Total Flow Needed (gpm) | Available Fire Flow (gpm) | Total Flow Available (gpm) | Residual Pressure @ Total Flow Needed (psi) | Residual Pressure (psi) | Satisfies Fire Flow Constraints? |
|---|---|---|---|---|---|---|---|---|---|---|
| J-1000 | HIGH SERVICE AREA | 375.00 | 6.98 | 1,000.00 | 1,006.98 | 1,525.88 | 1,532.86 | 51.90 | 45.96 | true |
| J-1001 | HIGH SERVICE AREA | 341.00 | 6.98 | 1,000.00 | 1,006.98 | 1,734.38 | 1,741.36 | 67.37 | 59.52 | true |
| J-1002 | HIGH SERVICE AREA | 272.00 | 6.98 | 1,000.00 | 1,006.98 | 1,798.83 | 1,805.81 | 97.25 | 88.51 | true |
| J-1003 | HIGH SERVICE AREA | 270.00 | 6.98 | 1,000.00 | 1,006.98 | 1,936.04 | 1,943.02 | 99.36 | 91.39 | true |
| J-1004 | HIGH SERVICE AREA | 285.00 | 6.98 | 1,000.00 | 1,006.98 | 1,700.93 | 1,707.91 | 91.83 | 84.85 | true |
| J-1005 | HIGH SERVICE AREA | 275.00 | 6.98 | 1,000.00 | 1,006.98 | 2,198.73 | 2,205.71 | 98.04 | 89.24 | true |
| J-1006 | HIGH SERVICE AREA | 272.00 | 6.98 | 1,000.00 | 1,006.98 | 2,277.34 | 2,284.33 | 99.67 | 88.39 | true |
| J-1007 | HIGH SERVICE AREA | 270.00 | 6.98 | 1,000.00 | 1,006.98 | 2,315.43 | 2,322.41 | 99.25 | 81.83 | true |
| J-1008 | HIGH SERVICE AREA | 270.00 | 6.98 | 1,000.00 | 1,006.98 | 2,315.43 | 2,322.41 | 98.47 | 78.32 | true |
| J-1009 | HIGH SERVICE AREA | 270.00 | 6.98 | 1,000.00 | 1,006.98 | 2,315.43 | 2,322.41 | 97.93 | 75.78 | true |
| J-1010 | HIGH SERVICE AREA | 290.00 | 6.98 | 1,000.00 | 1,006.98 | 2,391.60 | 2,398.58 | 91.44 | 80.95 | true |
| J-1011 | HIGH SERVICE AREA | 275.00 | 6.98 | 1,000.00 | 1,006.98 | 2,212.89 | 2,219.87 | 97.33 | 87.33 | true |
| J-1012 | HIGH SERVICE AREA | 295.00 | 6.98 | 1,000.00 | 1,006.98 | 1,984.38 | 1,991.36 | 87.61 | 78.65 | true |
| J-1013 | HIGH SERVICE AREA | 295.00 | 6.98 | 1,000.00 | 1,006.98 | 1,604.49 | 1,611.48 | 85.39 | 78.74 | true |
| J-1014 | HIGH SERVICE AREA | 277.00 | 6.98 | 1,000.00 | 1,006.98 | 1,604.49 | 1,611.48 | 84.62 | 66.08 | true |
| J-1015 | HIGH SERVICE AREA | 315.00 | 6.98 | 1,000.00 | 1,006.98 | 2,315.43 | 2,322.41 | 76.75 | 48.48 | true |
| J-1016 | HIGH SERVICE AREA | 295.00 | 6.98 | 1,000.00 | 1,006.98 | 2,315.43 | 2,322.41 | 85.10 | 55.80 | true |
| J-1017 | HIGH SERVICE AREA | 295.00 | 6.98 | 1,000.00 | 1,006.98 | 2,315.43 | 2,322.41 | 82.75 | 44.84 | true |
| J-1018 | HIGH SERVICE AREA | 270.00 | 6.98 | 1,000.00 | 1,006.98 | 1,402.83 | 1,409.81 | 94.02 | 88.46 | true |
| J-1019 | HIGH SERVICE AREA | 310.00 | 6.98 | 1,000.00 | 1,006.98 | 1,402.83 | 1,409.81 | 67.74 | 54.95 | true |
| J-1020 | HIGH SERVICE AREA | 340.00 | 6.98 | 1,000.00 | 1,006.98 | 1,402.83 | 1,409.81 | 50.93 | 34.87 | true |
| J-1021 | HIGH SERVICE AREA | 335.00 | 6.98 | 1,000.00 | 1,006.98 | 1,402.83 | 1,409.81 | 52.36 | 35.67 | true |
| J-1022 | HIGH SERVICE AREA | 315.00 | 22.44 | 1,000.00 | 1,022.44 | 1,402.83 | 1,425.27 | 63.56 | 49.11 | true |
| J-1023 | HIGH SERVICE AREA | 315.00 | 6.98 | 1,000.00 | 1,006.98 | 1,402.83 | 1,409.81 | 60.78 | 44.00 | true |
| J-1024 | HIGH SERVICE AREA | 310.00 | 6.98 | 1,000.00 | 1,006.98 | 1,402.83 | 1,409.81 | 61.80 | 44.03 | true |
| J-1025 | HIGH SERVICE AREA | 410.00 | 6.98 | 1,000.00 | 1,006.98 | 850.10 | 857.08 | 25.42 | 29.09 | false |
| J-1026 | HIGH SERVICE AREA | 410.00 | 6.98 | 1,000.00 | 1,006.98 | 873.29 | 880.27 | 26.11 | 29.09 | false |
| J-1027 | HIGH SERVICE AREA | 370.00 | 6.98 | 1,000.00 | 1,006.98 | 918.46 | 925.44 | 44.62 | 46.40 | false |
| J-1028 | HIGH SERVICE AREA | 385.00 | 6.98 | 1,000.00 | 1,006.98 | 936.65 | 943.63 | 38.56 | 39.91 | false |
| J-1029 | HIGH SERVICE AREA | 375.00 | 6.98 | 1,000.00 | 1,006.98 | 972.17 | 979.15 | 43.68 | 44.25 | false |
| J-1030 | HIGH SERVICE AREA | 300.00 | 6.98 | 1,000.00 | 1,006.98 | 916.75 | 923.73 | 68.03 | 70.85 | false |
| J-1031 | HIGH SERVICE AREA | 300.00 | 6.98 | 1,000.00 | 1,006.98 | 915.53 | 922.51 | 71.11 | 73.51 | false |
| J-1032 | HIGH SERVICE AREA | 310.00 | 6.98 | 1,000.00 | 1,006.98 | 914.67 | 921.66 | 69.35 | 71.39 | false |
| J-1033 | HIGH SERVICE AREA | 295.00 | 6.98 | 1,000.00 | 1,006.98 | 913.57 | 920.56 | 75.44 | 77.56 | false |
| J-1034 | HIGH SERVICE AREA | 275.00 | 6.98 | 1,000.00 | 1,006.98 | 913.57 | 920.56 | 83.11 | 85.39 | false |
| J-1035 | HIGH SERVICE AREA | 350.00 | 6.98 | 1,000.00 | 1,006.98 | 888.06 | 895.04 | 50.00 | 53.05 | false |
| J-1036 | HIGH SERVICE AREA | 285.00 | 6.98 | 1,000.00 | 1,006.98 | 2,535.64 | 2,542.63 | 85.45 | 50.04 | true |
| J-1037 | HIGH SERVICE AREA | 285.00 | 6.98 | 1,000.00 | 1,006.98 | 2,499.02 | 2,506.00 | 85.21 | 50.00 | true |
| J-1038 | HIGH SERVICE AREA | 272.00 | 6.98 | 1,000.00 | 1,006.98 | 2,239.75 | 2,246.73 | 91.15 | 65.70 | true |
| J-1039 | HIGH SERVICE AREA | 390.00 | 9.84 | 1,000.00 | 1,009.84 | 2,568.60 | 2,578.45 | 45.01 | 32.31 | true |
| J-1040 | HIGH SERVICE AREA | 450.00 | 6.98 | 1,000.00 | 1,006.98 | 2,677.73 | 2,684.72 | 22.46 | 20.00 | true |
| J-1041 | HIGH SERVICE AREA | 450.00 | 6.98 | 1,000.00 | 1,006.98 | 1,176.76 | 1,183.74 | 20.77 | 20.00 | true |
| J-1042 | HIGH SERVICE AREA | 410.00 | 6.98 | 1,000.00 | 1,006.98 | 3,117.19 | 3,124.17 | 39.68 | 33.59 | true |
| J-1043 | HIGH SERVICE AREA | 385.00 | 6.98 | 1,000.00 | 1,006.98 | 2,699.22 | 2,706.20 | 50.50 | 45.34 | true |
| J-1044 | HIGH SERVICE AREA | 337.00 | 6.98 | 1,000.00 | 1,006.98 | 2,789.06 | 2,796.05 | 71.16 | 64.02 | true |
| J-1045 | HIGH SERVICE AREA | 355.00 | 21.25 | 1,000.00 | 1,021.25 | 2,353.52 | 2,374.77 | 59.60 | 47.77 | true |
| J-1046 | HIGH SERVICE AREA | 335.00 | 6.98 | 1,000.00 | 1,006.98 | 2,816.41 | 2,823.39 | 72.00 | 63.90 | true |
| J-1047 | HIGH SERVICE AREA | 335.00 | 6.98 | 1,000.00 | 1,006.98 | 2,871.58 | 2,878.57 | 71.82 | 57.66 | true |
| J-1048 | HIGH SERVICE AREA | 270.00 | 6.98 | 1,000.00 | 1,006.98 | 2,858.89 | 2,865.87 | 93.24 | 49.16 | true |

# Scenario: FIRE FLOW
## Fire Flow Analysis
## Fire Flow Report

| Label | Zone | Elevation (ft) | Demand (gpm) | Needed Fire Flow (gpm) | Total Flow Needed (gpm) | Available Fire Flow (gpm) | Total Flow Available (gpm) | Residual Pressure @ Total Flow Needed (psi) | Residual Pressure (psi) | Satisfies Fire Flow Constraints? |
|---|---|---|---|---|---|---|---|---|---|---|
| J-1049 | HIGH SERVICE AREA | 285.00 | 6.98 | 1,000.00 | 1,006.98 | 1,814.33 | 1,821.31 | 76.07 | 40.34 | true |
| J-1050 | HIGH SERVICE AREA | 325.00 | 6.98 | 1,000.00 | 1,006.98 | 2,485.84 | 2,492.82 | 69.46 | 39.66 | true |
| J-1051 | HIGH SERVICE AREA | 330.00 | 6.98 | 1,000.00 | 1,006.98 | 1,792.60 | 1,799.59 | 55.69 | 20.00 | true |
| J-1052 | HIGH SERVICE AREA | 350.00 | 6.98 | 1,000.00 | 1,006.98 | 1,916.99 | 1,923.98 | 56.16 | 34.71 | true |
| J-1053 | HIGH SERVICE AREA | 312.00 | 6.98 | 1,000.00 | 1,006.98 | 2,270.51 | 2,277.49 | 75.30 | 52.03 | true |
| J-1054 | HIGH SERVICE AREA | 310.00 | 6.98 | 1,000.00 | 1,006.98 | 2,460.45 | 2,467.43 | 76.15 | 48.79 | true |
| J-1055 | HIGH SERVICE AREA | 305.00 | 6.98 | 1,000.00 | 1,006.98 | 2,487.79 | 2,494.78 | 77.71 | 46.97 | true |
| J-1056 | HIGH SERVICE AREA | 295.00 | 6.98 | 1,000.00 | 1,006.98 | 2,175.05 | 2,182.03 | 75.75 | 33.85 | true |
| J-1057 | HIGH SERVICE AREA | 320.00 | 6.98 | 1,000.00 | 1,006.98 | 2,137.45 | 2,144.43 | 72.76 | 57.82 | true |
| J-1058 | HIGH SERVICE AREA | 320.00 | 6.98 | 1,000.00 | 1,006.98 | 2,137.45 | 2,144.43 | 74.03 | 62.99 | true |
| J-1059 | HIGH SERVICE AREA | 320.00 | 6.98 | 1,000.00 | 1,006.98 | 2,169.92 | 2,176.90 | 74.05 | 62.60 | true |
| J-1060 | HIGH SERVICE AREA | 340.00 | 6.98 | 1,000.00 | 1,006.98 | 1,629.15 | 1,636.13 | 62.85 | 54.45 | true |
| J-1061 | HIGH SERVICE AREA | 345.00 | 6.98 | 1,000.00 | 1,006.98 | 2,568.36 | 2,575.34 | 60.08 | 20.00 | true |
| J-1062 | HIGH SERVICE AREA | 355.00 | 6.70 | 1,000.00 | 1,006.70 | 2,301.76 | 2,308.46 | 59.27 | 47.08 | true |
| J-1063 | HIGH SERVICE AREA | 345.00 | 6.98 | 1,000.00 | 1,006.98 | 1,770.02 | 1,777.00 | 61.66 | 52.54 | true |
| J-1064 | HIGH SERVICE AREA | 296.00 | 6.98 | 1,000.00 | 1,006.98 | 1,734.86 | 1,741.85 | 82.42 | 73.11 | true |
| J-1065 | HIGH SERVICE AREA | 290.00 | 6.98 | 1,000.00 | 1,006.98 | 1,803.96 | 1,810.94 | 84.41 | 72.75 | true |
| J-1066 | HIGH SERVICE AREA | 266.00 | 6.98 | 1,000.00 | 1,006.98 | 1,786.13 | 1,793.12 | 91.47 | 74.06 | true |
| J-1067 | HIGH SERVICE AREA | 262.00 | 6.98 | 1,000.00 | 1,006.98 | 1,761.23 | 1,768.21 | 91.27 | 71.29 | true |
| J-1068 | HIGH SERVICE AREA | 285.00 | 6.98 | 1,000.00 | 1,006.98 | 1,882.81 | 1,889.80 | 85.39 | 69.54 | true |
| J-1069 | HIGH SERVICE AREA | 295.00 | 6.98 | 1,000.00 | 1,006.98 | 1,821.78 | 1,828.76 | 75.98 | 51.63 | true |
| J-1070 | HIGH SERVICE AREA | 285.00 | 6.98 | 1,000.00 | 1,006.98 | 1,403.32 | 1,410.30 | 53.55 | 20.00 | true |
| J-1071 | HIGH SERVICE AREA | 260.00 | 6.98 | 1,000.00 | 1,006.98 | 948.64 | 955.62 | 11.52 | 20.00 | false |
| J-1072 | HIGH SERVICE AREA | 290.00 | 5.62 | 1,000.00 | 1,005.62 | 2,046.14 | 2,051.76 | 81.98 | 58.33 | true |
| J-1073 | HIGH SERVICE AREA | 295.00 | 6.98 | 1,000.00 | 1,006.98 | 2,231.45 | 2,238.43 | 78.44 | 43.85 | true |
| J-1074 | HIGH SERVICE AREA | 265.00 | 6.98 | 1,000.00 | 1,006.98 | 1,402.83 | 1,409.81 | 79.10 | 59.46 | true |
| J-1075 | HIGH SERVICE AREA | 377.00 | 6.98 | 1,000.00 | 1,006.98 | 2,301.76 | 2,308.74 | 48.84 | 33.34 | true |
| J-1076 | HIGH SERVICE AREA | 380.00 | 6.98 | 1,000.00 | 1,006.98 | 2,301.76 | 2,308.74 | 46.78 | 28.53 | true |
| J-1077 | HIGH SERVICE AREA | 320.00 | 6.98 | 1,000.00 | 1,006.98 | 2,274.41 | 2,281.40 | 73.71 | 59.60 | true |
| J-1078 | HIGH SERVICE AREA | 325.00 | 6.98 | 1,000.00 | 1,006.98 | 2,276.86 | 2,283.84 | 71.72 | 58.14 | true |
| J-1079 | HIGH SERVICE AREA | 380.00 | 61.76 | 1,000.00 | 1,061.76 | 2,259.03 | 2,320.79 | 47.42 | 32.53 | true |
| J-1080 | HIGH SERVICE AREA | 360.00 | 6.98 | 1,000.00 | 1,006.98 | 2,274.41 | 2,281.40 | 54.54 | 33.85 | true |
| J-1081 | HIGH SERVICE AREA | 350.00 | 6.98 | 1,000.00 | 1,006.98 | 1,705.81 | 1,712.79 | 59.04 | 50.16 | true |
| J-1082 | HIGH SERVICE AREA | 270.00 | 6.98 | 1,000.00 | 1,006.98 | 1,638.18 | 1,645.17 | 93.27 | 84.90 | true |
| J-1083 | HIGH SERVICE AREA | 400.00 | 6.98 | 1,000.00 | 1,006.98 | 1,123.78 | 1,130.76 | 31.22 | 28.58 | true |
| J-1084 | HIGH SERVICE AREA | 325.00 | 6.98 | 1,000.00 | 1,006.98 | 1,160.28 | 1,167.26 | 63.66 | 60.18 | true |
| J-1085 | HIGH SERVICE AREA | 325.00 | 6.98 | 1,000.00 | 1,006.98 | 1,002.20 | 1,009.18 | 59.93 | 59.88 | true |
| J-1086 | HIGH SERVICE AREA | 370.00 | 6.98 | 1,000.00 | 1,006.98 | 996.46 | 1,003.44 | 41.50 | 41.59 | false |
| J-1087 | HIGH SERVICE AREA | 415.00 | 6.98 | 1,000.00 | 1,006.98 | 960.69 | 967.68 | 20.62 | 21.68 | false |
| J-1088 | HIGH SERVICE AREA | 420.00 | 6.98 | 1,000.00 | 1,006.98 | 940.67 | 947.66 | 18.40 | 20.00 | false |
| J-1089 | HIGH SERVICE AREA | 328.00 | 6.98 | 1,000.00 | 1,006.98 | 995.97 | 1,002.95 | 44.85 | 45.05 | false |
| J-1090 | HIGH SERVICE AREA | 355.00 | 6.98 | 1,000.00 | 1,006.98 | 986.82 | 993.80 | 47.57 | 47.91 | false |
| J-1091 | HIGH SERVICE AREA | 324.00 | 6.98 | 1,000.00 | 1,006.98 | 1,002.20 | 1,009.18 | 50.90 | 50.81 | true |
| J-1092 | HIGH SERVICE AREA | 305.00 | 6.98 | 1,000.00 | 1,006.98 | 935.91 | 942.90 | 52.86 | 56.26 | false |
| J-1093 | HIGH SERVICE AREA | 330.00 | 6.98 | 1,000.00 | 1,006.98 | 797.73 | 804.71 | 29.62 | 43.94 | false |
| J-1094 | HIGH SERVICE AREA | 330.00 | 6.98 | 1,000.00 | 1,006.98 | 797.73 | 804.71 | 27.73 | 42.69 | false |
| J-1095 | HIGH SERVICE AREA | 306.00 | 6.98 | 1,000.00 | 1,006.98 | 995.97 | 1,002.95 | 43.29 | 43.58 | false |
| J-1096 | HIGH SERVICE AREA | 393.00 | 6.98 | 1,000.00 | 1,006.98 | 776.00 | 782.98 | 5.43 | 20.00 | false |
| J-1097 | HIGH SERVICE AREA | 330.00 | 6.98 | 1,000.00 | 1,006.98 | 929.93 | 936.91 | 43.70 | 47.20 | false |

# Scenario: FIRE FLOW
# Fire Flow Analysis
# Fire Flow Report

| Label | Zone | Elevation (ft) | Demand (gpm) | Needed Fire Flow (gpm) | Total Flow Needed (gpm) | Available Fire Flow (gpm) | Total Flow Available (gpm) | Residual Pressure @ Total Flow Needed (psi) | Residual Pressure (psi) | Satisfies Fire Flow Constraints? |
|---|---|---|---|---|---|---|---|---|---|---|
| J-1098 | HIGH SERVICE AREA | 270.00 | 6.98 | 1,000.00 | 1,006.98 | 2,315.43 | 2,322.41 | 100.74 | 88.29 | true |
| J-1099 | HIGH SERVICE AREA | 307.00 | 6.98 | 1,000.00 | 1,006.98 | 1,402.83 | 1,409.81 | 61.33 | 42.04 | true |
| J-1100 | HIGH SERVICE AREA | 440.00 | 6.98 | 1,000.00 | 1,006.98 | 4,000.00 | 4,006.98 | 27.10 | 24.33 | true |
| J-1101 | HIGH SERVICE AREA | 350.00 | 6.98 | 1,000.00 | 1,006.98 | 2,232.42 | 2,239.40 | 60.45 | 46.10 | true |
| J-1102 | HIGH SERVICE AREA | 305.00 | 6.98 | 1,000.00 | 1,006.98 | 2,315.43 | 2,322.41 | 82.74 | 60.47 | true |
| J-1103 | HIGH SERVICE AREA | 285.00 | 6.98 | 1,000.00 | 1,006.98 | 1,369.63 | 1,376.61 | 87.98 | 83.25 | true |
| J-1104 | HIGH SERVICE AREA | 420.00 | 6.98 | 1,000.00 | 1,006.98 | 2,845.70 | 2,852.69 | 34.19 | 26.58 | true |
| J-1105 | HIGH SERVICE AREA | 307.00 | 6.98 | 1,000.00 | 1,006.98 | 2,315.43 | 2,322.41 | 79.27 | 47.58 | true |
| J-1106 | HIGH SERVICE AREA | 303.00 | 6.98 | 1,000.00 | 1,006.98 | 2,315.43 | 2,322.41 | 80.21 | 45.58 | true |
| J-1107 | HIGH SERVICE AREA | 332.00 | 6.98 | 1,000.00 | 1,006.98 | 2,007.63 | 2,014.61 | 61.02 | 20.00 | true |
| J-1108 | HIGH SERVICE AREA | 277.00 | 6.98 | 1,000.00 | 1,006.98 | 2,315.43 | 2,322.41 | 93.98 | 68.63 | true |
| J-1109 | HIGH SERVICE AREA | 305.00 | 6.98 | 1,000.00 | 1,006.98 | 2,315.43 | 2,322.41 | 75.80 | 28.03 | true |
| J-1110 | HIGH SERVICE AREA | 320.00 | 6.98 | 1,000.00 | 1,006.98 | 1,935.30 | 1,942.29 | 63.51 | 20.00 | true |
| J-1111 | HIGH SERVICE AREA | 306.00 | 6.98 | 1,000.00 | 1,006.98 | 915.16 | 922.14 | 69.78 | 72.00 | false |
| J-1112 | HIGH SERVICE AREA | 307.00 | 6.98 | 1,000.00 | 1,006.98 | 915.16 | 922.14 | 64.76 | 67.67 | false |
| J-1113 | HIGH SERVICE AREA | 323.00 | 6.98 | 1,000.00 | 1,006.98 | 916.75 | 923.73 | 54.57 | 57.91 | false |
| J-1114 | HIGH SERVICE AREA | 431.00 | 6.98 | 1,000.00 | 1,006.98 | 751.83 | 758.81 | 12.66 | 20.00 | false |
| J-1115 | HIGH SERVICE AREA | 340.50 | 6.98 | 1,000.00 | 1,006.98 | 1,798.83 | 1,805.81 | 65.33 | 52.13 | true |
| J-1116 | HIGH SERVICE AREA | 425.50 | 6.98 | 1,000.00 | 1,006.98 | 1,115.72 | 1,122.71 | 22.69 | 20.00 | true |
| J-1117 | HIGH SERVICE AREA | 435.00 | 6.98 | 1,000.00 | 1,006.98 | 774.17 | 781.15 | 13.82 | 20.00 | false |
| J-1118 | HIGH SERVICE AREA | 319.00 | 6.98 | 1,000.00 | 1,006.98 | 1,614.56 | 1,621.55 | 54.73 | 20.00 | true |
| J-1119 | HIGH SERVICE AREA | 332.00 | 6.98 | 1,000.00 | 1,006.98 | 1,430.48 | 1,437.46 | 45.88 | 20.00 | true |
| J-1120 | HIGH SERVICE AREA | 384.00 | 6.98 | 1,000.00 | 1,006.98 | 1,732.91 | 1,739.89 | 39.57 | 20.00 | true |
| J-1121 | HIGH SERVICE AREA | 400.00 | 6.98 | 1,000.00 | 1,006.98 | 1,705.81 | 1,712.79 | 36.52 | 26.15 | true |
| J-1122 | HIGH SERVICE AREA | 443.00 | 6.98 | 1,000.00 | 1,006.98 | 652.10 | 659.08 | 12.81 | 20.00 | false |
| J-1123 | HIGH SERVICE AREA | 327.00 | 6.98 | 1,000.00 | 1,006.98 | 1,006.16 | 1,013.15 | 20.62 | 20.00 | true |
| J-1124 | HIGH SERVICE AREA | 264.00 | 6.98 | 1,000.00 | 1,006.98 | 1,761.23 | 1,768.21 | 77.14 | 33.59 | true |
| J-1125 | HIGH SERVICE AREA | 272.00 | 6.98 | 1,000.00 | 1,006.98 | 1,661.26 | 1,668.24 | 68.68 | 24.33 | true |
| J-1126 | HIGH SERVICE AREA | 278.00 | 6.98 | 1,000.00 | 1,006.98 | 1,586.85 | 1,593.84 | 62.83 | 20.00 | true |
| J-1127 | HIGH SERVICE AREA | 282.00 | 6.98 | 1,000.00 | 1,006.98 | 1,468.41 | 1,475.40 | 57.07 | 20.00 | true |
| J-1128 | HIGH SERVICE AREA | 282.00 | 6.98 | 1,000.00 | 1,006.98 | 1,255.40 | 1,262.38 | 45.07 | 20.00 | true |
| J-1129 | HIGH SERVICE AREA | 284.00 | 6.98 | 1,000.00 | 1,006.98 | 1,054.72 | 1,061.70 | 25.91 | 20.00 | true |
| J-1130 | HIGH SERVICE AREA | 306.00 | 6.98 | 1,000.00 | 1,006.98 | 1,423.89 | 1,430.87 | 45.61 | 20.00 | true |
| J-1131 | HIGH SERVICE AREA | 312.00 | 6.98 | 1,000.00 | 1,006.98 | 995.97 | 1,002.95 | 34.51 | 34.84 | false |
| J-1132 | HIGH SERVICE AREA | 372.00 | 6.98 | 1,000.00 | 1,006.98 | 1,002.20 | 1,009.18 | 23.05 | 22.93 | true |
| J-1133 | HIGH SERVICE AREA | 418.00 | 6.98 | 1,000.00 | 1,006.98 | 771.61 | 778.59 | 11.13 | 20.00 | false |
| J-2000 | LOW SERVICE AREA | 306.00 | 3.92 | 1,000.00 | 1,003.92 | 3,010.50 | 3,014.42 | 69.48 | 29.66 | true |
| J-2001 | LOW SERVICE AREA | 331.30 | 3.92 | 1,000.00 | 1,003.92 | 2,650.64 | 2,654.56 | 57.75 | 24.10 | true |
| J-2002 | LOW SERVICE AREA | 331.30 | 44.38 | 1,000.00 | 1,044.38 | 2,514.77 | 2,559.15 | 57.13 | 24.63 | true |
| J-2003 | LOW SERVICE AREA | 335.00 | 3.92 | 1,000.00 | 1,003.92 | 2,200.32 | 2,204.24 | 52.82 | 20.00 | true |
| J-2004 | LOW SERVICE AREA | 335.00 | 3.92 | 1,000.00 | 1,003.92 | 1,989.14 | 1,993.06 | 50.83 | 20.00 | true |
| J-2005 | LOW SERVICE AREA | 270.00 | 3.92 | 1,000.00 | 1,003.92 | 2,547.49 | 2,551.41 | 78.49 | 20.00 | true |
| J-2006 | LOW SERVICE AREA | 315.00 | 3.92 | 1,000.00 | 1,003.92 | 3,259.28 | 3,263.20 | 66.39 | 25.09 | true |
| J-2007 | LOW SERVICE AREA | 315.00 | 3.92 | 1,000.00 | 1,003.92 | 3,715.33 | 3,719.25 | 68.13 | 30.72 | true |
| J-2008 | LOW SERVICE AREA | 320.00 | 3.92 | 1,000.00 | 1,003.92 | 2,754.88 | 2,758.80 | 61.76 | 20.05 | true |
| J-2009 | LOW SERVICE AREA | 325.00 | 3.92 | 1,000.00 | 1,003.92 | 2,306.15 | 2,310.07 | 57.05 | 20.00 | true |
| J-2010 | LOW SERVICE AREA | 330.00 | 3.92 | 1,000.00 | 1,003.92 | 1,571.17 | 1,575.09 | 45.46 | 20.00 | true |
| J-2011 | LOW SERVICE AREA | 300.00 | 3.92 | 1,000.00 | 1,003.92 | 4,465.82 | 4,469.74 | 75.92 | 38.21 | true |
| J-2012 | LOW SERVICE AREA | 300.00 | 3.92 | 1,000.00 | 1,003.92 | 4,420.41 | 4,424.33 | 75.99 | 39.44 | true |

# Scenario: FIRE FLOW
## Fire Flow Analysis
## Fire Flow Report

| Label | Zone | Elevation (ft) | Demand (gpm) | Needed Fire Flow (gpm) | Total Flow Needed (gpm) | Available Fire Flow (gpm) | Total Flow Available (gpm) | Residual Pressure @ Total Flow Needed (psi) | Residual Pressure (psi) | Satisfies Fire Flow Constraints? |
|---|---|---|---|---|---|---|---|---|---|---|
| J-2013 | LOW SERVICE AREA | 330.00 | 3.92 | 1,000.00 | 1,003.92 | 2,412.72 | 2,416.64 | 56.57 | 20.00 | true |
| J-2014 | LOW SERVICE AREA | 330.00 | 3.92 | 1,000.00 | 1,003.92 | 4,925.78 | 4,929.70 | 63.14 | 20.00 | true |
| J-2015 | LOW SERVICE AREA | 285.00 | 3.92 | 1,000.00 | 1,003.92 | 3,259.89 | 3,263.81 | 77.63 | 21.89 | true |
| J-2016 | LOW SERVICE AREA | 275.00 | 3.92 | 1,000.00 | 1,003.92 | 2,768.43 | 2,772.35 | 79.47 | 26.64 | true |
| J-2017 | LOW SERVICE AREA | 265.00 | 3.92 | 1,000.00 | 1,003.92 | 2,062.50 | 2,066.42 | 74.02 | 20.01 | true |
| J-2018 | LOW SERVICE AREA | 265.00 | 3.92 | 1,000.00 | 1,003.92 | 830.11 | 834.03 | -10.05 | 20.00 | false |
| J-2019 | LOW SERVICE AREA | 275.00 | 3.92 | 1,000.00 | 1,003.92 | 3,065.00 | 3,068.92 | 80.30 | 20.00 | true |
| J-2020 | LOW SERVICE AREA | 295.00 | 3.92 | 1,000.00 | 1,003.92 | 2,730.47 | 2,734.39 | 70.89 | 20.00 | true |
| J-2021 | LOW SERVICE AREA | 270.00 | 3.92 | 1,000.00 | 1,003.92 | 3,277.47 | 3,281.39 | 83.29 | 20.00 | true |
| J-2022 | LOW SERVICE AREA | 295.00 | 3.92 | 1,000.00 | 1,003.92 | 3,049.56 | 3,053.48 | 72.76 | 20.00 | true |
| J-2023 | LOW SERVICE AREA | 290.00 | 3.92 | 1,000.00 | 1,003.92 | 1,880.37 | 1,884.29 | 63.07 | 20.00 | true |
| J-2024 | LOW SERVICE AREA | 295.00 | 3.92 | 1,000.00 | 1,003.92 | 2,437.26 | 2,441.18 | 68.78 | 20.00 | true |
| J-2025 | LOW SERVICE AREA | 260.00 | 3.92 | 1,000.00 | 1,003.92 | 1,926.64 | 1,930.56 | 75.57 | 28.50 | true |
| J-2026 | LOW SERVICE AREA | 325.00 | 3.92 | 1,000.00 | 1,003.92 | 4,425.78 | 4,429.70 | 65.12 | 27.43 | true |
| J-2027 | LOW SERVICE AREA | 350.00 | 3.92 | 1,000.00 | 1,003.92 | 2,782.84 | 2,786.76 | 51.35 | 20.00 | true |
| J-2028 | LOW SERVICE AREA | 287.00 | 3.92 | 1,000.00 | 1,003.92 | 4,451.66 | 4,455.58 | 81.48 | 42.05 | true |
| J-2029 | LOW SERVICE AREA | 282.00 | 3.92 | 1,000.00 | 1,003.92 | 3,972.41 | 3,976.33 | 83.25 | 45.62 | true |
| J-2030 | LOW SERVICE AREA | 335.00 | 3.92 | 1,000.00 | 1,003.92 | 3,591.80 | 3,595.72 | 61.47 | 39.09 | true |
| J-2031 | LOW SERVICE AREA | 320.00 | 3.92 | 1,000.00 | 1,003.92 | 2,789.67 | 2,793.59 | 62.47 | 20.00 | true |
| J-2032 | LOW SERVICE AREA | 260.00 | 3.92 | 1,000.00 | 1,003.92 | 3,188.97 | 3,192.89 | 94.20 | 75.98 | true |
| J-2033 | LOW SERVICE AREA | 270.00 | 3.92 | 1,000.00 | 1,003.92 | 2,527.59 | 2,531.51 | 84.83 | 51.13 | true |
| J-2034 | LOW SERVICE AREA | 285.00 | 3.92 | 1,000.00 | 1,003.92 | 2,388.92 | 2,392.84 | 78.81 | 51.24 | true |
| J-2035 | LOW SERVICE AREA | 259.00 | 3.92 | 1,000.00 | 1,003.92 | 2,209.11 | 2,213.03 | 87.47 | 62.52 | true |
| J-2036 | LOW SERVICE AREA | 265.00 | 3.92 | 1,000.00 | 1,003.92 | 2,714.84 | 2,718.77 | 84.11 | 37.31 | true |
| J-2037 | LOW SERVICE AREA | 305.00 | 3.92 | 1,000.00 | 1,003.92 | 2,224.55 | 2,228.47 | 62.92 | 20.00 | true |
| J-2038 | LOW SERVICE AREA | 265.00 | 3.92 | 1,000.00 | 1,003.92 | 4,174.80 | 4,178.73 | 88.09 | 20.00 | true |
| J-2039 | LOW SERVICE AREA | 280.00 | 3.92 | 1,000.00 | 1,003.92 | 3,689.21 | 3,693.13 | 80.86 | 20.00 | true |
| J-2040 | LOW SERVICE AREA | 270.00 | 3.92 | 1,000.00 | 1,003.92 | 3,397.77 | 3,401.69 | 83.75 | 20.00 | true |
| J-2041 | LOW SERVICE AREA | 275.00 | 3.92 | 1,000.00 | 1,003.92 | 3,603.88 | 3,607.80 | 83.02 | 24.99 | true |
| J-2042 | LOW SERVICE AREA | 305.00 | 7.41 | 1,000.00 | 1,007.41 | 3,399.41 | 3,406.83 | 70.20 | 20.00 | true |
| J-2043 | LOW SERVICE AREA | 280.00 | 3.92 | 1,000.00 | 1,003.92 | 3,228.03 | 3,231.95 | 79.19 | 20.00 | true |
| J-2044 | LOW SERVICE AREA | 280.00 | 3.92 | 1,000.00 | 1,003.92 | 3,162.11 | 3,166.03 | 79.39 | 24.33 | true |
| J-2045 | LOW SERVICE AREA | 290.00 | 3.92 | 1,000.00 | 1,003.92 | 2,376.34 | 2,380.26 | 69.89 | 20.00 | true |
| J-2046 | LOW SERVICE AREA | 280.00 | 3.92 | 1,000.00 | 1,003.92 | 3,864.26 | 3,868.18 | 82.34 | 26.33 | true |
| J-2047 | LOW SERVICE AREA | 290.00 | 3.92 | 1,000.00 | 1,003.92 | 3,846.68 | 3,850.60 | 78.96 | 33.81 | true |
| J-2048 | LOW SERVICE AREA | 305.00 | 3.92 | 1,000.00 | 1,003.92 | 3,907.23 | 3,911.15 | 72.03 | 20.77 | true |
| J-2049 | LOW SERVICE AREA | 305.00 | 3.92 | 1,000.00 | 1,003.92 | 3,777.47 | 3,781.39 | 71.64 | 20.00 | true |
| J-2050 | LOW SERVICE AREA | 325.00 | 3.92 | 1,000.00 | 1,003.92 | 3,963.62 | 3,967.54 | 64.00 | 20.00 | true |
| J-2051 | LOW SERVICE AREA | 325.00 | 3.92 | 1,000.00 | 1,003.92 | 2,664.55 | 2,668.47 | 59.90 | 20.00 | true |
| J-2052 | LOW SERVICE AREA | 365.00 | 35.82 | 1,000.00 | 1,035.82 | 1,920.17 | 1,955.99 | 40.37 | 20.00 | true |
| J-2053 | LOW SERVICE AREA | 275.00 | 3.92 | 1,000.00 | 1,003.92 | 3,075.68 | 3,079.61 | 83.81 | 51.73 | true |
| J-2054 | LOW SERVICE AREA | 265.00 | 3.92 | 1,000.00 | 1,003.92 | 2,876.10 | 2,880.02 | 82.75 | 20.00 | true |
| J-2055 | LOW SERVICE AREA | 285.00 | 3.92 | 1,000.00 | 1,003.92 | 4,493.16 | 4,497.09 | 82.85 | 53.82 | true |
| J-2056 | LOW SERVICE AREA | 295.00 | 3.92 | 1,000.00 | 1,003.92 | 4,470.70 | 4,474.63 | 78.56 | 50.45 | true |
| J-2057 | LOW SERVICE AREA | 295.00 | 12.55 | 1,000.00 | 1,012.55 | 2,393.19 | 2,405.74 | 68.21 | 20.00 | true |
| J-2058 | LOW SERVICE AREA | 285.00 | 3.92 | 1,000.00 | 1,003.92 | 4,333.01 | 4,336.93 | 83.13 | 60.68 | true |
| J-2059 | LOW SERVICE AREA | 265.00 | 3.92 | 1,000.00 | 1,003.92 | 4,583.98 | 4,587.91 | 91.13 | 54.16 | true |
| J-2060 | LOW SERVICE AREA | 280.00 | 3.92 | 1,000.00 | 1,003.92 | 2,938.97 | 2,942.89 | 83.00 | 54.61 | true |
| J-2061 | LOW SERVICE AREA | 265.00 | 3.92 | 1,000.00 | 1,003.92 | 2,387.82 | 2,391.74 | 79.14 | 20.00 | true |

# Scenario: FIRE FLOW
# Fire Flow Analysis
# Fire Flow Report

| Label | Zone | Elevation (ft) | Demand (gpm) | Needed Fire Flow (gpm) | Total Flow Needed (gpm) | Available Fire Flow (gpm) | Total Flow Available (gpm) | Residual Pressure @ Total Flow Needed (psi) | Residual Pressure (psi) | Satisfies Fire Flow Constraints? |
|---|---|---|---|---|---|---|---|---|---|---|
| J-2062 | LOW SERVICE AREA | 280.00 | 3.92 | 1,000.00 | 1,003.92 | 2,299.44 | 2,303.36 | 80.39 | 54.62 | true |
| J-2063 | LOW SERVICE AREA | 360.00 | 3.92 | 1,000.00 | 1,003.92 | 1,836.67 | 1,840.59 | 42.13 | 20.00 | true |
| J-2064 | LOW SERVICE AREA | 280.00 | 8.37 | 1,000.00 | 1,008.37 | 1,641.72 | 1,650.10 | 59.89 | 20.00 | true |
| J-2065 | LOW SERVICE AREA | 275.00 | 3.92 | 1,000.00 | 1,003.92 | 1,643.25 | 1,647.17 | 62.10 | 22.15 | true |
| J-2066 | LOW SERVICE AREA | 280.00 | 3.92 | 1,000.00 | 1,003.92 | 1,635.86 | 1,639.79 | 59.72 | 20.00 | true |
| J-2067 | LOW SERVICE AREA | 280.00 | 3.92 | 1,000.00 | 1,003.92 | 1,635.80 | 1,639.72 | 59.72 | 20.00 | true |
| J-2068 | LOW SERVICE AREA | 230.00 | 3.92 | 1,000.00 | 1,003.92 | 2,528.08 | 2,532.00 | 104.37 | 81.53 | true |
| J-2069 | LOW SERVICE AREA | 215.00 | 6.81 | 1,000.00 | 1,006.81 | 1,654.11 | 1,660.92 | 86.84 | 43.80 | true |
| J-2070 | LOW SERVICE AREA | 200.00 | 3.92 | 1,000.00 | 1,003.92 | 1,504.76 | 1,508.68 | 73.66 | 20.00 | true |
| J-2071 | LOW SERVICE AREA | 200.00 | 3.92 | 1,000.00 | 1,003.92 | 1,345.25 | 1,349.17 | 62.70 | 20.00 | true |
| J-2072 | LOW SERVICE AREA | 288.00 | 6.53 | 1,000.00 | 1,006.53 | 1,639.16 | 1,645.69 | 70.51 | 54.20 | true |
| J-2073 | LOW SERVICE AREA | 275.00 | 16.37 | 1,000.00 | 1,016.37 | 1,639.16 | 1,655.53 | 68.56 | 41.41 | true |
| J-2074 | LOW SERVICE AREA | 285.00 | 3.92 | 1,000.00 | 1,003.92 | 1,639.16 | 1,643.08 | 60.22 | 27.15 | true |
| J-2075 | LOW SERVICE AREA | 270.00 | 3.92 | 1,000.00 | 1,003.92 | 1,639.16 | 1,643.08 | 68.14 | 37.13 | true |
| J-2076 | LOW SERVICE AREA | 295.00 | 3.92 | 1,000.00 | 1,003.92 | 1,829.59 | 1,833.51 | 64.33 | 36.06 | true |
| J-2077 | LOW SERVICE AREA | 295.00 | 3.92 | 1,000.00 | 1,003.92 | 1,855.47 | 1,859.39 | 64.49 | 35.54 | true |
| J-2078 | LOW SERVICE AREA | 290.00 | 3.92 | 1,000.00 | 1,003.92 | 1,843.51 | 1,847.43 | 63.15 | 27.32 | true |
| J-2079 | LOW SERVICE AREA | 393.00 | 3.92 | 1,000.00 | 1,003.92 | 1,204.59 | 1,208.51 | 24.75 | 20.00 | true |
| J-2080 | LOW SERVICE AREA | 292.00 | 3.92 | 1,000.00 | 1,003.92 | 1,599.37 | 1,603.29 | 70.24 | 56.93 | true |
| J-2081 | LOW SERVICE AREA | 276.00 | 3.92 | 1,000.00 | 1,003.92 | 2,203.61 | 2,207.53 | 77.80 | 46.09 | true |
| J-2082 | LOW SERVICE AREA | 320.00 | 3.92 | 1,000.00 | 1,003.92 | 894.23 | 898.15 | 8.85 | 20.00 | false |
| J-2083 | LOW SERVICE AREA | 350.00 | 3.92 | 1,000.00 | 1,003.92 | 1,260.01 | 1,263.93 | 41.82 | 34.85 | true |
| J-2084 | LOW SERVICE AREA | 370.00 | 3.92 | 1,000.00 | 1,003.92 | 1,270.87 | 1,274.80 | 33.31 | 26.10 | true |
| J-2085 | LOW SERVICE AREA | 350.00 | 3.92 | 1,000.00 | 1,003.92 | 1,308.35 | 1,312.27 | 44.01 | 37.00 | true |
| J-2086 | LOW SERVICE AREA | 330.00 | 3.92 | 1,000.00 | 1,003.92 | 1,426.76 | 1,430.68 | 53.71 | 44.58 | true |
| J-2087 | LOW SERVICE AREA | 320.00 | 3.92 | 1,000.00 | 1,003.92 | 1,774.90 | 1,778.82 | 61.33 | 48.91 | true |
| J-2088 | LOW SERVICE AREA | 340.00 | 3.92 | 1,000.00 | 1,003.92 | 2,017.58 | 2,021.50 | 48.80 | 20.00 | true |
| J-2089 | LOW SERVICE AREA | 315.00 | 3.92 | 1,000.00 | 1,003.92 | 2,573.00 | 2,576.92 | 62.00 | 20.00 | true |
| J-2090 | LOW SERVICE AREA | 270.00 | 3.92 | 1,000.00 | 1,003.92 | 2,031.98 | 2,035.90 | 79.51 | 50.60 | true |
| J-2091 | LOW SERVICE AREA | 280.00 | 3.92 | 1,000.00 | 1,003.92 | 4,147.46 | 4,151.38 | 85.64 | 69.04 | true |
| J-2092 | LOW SERVICE AREA | 410.00 | 3.92 | 1,000.00 | 1,003.92 | 3,887.70 | 3,891.62 | 30.05 | 22.18 | true |
| J-2093 | LOW SERVICE AREA | 415.00 | 3.92 | 1,000.00 | 1,003.92 | 2,795.90 | 2,799.82 | 27.10 | 20.00 | true |
| J-2094 | LOW SERVICE AREA | 400.00 | 3.92 | 1,000.00 | 1,003.92 | 2,849.12 | 2,853.04 | 32.32 | 20.00 | true |
| J-2095 | LOW SERVICE AREA | 400.00 | 3.92 | 1,000.00 | 1,003.92 | 900.27 | 904.19 | 16.78 | 20.00 | false |
| J-2096 | LOW SERVICE AREA | 285.00 | 3.92 | 1,000.00 | 1,003.92 | 1,546.88 | 1,550.80 | 63.76 | 41.92 | true |
| J-2097 | LOW SERVICE AREA | 287.00 | 3.92 | 1,000.00 | 1,003.92 | 1,549.68 | 1,553.60 | 64.30 | 43.94 | true |
| J-2098 | LOW SERVICE AREA | 277.50 | 3.92 | 1,000.00 | 1,003.92 | 1,546.02 | 1,549.94 | 66.36 | 43.78 | true |
| J-2099 | LOW SERVICE AREA | 285.00 | 3.92 | 1,000.00 | 1,003.92 | 1,545.04 | 1,548.97 | 63.10 | 40.59 | true |
| J-2100 | LOW SERVICE AREA | 275.00 | 3.92 | 1,000.00 | 1,003.92 | 1,545.41 | 1,549.33 | 67.01 | 43.99 | true |
| J-2101 | LOW SERVICE AREA | 280.00 | 3.92 | 1,000.00 | 1,003.92 | 1,546.88 | 1,550.80 | 57.31 | 24.95 | true |
| J-2102 | LOW SERVICE AREA | 264.00 | 3.92 | 1,000.00 | 1,003.92 | 1,547.97 | 1,551.90 | 72.48 | 50.19 | true |
| J-2103 | LOW SERVICE AREA | 265.00 | 3.92 | 1,000.00 | 1,003.92 | 1,547.24 | 1,551.16 | 68.48 | 41.88 | true |
| J-2104 | LOW SERVICE AREA | 280.00 | 3.92 | 1,000.00 | 1,003.92 | 1,328.46 | 1,332.38 | 45.97 | 20.00 | true |
| J-2105 | LOW SERVICE AREA | 260.00 | 3.92 | 1,000.00 | 1,003.92 | 1,300.17 | 1,304.09 | 47.74 | 20.00 | true |
| J-2106 | LOW SERVICE AREA | 255.00 | 3.92 | 1,000.00 | 1,003.92 | 988.43 | 992.36 | 18.38 | 20.00 | false |
| J-2107 | LOW SERVICE AREA | 280.00 | 3.92 | 1,000.00 | 1,003.92 | 1,549.56 | 1,553.48 | 65.10 | 42.13 | true |
| J-2108 | LOW SERVICE AREA | 280.00 | 3.92 | 1,000.00 | 1,003.92 | 1,550.05 | 1,553.97 | 66.28 | 44.72 | true |
| J-2109 | LOW SERVICE AREA | 300.00 | 3.92 | 1,000.00 | 1,003.92 | 1,569.58 | 1,573.50 | 62.68 | 46.36 | true |
| J-2110 | LOW SERVICE AREA | 370.00 | 3.92 | 1,000.00 | 1,003.92 | 1,437.01 | 1,440.93 | 32.24 | 20.00 | true |

# Scenario: FIRE FLOW
# Fire Flow Analysis
# Fire Flow Report

| Label | Zone | Elevation (ft) | Demand (gpm) | Needed Fire Flow (gpm) | Total Flow Needed (gpm) | Available Fire Flow (gpm) | Total Flow Available (gpm) | Residual Pressure @ Total Flow Needed (psi) | Residual Pressure (psi) | Satisfies Fire Flow Constraints? |
|---|---|---|---|---|---|---|---|---|---|---|
| J-2111 | LOW SERVICE AREA | 318.00 | 3.92 | 1,000.00 | 1,003.92 | 1,546.75 | 1,550.67 | 53.94 | 37.28 | true |
| J-2112 | LOW SERVICE AREA | 315.00 | 3.92 | 1,000.00 | 1,003.92 | 1,550.29 | 1,554.21 | 56.49 | 41.15 | true |
| J-2113 | LOW SERVICE AREA | 368.00 | 3.92 | 1,000.00 | 1,003.92 | 1,512.82 | 1,516.74 | 33.85 | 20.00 | true |
| J-2114 | LOW SERVICE AREA | 340.00 | 3.92 | 1,000.00 | 1,003.92 | 1,565.55 | 1,569.47 | 46.54 | 31.74 | true |
| J-2115 | LOW SERVICE AREA | 300.00 | 3.92 | 1,000.00 | 1,003.92 | 1,406.49 | 1,410.42 | 50.74 | 29.52 | true |
| J-2116 | LOW SERVICE AREA | 300.00 | 3.92 | 1,000.00 | 1,003.92 | 1,570.68 | 1,574.60 | 63.51 | 48.12 | true |
| J-2117 | LOW SERVICE AREA | 310.00 | 3.92 | 1,000.00 | 1,003.92 | 1,575.44 | 1,579.36 | 58.29 | 41.55 | true |
| J-2118 | LOW SERVICE AREA | 287.00 | 3.92 | 1,000.00 | 1,003.92 | 1,600.34 | 1,604.26 | 69.68 | 54.03 | true |
| J-2119 | LOW SERVICE AREA | 271.00 | 3.92 | 1,000.00 | 1,003.92 | 1,869.87 | 1,873.79 | 79.40 | 60.29 | true |
| J-2120 | LOW SERVICE AREA | 262.00 | 3.92 | 1,000.00 | 1,003.92 | 1,925.05 | 1,928.97 | 83.78 | 64.20 | true |
| J-2121 | LOW SERVICE AREA | 255.00 | 3.92 | 1,000.00 | 1,003.92 | 1,782.71 | 1,786.64 | 85.44 | 67.23 | true |
| J-2122 | LOW SERVICE AREA | 265.00 | 3.92 | 1,000.00 | 1,003.92 | 1,755.25 | 1,759.17 | 80.60 | 62.32 | true |
| J-2123 | LOW SERVICE AREA | 265.00 | 3.92 | 1,000.00 | 1,003.92 | 1,754.64 | 1,758.56 | 80.76 | 62.77 | true |
| J-2124 | LOW SERVICE AREA | 255.00 | 3.92 | 1,000.00 | 1,003.92 | 1,773.32 | 1,777.24 | 85.34 | 67.23 | true |
| J-2125 | LOW SERVICE AREA | 265.00 | 3.92 | 1,000.00 | 1,003.92 | 1,744.63 | 1,748.55 | 80.74 | 63.02 | true |
| J-2126 | LOW SERVICE AREA | 255.00 | 3.92 | 1,000.00 | 1,003.92 | 1,783.69 | 1,787.61 | 85.50 | 67.38 | true |
| J-2127 | LOW SERVICE AREA | 250.00 | 8.32 | 1,000.00 | 1,008.32 | 3,927.73 | 3,936.06 | 93.74 | 21.37 | true |
| J-2128 | LOW SERVICE AREA | 305.00 | 3.92 | 1,000.00 | 1,003.92 | 1,960.69 | 1,964.61 | 65.62 | 46.09 | true |
| J-2129 | LOW SERVICE AREA | 315.00 | 3.92 | 1,000.00 | 1,003.92 | 2,014.16 | 2,018.08 | 60.34 | 36.38 | true |
| J-2130 | LOW SERVICE AREA | 300.00 | 3.92 | 1,000.00 | 1,003.92 | 2,007.81 | 2,011.73 | 63.15 | 29.67 | true |
| J-2131 | LOW SERVICE AREA | 320.00 | 3.92 | 1,000.00 | 1,003.92 | 2,000.00 | 2,003.92 | 58.10 | 34.19 | true |
| J-2132 | LOW SERVICE AREA | 320.00 | 3.92 | 1,000.00 | 1,003.92 | 1,887.70 | 1,891.62 | 61.71 | 48.00 | true |
| J-2133 | LOW SERVICE AREA | 345.00 | 3.92 | 1,000.00 | 1,003.92 | 2,264.16 | 2,268.08 | 52.60 | 36.75 | true |
| J-2134 | LOW SERVICE AREA | 285.00 | 3.92 | 1,000.00 | 1,003.92 | 1,952.88 | 1,956.80 | 74.32 | 55.13 | true |
| J-2135 | LOW SERVICE AREA | 295.00 | 3.92 | 1,000.00 | 1,003.92 | 2,054.93 | 2,058.85 | 69.85 | 47.34 | true |
| J-2136 | LOW SERVICE AREA | 297.00 | 3.92 | 1,000.00 | 1,003.92 | 2,060.06 | 2,063.98 | 68.94 | 46.13 | true |
| J-2137 | LOW SERVICE AREA | 260.00 | 3.92 | 1,000.00 | 1,003.92 | 1,971.68 | 1,975.60 | 84.33 | 62.57 | true |
| J-2138 | LOW SERVICE AREA | 270.00 | 3.92 | 1,000.00 | 1,003.92 | 2,091.80 | 2,095.72 | 80.71 | 57.23 | true |
| J-2139 | LOW SERVICE AREA | 250.00 | 3.92 | 1,000.00 | 1,003.92 | 2,117.43 | 2,121.35 | 90.04 | 67.76 | true |
| J-2140 | LOW SERVICE AREA | 250.00 | 3.92 | 1,000.00 | 1,003.92 | 2,106.93 | 2,110.85 | 87.25 | 57.04 | true |
| J-2141 | LOW SERVICE AREA | 280.00 | 3.92 | 1,000.00 | 1,003.92 | 2,122.31 | 2,126.24 | 74.93 | 46.14 | true |
| J-2142 | LOW SERVICE AREA | 300.00 | 3.92 | 1,000.00 | 1,003.92 | 2,125.00 | 2,128.92 | 66.77 | 39.34 | true |
| J-2143 | LOW SERVICE AREA | 295.00 | 3.92 | 1,000.00 | 1,003.92 | 2,130.37 | 2,134.29 | 69.00 | 41.54 | true |
| J-2144 | LOW SERVICE AREA | 320.00 | 3.92 | 1,000.00 | 1,003.92 | 2,142.58 | 2,146.50 | 60.79 | 40.59 | true |
| J-2145 | LOW SERVICE AREA | 285.00 | 3.92 | 1,000.00 | 1,003.92 | 2,139.40 | 2,143.33 | 75.46 | 54.06 | true |
| J-2146 | LOW SERVICE AREA | 320.00 | 3.92 | 1,000.00 | 1,003.92 | 2,138.92 | 2,142.84 | 59.79 | 36.80 | true |
| J-2147 | LOW SERVICE AREA | 285.00 | 3.92 | 1,000.00 | 1,003.92 | 2,138.67 | 2,142.59 | 74.93 | 51.94 | true |
| J-2148 | LOW SERVICE AREA | 250.00 | 3.92 | 1,000.00 | 1,003.92 | 2,138.67 | 2,142.59 | 90.38 | 68.36 | true |
| J-2149 | LOW SERVICE AREA | 245.00 | 3.92 | 1,000.00 | 1,003.92 | 2,138.18 | 2,142.11 | 92.45 | 70.17 | true |
| J-2150 | LOW SERVICE AREA | 260.00 | 3.92 | 1,000.00 | 1,003.92 | 2,138.67 | 2,142.59 | 85.65 | 62.39 | true |
| J-2151 | LOW SERVICE AREA | 240.00 | 3.92 | 1,000.00 | 1,003.92 | 2,138.18 | 2,142.11 | 94.29 | 71.01 | true |
| J-2152 | LOW SERVICE AREA | 245.00 | 3.92 | 1,000.00 | 1,003.92 | 2,136.96 | 2,140.88 | 92.49 | 70.40 | true |
| J-2153 | LOW SERVICE AREA | 260.00 | 3.92 | 1,000.00 | 1,003.92 | 2,857.91 | 2,861.83 | 94.16 | 76.39 | true |
| J-2154 | LOW SERVICE AREA | 280.00 | 9.01 | 1,000.00 | 1,009.01 | 2,514.89 | 2,523.90 | 84.44 | 68.18 | true |
| J-2155 | LOW SERVICE AREA | 295.00 | 3.92 | 1,000.00 | 1,003.92 | 2,486.08 | 2,490.01 | 77.39 | 59.53 | true |
| J-2156 | LOW SERVICE AREA | 344.00 | 3.92 | 1,000.00 | 1,003.92 | 2,154.30 | 2,158.22 | 55.33 | 40.20 | true |
| J-2157 | LOW SERVICE AREA | 393.00 | 19.91 | 1,000.00 | 1,019.91 | 1,889.89 | 1,909.80 | 33.06 | 20.00 | true |
| J-2158 | LOW SERVICE AREA | 384.00 | 3.92 | 1,000.00 | 1,003.92 | 1,987.30 | 1,991.23 | 36.48 | 20.28 | true |
| J-2159 | LOW SERVICE AREA | 307.00 | 3.92 | 1,000.00 | 1,003.92 | 3,010.50 | 3,014.42 | 67.93 | 20.69 | true |

# Scenario: FIRE FLOW
# Fire Flow Analysis
# Fire Flow Report

| Label | Zone | Elevation (ft) | Demand (gpm) | Needed Fire Flow (gpm) | Total Flow Needed (gpm) | Available Fire Flow (gpm) | Total Flow Available (gpm) | Residual Pressure @ Total Flow Needed (psi) | Residual Pressure (psi) | Satisfies Fire Flow Constraints? |
|---|---|---|---|---|---|---|---|---|---|---|
| J-2160 | LOW SERVICE AREA | 263.50 | 3.92 | 1,000.00 | 1,003.92 | 1,546.39 | 1,550.31 | 71.41 | 47.62 | true |
| J-2161 | LOW SERVICE AREA | 322.00 | 3.92 | 1,000.00 | 1,003.92 | 1,978.52 | 1,982.44 | 57.43 | 34.37 | true |
| J-2162 | LOW SERVICE AREA | 315.50 | 3.92 | 1,000.00 | 1,003.92 | 1,933.11 | 1,937.03 | 61.62 | 42.62 | true |
| J-2163 | LOW SERVICE AREA | 272.00 | 3.92 | 1,000.00 | 1,003.92 | 1,660.40 | 1,664.32 | 77.19 | 61.19 | true |
| J-2164 | LOW SERVICE AREA | 295.00 | 3.92 | 1,000.00 | 1,003.92 | 1,730.47 | 1,734.39 | 66.11 | 45.94 | true |
| J-2165 | LOW SERVICE AREA | 265.00 | 3.92 | 1,000.00 | 1,003.92 | 2,171.88 | 2,175.80 | 85.61 | 67.25 | true |
| J-2166 | LOW SERVICE AREA | 272.00 | 3.92 | 1,000.00 | 1,003.92 | 2,011.11 | 2,015.03 | 69.56 | 20.00 | true |
| J-2167 | LOW SERVICE AREA | 341.00 | 3.92 | 1,000.00 | 1,003.92 | 2,668.46 | 2,672.38 | 55.79 | 37.95 | true |
| J-2168 | LOW SERVICE AREA | 274.00 | 3.92 | 1,000.00 | 1,003.92 | 1,342.16 | 1,346.08 | 47.75 | 20.00 | true |
| J-2169 | LOW SERVICE AREA | 283.00 | 3.92 | 1,000.00 | 1,003.92 | 1,403.63 | 1,407.55 | 48.98 | 20.00 | true |
| J-2170 | LOW SERVICE AREA | 285.00 | 3.92 | 1,000.00 | 1,003.92 | 1,395.90 | 1,399.83 | 48.25 | 20.00 | true |
| J-2171 | LOW SERVICE AREA | 322.00 | 3.92 | 1,000.00 | 1,003.92 | 932.19 | 936.11 | 13.65 | 20.00 | false |
| J-2172 | LOW SERVICE AREA | 300.00 | 3.92 | 1,000.00 | 1,003.92 | 1,050.11 | 1,054.03 | 24.77 | 20.00 | true |
| J-2173 | LOW SERVICE AREA | 288.00 | 3.92 | 1,000.00 | 1,003.92 | 1,575.44 | 1,579.36 | 65.03 | 44.66 | true |
| J-2174 | LOW SERVICE AREA | 290.00 | 3.92 | 1,000.00 | 1,003.92 | 1,600.34 | 1,604.26 | 63.87 | 41.98 | true |
| J-2175 | LOW SERVICE AREA | 283.00 | 3.92 | 1,000.00 | 1,003.92 | 1,545.41 | 1,549.33 | 61.04 | 34.94 | true |
| J-2176 | LOW SERVICE AREA | 347.00 | 3.92 | 1,000.00 | 1,003.92 | 2,918.46 | 2,922.38 | 53.89 | 35.30 | true |
| J-2177 | LOW SERVICE AREA | 346.00 | 3.92 | 1,000.00 | 1,003.92 | 1,912.48 | 1,916.40 | 46.12 | 20.00 | true |
| J-2178 | LOW SERVICE AREA | 355.00 | 3.92 | 1,000.00 | 1,003.92 | 2,783.20 | 2,787.12 | 50.07 | 31.85 | true |
| J-2179 | LOW SERVICE AREA | 339.00 | 3.92 | 1,000.00 | 1,003.92 | 2,415.65 | 2,419.57 | 52.37 | 20.00 | true |
| J-2180 | LOW SERVICE AREA | 405.00 | 3.92 | 1,000.00 | 1,003.92 | 1,231.20 | 1,235.12 | 24.11 | 20.00 | true |
| J-2181 | LOW SERVICE AREA | 386.00 | 3.92 | 1,000.00 | 1,003.92 | 1,231.20 | 1,235.12 | 27.70 | 21.43 | true |
| J-2182 | LOW SERVICE AREA | 402.00 | 3.92 | 1,000.00 | 1,003.92 | 1,030.27 | 1,034.19 | 20.76 | 20.00 | true |
| J-2183 | LOW SERVICE AREA | 396.00 | 3.92 | 1,000.00 | 1,003.92 | 843.75 | 847.67 | 13.82 | 20.00 | false |
| J-2184 | LOW SERVICE AREA | 219.00 | 3.92 | 1,000.00 | 1,003.92 | 2,479.00 | 2,482.93 | 109.84 | 90.65 | true |
| J-2185 | LOW SERVICE AREA | 221.00 | 3.92 | 1,000.00 | 1,003.92 | 2,463.20 | 2,467.12 | 99.33 | 41.23 | true |
| J-2186 | LOW SERVICE AREA | 218.00 | 3.92 | 1,000.00 | 1,003.92 | 2,409.97 | 2,413.89 | 95.63 | 20.00 | true |
| J-2187 | LOW SERVICE AREA | 215.00 | 3.92 | 1,000.00 | 1,003.92 | 1,320.19 | 1,324.11 | 72.24 | 43.80 | true |
| J-2188 | LOW SERVICE AREA | 219.00 | 3.92 | 1,000.00 | 1,003.92 | 1,320.19 | 1,324.11 | 61.07 | 26.31 | true |
| J-2189 | LOW SERVICE AREA | 232.00 | 3.92 | 1,000.00 | 1,003.92 | 1,096.01 | 1,099.93 | 47.47 | 36.45 | true |
| J-2190 | LOW SERVICE AREA | 270.00 | 3.92 | 1,000.00 | 1,003.92 | 1,078.77 | 1,082.69 | 29.25 | 20.00 | true |
| J-2191 | LOW SERVICE AREA | 284.00 | 3.92 | 1,000.00 | 1,003.92 | 3,119.75 | 3,123.67 | 77.23 | 20.00 | true |
| J-2192 | LOW SERVICE AREA | 263.00 | 3.92 | 1,000.00 | 1,003.92 | 1,339.60 | 1,343.52 | 50.99 | 20.00 | true |
| J-2193 | LOW SERVICE AREA | 342.00 | 3.92 | 1,000.00 | 1,003.92 | 853.24 | 857.16 | 6.44 | 20.00 | false |
| J-2194 | LOW SERVICE AREA | 295.00 | 3.92 | 1,000.00 | 1,003.92 | 2,378.91 | 2,382.83 | 68.09 | 20.00 | true |
| J-2195 | LOW SERVICE AREA | 285.00 | 3.92 | 1,000.00 | 1,003.92 | 4,367.19 | 4,371.11 | 83.04 | 58.90 | true |
| J-2291 | LOW SERVICE AREA | 275.00 | 3.92 | 1,000.00 | 1,003.92 | 2,433.59 | 2,437.52 | 75.56 | 20.00 | true |

# Scenario: FIRE FLOW
# Fire Flow Analysis
# Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-1000 | 12.0 | J-1102 | J-1015 | 1,245 | 27.93 | 0.00 | 0.00 | 0.08 | 120.0 |
| P-1001 | 12.0 | J-1007 | J-1102 | 1,005 | 34.91 | 0.01 | 0.01 | 0.10 | 120.0 |
| P-1003 | 12.0 | J-1008 | J-1009 | 300 | 6.98 | 0.00 | 0.00 | 0.02 | 100.0 |
| P-1004 | 12.0 | J-1007 | J-1008 | 400 | 48.88 | 0.02 | 0.01 | 0.14 | 100.0 |
| P-1005 | 12.0 | J-1098 | J-1007 | 850 | 90.78 | 0.04 | 0.03 | 0.26 | 110.0 |
| P-1006 | 12.0 | J-1006 | J-1098 | 800 | -1,133.00 | 4.35 | 3.48 | 3.21 | 110.0 |
| P-1007 | 12.0 | J-1007 | J-1012 | 4,600 | 0.00 | 0.00 | 0.00 | 0.00 | 130.0 |
| P-1008 | 8.0 | J-1030 | J-1031 | 1,650 | -1.04 | 0.00 | 0.00 | 0.01 | 110.0 |
| P-1010 | 12.0 | J-1016 | J-1017 | 1,800 | 13.97 | 0.00 | 0.00 | 0.04 | 120.0 |
| P-1012 | 8.0 | J-1027 | J-1030 | 2,200 | 12.92 | 0.01 | 0.02 | 0.08 | 110.0 |
| P-1013 | 8.0 | J-1034 | J-1033 | 1,350 | -1.77 | 0.00 | 0.00 | 0.01 | 110.0 |
| P-1014 | 12.0 | J-1033 | J-1034 | 1,050 | 5.21 | 0.00 | 0.00 | 0.01 | 110.0 |
| P-1015 | 12.0 | J-1032 | J-1033 | 500 | 9.13 | 0.00 | 0.00 | 0.03 | 110.0 |
| P-1016 | 12.0 | J-1032 | J-1027 | 1,500 | -38.10 | 0.01 | 0.01 | 0.11 | 110.0 |
| P-1017 | 8.0 | J-1033 | J-1035 | 2,100 | -4.84 | 0.00 | 0.00 | 0.03 | 120.0 |
| P-1018 | 12.0 | J-1025 | PRV-4 | 1,183 | 0.00 | 0.00 | 0.00 | 0.00 | 110.0 |
| P-1019 | 12.0 | J-1026 | J-1025 | 450 | 13.97 | 0.00 | 0.00 | 0.04 | 110.0 |
| P-1020 | 12.0 | J-1026 | J-1027 | 1,100 | -32.77 | 0.01 | 0.01 | 0.09 | 110.0 |
| P-1021 | 8.0 | J-1035 | J-1026 | 600 | -11.82 | 0.01 | 0.00 | 0.08 | 120.0 |
| P-1022 | 10.0 | J-1029 | J-1028 | 2,500 | 23.88 | 0.01 | 0.02 | 0.10 | 110.0 |
| P-1023 | 12.0 | J-1028 | J-1027 | 250 | 90.78 | 0.04 | 0.01 | 0.26 | 110.0 |
| P-1024 | 12.0 | J-1029 | J-1028 | 750 | 73.88 | 0.03 | 0.02 | 0.21 | 110.0 |
| P-1025 | 12.0 | J-1103 | J-1029 | 3,500 | 104.74 | 0.05 | 0.16 | 0.30 | 120.0 |
| P-1026 | 10.0 | J-1019 | J-1018 | 1,500 | -71.32 | 0.09 | 0.14 | 0.29 | 90.0 |
| P-1027 | 12.0 | J-1011 | J-1005 | 2,200 | -527.14 | 0.90 | 1.98 | 1.50 | 120.0 |
| P-1028 | 10.0 | J-1013 | J-1014 | 1,950 | 6.98 | 0.00 | 0.00 | 0.03 | 100.0 |
| P-1029 | 12.0 | J-1013 | J-1012 | 2,000 | -394.63 | 0.62 | 1.23 | 1.12 | 110.0 |
| P-1030 | 10.0 | J-1103 | J-1013 | 1,000 | -380.66 | 1.19 | 1.19 | 1.56 | 120.0 |
| P-1031 | 10.0 | J-1018 | J-1103 | 400 | -268.94 | 0.63 | 0.25 | 1.10 | 120.0 |
| P-1032 | 8.0 | J-1053 | J-1018 | 2,080 | -190.64 | 1.38 | 2.87 | 1.22 | 100.0 |
| P-1033 | 8.0 | J-1054 | J-1036 | 500 | 128.07 | 0.55 | 0.28 | 0.82 | 110.0 |
| P-1034 | 8.0 | J-1036 | J-1037 | 650 | 59.23 | 0.13 | 0.09 | 0.38 | 110.0 |
| P-1035 | 8.0 | J-1037 | J-1036 | 600 | -61.85 | 0.14 | 0.09 | 0.39 | 110.0 |
| P-1036 | 8.0 | J-1053 | J-1054 | 400 | 136.21 | 0.74 | 0.30 | 0.87 | 100.0 |
| P-1037 | 8.0 | J-1052 | J-1053 | 800 | -47.45 | 0.10 | 0.08 | 0.30 | 100.0 |
| P-1038 | 8.0 | J-1050 | J-1052 | 1,200 | -33.48 | 0.06 | 0.07 | 0.21 | 100.0 |
| P-1039 | 12.0 | J-1011 | J-1012 | 750 | 401.61 | 0.64 | 0.48 | 1.14 | 110.0 |
| P-1040 | 12.0 | J-1010 | J-1011 | 2,200 | -118.55 | 0.07 | 0.15 | 0.34 | 110.0 |
| P-1041 | 12.0 | J-1047 | J-1010 | 1,800 | -647.60 | 1.54 | 2.78 | 1.84 | 110.0 |
| P-1042 | 8.0 | J-1054 | J-1055 | 500 | 1.16 | 0.00 | 0.00 | 0.01 | 100.0 |
| P-1043 | 12.0 | J-1005 | J-1006 | 1,750 | -1,126.02 | 4.30 | 7.53 | 3.19 | 110.0 |
| P-1044 | 12.0 | J-1010 | J-1005 | 1,950 | -536.03 | 1.09 | 2.12 | 1.52 | 110.0 |
| P-1045 | 12.0 | J-1001 | J-1004 | 1,500 | -4.76 | 0.00 | 0.00 | 0.01 | 100.0 |
| P-1046 | 12.0 | J-1002 | J-1003 | 1,900 | -21.23 | 0.00 | 0.01 | 0.06 | 100.0 |
| P-1047 | 12.0 | J-1001 | J-1002 | 1,100 | -7.27 | 0.00 | 0.00 | 0.02 | 100.0 |
| P-1048 | 8.0 | J-1000 | J-1001 | 975 | -5.05 | 0.00 | 0.00 | 0.03 | 100.0 |
| P-1049 | 12.0 | J-1004 | J-1000 | 1,400 | 15.90 | 0.00 | 0.00 | 0.05 | 120.0 |
| P-1050 | 12.0 | J-1003 | J-1004 | 1,200 | 27.65 | 0.01 | 0.01 | 0.08 | 100.0 |
| P-1051 | 12.0 | J-1005 | J-1003 | 430 | 55.86 | 0.02 | 0.01 | 0.16 | 100.0 |
| P-1052 | 12.0 | J-1100 | T-3 | 200 | 223.32 | 0.18 | 0.04 | 0.63 | 120.0 |
| P-1053 | 12.0 | J-1100 | J-1040 | 200 | 87.51 | 0.04 | 0.01 | 0.25 | 110.0 |

