

Commissioners

Linda Oosterman – District 1
Russell E. Olsen – District 2
Chris Stearns – District 3



Providing safe, reliable, affordable, and sustainable service.

May 19, 2022

Subject: Updated Capacity Analysis - Request for Expedited Approval of Additional Water Connections at the Timberline Village Water System #628

Jocelyne Gray, PE, WDM4, CCS
Assistant Regional Manager
Southwest Drinking Water Regional Operations
Washington State Department of Health
111 Israel Road S.E. Fifth floor
Tumwater, WA 98501

Jocelyn,

Thank you for taking the time to meet with PUD staff and I on May 18th. I would like to request your assistance and that of Regional Manager Andy Anderson P.E. In 2017, the PUD purchased the Timberline Village #628 water system from the for-profit company, H&R Waterworks. At the time Thurston PUD acquired this water system, it was over connected and we reported this to the SW Regional Engineer and a moratorium was placed on any further connections.

There was extensive water leak loss that averaged over 40 gpm in 2017. The PUD put extensive effort into reducing this leak loss to where it is **down to 5 gpm today**. These efforts have included extensive leak detection, with state of the art leak detection equipment, replacement of sections of the system's water mains, and replacement of most meters on the water system. We also installed cellular AMR meters on our critical zone areas to facilitate early warning of any water loss. This long delay from 2017 to 2022 has been very challenging and troublesome for property owners that have been waiting for water service; most are small lots so exempt wells are not an option. We feel our efforts have been successful and are requesting your assistance to approve new connections to provide service to these customers, many of whom have been on a water availability waiting list for years.

The PUD's District Engineer Doug Piehl has conducted a capacity analysis of the Timberline water system outlining our efforts and concerns and we are requesting your immediate approval of authorization to provide water service to 45 customers waiting for water service availability while we addressed these leak loss issues. We feel that our extensive efforts and the updated capacity analysis supports providing these connections now. If additional efforts and capital expenditures are needed to continue to maintain and improve the Timberline water system's infrastructure, Thurston PUD stands ready do what is necessary for the water system and its customers.

Again, I would like to request immediate approval to issue 45 new water system connections to serve customers that have no other options for service and have submitted requests for water availability from the PUD. This would bring the revised number of connections on the Timberline Village water system to 315 approved connections. Your assistance would be greatly appreciated. The PUD

Operations Team is willing to meet with you if needed. See Doug's Capacity Analysis of the Timberline #628 water system and please follow-up with him directly if there are questions at doug.piehl@thurstonpud.org. Thank you in advance for any immediate assistance you can provide the District.

If you have any questions or concerns at all, please feel free to contact me at (360) 763-5838 or email me at jweidenfeller@thurstonpud.org or Kim Gubbe, the Director of Planning and Compliance at kgubbe@thurstonpud.org.

Sincerely,

A handwritten signature in blue ink that reads "John Weidenfeller". The signature is written in a cursive style with a light blue background.

John Weidenfeller
General Manager
Thurston PUD

Attachments:

Washington State Department of Health Project Approval Application Form – Capacity Analysis of the Timberline Village #628 Water System (WSID 88388B)



Project Approval Application (PAA) Form

331-149F • 12/21/2021

Please complete all appropriate sections of this application form and include it with your project.

WATER SYSTEM Information

| | |
|--------------------------------|--------------------------|
| <u>Timberline Village #628</u> | <u>88388B</u> |
| Water System Name | PWS ID # |
| <u>Capacity Analysis</u> | <u>Lewis</u> |
| Submittal Description | County |
| <u>A-Communitny</u> | <u>100 - 500</u> |
| Classification | # of Service Connections |

PROJECT CONTACT Information

| | | | |
|--------------------------------------|--------------|-------------------|--------------|
| <u>Doug Piehl, District Engineer</u> | | | |
| Name/Position | | | |
| <u>Doug.piehl@thurstonpud.org</u> | | <u>3608906021</u> | |
| E-mail address | | Phone | |
| <u>1230 Rudell RD SE</u> | <u>Lacey</u> | <u>WA</u> | <u>90503</u> |
| Mailing address | City | State | Zip |

SMA Information

| | | | |
|-------------------|-------------------|-------------------|-----|
| <u>Enter text</u> | | <u>Enter text</u> | |
| Name/SMA | | SMA # | |
| <u>Enter text</u> | | <u>Enter text</u> | |
| E-mail address | | Phone | |
| <u>Enter text</u> | <u>Enter text</u> | | |
| Mailing address | City | State | Zip |

GENERAL Submittal Information

☐ Check here if you need a Box.com folder set up for transferring your project to us electronically. (You will receive an invite by e-mail after we have received the PAA)

Do you have projects currently under review by us?

☐ Yes ☒ No

☐ This is a new water system (Include a completed Water Facilities Inventory Report Form with your project)

☒ DWSRF Loan

Application # 2018-3607

Loan # DWL24059

☐ Water System Plan ([complete Planning Information](#))

☐ Engineering ([complete Engineering Information](#))

☐ Satellite Management Agency Plan ([complete SMA Information](#))

ENGINEERING Information

[Choose Project Report](#)

Project Report Type

[Choose Predesign Study](#)

Predesign Study

[Choose Construction Documents](#)

Construction Documents

[Capacity Analysis](#)

Other

OWNER Information

| | |
|-------------------------------|---------------------|
| <u>Thurston PUD</u> | <u>SMA 147</u> |
| Name | Owner ID # |
| <u>kgubbe@thurstonpud.org</u> | <u>(360)3578783</u> |
| E-mail address | Phone |
| <u>1230 Rudell RD SE</u> | <u>Lacey</u> |
| Mailing address | City |
| | <u>WA</u> |
| | <u>98503</u> |
| | State Zip |

CONSULTING/DESIGN ENGINEER Information

| | | | |
|------------------------------------|--------------|--------------------|--------------|
| <u>Douglas Piehl, Thurston PUD</u> | | | |
| Name/Firm | | | |
| <u>Doug.piehl@thurstonpud.org</u> | | <u>360-8906021</u> | |
| E-mail address | | Phone | |
| <u>1230 Rudell RD SE</u> | <u>Lacey</u> | <u>WA</u> | <u>98503</u> |
| Mailing address | City | State | Zip |

BILLING Information*

| | | | |
|-------------------------------|--------------|-------------------|--------------|
| <u>Thurston PUD</u> | | | |
| Name | | | |
| <u>kgubbe@thurstonpud.org</u> | | <u>3603578783</u> | |
| E-mail address | | Phone | |
| <u>1230 Rudell RD SE</u> | <u>Lacey</u> | <u>WA</u> | <u>98503</u> |
| Mailing address | City | State | Zip |

☐ Enforcement

Docket # _____

Type _____

☐ Small Water System Management Program ([complete Planning Information](#))

☐ Group B ([complete Engineering Information](#))

[Choose Special Report or Plans](#)

Special Report or Plans

[Choose Existing System Approval](#)

Existing System Approval

[Choose Waiver](#)

Waiver

PLANNING Information

| | |
|--|---|
| How many connections does system currently have? | 275 |
| If system is private-for-profit, is it regulated by UTC? | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| Is system expanding? | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| Extending service area? | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Increasing number of approved connections?..... | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| If the number of connections is expected to increase, how many <i>new</i> connections are proposed in the next ten (10) years? | 30 |
| Is your system pursuing additional water rights from the Department of Ecology in the next 20 Years... | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| Is a new intertie proposed?..... | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Is the system located in a Critical Water Supply Service Area (Is there a Coordinated Water System Plan)?..... | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| If yes, have you sent a copy of the plan to the county or responsible agency for the CWSP? | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| Are you requesting distribution main project report and construction document submittal exception?. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| If so, does the WSP contain standard construction specifications for distribution mains? | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| The water system/purveyor is responsible for sending a copy of the plan to: | |
| • Adjacent utilities for review or a letter notifying them that a copy is available for their review and where it is located. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| • All local governments within the service area..... | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| • County planning departments, adjacent water systems, etc..... | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| List who have you sent the WSP to for review other than ODW? | N/A |
| Are you proposing a change in the place of use of your water right? | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| If "yes", the purveyor must send a copy of the WSP or SWSMP to all local governments within the service area (county and city planning departments) for a local consistency determination. Has this been completed?..... | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| What are the years of the requested plan approval period (for example 2022 to 2032)? | N/A |
| Does your plan follow your preplan checklist? | <input type="checkbox"/> Yes <input type="checkbox"/> No |

SMA Information

☐ Ownership only ☐ Management and Operations only ☒ Ownership, Management & Operations

Where can we find the Notice of Intent, Publication 331-590, in your plan..... n/a

Please submit all documents electronically. We request one paper copy of planning documents be submitted to the address for your regional office below.

| | | |
|--|---|--|
| <input type="checkbox"/> Eastern Drinking Water Department of Health 16201 E Indiana Ave, Suite 1500 Spokane Valley, WA 99216 eroadmin@doh.wa.gov Phone: 509-329-2100 Fax: 509-329-2104 | <input type="checkbox"/> Northwest Drinking Water Department of Health 20425 72 nd Ave S, Suite 310 Kent, WA 98032-2388 dw.nwro.wsprojects@doh.wa.gov Phone: 253-395-6750 Fax: 253-395-6760 | <input checked="" type="checkbox"/> Southwest Drinking Water Department of Health PO Box 47823 Olympia, WA 98504-7823 swro.admin@doh.wa.gov Phone: 360-236-3030 Fax: 360-664-8058 |
|--|---|--|



To request this document in another format, call 1-800-525-0127. Deaf or hard of hearing customers, please call 711 (Washington Relay) or email civil.rights@doh.wa.gov.

Commissioners

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Capacity Analysis of the Timberline Village #628 Water System WSID: 88388B

Executive Summary

Due to excessively high leak loss the Timberline Village water system was overconnected when it was purchased by Thurston PUD. Over the past several years since the PUD purchased the system the PUD has brought leakage down from an average of 40 gpm (over 20 million gallons per year) down to a present loss of 5 gpm (2.6 million gallons per year).

There are approximately 150 parcels within the retail service area which are not currently developed; due to lot size and necessity of OSS, drilling of private wells is not generally feasible, and there are a number of property owners who have requested and been waiting for water service now for several years. In light of the fact that the PUD has pursued and resolved DSL to the best of its capability and now has excess available capacity, it is the obligation and duty of Thurston PUD per RCW 43.20.260 and Thurston PUD policy to provide water connection to these property owners on the water availability wait list. Thurston PUD hereby requests approval of 45 additional connections for the Timberline Village 628 water system, bringing the revised total approved connections to 315.

Pertinent information about the water system is summarized below:

| | |
|------------------------------|--------------------------------------|
| Water System Name: | Timberline Village -628 |
| System Type: | Group A Community Water System |
| WSDOH ID Number: | 88388-B |
| Location: | Lewis County, Washington |
| Source: | Groundwater |
| Type of Ownership: | Special Purpose District |
| Active Service Connections: | 275 |
| Current Approved Connections | 270 |
| Requested additional Con. | 45 |
| Ownership | Thurston PUD (owner/operator) |
| Primary Contact: | Kimberly Gubbe, Compliance Director |
| Owner Address: | 1230 Ruddell Rd SE Lacey WA 98503 |
| Owner Phone: | (360) 357-8783 |

Population and Demographics

Timberline Village is a residential community comprised of primarily part time and recreational residences, along with a small hotel, a restaurant, and a community center and swimming pool. There are very few full-time residences, and the majority of new connections being added are also part time connections. The community is located in an area which provides both abundant summertime and wintertime recreational opportunity. There are very few parcels with irrigation.

The prior water system plan was compiled in 2006. During the intervening 16 year time period the system has added an average of 3 connections per year, with an average of 1 connection per year being a full time connection. Based on this history and a survey of community members conducted earlier this year, those trends are expected to continue into the future.

Table 1: Connection Summary and Projections

| Year | Total Active Connections | Full Time connections |
|------------------|--------------------------|-----------------------|
| 2006 | 228 | 15 |
| 2022 | 275 | 29 |
| 2042 (projected) | 335 | 49 |

In a 2022 survey conducted by Thurston PUD, a combined 16% of respondents identified as either being a fulltime resident or operating the property as a vacation rental. 84% of all respondents identified as either part time or occasional recreational use only. Very few connections have irrigation systems (only 6% of respondents report actively using an irrigation system). Based on survey response, it is likely that the current use and character of the community will continue into the foreseeable future, with a significant number of respondents reporting future plans for cabin additions, ADU's, and other development consistent with part time or recreational use, and no respondents reporting plans to build a full time residence or transition to full time occupancy.

Table 2: Survey Results

| Use category | number | Percent of Total |
|-------------------------|--------|------------------|
| Full Time | 1 | 3% |
| Vacation rental | 5 | 13% |
| Part Time | 20 | 51% |
| Occasional rec use only | 13 | 33% |
| Total | 39 | 100% |

ERU Analysis

For the purpose of this report, one ERU is defined as the equivalent usage of a single-family residence occupied full time. Based on average annual usage, part time connections are counted as 0.174 ERU, and

there are 15 ERU of commercial and community services (hotel, condo, restaurant, community center, pool).

Table 3: ERU Analysis

| Class | Services | ERU |
|--------------------------|----------|-----|
| Full Time Residences | 29 | 29 |
| Part Time / Recreational | 241 | 42 |
| Commercial/community | 5 | 15 |
| Total | 275 | 86 |

Water Production and Usage

Meter Data

The community has a history of high DSL. Though current DSL is still above WUE target of less than 20%, Thurston PUD has made great strides in reducing leakage over the past several years through a combination of finding and fixing leaks and water main replacement projects. Total leakage has gone from an average of over 20 million gallons per year prior to 2018 to 5 million gallons per year in 2021, and continuing this downward trend into 2022. DSL as a percentage was 41% for 2021, and is on track to be 25% for 2022. DSL for the past 12 months represented 59 ERU based on annual consumption, and contributes a base demand of 9.9 gpm. With the resolution of further leaks, leakage for the past 3 months is even further down to 5 gpm, or about 1.25 gpm per zone. For the sake of a conservative approach average DSL of 9.9 gpm for the past 12 months is used in this capacity analysis rather than the more recent lower DSL rate.

Table 4: Summary of DSL over past 12-month period

| | |
|-------------------|------------|
| Average Daily DSL | 14,200 gpd |
| DSL | 59 ERU |
| Average DSL Rate | 9.9 gpm |

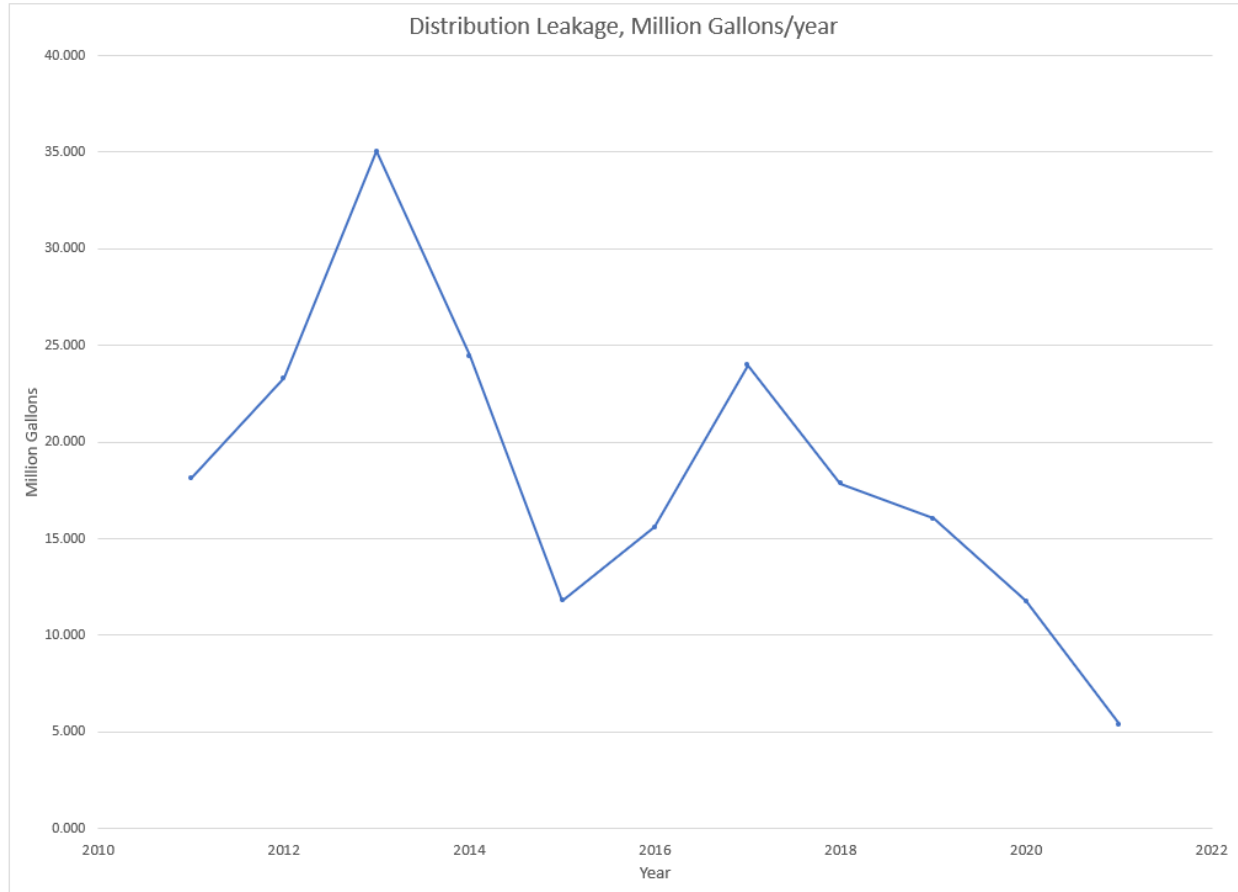


Figure 1: DSL from 2011 to 2021, MGY

System Parameters: ADD, MDD, and PHD

Based on the past year's metering data, ADD of full time connections is 241 gpd (defined as one ERU), and ADD of part time connections is 42 gpd, making part time connections 0.174 ERU. Due to the primarily part-time and seasonal nature of occupancy of the community MDD was defined as being 4 times ADD; Resulting MDD is therefore 964 gpd/ERU. A review of peak monthly metering records indicates this is a conservative assumption and likely overestimates MDD.

