# WATERVILLE ESTATES VILLAGE DISTRICT

## *WATER SYSTEM IMPROVEMENT PLAN*




***Prepared For: WEVD***

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# Executive Summary

## *Summary*

The Waterville Estates Village District (WEVD) owns and operates a small community water system, PWS ID #0341030. The water system serves approximately 560 residential units with growth potential for an additional 281 homes (Note: due to [slopes, etc.] only 1/3 of the lots may be buildable according to the 2025 NHDES Sanitary Survey). In 2024 the recorded average monthly water use was approximately 4.5 million gallons. The water system is supplied by two gravel packed dug wells and includes 6 pump stations and associated pumping equipment with chemical feed day tanks for treatment and control, 5 storage tanks and approximately 21 miles of water transmission and distribution main plus associated valves, blow-offs, and service laterals.

WEVD is expecting growth over the next few decades and is looking for a roadmap to prepare for this growth.

The water system assets included in this plan are summarized below.

| SUMMARY OF ASSETS | |
|---|---|
| **ASSET** | **INVENTORY** |
| WELLS | 2 |
| PUMP STATIONS | 6 |
| STORAGE TANKS | 5 |
| TREATMENT DAY TANKS | 2 |
| TRANSMISSION MAIN | 20,300 LF |
| DISTRIBUTION MAIN | 88,600 LF |
| GATE VALVES | 17 |
| PRESSURE REDUCING VALVES | 23 |
| BLOWOFFS | 15 |
| WATER METERS | 8 |
| APPROXIMATE SERVICE CONNECTIONS (CURRENT) | 560 |
| APPROXIMATE SERVICE CONNECTIONS (FULL BUILD-OUT) | 830 |

A detailed summary of each component is included in Appendix A and a map of these assets is included in Appendix B.

## *Conclusions*

The following conclusions are offered based on our investigation:

- Based on previous growth, the Waterville Estates Village District expects customer growth at a rate of roughly 2% over the next 25 years before reaching build-out capacity.
- Currently, the system serves approximately 560 customers and at full buildout will serve approximately 838 (Note: only 1/3 of the empty lots may be buildable per NHDES 2025 Sanitary Survey).

- The **measured** system water supply is at 65% of its rated capacity.
- The **by-rule** system water supply is at 96% of its rated capacity.
- The **by-rule** system water storage is at 97% of its capacity.
- The current rate structure will cover current operating costs in 2025 based on the budgeted revenue and expense reports provided by WEVD.
- To pay for the proposed system improvements over the next 15 years, user rates should be increased by 8% annually (5% for inflation and 3% for improvements).

### *Recommendations*

The district's plan for improving the overall management of the system includes the following:

- The current rate structure is based on the number of bedrooms in a house. The district had planned to install meters at each home. However, in 2023, a vote was held, and it was decided that meters would not be installed for customer usage. It is **highly** recommended that WEVD re-evaluate this decision and install meters for all users.
- Water loss is a metric that describes the overall health of a water system and WEVD is unable to determine their water loss without meters at all user locations. It is recommended to not only install meters at user locations but also to install meters at all transmission line segments and isolated zones to determine where water loss is occurring.
- Both increased storage and an additional water source are recommended to be implemented before system expansion.
- Currently the water operator is working to track system component locations. A GIS mapping system that can be used during all repairs and construction would help with mapping confirmation. This mapping is important for WaterCAD modelling accuracy. It is recommended to purchase a GIS tablet and subscription. Verdantas can provide this service.
- The current treatment method for pH adjustment is caustic soda which is extremely corrosive and dangerous for operators to handle and mix. It is recommended that the caustic soda be replaced with soda ash, a much safer alternative for the operator to use. The system has also seen pH readings of up to 9; soda ash should help maintain a slightly lower pH.
- The aeration system at Ski-Bowl is in poor condition and obsolete. It is recommended to eliminate the aeration process.
- The treatment system utilizes pH and chlorine analyzers. However, the operator still must manually adjust each of these to meet water quality standards. Integrating controls within the SCADA system that enable flow pacing of feed pumps to operator-defined programmable setpoints is advisable.

# 1. Introduction

This Water System Improvement Plan for the Waterville Estates, in Campton, NH describes how the utility should manage their infrastructure assets. Customer service demands and regulations require utilities to actively manage drinking water assets through careful maintenance, repair, and replacement decisions. This plan serves as an effective tool for combining technical, managerial, and financial practices to ensure clean water is provided at an appropriate cost.

## *1.1 Development of the Plan*

Horizons Engineering, Inc. (A Verdantas Company) performed the following tasks for the development of the Water System Improvement Plan:

A. *System Information Review and Base Map Update*:
Horizons coordinated with the Commissioners and the New Hampshire Department of Environmental Services (NHDES) to refine the project approach, goals, and ensure adequate understanding of the current system. An inventory of the system components was created using information collected from the field visit and file reviews, and included details such as system age, repair history, and other pertinent information. Horizons also generated a system map displaying pipe sizes, tank and booster station locations, etc.

The information review summary is included in Appendix C and an updated base map is attached in Appendix B.

B. *Hydraulic Model*
A WaterCAD hydraulic model was prepared to assess pressure and flow characteristics. The model was used to assess current conditions and project full build-out. The model helped to assess critical areas of the distribution system, identify which areas of system main are undersized, and identify the need for additional source, storage and/or booster station capacity.

The completed hydraulic model including system map and model output were included with the final submission of this report.

C. *Preliminary Water Source Review*
Horizons completed a review of the existing well field. Horizons assessed the ability of the existing source to meet projected demand, the need for water treatment and well field maintenance, and overall source sustainability. Pumping test data was reviewed as well as water level data in the well field to assess the hydraulic influence under normal pumping conditions. The results are included in Appendix C.

D. *Water Usage, Leak History, Operations Costs and Rate Structure Review*
A review was also completed of historical water usage data (including either documented or estimated annual, monthly, daily, and peak hourly flows), leak history, current system operations costs, rate structure, and rates/revenue generation. Horizons used the results to quantify non-billed water loss and the impact of this loss on future build out capacity, operations costs, and revenue generation.

A summary of current water loss and existing rate structure, a proposed approach to addressing water loss and metering upgrades, and suggested modifications to rate structure including rates and connection fees included in Appendix C.

E. *Infrastructure Review, Permitting Summary, Capital Plan, and Funding Assessment*
After compiling the information gathered in Items A-D, Horizons assembled a list of priority infrastructure upgrades, along with associated conceptual opinions of probable cost, a capital planning schedule, and a summary of permitting requirements and applicable funding programs. The proposed work includes upgrades needed to meet existing demand and upgrades necessary to meet future build-out.

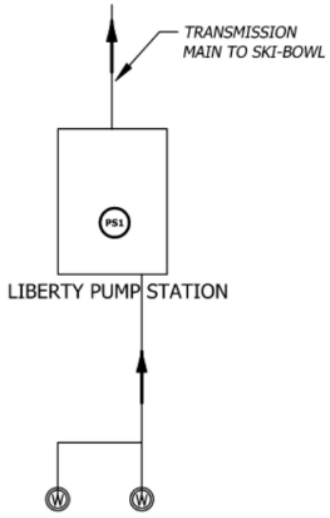
F. *Master Plan Compilation and Presentation*
Using the information gathered and prepared in scope Items A-E, Horizons prepared this comprehensive system Master Plan, which will be presented to the Commissioners and used as a planning tool for the water system.

# 2. Utility Overview

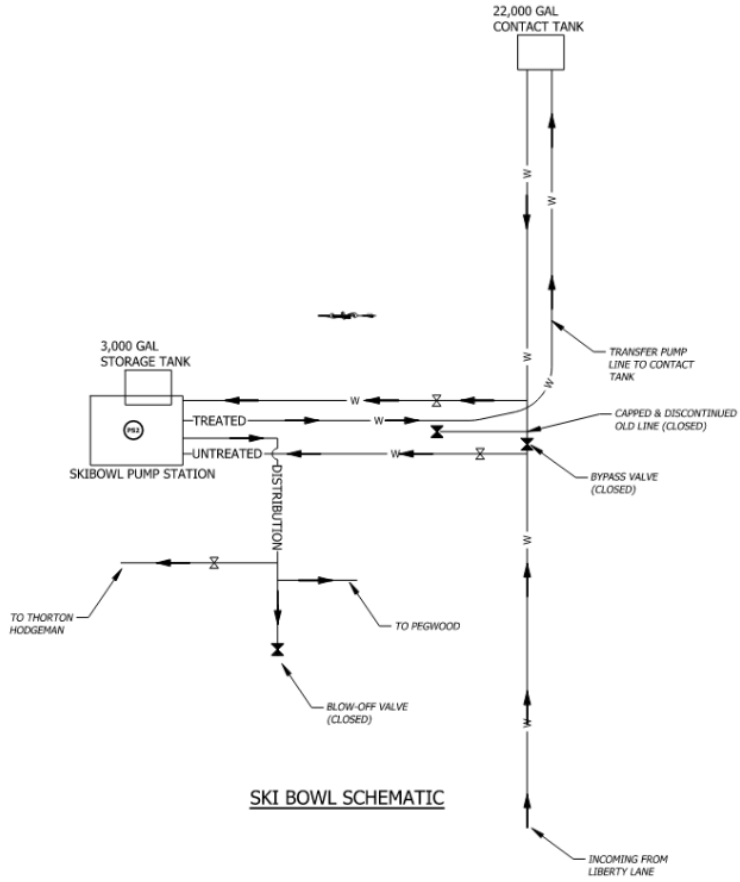
## *2.1 Existing Facilities*

A complete system map is included in Appendix B. Generally, the system operates as follows:

Water is drawn from two gravel packed dug wells located within the same well field at the Liberty Pump Station. From the Liberty pump station, water is pumped using two VFD pumps through a 4-inch, 3,800 LF transmission main to the Ski-Bowl Pump Station. The pumps operate as lead-lag, meaning the second pump will turn on when more demand is required.

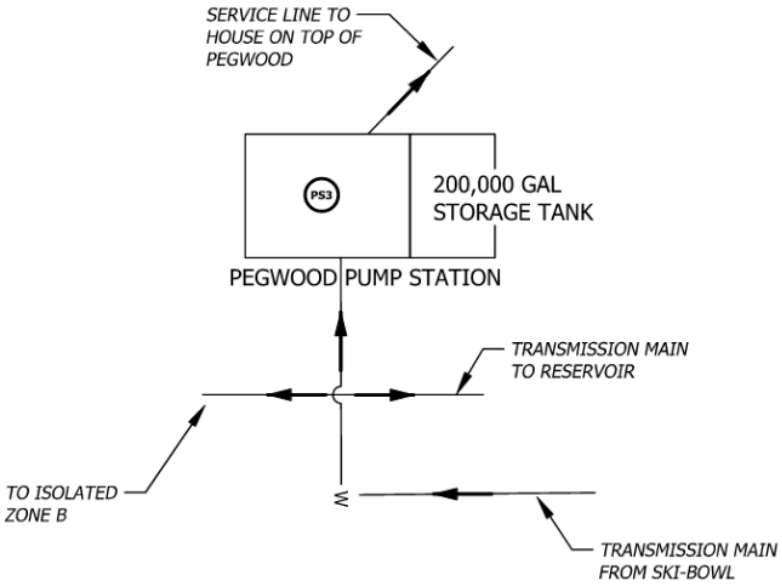



LIBERTY SCHEMATIC




SKI BOWL SCHEMATIC

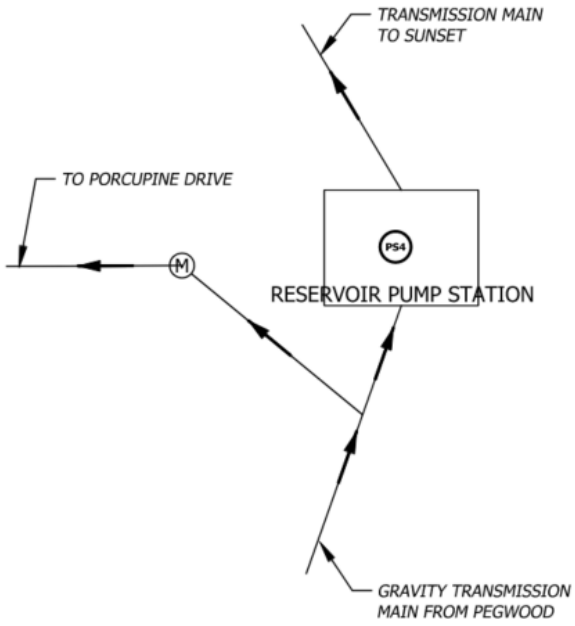
All treatment (pH adjustment and Chlorination) for the system occurs in the **Ski-Bowl station**. Water is aerated, then pumped into the Ski-Bowl 3,000 gallon holding tank before it is and treated with caustic soda (NaOH) and sodium hypochlorite (NaOCl) and transferred to the 22,000-gallon contact tank which sits 250’ southeast and 45’ vertically above Ski-Bowl. From the contact tank, water gravity flows back to Ski-Bowl where it is pumped through two VFD pumps to feed Zone A (Thorton Hodgeman Section) and a transmission line to the Pegwood Pump Station. There is a PRV that reduces the pressure from 180 psi to 60 psi on the Thorton Hodgeman distribution stub. The transmission line to Pegwood has two known users on the line.




PEGWOOD SCHEMATIC

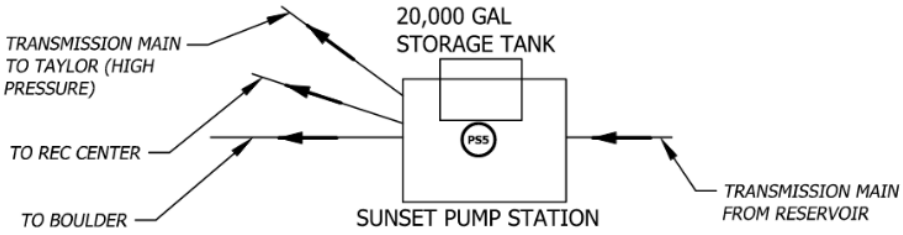
The **Pegwood Pump Station** serves Zone B through gravity flow, a single home on top of Pegwood Rd and a gravity transmission line leading to the Reservoir Pump Station that splits and feeds Bell Valley, David Thompson and Richardson Tr. The Pegwood Pump Station also includes a 200,000-gallon in-ground concrete storage tank.

The **Reservoir Pump Station** includes two VFD pumps and feeds Zone A, Zone C, Zone D and a 3,000 LF transmission line leading to the Sunset Pump Station.

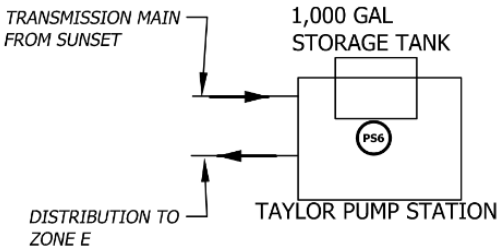



RESERVOIR SCHEMATIC

The **Sunset Pump Station** Includes a 20,000 gallon pneumatic water storage tank. Sunset feeds Zone A and a transmission line running to the highest point of the water system at the Taylor Pump Station.




SUNSET SCHEMATIC




The Taylor Pump Station feeds approximately 10 users and includes a 1,000-gallon atmospheric holding tank and feeds Zone E.

TAYLOR SCHEMATIC

## *2.2 Condition of Existing Facilities*

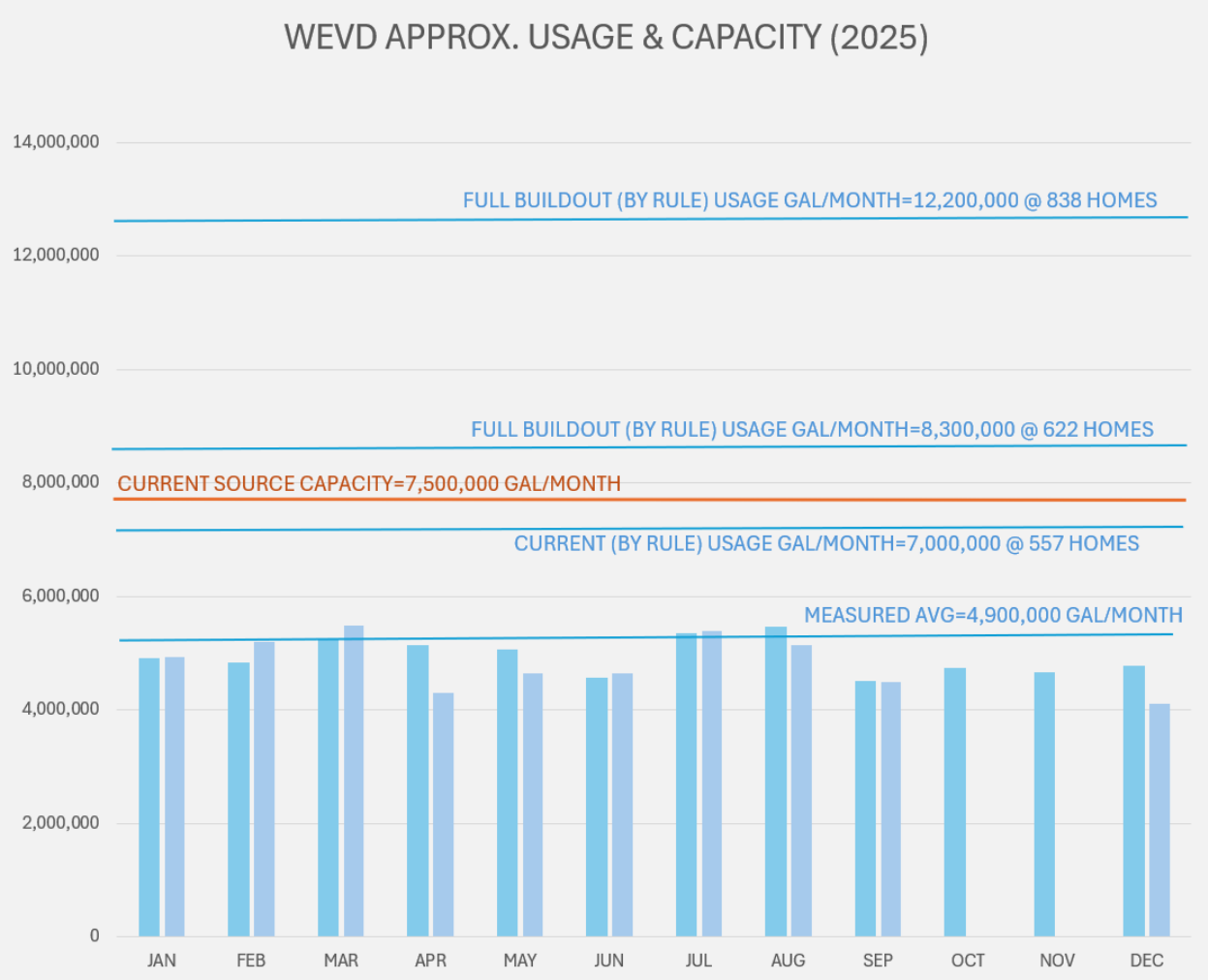
### 2.2.1 Source

Both wells are located roughly 400’ west and downslope of the Liberty Pump Station and are thought to be in good condition. The wells are both roughly 20’ deep and can produce 95-110 gpm each. In tandem, the pumps can produce 172 gpm.

| WATER SOURCE - LIBERTY WELLS | | | | | |
|---|---|---|---|---|---|
| WELL ID | CASING DIAMETER | WELL DEPTH | RATED CAPACITY (GPM) | MEASURED DAILY PRODUCTION (GPM) | % OF CAPACITY USED |
| DUG WELL 1 | 12" | 17' | 95 | 55 | 58% |
| DUG WELL 2 | 12" | 19' | 95 | 55 | 58% |
| IN TANDEM | | | 172 | 113 | 66% |

Metered data are available from the well source but there is no metering available from consumers to calculate water loss. The figure below shows actual usage measured during 2023 and 2024 from the

Liberty source along with calculated current usage, calculated source capacity and calculated expected usage at full development with approximately 622 (minimum based on NHDES 2025 Sanitary Survey Report) to 838 (maximum based on WEVD D&K Report) homes depending on buildability. The calculated current usage and calculated expected usage are based on the total number of bedrooms within the system at 150 gal/day per bedroom. The calculated capacity is based on the tandem well production of wells 1 and 2.




Measured data from the last two years indicates that the system is running at approximately 66% of its rated source capacity. This is based on the quotient of the produced flow to the source capacity.

### 2.2.2 Treatment, Controls and Structures

**Treatment / Controls:** The Ski-Bowl pump station contains two 1,000-gallon storage tanks. One filled with caustic liquid potash and the other for chlorination. Water moves from the Liberty Pump station to the Ski-Bowl Pump Station, where it is aerated, pumped to the contact tank, and then gravity-fed back for distribution to Zone A and Pegwood. The treatment is adjusted manually while the operator takes daily recordings. A SCADA system is used to record both pH and chlorine levels through analyzers in the Ski-Bowl station.



### 2.2.3 Storage Tanks

There are five storage tanks in the system, with a total capacity of roughly 245,000 gallons. The Sunset holding tank and the Ski-bowl holding tank are in very poor condition.

| STORAGE TANKS | | | | |
|---|---|---|---|---|
| **LOCATION** | **CAPACITY (GAL)** | **ELEVATION** | **TYPE** | **MATERIAL** |
| SKI-BOWL CONTACT TANK | 22,000 | 1,265 | ATMOSPHERIC | Metal (RUBBER LINED 2012) |
| SKI-BOWL HOLDING TANK | 3,000 | 1,220 | HOLDING | STEEL |
| PEGWOOD | 200,000 | 1,630 | ATMOSPHERIC | CONCRETE |
| SUNSET | 20,000 | 1,660 | HOLDING | STEEL |
| TAYLOR | 1,000 | 1,815 | HOLDING TANK | POLY |
| **TOTAL** | **246,000** | | | |

**Ski-Bowl Storage Tanks:**

The Ski-Bowl Pump Station includes two water storage tanks. Both tanks are thought to be installed in the 1980's. The 22,000-gallon atmospheric contact tank is in good condition and was lined with rubber in roughly 2012. The roughly 3,000-gallon steel holding tank is thought to be in very poor condition based on age and exterior tank condition.



**Pegwood Storage Tank:**

The Pegwood 200,000-gallon atmospheric tank was installed in 2006 and is in very good condition. Pegwood gravity feeds to zones B, D and the Reservoir pump station.





**Sunset Storage Tank**

The sunset 20,000-gallon steel holding tank is in very poor condition. Its estimated installation year is 1980 and it feeds zone A and the Taylor pump station.

**Taylor Storage Tank**

The Taylor plastic 1,000 gallon holding tank is in fair condition and was installed in roughly 2005. It feeds zone E (Approximately 10 homes) and sits at the highest elevation within the WEVD water system.



### 2.2.4 Pumping

The WEVD water system currently includes ten pumps ranging in size from 5HP to 25HP. The system schematic indicates pump locations, flow directions, and elevation scaling.

The Liberty Pump Station includes two 25HP submersible source pumps at the wells. The submersible pumps flow directly to the Ski-Bowl 5,000-gallon transfer tank through a transmission main. The pumps alternate each cycle and are controlled by the water level in the 22,000-gal Ski-Bowl holding tank.

From the transfer tank, two 5HP transfer pumps alternate each cycle and send water up to the 22,000-gallon contact tank which gravity flows down to the Ski-Bowl 20HP booster pumps (2). The Ski-Bowl booster pumps feed zone A (Including zone A1-A2) and the Pegwood Pump station through a transmission main.

The Pegwood Pump Station gravity feeds to zone B, a single home on top of Pegwoood with a pressure tank, and then gravity flows to the Reservoir Pump Station.

The Reservoir Pump Station uses a 7HP pump to feed zones A and C while pumping through a transmission main to the Sunset Pump Station.

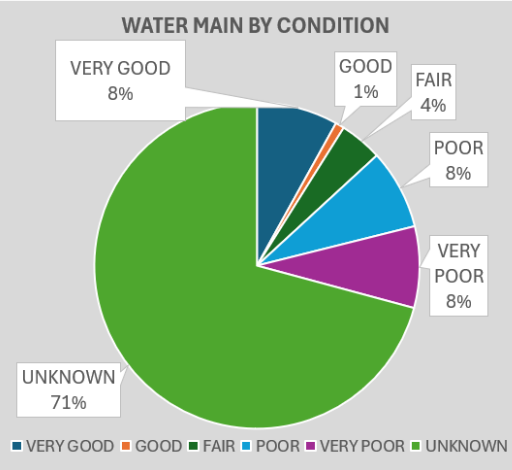
The Sunset Pump Station uses two alternating 10HP pumps to feed the Taylor Pump Station and zone A. This pump station is in very poor condition.

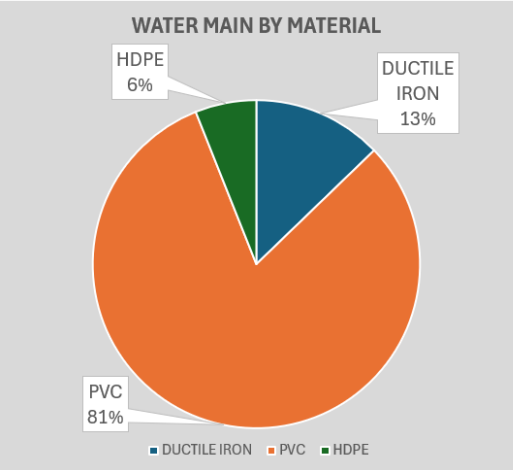
Finally, the Taylor Pump Station feeds zone D which only includes approximately 8 users.

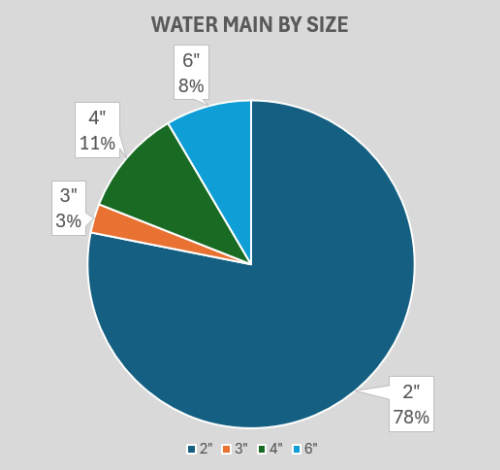
### 2.2.5 Watermain and Appurtenances

The WEVD distribution system consists of roughly 107,500 LF (20 miles) of distribution and transmission watermain. The water system is thought to have been first constructed in the 1980's and some of the original water main is still in use today. It includes PVC, HDPE, and Ductile Iron piping ranging in size from 2 to 6 inches in diameter. There are approximately 15 blowoffs, 17 gate valves, 23 PRV's throughout the system and there are no fire hydrants. The WEVD has no intention of upgrading the system for fire flow.

**Piping:** Water main age is largely unknown; therefore, The Village District should keep records of pipe condition during any repairs in the excel document that is provided with this water system improvement plan. The following figures illustrate the distribution by condition, material, and size.




**Valves:** The WEVD system includes approximately 17 known gate valves. Some of the gate valves that are used to isolate zones are still connected to offline water main and remain closed. These valves should be removed and the lines capped where necessary, or at a minimum, temporarily have the access boxes removed so operators cannot accidentally mix the zones and alter pressures.

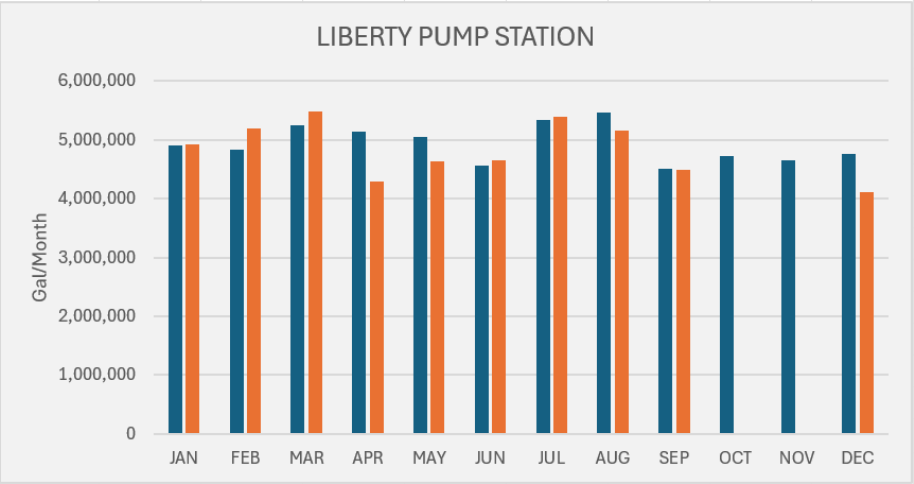
**Meters:** There are 8 meters within the WEVD system. Data collected from the Liberty, Reservoir and Sunset meters over the last two years was very consistent. However, the remaining meters showed large periods of time with no recordings. The most valuable meter is located at the Liberty pump station, the system source, which provides the total volume used.