# Scenario: FIRE FLOW
# Fire Flow Analysis
# Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-1054 | 12.0 | J-1042 | J-1100 | 1,000 | 317.81 | 0.41 | 0.41 | 0.90 | 110.0 |
| P-1055 | 8.0 | J-1044 | J-1046 | 350 | -141.78 | 0.80 | 0.28 | 0.90 | 100.0 |
| P-1056 | 8.0 | J-1046 | J-1048 | 1,360 | 79.98 | 0.28 | 0.38 | 0.51 | 100.0 |
| P-1057 | 12.0 | J-1046 | J-1047 | 1,800 | -640.61 | 1.51 | 2.72 | 1.82 | 110.0 |
| P-1058 | 12.0 | J-1044 | J-1046 | 350 | -411.87 | 0.80 | 0.28 | 1.17 | 100.0 |
| P-1059 | 8.0 | J-1044 | J-1061 | 1,100 | 83.80 | 0.30 | 0.33 | 0.53 | 100.0 |
| P-1060 | 12.0 | J-1043 | J-1044 | 600 | -462.87 | 0.83 | 0.50 | 1.31 | 110.0 |
| P-1061 | 12.0 | J-1043 | J-1042 | 800 | 324.79 | 0.43 | 0.34 | 0.92 | 110.0 |
| P-1062 | 8.0 | J-1041 | J-1043 | 1,150 | -131.09 | 0.49 | 0.57 | 0.84 | 120.0 |
| P-1063 | 8.0 | J-1040 | J-1041 | 500 | -117.13 | 0.40 | 0.20 | 0.75 | 120.0 |
| P-1064 | 12.0 | J-1104 | J-1040 | 615 | -197.65 | 0.20 | 0.13 | 0.56 | 100.0 |
| P-1065 | 12.0 | J-1039 | J-1104 | 1,585 | -190.66 | 0.19 | 0.30 | 0.54 | 100.0 |
| P-1066 | 12.0 | J-1101 | J-1079 | 1,326 | -0.83 | 0.00 | 0.00 | 0.00 | 120.0 |
| P-1067 | 12.0 | J-1059 | J-1101 | 1,774 | 6.15 | 0.00 | 0.00 | 0.02 | 120.0 |
| P-1068 | 8.0 | J-1057 | J-1058 | 1,350 | -3.43 | 0.00 | 0.00 | 0.02 | 120.0 |
| P-1069 | 12.0 | J-1058 | J-1057 | 1,870 | 3.56 | 0.00 | 0.00 | 0.01 | 120.0 |
| P-1070 | 8.0 | J-1050 | J-1051 | 1,250 | 6.98 | 0.00 | 0.00 | 0.04 | 120.0 |
| P-1071 | 8.0 | J-1048 | J-1050 | 1,200 | 52.05 | 0.12 | 0.15 | 0.33 | 100.0 |
| P-1072 | 8.0 | J-1048 | J-1049 | 800 | 20.95 | 0.02 | 0.02 | 0.13 | 100.0 |
| P-1073 | 6.0 | J-1061 | J-1045 | 1,400 | 76.82 | 1.04 | 1.46 | 0.87 | 100.0 |
| P-1074 | 12.0 | J-1045 | J-1039 | 550 | -180.82 | 0.17 | 0.10 | 0.51 | 100.0 |
| P-1075 | 12.0 | J-1045 | J-1058 | 2,800 | 73.92 | 0.03 | 0.09 | 0.21 | 100.0 |
| P-1076 | 12.0 | J-1062 | J-1045 | 280 | -162.47 | 0.14 | 0.04 | 0.46 | 100.0 |
| P-1077 | 12.0 | J-1075 | J-1076 | 500 | 6.98 | 0.00 | 0.00 | 0.02 | 110.0 |
| P-1078 | 12.0 | J-1062 | J-1075 | 500 | 13.97 | 0.00 | 0.00 | 0.04 | 100.0 |
| P-1079 | 8.0 | J-1077 | J-1080 | 200 | 6.98 | 0.00 | 0.00 | 0.04 | 120.0 |
| P-1080 | 12.0 | J-1062 | J-1059 | 2,800 | 58.26 | 0.02 | 0.05 | 0.17 | 110.0 |
| P-1081 | 12.0 | J-1078 | J-1062 | 500 | -83.54 | 0.04 | 0.02 | 0.24 | 100.0 |
| P-1082 | 12.0 | J-1077 | J-1078 | 350 | -76.56 | 0.03 | 0.01 | 0.22 | 120.0 |
| P-1083 | 12.0 | J-1079 | J-1077 | 1,200 | -62.59 | 0.02 | 0.02 | 0.18 | 120.0 |
| P-1084 | 12.0 | J-1058 | J-1059 | 300 | -45.13 | 0.01 | 0.00 | 0.13 | 120.0 |
| P-1085 | 12.0 | J-1063 | J-1058 | 1,750 | -105.09 | 0.05 | 0.09 | 0.30 | 110.0 |
| P-1086 | 12.0 | J-1093 | J-1094 | 1,250 | 6.98 | 0.00 | 0.00 | 0.02 | 110.0 |
| P-1087 | 6.0 | J-1092 | J-1093 | 1,600 | 6.85 | 0.01 | 0.02 | 0.08 | 100.0 |
| P-1088 | 8.0 | J-1093 | J-1096 | 1,100 | -7.11 | 0.00 | 0.00 | 0.05 | 110.0 |
| P-1089 | 8.0 | J-1096 | J-1097 | 2,000 | -14.10 | 0.01 | 0.02 | 0.09 | 110.0 |
| P-1090 | 8.0 | J-1092 | J-1097 | 800 | -7.17 | 0.00 | 0.00 | 0.05 | 100.0 |
| P-1091 | 8.0 | J-1089 | J-1092 | 2,000 | 6.67 | 0.00 | 0.01 | 0.04 | 100.0 |
| P-1092 | 8.0 | J-1097 | J-1091 | 650 | -28.25 | 0.04 | 0.03 | 0.18 | 100.0 |
| P-1093 | 8.0 | J-1091 | J-1089 | 600 | 27.61 | 0.04 | 0.02 | 0.18 | 100.0 |
| P-1094 | 8.0 | J-1095 | J-1089 | 840 | -13.97 | 0.01 | 0.01 | 0.09 | 100.0 |
| P-1095 | 6.0 | J-1095 | PRV-2 | 2,322 | 0.00 | 0.00 | 0.00 | 0.00 | 110.0 |
| P-1096 | 8.0 | J-1084 | J-1085 | 1,800 | 38.22 | 0.07 | 0.13 | 0.24 | 100.0 |
| P-1098 | 8.0 | J-1084 | J-1083 | 900 | 14.58 | 0.01 | 0.01 | 0.09 | 110.0 |
| P-1099 | 8.0 | J-1083 | J-1082 | 1,350 | -65.91 | 0.16 | 0.22 | 0.42 | 110.0 |
| P-1100 | 10.0 | J-1086 | J-1083 | 1,150 | -73.50 | 0.08 | 0.09 | 0.30 | 100.0 |
| P-1101 | 10.0 | J-1086 | J-1090 | 515 | 41.27 | 0.03 | 0.01 | 0.17 | 100.0 |
| P-1102 | 10.0 | J-1087 | J-1086 | 1,100 | -25.25 | 0.01 | 0.01 | 0.10 | 110.0 |
| P-1103 | 10.0 | J-1085 | J-1090 | 500 | -38.59 | 0.02 | 0.01 | 0.16 | 100.0 |
| P-1104 | 12.0 | J-1081 | J-1121 | 690 | 6.98 | 0.00 | 0.00 | 0.02 | 120.0 |
| P-1105 | 8.0 | J-1060 | J-1084 | 1,300 | 59.79 | 0.16 | 0.21 | 0.38 | 100.0 |

# Scenario: FIRE FLOW
# Fire Flow Analysis
# Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-1106 | 10.0 | J-1088 | J-1087 | 700 | -18.27 | 0.01 | 0.00 | 0.07 | 110.0 |
| P-1107 | 8.0 | J-1091 | J-1085 | 650 | -69.83 | 0.21 | 0.14 | 0.45 | 100.0 |
| P-1108 | 10.0 | J-1090 | J-1088 | 1,100 | -4.30 | 0.00 | 0.00 | 0.02 | 110.0 |
| P-1109 | 8.0 | J-1064 | J-1060 | 300 | 65.67 | 0.12 | 0.04 | 0.42 | 130.0 |
| P-1110 | 8.0 | J-1068 | J-1069 | 1,450 | 34.61 | 0.06 | 0.08 | 0.22 | 100.0 |
| P-1111 | 8.0 | J-1038 | J-1073 | 1,400 | 3.59 | 0.00 | 0.00 | 0.02 | 110.0 |
| P-1112 | 8.0 | J-1068 | J-1072 | 950 | -97.92 | 0.40 | 0.38 | 0.62 | 100.0 |
| P-1113 | 8.0 | J-1065 | J-1068 | 500 | -56.32 | 0.14 | 0.07 | 0.36 | 100.0 |
| P-1114 | 6.0 | J-1073 | J-1065 | 1,700 | 48.38 | 0.44 | 0.75 | 0.55 | 100.0 |
| P-1115 | 6.0 | J-1056 | J-1073 | 1,100 | 51.77 | 0.50 | 0.55 | 0.59 | 100.0 |
| P-1116 | 8.0 | J-1065 | J-1064 | 250 | 77.68 | 0.26 | 0.07 | 0.50 | 100.0 |
| P-1117 | 8.0 | J-1066 | J-1065 | 1,400 | -20.04 | 0.02 | 0.03 | 0.13 | 100.0 |
| P-1118 | 8.0 | J-1064 | J-1067 | 1,250 | 15.18 | 0.01 | 0.02 | 0.10 | 100.0 |
| P-1119 | 12.0 | J-1063 | J-1064 | 1,910 | 10.15 | 0.00 | 0.00 | 0.03 | 110.0 |
| P-1120 | 12.0 | J-1081 | J-1063 | 450 | -87.95 | 0.04 | 0.02 | 0.25 | 110.0 |
| P-1121 | 12.0 | J-1082 | J-1081 | 700 | -73.99 | 0.03 | 0.02 | 0.21 | 110.0 |
| P-1122 | 12.0 | J-1082 | J-1060 | 1,400 | 1.10 | 0.00 | 0.00 | 0.00 | 110.0 |
| P-1123 | 6.0 | J-1069 | J-1070 | 500 | 13.97 | 0.04 | 0.02 | 0.16 | 100.0 |
| P-1124 | 6.0 | J-1069 | J-1066 | 400 | 13.66 | 0.04 | 0.02 | 0.16 | 100.0 |
| P-1125 | 6.0 | J-1067 | J-1066 | 350 | -26.72 | 0.15 | 0.05 | 0.30 | 100.0 |
| P-1126 | 6.0 | J-1070 | J-1071 | 1,000 | 6.98 | 0.01 | 0.01 | 0.08 | 100.0 |
| P-1127 | 8.0 | J-1038 | J-1037 | 900 | -114.11 | 0.45 | 0.40 | 0.73 | 110.0 |
| P-1128 | 8.0 | J-1072 | J-1038 | 800 | -103.53 | 0.37 | 0.30 | 0.66 | 110.0 |
| P-1129 | 8.0 | J-1055 | J-1050 | 650 | -71.57 | 0.22 | 0.15 | 0.46 | 100.0 |
| P-1130 | 8.0 | J-1055 | J-1056 | 1,120 | 65.74 | 0.19 | 0.22 | 0.42 | 100.0 |
| P-1131 | 10.0 | J-1019 | J-1022 | 500 | 44.37 | 0.04 | 0.02 | 0.18 | 90.0 |
| P-1132 | 8.0 | J-1020 | J-1019 | 520 | -19.96 | 0.02 | 0.01 | 0.13 | 100.0 |
| P-1133 | 8.0 | J-1021 | J-1020 | 800 | -5.49 | 0.00 | 0.00 | 0.04 | 100.0 |
| P-1134 | 6.0 | J-1022 | J-1021 | 700 | -6.00 | 0.01 | 0.01 | 0.07 | 100.0 |
| P-1135 | 10.0 | J-1023 | J-1022 | 500 | -27.93 | 0.02 | 0.01 | 0.11 | 90.0 |
| P-1136 | 8.0 | J-1020 | J-1021 | 450 | 7.49 | 0.00 | 0.00 | 0.05 | 100.0 |
| P-1137 | 8.0 | J-1074 | J-1024 | 800 | -1.36 | 0.00 | 0.00 | 0.01 | 100.0 |
| P-1138 | 8.0 | J-1023 | J-1074 | 900 | 5.62 | 0.00 | 0.00 | 0.04 | 100.0 |
| P-1139 | 10.0 | J-1024 | J-1023 | 320 | -15.33 | 0.01 | 0.00 | 0.06 | 90.0 |
| P-1140 | 10.0 | J-1024 | J-1099 | 330 | 6.98 | 0.00 | 0.00 | 0.03 | 90.0 |
| P-1141 | 10.0 | J-1099 | PRV-3 | 5 | 0.00 | 0.00 | 0.00 | 0.00 | 90.0 |
| P-1142 | 8.0 | J-1092 | PRV-1 | 390 | 0.00 | 0.00 | 0.00 | 0.00 | 100.0 |
| P-1143 | 12.0 | J-1015 | J-1105 | 825 | 20.95 | 0.00 | 0.00 | 0.06 | 130.0 |
| P-1144 | 12.0 | J-1105 | J-1106 | 715 | 6.98 | 0.00 | 0.00 | 0.02 | 130.0 |
| P-1145 | 8.0 | J-1105 | J-1107 | 928 | 6.98 | 0.00 | 0.00 | 0.04 | 130.0 |
| P-1146 | 12.0 | J-1008 | J-1108 | 1,077 | 34.91 | 0.01 | 0.01 | 0.10 | 120.0 |
| P-1147 | 8.0 | J-1108 | J-1109 | 757 | 6.98 | 0.00 | 0.00 | 0.04 | 130.0 |
| P-1148 | 8.0 | J-1017 | J-1110 | 1,053 | 6.98 | 0.00 | 0.00 | 0.04 | 130.0 |
| P-1149 | 12.0 | J-1111 | J-1032 | 1,442 | -21.99 | 0.00 | 0.00 | 0.06 | 110.0 |
| P-1150 | 8.0 | J-1111 | J-1112 | 573 | 6.98 | 0.00 | 0.00 | 0.04 | 130.0 |
| P-1151 | 12.0 | J-1031 | J-1111 | 1,858 | -8.03 | 0.00 | 0.00 | 0.02 | 110.0 |
| P-1152 | 8.0 | J-1030 | J-1113 | 439 | 6.98 | 0.00 | 0.00 | 0.04 | 130.0 |
| P-1153 | 8.0 | J-1025 | J-1114 | 459 | 6.98 | 0.00 | 0.00 | 0.04 | 130.0 |
| P-1154 | 12.0 | J-1002 | J-1115 | 2,056 | 6.98 | 0.00 | 0.00 | 0.02 | 130.0 |
| P-1155 | 8.0 | J-1000 | J-1116 | 920 | 6.98 | 0.00 | 0.00 | 0.04 | 130.0 |
| P-1156 | 8.0 | J-1000 | J-1117 | 1,514 | 6.98 | 0.00 | 0.00 | 0.04 | 130.0 |

# Scenario: FIRE FLOW
# Fire Flow Analysis
# Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-1157 | 8.0 | J-1049 | J-1118 | 828 | 6.98 | 0.00 | 0.00 | 0.04 | 130.0 |
| P-1158 | 8.0 | J-1049 | J-1119 | 1,231 | 6.98 | 0.00 | 0.00 | 0.04 | 130.0 |
| P-1159 | 10.0 | J-1052 | J-1120 | 698 | 6.98 | 0.00 | 0.00 | 0.03 | 130.0 |
| P-1161 | 6.0 | J-1041 | J-1122 | 338 | 6.98 | 0.01 | 0.00 | 0.08 | 130.0 |
| P-1162 | 6.0 | J-1056 | J-1123 | 932 | 6.98 | 0.01 | 0.01 | 0.08 | 110.0 |
| P-1163 | 6.0 | J-1067 | J-1124 | 388 | 34.91 | 0.15 | 0.06 | 0.40 | 130.0 |
| P-1164 | 6.0 | J-1124 | J-1125 | 150 | 20.95 | 0.06 | 0.01 | 0.24 | 130.0 |
| P-1165 | 6.0 | J-1125 | J-1126 | 100 | 6.98 | 0.01 | 0.00 | 0.08 | 130.0 |
| P-1166 | 6.0 | J-1125 | J-1127 | 224 | 6.98 | 0.01 | 0.00 | 0.08 | 130.0 |
| P-1167 | 6.0 | J-1124 | J-1128 | 747 | 6.98 | 0.01 | 0.01 | 0.08 | 130.0 |
| P-1168 | 8.0 | J-1095 | J-1131 | 773 | 6.98 | 0.00 | 0.00 | 0.04 | 130.0 |
| P-1169 | 8.0 | J-1091 | J-1132 | 885 | 6.98 | 0.00 | 0.00 | 0.04 | 130.0 |
| P-1170 | 8.0 | J-1088 | J-1133 | 1,016 | 6.98 | 0.00 | 0.00 | 0.04 | 130.0 |
| P-2000 | 6.0 | J-2017 | J-2018 | 1,600 | 3.92 | 0.00 | 0.01 | 0.04 | 100.0 |
| P-2001 | 8.0 | J-2016 | J-2019 | 650 | -22.83 | 0.03 | 0.02 | 0.15 | 100.0 |
| P-2002 | 8.0 | J-2016 | J-2017 | 750 | 7.84 | 0.00 | 0.00 | 0.05 | 100.0 |
| P-2003 | 12.0 | J-2020 | J-2016 | 650 | -11.07 | 0.00 | 0.00 | 0.03 | 110.0 |
| P-2004 | 8.0 | J-2015 | J-2021 | 550 | -39.23 | 0.07 | 0.04 | 0.25 | 100.0 |
| P-2005 | 6.0 | J-2020 | J-2015 | 450 | -15.41 | 0.06 | 0.03 | 0.17 | 90.0 |
| P-2006 | 8.0 | J-2019 | J-2015 | 300 | -26.75 | 0.04 | 0.01 | 0.17 | 100.0 |
| P-2007 | 6.0 | J-2005 | J-2020 | 300 | -22.55 | 0.07 | 0.02 | 0.26 | 130.0 |
| P-2008 | 6.0 | J-2191 | J-2192 | 1,093 | 3.92 | 0.00 | 0.00 | 0.04 | 130.0 |
| P-2009 | 8.0 | J-2015 | J-2014 | 2,160 | -6.85 | 0.00 | 0.01 | 0.04 | 100.0 |
| P-2010 | 6.0 | J-2004 | J-2005 | 1,200 | -18.63 | 0.08 | 0.09 | 0.21 | 100.0 |
| P-2011 | 8.0 | J-207 | T-2 | 223 | 22.61 | 0.02 | 0.00 | 0.14 | 130.0 |
| P-2012 | 8.0 | J-2025 | J-2024 | 2,400 | -3.29 | 0.00 | 0.00 | 0.02 | 90.0 |
| P-2013 | 8.0 | J-2023 | J-2025 | 250 | 0.64 | 0.00 | 0.00 | 0.00 | 90.0 |
| P-2014 | 8.0 | J-2024 | J-2023 | 1,300 | 4.56 | 0.00 | 0.00 | 0.03 | 90.0 |
| P-2015 | 8.0 | J-2022 | J-2024 | 250 | 11.76 | 0.01 | 0.00 | 0.08 | 90.0 |
| P-2016 | 10.0 | J-2014 | J-207 | 800 | 4.08 | 0.00 | 0.00 | 0.02 | 90.0 |
| P-2017 | 8.0 | J-207 | J-2027 | 1,200 | -18.54 | 0.02 | 0.02 | 0.12 | 110.0 |
| P-2018 | 10.0 | J-2022 | J-2029 | 3,500 | -66.69 | 0.07 | 0.23 | 0.27 | 100.0 |
| P-2019 | 10.0 | J-2014 | J-2011 | 2,900 | -14.85 | 0.00 | 0.01 | 0.06 | 100.0 |
| P-2020 | 6.0 | J-2010 | J-2004 | 700 | -5.76 | 0.01 | 0.01 | 0.07 | 90.0 |
| P-2021 | 12.0 | PRV-4 | J-2003 | 167 | 0.00 | 0.00 | 0.00 | 0.00 | 110.0 |
| P-2022 | 6.0 | J-2004 | J-2003 | 350 | 8.95 | 0.02 | 0.01 | 0.10 | 90.0 |
| P-2023 | 10.0 | J-2003 | J-2002 | 1,650 | 5.03 | 0.00 | 0.00 | 0.02 | 110.0 |
| P-2024 | 8.0 | J-2009 | J-2002 | 850 | 4.51 | 0.00 | 0.00 | 0.03 | 110.0 |
| P-2025 | 6.0 | J-2008 | J-2001 | 1,200 | 3.74 | 0.00 | 0.00 | 0.04 | 130.0 |
| P-2026 | 8.0 | J-2008 | J-2001 | 1,000 | 7.45 | 0.00 | 0.00 | 0.05 | 110.0 |
| P-2027 | 6.0 | J-2008 | J-2009 | 750 | 6.59 | 0.01 | 0.01 | 0.07 | 90.0 |
| P-2028 | 10.0 | J-2002 | J-2001 | 400 | -38.76 | 0.02 | 0.01 | 0.16 | 110.0 |
| P-2029 | 8.0 | J-2029 | J-2031 | 400 | 3.92 | 0.00 | 0.00 | 0.03 | 110.0 |
| P-2030 | 8.0 | J-2050 | J-2012 | 400 | 61.36 | 0.17 | 0.07 | 0.39 | 100.0 |
| P-2031 | 6.0 | J-2051 | J-2050 | 450 | -20.53 | 0.09 | 0.04 | 0.23 | 100.0 |
| P-2032 | 6.0 | J-2026 | J-2051 | 300 | -16.61 | 0.06 | 0.02 | 0.19 | 100.0 |
| P-2033 | 12.0 | J-2026 | J-2028 | 600 | -49.66 | 0.01 | 0.01 | 0.14 | 120.0 |
| P-2034 | 12.0 | J-2026 | J-2012 | 650 | 54.22 | 0.01 | 0.01 | 0.15 | 120.0 |
| P-2035 | 8.0 | J-2013 | J-2026 | 1,300 | -8.12 | 0.00 | 0.00 | 0.05 | 110.0 |
| P-2036 | 6.0 | J-2012 | J-2013 | 900 | -4.20 | 0.00 | 0.00 | 0.05 | 100.0 |
| P-2037 | 10.0 | J-2011 | J-2012 | 150 | -115.86 | 0.22 | 0.03 | 0.47 | 90.0 |

# Scenario: FIRE FLOW
# Fire Flow Analysis
# Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-2038 | 8.0 | J-2028 | J-2029 | 900 | -76.04 | 0.31 | 0.27 | 0.49 | 90.0 |
| P-2039 | 8.0 | J-2027 | J-2028 | 1,950 | -22.46 | 0.02 | 0.04 | 0.14 | 110.0 |
| P-2040 | 8.0 | J-2007 | J-2008 | 1,950 | 21.71 | 0.03 | 0.06 | 0.14 | 90.0 |
| P-2041 | 10.0 | J-2007 | J-2011 | 600 | -97.09 | 0.16 | 0.10 | 0.40 | 90.0 |
| P-2042 | 10.0 | J-2006 | J-2007 | 600 | -47.17 | 0.04 | 0.03 | 0.19 | 90.0 |
| P-2043 | 8.0 | J-2042 | J-2007 | 1,650 | -11.53 | 0.01 | 0.01 | 0.07 | 100.0 |
| P-2044 | 8.0 | J-2007 | J-2043 | 1,450 | 12.76 | 0.01 | 0.01 | 0.08 | 110.0 |
| P-2045 | 10.0 | J-2030 | J-2029 | 1,080 | 150.56 | 0.25 | 0.27 | 0.62 | 110.0 |
| P-2046 | 8.0 | J-2050 | J-2049 | 600 | -85.81 | 0.31 | 0.19 | 0.55 | 100.0 |
| P-2047 | 10.0 | J-2000 | J-2006 | 470 | -43.25 | 0.04 | 0.02 | 0.18 | 90.0 |
| P-2048 | 10.0 | J-2001 | J-2000 | 1,350 | -31.49 | 0.01 | 0.02 | 0.13 | 110.0 |
| P-2049 | 10.0 | PRV-3 | J-2159 | 5 | 0.00 | 0.00 | 0.00 | 0.00 | 90.0 |
| P-2050 | 10.0 | J-2159 | J-2000 | 210 | -3.92 | 0.00 | 0.00 | 0.02 | 90.0 |
| P-2051 | 12.0 | J-2153 | J-208 | 909 | -683.30 | 1.71 | 1.55 | 1.94 | 110.0 |
| P-2052 | 8.0 | J-2036 | J-2038 | 1,250 | -84.36 | 0.30 | 0.38 | 0.54 | 100.0 |
| P-2053 | 8.0 | J-2059 | J-2060 | 1,100 | -123.95 | 0.76 | 0.83 | 0.79 | 90.0 |
| P-2054 | 12.0 | J-2153 | J-2032 | 1,460 | 428.91 | 0.72 | 1.05 | 1.22 | 110.0 |
| P-2055 | 6.0 | J-2032 | J-2033 | 450 | -65.57 | 0.65 | 0.29 | 0.74 | 110.0 |
| P-2056 | 8.0 | J-2060 | J-2062 | 200 | 7.84 | 0.00 | 0.00 | 0.05 | 100.0 |
| P-2057 | 8.0 | J-2030 | J-2032 | 1,800 | -77.12 | 0.31 | 0.56 | 0.49 | 90.0 |
| P-2058 | 8.0 | J-2060 | J-2061 | 800 | 3.92 | 0.00 | 0.00 | 0.03 | 100.0 |
| P-2059 | 8.0 | J-2032 | J-2060 | 450 | 139.64 | 0.94 | 0.42 | 0.89 | 90.0 |
| P-2060 | 12.0 | J-2030 | J-2032 | 1,800 | -273.80 | 0.31 | 0.56 | 0.78 | 110.0 |
| P-2061 | 8.0 | J-2038 | J-2030 | 2,600 | -94.94 | 0.27 | 0.70 | 0.61 | 120.0 |
| P-2062 | 8.0 | J-2039 | J-2038 | 900 | -6.66 | 0.00 | 0.00 | 0.04 | 100.0 |
| P-2063 | 8.0 | J-2042 | J-2041 | 250 | 4.15 | 0.00 | 0.00 | 0.03 | 100.0 |
| P-2064 | 8.0 | J-2039 | J-2042 | 800 | 0.03 | 0.00 | 0.00 | 0.00 | 100.0 |
| P-2065 | 8.0 | J-2040 | J-2039 | 600 | -2.70 | 0.00 | 0.00 | 0.02 | 100.0 |
| P-2066 | 8.0 | J-2041 | J-2040 | 550 | 1.22 | 0.00 | 0.00 | 0.01 | 100.0 |
| P-2067 | 8.0 | J-2044 | J-2041 | 550 | 0.99 | 0.00 | 0.00 | 0.01 | 100.0 |
| P-2068 | 8.0 | J-2044 | J-2045 | 400 | 3.92 | 0.00 | 0.00 | 0.03 | 100.0 |
| P-2069 | 8.0 | J-2043 | J-2044 | 350 | 8.84 | 0.00 | 0.00 | 0.06 | 100.0 |
| P-2070 | 8.0 | J-2046 | J-2047 | 250 | -46.13 | 0.08 | 0.02 | 0.29 | 110.0 |
| P-2071 | 8.0 | J-2048 | J-2046 | 500 | -42.21 | 0.07 | 0.04 | 0.27 | 110.0 |
| P-2072 | 8.0 | J-2047 | J-2030 | 280 | -101.49 | 0.52 | 0.15 | 0.65 | 90.0 |
| P-2073 | 8.0 | J-2048 | J-2047 | 380 | -51.44 | 0.15 | 0.06 | 0.33 | 90.0 |
| P-2074 | 8.0 | J-2049 | J-2048 | 250 | -89.73 | 0.42 | 0.10 | 0.57 | 90.0 |
| P-2075 | 12.0 | J-2184 | J-2068 | 928 | 132.45 | 0.07 | 0.06 | 0.38 | 120.0 |
| P-2076 | 8.0 | J-2157 | J-2158 | 1,800 | -1.55 | 0.00 | 0.00 | 0.01 | 110.0 |
| P-2077 | 12.0 | J-2155 | J-2154 | 900 | -148.43 | 0.09 | 0.08 | 0.42 | 120.0 |
| P-2079 | 8.0 | J-2157 | J-2158 | 600 | -2.66 | 0.00 | 0.00 | 0.02 | 110.0 |
| P-2080 | 8.0 | J-2156 | J-2157 | 300 | 15.70 | 0.01 | 0.00 | 0.10 | 110.0 |
| P-2081 | 6.0 | J-2033 | J-2034 | 900 | -23.86 | 0.10 | 0.09 | 0.27 | 110.0 |
| P-2082 | 12.0 | J-2154 | J-2153 | 1,600 | -250.47 | 0.23 | 0.36 | 0.71 | 120.0 |
| P-2083 | 8.0 | J-2156 | J-2154 | 550 | -93.03 | 0.31 | 0.17 | 0.59 | 110.0 |
| P-2084 | 8.0 | J-2034 | J-2156 | 700 | -73.41 | 0.20 | 0.14 | 0.47 | 110.0 |
| P-2085 | 8.0 | J-2033 | J-2034 | 1,100 | -45.63 | 0.08 | 0.09 | 0.29 | 110.0 |
| P-2086 | 10.0 | J-2062 | J-2063 | 997 | 3.92 | 0.00 | 0.00 | 0.02 | 110.0 |
| P-2087 | 12.0 | J-2055 | J-2059 | 650 | -120.03 | 0.06 | 0.04 | 0.34 | 120.0 |
| P-2088 | 8.0 | J-2054 | J-2053 | 800 | 44.98 | 0.24 | 0.20 | 0.29 | 60.0 |
| P-2089 | 6.0 | J-2055 | J-2054 | 250 | 48.90 | 1.16 | 0.29 | 0.55 | 60.0 |

# Scenario: FIRE FLOW
# Fire Flow Analysis
# Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-2092 | 12.0 | J-2055 | J-2056 | 150 | 122.77 | 0.06 | 0.01 | 0.35 | 120.0 |
| P-2093 | 10.0 | J-2127 | J-2055 | 2,560 | 55.56 | 0.05 | 0.12 | 0.23 | 100.0 |
| P-2094 | 6.0 | J-2127 | J-2065 | 350 | 26.47 | 0.37 | 0.13 | 0.30 | 60.0 |
| P-2095 | 6.0 | J-2068 | J-2127 | 450 | 90.35 | 3.62 | 1.63 | 1.03 | 60.0 |
| P-2096 | 8.0 | J-2185 | J-2186 | 628 | 3.92 | 0.00 | 0.00 | 0.03 | 130.0 |
| P-2097 | 12.0 | J-2065 | J-2064 | 200 | 14.47 | 0.00 | 0.00 | 0.04 | 120.0 |
| P-2098 | 12.0 | J-2066 | J-2065 | 450 | -8.08 | 0.00 | 0.00 | 0.02 | 110.0 |
| P-2099 | 12.0 | J-2067 | J-2066 | 200 | -4.16 | 0.00 | 0.00 | 0.01 | 120.0 |
| P-2100 | 12.0 | J-2064 | J-2067 | 450 | -0.24 | 0.00 | 0.00 | 0.00 | 110.0 |
| P-2101 | 6.0 | J-2057 | J-2064 | 1,250 | -6.33 | 0.03 | 0.03 | 0.07 | 60.0 |
| P-2102 | 6.0 | J-2058 | J-2057 | 550 | -3.54 | 0.01 | 0.00 | 0.04 | 60.0 |
| P-2103 | 8.0 | J-2053 | J-2058 | 650 | -77.80 | 0.68 | 0.44 | 0.50 | 60.0 |
| P-2104 | 6.0 | J-2071 | J-2070 | 1,399 | -1.82 | 0.00 | 0.00 | 0.02 | 130.0 |
| P-2105 | 6.0 | J-2070 | J-2071 | 1,081 | 2.10 | 0.00 | 0.00 | 0.02 | 130.0 |
| P-2106 | 8.0 | J-2069 | J-2070 | 1,800 | 7.84 | 0.00 | 0.01 | 0.05 | 110.0 |
| P-2107 | 8.0 | J-2036 | J-2037 | 300 | 3.92 | 0.00 | 0.00 | 0.03 | 100.0 |
| P-2108 | 8.0 | J-2035 | J-2036 | 2,180 | -76.52 | 0.18 | 0.40 | 0.49 | 120.0 |
| P-2109 | 8.0 | J-2035 | J-2052 | 1,300 | -5.78 | 0.00 | 0.00 | 0.04 | 100.0 |
| P-2110 | 8.0 | J-2052 | J-2053 | 2,400 | -48.60 | 0.11 | 0.26 | 0.31 | 100.0 |
| P-2111 | 8.0 | J-2090 | J-2052 | 700 | -6.99 | 0.00 | 0.00 | 0.04 | 110.0 |
| P-2112 | 8.0 | J-2035 | J-2090 | 1,800 | -3.07 | 0.00 | 0.00 | 0.02 | 110.0 |
| P-2113 | 8.0 | J-2081 | J-2035 | 650 | -81.45 | 0.29 | 0.19 | 0.52 | 100.0 |
| P-2114 | 6.0 | J-2081 | J-2082 | 950 | 3.92 | 0.00 | 0.00 | 0.04 | 100.0 |
| P-2115 | 8.0 | J-2080 | J-2081 | 2,050 | -73.61 | 0.24 | 0.49 | 0.47 | 100.0 |
| P-2116 | 8.0 | J-2079 | J-2080 | 2,600 | 16.21 | 0.01 | 0.02 | 0.10 | 130.0 |
| P-2117 | 8.0 | J-2083 | J-2079 | 650 | 9.85 | 0.01 | 0.00 | 0.06 | 100.0 |
| P-2118 | 8.0 | J-2089 | J-2053 | 1,200 | -70.26 | 0.15 | 0.19 | 0.45 | 120.0 |
| P-2119 | 8.0 | J-2088 | J-2089 | 3,000 | -66.34 | 0.14 | 0.42 | 0.42 | 120.0 |
| P-2120 | 12.0 | J-2091 | J-2058 | 1,000 | -23.07 | 0.00 | 0.00 | 0.07 | 120.0 |
| P-2121 | 12.0 | J-2092 | J-2091 | 1,050 | -19.15 | 0.00 | 0.00 | 0.05 | 120.0 |
| P-2122 | 12.0 | T-1 | J-2092 | 700 | 258.15 | 0.24 | 0.17 | 0.73 | 120.0 |
| P-2124 | 12.0 | J-2093 | J-2092 | 550 | -253.77 | 0.20 | 0.11 | 0.72 | 130.0 |
| P-2125 | 12.0 | J-2094 | J-2093 | 1,100 | -249.85 | 0.19 | 0.21 | 0.71 | 130.0 |
| P-2126 | 8.0 | J-2073 | J-2074 | 365 | 10.90 | 0.01 | 0.00 | 0.07 | 110.0 |
| P-2127 | 8.0 | J-2073 | J-2075 | 200 | 3.92 | 0.00 | 0.00 | 0.03 | 100.0 |
| P-2128 | 8.0 | J-2072 | J-2073 | 550 | 38.18 | 0.07 | 0.04 | 0.24 | 100.0 |
| P-2129 | 8.0 | PRV-2 | J-2072 | 238 | 0.00 | 0.00 | 0.00 | 0.00 | 100.0 |
| P-2130 | 8.0 | J-2076 | J-2072 | 1,900 | -41.18 | 0.08 | 0.15 | 0.26 | 100.0 |
| P-2131 | 8.0 | J-2072 | J-2080 | 300 | -85.89 | 0.32 | 0.09 | 0.55 | 100.0 |
| P-2132 | 8.0 | J-2084 | J-2085 | 550 | -14.20 | 0.01 | 0.01 | 0.09 | 110.0 |
| P-2133 | 8.0 | J-2079 | J-2084 | 1,350 | -10.28 | 0.01 | 0.01 | 0.07 | 110.0 |
| P-2134 | 8.0 | J-2085 | J-2083 | 950 | 13.77 | 0.01 | 0.01 | 0.09 | 110.0 |
| P-2135 | 8.0 | J-2086 | J-2085 | 450 | 31.89 | 0.04 | 0.02 | 0.20 | 110.0 |
| P-2136 | 8.0 | J-2087 | J-2086 | 800 | 35.81 | 0.05 | 0.04 | 0.23 | 110.0 |
| P-2137 | 8.0 | J-2087 | J-2088 | 1,360 | -62.42 | 0.17 | 0.24 | 0.40 | 100.0 |
| P-2138 | 8.0 | J-2132 | J-2087 | 300 | -22.68 | 0.02 | 0.01 | 0.14 | 110.0 |
| P-2140 | 12.0 | J-2133 | J-2167 | 2,000 | -226.32 | 0.19 | 0.38 | 0.64 | 120.0 |
| P-2141 | 12.0 | J-2133 | J-2165 | 1,500 | 165.69 | 0.12 | 0.19 | 0.47 | 110.0 |
| P-2142 | 8.0 | J-2132 | J-2133 | 960 | -56.71 | 0.15 | 0.14 | 0.36 | 100.0 |
| P-2143 | 8.0 | J-2078 | J-2076 | 1,000 | -13.69 | 0.01 | 0.01 | 0.09 | 100.0 |
| P-2144 | 8.0 | J-2077 | J-2078 | 1,200 | -9.77 | 0.01 | 0.01 | 0.06 | 100.0 |

# Scenario: FIRE FLOW
# Fire Flow Analysis
# Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-2145 | 8.0 | J-2077 | J-2076 | 600 | -23.57 | 0.03 | 0.02 | 0.15 | 100.0 |
| P-2146 | 8.0 | J-2119 | J-2077 | 1,650 | -29.42 | 0.04 | 0.07 | 0.19 | 100.0 |
| P-2147 | 8.0 | J-2162 | J-2132 | 400 | -75.47 | 0.25 | 0.10 | 0.48 | 100.0 |
| P-2148 | 8.0 | J-2161 | J-2162 | 560 | -71.55 | 0.22 | 0.13 | 0.46 | 100.0 |
| P-2149 | 8.0 | J-2131 | J-2161 | 300 | -67.63 | 0.20 | 0.06 | 0.43 | 100.0 |
| P-2150 | 8.0 | J-2134 | J-2135 | 1,050 | -31.72 | 0.04 | 0.04 | 0.20 | 110.0 |
| P-2151 | 8.0 | J-2131 | J-2130 | 1,400 | 17.98 | 0.02 | 0.02 | 0.11 | 100.0 |
| P-2152 | 8.0 | J-2129 | J-2130 | 900 | -14.06 | 0.01 | 0.01 | 0.09 | 100.0 |
| P-2153 | 8.0 | J-2119 | J-2128 | 1,250 | -22.68 | 0.03 | 0.03 | 0.14 | 100.0 |
| P-2154 | 8.0 | J-2129 | J-2131 | 350 | -45.72 | 0.10 | 0.03 | 0.29 | 100.0 |
| P-2155 | 8.0 | J-2128 | J-2129 | 510 | -55.86 | 0.14 | 0.07 | 0.36 | 100.0 |
| P-2156 | 12.0 | J-2134 | J-2128 | 750 | -29.26 | 0.00 | 0.00 | 0.08 | 110.0 |
| P-2157 | 12.0 | J-2120 | J-2134 | 1,250 | -57.06 | 0.02 | 0.02 | 0.16 | 110.0 |
| P-2158 | 8.0 | J-2120 | J-2119 | 1,400 | 10.00 | 0.01 | 0.01 | 0.06 | 100.0 |
| P-2159 | 8.0 | J-2121 | J-2120 | 800 | -43.13 | 0.09 | 0.07 | 0.28 | 100.0 |
| P-2160 | 8.0 | J-2142 | J-2143 | 500 | -28.06 | 0.03 | 0.01 | 0.18 | 120.0 |
| P-2161 | 8.0 | J-2136 | J-2137 | 1,650 | 16.95 | 0.01 | 0.02 | 0.11 | 110.0 |
| P-2162 | 8.0 | J-2142 | J-2141 | 900 | -2.37 | 0.00 | 0.00 | 0.02 | 120.0 |
| P-2163 | 8.0 | J-2135 | J-2142 | 1,250 | -26.51 | 0.03 | 0.04 | 0.17 | 110.0 |
| P-2164 | 8.0 | J-2136 | J-2135 | 200 | 9.13 | 0.00 | 0.00 | 0.06 | 110.0 |
| P-2165 | 8.0 | J-2138 | J-2136 | 750 | 30.00 | 0.04 | 0.03 | 0.19 | 100.0 |
| P-2166 | 8.0 | J-2141 | J-2140 | 750 | 8.29 | 0.00 | 0.00 | 0.05 | 120.0 |
| P-2167 | 8.0 | J-2143 | J-2141 | 1,650 | 14.58 | 0.01 | 0.01 | 0.09 | 120.0 |
| P-2168 | 8.0 | J-2144 | J-2143 | 1,000 | 46.57 | 0.10 | 0.10 | 0.30 | 100.0 |
| P-2169 | 8.0 | J-2165 | J-2166 | 1,200 | 3.92 | 0.00 | 0.00 | 0.03 | 110.0 |
| P-2170 | 12.0 | J-2144 | J-2165 | 1,600 | -157.85 | 0.10 | 0.15 | 0.45 | 120.0 |
| P-2171 | 12.0 | J-2145 | J-2144 | 750 | -107.36 | 0.05 | 0.04 | 0.30 | 120.0 |
| P-2172 | 12.0 | J-2146 | J-2147 | 500 | 35.12 | 0.01 | 0.00 | 0.10 | 120.0 |
| P-2173 | 12.0 | J-2145 | J-2146 | 1,350 | 39.04 | 0.01 | 0.01 | 0.11 | 120.0 |
| P-2174 | 12.0 | J-2148 | J-2145 | 600 | -64.40 | 0.02 | 0.01 | 0.18 | 120.0 |
| P-2175 | 8.0 | J-2147 | J-2148 | 1,450 | -5.23 | 0.00 | 0.00 | 0.03 | 120.0 |
| P-2176 | 8.0 | J-2139 | J-2138 | 250 | 29.55 | 0.05 | 0.01 | 0.19 | 90.0 |
| P-2177 | 8.0 | J-2140 | J-2138 | 1,050 | 4.37 | 0.00 | 0.00 | 0.03 | 120.0 |
| P-2178 | 12.0 | J-2149 | J-2152 | 600 | 51.33 | 0.01 | 0.01 | 0.15 | 120.0 |
| P-2179 | 12.0 | J-2148 | J-2149 | 500 | 55.25 | 0.01 | 0.01 | 0.16 | 120.0 |
| P-2180 | 12.0 | J-2150 | J-2147 | 450 | -36.42 | 0.01 | 0.00 | 0.10 | 120.0 |
| P-2181 | 12.0 | J-2151 | J-2150 | 850 | -32.50 | 0.01 | 0.00 | 0.09 | 120.0 |
| P-2182 | 12.0 | J-2152 | J-2151 | 1,250 | -28.58 | 0.00 | 0.01 | 0.08 | 120.0 |
| P-2183 | 12.0 | J-2139 | J-2152 | 1,800 | -75.99 | 0.02 | 0.04 | 0.22 | 120.0 |
| P-2184 | 8.0 | J-2137 | J-2139 | 800 | -42.51 | 0.09 | 0.07 | 0.27 | 100.0 |
| P-2185 | 8.0 | J-2111 | J-2097 | 550 | 39.97 | 0.08 | 0.04 | 0.26 | 100.0 |
| P-2186 | 6.0 | J-2111 | J-2110 | 1,000 | -8.63 | 0.02 | 0.02 | 0.10 | 100.0 |
| P-2187 | 8.0 | J-2112 | J-2113 | 1,000 | -7.96 | 0.00 | 0.00 | 0.05 | 100.0 |
| P-2188 | 8.0 | J-2116 | J-2114 | 950 | -2.91 | 0.00 | 0.00 | 0.02 | 100.0 |
| P-2189 | 8.0 | J-2110 | J-2109 | 1,200 | 2.76 | 0.00 | 0.00 | 0.02 | 100.0 |
| P-2190 | 8.0 | J-2112 | J-2111 | 300 | 35.26 | 0.06 | 0.02 | 0.23 | 100.0 |
| P-2191 | 8.0 | J-2116 | J-2112 | 300 | 31.23 | 0.05 | 0.01 | 0.20 | 100.0 |
| P-2192 | 8.0 | J-2118 | J-2116 | 339 | 32.24 | 0.05 | 0.02 | 0.21 | 100.0 |
| P-2193 | 8.0 | J-2117 | J-2118 | 850 | -18.10 | 0.02 | 0.01 | 0.12 | 100.0 |
| P-2194 | 8.0 | J-2114 | J-2117 | 300 | -10.26 | 0.01 | 0.00 | 0.07 | 100.0 |
| P-2195 | 8.0 | J-2113 | J-2110 | 300 | 15.31 | 0.01 | 0.00 | 0.10 | 100.0 |

# Scenario: FIRE FLOW
# Fire Flow Analysis
# Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-2196 | 8.0 | J-2114 | J-2113 | 300 | 27.19 | 0.04 | 0.01 | 0.17 | 100.0 |
| P-2197 | 8.0 | J-2163 | J-2114 | 1,300 | 23.77 | 0.03 | 0.04 | 0.15 | 100.0 |
| P-2198 | 8.0 | J-2164 | J-2163 | 800 | 25.42 | 0.03 | 0.03 | 0.16 | 100.0 |
| P-2199 | 8.0 | J-2122 | J-2164 | 400 | 29.34 | 0.04 | 0.02 | 0.19 | 100.0 |
| P-2200 | 8.0 | J-2121 | J-2122 | 400 | 29.27 | 0.04 | 0.01 | 0.19 | 110.0 |
| P-2201 | 8.0 | J-2123 | J-2124 | 400 | -24.80 | 0.03 | 0.01 | 0.16 | 100.0 |
| P-2202 | 8.0 | J-2126 | J-2137 | 800 | -55.54 | 0.14 | 0.11 | 0.35 | 100.0 |
| P-2203 | 8.0 | J-2123 | J-2125 | 300 | 16.89 | 0.02 | 0.00 | 0.11 | 100.0 |
| P-2204 | 8.0 | J-2122 | J-2123 | 280 | -4.00 | 0.00 | 0.00 | 0.03 | 100.0 |
| P-2205 | 8.0 | J-2124 | J-2121 | 250 | -9.94 | 0.01 | 0.00 | 0.06 | 100.0 |
| P-2206 | 8.0 | J-2126 | J-2124 | 210 | 18.78 | 0.02 | 0.00 | 0.12 | 100.0 |
| P-2207 | 8.0 | J-2125 | J-2126 | 400 | -32.84 | 0.05 | 0.02 | 0.21 | 100.0 |
| P-2208 | 8.0 | J-2163 | J-2125 | 400 | -45.80 | 0.10 | 0.04 | 0.29 | 100.0 |
| P-2209 | 8.0 | J-2109 | J-2163 | 600 | -43.53 | 0.09 | 0.05 | 0.28 | 100.0 |
| P-2210 | 8.0 | PRV-1 | J-2096 | 660 | 0.00 | 0.00 | 0.00 | 0.00 | 100.0 |
| P-2211 | 8.0 | J-2097 | J-2096 | 400 | 36.05 | 0.06 | 0.03 | 0.23 | 100.0 |
| P-2212 | 8.0 | J-2096 | J-2098 | 200 | 22.18 | 0.03 | 0.01 | 0.14 | 100.0 |
| P-2213 | 8.0 | J-2115 | J-2096 | 2,600 | -9.95 | 0.00 | 0.01 | 0.06 | 110.0 |
| P-2214 | 8.0 | J-2099 | J-2175 | 548 | 9.66 | 0.00 | 0.00 | 0.06 | 110.0 |
| P-2215 | 8.0 | J-2098 | J-2099 | 300 | 18.26 | 0.02 | 0.01 | 0.12 | 100.0 |
| P-2216 | 8.0 | J-2160 | J-2100 | 400 | 3.32 | 0.00 | 0.00 | 0.02 | 100.0 |
| P-2217 | 8.0 | J-2102 | J-2160 | 600 | 7.24 | 0.00 | 0.00 | 0.05 | 100.0 |
| P-2218 | 6.0 | J-2100 | J-2101 | 700 | 4.08 | 0.00 | 0.00 | 0.05 | 100.0 |
| P-2219 | 8.0 | J-2102 | J-2108 | 1,100 | -17.77 | 0.01 | 0.01 | 0.11 | 120.0 |
| P-2220 | 8.0 | J-2108 | J-2109 | 950 | -42.38 | 0.09 | 0.08 | 0.27 | 100.0 |
| P-2221 | 8.0 | J-2107 | J-2108 | 200 | -20.68 | 0.02 | 0.00 | 0.13 | 100.0 |
| P-2222 | 8.0 | J-2102 | J-2107 | 950 | -12.84 | 0.01 | 0.01 | 0.08 | 100.0 |
| P-2223 | 8.0 | J-2099 | J-2100 | 850 | 4.68 | 0.00 | 0.00 | 0.03 | 100.0 |
| P-2224 | 6.0 | J-2105 | J-2106 | 600 | 3.92 | 0.00 | 0.00 | 0.04 | 100.0 |
| P-2225 | 6.0 | J-2102 | J-2105 | 500 | 7.84 | 0.02 | 0.01 | 0.09 | 100.0 |
| P-2226 | 8.0 | J-2103 | J-2102 | 500 | -11.61 | 0.01 | 0.00 | 0.07 | 100.0 |
| P-2227 | 6.0 | J-2104 | J-2103 | 305 | -3.92 | 0.00 | 0.00 | 0.04 | 100.0 |
| P-2228 | 8.0 | J-2101 | J-2103 | 1,900 | -3.77 | 0.00 | 0.00 | 0.02 | 110.0 |
| P-2229 | 6.0 | J-2101 | J-2168 | 376 | 3.92 | 0.00 | 0.00 | 0.04 | 130.0 |
| P-2230 | 6.0 | J-2175 | J-2170 | 369 | 3.92 | 0.00 | 0.00 | 0.04 | 130.0 |
| P-2231 | 6.0 | J-2175 | J-2169 | 373 | 3.92 | 0.00 | 0.00 | 0.04 | 130.0 |
| P-2232 | 8.0 | J-2175 | J-2115 | 1,352 | -2.10 | 0.00 | 0.00 | 0.01 | 110.0 |
| P-2233 | 6.0 | J-2115 | J-2171 | 853 | 3.92 | 0.00 | 0.00 | 0.04 | 130.0 |
| P-2234 | 6.0 | J-2107 | J-2172 | 980 | 3.92 | 0.00 | 0.00 | 0.04 | 130.0 |
| P-2235 | 8.0 | J-2117 | J-2173 | 348 | 3.92 | 0.00 | 0.00 | 0.03 | 130.0 |
| P-2236 | 8.0 | J-2118 | J-2174 | 567 | 3.92 | 0.00 | 0.00 | 0.03 | 130.0 |
| P-2237 | 12.0 | J-2176 | J-2094 | 1,500 | -245.93 | 0.19 | 0.28 | 0.70 | 130.0 |
| P-2238 | 12.0 | J-2178 | J-2176 | 401 | -238.09 | 0.21 | 0.08 | 0.68 | 120.0 |
| P-2239 | 12.0 | J-2167 | J-2178 | 399 | -230.24 | 0.19 | 0.08 | 0.65 | 120.0 |
| P-2240 | 8.0 | J-2176 | J-2177 | 1,030 | 3.92 | 0.00 | 0.00 | 0.03 | 130.0 |
| P-2241 | 8.0 | J-2178 | J-2179 | 580 | 3.92 | 0.00 | 0.00 | 0.03 | 130.0 |
| P-2242 | 8.0 | J-2092 | J-2180 | 501 | 19.61 | 0.02 | 0.01 | 0.13 | 90.0 |
| P-2243 | 8.0 | J-2180 | J-2181 | 581 | 3.92 | 0.00 | 0.00 | 0.03 | 130.0 |
| P-2244 | 8.0 | J-2180 | J-2182 | 291 | 11.76 | 0.01 | 0.00 | 0.08 | 90.0 |
| P-2245 | 6.0 | J-2182 | J-2183 | 295 | 3.92 | 0.00 | 0.00 | 0.04 | 130.0 |
| P-2246 | 8.0 | J-2182 | J-2095 | 308 | 3.92 | 0.00 | 0.00 | 0.03 | 90.0 |

# Scenario: FIRE FLOW
# Fire Flow Analysis
# Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-2247 | 12.0 | J-2155 | J-2184 | 1,102 | 144.51 | 0.08 | 0.09 | 0.41 | 120.0 |
| P-2248 | 8.0 | J-2184 | J-2158 | 1,245 | 8.13 | 0.00 | 0.00 | 0.05 | 110.0 |
| P-2249 | 8.0 | J-2068 | J-2185 | 774 | 38.18 | 0.06 | 0.05 | 0.24 | 110.0 |
| P-2250 | 8.0 | J-2185 | J-2069 | 1,326 | 30.33 | 0.04 | 0.05 | 0.19 | 110.0 |
| P-2251 | 6.0 | J-2069 | J-2187 | 442 | 15.69 | 0.03 | 0.01 | 0.18 | 130.0 |
| P-2252 | 6.0 | J-2187 | J-2188 | 292 | 3.92 | 0.00 | 0.00 | 0.04 | 130.0 |
| P-2253 | 6.0 | J-2187 | J-2189 | 535 | 7.84 | 0.01 | 0.01 | 0.09 | 130.0 |
| P-2254 | 8.0 | J-2189 | J-2190 | 905 | 1.85 | 0.00 | 0.00 | 0.01 | 130.0 |
| P-2255 | 8.0 | J-2190 | J-2189 | 723 | -2.07 | 0.00 | 0.00 | 0.01 | 130.0 |
| P-2256 | 8.0 | J-2000 | J-2291 | 921 | 3.92 | 0.00 | 0.00 | 0.03 | 130.0 |
| P-2257 | 6.0 | J-2074 | J-1129 | 1,069 | 6.98 | 0.01 | 0.01 | 0.08 | 130.0 |
| P-2258 | 8.0 | J-2073 | J-1130 | 1,192 | 6.98 | 0.00 | 0.00 | 0.04 | 130.0 |
| P-2259 | 10.0 | J-2191 | J-2022 | 760 | -51.00 | 0.04 | 0.03 | 0.21 | 100.0 |
| P-2260 | 6.0 | J-2002 | J-2193 | 1,425 | 3.92 | 0.00 | 0.00 | 0.04 | 130.0 |
| P-2296 | 10.0 | J-2021 | J-2191 | 1,290 | -43.16 | 0.03 | 0.04 | 0.18 | 100.0 |
| P-2297 | 6.0 | J-2009 | J-2010 | 600 | -1.84 | 0.00 | 0.00 | 0.02 | 90.0 |
| P-2298 | 12.0 | J-2056 | J-2195 | 644 | 105.17 | 0.05 | 0.03 | 0.30 | 120.0 |
| P-2299 | 12.0 | J-2195 | J-2058 | 206 | 101.25 | 0.04 | 0.01 | 0.29 | 120.0 |
| P-2300 | 8.0 | J-2056 | J-2194 | 1,153 | 13.68 | 0.03 | 0.03 | 0.09 | 60.0 |

# Scenario: FIRE FLOW
# Fire Flow Analysis
# Pump Report

| Label | Elevation (ft) | Control Status | Intake Pump Grade (ft) | Discharge Pump Grade (ft) | Discharge (gpm) | Pump Head (ft) | Notes |
|---|---|---|---|---|---|---|---|
| PMP-6 | 285.00 | Off | 288.68 | 523.37 | 0.00 | 0.00 | Boland |
| PMP-2 | 285.00 | On | 287.23 | 553.65 | 601.66 | 266.42 | Boland |
| PMP-1 | 285.00 | On | 287.54 | 548.82 | 629.11 | 261.28 | Boland |
| PMP-4 | 275.00 | On | 283.95 | 488.66 | 683.30 | 204.71 | Hosmer |
| PMP-5 | 275.00 | Off | 284.71 | 486.73 | 0.00 | 0.00 | Hosmer |


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# Scenario: FIRE FLOW
# Fire Flow Analysis
# Tank Report

| Label | Zone | Base Elevation (ft) | Minimum Elevation (ft) | Initial HGL (ft) | Maximum Elevation (ft) | Tank Diameter (ft) | Inflow (gpm) | Current Status | Calculated Hydraulic Grade (ft) | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| T-1 | Zone | 418.00 | 418.00 | 482.00 | 492.70 | 25.00 | -258.15 | Draining | 482.00 | Oak Hill Tank |
| T-2 | Zone | 451.00 | 451.00 | 482.00 | 493.30 | 40.00 | 22.61 | Filling | 482.00 | Clear Hill Tank |
| T-3 | Zone | 467.00 | 467.00 | 503.00 | 515.00 | 67.00 | 223.32 | Filling | 503.00 | Tara Rd Tank |


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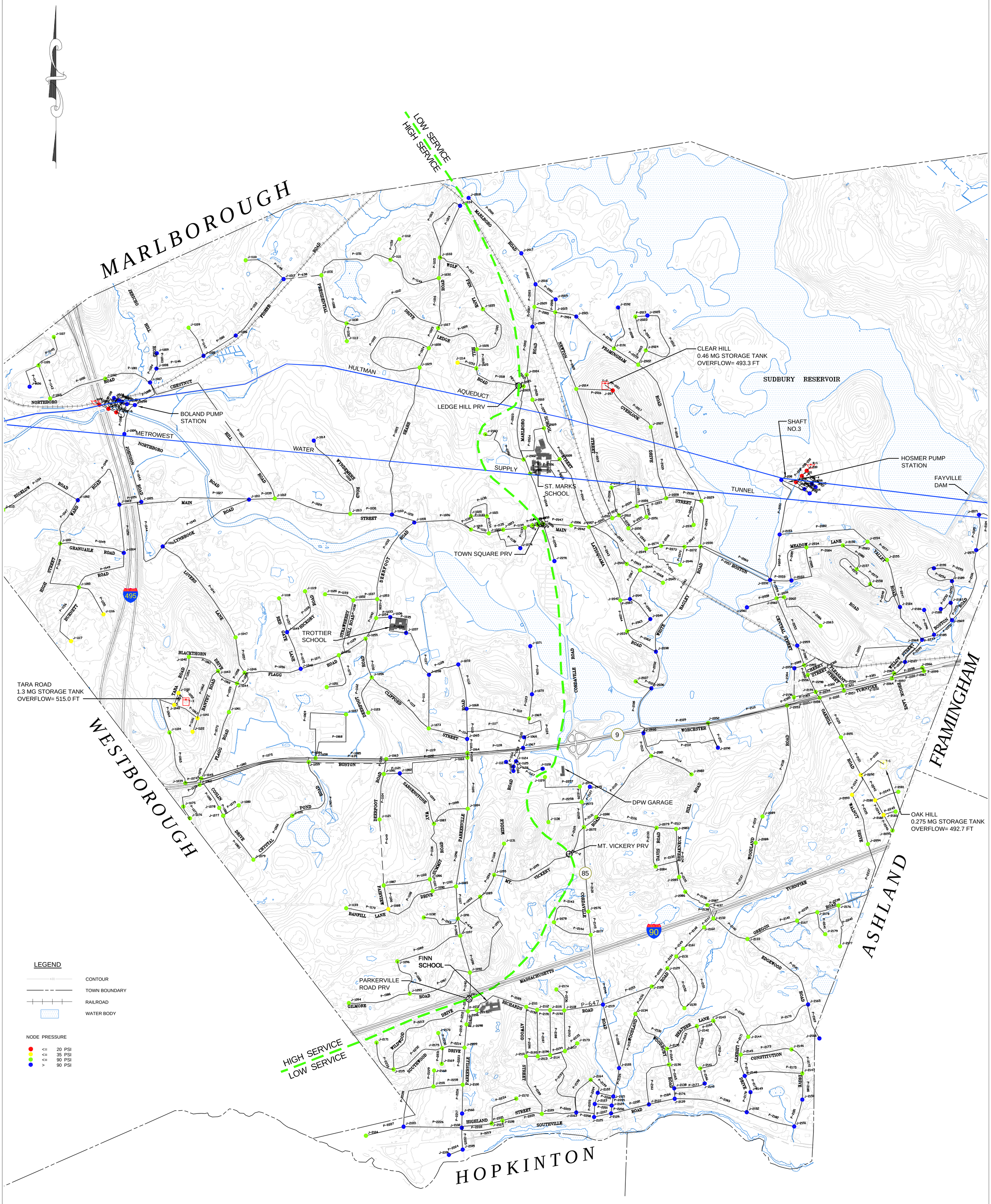
# APPENDIX H

# AVAILABLE SYSTEM PRESSURE ON A MAX DAY

# NODE AND PIPELINE PLAN




LEGEND

- CONTOUR
- TOWN BOUNDARY
- RAILROAD
- WATER BODY

NODE PRESSURE

- <= 20 PSI
- <= 35 PSI
- <= 90 PSI
- > 90 PSI

Graphic Scale 1"=800'

800' 400' 0 800' 1600' 3200'

PARE CORPORATION
ENGINEERS - SCIENTISTS - PLANNERS
8 BLACKSTONE VALLEY PLACE
LINCOLN, RI 02865
401-334-4100

# TOWN OF SOUTHBOROUGH
# WATER SYSTEM MASTER PLAN

SOUTHBOROUGH, MASSACHUSETTS

REVISIONS:

| | |
|---|---|
| PROJECT NO.: | 08176.01 |
| DATE: | FEBRUARY 2009 |
| SCALE: | 1"=800' |
| DESIGNED BY: | KLM |
| CHECKED BY: | TPT |
| DRAWN BY: | AKL |
| APPROVED BY: | RPS |

DRAWING TITLE: AVAILABLE SYSTEM PRESSURE ON A MAX DAY

DRAWING NO.: 1

SHEET NO. 1 OF 1

# APPENDIX I

# AVAILABLE FIRE FLOW

# NODE AND PIPELINE PLAN

MARLBOROUGH

WESTBOROUGH

FRAMINGHAM

ASHLAND

HOPKINTON

LOW SERVICE
HIGH SERVICE

HULTMAN AQUEDUCT

SUDBURY RESERVOIR

BOLAND PUMP STATION

LEDGE HILL PRV

CLEAR HILL
0.46 MG STORAGE TANK
OVERFLOW= 493.3 FT

SHAFT NO.3

HOSMER PUMP STATION

FAYVILLE DAM

TUNNEL

METROWEST WATER SUPPLY

ST. MARK'S SCHOOL

TOWN SQUARE PRV

DPW GARAGE

MT. VICKERY PRV

TROTTIER SCHOOL

PARKERVILLE ROAD PRV

FINN SCHOOL

TARA ROAD
1.3 MG STORAGE TANK
OVERFLOW= 515.0 FT

OAK HILL
0.275 MG STORAGE TANK
OVERFLOW= 492.7 FT

LEGEND

- CONTOUR
- TOWN BOUNDARY
- RAILROAD
- EXISTING PIPE
- PROPOSED CAPITAL IMPROVEMENT
- WATER BODY

NODE AVAILABLE FIRE FLOW

- <= 1,000 GPM
- = 1,001 - 2,000 GPM
- = 2,001 - 3,000 GPM
- = 3,001 - 4,000 GPM
- = 4,001 - 5,000 GPM
- = NOT DETERMINED

Graphic Scale 1"=800'

800' 400' 0 800' 1600' 3200'


PARE CORPORATION
ENGINEERS - SCIENTISTS - PLANNERS
8 BLACKSTONE VALLEY PLACE
LINCOLN, RI 02865
401-334-4100


# TOWN OF SOUTHBOROUGH
# WATER SYSTEM MASTER PLAN

SOUTHBOROUGH, MASSACHUSETTS

REVISIONS:

| | |
|---|---|
| PROJECT NO.: | 08176.01 |
| DATE: | FEBRUARY 2009 |
| SCALE: | 1"=800' |
| DESIGNED BY: | KLM |
| CHECKED BY: | TPT |
| DRAWN BY: | AKL |
| APPROVED BY: | RPS |

DRAWING TITLE: AVAILABLE FIRE FLOW

DRAWING NO.: 1

SHEET NO. 1 OF 1

# APPENDIX J

# ISO HYDRANT FLOW TESTS

# Table 7 - Hydrant Flow Data Summary for Town Of Southborough

Conducted by ISO Commercial Risk Services, Inc.

City Southborough State MA Zip 01772 Witnessed by A. Lagadinos Date 3-9-00

| TEST NO. | TYPE DIST.* | TEST LOCATION | SERVICE | FLOW-GPM INDIVIDUAL HYDRANTS | | | FLOW-GPM TOTAL | PRESSURE PSI STATIC | PRESSURE PSI RESID. | FLOW AT 20 PSI NEEDED** | FLOW AT 20 PSI AVAIL. | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Res | Presidential & Sears | Main | 1140 | | | 1140 | 48 | 30 | 500 | 1400 | |
| 2 | Res | 6 Maple Crest Dr. | " | 1570 | | | 1570 | 80 | 42 | 750 | 2000 | |
| 3 | Comm | Main St. at Fay School | " | 2050 | | | 2050 | 76 | 55 | 3000 | 3500 | |
| 4 | Comm | 150 Cordaville Rd | " | 1380 | | | 1380 | 94 | 73 | 3000 | 2700 | |
| 5 | Comm | Cor. Rte 9 & Willow St | " | 1200 | | | 1200 | 90 | 22 | 3500 | 1200 | |
| 6 | Comm | 337 Turnpike Rd-Rt 9 | " | 2060 | | | 2060 | 66 | 55 | 2500 | 4500 | |
| 7 | Res | Lynnbrook at CUL DE SAC | " | 2820 | | | 2820 | 86 | 75 | 500 | 7400 | |
| 8 | Comm | Neary School--Front Yard | " | 1690 | | | 1690 | 90 | 34 | 3000 | 1900 | |
| 9 | Comm | 21 Boston Rd. | " | 2150 | | | 2150 | 78 | 48 | 1500 | 3100 | |
| 10 | Comm | 17 Oregon Rd. | " | 1280 | | | 1280 | 60 | 8 | 1250 | 1100 | |
| 11 | Comm | Parkerville Rd.near Gilmore | " | 1160 | | | 1160 | 80 | 62 | 2250 | 2200 | |
| 12 | Res | 151 Southville Rd | " | 1980 | | | 1980 | 92 | 58 | 750 | 3000 | |
| 13 | Comm | Southville Rd.at North St | " | 1950 | | | 1950 | 102 | 50 | 2250 | 2500 | |
| 14 | Comm | 10 Southville Rd. | " | 2220 | | | 2220 | 105 | 48 | 1250 | 2800 | |
| | | | | | | | | | | | | |

THE ABOVE LISTED NEEDED FIRE FLOWS ARE FOR INSURANCE RATING PURPOSES ONLY AND ARE *NOT* INTENDED TO PREDICT THE MAXIMUM AMOUNT OF WATER REQUIRED FOR A LARGE SCALE FIRE CONDITION. THE AVAILABLE FLOWS ONLY INDICATE THE CONDITIONS THAT EXISTED AT THE TIME AND AT THE LOCATION WHERE TESTS WERE WITNESSED.

* Comm = Commercial; Res = Residential.

** Needed is the rate of flow for a specific duration for a full credit condition. Needed Fire Flows greater than 3,500 gpm are not considered in determining the classification of the city when using the Fire Suppression Rating Schedule.

INSURANCE SERVICES OFFICE, INC.

# HYDRANT FLOW DATA SUMMARY

City SOUTHBOROUGH
County WORCESTER State MA Witnessed by _ Southborough Water Dept. Date March 4, 2002

| TEST NO. | TYPE DIST.* | TEST LOCATION | SERVICE | FLOW - GPM $Q=(29.83(C^2(d^2)p^{0.5}))$ INDIVIDUAL HYDRANTS | | | TOTAL | PRESSURE PSI STATIC | PRESSURE PSI RESID. | FLOW -AT 20 PSI $Q_R=Q_F(h_R^{0.54}/h_F^{0.54})$ NEEDED ** | FLOW -AT 20 PSI AVAIL. | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Comm | BOSTON WORCESTER @ COSLIN | MAIN | 1180 | | | 1180 | 45 | 44 | 4000 | 6700 | A (2170gpm) |
| 1-A | Comm | BOSTON WORCESTER @ COSLIN | MAIN | 1180 | | | 1180 | 45 | 44 | 3000 | 6700 | |
| 2 | Comm | MARLBORO @ ST.MARKS | MAIN | 1180 | 1130 | | 1180 | 69 72 | 50 54 | 2500 | 2100 | |
| 3 | Comm | ON NEWTON @ ABT.1/4 MILE S.OF OVERLOOK | MAIN | 1300 | | | 1300 | 70 | 67 | 3000 | 5900 | A (1920gpm) |
| 4 | Comm | RICHARDS @ PARKERVILLE | MAIN | 1060 | 1050 | | 1060 | 90 83 | 50 48 | 2250 | 1500 | |
| 5 | Comm | MT.VICKERY RD.@ CORDAVILLE RD | MAIN | 1150 | 1150 | | 1150 | 85 84 | 52 48 | 3500 | 1600 | |
| 6 | Comm | RT -9 near DEERFOOT | MAIN | 1260 | | | 1260 | 56 | 50 | 1500 | 3300 | |
| 7 | Comm | HIGHLAND @ ATWOOD | MAIN | 920 | | | 920 | 80 | 42 | 1500 | 1200 | |
| 8 | Comm | ON BOSTON RD./ABT.1000' S.OF E.MAIN ST | MAIN | 2140 | | | 2140 | 78 | 48 | 1500 | 3100 | |
| 9 | Res | BANFILL @ FAIRVIEW | MAIN | 810 | | | 810 | 38 | 28 | 750 | 1100 | |
| 10 | Comm | BREAKNECK RD.@ MT.VICKERY RD | MAIN | 1200 | | | 1200 | 100 | 89 | 2000 | 3500 | A (1920gpm) |
| 11 | Res | BOSTON RD NR.VALLEY | MAIN | 1450 | | | 1450 | 112 | 84 | 750 | 2800 | |
| 12 | Res | FISHER @ NORTHBORO | MAIN | 1690 | | | 1690 | 96 | 82 | 750 | 4200 | |
| | | | A = Limited by available hydrants. | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

THE ABOVE LISTED NEEDED FIRE FLOWS ARE FOR PROPERTY INSURANCE PREMIUM CALCULATIONS ONLY AND ARE *NOT* INTENDED TO PREDICT THE MAXIMUM AMOUNT OF WATER REQUIRED FOR A LARGE SCALE FIRE CONDITION. THE AVAILABLE FLOWS ONLY INDICATE THE CONDITIONS THAT EXISTED AT THE TIME AND AT THE LOCATION WHERE TESTS WERE WITNESSED.

*Comm = Commercial; Res = Residential.

**Needed is the rate of flow for a specific duration for a full credit condition. Needed Fire Flows greater than 3,500 gpm are not considered in determining the classification of the city when using the Fire Suppression Rating Schedule.