Due to the primarily-part time residential/recreational nature of the community Peak Hourly Demand (PHD) is calculated using Equation 3-2 of the WSDM. Based on 29 full time ERU, 15 commercial/community ERU, and 42 part time ERU, system wide MDD is

$$MDD_{system} = (29 \text{ ERU} + 15 \text{ ERU} + 42 \text{ ERU}) * 964 \frac{\text{GPD}}{\text{ERU}} = 82,904 \text{ GPD}$$

Using Equation 3-2 and Figure 3.1 of the Design Guide, PHD is calculated as

$$PHD_{exist} = \frac{MDD_{system}}{1440} * PF = \frac{82,904}{1440} * 2.6 = 150 \text{ gpm}$$

Table 5: Summary of Current Systems Design Parameters

| | |
|--------------------|---------|
| Total Existing ERU | 86 |
| ADD/ERU | 241 gpd |
| MDD/ERU | 964 gpd |
| PHD (existing) | 150 gpm |
| PHD + DSL | 160 gpm |

Capacity Analysis

Water Rights

The system has three water rights. Water right G2-22984 provides 160 gpm and 19 acre feet per year, G2-00887 provides 160 gpm and 37 acre feet per year, and water right G2-25619 provides an additional 80 gpm, for a total combined 400 gpm and 58 acre feet per year.

The number of ERU's that may be served by the system's permitted withdrawal under MDD conditions after accounting for DSL (10 gpm) are

$$N_{wr, instant} = \frac{(400 \text{ gpm} - 10 \text{ gpm}) * 1,440 \frac{\text{min}}{\text{day}}}{964 \frac{\text{gpd}}{\text{ERU}}} = 583 \text{ ERU}$$

Annual water rights (minus DSL) limit the system as follows:

$$N_{wr, annual} = \frac{58 \frac{\text{acft}}{\text{year}} * 325,851 \frac{\text{gallons}}{\text{acft}}}{241 \frac{\text{gpd}}{\text{ERU}} * 365} - 59 \text{ ERU} = 156 \text{ ERU}$$

Source Capacity

Well 1 (AFM952) has a capacity of 125 gpm; Well 2 (AFM953) has a capacity of 240 gpm. In general wells should not be pumped for more than 50% of the day at their peak capacity year-round; however, on peak demand days they may be pumped up to 20 hours. Well capacity with equalizing storage is:

$$N_{source} = \frac{(125 \text{ gpm} + 240 \text{ gpm}) * 20 \frac{\text{hr}}{\text{day}} * 60 \frac{\text{min}}{\text{hr}} - 10 \text{ gpm} * 1440 \frac{\text{min}}{\text{day}}}{964 \text{ gpd/ERU}} = 439 \text{ ERU}$$

Without Equalizing Storage the wells must meet PHD and DSL, giving a more limiting well capacity of:

$$N_{source} = \frac{(125 \text{ gpm} + 240 \text{ gpm} - 10 \text{ gpm}) * 1440 \frac{\text{min}}{\text{day}}}{2.6 * 964 \text{ gpd/ERU}} = 204 \text{ ERU}$$

Booster Pumps

The lower zone is gravity fed from the reservoir, and consists of Divisions 1,2,3 and tract 24, for a total of 248 lots. The upper zone is pressurized by four 5 hp Grundfos booster pumps and consists of Divisions 4 and 5 and Tracts 17-27 and 29, consisting of a total of 173 lots. Installed booster pumps have a combined capacity of 168 gpm while serving the upper zone. Conservatively, half of the 10 gpm DSL is assumed in the upper zone.

$$N_{booster} = \frac{(168 \text{ gpm} - 5 \text{ gpm}) * 1440 \frac{\text{min}}{\text{day}}}{2.6 * 964 \text{ gpd/ERU}} = 94 \text{ ERU}$$

Storage

Storage is provided by two 30,000 gallon horizontal cylindrical tanks, providing a total usable volume of approximately 48,000 gallons. Equalizing storage is not needed and fire flow storage of 15,000 gallons is nested with standby storage, therefore all available storage can be used for standby storage. With two high output wells the alternative minimum of 200 gpd/ERU is used.

$$N_{storage} = \frac{48,000 \text{ gal}}{200 \text{ gal/ERU}} = 240 \text{ ERU}$$

Distribution System

A distribution system hydraulic analysis was conducted by Northwest Water Systems (analysis attached). Maximum PHD that the current distribution system can support was determined to be 395 gpm. Distribution Capacity is therefore estimated to be:

$$N_{distribution} = \frac{(395 \text{ gpm} - 10 \text{ gpm}) * 1440 \frac{\text{min}}{\text{day}}}{2.6 * 964 \text{ gpd/ERU}} = 221 \text{ ERU}$$

Summary

The current systems limits are shown in Table 6.

Table 6: System Capacity Summary

| Limitation | Maximum ERU |
|--|-------------|
| Water Rights, Instantaneous withdrawal | 583 |
| Water Rights, Annual withdrawal | 156 |
| Total Source Production | 204 |
| Upper zone booster ¹ | 94 |
| Reservoirs | 240 |
| Distribution System | 221 |

¹Upper pressure zone only

Conclusion

Historically Timberline Village has lost extraordinarily large quantities of water to DSL. However, following a program of finding and fixing leaks and targeted main replacement DSL has been reduced from an average of 20 million gallons per year prior to 2018, to 5 million gallons in 2021, and is on target to reduce this still further in 2022. The system has the capacity for up to 156 ERU based on annual water rights, limited to 94 ERU in the upper pressure zone based on booster station capacity.

The existing 29 full time, 241 part time, and 5 commercial/community connections amount to 86 total ERU, well under the capacity of the system. Based on past trends of adding or converting one full time connection for every 2 new part time connections, 156 ERU would allow up to 51 new full-time connections and 102 new part time connections, for a total of 153 new connections (69 new ERU). At present Thurston PUD requests approval of 45 new connections (20 ERU) and will provide a revised capacity analysis based on updated metering data and demographics should further additional connections be desired in the future. We believe this is a very conservative approach and allows the PUD some connections now to fulfill its obligation to customers who have been waiting for water, with the possibility of further future connections once more metering data is available to support a further request.

Engineer:

Douglas Piehl

Doug Piehl, P.E.
District Engineer
(360) 357-8783
doug.piehl@thurstonpud.org



Engineer's Signature

Date: May 18, 2022

WATER FACILITIES INVENTORY (WFI) FORM

ONE FORM PER SYSTEM

RETURN TO: Southwest Regional Office POB 87423 Olympia WA 98504-7823

| | | | | |
|-----------------------------------|--|---------------------------|----------------------------|------------------------|
| 1. SYSTEM ID NO. 88388B | 2. SYSTEM NAME Timberline Village #628 | 3. COUNTY Lewis | 4. GROUP Group A | 5. TYPE Comm |
|-----------------------------------|--|---------------------------|----------------------------|------------------------|

| | | | | |
|---|-------|--|------|------------------|
| 6. PRIMARY CONTACT NAME & MAILING ADDRESS PUD No1 of Thurston County Kimberly S. Gubbe [Compliance Director] 1230 Ruddell Rd SE Lacey, WA 98503 | | 7. OWNER NAME & MAILING ADDRESS PUD NO 1 of Thurston County John G. Weidenfeller [General Manager] 1230 Ruddell Rd. SE Lacey, WA 98503 | | 8. Owner Number: |
| STREET ADDRESS IF DIFFERENT FROM ABOVE | | STREET ADDRESS IF DIFFERENT FROM ABOVE | | |
| ATTN | | ATTN | | |
| ADDRESS | | ADDRESS | | |
| CITY | STATE | ZIP | CITY | STATE |
| | | | | ZIP |

| | | | |
|--|---------------------------------------|--|---------|
| 9. 24 HOUR PRIMARY CONTACT INFORMATION | | 10. OWNER CONTACT INFORMATION | |
| Primary Contact Daytime Phone: (360) 357-8783 x 125 | | Owner Daytime Phone: (360) 357-8783 | |
| Primary Contact Evening Phone: (360) 688-0827 | | Owner Evening Phone: (360) 791-1739 | |
| Primary Contact Mobile/Cell Phone: | | Owner Mobile/Cell Phone: | |
| Fax: (360) 357-1172 | E-mail: kgubbe@thurstonpud.org | Fax (360) 357-1172 | E-Mail: |

WAC 246-290-420(j) requires that water systems provide 24-hour contact information for emergencies.

| | |
|--|------------------------|
| 11. SATELLITE MANAGEMENT AGENCY – SMA (check only one) | |
| <input type="checkbox"/> Not applicable (Skip to #12) <input checked="" type="checkbox"/> Owned and Managed <input type="checkbox"/> Managed Only <input type="checkbox"/> Owned Only | |
| SMA NAME: PUD No1 of Thurston County | SMA Number: 147 |

| | | |
|---|--|--|
| 12. WATER SYSTEM CHARACTERISTICS (mark ALL that apply) | | |
| <input type="checkbox"/> Agricultural <input checked="" type="checkbox"/> Commercial / Business <input type="checkbox"/> Day Care <input type="checkbox"/> Food Service/Food Permit <input type="checkbox"/> 1,000 or more person event for 2 or more days per year | <input type="checkbox"/> Hospital/Clinic <input type="checkbox"/> Industrial <input type="checkbox"/> Licensed Residential Facility <input type="checkbox"/> Lodging <input type="checkbox"/> Recreational / RV Park | <input checked="" type="checkbox"/> Residential <input type="checkbox"/> School <input type="checkbox"/> Temporary Farm Worker <input type="checkbox"/> Other (church, fire station, etc.): |

| | | |
|--|--|--------------------------------|
| 13. WATER SYSTEM OWNERSHIP (mark only one) | | 14. STORAGE CAPACITY (gallons) |
| <input type="checkbox"/> Association <input type="checkbox"/> City / Town <input type="checkbox"/> County <input type="checkbox"/> Federal <input type="checkbox"/> Investor <input type="checkbox"/> Private <input checked="" type="checkbox"/> Special District <input type="checkbox"/> State | | 60,000 |

| 15. | 16. SOURCE NAME | 17. INTERTIE | 18. SOURCE CATEGORY | | | | | | | | | | 19. USE | 20. | 21. TREATMENT | | | | | 22. DEPTH | 23. | 24. SOURCE LOCATION | | | | | | |
|---------------|--|---------------------------|---------------------|------------|----------------------|--------|--------------|-----------|-----------|---------------|-----------------------|-------|-----------|----------|---------------|----------------|------|--------------|------------|--------------|------------------|---------------------|-----------------|-------------------------------|------------------|----------------|----------|-------|
| SOURCE NUMBER | LIST UTILITY'S NAME FOR SOURCE AND WELL TAG ID NUMBER. Example: WELL #1 XYZ456 IF SOURCE IS PURCHASED OR INTERTIED, LIST SELLER'S NAME Example: SEATTLE | INTERTIE SYSTEM ID NUMBER | WELL | WELL FIELD | WELL IN A WELL FIELD | SPRING | SPRING FIELD | SPRING IN | SEA WATER | SURFACE WATER | RANNEY / INF. GALLERY | OTHER | PERMANENT | SEASONAL | EMERGENCY | SOURCE METERED | NONE | CHLORINATION | FILTRATION | FLUORIDATION | IRRADIATION (UV) | OTHER | OPEN INT (FEET) | CAPACITY (GALLONS PER MINUTE) | 1/4, 1/4 SECTION | SECTION NUMBER | TOWNSHIP | RANGE |
| | Well # 1 AFM952 | | x | | | | | | | | | | x | | | Y | X | | | | | | 89 | 125 | SE NE | 01 | 13N | 09E |
| | Well # 2 AFM953 | | x | | | | | | | | | | x | | | Y | X | | | | | | 63 | 240 | SE NE | 01 | 13N | 09E |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| | | | | |
|---|--|----------------------------|--|---------------------------------------|
| If this water system serves 100 OR MORE single-family residences, please enter the total number of service connections on line 25, then skip to lines 29, 35 and 36. If this water system serves LESS THAN 100 single-family residences, complete entire form. | | ACTIVE SERVICE CONNECTIONS | DOH USE ONLY! CALCULATED ACTIVE CONNECTIONS | DOH USE ONLY! APPROVED CONNECTIONS |
| 25. SINGLE FAMILY RESIDENCES (How many of the following do you have?) | | | | |
| A. Full Time Single Family Residences (Occupied 180 days or more per year) | | 29 | | |
| B. Part Time Single Family Residences (Occupied less than 180 days per year) | | 241 | | |
| 26. MULTI-FAMILY RESIDENTIAL BUILDINGS (How many of the following do you have?) | | | | |
| A. Apartment Buildings, condos, duplexes, barracks, dorms | | | | |
| B. Full Time Residential Units in Apartments, Condos, Duplexes, Dorms that are occupied more than 180 days/year | | | | |
| C. Part Time Residential Units in Apartments, Condos, Duplexes, Dorms that are occupied less than 180 days/year | | | | |
| 27. NON-RESIDENTIAL CONNECTIONS (How many of the following do you have?) | | | | |
| A. Recreational Services (Campsites, RV Sites, Spigots, etc.) | | | | |
| B. Institutional, Commercial or Industrial Services | | 5 | | |
| 28. TOTAL SERVICE CONNECTIONS | | 275 | | |

| |
|---|
| 29. FULL-TIME RESIDENTIAL POPULATION |
| A. How many residents are served by this system 180 or more days per year? 75 |

| | | | | | | | | | | | | |
|--|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 30. PART-TIME RESIDENTIAL POPULATION | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
| A. How many part-time residents are present each month? | 193 | 193 | 193 | 193 | 193 | 193 | 193 | 193 | 193 | 193 | 193 | 193 |
| B. How many days per month are they present? | 8 | 8 | 8 | 4 | 4 | 4 | 4 | 4 | 4 | 8 | 8 | 8 |
| 31. TEMPORARY & TRANSIENT USERS | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
| A. How many visitors, attendees, travelers, campers, patients or customers have access to the water system each month? | | | | | | | | | | | | |
| B. How many days per month are they present? | | | | | | | | | | | | |
| 32. REGULAR NON-RESIDENTIAL USERS | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
| A. If you have schools, daycares, or businesses connected to your water system, how many students, daycare children and/or employees are present each month? | | | | | | | | | | | | |
| B. How many days per month are they present? | | | | | | | | | | | | |

| | | | | | | | | | | | | |
|--|-----------|-----|-----|----------|-----|-----|--------------------|-----|-----|-----|-----|-----|
| 33. ROUTINE COLIFORM SCHEDULE | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
| | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 34. GROUP B NITRATE SCHEDULE | QUARTERLY | | | ANNUALLY | | | ONCE EVERY 3 YEARS | | | | | |
| <i>This will be suppressed for all Group A systems</i> | | | | | | | | | | | | |

| |
|--|
| 35. Reason for Submitting WFI: <i>(To be completed by system submitting form – not a Sentry feed)</i> |
|--|

☒ Update-Change
 ☐ Update-No Change
 ☐ Inactivate
 ☐ Re-Activate
 ☐ Name change
 ☐ New System
 ☐ Other _____

36. I certify that the information stated on this WFI form is correct to the best of my knowledge.

SIGNATURE: Douglas Piehl DATE: 5/18/22

PRINT NAME: Douglas Piehl TITLE: District Engineer

Water Right Self-Assessment Form for Water System Plan

Mouse-over any link for more information. Click on any link for more detailed instructions.