The Liberty meter indicates consistent usage between 2023 and 2024, whereas Reservoir and Sunset show large variations in their usage. This is partially due to the smaller volumes being pumped through these locations, but it is also an indication of potential water losses and system problems in general.

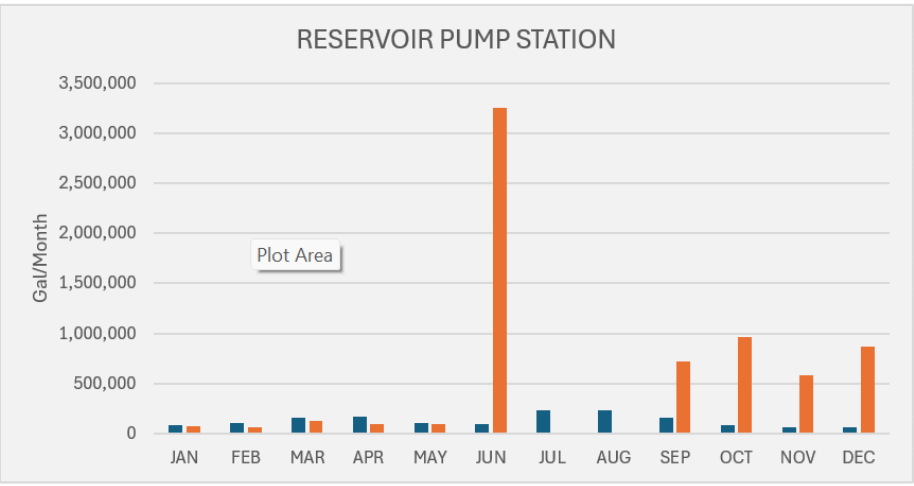
| METER ID# | LOCATION | COND |
|---|---|---|
| 1 | BOULDER | FAILED |
| 2 | LIBERTY | WORKING |
| 3 | PEGWOOD FILL | FAILED |
| 4 | PEGWOOD MID | FAILED |
| 5 | RESERVOIR | WORKING |
| 6 | SUNSET/WANOSHA | FAILED |
| 7 | THORTON HODGEMAN | FAILED |
| 8 | SOUTH MTN | FAILED |

Metered usage data is shown below for the two working meters as well as sunset which was working until July of 2024.

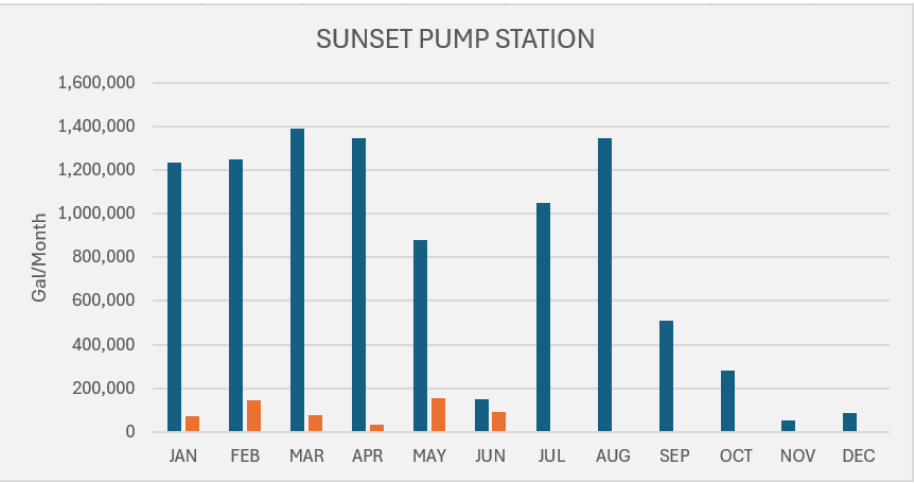
| LIBERTY (Gal/Month) | | |
|---|---|---|
| MONTH | 2023 | 2024 |
| JAN | 4,898,881 | 4,925,500 |
| FEB | 4,829,050 | 5,192,525 |
| MAR | 5,251,075 | 5,484,125 |
| APR | 5,138,188 | 4,299,613 |
| MAY | 5,050,425 | 4,636,975 |
| JUN | 4,568,700 | 4,650,200 |
| JUL | 5,340,600 | 5,390,113 |
| AUG | 5,463,950 | 5,148,963 |
| SEP | 4,501,138 | 4,485,875 |
| OCT | 4,726,075 | |
| NOV | 4,651,738 | |
| DEC | 4,762,663 | 4,117,405 |
| **TOTAL** | **59,182,482** | **48,331,294** |




| RESERVOIR (Gal/Month) | | |
|---|---|---|
| MONTH | 2023 | 2024 |
| JAN | 83,941 | 67,097 |
| FEB | 102,847 | 64,997 |
| MAR | 154,306 | 124,991 |
| APR | 162,659 | 90,181 |
| MAY | 107,419 | 96,594 |
| JUN | 92,544 | 3,255,597 |
| JUL | 226,088 | |
| AUG | 234,169 | |
| SEP | 158,544 | 713,956 |
| OCT | 83,359 | 959,694 |
| NOV | 66,094 | 584,588 |
| DEC | 59,778 | 868,050 |
| **TOTAL** | **1,531,748** | **6,825,745** |




| SUNSET (Gal/Month) | | |
|---|---|---|
| MONTH | 2023 | 2024 |
| JAN | 1,236,563 | 71,022 |
| FEB | 1,251,191 | 144,534 |
| MAR | 1,391,281 | 78,606 |
| APR | 1,346,313 | 32,888 |
| MAY | 877,925 | 155,856 |
| JUN | 151,884 | 92,975 |
| JUL | 1,048,819 | |
| AUG | 1,347,644 | |
| SEP | 510,956 | |
| OCT | 281,163 | |
| NOV | 49,959 | |
| DEC | 84,266 | |
| **TOTAL** | **9,577,964** | **575,881** |




District users voted not to install individual meters for each customer in 2023. Therefore, there is currently no way to measure water loss without meters placed at all homes/users. Installing water meters at all user locations would resolve this issue and provide valuable data. Typically, a system with water meters would measure the following:

- Water Sold (Measured with residential meters at each house)
- Water Pumped (Measured at Liberty)
- Water Flushed (Estimated by Operator)
- Water Lost = Pumped – (Sold - Flushed)
- **Water Loss = Water Lost / Water Pumped**

### *2.3 Asset Valuation*

The 2025 estimated replacement cost for the WEVD is $20.4 million. The table below represents an approximate value of the assets owned by the utility. Values are based on 2025 replacement costs. For a detailed breakdown of assets, see Appendix C.

| WEVD - SYSTEM VALUATION (2025) | | | |
|---|---|---|---|
| **COMPONENT** | **DESCRIPTION** | **REPLACEMENT COST** | |
| WATER MAIN | 107,500 LF | $ | 18,816,000.00 |
| LIBERTY | PUMPHOUSE & WELLS | $ | 297,000.00 |
| PEGWOOD | PUMP HOUSE & TANK | $ | 237,000.00 |
| RESERVOIR | PUMP HOUSE | $ | 132,000.00 |
| TAYLOR | PUMP HOUSE & TANK | $ | 128,000.00 |
| SKI-BOWL | PUMP HOUSE & TANKS | $ | 308,000.00 |
| SUNSET | PUMP HOUSE & TANK | $ | 217,000.00 |
| PRV'S | 23 VAULTS | $ | 230,000.00 |
| **SYSTEM VALUE** | **$** | | **20,365,000.00** |

It should be noted that these unit costs are estimates and can vary greatly by the project size and other site-specific factors such as ledge, wetlands, work within state highways or railroads rights of way. These costs are intended for general budgeting guidance and as specific projects are developed an opinion of probable construction costs should be completed for the specific project scope.

## 3. Asset Management Strategy

### *3.1 General*

Using the best available information from existing mapping, field observation and discussion with the water system operator, an inventory of the water system assets was developed, and the overall condition of system components quantified.

The water system assets that are included in this plan are as follows:

- Water distribution and transmission mains
- Blowoffs
- Water supply wells
- Pump Stations
- Water storage tanks
- Pressure reducing vaults

An excel spreadsheet was developed to summarize existing inventory, condition, installation date, useful life, and other data points. This inventory data was used to calculate the consequences of failure,

probability of failure and risk. The spreadsheet has been provided to the WEVD with the water system improvement plan.

The mapping of existing assets was previously completed and updated during this project. A map is provided in Appendix B.

### *3.2 Condition Assessment*

As part of the inventory, the conditions of assets were determined based on the age of the component, physical inspection (if possible) and operator knowledge. They were placed in one of six categories as follows:

| CONDITION | POF |
|---|---|
| VERY POOR | 5 |
| POOR | 4 |
| FAIR | 3 |
| GOOD | 2 |
| VERY GOOD | 1 |
| UNKNOWN | 3 |

### *3.3 Risk Assessment*

Risk is the product of the following two key factors:

1. **Probability of Failure** – the likelihood that an asset will fail

Probability of Failure (PoF) is based on the condition of the asset, estimated useful life, estimated remaining life, and operator knowledge. If an asset can provide the same or similar service as another asset, the consequence of failure is not as significant, and the life of an asset may also be extended. Probability of Failure is rated on a scale of 1 to 5 with 5 indicating certain failure. Probability of failure is directly based on the condition of an asset.

2. **Consequence of failure** – the impact a failed asset will have on the system and customer

Consequence of Failure (CoF) estimates the degree of impact on the utility service should the asset fail. It is rated on a scale of 1 to 5 as well with 5 indicating extreme consequences. Consequence of failure is based on operator knowledge and redundancy.

Risk is calculated by multiplying the probability of failure by the consequence of failure. The table below shows the risk category, score, and their required actions.

| COF | COF VALUE | POF | POF VALUE | Risk Score | Risk Category | Response |
|---|---|---|---|---|---|---|
| VERY HIGH | 5 | VERY HIGH | 5 | 21 to 25 | Very High | Immediate Attention |
| HIGH | 4 | HIGH | 4 | 16 to 20 | High | Aggressive Monitoring |
| MEDIUM | 3 | MEDIUM | 3 | 11 to 15 | Medium | Monitoring |
| LOW | 2 | LOW | 2 | 6 to 10 | Low | Routine Maintenance |
| VERY LOW | 1 | VERY LOW | 1 | 0 to 5 | Very Low | Preventative Maintenance |

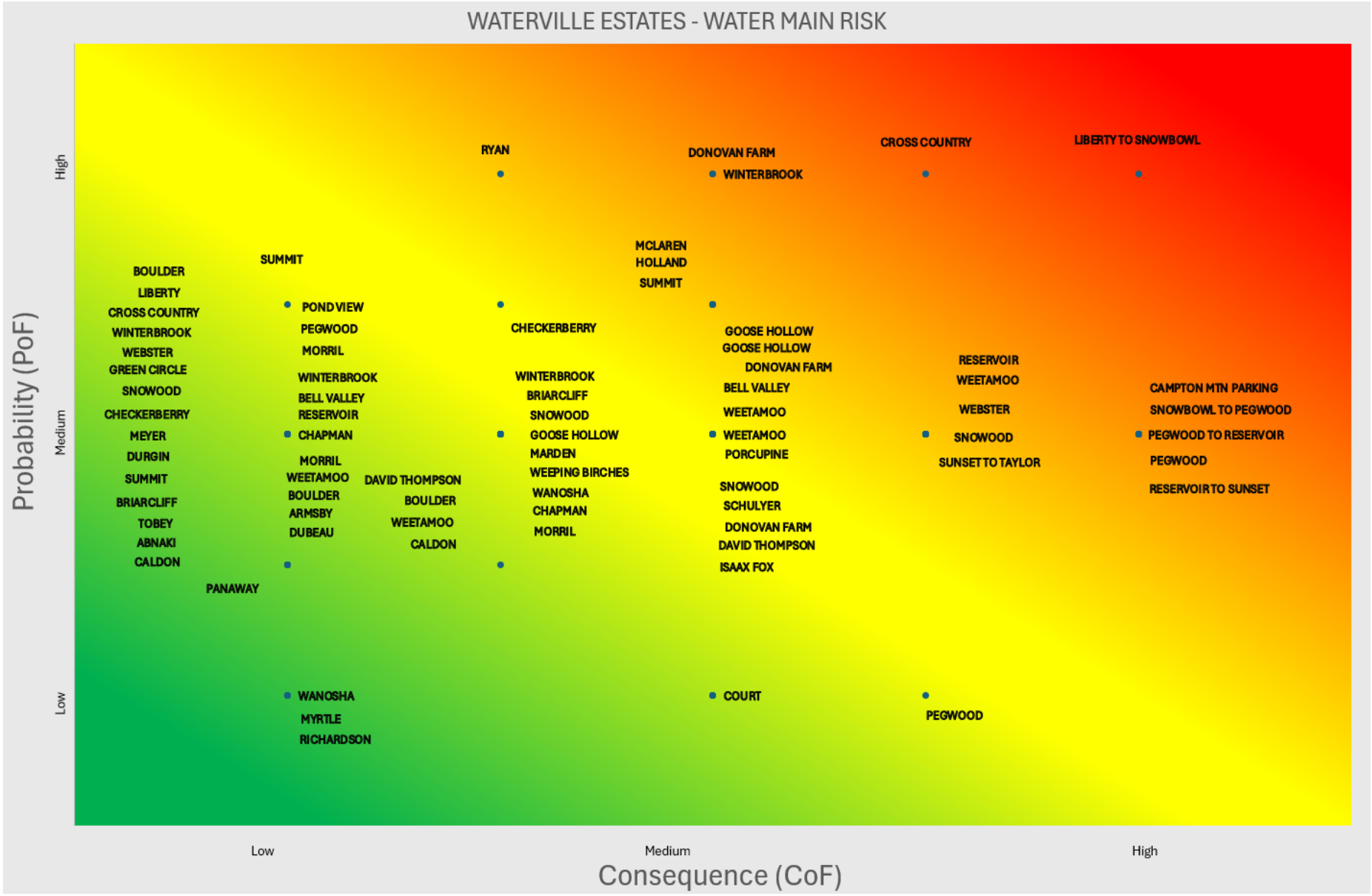
### *3.4 Summary of Critical Assets*

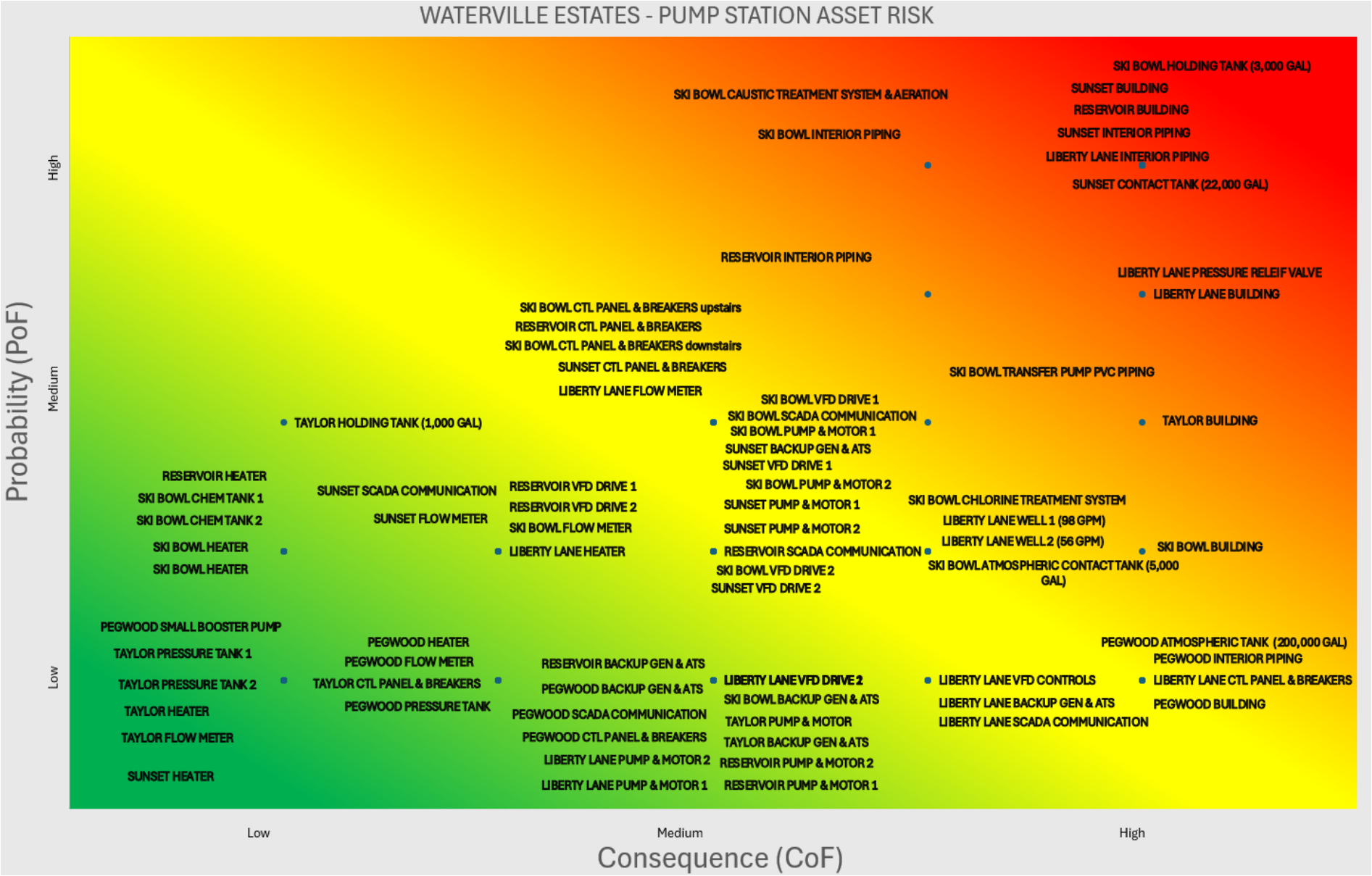
Some assets are more important than others in ensuring that customers receive safe drinking water. They may be important due to the social, economic, or environmental consequences should the asset fail.

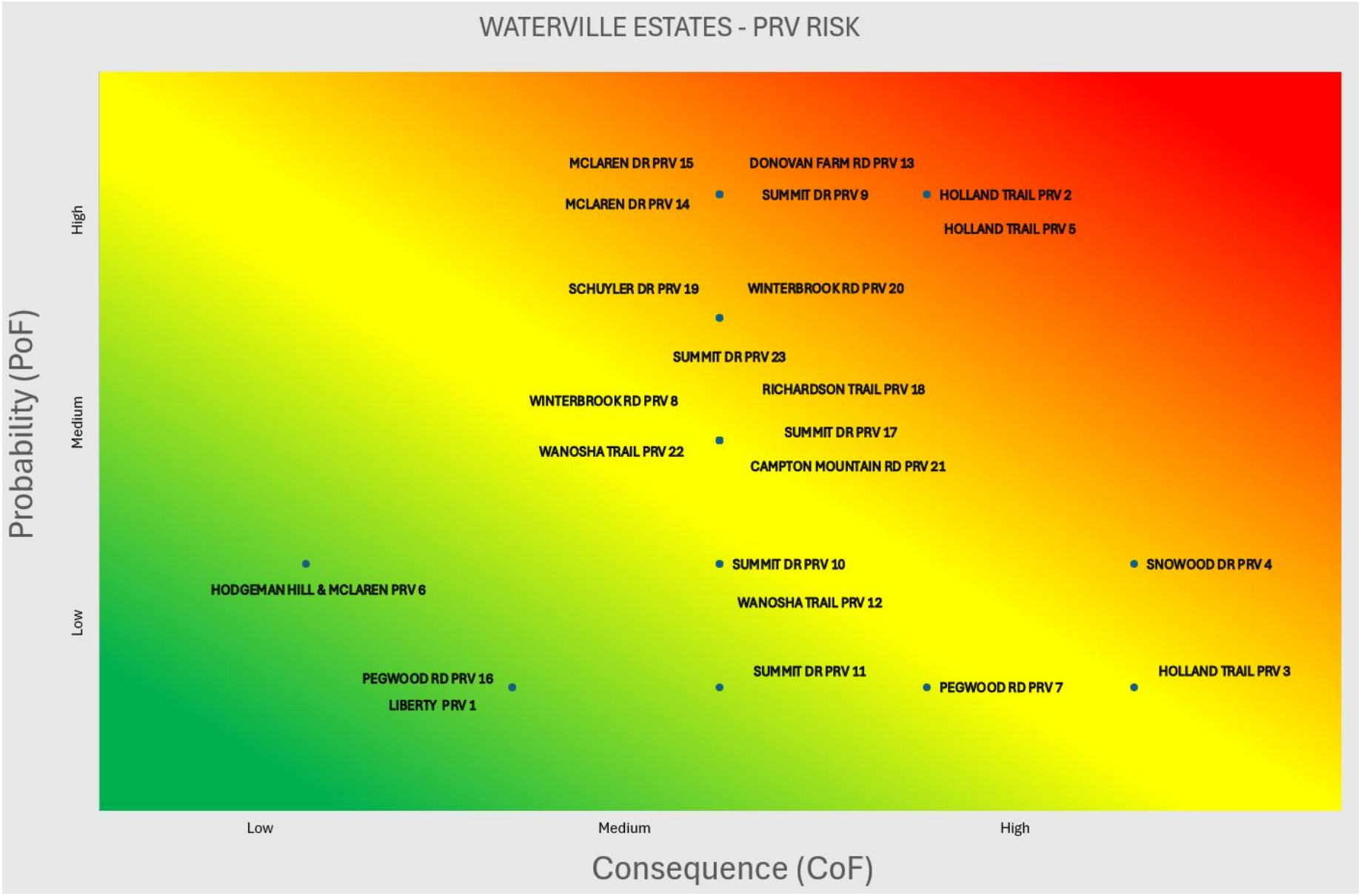
This risk assessment is used to identify the highest priority assets and set funding strategies accordingly. The table above identifies assets to consider for replacement during the 15-year planning period due to their estimated useful life, condition, and risk rating. The methods used to compute the risk scores above have a direct relationship to the accuracy of the input information. The high-risk items have been discussed with the WEVD to better refine the process of developing a capital improvement plan.

The following matrices illustrate the calculation of risk. The lower left quadrant of the matrix indicates assets that are low risk while the upper right quadrant indicates assets that are high risk. To better organize assets, three matrices were built, one for distribution piping, one for pump station components, and finally one for pressure reducing valves. The lower left quadrant data points may not have labels for readability purposes. The entire asset lists with associated risk scores can be found in Appendix A. The condition of each asset will change over time therefore it is important to review and adjust the risk assessment on a regular basis or as assets are replaced.

| TYPE | LOCATION | DESCRIPTION | RISK SCORE | RISK |
|---|---|---|---|---|
| WATER MAIN | LIBERTY TO SNOWBOWL | PS1 TO PS2 | 25 | Very High |
| PUMP STATION | LIBERTY LANE | LIBERTY LANE INTERIOR PIPING | 25 | Very High |
| PUMP STATION | RESERVOIR | RESERVOIR BUILDING | 25 | Very High |
| PUMP STATION | SKI BOWL | SKI BOWL HOLDING TANK (3,000 GAL) | 25 | Very High |
| PUMP STATION | SUNSET | SUNSET BUILDING | 25 | Very High |
| PUMP STATION | SUNSET | SUNSET CONTACT TANK (22,000 GAL) | 25 | Very High |
| PUMP STATION | SUNSET | SUNSET INTERIOR PIPING | 25 | Very High |
| WATER MAIN | CROSS COUNTRY | A11 TO A12 | 20 | High |
| PUMP STATION | LIBERTY LANE | LIBERTY LANE BUILDING | 20 | High |
| PUMP STATION | LIBERTY LANE | LIBERTY LANE PRESSURE RELEIF VALVE | 20 | High |
| PUMP STATION | SKI BOWL | SKI BOWL INTERIOR PIPING | 20 | High |
| PUMP STATION | SKI BOWL | SKI BOWL CAUSTIC TREATMENT SYSTEM & AERATION | 20 | High |
| PRV | HOLLAND TRAIL | PRV 2 | 20 | High |
| PRV | HOLLAND TRAIL | PRV 5 | 20 | High |
| PUMP STATION | RESERVOIR | RESERVOIR INTERIOR PIPING | 16 | High |
| WATER MAIN | SNOWBOWL TO PEGWOOD | PS2 TO PS3 | 15 | Medium |
| WATER MAIN | PEGWOOD TO RESERVOIR | PS3 TO PS4 | 15 | Medium |
| WATER MAIN | RESERVOIR TO SUNSET | PS4 TO PS5 | 15 | Medium |
| WATER MAIN | CAMPTON MTN PARKING | PS2 TO A1 | 15 | Medium |
| WATER MAIN | WINTERBROOK | A27 TO A28 | 15 | Medium |
| WATER MAIN | DONOVAN FARM | A28 TO A29 | 15 | Medium |
| WATER MAIN | CROSS COUNTRY | PS4 TO D1 | 15 | Medium |
| WATER MAIN | PEGWOOD | PS3 TO B1 | 15 | Medium |
| WATER MAIN | PEGWOOD | B1 TO B2 | 15 | Medium |
| PUMP STATION | TAYLOR | TAYLOR BUILDING | 15 | Medium |
| PRV | SUMMIT DR | PRV 9 | 15 | Medium |
| PRV | DONOVAN FARM RD | PRV 13 | 15 | Medium |
| PRV | MCLAREN DR | PRV 14 | 15 | Medium |
| PRV | MCLAREN DR | PRV 15 | 15 | Medium |
| WATER MAIN | SUNSET TO TAYLOR | PS5 TO PS6 | 12 | Medium |
| WATER MAIN | CROSS COUNTRY | A1 TO A2 | 12 | Medium |
| WATER MAIN | CROSS COUNTRY | A2 TO A3 | 12 | Medium |
| WATER MAIN | SNOWOOD | A3 TO A4 | 12 | Medium |
| WATER MAIN | HOLLAND | A5 TO A7 | 12 | Medium |
| WATER MAIN | WEBSTER | A1 TO A11 | 12 | Medium |
| WATER MAIN | SUMMIT | A20 TO A21 | 12 | Medium |
| WATER MAIN | SUMMIT | A22 TO A25 | 12 | Medium |
| WATER MAIN | CROSS COUNTRY | A30 TO PS4 | 12 | Medium |
| WATER MAIN | WEETAMOO | A21 TO A31 | 12 | Medium |
| WATER MAIN | RESERVOIR | PS4 TO A35 | 12 | Medium |
| WATER MAIN | RESERVOIR | A35 TO A36 | 12 | Medium |
| WATER MAIN | WEETAMOO | PS5 TO A31 | 12 | Medium |
| WATER MAIN | MCLAREN | B4 TO B5 | 12 | Medium |
| PUMP STATION | SKI BOWL | SKI BOWL TRANSFER PUMP PVC PIPING | 12 | Medium |
| PRV | SCHUYLER DR | PRV 19 | 12 | Medium |
| PRV | WINTERBROOK RD | PRV 20 | 12 | Medium |