Edition 2: 5/01/02

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# APPENDIX K

# PARE'S AUGUST 2007 HYDRANT FLOW TEST REPORTS

PARE CORPORATION

# HYDRANT FLOW TEST REPORT #1A

*Location:* St. Mark's School
Southborough, Massachusetts

*Date:* November 6, 2007

*Test Made By:* Brandon Blanchard

*Start of Test:* 1:00 P.M.

*Duration of Test:* 2 min. +/-

*Representative of:* Pare Corporation (with assistance from Southborough DPW personnel)

*Purpose of Test:* Determine available fire flow at 20 psi residual pressure.

*Consumption Rate During Test:* 1,130 gpm at 2 min = 2,260 gallons +/-

*Flow Test Results at Hydrant:*

| | Flow Hydrant | Residual Hydrant |
|---|---|---|
| *Flow Rate:* | 1,130 gpm | |
| *Size Nozzle:* | 2½ inch | 2½ inch |
| *Static Pressure:* | 69 psi | 69 psi |
| *Residual Pressure:* | 50 psi | 58 psi |

Note: Residual pressure was gauge monitored at both the flow and residual hydrants, and is provided above. Pressure read from pitot tube gauge corresponding to a flow rate of 1,130 gpm was approximately 45 psi. Friction coefficient of 0.9 is factored into the pitot tube gauge.

*Remarks:* The results of this flow test are indicative of the conditions of the water system at the time of the test. Other factors, such as available fire reserve (i.e. storage tank volume), the operation of booster pumps, etc., were not considered in this evaluation.

*Report prepared by:* Brandon Blanchard

PARE CORPORATION

# HYDRANT FLOW TEST REPORT #2A

*Location:* Trottier School
Southborough, Massachusetts

*Date:* November 6, 2007

*Test Made By:* Brandon Blanchard

*Start of Test:* 1:30 P.M.

*Duration of Test:* 2 min. +/-

*Representative of:* Pare Corporation (with assistance from Southborough DPW personnel)

*Purpose of Test:* Determine available fire flow at 20 psi residual pressure.

*Consumption Rate During Test:* 1,455 gpm at 2 min = 2,910 gallons +/-

*Flow Test Results at Hydrant:*

| | Flow Hydrant | Residual Hydrant |
|---|---|---|
| *Flow Rate:* | 1,455 gpm | |
| *Size Nozzle:* | 2½ inch | 2½ inch |
| *Static Pressure:* | 98 psi | 98 psi |
| *Residual Pressure:* | 78 psi | 86 psi |

Note: Residual pressure was gauge monitored at both the flow and residual hydrants, and is provided above. Pressure read from pitot tube gauge corresponding to a flow rate of 1,455 gpm was approximately 75 psi. Friction coefficient of 0.9 is factored into the pitot tube gauge.

*Remarks:* The results of this flow test are indicative of the conditions of the water system at the time of the test. According to Southborough DPW personnel, two (2) booster pumps were running at the time of this test. Other factors, such as available fire reserve (i.e. storage tank volume), were not considered in this evaluation.

*Report prepared by:* Brandon Blanchard

PARE CORPORATION

# HYDRANT FLOW TEST REPORT #2B

*Location:* Trottier School
Southborough, Massachusetts

*Date:* November 6, 2007

*Test Made By:* Brandon Blanchard

*Start of Test:* 1:45 P.M.

*Duration of Test:* 2 min. +/-

*Representative of:* Pare Corporation (with assistance from Southborough DPW personnel)

*Purpose of Test:* Determine available fire flow at 20 psi residual pressure.

*Consumption Rate During Test:* 1,400 gpm at 2 min = 2,800 gallons +/-

*Flow Test Results at Hydrant:*

| | Flow Hydrant | Residual Hydrant |
|---|---|---|
| *Flow Rate:* | 1,400 gpm | |
| *Size Nozzle:* | 2½ inch | 2½ inch |
| *Static Pressure:* | 98 psi | 98 psi |
| *Residual Pressure:* | 76 psi | 82 psi |

Note: Residual pressure was gauge monitored at both the flow and residual hydrants, and is provided above. Pressure read from pitot tube gauge corresponding to a flow rate of 1,400 gpm was approximately 70 psi. Friction coefficient of 0.9 is factored into the pitot tube gauge.

*Remarks:* The results of this flow test are indicative of the conditions of the water system at the time of the test. According to Southborough DPW personnel, no (0) booster pumps were running at the time of this test. Other factors, such as available fire reserve (i.e. storage tank volume), were not considered in this evaluation.

*Report prepared by:* Brandon Blanchard

PARE CORPORATION

# HYDRANT FLOW TEST REPORT #3

*Location:* Finn School
Southborough, Massachusetts

*Date:* November 6, 2007

*Test Made By:* Brandon Blanchard

*Start of Test:* 2:05 P.M.

*Duration of Test:* 2 min. +/-

*Representative of:* Pare Corporation (with assistance from Southborough DPW personnel)

*Purpose of Test:* Determine available fire flow at 20 psi residual pressure.

*Consumption Rate During Test:* 1,050 gpm at 2 min = 2,100 gallons +/-

*Flow Test Results at Hydrant:*

| Flow Hydrant | Residual Hydrant |
|---|---|
| *Flow Rate:* 1,050 gpm | |
| *Size Nozzle:* 2½ inch | *Size Nozzle:* 2½ inch |
| *Static Pressure:* 88 psi | *Static Pressure:* 84 psi |
| *Residual Pressure:* 50 psi | *Residual Pressure:* 60 psi |

Note: Residual pressure was gauge monitored at both the flow and residual hydrants, and is provided above. Pressure read from pitot tube gauge corresponding to a flow rate of 2,100 gpm was approximately 39 psi. Friction coefficient of 0.9 is factored into the pitot tube gauge.

*Remarks:* The results of this flow test are indicative of the conditions of the water system at the time of the test. Other factors, such as available fire reserve (i.e. storage tank volume), operation of booster pumps, etc., were not considered in this evaluation.

*Report prepared by:* Brandon Blanchard

PARE CORPORATION

# HYDRANT FLOW TEST REPORT #4

*Location:* Parkerville Road & Highland Road
Southborough, Massachusetts

*Date:* November 6, 2007

*Test Made By:* Brandon Blanchard

*Start of Test:* 2:20 P.M.

*Duration of Test:* 2 min. +/-

*Representative of:* Pare Corporation (with assistance from Southborough DPW personnel)

*Purpose of Test:* Determine available fire flow at 20 psi residual pressure.

*Consumption Rate During Test:* 900 gpm at 2 min = 1,800 gallons +/-

*Flow Test Results at Hydrant:*

| | Flow Hydrant | Residual Hydrant |
|---|---|---|
| *Flow Rate:* | 900 gpm | |
| *Size Nozzle:* | 2½ inch | 2½ inch |
| *Static Pressure:* | 94 psi | 94 psi |
| *Residual Pressure:* | 44 psi | 58 psi |

Note: Residual pressure was gauge monitored at both the flow and residual hydrants, and is provided above. Pressure read from pitot tube gauge corresponding to a flow rate of 900 gpm was approximately 29 psi. Friction coefficient of 0.9 is factored into the pitot tube gauge.

*Remarks:* The results of this flow test are indicative of the conditions of the water system at the time of the test. Other factors, such as available fire reserve (i.e. storage tank volume), operation of booster pumps, etc., were not considered in this evaluation.

*Report prepared by:* Brandon Blanchard

PARE CORPORATION

# HYDRANT FLOW TEST REPORT #5

*Location:* Mt. Vickery Road
Southborough, Massachusetts

*Date:* November 7, 2007

*Test Made By:* Brandon Blanchard

*Start of Test:* 1:45 P.M.
*Duration of Test:* 2 min. +/-

*Representative of:* Pare Corporation (with assistance from Southborough DPW personnel)

*Purpose of Test:* Determine available fire flow at 20 psi residual pressure.

*Consumption Rate During Test:* 1,150 gpm at 2 min = 2,300 gallons +/-

*Flow Test Results at Hydrant:*

| | Flow Hydrant | Residual Hydrant |
|---|---|---|
| *Flow Rate:* | 1,150 gpm | |
| *Size Nozzle:* | 2½ inch | 2½ inch |
| *Static Pressure:* | 85 psi | 83 psi |
| *Residual Pressure:* | 52 psi | 74 psi |

Note: Residual pressure was gauge monitored at both the flow and residual hydrants, and is provided above. Pressure read from pitot tube gauge corresponding to a flow rate of 1,150 gpm was approximately 47 psi. Friction coefficient of 0.9 is factored into the pitot tube gauge.

*Remarks:* The results of this flow test are indicative of the conditions of the water system at the time of the test. Other factors, such as available fire reserve (i.e. storage tank volume), operation of booster pumps, etc., were not considered in this evaluation.

*Report prepared by:* Brandon Blanchard

PARE CORPORATION

# HYDRANT FLOW TEST REPORT #6

*Location:* Woodland Road
Southborough, Massachusetts

*Date:* November 7, 2007

*Test Made By:* Brandon Blanchard

*Start of Test:* 1:15 P.M.

*Duration of Test:* 2 min. +/-

*Representative of:* Pare Corporation (with assistance from Southborough DPW personnel)

*Purpose of Test:* Determine available fire flow at 20 psi residual pressure.

*Consumption Rate During Test:* 1,200 gpm at 2 min = 2,400 gallons +/-

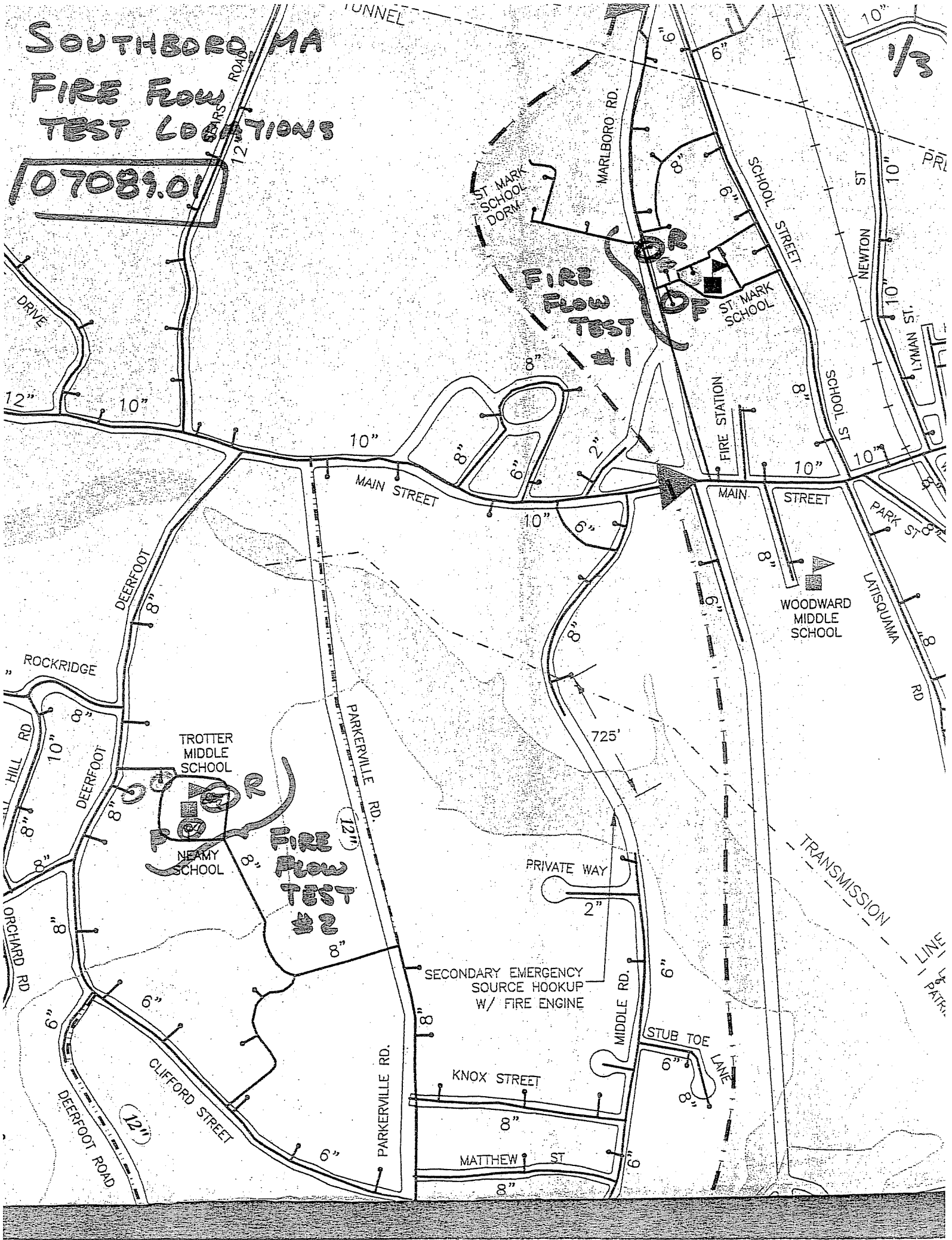
*Flow Test Results at Hydrant:*

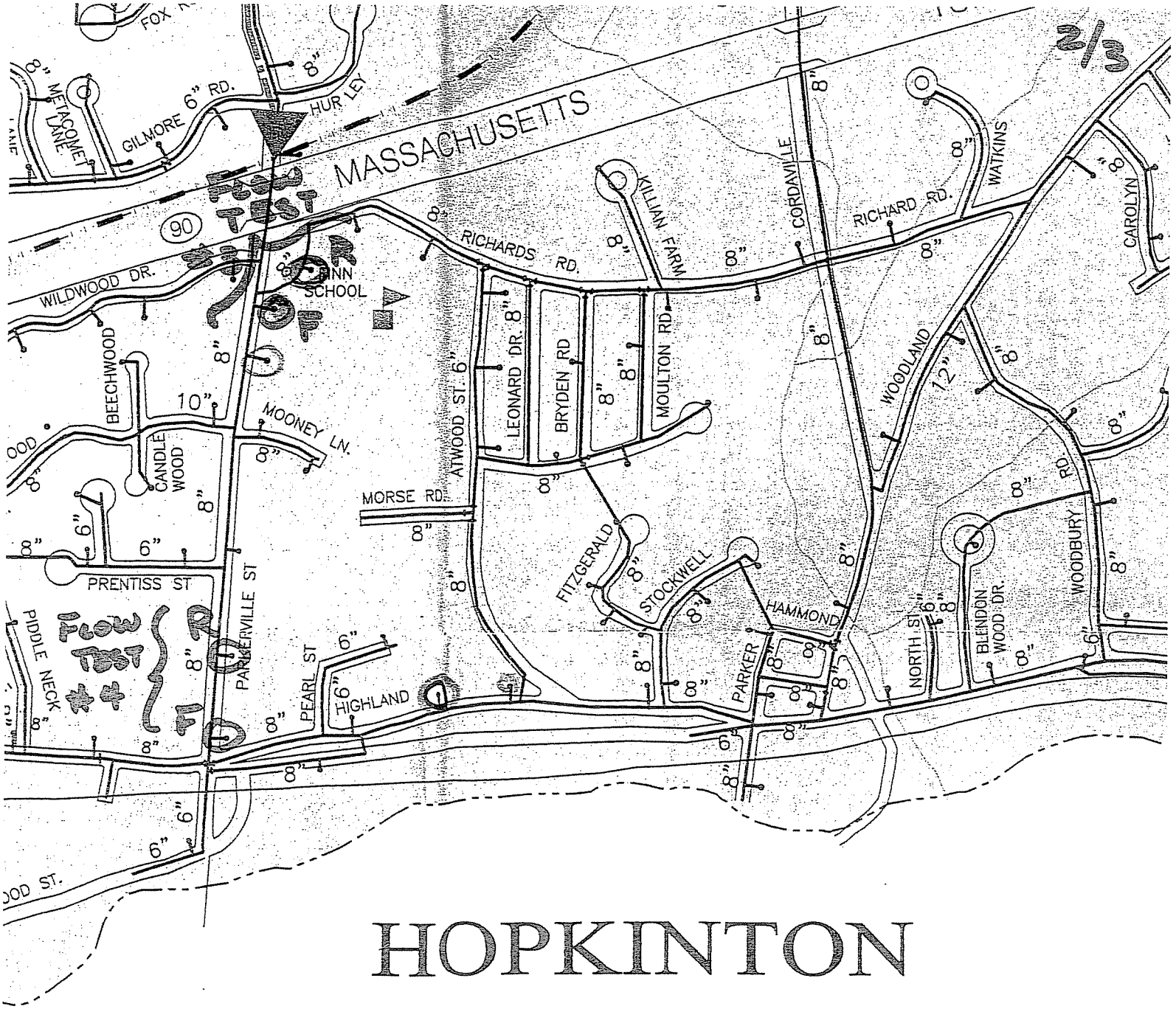
| Flow Hydrant | Residual Hydrant |
|---|---|
| *Flow Rate:* 1,200 gpm | |
| *Size Nozzle:* 2½ inch | *Size Nozzle:* 2½ inch |
| *Static Pressure:* 73 psi | *Static Pressure:* 70 psi |
| *Residual Pressure:* 54 psi | *Residual Pressure:* 52 psi |

Note: Residual pressure was gauge monitored at both the flow and residual hydrants, and is provided above. Pressure read from pitot tube gauge corresponding to a flow rate of 1,200 gpm was approximately 51 psi. Friction coefficient of 0.9 is factored into the pitot tube gauge.

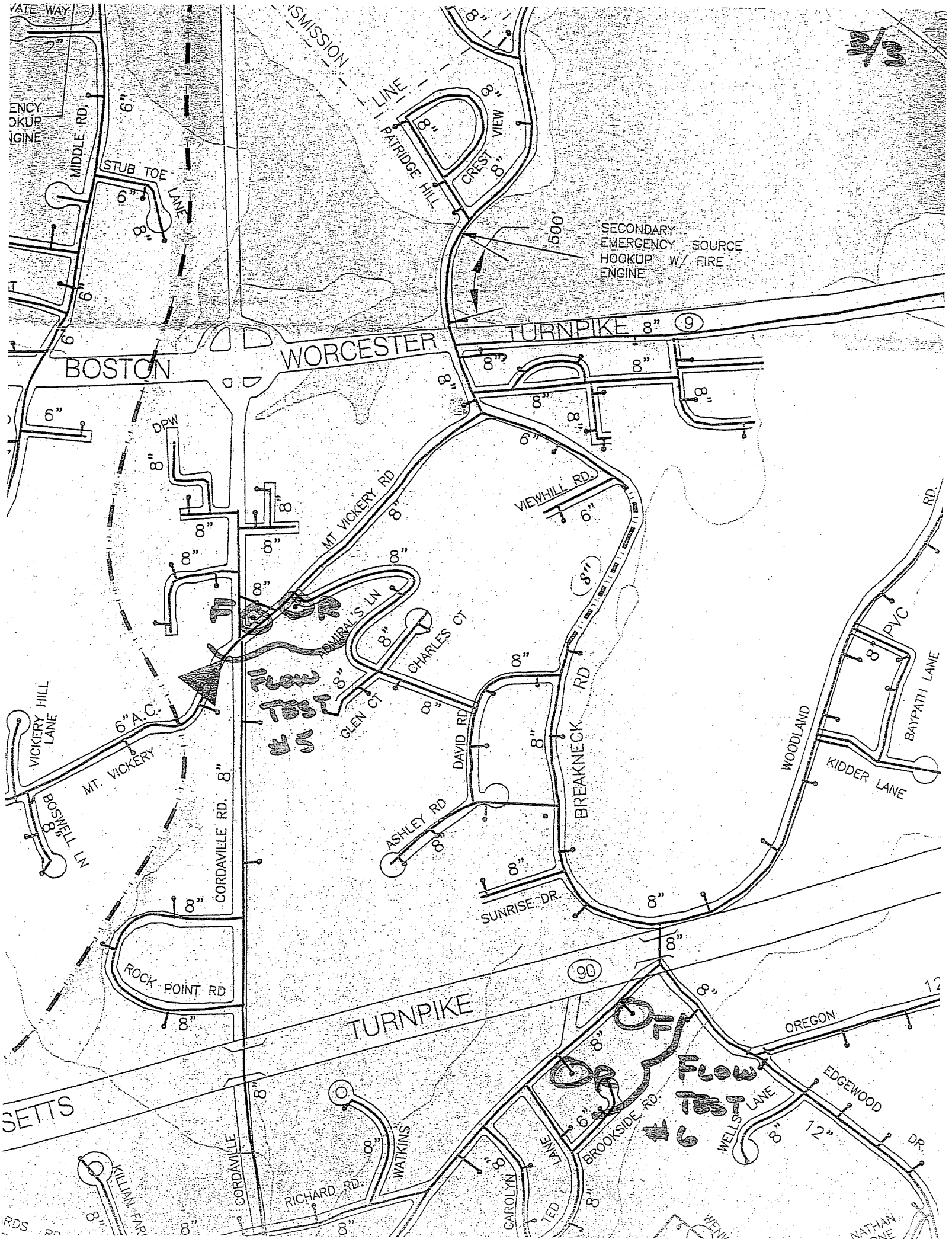
*Remarks:* The results of this flow test are indicative of the conditions of the water system at the time of the test. Other factors, such as available fire reserve (i.e. storage tank volume), operation of booster pumps, etc., were not considered in this evaluation.

*Report prepared by:* Brandon Blanchard


SOUTHBORO, MA
FIRE FLOW
TEST LOCATIONS
07089.01
1/3
TUNNEL
ROAD
DRIVE
MARLBORO RD.
ST MARK SCHOOL DORM
SCHOOL STREET
NEWTON ST
LYMAN ST.
ST MARK SCHOOL
FIRE FLOW TEST #1
FIRE STATION
SCHOOL ST
MAIN STREET
PARK ST
WOODWARD MIDDLE SCHOOL
LATISQUAMA RD
DEERFOOT
ROCKRIDGE
HILL RD
TROTTER MIDDLE SCHOOL
NEAMY SCHOOL
FIRE FLOW TEST #2
PARKERVILLE RD.
725'
PRIVATE WAY
TRANSMISSION LINE
ORCHARD RD
SECONDARY EMERGENCY SOURCE HOOKUP W/ FIRE ENGINE
MIDDLE RD.
STUB TOE LANE
KNOX STREET
CLIFFORD STREET
DEERFOOT ROAD
MATTHEW ST
12"
10"
8"
6"
2"


MASSACHUSETTS
90
WILDWOOD DR.
BEECHWOOD
CANDLE WOOD
MOONEY LN.
PRENTISS ST
PIDDLE NECK
PARKERVILLE ST
PEARL ST
HIGHLAND
MORSE RD.
ATWOOD ST.
LEONARD DR.
BRYDEN RD
MOULTON RD
RICHARDS RD.
KILLIAN FARM
CORDAVILLE
RICHARD RD.
WATKINS
CAROLYN
WOODLAND
RD.
WOODBURY
BLENDON WOOD DR.
NORTH ST.
PARKER
HAMMOND
STOCKWELL
FITZGERALD
HURLEY
GILMORE
METACOMET LANE
FOX
INN SCHOOL
FLOW TEST
0
1000
2000
4000
SCALE IN FEET

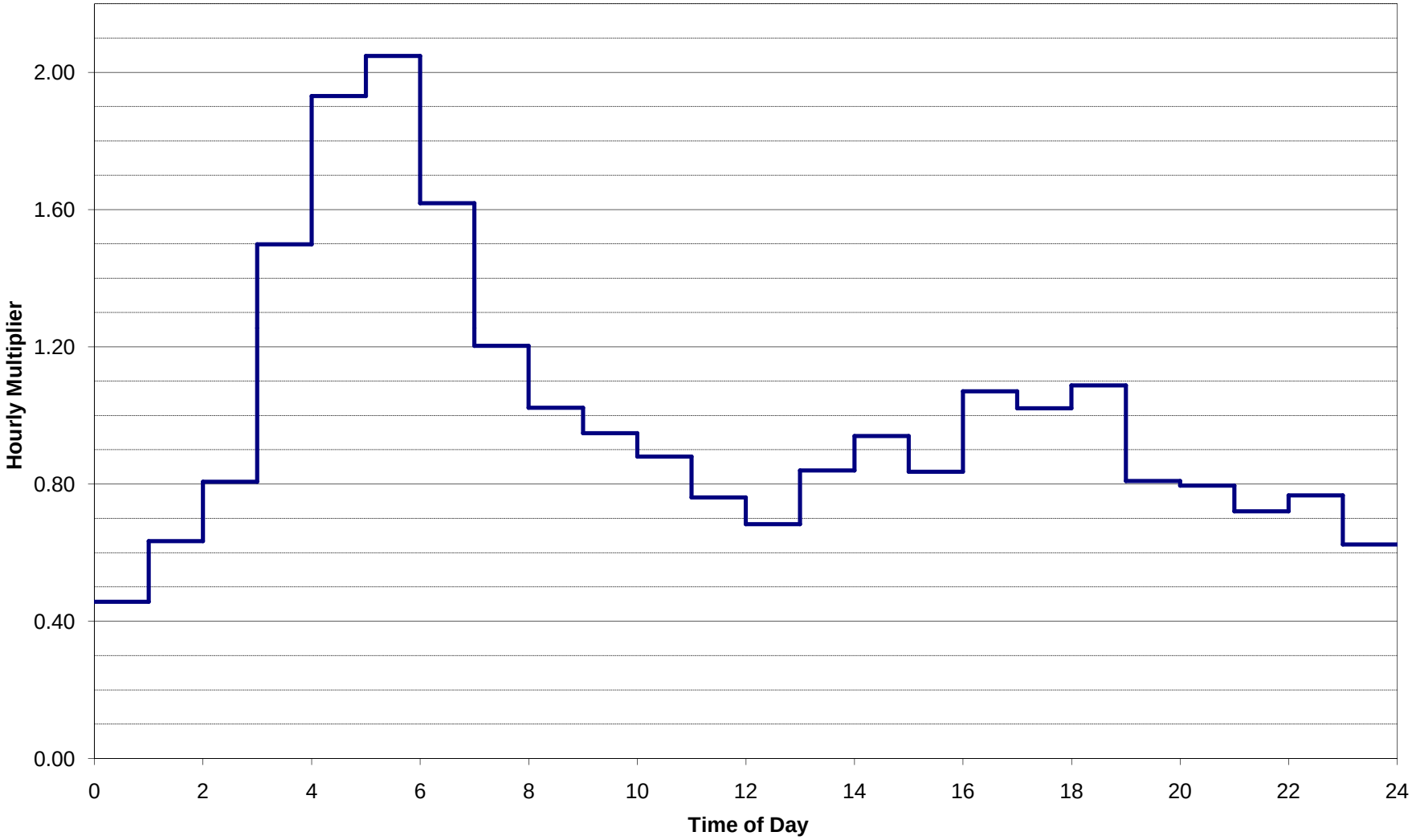
# HOPKINTON


3/3
MIDDLE RD.
STUB TOE LANE
PATRIDGE HILL
CREST VIEW
SECONDARY EMERGENCY SOURCE HOOKUP W/ FIRE ENGINE
500'
BOSTON WORCESTER TURNPIKE (9)
DPW
MT VICKERY RD
VIEWHILL RD.
ADMIRAL'S LN
CHARLES CT
GLEN CT
DAVID RD
BREAKNECK RD
WOODLAND
PVC
BAYPATH LANE
KIDDER LANE
VICKERY HILL LANE
MT. VICKERY
BOSWELL LN
CORDAVILLE RD.
ASHLEY RD
SUNRISE DR.
ROCK POINT RD
TURNPIKE (90)
OREGON
EDGEWOOD
WELLS LANE
BROOKSIDE RD.
CAROLYN
TED
WATKINS
RICHARD RD.
KILLIAN FARM
FLOW TEST #5
FLOW TEST #6
6"A.C.
2"
6"
8"
12"

# APPENDIX L

# HOURLY PEAKING FACTOR GRAPH

## Typical Hourly Peaking Factors



# APPENDIX M

# WATERCAD MODEL OUTPUT REPORTS

# (BUILD-OUT)

# Scenario: ADD-Buildout
# Steady State Analysis
# Junction Report

| Label | Elevation (ft) | Zone | Base Flow (gpm) | Pattern | Demand (gpm) | Hydraulic Grade (ft) | Pressure (psi) |
|---|---|---|---|---|---|---|---|
| J-1000 | 375.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 506.36 | 56.83 |
| J-1001 | 341.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 506.36 | 71.54 |
| J-1002 | 272.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 506.36 | 101.40 |
| J-1003 | 270.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 506.36 | 102.26 |
| J-1004 | 285.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 506.36 | 95.77 |
| J-1005 | 275.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 506.36 | 100.10 |
| J-1006 | 272.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 508.91 | 102.50 |
| J-1007 | 270.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 510.07 | 103.87 |
| J-1008 | 270.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 510.07 | 103.87 |
| J-1009 | 270.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 510.07 | 103.87 |
| J-1010 | 290.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 505.63 | 93.29 |
| J-1011 | 275.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 505.69 | 99.81 |
| J-1012 | 295.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 505.54 | 91.09 |
| J-1013 | 295.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 505.15 | 90.92 |
| J-1014 | 277.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 505.15 | 98.71 |
| J-1015 | 315.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 510.07 | 84.40 |
| J-1016 | 295.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 510.07 | 93.05 |
| J-1017 | 295.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 510.07 | 93.05 |
| J-1018 | 270.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 504.69 | 101.54 |
| J-1019 | 310.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 504.66 | 84.22 |
| J-1020 | 340.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 504.65 | 71.24 |
| J-1021 | 335.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 504.65 | 73.40 |
| J-1022 | 315.00 | HIGH SERVICE AREA | 9.38 | Fixed | 9.38 | 504.65 | 82.05 |
| J-1023 | 315.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 504.65 | 82.05 |
| J-1024 | 310.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 504.65 | 84.22 |
| J-1025 | 410.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 504.73 | 40.98 |
| J-1026 | 410.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 504.73 | 40.98 |
| J-1027 | 370.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 504.73 | 58.29 |
| J-1028 | 385.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 504.73 | 51.80 |
| J-1029 | 375.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 504.74 | 56.13 |
| J-1030 | 300.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 504.73 | 88.58 |
| J-1031 | 300.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 504.73 | 88.58 |
| J-1032 | 310.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 504.73 | 84.25 |
| J-1033 | 295.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 504.73 | 90.74 |
| J-1034 | 275.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 504.73 | 99.39 |
| J-1035 | 350.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 504.73 | 66.94 |
| J-1036 | 285.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 503.30 | 94.45 |
| J-1037 | 285.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 503.26 | 94.43 |
| J-1038 | 272.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 503.08 | 99.98 |
| J-1039 | 390.00 | HIGH SERVICE AREA | 7.86 | Fixed | 7.86 | 502.81 | 48.81 |
| J-1040 | 450.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 503.01 | 22.93 |
| J-1041 | 450.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 503.09 | 22.97 |
| J-1042 | 410.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 503.17 | 40.31 |
| J-1043 | 385.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 503.31 | 51.19 |
| J-1044 | 337.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 503.50 | 72.04 |
| J-1045 | 355.00 | HIGH SERVICE AREA | 12.37 | Fixed | 12.37 | 502.76 | 63.93 |
| J-1046 | 335.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 503.61 | 72.95 |
| J-1047 | 335.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 504.61 | 73.38 |
| J-1048 | 270.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 503.51 | 101.03 |
| J-1049 | 285.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 503.50 | 94.54 |
| J-1050 | 325.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 503.47 | 77.21 |
| J-1051 | 330.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 503.46 | 75.05 |
| J-1052 | 350.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 503.50 | 66.41 |

# Scenario: ADD-Buildout
# Steady State Analysis
# Junction Report

| Label | Elevation (ft) | Zone | Base Flow (gpm) | Pattern | Demand (gpm) | Hydraulic Grade (ft) | Pressure (psi) |
|---|---|---|---|---|---|---|---|
| J-1053 | 312.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 503.53 | 82.87 |
| J-1054 | 310.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 503.41 | 83.68 |
| J-1055 | 305.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 503.41 | 85.84 |
| J-1056 | 295.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 503.33 | 90.13 |
| J-1057 | 320.00 | HIGH SERVICE AREA | 6.73 | Fixed | 6.73 | 502.72 | 79.06 |
| J-1058 | 320.00 | HIGH SERVICE AREA | 6.73 | Fixed | 6.73 | 502.72 | 79.06 |
| J-1059 | 320.00 | HIGH SERVICE AREA | 6.73 | Fixed | 6.73 | 502.72 | 79.06 |
| J-1060 | 340.00 | HIGH SERVICE AREA | 6.73 | Fixed | 6.73 | 502.68 | 70.38 |
| J-1061 | 345.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 503.37 | 68.52 |
| J-1062 | 355.00 | HIGH SERVICE AREA | 6.62 | Fixed | 6.62 | 502.74 | 63.92 |
| J-1063 | 345.00 | HIGH SERVICE AREA | 6.73 | Fixed | 6.73 | 502.69 | 68.23 |
| J-1064 | 296.00 | HIGH SERVICE AREA | 6.73 | Fixed | 6.73 | 502.69 | 89.43 |
| J-1065 | 290.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 502.73 | 92.04 |
| J-1066 | 266.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 502.71 | 102.41 |
| J-1067 | 262.00 | HIGH SERVICE AREA | 6.73 | Fixed | 6.73 | 502.67 | 104.13 |
| J-1068 | 285.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 502.76 | 94.22 |
| J-1069 | 295.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 502.73 | 89.87 |
| J-1070 | 285.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 502.72 | 94.20 |
| J-1071 | 260.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 502.72 | 105.01 |
| J-1072 | 290.00 | HIGH SERVICE AREA | 2.73 | Fixed | 2.73 | 502.94 | 92.13 |
| J-1073 | 295.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 503.08 | 90.03 |
| J-1074 | 265.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 504.65 | 103.69 |
| J-1075 | 377.00 | HIGH SERVICE AREA | 6.73 | Fixed | 6.73 | 502.74 | 54.40 |
| J-1076 | 380.00 | HIGH SERVICE AREA | 6.73 | Fixed | 6.73 | 502.74 | 53.11 |
| J-1077 | 320.00 | HIGH SERVICE AREA | 6.73 | Fixed | 6.73 | 502.73 | 79.06 |
| J-1078 | 325.00 | HIGH SERVICE AREA | 6.73 | Fixed | 6.73 | 502.73 | 76.90 |
| J-1079 | 380.00 | HIGH SERVICE AREA | 28.38 | Fixed | 28.38 | 502.72 | 53.10 |
| J-1080 | 360.00 | HIGH SERVICE AREA | 6.73 | Fixed | 6.73 | 502.73 | 61.75 |
| J-1081 | 350.00 | HIGH SERVICE AREA | 6.73 | Fixed | 6.73 | 502.69 | 66.06 |
| J-1082 | 270.00 | HIGH SERVICE AREA | 6.73 | Fixed | 6.73 | 502.68 | 100.67 |
| J-1083 | 400.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 502.63 | 44.40 |
| J-1084 | 325.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 502.63 | 76.85 |
| J-1085 | 325.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 502.60 | 76.84 |
| J-1086 | 370.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 502.61 | 57.37 |
| J-1087 | 415.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 502.60 | 37.90 |
| J-1088 | 420.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 502.60 | 35.74 |
| J-1089 | 328.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 502.56 | 75.52 |
| J-1090 | 355.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 502.60 | 63.86 |
| J-1091 | 324.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 502.56 | 77.26 |
| J-1092 | 305.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 502.56 | 85.47 |
| J-1093 | 330.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 502.55 | 74.66 |
| J-1094 | 330.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 502.55 | 74.66 |
| J-1095 | 306.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 502.56 | 85.04 |
| J-1096 | 393.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 502.55 | 47.40 |
| J-1097 | 330.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 502.56 | 74.66 |
| J-1098 | 270.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 510.08 | 103.87 |
| J-1099 | 307.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 504.65 | 85.51 |
| J-1100 | 440.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 503.01 | 27.26 |
| J-1101 | 350.00 | HIGH SERVICE AREA | 6.73 | Fixed | 6.73 | 502.72 | 66.08 |
| J-1102 | 305.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 510.07 | 88.73 |
| J-1103 | 285.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 504.78 | 95.09 |
| J-1104 | 420.00 | HIGH SERVICE AREA | 6.73 | Fixed | 6.73 | 502.95 | 35.89 |
| J-1105 | 307.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 510.07 | 87.86 |

# Scenario: ADD-Buildout
# Steady State Analysis
# Junction Report

| Label | Elevation (ft) | Zone | Base Flow (gpm) | Pattern | Demand (gpm) | Hydraulic Grade (ft) | Pressure (psi) |
|---|---|---|---|---|---|---|---|
| J-1106 | 303.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 510.07 | 89.59 |
| J-1107 | 332.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 510.07 | 77.04 |
| J-1108 | 277.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 510.07 | 100.84 |
| J-1109 | 305.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 510.07 | 88.72 |
| J-1110 | 320.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 510.07 | 82.23 |
| J-1111 | 306.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 504.73 | 85.98 |
| J-1112 | 307.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 504.73 | 85.55 |
| J-1113 | 323.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 504.73 | 78.62 |
| J-1114 | 431.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 504.73 | 31.90 |
| J-1115 | 340.50 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 506.36 | 71.76 |
| J-1116 | 425.50 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 506.36 | 34.98 |
| J-1117 | 435.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 506.36 | 30.87 |
| J-1118 | 319.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 503.50 | 79.83 |
| J-1119 | 332.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 503.50 | 74.20 |
| J-1120 | 384.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 503.50 | 51.70 |
| J-1121 | 400.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 502.69 | 44.43 |
| J-1122 | 443.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 503.09 | 26.00 |
| J-1123 | 327.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 503.32 | 76.29 |
| J-1124 | 264.00 | HIGH SERVICE AREA | 6.73 | Fixed | 6.73 | 502.62 | 103.24 |
| J-1125 | 272.00 | HIGH SERVICE AREA | 6.73 | Fixed | 6.73 | 502.61 | 99.77 |
| J-1126 | 278.00 | HIGH SERVICE AREA | 6.73 | Fixed | 6.73 | 502.61 | 97.18 |
| J-1127 | 282.00 | HIGH SERVICE AREA | 6.73 | Fixed | 6.73 | 502.61 | 95.45 |
| J-1128 | 282.00 | HIGH SERVICE AREA | 6.73 | Fixed | 6.73 | 502.61 | 95.45 |
| J-1129 | 284.00 | HIGH SERVICE AREA | 6.73 | Fixed | 6.73 | 481.54 | 85.46 |
| J-1130 | 306.00 | HIGH SERVICE AREA | 6.73 | Fixed | 6.73 | 481.54 | 75.95 |
| J-1131 | 312.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 502.56 | 82.44 |
| J-1132 | 372.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 502.56 | 56.49 |
| J-1133 | 418.00 | HIGH SERVICE AREA | 3.27 | Fixed | 3.27 | 502.60 | 36.60 |
| J-2000 | 306.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 482.57 | 76.39 |
| J-2001 | 331.30 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 482.56 | 65.44 |
| J-2002 | 331.30 | LOW SERVICE AREA | 17.97 | Fixed | 17.97 | 482.55 | 65.44 |
| J-2003 | 335.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 482.55 | 63.84 |
| J-2004 | 335.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 482.55 | 63.84 |
| J-2005 | 270.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 482.55 | 91.96 |
| J-2006 | 315.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 482.57 | 72.50 |
| J-2007 | 315.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 482.58 | 72.50 |
| J-2008 | 320.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 482.56 | 70.33 |
| J-2009 | 325.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 482.55 | 68.17 |
| J-2010 | 330.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 482.55 | 66.00 |
| J-2011 | 300.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 482.60 | 79.00 |
| J-2012 | 300.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 482.63 | 79.02 |
| J-2013 | 330.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 482.63 | 66.04 |
| J-2014 | 330.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 482.36 | 65.92 |
| J-2015 | 285.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 482.56 | 85.47 |
| J-2016 | 275.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 482.55 | 89.80 |
| J-2017 | 265.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 482.55 | 94.12 |
| J-2018 | 265.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 482.55 | 94.12 |
| J-2019 | 275.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 482.55 | 89.80 |
| J-2020 | 295.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 482.55 | 81.15 |
| J-2021 | 270.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 482.64 | 92.00 |
| J-2022 | 295.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 482.75 | 81.23 |
| J-2023 | 290.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 482.75 | 83.39 |
| J-2024 | 295.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 482.75 | 81.23 |

# Scenario: ADD-Buildout
# Steady State Analysis
# Junction Report

| Label | Elevation (ft) | Zone | Base Flow (gpm) | Pattern | Demand (gpm) | Hydraulic Grade (ft) | Pressure (psi) |
|---|---|---|---|---|---|---|---|
| J-2025 | 260.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 482.75 | 96.37 |
| J-2026 | 325.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 482.64 | 68.20 |
| J-2027 | 350.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 482.34 | 57.26 |
| J-2028 | 287.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 482.64 | 84.64 |
| J-2029 | 282.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 483.01 | 86.97 |
| J-2030 | 335.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 483.33 | 64.18 |
| J-2031 | 320.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 483.01 | 70.53 |
| J-2032 | 260.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 483.96 | 96.90 |
| J-2033 | 270.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 484.37 | 92.75 |
| J-2034 | 285.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 484.48 | 86.31 |
| J-2035 | 259.00 | LOW SERVICE AREA | 5.44 | Fixed | 5.44 | 481.99 | 96.48 |
| J-2036 | 265.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 482.32 | 94.02 |
| J-2037 | 305.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 482.32 | 76.72 |
| J-2038 | 265.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 482.61 | 94.15 |
| J-2039 | 280.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 482.59 | 87.65 |
| J-2040 | 270.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 482.59 | 91.98 |
| J-2041 | 275.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 482.58 | 89.81 |
| J-2042 | 305.00 | LOW SERVICE AREA | 3.36 | Fixed | 3.36 | 482.58 | 76.83 |
| J-2043 | 280.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 482.58 | 87.65 |
| J-2044 | 280.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 482.58 | 87.65 |
| J-2045 | 290.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 482.58 | 83.32 |
| J-2046 | 280.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 483.15 | 87.89 |
| J-2047 | 290.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 483.17 | 83.58 |
| J-2048 | 305.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 483.10 | 77.06 |
| J-2049 | 305.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 482.97 | 77.00 |
| J-2050 | 325.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 482.72 | 68.24 |
| J-2051 | 325.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 482.67 | 68.22 |
| J-2052 | 365.00 | LOW SERVICE AREA | 18.05 | Fixed | 18.05 | 481.99 | 50.62 |
| J-2053 | 275.00 | LOW SERVICE AREA | 5.44 | Fixed | 5.44 | 482.03 | 89.57 |
| J-2054 | 265.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 482.12 | 93.94 |
| J-2055 | 285.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 482.25 | 85.34 |
| J-2056 | 295.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 482.23 | 81.01 |
| J-2057 | 295.00 | LOW SERVICE AREA | 8.85 | Fixed | 8.85 | 482.19 | 80.99 |
| J-2058 | 285.00 | LOW SERVICE AREA | 5.44 | Fixed | 5.44 | 482.14 | 85.29 |
| J-2059 | 265.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 482.30 | 94.02 |
| J-2060 | 280.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 483.45 | 88.02 |
| J-2061 | 265.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 483.44 | 94.51 |
| J-2062 | 280.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 483.44 | 88.02 |
| J-2063 | 360.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 483.44 | 53.41 |
| J-2064 | 280.00 | LOW SERVICE AREA | 7.20 | Fixed | 7.20 | 482.24 | 87.50 |
| J-2065 | 275.00 | LOW SERVICE AREA | 5.44 | Fixed | 5.44 | 482.24 | 89.66 |
| J-2066 | 280.00 | LOW SERVICE AREA | 5.44 | Fixed | 5.44 | 482.24 | 87.50 |
| J-2067 | 280.00 | LOW SERVICE AREA | 5.44 | Fixed | 5.44 | 482.24 | 87.50 |
| J-2068 | 230.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 484.60 | 110.15 |
| J-2069 | 215.00 | LOW SERVICE AREA | 3.12 | Fixed | 3.12 | 484.57 | 116.63 |
| J-2070 | 200.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 484.57 | 123.12 |
| J-2071 | 200.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 484.57 | 123.12 |
| J-2072 | 288.00 | LOW SERVICE AREA | 6.47 | Fixed | 6.47 | 481.58 | 83.75 |
| J-2073 | 275.00 | LOW SERVICE AREA | 10.36 | Fixed | 10.36 | 481.55 | 89.36 |
| J-2074 | 285.00 | LOW SERVICE AREA | 5.44 | Fixed | 5.44 | 481.54 | 85.03 |
| J-2075 | 270.00 | LOW SERVICE AREA | 5.44 | Fixed | 5.44 | 481.55 | 91.53 |
| J-2076 | 295.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.54 | 80.71 |
| J-2077 | 295.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.54 | 80.71 |

# Scenario: ADD-Buildout
# Steady State Analysis
# Junction Report

| Label | Elevation (ft) | Zone | Base Flow (gpm) | Pattern | Demand (gpm) | Hydraulic Grade (ft) | Pressure (psi) |
|---|---|---|---|---|---|---|---|
| J-2078 | 290.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.54 | 82.87 |
| J-2079 | 393.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.64 | 38.35 |
| J-2080 | 292.00 | LOW SERVICE AREA | 5.44 | Fixed | 5.44 | 481.63 | 82.04 |
| J-2081 | 276.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.89 | 89.08 |
| J-2082 | 320.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.89 | 70.04 |
| J-2083 | 350.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.64 | 56.95 |
| J-2084 | 370.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.64 | 48.30 |
| J-2085 | 350.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.64 | 56.96 |
| J-2086 | 330.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.65 | 65.61 |
| J-2087 | 320.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.67 | 69.94 |
| J-2088 | 340.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.77 | 61.34 |
| J-2089 | 315.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.95 | 72.23 |
| J-2090 | 270.00 | LOW SERVICE AREA | 5.44 | Fixed | 5.44 | 481.99 | 91.72 |
| J-2091 | 280.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 482.07 | 87.43 |
| J-2092 | 410.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 482.00 | 31.15 |
| J-2093 | 415.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.97 | 28.97 |
| J-2094 | 400.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.91 | 35.44 |
| J-2095 | 400.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 482.00 | 35.48 |
| J-2096 | 285.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.46 | 85.00 |
| J-2097 | 287.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.46 | 84.13 |
| J-2098 | 277.50 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.45 | 88.24 |
| J-2099 | 285.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.45 | 85.00 |
| J-2100 | 275.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.45 | 89.32 |
| J-2101 | 280.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.45 | 87.16 |
| J-2102 | 264.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.45 | 94.08 |
| J-2103 | 265.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.45 | 93.65 |
| J-2104 | 280.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.45 | 87.16 |
| J-2105 | 260.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.45 | 95.81 |
| J-2106 | 255.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.45 | 97.97 |
| J-2107 | 280.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.46 | 87.16 |
| J-2108 | 280.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.46 | 87.16 |
| J-2109 | 300.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.48 | 78.52 |
| J-2110 | 370.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.48 | 48.23 |
| J-2111 | 318.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.47 | 70.73 |
| J-2112 | 315.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.48 | 72.03 |
| J-2113 | 368.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.48 | 49.10 |
| J-2114 | 340.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.48 | 61.21 |
| J-2115 | 300.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.45 | 78.51 |
| J-2116 | 300.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.48 | 78.52 |
| J-2117 | 310.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.48 | 74.19 |
| J-2118 | 287.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.49 | 84.15 |
| J-2119 | 271.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.53 | 91.09 |
| J-2120 | 262.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.53 | 94.98 |
| J-2121 | 255.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.51 | 98.00 |
| J-2122 | 265.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.51 | 93.67 |
| J-2123 | 265.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.51 | 93.67 |
| J-2124 | 255.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.51 | 98.00 |
| J-2125 | 265.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.51 | 93.67 |
| J-2126 | 255.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.51 | 98.00 |
| J-2127 | 250.00 | LOW SERVICE AREA | 7.18 | Fixed | 7.18 | 482.42 | 100.56 |
| J-2128 | 305.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.54 | 76.38 |
| J-2129 | 315.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.56 | 72.06 |
| J-2130 | 300.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.57 | 78.55 |

# Scenario: ADD-Buildout
# Steady State Analysis
# Junction Report

| Label | Elevation (ft) | Zone | Base Flow (gpm) | Pattern | Demand (gpm) | Hydraulic Grade (ft) | Pressure (psi) |
|---|---|---|---|---|---|---|---|
| J-2131 | 320.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.57 | 69.90 |
| J-2132 | 320.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.66 | 69.94 |
| J-2133 | 345.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.69 | 59.14 |
| J-2134 | 285.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.54 | 85.03 |
| J-2135 | 295.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.55 | 80.71 |
| J-2136 | 297.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.55 | 79.85 |
| J-2137 | 260.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.54 | 95.85 |
| J-2138 | 270.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.56 | 91.53 |
| J-2139 | 250.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.56 | 100.19 |
| J-2140 | 250.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.56 | 100.19 |
| J-2141 | 280.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.56 | 87.21 |
| J-2142 | 300.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.56 | 78.55 |
| J-2143 | 295.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.57 | 80.72 |
| J-2144 | 320.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.59 | 69.91 |
| J-2145 | 285.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.58 | 85.05 |
| J-2146 | 320.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.58 | 69.91 |
| J-2147 | 285.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.58 | 85.05 |
| J-2148 | 250.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.58 | 100.19 |
| J-2149 | 245.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.58 | 102.36 |
| J-2150 | 260.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.58 | 95.87 |
| J-2151 | 240.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.58 | 104.52 |
| J-2152 | 245.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.58 | 102.36 |
| J-2153 | 260.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 485.11 | 97.39 |
| J-2154 | 280.00 | LOW SERVICE AREA | 3.99 | Fixed | 3.99 | 484.80 | 88.61 |
| J-2155 | 295.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 484.74 | 82.09 |
| J-2156 | 344.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 484.65 | 60.85 |
| J-2157 | 393.00 | LOW SERVICE AREA | 8.30 | Fixed | 8.30 | 484.65 | 39.65 |
| J-2158 | 384.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 484.65 | 43.55 |
| J-2159 | 307.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 482.57 | 75.96 |
| J-2160 | 263.50 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.45 | 94.30 |
| J-2161 | 322.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.59 | 69.05 |
| J-2162 | 315.50 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.63 | 71.88 |
| J-2163 | 272.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.49 | 90.64 |
| J-2164 | 295.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.50 | 80.69 |
| J-2165 | 265.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.64 | 93.73 |
| J-2166 | 272.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.64 | 90.70 |
| J-2167 | 341.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.79 | 60.91 |
| J-2168 | 274.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.45 | 89.75 |
| J-2169 | 283.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.45 | 85.86 |
| J-2170 | 285.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.45 | 85.00 |
| J-2171 | 322.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.45 | 68.99 |
| J-2172 | 300.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.45 | 78.51 |
| J-2173 | 288.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.48 | 83.71 |
| J-2174 | 290.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.49 | 82.85 |
| J-2175 | 283.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.45 | 85.86 |
| J-2176 | 347.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.84 | 58.34 |
| J-2177 | 346.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.84 | 58.77 |
| J-2178 | 355.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.81 | 54.87 |
| J-2179 | 339.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 481.81 | 61.79 |
| J-2180 | 405.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 482.00 | 33.31 |
| J-2181 | 386.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 482.00 | 41.53 |
| J-2182 | 402.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 482.00 | 34.61 |
| J-2183 | 396.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 482.00 | 37.21 |

# Scenario: ADD-Buildout
# Steady State Analysis
# Junction Report

| Label | Elevation (ft) | Zone | Base Flow (gpm) | Pattern | Demand (gpm) | Hydraulic Grade (ft) | Pressure (psi) |
|---|---|---|---|---|---|---|---|
| J-2184 | 219.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 484.66 | 114.94 |
| J-2185 | 221.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 484.58 | 114.04 |
| J-2186 | 218.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 484.58 | 115.34 |
| J-2187 | 215.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 484.57 | 116.63 |
| J-2188 | 219.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 484.57 | 114.90 |
| J-2189 | 232.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 484.57 | 109.27 |
| J-2190 | 270.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 484.57 | 92.83 |
| J-2191 | 284.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 482.71 | 85.97 |
| J-2192 | 263.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 482.70 | 95.06 |
| J-2193 | 342.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 482.55 | 60.81 |
| J-2194 | 295.00 | LOW SERVICE AREA | 0.00 | Fixed | 0.00 | 482.20 | 80.99 |
| J-2195 | 285.00 | LOW SERVICE AREA | 0.00 | Fixed | 0.00 | 482.16 | 85.30 |
| J-2291 | 275.00 | LOW SERVICE AREA | 1.98 | Fixed | 1.98 | 482.57 | 89.80 |

# Scenario: ADD-Buildout
# Steady State Analysis
# Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-1000 | 12.0 | J-1102 | J-1015 | 1,245 | 13.08 | 0.00 | 0.00 | 0.04 | 120.0 |
| P-1001 | 12.0 | J-1007 | J-1102 | 1,005 | 16.35 | 0.00 | 0.00 | 0.05 | 120.0 |
| P-1003 | 12.0 | J-1008 | J-1009 | 300 | 3.27 | 0.00 | 0.00 | 0.01 | 100.0 |
| P-1004 | 12.0 | J-1007 | J-1008 | 400 | 22.89 | 0.00 | 0.00 | 0.06 | 100.0 |
| P-1005 | 12.0 | J-1098 | J-1007 | 850 | 42.51 | 0.01 | 0.01 | 0.12 | 110.0 |
| P-1006 | 12.0 | J-1006 | J-1098 | 800 | -630.08 | 1.47 | 1.17 | 1.79 | 110.0 |
| P-1007 | 12.0 | J-1007 | J-1012 | 4,600 | 0.00 | 0.00 | 0.00 | 0.00 | 130.0 |
| P-1008 | 8.0 | J-1030 | J-1031 | 1,650 | -0.49 | 0.00 | 0.00 | 0.00 | 110.0 |
| P-1010 | 12.0 | J-1016 | J-1017 | 1,800 | 6.54 | 0.00 | 0.00 | 0.02 | 120.0 |
| P-1012 | 8.0 | J-1027 | J-1030 | 2,200 | 6.05 | 0.00 | 0.00 | 0.04 | 110.0 |
| P-1013 | 8.0 | J-1034 | J-1033 | 1,350 | -0.86 | 0.00 | 0.00 | 0.01 | 110.0 |
| P-1014 | 12.0 | J-1033 | J-1034 | 1,050 | 2.41 | 0.00 | 0.00 | 0.01 | 110.0 |
| P-1015 | 12.0 | J-1032 | J-1033 | 500 | 4.27 | 0.00 | 0.00 | 0.01 | 110.0 |
| P-1016 | 12.0 | J-1032 | J-1027 | 1,500 | -17.84 | 0.00 | 0.00 | 0.05 | 110.0 |
| P-1017 | 8.0 | J-1033 | J-1035 | 2,100 | -2.27 | 0.00 | 0.00 | 0.01 | 120.0 |
| P-1018 | 12.0 | J-1025 | PRV-4 | 1,183 | 0.00 | 0.00 | 0.00 | 0.00 | 110.0 |
| P-1019 | 12.0 | J-1026 | J-1025 | 450 | 6.54 | 0.00 | 0.00 | 0.02 | 110.0 |
| P-1020 | 12.0 | J-1026 | J-1027 | 1,100 | -15.35 | 0.00 | 0.00 | 0.04 | 110.0 |
| P-1021 | 8.0 | J-1035 | J-1026 | 600 | -5.54 | 0.00 | 0.00 | 0.04 | 120.0 |
| P-1022 | 10.0 | J-1029 | J-1028 | 2,500 | 11.18 | 0.00 | 0.01 | 0.05 | 110.0 |
| P-1023 | 12.0 | J-1028 | J-1027 | 250 | 42.51 | 0.01 | 0.00 | 0.12 | 110.0 |
| P-1024 | 12.0 | J-1029 | J-1028 | 750 | 34.60 | 0.01 | 0.01 | 0.10 | 110.0 |
| P-1025 | 12.0 | J-1103 | J-1029 | 3,500 | 49.05 | 0.01 | 0.04 | 0.14 | 120.0 |
| P-1026 | 10.0 | J-1019 | J-1018 | 1,500 | -32.27 | 0.02 | 0.03 | 0.13 | 90.0 |
| P-1027 | 12.0 | J-1011 | J-1005 | 2,200 | -294.46 | 0.31 | 0.67 | 0.84 | 120.0 |
| P-1028 | 10.0 | J-1013 | J-1014 | 1,950 | 3.27 | 0.00 | 0.00 | 0.01 | 100.0 |
| P-1029 | 12.0 | J-1013 | J-1012 | 2,000 | -211.13 | 0.19 | 0.39 | 0.60 | 110.0 |
| P-1030 | 10.0 | J-1103 | J-1013 | 1,000 | -204.59 | 0.38 | 0.38 | 0.84 | 120.0 |
| P-1031 | 10.0 | J-1018 | J-1103 | 400 | -152.27 | 0.22 | 0.09 | 0.62 | 120.0 |
| P-1032 | 8.0 | J-1053 | J-1018 | 2,080 | -116.73 | 0.56 | 1.16 | 0.75 | 100.0 |
| P-1033 | 8.0 | J-1054 | J-1036 | 500 | 79.90 | 0.23 | 0.12 | 0.51 | 110.0 |
| P-1034 | 8.0 | J-1036 | J-1037 | 650 | 37.48 | 0.06 | 0.04 | 0.24 | 110.0 |
| P-1035 | 8.0 | J-1037 | J-1036 | 600 | -39.14 | 0.06 | 0.04 | 0.25 | 110.0 |
| P-1036 | 8.0 | J-1053 | J-1054 | 400 | 84.19 | 0.30 | 0.12 | 0.54 | 100.0 |
| P-1037 | 8.0 | J-1052 | J-1053 | 800 | -29.27 | 0.04 | 0.03 | 0.19 | 100.0 |
| P-1038 | 8.0 | J-1050 | J-1052 | 1,200 | -22.73 | 0.03 | 0.03 | 0.15 | 100.0 |
| P-1039 | 12.0 | J-1011 | J-1012 | 750 | 214.40 | 0.20 | 0.15 | 0.61 | 110.0 |
| P-1040 | 12.0 | J-1010 | J-1011 | 2,200 | -76.78 | 0.03 | 0.07 | 0.22 | 110.0 |
| P-1041 | 12.0 | J-1047 | J-1010 | 1,800 | -376.44 | 0.57 | 1.02 | 1.07 | 110.0 |
| P-1042 | 8.0 | J-1054 | J-1055 | 500 | 1.02 | 0.00 | 0.00 | 0.01 | 100.0 |
| P-1043 | 12.0 | J-1005 | J-1006 | 1,750 | -626.81 | 1.45 | 2.54 | 1.78 | 110.0 |
| P-1044 | 12.0 | J-1010 | J-1005 | 1,950 | -302.92 | 0.38 | 0.74 | 0.86 | 110.0 |
| P-1045 | 12.0 | J-1001 | J-1004 | 1,500 | -2.23 | 0.00 | 0.00 | 0.01 | 100.0 |
| P-1046 | 12.0 | J-1002 | J-1003 | 1,900 | -9.94 | 0.00 | 0.00 | 0.03 | 100.0 |
| P-1047 | 12.0 | J-1001 | J-1002 | 1,100 | -3.40 | 0.00 | 0.00 | 0.01 | 100.0 |
| P-1048 | 8.0 | J-1000 | J-1001 | 975 | -2.37 | 0.00 | 0.00 | 0.02 | 100.0 |
| P-1049 | 12.0 | J-1004 | J-1000 | 1,400 | 7.44 | 0.00 | 0.00 | 0.02 | 120.0 |
| P-1050 | 12.0 | J-1003 | J-1004 | 1,200 | 12.95 | 0.00 | 0.00 | 0.04 | 100.0 |
| P-1051 | 12.0 | J-1005 | J-1003 | 430 | 26.16 | 0.00 | 0.00 | 0.07 | 100.0 |
| P-1052 | 12.0 | J-1100 | T-3 | 200 | 123.84 | 0.06 | 0.01 | 0.35 | 120.0 |
| P-1053 | 12.0 | J-1100 | J-1040 | 200 | 64.38 | 0.02 | 0.00 | 0.18 | 110.0 |

# Scenario: ADD-Buildout
# Steady State Analysis
# Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-1054 | 12.0 | J-1042 | J-1100 | 1,000 | 191.49 | 0.16 | 0.16 | 0.54 | 110.0 |
| P-1055 | 8.0 | J-1044 | J-1046 | 350 | -84.72 | 0.31 | 0.11 | 0.54 | 100.0 |
| P-1056 | 8.0 | J-1046 | J-1048 | 1,360 | 39.08 | 0.07 | 0.10 | 0.25 | 100.0 |
| P-1057 | 12.0 | J-1046 | J-1047 | 1,800 | -373.17 | 0.56 | 1.00 | 1.06 | 110.0 |
| P-1058 | 12.0 | J-1044 | J-1046 | 350 | -246.10 | 0.31 | 0.11 | 0.70 | 100.0 |
| P-1059 | 8.0 | J-1044 | J-1061 | 1,100 | 51.05 | 0.12 | 0.13 | 0.33 | 100.0 |
| P-1060 | 12.0 | J-1043 | J-1044 | 600 | -276.50 | 0.32 | 0.19 | 0.78 | 110.0 |
| P-1061 | 12.0 | J-1043 | J-1042 | 800 | 194.76 | 0.17 | 0.13 | 0.55 | 110.0 |
| P-1062 | 8.0 | J-1041 | J-1043 | 1,150 | -78.47 | 0.19 | 0.22 | 0.50 | 120.0 |
| P-1063 | 8.0 | J-1040 | J-1041 | 500 | -71.93 | 0.16 | 0.08 | 0.46 | 120.0 |
| P-1064 | 12.0 | J-1104 | J-1040 | 615 | -133.04 | 0.10 | 0.06 | 0.38 | 100.0 |
| P-1065 | 12.0 | J-1039 | J-1104 | 1,585 | -126.31 | 0.09 | 0.14 | 0.36 | 100.0 |
| P-1066 | 12.0 | J-1101 | J-1079 | 1,326 | -4.61 | 0.00 | 0.00 | 0.01 | 120.0 |
| P-1067 | 12.0 | J-1059 | J-1101 | 1,774 | 2.12 | 0.00 | 0.00 | 0.01 | 120.0 |
| P-1068 | 8.0 | J-1057 | J-1058 | 1,350 | -2.14 | 0.00 | 0.00 | 0.01 | 120.0 |
| P-1069 | 12.0 | J-1058 | J-1057 | 1,870 | 4.59 | 0.00 | 0.00 | 0.01 | 120.0 |
| P-1070 | 8.0 | J-1050 | J-1051 | 1,250 | 3.27 | 0.00 | 0.00 | 0.02 | 120.0 |
| P-1071 | 8.0 | J-1048 | J-1050 | 1,200 | 26.00 | 0.03 | 0.04 | 0.17 | 100.0 |
| P-1072 | 8.0 | J-1048 | J-1049 | 800 | 9.81 | 0.01 | 0.00 | 0.06 | 100.0 |
| P-1073 | 6.0 | J-1061 | J-1045 | 1,400 | 47.78 | 0.43 | 0.60 | 0.54 | 100.0 |
| P-1074 | 12.0 | J-1045 | J-1039 | 550 | -118.45 | 0.08 | 0.04 | 0.34 | 100.0 |
| P-1075 | 12.0 | J-1045 | J-1058 | 2,800 | 46.07 | 0.01 | 0.04 | 0.13 | 100.0 |
| P-1076 | 12.0 | J-1062 | J-1045 | 280 | -107.79 | 0.07 | 0.02 | 0.31 | 100.0 |
| P-1077 | 12.0 | J-1075 | J-1076 | 500 | 6.73 | 0.00 | 0.00 | 0.02 | 110.0 |
| P-1078 | 12.0 | J-1062 | J-1075 | 500 | 13.46 | 0.00 | 0.00 | 0.04 | 100.0 |
| P-1079 | 8.0 | J-1077 | J-1080 | 200 | 6.73 | 0.00 | 0.00 | 0.04 | 120.0 |
| P-1080 | 12.0 | J-1062 | J-1059 | 2,800 | 34.53 | 0.01 | 0.02 | 0.10 | 110.0 |
| P-1081 | 12.0 | J-1078 | J-1062 | 500 | -53.18 | 0.02 | 0.01 | 0.15 | 100.0 |
| P-1082 | 12.0 | J-1077 | J-1078 | 350 | -46.45 | 0.01 | 0.00 | 0.13 | 120.0 |
| P-1083 | 12.0 | J-1079 | J-1077 | 1,200 | -32.99 | 0.01 | 0.01 | 0.09 | 120.0 |
| P-1084 | 12.0 | J-1058 | J-1059 | 300 | -25.68 | 0.00 | 0.00 | 0.07 | 120.0 |
| P-1085 | 12.0 | J-1063 | J-1058 | 1,750 | -58.29 | 0.02 | 0.03 | 0.17 | 110.0 |
| P-1086 | 12.0 | J-1093 | J-1094 | 1,250 | 3.27 | 0.00 | 0.00 | 0.01 | 110.0 |
| P-1087 | 6.0 | J-1092 | J-1093 | 1,600 | 3.21 | 0.00 | 0.00 | 0.04 | 100.0 |
| P-1088 | 8.0 | J-1093 | J-1096 | 1,100 | -3.33 | 0.00 | 0.00 | 0.02 | 110.0 |
| P-1089 | 8.0 | J-1096 | J-1097 | 2,000 | -6.60 | 0.00 | 0.00 | 0.04 | 110.0 |
| P-1090 | 8.0 | J-1092 | J-1097 | 800 | -3.36 | 0.00 | 0.00 | 0.02 | 100.0 |
| P-1091 | 8.0 | J-1089 | J-1092 | 2,000 | 3.12 | 0.00 | 0.00 | 0.02 | 100.0 |
| P-1092 | 8.0 | J-1097 | J-1091 | 650 | -13.23 | 0.01 | 0.01 | 0.08 | 100.0 |
| P-1093 | 8.0 | J-1091 | J-1089 | 600 | 12.93 | 0.01 | 0.01 | 0.08 | 100.0 |
| P-1094 | 8.0 | J-1095 | J-1089 | 840 | -6.54 | 0.00 | 0.00 | 0.04 | 100.0 |
| P-1095 | 6.0 | J-1095 | PRV-2 | 2,322 | 0.00 | 0.00 | 0.00 | 0.00 | 110.0 |
| P-1096 | 8.0 | J-1084 | J-1085 | 1,800 | 17.90 | 0.02 | 0.03 | 0.11 | 100.0 |
| P-1098 | 8.0 | J-1084 | J-1083 | 900 | 6.83 | 0.00 | 0.00 | 0.04 | 110.0 |
| P-1099 | 8.0 | J-1083 | J-1082 | 1,350 | -30.86 | 0.04 | 0.05 | 0.20 | 110.0 |
| P-1100 | 10.0 | J-1086 | J-1083 | 1,150 | -34.42 | 0.02 | 0.02 | 0.14 | 100.0 |
| P-1101 | 10.0 | J-1086 | J-1090 | 515 | 19.32 | 0.01 | 0.00 | 0.08 | 100.0 |
| P-1102 | 10.0 | J-1087 | J-1086 | 1,100 | -11.83 | 0.00 | 0.00 | 0.05 | 110.0 |
| P-1103 | 10.0 | J-1085 | J-1090 | 500 | -18.07 | 0.01 | 0.00 | 0.07 | 100.0 |
| P-1104 | 12.0 | J-1081 | J-1121 | 690 | 3.27 | 0.00 | 0.00 | 0.01 | 120.0 |
| P-1105 | 8.0 | J-1060 | J-1084 | 1,300 | 28.00 | 0.04 | 0.05 | 0.18 | 100.0 |

# Scenario: ADD-Buildout
# Steady State Analysis
# Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-1106 | 10.0 | J-1088 | J-1087 | 700 | -8.56 | 0.00 | 0.00 | 0.03 | 110.0 |
| P-1107 | 8.0 | J-1091 | J-1085 | 650 | -32.70 | 0.05 | 0.03 | 0.21 | 100.0 |
| P-1108 | 10.0 | J-1090 | J-1088 | 1,100 | -2.02 | 0.00 | 0.00 | 0.01 | 110.0 |
| P-1109 | 8.0 | J-1064 | J-1060 | 300 | 34.71 | 0.04 | 0.01 | 0.22 | 130.0 |
| P-1110 | 8.0 | J-1068 | J-1069 | 1,450 | 22.39 | 0.03 | 0.04 | 0.14 | 100.0 |
| P-1111 | 8.0 | J-1038 | J-1073 | 1,400 | 2.10 | 0.00 | 0.00 | 0.01 | 110.0 |
| P-1112 | 8.0 | J-1068 | J-1072 | 950 | -65.26 | 0.19 | 0.18 | 0.42 | 100.0 |
| P-1113 | 8.0 | J-1065 | J-1068 | 500 | -39.59 | 0.08 | 0.04 | 0.25 | 100.0 |
| P-1114 | 6.0 | J-1073 | J-1065 | 1,700 | 32.23 | 0.21 | 0.35 | 0.37 | 100.0 |
| P-1115 | 6.0 | J-1056 | J-1073 | 1,100 | 33.40 | 0.22 | 0.24 | 0.38 | 100.0 |
| P-1116 | 8.0 | J-1065 | J-1064 | 250 | 54.74 | 0.14 | 0.03 | 0.35 | 100.0 |
| P-1117 | 8.0 | J-1066 | J-1065 | 1,400 | -13.81 | 0.01 | 0.01 | 0.09 | 100.0 |
| P-1118 | 8.0 | J-1064 | J-1067 | 1,250 | 17.26 | 0.02 | 0.02 | 0.11 | 100.0 |
| P-1119 | 12.0 | J-1063 | J-1064 | 1,910 | 3.95 | 0.00 | 0.00 | 0.01 | 110.0 |
| P-1120 | 12.0 | J-1081 | J-1063 | 450 | -47.61 | 0.01 | 0.01 | 0.14 | 110.0 |
| P-1121 | 12.0 | J-1082 | J-1081 | 700 | -37.61 | 0.01 | 0.01 | 0.11 | 110.0 |
| P-1122 | 12.0 | J-1082 | J-1060 | 1,400 | 0.02 | 0.00 | 0.00 | 0.00 | 110.0 |
| P-1123 | 6.0 | J-1069 | J-1070 | 500 | 6.54 | 0.01 | 0.01 | 0.07 | 100.0 |
| P-1124 | 6.0 | J-1069 | J-1066 | 400 | 12.58 | 0.04 | 0.01 | 0.14 | 100.0 |
| P-1125 | 6.0 | J-1067 | J-1066 | 350 | -23.12 | 0.11 | 0.04 | 0.26 | 100.0 |
| P-1126 | 6.0 | J-1070 | J-1071 | 1,000 | 3.27 | 0.00 | 0.00 | 0.04 | 100.0 |
| P-1127 | 8.0 | J-1038 | J-1037 | 900 | -73.36 | 0.20 | 0.18 | 0.47 | 110.0 |
| P-1128 | 8.0 | J-1072 | J-1038 | 800 | -67.99 | 0.17 | 0.14 | 0.43 | 110.0 |
| P-1129 | 8.0 | J-1055 | J-1050 | 650 | -42.19 | 0.08 | 0.05 | 0.27 | 100.0 |
| P-1130 | 8.0 | J-1055 | J-1056 | 1,120 | 39.94 | 0.08 | 0.09 | 0.25 | 100.0 |
| P-1131 | 10.0 | J-1019 | J-1022 | 500 | 19.87 | 0.01 | 0.00 | 0.08 | 90.0 |
| P-1132 | 8.0 | J-1020 | J-1019 | 520 | -9.13 | 0.00 | 0.00 | 0.06 | 100.0 |
| P-1133 | 8.0 | J-1021 | J-1020 | 800 | -2.48 | 0.00 | 0.00 | 0.02 | 100.0 |
| P-1134 | 6.0 | J-1022 | J-1021 | 700 | -2.59 | 0.00 | 0.00 | 0.03 | 100.0 |
| P-1135 | 10.0 | J-1023 | J-1022 | 500 | -13.08 | 0.00 | 0.00 | 0.05 | 90.0 |
| P-1136 | 8.0 | J-1020 | J-1021 | 450 | 3.38 | 0.00 | 0.00 | 0.02 | 100.0 |
| P-1137 | 8.0 | J-1074 | J-1024 | 800 | -0.64 | 0.00 | 0.00 | 0.00 | 100.0 |
| P-1138 | 8.0 | J-1023 | J-1074 | 900 | 2.63 | 0.00 | 0.00 | 0.02 | 100.0 |
| P-1139 | 10.0 | J-1024 | J-1023 | 320 | -7.18 | 0.00 | 0.00 | 0.03 | 90.0 |
| P-1140 | 10.0 | J-1024 | J-1099 | 330 | 3.27 | 0.00 | 0.00 | 0.01 | 90.0 |
| P-1141 | 10.0 | J-1099 | PRV-3 | 5 | 0.00 | 0.00 | 0.00 | 0.00 | 90.0 |
| P-1142 | 8.0 | J-1092 | PRV-1 | 390 | 0.00 | 0.00 | 0.00 | 0.00 | 100.0 |
| P-1143 | 12.0 | J-1015 | J-1105 | 825 | 9.81 | 0.00 | 0.00 | 0.03 | 130.0 |
| P-1144 | 12.0 | J-1105 | J-1106 | 715 | 3.27 | 0.00 | 0.00 | 0.01 | 130.0 |
| P-1145 | 8.0 | J-1105 | J-1107 | 928 | 3.27 | 0.00 | 0.00 | 0.02 | 130.0 |
| P-1146 | 12.0 | J-1008 | J-1108 | 1,077 | 16.35 | 0.00 | 0.00 | 0.05 | 120.0 |
| P-1147 | 8.0 | J-1108 | J-1109 | 757 | 3.27 | 0.00 | 0.00 | 0.02 | 130.0 |
| P-1148 | 8.0 | J-1017 | J-1110 | 1,053 | 3.27 | 0.00 | 0.00 | 0.02 | 130.0 |
| P-1149 | 12.0 | J-1111 | J-1032 | 1,442 | -10.30 | 0.00 | 0.00 | 0.03 | 110.0 |
| P-1150 | 8.0 | J-1111 | J-1112 | 573 | 3.27 | 0.00 | 0.00 | 0.02 | 130.0 |
| P-1151 | 12.0 | J-1031 | J-1111 | 1,858 | -3.76 | 0.00 | 0.00 | 0.01 | 110.0 |
| P-1152 | 8.0 | J-1030 | J-1113 | 439 | 3.27 | 0.00 | 0.00 | 0.02 | 130.0 |
| P-1153 | 8.0 | J-1025 | J-1114 | 459 | 3.27 | 0.00 | 0.00 | 0.02 | 130.0 |
| P-1154 | 12.0 | J-1002 | J-1115 | 2,056 | 3.27 | 0.00 | 0.00 | 0.01 | 130.0 |
| P-1155 | 8.0 | J-1000 | J-1116 | 920 | 3.27 | 0.00 | 0.00 | 0.02 | 130.0 |
| P-1156 | 8.0 | J-1000 | J-1117 | 1,514 | 3.27 | 0.00 | 0.00 | 0.02 | 130.0 |