| Water Right Permit, Certificate, or Claim # *If water right is interruptible, identify limitation in yellow section below | WFI Source # If a source has multiple water rights, list each water right on separate line | Existing Water Rights | | | | Current Source Production – Most Recent Calendar Year | | | | 10-Year Forecasted Source Production (determined from WSP) This includes wholesale water sold | | | | 20-Year Forecasted Source Production (determined from WSP) This includes wholesale water sold | | | |
|--|---|--|---|--|---|---|-----------------------------------|---|-----------------------------------|--|--|---|--|--|--|---|--|
| | | Primary Qi Maximum Rate Allowed | Non-Additive Qi Maximum Rate Allowed | Primary Qa Maximum Volume Allowed | Non-Additive Qa Maximum Volume Allowed | Total Qi Maximum Instantaneous Flow Rate Withdrawn | Current Excess or (Deficiency) Qi | Total Qa Maximum Annual Volume Withdrawn | Current Excess or (Deficiency) Qa | Total Qi Maximum Instantaneous Flow Rate in 10 Years | 10-Year Forecasted Excess or (Deficiency) Qi | Total Qa Maximum Annual Volume in 10 Years | 10-Year Forecasted Excess or (Deficiency) Qa | Total Qi Maximum Instantaneous Flow Rate in 20 Years | 20-Year Forecasted Excess or (Deficiency) Qi | Total Qa Maximum Annual Volume in 20 Years | 20-Year Forecasted Excess or (Deficiency) Qa |
| 1 G2-00887C | S01, AFM952 | 160 gpm | | 39.0 ac-ft/yr | | 125 gpm | 35 gpm | 17.8 ac-ft/yr | 21.2 ac-ft/yr | 125 gpm | 35 gpm | 18.9 ac-ft/yr | 20.1 ac-ft/yr | 125 gpm | 35 gpm | 20.4 ac-ft/yr | 18.6 ac-ft/yr |
| 2 G2-22984C | S02, AFM953 | 160 gpm | | 19.0 ac-ft/yr | | 240 gpm | (80 gpm) | 22.6 ac-ft/yr | (3.6 ac-ft/yr) | 240 gpm | (80 gpm) | 23.9 ac-ft/yr | (4.9 ac-ft/yr) | 240 gpm | (80 gpm) | 26.0 ac-ft/yr | (7 ac-ft/yr) |
| 3 G2-25619C | S01 & S02 | 80 gpm | 400 gpm | | 58.0 ac-ft/yr | 0 gpm | 80 gpm | | | 0 gpm | 80 gpm | | | 0 gpm | 80 gpm | | |
| 4 | | | | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | | |
| | TOTALS = | 400 gpm | | 58.0 ac-ft/yr | | 365 gpm | 35 gpm | 40.4 ac-ft/yr | 17.6 ac-ft/yr | 365 gpm | 35 gpm | 42.8 ac-ft/yr | 15.2 ac-ft/yr | 365 gpm | 35 gpm | 46.4 ac-ft | 11.6 ac-ft/yr |

Column Identifiers for Calculations

A

B

C

$$= A - C$$

D

=B-D

E

$$= A - E$$

F

=B-F

G

$$= A - G$$
$$=B-H$$

| PENDING WATER RIGHT APPLICATIONS: Identify any water right applications that have been submitted to Ecology. | | | | | | |
|--|----------------------------|----------------|----------------------|-----------------|------------|-----------------|
| Application Number | New or Change Application? | Date Submitted | Quantities Requested | | | |
| | | | Primary Qi | Non-Additive Qi | Primary Qa | Non-Additive Qa |
| | | | | | | |
| | | | | | | |
| | | | | | | |

[illegible]

Column Identifiers for Calculations

A

B

C

$$= A - C$$

D

=B-D

E

$$= A - E$$

F

=B-F

G

$$= A - G$$
$$=B-H$$

| INTERRUPTIBLE WATER RIGHTS: Identify limitations on any water rights listed above that are interruptible. | | |
|--|----------------------------|-----------------------------|
| Water Right # | Conditions of Interruption | Time Period of Interruption |
| 1 | | |
| 2 | | |

ADDITIONAL COMMENTS:

DEPARTMENT OF ECOLOGY

REPORT OF EXAMINATION
TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

- ☐ Surface Water (Issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the Department of Ecology.)
- ☒ Ground Water (Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1946, and amendments thereto, and the rules and regulations of the Department of Ecology.)

| | | | |
|-----------------------|---------------------------------|---------------|--------------------|
| DATE June 13, 1980 | APPLICATION NUMBER G 2-25619 | PERMIT NUMBER | CERTIFICATE NUMBER |
|-----------------------|---------------------------------|---------------|--------------------|

| | | | |
|---|----------------|---------------------|-------------------|
| NAME FARWEST INDUSTRIES, INC. (TIMBERLINE VILLAGE) | | | |
| ADDRESS (STREET) 1510 Puyallup Street | CITY Sumner | STATE Washington | ZIP CODE 98390 |

PUBLIC WATERS TO BE APPROPRIATED

| |
|---------------------------------|
| SOURCE 2 wells |
| TERRITORY OF THE SURFACE WATERS |

| | | |
|-------------------------------|-----------------------------------|----------------------------------|
| MAXIMUM CUBIC FEET PER SECOND | MAXIMUM GALLONS PER MINUTE 400 | MAXIMUM ACRE-Feet PER YEAR 58 |
|-------------------------------|-----------------------------------|----------------------------------|

| | | |
|---|---------------------------|--------------|
| QUANTITY, TYPE OF USE, PERIOD OF USE 58 acre-feet per year | Community domestic supply | Continuously |
| (421 Recreational lots) | | |

LOCATION OF DIVERSION/WITHDRAWAL

| |
|---|
| APPROXIMATE LOCATION OF DIVERSION-WITHDRAWAL #1-970 feet west and 1,200 feet north; #2-1,000 feet west and 1,200 feet north - Both from Quarter Corner, Section 1 |
|---|

| | | | | | |
|--|--------------|-------------------|-------------------------------|----------------|-----------------|
| LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION) SE $\frac{1}{4}$ NE $\frac{1}{4}$ | SECTION 1 | TOWNSHIP N. 13 | RANGE, (E. OR W.) W.M. 9 E | W.B.L.A. 26 | COUNTY Lewis |
|--|--------------|-------------------|-------------------------------|----------------|-----------------|

RECORDED PLATTED PROPERTY

| | | |
|----------------|-------|---|
| LOT Tract A | BLOCK | OF (GIVE NAME OF PLAT OR ADDITION) Timberline Village Division 3 |
|----------------|-------|---|

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Government Lots 2, 3, 7, 8, and 11 and the SE $\frac{1}{4}$ NE $\frac{1}{4}$, Sec. 1, T. 13 N., R. 9 E.W.M.; EXCEPTING THEREFROM that part of said SE $\frac{1}{4}$ NE $\frac{1}{4}$ described as follows:
beginning at the point of intersection of the southerly boundary of the National Park Highway with the easterly boundary of said section; thence south along said section line 607.2 feet; thence west 444 feet; thence north 377.4 feet, more or less, to the southerly boundary of said highway; thence northeasterly along said highway to the point of beginning;
AND EXCEPTING THEREFROM the National Park Highway; AND EXCEPT a tract of land situated in Government Lot 2 in the NE $\frac{1}{4}$, Sec. 1, T. 13 N., R. 9 E.W.M. described as follows:
beginning at Monument 121 which is a point on the northerly line of PSN #5 and the east line of said Sec. 1, north 0°43' east 973.7 feet from the east quarter corner of said Sec. 1; thence continuing north 0°43' east 466.3 feet; thence north 89°17' west 200 feet to the true place of beginning; thence south 48°03' west 170 feet to the center line of Coal Creek; thence north 12°47' west along said center line of Coal Creek 143.5 feet; thence north 48°03' east 100 feet; thence south 41°57' east 125 feet to the place of beginning.

AND the N $\frac{1}{2}$ SE $\frac{1}{4}$, Sec. 1, T. 13 N., R. 9 E.W.M.; EXCEPTING THEREFROM the National Park Highway.

Being the land included in and around the plats of Timberline Village, recorded plats 1 through 5 and Timberline Village 5 Acre Tracts ALL in Sec. 1, T. 13 N., R. 9 E.W.M.

DESCRIPTION OF PROPOSED WORKS

Well #1-8" x 90'; Well #2-8" x 63'
Two 7½ HP pumps
1000 gallon hydropneumatic pressure tank
4" and 6" distribution system

DEVELOPMENT SCHEDULE

| BEG | JECT BY THIS DATE: | COMPLETE PROJECT BY THIS DATE: | WATER PUT TO FULL USE BY THIS DATE: |
|-----|--------------------|--------------------------------|-------------------------------------|
| | Started | June 1, 1983 | June 1, 1984 |

REPORT ~~BOOKS~~

BACKGROUND:

This application was received and accepted in this office on June 13, 1980. The public notice was advertised in The Daily Chronicle on July 15 and 22, 1980. No objections to these withdrawals were received during the 30-day protest period. The applicant has requested ground water rights for two existing wells in the amount of 400 gallons per minute for community domestic supply.

INVESTIGATION:

I inspected the water system and property on October 1, 1980. Both wells have been serving portions of this development for six years under the following Certificates of Water Right: G 2-00887 C - 160 gallons per minute and 39 acre-feet per year; G 2-22984 C - 160 gpm and 19 acre-feet per year - both for community domestic supply. This present application is for increasing the instantaneous withdrawal rate from 320 to 400 gpm. The annual quantity is based on 2500 gallons per day per lot for the 6 month recreational season. The 421 lots objected to be served will require 58 acre-feet per year. There is no history of well interference problems in this area of Lewis County.

CONCLUSIONS:

In accordance with Section 90.03 and 90.44 RCW, I find that there is water available for appropriation from the source in question and that the appropriation as recommended is a beneficial use and will not impair existing rights or be detrimental to the public welfare. Therefore, permit should issue, subject to existing rights and indicated provisions

RECOMMENDATIONS:

I recommend approval of this application for 400 gpm and 58 acre-feet per year for community domestic supply, based on the following provisions:
"I as a primary right for 80 gpm - the balance of 320 gpm shall be supplemental to G1 Water Certificates G 2-00887 C and G 2-22984 C. Total annual withdrawal shall not exceed 58 acre-feet per year."

The access port on each well shall be properly maintained.

Applicant is advised that notice of proof of appropriation of water (under which final certificate of water right issues) should not be filed until the permanent diversion facilities have been installed together with a mainline system capable of delivering the recommended quantity of water to an existing or proposed distribution system within the area to be served.

Use of the waters to be appropriated under this application will be for a public water supply. State Board of Health rules require every owner of a public water supply to obtain written approval from the Water Supply and Waste Section, Department of Social and Health Services, Mail Stop LB 11, Building 4, Olympia, Washington, 98504, prior to any new construction or alterations of a public water supply.

REPORTED BY:

J. M. R. e.

DATE:

DEC 2, 1980

The State Groundwater Code provides a \$20 penalty for each day of violation.

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

CERTIFICATE OF WATER RIGHT

- ☐ Surface Water (Issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the Department of Ecology.)
- ☒ Ground Water (Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology.)

| | | | |
|--------------------------------|---------------------------------|------------------------------|-----------------------------------|
| PRIORITY DATE June 13, 1980 | APPLICATION NUMBER G 2-25619 | PERMIT NUMBER G 2-25619 P | CERTIFICATE NUMBER G 2-25619 C |
|--------------------------------|---------------------------------|------------------------------|-----------------------------------|

NAME
EARWEST INDUSTRIES, INC. (TIMBERLINE VILLAGE)

ADDRESS (STREET) (CITY) (STATE) (ZIP CODE)
P.O. Box 700 Sumner Washington 98390

This is to certify that the herein named applicant has made proof to the satisfaction of the Department of Ecology of a right to the use of the public waters of the State of Washington as herein defined, and under and specifically subject to the provisions contained in the Permit issued by the Department of Ecology, and that said right to the use of said waters has been perfected in accordance with the laws of the State of Washington, and is hereby confirmed by the Department of Ecology and entered of record as shown.

PUBLIC WATER TO BE APPROPRIATED

SOURCE
Two wells

TRIBUTARY OF (IF SURFACE WATERS)

| | | |
|-------------------------------|-----------------------------------|----------------------------------|
| MAXIMUM CUBIC FEET PER SECOND | MAXIMUM GALLONS PER MINUTE 400 | MAXIMUM ACRE-Feet PER YEAR 58 |
|-------------------------------|-----------------------------------|----------------------------------|

QUANTITY, TYPE OF USE, PERIOD OF USE
58 acre-feet per year Community domestic supply Continuously

(421 Recreational lots)

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION-WITHDRAWAL
#1-970 feet west and 1,200 feet north; #2-1,000 feet west and 1,200 feet north - Both from East Quarter Corner, Section 1

| | | | | | |
|---|--------------|-------------------|------------------------------|----------------|-----------------|
| LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION) | SECTION 1 | TOWNSHIP N. 13 | RANGE (E. OR W.) W.M. 9 E | W.R.I.A. 26 | COUNTY Lewis |
|---|--------------|-------------------|------------------------------|----------------|-----------------|

RECORDED PLATTED PROPERTY

| | | |
|----------------|-------|---|
| LOT Tract A | BLOCK | OF (GIVE NAME OF PLAT OR ADDITION) Timberline Village Division 3 |
|----------------|-------|---|

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Real estate subdivision one through six Timberline Village located in Section 1, Township 13 North, Range 9 East W.M. in Lewis County WA.

PROVISIONS

"Issued as a primary right for 80 gpm - the balance of 320 gpm shall be supplemental to Ground Water Certificates G 2-20887 C and G 2-22984 C. Total annual withdrawal shall not exceed 58 acre-feet per year."

The access port shall be maintained at all times on the well (s).

The right to the use of the water aforesaid hereby confirmed is restricted to the lands or place of use herein described, except as provided in RCW 90.03.380, 90.03.390, and 90.44.020.

This certificate of water right is specifically subject to relinquishment for nonuse of water as provided in RCW 90.14.180.

Given under my hand and the seal of this office at Olympia Washington, this 26th day of September, 19 84

DONALD W. MOOS, Director
Department of Ecology

ENGINEERING DATA

OK *[Signature]*

by *[Signature]*
Joan K. Thomas, Regional Manager

FOR COUNTY USE ONLY

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

CERTIFICATE OF WATER RIGHT

☐ Surface Water (Issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the Department of Ecology.)
☒ Ground Water (Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology.)

| | | | |
|--------------------------------|---------------------------------|-----------------------------|-----------------------------------|
| PRIORITY DATE July 15, 1974 | APPLICATION NUMBER G 2-22984 | PERMIT NUMBER G 2-22984P | CERTIFICATE NUMBER G 2-22984 C |
|--------------------------------|---------------------------------|-----------------------------|-----------------------------------|

| | | | |
|-----------------------------------|------------------|-----------------------|---------------------|
| NAME FAR WEST INDUSTRIES, INC. | | | |
| ADDRESS (STREET) Box 144 | (CITY) Tacoma | (STATE) Washington | (ZIP CODE) 98401 |

This is to certify that the herein named applicant has made proof to the satisfaction of the Department of Ecology of a right to the use of the public waters of the State of Washington as herein defined, and under and specifically subject to the provisions contained in the Permit issued by the Department of Ecology, and that said right to the use of said waters has been perfected in accordance with the laws of the State of Washington, and is hereby confirmed by the Department of Ecology and entered of record as shown:

| | | |
|--|-----------------------------------|----------------------------------|
| PUBLIC WATER TO BE APPROPRIATED | | |
| SOURCE well | | |
| TRIBUTARY OF (IF SURFACE WATERS) | | |
| MAXIMUM CUBIC FEET PER SECOND | MAXIMUM GALLONS PER MINUTE 160 | MAXIMUM ACRE-Feet PER YEAR 19 |
| QUANTITY, TYPE OF USE, PERIOD OF USE 19 acre-feet per year community domestic supply continuously | | |

| |
|--|
| LOCATION OF DIVERSION/WITHDRAWAL 1,000 feet west and 1200 feet north from the East Quarter corner of Section 1. |
|--|

| | | | | | |
|---|--------------|-------------------|------------------------------|---------------|-----------------|
| LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION) | SECTION 1 | TOWNSHIP N. 13 | RANGE (E. OR W.) W.M. 9 E | W.R./A. 26 | COUNTY Lewis |
|---|--------------|-------------------|------------------------------|---------------|-----------------|

| | | |
|---------------------------|-------|---|
| RECORDED PLATTED PROPERTY | | |
| LOT Tract A | BLOCK | OF (GIVE NAME OF PLAT OR ADDITION) Timberline Village Div. 3 |

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Government Lots 2, 3, 7, 8, and 11 and the SE 1/4, Sec. 1, T. 13 N., R. 9 E.W.M.; EXCEPTING THEREFROM that part of said SE 1/4 described as follows: beginning at the point of intersection of the southerly boundary of the National Park Highway with the easterly boundary of said section; thence south along said section line 607.2 feet; thence west 444 feet; thence north 377.4 feet, more or less, to the southerly boundary of said highway; thence northeasterly along said highway to the point of beginning; AND EXCEPTING THEREFROM the National Park Highway; AND EXCEPT a tract of land situated in Government Lot 2 in the NE 1/4, Sec. 1, T. 13 N., R. 9 E.W.M. described as follows: beginning at Monument 121 which is a point on the northerly line of PSH #5 and the east line of said Sec. 1, north 0°43' east 973.7 feet from the east quarter corner of said Sec. 1; thence continuing north 0°43' east 466.3 feet; thence north 89°17' west 200 feet to the true place of beginning; thence south 48°03' west 170 feet to the center line of Coal Creek; thence north 12°47' west along said center line of Coal Creek 143.5 feet; thence north 48°03' east 100 feet; thence south 41°57' east 125 feet to the place of beginning.

