HIGH VALLEY WATER COMPANY
MASTER PLAN REPORT

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Prepared by:

Sunrise Engineering, Inc.
6875 S 900 E
Salt Lake City, Utah 84047
Tel: (801) 523-0100
Fax: (801) 523-0990

Cliff Linford, P.E.
State of Utah,
Principal
Date: 9-15-2021

HIGH VALLEY WATER COMPANY MASTER PLAN
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1 INTRODUCTION

This Culinary Water Master Plan has been prepared for High Valley Water Company. High Valley is located near Summit Park, west of Park City in Summit County.

High Valley Water Company is a non-profit water company established to serve the residents in the area southwest of the Silver Creek Junction in Summit County. The 2020 Utah Public Water Supply Use Form established the population of the neighborhood to be 780 in 252 developed lots. This gives an average of 3.1 residences per lot. With a final buildout of 265 lots and assuming a similar number of residences per lot in the 13 remaining lots, a final build out population is estimated to 820. In 2012, 233 lots had been developed. This leads to an average of 2.4 lots developed per year. Full buildout of the area is expected to be complete in 2026. High Valley Water Company is not expecting any growth or expansion of its boundary beyond buildout.

Water Rates have been analyzed in the formulation of this Plan. Even though a Capital Improvement Plan is not required for High Valley, in addition to the Water Master Plan, this document also provides a Capital Improvement Plan. This plan also determines the proportionate share of costs for improvement or expansion of the system, which are reasonable, related to, and necessary, to provide required levels of service for projected growth.

Figure 1.0 High Valley Area Overview

Table 1.1 High Valley Expected Lot Development and Population

Year	Developed Lots	Population
2012	233	
2020	252	780
2026	265	820

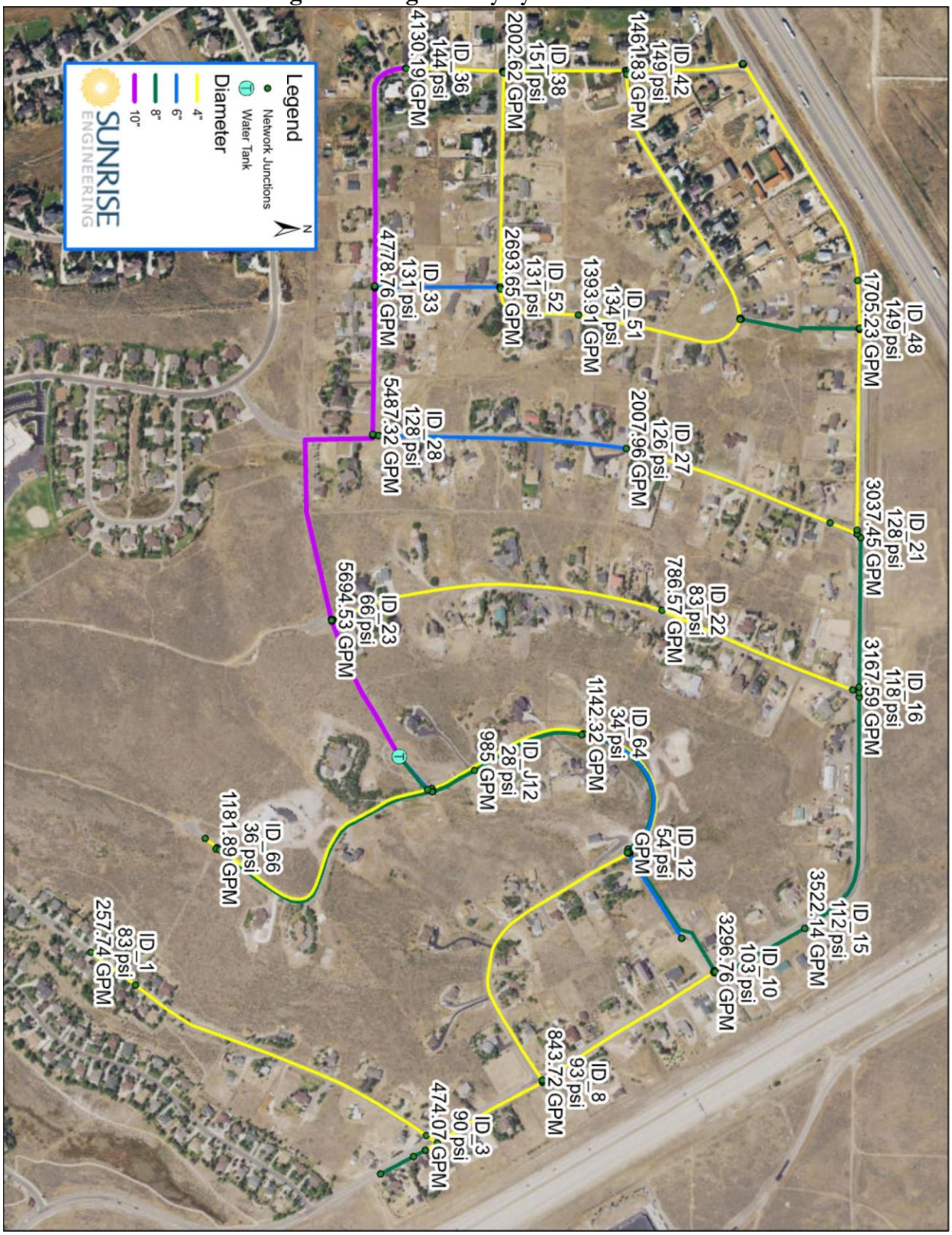
2 HIGH VALLEY WATER SYSTEM OVERVIEW

2.1 System Pressure Zones and System Overview

The system functions as a gravity fed system, with the source and storage at higher elevations within the system. High Valley Water Company owns three wells within the system that are included in their water right, E2846 (35-9434). None of the wells are currently in use. The Unused Well House Well is not active and is not in use. Atkinson #2 Well and High Valley #2 Well were overdrawn and are now experiencing high total suspended solids (TSS) and are currently not in use. If additional water is needed Atkinson #2 Well and High Valley #2 Well can be used by blending their water with Mountain Regional purchased water.

High Valley Water Company has two sources which feed the 500,000-gallon concrete storage reservoir. The two sources are owned by Mountain Regional Water Special Service District and Summit Water. High Valley Water Company purchases water from them. Water is purchased directly from Mountain Regional Water Special Service District and in the form of shares from Summit Water. The water system consists of one pressure zone with pressures ranging from the low of 28 psi to a high of 151 psi. The system has multiple loops and water is conveyed to the customers from the line in the street in front of their house. A map of the system is shown in Figure 2.0.

Figure 2.0 High Valley System Overview



2.2 Water System Facilities and Assets

Every water system is composed of facilities and assets. A basic understanding of the High Valley facilities and assets provides a better understanding of the system as a whole, and what goes into a water system. Water systems are composed of the following basic facilities and assets:

- Water Sources
- Water Storage Facilities
- Water Pipelines
- PRV Stations & Control Vaults

Table 2.2 below shows the specific facilities and assets in the High Valley culinary water distribution system including the pressure zone that they serve. Figure 2.0 shows a map of the major facilities and assets in the High Valley water system.

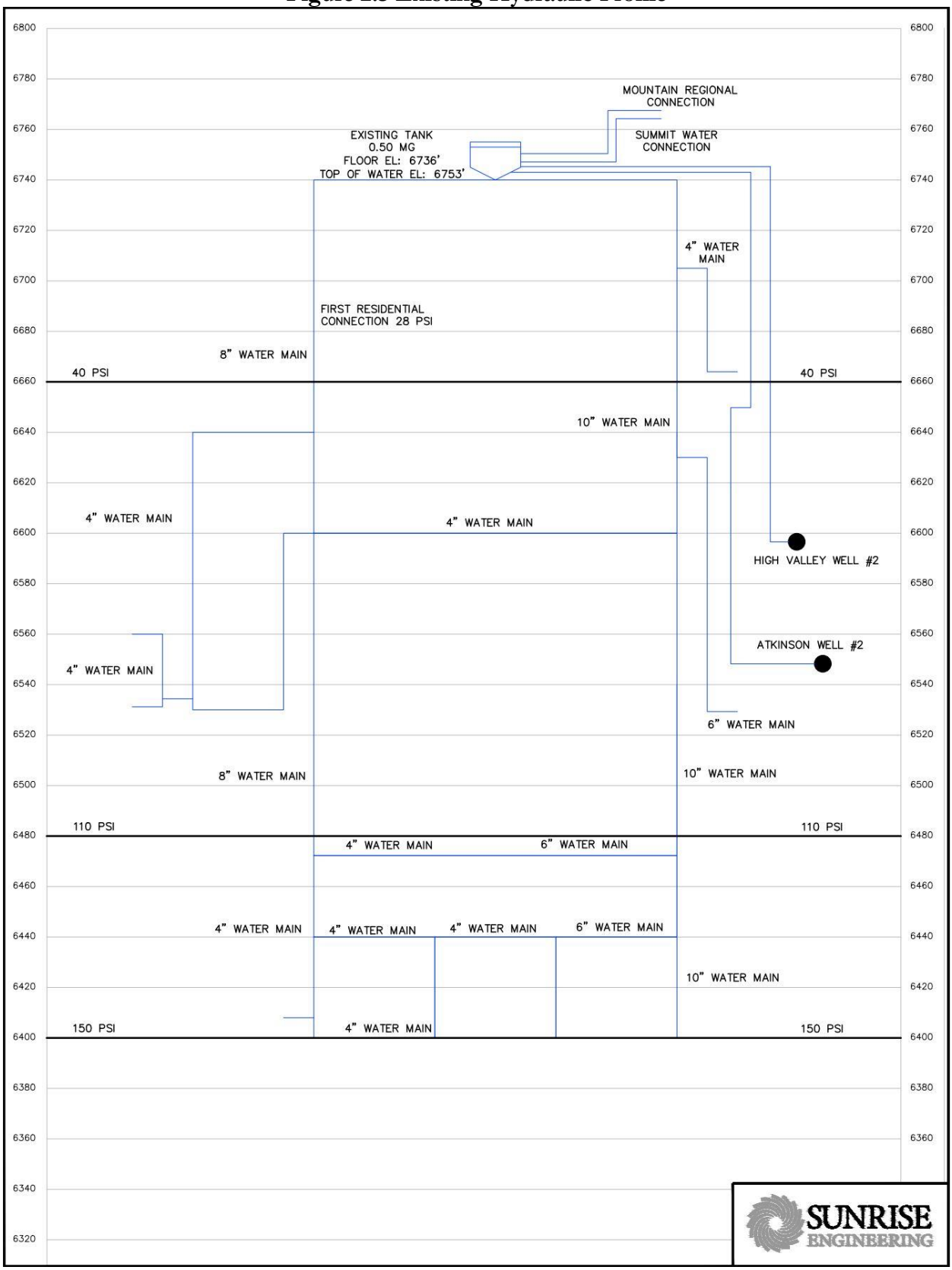
Table 2.2 High Valley Water Company Water System Facilities

High Valley Water Company Water System Facilities				
Tanks	**Size (gal)**	**Elevation (ft)**	**Height (ft)**	**HGL (ft)**
500,000 Gallon Tank	500,000	6,753	17	6753
*17.2% of 500,000 Gallon Tank	86,000	6,770	-	-
Source				
Atkinson #2 Well	75 ac-ft/yr	-	-	-
High Valley #2 Well	210 ac-ft/yr	-	-	-
Mountain Regional				
Summit Water	21 ac-ft/yr			
Distribution System			**Length (ft)**	**Length (Miles)**
Distribution	10"		3,806	0.72
Distribution	8"		7,293	1.38
Distribution	6"		4,106	0.78
Distribution	4"		19,579	3.71
Total Pipe			**34,784**	**6.59**
*** Tank owned and operated by Atkinson (Mountain Regional WSSD)**				

2.3 High Valley Water System Hydraulic Profile Schematic

Figure 2.3 is a hydraulic profile schematic map of High Valley's culinary water system that summarizes all of the key elements in the system and how they interact to provide water for the pressure zones within the system. The key elements include: sources, storage facilities, transmission lines, and pressure zones.