WATERVILLE ESTATES - WATER MAIN RISK
Probability (PoF)
High
Medium
Low
Low
Medium
High
Consequence (CoF)
BOULDER
LIBERTY
CROSS COUNTRY
WINTERBROOK
WEBSTER
GREEN CIRCLE
SNOWOOD
CHECKERBERRY
MEYER
DURGIN
SUMMIT
BRIARCLIFF
TOBEY
ABNAKI
CALDON
PANAWAY
SUMMIT
POND VIEW
PEGWOOD
MORRIL
WINTERBROOK
BELL VALLEY
RESERVOIR
CHAPMAN
MORRIL
WEETAMOO
BOULDER
ARMSBY
DUBEAU
DAVID THOMPSON
BOULDER
WEETAMOO
CALDON
WANOSHA
MYRTLE
RICHARDSON
RYAN
CHECKERBERRY
WINTERBROOK
BRIARCLIFF
SNOWOOD
GOOSE HOLLOW
MARDEN
WEEPING BIRCHES
WANOSHA
CHAPMAN
MORRIL
MCLAREN
HOLLAND
SUMMIT
DONOVAN FARM
WINTERBROOK
GOOSE HOLLOW
GOOSE HOLLOW
DONOVAN FARM
BELL VALLEY
WEETAMOO
WEETAMOO
PORCUPINE
SNOWOOD
SCHULYER
DONOVAN FARM
DAVID THOMPSON
ISAAX FOX
COURT
CROSS COUNTRY
RESERVOIR
WEETAMOO
WEBSTER
SNOWOOD
SUNSET TO TAYLOR
PEGWOOD
LIBERTY TO SNOWBOWL
CAMPTON MTN PARKING
SNOWBOWL TO PEGWOOD
PEGWOOD TO RESERVOIR
PEGWOOD
RESERVOIR TO SUNSET


WATERVILLE ESTATES - PUMP STATION ASSET RISK
Probability (PoF)
High
Medium
Low
SKI BOWL HOLDING TANK (3,000 GAL)
SUNSET BUILDING
RESERVOIR BUILDING
SUNSET INTERIOR PIPING
LIBERTY LANE INTERIOR PIPING
SUNSET CONTACT TANK (22,000 GAL)
SKI BOWL CAUSTIC TREATMENT SYSTEM & AERATION
SKI BOWL INTERIOR PIPING
RESERVOIR INTERIOR PIPING
LIBERTY LANE PRESSURE RELEIF VALVE
LIBERTY LANE BUILDING
SKI BOWL CTL PANEL & BREAKERS upstairs
RESERVOIR CTL PANEL & BREAKERS
SKI BOWL CTL PANEL & BREAKERS downstairs
SUNSET CTL PANEL & BREAKERS
LIBERTY LANE FLOW METER
SKI BOWL TRANSFER PUMP PVC PIPING
SKI BOWL VFD DRIVE 1
SKI BOWL SCADA COMMUNICATION
SKI BOWL PUMP & MOTOR 1
TAYLOR HOLDING TANK (1,000 GAL)
TAYLOR BUILDING
SUNSET BACKUP GEN & ATS
SUNSET VFD DRIVE 1
RESERVOIR HEATER
SKI BOWL CHEM TANK 1
SKI BOWL CHEM TANK 2
SUNSET SCADA COMMUNICATION
SUNSET FLOW METER
RESERVOIR VFD DRIVE 1
RESERVOIR VFD DRIVE 2
SKI BOWL FLOW METER
SKI BOWL PUMP & MOTOR 2
SUNSET PUMP & MOTOR 1
SKI BOWL CHLORINE TREATMENT SYSTEM
LIBERTY LANE WELL 1 (98 GPM)
SUNSET PUMP & MOTOR 2
LIBERTY LANE WELL 2 (56 GPM)
SKI BOWL HEATER
SKI BOWL HEATER
LIBERTY LANE HEATER
RESERVOIR SCADA COMMUNICATION
SKI BOWL BUILDING
SKI BOWL VFD DRIVE 2
SKI BOWL ATMOSPHERIC CONTACT TANK (5,000 GAL)
SUNSET VFD DRIVE 2
PEGWOOD SMALL BOOSTER PUMP
TAYLOR PRESSURE TANK 1
TAYLOR PRESSURE TANK 2
TAYLOR HEATER
TAYLOR FLOW METER
SUNSET HEATER
PEGWOOD HEATER
PEGWOOD FLOW METER
TAYLOR CTL PANEL & BREAKERS
PEGWOOD PRESSURE TANK
RESERVOIR BACKUP GEN & ATS
PEGWOOD BACKUP GEN & ATS
PEGWOOD SCADA COMMUNICATION
PEGWOOD CTL PANEL & BREAKERS
LIBERTY LANE PUMP & MOTOR 2
LIBERTY LANE PUMP & MOTOR 1
LIBERTY LANE VFD DRIVE 2
SKI BOWL BACKUP GEN & ATS
TAYLOR PUMP & MOTOR
TAYLOR BACKUP GEN & ATS
RESERVOIR PUMP & MOTOR 2
RESERVOIR PUMP & MOTOR 1
PEGWOOD ATMOSPHERIC TANK (200,000 GAL)
PEGWOOD INTERIOR PIPING
LIBERTY LANE VFD CONTROLS
LIBERTY LANE CTL PANEL & BREAKERS
LIBERTY LANE BACKUP GEN & ATS
PEGWOOD BUILDING
LIBERTY LANE SCADA COMMUNICATION
Low
Medium
High
Consequence (CoF)


WATERVILLE ESTATES - PRV RISK
Probability (PoF)
High
Medium
Low
MCLAREN DR PRV 15
DONOVAN FARM RD PRV 13
MCLAREN DR PRV 14
SUMMIT DR PRV 9
HOLLAND TRAIL PRV 2
HOLLAND TRAIL PRV 5
SCHUYLER DR PRV 19
WINTERBROOK RD PRV 20
SUMMIT DR PRV 23
WINTERBROOK RD PRV 8
RICHARDSON TRAIL PRV 18
SUMMIT DR PRV 17
WANOSHA TRAIL PRV 22
CAMPTON MOUNTAIN RD PRV 21
HODGEMAN HILL & MCLAREN PRV 6
SUMMIT DR PRV 10
SNOWOOD DR PRV 4
WANOSHA TRAIL PRV 12
PEGWOOD RD PRV 16
LIBERTY PRV 1
SUMMIT DR PRV 11
PEGWOOD RD PRV 7
HOLLAND TRAIL PRV 3
Low
Medium
High
Consequence (CoF)

# 4. Potential for Growth

## *4.1 Source Capacity*

WEVD currently draws water from two gravel packed dug wells located within the same well field at the Liberty Pump Station. The production of these wells was assessed by Horizons Engineering in June of 2025. The report on the assessment is available in Appendix C.

### 4.1.1 Current Source Capacity

Based on the Well 1 and Well 2 rated capacities of approximately 95 gpm each and 172 gpm in tandem, the following conclusions have been reached:

NHDES requires that while measured water usage data may be used for well production and storage assessment for currently developed areas of the system, any projected system build-out must use NHDES water use estimates as provided in state regulations (by-rule usage).

Based on **by-rule usage**:

| WATER SOURCE | PRODUCTION(GPM) | TANDEM PRODUCTION(GPM) | TANDEM PRODUCTION (GPD) | BY RULE USAGE (2023 & 2024) (GPD) |
|---|---|---|---|---|
| WELL 1 | 95 | 172 | 247,680 | 237,815 |
| WELL 2 | 95 | | | |
| **BY RULE % OF CAPACITY USED** | **LEFT OVER (GPD)** | | | |
| 96% | 9,865 | | | |
| **HOW MANY HOMES CAN BE ADDED TO THEY WEVD SYSTEM AT 100% WELL CAPACITY?** | **16** | | | |
| ASSUME 4 BR HOUSES (GPD) | 600 | | | |

- 16 four-bedroom houses could be added to the system before 100% of the well capacity is used based on the **by-rule usage**.
- The system is unable to add any more houses to the system as 80% capacity has already been surpassed based on the **by-rule usage**.

Once a system reaches 80% capacity of its production use it must plan for upgrades to accommodate proposed flows.

Based on **measured usage**:

| WATER SOURCE | PRODUCTION(GPM) | TANDEM PRODUCTION(GPM) | TANDEM PRODUCTION (GPD) | MEASURED USE (2023 & 2024) (GPD) |
|---|---|---|---|---|
| WELL 1 | 95 | 172 | 247,680 | 162,750 |
| WELL 2 | 95 | | | |
| **MEASURED % OF CAPACITY USED** | **LEFT OVER (GPD)** | | | |
| 66% | 84,930 | | | |
| **HOW MANY HOMES CAN BE ADDED TO THEY WEVD SYSTEM AT 100% WELL CAPACITY?** | **142** | | | |
| ASSUME 4 BR HOUSES (GPD) | 600 | | | |
| **HOW MANY HOMES CAN BE ADDED TO THEY WEVD SYSTEM AT 80% WELL CAPACITY?** | **59** | | | |
| ASSUME 4 BR HOUSES (GPD) | 600 | | | |

- 142 four-bedroom houses could be added to the system before 100% of the well capacity is used based on the **measured usage**.
- 59 four-bedroom houses could be added to the system before 80% of the well capacity is used based on the **measured usage**.

### 4.1.2 Source Capacity Required For Full Build-Out

The well production required for full build-out was determined in the Water Source Assessment available in Appendix C. The required full build-out production was determined to be 407,000 GPD. This leaves a new well production need of 160,000 GPD to achieve full build-out.

| ADDITIONAL REQUIRED WELL PRODUCTION FOR FULL BUILD-OUT | |
|---|---|
| PROJECTED FULL BUILD-OUT DESIGN FLOW (GPD) | 407,000 |
| WELL 1 & WELL 2 TANDEM PRODUCTION (GPD) | 247,000 |
| **ADDITIONAL PRODUCTION NEEDED PER NHDES REGULATIONS (GPD)** | **160,000** |

## *4.2 Storage Capacity*

WEVD currently has 240,000 gallons of atmospheric storage. Daily water demand and well production were used to determine the NHDES-required water storage capacity for the system.

### 4.2.1 Current Storage Capacity

Since the current design flow is 237,815 gpd, and the minimum flow from the smaller well is less than this, NHDES regulations require 100-percent of design flow available in atmospheric water storage capacity. This equates the current required water storage for WEVD at 237,815 gallons.

| CURRENT ATMOSPHERIC STORAGE CAPACITY | |
|---|---|
| DESIGN FLOW (GPD) | 237,815 |
| SINGLE WELL MIN FLOW (GPD) | 136,800 |
| RATIO | **0.575237** |
| STORAGE REQUIRED=DESIGN FLOW | 237,815 |
| APPROX. CURRENT STORAGE | 246,000 |
| **% CAPACITY USED** | **97%** |

Table 405-4: Requirement for Atmospheric Water Storage Capacity
For Water Systems That Have More Than One Source

| Minimum groundwater source capacity with largest producing well out-of-service | Atmospheric water storage capacity required |
|---|---|
| Peak flow | none required |
| 2.5 times the design flow | 25 percent of design flow |
| 1.5 times the design flow | 50 percent of design flow |
| Design flow | 75 percent of design flow |
| Less than design flow | 100 percent of design flow |

Because the WEVD system is at 97% of this storage capacity per NHDES rule, additional storage will soon be required.

### 4.2.2 Storage Capacity Required for Full Build-Out

The water storage required for full build-out was determined using NHDES water storage requirements for systems with multiple wells. The additional water source production required for full build-out was assumed to be coming from a single new well.

At full build-out, the well production was calculated to be 407,000 gpd. Since the minimum flow from the smaller well is less than this, NHDES requires 100-percent of the design flow available in atmospheric water storage capacity, or 407,000 gallons. With the capacity of the existing storage tanks, excluding the Sunset Drive 20,000-gallon storage tank because it is in poor condition and the operator would like it removed, an additional 181,000 gallons of water storage are required for full system build-out.

Table 405-4: Requirement for Atmospheric Water Storage Capacity
For Water Systems That Have More Than One Source

| Minimum groundwater source capacity with largest producing well out-of-service | Atmospheric water storage capacity required |
|---|---|
| Peak flow | none required |
| 2.5 times the design flow | 25 percent of design flow |
| 1.5 times the design flow | 50 percent of design flow |
| Design flow | 75 percent of design flow |
| Less than design flow | 100 percent of design flow |

| ADDITIONAL REQUIRED WATER STORAGE FOR FULL BUILD-OUT | |
|---|---|
| PROJECTED FULL BUILD-OUT DESIGN FLOW (GPD) - ALSO REQUIRED WELL PRODUCTION (GPD) | 407,000 |
| FULL BUILD-OUT LARGEST PRODUCTING WELL (GPD) | 160,000 |
| WELL PRODUCTION WITH LARGEST PRODUCTING WELL OUT-OF-SERVICE (GPD) | 247,000 |
| STORAGE REQUIRED WHEN WELL PRODUCTION WITH LARGEST PRODUCTION WELL OUT-OF-SERVICE IS LESS THAN THE DESIGN FLOW PER NHDES REGULATIONS | 100% OF ONE DAY'S DESIGN FLOW |
| **FULL BUILD-OUT WATER STORAGE REQUIRED (GALLONS)** | **407,000** |
| CURRENT PEGWOOD WATER STORAGE (GALLONS) | 200,000 |
| CURRENT SKI-BOWL CONTACT TANK (GALLONS) | 22,000 |
| CURRENT SKIBOWL HOLDING TANK (GALLONS) | 3,000 |
| CURRENT TAYLOR WATER STORAGE (GALLONS) | 1,000 |
| CURRENT SUNSET WATER STORAGE (GALLONS) - TO BE REMOVED | 20,000 |
| CURRENT WATER STORAGE EXCLUDING SUNSET DRIVE (GALLONS) | 226,000 |
| **ADDITIONAL WATER STORAGE REQUIRED (GALLONS)** | **181,000** |

WEVD should review this plan annually as part of the effort to prepare the annual budget and to adjust the goals and objectives as projects are completed. This document is not just a plan but a program.

### *4.3 Recommended Asset Improvements*

The following actions are recommended to improve the WEVD water infrastructure and prepare for further community build-out.

- **Add an additional water source.** Although the actual water usage indicates there is room for growth, another source should still be added to the system based on the by-rule usage and expected growth, which requires 140,000 gallons per day of additional water production.
- **Replace or Remove the Ski-bowl holding tank.** The steel holding tank is in very poor condition.
- **Install Chemical Injection Quills Upstream of the tank bypass.** Chemical feed quills should be installed further upstream (upstream of the tank bypass so that if/when the tank fails it can be taken offline without interrupting system treatment.
- **Replace or remove the Sunset Drive booster station and tank.** This pump station is in very poor condition. The WEVD operator expressed preference for its removal, if possible, which is evaluated in hydraulic model section of this report.
- **Expand storage at the Pegwood water tanks.** WEVD should consider expanding the storage at one of the system's high points while removing the Sunset Pump Station tank. With the capacity of the existing storage tanks, an additional 181,000 gallons of water storage are required for full system build-out. Per operator preference, it is suggested that another 200,000-gallon atmospheric tank be added at the Pegwood water storage location. This location was chosen as an initial site to investigate due to its elevation and existing equipment. There appears to be room for the additional storage tank, and it could be connected to the existing storage tank with isolation capabilities, allowing for the proposed two tanks to operate in tangent or isolation during repairs.
- **A fence should be installed around the Pegwood storage tank.** Fences are often placed around water system storage tanks to protect the health of its consumers from both intentional and accidental contamination.
- **Install water meters.** Water loss is a metric that describes the overall health of a water system and WEVD is unable to determine their water loss without meters at all user locations. It is recommended to not only install meters at user locations but also to install meters at all transmission line segments and isolated zones to determine where water loss is occurring.

# 5. Hydraulic Model

A water model for the Waterville Estates Village District water system was developed in WaterCAD, a definitive hydraulic model for pressurized-pipe networks. WaterCAD is owned and licensed by Bentley Systems. A copy of the calibrated model was provided with this report.

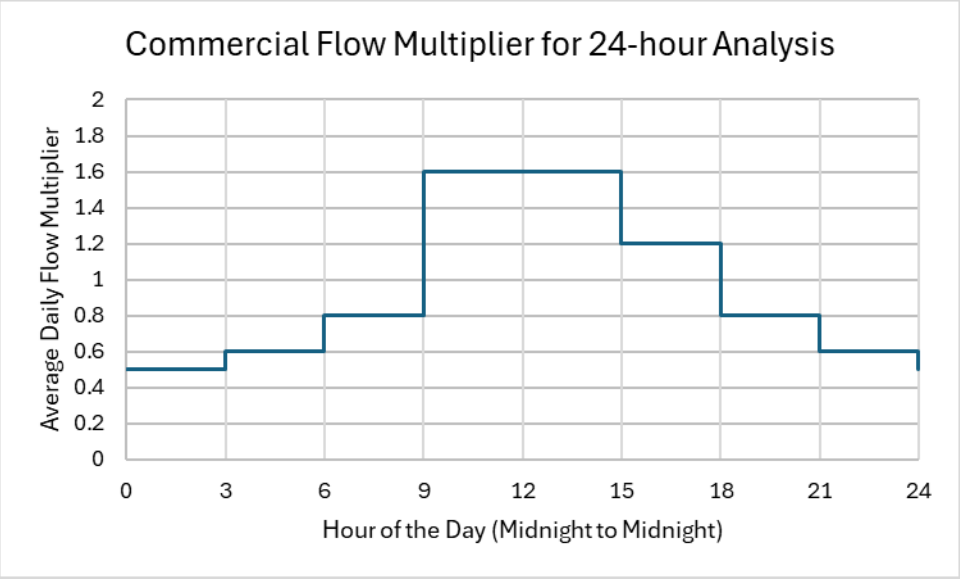
## *5.1 Model Development and Assumptions*

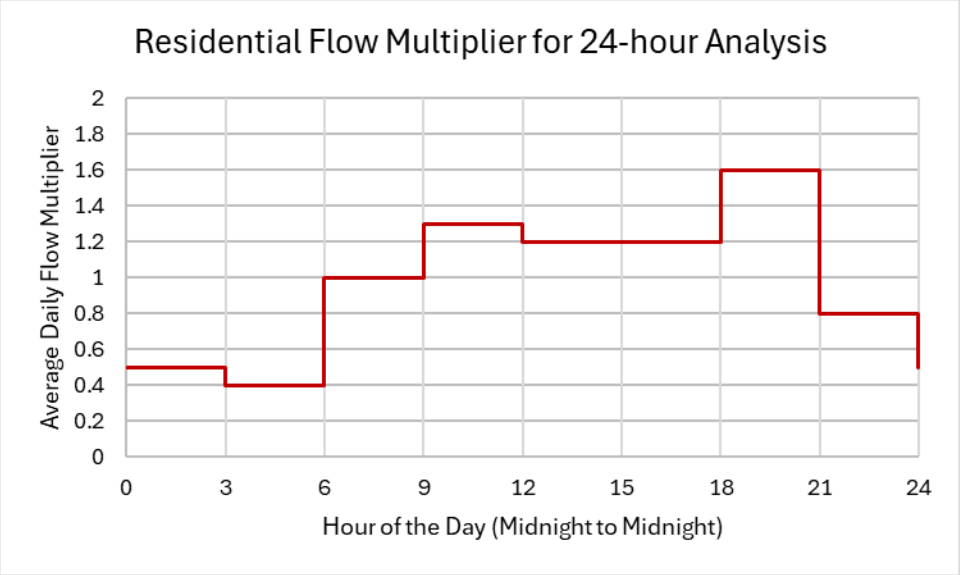
The water model was laid out according to the water distribution system map developed at the beginning of the project. Pipe diameters, material, and connections were all determined from mapping. Elevation data was taken from LiDAR for the area and from field survey. Water tank and pump model data was acquired from the operator. Average daily flow was derived from the daily flow data provided by the operator.

The following assumptions were made to create a working model:

| Model Assumptions |
|---|
| All pipe roughnesses at model default |
| Water demand is distributed evenly throughout the system |
| Water demand follows a standard 24-hour peaking curve |
| Base water demand is average daily demand (162,000 GPD) |
| Only one pump was operating at each pump station |
| Elevation data from LiDAR and field survey |
| Five (5) feet of cover for all water main |
| PRVs of unknown pressure reduction operate at 20-95 PSI |
| All pumps are VFDs |
| Pumps operate to keep the tank above them at least 80% full |
| Initial tank water depths set to 1 foot below full |

A 24-hour hydraulic analysis was computed for the system. Water demand was determined according to the following 24-hour flow demand multiplier step-wise defined functions. The flow multiplier was multiplied by the average daily flow to determine demand in the system at a given time in the 24-hour scenario.


Commercial Flow Multiplier for 24-hour Analysis
Average Daily Flow Multiplier
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
0
3
6
9
12
15
18
21
24
Hour of the Day (Midnight to Midnight)


Residential Flow Multiplier for 24-hour Analysis
Average Daily Flow Multiplier
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
0
3
6
9
12
15
18
21
24
Hour of the Day (Midnight to Midnight)

### *5.2 Model Calibration*

The model was calibrated using the known pressure data from the PRVs listed below. PRVs that did not have known data were initially assumed to reduce pressure to 50 PSI. This pressure setting (Low Pressure) was adjusted based on the known condition of the surrounding PRVs so that PRVs with measured pressures were modeled accurately. The field-measured high PRV pressures and the modeled pressures are shown below together with the assigned reduced pressures.

Error was calculated using the difference between the field-measured high pressure at a PRV and the modeled high pressure. Error was calculated as:

Error = Measured High Pressure – Modeled High Pressure

Error as a percentage was calculated as:

% Error = Error / Measured High Pressure

This error percentage was used to assess the model accuracy. PRV locations are shown on the map in Appendix B.

**Pressure Reducing Vaults - Model Calibration Points**

| PRV Name | Measured Low Pressure (PSI) | Assumed Low Pressure (PSI) | Measured High Pressure (PSI) | Modeled High Pressure (PSI) | Error (PSI) | Error (%) |
|---|---|---|---|---|---|---|
| PRV-1-Liberty | 52 | - | - | *Not considered | - | - |
| PRV-2-Holland | - | 40 | - | 75 | - | - |
| PRV-3-Holland | 40 | - | 90 | 87 | 3 | 3% |
| PRV-4-Snowood | 20 | - | 70 | 102 | -32 | 46% |
| PRV-5-Holland | 65 | - | 100 | 100 | 0 | 0% |
| PRV-6-Hodgeman | 55 | - | 165 | 166 | -1 | 1% |
| PRV-7-Pegwood | - | 95 | - | 136 | - | - |
| PRV-8-Winterbrook | - | 50 | - | 97 | - | - |
| PRV-9-Summit | - | 50 | - | *Not considered | - | - |
| PRV-10-Summit | - | 20 | - | 126 | - | - |
| PRV-11-Summit | 40 | - | 50 | 51 | -1 | 2% |
| PRV-12-Wanosha | 50 | - | 80 | 77 | 3 | 4% |
| PRV-13-Donovan | - | 20 | - | 181 | - | - |
| PRV-14-Mclaren | - | 50 | - | 99 | - | - |
| PRV-15-Mclaren | - | 50 | - | 104 | - | - |
| PRV-16-Pegwood | 45 | - | 100 | 103 | -3 | 3% |
| PRV-17-Summit | 75 | - | 110 | 122 | -12 | 11% |
| PRV-18-Richardson | 50 | - | 120 | 117 | 3 | 3% |
| PRV-19-Schuyler | - | 50 | - | 125 | - | - |
| PRV-20-Winterbrook | - | 20 | - | 105 | - | - |
| PRV-21-Campton | - | 50 | - | 62 | - | - |
| PRV-22-Wanosha | - | 25 | - | 107 | - | - |
| PRV-23-Summit | 45 | - | 60 | 93 | -33 | 55% |
| PRV-24-Skibowl | 60 | - | 180 | 178 | 2 | 1% |

*Believed to reduce pressure to a private service line.

The three yellow-highlighted PRVs in the table above each had a calculated modeled high-pressure error of greater than 5%. These differences could not be accounted for through modeling as these appear to be

elevation-driven pressure heads. This indicates that at these locations the modeled conditions are not accurately representing the field operating conditions. Further field investigation is required to identify the reasons for these discrepancies.

## *5.3 Model Results*

The existing water distribution system has high-pressure conditions caused by the surrounding terrain. Some of these pressure conditions may be attributed to PRVs being set appropriately. Also, given some of the pipe sizes within WEVD, it is fair to assume that the demand conditions on these small-diameter pipes affect the pressure readings negatively.

### 5.3.1 Modeled Low Pressures

One area to examine for potential low pressure (less than 30 PSI) is:

- Upper Pegwood Hill Road near junction B2E

### 5.3.2 Modeled High Pressures

Some areas to note for potential high pressure (greater than 100 PSI) are:

- Goose Hollow Road near junction A24E
- McClaren Drive near junction B5
- Bell Valley Road near junction D2E
- Doe Run near junction A10E
- Donovan Farm Road below between junction A28 (prior to the closed valve) and junction A27
- Dubeau Circle near junction A28
- Isaac Fox Drive from junction A35 to A34
- Weetamoo Trail from junction A34 to PRV-17
- Briarcliff Circle from junction A17
- David Thompson Road, Bell Valley Road, Armsby Circle, and Tobey Road from junction D2
- Porcupine Drive from the Reservoir Road pump station
- Caldon Circle from junction A26 to junction A26E
- Snowood Drive from junction A8 to junction A10

### 5.3.3 Recommended PRV Action Items

The following actions are recommended to reduce extreme service pressures throughout WEVD. These actions should always be preceded by a check of the water service pressure to the surrounding homes to ensure that no homes will lose pressure due to the reduction (elevations at residences, and therefore final water pressure, will differ from the elevation of in-ground water main).

- Reduce pressure in PRV-7 to regulate pressure along Pegwood Hill Road from PRV-7 to B5 (Hodgeman Hill Road).
- Reduce pressure in PRV-11 to regulate pressure along Summit Drive from PRV-11 to PRV-10.
- Reduce pressure in PRV-17 and PRV-23 to regulate pressure to Donovan Farm Road and Caldon Circle.
- Reduce pressure in PRV-6 to 45 PSI and PRV-21 to regulate pressure along Morrill Circle.
- Add a PRV at A17 to regulate pressure to Briarcliff Circle.
- Add a PRV at B3 for Pegwood Road at B3 to regulate pressure along Pegwood Road.

- Add a PRV at D2 to regulate pressure to Bell Valley Road, David Thompson Drive, Armsby Circle, Schuyler Drive, and Tobey Road.
- Add a PRV at A24 to regulate pressure along northern Wanosha Trail.

### *5.4 Sunset Drive Booster Station Removal: Water Modeling Scenarios*

The existing booster station (BS) and water storage tank at Sunset Drive are in very poor condition and must be replaced or removed. The operator expressed preference to remove this tank and pump station.

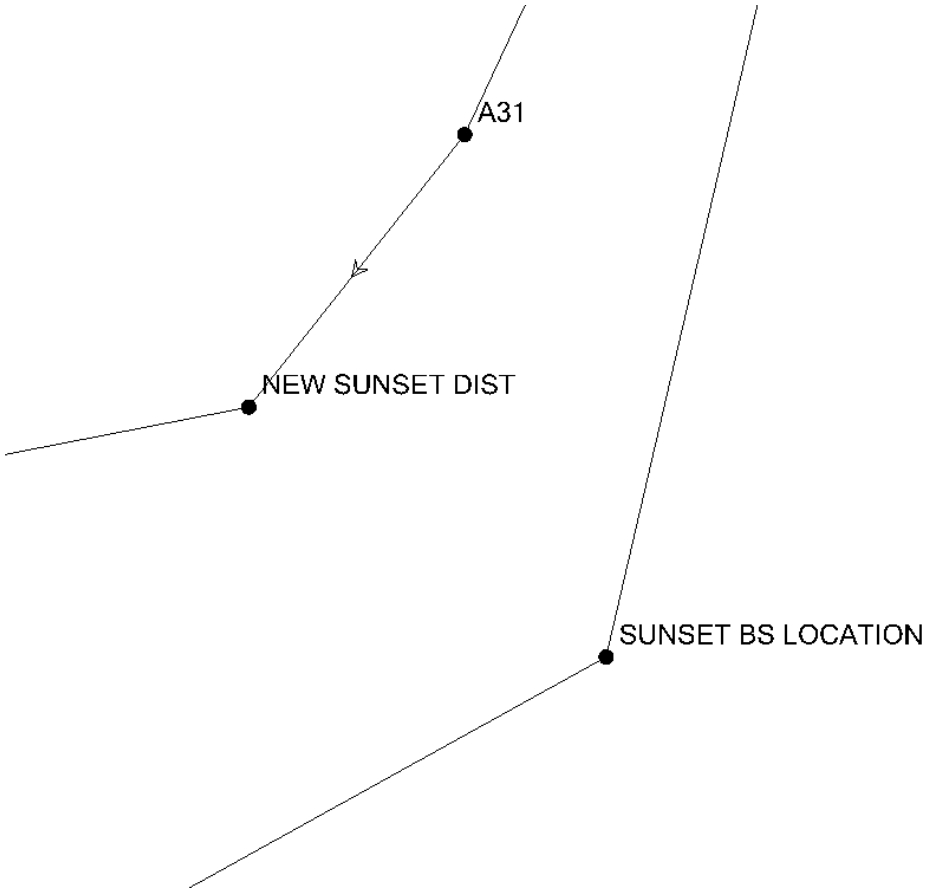
In addition to the potential loss of the Sunset Drive booster station and tank, 181,000 gallons of additional water storage are needed to achieve full build-out of WEVD. The operator expressed preference to meet this requirement by adding an additional 200,000 gallons of water storage at the Pegwood Storage Tank.