AND the NE 1/4, Sec. 1, T. 13 N., R. 9 E.W.M.; EXCEPTING THEREFROM the National Park Highway.

Being the land included in and around the plats of Timberline Village, recorded plats 1 through 5 and Timberline Village 5 Acre Tracts ALL in Sec. 1, T. 13 N., R. 9 E.W.M.

Lot 2
Coal Creek Dr

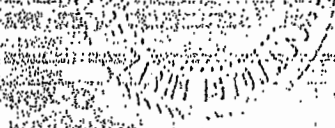
The access port as required on your permit shall be maintained at all times.

A suitable measuring device shall be installed and maintained in accordance with WAC 508-64-020 through WAC 508-64-040.

The right to the use of the water aforesaid hereby confirmed is restricted to the lands or place of use herein described, except as provided in RCW 90.03.380, 90.03.390, and 90.44.020.

This certificate of water right is specifically subject to relinquishment for nonuse of water as provided in RCW 90.14.180.

Given under my hand and the seal of this office at Olympia Washington, this 9th day of May, 1979.



WILBUR G. HALLAUER, DIRECTOR
Department of Ecology

ENGINEERING DATA

OK *[Signature]*
VES

by *[Signature]*
E.W. ASSELSTINE, Regional Manager

FOR COUNTY USE ONLY

DEPARTMENT OF ECOLOGY

CERTIFICATE OF WATER RIGHT

| | | | |
|-------------|------|------|-------------------|
| G 2-00007 C | 9334 | 9892 | November 19, 1969 |
|-------------|------|------|-------------------|

SAR WEST INDUSTRIES, INC.

767 Middle Waterway Tacoma, Washington 98421

That the public water of the State of Washington as herein defined and under and specific to the Department of Ecology and that and right to the

PUBLIC WATER TO BE APPROPRIATED

a well

160 39

160 gpm; 39 acre-feet per year community domestic supply continuously

LOCATION OF DIVERSION WITHDRAWAL

970 feet west and 1200 feet north of east quarter corner of Sec. 1

| | | | | |
|---|----|------|----|-------|
| 1 | 13 | 9 E. | 20 | Levin |
|---|----|------|----|-------|

RECORDED PLATTED PROPERTY

Tract A, Plat of Timberline Village Division No. 3

LEGAL DESCRIPTION OF PROPERTY WATER TO BE USED ON

Plat of Timberline Village, Timberline Village Division No. 2, Timberline Village Division No. 3 and Timberline Village Division No. 4; ALL in E4, Sec. 1, T. 13 N., R. 9 E.W.M.

PROVISIONS

The well shall be equipped with an accurate pump.

As provided under RCW 43.21.230, 90.44.230, and 90.44.020, a master meter shall be installed in this system to measure the total amount of the withdrawal.

The right to the use of the water aforesaid hereby confirmed is restricted to the lands or place of use herein described, except as provided in RCW 90.03.080, 90.03.090, and 90.44.020.

This certificate of water right is specifically subject to relinquishment for nonuse of water as provided in RCW 90.14.180.

Given under my hand and the seal of this office at Olympia, Washington, this 11th day of October, 1974.

JOHN A. BIGGS, Director
Department of Ecology

ENGINEERING DATA

by

R. JERRY BOLLEN, Assistant Director

FOR COUNTY USE ONLY

Commissioners

Linda Oosterman – District 1

Russell E. Olsen – District 2

Chris Stearns – District 3



Providing safe, reliable, affordable, and sustainable service.

January 14, 2022

Subject: Timberline Village #268 Water System Survey 2022

Dear Timberline Village residents,

This survey is part of our planning update effort for the Timberline Village water system. Responses are very important for our planning effort and will allow us to better serve you. Responses are confidential and are for planning and funding purposes only. We ask that you please take the time to complete this short survey and return it to us by February 24, 2022.

You may email, fax, or mail responses to:

Thurston PUD

Attn. Teal Reopelle

Email: treopelle@thurstonpud.org

Fax: (360) 357-1172

Mail: 1230 Ruddell Rd SE

Lacey, WA 98503

Sincerely,

Teal Reopelle

Teal Reopelle

Administrative Assistant

(360) 357-8783 x 126

Timberline Village #268 Water System Survey 2022

Please fill out or circle the below as applicable:

Lot #/Address _____

I use or reside on my property:

- Full time (primary residence)
- Part time
- Occasional recreational use only
- I use my lot primarily as a vacation rental
- I do not currently have water service
- Other _____

I have an irrigation system

- Yes
- No

Please tell us if you have intend to build on your undeveloped parcel, or to add an Accessory Dwelling Unit in the future: _____

| Address | Property use | Irrigation sy | Future build/ADU plans? |
|---------------------|-------------------------|---------------|--|
| | | | In the next 5 to 10 years we intend to build another structure on an undeveloped parcel next to ours. Probably 2 bed 1.5 |
| 100 Ridge Ln | Part Time | No | |
| 111 Huckleberry Ln | Occasional rec use only | No | None |
| 107 Elkhorn Trail | Vacation rental | No | None |
| 179 Summit Dr | Occasional rec use only | No | None |
| 110 Cascade Dr | Part Time | No | None |
| 124 Forest Ridge Dr | Vacation rental | No | None |
| 113 Timber Trail | Part Time | No | None |
| 142 Coal Creek Dr | Part Time | Yes | None |
| 112 River Run Dr | Part Time | No | None |
| | | | I have long-range plans to sell a portion of this property as a buildable parcel |
| 128 Cascade Dr | No water service | No | None |
| 107 Cottonwood Rd | No water service | No | None |
| 105 Cedar Rd | Occasional rec use only | No | We would like to build a small 'bunkhouse' |
| 109 Deer Park Ln | Part Time | No | None |
| 112 Trails End Dr | Occasional rec use only | No | None |
| 132 Grizzly Rd | Part Time | No | None |
| 138 Coal Creek Dr | Part Time | No | Many years down the road may add ADU |
| 126 Elkhorn Trail | Part Time | No | None |
| 160 Timberline Dr | Part Time | No | None |
| 138 Red Cedar Ln | Part Time | No | None |
| 179 Timberline Dr | Occasional rec use only | No | We hope to add on in the future |
| 106 Cascade Dr | Occasional rec use only | No | None |
| 126 Timberline Dr W | Occasional rec use only | No | None |
| | | | Hoping to build in near future, on waiting list for water |
| 188 Timberline Dr | No water service | No | |
| 161 Coal Creek Dr | Part Time | Yes | None |
| 121 Elkhorn Trail | Occasional rec use only | No | None |
| 103 Hemlock Place | Occasional rec use only | No | None |
| 108 View Place | Part Time | No | None |
| 157 Coal Creek Rd | Occasional rec use only | No | Would like to add ADU |
| | | | We plan to add on to current residence and add an ADU |
| 178 Summit Dr | Part Time | No | |
| 193 Timberline Dr W | Part Time | No | None |
| 107-B Ponderosa Rd | Part Time | No | None |
| 116 Summit Dr | Part Time | No | None |
| 196 Timberline Dr | Occasional rec use only | No | None |
| 124 Timber Trail | Occasional rec use only | No | None |
| 106 Timber Trail | Vacation rental | No | None |
| | | | I would like to build a small cabin on adjacent lot; I have applied for water |
| 151 Forest Ridge Dr | Part Time | No | |
| | | | No current plans, but we could develop adjacent unused lot in future |
| 104 Forest Ridge Dr | Vacation rental | No | |
| 185 Timberline Dr W | Part Time | No | None |

| | | | |
|---------------------|-------------------------|--------------|------|
| 175 Timberline Dr W | Full Time | No | None |
| 107 Red Cedar Ln | Vacation rental | Yes but unus | None |
| 125 Timberline Dr W | Part Time | No | None |
| 130 Forest Ridge Dr | Occasional rec use only | No | None |

| Use category | number | percent |
|-------------------------|--------|---------|
| Full Time | 1 | 3% |
| Vacation rental | 5 | 13% |
| Part Time | 20 | 51% |
| Occasional rec use only | 13 | 33% |
| Total | 39 | 100% |



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May 18, 2022

Doug Piehl, PE
Thurston PUD
doug.piehl@thurstonpud.org

Re: Timberline Village Water System, Hydraulic Analysis

Dear Doug Piehl,

A hydraulic analysis was completed using EPANet 2. Three scenarios were completed, full system build out, using the calculated PHD of 150 gpm from the capacity analysis, and adjusting system flow rate until the pressure dropped below 20 psi at a connection. The distribution system consists of 8-inch, 6-inch, 4-inch 3-inch, 2-inch, and 1.5-inch PVC . A coefficient of 130 was used as the friction coefficient. Pipe length, diameter, and layout were based upon the available system drawings with revisions from Thurston PUD staff who are familiar with the system layout.

A base demand was assigned to node representing service connections, and then scaled to provide the two scenarios.

The booster pump was modeled as a reservoir with additional head to represent pressure from the booster pump. The existing booster pump can provide 62 psi (143 feet) under PHD conditions and up to 70 psi (161.7 feet) under high pressure conditions. Similarly, the well pump was modeled as a reservoir with additional head to represent pressure from the well pump. The existing well pump operates at 70 psi based on floats in the upper reservoir. This reservoir “floats” on the system and does not have a dedicated inlet and outlet. There are several services which are connected on the fill line to the reservoir. The well pump was modeled at 62 psi (143 feet) under PHD conditions. Table 1 below lists the base elevation and corresponding modeled elevations for each source of supply component.

Table 1 – Modeled Elevations

| Component | Base Elevation | Pressure | Modeled Elevation |
|-----------------|----------------|-------------------|-------------------|
| Well Elevation | 1186 feet | 62 psi = 143 feet | 1329 feet |
| Reservoir | 1334 | 0 psi = 0 feet | 1334 feet |
| Booster Station | 1330 | 62 psi = 143 feet | 1473 feet |

The first scenario used a multiplier of 1.8 gpm/node. This was based on the results of the capacity analysis which calculated a system PHD of 150 gpm and ERU of 84, or 1.8 gpm/ERU. However, this multiplier was applied assuming build-out of the distribution system, or 376 ERU, not the existing 84 ERU. This assumed the PHD was distributed evenly throughout the distribution system. The results of this scenario are shown in Figure 1 below. There are several locations which the pressure dropped below 20 psi, and in some cases below 10 psi.

The second scenario calculated a multiplier of 0.4 gpm/node in order to achieve a flow rate of 150 gpm in the distribution system. It was assumed the PHD flow of 150 gpm was distributed evenly throughout the distribution system. In this scenario, there were 6 connections which had pressure under 30 psi. Per WAC 246-290-420(2), as an existing system the minimum residual pressure under PHD conditions must be greater than 20 psi. The results are shown in Figure 2 below

The third scenario adjusted the multiplier to 1.05 gpm/node which is the maximum flow in the distribution system while maintain each connection above 20 psi. This resulted in a total flow rate of 395 gpm spread throughout the distribution system. The results are shown in Figure 3 below.

The numerical results for all three scenarios are enclosed. Junction (node) 49 and 268 consistently show low pressures, however, these are not service connections. Junction 49 is just below the upper reservoir and Junction 268 is a blow off located above the highest elevation service connection.

The results demonstrate the existing distribution system is limited to a flow rate of 395 gpm.

Sincerely,
NORTHWEST WATER SYSTEMS, INC.

Lydia Bower

Lydia Bower, PE

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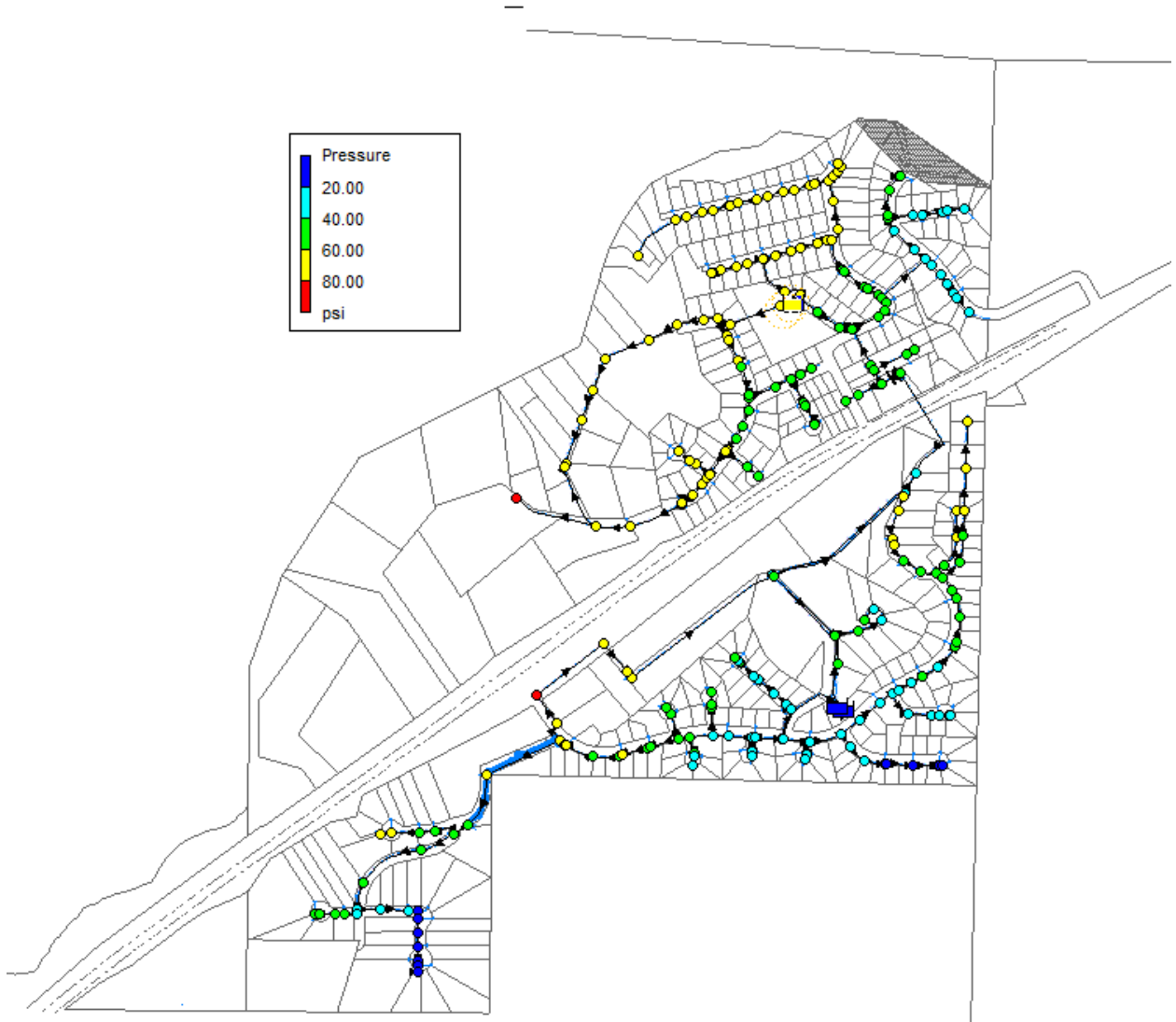