Figure 2.3 Existing Hydraulic Profile



3 CONNECTIONS AND GROWTH

This Master Plan uses a 20-year planning period, beginning in the fiscal year ending June 2021 and running through the fiscal year ending June 2042, to evaluate system improvements. User fees, hook-up fees, and impact fees should be monitored annually as the Company sets budgets and anticipates system improvements and expansion.

In this plan, reference is made to Equivalent Residential Connections (ERC's). One ERC is defined as the amount of culinary water supplied to an average residential connection for indoor use. Because an ERC also relates to the amount of water required for indoor use at the average residential connection, use of this term allows commercial, agricultural, and other large water users to be equated to a residential connection. ERC's are factored into calculations for impact fees, user rates and other analyses where required for design purposes. Because all of the connections within High Valley Water Company's water system are residential connections (no commercial connections), each connection will be viewed as one ERC.

3.1 Existing System Connections

The existing number of culinary connections in 2021, at the time of this report, is 252. It is assumed that this is the number of connections that is served at the start of the planning year and the start of the planning period. The 252 existing connections include 252 residential connections and no "other" connections or commercial connections.

3.2 Projected Future System Connections

After reviewing the development rate and local population data, the data supports the use of a 1.02% growth rate to full buildout. Therefore, a 1.02% annual rate of growth will be used in this master plan.

The 2020 Utah Public Water Supply Use Form established the population of the neighborhood to be 780 in 252 developed lots. This gives an average of 3.1 residences per lot. With a final buildout of 265 lots and assuming a similar number of residences per lot in the 13 remaining lots, a final build out population is estimated to 820. In 2012, 233 lots had been developed. This leads to an average of 2.4 lots developed per year. Full buildout of the area is expected to be complete in 2026. High Valley Water Company is not expecting any growth or expansion of its boundary beyond buildout.

The High Valley Water Company has 265 shares available for connections, 252 of the shares are in use and 13 are inactive. For this Master Plan it is assumed that all the shares will be put in use by the end of the planning period.

Total Projected ERC's = 265 ERCs

4 SYSTEM DEMANDS

Each individual connection in a water system exerts a specific water demand on the system. Individual connections may require more or less water demand, depending on how much water that connection uses. As stated previously, the demand required for each connection is based off of Equivalent Residential Connections (ERC's). This section of the report uses the number of ERC's determined in the previous section to estimate water demand that will be used to evaluate the water system. The demand numbers that are calculated in this section will also be used in other sections to determine source and storage adequacy.

4.1 Existing Demands

The State of Utah Division of Drinking Water (DDW) provides requirements for water systems regarding source sizing. Rule number R309-510-7 states the minimum source sizing requirements. Water sources shall legally (i.e. water rights) and physically meet water demands under two conditions, Peak Day Demand and Average Yearly Demand. Peak Day Demand is defined as the anticipated water demand on the day of highest water consumption. Average Yearly Demand is defined as the source capacity to provide one year's water supply.

The State of Utah Division of Drinking Water provides a peak day demand usage for indoor water usage and average yearly demand, which shall be used as the minimum sizing requirements for peak day demand and average yearly demand for indoor water use unless a public water system has obtained a reduction per R309-510-5 based off of actual historic system usage.

4.1.1 Existing Average Day Demands

For this Culinary Water Master Plan, the existing and proposed water system demands used are based off of existing and projected ERC's, respectively. As mentioned previously, the State of Utah Drinking Water Rules provides a minimum indoor and outdoor usage demand requirement to be used when analyzing water systems unless the system has obtained a reduction per R309-510-5. Prior to using the state minimum requirements, it should be determined whether or not the historical usage data corresponds with the DDW minimum requirements.

Indoor Use:

$$252\ Conns.\ \times 400 \frac{gal}{day\ -ERC} \times \frac{1\ day}{1{,}440\ min} = 70 \frac{gal}{min}$$

The State Rule for outdoor demand is highly variable throughout the year and is related to the amount of land irrigated as well as local climate conditions. According to the State Rule R309-510-7(3), in order to determine outdoor water demand, an *Irrigation Zone* needs to be defined based on the Irrigated Crop Consumptive Use Zone map prepared by the Soil Conservation Service. This map defines High Valley as being irrigation zone 2 (low outside watering requirement). The Utah State Rule R309-510-7(3) provides a table of peak day demand and average yearly demand values for outdoor use for all irrigation zones defined in the Soil Conservation Service map. Based on the table in the State rule, the outdoor average yearly demand for zone 2 is 1.23 acre-ft/irrigated acre. Based on the lot sizes throughout the company and in looking at the 2018-2020 meter read data along with the 2012 Projected Water Rights Use Analysis it was determined to use 0.2 irrigated acres per lot.

Outdoor Use:

$$252\ x\ 0.2 = 50.4\ Irr.\ Acres \times 1.23 \frac{acre - feet}{irrigated\ acre} \times \frac{325{,}851\ gal}{acre - feet} \times \frac{1\ year}{365\ days} \times \frac{1\ day}{1{,}440\ min}$$
$$= 38 \frac{gal}{min}$$

The total average day demand on the system as required by the State rules is determined by adding the indoor and outdoor usage as follows:

$$\textbf{Total Average Day Demand} = 70 \frac{gal}{min} + 38 \frac{gal}{min} = \mathbf{108 \frac{gal}{min}}$$

According to the DDW requirement for Average Day Demand, the High Valley water system should have a minimum average water demand of 108 gpm, which equates to approximately **175 AC-FT per year.**

4.1.2 Existing Peak Day Demands

The State DDW rules define peak day indoor demand for one ERU to be 800 gallons per day, which is double the average day demand.

Indoor Use:

$$252\ Conns. \times 800 \frac{gal}{day\ - ERC} \times \frac{1\ day}{1{,}440\ min} = 140 \frac{gal}{min}$$

For outdoor peak day demand, the demand given in the DDW R309-510-7(3) for zone 2 is 2.80 gpm/irrigated acre. Multiplying this demand with the average irrigated acreage of 0.2 acres equals the peak day outdoor demand.

Outdoor Use:

$$252\ x\ 0.2 = 50.4\ Irr.\ Acres \times 2.80 \frac{gpm}{irrigated\ acre} = 141 \frac{gal}{min}$$

The total peak day demand is determined from adding the indoor and outdoor demand totals as follows:

$$\textbf{Total Peak Day Demand} = 140 \frac{gal}{min} + 141 \frac{gal}{min} = \mathbf{281 \frac{gal}{min}}$$

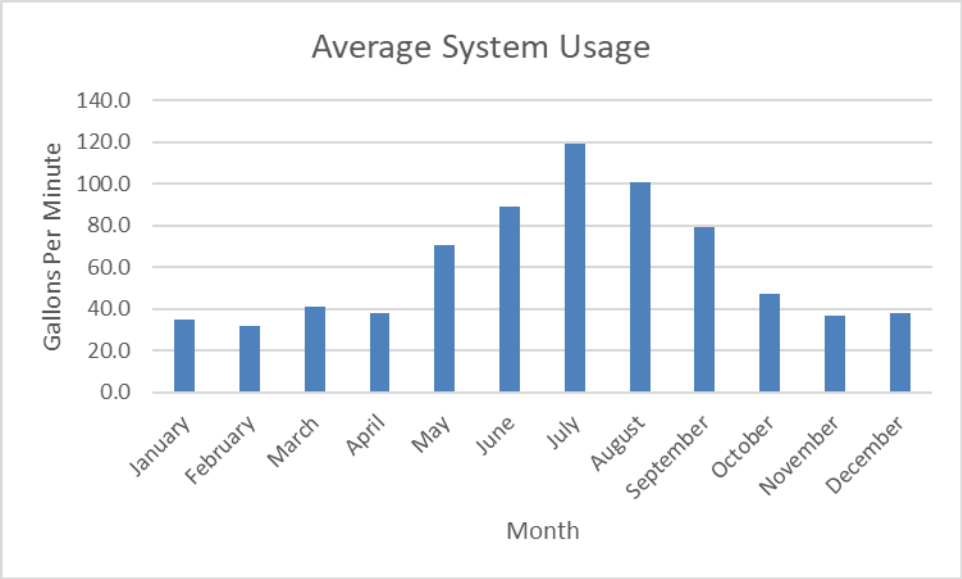
The calculation above shows the peak day demand of the High Valley water system using the DDW rules for indoor and outdoor use should be **281 gallons per minute on a peak day**.

4.1.3 Historical Usage

The 2020 meter reads were totaled for the High Valley Water Company. In 2020 the yearly usage equated to 62 gpm or 100 AC-FT. This is below the Division of Drinking Water calculations of 108 gpm or 175 Acre-Feet. The peak monthly demand on the system occurred in July and averaged 119 gallons per minute, a true peak day demand was not able to be measured but the peak monthly demand average is a good indicator on a peak day demand quantity. The calculated peak day demand was 281

GPM. The historical usage indicates that less water is being used than is shown in the DDW calculations.

Table 4.1 2020 Meter Reads System Usage



4.2 Projected System Demand

4.2.1 Projected Average Day Demand

The existing average water demand on the High Valley system used in this Culinary Water Master Plan was calculated using the minimum sizing requirements from the DDW. An assumption was made that the future connections will be similar to the existing connections.

Indoor Use:

$$\mathbf{265\ Conns.} \times \mathbf{400}\frac{\boldsymbol{gal}}{\boldsymbol{day\ -\ ERC}} \times \frac{\mathbf{1}\ \boldsymbol{day}}{\mathbf{1,440}\ \boldsymbol{min}} = \mathbf{74}\frac{\boldsymbol{gal}}{\boldsymbol{min}}$$

Outdoor Use:

$$265\ x\ 0.2 = 53\ Irr.\ Acres \times 1.23\frac{acre-feet}{irrigated\ acre} \times \frac{325{,}851\ gal}{acre-feet} \times \frac{1\ year}{365\ days} \times \frac{1\ day}{1{,}440\ min}$$
$$= \mathbf{40}\frac{\boldsymbol{gal}}{\boldsymbol{min}}$$

The total projected average day demand on the system as required by the State rules is determined by adding the indoor and outdoor usage as follows:

$$\textbf{Total Projected Average Day Demand} = 74\frac{gal}{min} + 40\frac{gal}{min} = \mathbf{114}\frac{\boldsymbol{gal}}{\boldsymbol{min}}$$

According to the DDW requirement for Average Day Demand, the High Valley water system should have a minimum average water demand of 114 gpm, which equates to approximately **184 AC-FT per year.**

4.2.2 Projected Peak Day Demand

The State DDW rules define peak day indoor demand for one ERU to be 800 gallons per day, which is double the average day demand.

The calculation below shows the projected peak day demand of the High Valley culinary water system using the DDW rules for indoor and outdoor use should be **84 gallons per minute on a peak day.**

Indoor Use:

$$265\ Conns.\ \times 800\frac{gal}{day\ -\ ERU} \times \frac{1\ day}{1{,}440\ min} = 147\frac{gal}{min}$$

Outdoor Use:

$$265\ x\ 0.2 = 53\ Irr.\ Acres \times 2.80\frac{gpm}{irrigated\ acre} = 148\frac{gal}{min}$$

The total peak day demand is determined from adding the indoor and outdoor demand totals as follows:

$$\textbf{Total Projected Peak Day Demand} = 147\frac{gal}{min} + 148\frac{gal}{min} = \mathbf{295}\frac{\boldsymbol{gal}}{\boldsymbol{min}}$$

The DDW rules lead to a calculated existing average day demand of 108 gpm and 175 AC-FT per year and a projected average day demand of 114 gpm and 184 AC-FT per year. These numbers are much higher than the existing average day demand of 62 gpm and 100 AC-FT per year. The DDW calculations are conservative and will be used during analysis to assure compliancy.