This was modeled to determine feasibility as described below.

#### 5.4.1 Scenario 1: Increase Pegwood storage and remove Sunset Drive tank and pump

The following actions were considered in the water model:

- Increased water storage at the Pegwood Tank to 400,000 gallons (added 200,000 gallons)
- Removed the Sunset Drive tank and booster station
- Reconnected the high-pressure lines and distribution network such that the high-pressure line traveled directly from Reservoir Road BS to Taylor Drive BS with no interconnections to the system.

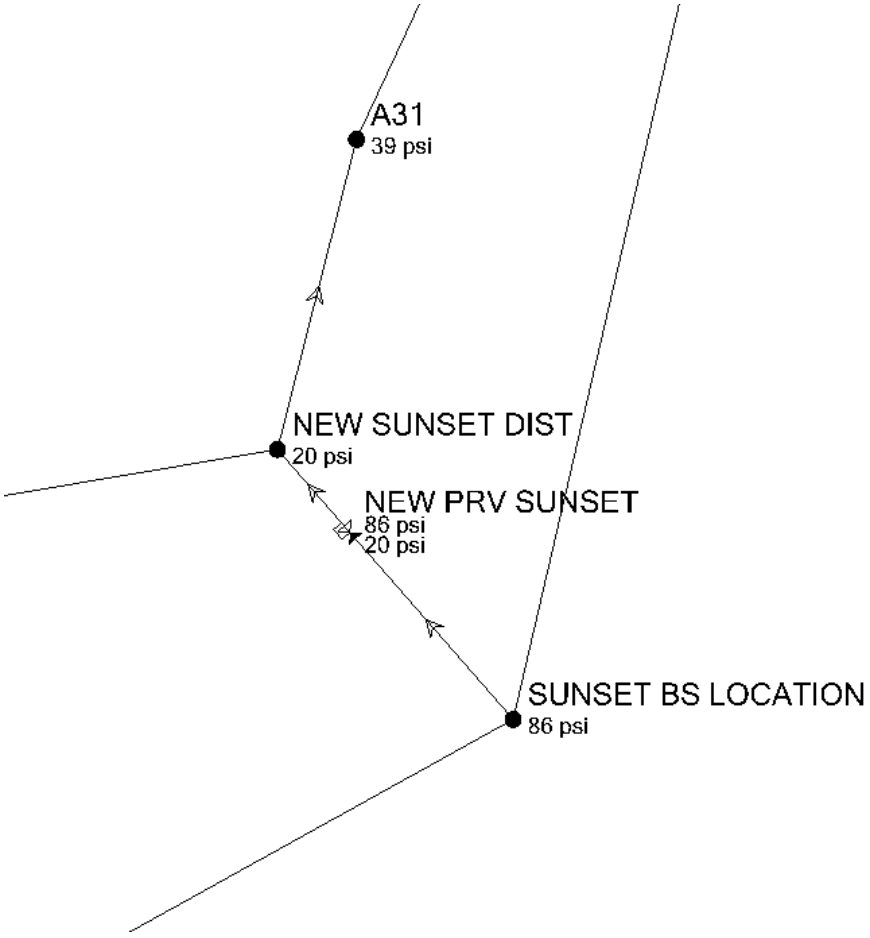


These actions led to service pressures below 0 PSI in the southeast portion of the system. Large sections of the system were without water. This scenario is therefore not feasible.

### 5.4.2 Scenario 2: Increase Pegwood storage, remove Sunset Drive tank and pump, and connect the distribution system to high pressure line at the old Sunset Booster Station.

Since Scenario 1 left sections of the WEVD system without pressure, alternatives were considered for the removal of the Sunset Drive booster station and tank. The following actions were considered in the water model:

- Increased storage at the Pegwood Tank to 400,000 gallons (added 200,000 gallons)
- Removed the Sunset Drive tank and booster station
- Reconnected the high-pressure lines and distribution network such that the high-pressure line traveled directly from Reservoir Road BS to Taylor Drive BS.
- Connected the distribution main into the high-pressure water line at the former Sunset Drive BS with a PRV set to 20 PSI.




This allowed sufficient pressure into the system but required operating pressures in the high-pressure line from the Reservoir booster station to the Sunset booster station to be approximately 280 PSI to generate

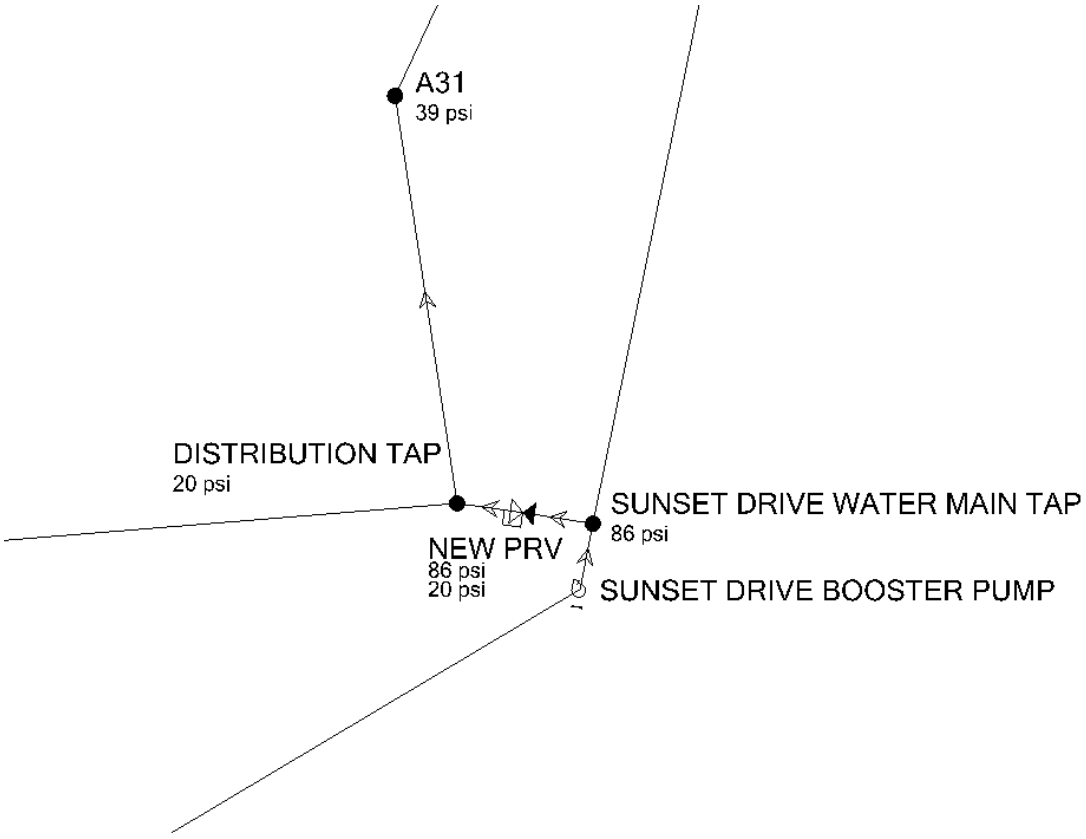
sufficient head to reach the tank at Taylor Drive. The existing water line for WEVD is not rated to withstand such high pressures, and as such this action is not feasible.

### 5.4.3 Scenario 3: Increase Pegwood storage, remove Sunset Drive tank, replace the Sunset Drive pump, and connect distribution system to the high pressure line at the old Sunset Booster Station

Since Scenario 2 showed that the Sunset Drive Booster Station is required to supply pressure head sufficient to transport water to the water tank at Taylor Drive, the pump station was replaced in the model and re-run.

The following actions were considered in the water model:

- Increased storage at the Pegwood Tank to 400,000 gallons (added 200,000 gallons)
- Removed the Sunset Drive water storage tank
- Replaced the Sunset Drive booster pump
- Reconnected the high-pressure lines and distribution network such that the high-pressure line traveled directly from Reservoir Road Booster Station to Taylor Drive Booster Station.
- Connected the distribution main into the high-pressure water line at the new Sunset Drive Booster Station with a PRV set to 20 PSI.




This scenario generated sufficient pressure in the system to supply homes. It also kept pressure in the high-pressure water main below the pressure rating for the existing water main.

Based on the modeled results, a booster pump is required at the Sunset Drive location, but the storage tank may be removed so long as sufficient storage is supplied at Pegwood Drive.

### *5.5 Modeling Conclusions and Recommendations*

The existing water distribution system has high-pressure conditions caused by the surrounding terrain. Some of these pressure conditions may be attributed to PRVs being set inappropriately. Also, given some of the pipe sizes within WEVD, it is fair to assume that the demand conditions on these small-diameter pipes affect the pressure readings negatively.

The following actions, if taken, will allow for better modeling accuracy, system monitoring, and assist in overall system management.

- Install meters at key locations including pump stations and PRVs, and areas of concern such as those noted to have extremely high or low pressure. This will assist in leak detection and allow for better model calibration by providing a better understanding of demand distribution and potential water loss.
- Investigate the system conditions at PRV-4-Snowood, PRV-17-Summit, and PRV-23-Summit. Field investigation may yield information regarding why the calibrated model is providing significantly different results than the observed data. It is possible that the modeled conditions are not what is present in the field at these locations.

Regarding the replacement or removal of the Sunset Drive storage tank and booster station:

- System pressures do not allow the Sunset Drive booster pump to be removed. The elevation head required to transport water without an additional booster station from the Reservoir Road booster station directly to Taylor Drive booster station creates an operating pressure of 280 PSI which exceeds the pressure rating for the existing water pipe (240 PSI).
- The existing tank can be removed at Sunset Drive and the booster pump replaced. The water distribution system for Weetamoo Trail must be connected to the high-pressure line after the new booster station with a PRV to maintain useable pressure in the system.

# 6. Capital Improvement Program

The WEVD Water Improvement Plan describes future capital projects. Capital improvement projects generally create a new asset that previously did not exist, or they upgrade and improve the capacity of an existing asset. The projects can result from growth or environmental needs, such as:

1. Expenditure that purchases or creates a new asset or in any way improves an asset beyond its original design capacity
2. Upgrades that increase the capacity of the asset
3. Construction designed to produce an improvement in the standard operation of the asset beyond its present capacity

In addition to capital improvement projects, the asset management team has reviewed and is establishing a renewal (or rehabilitation) strategy. Renewal expenditures do not increase the asset's design capacity but restore an existing asset to its original capacity. Any improvement projects that require more than restoring an asset to its original capacity are deemed to be a renewal project, such as the following:

1. Activities that do not increase the capacity of the asset (i.e., upgrade and enhance the assets restoring them to their original size, condition, and capacity)
2. Rehabilitation involving improvements and realignment or restores the assets to a new or fresh condition

In making renewal decisions, the utility should consider several categories other than the normally recognized physical, failure or breakage. Such renewal decisions include the following:

1. Structural
2. Capacity
3. Level of service failures
4. Outdated functionality
5. Cost or economic impact

## *6.1 Capital Improvement Project Need and Justification*

Although the Utility has made progress addressing the deficiencies of the system, there is still more to do.

Improvement projects can fall into the following categories:

Health and Sanitation

- Improve system reliability and security
- Reduce leakage
- Ensure adequate pump capacity
- Improve fire protection – undersized mains
- Protect well head areas

System O&M

- Detect and reduce sources of unaccounted for water
- Repair or replace nonfunctional valves
- Rehabilitate or replace obsolete pump houses
- Review rates annually – charge for cost of doing business

### *6.2 Capital Improvement Project List*

The Waterville Estates Village District Capital Improvement Program describes anticipated and prioritized future capital projects. This is a working document dependent on available funding and any unanticipated events.

| WATERVILLE ESTATES - IMPROVEMENT PLAN | | | | |
|---|---|---|---|---|
| **No.** | **ITEM** | **NOTES** | **COST** | **PROJECT YEAR** |
| 1 | PURCHASE GIS SYSTEM | STEVE TO OPERATE GIS SYSTEM | $ 5,000.00 | 2025 |
| 2 | REPLACE CAUSTIC SODA WITH SODA ASH | SAFER TREATMENT METHOD | $ 2,000.00 | |
| 3 | INSTALL METERS AT ALL USERS | SYSTEM WATER LOSS | $ 560,000.00 | 2026 |
| 4 | METER TRANSMISSION MAINS | WATER LOSS DETERMINATION | $ 40,000.00 | |
| 5 | TREATMENT TRANSPORT TO SNOWBOWL IN WINTER | WINCH AND SLED | $ 10,000.00 | |
| 6 | PROVIDE MORE STORAGE CAPACITY | NEW 200,000 GAL STORAGE TANK | $ 400,000.00 | 2027 |
| 7 | PROVIDE MORE SOURCE CAPACITY (SNOWOOOD OPTION) | NEW WELL SOURCE | $ 1,000,000.00 | |
| 8 | REMOVE AERATION SYSTEM AT SKI-BOWL | OUTDATED AND OBSOLETE | $ 20,000.00 | 2028 |
| 9 | SCADA CONTROLLED TREATMENT FROM ANALYZERS | ELIMINATE NEED FOR MANUAL ADJUSTMENTS | $ 10,000.00 | |
| 10 | REMOVE T-SECTION ON TRANSMISSION FROM LIBERTY TO SNOWBOWL | ELIMINATE POTENTIAL WL | $ 5,000.00 | |
| 11 | REMOVE USERS FROM TRANSMISSION MAINS | 2 KNOWN USERS SKIBOWL TO PEGWOOD | $ 20,000.00 | 2029 |
| 12 | REMOVE SUNSET STORAGE TANK | PEGWOOD TO ADD STORAGE | $ 400,000.00 | 2030 |
| 13 | NEW PRV LOCATIONS BASED ON ELEVATION ZONES (POST SUNSET REMOVAL) | AFTER SUNSET STORAGE REMOVED | $ 100,000.00 | |
| 14 | UPSIZE TRANSMISSION MAINS TO 6" (LIBERTY TO SNOW BOWL) | REDUCE WATER VELOCITY & IMPROVE EFFICIENCY | $ 1,000,000.00 | 2032 |
| 15 | REPLACE RESERVOIR BUILDING | VERY POOR CONDITION | $ 100,000.00 | 2034 |
| 16 | INSTALL METERS IN HORIZONTAL ISOLATION ZONES | WATER LOSS DETERMINATION | $ 15,000.00 | |
| 17 | REPLACE LIBERTY INTERIOR PIPING | VERY POOR CONDITION | $ 40,000.00 | 2036 |
| 18 | REPLACE/LINE SKI-BOWL WATER HOLDING TANK | VERY POOR CONDITION | $ 50,000.00 | 2038 |
| | | **TOTAL** | **$ 3,777,000.00** | |

The expected needs of the utility will change each year; therefore, this CIP plan should be updated to reflect those changes. These costs are intended for general budgeting guidance and as specific projects are developed an opinion of probable construction costs should be completed for the specific project scope.

# 7. Financial Management Strategy

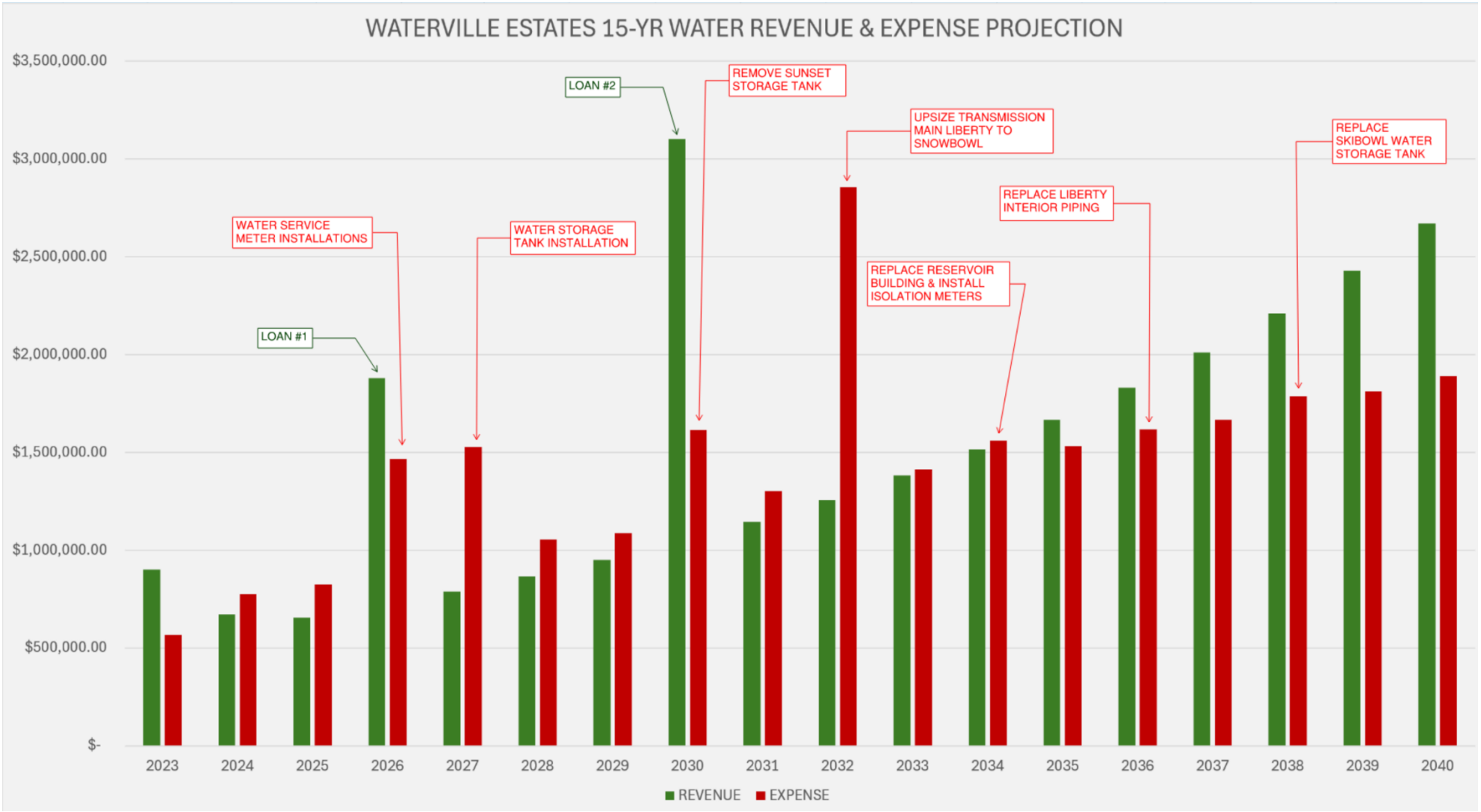
This section describes the WEVD's financial condition and its strategy for future financing. Capital costs are one-time expenses used to replace or upgrade a part of the utility. Capital costs do not include any O&M costs.

Costs for water are funded through user rates and fees. It is important to establish a rate structure by which the utility recovers the total cost of doing business. Short-term, external financing for capital expenses exceeding $50,000 should be financed through outside funding resources such as loans or grants. However, as WEVD plans for future improvements, the WEVD system should establish/continue funding a capital reserve fund to cover the costs of capital improvements necessary in 15 to 20 Years.

If large expenses are required for expansion or upgrades, the System should pay for improvements through user fees, grants, and loans. The utility should plan to spend approximately $3,777,000 on the water system over the next 15 years to accommodate system improvements and operations, compliance with state and federal regulations, and new drinking water requirements. Any profit is to be placed into the reserve fund. Every year a re-evaluation should take place and adjustments can be made based on actual revenues and expenses while taking into consideration the overall water system health and needs.

## *7.1 Financial Forecast*

The Financial Forecast shows predicted revenues and expenses using the values provided in the financial history tables found in Appendix A. The projections are used to help the utility plan for and predict future expenses and revenue and how to better finance capital improvement projects through planned rate changes.


WATERVILLE ESTATES 15-YR WATER REVENUE & EXPENSE PROJECTION
$3,500,000.00
$3,000,000.00
$2,500,000.00
$2,000,000.00
$1,500,000.00
$1,000,000.00
$500,000.00
$-
2023
2024
2025
2026
2027
2028
2029
2030
2031
2032
2033
2034
2035
2036
2037
2038
2039
2040
LOAN #1
LOAN #2
WATER SERVICE METER INSTALLATIONS
WATER STORAGE TANK INSTALLATION
REMOVE SUNSET STORAGE TANK
UPSIZE TRANSMISSION MAIN LIBERTY TO SNOWBOWL
REPLACE RESERVOIR BUILDING & INSTALL ISOLATION METERS
REPLACE LIBERTY INTERIOR PIPING
REPLACE SKIBOWL WATER STORAGE TANK
REVENUE
EXPENSE

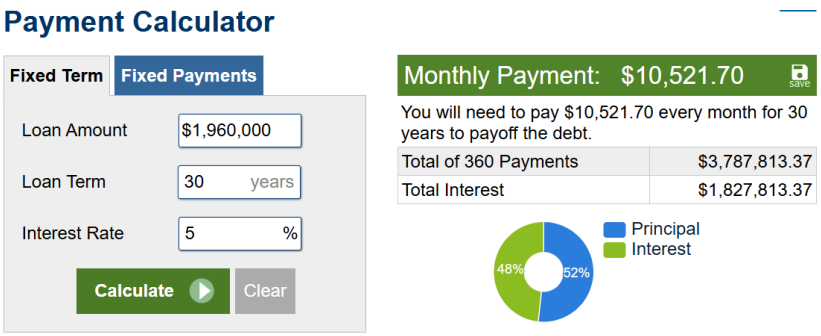
The figure above illustrates the forecasted financial needs for the next 15 years. It includes revenue, operational costs and proposed capital expenditures to develop the full cost of operating the system. The actual revenue and expenditure from 2023 through 2024 are shown for comparison.

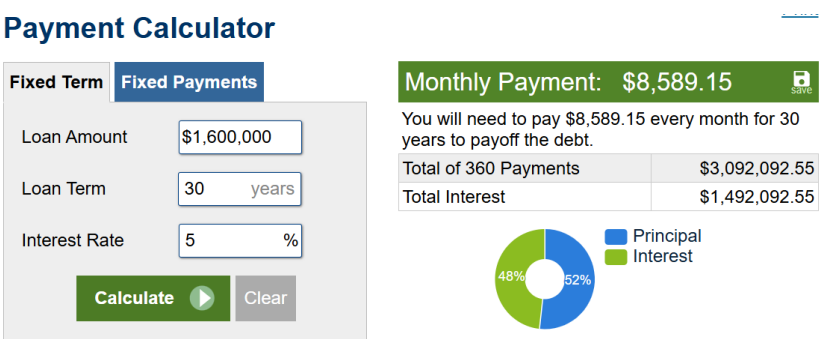
The plan calls for an investment of just under $3.8 million over fifteen years in 2025 dollars. The costs for each project were based on current estimates of 2025 construction costs. However, inflation is anticipated and when considering the financial feasibility of the plan an inflation factor needs to be incorporated. An inflation rate of 5% has been used in this 15-year projection on all expenditures. Prior to moving forward with construction projects, total project costs including engineering, easements, legal and administration as well as more detailed construction costs should be developed.

### *7.2 Total Expenditures*

The following table was used to create the figure above. It includes revenue, operational costs and proposed capital expenditures along with water fee income. The forecasts are based on a combination of loan and grant funds to make the necessary capital improvements. There is also a 5% annual inflation rate for all expenditures. This table should be updated annually by WEVD as their goals and proposed projects may change from year to year. The cash on hand reserve fund is an important line item to focus on. The WEVD can plan for a reserve fund balance of approximately $250,000 in the year 2040 given the current proposed projects with the outlined rate increases.

Two loans were used in the 15-year forecast. One in 2026 and one in 2030 at an amount of $1,960,000 and $1,600,000 respectively. The Loan Payback calculations are below.



Customer growth was not included in the forecast because the growth is unknown and may not occur until additional storage and supply are added, and to provide a conservative outlook. The spreadsheet will be provided to WEVD and should be updated and adjusted annually to better account for actual customer growth.