# Scenario: ADD-Buildout
# Steady State Analysis
# Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-1157 | 8.0 | J-1049 | J-1118 | 828 | 3.27 | 0.00 | 0.00 | 0.02 | 130.0 |
| P-1158 | 8.0 | J-1049 | J-1119 | 1,231 | 3.27 | 0.00 | 0.00 | 0.02 | 130.0 |
| P-1159 | 10.0 | J-1052 | J-1120 | 698 | 3.27 | 0.00 | 0.00 | 0.01 | 130.0 |
| P-1161 | 6.0 | J-1041 | J-1122 | 338 | 3.27 | 0.00 | 0.00 | 0.04 | 130.0 |
| P-1162 | 6.0 | J-1056 | J-1123 | 932 | 3.27 | 0.00 | 0.00 | 0.04 | 110.0 |
| P-1163 | 6.0 | J-1067 | J-1124 | 388 | 33.65 | 0.14 | 0.05 | 0.38 | 130.0 |
| P-1164 | 6.0 | J-1124 | J-1125 | 150 | 20.19 | 0.05 | 0.01 | 0.23 | 130.0 |
| P-1165 | 6.0 | J-1125 | J-1126 | 100 | 6.73 | 0.01 | 0.00 | 0.08 | 130.0 |
| P-1166 | 6.0 | J-1125 | J-1127 | 224 | 6.73 | 0.01 | 0.00 | 0.08 | 130.0 |
| P-1167 | 6.0 | J-1124 | J-1128 | 747 | 6.73 | 0.01 | 0.01 | 0.08 | 130.0 |
| P-1168 | 8.0 | J-1095 | J-1131 | 773 | 3.27 | 0.00 | 0.00 | 0.02 | 130.0 |
| P-1169 | 8.0 | J-1091 | J-1132 | 885 | 3.27 | 0.00 | 0.00 | 0.02 | 130.0 |
| P-1170 | 8.0 | J-1088 | J-1133 | 1,016 | 3.27 | 0.00 | 0.00 | 0.02 | 130.0 |
| P-2000 | 6.0 | J-2017 | J-2018 | 1,600 | 1.98 | 0.00 | 0.00 | 0.02 | 100.0 |
| P-2001 | 8.0 | J-2016 | J-2019 | 650 | -5.19 | 0.00 | 0.00 | 0.03 | 100.0 |
| P-2002 | 8.0 | J-2016 | J-2017 | 750 | 3.96 | 0.00 | 0.00 | 0.03 | 100.0 |
| P-2003 | 12.0 | J-2020 | J-2016 | 650 | 0.75 | 0.00 | 0.00 | 0.00 | 110.0 |
| P-2004 | 8.0 | J-2015 | J-2021 | 550 | -57.20 | 0.15 | 0.08 | 0.37 | 100.0 |
| P-2005 | 6.0 | J-2020 | J-2015 | 450 | -3.71 | 0.00 | 0.00 | 0.04 | 90.0 |
| P-2006 | 8.0 | J-2019 | J-2015 | 300 | -7.17 | 0.00 | 0.00 | 0.05 | 100.0 |
| P-2007 | 6.0 | J-2005 | J-2020 | 300 | -0.99 | 0.00 | 0.00 | 0.01 | 130.0 |
| P-2008 | 6.0 | J-2191 | J-2192 | 1,093 | 1.98 | 0.00 | 0.00 | 0.02 | 130.0 |
| P-2009 | 8.0 | J-2015 | J-2014 | 2,160 | 44.33 | 0.09 | 0.20 | 0.28 | 100.0 |
| P-2010 | 6.0 | J-2004 | J-2005 | 1,200 | 0.99 | 0.00 | 0.00 | 0.01 | 100.0 |
| P-2011 | 8.0 | J-207 | T-2 | 223 | 179.62 | 0.76 | 0.17 | 1.15 | 130.0 |
| P-2012 | 8.0 | J-2025 | J-2024 | 2,400 | -1.66 | 0.00 | 0.00 | 0.01 | 90.0 |
| P-2013 | 8.0 | J-2023 | J-2025 | 250 | 0.32 | 0.00 | 0.00 | 0.00 | 90.0 |
| P-2014 | 8.0 | J-2024 | J-2023 | 1,300 | 2.30 | 0.00 | 0.00 | 0.01 | 90.0 |
| P-2015 | 8.0 | J-2022 | J-2024 | 250 | 5.94 | 0.00 | 0.00 | 0.04 | 90.0 |
| P-2016 | 10.0 | J-2014 | J-207 | 800 | 117.89 | 0.23 | 0.19 | 0.48 | 90.0 |
| P-2017 | 8.0 | J-207 | J-2027 | 1,200 | -61.73 | 0.14 | 0.17 | 0.39 | 110.0 |
| P-2018 | 10.0 | J-2022 | J-2029 | 3,500 | -71.06 | 0.07 | 0.26 | 0.29 | 100.0 |
| P-2019 | 10.0 | J-2014 | J-2011 | 2,900 | -75.54 | 0.08 | 0.24 | 0.31 | 100.0 |
| P-2020 | 6.0 | J-2010 | J-2004 | 700 | 0.49 | 0.00 | 0.00 | 0.01 | 90.0 |
| P-2021 | 12.0 | PRV-4 | J-2003 | 167 | 0.00 | 0.00 | 0.00 | 0.00 | 110.0 |
| P-2022 | 6.0 | J-2004 | J-2003 | 350 | -2.48 | 0.00 | 0.00 | 0.03 | 90.0 |
| P-2023 | 10.0 | J-2003 | J-2002 | 1,650 | -4.46 | 0.00 | 0.00 | 0.02 | 110.0 |
| P-2024 | 8.0 | J-2009 | J-2002 | 850 | -0.12 | 0.00 | 0.00 | 0.00 | 110.0 |
| P-2025 | 6.0 | J-2008 | J-2001 | 1,200 | 2.26 | 0.00 | 0.00 | 0.03 | 130.0 |
| P-2026 | 8.0 | J-2008 | J-2001 | 1,000 | 4.49 | 0.00 | 0.00 | 0.03 | 110.0 |
| P-2027 | 6.0 | J-2008 | J-2009 | 750 | 4.33 | 0.01 | 0.00 | 0.05 | 90.0 |
| P-2028 | 10.0 | J-2002 | J-2001 | 400 | -24.53 | 0.01 | 0.00 | 0.10 | 110.0 |
| P-2029 | 8.0 | J-2029 | J-2031 | 400 | 1.98 | 0.00 | 0.00 | 0.01 | 110.0 |
| P-2030 | 8.0 | J-2050 | J-2012 | 400 | 73.22 | 0.23 | 0.09 | 0.47 | 100.0 |
| P-2031 | 6.0 | J-2051 | J-2050 | 450 | -24.56 | 0.13 | 0.06 | 0.28 | 100.0 |
| P-2032 | 6.0 | J-2026 | J-2051 | 300 | -22.58 | 0.11 | 0.03 | 0.26 | 100.0 |
| P-2033 | 12.0 | J-2026 | J-2028 | 600 | -24.25 | 0.00 | 0.00 | 0.07 | 120.0 |
| P-2034 | 12.0 | J-2026 | J-2012 | 650 | 39.51 | 0.01 | 0.00 | 0.11 | 120.0 |
| P-2035 | 8.0 | J-2013 | J-2026 | 1,300 | -5.34 | 0.00 | 0.00 | 0.03 | 110.0 |
| P-2036 | 6.0 | J-2012 | J-2013 | 900 | -3.36 | 0.00 | 0.00 | 0.04 | 100.0 |
| P-2037 | 10.0 | J-2011 | J-2012 | 150 | -114.11 | 0.22 | 0.03 | 0.47 | 90.0 |

# Scenario: ADD-Buildout
# Steady State Analysis
# Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-2038 | 8.0 | J-2028 | J-2029 | 900 | -89.95 | 0.42 | 0.38 | 0.57 | 90.0 |
| P-2039 | 8.0 | J-2027 | J-2028 | 1,950 | -63.71 | 0.15 | 0.30 | 0.41 | 110.0 |
| P-2040 | 8.0 | J-2007 | J-2008 | 1,950 | 13.06 | 0.01 | 0.02 | 0.08 | 90.0 |
| P-2041 | 10.0 | J-2007 | J-2011 | 600 | -36.58 | 0.03 | 0.02 | 0.15 | 90.0 |
| P-2042 | 10.0 | J-2006 | J-2007 | 600 | -27.68 | 0.02 | 0.01 | 0.11 | 90.0 |
| P-2043 | 8.0 | J-2042 | J-2007 | 1,650 | 4.70 | 0.00 | 0.00 | 0.03 | 100.0 |
| P-2044 | 8.0 | J-2007 | J-2043 | 1,450 | -1.44 | 0.00 | 0.00 | 0.01 | 110.0 |
| P-2045 | 10.0 | J-2030 | J-2029 | 1,080 | 164.96 | 0.30 | 0.32 | 0.67 | 110.0 |
| P-2046 | 8.0 | J-2050 | J-2049 | 600 | -99.75 | 0.42 | 0.25 | 0.64 | 100.0 |
| P-2047 | 10.0 | J-2000 | J-2006 | 470 | -25.70 | 0.01 | 0.01 | 0.11 | 90.0 |
| P-2048 | 10.0 | J-2001 | J-2000 | 1,350 | -19.76 | 0.01 | 0.01 | 0.08 | 110.0 |
| P-2049 | 10.0 | PRV-3 | J-2159 | 5 | 0.00 | 0.00 | 0.00 | 0.00 | 90.0 |
| P-2050 | 10.0 | J-2159 | J-2000 | 210 | -1.98 | 0.00 | 0.00 | 0.01 | 90.0 |
| P-2051 | 12.0 | J-2153 | J-208 | 909 | -681.05 | 1.70 | 1.54 | 1.93 | 110.0 |
| P-2052 | 8.0 | J-2036 | J-2038 | 1,250 | -73.07 | 0.23 | 0.29 | 0.47 | 100.0 |
| P-2053 | 8.0 | J-2059 | J-2060 | 1,100 | -147.32 | 1.04 | 1.14 | 0.94 | 90.0 |
| P-2054 | 12.0 | J-2153 | J-2032 | 1,460 | 450.09 | 0.79 | 1.15 | 1.28 | 110.0 |
| P-2055 | 6.0 | J-2032 | J-2033 | 450 | -78.17 | 0.90 | 0.41 | 0.89 | 110.0 |
| P-2056 | 8.0 | J-2060 | J-2062 | 200 | 3.96 | 0.00 | 0.00 | 0.03 | 100.0 |
| P-2057 | 8.0 | J-2030 | J-2032 | 1,800 | -81.54 | 0.35 | 0.63 | 0.52 | 90.0 |
| P-2058 | 8.0 | J-2060 | J-2061 | 800 | 1.98 | 0.00 | 0.00 | 0.01 | 100.0 |
| P-2059 | 8.0 | J-2032 | J-2060 | 450 | 155.24 | 1.15 | 0.52 | 0.99 | 90.0 |
| P-2060 | 12.0 | J-2030 | J-2032 | 1,800 | -289.50 | 0.35 | 0.63 | 0.82 | 110.0 |
| P-2061 | 8.0 | J-2038 | J-2030 | 2,600 | -96.43 | 0.28 | 0.72 | 0.62 | 120.0 |
| P-2062 | 8.0 | J-2039 | J-2038 | 900 | -21.38 | 0.02 | 0.02 | 0.14 | 100.0 |
| P-2063 | 8.0 | J-2042 | J-2041 | 250 | 2.05 | 0.00 | 0.00 | 0.01 | 100.0 |
| P-2064 | 8.0 | J-2039 | J-2042 | 800 | 10.12 | 0.01 | 0.00 | 0.06 | 100.0 |
| P-2065 | 8.0 | J-2040 | J-2039 | 600 | -9.29 | 0.01 | 0.00 | 0.06 | 100.0 |
| P-2066 | 8.0 | J-2041 | J-2040 | 550 | -7.31 | 0.00 | 0.00 | 0.05 | 100.0 |
| P-2067 | 8.0 | J-2044 | J-2041 | 550 | -7.38 | 0.00 | 0.00 | 0.05 | 100.0 |
| P-2068 | 8.0 | J-2044 | J-2045 | 400 | 1.98 | 0.00 | 0.00 | 0.01 | 100.0 |
| P-2069 | 8.0 | J-2043 | J-2044 | 350 | -3.42 | 0.00 | 0.00 | 0.02 | 100.0 |
| P-2070 | 8.0 | J-2046 | J-2047 | 250 | -49.17 | 0.09 | 0.02 | 0.31 | 110.0 |
| P-2071 | 8.0 | J-2048 | J-2046 | 500 | -47.19 | 0.09 | 0.04 | 0.30 | 110.0 |
| P-2072 | 8.0 | J-2047 | J-2030 | 280 | -107.67 | 0.58 | 0.16 | 0.69 | 90.0 |
| P-2073 | 8.0 | J-2048 | J-2047 | 380 | -56.52 | 0.18 | 0.07 | 0.36 | 90.0 |
| P-2074 | 8.0 | J-2049 | J-2048 | 250 | -101.73 | 0.52 | 0.13 | 0.65 | 90.0 |
| P-2075 | 12.0 | J-2184 | J-2068 | 928 | 126.63 | 0.06 | 0.06 | 0.36 | 120.0 |
| P-2076 | 8.0 | J-2157 | J-2158 | 1,800 | -1.75 | 0.00 | 0.00 | 0.01 | 110.0 |
| P-2077 | 12.0 | J-2155 | J-2154 | 900 | -137.49 | 0.07 | 0.07 | 0.39 | 120.0 |
| P-2079 | 8.0 | J-2157 | J-2158 | 600 | -3.17 | 0.00 | 0.00 | 0.02 | 110.0 |
| P-2080 | 8.0 | J-2156 | J-2157 | 300 | 3.38 | 0.00 | 0.00 | 0.02 | 110.0 |
| P-2081 | 6.0 | J-2033 | J-2034 | 900 | -27.52 | 0.13 | 0.12 | 0.31 | 110.0 |
| P-2082 | 12.0 | J-2154 | J-2153 | 1,600 | -228.97 | 0.19 | 0.31 | 0.65 | 120.0 |
| P-2083 | 8.0 | J-2156 | J-2154 | 550 | -87.49 | 0.27 | 0.15 | 0.56 | 110.0 |
| P-2084 | 8.0 | J-2034 | J-2156 | 700 | -82.13 | 0.24 | 0.17 | 0.52 | 110.0 |
| P-2085 | 8.0 | J-2033 | J-2034 | 1,100 | -52.63 | 0.11 | 0.12 | 0.34 | 110.0 |
| P-2086 | 10.0 | J-2062 | J-2063 | 997 | 1.98 | 0.00 | 0.00 | 0.01 | 110.0 |
| P-2087 | 12.0 | J-2055 | J-2059 | 650 | -145.34 | 0.08 | 0.05 | 0.41 | 120.0 |
| P-2088 | 8.0 | J-2054 | J-2053 | 800 | 29.51 | 0.11 | 0.09 | 0.19 | 60.0 |
| P-2089 | 6.0 | J-2055 | J-2054 | 250 | 31.49 | 0.51 | 0.13 | 0.36 | 60.0 |

# Scenario: ADD-Buildout
# Steady State Analysis
# Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-2092 | 12.0 | J-2055 | J-2056 | 150 | 179.10 | 0.12 | 0.02 | 0.51 | 120.0 |
| P-2093 | 10.0 | J-2127 | J-2055 | 2,560 | 67.23 | 0.07 | 0.17 | 0.27 | 100.0 |
| P-2094 | 6.0 | J-2127 | J-2065 | 350 | 31.28 | 0.51 | 0.18 | 0.35 | 60.0 |
| P-2095 | 6.0 | J-2068 | J-2127 | 450 | 105.69 | 4.84 | 2.18 | 1.20 | 60.0 |
| P-2096 | 8.0 | J-2185 | J-2186 | 628 | 1.98 | 0.00 | 0.00 | 0.01 | 130.0 |
| P-2097 | 12.0 | J-2065 | J-2064 | 200 | 16.39 | 0.00 | 0.00 | 0.05 | 120.0 |
| P-2098 | 12.0 | J-2066 | J-2065 | 450 | -9.46 | 0.00 | 0.00 | 0.03 | 110.0 |
| P-2099 | 12.0 | J-2067 | J-2066 | 200 | -4.02 | 0.00 | 0.00 | 0.01 | 120.0 |
| P-2100 | 12.0 | J-2064 | J-2067 | 450 | 1.42 | 0.00 | 0.00 | 0.00 | 110.0 |
| P-2101 | 6.0 | J-2057 | J-2064 | 1,250 | -7.76 | 0.04 | 0.05 | 0.09 | 60.0 |
| P-2102 | 6.0 | J-2058 | J-2057 | 550 | -12.66 | 0.10 | 0.05 | 0.14 | 60.0 |
| P-2103 | 8.0 | J-2053 | J-2058 | 650 | -37.33 | 0.17 | 0.11 | 0.24 | 60.0 |
| P-2104 | 6.0 | J-2071 | J-2070 | 1,399 | -0.92 | 0.00 | 0.00 | 0.01 | 130.0 |
| P-2105 | 6.0 | J-2070 | J-2071 | 1,081 | 1.06 | 0.00 | 0.00 | 0.01 | 130.0 |
| P-2106 | 8.0 | J-2069 | J-2070 | 1,800 | 3.96 | 0.00 | 0.00 | 0.03 | 110.0 |
| P-2107 | 8.0 | J-2036 | J-2037 | 300 | 1.98 | 0.00 | 0.00 | 0.01 | 100.0 |
| P-2108 | 8.0 | J-2035 | J-2036 | 2,180 | -69.11 | 0.15 | 0.33 | 0.44 | 120.0 |
| P-2109 | 8.0 | J-2035 | J-2052 | 1,300 | 3.04 | 0.00 | 0.00 | 0.02 | 100.0 |
| P-2110 | 8.0 | J-2052 | J-2053 | 2,400 | -17.26 | 0.02 | 0.04 | 0.11 | 100.0 |
| P-2111 | 8.0 | J-2090 | J-2052 | 700 | -2.26 | 0.00 | 0.00 | 0.01 | 110.0 |
| P-2112 | 8.0 | J-2035 | J-2090 | 1,800 | 3.18 | 0.00 | 0.00 | 0.02 | 110.0 |
| P-2113 | 8.0 | J-2081 | J-2035 | 650 | -57.44 | 0.15 | 0.10 | 0.37 | 100.0 |
| P-2114 | 6.0 | J-2081 | J-2082 | 950 | 1.98 | 0.00 | 0.00 | 0.02 | 100.0 |
| P-2115 | 8.0 | J-2080 | J-2081 | 2,050 | -53.48 | 0.13 | 0.27 | 0.34 | 100.0 |
| P-2116 | 8.0 | J-2079 | J-2080 | 2,600 | 11.19 | 0.00 | 0.01 | 0.07 | 130.0 |
| P-2117 | 8.0 | J-2083 | J-2079 | 650 | 6.52 | 0.00 | 0.00 | 0.04 | 100.0 |
| P-2118 | 8.0 | J-2089 | J-2053 | 1,200 | -44.13 | 0.07 | 0.08 | 0.28 | 120.0 |
| P-2119 | 8.0 | J-2088 | J-2089 | 3,000 | -42.15 | 0.06 | 0.18 | 0.27 | 120.0 |
| P-2120 | 12.0 | J-2091 | J-2058 | 1,000 | -133.26 | 0.07 | 0.07 | 0.38 | 120.0 |
| P-2121 | 12.0 | J-2092 | J-2091 | 1,050 | -131.28 | 0.07 | 0.07 | 0.37 | 120.0 |
| P-2122 | 12.0 | T-1 | J-2092 | 700 | 5.81 | 0.00 | 0.00 | 0.02 | 120.0 |
| P-2124 | 12.0 | J-2093 | J-2092 | 550 | -125.21 | 0.05 | 0.03 | 0.36 | 130.0 |
| P-2125 | 12.0 | J-2094 | J-2093 | 1,100 | -123.23 | 0.05 | 0.06 | 0.35 | 130.0 |
| P-2126 | 8.0 | J-2073 | J-2074 | 365 | 12.17 | 0.01 | 0.00 | 0.08 | 110.0 |
| P-2127 | 8.0 | J-2073 | J-2075 | 200 | 5.44 | 0.00 | 0.00 | 0.03 | 100.0 |
| P-2128 | 8.0 | J-2072 | J-2073 | 550 | 34.70 | 0.06 | 0.03 | 0.22 | 100.0 |
| P-2129 | 8.0 | PRV-2 | J-2072 | 238 | 0.00 | 0.00 | 0.00 | 0.00 | 100.0 |
| P-2130 | 8.0 | J-2076 | J-2072 | 1,900 | -18.06 | 0.02 | 0.03 | 0.12 | 100.0 |
| P-2131 | 8.0 | J-2072 | J-2080 | 300 | -59.23 | 0.16 | 0.05 | 0.38 | 100.0 |
| P-2132 | 8.0 | J-2084 | J-2085 | 550 | -8.63 | 0.00 | 0.00 | 0.06 | 110.0 |
| P-2133 | 8.0 | J-2079 | J-2084 | 1,350 | -6.65 | 0.00 | 0.00 | 0.04 | 110.0 |
| P-2134 | 8.0 | J-2085 | J-2083 | 950 | 8.50 | 0.00 | 0.00 | 0.05 | 110.0 |
| P-2135 | 8.0 | J-2086 | J-2085 | 450 | 19.11 | 0.02 | 0.01 | 0.12 | 110.0 |
| P-2136 | 8.0 | J-2087 | J-2086 | 800 | 21.09 | 0.02 | 0.02 | 0.13 | 110.0 |
| P-2137 | 8.0 | J-2087 | J-2088 | 1,360 | -40.17 | 0.08 | 0.10 | 0.26 | 100.0 |
| P-2138 | 8.0 | J-2132 | J-2087 | 300 | -17.10 | 0.01 | 0.00 | 0.11 | 110.0 |
| P-2140 | 12.0 | J-2133 | J-2167 | 2,000 | -111.35 | 0.05 | 0.10 | 0.32 | 120.0 |
| P-2141 | 12.0 | J-2133 | J-2165 | 1,500 | 84.43 | 0.04 | 0.05 | 0.24 | 110.0 |
| P-2142 | 8.0 | J-2132 | J-2133 | 960 | -24.94 | 0.03 | 0.03 | 0.16 | 100.0 |
| P-2143 | 8.0 | J-2078 | J-2076 | 1,000 | -6.00 | 0.00 | 0.00 | 0.04 | 100.0 |
| P-2144 | 8.0 | J-2077 | J-2078 | 1,200 | -4.02 | 0.00 | 0.00 | 0.03 | 100.0 |

# Scenario: ADD-Buildout
# Steady State Analysis
# Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-2145 | 8.0 | J-2077 | J-2076 | 600 | -10.09 | 0.01 | 0.00 | 0.06 | 100.0 |
| P-2146 | 8.0 | J-2119 | J-2077 | 1,650 | -12.12 | 0.01 | 0.01 | 0.08 | 100.0 |
| P-2147 | 8.0 | J-2162 | J-2132 | 400 | -40.07 | 0.08 | 0.03 | 0.26 | 100.0 |
| P-2148 | 8.0 | J-2161 | J-2162 | 560 | -38.09 | 0.07 | 0.04 | 0.24 | 100.0 |
| P-2149 | 8.0 | J-2131 | J-2161 | 300 | -36.11 | 0.06 | 0.02 | 0.23 | 100.0 |
| P-2150 | 8.0 | J-2134 | J-2135 | 1,050 | -16.41 | 0.01 | 0.01 | 0.10 | 110.0 |
| P-2151 | 8.0 | J-2131 | J-2130 | 1,400 | 9.60 | 0.01 | 0.01 | 0.06 | 100.0 |
| P-2152 | 8.0 | J-2129 | J-2130 | 900 | -7.62 | 0.00 | 0.00 | 0.05 | 100.0 |
| P-2153 | 8.0 | J-2119 | J-2128 | 1,250 | -12.59 | 0.01 | 0.01 | 0.08 | 100.0 |
| P-2154 | 8.0 | J-2129 | J-2131 | 350 | -24.52 | 0.03 | 0.01 | 0.16 | 100.0 |
| P-2155 | 8.0 | J-2128 | J-2129 | 510 | -30.17 | 0.05 | 0.02 | 0.19 | 100.0 |
| P-2156 | 12.0 | J-2134 | J-2128 | 750 | -15.60 | 0.00 | 0.00 | 0.04 | 110.0 |
| P-2157 | 12.0 | J-2120 | J-2134 | 1,250 | -30.03 | 0.01 | 0.01 | 0.09 | 110.0 |
| P-2158 | 8.0 | J-2120 | J-2119 | 1,400 | 6.34 | 0.00 | 0.00 | 0.04 | 100.0 |
| P-2159 | 8.0 | J-2121 | J-2120 | 800 | -21.71 | 0.02 | 0.02 | 0.14 | 100.0 |
| P-2160 | 8.0 | J-2142 | J-2143 | 500 | -14.35 | 0.01 | 0.00 | 0.09 | 120.0 |
| P-2161 | 8.0 | J-2136 | J-2137 | 1,650 | 8.64 | 0.00 | 0.01 | 0.06 | 110.0 |
| P-2162 | 8.0 | J-2142 | J-2141 | 900 | -1.24 | 0.00 | 0.00 | 0.01 | 120.0 |
| P-2163 | 8.0 | J-2135 | J-2142 | 1,250 | -13.61 | 0.01 | 0.01 | 0.09 | 110.0 |
| P-2164 | 8.0 | J-2136 | J-2135 | 200 | 4.78 | 0.00 | 0.00 | 0.03 | 110.0 |
| P-2165 | 8.0 | J-2138 | J-2136 | 750 | 15.40 | 0.01 | 0.01 | 0.10 | 100.0 |
| P-2166 | 8.0 | J-2141 | J-2140 | 750 | 4.23 | 0.00 | 0.00 | 0.03 | 120.0 |
| P-2167 | 8.0 | J-2143 | J-2141 | 1,650 | 7.45 | 0.00 | 0.00 | 0.05 | 120.0 |
| P-2168 | 8.0 | J-2144 | J-2143 | 1,000 | 23.78 | 0.03 | 0.03 | 0.15 | 100.0 |
| P-2169 | 8.0 | J-2165 | J-2166 | 1,200 | 1.98 | 0.00 | 0.00 | 0.01 | 110.0 |
| P-2170 | 12.0 | J-2144 | J-2165 | 1,600 | -80.47 | 0.03 | 0.04 | 0.23 | 120.0 |
| P-2171 | 12.0 | J-2145 | J-2144 | 750 | -54.71 | 0.01 | 0.01 | 0.16 | 120.0 |
| P-2172 | 12.0 | J-2146 | J-2147 | 500 | 17.92 | 0.00 | 0.00 | 0.05 | 120.0 |
| P-2173 | 12.0 | J-2145 | J-2146 | 1,350 | 19.90 | 0.00 | 0.00 | 0.06 | 120.0 |
| P-2174 | 12.0 | J-2148 | J-2145 | 600 | -32.83 | 0.01 | 0.00 | 0.09 | 120.0 |
| P-2175 | 8.0 | J-2147 | J-2148 | 1,450 | -2.64 | 0.00 | 0.00 | 0.02 | 120.0 |
| P-2176 | 8.0 | J-2139 | J-2138 | 250 | 15.13 | 0.02 | 0.00 | 0.10 | 90.0 |
| P-2177 | 8.0 | J-2140 | J-2138 | 1,050 | 2.25 | 0.00 | 0.00 | 0.01 | 120.0 |
| P-2178 | 12.0 | J-2149 | J-2152 | 600 | 26.23 | 0.00 | 0.00 | 0.07 | 120.0 |
| P-2179 | 12.0 | J-2148 | J-2149 | 500 | 28.21 | 0.00 | 0.00 | 0.08 | 120.0 |
| P-2180 | 12.0 | J-2150 | J-2147 | 450 | -18.58 | 0.00 | 0.00 | 0.05 | 120.0 |
| P-2181 | 12.0 | J-2151 | J-2150 | 850 | -16.60 | 0.00 | 0.00 | 0.05 | 120.0 |
| P-2182 | 12.0 | J-2152 | J-2151 | 1,250 | -14.62 | 0.00 | 0.00 | 0.04 | 120.0 |
| P-2183 | 12.0 | J-2139 | J-2152 | 1,800 | -38.87 | 0.01 | 0.01 | 0.11 | 120.0 |
| P-2184 | 8.0 | J-2137 | J-2139 | 800 | -21.76 | 0.02 | 0.02 | 0.14 | 100.0 |
| P-2185 | 8.0 | J-2111 | J-2097 | 550 | 20.17 | 0.02 | 0.01 | 0.13 | 100.0 |
| P-2186 | 6.0 | J-2111 | J-2110 | 1,000 | -4.37 | 0.01 | 0.01 | 0.05 | 100.0 |
| P-2187 | 8.0 | J-2112 | J-2113 | 1,000 | -4.06 | 0.00 | 0.00 | 0.03 | 100.0 |
| P-2188 | 8.0 | J-2116 | J-2114 | 950 | -1.58 | 0.00 | 0.00 | 0.01 | 100.0 |
| P-2189 | 8.0 | J-2110 | J-2109 | 1,200 | 1.27 | 0.00 | 0.00 | 0.01 | 100.0 |
| P-2190 | 8.0 | J-2112 | J-2111 | 300 | 17.78 | 0.02 | 0.01 | 0.11 | 100.0 |
| P-2191 | 8.0 | J-2116 | J-2112 | 300 | 15.70 | 0.01 | 0.00 | 0.10 | 100.0 |
| P-2192 | 8.0 | J-2118 | J-2116 | 339 | 16.10 | 0.01 | 0.00 | 0.10 | 100.0 |
| P-2193 | 8.0 | J-2117 | J-2118 | 850 | -9.02 | 0.00 | 0.00 | 0.06 | 100.0 |
| P-2194 | 8.0 | J-2114 | J-2117 | 300 | -5.06 | 0.00 | 0.00 | 0.03 | 100.0 |
| P-2195 | 8.0 | J-2113 | J-2110 | 300 | 7.62 | 0.00 | 0.00 | 0.05 | 100.0 |

# Scenario: ADD-Buildout
# Steady State Analysis
# Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-2196 | 8.0 | J-2114 | J-2113 | 300 | 13.66 | 0.01 | 0.00 | 0.09 | 100.0 |
| P-2197 | 8.0 | J-2163 | J-2114 | 1,300 | 12.16 | 0.01 | 0.01 | 0.08 | 100.0 |
| P-2198 | 8.0 | J-2164 | J-2163 | 800 | 12.94 | 0.01 | 0.01 | 0.08 | 100.0 |
| P-2199 | 8.0 | J-2122 | J-2164 | 400 | 14.92 | 0.01 | 0.00 | 0.10 | 100.0 |
| P-2200 | 8.0 | J-2121 | J-2122 | 400 | 14.84 | 0.01 | 0.00 | 0.09 | 110.0 |
| P-2201 | 8.0 | J-2123 | J-2124 | 400 | -12.61 | 0.01 | 0.00 | 0.08 | 100.0 |
| P-2202 | 8.0 | J-2126 | J-2137 | 800 | -28.42 | 0.04 | 0.03 | 0.18 | 100.0 |
| P-2203 | 8.0 | J-2123 | J-2125 | 300 | 8.56 | 0.00 | 0.00 | 0.05 | 100.0 |
| P-2204 | 8.0 | J-2122 | J-2123 | 280 | -2.07 | 0.00 | 0.00 | 0.01 | 100.0 |
| P-2205 | 8.0 | J-2124 | J-2121 | 250 | -4.89 | 0.00 | 0.00 | 0.03 | 100.0 |
| P-2206 | 8.0 | J-2126 | J-2124 | 210 | 9.70 | 0.01 | 0.00 | 0.06 | 100.0 |
| P-2207 | 8.0 | J-2125 | J-2126 | 400 | -16.74 | 0.02 | 0.01 | 0.11 | 100.0 |
| P-2208 | 8.0 | J-2163 | J-2125 | 400 | -23.32 | 0.03 | 0.01 | 0.15 | 100.0 |
| P-2209 | 8.0 | J-2109 | J-2163 | 600 | -22.12 | 0.03 | 0.02 | 0.14 | 100.0 |
| P-2210 | 8.0 | PRV-1 | J-2096 | 660 | 0.00 | 0.00 | 0.00 | 0.00 | 100.0 |
| P-2211 | 8.0 | J-2097 | J-2096 | 400 | 18.19 | 0.02 | 0.01 | 0.12 | 100.0 |
| P-2212 | 8.0 | J-2096 | J-2098 | 200 | 11.19 | 0.01 | 0.00 | 0.07 | 100.0 |
| P-2213 | 8.0 | J-2115 | J-2096 | 2,600 | -5.02 | 0.00 | 0.00 | 0.03 | 110.0 |
| P-2214 | 8.0 | J-2099 | J-2175 | 548 | 4.88 | 0.00 | 0.00 | 0.03 | 110.0 |
| P-2215 | 8.0 | J-2098 | J-2099 | 300 | 9.21 | 0.01 | 0.00 | 0.06 | 100.0 |
| P-2216 | 8.0 | J-2160 | J-2100 | 400 | 1.68 | 0.00 | 0.00 | 0.01 | 100.0 |
| P-2217 | 8.0 | J-2102 | J-2160 | 600 | 3.66 | 0.00 | 0.00 | 0.02 | 100.0 |
| P-2218 | 6.0 | J-2100 | J-2101 | 700 | 2.06 | 0.00 | 0.00 | 0.02 | 100.0 |
| P-2219 | 8.0 | J-2102 | J-2108 | 1,100 | -8.98 | 0.00 | 0.00 | 0.06 | 120.0 |
| P-2220 | 8.0 | J-2108 | J-2109 | 950 | -21.41 | 0.02 | 0.02 | 0.14 | 100.0 |
| P-2221 | 8.0 | J-2107 | J-2108 | 200 | -10.45 | 0.01 | 0.00 | 0.07 | 100.0 |
| P-2222 | 8.0 | J-2102 | J-2107 | 950 | -6.49 | 0.00 | 0.00 | 0.04 | 100.0 |
| P-2223 | 8.0 | J-2099 | J-2100 | 850 | 2.35 | 0.00 | 0.00 | 0.02 | 100.0 |
| P-2224 | 6.0 | J-2105 | J-2106 | 600 | 1.98 | 0.00 | 0.00 | 0.02 | 100.0 |
| P-2225 | 6.0 | J-2102 | J-2105 | 500 | 3.96 | 0.00 | 0.00 | 0.04 | 100.0 |
| P-2226 | 8.0 | J-2103 | J-2102 | 500 | -5.86 | 0.00 | 0.00 | 0.04 | 100.0 |
| P-2227 | 6.0 | J-2104 | J-2103 | 305 | -1.98 | 0.00 | 0.00 | 0.02 | 100.0 |
| P-2228 | 8.0 | J-2101 | J-2103 | 1,900 | -1.90 | 0.00 | 0.00 | 0.01 | 110.0 |
| P-2229 | 6.0 | J-2101 | J-2168 | 376 | 1.98 | 0.00 | 0.00 | 0.02 | 130.0 |
| P-2230 | 6.0 | J-2175 | J-2170 | 369 | 1.98 | 0.00 | 0.00 | 0.02 | 130.0 |
| P-2231 | 6.0 | J-2175 | J-2169 | 373 | 1.98 | 0.00 | 0.00 | 0.02 | 130.0 |
| P-2232 | 8.0 | J-2175 | J-2115 | 1,352 | -1.06 | 0.00 | 0.00 | 0.01 | 110.0 |
| P-2233 | 6.0 | J-2115 | J-2171 | 853 | 1.98 | 0.00 | 0.00 | 0.02 | 130.0 |
| P-2234 | 6.0 | J-2107 | J-2172 | 980 | 1.98 | 0.00 | 0.00 | 0.02 | 130.0 |
| P-2235 | 8.0 | J-2117 | J-2173 | 348 | 1.98 | 0.00 | 0.00 | 0.01 | 130.0 |
| P-2236 | 8.0 | J-2118 | J-2174 | 567 | 1.98 | 0.00 | 0.00 | 0.01 | 130.0 |
| P-2237 | 12.0 | J-2176 | J-2094 | 1,500 | -121.25 | 0.05 | 0.08 | 0.34 | 130.0 |
| P-2238 | 12.0 | J-2178 | J-2176 | 401 | -117.29 | 0.06 | 0.02 | 0.33 | 120.0 |
| P-2239 | 12.0 | J-2167 | J-2178 | 399 | -113.33 | 0.05 | 0.02 | 0.32 | 120.0 |
| P-2240 | 8.0 | J-2176 | J-2177 | 1,030 | 1.98 | 0.00 | 0.00 | 0.01 | 130.0 |
| P-2241 | 8.0 | J-2178 | J-2179 | 580 | 1.98 | 0.00 | 0.00 | 0.01 | 130.0 |
| P-2242 | 8.0 | J-2092 | J-2180 | 501 | 9.90 | 0.01 | 0.00 | 0.06 | 90.0 |
| P-2243 | 8.0 | J-2180 | J-2181 | 581 | 1.98 | 0.00 | 0.00 | 0.01 | 130.0 |
| P-2244 | 8.0 | J-2180 | J-2182 | 291 | 5.94 | 0.00 | 0.00 | 0.04 | 90.0 |
| P-2245 | 6.0 | J-2182 | J-2183 | 295 | 1.98 | 0.00 | 0.00 | 0.02 | 130.0 |
| P-2246 | 8.0 | J-2182 | J-2095 | 308 | 1.98 | 0.00 | 0.00 | 0.01 | 90.0 |

# Scenario: ADD-Buildout
# Steady State Analysis
# Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-2247 | 12.0 | J-2155 | J-2184 | 1,102 | 135.51 | 0.07 | 0.08 | 0.38 | 120.0 |
| P-2248 | 8.0 | J-2184 | J-2158 | 1,245 | 6.90 | 0.00 | 0.00 | 0.04 | 110.0 |
| P-2249 | 8.0 | J-2068 | J-2185 | 774 | 18.96 | 0.02 | 0.01 | 0.12 | 110.0 |
| P-2250 | 8.0 | J-2185 | J-2069 | 1,326 | 15.00 | 0.01 | 0.01 | 0.10 | 110.0 |
| P-2251 | 6.0 | J-2069 | J-2187 | 442 | 7.92 | 0.01 | 0.00 | 0.09 | 130.0 |
| P-2252 | 6.0 | J-2187 | J-2188 | 292 | 1.98 | 0.00 | 0.00 | 0.02 | 130.0 |
| P-2253 | 6.0 | J-2187 | J-2189 | 535 | 3.96 | 0.00 | 0.00 | 0.04 | 130.0 |
| P-2254 | 8.0 | J-2189 | J-2190 | 905 | 0.93 | 0.00 | 0.00 | 0.01 | 130.0 |
| P-2255 | 8.0 | J-2190 | J-2189 | 723 | -1.05 | 0.00 | 0.00 | 0.01 | 130.0 |
| P-2256 | 8.0 | J-2000 | J-2291 | 921 | 1.98 | 0.00 | 0.00 | 0.01 | 130.0 |
| P-2257 | 6.0 | J-2074 | J-1129 | 1,069 | 6.73 | 0.01 | 0.01 | 0.08 | 130.0 |
| P-2258 | 8.0 | J-2073 | J-1130 | 1,192 | 6.73 | 0.00 | 0.00 | 0.04 | 130.0 |
| P-2259 | 10.0 | J-2191 | J-2022 | 760 | -63.14 | 0.06 | 0.05 | 0.26 | 100.0 |
| P-2260 | 6.0 | J-2002 | J-2193 | 1,425 | 1.98 | 0.00 | 0.00 | 0.02 | 130.0 |
| P-2296 | 10.0 | J-2021 | J-2191 | 1,290 | -59.18 | 0.05 | 0.07 | 0.24 | 100.0 |
| P-2297 | 6.0 | J-2009 | J-2010 | 600 | 2.47 | 0.00 | 0.00 | 0.03 | 90.0 |
| P-2298 | 12.0 | J-2056 | J-2195 | 644 | 163.37 | 0.10 | 0.07 | 0.46 | 120.0 |
| P-2299 | 12.0 | J-2195 | J-2058 | 206 | 163.37 | 0.10 | 0.02 | 0.46 | 120.0 |
| P-2300 | 8.0 | J-2056 | J-2194 | 1,153 | 13.75 | 0.03 | 0.03 | 0.09 | 60.0 |

# Scenario: ADD-Buildout
# Steady State Analysis
# Pump Report

| Label | Elevation (ft) | Control Status | Intake Pump Grade (ft) | Discharge Pump Grade (ft) | Discharge (gpm) | Pump Head (ft) | Notes |
|---|---|---|---|---|---|---|---|
| PMP-6 | 285.00 | Off | 288.92 | 510.13 | 0.00 | 0.00 | Boland |
| PMP-2 | 285.00 | Off | 288.92 | 510.28 | 0.00 | 0.00 | Boland |
| PMP-1 | 285.00 | On | 287.53 | 539.08 | 675.86 | 251.55 | Boland |
| PMP-4 | 275.00 | On | 283.96 | 489.52 | 681.05 | 205.56 | Hosmer |
| PMP-5 | 275.00 | Off | 284.71 | 487.59 | 0.00 | 0.00 | Hosmer |

# Scenario: ADD-Buildout
# Steady State Analysis
# Tank Report

| Label | Zone | Base Elevation (ft) | Minimum Elevation (ft) | Initial HGL (ft) | Maximum Elevation (ft) | Tank Diameter (ft) | Inflow (gpm) | Current Status | Calculated Hydraulic Grade (ft) | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| T-1 | Zone | 418.00 | 418.00 | 482.00 | 492.70 | 25.00 | -5.81 | Draining | 482.00 | Oak Hill Tank |
| T-2 | Zone | 451.00 | 451.00 | 482.00 | 493.30 | 40.00 | 179.62 | Filling | 482.00 | Clear Hill Tank |
| T-3 | Zone | 467.00 | 467.00 | 503.00 | 515.00 | 67.00 | 123.84 | Filling | 503.00 | Tara Rd Tank |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# Scenario: MDD-Buildout
# Steady State Analysis
# Junction Report

| Label | Elevation (ft) | Zone | Base Flow (gpm) | Pattern | Demand (gpm) | Hydraulic Grade (ft) | Pressure (psi) |
|---|---|---|---|---|---|---|---|
| J-1000 | 375.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 510.51 | 58.63 |
| J-1001 | 341.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 510.51 | 73.34 |
| J-1002 | 272.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 510.51 | 103.19 |
| J-1003 | 270.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 510.52 | 104.06 |
| J-1004 | 285.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 510.51 | 97.57 |
| J-1005 | 275.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 510.53 | 101.90 |
| J-1006 | 272.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 517.98 | 106.42 |
| J-1007 | 270.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 521.38 | 108.76 |
| J-1008 | 270.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 521.37 | 108.76 |
| J-1009 | 270.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 521.37 | 108.76 |
| J-1010 | 290.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 508.51 | 94.54 |
| J-1011 | 275.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 508.59 | 101.06 |
| J-1012 | 295.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 508.04 | 92.17 |
| J-1013 | 295.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 506.64 | 91.57 |
| J-1014 | 277.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 506.64 | 99.35 |
| J-1015 | 315.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 521.36 | 89.28 |
| J-1016 | 295.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 521.36 | 97.93 |
| J-1017 | 295.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 521.36 | 97.93 |
| J-1018 | 270.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 505.03 | 101.69 |
| J-1019 | 310.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 504.85 | 84.30 |
| J-1020 | 340.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 504.84 | 71.32 |
| J-1021 | 335.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 504.84 | 73.48 |
| J-1022 | 315.00 | HIGH SERVICE AREA | 23.73 | Fixed | 23.73 | 504.83 | 82.13 |
| J-1023 | 315.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 504.82 | 82.13 |
| J-1024 | 310.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 504.82 | 84.29 |
| J-1025 | 410.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 505.02 | 41.11 |
| J-1026 | 410.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 505.02 | 41.11 |
| J-1027 | 370.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 505.03 | 58.42 |
| J-1028 | 385.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 505.05 | 51.94 |
| J-1029 | 375.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 505.07 | 56.28 |
| J-1030 | 300.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 505.01 | 88.70 |
| J-1031 | 300.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 505.01 | 88.70 |
| J-1032 | 310.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 505.01 | 84.37 |
| J-1033 | 295.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 505.01 | 90.86 |
| J-1034 | 275.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 505.01 | 99.52 |
| J-1035 | 350.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 505.02 | 67.07 |
| J-1036 | 285.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 501.64 | 93.73 |
| J-1037 | 285.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 501.52 | 93.68 |
| J-1038 | 272.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 500.98 | 99.07 |
| J-1039 | 390.00 | HIGH SERVICE AREA | 19.89 | Fixed | 19.89 | 501.06 | 48.05 |
| J-1040 | 450.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 502.88 | 22.88 |
| J-1041 | 450.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 502.99 | 22.93 |
| J-1042 | 410.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 503.17 | 40.31 |
| J-1043 | 385.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 503.34 | 51.20 |
| J-1044 | 337.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 503.60 | 72.08 |
| J-1045 | 355.00 | HIGH SERVICE AREA | 31.30 | Fixed | 31.30 | 500.66 | 63.02 |
| J-1046 | 335.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 503.79 | 73.03 |
| J-1047 | 335.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 506.12 | 74.04 |
| J-1048 | 270.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 502.80 | 100.72 |
| J-1049 | 285.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 502.78 | 94.22 |
| J-1050 | 325.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 502.29 | 76.70 |
| J-1051 | 330.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 502.28 | 74.54 |
| J-1052 | 350.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 502.30 | 65.89 |

# Scenario: MDD-Buildout
# Steady State Analysis
# Junction Report

| Label | Elevation (ft) | Zone | Base Flow (gpm) | Pattern | Demand (gpm) | Hydraulic Grade (ft) | Pressure (psi) |
|---|---|---|---|---|---|---|---|
| J-1053 | 312.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 502.34 | 82.35 |
| J-1054 | 310.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 502.01 | 83.07 |
| J-1055 | 305.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 502.02 | 85.24 |
| J-1056 | 295.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 501.72 | 89.44 |
| J-1057 | 320.00 | HIGH SERVICE AREA | 17.03 | Fixed | 17.03 | 500.34 | 78.02 |
| J-1058 | 320.00 | HIGH SERVICE AREA | 17.03 | Fixed | 17.03 | 500.34 | 78.02 |
| J-1059 | 320.00 | HIGH SERVICE AREA | 17.03 | Fixed | 17.03 | 500.35 | 78.03 |
| J-1060 | 340.00 | HIGH SERVICE AREA | 17.03 | Fixed | 17.03 | 499.88 | 69.17 |
| J-1061 | 345.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 503.06 | 68.39 |
| J-1062 | 355.00 | HIGH SERVICE AREA | 16.75 | Fixed | 16.75 | 500.52 | 62.96 |
| J-1063 | 345.00 | HIGH SERVICE AREA | 17.03 | Fixed | 17.03 | 499.96 | 67.05 |
| J-1064 | 296.00 | HIGH SERVICE AREA | 17.03 | Fixed | 17.03 | 499.92 | 88.23 |
| J-1065 | 290.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 499.98 | 90.85 |
| J-1066 | 266.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 499.89 | 101.19 |
| J-1067 | 262.00 | HIGH SERVICE AREA | 17.03 | Fixed | 17.03 | 499.75 | 102.86 |
| J-1068 | 285.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 500.06 | 93.05 |
| J-1069 | 295.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 499.93 | 88.66 |
| J-1070 | 285.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 499.90 | 92.98 |
| J-1071 | 260.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 499.88 | 103.78 |
| J-1072 | 290.00 | HIGH SERVICE AREA | 6.91 | Fixed | 6.91 | 500.58 | 91.11 |
| J-1073 | 295.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 500.98 | 89.12 |
| J-1074 | 265.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 504.82 | 103.76 |
| J-1075 | 377.00 | HIGH SERVICE AREA | 17.03 | Fixed | 17.03 | 500.51 | 53.44 |
| J-1076 | 380.00 | HIGH SERVICE AREA | 17.03 | Fixed | 17.03 | 500.51 | 52.14 |
| J-1077 | 320.00 | HIGH SERVICE AREA | 17.03 | Fixed | 17.03 | 500.42 | 78.06 |
| J-1078 | 325.00 | HIGH SERVICE AREA | 17.03 | Fixed | 17.03 | 500.45 | 75.91 |
| J-1079 | 380.00 | HIGH SERVICE AREA | 71.80 | Fixed | 71.80 | 500.36 | 52.08 |
| J-1080 | 360.00 | HIGH SERVICE AREA | 17.03 | Fixed | 17.03 | 500.42 | 60.75 |
| J-1081 | 350.00 | HIGH SERVICE AREA | 17.03 | Fixed | 17.03 | 499.92 | 64.86 |
| J-1082 | 270.00 | HIGH SERVICE AREA | 17.03 | Fixed | 17.03 | 499.88 | 99.46 |
| J-1083 | 400.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 499.58 | 43.08 |
| J-1084 | 325.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 499.59 | 75.54 |
| J-1085 | 325.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 499.42 | 75.46 |
| J-1086 | 370.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 499.46 | 56.01 |
| J-1087 | 415.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 499.44 | 36.53 |
| J-1088 | 420.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 499.44 | 34.37 |
| J-1089 | 328.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 499.20 | 74.07 |
| J-1090 | 355.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 499.44 | 62.49 |
| J-1091 | 324.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 499.23 | 75.81 |
| J-1092 | 305.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 499.19 | 84.02 |
| J-1093 | 330.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 499.16 | 73.19 |
| J-1094 | 330.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 499.16 | 73.19 |
| J-1095 | 306.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 499.18 | 83.58 |
| J-1096 | 393.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 499.17 | 45.93 |
| J-1097 | 330.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 499.19 | 73.20 |
| J-1098 | 270.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 521.43 | 108.78 |
| J-1099 | 307.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 504.82 | 85.59 |
| J-1100 | 440.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 502.98 | 27.25 |
| J-1101 | 350.00 | HIGH SERVICE AREA | 17.03 | Fixed | 17.03 | 500.36 | 65.05 |
| J-1102 | 305.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 521.37 | 93.61 |
| J-1103 | 285.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 505.29 | 95.31 |
| J-1104 | 420.00 | HIGH SERVICE AREA | 17.03 | Fixed | 17.03 | 502.34 | 35.63 |
| J-1105 | 307.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 521.36 | 92.74 |

# Scenario: MDD-Buildout
# Steady State Analysis
# Junction Report

| Label | Elevation (ft) | Zone | Base Flow (gpm) | Pattern | Demand (gpm) | Hydraulic Grade (ft) | Pressure (psi) |
|---|---|---|---|---|---|---|---|
| J-1106 | 303.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 521.36 | 94.47 |
| J-1107 | 332.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 521.36 | 81.93 |
| J-1108 | 277.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 521.36 | 105.72 |
| J-1109 | 305.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 521.36 | 93.61 |
| J-1110 | 320.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 521.35 | 87.12 |
| J-1111 | 306.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 505.01 | 86.10 |
| J-1112 | 307.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 505.01 | 85.67 |
| J-1113 | 323.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 505.01 | 78.75 |
| J-1114 | 431.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 505.02 | 32.03 |
| J-1115 | 340.50 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 510.51 | 73.56 |
| J-1116 | 425.50 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 510.51 | 36.78 |
| J-1117 | 435.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 510.50 | 32.67 |
| J-1118 | 319.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 502.78 | 79.51 |
| J-1119 | 332.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 502.77 | 73.89 |
| J-1120 | 384.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 502.30 | 51.18 |
| J-1121 | 400.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 499.92 | 43.23 |
| J-1122 | 443.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 502.99 | 25.95 |
| J-1123 | 327.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 501.71 | 75.59 |
| J-1124 | 264.00 | HIGH SERVICE AREA | 17.03 | Fixed | 17.03 | 499.45 | 101.87 |
| J-1125 | 272.00 | HIGH SERVICE AREA | 17.03 | Fixed | 17.03 | 499.40 | 98.39 |
| J-1126 | 278.00 | HIGH SERVICE AREA | 17.03 | Fixed | 17.03 | 499.40 | 95.79 |
| J-1127 | 282.00 | HIGH SERVICE AREA | 17.03 | Fixed | 17.03 | 499.39 | 94.06 |
| J-1128 | 282.00 | HIGH SERVICE AREA | 17.03 | Fixed | 17.03 | 499.42 | 94.07 |
| J-1129 | 284.00 | HIGH SERVICE AREA | 17.03 | Fixed | 17.03 | 478.01 | 83.94 |
| J-1130 | 306.00 | HIGH SERVICE AREA | 17.03 | Fixed | 17.03 | 478.06 | 74.44 |
| J-1131 | 312.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 499.18 | 80.99 |
| J-1132 | 372.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 499.23 | 55.04 |
| J-1133 | 418.00 | HIGH SERVICE AREA | 8.27 | Fixed | 8.27 | 499.43 | 35.23 |
| J-2000 | 306.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 481.53 | 75.94 |
| J-2001 | 331.30 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 481.51 | 64.99 |
| J-2002 | 331.30 | LOW SERVICE AREA | 45.46 | Fixed | 45.46 | 481.50 | 64.99 |
| J-2003 | 335.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 481.51 | 63.39 |
| J-2004 | 335.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 481.52 | 63.39 |
| J-2005 | 270.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 481.67 | 91.58 |
| J-2006 | 315.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 481.55 | 72.06 |
| J-2007 | 315.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 481.58 | 72.07 |
| J-2008 | 320.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 481.52 | 69.88 |
| J-2009 | 325.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 481.51 | 67.71 |
| J-2010 | 330.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 481.51 | 65.55 |
| J-2011 | 300.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 481.80 | 78.66 |
| J-2012 | 300.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 481.83 | 78.67 |
| J-2013 | 330.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 481.84 | 65.69 |
| J-2014 | 330.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 481.86 | 65.70 |
| J-2015 | 285.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 481.75 | 85.12 |
| J-2016 | 275.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 481.70 | 89.43 |
| J-2017 | 265.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 481.70 | 93.76 |
| J-2018 | 265.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 481.69 | 93.75 |
| J-2019 | 275.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 481.73 | 89.44 |
| J-2020 | 295.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 481.70 | 80.78 |
| J-2021 | 270.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 481.77 | 91.62 |
| J-2022 | 295.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 481.82 | 80.83 |
| J-2023 | 290.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 481.81 | 82.99 |
| J-2024 | 295.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 481.81 | 80.82 |

# Scenario: MDD-Buildout
# Steady State Analysis
# Junction Report

| Label | Elevation (ft) | Zone | Base Flow (gpm) | Pattern | Demand (gpm) | Hydraulic Grade (ft) | Pressure (psi) |
|---|---|---|---|---|---|---|---|
| J-2025 | 260.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 481.81 | 95.97 |
| J-2026 | 325.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 481.85 | 67.86 |
| J-2027 | 350.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 481.90 | 57.07 |
| J-2028 | 287.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 481.86 | 84.31 |
| J-2029 | 282.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 482.02 | 86.54 |
| J-2030 | 335.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 482.23 | 63.70 |
| J-2031 | 320.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 482.02 | 70.10 |
| J-2032 | 260.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 482.71 | 96.36 |
| J-2033 | 270.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 482.94 | 92.13 |
| J-2034 | 285.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 483.01 | 85.67 |
| J-2035 | 259.00 | LOW SERVICE AREA | 13.76 | Fixed | 13.76 | 479.80 | 95.53 |
| J-2036 | 265.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 480.64 | 93.30 |
| J-2037 | 305.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 480.64 | 75.99 |
| J-2038 | 265.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 481.44 | 93.64 |
| J-2039 | 280.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 481.47 | 87.17 |
| J-2040 | 270.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 481.48 | 91.50 |
| J-2041 | 275.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 481.49 | 89.34 |
| J-2042 | 305.00 | LOW SERVICE AREA | 8.50 | Fixed | 8.50 | 481.49 | 76.36 |
| J-2043 | 280.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 481.52 | 87.19 |
| J-2044 | 280.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 481.50 | 87.18 |
| J-2045 | 290.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 481.50 | 82.85 |
| J-2046 | 280.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 482.10 | 87.44 |
| J-2047 | 290.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 482.11 | 83.12 |
| J-2048 | 305.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 482.07 | 76.61 |
| J-2049 | 305.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 482.00 | 76.58 |
| J-2050 | 325.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 481.88 | 67.87 |
| J-2051 | 325.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 481.85 | 67.86 |
| J-2052 | 365.00 | LOW SERVICE AREA | 45.67 | Fixed | 45.67 | 479.81 | 49.67 |
| J-2053 | 275.00 | LOW SERVICE AREA | 13.76 | Fixed | 13.76 | 480.39 | 88.86 |
| J-2054 | 265.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 480.78 | 93.36 |
| J-2055 | 285.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 481.36 | 84.95 |
| J-2056 | 295.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 481.35 | 80.63 |
| J-2057 | 295.00 | LOW SERVICE AREA | 22.39 | Fixed | 22.39 | 481.26 | 80.59 |
| J-2058 | 285.00 | LOW SERVICE AREA | 13.76 | Fixed | 13.76 | 481.35 | 84.95 |
| J-2059 | 265.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 481.40 | 93.62 |
| J-2060 | 280.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 482.25 | 87.50 |
| J-2061 | 265.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 482.25 | 93.99 |
| J-2062 | 280.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 482.25 | 87.50 |
| J-2063 | 360.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 482.25 | 52.89 |
| J-2064 | 280.00 | LOW SERVICE AREA | 18.22 | Fixed | 18.22 | 481.07 | 87.00 |
| J-2065 | 275.00 | LOW SERVICE AREA | 13.76 | Fixed | 13.76 | 481.07 | 89.16 |
| J-2066 | 280.00 | LOW SERVICE AREA | 13.76 | Fixed | 13.76 | 481.07 | 86.99 |
| J-2067 | 280.00 | LOW SERVICE AREA | 13.76 | Fixed | 13.76 | 481.07 | 86.99 |
| J-2068 | 230.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 483.05 | 109.48 |
| J-2069 | 215.00 | LOW SERVICE AREA | 7.89 | Fixed | 7.89 | 482.90 | 115.91 |
| J-2070 | 200.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 482.90 | 122.40 |
| J-2071 | 200.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 482.89 | 122.39 |
| J-2072 | 288.00 | LOW SERVICE AREA | 16.37 | Fixed | 16.37 | 478.25 | 82.31 |
| J-2073 | 275.00 | LOW SERVICE AREA | 26.21 | Fixed | 26.21 | 478.07 | 87.86 |
| J-2074 | 285.00 | LOW SERVICE AREA | 13.76 | Fixed | 13.76 | 478.06 | 83.53 |
| J-2075 | 270.00 | LOW SERVICE AREA | 13.76 | Fixed | 13.76 | 478.07 | 90.02 |
| J-2076 | 295.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 478.15 | 79.24 |
| J-2077 | 295.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 478.15 | 79.24 |

# Scenario: MDD-Buildout
# Steady State Analysis
# Junction Report

| Label | Elevation (ft) | Zone | Base Flow (gpm) | Pattern | Demand (gpm) | Hydraulic Grade (ft) | Pressure (psi) |
|---|---|---|---|---|---|---|---|
| J-2078 | 290.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 478.15 | 81.40 |
| J-2079 | 393.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 478.61 | 37.04 |
| J-2080 | 292.00 | LOW SERVICE AREA | 13.76 | Fixed | 13.76 | 478.47 | 80.68 |
| J-2081 | 276.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 479.44 | 88.02 |
| J-2082 | 320.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 479.43 | 68.98 |
| J-2083 | 350.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 478.63 | 55.65 |
| J-2084 | 370.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 478.65 | 47.01 |
| J-2085 | 350.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 478.67 | 55.67 |
| J-2086 | 330.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 478.73 | 64.35 |
| J-2087 | 320.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 478.87 | 68.74 |
| J-2088 | 340.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 479.30 | 60.27 |
| J-2089 | 315.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 480.05 | 71.41 |
| J-2090 | 270.00 | LOW SERVICE AREA | 13.76 | Fixed | 13.76 | 479.80 | 90.77 |
| J-2091 | 280.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 481.39 | 87.13 |
| J-2092 | 410.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 481.44 | 30.91 |
| J-2093 | 415.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 481.22 | 28.65 |
| J-2094 | 400.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 480.81 | 34.96 |
| J-2095 | 400.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 481.41 | 35.22 |
| J-2096 | 285.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 477.74 | 83.39 |
| J-2097 | 287.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 477.78 | 82.54 |
| J-2098 | 277.50 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 477.73 | 86.63 |
| J-2099 | 285.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 477.72 | 83.38 |
| J-2100 | 275.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 477.72 | 87.71 |
| J-2101 | 280.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 477.71 | 85.54 |
| J-2102 | 264.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 477.72 | 92.47 |
| J-2103 | 265.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 477.72 | 92.03 |
| J-2104 | 280.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 477.71 | 85.54 |
| J-2105 | 260.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 477.71 | 94.19 |
| J-2106 | 255.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 477.71 | 96.35 |
| J-2107 | 280.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 477.74 | 85.55 |
| J-2108 | 280.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 477.74 | 85.55 |
| J-2109 | 300.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 477.87 | 76.96 |
| J-2110 | 370.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 477.87 | 46.67 |
| J-2111 | 318.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 477.84 | 69.16 |
| J-2112 | 315.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 477.87 | 70.47 |
| J-2113 | 368.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 477.88 | 47.54 |
| J-2114 | 340.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 477.89 | 59.66 |
| J-2115 | 300.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 477.72 | 76.89 |
| J-2116 | 300.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 477.89 | 76.97 |
| J-2117 | 310.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 477.90 | 72.64 |
| J-2118 | 287.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 477.92 | 82.60 |
| J-2119 | 271.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 478.12 | 89.61 |
| J-2120 | 262.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 478.16 | 93.52 |
| J-2121 | 255.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 478.06 | 96.51 |
| J-2122 | 265.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 478.03 | 92.17 |
| J-2123 | 265.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 478.03 | 92.17 |
| J-2124 | 255.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 478.06 | 96.51 |
| J-2125 | 265.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 478.03 | 92.17 |
| J-2126 | 255.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 478.06 | 96.51 |
| J-2127 | 250.00 | LOW SERVICE AREA | 18.17 | Fixed | 18.17 | 481.40 | 100.11 |
| J-2128 | 305.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 478.20 | 74.94 |
| J-2129 | 315.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 478.33 | 70.66 |
| J-2130 | 300.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 478.34 | 77.16 |

# Scenario: MDD-Buildout
# Steady State Analysis
# Junction Report

| Label | Elevation (ft) | Zone | Base Flow (gpm) | Pattern | Demand (gpm) | Hydraulic Grade (ft) | Pressure (psi) |
|---|---|---|---|---|---|---|---|
| J-2131 | 320.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 478.39 | 68.53 |
| J-2132 | 320.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 478.87 | 68.74 |
| J-2133 | 345.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 479.22 | 58.07 |
| J-2134 | 285.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 478.20 | 83.59 |
| J-2135 | 295.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 478.30 | 79.31 |
| J-2136 | 297.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 478.31 | 78.44 |
| J-2137 | 260.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 478.27 | 94.44 |
| J-2138 | 270.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 478.37 | 90.15 |
| J-2139 | 250.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 478.40 | 98.82 |
| J-2140 | 250.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 478.38 | 98.81 |
| J-2141 | 280.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 478.38 | 85.83 |
| J-2142 | 300.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 478.38 | 77.18 |
| J-2143 | 295.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 478.41 | 79.35 |
| J-2144 | 320.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 478.60 | 68.62 |
| J-2145 | 285.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 478.53 | 83.73 |
| J-2146 | 320.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 478.52 | 68.58 |
| J-2147 | 285.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 478.51 | 83.72 |
| J-2148 | 250.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 478.51 | 98.87 |
| J-2149 | 245.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 478.50 | 101.02 |
| J-2150 | 260.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 478.51 | 94.54 |
| J-2151 | 240.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 478.50 | 103.19 |
| J-2152 | 245.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 478.49 | 101.02 |
| J-2153 | 260.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 483.71 | 96.79 |
| J-2154 | 280.00 | LOW SERVICE AREA | 10.09 | Fixed | 10.09 | 483.31 | 87.96 |
| J-2155 | 295.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 483.23 | 81.44 |
| J-2156 | 344.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 483.13 | 60.20 |
| J-2157 | 393.00 | LOW SERVICE AREA | 21.00 | Fixed | 21.00 | 483.13 | 38.99 |
| J-2158 | 384.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 483.13 | 42.89 |
| J-2159 | 307.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 481.53 | 75.51 |
| J-2160 | 263.50 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 477.72 | 92.68 |
| J-2161 | 322.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 478.49 | 67.71 |
| J-2162 | 315.50 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 478.70 | 70.61 |
| J-2163 | 272.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 477.96 | 89.11 |
| J-2164 | 295.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 478.00 | 79.18 |
| J-2165 | 265.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 478.88 | 92.54 |
| J-2166 | 272.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 478.88 | 89.51 |
| J-2167 | 341.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 479.95 | 60.12 |
| J-2168 | 274.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 477.71 | 88.14 |
| J-2169 | 283.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 477.71 | 84.24 |
| J-2170 | 285.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 477.71 | 83.38 |
| J-2171 | 322.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 477.71 | 67.37 |
| J-2172 | 300.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 477.73 | 76.90 |
| J-2173 | 288.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 477.90 | 82.16 |
| J-2174 | 290.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 477.92 | 81.30 |
| J-2175 | 283.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 477.72 | 84.24 |
| J-2176 | 347.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 480.27 | 57.66 |
| J-2177 | 346.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 480.26 | 58.09 |
| J-2178 | 355.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 480.10 | 54.13 |
| J-2179 | 339.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 480.10 | 61.05 |
| J-2180 | 405.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 481.42 | 33.06 |
| J-2181 | 386.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 481.42 | 41.28 |
| J-2182 | 402.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 481.41 | 34.36 |
| J-2183 | 396.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 481.41 | 36.95 |


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# Scenario: MDD-Buildout
# Steady State Analysis
# Junction Report

| Label | Elevation (ft) | Zone | Base Flow (gpm) | Pattern | Demand (gpm) | Hydraulic Grade (ft) | Pressure (psi) |
|---|---|---|---|---|---|---|---|
| J-2184 | 219.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 483.13 | 114.28 |
| J-2185 | 221.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 482.98 | 113.35 |
| J-2186 | 218.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 482.98 | 114.64 |
| J-2187 | 215.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 482.88 | 115.90 |
| J-2188 | 219.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 482.88 | 114.17 |
| J-2189 | 232.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 482.87 | 108.54 |
| J-2190 | 270.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 482.87 | 92.10 |
| J-2191 | 284.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 481.79 | 85.58 |
| J-2192 | 263.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 481.79 | 94.66 |
| J-2193 | 342.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 481.50 | 60.35 |
| J-2194 | 295.00 | LOW SERVICE AREA | 0.00 | Fixed | 0.00 | 481.27 | 80.59 |
| J-2195 | 285.00 | LOW SERVICE AREA | 0.00 | Fixed | 0.00 | 481.35 | 84.95 |
| J-2291 | 275.00 | LOW SERVICE AREA | 5.01 | Fixed | 5.01 | 481.53 | 89.36 |