5 SOURCE ANALYSIS

The Utah Division of Drinking water has provided rules and regulations governing source capacity for each system. Rule R309-510-7 (1) states that the sources should meet water demands under two separate conditions:

1. Peak day anticipated water demand
2. Provide one year's supply of water (the average yearly demand)

High Valley Water Company currently has three wells. None of these wells are currently in use. The Unused Well House Well is not active and is not in use. Atkinson #2 Well and High Valley #2 Well were overdrawn and are now experiencing high total suspended solids (TSS) and are currently not in use. Purchased water from Mountain Regional and Summit Water is the source for the culinary water system.

The Mountain Regional source agreement is based on wholesale purchase. There is no set limit to the amount of water that can be purchased. Purchased water can be blended with High Valley Water Company's well water when needed to ensure that the well water meets drinking water standards.

Water purchased from Mountain Regional is the main source of water for High Valley Water Company.

The Summit Water source agreement is based on shares. Additional water over the allowable shares can be used during emergencies and will be billed at the wholesale rate. High Valley Water Company owns 50 acre foot shares. Each acre foot share represents an average use of 1.13 gpm with a maximum daily draw rate of 1.58 gpm. Over use will be subject to over use fees in accordance with Summit Water's current Assessment and Fee Schedule.

This section of the report will discuss the sources and their ability to meet condition 1 and 2 shown above. The average yearly demand requirement shown in condition 2 is mainly for water right purposes

5.1 Water Rights

High Valley Water Company currently owns one water right. It is currently approved to be used from three wells. Table 5.1 below shows the basic information associated with the water rights.

Table 5.1 High Valley Culinary Water Right

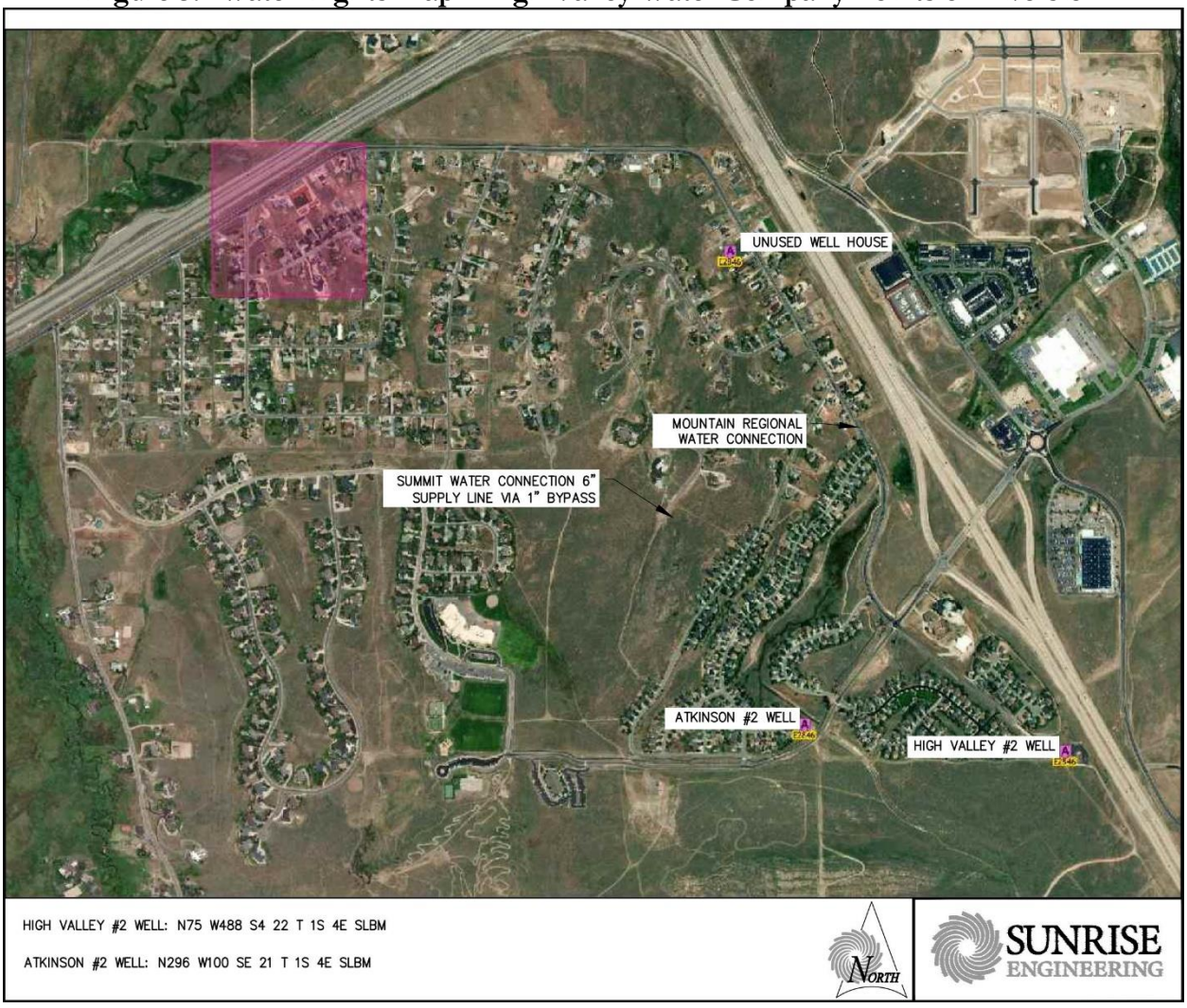
Water Right Number	Flow in CFS	Quantity in Acre-feet per year	Status
35-9434	0.39	285	Approved
TOTALS	0.39	285	

Uses	Quantity (Acres, ELUs or EDUs)	Quantity in Acre-feet per year	Use-Period
Irrigation	53.3	66	04/01-10/31
Domestic	265	119	Year-Round
Stock Water	205		Year-Round

The flow of 0.39 CFS was calculated based upon the water right quantiy. The current data page does not include flow; it only includes quantity. The uses acre-ft per year data was not included and was calculated based on DDW data. None of the wells in the water right are currently in use. The Unused Well House well is not active. The Atkinson #2 Well and the High Valley #2 Well are currently not in use due to to high levels of TSS. Well water would need to be blended with purchased water to meet drinking water standards.

35-9434 was approved in 1992 using the full number of domestics and acres that could be proofed at the time. Further review has found that the average acreage per lot of 0.2 used for the water right is accurate.

Figure 5.1 Water Rights Map –High Valley Water Company Points of Diversion



5.2 Water Rights Summary

The High Valley Water Company has adequate water rights for both flow and quantity. The existing average day demand for High Valley Water Company is 175 AC-FT and the projected average day demand is 184 AC-FT as shown in Sections 4.1.1 and 4.2.1 respectively. These are both well below annual capacity of the water right as shown in Table 5.1 of 285 AC-FT.

High Valley Water Company water rights are currently in good standing a few recommendations to maintain that status are as follows:

1. Request the state revise the water use to all domestic water as livestock numbers are not counted and monitored.

5.3 Physical Source Capacity

High Valley Water System does not use any well water. Atkinson #2 Well and High Valley #2 Well are part of the water right and can be used if need be. The Atkinson #2 Well has a yearly volume

capacity of 75 AC-FT per year while the High Valley #2 Well has a yearly volume capacity of 210 AC-Ft per year. The Unused Well House Well is also part of the water right but is not active. These wells are not currently in use. All water for the High Valley Water System comes from purchased sources.

The purchased sources are Mountain Regional Water Special Service District and Summit Water. The water purchased from Mountain Regional is based on rate and not supply. The Mountain Regional source agreement is based on wholesale purchase. Water purchased from Mountain Regional is the main source of water for High Valley Water Company. There is no set limit to the amount of water that can be purchased.

Summit Water currently has a surplus capacity of more than 1,800 gpm. Their supply is based on an average of 1.13 gpm/AC-FT share with a maximum draw rate of 1.58 gpm/AC-FT share. High Valley Water Company owns 50 shares with 12 being active. This results in an average source of 13.56 gpm with a maximum of 18.96 gpm from Summit Water. Selling these 38 unused shared could be a source of income to offset improvements. The Summit Water source is connected via a 6-inch supply line with a 1-inch bypass pipe.

5.3.1 Physical Source Capacity Analysis

The Utah Division of Drinking water has provided rules and regulations governing source capacity for each system. Rule R309-510-7 (1) states that the sources should meet water demands under two separate conditions:

1. Peak day anticipated water demand
2. Provide one year's supply of water (the average yearly demand)

Table 5.3.1 shows the existing systems physical source capacity surplus of 132 AC/FT.

Table 5.3.1 Average Day Demand Analysis

Minimum Source Requirement	Ave. Demand (GPM)	Ave. Yearly Demand (MG)	Ave. Yearly Demand (AC-FT)
Exisiting (DDW)	108	57	175
Existing Source Water Right Capacity	177	93	285
High Valley #2 Well	Not In Use		
Atkinson #2 Well	Not In Use		
Unused Well House Well	Inactive		
Mountain Regional	No Set Limit		
Summit Water	13.56	7.1	21.9
Source Capacity DDW (Surplus/Deficit)	82	43	132

Table 5.3.2 Projected Average Day Demand Analysis.

Minimum Source Requirement	Ave. Demand (GPM)	Ave. Yearly Demand (MG)	Ave. Yearly Demand (AC-FT)
Projected (DDW)	114	60	184
Existing Source Capacity	177	93	285
High Valley #2 Well	Not In Use		
Atkinson #2 Well	Not In Use		
Unused Well House Well	Inactive		
Mountain Regional	No Set Limit		
Summit Water	13.56	7.1	21.9
Source Capacity DDW (Surplus/Deficit)	76	40	123

The other condition that the water sources need to meet is the peak day demand. Table 5.3.3 below shows the existing system's peak day demand analysis and Table 5.3.4 shows the projected peak day demand analysis.

Table 5.3.3 Existing Peak Day Demand Analysis

Minimum Source Requirement	Peak. Demand (GPM)
Existing (DDW)	281

Table 5.3.4 Projected Peak Day Demand Analysis

Minimum Source Requirement	Peak. Demand (GPM)
Projected (DDW)	295

5.4 Source Summary

In summary the physical surplus of the existing system is limited by its water rights, which limits the yearly volume to 285 AC-FT. On a peak day demand basis, the existing water system has a requirement of 281gpm with today's customers and a projected requirement of 295 gpm with the projected ERCs. The water purchased from Mountain Regional is based on rate and not supply. The Mountain Regional source agreement is based on wholesale purchase. Because most of the water for the system is purchased through Mountain Regional Water Special Service District and there is no set limit to the amount of purchased water, there is no source capacity issue. The agreement with Summit Water also allows an average of 13.56 gpm from the 12 active shares. Well water could be used as a source by mixing purchased water from Mountain Regional with water from the currently unused wells.

6 STORAGE ANALYSIS

All culinary water systems are required to have water storage capacity. Storage capacity is used in the case that water is not available immediately from the sources providing water to the system. A storage reservoir also mitigates the instantaneous demands of the system which will vary dramatically throughout the day. If a source goes down, or another emergency happens, the water system should still be able to provide water to the users as well as adequate fire flow throughout the system.

The Utah Division of Drinking water has provided rules and regulations governing the amount of storage required for each system. Rule R309-510-8 states that each storage facility shall provide the following:

1. equalization storage volume, to satisfy average day demands for water for indoor use and irrigation use,
2. fire flow storage volume, if the water system is equipped with fire hydrants intended to provide fire suppression water or as required by the local fire code official, and
3. emergency storage, if deemed appropriate by the water supplier or the Director.

6.1 Existing Storage Capacity

High Valley Water Company currently has one 500,000-gallon concrete water storage tank in use, along with 17.2% ownership of another 500,000-gallon storage tank. The combination of these two storage sources results in 586,000-gallons.