WATERVILLE ESTATES VILLAGE DISTRICT
WATER SYSTEM IMPROVEMENT PLAN

OCTOBER-2025

| | | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 | 2040 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CASH SURPLUS / DEFICIT** | | $ (105,525.21) | $ (18,319.00) | $ 1,290,234.85 | $ (1,563,538.08) | $ (173,291.27) | $ (130,006.83) | $ 1,021,609.14 | $ (146,191.39) | $ (1,106,924.20) | $ (63,278.38) | $ (129,841.80) | $ 38,833.78 | $ 58,235.67 | $ 163,893.60 | $ 186,383.22 | $ 316,330.05 | $ 404,413.55 |
| NUMBER OF CUSTOMERS | | 530 | 541 | 551 | 562 | 574 | 585 | 597 | 609 | 621 | 633 | 646 | 659 | 672 | 686 | 699 | 713 | 728 |
| CASH ON HAND/RESERVE FUND (END OF YR) | | $ - | $ 50,000.00 | $ 1,340,234.85 | $ (223,303.23) | $ (396,594.51) | $ (526,601.34) | $ 495,007.80 | $ 348,816.40 | $ (758,107.80) | $ (821,386.18) | $ (951,227.98) | $ (912,394.19) | $ (854,158.52) | $ (690,264.92) | $ (503,881.70) | $ (187,551.65) | $ 216,861.90 |
| INFLATION RATE | | | | | | | | | | | | | | | | | | |
| **Income** | | $ 670,674.02 | $ 624,182.00 | $ 2,666,510.90 | $ 761,303.77 | $ 820,480.07 | $ 884,390.48 | $ 2,553,413.72 | $ 1,027,958.81 | $ 1,108,467.52 | $ 1,195,416.92 | $ 1,289,322.27 | $ 1,390,740.05 | $ 1,500,271.26 | $ 1,618,564.96 | $ 1,746,322.16 | $ 1,884,299.93 | $ 2,033,315.92 |
| 02.3401.520.001 REV - WATER FEES | | $ 618,427.29 | $ 602,582.00 | $ 684,910.90 | $ 739,703.77 | $ 798,880.07 | $ 862,790.48 | $ 931,813.72 | $ 1,006,358.81 | $ 1,086,867.52 | $ 1,173,816.92 | $ 1,267,722.27 | $ 1,369,140.05 | $ 1,478,671.26 | $ 1,596,964.96 | $ 1,724,722.16 | $ 1,862,699.93 | $ 2,011,715.92 |
| 02.3401.520.002 REV - RETURNED CHECK FEES | | $ 75.00 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| 02.3401.520.003 REV - METER INCOME | | $ 17,009.08 | | | | | | | | | | | | | | | | |
| 02.3401.520.004 REV - FINANCE CHARGES | | $ 1,937.66 | $ 2,000.00 | $ 2,000.00 | $ 2,000.00 | $ 2,000.00 | $ 2,000.00 | $ 2,000.00 | $ 2,000.00 | $ 2,000.00 | $ 2,000.00 | $ 2,000.00 | $ 2,000.00 | $ 2,000.00 | $ 2,000.00 | $ 2,000.00 | $ 2,000.00 | $ 2,000.00 |
| 02.3402.520.001 REV - CONNECT/DISCONNECT FEES | | $ 7,700.00 | $ 10,000.00 | $ 10,000.00 | $ 10,000.00 | $ 10,000.00 | $ 10,000.00 | $ 10,000.00 | $ 10,000.00 | $ 10,000.00 | $ 10,000.00 | $ 10,000.00 | $ 10,000.00 | $ 10,000.00 | $ 10,000.00 | $ 10,000.00 | $ 10,000.00 | $ 10,000.00 |
| 02.3502.520.001 INT - INTEREST INCOME | | $ 25,524.99 | $ 9,600.00 | $ 9,600.00 | $ 9,600.00 | $ 9,600.00 | $ 9,600.00 | $ 9,600.00 | $ 9,600.00 | $ 9,600.00 | $ 9,600.00 | $ 9,600.00 | $ 9,600.00 | $ 9,600.00 | $ 9,600.00 | $ 9,600.00 | $ 9,600.00 | $ 9,600.00 |
| 02.3502.520.002 INT - MISCELLANEOUS INCOME | | | | | | | | | | | | | | | | | | |
| 02.3934.000.023 PROCEEDS FROM NH MUNICIPAL BOND BANK | | | | | | | | | | | | | | | | | | |
| **Expense** | | $ 776,199.23 | $ 642,501.00 | $ 1,376,276.05 | $ 2,324,841.85 | $ 993,771.35 | $ 1,014,397.31 | $ 1,531,804.58 | $ 1,174,150.21 | $ 2,215,391.72 | $ 1,258,695.30 | $ 1,419,164.07 | $ 1,351,906.27 | $ 1,442,035.59 | $ 1,454,671.36 | $ 1,559,938.93 | $ 1,567,969.88 | $ 1,628,902.37 |
| 02.4331.001.220 | WTR - PAYROLL TAXES | $ 6,573.87 | $ 7,486.00 | $ 7,860.30 | $ 8,253.32 | $ 8,665.98 | $ 9,099.28 | $ 9,554.24 | $ 10,031.96 | $ 10,533.55 | $ 11,060.23 | $ 11,613.24 | $ 12,193.91 | $ 12,803.60 | $ 13,443.78 | $ 14,115.97 | $ 14,821.77 | $ 15,562.86 |
| 02.4331.520.110 | WTR - WAGES | $ 54,642.45 | $ 66,362.00 | $ 69,680.10 | $ 73,164.11 | $ 76,822.31 | $ 80,663.43 | $ 84,696.60 | $ 88,931.43 | $ 93,378.00 | $ 98,046.90 | $ 102,949.24 | $ 108,096.71 | $ 113,501.54 | $ 119,176.62 | $ 125,135.45 | $ 131,392.22 | $ 137,961.83 |
| 02.4331.520.111 | WTR - WAGES ADMINISTRATION | $ 29,821.02 | $ 31,491.00 | $ 33,065.55 | $ 34,718.83 | $ 36,454.77 | $ 38,277.51 | $ 40,191.38 | $ 42,200.95 | $ 44,311.00 | $ 46,526.55 | $ 48,852.88 | $ 51,295.52 | $ 53,860.30 | $ 56,553.31 | $ 59,380.98 | $ 62,350.03 | $ 65,467.53 |
| 02.4331.520.119 | WTR - WAGES - OVERTIME | $ 2,921.34 | $ 5,600.00 | $ 5,880.00 | $ 6,174.00 | $ 6,482.70 | $ 6,806.84 | $ 7,147.18 | $ 7,504.54 | $ 7,879.76 | $ 8,273.75 | $ 8,687.44 | $ 9,121.81 | $ 9,577.90 | $ 10,056.80 | $ 10,559.64 | $ 11,087.62 | $ 11,642.00 |
| 02.4331.520.210 | WTR - HEALTH INSURANCE | $ 22,367.22 | $ 23,795.00 | $ 24,984.75 | $ 26,233.99 | $ 27,545.69 | $ 28,922.97 | $ 30,369.12 | $ 31,887.58 | $ 33,481.95 | $ 35,156.05 | $ 36,913.85 | $ 38,759.55 | $ 40,697.53 | $ 42,732.40 | $ 44,869.02 | $ 47,112.47 | $ 49,468.10 |
| 02.4331.520.211 | WTR - DENTAL INSURANCE | $ 988.27 | $ 955.00 | $ 1,002.75 | $ 1,052.89 | $ 1,105.53 | $ 1,160.81 | $ 1,218.85 | $ 1,279.79 | $ 1,343.78 | $ 1,410.97 | $ 1,481.52 | $ 1,555.59 | $ 1,633.37 | $ 1,715.04 | $ 1,800.79 | $ 1,890.83 | $ 1,985.38 |
| 02.4331.520.230 | WTR - RETIREMENT | $ 1,810.72 | $ 13,240.00 | $ 13,902.00 | $ 14,597.10 | $ 15,326.96 | $ 16,093.30 | $ 16,897.97 | $ 17,742.87 | $ 18,630.01 | $ 19,561.51 | $ 20,539.59 | $ 21,566.56 | $ 22,644.89 | $ 23,777.14 | $ 24,965.99 | $ 26,214.29 | $ 27,525.01 |
| 02.4331.520.240 | WTR - EDUCATION | $ - | $ 1,500.00 | $ 1,575.00 | $ 1,653.75 | $ 1,736.44 | $ 1,823.26 | $ 1,914.42 | $ 2,010.14 | $ 2,110.65 | $ 2,216.18 | $ 2,326.99 | $ 2,443.34 | $ 2,565.51 | $ 2,693.78 | $ 2,828.47 | $ 2,969.90 | $ 3,118.39 |
| 02.4331.520.260 | WTR - WORKERS COMP INSURANCE | $ - | $ 1,576.00 | $ 1,654.80 | $ 1,737.54 | $ 1,824.42 | $ 1,915.64 | $ 2,011.42 | $ 2,111.99 | $ 2,217.59 | $ 2,328.47 | $ 2,444.89 | $ 2,567.14 | $ 2,695.49 | $ 2,830.27 | $ 2,971.78 | $ 3,120.37 | $ 3,276.39 |
| 02.4331.520.261 | WTR - PROPERTY & LIABILITY INSURANCE | $ 8,190.47 | $ 9,200.00 | $ 9,660.00 | $ 10,143.00 | $ 10,650.15 | $ 11,182.66 | $ 11,741.79 | $ 12,328.88 | $ 12,945.32 | $ 13,592.59 | $ 14,272.22 | $ 14,985.83 | $ 15,735.12 | $ 16,521.88 | $ 17,347.97 | $ 18,215.37 | $ 19,126.14 |
| 02.4331.520.301 | WTR - ANNUAL AUDIT | $ 4,567.50 | $ 4,000.00 | $ 4,200.00 | $ 4,410.00 | $ 4,630.50 | $ 4,862.03 | $ 5,105.13 | $ 5,360.38 | $ 5,628.40 | $ 5,909.82 | $ 6,205.31 | $ 6,515.58 | $ 6,841.36 | $ 7,183.43 | $ 7,542.60 | $ 7,919.73 | $ 8,315.71 |
| 02.4331.520.305 | WTR - ADVERTISING | $ 22.50 | $ 100.00 | $ 105.00 | $ 110.25 | $ 115.76 | $ 121.55 | $ 127.63 | $ 134.01 | $ 140.71 | $ 147.75 | $ 155.13 | $ 162.89 | $ 171.03 | $ 179.59 | $ 188.56 | $ 197.99 | $ 207.89 |
| 02.4331.520.320 | WTR - LICENSES AND FEES | $ 2,642.04 | $ 2,500.00 | $ 2,625.00 | $ 2,756.25 | $ 2,894.06 | $ 3,038.77 | $ 3,190.70 | $ 3,350.24 | $ 3,517.75 | $ 3,693.64 | $ 3,878.32 | $ 4,072.24 | $ 4,275.85 | $ 4,489.64 | $ 4,714.12 | $ 4,949.83 | $ 5,197.32 |
| 02.4331.520.321 | WTR - BAD DEBTS | $ 927.41 | $ 500.00 | $ 525.00 | $ 551.25 | $ 578.81 | $ 607.75 | $ 638.14 | $ 670.05 | $ 703.55 | $ 738.73 | $ 775.66 | $ 814.45 | $ 855.17 | $ 897.93 | $ 942.82 | $ 989.97 | $ 1,039.46 |
| 02.4331.520.323 | WTR - LEGAL EXPENSES | $ 957.87 | $ 7,500.00 | $ 7,875.00 | $ 8,268.75 | $ 8,682.19 | $ 9,116.30 | $ 9,572.11 | $ 10,050.72 | $ 10,553.25 | $ 11,080.92 | $ 11,634.96 | $ 12,216.71 | $ 12,827.55 | $ 13,468.92 | $ 14,142.37 | $ 14,849.49 | $ 15,591.96 |
| 02.4331.520.340 | WTR - ELECTRICITY | $ 84,726.75 | $ 90,000.00 | $ 94,500.00 | $ 99,225.00 | $ 104,186.25 | $ 109,395.56 | $ 114,865.34 | $ 120,608.61 | $ 126,639.04 | $ 132,970.99 | $ 139,619.54 | $ 146,600.52 | $ 153,930.54 | $ 161,627.07 | $ 169,708.42 | $ 178,193.84 | $ 187,103.54 |
| 02.4331.520.342 | WTR - COMPUTER SUPPORT | $ 2,800.00 | $ 2,800.00 | $ 2,940.00 | $ 3,087.00 | $ 3,241.35 | $ 3,403.42 | $ 3,573.59 | $ 3,752.27 | $ 3,939.88 | $ 4,136.88 | $ 4,343.72 | $ 4,560.90 | $ 4,788.95 | $ 5,028.40 | $ 5,279.82 | $ 5,543.81 | $ 5,821.00 |
| 02.4331.520.350 | WTR - TELEPHONE | $ 6,158.56 | $ 5,000.00 | $ 5,250.00 | $ 5,512.50 | $ 5,788.13 | $ 6,077.53 | $ 6,381.41 | $ 6,700.48 | $ 7,035.50 | $ 7,387.28 | $ 7,756.64 | $ 8,144.47 | $ 8,551.70 | $ 8,979.28 | $ 9,428.25 | $ 9,899.66 | $ 10,394.64 |
| 02.4331.520.351 | WTR - CELL PHONE | $ 492.72 | $ 900.00 | $ 945.00 | $ 992.25 | $ 1,041.86 | $ 1,093.96 | $ 1,148.65 | $ 1,206.09 | $ 1,266.39 | $ 1,329.71 | $ 1,396.20 | $ 1,466.01 | $ 1,539.31 | $ 1,616.27 | $ 1,697.08 | $ 1,781.94 | $ 1,871.04 |
| 02.4331.520.390 | WTR - CONSULTING | $ 6,280.00 | $ 5,625.00 | $ 5,906.25 | $ 6,201.56 | $ 6,511.64 | $ 6,837.22 | $ 7,179.08 | $ 7,538.04 | $ 7,914.94 | $ 8,310.69 | $ 8,726.22 | $ 9,162.53 | $ 9,620.66 | $ 10,101.69 | $ 10,606.78 | $ 11,137.12 | $ 11,693.97 |
| 02.4331.520.609 | WTR - DEPT UNIFORMS | $ 604.88 | $ 500.00 | $ 525.00 | $ 551.25 | $ 578.81 | $ 607.75 | $ 638.14 | $ 670.05 | $ 703.55 | $ 738.73 | $ 775.66 | $ 814.45 | $ 855.17 | $ 897.93 | $ 942.82 | $ 989.97 | $ 1,039.46 |
| 02.4331.520.610 | WTR - OFFICE SUPPLIES | $ 1,380.07 | $ 2,500.00 | $ 2,625.00 | $ 2,756.25 | $ 2,894.06 | $ 3,038.77 | $ 3,190.70 | $ 3,350.24 | $ 3,517.75 | $ 3,693.64 | $ 3,878.32 | $ 4,072.24 | $ 4,275.85 | $ 4,489.64 | $ 4,714.12 | $ 4,949.83 | $ 5,197.32 |
| 02.4331.520.611 | WTR - TOOLS | $ 5,740.93 | $ 7,000.00 | $ 7,350.00 | $ 7,717.50 | $ 8,103.38 | $ 8,508.54 | $ 8,933.97 | $ 9,380.67 | $ 9,849.70 | $ 10,342.19 | $ 10,859.30 | $ 11,402.26 | $ 11,972.38 | $ 12,570.99 | $ 13,199.54 | $ 13,859.52 | $ 14,552.50 |
| 02.4331.520.618 | WTR - COPIER LEASE | $ 1,715.83 | $ 2,160.00 | $ 2,268.00 | $ 2,381.40 | $ 2,500.47 | $ 2,625.49 | $ 2,756.77 | $ 2,894.61 | $ 3,039.34 | $ 3,191.30 | $ 3,350.87 | $ 3,518.41 | $ 3,694.33 | $ 3,879.05 | $ 4,073.00 | $ 4,276.65 | $ 4,490.48 |
| 02.4331.520.620 | WTR - MISCELLANEOUS EXPENSE | $ 1,107.15 | $ 500.00 | $ 525.00 | $ 551.25 | $ 578.81 | $ 607.75 | $ 638.14 | $ 670.05 | $ 703.55 | $ 738.73 | $ 775.66 | $ 814.45 | $ 855.17 | $ 897.93 | $ 942.82 | $ 989.97 | $ 1,039.46 |
| 02.4331.520.625 | WTR - POSTAGE | $ 2,391.80 | $ 2,500.00 | $ 2,625.00 | $ 2,756.25 | $ 2,894.06 | $ 3,038.77 | $ 3,190.70 | $ 3,350.24 | $ 3,517.75 | $ 3,693.64 | $ 3,878.32 | $ 4,072.24 | $ 4,275.85 | $ 4,489.64 | $ 4,714.12 | $ 4,949.83 | $ 5,197.32 |
| 02.4331.520.640 | WTR - GENERATOR MAINTENANCE | $ - | $ 6,200.00 | $ 6,510.00 | $ 6,835.50 | $ 7,177.28 | $ 7,536.14 | $ 7,912.95 | $ 8,308.59 | $ 8,724.02 | $ 9,160.22 | $ 9,618.23 | $ 10,099.15 | $ 10,604.10 | $ 11,134.31 | $ 11,691.02 | $ 12,275.58 | $ 12,889.35 |
| 02.4331.520.641 | WTR - SYSTEM REPAIRS | $ 179,738.44 | $ 110,000.00 | $ 115,500.00 | $ 121,275.00 | $ 127,338.75 | $ 133,705.69 | $ 140,390.97 | $ 147,410.52 | $ 154,781.05 | $ 162,520.10 | $ 170,646.10 | $ 179,178.41 | $ 188,137.33 | $ 197,544.20 | $ 207,421.41 | $ 217,792.48 | $ 228,682.10 |
| 02.4331.520.670 | WTR - SUBSCRIPTION & DUES | $ 1,089.25 | $ 600.00 | $ 630.00 | $ 661.50 | $ 694.58 | $ 729.30 | $ 765.77 | $ 804.06 | $ 844.26 | $ 886.47 | $ 930.80 | $ 977.34 | $ 1,026.20 | $ 1,077.51 | $ 1,131.39 | $ 1,187.96 | $ 1,247.36 |
| 02.4331.520.816 | WTR - FEES | $ 60.00 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| 02.4331.520.822 | WTR - PROJECTS | $ 7,608.00 | $ 1,030.00 | $ 1,081.50 | $ 1,135.58 | $ 1,192.35 | $ 1,251.97 | $ 1,314.57 | $ 1,380.30 | $ 1,449.31 | $ 1,521.78 | $ 1,597.87 | $ 1,677.76 | $ 1,761.65 | $ 1,849.73 | $ 1,942.22 | $ 2,039.33 | $ 2,141.30 |
| 02.4331.520.823 | WTR - VEHICLE FUEL | $ 5,675.28 | $ 5,250.00 | $ 5,512.50 | $ 5,788.13 | $ 6,077.53 | $ 6,381.41 | $ 6,700.48 | $ 7,035.50 | $ 7,387.28 | $ 7,756.64 | $ 8,144.47 | $ 8,551.70 | $ 8,979.28 | $ 9,428.25 | $ 9,899.66 | $ 10,394.64 | $ 10,914.37 |
| 02.4331.520.826 | WTR - VEHICLE MAINTENANCE | $ 7,403.56 | $ 3,500.00 | $ 3,675.00 | $ 3,858.75 | $ 4,051.69 | $ 4,254.27 | $ 4,466.99 | $ 4,690.33 | $ 4,924.85 | $ 5,171.09 | $ 5,429.65 | $ 5,701.13 | $ 5,986.19 | $ 6,285.50 | $ 6,599.77 | $ 6,929.76 | $ 7,276.25 |
| 02.4331.520.860 | WTR - WATER TESTING | $ 2,296.65 | $ 3,000.00 | $ 3,150.00 | $ 3,307.50 | $ 3,472.88 | $ 3,646.52 | $ 3,828.84 | $ 4,020.29 | $ 4,221.30 | $ 4,432.37 | $ 4,653.98 | $ 4,886.68 | $ 5,131.02 | $ 5,387.57 | $ 5,656.95 | $ 5,939.79 | $ 6,236.78 |
| 02.4331.520.861 | WTR - LEAK REPAIRS | $ 42,590.98 | $ 35,000.00 | $ 36,750.00 | $ 38,587.50 | $ 40,516.88 | $ 42,542.72 | $ 44,669.85 | $ 46,903.35 | $ 49,248.51 | $ 51,710.94 | $ 54,296.49 | $ 57,011.31 | $ 59,861.88 | $ 62,854.97 | $ 65,997.72 | $ 69,297.61 | $ 72,762.49 |
| 02.4331.520.862 | WTR - ENGINEERING | $ 980.00 | $ 30,000.00 | $ 31,500.00 | $ 33,075.00 | $ 34,728.75 | $ 36,465.19 | $ 38,288.45 | $ 40,202.87 | $ 42,213.01 | $ 44,323.66 | $ 46,539.85 | $ 48,866.84 | $ 51,310.18 | $ 53,875.69 | $ 56,569.47 | $ 59,397.95 | $ 62,367.85 |
| 02.4331.520.863 | WTR - EQUIPMENT RENTAL | $ - | $ 3,000.00 | $ 3,150.00 | $ 3,307.50 | $ 3,472.88 | $ 3,646.52 | $ 3,828.84 | $ 4,020.29 | $ 4,221.30 | $ 4,432.37 | $ 4,653.98 | $ 4,886.68 | $ 5,131.02 | $ 5,387.57 | $ 5,656.95 | $ 5,939.79 | $ 6,236.78 |
| 02.4331.520.864 | WTR - TELEMETRY | $ 458.72 | $ 5,000.00 | $ 5,250.00 | $ 5,512.50 | $ 5,788.13 | $ 6,077.53 | $ 6,381.41 | $ 6,700.48 | $ 7,035.50 | $ 7,387.28 | $ 7,756.64 | $ 8,144.47 | $ 8,551.70 | $ 8,979.28 | $ 9,428.25 | $ 9,899.66 | $ 10,394.64 |
| 02.4331.520.865 | WTR - CHEMICALS | $ 5,142.11 | $ 13,000.00 | $ 13,650.00 | $ 14,332.50 | $ 15,049.13 | $ 15,801.58 | $ 16,591.66 | $ 17,421.24 | $ 18,292.31 | $ 19,206.92 | $ 20,167.27 | $ 21,175.63 | $ 22,234.41 | $ 23,346.13 | $ 24,513.44 | $ 25,739.11 | $ 27,026.07 |
| 02.4712.520.001 | WTR - BOND PAYMENT PRINCIPAL | $ 11,988.00 | $ 11,988.00 | $ 12,587.40 | $ 13,216.77 | $ 13,877.61 | $ 14,571.49 | $ 15,300.06 | $ 16,065.07 | $ 16,868.32 | $ 17,711.74 | $ 18,597.32 | $ 19,527.19 | $ 20,503.55 | $ 21,528.73 | $ 22,605.16 | $ 23,735.42 | $ 24,922.19 |
| 02.4721.520.001 | DEBT - INTEREST PAYMENTS | $ 5,873.81 | $ 11,943.00 | $ 12,540.15 | $ 13,167.16 | $ 13,825.52 | $ 14,516.79 | $ 15,242.63 | $ 16,004.76 | $ 16,805.00 | $ 17,645.25 | $ 18,527.51 | $ 19,453.89 | $ 20,426.58 | $ 21,447.91 | $ 22,520.31 | $ 23,646.32 | $ 24,828.64 |
| **02.4903.023.002** | **WATER MAIN - W A 2 2023 (+REPLACEMENT CONTINGENCY)** | $ 175,416.00 | $ - | $ 100,000.00 | $ 100,000.00 | $ 100,000.00 | $ 100,000.00 | $ 100,000.00 | $ 100,000.00 | $ 100,000.00 | $ 100,000.00 | $ 100,000.00 | $ 100,000.00 | $ 100,000.00 | $ 100,000.00 | $ 100,000.00 | $ 100,000.00 | $ 100,000.00 |
| 02.4903.024.007 | WELL CLEANING WA 7 2024 | $ 16,675.00 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| 02.4903.490.002 | CAP - PUMP HOUSE PAINTING | $ - | $ 2,500.00 | $ 2,625.00 | $ 2,756.25 | $ 2,894.06 | $ 3,038.77 | $ 3,190.70 | $ 3,350.24 | $ 3,517.75 | $ 3,693.64 | $ 3,878.32 | $ 4,072.24 | $ 4,275.85 | $ 4,489.64 | $ 4,714.12 | $ 4,949.83 | $ 5,197.32 |
| 02.4903.490.004 | CAP - WATER METER UPGRADES | $ 47,514.70 | $ 50,000.00 | $ 52,500.00 | $ 55,125.00 | $ 57,881.25 | $ 60,775.31 | $ 63,814.08 | $ 67,004.78 | $ 70,355.02 | $ 73,872.77 | $ 77,566.41 | $ 81,444.73 | $ 85,516.97 | $ 89,792.82 | $ 94,282.46 | $ 98,996.58 | $ 103,946.41 |
| 02.4903.490.008 | CAP - SKI BOWL TREATMENT BUILDING REPAIRS | $ - | $ 1,200.00 | $ 1,260.00 | $ 1,323.00 | $ 1,389.15 | $ 1,458.61 | $ 1,531.54 | $ 1,608.11 | $ 1,688.52 | $ 1,772.95 | $ 1,861.59 | $ 1,954.67 | $ 2,052.41 | $ 2,155.03 | $ 2,262.78 | $ 2,375.92 | $ 2,494.71 |
| 02.4903.490.011 | CAP - PUMP PHASE REPLACEMENT | $ 8,644.38 | $ 20,000.00 | $ 21,000.00 | $ 22,050.00 | $ 23,152.50 | $ 24,310.13 | $ 25,525.63 | $ 26,801.91 | $ 28,142.01 | $ 29,549.11 | $ 31,026.56 | $ 32,577.89 | $ 34,206.79 | $ 35,917.13 | $ 37,712.98 | $ 39,598.63 | $ 41,578.56 |
| 02.4903.490.012 | CAP - PEGWOOD BACKUP GENERATOR | $ 7,212.98 | $ 7,000.00 | $ 7,350.00 | $ 7,717.50 | $ 8,103.38 | $ 8,508.54 | $ 8,933.97 | $ 9,380.67 | $ 9,849.70 | $ 10,342.19 | $ 10,859.30 | $ 11,402.26 | $ 11,972.38 | $ 12,570.99 | $ 13,199.54 | $ 13,859.52 | $ 14,552.50 |
| 02.4903.490.005 | CAP - COMPUTER SOFTWARE UPDATES | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| LOAN 1 REPAYMENT (30 YR AMMORTIZATION @ 5%) | | | | | $ 126,252.00 | $ 126,252.00 | $ 126,252.00 | $ 126,252.00 | $ 126,252.00 | $ 126,252.00 | $ 126,252.00 | $ 126,252.00 | $ 126,252.00 | $ 126,252.00 | $ 126,252.00 | $ 126,252.00 | $ 126,252.00 | $ 126,252.00 |
| LOAN 2 REPAYMENT (30 YR AMMORTIZATION @ 5%) | | | | | | | | | $ 103,068.00 | $ 103,068.00 | $ 103,068.00 | $ 103,068.00 | $ 103,068.00 | $ 103,068.00 | $ 103,068.00 | $ 103,068.00 | $ 103,068.00 | $ 103,068.00 |
| PURCHASE GIS SYSTEM | | | $ 5,000.00 | | | | | | | | | | | | | | | |
| REPLACE CAUSTIC SODA WITH SODA ASH | | | $ 2,000.00 | | | | | | | | | | | | | | | |
| INSTALL METERS AT ALL USERS | | | | $ 560,000.00 | | | | | | | | | | | | | | |
| METER TRANSMISSION MAINS | | | | $ 40,000.00 | | | | | | | | | | | | | | |
| TREATMENT TO SNOWBOWL IN WINTER DESIGN | | | | $ 10,000.00 | | | | | | | | | | | | | | |
| PROVIDE MORE STORAGE CAPACITY | | | | | $ 400,000.00 | | | | | | | | | | | | | |
| PROVIDE MORE SOURCE CAPACITY | | | | | $ 1,000,000.00 | | | | | | | | | | | | | |
| REMOVE AERATION SYSTEM AT SKI-BOWL | | | | | | $ 20,000.00 | | | | | | | | | | | | |
| SCADA CONTROLLED TREATMENT FROM ANALYZERS | | | | | | $ 10,000.00 | | | | | | | | | | | | |
| REMOVE T-SECTION ON TRANSMISSION FROM LIBERTY TO SNOWBOWL | | | | | | $ 5,000.00 | | | | | | | | | | | | |
| REMOVE USERS FROM TRANSMISSION MAINS | | | | | | | $ 20,000.00 | | | | | | | | | | | |
| REMOVE SUNSET STORAGE (PEGWOOD TO FEED SYSTEM EXCEPT FOR TAYLOR) | | | | | | | | $ 400,000.00 | | | | | | | | | | |
| NEW PRV LOCATIONS BASED ON ELEVATION ZONES (POST SUNSET REMOVAL) | | | | | | | | $ 100,000.00 | | | | | | | | | | |
| UPSIZE TRANSMISSION MAINS TO 6" (LIBERTY TO SNOW BOWL) | | | | | | | | | | $ 1,000,000.00 | | | | | | | | |
| REPLACE RESERVOIR BUILDING | | | | | | | | | | | | $ 100,000.00 | | | | | | |
| INSTALL METERS IN HORIZONTAL ISOLATION ZONES | | | | | | | | | | | | $ 15,000.00 | | | | | | |
| REPLACE LIBERTY INTERIOR PIPING | | | | | | | | | | | | | | $ 40,000.00 | | | | |
| REPLACE SKI-BOWL WATER HOLDING TANK | | | | | | | | | | | | | | | | $ 50,000.00 | | |
| MINOR REPAIR CONTINGENCY | | | $ 20,000.00 | $ 20,000.00 | $ 20,000.00 | $ 20,000.00 | $ 20,000.00 | $ 20,000.00 | $ 20,000.00 | $ 20,000.00 | $ 20,000.00 | $ 20,000.00 | $ 20,000.00 | $ 20,000.00 | $ 20,000.00 | $ 20,000.00 | $ 20,000.00 | $ 20,000.00 |
| LOAN 1 | | | | **$ 1,960,000.00** | | | | | | | | | | | | | | |
| LOAN 2 | | | | | | | | **$ 1,600,000.00** | | | | | | | | | | |

## *7.3 Funding Alternatives*

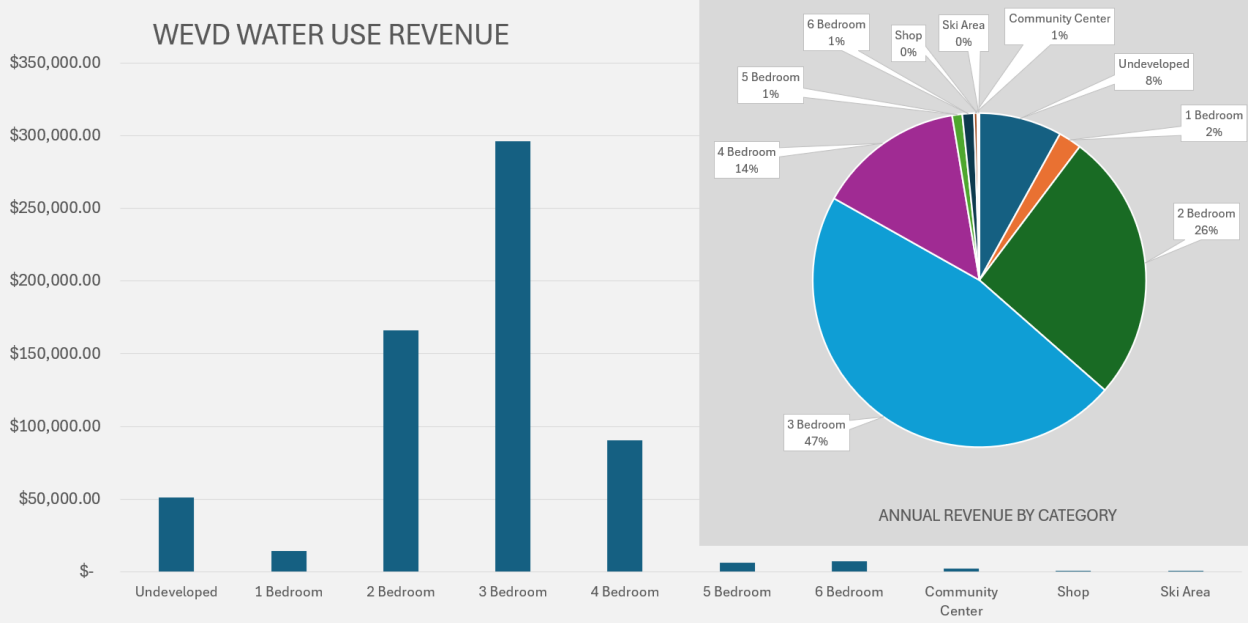
### 7.3.1 User Rates

In WEVD, water utility rates are a flat fee determined by the number of bedrooms in each house. The income earned by the Utility is typically used for repairs and management of the system, routine maintenance, and allocation to reserve funds. User rates should be adjusted in a manner that does not create extreme increases each year and should be reviewed on an annual basis. The table below illustrates the water revenue distribution within the WEVD customer base for this year.

| RATE STRUCTURE | | 2025 | |
|---|---|---|---|
| **Category** | **#Customers** | **BASE RATE** | **REVENUE** |
| Undeveloped | 265 | $ 192.17 | $ 50,926.32 |
| 1 Bedroom | 22 | $ 646.46 | $ 14,222.03 |
| 2 Bedroom | 190 | $ 873.60 | $ 165,983.39 |
| 3 Bedroom | 269 | $ 1,100.74 | $ 296,098.38 |
| 4 Bedroom | 68 | $ 1,327.88 | $ 90,295.71 |
| 5 Bedroom | 4 | $ 1,555.02 | $ 6,220.08 |
| 6 Bedroom | 4 | $ 1,782.16 | $ 7,128.64 |
| **SUB-TOTAL** | | **$** | **630,874.55** |
| CC | 1 | $ 2,009.30 | $ 2,009.30 |
| Shop | 1 | $ 646.46 | $ 646.46 |
| Ski Area | 1 | $ 646.46 | $ 646.46 |
| **SUB-TOTAL** | | **$** | **3,302.21** |
| **TOTAL** | **825** | **$** | **634,176.76** |

Base rates are comprised of two parts: availability and usage. Both are flat rates but calculated separately. Availability accounts for 25% of what is billed and applies equally to all properties within the Estates that are eligible for billing according to section 22 of the ordinance. Usage accounts for 75% of what is billed and applies only to those accounts with structures. To determine what is billed to each account under usage, an occupancy estimate is calculated equal to the # of bedrooms plus 1. A total estimate is done for the whole community to determine the per occupant rate, and then that rate is multiplied by the individual property's estimated occupancy to establish the billed amount.