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# Scenario: MDD-Buildout
# Steady State Analysis
# Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-1000 | 12.0 | J-1102 | J-1015 | 1,245 | 33.09 | 0.01 | 0.01 | 0.09 | 120.0 |
| P-1001 | 12.0 | J-1007 | J-1102 | 1,005 | 41.37 | 0.01 | 0.01 | 0.12 | 120.0 |
| P-1003 | 12.0 | J-1008 | J-1009 | 300 | 8.27 | 0.00 | 0.00 | 0.02 | 100.0 |
| P-1004 | 12.0 | J-1007 | J-1008 | 400 | 57.91 | 0.02 | 0.01 | 0.16 | 100.0 |
| P-1005 | 12.0 | J-1098 | J-1007 | 850 | 107.55 | 0.06 | 0.05 | 0.31 | 110.0 |
| P-1006 | 12.0 | J-1006 | J-1098 | 800 | -1,127.43 | 4.31 | 3.45 | 3.20 | 110.0 |
| P-1007 | 12.0 | J-1007 | J-1012 | 4,600 | 0.00 | 0.00 | 0.00 | 0.00 | 130.0 |
| P-1008 | 8.0 | J-1030 | J-1031 | 1,650 | -1.24 | 0.00 | 0.00 | 0.01 | 110.0 |
| P-1010 | 12.0 | J-1016 | J-1017 | 1,800 | 16.55 | 0.00 | 0.00 | 0.05 | 120.0 |
| P-1012 | 8.0 | J-1027 | J-1030 | 2,200 | 15.31 | 0.01 | 0.02 | 0.10 | 110.0 |
| P-1013 | 8.0 | J-1034 | J-1033 | 1,350 | -3.82 | 0.00 | 0.00 | 0.02 | 110.0 |
| P-1014 | 12.0 | J-1033 | J-1034 | 1,050 | 4.45 | 0.00 | 0.00 | 0.01 | 110.0 |
| P-1015 | 12.0 | J-1032 | J-1033 | 500 | 10.81 | 0.00 | 0.00 | 0.03 | 110.0 |
| P-1016 | 12.0 | J-1032 | J-1027 | 1,500 | -45.14 | 0.01 | 0.02 | 0.13 | 110.0 |
| P-1017 | 8.0 | J-1033 | J-1035 | 2,100 | -5.73 | 0.00 | 0.00 | 0.04 | 120.0 |
| P-1018 | 12.0 | J-1025 | PRV-4 | 1,183 | 0.00 | 0.00 | 0.00 | 0.00 | 110.0 |
| P-1019 | 12.0 | J-1026 | J-1025 | 450 | 16.55 | 0.00 | 0.00 | 0.05 | 110.0 |
| P-1020 | 12.0 | J-1026 | J-1027 | 1,100 | -38.83 | 0.01 | 0.01 | 0.11 | 110.0 |
| P-1021 | 8.0 | J-1035 | J-1026 | 600 | -14.01 | 0.01 | 0.00 | 0.09 | 120.0 |
| P-1022 | 10.0 | J-1029 | J-1028 | 2,500 | 28.29 | 0.01 | 0.03 | 0.12 | 110.0 |
| P-1023 | 12.0 | J-1028 | J-1027 | 250 | 107.55 | 0.06 | 0.01 | 0.31 | 110.0 |
| P-1024 | 12.0 | J-1029 | J-1028 | 750 | 87.54 | 0.04 | 0.03 | 0.25 | 110.0 |
| P-1025 | 12.0 | J-1103 | J-1029 | 3,500 | 124.10 | 0.06 | 0.22 | 0.35 | 120.0 |
| P-1026 | 10.0 | J-1019 | J-1018 | 1,500 | -81.64 | 0.12 | 0.18 | 0.33 | 90.0 |
| P-1027 | 12.0 | J-1011 | J-1005 | 2,200 | -522.66 | 0.88 | 1.94 | 1.48 | 120.0 |
| P-1028 | 10.0 | J-1013 | J-1014 | 1,950 | 8.27 | 0.00 | 0.00 | 0.03 | 100.0 |
| P-1029 | 12.0 | J-1013 | J-1012 | 2,000 | -422.95 | 0.70 | 1.40 | 1.20 | 110.0 |
| P-1030 | 10.0 | J-1103 | J-1013 | 1,000 | -406.40 | 1.35 | 1.35 | 1.66 | 120.0 |
| P-1031 | 10.0 | J-1018 | J-1103 | 400 | -274.03 | 0.65 | 0.26 | 1.12 | 120.0 |
| P-1032 | 8.0 | J-1053 | J-1018 | 2,080 | -184.12 | 1.29 | 2.69 | 1.18 | 100.0 |
| P-1033 | 8.0 | J-1054 | J-1036 | 500 | 150.42 | 0.75 | 0.37 | 0.96 | 110.0 |
| P-1034 | 8.0 | J-1036 | J-1037 | 650 | 69.54 | 0.18 | 0.12 | 0.44 | 110.0 |
| P-1035 | 8.0 | J-1037 | J-1036 | 600 | -72.61 | 0.19 | 0.12 | 0.46 | 110.0 |
| P-1036 | 8.0 | J-1053 | J-1054 | 400 | 144.50 | 0.83 | 0.33 | 0.92 | 100.0 |
| P-1037 | 8.0 | J-1052 | J-1053 | 800 | -31.35 | 0.05 | 0.04 | 0.20 | 100.0 |
| P-1038 | 8.0 | J-1050 | J-1052 | 1,200 | -14.80 | 0.01 | 0.01 | 0.09 | 100.0 |
| P-1039 | 12.0 | J-1011 | J-1012 | 750 | 431.22 | 0.73 | 0.55 | 1.22 | 110.0 |
| P-1040 | 12.0 | J-1010 | J-1011 | 2,200 | -83.17 | 0.03 | 0.08 | 0.24 | 110.0 |
| P-1041 | 12.0 | J-1047 | J-1010 | 1,800 | -596.93 | 1.33 | 2.39 | 1.69 | 110.0 |
| P-1042 | 8.0 | J-1054 | J-1055 | 500 | -14.20 | 0.01 | 0.01 | 0.09 | 100.0 |
| P-1043 | 12.0 | J-1005 | J-1006 | 1,750 | -1,119.16 | 4.25 | 7.44 | 3.17 | 110.0 |
| P-1044 | 12.0 | J-1010 | J-1005 | 1,950 | -522.04 | 1.04 | 2.02 | 1.48 | 110.0 |
| P-1045 | 12.0 | J-1001 | J-1004 | 1,500 | -6.40 | 0.00 | 0.00 | 0.02 | 100.0 |
| P-1046 | 12.0 | J-1002 | J-1003 | 1,900 | -25.11 | 0.00 | 0.01 | 0.07 | 100.0 |
| P-1047 | 12.0 | J-1001 | J-1002 | 1,100 | -8.57 | 0.00 | 0.00 | 0.02 | 100.0 |
| P-1048 | 8.0 | J-1000 | J-1001 | 975 | -6.70 | 0.00 | 0.00 | 0.04 | 100.0 |
| P-1049 | 12.0 | J-1004 | J-1000 | 1,400 | 18.12 | 0.00 | 0.00 | 0.05 | 120.0 |
| P-1050 | 12.0 | J-1003 | J-1004 | 1,200 | 32.80 | 0.01 | 0.01 | 0.09 | 100.0 |
| P-1051 | 12.0 | J-1005 | J-1003 | 430 | 66.18 | 0.03 | 0.01 | 0.19 | 100.0 |
| P-1052 | 12.0 | J-1100 | T-3 | 200 | -153.36 | 0.09 | 0.02 | 0.44 | 120.0 |
| P-1053 | 12.0 | J-1100 | J-1040 | 200 | 355.58 | 0.51 | 0.10 | 1.01 | 110.0 |

# Scenario: MDD-Buildout
# Steady State Analysis
# Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-1054 | 12.0 | J-1042 | J-1100 | 1,000 | 210.50 | 0.19 | 0.19 | 0.60 | 110.0 |
| P-1055 | 8.0 | J-1044 | J-1046 | 350 | -114.11 | 0.53 | 0.19 | 0.73 | 100.0 |
| P-1056 | 8.0 | J-1046 | J-1048 | 1,360 | 134.78 | 0.73 | 0.99 | 0.86 | 100.0 |
| P-1057 | 12.0 | J-1046 | J-1047 | 1,800 | -588.66 | 1.29 | 2.33 | 1.67 | 110.0 |
| P-1058 | 12.0 | J-1044 | J-1046 | 350 | -331.50 | 0.53 | 0.19 | 0.94 | 100.0 |
| P-1059 | 8.0 | J-1044 | J-1061 | 1,100 | 109.03 | 0.49 | 0.54 | 0.70 | 100.0 |
| P-1060 | 12.0 | J-1043 | J-1044 | 600 | -328.30 | 0.44 | 0.26 | 0.93 | 110.0 |
| P-1061 | 12.0 | J-1043 | J-1042 | 800 | 218.77 | 0.21 | 0.17 | 0.62 | 110.0 |
| P-1062 | 8.0 | J-1041 | J-1043 | 1,150 | -101.26 | 0.30 | 0.35 | 0.65 | 120.0 |
| P-1063 | 8.0 | J-1040 | J-1041 | 500 | -84.71 | 0.22 | 0.11 | 0.54 | 120.0 |
| P-1064 | 12.0 | J-1104 | J-1040 | 615 | -432.02 | 0.87 | 0.54 | 1.23 | 100.0 |
| P-1065 | 12.0 | J-1039 | J-1104 | 1,585 | -414.99 | 0.81 | 1.28 | 1.18 | 100.0 |
| P-1066 | 12.0 | J-1101 | J-1079 | 1,326 | -35.89 | 0.01 | 0.01 | 0.10 | 120.0 |
| P-1067 | 12.0 | J-1059 | J-1101 | 1,774 | -18.86 | 0.00 | 0.00 | 0.05 | 120.0 |
| P-1068 | 8.0 | J-1057 | J-1058 | 1,350 | -5.05 | 0.00 | 0.00 | 0.03 | 120.0 |
| P-1069 | 12.0 | J-1058 | J-1057 | 1,870 | 11.98 | 0.00 | 0.00 | 0.03 | 120.0 |
| P-1070 | 8.0 | J-1050 | J-1051 | 1,250 | 8.27 | 0.00 | 0.00 | 0.05 | 120.0 |
| P-1071 | 8.0 | J-1048 | J-1050 | 1,200 | 101.68 | 0.43 | 0.52 | 0.65 | 100.0 |
| P-1072 | 8.0 | J-1048 | J-1049 | 800 | 24.82 | 0.03 | 0.03 | 0.16 | 100.0 |
| P-1073 | 6.0 | J-1061 | J-1045 | 1,400 | 100.76 | 1.72 | 2.41 | 1.14 | 100.0 |
| P-1074 | 12.0 | J-1045 | J-1039 | 550 | -395.11 | 0.74 | 0.41 | 1.12 | 100.0 |
| P-1075 | 12.0 | J-1045 | J-1058 | 2,800 | 144.26 | 0.11 | 0.32 | 0.41 | 100.0 |
| P-1076 | 12.0 | J-1062 | J-1045 | 280 | -320.31 | 0.50 | 0.14 | 0.91 | 100.0 |
| P-1077 | 12.0 | J-1075 | J-1076 | 500 | 17.03 | 0.00 | 0.00 | 0.05 | 110.0 |
| P-1078 | 12.0 | J-1062 | J-1075 | 500 | 34.05 | 0.01 | 0.00 | 0.10 | 100.0 |
| P-1079 | 8.0 | J-1077 | J-1080 | 200 | 17.03 | 0.01 | 0.00 | 0.11 | 120.0 |
| P-1080 | 12.0 | J-1062 | J-1059 | 2,800 | 110.74 | 0.06 | 0.16 | 0.31 | 110.0 |
| P-1081 | 12.0 | J-1078 | J-1062 | 500 | -158.77 | 0.14 | 0.07 | 0.45 | 100.0 |
| P-1082 | 12.0 | J-1077 | J-1078 | 350 | -141.74 | 0.08 | 0.03 | 0.40 | 120.0 |
| P-1083 | 12.0 | J-1079 | J-1077 | 1,200 | -107.69 | 0.05 | 0.06 | 0.31 | 120.0 |
| P-1084 | 12.0 | J-1058 | J-1059 | 300 | -112.57 | 0.05 | 0.02 | 0.32 | 120.0 |
| P-1085 | 12.0 | J-1063 | J-1058 | 1,750 | -222.78 | 0.21 | 0.37 | 0.63 | 110.0 |
| P-1086 | 12.0 | J-1093 | J-1094 | 1,250 | 8.27 | 0.00 | 0.00 | 0.02 | 110.0 |
| P-1087 | 6.0 | J-1092 | J-1093 | 1,600 | 8.12 | 0.02 | 0.03 | 0.09 | 100.0 |
| P-1088 | 8.0 | J-1093 | J-1096 | 1,100 | -8.43 | 0.00 | 0.00 | 0.05 | 110.0 |
| P-1089 | 8.0 | J-1096 | J-1097 | 2,000 | -16.70 | 0.01 | 0.03 | 0.11 | 110.0 |
| P-1090 | 8.0 | J-1092 | J-1097 | 800 | -8.49 | 0.00 | 0.00 | 0.05 | 100.0 |
| P-1091 | 8.0 | J-1089 | J-1092 | 2,000 | 7.90 | 0.00 | 0.01 | 0.05 | 100.0 |
| P-1092 | 8.0 | J-1097 | J-1091 | 650 | -33.47 | 0.06 | 0.04 | 0.21 | 100.0 |
| P-1093 | 8.0 | J-1091 | J-1089 | 600 | 32.72 | 0.05 | 0.03 | 0.21 | 100.0 |
| P-1094 | 8.0 | J-1095 | J-1089 | 840 | -16.55 | 0.01 | 0.01 | 0.11 | 100.0 |
| P-1095 | 6.0 | J-1095 | PRV-2 | 2,322 | 0.00 | 0.00 | 0.00 | 0.00 | 110.0 |
| P-1096 | 8.0 | J-1084 | J-1085 | 1,800 | 45.27 | 0.10 | 0.17 | 0.29 | 100.0 |
| P-1098 | 8.0 | J-1084 | J-1083 | 900 | 17.12 | 0.01 | 0.01 | 0.11 | 110.0 |
| P-1099 | 8.0 | J-1083 | J-1082 | 1,350 | -78.25 | 0.22 | 0.30 | 0.50 | 110.0 |
| P-1100 | 10.0 | J-1086 | J-1083 | 1,150 | -87.10 | 0.11 | 0.13 | 0.36 | 100.0 |
| P-1101 | 10.0 | J-1086 | J-1090 | 515 | 48.90 | 0.04 | 0.02 | 0.20 | 100.0 |
| P-1102 | 10.0 | J-1087 | J-1086 | 1,100 | -29.92 | 0.01 | 0.01 | 0.12 | 110.0 |
| P-1103 | 10.0 | J-1085 | J-1090 | 500 | -45.73 | 0.03 | 0.02 | 0.19 | 100.0 |
| P-1104 | 12.0 | J-1081 | J-1121 | 690 | 8.27 | 0.00 | 0.00 | 0.02 | 120.0 |
| P-1105 | 8.0 | J-1060 | J-1084 | 1,300 | 70.66 | 0.22 | 0.29 | 0.45 | 100.0 |

# Scenario: MDD-Buildout
# Steady State Analysis
# Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-1106 | 10.0 | J-1088 | J-1087 | 700 | -21.65 | 0.01 | 0.00 | 0.09 | 110.0 |
| P-1107 | 8.0 | J-1091 | J-1085 | 650 | -82.73 | 0.29 | 0.19 | 0.53 | 100.0 |
| P-1108 | 10.0 | J-1090 | J-1088 | 1,100 | -5.10 | 0.00 | 0.00 | 0.02 | 110.0 |
| P-1109 | 8.0 | J-1064 | J-1060 | 300 | 70.16 | 0.13 | 0.04 | 0.45 | 130.0 |
| P-1110 | 8.0 | J-1068 | J-1069 | 1,450 | 44.80 | 0.09 | 0.14 | 0.29 | 100.0 |
| P-1111 | 8.0 | J-1038 | J-1073 | 1,400 | 3.83 | 0.00 | 0.00 | 0.02 | 110.0 |
| P-1112 | 8.0 | J-1068 | J-1072 | 950 | -114.87 | 0.54 | 0.51 | 0.73 | 100.0 |
| P-1113 | 8.0 | J-1065 | J-1068 | 500 | -61.79 | 0.17 | 0.09 | 0.39 | 100.0 |
| P-1114 | 6.0 | J-1073 | J-1065 | 1,700 | 56.48 | 0.59 | 1.00 | 0.64 | 100.0 |
| P-1115 | 6.0 | J-1056 | J-1073 | 1,100 | 60.92 | 0.68 | 0.74 | 0.69 | 100.0 |
| P-1116 | 8.0 | J-1065 | J-1064 | 250 | 74.55 | 0.24 | 0.06 | 0.48 | 100.0 |
| P-1117 | 8.0 | J-1066 | J-1065 | 1,400 | -35.45 | 0.06 | 0.09 | 0.23 | 100.0 |
| P-1118 | 8.0 | J-1064 | J-1067 | 1,250 | 55.01 | 0.14 | 0.17 | 0.35 | 100.0 |
| P-1119 | 12.0 | J-1063 | J-1064 | 1,910 | 67.64 | 0.02 | 0.04 | 0.19 | 110.0 |
| P-1120 | 12.0 | J-1081 | J-1063 | 450 | -138.11 | 0.09 | 0.04 | 0.39 | 110.0 |
| P-1121 | 12.0 | J-1082 | J-1081 | 700 | -112.81 | 0.06 | 0.04 | 0.32 | 110.0 |
| P-1122 | 12.0 | J-1082 | J-1060 | 1,400 | 17.53 | 0.00 | 0.00 | 0.05 | 110.0 |
| P-1123 | 6.0 | J-1069 | J-1070 | 500 | 16.55 | 0.06 | 0.03 | 0.19 | 100.0 |
| P-1124 | 6.0 | J-1069 | J-1066 | 400 | 19.98 | 0.09 | 0.03 | 0.23 | 100.0 |
| P-1125 | 6.0 | J-1067 | J-1066 | 350 | -47.16 | 0.42 | 0.15 | 0.54 | 100.0 |
| P-1126 | 6.0 | J-1070 | J-1071 | 1,000 | 8.27 | 0.02 | 0.02 | 0.09 | 100.0 |
| P-1127 | 8.0 | J-1038 | J-1037 | 900 | -133.88 | 0.60 | 0.54 | 0.85 | 110.0 |
| P-1128 | 8.0 | J-1072 | J-1038 | 800 | -121.77 | 0.50 | 0.40 | 0.78 | 110.0 |
| P-1129 | 8.0 | J-1055 | J-1050 | 650 | -99.94 | 0.42 | 0.27 | 0.64 | 100.0 |
| P-1130 | 8.0 | J-1055 | J-1056 | 1,120 | 77.47 | 0.26 | 0.29 | 0.49 | 100.0 |
| P-1131 | 10.0 | J-1019 | J-1022 | 500 | 50.28 | 0.05 | 0.02 | 0.21 | 90.0 |
| P-1132 | 8.0 | J-1020 | J-1019 | 520 | -23.09 | 0.03 | 0.01 | 0.15 | 100.0 |
| P-1133 | 8.0 | J-1021 | J-1020 | 800 | -6.27 | 0.00 | 0.00 | 0.04 | 100.0 |
| P-1134 | 6.0 | J-1022 | J-1021 | 700 | -6.54 | 0.01 | 0.01 | 0.07 | 100.0 |
| P-1135 | 10.0 | J-1023 | J-1022 | 500 | -33.09 | 0.02 | 0.01 | 0.14 | 90.0 |
| P-1136 | 8.0 | J-1020 | J-1021 | 450 | 8.55 | 0.00 | 0.00 | 0.05 | 100.0 |
| P-1137 | 8.0 | J-1074 | J-1024 | 800 | -1.62 | 0.00 | 0.00 | 0.01 | 100.0 |
| P-1138 | 8.0 | J-1023 | J-1074 | 900 | 6.66 | 0.00 | 0.00 | 0.04 | 100.0 |
| P-1139 | 10.0 | J-1024 | J-1023 | 320 | -18.16 | 0.01 | 0.00 | 0.07 | 90.0 |
| P-1140 | 10.0 | J-1024 | J-1099 | 330 | 8.27 | 0.00 | 0.00 | 0.03 | 90.0 |
| P-1141 | 10.0 | J-1099 | PRV-3 | 5 | 0.00 | 0.00 | 0.00 | 0.00 | 90.0 |
| P-1142 | 8.0 | J-1092 | PRV-1 | 390 | 0.00 | 0.00 | 0.00 | 0.00 | 100.0 |
| P-1143 | 12.0 | J-1015 | J-1105 | 825 | 24.82 | 0.00 | 0.00 | 0.07 | 130.0 |
| P-1144 | 12.0 | J-1105 | J-1106 | 715 | 8.27 | 0.00 | 0.00 | 0.02 | 130.0 |
| P-1145 | 8.0 | J-1105 | J-1107 | 928 | 8.27 | 0.00 | 0.00 | 0.05 | 130.0 |
| P-1146 | 12.0 | J-1008 | J-1108 | 1,077 | 41.37 | 0.01 | 0.01 | 0.12 | 120.0 |
| P-1147 | 8.0 | J-1108 | J-1109 | 757 | 8.27 | 0.00 | 0.00 | 0.05 | 130.0 |
| P-1148 | 8.0 | J-1017 | J-1110 | 1,053 | 8.27 | 0.00 | 0.00 | 0.05 | 130.0 |
| P-1149 | 12.0 | J-1111 | J-1032 | 1,442 | -26.06 | 0.00 | 0.01 | 0.07 | 110.0 |
| P-1150 | 8.0 | J-1111 | J-1112 | 573 | 8.27 | 0.00 | 0.00 | 0.05 | 130.0 |
| P-1151 | 12.0 | J-1031 | J-1111 | 1,858 | -9.51 | 0.00 | 0.00 | 0.03 | 110.0 |
| P-1152 | 8.0 | J-1030 | J-1113 | 439 | 8.27 | 0.00 | 0.00 | 0.05 | 130.0 |
| P-1153 | 8.0 | J-1025 | J-1114 | 459 | 8.27 | 0.00 | 0.00 | 0.05 | 130.0 |
| P-1154 | 12.0 | J-1002 | J-1115 | 2,056 | 8.27 | 0.00 | 0.00 | 0.02 | 130.0 |
| P-1155 | 8.0 | J-1000 | J-1116 | 920 | 8.27 | 0.00 | 0.00 | 0.05 | 130.0 |
| P-1156 | 8.0 | J-1000 | J-1117 | 1,514 | 8.27 | 0.00 | 0.00 | 0.05 | 130.0 |

# Scenario: MDD-Buildout
# Steady State Analysis
# Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-1157 | 8.0 | J-1049 | J-1118 | 828 | 8.27 | 0.00 | 0.00 | 0.05 | 130.0 |
| P-1158 | 8.0 | J-1049 | J-1119 | 1,231 | 8.27 | 0.00 | 0.00 | 0.05 | 130.0 |
| P-1159 | 10.0 | J-1052 | J-1120 | 698 | 8.27 | 0.00 | 0.00 | 0.03 | 130.0 |
| P-1161 | 6.0 | J-1041 | J-1122 | 338 | 8.27 | 0.01 | 0.00 | 0.09 | 130.0 |
| P-1162 | 6.0 | J-1056 | J-1123 | 932 | 8.27 | 0.01 | 0.01 | 0.09 | 110.0 |
| P-1163 | 6.0 | J-1067 | J-1124 | 388 | 85.13 | 0.77 | 0.30 | 0.97 | 130.0 |
| P-1164 | 6.0 | J-1124 | J-1125 | 150 | 51.08 | 0.30 | 0.05 | 0.58 | 130.0 |
| P-1165 | 6.0 | J-1125 | J-1126 | 100 | 17.03 | 0.04 | 0.00 | 0.19 | 130.0 |
| P-1166 | 6.0 | J-1125 | J-1127 | 224 | 17.03 | 0.04 | 0.01 | 0.19 | 130.0 |
| P-1167 | 6.0 | J-1124 | J-1128 | 747 | 17.03 | 0.04 | 0.03 | 0.19 | 130.0 |
| P-1168 | 8.0 | J-1095 | J-1131 | 773 | 8.27 | 0.00 | 0.00 | 0.05 | 130.0 |
| P-1169 | 8.0 | J-1091 | J-1132 | 885 | 8.27 | 0.00 | 0.00 | 0.05 | 130.0 |
| P-1170 | 8.0 | J-1088 | J-1133 | 1,016 | 8.27 | 0.00 | 0.00 | 0.05 | 130.0 |
| P-2000 | 6.0 | J-2017 | J-2018 | 1,600 | 5.01 | 0.01 | 0.01 | 0.06 | 100.0 |
| P-2001 | 8.0 | J-2016 | J-2019 | 650 | -29.62 | 0.04 | 0.03 | 0.19 | 100.0 |
| P-2002 | 8.0 | J-2016 | J-2017 | 750 | 10.02 | 0.01 | 0.00 | 0.06 | 100.0 |
| P-2003 | 12.0 | J-2020 | J-2016 | 650 | -14.60 | 0.00 | 0.00 | 0.04 | 110.0 |
| P-2004 | 8.0 | J-2015 | J-2021 | 550 | -27.23 | 0.04 | 0.02 | 0.17 | 100.0 |
| P-2005 | 6.0 | J-2020 | J-2015 | 450 | -19.98 | 0.10 | 0.05 | 0.23 | 90.0 |
| P-2006 | 8.0 | J-2019 | J-2015 | 300 | -34.63 | 0.06 | 0.02 | 0.22 | 100.0 |
| P-2007 | 6.0 | J-2005 | J-2020 | 300 | -29.57 | 0.11 | 0.03 | 0.34 | 130.0 |
| P-2008 | 6.0 | J-2191 | J-2192 | 1,093 | 5.01 | 0.00 | 0.00 | 0.06 | 130.0 |
| P-2009 | 8.0 | J-2015 | J-2014 | 2,160 | -32.39 | 0.05 | 0.11 | 0.21 | 100.0 |
| P-2010 | 6.0 | J-2004 | J-2005 | 1,200 | -24.56 | 0.13 | 0.15 | 0.28 | 100.0 |
| P-2011 | 8.0 | J-207 | T-2 | 223 | -101.39 | 0.26 | 0.06 | 0.65 | 130.0 |
| P-2012 | 8.0 | J-2025 | J-2024 | 2,400 | -4.19 | 0.00 | 0.00 | 0.03 | 90.0 |
| P-2013 | 8.0 | J-2023 | J-2025 | 250 | 0.81 | 0.00 | 0.00 | 0.01 | 90.0 |
| P-2014 | 8.0 | J-2024 | J-2023 | 1,300 | 5.82 | 0.00 | 0.00 | 0.04 | 90.0 |
| P-2015 | 8.0 | J-2022 | J-2024 | 250 | 15.03 | 0.02 | 0.00 | 0.10 | 90.0 |
| P-2016 | 10.0 | J-2014 | J-207 | 800 | -74.09 | 0.10 | 0.08 | 0.30 | 90.0 |
| P-2017 | 8.0 | J-207 | J-2027 | 1,200 | 27.30 | 0.03 | 0.04 | 0.17 | 110.0 |
| P-2018 | 10.0 | J-2022 | J-2029 | 3,500 | -62.30 | 0.06 | 0.21 | 0.25 | 100.0 |
| P-2019 | 10.0 | J-2014 | J-2011 | 2,900 | 36.69 | 0.02 | 0.06 | 0.15 | 100.0 |
| P-2020 | 6.0 | J-2010 | J-2004 | 700 | -7.74 | 0.02 | 0.01 | 0.09 | 90.0 |
| P-2021 | 12.0 | PRV-4 | J-2003 | 167 | 0.00 | 0.00 | 0.00 | 0.00 | 110.0 |
| P-2022 | 6.0 | J-2004 | J-2003 | 350 | 11.81 | 0.04 | 0.01 | 0.13 | 90.0 |
| P-2023 | 10.0 | J-2003 | J-2002 | 1,650 | 6.80 | 0.00 | 0.00 | 0.03 | 110.0 |
| P-2024 | 8.0 | J-2009 | J-2002 | 850 | 4.48 | 0.00 | 0.00 | 0.03 | 110.0 |
| P-2025 | 6.0 | J-2008 | J-2001 | 1,200 | 3.94 | 0.00 | 0.00 | 0.04 | 130.0 |
| P-2026 | 8.0 | J-2008 | J-2001 | 1,000 | 7.84 | 0.00 | 0.00 | 0.05 | 110.0 |
| P-2027 | 6.0 | J-2008 | J-2009 | 750 | 6.76 | 0.01 | 0.01 | 0.08 | 90.0 |
| P-2028 | 10.0 | J-2002 | J-2001 | 400 | -39.19 | 0.02 | 0.01 | 0.16 | 110.0 |
| P-2029 | 8.0 | J-2029 | J-2031 | 400 | 5.01 | 0.00 | 0.00 | 0.03 | 110.0 |
| P-2030 | 8.0 | J-2050 | J-2012 | 400 | 48.23 | 0.11 | 0.04 | 0.31 | 100.0 |
| P-2031 | 6.0 | J-2051 | J-2050 | 450 | -15.00 | 0.05 | 0.02 | 0.17 | 100.0 |
| P-2032 | 6.0 | J-2026 | J-2051 | 300 | -9.99 | 0.02 | 0.01 | 0.11 | 100.0 |
| P-2033 | 12.0 | J-2026 | J-2028 | 600 | -74.00 | 0.02 | 0.01 | 0.21 | 120.0 |
| P-2034 | 12.0 | J-2026 | J-2012 | 650 | 68.67 | 0.02 | 0.01 | 0.19 | 120.0 |
| P-2035 | 8.0 | J-2013 | J-2026 | 1,300 | -10.31 | 0.01 | 0.01 | 0.07 | 110.0 |
| P-2036 | 6.0 | J-2012 | J-2013 | 900 | -5.30 | 0.01 | 0.01 | 0.06 | 100.0 |
| P-2037 | 10.0 | J-2011 | J-2012 | 150 | -117.19 | 0.23 | 0.03 | 0.48 | 90.0 |

# Scenario: MDD-Buildout
# Steady State Analysis
# Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-2038 | 8.0 | J-2028 | J-2029 | 900 | -56.71 | 0.18 | 0.16 | 0.36 | 90.0 |
| P-2039 | 8.0 | J-2027 | J-2028 | 1,950 | 22.29 | 0.02 | 0.04 | 0.14 | 110.0 |
| P-2040 | 8.0 | J-2007 | J-2008 | 1,950 | 23.55 | 0.03 | 0.07 | 0.15 | 90.0 |
| P-2041 | 10.0 | J-2007 | J-2011 | 600 | -148.87 | 0.36 | 0.21 | 0.61 | 90.0 |
| P-2042 | 10.0 | J-2006 | J-2007 | 600 | -52.46 | 0.05 | 0.03 | 0.21 | 90.0 |
| P-2043 | 8.0 | J-2042 | J-2007 | 1,650 | -33.95 | 0.06 | 0.09 | 0.22 | 100.0 |
| P-2044 | 8.0 | J-2007 | J-2043 | 1,450 | 33.90 | 0.05 | 0.07 | 0.22 | 110.0 |
| P-2045 | 10.0 | J-2030 | J-2029 | 1,080 | 129.03 | 0.19 | 0.20 | 0.53 | 110.0 |
| P-2046 | 8.0 | J-2050 | J-2049 | 600 | -68.24 | 0.21 | 0.12 | 0.44 | 100.0 |
| P-2047 | 10.0 | J-2000 | J-2006 | 470 | -47.45 | 0.04 | 0.02 | 0.19 | 90.0 |
| P-2048 | 10.0 | J-2001 | J-2000 | 1,350 | -32.42 | 0.01 | 0.02 | 0.13 | 110.0 |
| P-2049 | 10.0 | PRV-3 | J-2159 | 5 | 0.00 | 0.00 | 0.00 | 0.00 | 90.0 |
| P-2050 | 10.0 | J-2159 | J-2000 | 210 | -5.01 | 0.00 | 0.00 | 0.02 | 90.0 |
| P-2051 | 12.0 | J-2153 | J-208 | 909 | -684.63 | 1.71 | 1.56 | 1.94 | 110.0 |
| P-2052 | 8.0 | J-2036 | J-2038 | 1,250 | -125.36 | 0.63 | 0.79 | 0.80 | 100.0 |
| P-2053 | 8.0 | J-2059 | J-2060 | 1,100 | -125.89 | 0.78 | 0.85 | 0.80 | 90.0 |
| P-2054 | 12.0 | J-2153 | J-2032 | 1,460 | 416.75 | 0.68 | 1.00 | 1.18 | 110.0 |
| P-2055 | 6.0 | J-2032 | J-2033 | 450 | -57.58 | 0.51 | 0.23 | 0.65 | 110.0 |
| P-2056 | 8.0 | J-2060 | J-2062 | 200 | 10.02 | 0.01 | 0.00 | 0.06 | 100.0 |
| P-2057 | 8.0 | J-2030 | J-2032 | 1,800 | -71.07 | 0.27 | 0.49 | 0.45 | 90.0 |
| P-2058 | 8.0 | J-2060 | J-2061 | 800 | 5.01 | 0.00 | 0.00 | 0.03 | 100.0 |
| P-2059 | 8.0 | J-2032 | J-2060 | 450 | 145.92 | 1.02 | 0.46 | 0.93 | 90.0 |
| P-2060 | 12.0 | J-2030 | J-2032 | 1,800 | -252.33 | 0.27 | 0.49 | 0.72 | 110.0 |
| P-2061 | 8.0 | J-2038 | J-2030 | 2,600 | -101.08 | 0.30 | 0.79 | 0.65 | 120.0 |
| P-2062 | 8.0 | J-2039 | J-2038 | 900 | 29.29 | 0.04 | 0.04 | 0.19 | 100.0 |
| P-2063 | 8.0 | J-2042 | J-2041 | 250 | 5.10 | 0.00 | 0.00 | 0.03 | 100.0 |
| P-2064 | 8.0 | J-2039 | J-2042 | 800 | -20.35 | 0.02 | 0.02 | 0.13 | 100.0 |
| P-2065 | 8.0 | J-2040 | J-2039 | 600 | 13.95 | 0.01 | 0.01 | 0.09 | 100.0 |
| P-2066 | 8.0 | J-2041 | J-2040 | 550 | 18.96 | 0.02 | 0.01 | 0.12 | 100.0 |
| P-2067 | 8.0 | J-2044 | J-2041 | 550 | 18.87 | 0.02 | 0.01 | 0.12 | 100.0 |
| P-2068 | 8.0 | J-2044 | J-2045 | 400 | 5.01 | 0.00 | 0.00 | 0.03 | 100.0 |
| P-2069 | 8.0 | J-2043 | J-2044 | 350 | 28.89 | 0.04 | 0.01 | 0.18 | 100.0 |
| P-2070 | 8.0 | J-2046 | J-2047 | 250 | -39.95 | 0.06 | 0.02 | 0.25 | 110.0 |
| P-2071 | 8.0 | J-2048 | J-2046 | 500 | -34.94 | 0.05 | 0.02 | 0.22 | 110.0 |
| P-2072 | 8.0 | J-2047 | J-2030 | 280 | -88.28 | 0.40 | 0.11 | 0.56 | 90.0 |
| P-2073 | 8.0 | J-2048 | J-2047 | 380 | -43.32 | 0.11 | 0.04 | 0.28 | 90.0 |
| P-2074 | 8.0 | J-2049 | J-2048 | 250 | -73.25 | 0.29 | 0.07 | 0.47 | 90.0 |
| P-2075 | 12.0 | J-2184 | J-2068 | 928 | 144.14 | 0.08 | 0.08 | 0.41 | 120.0 |
| P-2076 | 8.0 | J-2157 | J-2158 | 1,800 | 0.81 | 0.00 | 0.00 | 0.01 | 110.0 |
| P-2077 | 12.0 | J-2155 | J-2154 | 900 | -156.92 | 0.10 | 0.09 | 0.45 | 120.0 |
| P-2079 | 8.0 | J-2157 | J-2158 | 600 | 1.43 | 0.00 | 0.00 | 0.01 | 110.0 |
| P-2080 | 8.0 | J-2156 | J-2157 | 300 | 23.24 | 0.02 | 0.01 | 0.15 | 110.0 |
| P-2081 | 6.0 | J-2033 | J-2034 | 900 | -21.49 | 0.08 | 0.07 | 0.24 | 110.0 |
| P-2082 | 12.0 | J-2154 | J-2153 | 1,600 | -262.87 | 0.25 | 0.40 | 0.75 | 120.0 |
| P-2083 | 8.0 | J-2156 | J-2154 | 550 | -95.85 | 0.32 | 0.18 | 0.61 | 110.0 |
| P-2084 | 8.0 | J-2034 | J-2156 | 700 | -67.60 | 0.17 | 0.12 | 0.43 | 110.0 |
| P-2085 | 8.0 | J-2033 | J-2034 | 1,100 | -41.10 | 0.07 | 0.07 | 0.26 | 110.0 |
| P-2086 | 10.0 | J-2062 | J-2063 | 997 | 5.01 | 0.00 | 0.00 | 0.02 | 110.0 |
| P-2087 | 12.0 | J-2055 | J-2059 | 650 | -120.88 | 0.06 | 0.04 | 0.34 | 120.0 |
| P-2088 | 8.0 | J-2054 | J-2053 | 800 | 65.74 | 0.49 | 0.40 | 0.42 | 60.0 |
| P-2089 | 6.0 | J-2055 | J-2054 | 250 | 70.75 | 2.30 | 0.58 | 0.80 | 60.0 |

# Scenario: MDD-Buildout
# Steady State Analysis
# Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-2092 | 12.0 | J-2055 | J-2056 | 150 | 74.97 | 0.02 | 0.00 | 0.21 | 120.0 |
| P-2093 | 10.0 | J-2127 | J-2055 | 2,560 | 29.86 | 0.02 | 0.04 | 0.12 | 100.0 |
| P-2094 | 6.0 | J-2127 | J-2065 | 350 | 43.14 | 0.92 | 0.32 | 0.49 | 60.0 |
| P-2095 | 6.0 | J-2068 | J-2127 | 450 | 91.16 | 3.68 | 1.66 | 1.03 | 60.0 |
| P-2096 | 8.0 | J-2185 | J-2186 | 628 | 5.01 | 0.00 | 0.00 | 0.03 | 130.0 |
| P-2097 | 12.0 | J-2065 | J-2064 | 200 | 14.15 | 0.00 | 0.00 | 0.04 | 120.0 |
| P-2098 | 12.0 | J-2066 | J-2065 | 450 | -15.22 | 0.00 | 0.00 | 0.04 | 110.0 |
| P-2099 | 12.0 | J-2067 | J-2066 | 200 | -1.46 | 0.00 | 0.00 | 0.00 | 120.0 |
| P-2100 | 12.0 | J-2064 | J-2067 | 450 | 12.30 | 0.00 | 0.00 | 0.03 | 110.0 |
| P-2101 | 6.0 | J-2057 | J-2064 | 1,250 | 16.37 | 0.15 | 0.19 | 0.19 | 60.0 |
| P-2102 | 6.0 | J-2058 | J-2057 | 550 | 15.96 | 0.15 | 0.08 | 0.18 | 60.0 |
| P-2103 | 8.0 | J-2053 | J-2058 | 650 | -118.59 | 1.47 | 0.96 | 0.76 | 60.0 |
| P-2104 | 6.0 | J-2071 | J-2070 | 1,399 | -2.33 | 0.00 | 0.00 | 0.03 | 130.0 |
| P-2105 | 6.0 | J-2070 | J-2071 | 1,081 | 2.68 | 0.00 | 0.00 | 0.03 | 130.0 |
| P-2106 | 8.0 | J-2069 | J-2070 | 1,800 | 10.02 | 0.00 | 0.01 | 0.06 | 110.0 |
| P-2107 | 8.0 | J-2036 | J-2037 | 300 | 5.01 | 0.00 | 0.00 | 0.03 | 100.0 |
| P-2108 | 8.0 | J-2035 | J-2036 | 2,180 | -115.34 | 0.39 | 0.85 | 0.74 | 120.0 |
| P-2109 | 8.0 | J-2035 | J-2052 | 1,300 | -11.77 | 0.01 | 0.01 | 0.08 | 100.0 |
| P-2110 | 8.0 | J-2052 | J-2053 | 2,400 | -74.46 | 0.24 | 0.58 | 0.48 | 100.0 |
| P-2111 | 8.0 | J-2090 | J-2052 | 700 | -17.02 | 0.01 | 0.01 | 0.11 | 110.0 |
| P-2112 | 8.0 | J-2035 | J-2090 | 1,800 | -3.25 | 0.00 | 0.00 | 0.02 | 110.0 |
| P-2113 | 8.0 | J-2081 | J-2035 | 650 | -116.61 | 0.55 | 0.36 | 0.74 | 100.0 |
| P-2114 | 6.0 | J-2081 | J-2082 | 950 | 5.01 | 0.01 | 0.01 | 0.06 | 100.0 |
| P-2115 | 8.0 | J-2080 | J-2081 | 2,050 | -106.59 | 0.47 | 0.96 | 0.68 | 100.0 |
| P-2116 | 8.0 | J-2079 | J-2080 | 2,600 | 43.23 | 0.05 | 0.14 | 0.28 | 130.0 |
| P-2117 | 8.0 | J-2083 | J-2079 | 650 | 24.14 | 0.03 | 0.02 | 0.15 | 100.0 |
| P-2118 | 8.0 | J-2089 | J-2053 | 1,200 | -96.11 | 0.28 | 0.33 | 0.61 | 120.0 |
| P-2119 | 8.0 | J-2088 | J-2089 | 3,000 | -91.10 | 0.25 | 0.75 | 0.58 | 120.0 |
| P-2120 | 12.0 | J-2091 | J-2058 | 1,000 | 101.15 | 0.04 | 0.04 | 0.29 | 120.0 |
| P-2121 | 12.0 | J-2092 | J-2091 | 1,050 | 106.16 | 0.05 | 0.05 | 0.30 | 120.0 |
| P-2122 | 12.0 | T-1 | J-2092 | 700 | 497.27 | 0.81 | 0.56 | 1.41 | 120.0 |
| P-2124 | 12.0 | J-2093 | J-2092 | 550 | -361.06 | 0.38 | 0.21 | 1.02 | 130.0 |
| P-2125 | 12.0 | J-2094 | J-2093 | 1,100 | -356.05 | 0.37 | 0.41 | 1.01 | 130.0 |
| P-2126 | 8.0 | J-2073 | J-2074 | 365 | 30.79 | 0.04 | 0.01 | 0.20 | 110.0 |
| P-2127 | 8.0 | J-2073 | J-2075 | 200 | 13.76 | 0.01 | 0.00 | 0.09 | 100.0 |
| P-2128 | 8.0 | J-2072 | J-2073 | 550 | 87.79 | 0.33 | 0.18 | 0.56 | 100.0 |
| P-2129 | 8.0 | PRV-2 | J-2072 | 238 | 0.00 | 0.00 | 0.00 | 0.00 | 100.0 |
| P-2130 | 8.0 | J-2076 | J-2072 | 1,900 | -31.90 | 0.05 | 0.10 | 0.20 | 100.0 |
| P-2131 | 8.0 | J-2072 | J-2080 | 300 | -136.06 | 0.74 | 0.22 | 0.87 | 100.0 |
| P-2132 | 8.0 | J-2084 | J-2085 | 550 | -29.11 | 0.04 | 0.02 | 0.19 | 110.0 |
| P-2133 | 8.0 | J-2079 | J-2084 | 1,350 | -24.10 | 0.03 | 0.03 | 0.15 | 110.0 |
| P-2134 | 8.0 | J-2085 | J-2083 | 950 | 29.15 | 0.04 | 0.03 | 0.19 | 110.0 |
| P-2135 | 8.0 | J-2086 | J-2085 | 450 | 63.27 | 0.15 | 0.07 | 0.40 | 110.0 |
| P-2136 | 8.0 | J-2087 | J-2086 | 800 | 68.28 | 0.17 | 0.14 | 0.44 | 110.0 |
| P-2137 | 8.0 | J-2087 | J-2088 | 1,360 | -86.09 | 0.32 | 0.43 | 0.55 | 100.0 |
| P-2138 | 8.0 | J-2132 | J-2087 | 300 | -12.80 | 0.01 | 0.00 | 0.08 | 110.0 |
| P-2140 | 12.0 | J-2133 | J-2167 | 2,000 | -325.99 | 0.37 | 0.74 | 0.92 | 120.0 |
| P-2141 | 12.0 | J-2133 | J-2165 | 1,500 | 228.62 | 0.22 | 0.34 | 0.65 | 110.0 |
| P-2142 | 8.0 | J-2132 | J-2133 | 960 | -92.37 | 0.36 | 0.35 | 0.59 | 100.0 |
| P-2143 | 8.0 | J-2078 | J-2076 | 1,000 | -10.52 | 0.01 | 0.01 | 0.07 | 100.0 |
| P-2144 | 8.0 | J-2077 | J-2078 | 1,200 | -5.51 | 0.00 | 0.00 | 0.04 | 100.0 |

# Scenario: MDD-Buildout
# Steady State Analysis
# Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-2145 | 8.0 | J-2077 | J-2076 | 600 | -16.37 | 0.01 | 0.01 | 0.10 | 100.0 |
| P-2146 | 8.0 | J-2119 | J-2077 | 1,650 | -16.87 | 0.02 | 0.03 | 0.11 | 100.0 |
| P-2147 | 8.0 | J-2162 | J-2132 | 400 | -100.16 | 0.42 | 0.17 | 0.64 | 100.0 |
| P-2148 | 8.0 | J-2161 | J-2162 | 560 | -95.15 | 0.38 | 0.21 | 0.61 | 100.0 |
| P-2149 | 8.0 | J-2131 | J-2161 | 300 | -90.14 | 0.34 | 0.10 | 0.58 | 100.0 |
| P-2150 | 8.0 | J-2134 | J-2135 | 1,050 | -51.17 | 0.10 | 0.11 | 0.33 | 110.0 |
| P-2151 | 8.0 | J-2131 | J-2130 | 1,400 | 23.97 | 0.03 | 0.04 | 0.15 | 100.0 |
| P-2152 | 8.0 | J-2129 | J-2130 | 900 | -18.96 | 0.02 | 0.02 | 0.12 | 100.0 |
| P-2153 | 8.0 | J-2119 | J-2128 | 1,250 | -36.61 | 0.06 | 0.08 | 0.23 | 100.0 |
| P-2154 | 8.0 | J-2129 | J-2131 | 350 | -61.16 | 0.17 | 0.06 | 0.39 | 100.0 |
| P-2155 | 8.0 | J-2128 | J-2129 | 510 | -75.12 | 0.25 | 0.13 | 0.48 | 100.0 |
| P-2156 | 12.0 | J-2134 | J-2128 | 750 | -33.50 | 0.01 | 0.00 | 0.10 | 110.0 |
| P-2157 | 12.0 | J-2120 | J-2134 | 1,250 | -79.66 | 0.03 | 0.04 | 0.23 | 110.0 |
| P-2158 | 8.0 | J-2120 | J-2119 | 1,400 | 22.37 | 0.03 | 0.04 | 0.14 | 100.0 |
| P-2159 | 8.0 | J-2121 | J-2120 | 800 | -52.29 | 0.13 | 0.10 | 0.33 | 100.0 |
| P-2160 | 8.0 | J-2142 | J-2143 | 500 | -39.87 | 0.05 | 0.03 | 0.25 | 120.0 |
| P-2161 | 8.0 | J-2136 | J-2137 | 1,650 | 22.06 | 0.02 | 0.04 | 0.14 | 110.0 |
| P-2162 | 8.0 | J-2142 | J-2141 | 900 | -4.22 | 0.00 | 0.00 | 0.03 | 120.0 |
| P-2163 | 8.0 | J-2135 | J-2142 | 1,250 | -39.08 | 0.06 | 0.08 | 0.25 | 110.0 |
| P-2164 | 8.0 | J-2136 | J-2135 | 200 | 17.10 | 0.01 | 0.00 | 0.11 | 110.0 |
| P-2165 | 8.0 | J-2138 | J-2136 | 750 | 44.18 | 0.09 | 0.07 | 0.28 | 100.0 |
| P-2166 | 8.0 | J-2141 | J-2140 | 750 | 11.38 | 0.01 | 0.00 | 0.07 | 120.0 |
| P-2167 | 8.0 | J-2143 | J-2141 | 1,650 | 20.61 | 0.02 | 0.03 | 0.13 | 120.0 |
| P-2168 | 8.0 | J-2144 | J-2143 | 1,000 | 65.49 | 0.19 | 0.19 | 0.42 | 100.0 |
| P-2169 | 8.0 | J-2165 | J-2166 | 1,200 | 5.01 | 0.00 | 0.00 | 0.03 | 110.0 |
| P-2170 | 12.0 | J-2144 | J-2165 | 1,600 | -218.60 | 0.18 | 0.28 | 0.62 | 120.0 |
| P-2171 | 12.0 | J-2145 | J-2144 | 750 | -148.10 | 0.09 | 0.06 | 0.42 | 120.0 |
| P-2172 | 12.0 | J-2146 | J-2147 | 500 | 48.81 | 0.01 | 0.01 | 0.14 | 120.0 |
| P-2173 | 12.0 | J-2145 | J-2146 | 1,350 | 53.82 | 0.01 | 0.02 | 0.15 | 120.0 |
| P-2174 | 12.0 | J-2148 | J-2145 | 600 | -89.27 | 0.03 | 0.02 | 0.25 | 120.0 |
| P-2175 | 8.0 | J-2147 | J-2148 | 1,450 | -6.95 | 0.00 | 0.00 | 0.04 | 120.0 |
| P-2176 | 8.0 | J-2139 | J-2138 | 250 | 42.82 | 0.11 | 0.03 | 0.27 | 90.0 |
| P-2177 | 8.0 | J-2140 | J-2138 | 1,050 | 6.37 | 0.00 | 0.00 | 0.04 | 120.0 |
| P-2178 | 12.0 | J-2149 | J-2152 | 600 | 72.30 | 0.02 | 0.01 | 0.21 | 120.0 |
| P-2179 | 12.0 | J-2148 | J-2149 | 500 | 77.31 | 0.03 | 0.01 | 0.22 | 120.0 |
| P-2180 | 12.0 | J-2150 | J-2147 | 450 | -50.75 | 0.01 | 0.01 | 0.14 | 120.0 |
| P-2181 | 12.0 | J-2151 | J-2150 | 850 | -45.74 | 0.01 | 0.01 | 0.13 | 120.0 |
| P-2182 | 12.0 | J-2152 | J-2151 | 1,250 | -40.73 | 0.01 | 0.01 | 0.12 | 120.0 |
| P-2183 | 12.0 | J-2139 | J-2152 | 1,800 | -108.03 | 0.05 | 0.09 | 0.31 | 120.0 |
| P-2184 | 8.0 | J-2137 | J-2139 | 800 | -60.20 | 0.16 | 0.13 | 0.38 | 100.0 |
| P-2185 | 8.0 | J-2111 | J-2097 | 550 | 50.93 | 0.12 | 0.07 | 0.33 | 100.0 |
| P-2186 | 6.0 | J-2111 | J-2110 | 1,000 | -11.21 | 0.03 | 0.03 | 0.13 | 100.0 |
| P-2187 | 8.0 | J-2112 | J-2113 | 1,000 | -10.66 | 0.01 | 0.01 | 0.07 | 100.0 |
| P-2188 | 8.0 | J-2116 | J-2114 | 950 | -4.98 | 0.00 | 0.00 | 0.03 | 100.0 |
| P-2189 | 8.0 | J-2110 | J-2109 | 1,200 | 2.02 | 0.00 | 0.00 | 0.01 | 100.0 |
| P-2190 | 8.0 | J-2112 | J-2111 | 300 | 44.72 | 0.09 | 0.03 | 0.29 | 100.0 |
| P-2191 | 8.0 | J-2116 | J-2112 | 300 | 39.07 | 0.07 | 0.02 | 0.25 | 100.0 |
| P-2192 | 8.0 | J-2118 | J-2116 | 339 | 39.10 | 0.07 | 0.02 | 0.25 | 100.0 |
| P-2193 | 8.0 | J-2117 | J-2118 | 850 | -21.71 | 0.02 | 0.02 | 0.14 | 100.0 |
| P-2194 | 8.0 | J-2114 | J-2117 | 300 | -11.70 | 0.01 | 0.00 | 0.07 | 100.0 |
| P-2195 | 8.0 | J-2113 | J-2110 | 300 | 18.24 | 0.02 | 0.01 | 0.12 | 100.0 |

# Scenario: MDD-Buildout
# Steady State Analysis
# Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-2196 | 8.0 | J-2114 | J-2113 | 300 | 33.91 | 0.06 | 0.02 | 0.22 | 100.0 |
| P-2197 | 8.0 | J-2163 | J-2114 | 1,300 | 32.21 | 0.05 | 0.07 | 0.21 | 100.0 |
| P-2198 | 8.0 | J-2164 | J-2163 | 800 | 33.66 | 0.06 | 0.04 | 0.21 | 100.0 |
| P-2199 | 8.0 | J-2122 | J-2164 | 400 | 38.67 | 0.07 | 0.03 | 0.25 | 100.0 |
| P-2200 | 8.0 | J-2121 | J-2122 | 400 | 37.71 | 0.06 | 0.02 | 0.24 | 110.0 |
| P-2201 | 8.0 | J-2123 | J-2124 | 400 | -32.65 | 0.05 | 0.02 | 0.21 | 100.0 |
| P-2202 | 8.0 | J-2126 | J-2137 | 800 | -77.26 | 0.26 | 0.21 | 0.49 | 100.0 |
| P-2203 | 8.0 | J-2123 | J-2125 | 300 | 21.67 | 0.02 | 0.01 | 0.14 | 100.0 |
| P-2204 | 8.0 | J-2122 | J-2123 | 280 | -5.97 | 0.00 | 0.00 | 0.04 | 100.0 |
| P-2205 | 8.0 | J-2124 | J-2121 | 250 | -9.57 | 0.01 | 0.00 | 0.06 | 100.0 |
| P-2206 | 8.0 | J-2126 | J-2124 | 210 | 28.10 | 0.04 | 0.01 | 0.18 | 100.0 |
| P-2207 | 8.0 | J-2125 | J-2126 | 400 | -44.15 | 0.09 | 0.04 | 0.28 | 100.0 |
| P-2208 | 8.0 | J-2163 | J-2125 | 400 | -60.81 | 0.17 | 0.07 | 0.39 | 100.0 |
| P-2209 | 8.0 | J-2109 | J-2163 | 600 | -57.26 | 0.15 | 0.09 | 0.37 | 100.0 |
| P-2210 | 8.0 | PRV-1 | J-2096 | 660 | 0.00 | 0.00 | 0.00 | 0.00 | 100.0 |
| P-2211 | 8.0 | J-2097 | J-2096 | 400 | 45.92 | 0.10 | 0.04 | 0.29 | 100.0 |
| P-2212 | 8.0 | J-2096 | J-2098 | 200 | 28.23 | 0.04 | 0.01 | 0.18 | 100.0 |
| P-2213 | 8.0 | J-2115 | J-2096 | 2,600 | -12.67 | 0.01 | 0.02 | 0.08 | 110.0 |
| P-2214 | 8.0 | J-2099 | J-2175 | 548 | 12.37 | 0.01 | 0.00 | 0.08 | 110.0 |
| P-2215 | 8.0 | J-2098 | J-2099 | 300 | 23.22 | 0.03 | 0.01 | 0.15 | 100.0 |
| P-2216 | 8.0 | J-2160 | J-2100 | 400 | 4.35 | 0.00 | 0.00 | 0.03 | 100.0 |
| P-2217 | 8.0 | J-2102 | J-2160 | 600 | 9.36 | 0.01 | 0.00 | 0.06 | 100.0 |
| P-2218 | 6.0 | J-2100 | J-2101 | 700 | 5.18 | 0.01 | 0.00 | 0.06 | 100.0 |
| P-2219 | 8.0 | J-2102 | J-2108 | 1,100 | -22.78 | 0.02 | 0.02 | 0.15 | 120.0 |
| P-2220 | 8.0 | J-2108 | J-2109 | 950 | -54.27 | 0.13 | 0.13 | 0.35 | 100.0 |
| P-2221 | 8.0 | J-2107 | J-2108 | 200 | -26.48 | 0.04 | 0.01 | 0.17 | 100.0 |
| P-2222 | 8.0 | J-2102 | J-2107 | 950 | -16.46 | 0.01 | 0.01 | 0.11 | 100.0 |
| P-2223 | 8.0 | J-2099 | J-2100 | 850 | 5.84 | 0.00 | 0.00 | 0.04 | 100.0 |
| P-2224 | 6.0 | J-2105 | J-2106 | 600 | 5.01 | 0.01 | 0.00 | 0.06 | 100.0 |
| P-2225 | 6.0 | J-2102 | J-2105 | 500 | 10.02 | 0.02 | 0.01 | 0.11 | 100.0 |
| P-2226 | 8.0 | J-2103 | J-2102 | 500 | -14.86 | 0.01 | 0.01 | 0.09 | 100.0 |
| P-2227 | 6.0 | J-2104 | J-2103 | 305 | -5.01 | 0.01 | 0.00 | 0.06 | 100.0 |
| P-2228 | 8.0 | J-2101 | J-2103 | 1,900 | -4.84 | 0.00 | 0.00 | 0.03 | 110.0 |
| P-2229 | 6.0 | J-2101 | J-2168 | 376 | 5.01 | 0.00 | 0.00 | 0.06 | 130.0 |
| P-2230 | 6.0 | J-2175 | J-2170 | 369 | 5.01 | 0.00 | 0.00 | 0.06 | 130.0 |
| P-2231 | 6.0 | J-2175 | J-2169 | 373 | 5.01 | 0.00 | 0.00 | 0.06 | 130.0 |
| P-2232 | 8.0 | J-2175 | J-2115 | 1,352 | -2.65 | 0.00 | 0.00 | 0.02 | 110.0 |
| P-2233 | 6.0 | J-2115 | J-2171 | 853 | 5.01 | 0.00 | 0.00 | 0.06 | 130.0 |
| P-2234 | 6.0 | J-2107 | J-2172 | 980 | 5.01 | 0.00 | 0.00 | 0.06 | 130.0 |
| P-2235 | 8.0 | J-2117 | J-2173 | 348 | 5.01 | 0.00 | 0.00 | 0.03 | 130.0 |
| P-2236 | 8.0 | J-2118 | J-2174 | 567 | 5.01 | 0.00 | 0.00 | 0.03 | 130.0 |
| P-2237 | 12.0 | J-2176 | J-2094 | 1,500 | -351.04 | 0.36 | 0.55 | 1.00 | 130.0 |
| P-2238 | 12.0 | J-2178 | J-2176 | 401 | -341.02 | 0.40 | 0.16 | 0.97 | 120.0 |
| P-2239 | 12.0 | J-2167 | J-2178 | 399 | -331.00 | 0.38 | 0.15 | 0.94 | 120.0 |
| P-2240 | 8.0 | J-2176 | J-2177 | 1,030 | 5.01 | 0.00 | 0.00 | 0.03 | 130.0 |
| P-2241 | 8.0 | J-2178 | J-2179 | 580 | 5.01 | 0.00 | 0.00 | 0.03 | 130.0 |
| P-2242 | 8.0 | J-2092 | J-2180 | 501 | 25.05 | 0.04 | 0.02 | 0.16 | 90.0 |
| P-2243 | 8.0 | J-2180 | J-2181 | 581 | 5.01 | 0.00 | 0.00 | 0.03 | 130.0 |
| P-2244 | 8.0 | J-2180 | J-2182 | 291 | 15.03 | 0.02 | 0.00 | 0.10 | 90.0 |
| P-2245 | 6.0 | J-2182 | J-2183 | 295 | 5.01 | 0.00 | 0.00 | 0.06 | 130.0 |
| P-2246 | 8.0 | J-2182 | J-2095 | 308 | 5.01 | 0.00 | 0.00 | 0.03 | 90.0 |

# Scenario: MDD-Buildout
# Steady State Analysis
# Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-2247 | 12.0 | J-2155 | J-2184 | 1,102 | 151.91 | 0.09 | 0.10 | 0.43 | 120.0 |
| P-2248 | 8.0 | J-2184 | J-2158 | 1,245 | 2.77 | 0.00 | 0.00 | 0.02 | 110.0 |
| P-2249 | 8.0 | J-2068 | J-2185 | 774 | 47.97 | 0.09 | 0.07 | 0.31 | 110.0 |
| P-2250 | 8.0 | J-2185 | J-2069 | 1,326 | 37.95 | 0.06 | 0.08 | 0.24 | 110.0 |
| P-2251 | 6.0 | J-2069 | J-2187 | 442 | 20.04 | 0.05 | 0.02 | 0.23 | 130.0 |
| P-2252 | 6.0 | J-2187 | J-2188 | 292 | 5.01 | 0.00 | 0.00 | 0.06 | 130.0 |
| P-2253 | 6.0 | J-2187 | J-2189 | 535 | 10.02 | 0.01 | 0.01 | 0.11 | 130.0 |
| P-2254 | 8.0 | J-2189 | J-2190 | 905 | 2.35 | 0.00 | 0.00 | 0.02 | 130.0 |
| P-2255 | 8.0 | J-2190 | J-2189 | 723 | -2.66 | 0.00 | 0.00 | 0.02 | 130.0 |
| P-2256 | 8.0 | J-2000 | J-2291 | 921 | 5.01 | 0.00 | 0.00 | 0.03 | 130.0 |
| P-2257 | 6.0 | J-2074 | J-1129 | 1,069 | 17.03 | 0.04 | 0.04 | 0.19 | 130.0 |
| P-2258 | 8.0 | J-2073 | J-1130 | 1,192 | 17.03 | 0.01 | 0.01 | 0.11 | 130.0 |
| P-2259 | 10.0 | J-2191 | J-2022 | 760 | -42.26 | 0.03 | 0.02 | 0.17 | 100.0 |
| P-2260 | 6.0 | J-2002 | J-2193 | 1,425 | 5.01 | 0.00 | 0.01 | 0.06 | 130.0 |
| P-2296 | 10.0 | J-2021 | J-2191 | 1,290 | -32.24 | 0.02 | 0.02 | 0.13 | 100.0 |
| P-2297 | 6.0 | J-2009 | J-2010 | 600 | -2.73 | 0.00 | 0.00 | 0.03 | 90.0 |
| P-2298 | 12.0 | J-2056 | J-2195 | 644 | 47.17 | 0.01 | 0.01 | 0.13 | 120.0 |
| P-2299 | 12.0 | J-2195 | J-2058 | 206 | 47.17 | 0.01 | 0.00 | 0.13 | 120.0 |
| P-2300 | 8.0 | J-2056 | J-2194 | 1,153 | 22.80 | 0.07 | 0.08 | 0.15 | 60.0 |

# Scenario: MDD-Buildout
# Steady State Analysis
# Pump Report

| Label | Elevation (ft) | Control Status | Intake Pump Grade (ft) | Discharge Pump Grade (ft) | Discharge (gpm) | Pump Head (ft) | Notes |
|---|---|---|---|---|---|---|---|
| PMP-6 | 285.00 | Off | 288.67 | 521.59 | 0.00 | 0.00 | Boland |
| PMP-2 | 285.00 | On | 287.20 | 552.49 | 607.84 | 265.30 | Boland |
| PMP-1 | 285.00 | On | 287.51 | 547.55 | 635.42 | 260.04 | Boland |
| PMP-4 | 275.00 | On | 283.95 | 488.16 | 684.63 | 204.21 | Hosmer |
| PMP-5 | 275.00 | Off | 284.71 | 486.22 | 0.00 | 0.00 | Hosmer |

# Scenario: MDD-Buildout
# Steady State Analysis
# Tank Report

| Label | Zone | Base Elevation (ft) | Minimum Elevation (ft) | Initial HGL (ft) | Maximum Elevation (ft) | Tank Diameter (ft) | Inflow (gpm) | Current Status | Calculated Hydraulic Grade (ft) | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| T-1 | Zone | 418.00 | 418.00 | 482.00 | 492.70 | 25.00 | -497.27 | Draining | 482.00 | Oak Hill Tank |
| T-2 | Zone | 451.00 | 451.00 | 482.00 | 493.30 | 40.00 | -101.39 | Draining | 482.00 | Clear Hill Tank |
| T-3 | Zone | 467.00 | 467.00 | 503.00 | 515.00 | 67.00 | -153.36 | Draining | 503.00 | Tara Rd Tank |


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# Scenario: PH-Buildout
# Steady State Analysis
# Junction Report

| Label | Elevation (ft) | Zone | Base Flow (gpm) | Pattern | Demand (gpm) | Hydraulic Grade (ft) | Pressure (psi) |
|---|---|---|---|---|---|---|---|
| J-1000 | 375.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 501.82 | 54.87 |
| J-1001 | 341.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 501.83 | 69.58 |
| J-1002 | 272.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 501.83 | 99.44 |
| J-1003 | 270.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 501.86 | 100.32 |
| J-1004 | 285.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 501.83 | 93.81 |
| J-1005 | 275.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 501.91 | 98.17 |
| J-1006 | 272.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 508.57 | 102.35 |
| J-1007 | 270.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 511.53 | 104.50 |
| J-1008 | 270.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 511.50 | 104.48 |
| J-1009 | 270.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 511.50 | 104.48 |
| J-1010 | 290.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 500.59 | 91.11 |
| J-1011 | 275.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 500.19 | 97.43 |
| J-1012 | 295.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 498.94 | 88.23 |
| J-1013 | 295.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 495.74 | 86.85 |
| J-1014 | 277.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 495.73 | 94.63 |
| J-1015 | 315.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 511.47 | 85.00 |
| J-1016 | 295.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 511.45 | 93.65 |
| J-1017 | 295.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 511.44 | 93.65 |
| J-1018 | 270.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 492.33 | 96.19 |
| J-1019 | 310.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 491.66 | 78.60 |
| J-1020 | 340.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 491.61 | 65.59 |
| J-1021 | 335.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 491.60 | 67.75 |
| J-1022 | 315.00 | HIGH SERVICE AREA | 48.59 | Fixed | 48.59 | 491.57 | 76.39 |
| J-1023 | 315.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 491.53 | 76.38 |
| J-1024 | 310.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 491.52 | 78.54 |
| J-1025 | 410.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 491.73 | 35.36 |
| J-1026 | 410.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 491.74 | 35.36 |
| J-1027 | 370.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 491.77 | 52.68 |
| J-1028 | 385.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 491.82 | 46.22 |
| J-1029 | 375.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 491.93 | 50.59 |
| J-1030 | 300.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 491.68 | 82.93 |
| J-1031 | 300.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 491.68 | 82.93 |
| J-1032 | 310.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 491.71 | 78.62 |
| J-1033 | 295.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 491.71 | 85.11 |
| J-1034 | 275.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 491.71 | 93.76 |
| J-1035 | 350.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 491.72 | 61.32 |
| J-1036 | 285.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 488.66 | 88.11 |
| J-1037 | 285.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 488.43 | 88.01 |
| J-1038 | 272.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 487.40 | 93.19 |
| J-1039 | 390.00 | HIGH SERVICE AREA | 40.71 | Fixed | 40.71 | 491.89 | 44.08 |
| J-1040 | 450.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 500.81 | 21.98 |
| J-1041 | 450.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 500.68 | 21.93 |
| J-1042 | 410.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 501.02 | 39.38 |
| J-1043 | 385.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 500.54 | 49.99 |
| J-1044 | 337.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 500.10 | 70.57 |
| J-1045 | 355.00 | HIGH SERVICE AREA | 64.08 | Fixed | 64.08 | 489.87 | 58.35 |
| J-1046 | 335.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 500.06 | 71.41 |
| J-1047 | 335.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 500.30 | 71.52 |
| J-1048 | 270.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 493.98 | 96.91 |
| J-1049 | 285.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 493.88 | 90.37 |
| J-1050 | 325.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 490.34 | 71.53 |
| J-1051 | 330.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 490.32 | 69.36 |
| J-1052 | 350.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 490.06 | 60.60 |

# Scenario: PH-Buildout
# Steady State Analysis
# Junction Report

| Label | Elevation (ft) | Zone | Base Flow (gpm) | Pattern | Demand (gpm) | Hydraulic Grade (ft) | Pressure (psi) |
|---|---|---|---|---|---|---|---|
| J-1053 | 312.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 490.00 | 77.01 |
| J-1054 | 310.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 489.43 | 77.63 |
| J-1055 | 305.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 489.49 | 79.82 |
| J-1056 | 295.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 488.83 | 83.86 |
| J-1057 | 320.00 | HIGH SERVICE AREA | 34.86 | Fixed | 34.86 | 488.28 | 72.81 |
| J-1058 | 320.00 | HIGH SERVICE AREA | 34.86 | Fixed | 34.86 | 488.28 | 72.81 |
| J-1059 | 320.00 | HIGH SERVICE AREA | 34.86 | Fixed | 34.86 | 488.38 | 72.85 |
| J-1060 | 340.00 | HIGH SERVICE AREA | 34.86 | Fixed | 34.86 | 485.62 | 63.00 |
| J-1061 | 345.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 498.22 | 66.29 |
| J-1062 | 355.00 | HIGH SERVICE AREA | 34.29 | Fixed | 34.29 | 489.22 | 58.07 |
| J-1063 | 345.00 | HIGH SERVICE AREA | 34.86 | Fixed | 34.86 | 486.09 | 61.04 |
| J-1064 | 296.00 | HIGH SERVICE AREA | 34.86 | Fixed | 34.86 | 485.70 | 82.07 |
| J-1065 | 290.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 485.72 | 84.68 |
| J-1066 | 266.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 485.37 | 94.91 |
| J-1067 | 262.00 | HIGH SERVICE AREA | 34.86 | Fixed | 34.86 | 484.92 | 96.45 |
| J-1068 | 285.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 485.80 | 86.88 |
| J-1069 | 295.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 485.42 | 82.39 |
| J-1070 | 285.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 485.31 | 86.66 |
| J-1071 | 260.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 485.25 | 97.45 |
| J-1072 | 290.00 | HIGH SERVICE AREA | 14.14 | Fixed | 14.14 | 486.67 | 85.09 |
| J-1073 | 295.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 487.40 | 83.24 |
| J-1074 | 265.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 491.52 | 98.00 |
| J-1075 | 377.00 | HIGH SERVICE AREA | 34.86 | Fixed | 34.86 | 489.20 | 48.55 |
| J-1076 | 380.00 | HIGH SERVICE AREA | 34.86 | Fixed | 34.86 | 489.20 | 47.25 |
| J-1077 | 320.00 | HIGH SERVICE AREA | 34.86 | Fixed | 34.86 | 488.78 | 73.02 |
| J-1078 | 325.00 | HIGH SERVICE AREA | 34.86 | Fixed | 34.86 | 488.91 | 70.91 |
| J-1079 | 380.00 | HIGH SERVICE AREA | 147.01 | Fixed | 147.01 | 488.49 | 46.94 |
| J-1080 | 360.00 | HIGH SERVICE AREA | 34.86 | Fixed | 34.86 | 488.77 | 55.71 |
| J-1081 | 350.00 | HIGH SERVICE AREA | 34.86 | Fixed | 34.86 | 485.89 | 58.79 |
| J-1082 | 270.00 | HIGH SERVICE AREA | 34.86 | Fixed | 34.86 | 485.67 | 93.31 |
| J-1083 | 400.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 484.52 | 36.57 |
| J-1084 | 325.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 484.56 | 69.04 |
| J-1085 | 325.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 483.91 | 68.75 |
| J-1086 | 370.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 484.05 | 49.34 |
| J-1087 | 415.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 484.00 | 29.85 |
| J-1088 | 420.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 483.98 | 27.68 |
| J-1089 | 328.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 483.07 | 67.09 |
| J-1090 | 355.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 483.98 | 55.80 |
| J-1091 | 324.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 483.19 | 68.88 |
| J-1092 | 305.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 483.05 | 77.03 |
| J-1093 | 330.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 482.95 | 66.17 |
| J-1094 | 330.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 482.95 | 66.17 |
| J-1095 | 306.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 483.03 | 76.59 |
| J-1096 | 393.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 482.96 | 38.92 |
| J-1097 | 330.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 483.06 | 66.22 |
| J-1098 | 270.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 511.71 | 104.58 |
| J-1099 | 307.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 491.52 | 79.83 |
| J-1100 | 440.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 501.67 | 26.68 |
| J-1101 | 350.00 | HIGH SERVICE AREA | 34.86 | Fixed | 34.86 | 488.43 | 59.89 |
| J-1102 | 305.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 511.50 | 89.34 |
| J-1103 | 285.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 492.75 | 89.88 |
| J-1104 | 420.00 | HIGH SERVICE AREA | 34.86 | Fixed | 34.86 | 498.20 | 33.83 |
| J-1105 | 307.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 511.46 | 88.46 |

