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Valley Rural Utility Company

Water Utility Improvements Asset Management Plan
April 2025 Update



CEI Project #W23088

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PART A
TECHNICAL SECTION

**PART A – TECHNICAL SECTION
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Section 0 – Disclaimer

Commonwealth Engineers, Inc (CEI), performed the Water Utility Asset Management Plan presented herein at the request of the Valley Rural Utility Company (Utility). The information contained in this report are the professional opinions of the team members during the Water Utility Assessment Process. These opinions were based on the information provided by the Utility, as well as field investigation performed by CEI at the time of the Report.

Because water systems constantly change, asset management is an ongoing process. New information may become available, and this information will need to be evaluated to determine how it may affect the recommendations and findings in this Report.

All information utilized in the report assembly is detailed in Section 1. Should additional information relevant to the assembly of this report come to light in the future, this document would need to be updated accordingly.

Section 1 – Supplemental Information Utilized

1.1 Indiana Department of Environmental Management (IDEM) Virtual File Cabinet (VFC) Review

- Monthly Report of Operations Reports (January 2020 – October 2023)

1.2 Resources provided by the Valley Rural Utility Company

- 2023 Water System Distribution Preliminary Engineering Report
- 2011 Valley Rural Utility Company Water Main Map
- 2023 Water Rates
- 2023 Control Documentation
- 2021 Storage Tank Inspection Reports
- 2021 Validated Water Loss Audit
- 2022 User Profile
- Managerial & Technical Section Questionnaire Responses
- 1971-1979 Distribution System As-Builts
- 2004 Utility Fire Hydrant List

Section 2 – Introduction

The purpose of this Water Utility Asset Management Plan (AMP) is to ensure long term sustainability of the Water Utility (Utility). The proper operation and maintenance of the Utility is essential for public health and safety; therefore, it is important for the Utility to quantify and assess their existing assets and determine the necessary improvements to maintain an adequate level of service. The AMP presented herein will provide the information and tools needed to improve the decision-making process regarding resource allocation and assets' operation and maintenance.

The Water Utility AMP has been developed to provide the Valley Rural Utility Company with a detailed overview of their Water Utility. The Plan will focus on the following items:

- Water Utility and System Description – general information of the Water Utility and an extensive inventory of the existing physical assets.
- Asset Condition Assessment – a description of the existing assets is provided, including location, age, condition, risk of failure, criticality, and anticipated replacement cost.
- Needs Assessment – the asset evaluation will be utilized to identify the system's weaknesses under existing conditions.
- Recommended Improvements – improvements project will be proposed to target identified needs and will be prioritized as Immediate Action Items, and Capital Asset Replacement Plan Items.
- Maintenance Schedule – summary of the Utilities current maintenance plan and replacement schedule.

The above will be discussed in detail in subsequent sections of this report. Supplemental information is provided as Attachments to the report and referenced in each section as pertinent.

Section 3 – Information Gathering Phase

The assembly of the Water Utility Asset Management Plan requires a thorough evaluation of existing data and documentation. To collect the necessary data, CEI scheduled several meetings with representatives of the Valley Rural Utility Company (Utility). Additionally, through extensive site investigation a complete inventory and assessment of physical assets was performed.

3.1 Meetings and Site Visits with the Valley Rural Utility Company

Meetings and site visits were held with Utility staff throughout the duration of the creation of the AMP as detailed below:

- A.** AMP Kickoff Meeting and Site Visit were held on August 2, 2023.
- B.** PER Kickoff Meeting and Site Visit were held on November 28, 2023, at which, a follow-up discussion on the AMP took place.

Section 4 – Responsible Parties

4.1 Valley Rural Utility Company – Water Utility is represented by:

Kevin Groose, Board President

David Spinney, Vice President

Dana Hensley, Secretary

Paul Schumacher, Treasurer

Karen Shaw, Member at Large

Bill Neyer, General Manager

4.2 Commonwealth Engineer’s Water Utility Assessment Team is represented by:

Rachel Runge, P.E., Project Management and QA/QC

Treann Quick, Engineering Intern

Walker Schoenung, Engineering Intern

Matt Wirth, Client Liaison

Section 5 – Existing Water Utility

5.1 Ranking Criteria and Approach

This section provides a description of the major public water supply facilities which are owned and maintained by the Valley Rural Utility Company (Utility), which serves the Hidden Valley Lake Community.

5.2 Description

Included is a discussion of the existing water supply source and transmission main, storage and pumping facilities, and distribution system.