It is highly recommended that WEVD introduce water meters for all customers so charges can be based on usage. The introduction of meters for all system users will also help identify the health of the water system through water loss tracking.




The water rate growth is projected through 2040 using a 5% increase to account for inflation and an additional 3% to pay for capital projects and build the reserve funds, as shown in the tables below. This spreadsheet has been provided to WEVD and should be updated annually as their goals and project timelines change. It is also suggested that if meters are installed the rate structure includes a fee per 10,000 gallons in addition to a new base rate.

| RATE STRUCTURE | | 2025 | | 2026 | | 2027 | |
|---|---|---|---|---|---|---|---|
| **Category** | **#Customers** | **BASE RATE** | **REVENUE** | **BASE RATE** | **REVENUE** | **BASE RATE** | **REVENUE** |
| Undeveloped | 265 | $ 192.17 | $ 50,926.32 | $ 207.55 | $ 55,000.42 | $ 224.15 | $ 59,400.45 |
| 1 Bedroom | 22 | $ 646.46 | $ 14,222.03 | $ 698.17 | $ 15,359.80 | $ 754.03 | $ 16,588.58 |
| 2 Bedroom | 190 | $ 873.60 | $ 165,983.39 | $ 943.48 | $ 179,262.06 | $ 1,018.96 | $ 193,603.03 |
| 3 Bedroom | 269 | $ 1,100.74 | $ 296,098.38 | $ 1,188.80 | $ 319,786.25 | $ 1,283.90 | $ 345,369.15 |
| 4 Bedroom | 68 | $ 1,327.88 | $ 90,295.71 | $ 1,434.11 | $ 97,519.37 | $ 1,548.84 | $ 105,320.92 |
| 5 Bedroom | 4 | $ 1,555.02 | $ 6,220.08 | $ 1,679.42 | $ 6,717.68 | $ 1,813.77 | $ 7,255.10 |
| 6 Bedroom | 4 | $ 1,782.16 | $ 7,128.64 | $ 1,924.73 | $ 7,698.93 | $ 2,078.71 | $ 8,314.84 |
| **SUB-TOTAL** | | **$** | **630,874.55** | **$** | **681,344.51** | **$** | **735,852.07** |
| CC | 1 | $ 2,009.30 | $ 2,009.30 | $ 2,170.04 | $ 2,170.04 | $ 2,343.65 | $ 2,343.65 |
| Shop | 1 | $ 646.46 | $ 646.46 | $ 698.17 | $ 698.17 | $ 754.03 | $ 754.03 |
| Ski Area | 1 | $ 646.46 | $ 646.46 | $ 698.17 | $ 698.17 | $ 754.03 | $ 754.03 |
| **SUB-TOTAL** | | **$** | **3,302.21** | **$** | **3,566.39** | **$** | **3,851.70** |
| **TOTAL** | **825** | **$** | **634,176.76** | **$** | **684,910.90** | **$** | **739,703.77** |

| RATE STRUCTURE | | 2028 | | 2029 | | 2030 | |
|---|---|---|---|---|---|---|---|
| **Category** | **#Customers** | **BASE RATE** | **REVENUE** | **BASE RATE** | **REVENUE** | **BASE RATE** | **REVENUE** |
| Undeveloped | 265 | $ 242.08 | $ 64,152.49 | $ 261.45 | $ 69,284.69 | $ 282.37 | $ 74,827.47 |
| 1 Bedroom | 22 | $ 814.35 | $ 17,915.67 | $ 879.50 | $ 19,348.92 | $ 949.86 | $ 20,896.83 |
| 2 Bedroom | 190 | $ 1,100.48 | $ 209,091.27 | $ 1,188.52 | $ 225,818.57 | $ 1,283.60 | $ 243,884.06 |
| 3 Bedroom | 269 | $ 1,386.61 | $ 372,998.68 | $ 1,497.54 | $ 402,838.57 | $ 1,617.34 | $ 435,065.66 |
| 4 Bedroom | 68 | $ 1,672.74 | $ 113,746.59 | $ 1,806.56 | $ 122,846.32 | $ 1,951.09 | $ 132,674.03 |
| 5 Bedroom | 4 | $ 1,958.88 | $ 7,835.50 | $ 2,115.59 | $ 8,462.34 | $ 2,284.83 | $ 9,139.33 |
| 6 Bedroom | 4 | $ 2,245.01 | $ 8,980.03 | $ 2,424.61 | $ 9,698.43 | $ 2,618.58 | $ 10,474.31 |
| **SUB-TOTAL** | | **$** | **794,720.24** | **$** | **858,297.85** | **$** | **926,961.68** |
| CC | 1 | $ 2,531.14 | $ 2,531.14 | $ 2,733.63 | $ 2,733.63 | $ 2,952.32 | $ 2,952.32 |
| Shop | 1 | $ 814.35 | $ 814.35 | $ 879.50 | $ 879.50 | $ 949.86 | $ 949.86 |
| Ski Area | 1 | $ 814.35 | $ 814.35 | $ 879.50 | $ 879.50 | $ 949.86 | $ 949.86 |
| **SUB-TOTAL** | | **$** | **4,159.84** | **$** | **4,492.62** | **$** | **4,852.03** |
| **TOTAL** | **825** | **$** | **798,880.07** | **$** | **862,790.48** | **$** | **931,813.72** |

| RATE STRUCTURE | | 2031 | | 2032 | | 2033 | |
|---|---|---|---|---|---|---|---|
| **Category** | **#Customers** | **BASE RATE** | **REVENUE** | **BASE RATE** | **REVENUE** | **BASE RATE** | **REVENUE** |
| Undeveloped | 265 | $ 304.96 | $ 80,813.66 | $ 329.35 | $ 87,278.76 | $ 355.70 | $ 94,261.06 |
| 1 Bedroom | 22 | $ 1,025.84 | $ 22,568.58 | $ 1,107.91 | $ 24,374.07 | $ 1,196.55 | $ 26,323.99 |
| 2 Bedroom | 190 | $ 1,386.29 | $ 263,394.78 | $ 1,497.19 | $ 284,466.36 | $ 1,616.97 | $ 307,223.67 |
| 3 Bedroom | 269 | $ 1,746.73 | $ 469,870.91 | $ 1,886.47 | $ 507,460.59 | $ 2,037.39 | $ 548,057.43 |
| 4 Bedroom | 68 | $ 2,107.18 | $ 143,287.95 | $ 2,275.75 | $ 154,750.98 | $ 2,457.81 | $ 167,131.06 |
| 5 Bedroom | 4 | $ 2,467.62 | $ 9,870.48 | $ 2,665.03 | $ 10,660.12 | $ 2,878.23 | $ 11,512.93 |
| 6 Bedroom | 4 | $ 2,828.06 | $ 11,312.25 | $ 3,054.31 | $ 12,217.23 | $ 3,298.65 | $ 13,194.61 |
| **SUB-TOTAL** | | **$** | **1,001,118.62** | **$** | **1,081,208.11** | **$** | **1,167,704.75** |
| CC | 1 | $ 3,188.51 | $ 3,188.51 | $ 3,443.59 | $ 3,443.59 | $ 3,719.07 | $ 3,719.07 |
| Shop | 1 | $ 1,025.84 | $ 1,025.84 | $ 1,107.91 | $ 1,107.91 | $ 1,196.55 | $ 1,196.55 |
| Ski Area | 1 | $ 1,025.84 | $ 1,025.84 | $ 1,107.91 | $ 1,107.91 | $ 1,196.55 | $ 1,196.55 |
| **SUB-TOTAL** | | **$** | **5,240.20** | **$** | **5,659.41** | **$** | **6,112.16** |
| **TOTAL** | **825** | **$** | **1,006,358.81** | **$** | **1,086,867.52** | **$** | **1,173,816.92** |

| RATE STRUCTURE | | 2034 | | 2035 | | 2036 | |
|---|---|---|---|---|---|---|---|
| **Category** | **#Customers** | **BASE RATE** | **REVENUE** | **BASE RATE** | **REVENUE** | **BASE RATE** | **REVENUE** |
| Undeveloped | 265 | $ 384.16 | $ 101,801.94 | $ 414.89 | $ 109,946.10 | $ 448.08 | $ 118,741.78 |
| 1 Bedroom | 22 | $ 1,292.27 | $ 28,429.91 | $ 1,395.65 | $ 30,704.31 | $ 1,507.30 | $ 33,160.65 |
| 2 Bedroom | 190 | $ 1,746.32 | $ 331,801.57 | $ 1,886.03 | $ 358,345.69 | $ 2,036.91 | $ 387,013.35 |
| 3 Bedroom | 269 | $ 2,200.38 | $ 591,902.03 | $ 2,376.41 | $ 639,254.19 | $ 2,566.52 | $ 690,394.53 |
| 4 Bedroom | 68 | $ 2,654.43 | $ 180,501.55 | $ 2,866.79 | $ 194,941.67 | $ 3,096.13 | $ 210,537.01 |
| 5 Bedroom | 4 | $ 3,108.49 | $ 12,433.96 | $ 3,357.17 | $ 13,428.68 | $ 3,625.74 | $ 14,502.97 |
| 6 Bedroom | 4 | $ 3,562.55 | $ 14,250.18 | $ 3,847.55 | $ 15,390.19 | $ 4,155.35 | $ 16,621.41 |
| **SUB-TOTAL** | | **$** | **1,261,121.14** | **$** | **1,362,010.83** | **$** | **1,470,971.69** |
| CC | 1 | $ 4,016.60 | $ 4,016.60 | $ 4,337.93 | $ 4,337.93 | $ 4,684.96 | $ 4,684.96 |
| Shop | 1 | $ 1,292.27 | $ 1,292.27 | $ 1,395.65 | $ 1,395.65 | $ 1,507.30 | $ 1,507.30 |
| Ski Area | 1 | $ 1,292.27 | $ 1,292.27 | $ 1,395.65 | $ 1,395.65 | $ 1,507.30 | $ 1,507.30 |
| **SUB-TOTAL** | | **$** | **6,601.14** | **$** | **7,129.23** | **$** | **7,699.57** |
| **TOTAL** | **825** | **$** | **1,267,722.27** | **$** | **1,369,140.05** | **$** | **1,478,671.26** |

| RATE STRUCTURE | | 2037 | | 2038 | | 2039 | |
|---|---|---|---|---|---|---|---|
| **Category** | **#Customers** | **BASE RATE** | **REVENUE** | **BASE RATE** | **REVENUE** | **BASE RATE** | **REVENUE** |
| Undeveloped | 265 | $ 483.93 | $ 128,241.13 | $ 522.64 | $ 138,500.42 | $ 564.45 | $ 149,580.45 |
| 1 Bedroom | 22 | $ 1,627.89 | $ 35,813.50 | $ 1,758.12 | $ 38,678.58 | $ 1,898.77 | $ 41,772.87 |
| 2 Bedroom | 190 | $ 2,199.87 | $ 417,974.41 | $ 2,375.85 | $ 451,412.37 | $ 2,565.92 | $ 487,525.36 |
| 3 Bedroom | 269 | $ 2,771.84 | $ 745,626.09 | $ 2,993.59 | $ 805,276.17 | $ 3,233.08 | $ 869,698.27 |
| 4 Bedroom | 68 | $ 3,343.82 | $ 227,379.97 | $ 3,611.33 | $ 245,570.36 | $ 3,900.24 | $ 265,215.99 |
| 5 Bedroom | 4 | $ 3,915.80 | $ 15,663.21 | $ 4,229.07 | $ 16,916.26 | $ 4,567.39 | $ 18,269.57 |
| 6 Bedroom | 4 | $ 4,487.78 | $ 17,951.12 | $ 4,846.80 | $ 19,387.21 | $ 5,234.55 | $ 20,938.19 |
| **SUB-TOTAL** | | **$** | **1,588,649.43** | **$** | **1,715,741.38** | **$** | **1,853,000.69** |
| CC | 1 | $ 5,059.76 | $ 5,059.76 | $ 5,464.54 | $ 5,464.54 | $ 5,901.70 | $ 5,901.70 |
| Shop | 1 | $ 1,627.89 | $ 1,627.89 | $ 1,758.12 | $ 1,758.12 | $ 1,898.77 | $ 1,898.77 |
| Ski Area | 1 | $ 1,627.89 | $ 1,627.89 | $ 1,758.12 | $ 1,758.12 | $ 1,898.77 | $ 1,898.77 |
| **SUB-TOTAL** | | **$** | **8,315.53** | **$** | **8,980.78** | **$** | **9,699.24** |
| **TOTAL** | **825** | **$** | **1,596,964.96** | **$** | **1,724,722.16** | **$** | **1,862,699.93** |

| RATE STRUCTURE | | 2040 | |
|---|---|---|---|
| **Category** | **#Customers** | **BASE RATE** | **REVENUE** |
| Undeveloped | 265 | $ 609.61 | $ 161,546.88 |
| 1 Bedroom | 22 | $ 2,050.67 | $ 45,114.70 |
| 2 Bedroom | 190 | $ 2,771.20 | $ 526,527.39 |
| 3 Bedroom | 269 | $ 3,491.73 | $ 939,274.13 |
| 4 Bedroom | 68 | $ 4,212.25 | $ 286,433.27 |
| 5 Bedroom | 4 | $ 4,932.78 | $ 19,731.13 |
| 6 Bedroom | 4 | $ 5,653.31 | $ 22,613.25 |
| **SUB-TOTAL** | | **$** | **2,001,240.75** |
| CC | 1 | $ 6,373.84 | $ 6,373.84 |
| Shop | 1 | $ 2,050.67 | $ 2,050.67 |
| Ski Area | 1 | $ 2,050.67 | $ 2,050.67 |
| **SUB-TOTAL** | | **$** | **10,475.18** |
| **TOTAL** | **825** | **$** | **2,011,715.92** |

It is important to note that the above increases are a suggestion. Understandably, changes in water rates can be concerning to users, and these capital improvement recommendations aim to support the long-term reliability and quality of the water system. By gradually adjusting rates over time, WEVD can prepare for future maintenance and improvements, ensuring that the community continues to receive safe and dependable water service.

To give a sense of the value, the annual average water fee per household for 2025 in New Hampshire is $867.93 for 90,000 gallons of water. This water system, valued at approximately $20.4 million, includes five pump stations and over 100,000 linear feet of water main—resources that require attention and upkeep over the next two decades. By planning ahead and making incremental changes to rates, users can avoid large, sudden increases that are more difficult for everyone.

### 7.3.2 Outside Sources

Costs for water are typically funded through general rates and fees. If large expenses are required for expansion or upgrades, the System plans to pay for the improvements through user fees, grants, and loans.

User rates can be adjusted in the future to fund improvements and some of the future projects can be accomplished with a combination of capital reserve funds and outside funding resources such as those listed below.

**Planning Funds:**

USDA Rural Development SEARCH (Special Evaluation Assistance for Rural Communities and Households

- *Low income rural community (<80% of MHI of state) and population <2500*
- *$25,000 maximum with no match required*
- *Predevelopment feasibility studies, preliminary design and engineering analysis, development of implementation applications*
- *Water, sewer, solid waste, storm water, and other public improvements*

USDA Predevelopment Planning Grant (PPG)

- *Low income rural community with population <10,000*
- *Preliminary Engineering Report / system study and application package for implementation funds to USDA*
- *$30,000 maximum with 25% match (no in-kind)*

NHDES SRF Drinking Water Asset Management Grant

- *Water systems serving more than 200 customers*
- *Maximum grant and match varies*
- *Asset Inventory, Financial Review and long-term funding strategy, implementation plan and community outreach plan*
- *Typical annual applications due December*

**Construction Funds**

USDA Rural Development Water and Environmental Programs (WEP)

- *For Necessary and Inevitable Work related to drinking water, sanitary sewer, solid waste and storm drainage*
- *Population < 10,000*
- *Acquisition, construction or improvement of*
  - *Drinking water source, treatment, storage, distribution*
  - *Sewer Collection, transmission, treatment and disposal*
  - *Solid waste collection, disposal, closure*
  - *Stormwater collection, transmission and disposal*
  - *Including engineering, legal, interest cost during construction*
- *Loan with up to 40-year payback with fixed interest rates based on MHI*
- *Grant – Loan combination amount based on user rates and community demographics*
- *Applications due in December for state funds and April for national pool*
- *Town meeting bond vote required*

- *Preliminary Engineering Report is required*

NHDES Drinking Water SRF

- *Public water systems*
- *Uses include*
  - *Infrastructure improvement source development, distribution main rehab or replacement, treatment and storage facilities*
- *Pre-applications are competitively ranked*
  - *Based on violations, deficiencies, affordability, asset management in place etc*
- *Loan forgiveness for disadvantaged communities*
- *Competitive loan rates*
- *Typical projects are greater than $200,000*
- *Town bond vote required*

NHDES Drinking Water and Groundwater Trust Fund (DWGTF)

- *Public water systems*
- *Uses include*
  - *Planning, design, construction of aging water infrastructure*
  - *Treatment or replacement of water source*
  - *Extension of public water system*
  - *Permanent protection of water supply land*
- *Pre-application competitively ranked*
- *Long term loans with some principal forgiveness*
- *Planning grants available*
- *Town bond vote required*

Community Development Block Grant

- *All municipalities are eligible to apply*
- *Public Facilities and Economic Development Grants Available*
- *Up to $500,000 per year competitively scored*
- *Public Facilities – typically January and July applications – NHDES violation and low income benefit*
- *Economic Development – accepted year-round, must have business committed to creating jobs, 1:1 match required*
- *Feasibility Study up to $12,000 for preliminary design and income surveys, typically October and April Applications*

Northern Border Regional Commission

- *Purpose is to revitalize and modernize essential infrastructure in communities in support of economic development*
- *Eligible counties in NH include*
  - *Coos and Sullivan Counties up to 80% grant eligible*
  - *Grafton and Carroll Counties up to 50% grant eligible*
- *Uses include engineering and construction of infrastructure*
- *Typically, $250,000 award ($1,000,000 may be available in certain circumstances)*
- *Applications due in May or June of each year*

US Department of Commerce Economic Development Administration Public Works Program

- *Construction funds for infrastructure in support of economic development including road, water, sewer, electrical.*
- *Must have the likelihood of business growth*
- *1:1 match typically required*
- *Year-round applications*
- *Average awards are $1 million depending on benefits of project*

Municipal bond banks and traditional local banks are also a resource for capital improvement loans.

## 8. Public Outreach

The purpose of public outreach is for the WEVD to provide information on the operation of the water system to its customers to establish customer expectations and to allow the System to recover the costs associated with operating, maintaining, and upgrading the water system.

The Communication plan will provide the following information as part of the plan:

- Current and proposed rate structure/increases
- Condition of the system components
- Explanation of the true cost of operating and maintaining the water system including capital improvements to convey the important message that providing safe drinking water requires ongoing investment and care
- Status of meeting the goals

This information will be provided utilizing the following outlets:

- Public Informational Meetings
- Annual Meetings
- Commissioner meetings open to the public
- Social media including Websites and Facebook

It is important to the customer and the commissioners that everyone understands the importance of maintaining and efficiently operating their $20.4 million shared system.

## 9. Conclusions and Recommendations

The System should plan for future improvements as follows:

- The current rate structure is based on the number of bedrooms in a house. The district had planned to install meters at each home. However, in 2023, a vote was held, and it was decided that meters would not be installed for customer usage. It is recommended that WEVD re-evaluate this decision and install meters for all users.
- Water loss is a metric that describes the overall health of a water system and WEVD is unable to determine their water loss without meters at all user locations. It is recommended to not only install meters at user locations but also to install meters at all transmission line segments and isolated zones to determine where water loss is occurring.
- Both increased storage and another water source are recommended before system expansion.
- Currently the water operator is working to track system component locations. A GIS mapping system that can be used during all repairs and construction would help with mapping confirmation. This mapping is important for WaterCAD modelling accuracy. It is recommended to purchase a tablet and GIS subscription.
- The treatment method for pH adjustment is currently caustic soda which is extremely corrosive and dangerous for operators to handle and mix. It is recommended that the caustic soda be replaced with soda ash, a much safer alternative for the operator to use. The system has also seen pH readings of up to 9, soda ash should maintain a slightly lower pH.
- The aeration system at ski-bowl is in poor condition and obsolete. It is recommended to eliminate the aeration process.
- The treatment system utilizes pH and chlorine analyzers. However, the operator still must manually adjust to meet water quality standards. Integrating controls within the SCADA system that enable flow pacing of feed pumps to operator-defined programmable setpoints is recommended.
- Since water main age is largely unknown, the Village District should keep records of pipe condition during any repairs in the excel document that is provided with this water system improvement plan.

This improvement plan should be used as a guide to keep water system improvements moving forward and to implement user rates at an appropriate level to complete necessary upgrades and maintenance rather than allowing components to outlive their useful life and fall into deferred maintenance. It is important to manage the system as a business that strives to satisfy its customers and implement rates that cover the true cost of operating the $20.4 million asset.