# Scenario: PH-Buildout
# Steady State Analysis
# Junction Report

| Label | Elevation (ft) | Zone | Base Flow (gpm) | Pattern | Demand (gpm) | Hydraulic Grade (ft) | Pressure (psi) |
|---|---|---|---|---|---|---|---|
| J-1106 | 303.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 511.46 | 90.19 |
| J-1107 | 332.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 511.46 | 77.64 |
| J-1108 | 277.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 511.46 | 101.44 |
| J-1109 | 305.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 511.46 | 89.32 |
| J-1110 | 320.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 511.43 | 82.82 |
| J-1111 | 306.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 491.69 | 80.34 |
| J-1112 | 307.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 491.68 | 79.90 |
| J-1113 | 323.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 491.68 | 72.98 |
| J-1114 | 431.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 491.73 | 26.27 |
| J-1115 | 340.50 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 501.83 | 69.80 |
| J-1116 | 425.50 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 501.81 | 33.02 |
| J-1117 | 435.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 501.80 | 28.90 |
| J-1118 | 319.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 493.88 | 75.66 |
| J-1119 | 332.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 493.87 | 70.03 |
| J-1120 | 384.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 490.05 | 45.88 |
| J-1121 | 400.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 485.89 | 37.16 |
| J-1122 | 443.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 500.66 | 24.95 |
| J-1123 | 327.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 488.78 | 69.99 |
| J-1124 | 264.00 | HIGH SERVICE AREA | 34.86 | Fixed | 34.86 | 483.79 | 95.09 |
| J-1125 | 272.00 | HIGH SERVICE AREA | 34.86 | Fixed | 34.86 | 483.62 | 91.56 |
| J-1126 | 278.00 | HIGH SERVICE AREA | 34.86 | Fixed | 34.86 | 483.61 | 88.96 |
| J-1127 | 282.00 | HIGH SERVICE AREA | 34.86 | Fixed | 34.86 | 483.59 | 87.22 |
| J-1128 | 282.00 | HIGH SERVICE AREA | 34.86 | Fixed | 34.86 | 483.68 | 87.26 |
| J-1129 | 284.00 | HIGH SERVICE AREA | 34.86 | Fixed | 34.86 | 467.02 | 79.18 |
| J-1130 | 306.00 | HIGH SERVICE AREA | 34.86 | Fixed | 34.86 | 467.19 | 69.74 |
| J-1131 | 312.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 483.02 | 73.99 |
| J-1132 | 372.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 483.18 | 48.10 |
| J-1133 | 418.00 | HIGH SERVICE AREA | 16.94 | Fixed | 16.94 | 483.97 | 28.54 |
| J-2000 | 306.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 480.31 | 75.42 |
| J-2001 | 331.30 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 480.24 | 64.44 |
| J-2002 | 331.30 | LOW SERVICE AREA | 93.08 | Fixed | 93.08 | 480.21 | 64.42 |
| J-2003 | 335.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 480.21 | 62.83 |
| J-2004 | 335.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 480.26 | 62.85 |
| J-2005 | 270.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 480.83 | 91.22 |
| J-2006 | 315.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 480.39 | 71.56 |
| J-2007 | 315.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 480.51 | 71.61 |
| J-2008 | 320.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 480.25 | 69.33 |
| J-2009 | 325.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 480.21 | 67.15 |
| J-2010 | 330.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 480.22 | 64.99 |
| J-2011 | 300.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 481.31 | 78.44 |
| J-2012 | 300.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 481.44 | 78.50 |
| J-2013 | 330.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 481.47 | 65.53 |
| J-2014 | 330.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 481.53 | 65.56 |
| J-2015 | 285.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 481.13 | 84.86 |
| J-2016 | 275.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 480.96 | 89.11 |
| J-2017 | 265.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 480.94 | 93.43 |
| J-2018 | 265.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 480.90 | 93.41 |
| J-2019 | 275.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 481.06 | 89.15 |
| J-2020 | 295.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 480.95 | 80.45 |
| J-2021 | 270.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 481.21 | 91.38 |
| J-2022 | 295.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 481.39 | 80.64 |
| J-2023 | 290.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 481.36 | 82.79 |
| J-2024 | 295.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 481.37 | 80.64 |

# Scenario: PH-Buildout
# Steady State Analysis
# Junction Report

| Label | Elevation (ft) | Zone | Base Flow (gpm) | Pattern | Demand (gpm) | Hydraulic Grade (ft) | Pressure (psi) |
|---|---|---|---|---|---|---|---|
| J-2025 | 260.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 481.36 | 95.77 |
| J-2026 | 325.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 481.49 | 67.71 |
| J-2027 | 350.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 481.68 | 56.97 |
| J-2028 | 287.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 481.55 | 84.17 |
| J-2029 | 282.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 482.19 | 86.61 |
| J-2030 | 335.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 482.99 | 64.03 |
| J-2031 | 320.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 482.18 | 70.17 |
| J-2032 | 260.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 484.88 | 97.29 |
| J-2033 | 270.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 485.78 | 93.36 |
| J-2034 | 285.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 486.07 | 86.99 |
| J-2035 | 259.00 | LOW SERVICE AREA | 28.18 | Fixed | 28.18 | 473.75 | 92.91 |
| J-2036 | 265.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 476.96 | 91.70 |
| J-2037 | 305.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 476.95 | 74.40 |
| J-2038 | 265.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 479.96 | 93.00 |
| J-2039 | 280.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 480.10 | 86.57 |
| J-2040 | 270.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 480.12 | 90.91 |
| J-2041 | 275.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 480.16 | 88.76 |
| J-2042 | 305.00 | LOW SERVICE AREA | 17.40 | Fixed | 17.40 | 480.16 | 75.78 |
| J-2043 | 280.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 480.25 | 86.64 |
| J-2044 | 280.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 480.20 | 86.62 |
| J-2045 | 290.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 480.20 | 82.29 |
| J-2046 | 280.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 482.48 | 87.60 |
| J-2047 | 290.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 482.55 | 83.31 |
| J-2048 | 305.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 482.38 | 76.75 |
| J-2049 | 305.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 482.10 | 76.62 |
| J-2050 | 325.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 481.61 | 67.76 |
| J-2051 | 325.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 481.52 | 67.72 |
| J-2052 | 365.00 | LOW SERVICE AREA | 93.50 | Fixed | 93.50 | 473.79 | 47.07 |
| J-2053 | 275.00 | LOW SERVICE AREA | 28.18 | Fixed | 28.18 | 475.97 | 86.95 |
| J-2054 | 265.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 477.46 | 91.92 |
| J-2055 | 285.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 479.63 | 84.21 |
| J-2056 | 295.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 479.62 | 79.88 |
| J-2057 | 295.00 | LOW SERVICE AREA | 45.84 | Fixed | 45.84 | 479.28 | 79.73 |
| J-2058 | 285.00 | LOW SERVICE AREA | 28.18 | Fixed | 28.18 | 479.58 | 84.19 |
| J-2059 | 265.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 479.78 | 92.93 |
| J-2060 | 280.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 483.10 | 87.87 |
| J-2061 | 265.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 483.09 | 94.36 |
| J-2062 | 280.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 483.09 | 87.87 |
| J-2063 | 360.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 483.09 | 53.26 |
| J-2064 | 280.00 | LOW SERVICE AREA | 37.30 | Fixed | 37.30 | 478.57 | 85.91 |
| J-2065 | 275.00 | LOW SERVICE AREA | 28.18 | Fixed | 28.18 | 478.57 | 88.08 |
| J-2066 | 280.00 | LOW SERVICE AREA | 28.18 | Fixed | 28.18 | 478.57 | 85.91 |
| J-2067 | 280.00 | LOW SERVICE AREA | 28.18 | Fixed | 28.18 | 478.57 | 85.91 |
| J-2068 | 230.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 486.22 | 110.85 |
| J-2069 | 215.00 | LOW SERVICE AREA | 16.16 | Fixed | 16.16 | 485.67 | 117.10 |
| J-2070 | 200.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 485.63 | 123.58 |
| J-2071 | 200.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 485.63 | 123.58 |
| J-2072 | 288.00 | LOW SERVICE AREA | 33.51 | Fixed | 33.51 | 467.91 | 77.84 |
| J-2073 | 275.00 | LOW SERVICE AREA | 53.66 | Fixed | 53.66 | 467.23 | 83.17 |
| J-2074 | 285.00 | LOW SERVICE AREA | 28.18 | Fixed | 28.18 | 467.18 | 78.82 |
| J-2075 | 270.00 | LOW SERVICE AREA | 28.18 | Fixed | 28.18 | 467.22 | 85.33 |
| J-2076 | 295.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 467.55 | 74.65 |
| J-2077 | 295.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 467.52 | 74.64 |

# Scenario: PH-Buildout
# Steady State Analysis
# Junction Report

| Label | Elevation (ft) | Zone | Base Flow (gpm) | Pattern | Demand (gpm) | Hydraulic Grade (ft) | Pressure (psi) |
|---|---|---|---|---|---|---|---|
| J-2078 | 290.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 467.52 | 76.81 |
| J-2079 | 393.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 469.28 | 33.00 |
| J-2080 | 292.00 | LOW SERVICE AREA | 28.18 | Fixed | 28.18 | 468.75 | 76.47 |
| J-2081 | 276.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 472.39 | 84.97 |
| J-2082 | 320.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 472.36 | 65.92 |
| J-2083 | 350.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 469.35 | 51.64 |
| J-2084 | 370.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 469.41 | 43.01 |
| J-2085 | 350.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 469.48 | 51.69 |
| J-2086 | 330.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 469.73 | 60.46 |
| J-2087 | 320.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 470.25 | 65.01 |
| J-2088 | 340.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 471.88 | 57.06 |
| J-2089 | 315.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 474.72 | 69.10 |
| J-2090 | 270.00 | LOW SERVICE AREA | 28.18 | Fixed | 28.18 | 473.76 | 88.16 |
| J-2091 | 280.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 479.73 | 86.41 |
| J-2092 | 410.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 479.90 | 30.24 |
| J-2093 | 415.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 479.11 | 27.74 |
| J-2094 | 400.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 477.56 | 33.55 |
| J-2095 | 400.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 479.81 | 34.53 |
| J-2096 | 285.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 465.97 | 78.30 |
| J-2097 | 287.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 466.12 | 77.50 |
| J-2098 | 277.50 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 465.94 | 81.53 |
| J-2099 | 285.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 465.91 | 78.27 |
| J-2100 | 275.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 465.90 | 82.59 |
| J-2101 | 280.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 465.88 | 80.42 |
| J-2102 | 264.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 465.92 | 87.36 |
| J-2103 | 265.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 465.89 | 86.92 |
| J-2104 | 280.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 465.88 | 80.42 |
| J-2105 | 260.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 465.87 | 89.07 |
| J-2106 | 255.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 465.86 | 91.23 |
| J-2107 | 280.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 465.97 | 80.46 |
| J-2108 | 280.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 466.00 | 80.47 |
| J-2109 | 300.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 466.48 | 72.03 |
| J-2110 | 370.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 466.48 | 41.74 |
| J-2111 | 318.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 466.37 | 64.19 |
| J-2112 | 315.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 466.47 | 65.54 |
| J-2113 | 368.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 466.50 | 42.62 |
| J-2114 | 340.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 466.56 | 54.76 |
| J-2115 | 300.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 465.90 | 71.78 |
| J-2116 | 300.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 466.56 | 72.06 |
| J-2117 | 310.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 466.57 | 67.74 |
| J-2118 | 287.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 466.65 | 77.73 |
| J-2119 | 271.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 467.42 | 84.98 |
| J-2120 | 262.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 467.56 | 88.93 |
| J-2121 | 255.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 467.18 | 91.80 |
| J-2122 | 265.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 467.09 | 87.43 |
| J-2123 | 265.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 467.09 | 87.44 |
| J-2124 | 255.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 467.17 | 91.80 |
| J-2125 | 265.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 467.06 | 87.42 |
| J-2126 | 255.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 467.20 | 91.81 |
| J-2127 | 250.00 | LOW SERVICE AREA | 37.19 | Fixed | 37.19 | 479.79 | 99.42 |
| J-2128 | 305.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 467.72 | 70.40 |
| J-2129 | 315.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 468.20 | 66.28 |
| J-2130 | 300.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 468.26 | 72.80 |

# Scenario: PH-Buildout
# Steady State Analysis
# Junction Report

| Label | Elevation (ft) | Zone | Base Flow (gpm) | Pattern | Demand (gpm) | Hydraulic Grade (ft) | Pressure (psi) |
|---|---|---|---|---|---|---|---|
| J-2131 | 320.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 468.42 | 64.21 |
| J-2132 | 320.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 470.24 | 65.00 |
| J-2133 | 345.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 471.54 | 54.75 |
| J-2134 | 285.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 467.71 | 79.05 |
| J-2135 | 295.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 468.11 | 74.89 |
| J-2136 | 297.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 468.12 | 74.03 |
| J-2137 | 260.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 467.98 | 89.98 |
| J-2138 | 270.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 468.38 | 85.83 |
| J-2139 | 250.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 468.47 | 94.52 |
| J-2140 | 250.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 468.38 | 94.48 |
| J-2141 | 280.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 468.40 | 81.51 |
| J-2142 | 300.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 468.39 | 72.86 |
| J-2143 | 295.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 468.50 | 75.06 |
| J-2144 | 320.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 469.21 | 64.56 |
| J-2145 | 285.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 468.97 | 79.60 |
| J-2146 | 320.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 468.91 | 64.42 |
| J-2147 | 285.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 468.89 | 79.56 |
| J-2148 | 250.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 468.90 | 94.71 |
| J-2149 | 245.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 468.85 | 96.85 |
| J-2150 | 260.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 468.87 | 90.37 |
| J-2151 | 240.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 468.83 | 99.01 |
| J-2152 | 245.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 468.80 | 96.83 |
| J-2153 | 260.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 468.74 | 98.97 |
| J-2154 | 280.00 | LOW SERVICE AREA | 20.67 | Fixed | 20.67 | 487.22 | 89.65 |
| J-2155 | 295.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 486.89 | 83.02 |
| J-2156 | 344.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 486.53 | 61.67 |
| J-2157 | 393.00 | LOW SERVICE AREA | 42.99 | Fixed | 42.99 | 486.51 | 40.46 |
| J-2158 | 384.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 486.51 | 44.35 |
| J-2159 | 307.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 480.31 | 74.98 |
| J-2160 | 263.50 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 465.90 | 87.57 |
| J-2161 | 322.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 468.81 | 63.52 |
| J-2162 | 315.50 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 469.61 | 66.68 |
| J-2163 | 272.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 466.81 | 84.29 |
| J-2164 | 295.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 466.98 | 74.41 |
| J-2165 | 265.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 470.27 | 88.81 |
| J-2166 | 272.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 470.27 | 85.78 |
| J-2167 | 341.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 474.32 | 57.68 |
| J-2168 | 274.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 465.88 | 83.02 |
| J-2169 | 283.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 465.89 | 79.13 |
| J-2170 | 285.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 465.89 | 78.26 |
| J-2171 | 322.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 465.88 | 62.25 |
| J-2172 | 300.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 465.95 | 71.80 |
| J-2173 | 288.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 466.57 | 77.26 |
| J-2174 | 290.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 466.65 | 76.43 |
| J-2175 | 283.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 465.89 | 79.13 |
| J-2176 | 347.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 475.50 | 55.59 |
| J-2177 | 346.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 475.49 | 56.03 |
| J-2178 | 355.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 474.89 | 51.87 |
| J-2179 | 339.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 474.89 | 58.79 |
| J-2180 | 405.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 479.83 | 32.37 |
| J-2181 | 386.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 479.83 | 40.59 |
| J-2182 | 402.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 479.81 | 33.67 |
| J-2183 | 396.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 479.81 | 36.26 |

# Scenario: PH-Buildout
# Steady State Analysis
# Junction Report

| Label | Elevation (ft) | Zone | Base Flow (gpm) | Pattern | Demand (gpm) | Hydraulic Grade (ft) | Pressure (psi) |
|---|---|---|---|---|---|---|---|
| J-2184 | 219.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 486.51 | 115.74 |
| J-2185 | 221.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 485.96 | 114.63 |
| J-2186 | 218.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 485.95 | 115.93 |
| J-2187 | 215.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 485.58 | 117.07 |
| J-2188 | 219.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 485.57 | 115.33 |
| J-2189 | 232.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 485.55 | 109.70 |
| J-2190 | 270.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 485.55 | 93.26 |
| J-2191 | 284.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 481.30 | 85.36 |
| J-2192 | 263.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 481.29 | 94.44 |
| J-2193 | 342.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 480.18 | 59.79 |
| J-2194 | 295.00 | LOW SERVICE AREA | 0.00 | Fixed | 0.00 | 479.32 | 79.74 |
| J-2195 | 285.00 | LOW SERVICE AREA | 0.00 | Fixed | 0.00 | 479.59 | 84.19 |
| J-2291 | 275.00 | LOW SERVICE AREA | 10.26 | Fixed | 10.26 | 480.31 | 88.83 |

# Scenario: PH-Buildout
# Steady State Analysis
# Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-1000 | 12.0 | J-1102 | J-1015 | 1,245 | 67.75 | 0.02 | 0.03 | 0.19 | 120.0 |
| P-1001 | 12.0 | J-1007 | J-1102 | 1,005 | 84.69 | 0.03 | 0.03 | 0.24 | 120.0 |
| P-1003 | 12.0 | J-1008 | J-1009 | 300 | 16.94 | 0.00 | 0.00 | 0.05 | 100.0 |
| P-1004 | 12.0 | J-1007 | J-1008 | 400 | 118.57 | 0.08 | 0.03 | 0.34 | 100.0 |
| P-1005 | 12.0 | J-1098 | J-1007 | 850 | 220.20 | 0.21 | 0.18 | 0.62 | 110.0 |
| P-1006 | 12.0 | J-1006 | J-1098 | 800 | -1,071.08 | 3.92 | 3.14 | 3.04 | 110.0 |
| P-1007 | 12.0 | J-1007 | J-1012 | 4,600 | 0.00 | 0.00 | 0.00 | 0.00 | 130.0 |
| P-1008 | 8.0 | J-1030 | J-1031 | 1,650 | -2.53 | 0.00 | 0.00 | 0.02 | 110.0 |
| P-1010 | 12.0 | J-1016 | J-1017 | 1,800 | 33.88 | 0.01 | 0.01 | 0.10 | 120.0 |
| P-1012 | 8.0 | J-1027 | J-1030 | 2,200 | 31.35 | 0.04 | 0.09 | 0.20 | 110.0 |
| P-1013 | 8.0 | J-1034 | J-1033 | 1,350 | -6.25 | 0.00 | 0.00 | 0.04 | 110.0 |
| P-1014 | 12.0 | J-1033 | J-1034 | 1,050 | 10.69 | 0.00 | 0.00 | 0.03 | 110.0 |
| P-1015 | 12.0 | J-1032 | J-1033 | 500 | 22.14 | 0.00 | 0.00 | 0.06 | 110.0 |
| P-1016 | 12.0 | J-1032 | J-1027 | 1,500 | -92.42 | 0.04 | 0.06 | 0.26 | 110.0 |
| P-1017 | 8.0 | J-1033 | J-1035 | 2,100 | -11.74 | 0.01 | 0.01 | 0.07 | 120.0 |
| P-1018 | 12.0 | J-1025 | PRV-4 | 1,183 | 0.00 | 0.00 | 0.00 | 0.00 | 110.0 |
| P-1019 | 12.0 | J-1026 | J-1025 | 450 | 33.88 | 0.01 | 0.00 | 0.10 | 110.0 |
| P-1020 | 12.0 | J-1026 | J-1027 | 1,100 | -79.49 | 0.03 | 0.03 | 0.23 | 110.0 |
| P-1021 | 8.0 | J-1035 | J-1026 | 600 | -28.68 | 0.03 | 0.02 | 0.18 | 120.0 |
| P-1022 | 10.0 | J-1029 | J-1028 | 2,500 | 57.92 | 0.04 | 0.11 | 0.24 | 110.0 |
| P-1023 | 12.0 | J-1028 | J-1027 | 250 | 220.20 | 0.21 | 0.05 | 0.62 | 110.0 |
| P-1024 | 12.0 | J-1029 | J-1028 | 750 | 179.22 | 0.14 | 0.11 | 0.51 | 110.0 |
| P-1025 | 12.0 | J-1103 | J-1029 | 3,500 | 254.08 | 0.23 | 0.81 | 0.72 | 120.0 |
| P-1026 | 10.0 | J-1019 | J-1018 | 1,500 | -167.16 | 0.44 | 0.66 | 0.68 | 90.0 |
| P-1027 | 12.0 | J-1011 | J-1005 | 2,200 | -488.33 | 0.78 | 1.71 | 1.39 | 120.0 |
| P-1028 | 10.0 | J-1013 | J-1014 | 1,950 | 16.94 | 0.01 | 0.01 | 0.07 | 100.0 |
| P-1029 | 12.0 | J-1013 | J-1012 | 2,000 | -659.37 | 1.60 | 3.19 | 1.87 | 110.0 |
| P-1030 | 10.0 | J-1103 | J-1013 | 1,000 | -625.49 | 3.00 | 3.00 | 2.56 | 120.0 |
| P-1031 | 10.0 | J-1018 | J-1103 | 400 | -354.48 | 1.05 | 0.42 | 1.45 | 120.0 |
| P-1032 | 8.0 | J-1053 | J-1018 | 2,080 | -170.38 | 1.12 | 2.33 | 1.09 | 100.0 |
| P-1033 | 8.0 | J-1054 | J-1036 | 500 | 223.27 | 1.55 | 0.77 | 1.43 | 110.0 |
| P-1034 | 8.0 | J-1036 | J-1037 | 650 | 100.94 | 0.36 | 0.23 | 0.64 | 110.0 |
| P-1035 | 8.0 | J-1037 | J-1036 | 600 | -105.40 | 0.39 | 0.23 | 0.67 | 110.0 |
| P-1036 | 8.0 | J-1053 | J-1054 | 400 | 192.60 | 1.41 | 0.56 | 1.23 | 100.0 |
| P-1037 | 8.0 | J-1052 | J-1053 | 800 | 39.16 | 0.07 | 0.06 | 0.25 | 100.0 |
| P-1038 | 8.0 | J-1050 | J-1052 | 1,200 | 73.03 | 0.23 | 0.28 | 0.47 | 100.0 |
| P-1039 | 12.0 | J-1011 | J-1012 | 750 | 676.31 | 1.67 | 1.26 | 1.92 | 110.0 |
| P-1040 | 12.0 | J-1010 | J-1011 | 2,200 | 204.91 | 0.18 | 0.40 | 0.58 | 110.0 |
| P-1041 | 12.0 | J-1047 | J-1010 | 1,800 | -191.50 | 0.16 | 0.29 | 0.54 | 110.0 |
| P-1042 | 8.0 | J-1054 | J-1055 | 500 | -47.62 | 0.11 | 0.05 | 0.30 | 100.0 |
| P-1043 | 12.0 | J-1005 | J-1006 | 1,750 | -1,054.14 | 3.81 | 6.66 | 2.99 | 110.0 |
| P-1044 | 12.0 | J-1010 | J-1005 | 1,950 | -413.36 | 0.67 | 1.31 | 1.17 | 110.0 |
| P-1045 | 12.0 | J-1001 | J-1004 | 1,500 | -12.05 | 0.00 | 0.00 | 0.03 | 100.0 |
| P-1046 | 12.0 | J-1002 | J-1003 | 1,900 | -51.48 | 0.02 | 0.03 | 0.15 | 100.0 |
| P-1047 | 12.0 | J-1001 | J-1002 | 1,100 | -17.60 | 0.00 | 0.00 | 0.05 | 100.0 |
| P-1048 | 8.0 | J-1000 | J-1001 | 975 | -12.71 | 0.01 | 0.01 | 0.08 | 100.0 |
| P-1049 | 12.0 | J-1004 | J-1000 | 1,400 | 38.10 | 0.01 | 0.01 | 0.11 | 120.0 |
| P-1050 | 12.0 | J-1003 | J-1004 | 1,200 | 67.09 | 0.03 | 0.03 | 0.19 | 100.0 |
| P-1051 | 12.0 | J-1005 | J-1003 | 430 | 135.51 | 0.10 | 0.04 | 0.38 | 100.0 |
| P-1052 | 12.0 | J-1100 | T-3 | 200 | -1,551.25 | 6.63 | 1.33 | 4.40 | 120.0 |
| P-1053 | 12.0 | J-1100 | J-1040 | 200 | 1,127.93 | 4.32 | 0.86 | 3.20 | 110.0 |

# Scenario: PH-Buildout
# Steady State Analysis
# Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-1054 | 12.0 | J-1042 | J-1100 | 1,000 | -406.38 | 0.65 | 0.65 | 1.15 | 110.0 |
| P-1055 | 8.0 | J-1044 | J-1046 | 350 | 51.74 | 0.12 | 0.04 | 0.33 | 100.0 |
| P-1056 | 8.0 | J-1046 | J-1048 | 1,360 | 359.69 | 4.47 | 6.08 | 2.30 | 100.0 |
| P-1057 | 12.0 | J-1046 | J-1047 | 1,800 | -174.57 | 0.14 | 0.25 | 0.50 | 110.0 |
| P-1058 | 12.0 | J-1044 | J-1046 | 350 | 150.32 | 0.12 | 0.04 | 0.43 | 100.0 |
| P-1059 | 8.0 | J-1044 | J-1061 | 1,100 | 214.20 | 1.71 | 1.88 | 1.37 | 100.0 |
| P-1060 | 12.0 | J-1043 | J-1044 | 600 | 433.20 | 0.73 | 0.44 | 1.23 | 110.0 |
| P-1061 | 12.0 | J-1043 | J-1042 | 800 | -389.44 | 0.60 | 0.48 | 1.10 | 110.0 |
| P-1062 | 8.0 | J-1041 | J-1043 | 1,150 | 60.70 | 0.12 | 0.14 | 0.39 | 120.0 |
| P-1063 | 8.0 | J-1040 | J-1041 | 500 | 94.58 | 0.27 | 0.13 | 0.60 | 120.0 |
| P-1064 | 12.0 | J-1104 | J-1040 | 615 | -1,016.41 | 4.25 | 2.61 | 2.88 | 100.0 |
| P-1065 | 12.0 | J-1039 | J-1104 | 1,585 | -981.55 | 3.98 | 6.31 | 2.78 | 100.0 |
| P-1066 | 12.0 | J-1101 | J-1079 | 1,326 | -109.88 | 0.05 | 0.07 | 0.31 | 120.0 |
| P-1067 | 12.0 | J-1059 | J-1101 | 1,774 | -75.02 | 0.02 | 0.04 | 0.21 | 120.0 |
| P-1068 | 8.0 | J-1057 | J-1058 | 1,350 | -10.46 | 0.00 | 0.01 | 0.07 | 120.0 |
| P-1069 | 12.0 | J-1058 | J-1057 | 1,870 | 24.40 | 0.00 | 0.01 | 0.07 | 120.0 |
| P-1070 | 8.0 | J-1050 | J-1051 | 1,250 | 16.94 | 0.01 | 0.01 | 0.11 | 120.0 |
| P-1071 | 8.0 | J-1048 | J-1050 | 1,200 | 291.93 | 3.04 | 3.64 | 1.86 | 100.0 |
| P-1072 | 8.0 | J-1048 | J-1049 | 800 | 50.82 | 0.12 | 0.10 | 0.32 | 100.0 |
| P-1073 | 6.0 | J-1061 | J-1045 | 1,400 | 197.26 | 5.97 | 8.35 | 2.24 | 100.0 |
| P-1074 | 12.0 | J-1045 | J-1039 | 550 | -940.84 | 3.68 | 2.02 | 2.67 | 100.0 |
| P-1075 | 12.0 | J-1045 | J-1058 | 2,800 | 342.00 | 0.56 | 1.58 | 0.97 | 100.0 |
| P-1076 | 12.0 | J-1062 | J-1045 | 280 | -732.02 | 2.31 | 0.65 | 2.08 | 100.0 |
| P-1077 | 12.0 | J-1075 | J-1076 | 500 | 34.86 | 0.01 | 0.00 | 0.10 | 110.0 |
| P-1078 | 12.0 | J-1062 | J-1075 | 500 | 69.72 | 0.03 | 0.01 | 0.20 | 100.0 |
| P-1079 | 8.0 | J-1077 | J-1080 | 200 | 34.86 | 0.04 | 0.01 | 0.22 | 120.0 |
| P-1080 | 12.0 | J-1062 | J-1059 | 2,800 | 266.53 | 0.30 | 0.84 | 0.76 | 110.0 |
| P-1081 | 12.0 | J-1078 | J-1062 | 500 | -361.48 | 0.63 | 0.31 | 1.03 | 100.0 |
| P-1082 | 12.0 | J-1077 | J-1078 | 350 | -326.61 | 0.37 | 0.13 | 0.93 | 120.0 |
| P-1083 | 12.0 | J-1079 | J-1077 | 1,200 | -256.89 | 0.24 | 0.28 | 0.73 | 120.0 |
| P-1084 | 12.0 | J-1058 | J-1059 | 300 | -306.69 | 0.33 | 0.10 | 0.87 | 120.0 |
| P-1085 | 12.0 | J-1063 | J-1058 | 1,750 | -578.97 | 1.26 | 2.20 | 1.64 | 110.0 |
| P-1086 | 12.0 | J-1093 | J-1094 | 1,250 | 16.94 | 0.00 | 0.00 | 0.05 | 110.0 |
| P-1087 | 6.0 | J-1092 | J-1093 | 1,600 | 16.62 | 0.06 | 0.10 | 0.19 | 100.0 |
| P-1088 | 8.0 | J-1093 | J-1096 | 1,100 | -17.26 | 0.01 | 0.01 | 0.11 | 110.0 |
| P-1089 | 8.0 | J-1096 | J-1097 | 2,000 | -34.20 | 0.05 | 0.10 | 0.22 | 110.0 |
| P-1090 | 8.0 | J-1092 | J-1097 | 800 | -17.39 | 0.02 | 0.01 | 0.11 | 100.0 |
| P-1091 | 8.0 | J-1089 | J-1092 | 2,000 | 16.17 | 0.01 | 0.03 | 0.10 | 100.0 |
| P-1092 | 8.0 | J-1097 | J-1091 | 650 | -68.53 | 0.21 | 0.13 | 0.44 | 100.0 |
| P-1093 | 8.0 | J-1091 | J-1089 | 600 | 66.98 | 0.20 | 0.12 | 0.43 | 100.0 |
| P-1094 | 8.0 | J-1095 | J-1089 | 840 | -33.88 | 0.06 | 0.05 | 0.22 | 100.0 |
| P-1095 | 6.0 | J-1095 | PRV-2 | 2,322 | 0.00 | 0.00 | 0.00 | 0.00 | 110.0 |
| P-1096 | 8.0 | J-1084 | J-1085 | 1,800 | 92.56 | 0.36 | 0.65 | 0.59 | 100.0 |
| P-1098 | 8.0 | J-1084 | J-1083 | 900 | 33.99 | 0.05 | 0.04 | 0.22 | 110.0 |
| P-1099 | 8.0 | J-1083 | J-1082 | 1,350 | -161.40 | 0.85 | 1.15 | 1.03 | 110.0 |
| P-1100 | 10.0 | J-1086 | J-1083 | 1,150 | -178.46 | 0.41 | 0.47 | 0.73 | 100.0 |
| P-1101 | 10.0 | J-1086 | J-1090 | 515 | 100.21 | 0.14 | 0.07 | 0.41 | 100.0 |
| P-1102 | 10.0 | J-1087 | J-1086 | 1,100 | -61.31 | 0.05 | 0.05 | 0.25 | 110.0 |
| P-1103 | 10.0 | J-1085 | J-1090 | 500 | -93.76 | 0.13 | 0.06 | 0.38 | 100.0 |
| P-1104 | 12.0 | J-1081 | J-1121 | 690 | 16.94 | 0.00 | 0.00 | 0.05 | 120.0 |
| P-1105 | 8.0 | J-1060 | J-1084 | 1,300 | 143.49 | 0.81 | 1.06 | 0.92 | 100.0 |

# Scenario: PH-Buildout
# Steady State Analysis
# Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-1106 | 10.0 | J-1088 | J-1087 | 700 | -44.37 | 0.03 | 0.02 | 0.18 | 110.0 |
| P-1107 | 8.0 | J-1091 | J-1085 | 650 | -169.39 | 1.11 | 0.72 | 1.08 | 100.0 |
| P-1108 | 10.0 | J-1090 | J-1088 | 1,100 | -10.49 | 0.00 | 0.00 | 0.04 | 110.0 |
| P-1109 | 8.0 | J-1064 | J-1060 | 300 | 98.89 | 0.25 | 0.08 | 0.63 | 130.0 |
| P-1110 | 8.0 | J-1068 | J-1069 | 1,450 | 77.10 | 0.26 | 0.37 | 0.49 | 100.0 |
| P-1111 | 8.0 | J-1038 | J-1073 | 1,400 | 5.04 | 0.00 | 0.00 | 0.03 | 110.0 |
| P-1112 | 8.0 | J-1068 | J-1072 | 950 | -153.27 | 0.92 | 0.87 | 0.98 | 100.0 |
| P-1113 | 8.0 | J-1065 | J-1068 | 500 | -59.23 | 0.16 | 0.08 | 0.38 | 100.0 |
| P-1114 | 6.0 | J-1073 | J-1065 | 1,700 | 74.70 | 0.99 | 1.68 | 0.85 | 100.0 |
| P-1115 | 6.0 | J-1056 | J-1073 | 1,100 | 86.59 | 1.30 | 1.43 | 0.98 | 100.0 |
| P-1116 | 8.0 | J-1065 | J-1064 | 250 | 40.95 | 0.08 | 0.02 | 0.26 | 100.0 |
| P-1117 | 8.0 | J-1066 | J-1065 | 1,400 | -76.04 | 0.25 | 0.35 | 0.49 | 100.0 |
| P-1118 | 8.0 | J-1064 | J-1067 | 1,250 | 123.78 | 0.62 | 0.77 | 0.79 | 100.0 |
| P-1119 | 12.0 | J-1063 | J-1064 | 1,910 | 216.58 | 0.20 | 0.39 | 0.61 | 110.0 |
| P-1120 | 12.0 | J-1081 | J-1063 | 450 | -327.53 | 0.44 | 0.20 | 0.93 | 110.0 |
| P-1121 | 12.0 | J-1082 | J-1081 | 700 | -275.73 | 0.32 | 0.22 | 0.78 | 110.0 |
| P-1122 | 12.0 | J-1082 | J-1060 | 1,400 | 79.47 | 0.03 | 0.04 | 0.23 | 110.0 |
| P-1123 | 6.0 | J-1069 | J-1070 | 500 | 33.88 | 0.23 | 0.11 | 0.38 | 100.0 |
| P-1124 | 6.0 | J-1069 | J-1066 | 400 | 26.28 | 0.14 | 0.06 | 0.30 | 100.0 |
| P-1125 | 6.0 | J-1067 | J-1066 | 350 | -85.39 | 1.27 | 0.44 | 0.97 | 100.0 |
| P-1126 | 6.0 | J-1070 | J-1071 | 1,000 | 16.94 | 0.06 | 0.06 | 0.19 | 100.0 |
| P-1127 | 8.0 | J-1038 | J-1037 | 900 | -189.40 | 1.14 | 1.03 | 1.21 | 110.0 |
| P-1128 | 8.0 | J-1072 | J-1038 | 800 | -167.41 | 0.91 | 0.73 | 1.07 | 110.0 |
| P-1129 | 8.0 | J-1055 | J-1050 | 650 | -185.02 | 1.30 | 0.85 | 1.18 | 100.0 |
| P-1130 | 8.0 | J-1055 | J-1056 | 1,120 | 120.47 | 0.59 | 0.66 | 0.77 | 100.0 |
| P-1131 | 10.0 | J-1019 | J-1022 | 500 | 102.95 | 0.18 | 0.09 | 0.42 | 90.0 |
| P-1132 | 8.0 | J-1020 | J-1019 | 520 | -47.27 | 0.10 | 0.05 | 0.30 | 100.0 |
| P-1133 | 8.0 | J-1021 | J-1020 | 800 | -12.83 | 0.01 | 0.01 | 0.08 | 100.0 |
| P-1134 | 6.0 | J-1022 | J-1021 | 700 | -13.39 | 0.04 | 0.03 | 0.15 | 100.0 |
| P-1135 | 10.0 | J-1023 | J-1022 | 500 | -67.75 | 0.08 | 0.04 | 0.28 | 90.0 |
| P-1136 | 8.0 | J-1020 | J-1021 | 450 | 17.50 | 0.02 | 0.01 | 0.11 | 100.0 |
| P-1137 | 8.0 | J-1074 | J-1024 | 800 | -3.31 | 0.00 | 0.00 | 0.02 | 100.0 |
| P-1138 | 8.0 | J-1023 | J-1074 | 900 | 13.63 | 0.01 | 0.01 | 0.09 | 100.0 |
| P-1139 | 10.0 | J-1024 | J-1023 | 320 | -37.19 | 0.03 | 0.01 | 0.15 | 90.0 |
| P-1140 | 10.0 | J-1024 | J-1099 | 330 | 16.94 | 0.01 | 0.00 | 0.07 | 90.0 |
| P-1141 | 10.0 | J-1099 | PRV-3 | 5 | 0.00 | 0.00 | 0.00 | 0.00 | 90.0 |
| P-1142 | 8.0 | J-1092 | PRV-1 | 390 | 0.00 | 0.00 | 0.00 | 0.00 | 100.0 |
| P-1143 | 12.0 | J-1015 | J-1105 | 825 | 50.82 | 0.01 | 0.01 | 0.14 | 130.0 |
| P-1144 | 12.0 | J-1105 | J-1106 | 715 | 16.94 | 0.00 | 0.00 | 0.05 | 130.0 |
| P-1145 | 8.0 | J-1105 | J-1107 | 928 | 16.94 | 0.01 | 0.01 | 0.11 | 130.0 |
| P-1146 | 12.0 | J-1008 | J-1108 | 1,077 | 84.69 | 0.03 | 0.03 | 0.24 | 120.0 |
| P-1147 | 8.0 | J-1108 | J-1109 | 757 | 16.94 | 0.01 | 0.01 | 0.11 | 130.0 |
| P-1148 | 8.0 | J-1017 | J-1110 | 1,053 | 16.94 | 0.01 | 0.01 | 0.11 | 130.0 |
| P-1149 | 12.0 | J-1111 | J-1032 | 1,442 | -53.35 | 0.02 | 0.02 | 0.15 | 110.0 |
| P-1150 | 8.0 | J-1111 | J-1112 | 573 | 16.94 | 0.01 | 0.01 | 0.11 | 130.0 |
| P-1151 | 12.0 | J-1031 | J-1111 | 1,858 | -19.47 | 0.00 | 0.00 | 0.06 | 110.0 |
| P-1152 | 8.0 | J-1030 | J-1113 | 439 | 16.94 | 0.01 | 0.00 | 0.11 | 130.0 |
| P-1153 | 8.0 | J-1025 | J-1114 | 459 | 16.94 | 0.01 | 0.00 | 0.11 | 130.0 |
| P-1154 | 12.0 | J-1002 | J-1115 | 2,056 | 16.94 | 0.00 | 0.00 | 0.05 | 130.0 |
| P-1155 | 8.0 | J-1000 | J-1116 | 920 | 16.94 | 0.01 | 0.01 | 0.11 | 130.0 |
| P-1156 | 8.0 | J-1000 | J-1117 | 1,514 | 16.94 | 0.01 | 0.01 | 0.11 | 130.0 |

# Scenario: PH-Buildout
# Steady State Analysis
# Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-1157 | 8.0 | J-1049 | J-1118 | 828 | 16.94 | 0.01 | 0.01 | 0.11 | 130.0 |
| P-1158 | 8.0 | J-1049 | J-1119 | 1,231 | 16.94 | 0.01 | 0.01 | 0.11 | 130.0 |
| P-1159 | 10.0 | J-1052 | J-1120 | 698 | 16.94 | 0.00 | 0.00 | 0.07 | 130.0 |
| P-1161 | 6.0 | J-1041 | J-1122 | 338 | 16.94 | 0.04 | 0.01 | 0.19 | 130.0 |
| P-1162 | 6.0 | J-1056 | J-1123 | 932 | 16.94 | 0.05 | 0.05 | 0.19 | 110.0 |
| P-1163 | 6.0 | J-1067 | J-1124 | 388 | 174.31 | 2.92 | 1.13 | 1.98 | 130.0 |
| P-1164 | 6.0 | J-1124 | J-1125 | 150 | 104.58 | 1.13 | 0.17 | 1.19 | 130.0 |
| P-1165 | 6.0 | J-1125 | J-1126 | 100 | 34.86 | 0.15 | 0.01 | 0.40 | 130.0 |
| P-1166 | 6.0 | J-1125 | J-1127 | 224 | 34.86 | 0.15 | 0.03 | 0.40 | 130.0 |
| P-1167 | 6.0 | J-1124 | J-1128 | 747 | 34.86 | 0.15 | 0.11 | 0.40 | 130.0 |
| P-1168 | 8.0 | J-1095 | J-1131 | 773 | 16.94 | 0.01 | 0.01 | 0.11 | 130.0 |
| P-1169 | 8.0 | J-1091 | J-1132 | 885 | 16.94 | 0.01 | 0.01 | 0.11 | 130.0 |
| P-1170 | 8.0 | J-1088 | J-1133 | 1,016 | 16.94 | 0.01 | 0.01 | 0.11 | 130.0 |
| P-2000 | 6.0 | J-2017 | J-2018 | 1,600 | 10.26 | 0.02 | 0.04 | 0.12 | 100.0 |
| P-2001 | 8.0 | J-2016 | J-2019 | 650 | -60.58 | 0.17 | 0.11 | 0.39 | 100.0 |
| P-2002 | 8.0 | J-2016 | J-2017 | 750 | 20.51 | 0.02 | 0.02 | 0.13 | 100.0 |
| P-2003 | 12.0 | J-2020 | J-2016 | 650 | -29.81 | 0.01 | 0.00 | 0.08 | 110.0 |
| P-2004 | 8.0 | J-2015 | J-2021 | 550 | -57.84 | 0.15 | 0.08 | 0.37 | 100.0 |
| P-2005 | 6.0 | J-2020 | J-2015 | 450 | -40.86 | 0.39 | 0.18 | 0.46 | 90.0 |
| P-2006 | 8.0 | J-2019 | J-2015 | 300 | -70.84 | 0.22 | 0.07 | 0.45 | 100.0 |
| P-2007 | 6.0 | J-2005 | J-2020 | 300 | -60.42 | 0.41 | 0.12 | 0.69 | 130.0 |
| P-2008 | 6.0 | J-2191 | J-2192 | 1,093 | 10.26 | 0.02 | 0.02 | 0.12 | 130.0 |
| P-2009 | 8.0 | J-2015 | J-2014 | 2,160 | -64.11 | 0.18 | 0.40 | 0.41 | 100.0 |
| P-2010 | 6.0 | J-2004 | J-2005 | 1,200 | -50.16 | 0.47 | 0.57 | 0.57 | 100.0 |
| P-2011 | 8.0 | J-207 | T-2 | 223 | -196.65 | 0.90 | 0.20 | 1.26 | 130.0 |
| P-2012 | 8.0 | J-2025 | J-2024 | 2,400 | -8.59 | 0.01 | 0.01 | 0.05 | 90.0 |
| P-2013 | 8.0 | J-2023 | J-2025 | 250 | 1.67 | 0.00 | 0.00 | 0.01 | 90.0 |
| P-2014 | 8.0 | J-2024 | J-2023 | 1,300 | 11.92 | 0.01 | 0.01 | 0.08 | 90.0 |
| P-2015 | 8.0 | J-2022 | J-2024 | 250 | 30.77 | 0.06 | 0.01 | 0.20 | 90.0 |
| P-2016 | 10.0 | J-2014 | J-207 | 800 | -145.33 | 0.34 | 0.27 | 0.59 | 90.0 |
| P-2017 | 8.0 | J-207 | J-2027 | 1,200 | 51.33 | 0.10 | 0.12 | 0.33 | 110.0 |
| P-2018 | 10.0 | J-2022 | J-2029 | 3,500 | -129.64 | 0.23 | 0.80 | 0.53 | 100.0 |
| P-2019 | 10.0 | J-2014 | J-2011 | 2,900 | 70.95 | 0.07 | 0.22 | 0.29 | 100.0 |
| P-2020 | 6.0 | J-2010 | J-2004 | 700 | -15.80 | 0.07 | 0.05 | 0.18 | 90.0 |
| P-2021 | 12.0 | PRV-4 | J-2003 | 167 | 0.00 | 0.00 | 0.00 | 0.00 | 110.0 |
| P-2022 | 6.0 | J-2004 | J-2003 | 350 | 24.10 | 0.15 | 0.05 | 0.27 | 90.0 |
| P-2023 | 10.0 | J-2003 | J-2002 | 1,650 | 13.84 | 0.00 | 0.01 | 0.06 | 110.0 |
| P-2024 | 8.0 | J-2009 | J-2002 | 850 | 9.15 | 0.00 | 0.00 | 0.06 | 110.0 |
| P-2025 | 6.0 | J-2008 | J-2001 | 1,200 | 8.07 | 0.01 | 0.01 | 0.09 | 130.0 |
| P-2026 | 8.0 | J-2008 | J-2001 | 1,000 | 16.07 | 0.01 | 0.01 | 0.10 | 110.0 |
| P-2027 | 6.0 | J-2008 | J-2009 | 750 | 13.86 | 0.05 | 0.04 | 0.16 | 90.0 |
| P-2028 | 10.0 | J-2002 | J-2001 | 400 | -80.35 | 0.08 | 0.03 | 0.33 | 110.0 |
| P-2029 | 8.0 | J-2029 | J-2031 | 400 | 10.26 | 0.01 | 0.00 | 0.07 | 110.0 |
| P-2030 | 8.0 | J-2050 | J-2012 | 400 | 101.46 | 0.43 | 0.17 | 0.65 | 100.0 |
| P-2031 | 6.0 | J-2051 | J-2050 | 450 | -31.78 | 0.20 | 0.09 | 0.36 | 100.0 |
| P-2032 | 6.0 | J-2026 | J-2051 | 300 | -21.53 | 0.10 | 0.03 | 0.24 | 100.0 |
| P-2033 | 12.0 | J-2026 | J-2028 | 600 | -150.69 | 0.09 | 0.05 | 0.43 | 120.0 |
| P-2034 | 12.0 | J-2026 | J-2012 | 650 | 140.82 | 0.08 | 0.05 | 0.40 | 120.0 |
| P-2035 | 8.0 | J-2013 | J-2026 | 1,300 | -21.14 | 0.02 | 0.03 | 0.13 | 110.0 |
| P-2036 | 6.0 | J-2012 | J-2013 | 900 | -10.88 | 0.03 | 0.03 | 0.12 | 100.0 |
| P-2037 | 10.0 | J-2011 | J-2012 | 150 | -242.90 | 0.89 | 0.13 | 0.99 | 90.0 |

# Scenario: PH-Buildout
# Steady State Analysis
# Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-2038 | 8.0 | J-2028 | J-2029 | 900 | -119.87 | 0.71 | 0.64 | 0.77 | 90.0 |
| P-2039 | 8.0 | J-2027 | J-2028 | 1,950 | 41.07 | 0.07 | 0.13 | 0.26 | 110.0 |
| P-2040 | 8.0 | J-2007 | J-2008 | 1,950 | 48.26 | 0.13 | 0.26 | 0.31 | 90.0 |
| P-2041 | 10.0 | J-2007 | J-2011 | 600 | -303.60 | 1.34 | 0.80 | 1.24 | 90.0 |
| P-2042 | 10.0 | J-2006 | J-2007 | 600 | -107.49 | 0.20 | 0.12 | 0.44 | 90.0 |
| P-2043 | 8.0 | J-2042 | J-2007 | 1,650 | -68.81 | 0.21 | 0.34 | 0.44 | 100.0 |
| P-2044 | 8.0 | J-2007 | J-2043 | 1,450 | 68.79 | 0.18 | 0.25 | 0.44 | 110.0 |
| P-2045 | 10.0 | J-2030 | J-2029 | 1,080 | 270.02 | 0.74 | 0.80 | 1.10 | 110.0 |
| P-2046 | 8.0 | J-2050 | J-2049 | 600 | -143.50 | 0.81 | 0.49 | 0.92 | 100.0 |
| P-2047 | 10.0 | J-2000 | J-2006 | 470 | -97.23 | 0.16 | 0.08 | 0.40 | 90.0 |
| P-2048 | 10.0 | J-2001 | J-2000 | 1,350 | -66.46 | 0.06 | 0.07 | 0.27 | 110.0 |
| P-2049 | 10.0 | PRV-3 | J-2159 | 5 | 0.00 | 0.00 | 0.00 | 0.00 | 90.0 |
| P-2050 | 10.0 | J-2159 | J-2000 | 210 | -10.26 | 0.00 | 0.00 | 0.04 | 90.0 |
| P-2051 | 12.0 | J-2153 | J-208 | 909 | -1,420.29 | 6.61 | 6.01 | 4.03 | 110.0 |
| P-2052 | 8.0 | J-2036 | J-2038 | 1,250 | -257.25 | 2.40 | 3.00 | 1.64 | 100.0 |
| P-2053 | 8.0 | J-2059 | J-2060 | 1,100 | -261.78 | 3.02 | 3.32 | 1.67 | 90.0 |
| P-2054 | 12.0 | J-2153 | J-2032 | 1,460 | 866.19 | 2.65 | 3.86 | 2.46 | 110.0 |
| P-2055 | 6.0 | J-2032 | J-2033 | 450 | -120.52 | 2.01 | 0.90 | 1.37 | 110.0 |
| P-2056 | 8.0 | J-2060 | J-2062 | 200 | 20.51 | 0.02 | 0.00 | 0.13 | 100.0 |
| P-2057 | 8.0 | J-2030 | J-2032 | 1,800 | -148.04 | 1.05 | 1.89 | 0.94 | 90.0 |
| P-2058 | 8.0 | J-2060 | J-2061 | 800 | 10.26 | 0.01 | 0.00 | 0.07 | 100.0 |
| P-2059 | 8.0 | J-2032 | J-2060 | 450 | 302.80 | 3.95 | 1.78 | 1.93 | 90.0 |
| P-2060 | 12.0 | J-2030 | J-2032 | 1,800 | -525.61 | 1.05 | 1.89 | 1.49 | 110.0 |
| P-2061 | 8.0 | J-2038 | J-2030 | 2,600 | -208.85 | 1.17 | 3.03 | 1.33 | 120.0 |
| P-2062 | 8.0 | J-2039 | J-2038 | 900 | 58.65 | 0.16 | 0.14 | 0.37 | 100.0 |
| P-2063 | 8.0 | J-2042 | J-2041 | 250 | 10.45 | 0.01 | 0.00 | 0.07 | 100.0 |
| P-2064 | 8.0 | J-2039 | J-2042 | 800 | -40.95 | 0.08 | 0.06 | 0.26 | 100.0 |
| P-2065 | 8.0 | J-2040 | J-2039 | 600 | 27.96 | 0.04 | 0.02 | 0.18 | 100.0 |
| P-2066 | 8.0 | J-2041 | J-2040 | 550 | 38.22 | 0.07 | 0.04 | 0.24 | 100.0 |
| P-2067 | 8.0 | J-2044 | J-2041 | 550 | 38.02 | 0.07 | 0.04 | 0.24 | 100.0 |
| P-2068 | 8.0 | J-2044 | J-2045 | 400 | 10.26 | 0.01 | 0.00 | 0.07 | 100.0 |
| P-2069 | 8.0 | J-2043 | J-2044 | 350 | 58.53 | 0.15 | 0.05 | 0.37 | 100.0 |
| P-2070 | 8.0 | J-2046 | J-2047 | 250 | -83.53 | 0.25 | 0.06 | 0.53 | 110.0 |
| P-2071 | 8.0 | J-2048 | J-2046 | 500 | -73.27 | 0.20 | 0.10 | 0.47 | 110.0 |
| P-2072 | 8.0 | J-2047 | J-2030 | 280 | -184.52 | 1.58 | 0.44 | 1.18 | 90.0 |
| P-2073 | 8.0 | J-2048 | J-2047 | 380 | -90.73 | 0.42 | 0.16 | 0.58 | 90.0 |
| P-2074 | 8.0 | J-2049 | J-2048 | 250 | -153.75 | 1.13 | 0.28 | 0.98 | 90.0 |
| P-2075 | 12.0 | J-2184 | J-2068 | 928 | 298.12 | 0.31 | 0.29 | 0.85 | 120.0 |
| P-2076 | 8.0 | J-2157 | J-2158 | 1,800 | 1.53 | 0.00 | 0.00 | 0.01 | 110.0 |
| P-2077 | 12.0 | J-2155 | J-2154 | 900 | -324.65 | 0.37 | 0.33 | 0.92 | 120.0 |
| P-2079 | 8.0 | J-2157 | J-2158 | 600 | 2.71 | 0.00 | 0.00 | 0.02 | 110.0 |
| P-2080 | 8.0 | J-2156 | J-2157 | 300 | 47.23 | 0.09 | 0.03 | 0.30 | 110.0 |
| P-2081 | 6.0 | J-2033 | J-2034 | 900 | -44.90 | 0.32 | 0.29 | 0.51 | 110.0 |
| P-2082 | 12.0 | J-2154 | J-2153 | 1,600 | -543.84 | 0.95 | 1.52 | 1.54 | 120.0 |
| P-2083 | 8.0 | J-2156 | J-2154 | 550 | -198.52 | 1.25 | 0.69 | 1.27 | 110.0 |
| P-2084 | 8.0 | J-2034 | J-2156 | 700 | -141.03 | 0.66 | 0.46 | 0.90 | 110.0 |
| P-2085 | 8.0 | J-2033 | J-2034 | 1,100 | -85.87 | 0.26 | 0.29 | 0.55 | 110.0 |
| P-2086 | 10.0 | J-2062 | J-2063 | 997 | 10.26 | 0.00 | 0.00 | 0.04 | 110.0 |
| P-2087 | 12.0 | J-2055 | J-2059 | 650 | -251.52 | 0.23 | 0.15 | 0.71 | 120.0 |
| P-2088 | 8.0 | J-2054 | J-2053 | 800 | 134.65 | 1.87 | 1.49 | 0.86 | 60.0 |
| P-2089 | 6.0 | J-2055 | J-2054 | 250 | 144.90 | 8.68 | 2.17 | 1.64 | 60.0 |

# Scenario: PH-Buildout
# Steady State Analysis
# Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-2092 | 12.0 | J-2055 | J-2056 | 150 | 160.29 | 0.10 | 0.01 | 0.45 | 120.0 |
| P-2093 | 10.0 | J-2127 | J-2055 | 2,560 | 63.93 | 0.06 | 0.16 | 0.26 | 100.0 |
| P-2094 | 6.0 | J-2127 | J-2065 | 350 | 88.53 | 3.48 | 1.22 | 1.00 | 60.0 |
| P-2095 | 6.0 | J-2068 | J-2127 | 450 | 189.65 | 14.29 | 6.43 | 2.15 | 60.0 |
| P-2096 | 8.0 | J-2185 | J-2186 | 628 | 10.26 | 0.00 | 0.00 | 0.07 | 130.0 |
| P-2097 | 12.0 | J-2065 | J-2064 | 200 | 29.15 | 0.00 | 0.00 | 0.08 | 120.0 |
| P-2098 | 12.0 | J-2066 | J-2065 | 450 | -31.20 | 0.01 | 0.00 | 0.09 | 110.0 |
| P-2099 | 12.0 | J-2067 | J-2066 | 200 | -3.02 | 0.00 | 0.00 | 0.01 | 120.0 |
| P-2100 | 12.0 | J-2064 | J-2067 | 450 | 25.16 | 0.00 | 0.00 | 0.07 | 110.0 |
| P-2101 | 6.0 | J-2057 | J-2064 | 1,250 | 33.30 | 0.57 | 0.71 | 0.38 | 60.0 |
| P-2102 | 6.0 | J-2058 | J-2057 | 550 | 32.45 | 0.54 | 0.30 | 0.37 | 60.0 |
| P-2103 | 8.0 | J-2053 | J-2058 | 650 | -242.67 | 5.55 | 3.61 | 1.55 | 60.0 |
| P-2104 | 6.0 | J-2071 | J-2070 | 1,399 | -4.77 | 0.00 | 0.01 | 0.05 | 130.0 |
| P-2105 | 6.0 | J-2070 | J-2071 | 1,081 | 5.48 | 0.00 | 0.01 | 0.06 | 130.0 |
| P-2106 | 8.0 | J-2069 | J-2070 | 1,800 | 20.51 | 0.02 | 0.03 | 0.13 | 110.0 |
| P-2107 | 8.0 | J-2036 | J-2037 | 300 | 10.26 | 0.01 | 0.00 | 0.07 | 100.0 |
| P-2108 | 8.0 | J-2035 | J-2036 | 2,180 | -236.74 | 1.47 | 3.20 | 1.51 | 120.0 |
| P-2109 | 8.0 | J-2035 | J-2052 | 1,300 | -23.98 | 0.03 | 0.04 | 0.15 | 100.0 |
| P-2110 | 8.0 | J-2052 | J-2053 | 2,400 | -152.19 | 0.91 | 2.18 | 0.97 | 100.0 |
| P-2111 | 8.0 | J-2090 | J-2052 | 700 | -34.71 | 0.05 | 0.03 | 0.22 | 110.0 |
| P-2112 | 8.0 | J-2035 | J-2090 | 1,800 | -6.53 | 0.00 | 0.00 | 0.04 | 110.0 |
| P-2113 | 8.0 | J-2081 | J-2035 | 650 | -239.07 | 2.10 | 1.36 | 1.53 | 100.0 |
| P-2114 | 6.0 | J-2081 | J-2082 | 950 | 10.26 | 0.02 | 0.02 | 0.12 | 100.0 |
| P-2115 | 8.0 | J-2080 | J-2081 | 2,050 | -218.55 | 1.78 | 3.64 | 1.39 | 100.0 |
| P-2116 | 8.0 | J-2079 | J-2080 | 2,600 | 88.37 | 0.20 | 0.53 | 0.56 | 130.0 |
| P-2117 | 8.0 | J-2083 | J-2079 | 650 | 49.36 | 0.11 | 0.07 | 0.32 | 100.0 |
| P-2118 | 8.0 | J-2089 | J-2053 | 1,200 | -196.95 | 1.05 | 1.25 | 1.26 | 120.0 |
| P-2119 | 8.0 | J-2088 | J-2089 | 3,000 | -186.69 | 0.95 | 2.84 | 1.19 | 120.0 |
| P-2120 | 12.0 | J-2091 | J-2058 | 1,000 | 199.96 | 0.15 | 0.15 | 0.57 | 120.0 |
| P-2121 | 12.0 | J-2092 | J-2091 | 1,050 | 210.21 | 0.16 | 0.17 | 0.60 | 120.0 |
| P-2122 | 12.0 | T-1 | J-2092 | 700 | 1,010.51 | 3.00 | 2.10 | 2.87 | 120.0 |
| P-2124 | 12.0 | J-2093 | J-2092 | 550 | -738.76 | 1.45 | 0.80 | 2.10 | 130.0 |
| P-2125 | 12.0 | J-2094 | J-2093 | 1,100 | -728.50 | 1.41 | 1.55 | 2.07 | 130.0 |
| P-2126 | 8.0 | J-2073 | J-2074 | 365 | 63.04 | 0.15 | 0.05 | 0.40 | 110.0 |
| P-2127 | 8.0 | J-2073 | J-2075 | 200 | 28.18 | 0.04 | 0.01 | 0.18 | 100.0 |
| P-2128 | 8.0 | J-2072 | J-2073 | 550 | 179.75 | 1.24 | 0.68 | 1.15 | 100.0 |
| P-2129 | 8.0 | PRV-2 | J-2072 | 238 | 0.00 | 0.00 | 0.00 | 0.00 | 100.0 |
| P-2130 | 8.0 | J-2076 | J-2072 | 1,900 | -65.48 | 0.19 | 0.36 | 0.42 | 100.0 |
| P-2131 | 8.0 | J-2072 | J-2080 | 300 | -278.74 | 2.79 | 0.84 | 1.78 | 100.0 |
| P-2132 | 8.0 | J-2084 | J-2085 | 550 | -59.52 | 0.13 | 0.07 | 0.38 | 110.0 |
| P-2133 | 8.0 | J-2079 | J-2084 | 1,350 | -49.26 | 0.09 | 0.13 | 0.31 | 110.0 |
| P-2134 | 8.0 | J-2085 | J-2083 | 950 | 59.62 | 0.13 | 0.13 | 0.38 | 110.0 |
| P-2135 | 8.0 | J-2086 | J-2085 | 450 | 129.39 | 0.56 | 0.25 | 0.83 | 110.0 |
| P-2136 | 8.0 | J-2087 | J-2086 | 800 | 139.65 | 0.65 | 0.52 | 0.89 | 110.0 |
| P-2137 | 8.0 | J-2087 | J-2088 | 1,360 | -176.43 | 1.19 | 1.63 | 1.13 | 100.0 |
| P-2138 | 8.0 | J-2132 | J-2087 | 300 | -26.53 | 0.03 | 0.01 | 0.17 | 110.0 |
| P-2140 | 12.0 | J-2133 | J-2167 | 2,000 | -666.96 | 1.39 | 2.78 | 1.89 | 120.0 |
| P-2141 | 12.0 | J-2133 | J-2165 | 1,500 | 467.89 | 0.85 | 1.27 | 1.33 | 110.0 |
| P-2142 | 8.0 | J-2132 | J-2133 | 960 | -188.81 | 1.35 | 1.30 | 1.21 | 100.0 |
| P-2143 | 8.0 | J-2078 | J-2076 | 1,000 | -21.59 | 0.02 | 0.02 | 0.14 | 100.0 |
| P-2144 | 8.0 | J-2077 | J-2078 | 1,200 | -11.33 | 0.01 | 0.01 | 0.07 | 100.0 |

# Scenario: PH-Buildout
# Steady State Analysis
# Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-2145 | 8.0 | J-2077 | J-2076 | 600 | -33.63 | 0.06 | 0.03 | 0.21 | 100.0 |
| P-2146 | 8.0 | J-2119 | J-2077 | 1,650 | -34.71 | 0.06 | 0.10 | 0.22 | 100.0 |
| P-2147 | 8.0 | J-2162 | J-2132 | 400 | -205.09 | 1.58 | 0.63 | 1.31 | 100.0 |
| P-2148 | 8.0 | J-2161 | J-2162 | 560 | -194.83 | 1.44 | 0.80 | 1.24 | 100.0 |
| P-2149 | 8.0 | J-2131 | J-2161 | 300 | -184.57 | 1.30 | 0.39 | 1.18 | 100.0 |
| P-2150 | 8.0 | J-2134 | J-2135 | 1,050 | -104.66 | 0.38 | 0.40 | 0.67 | 110.0 |
| P-2151 | 8.0 | J-2131 | J-2130 | 1,400 | 49.09 | 0.11 | 0.16 | 0.31 | 100.0 |
| P-2152 | 8.0 | J-2129 | J-2130 | 900 | -38.83 | 0.07 | 0.07 | 0.25 | 100.0 |
| P-2153 | 8.0 | J-2119 | J-2128 | 1,250 | -74.89 | 0.24 | 0.31 | 0.48 | 100.0 |
| P-2154 | 8.0 | J-2129 | J-2131 | 350 | -125.23 | 0.63 | 0.22 | 0.80 | 100.0 |
| P-2155 | 8.0 | J-2128 | J-2129 | 510 | -153.80 | 0.93 | 0.47 | 0.98 | 100.0 |
| P-2156 | 12.0 | J-2134 | J-2128 | 750 | -68.66 | 0.02 | 0.02 | 0.19 | 110.0 |
| P-2157 | 12.0 | J-2120 | J-2134 | 1,250 | -163.06 | 0.12 | 0.15 | 0.46 | 110.0 |
| P-2158 | 8.0 | J-2120 | J-2119 | 1,400 | 45.72 | 0.10 | 0.14 | 0.29 | 100.0 |
| P-2159 | 8.0 | J-2121 | J-2120 | 800 | -107.09 | 0.47 | 0.38 | 0.68 | 100.0 |
| P-2160 | 8.0 | J-2142 | J-2143 | 500 | -81.59 | 0.20 | 0.10 | 0.52 | 120.0 |
| P-2161 | 8.0 | J-2136 | J-2137 | 1,650 | 45.17 | 0.08 | 0.13 | 0.29 | 110.0 |
| P-2162 | 8.0 | J-2142 | J-2141 | 900 | -8.62 | 0.00 | 0.00 | 0.06 | 120.0 |
| P-2163 | 8.0 | J-2135 | J-2142 | 1,250 | -79.95 | 0.23 | 0.29 | 0.51 | 110.0 |
| P-2164 | 8.0 | J-2136 | J-2135 | 200 | 34.96 | 0.05 | 0.01 | 0.22 | 110.0 |
| P-2165 | 8.0 | J-2138 | J-2136 | 750 | 90.39 | 0.35 | 0.26 | 0.58 | 100.0 |
| P-2166 | 8.0 | J-2141 | J-2140 | 750 | 23.29 | 0.02 | 0.02 | 0.15 | 120.0 |
| P-2167 | 8.0 | J-2143 | J-2141 | 1,650 | 42.17 | 0.06 | 0.10 | 0.27 | 120.0 |
| P-2168 | 8.0 | J-2144 | J-2143 | 1,000 | 134.01 | 0.72 | 0.72 | 0.86 | 100.0 |
| P-2169 | 8.0 | J-2165 | J-2166 | 1,200 | 10.26 | 0.01 | 0.01 | 0.07 | 110.0 |
| P-2170 | 12.0 | J-2144 | J-2165 | 1,600 | -447.38 | 0.66 | 1.06 | 1.27 | 120.0 |
| P-2171 | 12.0 | J-2145 | J-2144 | 750 | -303.11 | 0.32 | 0.24 | 0.86 | 120.0 |
| P-2172 | 12.0 | J-2146 | J-2147 | 500 | 99.90 | 0.04 | 0.02 | 0.28 | 120.0 |
| P-2173 | 12.0 | J-2145 | J-2146 | 1,350 | 110.15 | 0.05 | 0.07 | 0.31 | 120.0 |
| P-2174 | 12.0 | J-2148 | J-2145 | 600 | -182.70 | 0.13 | 0.08 | 0.52 | 120.0 |
| P-2175 | 8.0 | J-2147 | J-2148 | 1,450 | -14.22 | 0.01 | 0.01 | 0.09 | 120.0 |
| P-2176 | 8.0 | J-2139 | J-2138 | 250 | 87.61 | 0.40 | 0.10 | 0.56 | 90.0 |
| P-2177 | 8.0 | J-2140 | J-2138 | 1,050 | 13.04 | 0.01 | 0.01 | 0.08 | 120.0 |
| P-2178 | 12.0 | J-2149 | J-2152 | 600 | 147.96 | 0.09 | 0.05 | 0.42 | 120.0 |
| P-2179 | 12.0 | J-2148 | J-2149 | 500 | 158.22 | 0.10 | 0.05 | 0.45 | 120.0 |
| P-2180 | 12.0 | J-2150 | J-2147 | 450 | -103.87 | 0.04 | 0.02 | 0.29 | 120.0 |
| P-2181 | 12.0 | J-2151 | J-2150 | 850 | -93.61 | 0.04 | 0.03 | 0.27 | 120.0 |
| P-2182 | 12.0 | J-2152 | J-2151 | 1,250 | -83.35 | 0.03 | 0.04 | 0.24 | 120.0 |
| P-2183 | 12.0 | J-2139 | J-2152 | 1,800 | -221.06 | 0.18 | 0.32 | 0.63 | 120.0 |
| P-2184 | 8.0 | J-2137 | J-2139 | 800 | -123.19 | 0.61 | 0.49 | 0.79 | 100.0 |
| P-2185 | 8.0 | J-2111 | J-2097 | 550 | 104.27 | 0.45 | 0.25 | 0.67 | 100.0 |
| P-2186 | 6.0 | J-2111 | J-2110 | 1,000 | -22.96 | 0.11 | 0.11 | 0.26 | 100.0 |
| P-2187 | 8.0 | J-2112 | J-2113 | 1,000 | -21.82 | 0.02 | 0.02 | 0.14 | 100.0 |
| P-2188 | 8.0 | J-2116 | J-2114 | 950 | -10.19 | 0.01 | 0.01 | 0.07 | 100.0 |
| P-2189 | 8.0 | J-2110 | J-2109 | 1,200 | 4.15 | 0.00 | 0.00 | 0.03 | 100.0 |
| P-2190 | 8.0 | J-2112 | J-2111 | 300 | 91.57 | 0.35 | 0.11 | 0.58 | 100.0 |
| P-2191 | 8.0 | J-2116 | J-2112 | 300 | 80.01 | 0.28 | 0.08 | 0.51 | 100.0 |
| P-2192 | 8.0 | J-2118 | J-2116 | 339 | 80.08 | 0.28 | 0.09 | 0.51 | 100.0 |
| P-2193 | 8.0 | J-2117 | J-2118 | 850 | -44.47 | 0.09 | 0.08 | 0.28 | 100.0 |
| P-2194 | 8.0 | J-2114 | J-2117 | 300 | -23.96 | 0.03 | 0.01 | 0.15 | 100.0 |
| P-2195 | 8.0 | J-2113 | J-2110 | 300 | 37.36 | 0.07 | 0.02 | 0.24 | 100.0 |