Table 6.1 Existing Storage Capacity

Water Storage	Capacity	High Water Elevation	Zone
500,000 gallon tank	500,000	6,753	1
17.2% of 500,000 gallon tank	86,000	6,770	1
Total	**586,000**		

6.2 Existing Storage Requirements

Water storage capacity requirements are separated into three categories: indoor, outdoor, and fire protection. The State of Utah Public Drinking Water Regulations states that a community's culinary water storage system should be able to store 400 gallons per day per connection for indoor use. It was previously noted that the average irrigated area per lot is 0.2 acres. Calculations for required storage capacity will include this assumption.

Storage requirements for fire protection vary from community to community. In general, fire flow requirements are based on building size, and type of construction. The statewide minimum fire flow is 1,000 gpm at a fire hydrant. It is recommended that fire flow be determined from the formula used by the Insurance Services Office (ISO). The ISO formula used in the calculation below generally produces required fire flows that are higher than the statewide minimum of 1,000 gpm. However, insurance rates are usually lower in communities meeting ISO guidelines. It should also be noted that modern fire pumper trucks are capable of pumping at much higher rates than the 1,000 gpm minimum. In order to make most effective use of this equipment, the system should be sized accordingly. The

local fire marshal also confirmed that 1,000 gpm is adequate for the area serviced by the High Valley Water Company.

Based on the above information, the existing required storage capacity is calculated as follows:

Indoor Use:

$$252\ Conns.\ \times 400 \frac{gal}{day\ -ERU} = \mathbf{100,800\ gal}$$

Outdoor Use:

$$50\ Irr.\ Acres \times 1{,}873 \frac{gal}{irrigated\ acre} = \mathbf{94,399\ gal}$$

Fire Protection:

$$1{,}000\ gpm \times 120\ min. = \mathbf{120,000\ gal}$$

Emergency Storage:

$$15\%\ of\ System\ Usage. = \mathbf{29,280\ gal}$$

Table 6.2 Existing Storage Requirements

Existing Minimum Storage Requirement	Storage Volume (Gal.)
Indoor	100,800
Outdoor	94,399
Fire Suppression	120,000
Emergency Storage	29,280
Total Storage Required	**344,479**
Existing Storage	586,000
Surplus/Deficit	**241,521**

The calculations show that High Valley Water Company has an existing storage capacity surplus of **241,521 gallons** according to regulations by the State of Utah Rules for Public Drinking Water Systems.

6.3 Projected Storage Requirements

The projected storage volume requirements will help the High Valley Water Company determine potential future infrastructure needs and the ability of the system as a whole to meet future storage requirements. As seen in the table below, High Valley Water Company has surplus storage capacity for the projected culinary water system demand.

Indoor Use:

$$265\ Conns.\ \times 400 \frac{gal}{day\ -ERU} = \mathbf{106,000\ gal}$$

Outdoor Use:

$$53\ Irr.\ Acres \times 1{,}873 \frac{gal}{irrigated\ acre} = \mathbf{99,269\ gal}$$

Fire Protection:

$$1000\ gpm \times 120\ min. = \mathbf{120,000\ gal}$$

Emergency Storage:

$$15\%\ of\ System\ Usage. = \mathbf{30,790\ gal}$$

Table 6.3 Projected Storage Requirements

Build Out Minimum Storage Requirement	Storage Volume (Gal.)
Indoor	106,000
Outdoor	99,269
Fire Suppression	120,000
Emergency Storage	30,790
Total Storage Required	**356,059**
Existing Storage	586,000
Surplus/Deficit	**229,941**

6.4 Storage Analysis Summary

The projected required storage capacity calculations yield a storage capacity surplus of **229,941 gallons** at the end of the planning period according to the regulations by the State of Utah Rules for Public Drinking Water Systems. There are no storage increases recommended.

7 DISTRIBUTION SYSTEM

7.1 Existing Distribution System Analysis

High Valley Water Company's distribution system was analyzed per R309-511-5, requirements for the Hydraulic Model included the following minimum requirements:

1. Include at least 80 percent of the total pipe lengths in the distribution system affected by the proposed project; **(100% modeled)**
2. Account for 100 percent of the flow in the distribution system affected by the proposed project. Water demand allocation must account for at least 80 percent of the flow delivered by the distribution system affected by the proposed project if customer usage in the system is metered; **(100% of the flow modeled)**
3. Include all 8-inch diameter and larger pipes. Pipes smaller than 8-inch diameter shall also be included if they connect pressure zones, storage facilities, major demand areas, pumps, and control valves, or if they are known or expected to be significant conveyers of water such as fire suppression demand. Model piping does not need to include service lateral piping; **All piping included except for service lateral piping.**
4. Include all pipes serving areas at higher elevations, dead ends, remote areas of a distribution system, and areas with known under-sized pipelines; **All piping included except for service lateral piping.**
5. Include all storage facilities and accompanying controls or settings applied to govern the open/closed status of the facility that reflect standard operations; **Tank Included**
6. If applicable, include all pump stations, drivers (constant or variable speed), and accompanying controls or settings applied to govern their on/off/speed status that reflect various operating conditions and drivers; **(No pump stations on system on existing system)**
7. Include all control valves or other system features that could significantly affect the flow of water through the distribution system (e.g., interconnections with other systems and pressure reducing valves between pressure zones) reflecting various operating conditions; **(No existing control valves, (2) PRV on proposed system)**
8. Impose peak day and peak instantaneous demands to the water system's facilities. These demands may be peak day and peak instantaneous demands per R309-510, the reduced demand approved by the Director per R309-510-5, or the demands experienced by the water system that are higher than the values listed in R309-510. This may require multiple model simulations to account for the varying water demand conditions. In some cases, extended period simulations are needed to evaluate changes in operating conditions over time. This will depend on the complexity of the water system, extent of anticipated fire event and nature of the new expansion; **(Peak Day and Peak Instantaneous demands included by pattern, steady state model)**
9. Calibrate the model to adequately represent the actual field conditions using field measurements and observations.
10. If fire hydrants are connected to the distribution system, account for fire suppression requirements specified by local fire authority or use the default values stated in R309-510-9(4). For significant fire suppression demand, extended simulations must contain the run time for the period of the anticipated fire event. In some cases, a steady-state model may be sufficient

for residential fire suppression demand; and, **(Steady State model with fire flow demand + peak day)**

11. Account for outdoor use, such as irrigation, if the drinking water system supplies water for outdoor use. **(0.2 irrigated acres per connection)**

The system was analyzed per the Division of Drinking Water's minimum dynamic pressure requirements for water approved after systems constructed after January 1, 2007, which states that the system shall be designed and shall meet the following minimum water pressures at points of connection:

(a) 20 psi during conditions of fire flow and fire demand experienced during peak day demand;

(b) 30 psi during peak instantaneous demand; and

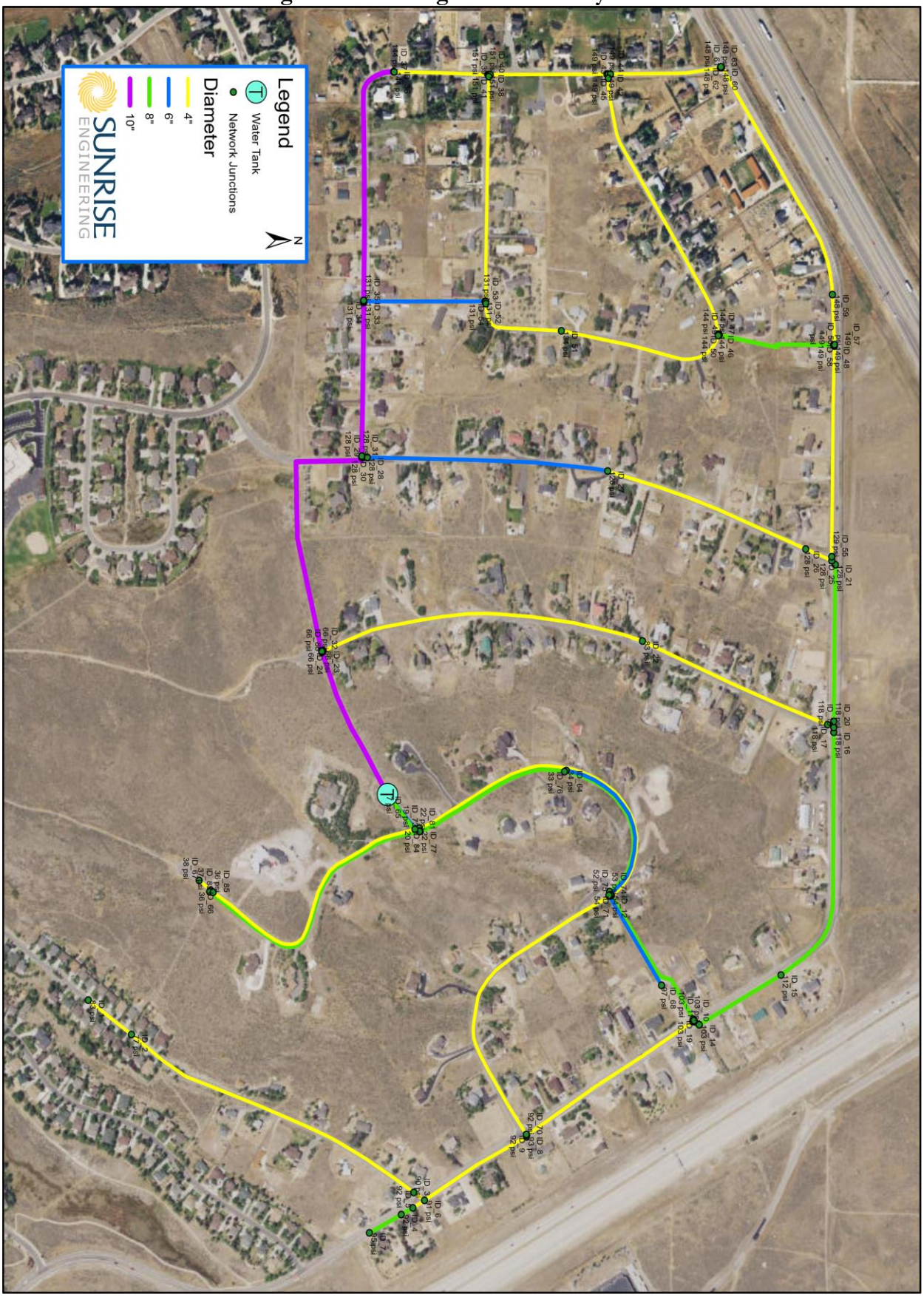
(c) 40 psi during peak day demand.

(3) Individual home booster pumps are not allowed as indicated in R309-540-5(4)(c).

As stated in Section 2.0 the system functions as a gravity fed system, with the source and storage at higher elevations within the system. The system functions as a gravity fed system, with the source and storage at higher elevations within the system. High Valley Water Company owns three wells within the system that are included in their water right, E2846 (35-9434). None of the wells are currently in use. The Unused Well House Well is not active and is not in use. Atkinson #2 Well and High Valley #2 Well are currently not in use.

High Valley Water Company has two sources feed the 500,000-gallon concrete storage reservoir. Purchased water from Mountain Regional and Summit Water feed the 500,000-gallon concrete storage reservoir. The water system consists of one pressure zone with pressures ranging from the low of 28 psi to a high of 151 psi. The system has multiple loops and water is conveyed to the customers from the line in the street in front of their house. A map of the system showing the piping, tank, well, PDD pressures, PID pressures, and available fire flow is shown in Figure 7.1.

Figure 7.1 Existing Distribution System



The hydraulic model shows that the existing system does not meet the minimum fire flow of 1,000 gallons per minute with 20 psi residual due to several areas of 4-inch pipe. Several areas also show extremely high pressures that can lead to system failure and leaks.

7.2 Projected Distribution System Analysis

The peak day demand on the projected system is determined based on the increased population and resulting number of connections caused by the projected growth in the High Valley Water Company. As determined previously in Section 4, the projected 20-year peak day demand is **295 gpm**.