Figure 1 – Scenario 1: Multiplier of 1.8 gpm/node, full build-out

Scenario 1

Network Table - Nodes

| Node ID | Elevation ft | Demand GPM | Head ft | Pressure psi |
|----------------------|-----------------|---------------|------------|-----------------|
| Resvr BoosterStation | 1473.2 | -331.20 | 1473.20 | 0.00 |
| Resvr Reservoirs | 1334 | -135.27 | 1334.00 | 0.00 |
| Resvr Wells | 1329 | -212.14 | 1329.00 | 0.00 |
| Junc 49 | 1330 | 0.00 | 1333.99 | 1.73 |
| Junc 268 | 1410 | 1.80 | 1418.89 | 3.85 |
| Junc 223 | 1406 | 1.80 | 1418.89 | 5.59 |
| Junc 222 | 1406 | 3.60 | 1418.89 | 5.59 |
| Junc 221 | 1400 | 3.60 | 1418.90 | 8.19 |
| Junc 220 | 1400 | 3.60 | 1418.91 | 8.19 |
| Junc 172 | 1403 | 3.60 | 1422.39 | 8.40 |
| Junc 170 | 1401 | 3.60 | 1422.42 | 9.28 |
| Junc 171 | 1400 | 3.60 | 1422.40 | 9.71 |
| Junc 169 | 1394 | 3.60 | 1422.90 | 12.52 |
| Junc 167 | 1394 | 3.60 | 1424.27 | 13.12 |
| Junc 168 | 1392 | 3.60 | 1422.92 | 13.40 |
| Junc 219 | 1388 | 3.60 | 1418.92 | 13.40 |
| Junc 218 | 1388 | 3.60 | 1418.94 | 13.41 |
| Junc 217 | 1380 | 3.60 | 1418.96 | 16.88 |
| Junc 166 | 1384 | 3.60 | 1424.33 | 17.48 |
| Junc 165 | 1380 | 3.60 | 1426.36 | 20.09 |
| Junc 216 | 1371 | 3.60 | 1418.96 | 20.78 |
| Junc 139 | 1277 | 0.00 | 1332.37 | 23.99 |
| Junc 164 | 1366 | 3.60 | 1428.72 | 27.18 |
| Junc 179 | 1362 | 3.60 | 1424.97 | 27.29 |
| Junc 177 | 1361 | 3.60 | 1425.18 | 27.81 |
| Junc 173 | 1364 | 3.60 | 1429.35 | 28.32 |

| Node ID | Elevation ft | Demand GPM | Head ft | Pressure psi |
|----------|-----------------|---------------|------------|-----------------|
| Junc 107 | 1204 | 7.20 | 1269.67 | 28.45 |
| Junc 180 | 1359 | 3.60 | 1424.97 | 28.58 |
| Junc 163 | 1364 | 0.00 | 1430.99 | 29.03 |
| Junc 178 | 1358 | 1.80 | 1425.07 | 29.06 |
| Junc 161 | 1368 | 3.60 | 1435.30 | 29.16 |
| Junc 159 | 1368 | 3.60 | 1435.40 | 29.20 |
| Junc 114 | 1221 | 3.60 | 1289.13 | 29.52 |
| Junc 106 | 1202 | 3.60 | 1270.29 | 29.59 |
| Junc 157 | 1372 | 0.00 | 1441.19 | 29.98 |
| Junc 156 | 1372 | 0.00 | 1441.29 | 30.02 |
| Junc 241 | 1366 | 3.60 | 1436.38 | 30.50 |
| Junc 105 | 1200 | 3.60 | 1270.75 | 30.66 |
| Junc 215 | 1348 | 3.60 | 1418.97 | 30.75 |
| Junc 160 | 1364 | 3.60 | 1435.36 | 30.92 |
| Junc 112 | 1218 | 3.60 | 1289.50 | 30.98 |
| Junc 176 | 1354 | 3.60 | 1425.77 | 31.10 |
| Junc 238 | 1364 | 0.00 | 1437.08 | 31.66 |
| Junc 239 | 1364 | 3.60 | 1437.47 | 31.84 |
| Junc 122 | 1256 | 0.00 | 1330.76 | 32.39 |
| Junc 113 | 1214 | 3.60 | 1289.33 | 32.64 |
| Junc 242 | 1360 | 1.80 | 1436.37 | 33.09 |
| Junc 104 | 1197 | 3.60 | 1273.56 | 33.17 |
| Junc 236 | 1350 | 3.60 | 1428.27 | 33.92 |
| Junc 240 | 1358 | 3.60 | 1436.43 | 33.98 |
| Junc 99 | 1212 | 3.60 | 1290.46 | 34.00 |
| Junc 184 | 1340 | 3.60 | 1418.68 | 34.09 |
| Junc 162 | 1356 | 3.60 | 1435.86 | 34.60 |

| Node ID | Elevation ft | Demand GPM | Head ft | Pressure psi |
|----------|-----------------|---------------|------------|-----------------|
| Junc 158 | 1356 | 0.00 | 1436.26 | 34.77 |
| Junc 103 | 1195 | 3.60 | 1275.31 | 34.80 |
| Junc 121 | 1248 | 3.60 | 1330.53 | 35.76 |
| Junc 182 | 1340 | 3.60 | 1422.64 | 35.81 |
| Junc 152 | 1346 | 3.60 | 1428.74 | 35.85 |
| Junc 98 | 1208 | 1.80 | 1291.87 | 36.34 |
| Junc 237 | 1349 | 3.60 | 1434.05 | 36.85 |
| Junc 174 | 1342 | 3.60 | 1427.69 | 37.13 |
| Junc 235 | 1340 | 3.60 | 1428.38 | 38.30 |
| Junc 267 | 1352 | 1.80 | 1440.48 | 38.34 |
| Junc 149 | 1350 | 1.80 | 1438.49 | 38.34 |
| Junc 151 | 1341 | 3.60 | 1429.61 | 38.39 |
| Junc 154 | 1338 | 3.60 | 1427.03 | 38.58 |
| Junc 181 | 1336 | 3.60 | 1425.28 | 38.69 |
| Junc 97 | 1205 | 3.60 | 1294.29 | 38.69 |
| Junc 233 | 1342 | 0.00 | 1432.25 | 39.11 |
| Junc 96 | 1204 | 0.00 | 1294.53 | 39.23 |
| Junc 101 | 1194 | 3.60 | 1284.76 | 39.33 |
| Junc 175 | 1336 | 0.00 | 1426.85 | 39.36 |
| Junc 150 | 1343 | 3.60 | 1433.90 | 39.39 |
| Junc 210 | 1328 | 0.00 | 1418.97 | 39.42 |
| Junc 209 | 1328 | 0.00 | 1418.97 | 39.42 |
| Junc 142 | 1324 | 3.60 | 1415.11 | 39.48 |
| Junc 141 | 1324 | 3.60 | 1415.11 | 39.48 |
| Junc 100 | 1199 | 3.60 | 1290.81 | 39.78 |
| Junc 102 | 1190 | 0.00 | 1282.35 | 40.02 |
| Junc 148 | 1348 | 1.80 | 1440.67 | 40.15 |

| Node ID | Elevation ft | Demand GPM | Head ft | Pressure psi |
|----------|-----------------|---------------|------------|-----------------|
| Junc 108 | 1189 | 3.60 | 1281.81 | 40.21 |
| Junc 183 | 1328 | 3.60 | 1420.83 | 40.22 |
| Junc 234 | 1334 | 3.60 | 1428.55 | 40.97 |
| Junc 208 | 1324 | 3.60 | 1418.98 | 41.16 |
| Junc 155 | 1332 | 3.60 | 1427.00 | 41.16 |
| Junc 143 | 1320 | 0.00 | 1415.11 | 41.21 |
| Junc 256 | 1320 | 3.60 | 1415.12 | 41.22 |
| Junc 153 | 1330 | 3.60 | 1427.10 | 42.07 |
| Junc 211 | 1321 | 3.60 | 1418.65 | 42.31 |
| Junc 243 | 1332 | 3.60 | 1430.01 | 42.47 |
| Junc 187 | 1314 | 3.60 | 1414.75 | 43.65 |
| Junc 232 | 1329 | 0.00 | 1429.77 | 43.67 |
| Junc 244 | 1328 | 3.60 | 1429.92 | 44.16 |
| Junc 212 | 1316 | 3.60 | 1418.51 | 44.42 |
| Junc 144 | 1312 | 3.60 | 1415.14 | 44.69 |
| Junc 109 | 1176 | 3.60 | 1279.78 | 44.97 |
| Junc 245 | 1326 | 3.60 | 1429.79 | 44.97 |
| Junc 186 | 1312 | 3.60 | 1415.96 | 45.05 |
| Junc 185 | 1310 | 3.60 | 1416.30 | 46.06 |
| Junc 140 | 1308 | 0.00 | 1415.14 | 46.42 |
| Junc 110 | 1172 | 3.60 | 1279.16 | 46.43 |
| Junc 111 | 1171 | 3.60 | 1279.15 | 46.86 |
| Junc 119 | 1221 | 0.00 | 1329.33 | 46.94 |
| Junc 229 | 1320 | 0.00 | 1428.61 | 47.06 |
| Junc 188 | 1302 | 3.60 | 1414.12 | 48.58 |
| Junc 90 | 1206 | 1.80 | 1318.13 | 48.59 |
| Junc 117 | 1216 | 0.00 | 1329.12 | 49.02 |

| Node ID | Elevation ft | Demand GPM | Head ft | Pressure psi |
|----------|-----------------|---------------|------------|-----------------|
| Junc 227 | 1312 | 3.60 | 1425.83 | 49.32 |
| Junc 189 | 1300 | 3.60 | 1413.97 | 49.38 |
| Junc 213 | 1304 | 3.60 | 1418.42 | 49.58 |
| Junc 214 | 1304 | 1.80 | 1418.43 | 49.58 |
| Junc 120 | 1214 | 1.80 | 1328.95 | 49.81 |
| Junc 200 | 1214 | 0.00 | 1328.95 | 49.81 |
| Junc 89 | 1202 | 3.60 | 1318.13 | 50.32 |
| Junc 88 | 1202 | 3.60 | 1318.24 | 50.37 |
| Junc 133 | 1294 | 3.60 | 1412.72 | 51.44 |
| Junc 116 | 1210 | 0.00 | 1328.97 | 51.55 |
| Junc 207 | 1300 | 3.60 | 1419.01 | 51.57 |
| Junc 40 | 1206 | 3.60 | 1325.08 | 51.60 |
| Junc 118 | 1210 | 1.80 | 1329.12 | 51.62 |
| Junc 87 | 1198 | 3.60 | 1318.28 | 52.12 |
| Junc 230 | 1306 | 3.60 | 1427.62 | 52.70 |
| Junc 41 | 1204 | 3.60 | 1325.68 | 52.72 |
| Junc 134 | 1292 | 0.00 | 1413.85 | 52.80 |
| Junc 42 | 1204 | 3.60 | 1326.43 | 53.05 |
| Junc 115 | 1206 | 1.80 | 1328.92 | 53.26 |
| Junc 202 | 1296 | 0.00 | 1419.02 | 53.31 |
| Junc 37 | 1200 | 3.60 | 1324.26 | 53.84 |
| Junc 38 | 1200 | 1.80 | 1324.51 | 53.95 |
| Junc 39 | 1200 | 0.00 | 1324.59 | 53.98 |
| Junc 201 | 1294 | 1.80 | 1419.03 | 54.18 |
| Junc 248 | 1204 | 0.00 | 1329.12 | 54.22 |
| Junc 36 | 1199 | 3.60 | 1324.22 | 54.26 |
| Junc 85 | 1194 | 3.60 | 1319.86 | 54.54 |

| Node ID | Elevation ft | Demand GPM | Head ft | Pressure psi |
|----------|-----------------|---------------|------------|-----------------|
| Junc 43 | 1202 | 3.60 | 1328.57 | 54.84 |
| Junc 44 | 1202 | 3.60 | 1328.57 | 54.84 |
| Junc 91 | 1192 | 3.60 | 1318.93 | 55.00 |
| Junc 86 | 1192 | 0.00 | 1318.99 | 55.02 |
| Junc 225 | 1296 | 3.60 | 1423.55 | 55.27 |
| Junc 130 | 1286 | 1.80 | 1413.89 | 55.41 |
| Junc 228 | 1298 | 3.60 | 1426.14 | 55.52 |
| Junc 93 | 1190 | 1.80 | 1318.92 | 55.86 |
| Junc 231 | 1298 | 3.60 | 1427.52 | 56.12 |
| Junc 129 | 1284 | 0.00 | 1414.03 | 56.34 |
| Junc 132 | 1281 | 3.60 | 1411.80 | 56.67 |
| Junc 35 | 1193 | 3.60 | 1323.81 | 56.68 |
| Junc 224 | 1290 | 3.60 | 1421.59 | 57.02 |
| Junc 82 | 1190 | 3.60 | 1321.68 | 57.06 |
| Junc 128 | 1282 | 1.80 | 1414.07 | 57.23 |
| Junc 203 | 1286 | 1.80 | 1418.47 | 57.40 |
| Junc 81 | 1188 | 1.80 | 1321.43 | 57.82 |
| Junc 127 | 1280 | 1.80 | 1414.12 | 58.11 |
| Junc 204 | 1284 | 3.60 | 1418.17 | 58.14 |
| Junc 79 | 1186 | 1.80 | 1320.69 | 58.36 |
| Junc 78 | 1186 | 7.20 | 1320.70 | 58.37 |
| Junc 34 | 1189 | 3.60 | 1323.80 | 58.41 |
| Junc 83 | 1187 | 0.00 | 1321.87 | 58.44 |
| Junc 84 | 1187 | 3.60 | 1321.98 | 58.49 |
| Junc 45 | 1193 | 3.60 | 1328.61 | 58.76 |
| Junc 46 | 1192 | 3.60 | 1328.71 | 59.24 |
| Junc 55 | 1186 | 3.60 | 1322.90 | 59.32 |

| Node ID | Elevation ft | Demand GPM | Head ft | Pressure psi |
|----------|-----------------|---------------|------------|-----------------|
| Junc 260 | 1277 | 0.00 | 1415.24 | 59.90 |
| Junc 80 | 1183 | 3.60 | 1321.25 | 59.90 |
| Junc 131 | 1275 | 3.60 | 1413.57 | 60.04 |
| Junc 226 | 1285 | 3.60 | 1423.83 | 60.16 |
| Junc 77 | 1181 | 0.00 | 1321.06 | 60.69 |
| Junc 75 | 1181 | 1.80 | 1321.08 | 60.70 |
| Junc 21 | 1183 | 3.60 | 1323.11 | 60.71 |
| Junc 95 | 1183 | 0.00 | 1323.39 | 60.83 |
| Junc 23 | 1183 | 1.80 | 1323.51 | 60.88 |
| Junc 126 | 1273 | 3.60 | 1414.18 | 61.17 |
| Junc 136 | 1270 | 3.60 | 1411.33 | 61.24 |
| Junc 12 | 1173 | 3.60 | 1314.97 | 61.52 |
| Junc 54 | 1181 | 3.60 | 1323.12 | 61.58 |
| Junc 47 | 1186 | 3.60 | 1328.83 | 61.89 |
| Junc 146 | 1330 | 0.00 | 1472.88 | 61.91 |
| Junc 48 | 1186 | 0.00 | 1328.98 | 61.95 |
| Junc 76 | 1186 | 0.00 | 1328.99 | 61.96 |
| Junc 24 | 1180 | 3.60 | 1323.85 | 62.33 |
| Junc 53 | 1180 | 3.60 | 1323.90 | 62.35 |
| Junc 205 | 1274 | 3.60 | 1417.91 | 62.35 |
| Junc 50 | 1184 | 1.80 | 1328.19 | 62.48 |
| Junc 125 | 1270 | 1.80 | 1414.20 | 62.48 |
| Junc 20 | 1178 | 3.60 | 1322.63 | 62.67 |
| Junc 25 | 1180 | 3.60 | 1324.70 | 62.70 |
| Junc 199 | 1274 | 1.80 | 1419.07 | 62.86 |
| Junc 11 | 1168 | 3.60 | 1313.39 | 63.00 |
| Junc 135 | 1268 | 3.60 | 1413.51 | 63.05 |

| Node ID | Elevation ft | Demand GPM | Head ft | Pressure psi |
|---------|-----------------|---------------|------------|-----------------|
| Junc 51 | 1183 | 1.80 | 1328.80 | 63.17 |
| Junc 70 | 1174 | 1.80 | 1320.82 | 63.62 |
| Junc 71 | 1174 | 0.00 | 1320.84 | 63.63 |
| Junc 13 | 1171 | 3.60 | 1318.05 | 63.72 |
| Junc 52 | 1177 | 3.60 | 1324.12 | 63.75 |
| Junc 14 | 1172 | 1.80 | 1319.12 | 63.75 |
| Junc 10 | 1164 | 3.60 | 1311.33 | 63.84 |
| Junc 16 | 1174 | 3.60 | 1321.58 | 63.95 |
| Junc 74 | 1172 | 10.80 | 1319.63 | 63.97 |
| Junc 8 | 1161 | 3.60 | 1309.02 | 64.14 |
| Junc 72 | 1172 | 3.60 | 1320.07 | 64.16 |
| Junc 26 | 1177 | 3.60 | 1325.42 | 64.31 |
| Junc 69 | 1172 | 3.60 | 1320.81 | 64.48 |
| Junc 73 | 1171 | 1.80 | 1319.92 | 64.53 |
| Junc 6 | 1159 | 3.60 | 1307.97 | 64.55 |
| Junc 27 | 1178 | 3.60 | 1326.99 | 64.56 |
| Junc 18 | 1172 | 3.60 | 1321.06 | 64.59 |
| Junc 9 | 1161 | 3.60 | 1310.32 | 64.70 |
| Junc 7 | 1159 | 3.60 | 1308.55 | 64.80 |
| Junc 4 | 1158 | 3.60 | 1307.61 | 64.83 |
| Junc 5 | 1158 | 3.60 | 1307.76 | 64.89 |
| Junc 15 | 1172 | 3.60 | 1322.33 | 65.14 |
| Junc 3 | 1157 | 3.60 | 1307.58 | 65.25 |
| Junc 68 | 1170 | 3.60 | 1320.78 | 65.33 |
| Junc 19 | 1170 | 1.80 | 1321.05 | 65.45 |
| Junc 17 | 1170 | 3.60 | 1321.21 | 65.52 |
| Junc 56 | 1172 | 3.60 | 1323.39 | 65.60 |