# Scenario: PH-Buildout
# Steady State Analysis
# Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-2196 | 8.0 | J-2114 | J-2113 | 300 | 69.44 | 0.21 | 0.06 | 0.44 | 100.0 |
| P-2197 | 8.0 | J-2163 | J-2114 | 1,300 | 65.92 | 0.19 | 0.25 | 0.42 | 100.0 |
| P-2198 | 8.0 | J-2164 | J-2163 | 800 | 68.91 | 0.21 | 0.17 | 0.44 | 100.0 |
| P-2199 | 8.0 | J-2122 | J-2164 | 400 | 79.17 | 0.27 | 0.11 | 0.51 | 100.0 |
| P-2200 | 8.0 | J-2121 | J-2122 | 400 | 77.21 | 0.22 | 0.09 | 0.49 | 110.0 |
| P-2201 | 8.0 | J-2123 | J-2124 | 400 | -66.84 | 0.20 | 0.08 | 0.43 | 100.0 |
| P-2202 | 8.0 | J-2126 | J-2137 | 800 | -158.11 | 0.98 | 0.78 | 1.01 | 100.0 |
| P-2203 | 8.0 | J-2123 | J-2125 | 300 | 44.37 | 0.09 | 0.03 | 0.28 | 100.0 |
| P-2204 | 8.0 | J-2122 | J-2123 | 280 | -12.22 | 0.01 | 0.00 | 0.08 | 100.0 |
| P-2205 | 8.0 | J-2124 | J-2121 | 250 | -19.62 | 0.02 | 0.01 | 0.13 | 100.0 |
| P-2206 | 8.0 | J-2126 | J-2124 | 210 | 57.48 | 0.15 | 0.03 | 0.37 | 100.0 |
| P-2207 | 8.0 | J-2125 | J-2126 | 400 | -90.37 | 0.35 | 0.14 | 0.58 | 100.0 |
| P-2208 | 8.0 | J-2163 | J-2125 | 400 | -124.48 | 0.63 | 0.25 | 0.79 | 100.0 |
| P-2209 | 8.0 | J-2109 | J-2163 | 600 | -117.22 | 0.56 | 0.34 | 0.75 | 100.0 |
| P-2210 | 8.0 | PRV-1 | J-2096 | 660 | 0.00 | 0.00 | 0.00 | 0.00 | 100.0 |
| P-2211 | 8.0 | J-2097 | J-2096 | 400 | 94.01 | 0.37 | 0.15 | 0.60 | 100.0 |
| P-2212 | 8.0 | J-2096 | J-2098 | 200 | 57.81 | 0.15 | 0.03 | 0.37 | 100.0 |
| P-2213 | 8.0 | J-2115 | J-2096 | 2,600 | -25.95 | 0.03 | 0.07 | 0.17 | 110.0 |
| P-2214 | 8.0 | J-2099 | J-2175 | 548 | 25.33 | 0.03 | 0.02 | 0.16 | 110.0 |
| P-2215 | 8.0 | J-2098 | J-2099 | 300 | 47.55 | 0.11 | 0.03 | 0.30 | 100.0 |
| P-2216 | 8.0 | J-2160 | J-2100 | 400 | 8.90 | 0.00 | 0.00 | 0.06 | 100.0 |
| P-2217 | 8.0 | J-2102 | J-2160 | 600 | 19.16 | 0.02 | 0.01 | 0.12 | 100.0 |
| P-2218 | 6.0 | J-2100 | J-2101 | 700 | 10.60 | 0.03 | 0.02 | 0.12 | 100.0 |
| P-2219 | 8.0 | J-2102 | J-2108 | 1,100 | -46.64 | 0.07 | 0.08 | 0.30 | 120.0 |
| P-2220 | 8.0 | J-2108 | J-2109 | 950 | -111.12 | 0.51 | 0.48 | 0.71 | 100.0 |
| P-2221 | 8.0 | J-2107 | J-2108 | 200 | -54.22 | 0.13 | 0.03 | 0.35 | 100.0 |
| P-2222 | 8.0 | J-2102 | J-2107 | 950 | -33.70 | 0.06 | 0.05 | 0.22 | 100.0 |
| P-2223 | 8.0 | J-2099 | J-2100 | 850 | 11.96 | 0.01 | 0.01 | 0.08 | 100.0 |
| P-2224 | 6.0 | J-2105 | J-2106 | 600 | 10.26 | 0.02 | 0.01 | 0.12 | 100.0 |
| P-2225 | 6.0 | J-2102 | J-2105 | 500 | 20.51 | 0.09 | 0.05 | 0.23 | 100.0 |
| P-2226 | 8.0 | J-2103 | J-2102 | 500 | -30.42 | 0.05 | 0.02 | 0.19 | 100.0 |
| P-2227 | 6.0 | J-2104 | J-2103 | 305 | -10.26 | 0.03 | 0.01 | 0.12 | 100.0 |
| P-2228 | 8.0 | J-2101 | J-2103 | 1,900 | -9.91 | 0.00 | 0.01 | 0.06 | 110.0 |
| P-2229 | 6.0 | J-2101 | J-2168 | 376 | 10.26 | 0.02 | 0.01 | 0.12 | 130.0 |
| P-2230 | 6.0 | J-2175 | J-2170 | 369 | 10.26 | 0.02 | 0.01 | 0.12 | 130.0 |
| P-2231 | 6.0 | J-2175 | J-2169 | 373 | 10.26 | 0.02 | 0.01 | 0.12 | 130.0 |
| P-2232 | 8.0 | J-2175 | J-2115 | 1,352 | -5.44 | 0.00 | 0.00 | 0.03 | 110.0 |
| P-2233 | 6.0 | J-2115 | J-2171 | 853 | 10.26 | 0.02 | 0.01 | 0.12 | 130.0 |
| P-2234 | 6.0 | J-2107 | J-2172 | 980 | 10.26 | 0.02 | 0.02 | 0.12 | 130.0 |
| P-2235 | 8.0 | J-2117 | J-2173 | 348 | 10.26 | 0.00 | 0.00 | 0.07 | 130.0 |
| P-2236 | 8.0 | J-2118 | J-2174 | 567 | 10.26 | 0.00 | 0.00 | 0.07 | 130.0 |
| P-2237 | 12.0 | J-2176 | J-2094 | 1,500 | -718.25 | 1.37 | 2.06 | 2.04 | 130.0 |
| P-2238 | 12.0 | J-2178 | J-2176 | 401 | -697.73 | 1.51 | 0.61 | 1.98 | 120.0 |
| P-2239 | 12.0 | J-2167 | J-2178 | 399 | -677.22 | 1.43 | 0.57 | 1.92 | 120.0 |
| P-2240 | 8.0 | J-2176 | J-2177 | 1,030 | 10.26 | 0.00 | 0.00 | 0.07 | 130.0 |
| P-2241 | 8.0 | J-2178 | J-2179 | 580 | 10.26 | 0.00 | 0.00 | 0.07 | 130.0 |
| P-2242 | 8.0 | J-2092 | J-2180 | 501 | 51.28 | 0.15 | 0.07 | 0.33 | 90.0 |
| P-2243 | 8.0 | J-2180 | J-2181 | 581 | 10.26 | 0.00 | 0.00 | 0.07 | 130.0 |
| P-2244 | 8.0 | J-2180 | J-2182 | 291 | 30.77 | 0.06 | 0.02 | 0.20 | 90.0 |
| P-2245 | 6.0 | J-2182 | J-2183 | 295 | 10.26 | 0.02 | 0.00 | 0.12 | 130.0 |
| P-2246 | 8.0 | J-2182 | J-2095 | 308 | 10.26 | 0.01 | 0.00 | 0.07 | 90.0 |

# Scenario: PH-Buildout
# Steady State Analysis
# Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-2247 | 12.0 | J-2155 | J-2184 | 1,102 | 314.40 | 0.34 | 0.38 | 0.89 | 120.0 |
| P-2248 | 8.0 | J-2184 | J-2158 | 1,245 | 6.02 | 0.00 | 0.00 | 0.04 | 110.0 |
| P-2249 | 8.0 | J-2068 | J-2185 | 774 | 98.21 | 0.34 | 0.26 | 0.63 | 110.0 |
| P-2250 | 8.0 | J-2185 | J-2069 | 1,326 | 77.70 | 0.22 | 0.29 | 0.50 | 110.0 |
| P-2251 | 6.0 | J-2069 | J-2187 | 442 | 41.03 | 0.20 | 0.09 | 0.47 | 130.0 |
| P-2252 | 6.0 | J-2187 | J-2188 | 292 | 10.26 | 0.02 | 0.00 | 0.12 | 130.0 |
| P-2253 | 6.0 | J-2187 | J-2189 | 535 | 20.51 | 0.06 | 0.03 | 0.23 | 130.0 |
| P-2254 | 8.0 | J-2189 | J-2190 | 905 | 4.82 | 0.00 | 0.00 | 0.03 | 130.0 |
| P-2255 | 8.0 | J-2190 | J-2189 | 723 | -5.44 | 0.00 | 0.00 | 0.03 | 130.0 |
| P-2256 | 8.0 | J-2000 | J-2291 | 921 | 10.26 | 0.00 | 0.00 | 0.07 | 130.0 |
| P-2257 | 6.0 | J-2074 | J-1129 | 1,069 | 34.86 | 0.15 | 0.16 | 0.40 | 130.0 |
| P-2258 | 8.0 | J-2073 | J-1130 | 1,192 | 34.86 | 0.04 | 0.04 | 0.22 | 130.0 |
| P-2259 | 10.0 | J-2191 | J-2022 | 760 | -88.61 | 0.11 | 0.09 | 0.36 | 100.0 |
| P-2260 | 6.0 | J-2002 | J-2193 | 1,425 | 10.26 | 0.02 | 0.02 | 0.12 | 130.0 |
| P-2296 | 10.0 | J-2021 | J-2191 | 1,290 | -68.10 | 0.07 | 0.09 | 0.28 | 100.0 |
| P-2297 | 6.0 | J-2009 | J-2010 | 600 | -5.55 | 0.01 | 0.01 | 0.06 | 90.0 |
| P-2298 | 12.0 | J-2056 | J-2195 | 644 | 103.33 | 0.04 | 0.03 | 0.29 | 120.0 |
| P-2299 | 12.0 | J-2195 | J-2058 | 206 | 103.33 | 0.04 | 0.01 | 0.29 | 120.0 |
| P-2300 | 8.0 | J-2056 | J-2194 | 1,153 | 46.70 | 0.26 | 0.30 | 0.30 | 60.0 |

# Scenario: PH-Buildout
# Steady State Analysis
# Pump Report

| Label | Elevation (ft) | Control Status | Intake Pump Grade (ft) | Discharge Pump Grade (ft) | Discharge (gpm) | Pump Head (ft) | Notes |
|---|---|---|---|---|---|---|---|
| PMP-6 | 285.00 | Off | 288.64 | 511.89 | 0.00 | 0.00 | Boland |
| PMP-2 | 285.00 | On | 287.01 | 546.14 | 639.99 | 259.13 | Boland |
| PMP-1 | 285.00 | On | 287.36 | 540.59 | 668.23 | 253.23 | Boland |
| PMP-4 | 275.00 | On | 283.15 | 500.20 | 649.70 | 217.05 | Hosmer |
| PMP-5 | 275.00 | On | 283.04 | 499.26 | 770.59 | 216.21 | Hosmer |

# Scenario: PH-Buildout
# Steady State Analysis
# Tank Report

| Label | Zone | Base Elevation (ft) | Minimum Elevation (ft) | Initial HGL (ft) | Maximum Elevation (ft) | Tank Diameter (ft) | Inflow (gpm) | Current Status | Calculated Hydraulic Grade (ft) | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| T-1 | Zone | 418.00 | 418.00 | 482.00 | 492.70 | 25.00 | -1,010.51 | Draining | 482.00 | Oak Hill Tank |
| T-2 | Zone | 451.00 | 451.00 | 482.00 | 493.30 | 40.00 | -196.65 | Draining | 482.00 | Clear Hill Tank |
| T-3 | Zone | 467.00 | 467.00 | 503.00 | 515.00 | 67.00 | -1,551.25 | Draining | 503.00 | Tara Rd Tank |


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# Scenario: FIRE FLOW BUILDOUT
## Fire Flow Analysis
## Fire Flow Report

| Label | Zone | Elevation (ft) | Demand (gpm) | Needed Fire Flow (gpm) | Total Flow Needed (gpm) | Available Fire Flow (gpm) | Total Flow Available (gpm) | Residual Pressure @ Total Flow Needed (psi) | Residual Pressure (psi) | Satisfies Fire Flow Constraints? |
|---|---|---|---|---|---|---|---|---|---|---|
| J-1000 | HIGH SERVICE AREA | 375.00 | 8.27 | 1,000.00 | 1,008.27 | 1,429.44 | 1,437.72 | 51.09 | 45.96 | true |
| J-1001 | HIGH SERVICE AREA | 341.00 | 8.27 | 1,000.00 | 1,008.27 | 1,617.43 | 1,625.70 | 66.56 | 59.67 | true |
| J-1002 | HIGH SERVICE AREA | 272.00 | 8.27 | 1,000.00 | 1,008.27 | 1,674.80 | 1,683.08 | 96.45 | 88.76 | true |
| J-1003 | HIGH SERVICE AREA | 270.00 | 8.27 | 1,000.00 | 1,008.27 | 1,798.34 | 1,806.61 | 98.57 | 91.40 | true |
| J-1004 | HIGH SERVICE AREA | 285.00 | 8.27 | 1,000.00 | 1,008.27 | 1,587.89 | 1,596.16 | 91.03 | 84.85 | true |
| J-1005 | HIGH SERVICE AREA | 275.00 | 8.27 | 1,000.00 | 1,008.27 | 2,035.64 | 2,043.92 | 97.27 | 89.24 | true |
| J-1006 | HIGH SERVICE AREA | 272.00 | 8.27 | 1,000.00 | 1,008.27 | 2,105.96 | 2,114.23 | 98.95 | 88.99 | true |
| J-1007 | HIGH SERVICE AREA | 270.00 | 8.27 | 1,000.00 | 1,008.27 | 2,140.14 | 2,148.41 | 98.51 | 83.47 | true |
| J-1008 | HIGH SERVICE AREA | 270.00 | 8.27 | 1,000.00 | 1,008.27 | 2,140.14 | 2,148.41 | 97.72 | 80.41 | true |
| J-1009 | HIGH SERVICE AREA | 270.00 | 8.27 | 1,000.00 | 1,008.27 | 2,140.14 | 2,148.41 | 97.17 | 78.20 | true |
| J-1010 | HIGH SERVICE AREA | 290.00 | 8.27 | 1,000.00 | 1,008.27 | 2,207.52 | 2,215.79 | 90.67 | 81.14 | true |
| J-1011 | HIGH SERVICE AREA | 275.00 | 8.27 | 1,000.00 | 1,008.27 | 2,038.82 | 2,047.09 | 96.42 | 87.54 | true |
| J-1012 | HIGH SERVICE AREA | 295.00 | 8.27 | 1,000.00 | 1,008.27 | 1,829.59 | 1,837.86 | 86.67 | 78.86 | true |
| J-1013 | HIGH SERVICE AREA | 295.00 | 8.27 | 1,000.00 | 1,008.27 | 1,477.54 | 1,485.81 | 84.25 | 78.88 | true |
| J-1014 | HIGH SERVICE AREA | 277.00 | 8.27 | 1,000.00 | 1,008.27 | 1,477.54 | 1,485.81 | 83.46 | 69.07 | true |
| J-1015 | HIGH SERVICE AREA | 315.00 | 8.27 | 1,000.00 | 1,008.27 | 2,140.14 | 2,148.41 | 75.98 | 51.92 | true |
| J-1016 | HIGH SERVICE AREA | 295.00 | 8.27 | 1,000.00 | 1,008.27 | 2,140.14 | 2,148.41 | 84.33 | 59.41 | true |
| J-1017 | HIGH SERVICE AREA | 295.00 | 8.27 | 1,000.00 | 1,008.27 | 2,140.14 | 2,148.41 | 81.97 | 49.90 | true |
| J-1018 | HIGH SERVICE AREA | 270.00 | 8.27 | 1,000.00 | 1,008.27 | 1,291.99 | 1,300.27 | 92.69 | 88.61 | true |
| J-1019 | HIGH SERVICE AREA | 310.00 | 8.27 | 1,000.00 | 1,008.27 | 1,291.99 | 1,300.27 | 66.25 | 57.08 | true |
| J-1020 | HIGH SERVICE AREA | 340.00 | 8.27 | 1,000.00 | 1,008.27 | 1,291.99 | 1,300.27 | 49.42 | 37.97 | true |
| J-1021 | HIGH SERVICE AREA | 335.00 | 8.27 | 1,000.00 | 1,008.27 | 1,291.99 | 1,300.27 | 50.85 | 38.95 | true |
| J-1022 | HIGH SERVICE AREA | 315.00 | 23.73 | 1,000.00 | 1,023.73 | 1,291.99 | 1,315.72 | 62.04 | 51.71 | true |
| J-1023 | HIGH SERVICE AREA | 315.00 | 8.27 | 1,000.00 | 1,008.27 | 1,291.99 | 1,300.27 | 59.24 | 47.28 | true |
| J-1024 | HIGH SERVICE AREA | 310.00 | 8.27 | 1,000.00 | 1,008.27 | 1,291.99 | 1,300.27 | 60.25 | 47.60 | true |
| J-1025 | HIGH SERVICE AREA | 410.00 | 8.27 | 1,000.00 | 1,008.27 | 789.31 | 797.58 | 23.89 | 29.09 | false |
| J-1026 | HIGH SERVICE AREA | 410.00 | 8.27 | 1,000.00 | 1,008.27 | 810.06 | 818.33 | 24.58 | 29.09 | false |
| J-1027 | HIGH SERVICE AREA | 370.00 | 8.27 | 1,000.00 | 1,008.27 | 850.59 | 858.86 | 43.10 | 46.40 | false |
| J-1028 | HIGH SERVICE AREA | 385.00 | 8.27 | 1,000.00 | 1,008.27 | 867.43 | 875.70 | 37.07 | 39.91 | false |
| J-1029 | HIGH SERVICE AREA | 375.00 | 8.27 | 1,000.00 | 1,008.27 | 899.90 | 908.18 | 42.21 | 44.26 | false |
| J-1030 | HIGH SERVICE AREA | 300.00 | 8.27 | 1,000.00 | 1,008.27 | 849.12 | 857.39 | 66.48 | 71.57 | false |
| J-1031 | HIGH SERVICE AREA | 300.00 | 8.27 | 1,000.00 | 1,008.27 | 847.90 | 856.17 | 69.57 | 73.89 | false |
| J-1032 | HIGH SERVICE AREA | 310.00 | 8.27 | 1,000.00 | 1,008.27 | 847.17 | 855.44 | 67.82 | 71.50 | false |
| J-1033 | HIGH SERVICE AREA | 295.00 | 8.27 | 1,000.00 | 1,008.27 | 845.95 | 854.22 | 73.90 | 77.72 | false |
| J-1034 | HIGH SERVICE AREA | 275.00 | 8.27 | 1,000.00 | 1,008.27 | 845.95 | 854.22 | 81.58 | 85.65 | false |
| J-1035 | HIGH SERVICE AREA | 350.00 | 8.27 | 1,000.00 | 1,008.27 | 823.24 | 831.52 | 48.47 | 53.31 | false |
| J-1036 | HIGH SERVICE AREA | 285.00 | 8.27 | 1,000.00 | 1,008.27 | 2,126.46 | 2,134.74 | 83.61 | 58.94 | true |
| J-1037 | HIGH SERVICE AREA | 285.00 | 8.27 | 1,000.00 | 1,008.27 | 2,091.31 | 2,099.58 | 83.33 | 59.02 | true |
| J-1038 | HIGH SERVICE AREA | 272.00 | 8.27 | 1,000.00 | 1,008.27 | 1,879.39 | 1,887.67 | 89.08 | 71.65 | true |
| J-1039 | HIGH SERVICE AREA | 390.00 | 19.89 | 1,000.00 | 1,019.89 | 2,215.33 | 2,235.22 | 43.25 | 32.96 | true |
| J-1040 | HIGH SERVICE AREA | 450.00 | 8.27 | 1,000.00 | 1,008.27 | 2,357.42 | 2,365.70 | 22.14 | 20.00 | true |
| J-1041 | HIGH SERVICE AREA | 450.00 | 8.27 | 1,000.00 | 1,008.27 | 1,110.35 | 1,118.62 | 20.50 | 20.00 | true |
| J-1042 | HIGH SERVICE AREA | 410.00 | 8.27 | 1,000.00 | 1,008.27 | 2,722.66 | 2,730.93 | 39.38 | 34.31 | true |
| J-1043 | HIGH SERVICE AREA | 385.00 | 8.27 | 1,000.00 | 1,008.27 | 2,375.00 | 2,383.27 | 50.07 | 45.64 | true |
| J-1044 | HIGH SERVICE AREA | 337.00 | 8.27 | 1,000.00 | 1,008.27 | 2,455.08 | 2,463.35 | 70.57 | 64.56 | true |
| J-1045 | HIGH SERVICE AREA | 355.00 | 31.30 | 1,000.00 | 1,031.30 | 2,022.22 | 2,053.51 | 57.61 | 48.19 | true |
| J-1046 | HIGH SERVICE AREA | 335.00 | 8.27 | 1,000.00 | 1,008.27 | 2,478.52 | 2,486.79 | 71.36 | 64.60 | true |
| J-1047 | HIGH SERVICE AREA | 335.00 | 8.27 | 1,000.00 | 1,008.27 | 2,550.78 | 2,559.05 | 71.13 | 59.36 | true |
| J-1048 | HIGH SERVICE AREA | 270.00 | 8.27 | 1,000.00 | 1,008.27 | 2,557.62 | 2,565.89 | 91.99 | 56.40 | true |

# Scenario: FIRE FLOW BUILDOUT
## Fire Flow Analysis
## Fire Flow Report

| Label | Zone | Elevation (ft) | Demand (gpm) | Needed Fire Flow (gpm) | Total Flow Needed (gpm) | Available Fire Flow (gpm) | Total Flow Available (gpm) | Residual Pressure @ Total Flow Needed (psi) | Residual Pressure (psi) | Satisfies Fire Flow Constraints? |
|---|---|---|---|---|---|---|---|---|---|---|
| J-1049 | HIGH SERVICE AREA | 285.00 | 8.27 | 1,000.00 | 1,008.27 | 1,778.44 | 1,786.72 | 74.75 | 40.34 | true |
| J-1050 | HIGH SERVICE AREA | 325.00 | 8.27 | 1,000.00 | 1,008.27 | 2,266.11 | 2,274.39 | 67.87 | 42.71 | true |
| J-1051 | HIGH SERVICE AREA | 330.00 | 8.27 | 1,000.00 | 1,008.27 | 1,751.04 | 1,759.31 | 54.07 | 20.00 | true |
| J-1052 | HIGH SERVICE AREA | 350.00 | 8.27 | 1,000.00 | 1,008.27 | 1,833.25 | 1,841.53 | 54.49 | 34.71 | true |
| J-1053 | HIGH SERVICE AREA | 312.00 | 8.27 | 1,000.00 | 1,008.27 | 2,057.62 | 2,065.89 | 73.65 | 54.38 | true |
| J-1054 | HIGH SERVICE AREA | 310.00 | 8.27 | 1,000.00 | 1,008.27 | 2,222.17 | 2,230.44 | 74.40 | 51.65 | true |
| J-1055 | HIGH SERVICE AREA | 305.00 | 8.27 | 1,000.00 | 1,008.27 | 2,244.63 | 2,252.90 | 75.98 | 50.59 | true |
| J-1056 | HIGH SERVICE AREA | 295.00 | 8.27 | 1,000.00 | 1,008.27 | 2,110.47 | 2,118.75 | 73.88 | 33.85 | true |
| J-1057 | HIGH SERVICE AREA | 320.00 | 17.03 | 1,000.00 | 1,017.03 | 1,828.86 | 1,845.88 | 70.53 | 59.41 | true |
| J-1058 | HIGH SERVICE AREA | 320.00 | 17.03 | 1,000.00 | 1,017.03 | 1,828.86 | 1,845.88 | 71.83 | 63.33 | true |
| J-1059 | HIGH SERVICE AREA | 320.00 | 17.03 | 1,000.00 | 1,017.03 | 1,853.52 | 1,870.54 | 71.87 | 63.07 | true |
| J-1060 | HIGH SERVICE AREA | 340.00 | 17.03 | 1,000.00 | 1,017.03 | 1,403.32 | 1,420.35 | 60.26 | 54.58 | true |
| J-1061 | HIGH SERVICE AREA | 345.00 | 8.27 | 1,000.00 | 1,008.27 | 2,521.61 | 2,529.88 | 59.28 | 20.00 | true |
| J-1062 | HIGH SERVICE AREA | 355.00 | 16.75 | 1,000.00 | 1,016.75 | 1,963.87 | 1,980.62 | 57.19 | 47.73 | true |
| J-1063 | HIGH SERVICE AREA | 345.00 | 17.03 | 1,000.00 | 1,017.03 | 1,519.04 | 1,536.07 | 59.15 | 52.63 | true |
| J-1064 | HIGH SERVICE AREA | 296.00 | 17.03 | 1,000.00 | 1,017.03 | 1,488.04 | 1,505.06 | 79.84 | 73.31 | true |
| J-1065 | HIGH SERVICE AREA | 290.00 | 8.27 | 1,000.00 | 1,008.27 | 1,541.26 | 1,549.53 | 81.88 | 73.77 | true |
| J-1066 | HIGH SERVICE AREA | 266.00 | 8.27 | 1,000.00 | 1,008.27 | 1,527.83 | 1,536.11 | 88.70 | 76.96 | true |
| J-1067 | HIGH SERVICE AREA | 262.00 | 17.03 | 1,000.00 | 1,017.03 | 1,509.77 | 1,526.79 | 88.06 | 74.59 | true |
| J-1068 | HIGH SERVICE AREA | 285.00 | 8.27 | 1,000.00 | 1,008.27 | 1,601.32 | 1,609.59 | 82.94 | 72.10 | true |
| J-1069 | HIGH SERVICE AREA | 295.00 | 8.27 | 1,000.00 | 1,008.27 | 1,553.47 | 1,561.74 | 73.34 | 57.30 | true |
| J-1070 | HIGH SERVICE AREA | 285.00 | 8.27 | 1,000.00 | 1,008.27 | 1,367.13 | 1,375.40 | 50.78 | 20.00 | true |
| J-1071 | HIGH SERVICE AREA | 260.00 | 8.27 | 1,000.00 | 1,008.27 | 931.40 | 939.67 | 8.63 | 20.00 | false |
| J-1072 | HIGH SERVICE AREA | 290.00 | 6.91 | 1,000.00 | 1,006.91 | 1,730.71 | 1,737.62 | 79.72 | 63.64 | true |
| J-1073 | HIGH SERVICE AREA | 295.00 | 8.27 | 1,000.00 | 1,008.27 | 1,875.00 | 1,883.27 | 76.36 | 52.99 | true |
| J-1074 | HIGH SERVICE AREA | 265.00 | 8.27 | 1,000.00 | 1,008.27 | 1,291.99 | 1,300.27 | 77.55 | 63.59 | true |
| J-1075 | HIGH SERVICE AREA | 377.00 | 17.03 | 1,000.00 | 1,017.03 | 1,963.87 | 1,980.89 | 46.72 | 35.00 | true |
| J-1076 | HIGH SERVICE AREA | 380.00 | 17.03 | 1,000.00 | 1,017.03 | 1,963.87 | 1,980.89 | 44.65 | 31.06 | true |
| J-1077 | HIGH SERVICE AREA | 320.00 | 17.03 | 1,000.00 | 1,017.03 | 1,944.34 | 1,961.36 | 71.56 | 60.76 | true |
| J-1078 | HIGH SERVICE AREA | 325.00 | 17.03 | 1,000.00 | 1,017.03 | 1,947.27 | 1,964.29 | 69.59 | 59.13 | true |
| J-1079 | HIGH SERVICE AREA | 380.00 | 71.80 | 1,000.00 | 1,071.80 | 1,927.25 | 1,999.05 | 45.26 | 34.00 | true |
| J-1080 | HIGH SERVICE AREA | 360.00 | 17.03 | 1,000.00 | 1,017.03 | 1,944.34 | 1,961.36 | 52.37 | 37.07 | true |
| J-1081 | HIGH SERVICE AREA | 350.00 | 17.03 | 1,000.00 | 1,017.03 | 1,466.80 | 1,483.82 | 56.49 | 50.28 | true |
| J-1082 | HIGH SERVICE AREA | 270.00 | 17.03 | 1,000.00 | 1,017.03 | 1,414.06 | 1,431.09 | 90.69 | 84.95 | true |
| J-1083 | HIGH SERVICE AREA | 400.00 | 8.27 | 1,000.00 | 1,008.27 | 990.36 | 998.63 | 28.41 | 28.63 | false |
| J-1084 | HIGH SERVICE AREA | 325.00 | 8.27 | 1,000.00 | 1,008.27 | 1,018.31 | 1,026.58 | 60.87 | 60.46 | true |
| J-1085 | HIGH SERVICE AREA | 325.00 | 8.27 | 1,000.00 | 1,008.27 | 887.45 | 895.72 | 57.01 | 60.09 | false |
| J-1086 | HIGH SERVICE AREA | 370.00 | 8.27 | 1,000.00 | 1,008.27 | 883.06 | 891.33 | 38.61 | 41.61 | false |
| J-1087 | HIGH SERVICE AREA | 415.00 | 8.27 | 1,000.00 | 1,008.27 | 853.52 | 861.79 | 17.71 | 21.78 | false |
| J-1088 | HIGH SERVICE AREA | 420.00 | 8.27 | 1,000.00 | 1,008.27 | 837.16 | 845.43 | 15.49 | 20.00 | false |
| J-1089 | HIGH SERVICE AREA | 328.00 | 8.27 | 1,000.00 | 1,008.27 | 887.45 | 895.72 | 41.66 | 47.36 | false |
| J-1090 | HIGH SERVICE AREA | 355.00 | 8.27 | 1,000.00 | 1,008.27 | 874.88 | 883.15 | 44.67 | 47.95 | false |
| J-1091 | HIGH SERVICE AREA | 324.00 | 8.27 | 1,000.00 | 1,008.27 | 887.45 | 895.72 | 47.77 | 52.63 | false |
| J-1092 | HIGH SERVICE AREA | 305.00 | 8.27 | 1,000.00 | 1,008.27 | 872.62 | 880.89 | 49.66 | 56.50 | false |
| J-1093 | HIGH SERVICE AREA | 330.00 | 8.27 | 1,000.00 | 1,008.27 | 748.05 | 756.32 | 26.34 | 44.29 | false |
| J-1094 | HIGH SERVICE AREA | 330.00 | 8.27 | 1,000.00 | 1,008.27 | 748.05 | 756.32 | 24.44 | 43.18 | false |
| J-1095 | HIGH SERVICE AREA | 306.00 | 8.27 | 1,000.00 | 1,008.27 | 887.45 | 895.72 | 40.06 | 47.93 | false |
| J-1096 | HIGH SERVICE AREA | 393.00 | 8.27 | 1,000.00 | 1,008.27 | 728.45 | 736.73 | 2.16 | 20.00 | false |
| J-1097 | HIGH SERVICE AREA | 330.00 | 8.27 | 1,000.00 | 1,008.27 | 867.55 | 875.83 | 40.50 | 47.22 | false |

# Scenario: FIRE FLOW BUILDOUT
## Fire Flow Analysis
## Fire Flow Report

| Label | Zone | Elevation (ft) | Demand (gpm) | Needed Fire Flow (gpm) | Total Flow Needed (gpm) | Available Fire Flow (gpm) | Total Flow Available (gpm) | Residual Pressure @ Total Flow Needed (psi) | Residual Pressure (psi) | Satisfies Fire Flow Constraints? |
|---|---|---|---|---|---|---|---|---|---|---|
| J-1098 | HIGH SERVICE AREA | 270.00 | 8.27 | 1,000.00 | 1,008.27 | 2,140.14 | 2,148.41 | 100.04 | 89.17 | true |
| J-1099 | HIGH SERVICE AREA | 307.00 | 8.27 | 1,000.00 | 1,008.27 | 1,291.99 | 1,300.27 | 59.78 | 46.07 | true |
| J-1100 | HIGH SERVICE AREA | 440.00 | 8.27 | 1,000.00 | 1,008.27 | 3,595.70 | 3,603.98 | 26.93 | 24.37 | true |
| J-1101 | HIGH SERVICE AREA | 350.00 | 17.03 | 1,000.00 | 1,017.03 | 1,903.81 | 1,920.84 | 58.28 | 47.45 | true |
| J-1102 | HIGH SERVICE AREA | 305.00 | 8.27 | 1,000.00 | 1,008.27 | 2,140.14 | 2,148.41 | 81.99 | 62.91 | true |
| J-1103 | HIGH SERVICE AREA | 285.00 | 8.27 | 1,000.00 | 1,008.27 | 1,261.23 | 1,269.50 | 86.68 | 83.28 | true |
| J-1104 | HIGH SERVICE AREA | 420.00 | 17.03 | 1,000.00 | 1,017.03 | 2,500.00 | 2,517.03 | 33.35 | 26.80 | true |
| J-1105 | HIGH SERVICE AREA | 307.00 | 8.27 | 1,000.00 | 1,008.27 | 2,140.14 | 2,148.41 | 78.49 | 51.60 | true |
| J-1106 | HIGH SERVICE AREA | 303.00 | 8.27 | 1,000.00 | 1,008.27 | 2,140.14 | 2,148.41 | 79.43 | 50.10 | true |
| J-1107 | HIGH SERVICE AREA | 332.00 | 8.27 | 1,000.00 | 1,008.27 | 1,974.24 | 1,982.52 | 60.23 | 20.00 | true |
| J-1108 | HIGH SERVICE AREA | 277.00 | 8.27 | 1,000.00 | 1,008.27 | 2,140.14 | 2,148.41 | 93.21 | 71.57 | true |
| J-1109 | HIGH SERVICE AREA | 305.00 | 8.27 | 1,000.00 | 1,008.27 | 2,140.14 | 2,148.41 | 75.02 | 34.80 | true |
| J-1110 | HIGH SERVICE AREA | 320.00 | 8.27 | 1,000.00 | 1,008.27 | 1,906.13 | 1,914.40 | 62.70 | 20.00 | true |
| J-1111 | HIGH SERVICE AREA | 306.00 | 8.27 | 1,000.00 | 1,008.27 | 847.53 | 855.81 | 68.23 | 72.24 | false |
| J-1112 | HIGH SERVICE AREA | 307.00 | 8.27 | 1,000.00 | 1,008.27 | 847.53 | 855.81 | 63.20 | 68.41 | false |
| J-1113 | HIGH SERVICE AREA | 323.00 | 8.27 | 1,000.00 | 1,008.27 | 849.12 | 857.39 | 53.00 | 59.01 | false |
| J-1114 | HIGH SERVICE AREA | 431.00 | 8.27 | 1,000.00 | 1,008.27 | 700.56 | 708.83 | 11.12 | 20.00 | false |
| J-1115 | HIGH SERVICE AREA | 340.50 | 8.27 | 1,000.00 | 1,008.27 | 1,674.80 | 1,683.08 | 64.52 | 53.21 | true |
| J-1116 | HIGH SERVICE AREA | 425.50 | 8.27 | 1,000.00 | 1,008.27 | 1,076.17 | 1,084.45 | 21.86 | 20.00 | true |
| J-1117 | HIGH SERVICE AREA | 435.00 | 8.27 | 1,000.00 | 1,008.27 | 752.69 | 760.96 | 12.98 | 20.00 | false |
| J-1118 | HIGH SERVICE AREA | 319.00 | 8.27 | 1,000.00 | 1,008.27 | 1,587.52 | 1,595.80 | 53.40 | 20.00 | true |
| J-1119 | HIGH SERVICE AREA | 332.00 | 8.27 | 1,000.00 | 1,008.27 | 1,405.94 | 1,414.22 | 44.54 | 20.00 | true |
| J-1120 | HIGH SERVICE AREA | 384.00 | 8.27 | 1,000.00 | 1,008.27 | 1,661.87 | 1,670.14 | 37.89 | 20.00 | true |
| J-1121 | HIGH SERVICE AREA | 400.00 | 8.27 | 1,000.00 | 1,008.27 | 1,466.80 | 1,475.07 | 33.97 | 26.85 | true |
| J-1122 | HIGH SERVICE AREA | 443.00 | 8.27 | 1,000.00 | 1,008.27 | 637.94 | 646.21 | 12.51 | 20.00 | false |
| J-1123 | HIGH SERVICE AREA | 327.00 | 8.27 | 1,000.00 | 1,008.27 | 986.72 | 995.00 | 18.66 | 20.00 | false |
| J-1124 | HIGH SERVICE AREA | 264.00 | 17.03 | 1,000.00 | 1,017.03 | 1,509.77 | 1,526.79 | 72.71 | 44.17 | true |
| J-1125 | HIGH SERVICE AREA | 272.00 | 17.03 | 1,000.00 | 1,017.03 | 1,509.77 | 1,526.79 | 63.97 | 29.73 | true |
| J-1126 | HIGH SERVICE AREA | 278.00 | 17.03 | 1,000.00 | 1,017.03 | 1,509.77 | 1,526.79 | 58.07 | 20.10 | true |
| J-1127 | HIGH SERVICE AREA | 282.00 | 17.03 | 1,000.00 | 1,017.03 | 1,399.51 | 1,416.53 | 52.23 | 20.00 | true |
| J-1128 | HIGH SERVICE AREA | 282.00 | 17.03 | 1,000.00 | 1,017.03 | 1,202.58 | 1,219.60 | 40.19 | 20.00 | true |
| J-1129 | HIGH SERVICE AREA | 284.00 | 17.03 | 1,000.00 | 1,017.03 | 1,014.74 | 1,031.77 | 21.61 | 20.00 | true |
| J-1130 | HIGH SERVICE AREA | 306.00 | 17.03 | 1,000.00 | 1,017.03 | 1,356.57 | 1,373.59 | 41.92 | 20.00 | true |
| J-1131 | HIGH SERVICE AREA | 312.00 | 8.27 | 1,000.00 | 1,008.27 | 887.45 | 895.72 | 31.26 | 40.35 | false |
| J-1132 | HIGH SERVICE AREA | 372.00 | 8.27 | 1,000.00 | 1,008.27 | 887.45 | 895.72 | 19.90 | 26.16 | false |
| J-1133 | HIGH SERVICE AREA | 418.00 | 8.27 | 1,000.00 | 1,008.27 | 700.20 | 708.47 | 8.20 | 20.00 | false |
| J-2000 | LOW SERVICE AREA | 306.00 | 5.01 | 1,000.00 | 1,005.01 | 2,936.04 | 2,941.04 | 68.62 | 29.95 | true |
| J-2001 | LOW SERVICE AREA | 331.30 | 5.01 | 1,000.00 | 1,005.01 | 2,590.33 | 2,595.34 | 56.87 | 24.13 | true |
| J-2002 | LOW SERVICE AREA | 331.30 | 45.46 | 1,000.00 | 1,045.46 | 2,459.47 | 2,504.94 | 56.25 | 24.64 | true |
| J-2003 | LOW SERVICE AREA | 335.00 | 5.01 | 1,000.00 | 1,005.01 | 2,159.42 | 2,164.43 | 51.94 | 20.00 | true |
| J-2004 | LOW SERVICE AREA | 335.00 | 5.01 | 1,000.00 | 1,005.01 | 1,955.32 | 1,960.33 | 49.96 | 20.00 | true |
| J-2005 | LOW SERVICE AREA | 270.00 | 5.01 | 1,000.00 | 1,005.01 | 2,518.37 | 2,523.38 | 77.68 | 20.00 | true |
| J-2006 | LOW SERVICE AREA | 315.00 | 5.01 | 1,000.00 | 1,005.01 | 3,174.80 | 3,179.81 | 65.54 | 25.46 | true |
| J-2007 | LOW SERVICE AREA | 315.00 | 5.01 | 1,000.00 | 1,005.01 | 3,614.38 | 3,619.39 | 67.30 | 30.81 | true |
| J-2008 | LOW SERVICE AREA | 320.00 | 5.01 | 1,000.00 | 1,005.01 | 2,690.67 | 2,695.68 | 60.89 | 20.47 | true |
| J-2009 | LOW SERVICE AREA | 325.00 | 5.01 | 1,000.00 | 1,005.01 | 2,265.63 | 2,270.63 | 56.16 | 20.00 | true |
| J-2010 | LOW SERVICE AREA | 330.00 | 5.01 | 1,000.00 | 1,005.01 | 1,548.71 | 1,553.72 | 44.56 | 20.00 | true |
| J-2011 | LOW SERVICE AREA | 300.00 | 5.01 | 1,000.00 | 1,005.01 | 4,202.64 | 4,207.65 | 75.19 | 40.59 | true |
| J-2012 | LOW SERVICE AREA | 300.00 | 5.01 | 1,000.00 | 1,005.01 | 4,158.20 | 4,163.21 | 75.26 | 41.74 | true |

# Scenario: FIRE FLOW BUILDOUT
## Fire Flow Analysis
## Fire Flow Report

| Label | Zone | Elevation (ft) | Demand (gpm) | Needed Fire Flow (gpm) | Total Flow Needed (gpm) | Available Fire Flow (gpm) | Total Flow Available (gpm) | Residual Pressure @ Total Flow Needed (psi) | Residual Pressure (psi) | Satisfies Fire Flow Constraints? |
|---|---|---|---|---|---|---|---|---|---|---|
| J-2013 | LOW SERVICE AREA | 330.00 | 5.01 | 1,000.00 | 1,005.01 | 2,375.98 | 2,380.99 | 55.83 | 20.00 | true |
| J-2014 | LOW SERVICE AREA | 330.00 | 5.01 | 1,000.00 | 1,005.01 | 4,845.95 | 4,850.96 | 62.67 | 20.00 | true |
| J-2015 | LOW SERVICE AREA | 285.00 | 5.01 | 1,000.00 | 1,005.01 | 3,208.62 | 3,213.63 | 76.86 | 21.99 | true |
| J-2016 | LOW SERVICE AREA | 275.00 | 5.01 | 1,000.00 | 1,005.01 | 2,729.00 | 2,734.01 | 78.67 | 26.69 | true |
| J-2017 | LOW SERVICE AREA | 265.00 | 5.01 | 1,000.00 | 1,005.01 | 2,041.81 | 2,046.82 | 73.18 | 20.01 | true |
| J-2018 | LOW SERVICE AREA | 265.00 | 5.01 | 1,000.00 | 1,005.01 | 824.71 | 829.72 | -11.06 | 20.00 | false |
| J-2019 | LOW SERVICE AREA | 275.00 | 5.01 | 1,000.00 | 1,005.01 | 3,024.78 | 3,029.79 | 79.51 | 20.00 | true |
| J-2020 | LOW SERVICE AREA | 295.00 | 5.01 | 1,000.00 | 1,005.01 | 2,692.02 | 2,697.03 | 70.08 | 20.00 | true |
| J-2021 | LOW SERVICE AREA | 270.00 | 5.01 | 1,000.00 | 1,005.01 | 3,233.15 | 3,238.16 | 82.49 | 20.00 | true |
| J-2022 | LOW SERVICE AREA | 295.00 | 5.01 | 1,000.00 | 1,005.01 | 3,002.69 | 3,007.70 | 71.94 | 20.00 | true |
| J-2023 | LOW SERVICE AREA | 290.00 | 5.01 | 1,000.00 | 1,005.01 | 1,859.01 | 1,864.02 | 62.20 | 20.00 | true |
| J-2024 | LOW SERVICE AREA | 295.00 | 5.01 | 1,000.00 | 1,005.01 | 2,404.24 | 2,409.25 | 67.93 | 20.00 | true |
| J-2025 | LOW SERVICE AREA | 260.00 | 5.01 | 1,000.00 | 1,005.01 | 1,904.36 | 1,909.37 | 74.70 | 28.60 | true |
| J-2026 | LOW SERVICE AREA | 325.00 | 5.01 | 1,000.00 | 1,005.01 | 4,162.11 | 4,167.12 | 64.39 | 29.90 | true |
| J-2027 | LOW SERVICE AREA | 350.00 | 5.01 | 1,000.00 | 1,005.01 | 2,750.24 | 2,755.25 | 50.93 | 20.00 | true |
| J-2028 | LOW SERVICE AREA | 287.00 | 5.01 | 1,000.00 | 1,005.01 | 4,184.08 | 4,189.09 | 80.77 | 44.78 | true |
| J-2029 | LOW SERVICE AREA | 282.00 | 5.01 | 1,000.00 | 1,005.01 | 3,751.47 | 3,756.47 | 82.44 | 47.84 | true |
| J-2030 | LOW SERVICE AREA | 335.00 | 5.01 | 1,000.00 | 1,005.01 | 3,401.86 | 3,406.87 | 60.65 | 39.66 | true |
| J-2031 | LOW SERVICE AREA | 320.00 | 5.01 | 1,000.00 | 1,005.01 | 2,742.92 | 2,747.93 | 61.65 | 20.00 | true |
| J-2032 | LOW SERVICE AREA | 260.00 | 5.01 | 1,000.00 | 1,005.01 | 3,033.20 | 3,038.21 | 93.36 | 76.12 | true |
| J-2033 | LOW SERVICE AREA | 270.00 | 5.01 | 1,000.00 | 1,005.01 | 2,412.35 | 2,417.36 | 83.94 | 52.98 | true |
| J-2034 | LOW SERVICE AREA | 285.00 | 5.01 | 1,000.00 | 1,005.01 | 2,282.71 | 2,287.72 | 77.92 | 52.51 | true |
| J-2035 | LOW SERVICE AREA | 259.00 | 13.76 | 1,000.00 | 1,013.76 | 2,083.50 | 2,097.26 | 85.64 | 62.85 | true |
| J-2036 | LOW SERVICE AREA | 265.00 | 5.01 | 1,000.00 | 1,005.01 | 2,645.87 | 2,650.88 | 82.74 | 37.31 | true |
| J-2037 | LOW SERVICE AREA | 305.00 | 5.01 | 1,000.00 | 1,005.01 | 2,175.17 | 2,180.18 | 61.54 | 20.00 | true |
| J-2038 | LOW SERVICE AREA | 265.00 | 5.01 | 1,000.00 | 1,005.01 | 3,992.19 | 3,997.20 | 87.08 | 23.26 | true |
| J-2039 | LOW SERVICE AREA | 280.00 | 5.01 | 1,000.00 | 1,005.01 | 3,623.05 | 3,628.06 | 79.93 | 20.00 | true |
| J-2040 | LOW SERVICE AREA | 270.00 | 5.01 | 1,000.00 | 1,005.01 | 3,344.36 | 3,349.37 | 82.83 | 20.00 | true |
| J-2041 | LOW SERVICE AREA | 275.00 | 5.01 | 1,000.00 | 1,005.01 | 3,529.79 | 3,534.79 | 82.11 | 25.28 | true |
| J-2042 | LOW SERVICE AREA | 305.00 | 8.50 | 1,000.00 | 1,008.50 | 3,332.64 | 3,341.14 | 69.29 | 20.00 | true |
| J-2043 | LOW SERVICE AREA | 280.00 | 5.01 | 1,000.00 | 1,005.01 | 3,178.10 | 3,183.11 | 78.31 | 20.00 | true |
| J-2044 | LOW SERVICE AREA | 280.00 | 5.01 | 1,000.00 | 1,005.01 | 3,109.74 | 3,114.75 | 78.50 | 24.33 | true |
| J-2045 | LOW SERVICE AREA | 290.00 | 5.01 | 1,000.00 | 1,005.01 | 2,343.93 | 2,348.94 | 68.99 | 20.00 | true |
| J-2046 | LOW SERVICE AREA | 280.00 | 5.01 | 1,000.00 | 1,005.01 | 3,653.32 | 3,658.33 | 81.51 | 30.47 | true |
| J-2047 | LOW SERVICE AREA | 290.00 | 5.01 | 1,000.00 | 1,005.01 | 3,636.72 | 3,641.73 | 78.14 | 36.79 | true |
| J-2048 | LOW SERVICE AREA | 305.00 | 5.01 | 1,000.00 | 1,005.01 | 3,692.38 | 3,697.39 | 71.20 | 24.42 | true |
| J-2049 | LOW SERVICE AREA | 305.00 | 5.01 | 1,000.00 | 1,005.01 | 3,708.50 | 3,713.51 | 70.83 | 20.00 | true |
| J-2050 | LOW SERVICE AREA | 325.00 | 5.01 | 1,000.00 | 1,005.01 | 3,878.91 | 3,883.92 | 63.24 | 20.00 | true |
| J-2051 | LOW SERVICE AREA | 325.00 | 5.01 | 1,000.00 | 1,005.01 | 2,622.56 | 2,627.57 | 59.15 | 20.00 | true |
| J-2052 | LOW SERVICE AREA | 365.00 | 45.67 | 1,000.00 | 1,045.67 | 1,820.19 | 1,865.86 | 38.55 | 20.00 | true |
| J-2053 | LOW SERVICE AREA | 275.00 | 13.76 | 1,000.00 | 1,013.76 | 2,704.59 | 2,718.35 | 82.47 | 56.92 | true |
| J-2054 | LOW SERVICE AREA | 265.00 | 5.01 | 1,000.00 | 1,005.01 | 2,832.15 | 2,837.16 | 81.68 | 20.00 | true |
| J-2055 | LOW SERVICE AREA | 285.00 | 5.01 | 1,000.00 | 1,005.01 | 4,134.77 | 4,139.78 | 81.99 | 55.96 | true |
| J-2056 | LOW SERVICE AREA | 295.00 | 5.01 | 1,000.00 | 1,005.01 | 4,114.26 | 4,119.27 | 77.70 | 52.48 | true |
| J-2057 | LOW SERVICE AREA | 295.00 | 22.39 | 1,000.00 | 1,022.39 | 2,348.33 | 2,370.72 | 67.03 | 20.00 | true |
| J-2058 | LOW SERVICE AREA | 285.00 | 13.76 | 1,000.00 | 1,013.76 | 3,992.19 | 4,005.95 | 82.29 | 62.02 | true |
| J-2059 | LOW SERVICE AREA | 265.00 | 5.01 | 1,000.00 | 1,005.01 | 4,216.80 | 4,221.81 | 90.29 | 57.49 | true |
| J-2060 | LOW SERVICE AREA | 280.00 | 5.01 | 1,000.00 | 1,005.01 | 2,855.22 | 2,860.23 | 82.19 | 54.61 | true |
| J-2061 | LOW SERVICE AREA | 265.00 | 5.01 | 1,000.00 | 1,005.01 | 2,360.41 | 2,365.42 | 78.31 | 20.00 | true |

# Scenario: FIRE FLOW BUILDOUT
## Fire Flow Analysis
## Fire Flow Report

| Label | Zone | Elevation (ft) | Demand (gpm) | Needed Fire Flow (gpm) | Total Flow Needed (gpm) | Available Fire Flow (gpm) | Total Flow Available (gpm) | Residual Pressure @ Total Flow Needed (psi) | Residual Pressure (psi) | Satisfies Fire Flow Constraints? |
|---|---|---|---|---|---|---|---|---|---|---|
| J-2062 | LOW SERVICE AREA | 280.00 | 5.01 | 1,000.00 | 1,005.01 | 2,242.68 | 2,247.69 | 79.57 | 54.61 | true |
| J-2063 | LOW SERVICE AREA | 360.00 | 5.01 | 1,000.00 | 1,005.01 | 1,796.88 | 1,801.88 | 41.31 | 20.00 | true |
| J-2064 | LOW SERVICE AREA | 280.00 | 18.22 | 1,000.00 | 1,018.22 | 1,588.13 | 1,606.35 | 57.15 | 20.00 | true |
| J-2065 | LOW SERVICE AREA | 275.00 | 13.76 | 1,000.00 | 1,013.76 | 1,589.54 | 1,603.30 | 59.35 | 22.15 | true |
| J-2066 | LOW SERVICE AREA | 280.00 | 13.76 | 1,000.00 | 1,013.76 | 1,582.46 | 1,596.22 | 56.96 | 20.00 | true |
| J-2067 | LOW SERVICE AREA | 280.00 | 13.76 | 1,000.00 | 1,013.76 | 1,582.40 | 1,596.16 | 56.96 | 20.00 | true |
| J-2068 | LOW SERVICE AREA | 230.00 | 5.01 | 1,000.00 | 1,005.01 | 2,414.06 | 2,419.07 | 103.45 | 82.14 | true |
| J-2069 | LOW SERVICE AREA | 215.00 | 7.89 | 1,000.00 | 1,007.89 | 1,630.13 | 1,638.02 | 85.55 | 43.81 | true |
| J-2070 | LOW SERVICE AREA | 200.00 | 5.01 | 1,000.00 | 1,005.01 | 1,489.53 | 1,494.54 | 72.30 | 20.00 | true |
| J-2071 | LOW SERVICE AREA | 200.00 | 5.01 | 1,000.00 | 1,005.01 | 1,332.55 | 1,337.56 | 61.32 | 20.00 | true |
| J-2072 | LOW SERVICE AREA | 288.00 | 16.37 | 1,000.00 | 1,016.37 | 1,471.92 | 1,488.29 | 67.69 | 55.40 | true |
| J-2073 | LOW SERVICE AREA | 275.00 | 26.21 | 1,000.00 | 1,026.21 | 1,471.92 | 1,498.13 | 65.05 | 44.93 | true |
| J-2074 | LOW SERVICE AREA | 285.00 | 13.76 | 1,000.00 | 1,013.76 | 1,471.92 | 1,485.69 | 56.57 | 32.25 | true |
| J-2075 | LOW SERVICE AREA | 270.00 | 13.76 | 1,000.00 | 1,013.76 | 1,471.92 | 1,485.69 | 64.58 | 41.75 | true |
| J-2076 | LOW SERVICE AREA | 295.00 | 5.01 | 1,000.00 | 1,005.01 | 1,632.81 | 1,637.82 | 61.80 | 40.45 | true |
| J-2077 | LOW SERVICE AREA | 295.00 | 5.01 | 1,000.00 | 1,005.01 | 1,655.27 | 1,660.28 | 61.99 | 40.06 | true |
| J-2078 | LOW SERVICE AREA | 290.00 | 5.01 | 1,000.00 | 1,005.01 | 1,645.02 | 1,650.03 | 60.62 | 33.78 | true |
| J-2079 | LOW SERVICE AREA | 393.00 | 5.01 | 1,000.00 | 1,005.01 | 1,103.52 | 1,108.53 | 22.47 | 20.00 | true |
| J-2080 | LOW SERVICE AREA | 292.00 | 13.76 | 1,000.00 | 1,013.76 | 1,437.50 | 1,451.26 | 67.61 | 57.66 | true |
| J-2081 | LOW SERVICE AREA | 276.00 | 5.01 | 1,000.00 | 1,005.01 | 1,948.73 | 1,953.74 | 75.80 | 51.31 | true |
| J-2082 | LOW SERVICE AREA | 320.00 | 5.01 | 1,000.00 | 1,005.01 | 874.73 | 879.73 | 6.75 | 20.00 | false |
| J-2083 | LOW SERVICE AREA | 350.00 | 5.01 | 1,000.00 | 1,005.01 | 1,151.61 | 1,156.62 | 39.56 | 35.44 | true |
| J-2084 | LOW SERVICE AREA | 370.00 | 5.01 | 1,000.00 | 1,005.01 | 1,161.87 | 1,166.87 | 31.06 | 26.70 | true |
| J-2085 | LOW SERVICE AREA | 350.00 | 5.01 | 1,000.00 | 1,005.01 | 1,192.75 | 1,197.76 | 41.78 | 37.33 | true |
| J-2086 | LOW SERVICE AREA | 330.00 | 5.01 | 1,000.00 | 1,005.01 | 1,295.41 | 1,300.42 | 51.58 | 45.16 | true |
| J-2087 | LOW SERVICE AREA | 320.00 | 5.01 | 1,000.00 | 1,005.01 | 1,596.92 | 1,601.93 | 59.38 | 49.64 | true |
| J-2088 | LOW SERVICE AREA | 340.00 | 5.01 | 1,000.00 | 1,005.01 | 1,872.56 | 1,877.57 | 47.09 | 22.54 | true |
| J-2089 | LOW SERVICE AREA | 315.00 | 5.01 | 1,000.00 | 1,005.01 | 2,347.17 | 2,352.18 | 60.52 | 25.38 | true |
| J-2090 | LOW SERVICE AREA | 270.00 | 13.76 | 1,000.00 | 1,013.76 | 1,922.61 | 1,936.37 | 77.64 | 51.52 | true |
| J-2091 | LOW SERVICE AREA | 280.00 | 5.01 | 1,000.00 | 1,005.01 | 3,824.22 | 3,829.23 | 84.97 | 69.92 | true |
| J-2092 | LOW SERVICE AREA | 410.00 | 5.01 | 1,000.00 | 1,005.01 | 3,584.96 | 3,589.97 | 29.59 | 22.22 | true |
| J-2093 | LOW SERVICE AREA | 415.00 | 5.01 | 1,000.00 | 1,005.01 | 2,558.11 | 2,563.11 | 26.47 | 20.00 | true |
| J-2094 | LOW SERVICE AREA | 400.00 | 5.01 | 1,000.00 | 1,005.01 | 2,649.90 | 2,654.91 | 31.40 | 20.00 | true |
| J-2095 | LOW SERVICE AREA | 400.00 | 5.01 | 1,000.00 | 1,005.01 | 882.57 | 887.58 | 16.20 | 20.00 | false |
| J-2096 | LOW SERVICE AREA | 285.00 | 5.01 | 1,000.00 | 1,005.01 | 1,434.57 | 1,439.58 | 61.04 | 43.55 | true |
| J-2097 | LOW SERVICE AREA | 287.00 | 5.01 | 1,000.00 | 1,005.01 | 1,437.13 | 1,442.14 | 61.62 | 45.27 | true |
| J-2098 | LOW SERVICE AREA | 277.50 | 5.01 | 1,000.00 | 1,005.01 | 1,433.84 | 1,438.85 | 63.63 | 45.57 | true |
| J-2099 | LOW SERVICE AREA | 285.00 | 5.01 | 1,000.00 | 1,005.01 | 1,432.98 | 1,437.99 | 60.36 | 42.35 | true |
| J-2100 | LOW SERVICE AREA | 275.00 | 5.01 | 1,000.00 | 1,005.01 | 1,433.23 | 1,438.24 | 64.26 | 45.86 | true |
| J-2101 | LOW SERVICE AREA | 280.00 | 5.01 | 1,000.00 | 1,005.01 | 1,434.57 | 1,439.58 | 54.52 | 28.96 | true |
| J-2102 | LOW SERVICE AREA | 264.00 | 5.01 | 1,000.00 | 1,005.01 | 1,435.55 | 1,440.56 | 69.73 | 51.89 | true |
| J-2103 | LOW SERVICE AREA | 265.00 | 5.01 | 1,000.00 | 1,005.01 | 1,434.81 | 1,439.82 | 65.71 | 44.56 | true |
| J-2104 | LOW SERVICE AREA | 280.00 | 5.01 | 1,000.00 | 1,005.01 | 1,290.53 | 1,295.54 | 43.16 | 20.00 | true |
| J-2105 | LOW SERVICE AREA | 260.00 | 5.01 | 1,000.00 | 1,005.01 | 1,267.33 | 1,272.34 | 44.89 | 20.00 | true |
| J-2106 | LOW SERVICE AREA | 255.00 | 5.01 | 1,000.00 | 1,005.01 | 967.77 | 972.78 | 15.47 | 20.00 | false |
| J-2107 | LOW SERVICE AREA | 280.00 | 5.01 | 1,000.00 | 1,005.01 | 1,436.89 | 1,441.90 | 62.38 | 44.01 | true |
| J-2108 | LOW SERVICE AREA | 280.00 | 5.01 | 1,000.00 | 1,005.01 | 1,437.26 | 1,442.27 | 63.56 | 46.28 | true |
| J-2109 | LOW SERVICE AREA | 300.00 | 5.01 | 1,000.00 | 1,005.01 | 1,454.71 | 1,459.72 | 60.12 | 46.83 | true |
| J-2110 | LOW SERVICE AREA | 370.00 | 5.01 | 1,000.00 | 1,005.01 | 1,338.13 | 1,343.14 | 29.70 | 20.00 | true |

# Scenario: FIRE FLOW BUILDOUT
## Fire Flow Analysis
## Fire Flow Report

| Label | Zone | Elevation (ft) | Demand (gpm) | Needed Fire Flow (gpm) | Total Flow Needed (gpm) | Available Fire Flow (gpm) | Total Flow Available (gpm) | Residual Pressure @ Total Flow Needed (psi) | Residual Pressure (psi) | Satisfies Fire Flow Constraints? |
|---|---|---|---|---|---|---|---|---|---|---|
| J-2111 | LOW SERVICE AREA | 318.00 | 5.01 | 1,000.00 | 1,005.01 | 1,434.81 | 1,439.82 | 51.35 | 37.87 | true |
| J-2112 | LOW SERVICE AREA | 315.00 | 5.01 | 1,000.00 | 1,005.01 | 1,438.11 | 1,443.12 | 53.94 | 41.46 | true |
| J-2113 | LOW SERVICE AREA | 368.00 | 5.01 | 1,000.00 | 1,005.01 | 1,405.03 | 1,410.04 | 31.32 | 20.12 | true |
| J-2114 | LOW SERVICE AREA | 340.00 | 5.01 | 1,000.00 | 1,005.01 | 1,451.42 | 1,456.43 | 44.02 | 31.92 | true |
| J-2115 | LOW SERVICE AREA | 300.00 | 5.01 | 1,000.00 | 1,005.01 | 1,348.76 | 1,353.76 | 47.98 | 29.52 | true |
| J-2116 | LOW SERVICE AREA | 300.00 | 5.01 | 1,000.00 | 1,005.01 | 1,456.30 | 1,461.31 | 60.98 | 48.40 | true |
| J-2117 | LOW SERVICE AREA | 310.00 | 5.01 | 1,000.00 | 1,005.01 | 1,460.45 | 1,465.46 | 55.77 | 42.14 | true |
| J-2118 | LOW SERVICE AREA | 287.00 | 5.01 | 1,000.00 | 1,005.01 | 1,482.06 | 1,487.07 | 67.18 | 54.33 | true |
| J-2119 | LOW SERVICE AREA | 271.00 | 5.01 | 1,000.00 | 1,005.01 | 1,723.14 | 1,728.15 | 77.05 | 60.78 | true |
| J-2120 | LOW SERVICE AREA | 262.00 | 5.01 | 1,000.00 | 1,005.01 | 1,775.88 | 1,780.89 | 81.48 | 64.65 | true |
| J-2121 | LOW SERVICE AREA | 255.00 | 5.01 | 1,000.00 | 1,005.01 | 1,645.39 | 1,650.40 | 83.05 | 67.69 | true |
| J-2122 | LOW SERVICE AREA | 265.00 | 5.01 | 1,000.00 | 1,005.01 | 1,621.34 | 1,626.35 | 78.20 | 62.83 | true |
| J-2123 | LOW SERVICE AREA | 265.00 | 5.01 | 1,000.00 | 1,005.01 | 1,620.12 | 1,625.13 | 78.36 | 63.24 | true |
| J-2124 | LOW SERVICE AREA | 255.00 | 5.01 | 1,000.00 | 1,005.01 | 1,637.33 | 1,642.34 | 82.95 | 67.68 | true |
| J-2125 | LOW SERVICE AREA | 265.00 | 5.01 | 1,000.00 | 1,005.01 | 1,610.84 | 1,615.85 | 78.33 | 63.46 | true |
| J-2126 | LOW SERVICE AREA | 255.00 | 5.01 | 1,000.00 | 1,005.01 | 1,646.00 | 1,651.01 | 83.12 | 67.84 | true |
| J-2127 | LOW SERVICE AREA | 250.00 | 18.17 | 1,000.00 | 1,018.17 | 3,785.40 | 3,803.57 | 92.53 | 23.32 | true |
| J-2128 | LOW SERVICE AREA | 305.00 | 5.01 | 1,000.00 | 1,005.01 | 1,806.88 | 1,811.89 | 63.35 | 46.52 | true |
| J-2129 | LOW SERVICE AREA | 315.00 | 5.01 | 1,000.00 | 1,005.01 | 1,798.34 | 1,803.35 | 58.13 | 39.29 | true |
| J-2130 | LOW SERVICE AREA | 300.00 | 5.01 | 1,000.00 | 1,005.01 | 1,792.24 | 1,797.25 | 60.94 | 35.11 | true |
| J-2131 | LOW SERVICE AREA | 320.00 | 5.01 | 1,000.00 | 1,005.01 | 1,785.16 | 1,790.17 | 55.92 | 37.20 | true |
| J-2132 | LOW SERVICE AREA | 320.00 | 5.01 | 1,000.00 | 1,005.01 | 1,689.21 | 1,694.22 | 59.77 | 48.93 | true |
| J-2133 | LOW SERVICE AREA | 345.00 | 5.01 | 1,000.00 | 1,005.01 | 2,016.60 | 2,021.61 | 50.87 | 37.86 | true |
| J-2134 | LOW SERVICE AREA | 285.00 | 5.01 | 1,000.00 | 1,005.01 | 1,801.03 | 1,806.03 | 72.05 | 55.48 | true |
| J-2135 | LOW SERVICE AREA | 295.00 | 5.01 | 1,000.00 | 1,005.01 | 1,884.52 | 1,889.53 | 67.65 | 48.45 | true |
| J-2136 | LOW SERVICE AREA | 297.00 | 5.01 | 1,000.00 | 1,005.01 | 1,887.70 | 1,892.70 | 66.74 | 47.34 | true |
| J-2137 | LOW SERVICE AREA | 260.00 | 5.01 | 1,000.00 | 1,005.01 | 1,813.72 | 1,818.73 | 82.09 | 63.55 | true |
| J-2138 | LOW SERVICE AREA | 270.00 | 5.01 | 1,000.00 | 1,005.01 | 1,898.93 | 1,903.94 | 78.54 | 59.00 | true |
| J-2139 | LOW SERVICE AREA | 250.00 | 5.01 | 1,000.00 | 1,005.01 | 1,905.03 | 1,910.04 | 87.89 | 69.66 | true |
| J-2140 | LOW SERVICE AREA | 250.00 | 5.01 | 1,000.00 | 1,005.01 | 1,900.88 | 1,905.89 | 85.08 | 60.63 | true |
| J-2141 | LOW SERVICE AREA | 280.00 | 5.01 | 1,000.00 | 1,005.01 | 1,903.81 | 1,908.82 | 72.77 | 49.72 | true |
| J-2142 | LOW SERVICE AREA | 300.00 | 5.01 | 1,000.00 | 1,005.01 | 1,904.05 | 1,909.06 | 64.61 | 42.65 | true |
| J-2143 | LOW SERVICE AREA | 295.00 | 5.01 | 1,000.00 | 1,005.01 | 1,907.71 | 1,912.72 | 66.85 | 44.89 | true |
| J-2144 | LOW SERVICE AREA | 320.00 | 5.01 | 1,000.00 | 1,005.01 | 1,920.90 | 1,925.91 | 58.71 | 42.21 | true |
| J-2145 | LOW SERVICE AREA | 285.00 | 5.01 | 1,000.00 | 1,005.01 | 1,916.99 | 1,922.00 | 73.36 | 55.95 | true |
| J-2146 | LOW SERVICE AREA | 320.00 | 5.01 | 1,000.00 | 1,005.01 | 1,916.50 | 1,921.51 | 57.68 | 39.07 | true |
| J-2147 | LOW SERVICE AREA | 285.00 | 5.01 | 1,000.00 | 1,005.01 | 1,916.26 | 1,921.27 | 72.82 | 54.21 | true |
| J-2148 | LOW SERVICE AREA | 250.00 | 5.01 | 1,000.00 | 1,005.01 | 1,916.26 | 1,921.27 | 88.28 | 70.40 | true |
| J-2149 | LOW SERVICE AREA | 245.00 | 5.01 | 1,000.00 | 1,005.01 | 1,915.53 | 1,920.54 | 90.34 | 72.27 | true |
| J-2150 | LOW SERVICE AREA | 260.00 | 5.01 | 1,000.00 | 1,005.01 | 1,916.02 | 1,921.03 | 83.54 | 64.73 | true |
| J-2151 | LOW SERVICE AREA | 240.00 | 5.01 | 1,000.00 | 1,005.01 | 1,915.53 | 1,920.54 | 92.18 | 73.35 | true |
| J-2152 | LOW SERVICE AREA | 245.00 | 5.01 | 1,000.00 | 1,005.01 | 1,914.06 | 1,919.07 | 90.38 | 72.46 | true |
| J-2153 | LOW SERVICE AREA | 260.00 | 5.01 | 1,000.00 | 1,005.01 | 2,724.61 | 2,729.62 | 93.30 | 76.58 | true |
| J-2154 | LOW SERVICE AREA | 280.00 | 10.09 | 1,000.00 | 1,010.09 | 2,401.12 | 2,411.22 | 83.56 | 68.27 | true |
| J-2155 | LOW SERVICE AREA | 295.00 | 5.01 | 1,000.00 | 1,005.01 | 2,374.76 | 2,379.77 | 76.49 | 59.74 | true |
| J-2156 | LOW SERVICE AREA | 344.00 | 5.01 | 1,000.00 | 1,005.01 | 2,063.97 | 2,068.97 | 54.44 | 40.28 | true |
| J-2157 | LOW SERVICE AREA | 393.00 | 21.00 | 1,000.00 | 1,021.00 | 1,816.41 | 1,837.41 | 32.17 | 20.00 | true |
| J-2158 | LOW SERVICE AREA | 384.00 | 5.01 | 1,000.00 | 1,005.01 | 1,907.71 | 1,912.72 | 35.58 | 20.54 | true |
| J-2159 | LOW SERVICE AREA | 307.00 | 5.01 | 1,000.00 | 1,005.01 | 2,936.04 | 2,941.04 | 67.07 | 21.37 | true |

# Scenario: FIRE FLOW BUILDOUT
## Fire Flow Analysis
## Fire Flow Report

| Label | Zone | Elevation (ft) | Demand (gpm) | Needed Fire Flow (gpm) | Total Flow Needed (gpm) | Available Fire Flow (gpm) | Total Flow Available (gpm) | Residual Pressure @ Total Flow Needed (psi) | Residual Pressure (psi) | Satisfies Fire Flow Constraints? |
|---|---|---|---|---|---|---|---|---|---|---|
| J-2160 | LOW SERVICE AREA | 263.50 | 5.01 | 1,000.00 | 1,005.01 | 1,434.08 | 1,439.09 | 68.66 | 49.67 | true |
| J-2161 | LOW SERVICE AREA | 322.00 | 5.01 | 1,000.00 | 1,005.01 | 1,765.38 | 1,770.39 | 55.29 | 37.33 | true |
| J-2162 | LOW SERVICE AREA | 315.50 | 5.01 | 1,000.00 | 1,005.01 | 1,726.32 | 1,731.33 | 59.58 | 44.77 | true |
| J-2163 | LOW SERVICE AREA | 272.00 | 5.01 | 1,000.00 | 1,005.01 | 1,535.77 | 1,540.78 | 74.72 | 61.41 | true |
| J-2164 | LOW SERVICE AREA | 295.00 | 5.01 | 1,000.00 | 1,005.01 | 1,598.14 | 1,603.15 | 63.69 | 46.93 | true |
| J-2165 | LOW SERVICE AREA | 265.00 | 5.01 | 1,000.00 | 1,005.01 | 1,938.72 | 1,943.73 | 83.64 | 68.74 | true |
| J-2166 | LOW SERVICE AREA | 272.00 | 5.01 | 1,000.00 | 1,005.01 | 1,938.72 | 1,943.73 | 67.57 | 21.46 | true |
| J-2167 | LOW SERVICE AREA | 341.00 | 5.01 | 1,000.00 | 1,005.01 | 2,385.25 | 2,390.26 | 54.38 | 39.42 | true |
| J-2168 | LOW SERVICE AREA | 274.00 | 5.01 | 1,000.00 | 1,005.01 | 1,304.90 | 1,309.91 | 44.94 | 20.00 | true |
| J-2169 | LOW SERVICE AREA | 283.00 | 5.01 | 1,000.00 | 1,005.01 | 1,361.33 | 1,366.34 | 46.19 | 20.00 | true |
| J-2170 | LOW SERVICE AREA | 285.00 | 5.01 | 1,000.00 | 1,005.01 | 1,353.39 | 1,358.40 | 45.46 | 20.00 | true |
| J-2171 | LOW SERVICE AREA | 322.00 | 5.01 | 1,000.00 | 1,005.01 | 902.65 | 907.66 | 10.83 | 20.00 | false |
| J-2172 | LOW SERVICE AREA | 300.00 | 5.01 | 1,000.00 | 1,005.01 | 1,020.66 | 1,025.67 | 21.98 | 20.00 | true |
| J-2173 | LOW SERVICE AREA | 288.00 | 5.01 | 1,000.00 | 1,005.01 | 1,460.45 | 1,465.46 | 62.51 | 46.08 | true |
| J-2174 | LOW SERVICE AREA | 290.00 | 5.01 | 1,000.00 | 1,005.01 | 1,482.06 | 1,487.07 | 61.36 | 43.69 | true |
| J-2175 | LOW SERVICE AREA | 283.00 | 5.01 | 1,000.00 | 1,005.01 | 1,433.35 | 1,438.36 | 58.27 | 37.52 | true |
| J-2176 | LOW SERVICE AREA | 347.00 | 5.01 | 1,000.00 | 1,005.01 | 2,615.72 | 2,620.73 | 52.65 | 36.87 | true |
| J-2177 | LOW SERVICE AREA | 346.00 | 5.01 | 1,000.00 | 1,005.01 | 1,860.72 | 1,865.73 | 44.86 | 20.00 | true |
| J-2178 | LOW SERVICE AREA | 355.00 | 5.01 | 1,000.00 | 1,005.01 | 2,490.72 | 2,495.73 | 48.74 | 33.38 | true |
| J-2179 | LOW SERVICE AREA | 339.00 | 5.01 | 1,000.00 | 1,005.01 | 2,340.70 | 2,345.71 | 51.03 | 20.00 | true |
| J-2180 | LOW SERVICE AREA | 405.00 | 5.01 | 1,000.00 | 1,005.01 | 1,199.10 | 1,204.11 | 23.56 | 20.00 | true |
| J-2181 | LOW SERVICE AREA | 386.00 | 5.01 | 1,000.00 | 1,005.01 | 1,199.10 | 1,204.11 | 27.15 | 21.75 | true |
| J-2182 | LOW SERVICE AREA | 402.00 | 5.01 | 1,000.00 | 1,005.01 | 1,007.32 | 1,012.33 | 20.19 | 20.00 | true |
| J-2183 | LOW SERVICE AREA | 396.00 | 5.01 | 1,000.00 | 1,005.01 | 829.22 | 834.23 | 13.23 | 20.00 | false |
| J-2184 | LOW SERVICE AREA | 219.00 | 5.01 | 1,000.00 | 1,005.01 | 2,367.92 | 2,372.93 | 108.94 | 90.97 | true |
| J-2185 | LOW SERVICE AREA | 221.00 | 5.01 | 1,000.00 | 1,005.01 | 2,414.06 | 2,419.07 | 98.26 | 41.82 | true |
| J-2186 | LOW SERVICE AREA | 218.00 | 5.01 | 1,000.00 | 1,005.01 | 2,381.59 | 2,386.60 | 94.54 | 20.00 | true |
| J-2187 | LOW SERVICE AREA | 215.00 | 5.01 | 1,000.00 | 1,005.01 | 1,302.49 | 1,307.50 | 70.84 | 43.80 | true |
| J-2188 | LOW SERVICE AREA | 219.00 | 5.01 | 1,000.00 | 1,005.01 | 1,302.49 | 1,307.50 | 59.65 | 26.68 | true |
| J-2189 | LOW SERVICE AREA | 232.00 | 5.01 | 1,000.00 | 1,005.01 | 1,082.76 | 1,087.77 | 46.00 | 36.44 | true |
| J-2190 | LOW SERVICE AREA | 270.00 | 5.01 | 1,000.00 | 1,005.01 | 1,065.86 | 1,070.87 | 27.77 | 20.00 | true |
| J-2191 | LOW SERVICE AREA | 284.00 | 5.01 | 1,000.00 | 1,005.01 | 3,074.59 | 3,079.59 | 76.42 | 20.00 | true |
| J-2192 | LOW SERVICE AREA | 263.00 | 5.01 | 1,000.00 | 1,005.01 | 1,329.25 | 1,334.26 | 50.10 | 20.00 | true |
| J-2193 | LOW SERVICE AREA | 342.00 | 5.01 | 1,000.00 | 1,005.01 | 843.02 | 848.03 | 5.47 | 20.00 | false |
| J-2194 | LOW SERVICE AREA | 295.00 | 0.00 | 1,000.00 | 1,000.00 | 2,336.43 | 2,336.43 | 66.96 | 20.00 | true |
| J-2195 | LOW SERVICE AREA | 285.00 | 0.00 | 1,000.00 | 1,000.00 | 4,022.46 | 4,022.46 | 82.19 | 60.45 | true |
| J-2291 | LOW SERVICE AREA | 275.00 | 5.01 | 1,000.00 | 1,005.01 | 2,403.69 | 2,408.70 | 74.68 | 20.00 | true |