As is the case for improvements to the existing system, all projected improvements recommended for expansion of the distribution system will be designed and modeled using a fire flow of 1,000 gpm. In accordance with the State Regulations, this fire flow is added to the peak day demand as seen in Table 7.2.

Table 7.2: Peak Day Demand w/ Fire flow

Minimum Source Requirement	Peak. Demand (GPM)
Projected Indoor DDW	140
Projected Outdoor DDW	141
Fire Flow	1,000
	1,281

7.3 Recommended Distribution System Improvements

The model indicates that part of the system does not meet minimum fire flow requirements and the western part of the system along Star View Drive has higher than recommended pressures. Sunrise recommends constructing two new PRVs between Mountain View Drive and Snow View Drive to lower the pressures causes by the elevation variations in the system. Several areas will also need to be replaced and up sized. The proposed model indicates that in order to meet the minimum flow requirement of 1,000 gallons per minute the lines from the tank to the eastern connections along Silver Sage Drive and Fairview Drive will need to be a minimum of 8" in diameter. The lines along Star View Drive and Highland Drive on the western end of the system will need to be a minimum of 8" in diameter as well. It is recommended to upsize all 4" lines throughout the system to 8". This will provide for better flow throughout the system and will prevent line failures and leaks. One area of the system along Silver Sage Drive has pressures from 28 psi to 38 psi. These are lower than the required 40 psi during peak day demand. Fixing the low-pressure area would require raising the tank which is excessive for the minimal impact it would have raising the pressure a couple psi. It is recommended that no action to remediate low pressure zones takes place. (Two options have been considered for the projected distribution system. Both options also include a source review.) The 1-inch pipe feeding the system from Summit Water could be either unnecessary or an underutilized potential source if all 50 shares come into use.

Option 1 for the system update is to add the PRVs and only upsize the required lines. The lines that must be upsized to meet the required fire flow are located at various points

throughout the system with a total of 15,807 ft of line to be replaced. The PRVs would be located between Snow View Drive and Mountain View Drive at the northern and southern end of the system. This will lower the pressure on the western end of the system especially along Star View Drive resulting in lower maintenance costs and a more reliable system overall. This will create two pressure zones. Pressure Zone 1 will be on the east side of the system including Mountain View Drive, and Pressure Zone 2 will encompass the west side of the system including Snow View Drive. The results of the model are shown in Figure 7.3.1.

Option 2 would be to upsize all the 4" lines to 8" along with the addition of two PRVs. These upgrades will need to take place eventually and it is most economical in the long run to do them all at once along with an increase in reliability of the system. This results in an additional 4,378 ft of 8" pipe for a total of 20,185 ft. The capital cost of option 2 will be more than option 1, however, the operation and maintenance cost will be lower with less leaks and pipe failures. In both options the distribution system's hydraulic capabilities (pressures, flow capacity, friction loss, etc.) meet the state requirements. The results of the model are shown in Figure 7.3.2. The proposed Hydraulic Profile of the system is shown in Figure 7.3.3

Due to the increase in overall reliability of the system and a decrease in long term costs the preferred option is Option 2. Both options will be shown in the funding package and in cash flow projections.

Figure 7.3.1 Proposed Distribution System – Option 1

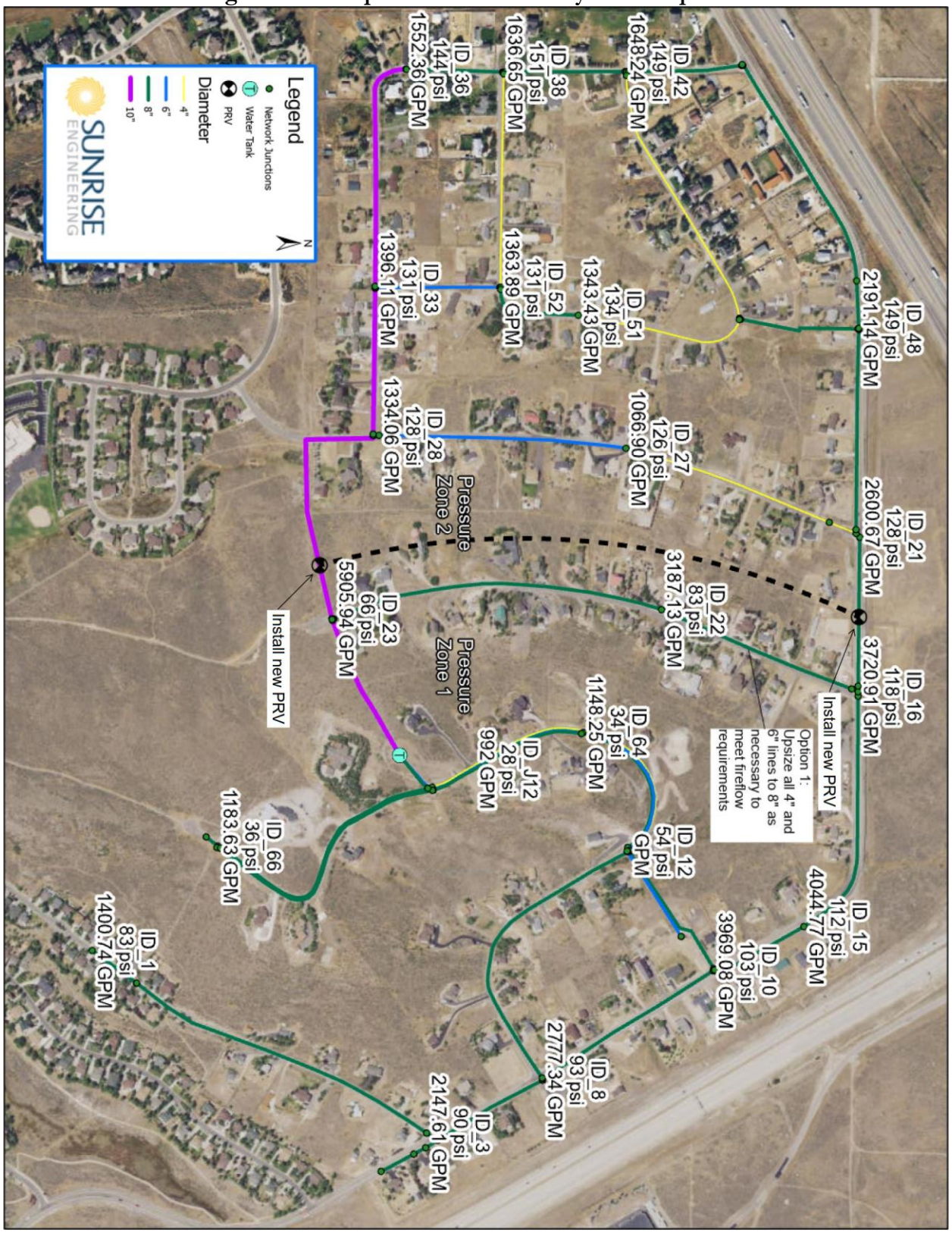


Figure 7.3.2 Proposed Distribution System – Option 2

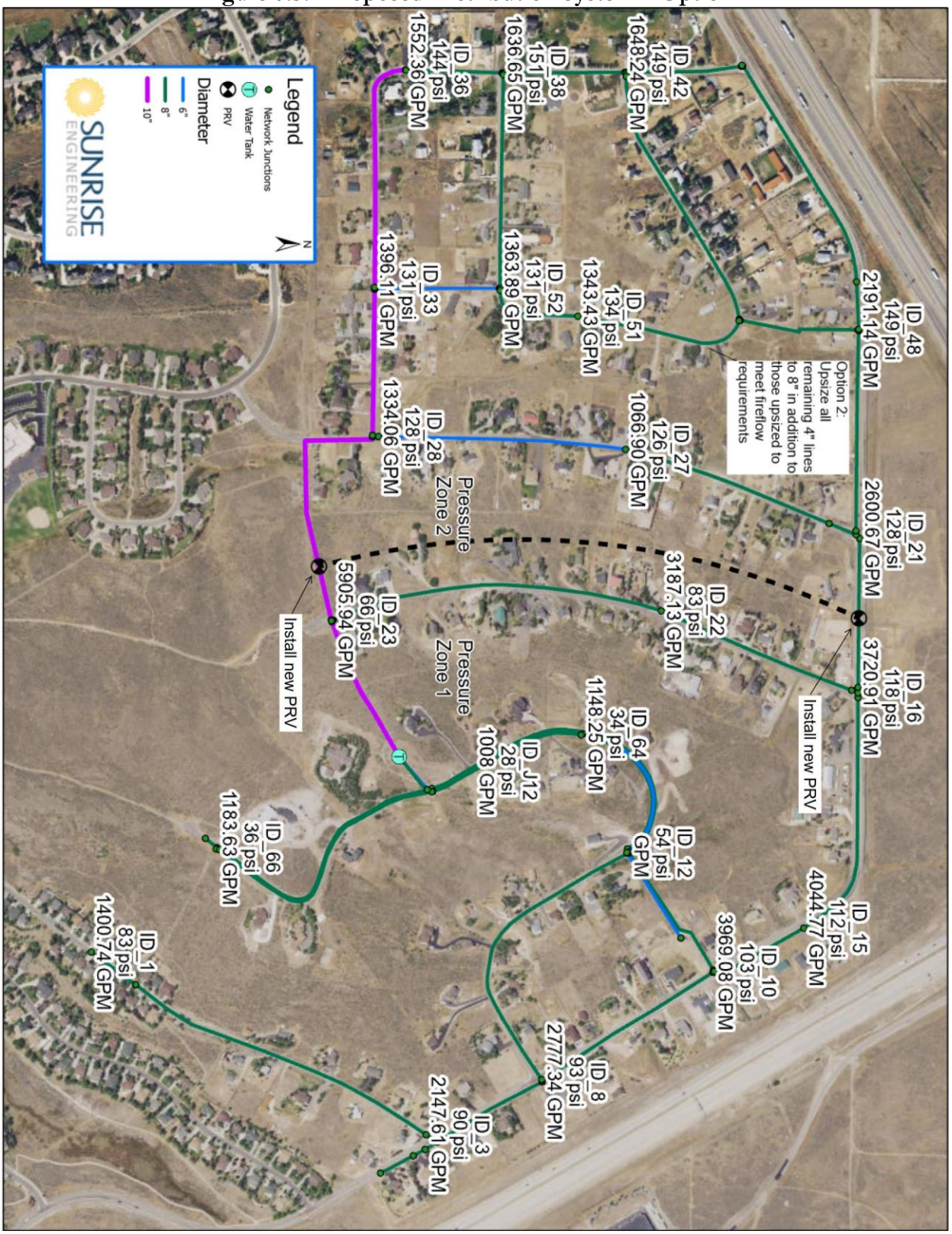
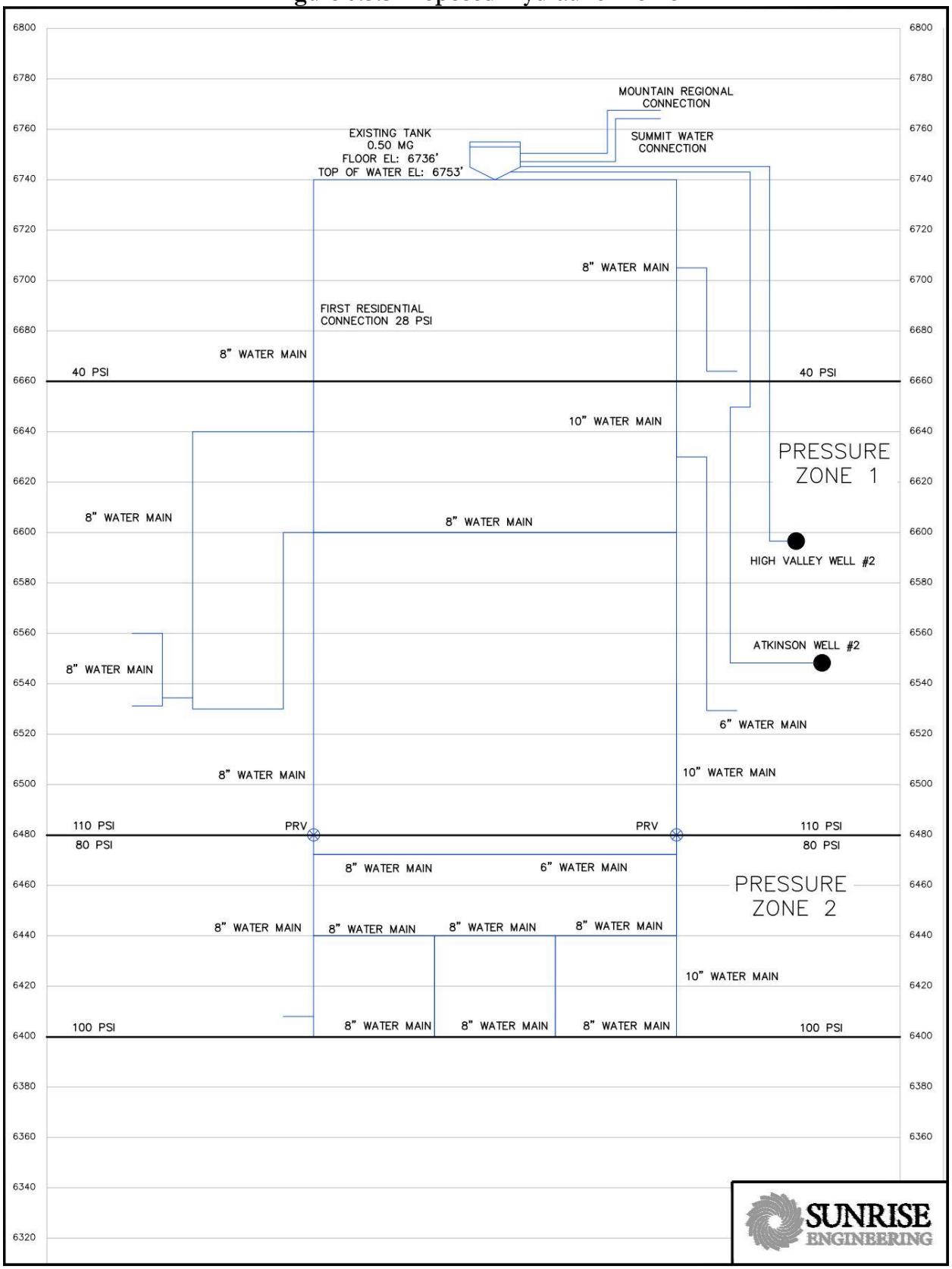