| Node ID | Elevation ft | Demand GPM | Head ft | Pressure psi |
|----------|-----------------|---------------|------------|-----------------|
| Junc 206 | 1266 | 3.60 | 1417.88 | 65.81 |
| Junc 57 | 1170 | 3.60 | 1322.29 | 65.99 |
| Junc 66 | 1168 | 1.80 | 1320.76 | 66.19 |
| Junc 247 | 1172 | 0.00 | 1324.80 | 66.21 |
| Junc 124 | 1261 | 3.60 | 1414.33 | 66.44 |
| Junc 28 | 1174 | 3.60 | 1328.33 | 66.87 |
| Junc 29 | 1174 | 0.00 | 1328.33 | 66.87 |
| Junc 30 | 1173 | 3.60 | 1327.64 | 67.01 |
| Junc 67 | 1166 | 3.60 | 1320.76 | 67.06 |
| Junc 31 | 1172 | 3.60 | 1327.34 | 67.31 |
| Junc 197 | 1264 | 3.60 | 1419.52 | 67.39 |
| Junc 32 | 1171 | 3.60 | 1327.12 | 67.65 |
| Junc 147 | 1164 | 3.60 | 1320.79 | 67.94 |
| Junc 33 | 1169 | 3.60 | 1327.07 | 68.49 |
| Junc 123 | 1256 | 0.00 | 1414.41 | 68.64 |
| Junc 266 | 1168 | 1.80 | 1327.07 | 68.93 |
| Junc 137 | 1250 | 3.60 | 1410.94 | 69.74 |
| Junc 246 | 1146 | 0.00 | 1307.58 | 70.01 |
| Junc 198 | 1256 | 3.60 | 1419.57 | 70.88 |
| Junc 58 | 1154 | 3.60 | 1320.75 | 72.25 |
| Junc 138 | 1244 | 3.60 | 1410.82 | 72.28 |
| Junc 190 | 1250 | 0.00 | 1417.05 | 72.38 |
| Junc 191 | 1250 | 1.80 | 1417.12 | 72.41 |
| Junc 196 | 1252 | 3.60 | 1419.13 | 72.42 |
| Junc 59 | 1150 | 3.60 | 1320.71 | 73.97 |
| Junc 192 | 1246 | 0.00 | 1417.53 | 74.32 |
| Junc 61 | 1148 | 3.60 | 1320.70 | 74.83 |

| Node ID | Elevation ft | Demand GPM | Head ft | Pressure psi |
|----------|-----------------|---------------|------------|-----------------|
| Junc 60 | 1148 | 3.60 | 1320.70 | 74.83 |
| Junc 62 | 1146 | 3.60 | 1320.70 | 75.70 |
| Junc 63 | 1146 | 3.60 | 1320.70 | 75.70 |
| Junc 64 | 1145 | 0.00 | 1320.71 | 76.14 |
| Junc 65 | 1145 | 1.80 | 1320.73 | 76.14 |
| Junc 195 | 1238 | 3.60 | 1418.84 | 78.36 |
| Junc 94 | 1136 | 1.80 | 1320.71 | 80.04 |
| Junc 194 | 1232 | 0.00 | 1418.46 | 80.79 |

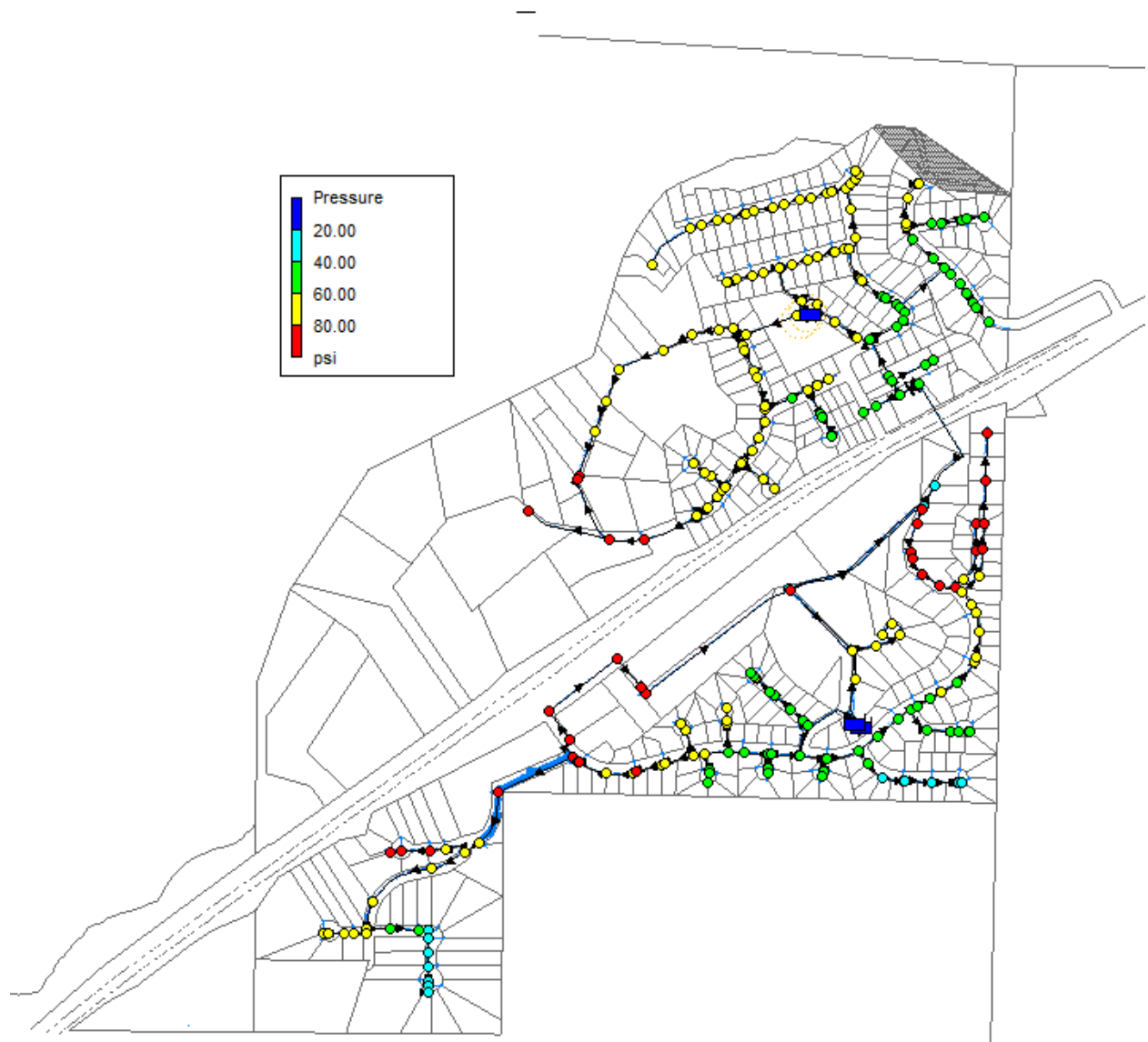


Figure 2 – Scenario 2: Multiplier of 0.4 gpm/node, 150 gpm distributed evenly across all nodes

Scenario 2

Network Table - Nodes

| Node ID | Elevation ft | Demand GPM | Head ft | Pressure psi |
|----------------------|-----------------|---------------|------------|-----------------|
| Resvr BoosterStation | 1473.2 | -73.60 | 1473.20 | 0.00 |
| Resvr Wells | 1329 | 0.00 | 1329.00 | 0.00 |
| Resvr Reservoirs | 1334 | -77.20 | 1334.00 | 0.00 |
| Junc 49 | 1330 | 0.00 | 1334.00 | 1.73 |
| Junc 139 | 1277 | 0.00 | 1333.42 | 24.45 |
| Junc 268 | 1410 | 0.40 | 1469.85 | 25.93 |
| Junc 223 | 1406 | 0.40 | 1469.85 | 27.67 |
| Junc 222 | 1406 | 0.80 | 1469.85 | 27.67 |
| Junc 172 | 1403 | 0.80 | 1470.07 | 29.06 |
| Junc 170 | 1401 | 0.80 | 1470.07 | 29.93 |
| Junc 221 | 1400 | 0.80 | 1469.85 | 30.27 |
| Junc 220 | 1400 | 0.80 | 1469.85 | 30.27 |
| Junc 171 | 1400 | 0.80 | 1470.07 | 30.36 |
| Junc 169 | 1394 | 0.80 | 1470.10 | 32.97 |
| Junc 167 | 1394 | 0.80 | 1470.18 | 33.01 |
| Junc 122 | 1256 | 0.00 | 1332.85 | 33.30 |
| Junc 168 | 1392 | 0.80 | 1470.10 | 33.84 |
| Junc 219 | 1388 | 0.80 | 1469.85 | 35.47 |
| Junc 218 | 1388 | 0.80 | 1469.85 | 35.47 |
| Junc 121 | 1248 | 0.80 | 1332.77 | 36.73 |
| Junc 166 | 1384 | 0.80 | 1470.19 | 37.34 |
| Junc 217 | 1380 | 0.80 | 1469.85 | 38.93 |
| Junc 165 | 1380 | 0.80 | 1470.31 | 39.13 |
| Junc 216 | 1371 | 0.80 | 1469.85 | 42.83 |
| Junc 157 | 1372 | 0.00 | 1471.22 | 42.99 |
| Junc 156 | 1372 | 0.00 | 1471.23 | 43.00 |

| Node ID | Elevation ft | Demand GPM | Head ft | Pressure psi |
|----------|-----------------|---------------|------------|-----------------|
| Junc 161 | 1368 | 0.80 | 1470.86 | 44.57 |
| Junc 159 | 1368 | 0.80 | 1470.87 | 44.57 |
| Junc 164 | 1366 | 0.80 | 1470.46 | 45.26 |
| Junc 241 | 1366 | 0.80 | 1470.93 | 45.47 |
| Junc 173 | 1364 | 0.80 | 1470.49 | 46.14 |
| Junc 163 | 1364 | 0.00 | 1470.60 | 46.19 |
| Junc 160 | 1364 | 0.80 | 1470.87 | 46.30 |
| Junc 238 | 1364 | 0.00 | 1470.97 | 46.35 |
| Junc 239 | 1364 | 0.80 | 1471.00 | 46.36 |
| Junc 179 | 1362 | 0.80 | 1470.22 | 46.89 |
| Junc 114 | 1221 | 0.80 | 1329.52 | 47.02 |
| Junc 177 | 1361 | 0.80 | 1470.24 | 47.33 |
| Junc 242 | 1360 | 0.40 | 1470.93 | 48.07 |
| Junc 180 | 1359 | 0.80 | 1470.22 | 48.19 |
| Junc 119 | 1221 | 0.00 | 1332.34 | 48.24 |
| Junc 112 | 1218 | 0.80 | 1329.54 | 48.33 |
| Junc 178 | 1358 | 0.40 | 1470.23 | 48.63 |
| Junc 240 | 1358 | 0.80 | 1470.93 | 48.93 |
| Junc 162 | 1356 | 0.80 | 1470.90 | 49.78 |
| Junc 158 | 1356 | 0.00 | 1470.92 | 49.80 |
| Junc 113 | 1214 | 0.80 | 1329.53 | 50.06 |
| Junc 117 | 1216 | 0.00 | 1332.26 | 50.37 |
| Junc 176 | 1354 | 0.80 | 1470.27 | 50.38 |
| Junc 99 | 1212 | 0.80 | 1329.60 | 50.96 |
| Junc 120 | 1214 | 0.40 | 1332.20 | 51.22 |
| Junc 200 | 1214 | 0.00 | 1332.20 | 51.22 |
| Junc 267 | 1352 | 0.40 | 1471.18 | 51.64 |

| Node ID | Elevation ft | Demand GPM | Head ft | Pressure psi |
|----------|-----------------|---------------|------------|-----------------|
| Junc 236 | 1350 | 0.80 | 1470.43 | 52.18 |
| Junc 149 | 1350 | 0.40 | 1471.06 | 52.45 |
| Junc 98 | 1208 | 0.40 | 1329.68 | 52.73 |
| Junc 237 | 1349 | 0.80 | 1470.78 | 52.77 |
| Junc 215 | 1348 | 0.80 | 1469.85 | 52.80 |
| Junc 116 | 1210 | 0.00 | 1332.20 | 52.95 |
| Junc 118 | 1210 | 0.40 | 1332.26 | 52.97 |
| Junc 148 | 1348 | 0.40 | 1471.19 | 53.38 |
| Junc 107 | 1204 | 1.60 | 1328.32 | 53.87 |
| Junc 152 | 1346 | 0.80 | 1470.46 | 53.93 |
| Junc 97 | 1205 | 0.80 | 1329.83 | 54.09 |
| Junc 90 | 1206 | 0.40 | 1330.84 | 54.09 |
| Junc 40 | 1206 | 0.80 | 1331.75 | 54.49 |
| Junc 96 | 1204 | 0.00 | 1329.85 | 54.53 |
| Junc 115 | 1206 | 0.40 | 1332.18 | 54.68 |
| Junc 106 | 1202 | 0.80 | 1328.35 | 54.75 |
| Junc 150 | 1343 | 0.80 | 1470.78 | 55.37 |
| Junc 41 | 1204 | 0.80 | 1331.80 | 55.38 |
| Junc 42 | 1204 | 0.80 | 1331.86 | 55.40 |
| Junc 248 | 1204 | 0.00 | 1332.26 | 55.57 |
| Junc 105 | 1200 | 0.80 | 1328.38 | 55.63 |
| Junc 174 | 1342 | 0.80 | 1470.39 | 55.63 |
| Junc 233 | 1342 | 0.00 | 1470.67 | 55.75 |
| Junc 89 | 1202 | 0.80 | 1330.84 | 55.82 |
| Junc 88 | 1202 | 0.80 | 1330.84 | 55.83 |
| Junc 151 | 1341 | 0.80 | 1470.51 | 56.12 |
| Junc 184 | 1340 | 0.80 | 1469.84 | 56.26 |

| Node ID | Elevation ft | Demand GPM | Head ft | Pressure psi |
|----------|-----------------|---------------|------------|-----------------|
| Junc 44 | 1202 | 0.80 | 1332.04 | 56.35 |
| Junc 43 | 1202 | 0.80 | 1332.05 | 56.35 |
| Junc 182 | 1340 | 0.80 | 1470.08 | 56.36 |
| Junc 235 | 1340 | 0.80 | 1470.44 | 56.52 |
| Junc 100 | 1199 | 0.80 | 1329.62 | 56.60 |
| Junc 104 | 1197 | 0.80 | 1328.56 | 57.00 |
| Junc 37 | 1200 | 0.80 | 1331.66 | 57.05 |
| Junc 38 | 1200 | 0.40 | 1331.69 | 57.06 |
| Junc 39 | 1200 | 0.00 | 1331.70 | 57.07 |
| Junc 154 | 1338 | 0.80 | 1470.35 | 57.35 |
| Junc 36 | 1199 | 0.80 | 1331.66 | 57.48 |
| Junc 87 | 1198 | 0.80 | 1330.84 | 57.56 |
| Junc 103 | 1195 | 0.80 | 1328.66 | 57.92 |
| Junc 181 | 1336 | 0.80 | 1470.24 | 58.17 |
| Junc 175 | 1336 | 0.00 | 1470.34 | 58.21 |
| Junc 101 | 1194 | 0.80 | 1329.25 | 58.60 |
| Junc 234 | 1334 | 0.80 | 1470.45 | 59.12 |
| Junc 85 | 1194 | 0.80 | 1330.94 | 59.34 |
| Junc 155 | 1332 | 0.80 | 1470.35 | 59.95 |
| Junc 243 | 1332 | 0.80 | 1470.54 | 60.03 |
| Junc 35 | 1193 | 0.80 | 1331.61 | 60.06 |
| Junc 91 | 1192 | 0.80 | 1330.88 | 60.18 |
| Junc 86 | 1192 | 0.00 | 1330.89 | 60.18 |
| Junc 45 | 1193 | 0.80 | 1331.95 | 60.21 |
| Junc 102 | 1190 | 0.00 | 1329.10 | 60.27 |
| Junc 46 | 1192 | 0.80 | 1331.80 | 60.57 |
| Junc 108 | 1189 | 0.80 | 1329.06 | 60.69 |