A. Facilities History

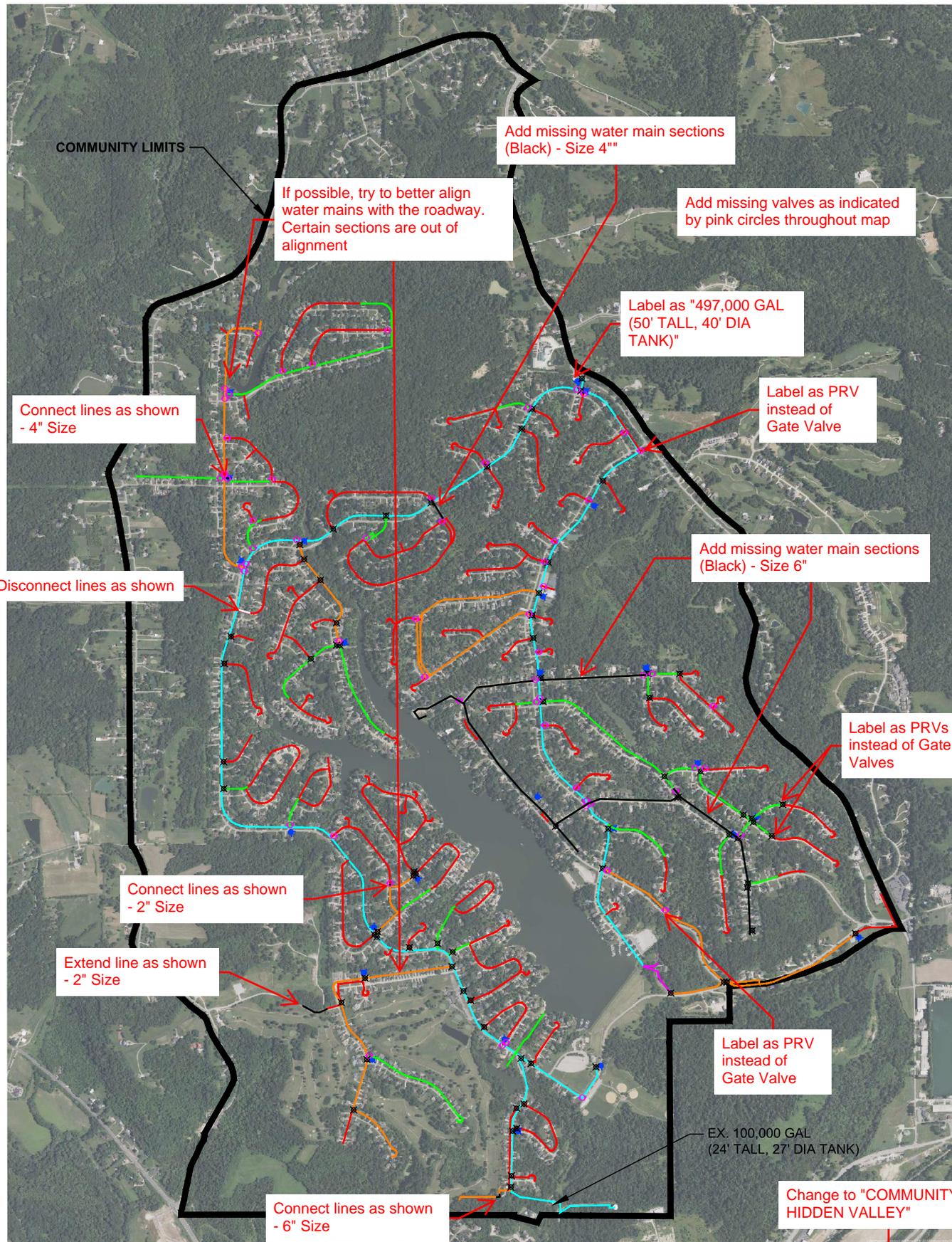
The Utility purchases water from the City of Greendale and has previously purchased water from the Tri-Township Water Corporation. The purchased treated water is stored in two (2) storage tanks and distributed through water mains ranging from one (1)-inch to eight (8)-inches in diameter.

The 100,000-gallon storage tank is twenty-four (24) feet tall and has a twenty-seven (27) foot diameter. The tank was built in 1976 and is located near Whispering Woods Drive on the south side of the lake. The 500,000-gallon storage tank is fifty (50) feet tall and is forty (40) feet in diameter. The tank was built in 1972 and is located off Alpine Drive on the north side of the lake.

The Utility has two (2) high service pumps located in a building near the 100,000-gallon storage tank that are assumed to have been originally installed in 1976. There are no records indicating that the high service pumps have been rehabilitated or replaced since their original construction. The pumps distribute water from the 100,000-gallon storage tank to the 500,000-gallon storage tank which then uses gravity to distribute water to the entire system. There are records indicating that the pumps have been replaced since the original construction of the pump station, however, the date of installation is unknown. To be conservative, it is assumed that the pumps have surpassed their useful life.

The majority of the water distribution system, which serves approximately 1,942 connections in the Hidden Valley, was installed between 1971 and 1979 and is comprised of polyvinyl chloride (PVC) pipe. **Figure 5-1** depicts the existing distribution system within the Utility service area.

Small sections of the distribution system have been replaced since initial installation, but specific quantities and locations are unknown. Three (3) new fire hydrants were installed in 2002. Additionally, the Utility regularly replaces customer meters and performs maintenance on the tanks.