Figure 7.3.3 Proposed Hydraulic Profile



8 TREATMENT

The State of Utah Public Drinking Water Regulations, in accordance with the National Safe Drinking Water Act, has adopted "primary" regulations for the protection of public health, and "secondary" regulations related to taste and aesthetics. High Valley Water Company's culinary water currently meets all requirements. The regulations also recommend that all culinary water sources have provisions for continuous disinfection.

8.1 EXISTING TREATMENT FACILITIES

As previously stated, the company utilizes water from Mountain Regional WSSD and Summit Water Distribution as the sources of water to the distribution system. The water is purchased from and chlorinated by Mountain Regional WSSD and Summit Water Distribution. Chlorination facilities and any other treatment methods were not considered for this plan.

8.2 RECOMMENDED TREATMENT FACILITY IMPROVEMENTS

Drinking water regulations state: "the design capacity of chlorination equipment must be such that a free chlorine residual of at least 2 mg/l can be maintained in the system after 30 minutes of contact time during peak demand. In addition, there must be a detectable residual, either combined or free in the system, at all times at all points in the distribution system. Residual monitoring equipment must be accurate to within 0.1 mg/l in the range below 0.5 mg/l, which implies that the minimum detectable residual would be approximately 0.05 mg/l." Since the existing chlorination equipment is owned and operated by outside sources and are assumed in good condition, no changes are recommended.

9 CAPITAL IMPROVEMENT PLAN PROJECTS

The High Valley Water Company needs to complete a variety of projects in order to be able to meet the Division of Drinking Water's minimum standards. The recommended projects are grouped by Storage, Source, Distribution, Water Rights, and Treatment. Tables 9.1.1 and 9.1.2 summarize the High Valley Water Company's Capital Improvement Projects. Option 2 is presented in Table 9.1.1 while Option 1 is presented in Table 9.1.2

Table 9.1.1 HVWC Capital Improvement Projects

High Valley Water Company Capital Improvement Projects				
Project	**Category**	**Size**	**Length**	**Construction Cost**
Source				
None				**$ -**
Subtotal				**$ -**
Distribution				
Piping				
PRV Station	Pressure	8",10"		$ 150,000.00
Zone 1 Distribution (Fairview)	Distribution	8"	1,905	$ 249,899.47
Zone 1 Distribution (Highland)	Distribution	8"	1,635	$ 214,442.07
Zone 1 Distribution (Silver Sage Dr)	Distribution	8"	4,559	$ 598,102.48
Zone 1 Distribution (Mountani View Dr)	Distribution	8"	2,633	$ 345,420.32
Zone 2 Distribution (Highland)	Pressure	8"	2,397	$ 314,491.86
Zone 2 Distribution (Snow View Dr)	Pressure	8"	1,179	$ 154,671.18
Zone 2 Distribution (Star View Dr)	Pressure	8"	1,619	$ 212,470.17
Zone 2 Distribution (Countryside Dr)	Pressure	8"	4,258	$ 558,684.24
Subtotal				**$ 2,798,181.80**
Water Rights				
None				**$ -**
Treatment				
None				**$ -**
Total Construction Cost				**$ 2,798,181.80**
Contingency		10%		$ 280,000.00
Total Construction Budget				**$ 3,078,181.80**
Water Rights				
Professional Services				
Survey				$ 32,500.00
Environmental Assessment				$ 32,500.00
Civil Design				$ 190,000.00
Geotechnical				$ 19,500.00
Construction Administration				$ 190,000.00
Subtotal Professional Services				**$ 464,500.00**
Division of Drinking Water				$ 7,000.00
Total Project Budget				**$ 3,549,681.80**

Table 9.1.2 HVWC Capital Improvement Projects

High Valley Water Company Capital Improvement Projects				
Project	**Category**	**Size**	**Length**	**Construction Cost**
Source				
None				**$ -**
Subtotal				**$ -**
Distribution				
Piping				
PRV Station	Pressure	8",10"		$ 150,000.00
Zone 1 Distribution (Fairview)	Distribution	8"	1,905	$ 249,338.03
Zone 1 Distribution (Highland)	Distribution	8"	1,635	$ 213,960.30
Zone 1 Distribution (Silver Sage Dr)	Distribution	8"	4,559	$ 596,758.76
Zone 1 Distribution (Mountani View Dr)	Distribution	8"	2,633	$ 344,644.29
Zone 2 Distribution (Highland)	Pressure	8"	2,397	$ 313,785.31
Zone 2 Distribution (Star View Dr)	Pressure	8"	1,619	$ 211,992.83
Zone 2 Distribution (Countryside Dr)	Pressure	8"	1,060	$ 138,703.08
Subtotal				**$ 2,219,182.60**
Water Rights				
None				**$ -**
Treatment				
None				**$ -**
Total Construction Cost				**$ 2,219,182.60**
Contingency		10%		$ 230,000.00
Total Construction Budget				**$ 2,449,182.60**
Water Rights				
Professional Services				
Survey				$ 32,500.00
Environmental Assessment				$ 32,500.00
Civil Design				$ 150,000.00
Geotechnical				$ 19,500.00
Construction Administration				$ 150,000.00
Subtotal Professional Services				**$ 384,500.00**
Division of Drinking Water				$ 7,000.00
Total Project Budget				**$ 2,840,682.60**

The majority of the improvements are related to flow and pressure requirements. Most of the distribution system modifications are also to meet the required flow of 1,000 gpm for the system. The projects not related to flow are pressure related. All of the deficiencies are related to existing conditions and are not related to growth or projected usage. It is our recommendation to treat the projects as one large project because they are all related to solving the same issues. A more detailed opinion of probable cost on the project can be found in Tables 9.1.3 and 9.1.4. Option 2 is presented in Table 9.1.3 while Option 1 is presented in Table 9.1.4

Table 9.1.3 Engineering Opinion of Probable Cost

SUNRISE ENGINEERING, INC.
CONSULTING ENGINEERS AND SURVEYORS
Opinion of Probable Costs

Project:	High Valley System Improvements	Project No:	
		Date:	28-Jul-21
Owner:	High Valley Water Company	By:	Ian Hammond

ITEM NO.	Project	Quantity	Unit	Unit Price	AMOUNT
	Distribution System				
1	Quality Control	1	LS	$ 25,000	$ 25,000
2	Mobilization	1	LS	$ 55,000	$ 55,000
3	Subsurface Investigation	40	Hour	$ 175	$ 7,000
4	Traffic Control	1	LS	$ 10,400	$ 10,400
5	8" PVC C900	20,185	LF	$ 65	$ 1,312,007
6	Mainline Tie-Ins	8	Each	$ 4,500	$ 36,000
7	Mainline Loop	1	Each	$ 3,500	$ 3,500
8	Remove & Replace Asphalt (Asphalt "T" Patch)	9,000	SY	$ 47	$ 425,250
9	PRV	2	Each	$ 75,000	$ 150,000
10	8" Gate Valves	49	Each	$ 2,600	$ 127,400
11	10" Butterfly valves	2	Each	$ 3,500	$ 7,000
12	Fire Hydrant Assembly	25	Each	$ 7,000	$ 175,000
13	3/4" Service Connection	177	Each	$ 1,000	$ 177,000
14	3/4" Service Meter Assembly	177	Each	$ 1,000	$ 177,000
15	3/4" Service Lateral	4,425	LF	$ 25	$ 110,625
16	**Subtotal**				**$ 2,798,182**

Table 9.1.3 Engineering Opinion of Probable Cost Cont.

SUNRISE ENGINEERING, INC.
CONSULTING ENGINEERS AND SURVEYORS
Opinion of Probable Costs

Project:	High Valley System Improvements			Project No:		
				Date:	28-Jul-21	
Owner:	High Valley Water Company			By:	Ian Hammond	

17	**Total Construction**					**$ 2,798,182**
18	Contingency	**10%**	1	LS	$ 280,000	$ 280,000
19	**Total Construction Budget**					**$ 3,078,182**
20	**Professional Services**					
21	Survey		1	LS	$ 32,500	$ 32,500
22	Environmental Assesment		1	LS	$ 32,500	$ 32,500
22	Civil Design	6%	1	LS	$ 190,000	$ 190,000
23	Geotechnical		1	LS	$ 19,500	$ 19,500
24	Construction Administration	6%	1	LS	$ 190,000	$ 190,000
25	**PROFESSIONAL SERVICES TOTAL**					**$ 464,500**
	Division of Drinking Water					$ 7,000
26	**PROJECT TOTAL**					**$ 3,549,682**

Table 9.1.4 Engineering Opinion of Probable Cost

SUNRISE ENGINEERING, INC.
CONSULTING ENGINEERS AND SURVEYORS
Opinion of Probable Costs

Project:	High Valley System Improvements	Project No:	
		Date:	28-Jul-21
Owner:	High Valley Water Company	By:	Ian Hammond

ITEM NO.	Project	Quantity	Unit	Unit Price	AMOUNT
	Distribution System				
1	Quality Control	1	LS	$ 25,000	$ 25,000
2	Mobilization	1	LS	$ 55,000	$ 55,000
3	Subsurface Investigation	40	Hour	$ 175	$ 7,000
4	Traffic Control	1	LS	$ 10,400	$ 10,400
5	8" PVC C900	15,807	LF	$ 65	$ 1,027,458
6	Mainline Tie-Ins	8	Each	$ 4,500	$ 36,000
7	Mainline Loop	1	Each	$ 3,500	$ 3,500
8	Remove & Replace Asphalt (Asphalt "T" Patch)	7,100	SY	$ 47	$ 335,475
9	PRV	2	Each	$ 75,000	$ 150,000
10	8" Gate Valves	46	Each	$ 2,600	$ 119,600
11	10" Butterfly valves	2	Each	$ 3,500	$ 7,000
12	Fire Hydrant Assembly	19	Each	$ 7,000	$ 133,000
13	3/4" Service Connection	118	Each	$ 1,000	$ 118,000
14	3/4" Service Meter Assembly	118	Each	$ 1,000	$ 118,000
15	3/4" Service Lateral	2,950	LF	$ 25	$ 73,750
16	**Subtotal**				**$ 2,219,183**

Table 9.1.4 Engineering Opinion of Probable Cost Cont.