| Node ID | Elevation ft | Demand GPM | Head ft | Pressure psi |
|----------|-----------------|---------------|------------|-----------------|
| Junc 153 | 1330 | 0.80 | 1470.36 | 60.82 |
| Junc 93 | 1190 | 0.40 | 1330.88 | 61.05 |
| Junc 82 | 1190 | 0.80 | 1331.05 | 61.12 |
| Junc 232 | 1329 | 0.00 | 1470.52 | 61.32 |
| Junc 210 | 1328 | 0.00 | 1469.85 | 61.47 |
| Junc 209 | 1328 | 0.00 | 1469.85 | 61.47 |
| Junc 183 | 1328 | 0.80 | 1469.97 | 61.52 |
| Junc 244 | 1328 | 0.80 | 1470.53 | 61.76 |
| Junc 34 | 1189 | 0.80 | 1331.61 | 61.79 |
| Junc 81 | 1188 | 0.40 | 1331.04 | 61.98 |
| Junc 146 | 1330 | 0.00 | 1473.18 | 62.04 |
| Junc 83 | 1187 | 0.00 | 1331.07 | 62.42 |
| Junc 84 | 1187 | 0.80 | 1331.07 | 62.43 |
| Junc 245 | 1326 | 0.80 | 1470.52 | 62.62 |
| Junc 79 | 1186 | 0.40 | 1330.99 | 62.83 |
| Junc 78 | 1186 | 1.60 | 1330.99 | 62.83 |
| Junc 55 | 1186 | 0.80 | 1331.13 | 62.88 |
| Junc 76 | 1186 | 0.00 | 1331.50 | 63.05 |
| Junc 48 | 1186 | 0.00 | 1331.50 | 63.05 |
| Junc 142 | 1324 | 0.80 | 1469.62 | 63.10 |
| Junc 141 | 1324 | 0.80 | 1469.62 | 63.10 |
| Junc 47 | 1186 | 0.80 | 1331.65 | 63.11 |
| Junc 208 | 1324 | 0.80 | 1469.85 | 63.20 |
| Junc 50 | 1184 | 0.40 | 1331.46 | 63.89 |
| Junc 80 | 1183 | 0.80 | 1331.03 | 64.14 |
| Junc 51 | 1183 | 0.40 | 1331.50 | 64.35 |
| Junc 21 | 1183 | 0.80 | 1331.53 | 64.36 |

| Node ID | Elevation ft | Demand GPM | Head ft | Pressure psi |
|----------|-----------------|---------------|------------|-----------------|
| Junc 23 | 1183 | 0.40 | 1331.54 | 64.36 |
| Junc 95 | 1183 | 0.00 | 1331.55 | 64.37 |
| Junc 211 | 1321 | 0.80 | 1469.83 | 64.49 |
| Junc 143 | 1320 | 0.00 | 1469.62 | 64.83 |
| Junc 256 | 1320 | 0.80 | 1469.62 | 64.83 |
| Junc 77 | 1181 | 0.00 | 1331.02 | 65.00 |
| Junc 75 | 1181 | 0.40 | 1331.02 | 65.00 |
| Junc 54 | 1181 | 0.80 | 1331.14 | 65.06 |
| Junc 229 | 1320 | 0.00 | 1470.45 | 65.19 |
| Junc 53 | 1180 | 0.80 | 1331.19 | 65.51 |
| Junc 25 | 1180 | 0.80 | 1331.50 | 65.65 |
| Junc 24 | 1180 | 0.80 | 1331.52 | 65.65 |
| Junc 109 | 1176 | 0.80 | 1328.94 | 66.27 |
| Junc 27 | 1178 | 0.80 | 1331.50 | 66.51 |
| Junc 20 | 1178 | 0.80 | 1331.50 | 66.51 |
| Junc 212 | 1316 | 0.80 | 1469.83 | 66.65 |
| Junc 52 | 1177 | 0.80 | 1331.20 | 66.82 |
| Junc 26 | 1177 | 0.80 | 1331.50 | 66.94 |
| Junc 187 | 1314 | 0.80 | 1469.59 | 67.42 |
| Junc 110 | 1172 | 0.80 | 1328.90 | 67.98 |
| Junc 70 | 1174 | 0.40 | 1331.00 | 68.03 |
| Junc 71 | 1174 | 0.00 | 1331.00 | 68.03 |
| Junc 16 | 1174 | 0.80 | 1331.44 | 68.22 |
| Junc 28 | 1174 | 0.80 | 1331.50 | 68.24 |
| Junc 29 | 1174 | 0.00 | 1331.50 | 68.24 |
| Junc 144 | 1312 | 0.80 | 1469.62 | 68.30 |
| Junc 186 | 1312 | 0.80 | 1469.67 | 68.32 |

| Node ID | Elevation ft | Demand GPM | Head ft | Pressure psi |
|----------|-----------------|---------------|------------|-----------------|
| Junc 111 | 1171 | 0.80 | 1328.90 | 68.42 |
| Junc 12 | 1173 | 0.80 | 1331.03 | 68.47 |
| Junc 227 | 1312 | 0.80 | 1470.28 | 68.58 |
| Junc 30 | 1173 | 0.80 | 1331.45 | 68.66 |
| Junc 74 | 1172 | 2.40 | 1330.93 | 68.86 |
| Junc 72 | 1172 | 0.80 | 1330.95 | 68.88 |
| Junc 69 | 1172 | 0.80 | 1331.00 | 68.89 |
| Junc 56 | 1172 | 0.80 | 1331.16 | 68.96 |
| Junc 247 | 1172 | 0.00 | 1331.25 | 69.00 |
| Junc 14 | 1172 | 0.40 | 1331.29 | 69.02 |
| Junc 18 | 1172 | 0.80 | 1331.41 | 69.07 |
| Junc 31 | 1172 | 0.80 | 1331.43 | 69.08 |
| Junc 15 | 1172 | 0.80 | 1331.49 | 69.11 |
| Junc 185 | 1310 | 0.80 | 1469.69 | 69.19 |
| Junc 73 | 1171 | 0.40 | 1330.95 | 69.30 |
| Junc 13 | 1171 | 0.80 | 1331.22 | 69.42 |
| Junc 32 | 1171 | 0.80 | 1331.42 | 69.51 |
| Junc 68 | 1170 | 0.80 | 1331.00 | 69.76 |
| Junc 57 | 1170 | 0.80 | 1331.09 | 69.80 |
| Junc 19 | 1170 | 0.40 | 1331.41 | 69.94 |
| Junc 17 | 1170 | 0.80 | 1331.42 | 69.94 |
| Junc 140 | 1308 | 0.00 | 1469.62 | 70.03 |
| Junc 33 | 1169 | 0.80 | 1331.42 | 70.38 |
| Junc 11 | 1168 | 0.80 | 1330.93 | 70.60 |
| Junc 66 | 1168 | 0.40 | 1331.00 | 70.63 |
| Junc 266 | 1168 | 0.40 | 1331.42 | 70.81 |
| Junc 230 | 1306 | 0.80 | 1470.39 | 71.23 |

| Node ID | Elevation ft | Demand GPM | Head ft | Pressure psi |
|----------|-----------------|---------------|------------|-----------------|
| Junc 67 | 1166 | 0.80 | 1331.00 | 71.49 |
| Junc 213 | 1304 | 0.80 | 1469.82 | 71.85 |
| Junc 214 | 1304 | 0.40 | 1469.82 | 71.85 |
| Junc 10 | 1164 | 0.80 | 1330.81 | 72.28 |
| Junc 147 | 1164 | 0.80 | 1331.00 | 72.36 |
| Junc 188 | 1302 | 0.80 | 1469.56 | 72.60 |
| Junc 189 | 1300 | 0.80 | 1469.55 | 73.46 |
| Junc 8 | 1161 | 0.80 | 1330.66 | 73.52 |
| Junc 9 | 1161 | 0.80 | 1330.74 | 73.55 |
| Junc 207 | 1300 | 0.80 | 1469.86 | 73.60 |
| Junc 6 | 1159 | 0.80 | 1330.60 | 74.35 |
| Junc 7 | 1159 | 0.80 | 1330.63 | 74.37 |
| Junc 228 | 1298 | 0.80 | 1470.30 | 74.66 |
| Junc 231 | 1298 | 0.80 | 1470.38 | 74.69 |
| Junc 4 | 1158 | 0.80 | 1330.58 | 74.78 |
| Junc 5 | 1158 | 0.80 | 1330.59 | 74.78 |
| Junc 3 | 1157 | 0.80 | 1330.58 | 75.21 |
| Junc 202 | 1296 | 0.00 | 1469.86 | 75.33 |
| Junc 225 | 1296 | 0.80 | 1470.14 | 75.45 |
| Junc 133 | 1294 | 0.80 | 1469.47 | 76.03 |
| Junc 201 | 1294 | 0.40 | 1469.86 | 76.20 |
| Junc 58 | 1154 | 0.80 | 1331.00 | 76.69 |
| Junc 134 | 1292 | 0.00 | 1469.54 | 76.93 |
| Junc 224 | 1290 | 0.80 | 1470.02 | 78.00 |
| Junc 59 | 1150 | 0.80 | 1330.99 | 78.42 |
| Junc 61 | 1148 | 0.80 | 1330.99 | 79.29 |
| Junc 60 | 1148 | 0.80 | 1330.99 | 79.29 |

| Node ID | Elevation ft | Demand GPM | Head ft | Pressure psi |
|----------|-----------------|---------------|------------|-----------------|
| Junc 130 | 1286 | 0.40 | 1469.54 | 79.53 |
| Junc 203 | 1286 | 0.40 | 1469.82 | 79.65 |
| Junc 246 | 1146 | 0.00 | 1330.58 | 79.98 |
| Junc 63 | 1146 | 0.80 | 1330.99 | 80.16 |
| Junc 62 | 1146 | 0.80 | 1330.99 | 80.16 |
| Junc 226 | 1285 | 0.80 | 1470.15 | 80.23 |
| Junc 129 | 1284 | 0.00 | 1469.55 | 80.40 |
| Junc 204 | 1284 | 0.80 | 1469.80 | 80.51 |
| Junc 64 | 1145 | 0.00 | 1330.99 | 80.59 |
| Junc 65 | 1145 | 0.40 | 1331.00 | 80.59 |
| Junc 128 | 1282 | 0.40 | 1469.55 | 81.27 |
| Junc 132 | 1281 | 0.80 | 1469.41 | 81.64 |
| Junc 127 | 1280 | 0.40 | 1469.56 | 82.13 |
| Junc 260 | 1277 | 0.00 | 1469.62 | 83.46 |
| Junc 131 | 1275 | 0.80 | 1469.52 | 84.29 |
| Junc 94 | 1136 | 0.40 | 1330.99 | 84.49 |
| Junc 205 | 1274 | 0.80 | 1469.79 | 84.84 |
| Junc 199 | 1274 | 0.40 | 1469.86 | 84.87 |
| Junc 126 | 1273 | 0.80 | 1469.56 | 85.17 |
| Junc 136 | 1270 | 0.80 | 1469.38 | 86.39 |
| Junc 125 | 1270 | 0.40 | 1469.56 | 86.47 |
| Junc 135 | 1268 | 0.80 | 1469.52 | 87.32 |
| Junc 206 | 1266 | 0.80 | 1469.79 | 88.30 |
| Junc 197 | 1264 | 0.80 | 1469.89 | 89.21 |
| Junc 124 | 1261 | 0.80 | 1469.57 | 90.37 |
| Junc 123 | 1256 | 0.00 | 1469.57 | 92.54 |
| Junc 198 | 1256 | 0.80 | 1469.89 | 92.68 |

| Node ID | Elevation ft | Demand GPM | Head ft | Pressure psi |
|----------|-----------------|---------------|------------|-----------------|
| Junc 196 | 1252 | 0.80 | 1469.86 | 94.40 |
| Junc 137 | 1250 | 0.80 | 1469.36 | 95.05 |
| Junc 190 | 1250 | 0.00 | 1469.74 | 95.21 |
| Junc 191 | 1250 | 0.40 | 1469.74 | 95.21 |
| Junc 192 | 1246 | 0.00 | 1469.77 | 96.96 |
| Junc 138 | 1244 | 0.80 | 1469.35 | 97.64 |
| Junc 195 | 1238 | 0.80 | 1469.85 | 100.46 |
| Junc 194 | 1232 | 0.00 | 1469.82 | 103.05 |



Figure 3 – Scenario 3: Multiplier 1.05 gpm/node, pressure at all connections >20 psi

Scenario 3

Network Table - Nodes

| Node ID | Elevation ft | Demand GPM | Head ft | Pressure psi |
|----------------------|-----------------|---------------|------------|-----------------|
| Resvr BoosterStation | 1473.2 | -193.20 | 1473.20 | 0.00 |
| Resvr Reservoirs | 1334 | -124.01 | 1334.00 | 0.00 |
| Resvr Wells | 1329 | -78.64 | 1329.00 | 0.00 |
| Junc 49 | 1330 | 0.00 | 1333.99 | 1.73 |
| Junc 268 | 1410 | 1.05 | 1453.19 | 18.71 |
| Junc 223 | 1406 | 1.05 | 1453.19 | 20.45 |
| Junc 222 | 1406 | 2.10 | 1453.19 | 20.45 |
| Junc 172 | 1403 | 2.10 | 1454.48 | 22.30 |
| Junc 221 | 1400 | 2.10 | 1453.19 | 23.05 |
| Junc 220 | 1400 | 2.10 | 1453.19 | 23.05 |
| Junc 170 | 1401 | 2.10 | 1454.48 | 23.17 |
| Junc 171 | 1400 | 2.10 | 1454.48 | 23.61 |
| Junc 139 | 1277 | 0.00 | 1332.61 | 24.10 |
| Junc 169 | 1394 | 2.10 | 1454.66 | 26.29 |
| Junc 167 | 1394 | 2.10 | 1455.17 | 26.50 |
| Junc 168 | 1392 | 2.10 | 1454.67 | 27.15 |
| Junc 219 | 1388 | 2.10 | 1453.20 | 28.25 |
| Junc 218 | 1388 | 2.10 | 1453.20 | 28.25 |
| Junc 166 | 1384 | 2.10 | 1455.19 | 30.85 |
| Junc 217 | 1380 | 2.10 | 1453.21 | 31.72 |
| Junc 122 | 1256 | 0.00 | 1331.24 | 32.60 |
| Junc 165 | 1380 | 2.10 | 1455.94 | 32.90 |
| Junc 216 | 1371 | 2.10 | 1453.21 | 35.62 |
| Junc 121 | 1248 | 2.10 | 1331.04 | 35.98 |
| Junc 157 | 1372 | 0.00 | 1461.40 | 38.74 |
| Junc 156 | 1372 | 0.00 | 1461.44 | 38.75 |

| Node ID | Elevation ft | Demand GPM | Head ft | Pressure psi |
|----------|-----------------|---------------|------------|-----------------|
| Junc 164 | 1366 | 2.10 | 1456.81 | 39.35 |
| Junc 161 | 1368 | 2.10 | 1459.23 | 39.53 |
| Junc 159 | 1368 | 2.10 | 1459.27 | 39.55 |
| Junc 173 | 1364 | 2.10 | 1457.04 | 40.31 |
| Junc 179 | 1362 | 2.10 | 1455.43 | 40.48 |
| Junc 241 | 1366 | 2.10 | 1459.63 | 40.57 |
| Junc 163 | 1364 | 0.00 | 1457.64 | 40.58 |
| Junc 114 | 1221 | 2.10 | 1314.75 | 40.62 |
| Junc 177 | 1361 | 2.10 | 1455.50 | 40.95 |
| Junc 160 | 1364 | 2.10 | 1459.25 | 41.27 |
| Junc 238 | 1364 | 0.00 | 1459.89 | 41.55 |
| Junc 239 | 1364 | 2.10 | 1460.03 | 41.61 |
| Junc 180 | 1359 | 2.10 | 1455.43 | 41.78 |
| Junc 112 | 1218 | 2.10 | 1314.89 | 41.98 |
| Junc 178 | 1358 | 1.05 | 1455.46 | 42.23 |
| Junc 242 | 1360 | 1.05 | 1459.63 | 43.17 |
| Junc 113 | 1214 | 2.10 | 1314.82 | 43.69 |
| Junc 240 | 1358 | 2.10 | 1459.65 | 44.04 |
| Junc 176 | 1354 | 2.10 | 1455.72 | 44.07 |
| Junc 99 | 1212 | 2.10 | 1315.24 | 44.73 |
| Junc 162 | 1356 | 2.10 | 1459.44 | 44.82 |
| Junc 107 | 1204 | 4.20 | 1307.58 | 44.88 |
| Junc 158 | 1356 | 0.00 | 1459.58 | 44.88 |
| Junc 215 | 1348 | 2.10 | 1453.21 | 45.59 |
| Junc 106 | 1202 | 2.10 | 1307.81 | 45.85 |
| Junc 236 | 1350 | 2.10 | 1456.64 | 46.21 |
| Junc 98 | 1208 | 1.05 | 1315.76 | 46.69 |