# Appendices

*Appendix A: Asset Data Tables*

| Location | START Node | End Node | Size | Material | Length (LF) | TYPE | Condition |
|---|---|---|---|---|---|---|---|
| LIBERTY TO SNOWBOWL | PS1 | PS2 | 4 | DI | 3,847 | TM | VERY POOR |
| SNOWBOWL TO PEGWOOD | PS2 | PS3 | 6 | DI | 6,844 | TM | UNKNOWN |
| PEGWOOD TO RESERVOIR | PS3 | PS4 | 4 | PVC | 3,359 | TM | FAIR |
| RESERVOIR TO SUNSET | PS4 | PS5 | 3 | DI | 3,065 | TM | UNKNOWN |
| SUNSET TO TAYLOR | PS5 | PS6 | 2 | PVC | 3,158 | TM | UNKNOWN |
| CAMPTON MTN PARKING | PS2 | A1 | 2 | PVC | 946 | WM | UNKNOWN |
| CROSS COUNTRY | A1 | A2 | 2 | PVC | 400 | WM | UNKNOWN |
| CROSS COUNTRY | A2 | A2E1 | 2 | PVC | 806 | WM | UNKNOWN |
| CROSS COUNTRY | A2 | A2E2 | 2 | PVC | 1,231 | WM | UNKNOWN |
| CROSS COUNTRY | A2 | A3 | 2 | PVC | 426 | WM | UNKNOWN |
| CROSS COUNTRY | A3 | A3E | 2 | PVC | 288 | WM | UNKNOWN |
| SNOWOOD | A3 | A4 | 2 | PVC | 1,469 | WM | UNKNOWN |
| SNOWOOD | A4 | A5 | 2 | PVC | 342 | WM | UNKNOWN |
| WEEPING BIRCHES | A4 | A6 | 4 | HDPE | 2,940 | WM | UNKNOWN |
| SNOWOOD | A6 | A6E | 2 | PVC | 1,203 | WM | UNKNOWN |
| SNOWOOD | A5 | A6 | 2 | PVC | 837 | WM | UNKNOWN |
| HOLLAND | A5 | A7 | 2 | PVC | 2,790 | WM | POOR |
| CHECKERBERRY | A7 | A7E | 2 | PVC | 605 | WM | UNKNOWN |
| CHECKERBERRY | A7 | A8 | 2 | PVC | 430 | WM | POOR |
| CROSS COUNTRY | A8 | A9 | 2 | PVC | 548 | WM | UNKNOWN |
| LIBERTY | A9 | A9E | 2 | PVC | 599 | WM | UNKNOWN |
| CROSS COUNTRY | A8 | A10 | 2 | PVC | 563 | WM | UNKNOWN |
| LIBERTY | A9 | A10 | 2 | PVC | 254 | WM | UNKNOWN |
| LIBERTY | A10 | A10E | 2 | PVC | 1,705 | WM | UNKNOWN |
| WEBSTER | A1 | A11 | 2 | PVC | 288 | WM | UNKNOWN |
| WEBSTER | A11 | A11E | 2 | PVC | 157 | WM | UNKNOWN |
| CROSS COUNTRY | A11 | A12 | 2 | PVC | 946 | WM | VERY POOR |
| DONOVAN FARM | A12 | A13 | 2 | PVC | 681 | WM | UNKNOWN |
| WINTERBROOK | A13 | A13E1 | 2 | PVC | 495 | WM | UNKNOWN |
| GREEN CIRCLE | A13 | A13E2 | 2 | PVC | 1,956 | WM | UNKNOWN |
| DONOVAN FARM | A13 | A14 | 2 | PVC | 813 | WM | UNKNOWN |
| GOOSE HOLLOW | AA14 | A15 | 2 | PVC | 675 | WM | UNKNOWN |
| MARDEN | AB14 | A15 | 2 | PVC | 836 | WM | UNKNOWN |
| GOOSE HOLLOW | A15 | A16 | 2 | PVC | 215 | WM | UNKNOWN |
| GOOSE HOLLOW | A16 | A17 | 2 | PVC | 577 | WM | UNKNOWN |
| BRIARCLIFF | A17 | A18 | 2 | PVC | 715 | WM | UNKNOWN |
| BRIARCLIFF | A18 | A18E1 | 2 | PVC | 1,083 | WM | UNKNOWN |
| MEYER | A18 | A18E2 | 2 | PVC | 441 | WM | UNKNOWN |
| SUMMIT | A16 | A19 | 2 | PVC | 633 | WM | UNKNOWN |
| DURGIN | A19 | A19E | 2 | PVC | 490 | WM | UNKNOWN |
| SUMMIT | A19 | A20 | 2 | PVC | 319 | WM | UNKNOWN |
| RYAN | A17 | A20 | 2 | PVC | 938 | WM | VERY POOR |

| Location | START Node | End Node | Size | Material | Length (LF) | TYPE | Condition |
|---|---|---|---|---|---|---|---|
| SUMMIT | A20 | A21 | 2 | PVC | 1,472 | WM | POOR |
| SUMMIT | A21 | A22 | 2 | PVC | 863 | WM | UNKNOWN |
| WANOSHA | A22 | A23 | 2 | PVC | 1,174 | WM | UNKNOWN |
| WANOSHA | A23 | A23E | 2 | PVC | 307 | WM | VERY GOOD |
| CHAPMAN | A23 | A24 | 2 | PVC | 337 | WM | UNKNOWN |
| CHAPMAN | A24 | A24E2 | 2 | PVC | 363 | WM | UNKNOWN |
| CROSS COUNTRY | A24 | A24E1 | 2 | PVC | 936 | WM | UNKNOWN |
| SUMMIT | A22 | A25 | 2 | PVC | 389 | WM | POOR |
| CALDON | A25 | A26 | 2 | PVC | 358 | WM | UNKNOWN |
| CALDON | A26 | A26E1 | 2 | PVC | 190 | WM | UNKNOWN |
| CALDON | A26 | A26E2 | 2 | PVC | 367 | WM | UNKNOWN |
| SUMMIT | A25 | A27 | 2 | PVC | 866 | WM | POOR |
| WINTERBROOK | A27 | A28 | 2 | PVC | 2,181 | WM | VERY POOR |
| DUBEAU | A28 | A28E | 2 | PVC | 725 | WM | UNKNOWN |
| DONOVAN FARM | A28 | A29 | 2 | PVC | 775 | WM | VERY POOR |
| BELL VALLEY | A29 | A30 | 2 | PVC | 1,756 | WM | UNKNOWN |
| POND VIEW | A30 | A30E | 2 | PVC | 801 | WM | UNKNOWN |
| CROSS COUNTRY | A30 | PS4 | 2 | PVC | 3,327 | WM | UNKNOWN |
| WEETAMOO | A21 | A31 | 2 | PVC | 1,897 | WM | UNKNOWN |
| WEETAMOO | A32 | A32E | 2 | PVC | 838 | WM | UNKNOWN |
| BOULDER | A32 | A33 | 2 | PVC | 366 | WM | UNKNOWN |
| BOULDER | A33 | A33E1 | 2 | PVC | 451 | WM | UNKNOWN |
| BOULDER | A33 | A33E2 | 2 | PVC | 525 | WM | UNKNOWN |
| BOULDER | A33 | A34 | 2 | PVC | 224 | WM | UNKNOWN |
| WEETAMOO | A27 | A34 | 2 | PVC | 306 | WM | UNKNOWN |
| WEETAMOO | A34 | A34E | 2 | PVC | 181 | WM | UNKNOWN |
| ISAAX FOX | A34 | A35 | 2 | PVC | 2,600 | WM | UNKNOWN |
| RESERVOIR | PS4 | A35 | 2 | PVC | 648 | WM | UNKNOWN |
| RESERVOIR | A35 | A36 | 2 | PVC | 2,531 | WM | UNKNOWN |
| RESERVOIR | A36 | A36E1 | 2 | PVC | 1,151 | WM | UNKNOWN |
| ABNAKI | A36 | A36E2 | 2 | PVC | 806 | WM | UNKNOWN |
| WEETAMOO | PS5 | A31 | 2 | PVC | 201 | WM | UNKNOWN |
| PORCUPINE | PS4 | C1E | 4 | PVC | 1,192 | WM | FAIR |
| CROSS COUNTRY | D1 | D1A | 2 | PVC | 98 | WM | UNKNOWN |
| DAVID THOMPSON | D2 | D2E | 2 | PVC | 933 | WM | UNKNOWN |
| COURT | D2 | D3 | 2 | PVC | 846 | WM | UNKNOWN |
| COURT | D3 | D4 | 6 | HDPE | 389 | WM | VERY GOOD |
| COURT | D4 | D5 | 2 | PVC | 104 | WM | GOOD |
| COURT | D5 | D5E | 2 | PVC | 235 | WM | GOOD |
| PANAWAY | D5 | D6 | 2 | PVC | 144 | WM | GOOD |
| PANAWAY | D6 | D6E1 | 2 | PVC | 90 | WM | GOOD |
| PANAWAY | D6 | D6E2 | 2 | PVC | 374 | WM | GOOD |
| RICHARDSON | D4 | D4E | 6 | HDPE | 1,889 | WM | VERY GOOD |

| Location | START Node | End Node | Size | Material | Length (LF) | TYPE | Condition |
|---|---|---|---|---|---|---|---|
| DAVID THOMPSON | D2 | D7 | 2 | PVC | 1,749 | WM | UNKNOWN |
| ARMSBY | D7 | D7E | 2 | HDPE | 503 | WM | UNKNOWN |
| SCHULYER | D7 | D8 | 2 | PVC | 1,675 | WM | UNKNOWN |
| TOBEY | D8 | D8E | 2 | PVC | 1,166 | WM | UNKNOWN |
| WINTERBROOK | D8 | D9 | 2 | PVC | 1,369 | WM | UNKNOWN |
| WINTERBROOK | D9 | D9E1 | 2 | PVC | 159 | WM | UNKNOWN |
| MYRTLE | D9 | D9E2 | 2 | HDPE | 778 | WM | VERY GOOD |
| PEGWOOD | PS3 | B1 | 2 | PVC | 1,460 | WM | UNKNOWN |
| PEGWOOD | B1 | B1E | 2 | PVC | 212 | WM | UNKNOWN |
| PEGWOOD | B1 | B2 | 2 | PVC | 830 | WM | UNKNOWN |
| PEGWOOD | B2 | B2E | 2 | PVC | 834 | WM | UNKNOWN |
| PEGWOOD | B2 | B3 | 2 | PVC | 860 | WM | VERY GOOD |
| PEGWOOD | B3 | B4 | 2 | PVC | 1,009 | WM | VERY GOOD |
| PEGWOOD | B4 | B4E | 2 | PVC | 291 | WM | UNKNOWN |
| MCLAREN | B4 | B5 | 2 | PVC | 2,571 | WM | POOR |
| PEGWOOD | B3 | B5 | 2 | PVC | 3,449 | WM | VERY GOOD |
| MORRIL | B5 | B6 | 2 | PVC | 987 | WM | UNKNOWN |
| MORRIL | B6 | B6E2 | 2 | PVC | 417 | WM | UNKNOWN |
| MORRIL | B6 | B6E2 | 2 | PVC | 82 | WM | UNKNOWN |

| Location | ASSET | COND | INSTALLATION |
|---|---|---|---|
| PS1<br>Liberty Lane<br>240 PSI<br>ELEV: 730.4<br>(SOURCE) | BUILDING | POOR | 1990 |
| | WELL 1 (98 GPM) | GOOD | 1990 |
| | WELL 2 (56 GPM) | GOOD | 1990 |
| | VFD DRIVE 1 | VERY GOOD | 2005 |
| | VFD DRIVE 2 | VERY GOOD | 2005 |
| | PUMP & MOTOR 1 | VERY GOOD | 2020 |
| | PUMP & MOTOR 2 | VERY GOOD | 2010 |
| | VFD CONTROLS | VERY GOOD | 2005 |
| | CTL PANEL & BREAKERS | VERY GOOD | 2005 |
| | SCADA COMMUNICATION | VERY GOOD | 2020 |
| | BACKUP GEN & ATS | VERY GOOD | 2015 |
| | HEATER | GOOD | 2022 |
| | FLOW METER | FAIR | 2015 |
| | PRESSURE RELEIF VALVE | POOR | 1990 |
| | INTERIOR PIPING | VERY POOR | 1990 |
| PS3<br>Pegwood<br>60 PSI<br>ELEV: 1631<br>(GRAVITY & TANK) | BUILDING | VERY GOOD | 2006 |
| | **ATMOSPHERIC TANK (200,000 GAL)** | VERY GOOD | 2006 |
| | CTL PANEL & BREAKERS | VERY GOOD | 2006 |
| | SCADA COMMUNICATION | VERY GOOD | 2020 |
| | BACKUP GEN & ATS | VERY GOOD | 2024 |
| | HEATER | VERY GOOD | 2024 |
| | Small booster pump for 1 home | VERY GOOD | 2022 |
| | FLOW METER | VERY GOOD | 2015 |
| | PRESSURE TANK | VERY GOOD | 2022 |
| | INTERIOR PIPING | VERY GOOD | 2006 |
| PS4<br>Reservoir<br>200 PSI<br>ELEV: 1182<br>(BOOSTER) | BUILDING | VERY POOR | 1970 |
| | CTL PANEL & BREAKERS | FAIR | 2015 |
| | SCADA COMMUNICATION | GOOD | 2020 |
| | BACKUP GEN & ATS | VERY GOOD | 2015 |
| | HEATER | GOOD | 2025 |
| | VFD DRIVE 1 | GOOD | 2015 |
| | VFD DRIVE 2 | GOOD | 2015 |
| | INTERIOR PIPING | POOR | 1970 |
| | PUMP & MOTOR 1 | VERY GOOD | 2015 |
| | PUMP & MOTOR 2 | VERY GOOD | 2015 |

| Location | ASSET | COND | INSTALLATION |
|---|---|---|---|
| PS6<br>Taylor<br>60 PSI<br>ELEV: 1814<br>(PUMP STATION & TANK) | BUILDING | FAIR | 2005 |
| | **HOLDING TANK (1,000 GAL)** | FAIR | 2005 |
| | PRESSURE TANK 1 | VERY GOOD | 2005 |
| | PRESSURE TANK 2 | VERY GOOD | 2005 |
| | CTL PANEL & BREAKERS | VERY GOOD | 2005 |
| | BACKUP GEN & ATS | VERY GOOD | 2005 |
| | HEATER | VERY GOOD | 2005 |
| | FLOW METER | VERY GOOD | 2005 |
| | PUMP & MOTOR | VERY GOOD | 2005 |
| PS2<br>Ski Bowl<br>210 PSI<br>ELEV: 1218<br>(PUMP STATION, TREATMENT & TANK) | BUILDING | GOOD | 2010 |
| | **HOLDING TANK (3,000 GAL)** | VERY POOR | 1980 |
| | **ATMOSPHERIC CONTACT TANK (22,000 GAL)** | GOOD | 1980 |
| | CTL PANEL & BREAKERS upstairs | FAIR | 2024 |
| | CTL PANEL & BREAKERS downstairs | FAIR | 2010 |
| | SCADA COMMUNICATION | GOOD | 2020 |
| | BACKUP GEN & ATS | VERY GOOD | 2015 |
| | HEATER | GOOD | 2020 |
| | HEATER | GOOD | 2020 |
| | FLOW METER | GOOD | 2015 |
| | VFD DRIVE 1 | GOOD | 2012 |
| | VFD DRIVE 2 | GOOD | 2012 |
| | TRANSFER PUMP PVC PIPING | FAIR | 2012 |
| | INTERIOR PIPING | VERY POOR | 1980 |
| | PUMP & MOTOR 1 | GOOD | 2019 |
| | PUMP & MOTOR 2 | GOOD | 2016 |
| | CHLORINE TREATMENT SYSTEM | GOOD | 2015 |
| | CAUSTIC TREATMENT SYSTEM & AERATION | VERY POOR | 2015 |
| | CHEM TANK 1 | GOOD | 2015 |
| | CHEM TANK 2 | GOOD | 2015 |
| PS5<br>SUNSET<br>140 PSI<br>ELEV: 1660<br>(PUMP STATION & TANK) | BUILDING | VERY POOR | 1980 |
| | **PNEUMATIC HOLDING TANK (20,000 GAL)** | VERY POOR | 1980 |
| | CTL PANEL & BREAKERS | FAIR | 1980 |
| | SCADA COMMUNICATION | GOOD | 2020 |
| | BACKUP GEN & ATS | GOOD | 2015 |
| | HEATER | VERY GOOD | 2025 |
| | FLOW METER | GOOD | 2015 |
| | VFD DRIVE 1 | GOOD | 2010 |
| | VFD DRIVE 2 | GOOD | 2025 |
| | INTERIOR PIPING | VERY POOR | 1980 |
| | PUMP & MOTOR 1 | GOOD | 2010 |
| | PUMP & MOTOR 2 | GOOD | 2025 |

| PRV ID# | LOCATION | COND | LIDAR ELEV | GPS ELEV | HIGH PRESSURE | LOW PRESSURE |
|---|---|---|---|---|---|---|
| 1 | LIBERTY | VERY GOOD | 867 | 875 | X | 52 |
| 2 | HOLLAND TRAIL | VERY POOR | 1080 | 1085 | X | X |
| 3 | HOLLAND TRAIL | VERY GOOD | 1161 | 1175 | 90 | 40 |
| 4 | SNOWOOD DR | GOOD | 1152 | 1156 | 70 | 20 |
| 5 | HOLLAND TRAIL | VERY POOR | 940 | 943 | 100 | 65 |
| 6 | HODGEMAN HILL & MCLAREN | GOOD | 1024 | 1046 | 165 | 55 |
| 7 | PEGWOOD RD | VERY GOOD | 1180 | 1182 | X | X |
| 8 | WINTERBROOK RD | FAIR | 1145 | 1147 | X | X |
| 9 | SUMMIT DR | VERY POOR | 1250 | 1252 | X | X |
| 10 | SUMMIT DR | GOOD | 1330 | 1335 | X | X |
| 11 | SUMMIT DR | VERY GOOD | 1512 | 1513 | 50 | 40 |
| 12 | WANOSHA TRAIL | GOOD | 1267 | 1272 | 80 | 50 |
| 13 | DONOVAN FARM RD | VERY POOR | 1216 | 1212 | X | X |
| 14 | MCLAREN DR | VERY POOR | 1139 | 1126 | X | X |
| 15 | MCLAREN DR | VERY POOR | 1260 | 1241 | X | X |
| 16 | PEGWOOD RD | VERY GOOD | 1390 | 1428 | 100 | 45 |
| 17 | SUMMIT DR | FAIR | 1376 | 1386 | 110 | 75 |
| 18 | RICHARDSON TRAIL | FAIR | 1337 | 1346 | 120 | 50 |
| 19 | SCHUYLER DR | POOR | 1175 | 1183 | X | X |
| 20 | WINTERBROOK RD | POOR | 1065 | 1055 | X | X |
| 21 | CAMPTON MOUNTAIN RD | FAIR | 1010 | 1019 | X | X |
| 22 | WANOSHA TRAIL | FAIR | 1382 | 1390 | X | X |
| 23 | SUMMIT DR | FAIR | 1410 | 1414 | 60 | 45 |
| 24 | SKIBOWL | | | | 180 | 60 |

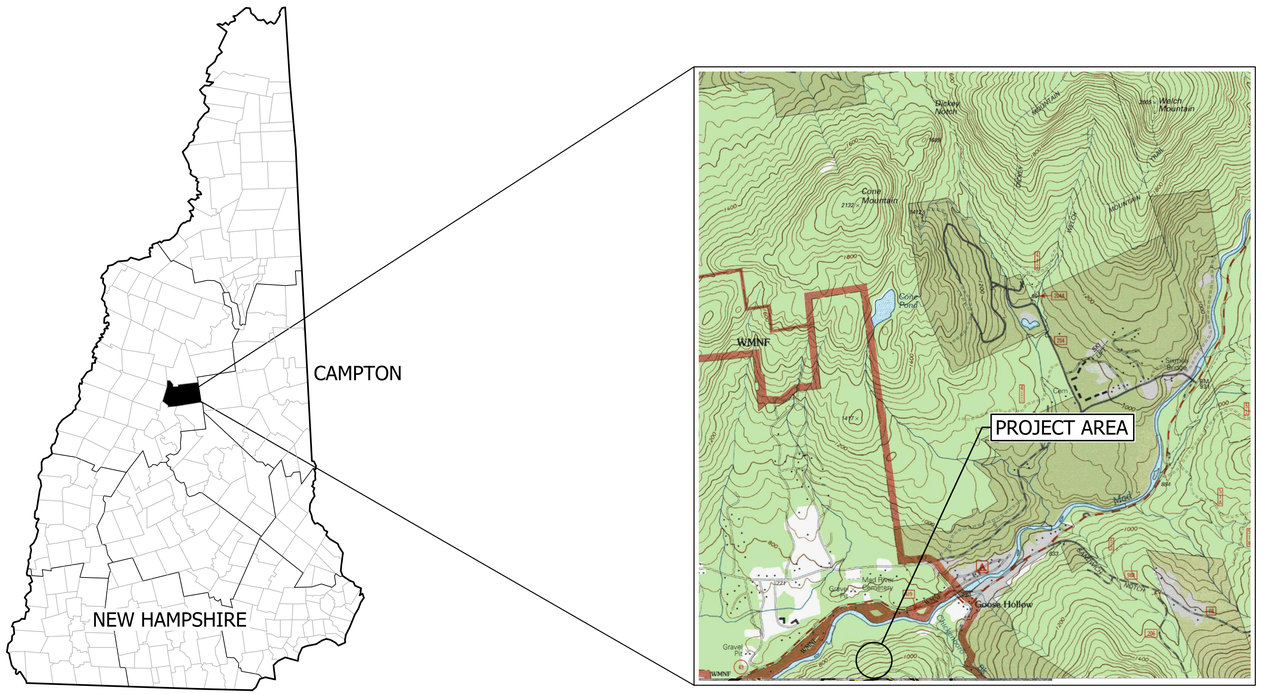
# *Appendix B: System Mapping*

# WATERVILLE ESTATES

## WATER SYSTEM IMPROVEMENTS

CAMPTON, NEW HAMPSHIRE

JULY 2025




LOCATION PLAN

SCALE: 1" = 2000'


OWNER:

WATERVILLE ESTATES
562 WINTERBROOK RD
CAMPTON, NH 03223
(603) 726 3082

ENGINEER:

horizons Engineering

34 SCHOOL STREET
LITTLETON, NH 03561
(603) 444-4111


SHEET INDEX


| | |
|---|---|
| | COVER |
| SHEET 1A | OVERALL (AERIAL) |
| SHEET 1B | OVERALL (TOPOGRAPHY) |
| SHEET 2 | ISOLATED ZONES |
| SHEET 3 | REPAIR HISTORY |
| SHEET 4 | SYSTEM ELEVATION VIEW |
| SHEET 5 | PUMP STATION SCHEMATICS |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## PLAN REFERENCE

(A) WATER MAIN LOCATIONS ARE BASED ON GPS POINTS RECEIVED FROM WATERVILLE ESTATES.
(B) PUMP STATION, PRV, AND GATE VALVE LOCATIONS ARE BASED ON GPS POINTS TAKEN WITH A ZENO IN MARCH OF 2025.

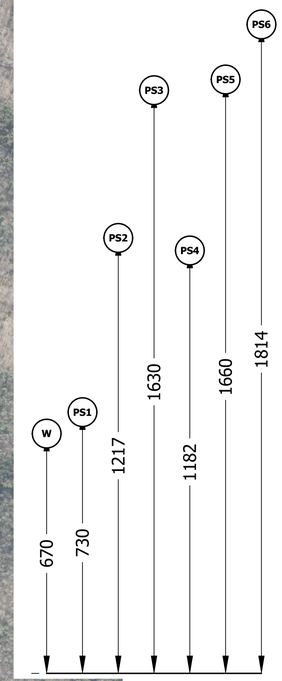
GRID

BRIARCLIFF CIRCLE
GOOSE HOLLOW RD
SUMMIT DR
DURGIN CIRCLE
CHAPMAN CIRCLE
MARDEN DR
WANOSHA TRAIL
TAYLOR DR
ABNAKY TRAIL
WEETAMOO TRAIL
BOULDER DR
CALDON CIRCLE
RESERVOIR RD
WINTERBROOK RD
GREEN CIRCLE
WEEPING BIRCHES
HOLLAND TRAIL
SNOWOOD DR
HODGEMAN HILL RD
DONOVAN FARM RD
ISAAX FOX DR
PORCUPINE DR
PARKER RD
CAMPTON MOUNTAIN RD
PEGWOOD RD
MCLAREN DR
MORRILL CIRCLE
DOE RUN
POND RD
LIBERTY LN
CHECKERBERRY RIDGE
BELL VALLEY RD
BELL VALLEY
COURT ST
DAVID THOMPSON
PANAWAY DR
RICHARDSON TRAIL
ARMSBY CI
SCHUYLER DR
TOBEY RD
MYRTLE ST
POND VIEW

CHICKENBORO BROOK RESERVOIR
WATERVILLE ESTATES COMMUNITY CENTER
CLOSED GATE VALVE
REVERSE OPERATING GATE VALVE
PRV-2 HOLLAND TRAIL
PRV-3 HOLLAND TRAIL
PRV-4 SNOWOOD DR
PRV-5 HOLLAND TRAIL
PRV-6 HODGEMAN & MCLAREN
PRV-6 WINTERBROOK RD
PRV-7 PEGWOOD RD
PRV-8 WINTERBROOK RD
PRV-9 SUMMIT DR
PRV-10 SUMMIT DR
PRV-11 SUMMIT DR
PRV-12 WANOSHA TRAIL
PRV-13 DONOVAN FARM RD
PRV-14 MCLAREN DR
PRV-15 MCLAREN DR
PRV-16 PEGWOOD RD
PRV-17 SUMMIT DR
PRV-18 RICHARDSON TRAIL
PRV-19 SCHUYLER DR
PRV-20 WINTERBROOK RD
PRV-22
PRV-23
PRV-24
PEGWOOD MID METER
SUNSET/WINOSHA METER
BOULDER METER
SOUTH MTN METER
RESERVOIR METER
RESERVOIR RD PUMP STATION
THORTON/HODGEMAN METER
PEGWOOD FILL METER
SUNSET PUMP STATION (20,000 GAL PNEUMATIC WATER TANK)
TAYLOR DR PUMP STATION (5,000 GAL HOLDING TANK)
PEGWOOD PUMP STATION & ATMOSPHERIC WATER TANK
SKI BOWL CONTACT TANK (22,000 GAL)
SKI BOWL PUMP STATION (3,000 GAL TRANSFER TANK)
CAMPTON MOUNTAIN SNOWMAKING WELL (40 GPM) (550' DEEP)
LIBERTY PUMP STATION (SOURCE)
LIBERTY (SOURCE) METER
GRAVEL PACKED DUG WELL 2 (56 GMP) (20' DEEP)
GRAVEL PACKED DUG WELL 1 (98 GMP) (19' DEEP)
"SOUTH MOUNTAIN PIT"
1680'

### WATER MAIN LEGEND

- PVC
- DUCTILE IRON
- HDPE
- INACTIVE
- UNKNOWN
- TRANSMISSION
- (A1) INTERCONNECTION
- (PS) PUMP STATION
- OPEN GATE VALVE
- CLOSED GATE VALVE




PUMP STATION ELEVATION VIEW

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# WATERVILLE ESTATES

## WATER SYSTEM IMPROVEMENTS

CAMPTON, NEW HAMPSHIRE

## OVERALL (AERIAL)

| NO. | DATE | REVISION DESCRIPTION | ENG | DWG |
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| DATE: JULY 2025 | PROJECT #: 240609 |
| ENGIN'D BY: HEI | DRAWN BY: JCH |
| CHECK'D BY: MLB | ARCHIVE #: H-___ |

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## PLAN REFERENCE

(A) WATER MAIN LOCATIONS ARE BASED ON GPS POINTS RECEIVED FROM WATERVILLE ESTATES.
(B) PUMP STATION, PRV, AND GATE VALVE LOCATIONS ARE BASED ON GPS POINTS TAKEN WITH A ZENO IN MARCH OF 2025.