SUNRISE ENGINEERING, INC.
CONSULTING ENGINEERS AND SURVEYORS
Opinion of Probable Costs

Project:	High Valley System Improvements			Project No:		
				Date:	28-Jul-21	
Owner:	High Valley Water Company			By:	Ian Hammond	

17	**Total Construction**					**$ 2,219,183**
18	Contingency	**10%**	1	LS	$ 230,000	$ 230,000
19	**Total Construction Budget**					**$ 2,449,183**
20	**Professional Services**					
21	Survey		1	LS	$ 32,500	$ 32,500
22	Environmental Assesment		1	LS	$ 32,500	$ 32,500
22	Civil Design	6%	1	LS	$ 150,000	$ 150,000
23	Geotechnical		1	LS	$ 19,500	$ 19,500
24	Construction Administration	6%	1	LS	$ 150,000	$ 150,000
25	**PROFESSIONAL SERVICES TOTAL**					**$ 384,500**
	Division of Drinking Water					$ 7,000
26	**PROJECT TOTAL**					**$ 2,840,683**

10 FUNDING, RATES, AND CASHFLOW

Based on the fact that the project is quite large for a system the size of High Valley Water Company funding for the project will be critical. These plans are submitted only as a guide to possible funding sources, and they must be used only as a guide. It should be noted that an increase in water rates will be required in order to proceed with the proposed project. The increase will be discussed in more detail in Section 10.3 Water Rates Analysis. It is Sunrise Engineering, Inc. opinion that the projects be treated as one large project for the best overall value and its funding package will be used for the rest of the financial calculations. For this study a funding package with the Division of Drinking Water will be presented based on previous discussions with the DDW on its Federal State Revolving fund. For the Water Master Plan, cash flow analysis, and water rate analysis, a 10% grant 90% loan at 1% interest was used. Selling unused shares of Summit Water rights could raise additional funds as well.

10.1 High Valley Water Company Current Budget

High Valley Water Company's budget was obtained from the company's 2020 financial statement. The financial statement items were summarized to follow the DDW funding forms and is shown below in Table 10.1. The system has slight current debt and has operated at a $16,524-dollar profit over the last year, in anticipation of funding an upgrade project.

Table 10.1 High Valley Water Company 2020 Budget

					2020
General Information					
			Number of High Valley Residential ERUs		252
			Total Number of New Connections		**0**
Revenues					
			Total Revenues	**$**	**312,299**
			Average Water Bill Per Connection Per Month	**$**	**98.50**
Expenses					
		Operation Expenses			
		a.	Accounting & Tax Prep	$	24,000
		b.	Bank Charges	$	-
		c.	Board Member Payments	$	6,000
		d.	Depreciatin Expense	$	31,568
		e.	Dues & Subscriptions	$	827
		f.	Hookup Costs		
		g.	Insurance	$	2,675
		h.	Lab Tests	$	501
		i.	Legal & Professional	$	1,685
		j.	Licenses & Fees	$	379
		k.	Maint. System Operator	$	36,000
		l.	Maintenance Supplies	$	20,788
		m.	Meter Readings	$	4,200
		n.	Miscellaneous Expense	$	400
		o.	Office Supplies	$	1,100
		p.	Phone/Internet	$	1,941
		q.	Postage	$	1,370
		r.	System Repairs & Maintenance	$	41,896
		s.	Training & Educatino	$	-
		t.	Travel	$	2,189
		u.	Utilities	$	7,402
		v.	Water Manager	$	22,200
		w.	Water Purchase Expense	$	52,550
		x.	Weber Basin Water Shares	$	36,104
			Subtotal Operation Expenses	$	295,775
			Subtotal Expenses	**$**	**295,774.53**
		Debt Service			
30	1%	***$ 2,557,779.66***	**DDW Loan**		
			Payment		
			Total	**$**	**-**
			Subtotal Debt Service Expenses	**$**	**-**
			Debt Service Reserve Fund		
			Total Expenses	**$**	**295,775**
			Debt Coverage Ratio		
		Profit/Loss		**$**	**16,524**
Cash On Hand					
			Total Cash On Hand End of Year	**$**	**637,351**

10.2 Assumed Funding Package DDW SRF Fund

Sunrise Engineering contacted multiple funding agencies to discuss the High Valley Water Company's needs for potential funding. Among the agencies contacted were CDBG, CIB, Rural Development, and Division of Drinking Water. The funding package that is currently estimated is a 10% grant and 90 % loan at a 1% interest rate. The Division of Drinking Water Board will determine the final funding package.

Table 10.2 High Valley Water Company Assumed Funding Package

High Valley Water Company Funding Package

Zip Code	84036	Local MAGI	$63,300
Yearly Water Bill @ 1.75% of MAGI			$ 1,107.75
Monthly Water Bill @ 1.75% MAGI			$ 92.31
Current Average Monthly Water Bill			$ 98.50
Total Project Cost			$ 3,549,681.80
Funding Package			
10% Grant			$ 354,968.18
90% Loan		1% for 30 Years	$ 3,194,713.62
		Monthly Payment	$10,275.46
Monthly Payment per Connection			$40.78

10.3 High Valley Water Company Water Rates

Currently the High Valley Water Company has a base rate of $70.00 per month which includes 16,000 gallons. The company also has a tiered overage rate of $0.005 per gallons for usage between 16,001 and 20,000 gallons per month, $0.01 for 20,001 to 28,000 gallons, $0.015 for 25,001 to 58,000, and $0.02 for over 58,000. Based on last year's revenue the average water bill for High Valley Water Company is $98.50 per month per connection. The average water bill is 1.87 % of the Median Adjusted Gross Income (MAGI) for their Zip Code.

As mentioned previously in section 10.0 the proposed project is large for a system with only 252 connections. In order to be able to pay for the project with the proposed funding package the water rates will need to increase quite significantly. Based on the funding package and the Cash Flow Analysis shown in Section 10.4, the average monthly water bill will need to be increased to $139.27. This increase would be 2.6% of the local MAGI. A proposed water rate along with the current water rate is shown in Table 10.3. The proposed water rate can be structured a number of different ways with base rates and different tiers, however the average water bill would still need to be the $139.27 per month to meet its obligations.

Table 10.3 High Valley Water Company Water Rates

High Valley Water Company Water Rates

Current Water Rate		Dollars	1,000 Gal.
Base Rate	$	70.00	0-16
Overage Rate Tier 1	$	0.005	16-20
Overage Rate Tier 2	$	0.010	20-28
Overage Rate Tier 3	$	0.015	28-56
Overage Rate Tier 4	$	0.020	>56
Average Usage		10,792	
Average Monthly Water Bill		**$98.50**	
% of Local MAGI		1.87%	
Projected Water Rate			
Base Rate	$	111.00	0-16
Overage Rate Tier 1	$	0.005	16-20
Overage Rate Tier 2	$	0.010	20-28
Overage Rate Tier 3	$	0.015	28-56
Overage Rate Tier 4	$	0.020	>56
Average Monthly Water Bill	**$**	**139.27**	
% of Local MAGI		2.6%	

10.4 High Valley Water Company Cash Flow Analysis

A cash flow model is a good indicator on what the average water bill needs to be in order for a water system to be able to meets its obligations. As with all projections a number of assumptions need to be made, inflation rates, growth rates, usage, etc. For this Master Plan cash flow model, the inflation rate was not taken into consideration. Assuming a 2% inflation rate on expenses an alternative approach would be to increase the water rate at 2% per year. The growth rate increased the number of connections from 252 to the full buildout of 265 in the 20-year model. The operation and maintenance costs were based on the 2020 financials. Typically, the funding agencies require a debt service ratio built into the water rates to ensure that system will be able to make its payments. The first 3 years of the cash flow model is shown in Table 10.4. The twenty-year cash flow model is shown in the appendix.

Table 10.4 Cash Flow Model

				2020	2021	2022	2023	2024
General Information								
			Number of High Valley Residential ERUs	252	254	257	259	262
			Total Number of New Connections	**0**	**2**	**2**	**2**	**2**
Revenues								
			Total Revenues	**$ 312,299**	**$ 312,299**	**$ 429,747**	**$ 436,368**	**$ 438,795**
			Average Water Bill Per Connection Per Month	**$ 98.50**	**$ 98.50**	**$ 139.27**	**$ 139.27**	**$ 139.27**
Expenses								
		Operation Expenses						
		a.	Accounting & Tax Prep	$ 24,000	$ 24,000	$ 24,000	$ 24,000	$ 24,000
		b.	Bank Charges	$ -	$ -	$ -	$ -	$ -
		c.	Board Member Payments	$ 6,000	$ 6,000	$ 6,000	$ 6,000	$ 6,000
		d.	Depreciatin Expense	$ 31,568	$ 31,568	$ 31,568	$ 32,668	$ 32,668
		e.	Dues & Subscriptions	$ 827	$ 827	$ 827	$ 827	$ 827
		f.	Hookup Costs		$ -	$ -	$ -	$ -
		g.	Insurance	$ 2,675	$ 2,675	$ 2,675	$ 2,675	$ 2,675
		h.	Lab Tests	$ 501	$ 501	$ 501	$ 501	$ 501
		i.	Legal & Professional	$ 1,685	$ 1,685	$ 1,685	$ 1,685	$ 1,685
		j.	Licenses & Fees	$ 379	$ 379	$ 379	$ 379	$ 379
		k.	Maint. System Operator	$ 36,000	$ 36,000	$ 36,000	$ 36,000	$ 36,000
		l.	Maintenance Supplies	$ 20,788	$ 20,788	$ 20,788	$ 20,788	$ 20,788
		m.	Meter Readings	$ 4,200	$ 4,200	$ 4,200	$ 4,200	$ 4,200
		n.	Miscellaneous Expense	$ 400	$ 400	$ 400	$ 400	$ 400
		o.	Office Supplies	$ 1,100	$ 1,100	$ 1,100	$ 1,100	$ 1,100
		p.	Phone/Internet	$ 1,941	$ 1,941	$ 1,941	$ 1,941	$ 1,941
		q.	Postage	$ 1,370	$ 1,370	$ 1,370	$ 1,370	$ 1,370
		r.	System Repairs & Maintenance	$ 41,896	$ 41,896	$ 41,896	$ 41,896	$ 41,896
		s.	Training & Educatino	$ -	$ -	$ -	$ -	$ -
		t.	Travel	$ 2,189	$ 2,189	$ 2,189	$ 2,189	$ 2,189
		u.	Utilities	$ 7,402	$ 7,402	$ 7,402	$ 7,402	$ 7,402
		v.	Water Manager	$ 22,200	$ 22,200	$ 22,200	$ 22,200	$ 22,200
		w.	Water Purchase Expense	$ 52,550	$ 52,550	$ 52,550	$ 52,550	$ 52,550
		x.	Weber Basin Water Shares	$ 36,104	$ 36,104	$ 36,104	$ 36,104	$ 36,104
			Subtotal Operation Expenses	$ 295,775	$ 295,775	$ 295,775	$ 296,875	$ 296,875
			Subtotal Expenses	**$ 295,774.53**	**$ 295,774.53**	**$ 295,774.53**	**$ 296,874.53**	**$ 296,874.53**
		Debt Service						
30	1%	***$ 3,194,713.62***	**DDW Loan**					
			Payment			$ 123,306	$ 123,306	$ 123,306
			Total	**$ -**	**$ -**	**$ 123,306**	**$ 123,306**	**$ 123,306**
			Subtotal Debt Service Expenses	**$ -**	**$ -**	**$ 123,306**	**$ 123,306**	**$ 123,306**
			Debt Service Reserve Fund			$ 20,551	$ 20,551	$ 20,551
			Total Expenses	**$ 295,775**	**$ 295,775**	**$ 439,631**	**$ 440,731**	**$ 440,731**
			Debt Coverage Ratio			**1.09**	**1.13**	**1.15**
		Profit/Loss		**$ 16,524**	**$ 16,524**	**$ (9,884)**	**$ (4,363)**	**$ (1,936)**
Cash On Hand								
			Total Cash On Hand End of Year	**$ 637,351**	**$ 653,875**	**$ 670,400**	**$ 660,516**	**$ 656,153**