| Node ID | Elevation ft | Demand GPM | Head ft | Pressure psi |
|----------|-----------------|---------------|------------|-----------------|
| Junc 105 | 1200 | 2.10 | 1307.98 | 46.79 |
| Junc 119 | 1221 | 0.00 | 1330.01 | 47.23 |
| Junc 267 | 1352 | 1.05 | 1461.14 | 47.29 |
| Junc 237 | 1349 | 2.10 | 1458.77 | 47.56 |
| Junc 149 | 1350 | 1.05 | 1460.41 | 47.84 |
| Junc 152 | 1346 | 2.10 | 1456.81 | 48.02 |
| Junc 97 | 1205 | 2.10 | 1316.65 | 48.38 |
| Junc 104 | 1197 | 2.10 | 1309.01 | 48.53 |
| Junc 96 | 1204 | 0.00 | 1316.74 | 48.85 |
| Junc 184 | 1340 | 2.10 | 1453.11 | 49.01 |
| Junc 148 | 1348 | 1.05 | 1461.21 | 49.05 |
| Junc 117 | 1216 | 0.00 | 1329.82 | 49.32 |
| Junc 174 | 1342 | 2.10 | 1456.43 | 49.58 |
| Junc 182 | 1340 | 2.10 | 1454.56 | 49.64 |
| Junc 103 | 1195 | 2.10 | 1309.66 | 49.68 |
| Junc 200 | 1214 | 0.00 | 1329.69 | 50.13 |
| Junc 120 | 1214 | 1.05 | 1329.69 | 50.13 |
| Junc 150 | 1343 | 2.10 | 1458.72 | 50.14 |
| Junc 233 | 1342 | 0.00 | 1458.11 | 50.31 |
| Junc 151 | 1341 | 2.10 | 1457.13 | 50.32 |
| Junc 100 | 1199 | 2.10 | 1315.37 | 50.42 |
| Junc 235 | 1340 | 2.10 | 1456.68 | 50.56 |
| Junc 154 | 1338 | 2.10 | 1456.18 | 51.21 |
| Junc 90 | 1206 | 1.05 | 1325.00 | 51.56 |
| Junc 101 | 1194 | 2.10 | 1313.14 | 51.62 |
| Junc 181 | 1336 | 2.10 | 1455.54 | 51.80 |
| Junc 116 | 1210 | 0.00 | 1329.70 | 51.86 |

| Node ID | Elevation ft | Demand GPM | Head ft | Pressure psi |
|----------|-----------------|---------------|------------|-----------------|
| Junc 118 | 1210 | 1.05 | 1329.82 | 51.92 |
| Junc 175 | 1336 | 0.00 | 1456.12 | 52.05 |
| Junc 40 | 1206 | 2.10 | 1328.01 | 52.87 |
| Junc 102 | 1190 | 0.00 | 1312.25 | 52.97 |
| Junc 234 | 1334 | 2.10 | 1456.74 | 53.18 |
| Junc 89 | 1202 | 2.10 | 1325.00 | 53.30 |
| Junc 88 | 1202 | 2.10 | 1325.04 | 53.31 |
| Junc 108 | 1189 | 2.10 | 1312.05 | 53.32 |
| Junc 115 | 1206 | 1.05 | 1329.65 | 53.58 |
| Junc 155 | 1332 | 2.10 | 1456.17 | 53.80 |
| Junc 41 | 1204 | 2.10 | 1328.23 | 53.83 |
| Junc 42 | 1204 | 2.10 | 1328.52 | 53.95 |
| Junc 209 | 1328 | 0.00 | 1453.21 | 54.26 |
| Junc 210 | 1328 | 0.00 | 1453.21 | 54.26 |
| Junc 243 | 1332 | 2.10 | 1457.28 | 54.29 |
| Junc 248 | 1204 | 0.00 | 1329.82 | 54.52 |
| Junc 183 | 1328 | 2.10 | 1453.90 | 54.55 |
| Junc 153 | 1330 | 2.10 | 1456.21 | 54.69 |
| Junc 87 | 1198 | 2.10 | 1325.05 | 55.05 |
| Junc 44 | 1202 | 2.10 | 1329.33 | 55.17 |
| Junc 43 | 1202 | 2.10 | 1329.34 | 55.17 |
| Junc 37 | 1200 | 2.10 | 1327.69 | 55.33 |
| Junc 38 | 1200 | 1.05 | 1327.78 | 55.37 |
| Junc 142 | 1324 | 2.10 | 1451.79 | 55.37 |
| Junc 141 | 1324 | 2.10 | 1451.79 | 55.37 |
| Junc 39 | 1200 | 0.00 | 1327.82 | 55.38 |
| Junc 232 | 1329 | 0.00 | 1457.20 | 55.55 |

| Node ID | Elevation ft | Demand GPM | Head ft | Pressure psi |
|----------|-----------------|---------------|------------|-----------------|
| Junc 36 | 1199 | 2.10 | 1327.67 | 55.75 |
| Junc 208 | 1324 | 2.10 | 1453.22 | 55.99 |
| Junc 244 | 1328 | 2.10 | 1457.25 | 56.00 |
| Junc 245 | 1326 | 2.10 | 1457.20 | 56.85 |
| Junc 85 | 1194 | 2.10 | 1325.64 | 57.04 |
| Junc 143 | 1320 | 0.00 | 1451.79 | 57.11 |
| Junc 256 | 1320 | 2.10 | 1451.80 | 57.11 |
| Junc 211 | 1321 | 2.10 | 1453.10 | 57.24 |
| Junc 91 | 1192 | 2.10 | 1325.30 | 57.76 |
| Junc 86 | 1192 | 0.00 | 1325.31 | 57.77 |
| Junc 35 | 1193 | 2.10 | 1327.51 | 58.28 |
| Junc 93 | 1190 | 1.05 | 1325.29 | 58.62 |
| Junc 109 | 1176 | 2.10 | 1311.30 | 58.63 |
| Junc 45 | 1193 | 2.10 | 1329.27 | 59.04 |
| Junc 82 | 1190 | 2.10 | 1326.31 | 59.06 |
| Junc 229 | 1320 | 0.00 | 1456.77 | 59.26 |
| Junc 212 | 1316 | 2.10 | 1453.04 | 59.38 |
| Junc 46 | 1192 | 2.10 | 1329.16 | 59.43 |
| Junc 187 | 1314 | 2.10 | 1451.66 | 59.65 |
| Junc 81 | 1188 | 1.05 | 1326.22 | 59.89 |
| Junc 34 | 1189 | 2.10 | 1327.50 | 60.01 |
| Junc 110 | 1172 | 2.10 | 1311.07 | 60.26 |
| Junc 83 | 1187 | 0.00 | 1326.38 | 60.39 |
| Junc 84 | 1187 | 2.10 | 1326.42 | 60.41 |
| Junc 144 | 1312 | 2.10 | 1451.80 | 60.58 |
| Junc 79 | 1186 | 1.05 | 1325.94 | 60.64 |
| Junc 78 | 1186 | 4.20 | 1325.95 | 60.64 |

| Node ID | Elevation ft | Demand GPM | Head ft | Pressure psi |
|----------|-----------------|---------------|------------|-----------------|
| Junc 111 | 1171 | 2.10 | 1311.07 | 60.69 |
| Junc 186 | 1312 | 2.10 | 1452.10 | 60.71 |
| Junc 55 | 1186 | 2.10 | 1326.76 | 60.99 |
| Junc 185 | 1310 | 2.10 | 1452.23 | 61.63 |
| Junc 48 | 1186 | 0.00 | 1329.00 | 61.96 |
| Junc 76 | 1186 | 0.00 | 1329.00 | 61.96 |
| Junc 47 | 1186 | 2.10 | 1329.07 | 61.99 |
| Junc 146 | 1330 | 0.00 | 1473.08 | 62.00 |
| Junc 80 | 1183 | 2.10 | 1326.15 | 62.03 |
| Junc 227 | 1312 | 2.10 | 1455.74 | 62.28 |
| Junc 140 | 1308 | 0.00 | 1451.80 | 62.31 |
| Junc 21 | 1183 | 2.10 | 1327.23 | 62.50 |
| Junc 95 | 1183 | 0.00 | 1327.34 | 62.54 |
| Junc 23 | 1183 | 1.05 | 1327.37 | 62.55 |
| Junc 50 | 1184 | 1.05 | 1328.71 | 62.70 |
| Junc 77 | 1181 | 0.00 | 1326.08 | 62.86 |
| Junc 75 | 1181 | 1.05 | 1326.09 | 62.87 |
| Junc 54 | 1181 | 2.10 | 1326.84 | 63.19 |
| Junc 51 | 1183 | 1.05 | 1328.94 | 63.23 |
| Junc 53 | 1180 | 2.10 | 1327.13 | 63.75 |
| Junc 24 | 1180 | 2.10 | 1327.45 | 63.89 |
| Junc 25 | 1180 | 2.10 | 1327.69 | 63.99 |
| Junc 213 | 1304 | 2.10 | 1453.01 | 64.57 |
| Junc 214 | 1304 | 1.05 | 1453.01 | 64.57 |
| Junc 20 | 1178 | 2.10 | 1327.06 | 64.59 |
| Junc 188 | 1302 | 2.10 | 1451.43 | 64.75 |
| Junc 52 | 1177 | 2.10 | 1327.21 | 65.08 |

| Node ID | Elevation ft | Demand GPM | Head ft | Pressure psi |
|----------|-----------------|---------------|------------|-----------------|
| Junc 27 | 1178 | 2.10 | 1328.37 | 65.15 |
| Junc 230 | 1306 | 2.10 | 1456.40 | 65.17 |
| Junc 26 | 1177 | 2.10 | 1327.90 | 65.38 |
| Junc 12 | 1173 | 2.10 | 1324.24 | 65.53 |
| Junc 189 | 1300 | 2.10 | 1451.37 | 65.59 |
| Junc 70 | 1174 | 1.05 | 1325.99 | 65.86 |
| Junc 71 | 1174 | 0.00 | 1326.00 | 65.86 |
| Junc 16 | 1174 | 2.10 | 1326.67 | 66.15 |
| Junc 207 | 1300 | 2.10 | 1453.23 | 66.39 |
| Junc 74 | 1172 | 6.30 | 1325.55 | 66.53 |
| Junc 72 | 1172 | 2.10 | 1325.71 | 66.60 |
| Junc 14 | 1172 | 1.05 | 1325.77 | 66.63 |
| Junc 69 | 1172 | 2.10 | 1325.99 | 66.72 |
| Junc 13 | 1171 | 2.10 | 1325.37 | 66.89 |
| Junc 18 | 1172 | 2.10 | 1326.48 | 66.94 |
| Junc 73 | 1171 | 1.05 | 1325.66 | 67.01 |
| Junc 28 | 1174 | 2.10 | 1328.78 | 67.07 |
| Junc 29 | 1174 | 0.00 | 1328.78 | 67.07 |
| Junc 56 | 1172 | 2.10 | 1326.94 | 67.13 |
| Junc 15 | 1172 | 2.10 | 1326.95 | 67.14 |
| Junc 247 | 1172 | 0.00 | 1327.46 | 67.36 |
| Junc 30 | 1173 | 2.10 | 1328.53 | 67.39 |
| Junc 11 | 1168 | 2.10 | 1323.65 | 67.44 |
| Junc 68 | 1170 | 2.10 | 1325.97 | 67.58 |
| Junc 31 | 1172 | 2.10 | 1328.42 | 67.77 |
| Junc 19 | 1170 | 1.05 | 1326.48 | 67.80 |
| Junc 57 | 1170 | 2.10 | 1326.53 | 67.82 |

| Node ID | Elevation ft | Demand GPM | Head ft | Pressure psi |
|----------|-----------------|---------------|------------|-----------------|
| Junc 17 | 1170 | 2.10 | 1326.53 | 67.83 |
| Junc 133 | 1294 | 2.10 | 1450.91 | 67.99 |
| Junc 202 | 1296 | 0.00 | 1453.23 | 68.13 |
| Junc 32 | 1171 | 2.10 | 1328.33 | 68.17 |
| Junc 228 | 1298 | 2.10 | 1455.86 | 68.40 |
| Junc 66 | 1168 | 1.05 | 1325.97 | 68.45 |
| Junc 231 | 1298 | 2.10 | 1456.37 | 68.62 |
| Junc 10 | 1164 | 2.10 | 1322.89 | 68.85 |
| Junc 225 | 1296 | 2.10 | 1454.90 | 68.85 |
| Junc 201 | 1294 | 1.05 | 1453.24 | 69.00 |
| Junc 33 | 1169 | 2.10 | 1328.32 | 69.03 |
| Junc 134 | 1292 | 0.00 | 1451.33 | 69.04 |
| Junc 67 | 1166 | 2.10 | 1325.97 | 69.31 |
| Junc 266 | 1168 | 1.05 | 1328.32 | 69.47 |
| Junc 8 | 1161 | 2.10 | 1322.04 | 69.78 |
| Junc 9 | 1161 | 2.10 | 1322.52 | 69.99 |
| Junc 147 | 1164 | 2.10 | 1325.98 | 70.19 |
| Junc 6 | 1159 | 2.10 | 1321.66 | 70.48 |
| Junc 7 | 1159 | 2.10 | 1321.87 | 70.57 |
| Junc 4 | 1158 | 2.10 | 1321.52 | 70.85 |
| Junc 5 | 1158 | 2.10 | 1321.58 | 70.88 |
| Junc 224 | 1290 | 2.10 | 1454.18 | 71.14 |
| Junc 3 | 1157 | 2.10 | 1321.51 | 71.28 |
| Junc 130 | 1286 | 1.05 | 1451.34 | 71.64 |
| Junc 203 | 1286 | 1.05 | 1453.03 | 72.37 |
| Junc 129 | 1284 | 0.00 | 1451.39 | 72.53 |
| Junc 204 | 1284 | 2.10 | 1452.92 | 73.19 |

| Node ID | Elevation ft | Demand GPM | Head ft | Pressure psi |
|----------|-----------------|---------------|------------|-----------------|
| Junc 128 | 1282 | 1.05 | 1451.41 | 73.40 |
| Junc 132 | 1281 | 2.10 | 1450.57 | 73.47 |
| Junc 226 | 1285 | 2.10 | 1455.01 | 73.66 |
| Junc 127 | 1280 | 1.05 | 1451.43 | 74.28 |
| Junc 58 | 1154 | 2.10 | 1325.97 | 74.51 |
| Junc 260 | 1277 | 0.00 | 1451.84 | 75.76 |
| Junc 246 | 1146 | 0.00 | 1321.51 | 76.05 |
| Junc 59 | 1150 | 2.10 | 1325.95 | 76.24 |
| Junc 131 | 1275 | 2.10 | 1451.23 | 76.36 |
| Junc 61 | 1148 | 2.10 | 1325.95 | 77.10 |
| Junc 60 | 1148 | 2.10 | 1325.95 | 77.10 |
| Junc 126 | 1273 | 2.10 | 1451.45 | 77.32 |
| Junc 205 | 1274 | 2.10 | 1452.82 | 77.48 |
| Junc 199 | 1274 | 1.05 | 1453.25 | 77.67 |
| Junc 62 | 1146 | 2.10 | 1325.94 | 77.97 |
| Junc 63 | 1146 | 2.10 | 1325.95 | 77.97 |
| Junc 136 | 1270 | 2.10 | 1450.40 | 78.17 |
| Junc 64 | 1145 | 0.00 | 1325.95 | 78.41 |
| Junc 65 | 1145 | 1.05 | 1325.96 | 78.41 |
| Junc 125 | 1270 | 1.05 | 1451.46 | 78.63 |
| Junc 135 | 1268 | 2.10 | 1451.20 | 79.38 |
| Junc 206 | 1266 | 2.10 | 1452.81 | 80.95 |
| Junc 197 | 1264 | 2.10 | 1453.42 | 82.07 |
| Junc 94 | 1136 | 1.05 | 1325.95 | 82.31 |
| Junc 124 | 1261 | 2.10 | 1451.50 | 82.55 |
| Junc 123 | 1256 | 0.00 | 1451.53 | 84.72 |
| Junc 198 | 1256 | 2.10 | 1453.44 | 85.55 |

| Node ID | Elevation ft | Demand GPM | Head ft | Pressure psi |
|----------|-----------------|---------------|------------|-----------------|
| Junc 137 | 1250 | 2.10 | 1450.26 | 86.77 |
| Junc 196 | 1252 | 2.10 | 1453.27 | 87.21 |
| Junc 190 | 1250 | 0.00 | 1452.50 | 87.75 |
| Junc 191 | 1250 | 1.05 | 1452.53 | 87.76 |
| Junc 138 | 1244 | 2.10 | 1450.21 | 89.35 |
| Junc 192 | 1246 | 0.00 | 1452.68 | 89.56 |
| Junc 195 | 1238 | 2.10 | 1453.17 | 93.23 |
| Junc 194 | 1232 | 0.00 | 1453.02 | 95.77 |