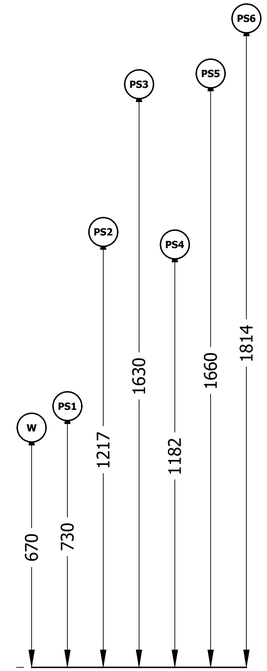
GRID

### WATER MAIN LEGEND

- PVC
- DUCTILE IRON
- HDPE
- INACTIVE
- UNKNOWN
- TRANSMISSION
- A1 INTERCONNECTION
- PS PUMP STATION
- OPEN GATE VALVE
- CLOSED GATE VALVE

BRIARCLIFF CIRCLE
GOOSE HOLLOW RD
PRV-9 SUMMIT DR
PRV-10 SUMMIT DR
SUMMIT DR
DURGIN CIRCLE
CHAPMAN CIRCLE
MARDEN DR
SUNSET/WINONSHA METER
PRV-11 SUMMIT DR
TAYLOR DR
TAYLOR DR PUMP STATION (5,000 GAL HOLDING TANK)
ABNAKY TRAIL
CLOSED GATE VALVE
CHICKENBORO BROOK RESERVOIR
PRV-22
SUNSET PUMP STATION (20,000 GAL PNEUMATIC WATER TANK)
BOULDER METER
WEETAMOO TRAIL
RESERVOIR RD
WATERVILLE ESTATES COMMUNITY CENTER
WANOSHA TRAIL
PRV-12 WANOSHA TRAIL
PRV-23
PRV-3 HOLLAND TRAIL
WEEPING BIRCHES
GREEN CIRCLE
WINTERBROOK RD
CALDON CIRCLE
BOULDER DR
PEGWOOD MID METER
PRV-8 WINTERBROOK RD
PRV-13 DONOVAN FARM RD
PRV-17 SUMMIT DR
HOLLAND TRAIL
SNOWOOD DR
REVERSE OPERATING GATE VALVE
HODGEMAN HILL RD
DONOVAN FARM RD
CLOSED GATE VALVE
ISAAX FOX DR
RESERVOIR METER
RESERVOIR RD PUMP STATION
PRV-2 HOLLAND TRAIL
PARKER RD
PORCUPINE DR
SKI BOWL CONTACT TANK (22,000 GAL)
CAMPTON MOUNTAIN SNOWMAKING WELL (40 GPM) (550' DEEP)
POND VIEW
PRV-4 SNOWOOD DR
THORTON/HODGEMAN METER
SKI BOWL PUMP STATION (3,000 GAL TRANSFER TANK)
CLOSED GATE VALVE
BELL VALLEY RD
CLOSED GATE VALVE
BELL VALLEY
SOUTH MTN METER
PRV-5 HOLLAND TRAIL
CAMPTON MOUNTAIN RD
PRV-21
PEGWOOD RD
PRV-7 PEGWOOD RD
PRV-18 RICHARDSON TRAIL
PEGWOOD PUMP STATION & ATMOSPHERIC WATER TANK
COURT ST
DAVID THOMPSON
DANAWAY DR
WINTERBROOK RD
PRV-20 WINTERBROOK RD
PRV-1 LIBERTY
LIBERTY LN
CHECKERBERRY RIDGE
CLOSED GATE VALVE
MCLAREN DR
HODGEMAN HILL RD
PEGWOOD FILL METER
PRV-16 PEGWOOD RD
"SOUTH MOUNTAIN PIT"
PRV-6 HODGEMAN & MCLAREN
PRV-15 MCLAREN DR
PRV-14 MCLAREN DR
ARNISBY CT
SCHUYLER DR
PRV-19 SCHUYLER DR
TOBEY RD
MORRILL CIRCLE
DOE RUN
RICHARDSON TRAIL
MYRTLE ST
POND RD
LIBERTY PUMP STATION (SOURCE)
LIBERTY (SOURCE) METER
GRAVEL PACKED DUG WELL 2 (56 GMP) (20' DEEP)
GRAVEL PACKED DUG WELL 1 (98 GMP) (19' DEEP)

### PUMP STATION ELEVATION VIEW

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# WATERVILLE ESTATES

## WATER SYSTEM IMPROVEMENTS

CAMPTON, NEW HAMPSHIRE

## OVERALL (TOPOGRAPHY)

| NO. | DATE | REVISION DESCRIPTION | ENG | DWG |
|---|---|---|---|---|
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| DATE: JULY 2025 | PROJECT #: 240609 |
| ENGIN'D BY: HEI | DRAWN BY: JCH |
| CHECK'D BY: MLB | ARCHIVE #: H-___ |

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GRID

## SYSTEM ISOLATED ZONES

- ZONE A1-A2
- ZONE A
- ZONE B
- ZONE C
- ZONE D
- ZONE E
- TRANSMISSION

BRIARCLIFF CIRCLE
GOOSE HOLLOW RD
PRV-9 SUMMIT DR
PRV-10 SUMMIT DR
SUMMIT DR
DURGIN CIRCLE
SUNSET/WINOOSHA METER
PRV-11 SUMMIT DR
TAYLOR DR
TAYLOR DR PUMP STATION (5,000 GAL HOLDING TANK)
CHICKENBORO BROOK RESERVOIR
MARDEN DR
CHAPMAN CIRCLE
PRV-22
WANOSHA TRAIL
PRV-12 WANOSHA TRAIL
PRV-23
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GREEN CIRCLE
WINTERBROOK RD
CALDON CIRCLE
BOULDER DR
PRV-17 SUMMIT DR
PEGWOOD MID METER
PRV-13 DONOVAN FARM RD
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PRV-8 WINTERBROOK RD
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ISAAX FOX DR
PORCUPINE DR
RESERVOIR METER
RESERVOIR RD PUMP STATION
SNOWOOD DR
HOLLAND TRAIL
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PARKER RD
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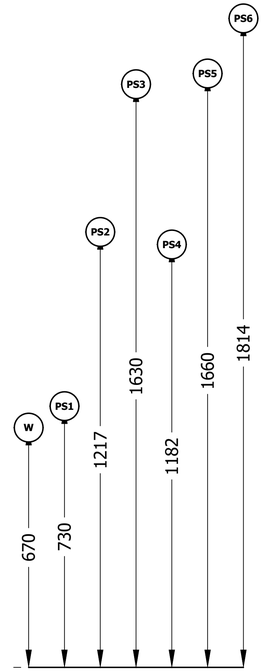
CAMPTON MOUNTAIN SNOWMAKING WELL (40 GPM) (550' DEEP)
HODGEMAN HILL RD
CAMPTON MOUNTAIN LOOP
PRV-4 SNOWOOD DR
THORTON/HODGEMAN METER
SKI BOWL PUMP STATION (3,000 GAL TRANSFER TANK)
POND VIEW
BELL VALLEY RD
PRV-7 PEGWOOD RD
PEGWOOD RD
PRV-18 RICHARDSON TRAIL
PEGWOOD PUMP STATION & ATMOSPHERIC WATER TANK
SOUTH MTN METER
COURT ST
DAVID THOMPSON
BELL VALLEY
PANAWAY DR
WINTERBROOK RD
PRV-20 WINTERBROOK RD
SNOWOOD DR
PRV-5 HOLLAND TRAIL
PRV-21
CAMPTON MOUNTAIN RD
PRV-1 LIBERTY
LIBERTY LN
CHECKERBERRY RIDGE
HODGEMAN HILL RD
MCLAREN DR
PRV-6 HODGEMAN & MCLAREN
PRV-16 PEGWOOD RD
PRV-15 MCLAREN DR
PRV-14 MCLAREN DR
PEGWOOD FILL METER
1600
"SOUTH MOUNTAIN PIT"
ARMSBY CI
SCHUYLER DR
PRV-19 SCHUYLER DR
TOBEY RD
MORRILL CIRCLE
DOE RUN
POND RD
LIBERTY PUMP STATION (SOURCE)
LIBERTY (SOURCE) METER
GRAVEL PACKED DUG WELL 2 (56 GMP) (20' DEEP)
GRAVEL PACKED DUG WELL 1 (98 GMP) (19' DEEP)
RICHARDSON TRAIL
MYRTLE ST

## PUMP STATION ELEVATION VIEW

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# WATERVILLE ESTATES

## WATER SYSTEM IMPROVEMENTS

CAMPTON, NEW HAMPSHIRE

## ISOLATED ZONES

| NO. | DATE | REVISION DESCRIPTION | ENG | DWG |
|---|---|---|---|---|
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| DATE: JULY 2025 | PROJECT #: 240609 |
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| CHECK'D BY: MLB | ARCHIVE #: H-___ |

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GRID

## WATER MAIN LEGEND

- PVC
- DUCTILE IRON
- HDPE
- INACTIVE
- UNKNOWN
- TRANSMISSION
- A1 INTERCONNECTION
- PS PUMP STATION
- OPEN GATE VALVE
- CLOSED GATE VALVE

BRIARCLIFF CIRCLE
GOOSE HOLLOW RD
PRV-9 SUMMIT DR
PRV-10 SUMMIT DR
SUMMIT DR
DURGIN CIRCLE
SUNSET/WINOOSHA METER
PRV-11 SUMMIT DR
TAYLOR DR
TAYLOR DR PUMP STATION (5,000 GAL HOLDING TANK)
PROPOSED REMOVAL OF SUNSET PUMP STATION
SUNSET PUMP STATION (20,000 GAL PNEUMATIC WATER TANK)
BOULDER METER
ABNAKY TRAIL
RESERVOIR RD
WEETAMOO TRAIL
BOULDER DR
PRV-17 SUMMIT DR
PRV-23
PRV-22
CHAPMAN CIRCLE
WANOSHA TRAIL
PRV-12 WANOSHA TRAIL
CALDON CIRCLE
CLOSED GATE VALVE
CHICKENBORO BROOK RESERVOIR
WATERVILLE ESTATES COMMUNITY CENTER
MARDEN DR
GREEN CIRCLE
WINTERBROOK RD
PRV-8 WINTERBROOK RD
HODGEMAN HILL RD
PEGWOOD MID METER
THIS AREA NEEDS INVESTIGATION
PRV-13 DONOVAN FARM RD
DONOVAN FARM RD
CLOSED GATE VALVE
SNOWMOBILE TRAIL BREAK HISTORY
REPLACE/REMOVE PRV-13
PARKER RD
ISAAX FOX DR
PORCUPINE DR
RESERVOIR METER
RESERVOIR RD PUMP STATION
PRV-3 HOLLAND TRAIL
WEEPING BIRCHES
HOLLAND TRAIL
SNOWOOD DR
REVERSE OPERATING GATE VALVE
PRV-2 HOLLAND TRAIL
PROPOSED WELL LOCATION
HODGEMAN HILL RD
PRV-4 SNOWOOD DR
CAMPTON MOUNTAIN LOOP
SKI BOWL CONTACT TANK (22,000 GAL)
CAMPTON MOUNTAIN SNOWMAKING WELL (40 GPM) (550' DEEP)
SKI BOWL PUMP STATION (3,000 GAL TRANSFER TANK)
THORTON/HODGEMAN METER
POND VIEW
BELL VALLEY RD
CLOSED GATE VALVE
DISCONNECT FROM TRANSMISSION MAIN
SOUTH MTN METER
COURT ST
PANAWAY DR
DAVID THOMPSON
BELL VALLEY
WINTERBROOK RD
PRV-20 WINTERBROOK RD
PRV-18 RICHARDSON TRAIL
PEGWOOD PUMP STATION & ATMOSPHERIC WATER TANK
PROPOSED ADDITIONAL 200,000 GAL STORAGE TANK
"SOUTH MOUNTAIN PIT"
RICHARDSON TRAIL
ARMSBY CT
SCHUYLER DR
PRV-19 SCHUYLER DR
TOBEY RD
MYRTLE ST
USER ONLY HAS MYPSI
SNOWOOD DR
PRV-5 HOLLAND TRAIL
PRV-1 LIBERTY
LIBERTY LN
CHECKERBERRY RIDGE
CAMPTON MOUNTAIN RD
PRV-21
CLOSED GATE VALVE
PEGWOOD RD
PRV-7 PEGWOOD RD
REMOVE TEE SECTION AND SEPARATE DEAD WATER MAIN
CLOSED GATE VALVE
OFFLINE PRV TO BE REMOVED
PRV-16 PEGWOOD RD
PEGWOOD FILL METER
1600
PRV-15 MCLAREN DR
PRV-14 MCLAREN DR
MCLAREN DR
HODGEMAN HILL RD
PRV-6 HODGEMAN & MCLAREN
MORRILL CIRCLE
REPLACE/REMOVE PRV-14
THIS SECTION OF PIPE IS AN UNKNOWN. WATER SURFACES FROM THE GROUND HERE. EXCAVATE TO DETERMINE IF THIS EXISTS.
DOE RUN
POND RD
LIBERTY PUMP STATION (SOURCE)
LIBERTY (SOURCE) METER
GRAVEL PACKED DUG WELL 2 (56 GMP) (20' DEEP)
GRAVEL PACKED DUG WELL 1 (98 GMP) (19' DEEP)

FOR REVIEW
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0 175 350 700 1400
SCALE IN FEET

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# WATERVILLE ESTATES

## WATER SYSTEM IMPROVEMENTS

CAMPTON, NEW HAMPSHIRE

REPAIR HISTORY & PROPOSED WORK

| NO. | DATE | REVISION DESCRIPTION | ENG | DWG |
|---|---|---|---|---|
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| DATE: JULY 2025 | PROJECT #: 240609 |
| ENGIN'D BY: HEI | DRAWN BY: JCH |
| CHECK'D BY: MLB | ARCHIVE #: H-___ |

SHEET 3

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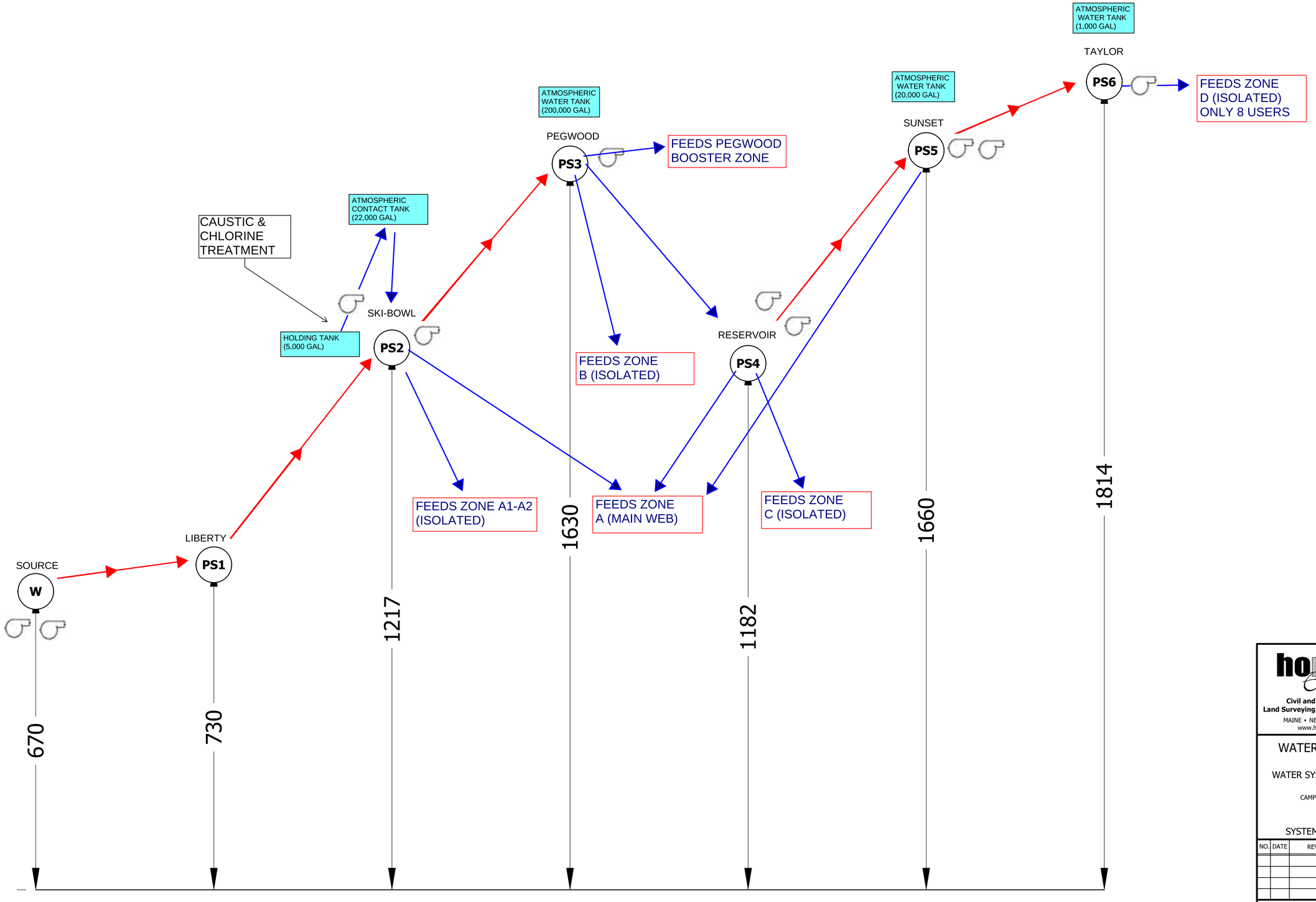


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SCALE IN FEET

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# WATERVILLE ESTATES

## WATER SYSTEM IMPROVEMENTS

CAMPTON, NEW HAMPSHIRE

## SYSTEM ELEVATION VIEW

| NO. | DATE | REVISION DESCRIPTION | ENG | DWG |
|---|---|---|---|---|
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|---|---|
| DATE: JULY 2025 | PROJECT #: 240609 |
| ENGIN'D BY: HEI | DRAWN BY: JCH |
| CHECK'D BY: MLB | ARCHIVE #: H-___ |

SHEET 4

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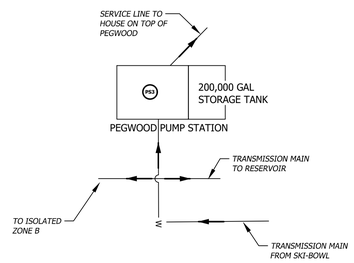
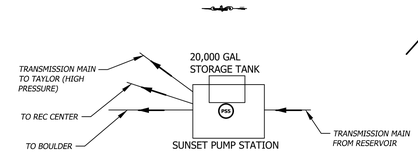



PEGWOOD SCHEMATIC

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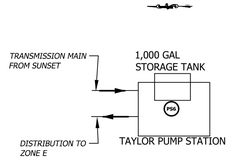


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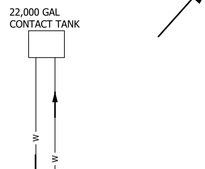
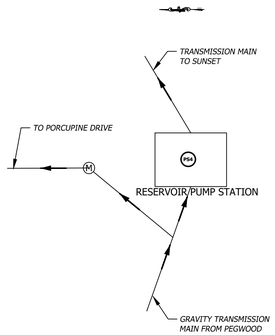
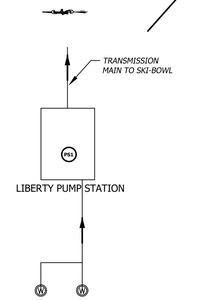



SKI BOWL SCHEMATIC




RESERVOIR SCHEMATIC




LIBERTY SCHEMATIC

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# WATERVILLE ESTATES

## WATER SYSTEM IMPROVEMENTS

CAMPTON, NEW HAMPSHIRE

## PUMP STATION SCHEMATICS

| NO. | DATE | REVISION DESCRIPTION | ENG | DWG |
|---|---|---|---|---|
| | | | | |
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|---|---|
| DATE: JULY 2025 | PROJECT #: 240609 |
| ENGIN'D BY: HEI | DRAWN BY: JCH |
| CHECK'D BY: MLB | ARCHIVE #: H-___ |

SHEET 5

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*Appendix C: Water Source Assessment*

**Introduction**

The Waterville Estates Village District (WEVD) owns and operates a large community water system, PWS ID #0341030. The water system serves approximately 560 residential units with growth potential for an additional 65 to 200. Waterville Estates contains a mix of permanently and seasonally occupied homes, some of which are made available by their owners as short-term rentals. Water for the system is produced from one well site via two T-wells in shallow sand and gravel adjacent to the Mad River. Non-residential water users for the system include a ski lodge and office building.

Horizons Engineering, Inc, a Verdantas company, has been retained to review the existing water sources and make recommendations for future water sources as part of an effort to plan for the future of the system. Information for this assessment came from a site visit on June 6, 2025, records of previous exploration and testing, and discussion with the operator.

**Current System Sources**

The system currently relies on two T-wells constructed approximately 50 feet apart. The wells parallel the course of the Mad River and are approximately 180 feet from the top of the bank. Test pits in the vicinity indicated suitable material for a collector well at depths of 15-18 feet, with dense sediments below. The T-wells were constructed with the collectors at a depth of 16 (Well #1) and 18 (Well #2) feet to intersect the most productive interval. Construction of the T-wells was completed in 1992 with pump testing shortly thereafter. The wells are currently reported to be capable of producing 95 GPM individually and 172 GPM when run simultaneously. A line of three monitoring wells parallel with the Mad River and to the west of the two production wells was accessed during the site visit on June 6, 2025. Location, water level and total depth was recorded at each of the three wells. At least two more monitoring wells were installed for the 1992 pumping test on an axis perpendicular to the course of the river and intersecting the well field. These wells were not found during the site visit. Water levels in the wells that were able to accessed are summarized in the table below-

| Monitoring Well | Water Level (feet bgs) | Total Depth (feet bgs) |
|---|---|---|
| 2-92 | 11.16 | 13.89 |
| 4-92 | 11.65 | 16.74 |
| 6-92 | 12.12 | 14.85 |

Historically, the yield from these wells has remained stable. Water quality, specifically bacterial issues and surface water contamination indicators have been an issue at the well site since the wells' construction, from coliform detections shortly after construction to a boil order in 2010. This is likely due to the proximity of the Mad River, shallow depth of the aquifer, and design of the wells. Significant efforts to rectify the water quality issues have been made (fencing installed encompassing the collector area, 4-log disinfection protocols). Review of the construction plans and logs indicate no obvious deficiencies in the construction of the wells. However, the collectors are shallow, and even with a correctly installed and functional surface seal remain vulnerable to contamination. Potential sources of contamination for the wells include the Mad River, animal excrement, and drainage from the terraces upgradient of the wells. Additionally, while the wells are not located within a special flood hazard zone, the collector area is surrounded by flood risk areas in the 1-.2% yearly range.

**Liberty Lane Well Maps** are attached in **Appendix A**

Several bedrock wells are present throughout the Estates serving individual homes that were not serviceable/opted out of service from the public water system. Review of available information from the

water well records in the area indicates that the majority of the bedrock wells in the area have low (<10 gpm) yields, with a handful in the 20-30gpm range. This includes the current water source for snowmaking, a bedrock well reported to be capable of producing in excess of 30 gpm when installed but currently being utilized at a rate of 20 gpm due to sedimentation issues.

**Water Use**

Current measured water use is 162,000 gallons per day on average (vs 247,000 gpd available flow from the wells), with the average monthly use peaks in February/March and July/August. A water shortage was reported during a time period when potable water was being used for snow making, coinciding with a large number of users staying at seasonal homes/short term rentals.

Projected future water use for full buildout varies between approximately 250,000 GPD (projected from historical use, assuming each new connection at full buildout would use a similar amount of water to the current connections) and 407,000 GPD (calculated daily demand per NHDES regulations). This would require a minimum of 3,000 gpd and up to 160,000 GPD new capacity to be developed for full build out.

**New Bedrock Well Source Assessment**

***Existing Wells/Conversions***

While several existing bedrock wells may theoretically be available for use, the relatively low yield of the majority of the wells in the area and sanitary protective area requirements for public water supply wells indicate this approach is unfeasible.

One exception is the current snowmaking well. The well is reported to be a reliable producer, and a 200-ft SPA would appear to fit within the ski resort property. Waivers for the presence of ski lifts and snowmaking appurtenances within the SPA would likely be required. Additionally, it is reported that NHDES has voiced some concerns about contamination of the well after the use of treated drinking water for snow making operations. The sedimentation issue would need to be addressed and the long term yield of the well verified before attempting to permit the well as a public water supply source.

***New Bedrock Wells***

Several properties owned by the Estates have the potential to fit 200-ft SPAs within them and would not require waivers. While it is possible that a sufficiently productive bedrock well could be sited on one of these parcels, the overall low yields of the bedrock wells in the development area could potentially require numerous wells in order to provide the source capacity necessary for full build out. Some areas, such as the site across from the DPW yard, exhibit potential water quality issues from animal or surface water contamination. Before proceeding with new bedrock well installation, a fracture trace analysis and in-depth study of the location and depths of the higher yielding wells in the area should be undertaken in order to rank the sites with the highest potential, and potential contamination sources should be evaluated.

**New Overburden Well Source Assessment**

Given the limited useable aquifer depth at the Liberty Lane well site, the focus for new overburden well assessment is on the Snowood Village parcel. While limited area for the siting of a new large groundwater withdrawal is available within the parcel, an easement for the sanitary protective area has been granted by the adjoining parcel to the east.

***New Overburden Wells (Floodplain)***

Previous exploration has focused in the low-lying abandoned stream bed above the current bank elevation of the Mad River. Two test wells have been installed below the Snowood Village Condominiums. During the site visit, both were located but neither could be opened. Logs for the wells have not been located, though in one email TW-07-01 is noted to be 26' to refusal and screened from 15-21'. At one point it appears one of the wells was vandalized with the addition of an unknown petroleum substance.

During the site visit, the terrain was consistent with an intermittently active flood plain, with clean gravel bars and sand spits meandering in the general downstream flow direction. The site is within a special flood hazard zone, and in 2011, the area flooded after a hurricane. Given the uneven nature of the ground surface, it is possible that an area with better aquifer material at greater depth is available within the floodplain. It is possible that a standard, drilled sand and gravel well of sufficient size (or multiple wells) could produce enough water to satisfy the future needs of the WEVD. However, access to the floodplain is likely to be extremely difficult. The grade from the closest road is extremely steep. A wetlands permit was obtained for the construction of an access road but construction was cancelled. Access along the river bottom is similarly difficult, requiring at multiple stream crossings and construction of an access road parallel to the river through the floodplain.

In order to install potential wells at this location, the road will have to be completed, likely at significant expense. The design of the road may need to be changed in order to ensure access, and in the floodplain it will also need to protected against potential flooding. Before construction of the road, the feasibility of a sand and gravel well in the available area should be assessed. While it is possible that a more in-depth field visit would help narrow down the areas to be tested, a geophysical survey with resistivity equipment would help map subsurface materials and depth to bedrock in the available area. This could be conducted before any improvements are to be made and would help guide future drilling and cost/benefit analysis for the construction of the road.

After the survey results are analyzed, a test drilling program with a track rig should be designed and carried out. The test well installations would assess the areas identified as potential well sites during the resistivity surveys, provide data on subsurface materials and yield, and provide monitoring wells for the pumping test if a production well is to be installed. A short pumping test would provide more data after the drilling program.

If a suitable site for a production well is found, the access road would need to be to the site before a truck-mounted rig could be mobilized for construction of the well or wells. A preliminary large groundwater withdrawal permit application would need to be prepared and approved by NHDES, a regulatory pumping test conducted, and the final report prepared and approved.

***New Overburden Wells (Terrace)***

While previous exploration efforts have focused on the floodplain, some of the available area for the Snowood Village parcel overlaps the terraces that are interpreted to represent the previous banks of the Mad River before the base elevation dropped. Limited information is available for the subsurface materials on these terraces. However, drillers logs from bedrock wells along the terrace indicate areas with 60-170 feet of overburden above the bedrock surface (bedrock depths are shown on the attached map). In a conversation with Capital Well, who installed several wells on the terrace, it was reported that a package of gravel perhaps 10-20 feet thick was encountered at the base of the overburden. Due to the drilling method used, it is not possible to ascertain from the log whether the gravel was part of a dense till or clean, water bearing gravel. If the gravel is water bearing, access would be significantly easier than down into the flood plain. The site would also be outside of the floodplain, and likely a deeper well and thus more protected from contamination. A single test well would likely be sufficient to confirm whether

or not the gravel is present and whether or not it represents a potential site for production. If so, more monitoring wells would be installed and the same construction and permitting process followed as indicated for the floodplain site.

**Snowood Village Well Exploration Maps** are attached in **Appendix B**

***New Overburden Wells/Replacement Wells (Current Well Site)***

One potential option would be further exploration of the existing well field at Liberty Lane. Logs of test borings and field notes for the test work that lead to the installation of the T-wells were unable to be recovered as of the date of this report. It is possible that the sand and gravel aquifer supplying the current wells extends further below ground surface than the current layer intercepted by the T-wells.

New wells at the site could be considered replacement wells by NHDES and subject to a less extensive permitting process. Deeper wells with proper sanitary seals would also likely be less vulnerable to contamination from surface waters or drought conditions in the future. However, if these wells were permitted as replacement wells, the permitted production volume would not be allowed to exceed the current production volume without triggering the regular large groundwater withdrawal review. Thus, a replacement well or wells within the current wellfield would not result in additional capacity for the system. However, if water bearing sand and gravel extends deeper than the existing wells, infrastructure costs to connect new wells would be low.

**CONCLUSIONS AND RECOMMENDATIONS**

After review of available information on the current sources, previous exploration efforts, and observations made during the field visit, HEI offers the following conclusions and recommendations:

-Yield from the two T-wells has remained stable, but contamination risks are high. Yield has been insufficient for the demand from snow making and water users in the past. Future buildout will require more capacity.

-New bedrock wells are not recommended for the system. Conversion of the snow making well into a public water supply well should be considered

-A new sand and gravel well may be able to be developed on the floodplain below Snowood Village. Costs will likely be high for access road construction, geophysical surveys and test wells should be considered before construction of a road

-A basal gravel layer may be present in the overburden on the terraces above the floodplain. Test well installation should be considered to determine the overburden lithology.

-While replacement wells in the current well field would not increase permitted production volume, it may represent a low cost addition to groundwater exploration at other sites.

If you have any questions or desire more information, do not hesitate to contact the undersigned. We appreciate the opportunity to work further with the WEVD.

Best,



*Ethan Jennings*

*Geologist*

*Horizons Engineering (a Verdantas Company)*

# Appendix A – Liberty Lane Well Maps

6-92

4-92

T-Well 2

T-Well 1

2-92

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Legend

Wells

**Liberty Lane**
**T-Wells**
**Waterville Estates**
**Village District**
**Thornton, NH**

0 50 100 ft

N

# National Flood Hazard Layer FIRMette

FEMA

71°37'35"W 43°52'29"N




71°36'57"W 43°52'3"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

*Basemap Imagery Source: USGS National Map 2023*

## Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

**SPECIAL FLOOD HAZARD AREAS**
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

**OTHER AREAS OF FLOOD HAZARD**
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

**OTHER AREAS**
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

**GENERAL STRUCTURES**
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

**OTHER FEATURES**
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

**MAP PANELS**
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

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# Appendix B – Snowood Village Well Exploration Map

TW-07-2

TW-07-1

Bedrock depth increasing towards Snowood Village

BDKD 170

BDKD 60

BDKD 124

BDKD 132

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## Legend

- Wells
- Snowood Village Parcel
- Snowood New Well Area

# Snowood Village Well Exploration Map
# Waterville Estates Village District
# Thornton, NH

0 100 200 ft

N

# National Flood Hazard Layer FIRMette

FEMA

71°36'49"W 43°52'57"N




71°36'11"W 43°52'31"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

*Basemap Imagery Source: USGS National Map 2023*

## Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

**SPECIAL FLOOD HAZARD AREAS**
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

**OTHER AREAS OF FLOOD HAZARD**
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

**OTHER AREAS**
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

**GENERAL STRUCTURES**
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

**OTHER FEATURES**
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

**MAP PANELS**
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

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