# Scenario: FIRE FLOW BUILDOUT
## Fire Flow Analysis
## Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-1000 | 12.0 | J-1102 | J-1015 | 1,245 | 33.09 | 0.01 | 0.01 | 0.09 | 120.0 |
| P-1001 | 12.0 | J-1007 | J-1102 | 1,005 | 41.37 | 0.01 | 0.01 | 0.12 | 120.0 |
| P-1003 | 12.0 | J-1008 | J-1009 | 300 | 8.27 | 0.00 | 0.00 | 0.02 | 100.0 |
| P-1004 | 12.0 | J-1007 | J-1008 | 400 | 57.91 | 0.02 | 0.01 | 0.16 | 100.0 |
| P-1005 | 12.0 | J-1098 | J-1007 | 850 | 107.55 | 0.06 | 0.05 | 0.31 | 110.0 |
| P-1006 | 12.0 | J-1006 | J-1098 | 800 | -1,127.43 | 4.31 | 3.45 | 3.20 | 110.0 |
| P-1007 | 12.0 | J-1007 | J-1012 | 4,600 | 0.00 | 0.00 | 0.00 | 0.00 | 130.0 |
| P-1008 | 8.0 | J-1030 | J-1031 | 1,650 | -1.24 | 0.00 | 0.00 | 0.01 | 110.0 |
| P-1010 | 12.0 | J-1016 | J-1017 | 1,800 | 16.55 | 0.00 | 0.00 | 0.05 | 120.0 |
| P-1012 | 8.0 | J-1027 | J-1030 | 2,200 | 15.31 | 0.01 | 0.02 | 0.10 | 110.0 |
| P-1013 | 8.0 | J-1034 | J-1033 | 1,350 | -3.82 | 0.00 | 0.00 | 0.02 | 110.0 |
| P-1014 | 12.0 | J-1033 | J-1034 | 1,050 | 4.45 | 0.00 | 0.00 | 0.01 | 110.0 |
| P-1015 | 12.0 | J-1032 | J-1033 | 500 | 10.81 | 0.00 | 0.00 | 0.03 | 110.0 |
| P-1016 | 12.0 | J-1032 | J-1027 | 1,500 | -45.14 | 0.01 | 0.02 | 0.13 | 110.0 |
| P-1017 | 8.0 | J-1033 | J-1035 | 2,100 | -5.73 | 0.00 | 0.00 | 0.04 | 120.0 |
| P-1018 | 12.0 | J-1025 | PRV-4 | 1,183 | 0.00 | 0.00 | 0.00 | 0.00 | 110.0 |
| P-1019 | 12.0 | J-1026 | J-1025 | 450 | 16.55 | 0.00 | 0.00 | 0.05 | 110.0 |
| P-1020 | 12.0 | J-1026 | J-1027 | 1,100 | -38.83 | 0.01 | 0.01 | 0.11 | 110.0 |
| P-1021 | 8.0 | J-1035 | J-1026 | 600 | -14.01 | 0.01 | 0.00 | 0.09 | 120.0 |
| P-1022 | 10.0 | J-1029 | J-1028 | 2,500 | 28.29 | 0.01 | 0.03 | 0.12 | 110.0 |
| P-1023 | 12.0 | J-1028 | J-1027 | 250 | 107.55 | 0.06 | 0.01 | 0.31 | 110.0 |
| P-1024 | 12.0 | J-1029 | J-1028 | 750 | 87.54 | 0.04 | 0.03 | 0.25 | 110.0 |
| P-1025 | 12.0 | J-1103 | J-1029 | 3,500 | 124.10 | 0.06 | 0.22 | 0.35 | 120.0 |
| P-1026 | 10.0 | J-1019 | J-1018 | 1,500 | -81.64 | 0.12 | 0.18 | 0.33 | 90.0 |
| P-1027 | 12.0 | J-1011 | J-1005 | 2,200 | -522.66 | 0.88 | 1.94 | 1.48 | 120.0 |
| P-1028 | 10.0 | J-1013 | J-1014 | 1,950 | 8.27 | 0.00 | 0.00 | 0.03 | 100.0 |
| P-1029 | 12.0 | J-1013 | J-1012 | 2,000 | -422.95 | 0.70 | 1.40 | 1.20 | 110.0 |
| P-1030 | 10.0 | J-1103 | J-1013 | 1,000 | -406.40 | 1.35 | 1.35 | 1.66 | 120.0 |
| P-1031 | 10.0 | J-1018 | J-1103 | 400 | -274.03 | 0.65 | 0.26 | 1.12 | 120.0 |
| P-1032 | 8.0 | J-1053 | J-1018 | 2,080 | -184.12 | 1.29 | 2.69 | 1.18 | 100.0 |
| P-1033 | 8.0 | J-1054 | J-1036 | 500 | 150.42 | 0.75 | 0.37 | 0.96 | 110.0 |
| P-1034 | 8.0 | J-1036 | J-1037 | 650 | 69.54 | 0.18 | 0.12 | 0.44 | 110.0 |
| P-1035 | 8.0 | J-1037 | J-1036 | 600 | -72.61 | 0.19 | 0.12 | 0.46 | 110.0 |
| P-1036 | 8.0 | J-1053 | J-1054 | 400 | 144.50 | 0.83 | 0.33 | 0.92 | 100.0 |
| P-1037 | 8.0 | J-1052 | J-1053 | 800 | -31.35 | 0.05 | 0.04 | 0.20 | 100.0 |
| P-1038 | 8.0 | J-1050 | J-1052 | 1,200 | -14.80 | 0.01 | 0.01 | 0.09 | 100.0 |
| P-1039 | 12.0 | J-1011 | J-1012 | 750 | 431.22 | 0.73 | 0.55 | 1.22 | 110.0 |
| P-1040 | 12.0 | J-1010 | J-1011 | 2,200 | -83.17 | 0.03 | 0.08 | 0.24 | 110.0 |
| P-1041 | 12.0 | J-1047 | J-1010 | 1,800 | -596.93 | 1.33 | 2.39 | 1.69 | 110.0 |
| P-1042 | 8.0 | J-1054 | J-1055 | 500 | -14.20 | 0.01 | 0.01 | 0.09 | 100.0 |
| P-1043 | 12.0 | J-1005 | J-1006 | 1,750 | -1,119.16 | 4.25 | 7.44 | 3.17 | 110.0 |
| P-1044 | 12.0 | J-1010 | J-1005 | 1,950 | -522.04 | 1.04 | 2.02 | 1.48 | 110.0 |
| P-1045 | 12.0 | J-1001 | J-1004 | 1,500 | -6.40 | 0.00 | 0.00 | 0.02 | 100.0 |
| P-1046 | 12.0 | J-1002 | J-1003 | 1,900 | -25.11 | 0.00 | 0.01 | 0.07 | 100.0 |
| P-1047 | 12.0 | J-1001 | J-1002 | 1,100 | -8.57 | 0.00 | 0.00 | 0.02 | 100.0 |
| P-1048 | 8.0 | J-1000 | J-1001 | 975 | -6.70 | 0.00 | 0.00 | 0.04 | 100.0 |
| P-1049 | 12.0 | J-1004 | J-1000 | 1,400 | 18.12 | 0.00 | 0.00 | 0.05 | 120.0 |
| P-1050 | 12.0 | J-1003 | J-1004 | 1,200 | 32.80 | 0.01 | 0.01 | 0.09 | 100.0 |
| P-1051 | 12.0 | J-1005 | J-1003 | 430 | 66.18 | 0.03 | 0.01 | 0.19 | 100.0 |
| P-1052 | 12.0 | J-1100 | T-3 | 200 | -153.36 | 0.09 | 0.02 | 0.44 | 120.0 |
| P-1053 | 12.0 | J-1100 | J-1040 | 200 | 355.58 | 0.51 | 0.10 | 1.01 | 110.0 |

# Scenario: FIRE FLOW BUILDOUT
## Fire Flow Analysis
## Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-1054 | 12.0 | J-1042 | J-1100 | 1,000 | 210.50 | 0.19 | 0.19 | 0.60 | 110.0 |
| P-1055 | 8.0 | J-1044 | J-1046 | 350 | -114.11 | 0.53 | 0.19 | 0.73 | 100.0 |
| P-1056 | 8.0 | J-1046 | J-1048 | 1,360 | 134.78 | 0.73 | 0.99 | 0.86 | 100.0 |
| P-1057 | 12.0 | J-1046 | J-1047 | 1,800 | -588.66 | 1.29 | 2.33 | 1.67 | 110.0 |
| P-1058 | 12.0 | J-1044 | J-1046 | 350 | -331.50 | 0.53 | 0.19 | 0.94 | 100.0 |
| P-1059 | 8.0 | J-1044 | J-1061 | 1,100 | 109.03 | 0.49 | 0.54 | 0.70 | 100.0 |
| P-1060 | 12.0 | J-1043 | J-1044 | 600 | -328.30 | 0.44 | 0.26 | 0.93 | 110.0 |
| P-1061 | 12.0 | J-1043 | J-1042 | 800 | 218.77 | 0.21 | 0.17 | 0.62 | 110.0 |
| P-1062 | 8.0 | J-1041 | J-1043 | 1,150 | -101.26 | 0.30 | 0.35 | 0.65 | 120.0 |
| P-1063 | 8.0 | J-1040 | J-1041 | 500 | -84.71 | 0.22 | 0.11 | 0.54 | 120.0 |
| P-1064 | 12.0 | J-1104 | J-1040 | 615 | -432.02 | 0.87 | 0.54 | 1.23 | 100.0 |
| P-1065 | 12.0 | J-1039 | J-1104 | 1,585 | -414.99 | 0.81 | 1.28 | 1.18 | 100.0 |
| P-1066 | 12.0 | J-1101 | J-1079 | 1,326 | -35.89 | 0.01 | 0.01 | 0.10 | 120.0 |
| P-1067 | 12.0 | J-1059 | J-1101 | 1,774 | -18.86 | 0.00 | 0.00 | 0.05 | 120.0 |
| P-1068 | 8.0 | J-1057 | J-1058 | 1,350 | -5.05 | 0.00 | 0.00 | 0.03 | 120.0 |
| P-1069 | 12.0 | J-1058 | J-1057 | 1,870 | 11.98 | 0.00 | 0.00 | 0.03 | 120.0 |
| P-1070 | 8.0 | J-1050 | J-1051 | 1,250 | 8.27 | 0.00 | 0.00 | 0.05 | 120.0 |
| P-1071 | 8.0 | J-1048 | J-1050 | 1,200 | 101.68 | 0.43 | 0.52 | 0.65 | 100.0 |
| P-1072 | 8.0 | J-1048 | J-1049 | 800 | 24.82 | 0.03 | 0.03 | 0.16 | 100.0 |
| P-1073 | 6.0 | J-1061 | J-1045 | 1,400 | 100.76 | 1.72 | 2.41 | 1.14 | 100.0 |
| P-1074 | 12.0 | J-1045 | J-1039 | 550 | -395.11 | 0.74 | 0.41 | 1.12 | 100.0 |
| P-1075 | 12.0 | J-1045 | J-1058 | 2,800 | 144.26 | 0.11 | 0.32 | 0.41 | 100.0 |
| P-1076 | 12.0 | J-1062 | J-1045 | 280 | -320.31 | 0.50 | 0.14 | 0.91 | 100.0 |
| P-1077 | 12.0 | J-1075 | J-1076 | 500 | 17.03 | 0.00 | 0.00 | 0.05 | 110.0 |
| P-1078 | 12.0 | J-1062 | J-1075 | 500 | 34.05 | 0.01 | 0.00 | 0.10 | 100.0 |
| P-1079 | 8.0 | J-1077 | J-1080 | 200 | 17.03 | 0.01 | 0.00 | 0.11 | 120.0 |
| P-1080 | 12.0 | J-1062 | J-1059 | 2,800 | 110.74 | 0.06 | 0.16 | 0.31 | 110.0 |
| P-1081 | 12.0 | J-1078 | J-1062 | 500 | -158.77 | 0.14 | 0.07 | 0.45 | 100.0 |
| P-1082 | 12.0 | J-1077 | J-1078 | 350 | -141.74 | 0.08 | 0.03 | 0.40 | 120.0 |
| P-1083 | 12.0 | J-1079 | J-1077 | 1,200 | -107.69 | 0.05 | 0.06 | 0.31 | 120.0 |
| P-1084 | 12.0 | J-1058 | J-1059 | 300 | -112.57 | 0.05 | 0.02 | 0.32 | 120.0 |
| P-1085 | 12.0 | J-1063 | J-1058 | 1,750 | -222.78 | 0.21 | 0.37 | 0.63 | 110.0 |
| P-1086 | 12.0 | J-1093 | J-1094 | 1,250 | 8.27 | 0.00 | 0.00 | 0.02 | 110.0 |
| P-1087 | 6.0 | J-1092 | J-1093 | 1,600 | 8.12 | 0.02 | 0.03 | 0.09 | 100.0 |
| P-1088 | 8.0 | J-1093 | J-1096 | 1,100 | -8.43 | 0.00 | 0.00 | 0.05 | 110.0 |
| P-1089 | 8.0 | J-1096 | J-1097 | 2,000 | -16.70 | 0.01 | 0.03 | 0.11 | 110.0 |
| P-1090 | 8.0 | J-1092 | J-1097 | 800 | -8.49 | 0.00 | 0.00 | 0.05 | 100.0 |
| P-1091 | 8.0 | J-1089 | J-1092 | 2,000 | 7.90 | 0.00 | 0.01 | 0.05 | 100.0 |
| P-1092 | 8.0 | J-1097 | J-1091 | 650 | -33.47 | 0.06 | 0.04 | 0.21 | 100.0 |
| P-1093 | 8.0 | J-1091 | J-1089 | 600 | 32.72 | 0.05 | 0.03 | 0.21 | 100.0 |
| P-1094 | 8.0 | J-1095 | J-1089 | 840 | -16.55 | 0.01 | 0.01 | 0.11 | 100.0 |
| P-1095 | 6.0 | J-1095 | PRV-2 | 2,322 | 0.00 | 0.00 | 0.00 | 0.00 | 110.0 |
| P-1096 | 8.0 | J-1084 | J-1085 | 1,800 | 45.27 | 0.10 | 0.17 | 0.29 | 100.0 |
| P-1098 | 8.0 | J-1084 | J-1083 | 900 | 17.12 | 0.01 | 0.01 | 0.11 | 110.0 |
| P-1099 | 8.0 | J-1083 | J-1082 | 1,350 | -78.25 | 0.22 | 0.30 | 0.50 | 110.0 |
| P-1100 | 10.0 | J-1086 | J-1083 | 1,150 | -87.10 | 0.11 | 0.13 | 0.36 | 100.0 |
| P-1101 | 10.0 | J-1086 | J-1090 | 515 | 48.90 | 0.04 | 0.02 | 0.20 | 100.0 |
| P-1102 | 10.0 | J-1087 | J-1086 | 1,100 | -29.92 | 0.01 | 0.01 | 0.12 | 110.0 |
| P-1103 | 10.0 | J-1085 | J-1090 | 500 | -45.73 | 0.03 | 0.02 | 0.19 | 100.0 |
| P-1104 | 12.0 | J-1081 | J-1121 | 690 | 8.27 | 0.00 | 0.00 | 0.02 | 120.0 |
| P-1105 | 8.0 | J-1060 | J-1084 | 1,300 | 70.66 | 0.22 | 0.29 | 0.45 | 100.0 |

# Scenario: FIRE FLOW BUILDOUT
## Fire Flow Analysis
## Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-1106 | 10.0 | J-1088 | J-1087 | 700 | -21.65 | 0.01 | 0.00 | 0.09 | 110.0 |
| P-1107 | 8.0 | J-1091 | J-1085 | 650 | -82.73 | 0.29 | 0.19 | 0.53 | 100.0 |
| P-1108 | 10.0 | J-1090 | J-1088 | 1,100 | -5.10 | 0.00 | 0.00 | 0.02 | 110.0 |
| P-1109 | 8.0 | J-1064 | J-1060 | 300 | 70.16 | 0.13 | 0.04 | 0.45 | 130.0 |
| P-1110 | 8.0 | J-1068 | J-1069 | 1,450 | 44.80 | 0.09 | 0.14 | 0.29 | 100.0 |
| P-1111 | 8.0 | J-1038 | J-1073 | 1,400 | 3.83 | 0.00 | 0.00 | 0.02 | 110.0 |
| P-1112 | 8.0 | J-1068 | J-1072 | 950 | -114.87 | 0.54 | 0.51 | 0.73 | 100.0 |
| P-1113 | 8.0 | J-1065 | J-1068 | 500 | -61.79 | 0.17 | 0.09 | 0.39 | 100.0 |
| P-1114 | 6.0 | J-1073 | J-1065 | 1,700 | 56.48 | 0.59 | 1.00 | 0.64 | 100.0 |
| P-1115 | 6.0 | J-1056 | J-1073 | 1,100 | 60.92 | 0.68 | 0.74 | 0.69 | 100.0 |
| P-1116 | 8.0 | J-1065 | J-1064 | 250 | 74.55 | 0.24 | 0.06 | 0.48 | 100.0 |
| P-1117 | 8.0 | J-1066 | J-1065 | 1,400 | -35.45 | 0.06 | 0.09 | 0.23 | 100.0 |
| P-1118 | 8.0 | J-1064 | J-1067 | 1,250 | 55.01 | 0.14 | 0.17 | 0.35 | 100.0 |
| P-1119 | 12.0 | J-1063 | J-1064 | 1,910 | 67.64 | 0.02 | 0.04 | 0.19 | 110.0 |
| P-1120 | 12.0 | J-1081 | J-1063 | 450 | -138.11 | 0.09 | 0.04 | 0.39 | 110.0 |
| P-1121 | 12.0 | J-1082 | J-1081 | 700 | -112.81 | 0.06 | 0.04 | 0.32 | 110.0 |
| P-1122 | 12.0 | J-1082 | J-1060 | 1,400 | 17.53 | 0.00 | 0.00 | 0.05 | 110.0 |
| P-1123 | 6.0 | J-1069 | J-1070 | 500 | 16.55 | 0.06 | 0.03 | 0.19 | 100.0 |
| P-1124 | 6.0 | J-1069 | J-1066 | 400 | 19.98 | 0.09 | 0.03 | 0.23 | 100.0 |
| P-1125 | 6.0 | J-1067 | J-1066 | 350 | -47.16 | 0.42 | 0.15 | 0.54 | 100.0 |
| P-1126 | 6.0 | J-1070 | J-1071 | 1,000 | 8.27 | 0.02 | 0.02 | 0.09 | 100.0 |
| P-1127 | 8.0 | J-1038 | J-1037 | 900 | -133.88 | 0.60 | 0.54 | 0.85 | 110.0 |
| P-1128 | 8.0 | J-1072 | J-1038 | 800 | -121.77 | 0.50 | 0.40 | 0.78 | 110.0 |
| P-1129 | 8.0 | J-1055 | J-1050 | 650 | -99.94 | 0.42 | 0.27 | 0.64 | 100.0 |
| P-1130 | 8.0 | J-1055 | J-1056 | 1,120 | 77.47 | 0.26 | 0.29 | 0.49 | 100.0 |
| P-1131 | 10.0 | J-1019 | J-1022 | 500 | 50.28 | 0.05 | 0.02 | 0.21 | 90.0 |
| P-1132 | 8.0 | J-1020 | J-1019 | 520 | -23.09 | 0.03 | 0.01 | 0.15 | 100.0 |
| P-1133 | 8.0 | J-1021 | J-1020 | 800 | -6.27 | 0.00 | 0.00 | 0.04 | 100.0 |
| P-1134 | 6.0 | J-1022 | J-1021 | 700 | -6.54 | 0.01 | 0.01 | 0.07 | 100.0 |
| P-1135 | 10.0 | J-1023 | J-1022 | 500 | -33.09 | 0.02 | 0.01 | 0.14 | 90.0 |
| P-1136 | 8.0 | J-1020 | J-1021 | 450 | 8.55 | 0.00 | 0.00 | 0.05 | 100.0 |
| P-1137 | 8.0 | J-1074 | J-1024 | 800 | -1.62 | 0.00 | 0.00 | 0.01 | 100.0 |
| P-1138 | 8.0 | J-1023 | J-1074 | 900 | 6.66 | 0.00 | 0.00 | 0.04 | 100.0 |
| P-1139 | 10.0 | J-1024 | J-1023 | 320 | -18.16 | 0.01 | 0.00 | 0.07 | 90.0 |
| P-1140 | 10.0 | J-1024 | J-1099 | 330 | 8.27 | 0.00 | 0.00 | 0.03 | 90.0 |
| P-1141 | 10.0 | J-1099 | PRV-3 | 5 | 0.00 | 0.00 | 0.00 | 0.00 | 90.0 |
| P-1142 | 8.0 | J-1092 | PRV-1 | 390 | 0.00 | 0.00 | 0.00 | 0.00 | 100.0 |
| P-1143 | 12.0 | J-1015 | J-1105 | 825 | 24.82 | 0.00 | 0.00 | 0.07 | 130.0 |
| P-1144 | 12.0 | J-1105 | J-1106 | 715 | 8.27 | 0.00 | 0.00 | 0.02 | 130.0 |
| P-1145 | 8.0 | J-1105 | J-1107 | 928 | 8.27 | 0.00 | 0.00 | 0.05 | 130.0 |
| P-1146 | 12.0 | J-1008 | J-1108 | 1,077 | 41.37 | 0.01 | 0.01 | 0.12 | 120.0 |
| P-1147 | 8.0 | J-1108 | J-1109 | 757 | 8.27 | 0.00 | 0.00 | 0.05 | 130.0 |
| P-1148 | 8.0 | J-1017 | J-1110 | 1,053 | 8.27 | 0.00 | 0.00 | 0.05 | 130.0 |
| P-1149 | 12.0 | J-1111 | J-1032 | 1,442 | -26.06 | 0.00 | 0.01 | 0.07 | 110.0 |
| P-1150 | 8.0 | J-1111 | J-1112 | 573 | 8.27 | 0.00 | 0.00 | 0.05 | 130.0 |
| P-1151 | 12.0 | J-1031 | J-1111 | 1,858 | -9.51 | 0.00 | 0.00 | 0.03 | 110.0 |
| P-1152 | 8.0 | J-1030 | J-1113 | 439 | 8.27 | 0.00 | 0.00 | 0.05 | 130.0 |
| P-1153 | 8.0 | J-1025 | J-1114 | 459 | 8.27 | 0.00 | 0.00 | 0.05 | 130.0 |
| P-1154 | 12.0 | J-1002 | J-1115 | 2,056 | 8.27 | 0.00 | 0.00 | 0.02 | 130.0 |
| P-1155 | 8.0 | J-1000 | J-1116 | 920 | 8.27 | 0.00 | 0.00 | 0.05 | 130.0 |
| P-1156 | 8.0 | J-1000 | J-1117 | 1,514 | 8.27 | 0.00 | 0.00 | 0.05 | 130.0 |

# Scenario: FIRE FLOW BUILDOUT
## Fire Flow Analysis
## Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-1157 | 8.0 | J-1049 | J-1118 | 828 | 8.27 | 0.00 | 0.00 | 0.05 | 130.0 |
| P-1158 | 8.0 | J-1049 | J-1119 | 1,231 | 8.27 | 0.00 | 0.00 | 0.05 | 130.0 |
| P-1159 | 10.0 | J-1052 | J-1120 | 698 | 8.27 | 0.00 | 0.00 | 0.03 | 130.0 |
| P-1161 | 6.0 | J-1041 | J-1122 | 338 | 8.27 | 0.01 | 0.00 | 0.09 | 130.0 |
| P-1162 | 6.0 | J-1056 | J-1123 | 932 | 8.27 | 0.01 | 0.01 | 0.09 | 110.0 |
| P-1163 | 6.0 | J-1067 | J-1124 | 388 | 85.13 | 0.77 | 0.30 | 0.97 | 130.0 |
| P-1164 | 6.0 | J-1124 | J-1125 | 150 | 51.08 | 0.30 | 0.05 | 0.58 | 130.0 |
| P-1165 | 6.0 | J-1125 | J-1126 | 100 | 17.03 | 0.04 | 0.00 | 0.19 | 130.0 |
| P-1166 | 6.0 | J-1125 | J-1127 | 224 | 17.03 | 0.04 | 0.01 | 0.19 | 130.0 |
| P-1167 | 6.0 | J-1124 | J-1128 | 747 | 17.03 | 0.04 | 0.03 | 0.19 | 130.0 |
| P-1168 | 8.0 | J-1095 | J-1131 | 773 | 8.27 | 0.00 | 0.00 | 0.05 | 130.0 |
| P-1169 | 8.0 | J-1091 | J-1132 | 885 | 8.27 | 0.00 | 0.00 | 0.05 | 130.0 |
| P-1170 | 8.0 | J-1088 | J-1133 | 1,016 | 8.27 | 0.00 | 0.00 | 0.05 | 130.0 |
| P-2000 | 6.0 | J-2017 | J-2018 | 1,600 | 5.01 | 0.01 | 0.01 | 0.06 | 100.0 |
| P-2001 | 8.0 | J-2016 | J-2019 | 650 | -29.62 | 0.04 | 0.03 | 0.19 | 100.0 |
| P-2002 | 8.0 | J-2016 | J-2017 | 750 | 10.02 | 0.01 | 0.00 | 0.06 | 100.0 |
| P-2003 | 12.0 | J-2020 | J-2016 | 650 | -14.60 | 0.00 | 0.00 | 0.04 | 110.0 |
| P-2004 | 8.0 | J-2015 | J-2021 | 550 | -27.23 | 0.04 | 0.02 | 0.17 | 100.0 |
| P-2005 | 6.0 | J-2020 | J-2015 | 450 | -19.98 | 0.10 | 0.05 | 0.23 | 90.0 |
| P-2006 | 8.0 | J-2019 | J-2015 | 300 | -34.63 | 0.06 | 0.02 | 0.22 | 100.0 |
| P-2007 | 6.0 | J-2005 | J-2020 | 300 | -29.57 | 0.11 | 0.03 | 0.34 | 130.0 |
| P-2008 | 6.0 | J-2191 | J-2192 | 1,093 | 5.01 | 0.00 | 0.00 | 0.06 | 130.0 |
| P-2009 | 8.0 | J-2015 | J-2014 | 2,160 | -32.39 | 0.05 | 0.11 | 0.21 | 100.0 |
| P-2010 | 6.0 | J-2004 | J-2005 | 1,200 | -24.56 | 0.13 | 0.15 | 0.28 | 100.0 |
| P-2011 | 8.0 | J-207 | T-2 | 223 | -101.39 | 0.26 | 0.06 | 0.65 | 130.0 |
| P-2012 | 8.0 | J-2025 | J-2024 | 2,400 | -4.19 | 0.00 | 0.00 | 0.03 | 90.0 |
| P-2013 | 8.0 | J-2023 | J-2025 | 250 | 0.81 | 0.00 | 0.00 | 0.01 | 90.0 |
| P-2014 | 8.0 | J-2024 | J-2023 | 1,300 | 5.82 | 0.00 | 0.00 | 0.04 | 90.0 |
| P-2015 | 8.0 | J-2022 | J-2024 | 250 | 15.03 | 0.02 | 0.00 | 0.10 | 90.0 |
| P-2016 | 10.0 | J-2014 | J-207 | 800 | -74.09 | 0.10 | 0.08 | 0.30 | 90.0 |
| P-2017 | 8.0 | J-207 | J-2027 | 1,200 | 27.30 | 0.03 | 0.04 | 0.17 | 110.0 |
| P-2018 | 10.0 | J-2022 | J-2029 | 3,500 | -62.30 | 0.06 | 0.21 | 0.25 | 100.0 |
| P-2019 | 10.0 | J-2014 | J-2011 | 2,900 | 36.69 | 0.02 | 0.06 | 0.15 | 100.0 |
| P-2020 | 6.0 | J-2010 | J-2004 | 700 | -7.74 | 0.02 | 0.01 | 0.09 | 90.0 |
| P-2021 | 12.0 | PRV-4 | J-2003 | 167 | 0.00 | 0.00 | 0.00 | 0.00 | 110.0 |
| P-2022 | 6.0 | J-2004 | J-2003 | 350 | 11.81 | 0.04 | 0.01 | 0.13 | 90.0 |
| P-2023 | 10.0 | J-2003 | J-2002 | 1,650 | 6.80 | 0.00 | 0.00 | 0.03 | 110.0 |
| P-2024 | 8.0 | J-2009 | J-2002 | 850 | 4.48 | 0.00 | 0.00 | 0.03 | 110.0 |
| P-2025 | 6.0 | J-2008 | J-2001 | 1,200 | 3.94 | 0.00 | 0.00 | 0.04 | 130.0 |
| P-2026 | 8.0 | J-2008 | J-2001 | 1,000 | 7.84 | 0.00 | 0.00 | 0.05 | 110.0 |
| P-2027 | 6.0 | J-2008 | J-2009 | 750 | 6.76 | 0.01 | 0.01 | 0.08 | 90.0 |
| P-2028 | 10.0 | J-2002 | J-2001 | 400 | -39.19 | 0.02 | 0.01 | 0.16 | 110.0 |
| P-2029 | 8.0 | J-2029 | J-2031 | 400 | 5.01 | 0.00 | 0.00 | 0.03 | 110.0 |
| P-2030 | 8.0 | J-2050 | J-2012 | 400 | 48.23 | 0.11 | 0.04 | 0.31 | 100.0 |
| P-2031 | 6.0 | J-2051 | J-2050 | 450 | -15.00 | 0.05 | 0.02 | 0.17 | 100.0 |
| P-2032 | 6.0 | J-2026 | J-2051 | 300 | -9.99 | 0.02 | 0.01 | 0.11 | 100.0 |
| P-2033 | 12.0 | J-2026 | J-2028 | 600 | -74.00 | 0.02 | 0.01 | 0.21 | 120.0 |
| P-2034 | 12.0 | J-2026 | J-2012 | 650 | 68.67 | 0.02 | 0.01 | 0.19 | 120.0 |
| P-2035 | 8.0 | J-2013 | J-2026 | 1,300 | -10.31 | 0.01 | 0.01 | 0.07 | 110.0 |
| P-2036 | 6.0 | J-2012 | J-2013 | 900 | -5.30 | 0.01 | 0.01 | 0.06 | 100.0 |
| P-2037 | 10.0 | J-2011 | J-2012 | 150 | -117.19 | 0.23 | 0.03 | 0.48 | 90.0 |

# Scenario: FIRE FLOW BUILDOUT
## Fire Flow Analysis
## Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-2038 | 8.0 | J-2028 | J-2029 | 900 | -56.71 | 0.18 | 0.16 | 0.36 | 90.0 |
| P-2039 | 8.0 | J-2027 | J-2028 | 1,950 | 22.29 | 0.02 | 0.04 | 0.14 | 110.0 |
| P-2040 | 8.0 | J-2007 | J-2008 | 1,950 | 23.55 | 0.03 | 0.07 | 0.15 | 90.0 |
| P-2041 | 10.0 | J-2007 | J-2011 | 600 | -148.87 | 0.36 | 0.21 | 0.61 | 90.0 |
| P-2042 | 10.0 | J-2006 | J-2007 | 600 | -52.46 | 0.05 | 0.03 | 0.21 | 90.0 |
| P-2043 | 8.0 | J-2042 | J-2007 | 1,650 | -33.95 | 0.06 | 0.09 | 0.22 | 100.0 |
| P-2044 | 8.0 | J-2007 | J-2043 | 1,450 | 33.90 | 0.05 | 0.07 | 0.22 | 110.0 |
| P-2045 | 10.0 | J-2030 | J-2029 | 1,080 | 129.03 | 0.19 | 0.20 | 0.53 | 110.0 |
| P-2046 | 8.0 | J-2050 | J-2049 | 600 | -68.24 | 0.21 | 0.12 | 0.44 | 100.0 |
| P-2047 | 10.0 | J-2000 | J-2006 | 470 | -47.45 | 0.04 | 0.02 | 0.19 | 90.0 |
| P-2048 | 10.0 | J-2001 | J-2000 | 1,350 | -32.42 | 0.01 | 0.02 | 0.13 | 110.0 |
| P-2049 | 10.0 | PRV-3 | J-2159 | 5 | 0.00 | 0.00 | 0.00 | 0.00 | 90.0 |
| P-2050 | 10.0 | J-2159 | J-2000 | 210 | -5.01 | 0.00 | 0.00 | 0.02 | 90.0 |
| P-2051 | 12.0 | J-2153 | J-208 | 909 | -684.63 | 1.71 | 1.56 | 1.94 | 110.0 |
| P-2052 | 8.0 | J-2036 | J-2038 | 1,250 | -125.36 | 0.63 | 0.79 | 0.80 | 100.0 |
| P-2053 | 8.0 | J-2059 | J-2060 | 1,100 | -125.89 | 0.78 | 0.85 | 0.80 | 90.0 |
| P-2054 | 12.0 | J-2153 | J-2032 | 1,460 | 416.75 | 0.68 | 1.00 | 1.18 | 110.0 |
| P-2055 | 6.0 | J-2032 | J-2033 | 450 | -57.58 | 0.51 | 0.23 | 0.65 | 110.0 |
| P-2056 | 8.0 | J-2060 | J-2062 | 200 | 10.02 | 0.01 | 0.00 | 0.06 | 100.0 |
| P-2057 | 8.0 | J-2030 | J-2032 | 1,800 | -71.07 | 0.27 | 0.49 | 0.45 | 90.0 |
| P-2058 | 8.0 | J-2060 | J-2061 | 800 | 5.01 | 0.00 | 0.00 | 0.03 | 100.0 |
| P-2059 | 8.0 | J-2032 | J-2060 | 450 | 145.92 | 1.02 | 0.46 | 0.93 | 90.0 |
| P-2060 | 12.0 | J-2030 | J-2032 | 1,800 | -252.33 | 0.27 | 0.49 | 0.72 | 110.0 |
| P-2061 | 8.0 | J-2038 | J-2030 | 2,600 | -101.08 | 0.30 | 0.79 | 0.65 | 120.0 |
| P-2062 | 8.0 | J-2039 | J-2038 | 900 | 29.29 | 0.04 | 0.04 | 0.19 | 100.0 |
| P-2063 | 8.0 | J-2042 | J-2041 | 250 | 5.10 | 0.00 | 0.00 | 0.03 | 100.0 |
| P-2064 | 8.0 | J-2039 | J-2042 | 800 | -20.35 | 0.02 | 0.02 | 0.13 | 100.0 |
| P-2065 | 8.0 | J-2040 | J-2039 | 600 | 13.95 | 0.01 | 0.01 | 0.09 | 100.0 |
| P-2066 | 8.0 | J-2041 | J-2040 | 550 | 18.96 | 0.02 | 0.01 | 0.12 | 100.0 |
| P-2067 | 8.0 | J-2044 | J-2041 | 550 | 18.87 | 0.02 | 0.01 | 0.12 | 100.0 |
| P-2068 | 8.0 | J-2044 | J-2045 | 400 | 5.01 | 0.00 | 0.00 | 0.03 | 100.0 |
| P-2069 | 8.0 | J-2043 | J-2044 | 350 | 28.89 | 0.04 | 0.01 | 0.18 | 100.0 |
| P-2070 | 8.0 | J-2046 | J-2047 | 250 | -39.95 | 0.06 | 0.02 | 0.25 | 110.0 |
| P-2071 | 8.0 | J-2048 | J-2046 | 500 | -34.94 | 0.05 | 0.02 | 0.22 | 110.0 |
| P-2072 | 8.0 | J-2047 | J-2030 | 280 | -88.28 | 0.40 | 0.11 | 0.56 | 90.0 |
| P-2073 | 8.0 | J-2048 | J-2047 | 380 | -43.32 | 0.11 | 0.04 | 0.28 | 90.0 |
| P-2074 | 8.0 | J-2049 | J-2048 | 250 | -73.25 | 0.29 | 0.07 | 0.47 | 90.0 |
| P-2075 | 12.0 | J-2184 | J-2068 | 928 | 144.14 | 0.08 | 0.08 | 0.41 | 120.0 |
| P-2076 | 8.0 | J-2157 | J-2158 | 1,800 | 0.81 | 0.00 | 0.00 | 0.01 | 110.0 |
| P-2077 | 12.0 | J-2155 | J-2154 | 900 | -156.92 | 0.10 | 0.09 | 0.45 | 120.0 |
| P-2079 | 8.0 | J-2157 | J-2158 | 600 | 1.43 | 0.00 | 0.00 | 0.01 | 110.0 |
| P-2080 | 8.0 | J-2156 | J-2157 | 300 | 23.24 | 0.02 | 0.01 | 0.15 | 110.0 |
| P-2081 | 6.0 | J-2033 | J-2034 | 900 | -21.49 | 0.08 | 0.07 | 0.24 | 110.0 |
| P-2082 | 12.0 | J-2154 | J-2153 | 1,600 | -262.87 | 0.25 | 0.40 | 0.75 | 120.0 |
| P-2083 | 8.0 | J-2156 | J-2154 | 550 | -95.85 | 0.32 | 0.18 | 0.61 | 110.0 |
| P-2084 | 8.0 | J-2034 | J-2156 | 700 | -67.60 | 0.17 | 0.12 | 0.43 | 110.0 |
| P-2085 | 8.0 | J-2033 | J-2034 | 1,100 | -41.10 | 0.07 | 0.07 | 0.26 | 110.0 |
| P-2086 | 10.0 | J-2062 | J-2063 | 997 | 5.01 | 0.00 | 0.00 | 0.02 | 110.0 |
| P-2087 | 12.0 | J-2055 | J-2059 | 650 | -120.88 | 0.06 | 0.04 | 0.34 | 120.0 |
| P-2088 | 8.0 | J-2054 | J-2053 | 800 | 65.74 | 0.49 | 0.40 | 0.42 | 60.0 |
| P-2089 | 6.0 | J-2055 | J-2054 | 250 | 70.75 | 2.30 | 0.58 | 0.80 | 60.0 |

# Scenario: FIRE FLOW BUILDOUT
## Fire Flow Analysis
## Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-2092 | 12.0 | J-2055 | J-2056 | 150 | 74.97 | 0.02 | 0.00 | 0.21 | 120.0 |
| P-2093 | 10.0 | J-2127 | J-2055 | 2,560 | 29.86 | 0.02 | 0.04 | 0.12 | 100.0 |
| P-2094 | 6.0 | J-2127 | J-2065 | 350 | 43.14 | 0.92 | 0.32 | 0.49 | 60.0 |
| P-2095 | 6.0 | J-2068 | J-2127 | 450 | 91.16 | 3.68 | 1.66 | 1.03 | 60.0 |
| P-2096 | 8.0 | J-2185 | J-2186 | 628 | 5.01 | 0.00 | 0.00 | 0.03 | 130.0 |
| P-2097 | 12.0 | J-2065 | J-2064 | 200 | 14.15 | 0.00 | 0.00 | 0.04 | 120.0 |
| P-2098 | 12.0 | J-2066 | J-2065 | 450 | -15.22 | 0.00 | 0.00 | 0.04 | 110.0 |
| P-2099 | 12.0 | J-2067 | J-2066 | 200 | -1.46 | 0.00 | 0.00 | 0.00 | 120.0 |
| P-2100 | 12.0 | J-2064 | J-2067 | 450 | 12.30 | 0.00 | 0.00 | 0.03 | 110.0 |
| P-2101 | 6.0 | J-2057 | J-2064 | 1,250 | 16.37 | 0.15 | 0.19 | 0.19 | 60.0 |
| P-2102 | 6.0 | J-2058 | J-2057 | 550 | 15.96 | 0.15 | 0.08 | 0.18 | 60.0 |
| P-2103 | 8.0 | J-2053 | J-2058 | 650 | -118.59 | 1.47 | 0.96 | 0.76 | 60.0 |
| P-2104 | 6.0 | J-2071 | J-2070 | 1,399 | -2.33 | 0.00 | 0.00 | 0.03 | 130.0 |
| P-2105 | 6.0 | J-2070 | J-2071 | 1,081 | 2.68 | 0.00 | 0.00 | 0.03 | 130.0 |
| P-2106 | 8.0 | J-2069 | J-2070 | 1,800 | 10.02 | 0.00 | 0.01 | 0.06 | 110.0 |
| P-2107 | 8.0 | J-2036 | J-2037 | 300 | 5.01 | 0.00 | 0.00 | 0.03 | 100.0 |
| P-2108 | 8.0 | J-2035 | J-2036 | 2,180 | -115.34 | 0.39 | 0.85 | 0.74 | 120.0 |
| P-2109 | 8.0 | J-2035 | J-2052 | 1,300 | -11.77 | 0.01 | 0.01 | 0.08 | 100.0 |
| P-2110 | 8.0 | J-2052 | J-2053 | 2,400 | -74.46 | 0.24 | 0.58 | 0.48 | 100.0 |
| P-2111 | 8.0 | J-2090 | J-2052 | 700 | -17.02 | 0.01 | 0.01 | 0.11 | 110.0 |
| P-2112 | 8.0 | J-2035 | J-2090 | 1,800 | -3.25 | 0.00 | 0.00 | 0.02 | 110.0 |
| P-2113 | 8.0 | J-2081 | J-2035 | 650 | -116.61 | 0.55 | 0.36 | 0.74 | 100.0 |
| P-2114 | 6.0 | J-2081 | J-2082 | 950 | 5.01 | 0.01 | 0.01 | 0.06 | 100.0 |
| P-2115 | 8.0 | J-2080 | J-2081 | 2,050 | -106.59 | 0.47 | 0.96 | 0.68 | 100.0 |
| P-2116 | 8.0 | J-2079 | J-2080 | 2,600 | 43.23 | 0.05 | 0.14 | 0.28 | 130.0 |
| P-2117 | 8.0 | J-2083 | J-2079 | 650 | 24.14 | 0.03 | 0.02 | 0.15 | 100.0 |
| P-2118 | 8.0 | J-2089 | J-2053 | 1,200 | -96.11 | 0.28 | 0.33 | 0.61 | 120.0 |
| P-2119 | 8.0 | J-2088 | J-2089 | 3,000 | -91.10 | 0.25 | 0.75 | 0.58 | 120.0 |
| P-2120 | 12.0 | J-2091 | J-2058 | 1,000 | 101.15 | 0.04 | 0.04 | 0.29 | 120.0 |
| P-2121 | 12.0 | J-2092 | J-2091 | 1,050 | 106.16 | 0.05 | 0.05 | 0.30 | 120.0 |
| P-2122 | 12.0 | T-1 | J-2092 | 700 | 497.27 | 0.81 | 0.56 | 1.41 | 120.0 |
| P-2124 | 12.0 | J-2093 | J-2092 | 550 | -361.06 | 0.38 | 0.21 | 1.02 | 130.0 |
| P-2125 | 12.0 | J-2094 | J-2093 | 1,100 | -356.05 | 0.37 | 0.41 | 1.01 | 130.0 |
| P-2126 | 8.0 | J-2073 | J-2074 | 365 | 30.79 | 0.04 | 0.01 | 0.20 | 110.0 |
| P-2127 | 8.0 | J-2073 | J-2075 | 200 | 13.76 | 0.01 | 0.00 | 0.09 | 100.0 |
| P-2128 | 8.0 | J-2072 | J-2073 | 550 | 87.79 | 0.33 | 0.18 | 0.56 | 100.0 |
| P-2129 | 8.0 | PRV-2 | J-2072 | 238 | 0.00 | 0.00 | 0.00 | 0.00 | 100.0 |
| P-2130 | 8.0 | J-2076 | J-2072 | 1,900 | -31.90 | 0.05 | 0.10 | 0.20 | 100.0 |
| P-2131 | 8.0 | J-2072 | J-2080 | 300 | -136.06 | 0.74 | 0.22 | 0.87 | 100.0 |
| P-2132 | 8.0 | J-2084 | J-2085 | 550 | -29.11 | 0.04 | 0.02 | 0.19 | 110.0 |
| P-2133 | 8.0 | J-2079 | J-2084 | 1,350 | -24.10 | 0.03 | 0.03 | 0.15 | 110.0 |
| P-2134 | 8.0 | J-2085 | J-2083 | 950 | 29.15 | 0.04 | 0.03 | 0.19 | 110.0 |
| P-2135 | 8.0 | J-2086 | J-2085 | 450 | 63.27 | 0.15 | 0.07 | 0.40 | 110.0 |
| P-2136 | 8.0 | J-2087 | J-2086 | 800 | 68.28 | 0.17 | 0.14 | 0.44 | 110.0 |
| P-2137 | 8.0 | J-2087 | J-2088 | 1,360 | -86.09 | 0.32 | 0.43 | 0.55 | 100.0 |
| P-2138 | 8.0 | J-2132 | J-2087 | 300 | -12.80 | 0.01 | 0.00 | 0.08 | 110.0 |
| P-2140 | 12.0 | J-2133 | J-2167 | 2,000 | -325.99 | 0.37 | 0.74 | 0.92 | 120.0 |
| P-2141 | 12.0 | J-2133 | J-2165 | 1,500 | 228.62 | 0.22 | 0.34 | 0.65 | 110.0 |
| P-2142 | 8.0 | J-2132 | J-2133 | 960 | -92.37 | 0.36 | 0.35 | 0.59 | 100.0 |
| P-2143 | 8.0 | J-2078 | J-2076 | 1,000 | -10.52 | 0.01 | 0.01 | 0.07 | 100.0 |
| P-2144 | 8.0 | J-2077 | J-2078 | 1,200 | -5.51 | 0.00 | 0.00 | 0.04 | 100.0 |

# Scenario: FIRE FLOW BUILDOUT
## Fire Flow Analysis
## Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-2145 | 8.0 | J-2077 | J-2076 | 600 | -16.37 | 0.01 | 0.01 | 0.10 | 100.0 |
| P-2146 | 8.0 | J-2119 | J-2077 | 1,650 | -16.87 | 0.02 | 0.03 | 0.11 | 100.0 |
| P-2147 | 8.0 | J-2162 | J-2132 | 400 | -100.16 | 0.42 | 0.17 | 0.64 | 100.0 |
| P-2148 | 8.0 | J-2161 | J-2162 | 560 | -95.15 | 0.38 | 0.21 | 0.61 | 100.0 |
| P-2149 | 8.0 | J-2131 | J-2161 | 300 | -90.14 | 0.34 | 0.10 | 0.58 | 100.0 |
| P-2150 | 8.0 | J-2134 | J-2135 | 1,050 | -51.17 | 0.10 | 0.11 | 0.33 | 110.0 |
| P-2151 | 8.0 | J-2131 | J-2130 | 1,400 | 23.97 | 0.03 | 0.04 | 0.15 | 100.0 |
| P-2152 | 8.0 | J-2129 | J-2130 | 900 | -18.96 | 0.02 | 0.02 | 0.12 | 100.0 |
| P-2153 | 8.0 | J-2119 | J-2128 | 1,250 | -36.61 | 0.06 | 0.08 | 0.23 | 100.0 |
| P-2154 | 8.0 | J-2129 | J-2131 | 350 | -61.16 | 0.17 | 0.06 | 0.39 | 100.0 |
| P-2155 | 8.0 | J-2128 | J-2129 | 510 | -75.12 | 0.25 | 0.13 | 0.48 | 100.0 |
| P-2156 | 12.0 | J-2134 | J-2128 | 750 | -33.50 | 0.01 | 0.00 | 0.10 | 110.0 |
| P-2157 | 12.0 | J-2120 | J-2134 | 1,250 | -79.66 | 0.03 | 0.04 | 0.23 | 110.0 |
| P-2158 | 8.0 | J-2120 | J-2119 | 1,400 | 22.37 | 0.03 | 0.04 | 0.14 | 100.0 |
| P-2159 | 8.0 | J-2121 | J-2120 | 800 | -52.29 | 0.13 | 0.10 | 0.33 | 100.0 |
| P-2160 | 8.0 | J-2142 | J-2143 | 500 | -39.87 | 0.05 | 0.03 | 0.25 | 120.0 |
| P-2161 | 8.0 | J-2136 | J-2137 | 1,650 | 22.06 | 0.02 | 0.04 | 0.14 | 110.0 |
| P-2162 | 8.0 | J-2142 | J-2141 | 900 | -4.22 | 0.00 | 0.00 | 0.03 | 120.0 |
| P-2163 | 8.0 | J-2135 | J-2142 | 1,250 | -39.08 | 0.06 | 0.08 | 0.25 | 110.0 |
| P-2164 | 8.0 | J-2136 | J-2135 | 200 | 17.10 | 0.01 | 0.00 | 0.11 | 110.0 |
| P-2165 | 8.0 | J-2138 | J-2136 | 750 | 44.18 | 0.09 | 0.07 | 0.28 | 100.0 |
| P-2166 | 8.0 | J-2141 | J-2140 | 750 | 11.38 | 0.01 | 0.00 | 0.07 | 120.0 |
| P-2167 | 8.0 | J-2143 | J-2141 | 1,650 | 20.61 | 0.02 | 0.03 | 0.13 | 120.0 |
| P-2168 | 8.0 | J-2144 | J-2143 | 1,000 | 65.49 | 0.19 | 0.19 | 0.42 | 100.0 |
| P-2169 | 8.0 | J-2165 | J-2166 | 1,200 | 5.01 | 0.00 | 0.00 | 0.03 | 110.0 |
| P-2170 | 12.0 | J-2144 | J-2165 | 1,600 | -218.60 | 0.18 | 0.28 | 0.62 | 120.0 |
| P-2171 | 12.0 | J-2145 | J-2144 | 750 | -148.10 | 0.09 | 0.06 | 0.42 | 120.0 |
| P-2172 | 12.0 | J-2146 | J-2147 | 500 | 48.81 | 0.01 | 0.01 | 0.14 | 120.0 |
| P-2173 | 12.0 | J-2145 | J-2146 | 1,350 | 53.82 | 0.01 | 0.02 | 0.15 | 120.0 |
| P-2174 | 12.0 | J-2148 | J-2145 | 600 | -89.27 | 0.03 | 0.02 | 0.25 | 120.0 |
| P-2175 | 8.0 | J-2147 | J-2148 | 1,450 | -6.95 | 0.00 | 0.00 | 0.04 | 120.0 |
| P-2176 | 8.0 | J-2139 | J-2138 | 250 | 42.82 | 0.11 | 0.03 | 0.27 | 90.0 |
| P-2177 | 8.0 | J-2140 | J-2138 | 1,050 | 6.37 | 0.00 | 0.00 | 0.04 | 120.0 |
| P-2178 | 12.0 | J-2149 | J-2152 | 600 | 72.30 | 0.02 | 0.01 | 0.21 | 120.0 |
| P-2179 | 12.0 | J-2148 | J-2149 | 500 | 77.31 | 0.03 | 0.01 | 0.22 | 120.0 |
| P-2180 | 12.0 | J-2150 | J-2147 | 450 | -50.75 | 0.01 | 0.01 | 0.14 | 120.0 |
| P-2181 | 12.0 | J-2151 | J-2150 | 850 | -45.74 | 0.01 | 0.01 | 0.13 | 120.0 |
| P-2182 | 12.0 | J-2152 | J-2151 | 1,250 | -40.73 | 0.01 | 0.01 | 0.12 | 120.0 |
| P-2183 | 12.0 | J-2139 | J-2152 | 1,800 | -108.03 | 0.05 | 0.09 | 0.31 | 120.0 |
| P-2184 | 8.0 | J-2137 | J-2139 | 800 | -60.20 | 0.16 | 0.13 | 0.38 | 100.0 |
| P-2185 | 8.0 | J-2111 | J-2097 | 550 | 50.93 | 0.12 | 0.07 | 0.33 | 100.0 |
| P-2186 | 6.0 | J-2111 | J-2110 | 1,000 | -11.21 | 0.03 | 0.03 | 0.13 | 100.0 |
| P-2187 | 8.0 | J-2112 | J-2113 | 1,000 | -10.66 | 0.01 | 0.01 | 0.07 | 100.0 |
| P-2188 | 8.0 | J-2116 | J-2114 | 950 | -4.98 | 0.00 | 0.00 | 0.03 | 100.0 |
| P-2189 | 8.0 | J-2110 | J-2109 | 1,200 | 2.02 | 0.00 | 0.00 | 0.01 | 100.0 |
| P-2190 | 8.0 | J-2112 | J-2111 | 300 | 44.72 | 0.09 | 0.03 | 0.29 | 100.0 |
| P-2191 | 8.0 | J-2116 | J-2112 | 300 | 39.07 | 0.07 | 0.02 | 0.25 | 100.0 |
| P-2192 | 8.0 | J-2118 | J-2116 | 339 | 39.10 | 0.07 | 0.02 | 0.25 | 100.0 |
| P-2193 | 8.0 | J-2117 | J-2118 | 850 | -21.71 | 0.02 | 0.02 | 0.14 | 100.0 |
| P-2194 | 8.0 | J-2114 | J-2117 | 300 | -11.70 | 0.01 | 0.00 | 0.07 | 100.0 |
| P-2195 | 8.0 | J-2113 | J-2110 | 300 | 18.24 | 0.02 | 0.01 | 0.12 | 100.0 |

# Scenario: FIRE FLOW BUILDOUT
## Fire Flow Analysis
## Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-2196 | 8.0 | J-2114 | J-2113 | 300 | 33.91 | 0.06 | 0.02 | 0.22 | 100.0 |
| P-2197 | 8.0 | J-2163 | J-2114 | 1,300 | 32.21 | 0.05 | 0.07 | 0.21 | 100.0 |
| P-2198 | 8.0 | J-2164 | J-2163 | 800 | 33.66 | 0.06 | 0.04 | 0.21 | 100.0 |
| P-2199 | 8.0 | J-2122 | J-2164 | 400 | 38.67 | 0.07 | 0.03 | 0.25 | 100.0 |
| P-2200 | 8.0 | J-2121 | J-2122 | 400 | 37.71 | 0.06 | 0.02 | 0.24 | 110.0 |
| P-2201 | 8.0 | J-2123 | J-2124 | 400 | -32.65 | 0.05 | 0.02 | 0.21 | 100.0 |
| P-2202 | 8.0 | J-2126 | J-2137 | 800 | -77.26 | 0.26 | 0.21 | 0.49 | 100.0 |
| P-2203 | 8.0 | J-2123 | J-2125 | 300 | 21.67 | 0.02 | 0.01 | 0.14 | 100.0 |
| P-2204 | 8.0 | J-2122 | J-2123 | 280 | -5.97 | 0.00 | 0.00 | 0.04 | 100.0 |
| P-2205 | 8.0 | J-2124 | J-2121 | 250 | -9.57 | 0.01 | 0.00 | 0.06 | 100.0 |
| P-2206 | 8.0 | J-2126 | J-2124 | 210 | 28.10 | 0.04 | 0.01 | 0.18 | 100.0 |
| P-2207 | 8.0 | J-2125 | J-2126 | 400 | -44.15 | 0.09 | 0.04 | 0.28 | 100.0 |
| P-2208 | 8.0 | J-2163 | J-2125 | 400 | -60.81 | 0.17 | 0.07 | 0.39 | 100.0 |
| P-2209 | 8.0 | J-2109 | J-2163 | 600 | -57.26 | 0.15 | 0.09 | 0.37 | 100.0 |
| P-2210 | 8.0 | PRV-1 | J-2096 | 660 | 0.00 | 0.00 | 0.00 | 0.00 | 100.0 |
| P-2211 | 8.0 | J-2097 | J-2096 | 400 | 45.92 | 0.10 | 0.04 | 0.29 | 100.0 |
| P-2212 | 8.0 | J-2096 | J-2098 | 200 | 28.23 | 0.04 | 0.01 | 0.18 | 100.0 |
| P-2213 | 8.0 | J-2115 | J-2096 | 2,600 | -12.67 | 0.01 | 0.02 | 0.08 | 110.0 |
| P-2214 | 8.0 | J-2099 | J-2175 | 548 | 12.37 | 0.01 | 0.00 | 0.08 | 110.0 |
| P-2215 | 8.0 | J-2098 | J-2099 | 300 | 23.22 | 0.03 | 0.01 | 0.15 | 100.0 |
| P-2216 | 8.0 | J-2160 | J-2100 | 400 | 4.35 | 0.00 | 0.00 | 0.03 | 100.0 |
| P-2217 | 8.0 | J-2102 | J-2160 | 600 | 9.36 | 0.01 | 0.00 | 0.06 | 100.0 |
| P-2218 | 6.0 | J-2100 | J-2101 | 700 | 5.18 | 0.01 | 0.00 | 0.06 | 100.0 |
| P-2219 | 8.0 | J-2102 | J-2108 | 1,100 | -22.78 | 0.02 | 0.02 | 0.15 | 120.0 |
| P-2220 | 8.0 | J-2108 | J-2109 | 950 | -54.27 | 0.13 | 0.13 | 0.35 | 100.0 |
| P-2221 | 8.0 | J-2107 | J-2108 | 200 | -26.48 | 0.04 | 0.01 | 0.17 | 100.0 |
| P-2222 | 8.0 | J-2102 | J-2107 | 950 | -16.46 | 0.01 | 0.01 | 0.11 | 100.0 |
| P-2223 | 8.0 | J-2099 | J-2100 | 850 | 5.84 | 0.00 | 0.00 | 0.04 | 100.0 |
| P-2224 | 6.0 | J-2105 | J-2106 | 600 | 5.01 | 0.01 | 0.00 | 0.06 | 100.0 |
| P-2225 | 6.0 | J-2102 | J-2105 | 500 | 10.02 | 0.02 | 0.01 | 0.11 | 100.0 |
| P-2226 | 8.0 | J-2103 | J-2102 | 500 | -14.86 | 0.01 | 0.01 | 0.09 | 100.0 |
| P-2227 | 6.0 | J-2104 | J-2103 | 305 | -5.01 | 0.01 | 0.00 | 0.06 | 100.0 |
| P-2228 | 8.0 | J-2101 | J-2103 | 1,900 | -4.84 | 0.00 | 0.00 | 0.03 | 110.0 |
| P-2229 | 6.0 | J-2101 | J-2168 | 376 | 5.01 | 0.00 | 0.00 | 0.06 | 130.0 |
| P-2230 | 6.0 | J-2175 | J-2170 | 369 | 5.01 | 0.00 | 0.00 | 0.06 | 130.0 |
| P-2231 | 6.0 | J-2175 | J-2169 | 373 | 5.01 | 0.00 | 0.00 | 0.06 | 130.0 |
| P-2232 | 8.0 | J-2175 | J-2115 | 1,352 | -2.65 | 0.00 | 0.00 | 0.02 | 110.0 |
| P-2233 | 6.0 | J-2115 | J-2171 | 853 | 5.01 | 0.00 | 0.00 | 0.06 | 130.0 |
| P-2234 | 6.0 | J-2107 | J-2172 | 980 | 5.01 | 0.00 | 0.00 | 0.06 | 130.0 |
| P-2235 | 8.0 | J-2117 | J-2173 | 348 | 5.01 | 0.00 | 0.00 | 0.03 | 130.0 |
| P-2236 | 8.0 | J-2118 | J-2174 | 567 | 5.01 | 0.00 | 0.00 | 0.03 | 130.0 |
| P-2237 | 12.0 | J-2176 | J-2094 | 1,500 | -351.04 | 0.36 | 0.55 | 1.00 | 130.0 |
| P-2238 | 12.0 | J-2178 | J-2176 | 401 | -341.02 | 0.40 | 0.16 | 0.97 | 120.0 |
| P-2239 | 12.0 | J-2167 | J-2178 | 399 | -331.00 | 0.38 | 0.15 | 0.94 | 120.0 |
| P-2240 | 8.0 | J-2176 | J-2177 | 1,030 | 5.01 | 0.00 | 0.00 | 0.03 | 130.0 |
| P-2241 | 8.0 | J-2178 | J-2179 | 580 | 5.01 | 0.00 | 0.00 | 0.03 | 130.0 |
| P-2242 | 8.0 | J-2092 | J-2180 | 501 | 25.05 | 0.04 | 0.02 | 0.16 | 90.0 |
| P-2243 | 8.0 | J-2180 | J-2181 | 581 | 5.01 | 0.00 | 0.00 | 0.03 | 130.0 |
| P-2244 | 8.0 | J-2180 | J-2182 | 291 | 15.03 | 0.02 | 0.00 | 0.10 | 90.0 |
| P-2245 | 6.0 | J-2182 | J-2183 | 295 | 5.01 | 0.00 | 0.00 | 0.06 | 130.0 |
| P-2246 | 8.0 | J-2182 | J-2095 | 308 | 5.01 | 0.00 | 0.00 | 0.03 | 90.0 |

# Scenario: FIRE FLOW BUILDOUT
## Fire Flow Analysis
## Pipe Report

| Label | Diameter (in) | From Node | To Node | Length (ft) | Discharge (gpm) | Headloss Gradient (ft/1000ft) | Calculated Friction Headloss (ft) | Velocity (ft/s) | Hazen-Williams C |
|---|---|---|---|---|---|---|---|---|---|
| P-2247 | 12.0 | J-2155 | J-2184 | 1,102 | 151.91 | 0.09 | 0.10 | 0.43 | 120.0 |
| P-2248 | 8.0 | J-2184 | J-2158 | 1,245 | 2.77 | 0.00 | 0.00 | 0.02 | 110.0 |
| P-2249 | 8.0 | J-2068 | J-2185 | 774 | 47.97 | 0.09 | 0.07 | 0.31 | 110.0 |
| P-2250 | 8.0 | J-2185 | J-2069 | 1,326 | 37.95 | 0.06 | 0.08 | 0.24 | 110.0 |
| P-2251 | 6.0 | J-2069 | J-2187 | 442 | 20.04 | 0.05 | 0.02 | 0.23 | 130.0 |
| P-2252 | 6.0 | J-2187 | J-2188 | 292 | 5.01 | 0.00 | 0.00 | 0.06 | 130.0 |
| P-2253 | 6.0 | J-2187 | J-2189 | 535 | 10.02 | 0.01 | 0.01 | 0.11 | 130.0 |
| P-2254 | 8.0 | J-2189 | J-2190 | 905 | 2.35 | 0.00 | 0.00 | 0.02 | 130.0 |
| P-2255 | 8.0 | J-2190 | J-2189 | 723 | -2.66 | 0.00 | 0.00 | 0.02 | 130.0 |
| P-2256 | 8.0 | J-2000 | J-2291 | 921 | 5.01 | 0.00 | 0.00 | 0.03 | 130.0 |
| P-2257 | 6.0 | J-2074 | J-1129 | 1,069 | 17.03 | 0.04 | 0.04 | 0.19 | 130.0 |
| P-2258 | 8.0 | J-2073 | J-1130 | 1,192 | 17.03 | 0.01 | 0.01 | 0.11 | 130.0 |
| P-2259 | 10.0 | J-2191 | J-2022 | 760 | -42.26 | 0.03 | 0.02 | 0.17 | 100.0 |
| P-2260 | 6.0 | J-2002 | J-2193 | 1,425 | 5.01 | 0.00 | 0.01 | 0.06 | 130.0 |
| P-2296 | 10.0 | J-2021 | J-2191 | 1,290 | -32.24 | 0.02 | 0.02 | 0.13 | 100.0 |
| P-2297 | 6.0 | J-2009 | J-2010 | 600 | -2.73 | 0.00 | 0.00 | 0.03 | 90.0 |
| P-2298 | 12.0 | J-2056 | J-2195 | 644 | 47.17 | 0.01 | 0.01 | 0.13 | 120.0 |
| P-2299 | 12.0 | J-2195 | J-2058 | 206 | 47.17 | 0.01 | 0.00 | 0.13 | 120.0 |
| P-2300 | 8.0 | J-2056 | J-2194 | 1,153 | 22.80 | 0.07 | 0.08 | 0.15 | 60.0 |

# Scenario: FIRE FLOW BUILDOUT
## Fire Flow Analysis
## Pump Report

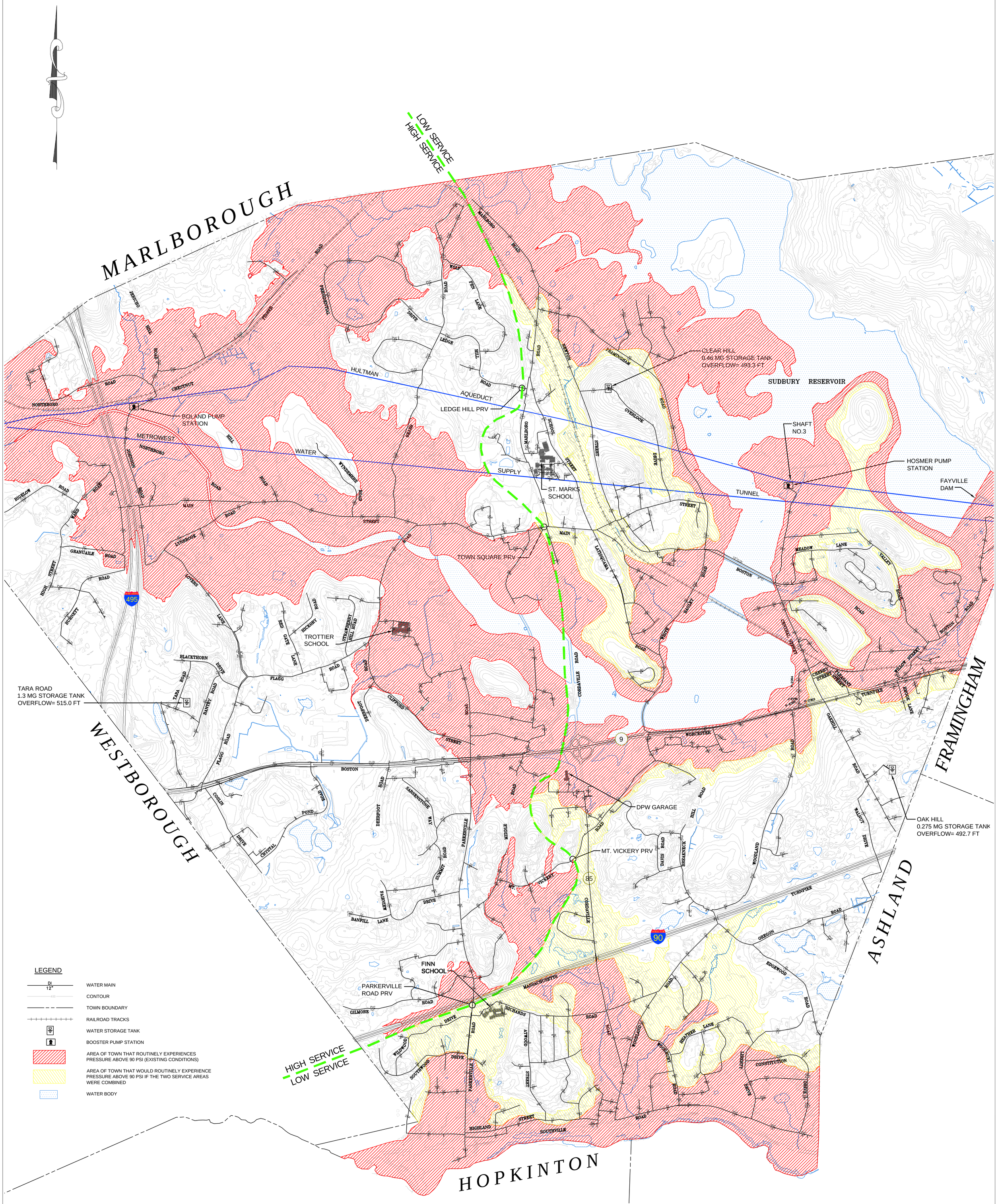
| Label | Elevation (ft) | Control Status | Intake Pump Grade (ft) | Discharge Pump Grade (ft) | Discharge (gpm) | Pump Head (ft) | Notes |
|---|---|---|---|---|---|---|---|
| PMP-6 | 285.00 | Off | 288.67 | 521.59 | 0.00 | 0.00 | Boland |
| PMP-2 | 285.00 | On | 287.20 | 552.49 | 607.84 | 265.30 | Boland |
| PMP-1 | 285.00 | On | 287.51 | 547.55 | 635.42 | 260.04 | Boland |
| PMP-4 | 275.00 | On | 283.95 | 488.16 | 684.63 | 204.21 | Hosmer |
| PMP-5 | 275.00 | Off | 284.71 | 486.22 | 0.00 | 0.00 | Hosmer |

# Scenario: FIRE FLOW BUILDOUT
## Fire Flow Analysis
## Tank Report

| Label | Zone | Base Elevation (ft) | Minimum Elevation (ft) | Initial HGL (ft) | Maximum Elevation (ft) | Tank Diameter (ft) | Inflow (gpm) | Current Status | Calculated Hydraulic Grade (ft) | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| T-1 | Zone | 418.00 | 418.00 | 482.00 | 492.70 | 25.00 | -497.27 | Draining | 482.00 | Oak Hill Tank |
| T-2 | Zone | 451.00 | 451.00 | 482.00 | 493.30 | 40.00 | -101.39 | Draining | 482.00 | Clear Hill Tank |
| T-3 | Zone | 467.00 | 467.00 | 503.00 | 515.00 | 67.00 | -153.36 | Draining | 503.00 | Tara Rd Tank |

# APPENDIX N

# COMBINED SERVICE AREA PRESSURE PLAN




LEGEND

- WATER MAIN (DI 12")
- CONTOUR
- TOWN BOUNDARY
- RAILROAD TRACKS
- WATER STORAGE TANK
- BOOSTER PUMP STATION
- AREA OF TOWN THAT ROUTINELY EXPERIENCES PRESSURE ABOVE 90 PSI (EXISTING CONDITIONS)
- AREA OF TOWN THAT WOULD ROUTINELY EXPERIENCE PRESSURE ABOVE 90 PSI IF THE TWO SERVICE AREAS WERE COMBINED
- WATER BODY

Graphic Scale 1"=800'

800' 400' 0 800' 1600' 3200'


PARE CORPORATION
ENGINEERS - SCIENTISTS - PLANNERS
8 BLACKSTONE VALLEY PLACE
LINCOLN, RI 02865
401-334-4100


# TOWN OF SOUTHBOROUGH
# WATER SYSTEM MASTER PLAN

SOUTHBOROUGH, MASSACHUSETTS

| REVISIONS: | |
|---|---|
| | |

| | |
|---|---|
| PROJECT NO.: | 08176.01 |
| DATE: | FEBRUARY 2009 |
| SCALE: | 1"=800' |
| DESIGNED BY: | KLM |
| CHECKED BY: | TPT |
| DRAWN BY: | AKL |
| APPROVED BY: | RPS |

DRAWING TITLE: COMBINED SERVICE AREA PRESSURE PLAN

DRAWING NO.: 1

SHEET NO. 1 OF 1