Appendix A – Cash Flow Analysis Model

$ 660,516	$ 656,153	$ 654,217	$ 654,708	$ 656,211	$ 657,714	$ 679,767	$ 701,821	$ 723,875	$ 745,928	$ 767,982	$ 790,036	$ 812,089	$ 834,143	$ 856,196	$ 878,250	$ 900,304	$ 922,357	$ 944,411	$ 966,464	
$ (4,363)	$ (1,936)	$ 491	$ 1,503	$ 1,503	$ 22,054	$ 22,054	$ 22,054	$ 22,054	$ 22,054	$ 22,054	$ 22,054	$ 22,054	$ 22,054	$ 22,054	$ 22,054	$ 22,054	$ 22,054	$ 22,054	$ 22,054	
1.13	1.15	1.17	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	
$ 440,731	$ 440,731	$ 440,731	$ 440,731	$ 440,731	$ 420,180	$ 420,180	$ 420,180	$ 420,180	$ 420,180	$ 420,180	$ 420,180	$ 420,180	$ 420,180	$ 420,180	$ 420,180	$ 420,180	$ 420,180	$ 420,180	$ 420,180	
				$ 20,551	$ 20,551	$ 20,551	$ 20,551	$ 20,551												
$ 123,306	$ 123,306	$ 123,306	$ 123,306	$ 123,306	$ 123,306	$ 123,306	$ 123,306	$ 123,306	$ 123,306	$ 123,306	$ 123,306	$ 123,306	$ 123,306	$ 123,306	$ 123,306	$ 123,306	$ 123,306	$ 123,306	$ 123,306	
$ 123,306	$ 123,306	$ 123,306	$ 123,306	$ 123,306	$ 123,306	$ 123,306	$ 123,306	$ 123,306	$ 123,306	$ 123,306	$ 123,306	$ 123,306	$ 123,306	$ 123,306	$ 123,306	$ 123,306	$ 123,306	$ 123,306	$ 123,306	
													$ -	$ -	$ -	$ -	$ -	$ -		
$ 123,306	$ 123,306	$ 123,306	$ 123,306	$ 123,306	$ 123,306	$ 123,306	$ 123,306	$ 123,306	$ 123,306	$ 123,306	$ 123,306	$ 123,306	$ 123,306	$ 123,306	$ 123,306	$ 123,306	$ 123,306	$ 123,306	$ 123,306	
$ 296,874.53	$ 296,874.53	$ 296,874.53	$ 296,874.53	$ 296,874.53	$ 296,874.53	$ 296,874.53	$ 296,874.53	$ 296,874.53	$ 296,874.53	$ 296,874.53	$ 296,874.53	$ 296,874.53	$ 296,874.53	$ 296,874.53	$ 296,874.53	$ 296,874.53	$ 296,874.53	$ 296,874.53	$ 296,874.53	
$ 296,875	$ 296,875	$ 296,875	$ 296,875	$ 296,875	$ 296,875	$ 296,875	$ 296,875	$ 296,875	$ 296,875	$ 296,875	$ 296,875	$ 296,875	$ 296,875	$ 296,875	$ 296,875	$ 296,875	$ 296,875	$ 296,875	$ 296,875	
$ 36,104	$ 36,104	$ 36,104	$ 36,104	$ 36,104	$ 36,104	$ 36,104	$ 36,104	$ 36,104	$ 36,104	$ 36,104	$ 36,104	$ 36,104	$ 36,104	$ 36,104	$ 36,104	$ 36,104	$ 36,104	$ 36,104	$ 36,104	
$ 52,550	$ 52,550	$ 52,550	$ 52,550	$ 52,550	$ 52,550	$ 52,550	$ 52,550	$ 52,550	$ 52,550	$ 52,550	$ 52,550	$ 52,550	$ 52,550	$ 52,550	$ 52,550	$ 52,550	$ 52,550	$ 52,550	$ 52,550	
$ 22,200	$ 22,200	$ 22,200	$ 22,200	$ 22,200	$ 22,200	$ 22,200	$ 22,200	$ 22,200	$ 22,200	$ 22,200	$ 22,200	$ 22,200	$ 22,200	$ 22,200	$ 22,200	$ 22,200	$ 22,200	$ 22,200	$ 22,200	
$ 7,402	$ 7,402	$ 7,402	$ 7,402	$ 7,402	$ 7,402	$ 7,402	$ 7,402	$ 7,402	$ 7,402	$ 7,402	$ 7,402	$ 7,402	$ 7,402	$ 7,402	$ 7,402	$ 7,402	$ 7,402	$ 7,402	$ 7,402	
$ 2,189	$ 2,189	$ 2,189	$ 2,189	$ 2,189	$ 2,189	$ 2,189	$ 2,189	$ 2,189	$ 2,189	$ 2,189	$ 2,189	$ 2,189	$ 2,189	$ 2,189	$ 2,189	$ 2,189	$ 2,189	$ 2,189	$ 2,189	
$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
$ 41,896	$ 41,896	$ 41,896	$ 41,896	$ 41,896	$ 41,896	$ 41,896	$ 41,896	$ 41,896	$ 41,896	$ 41,896	$ 41,896	$ 41,896	$ 41,896	$ 41,896	$ 41,896	$ 41,896	$ 41,896	$ 41,896	$ 41,896	
$ 1,370	$ 1,370	$ 1,370	$ 1,370	$ 1,370	$ 1,370	$ 1,370	$ 1,370	$ 1,370	$ 1,370	$ 1,370	$ 1,370	$ 1,370	$ 1,370	$ 1,370	$ 1,370	$ 1,370	$ 1,370	$ 1,370	$ 1,370	
$ 1,941	$ 1,941	$ 1,941	$ 1,941	$ 1,941	$ 1,941	$ 1,941	$ 1,941	$ 1,941	$ 1,941	$ 1,941	$ 1,941	$ 1,941	$ 1,941	$ 1,941	$ 1,941	$ 1,941	$ 1,941	$ 1,941	$ 1,941	
$ 1,100	$ 1,100	$ 1,100	$ 1,100	$ 1,100	$ 1,100	$ 1,100	$ 1,100	$ 1,100	$ 1,100	$ 1,100	$ 1,100	$ 1,100	$ 1,100	$ 1,100	$ 1,100	$ 1,100	$ 1,100	$ 1,100	$ 1,100	
$ 400	$ 400	$ 400	$ 400	$ 400	$ 400	$ 400	$ 400	$ 400	$ 400	$ 400	$ 400	$ 400	$ 400	$ 400	$ 400	$ 400	$ 400	$ 400	$ 400	
$ 4,200	$ 4,200	$ 4,200	$ 4,200	$ 4,200	$ 4,200	$ 4,200	$ 4,200	$ 4,200	$ 4,200	$ 4,200	$ 4,200	$ 4,200	$ 4,200	$ 4,200	$ 4,200	$ 4,200	$ 4,200	$ 4,200	$ 4,200	
$ 20,788	$ 20,788	$ 20,788	$ 20,788	$ 20,788	$ 20,788	$ 20,788	$ 20,788	$ 20,788	$ 20,788	$ 20,788	$ 20,788	$ 20,788	$ 20,788	$ 20,788	$ 20,788	$ 20,788	$ 20,788	$ 20,788	$ 20,788	
$ 36,000	$ 36,000	$ 36,000	$ 36,000	$ 36,000	$ 36,000	$ 36,000	$ 36,000	$ 36,000	$ 36,000	$ 36,000	$ 36,000	$ 36,000	$ 36,000	$ 36,000	$ 36,000	$ 36,000	$ 36,000	$ 36,000	$ 36,000	
$ 379	$ 379	$ 379	$ 379	$ 379	$ 379	$ 379	$ 379	$ 379	$ 379	$ 379	$ 379	$ 379	$ 379	$ 379	$ 379	$ 379	$ 379	$ 379	$ 379	
$ 1,685	$ 1,685	$ 1,685	$ 1,685	$ 1,685	$ 1,685	$ 1,685	$ 1,685	$ 1,685	$ 1,685	$ 1,685	$ 1,685	$ 1,685	$ 1,685	$ 1,685	$ 1,685	$ 1,685	$ 1,685	$ 1,685	$ 1,685	
$ 501	$ 501	$ 501	$ 501	$ 501	$ 501	$ 501	$ 501	$ 501	$ 501	$ 501	$ 501	$ 501	$ 501	$ 501	$ 501	$ 501	$ 501	$ 501	$ 501	
$ 2,675	$ 2,675	$ 2,675	$ 2,675	$ 2,675	$ 2,675	$ 2,675	$ 2,675	$ 2,675	$ 2,675	$ 2,675	$ 2,675	$ 2,675	$ 2,675	$ 2,675	$ 2,675	$ 2,675	$ 2,675	$ 2,675	$ 2,675	
$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
$ 827	$ 827	$ 827	$ 827	$ 827	$ 827	$ 827	$ 827	$ 827	$ 827	$ 827	$ 827	$ 827	$ 827	$ 827	$ 827	$ 827	$ 827	$ 827	$ 827	
$ 32,668	$ 32,668	$ 32,668	$ 32,668	$ 32,668	$ 32,668	$ 32,668	$ 32,668	$ 32,668	$ 32,668	$ 32,668	$ 32,668	$ 32,668	$ 32,668	$ 32,668	$ 32,668	$ 32,668	$ 32,668	$ 32,668	$ 32,668	
$ 6,000	$ 6,000	$ 6,000	$ 6,000	$ 6,000	$ 6,000	$ 6,000	$ 6,000	$ 6,000	$ 6,000	$ 6,000	$ 6,000	$ 6,000	$ 6,000	$ 6,000	$ 6,000	$ 6,000	$ 6,000	$ 6,000	$ 6,000	
$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
$ 24,000	$ 24,000	$ 24,000	$ 24,000	$ 24,000	$ 24,000	$ 24,000	$ 24,000	$ 24,000	$ 24,000	$ 24,000	$ 24,000	$ 24,000	$ 24,000	$ 24,000	$ 24,000	$ 24,000	$ 24,000	$ 24,000	$ 24,000	
$ 139.27	$ 139.27	$ 139.27	$ 139.27	$ 139.27	$ 139.27	$ 139.27	$ 139.27	$ 139.27	$ 139.27	$ 139.27	$ 139.27	$ 139.27	$ 139.27	$ 139.27	$ 139.27	$ 139.27	$ 139.27	$ 139.27	$ 139.27	
$ 442,234	$ 442,234	$ 441,222	$ 442,234	$ 442,234	$ 442,234	$ 442,234	$ 442,234	$ 442,234	$ 442,234	$ 442,234	$ 442,234	$ 442,234	$ 442,234	$ 442,234	$ 442,234	$ 442,234	$ 442,234	$ 442,234	$ 436,368	
0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	
265	265	264	265	265	265	265	265	265	265	265	265	265	265	265	265	265	265	262	259	
2041	2040	2037	2038	2039	2036	2035	2034	2033	2032	2031	2030	2029	2028	2027	2026	2025	2024	2023		
19	18	15	16	17	14	13	12	11	10	9	8	7	6	5	4	3	2	1		