LEGEND:

- EX. WATER MAIN 1" EX. WATER HYDRANTS
- EX. WATER MAIN 2" EX. GATE VALVES
- EX. WATER MAIN 4"
- EX. WATER MAIN 6"
- EX. WATER MAIN 8"



CITY OF HIDDEN VALLEY
 DEARBORN COUNTY, INDIANA
 ASSET MANAGEMENT PLAN
 EXISTING DISTRIBUTION SYSTEM
 FIGURE 5-1

B. Distribution System

The Utility's distribution system consists of one service zone or "pressure zone".

1. Pressure Zone

The Pressure Zone serves the majority of utility customers within the service area and is served primarily by gravity from the 500,000-gallon ground storage tank located at the North-East Section of the Service Area. The Utility's primary source of water enters into the 100,000-gallon storage tank and then through the nearby high service pumps which move the water through an eight (8)-inch water main and into the 500,000-gallon ground storage tank. The 500,000-gallon ground storage tank then utilizes gravity to distribute water through the rest of the distribution system. The local terrain is quite hilly and ground within the service area is within the range of 483 to 913 feet above MSL. This large variability in elevation can cause significant fluctuations within the pressure of the system.

2. Distribution System Inventory

In general, the water distribution system is comprised of water mains including various fittings, valves, meters, and hydrants, along with service connections, to provide water to the Utility's customers. An optimally designed distribution system should include many loops and the fewest possible dead-end lines.

The Indiana Department of Environmental Management (IDEM) has recently begun requesting a "Water Loss Audit" to be completed for every odd year. The next water loss audit for the Utility will be due in 2024. Public water systems must also submit a Lead Service Line Inventory (LSLI) which includes an inventory of all service lines connected to the distribution system by October 16, 2024. A summary of the Utility's Infrastructure is presented in **Table 5-1**.

**Table 5-1
Utility Infrastructure**

Infrastructure	Quantity
Water Mains	
1" Water Main	822
2" Water Main	76,342
4" Water Main	24,356
6" Water Main	35,838
8" Water Main	31,618
Meters	
5/8" - 3/4"	2,086
1"	1
1" - 1 1/2"	1
2"	2
Fire Hydrants	34
Isolation Valves	
2"	53
4"	28
6"	33
8"	23
Pressure Reducing Valves	
2"	4
6"	1
High Service Pumps	2
Storage Tanks	2

3. Potential Areas of Concern Due to System Age

Aging water mains have a higher likelihood of breaking and/or leaking. Broken water mains cause loss of system pressure for individual customers as well as loss of revenue for the Utility. System pressures dropping below 20 psi create dangerous environments for contaminants to enter the distribution system from the surrounding environment. When this occurs, current Regulations require the Utility to issue a boil order to the affected customers. Additionally, older water mains tend to be smaller in diameter. Today's State and Federal Regulations require water mains providing fire flow to be at least six (6)-inches in diameter or larger. Lines not providing fire flow must be at least four (4)-inches in diameter or larger. The original water system was constructed in 1973. The water lines are primarily made of PVC and there is no known lead in the system. During normal circumstances, the utility maintains a pressure of between 40 and 100 psi throughout the distribution system. This pressure varies because of elevation differences within the system.

Isolation valves and hydrants located within the distribution system should be exercised and inspected on a regular maintenance plan. Should a water main break occur, the isolation valves are utilized to reduce the affected area and, in turn, the number of customers without water while the Utility is fixing the water main break. Fire hydrants are utilized to mitigate fire events as well as flush the distribution system of old, stagnant, or contaminated water. If these components are aged and not regularly maintained, the distribution system is no longer operating effectively to prepare for emergency events.

Recent publicity and news reports have led to an increase in public awareness and interest in the conditions of our public water facilities nationwide. Through discussions with state regulatory officials, it is anticipated that in the near future, the Environmental Protection Agency (EPA) – which is the institution that has authority over national water standards - will ask all cities for a plan identifying their approach to address lead and copper concerns in sensitive areas such as schools, daycares, and nursing homes, and specifically those that may have facilities installed prior to the Safe Water Drinking Act (SWDA) in 1975.

C. Storage Facilities

The primary purpose of storage of potable water is to provide an adequate volume to meet average system demands over a 24-hr period and a reserve for emergency uses such as fire protection. Storage facilities provide some pump operation versatility. They can maintain the system pressure, allowing pumps to be turned off until the water level falls below an operator-designated low level.

Also, adequate storage allows pumps to operate at a constant, steady rate. When water use within the system is low, the excess quantity is stored in the tanks or reservoirs. During periods when water use is high, the stored water is used to help meet the system demands without the need to alter the source supply.

As discussed above, the Utility’s public water supply system includes a total of two (2) storage tanks. The total capacity available for the Utility is 600,000 gallons. The Utility typically maintains the 500,000-gallon storage tank between 87% and 96% and the 100,000-gallon storage tank has low and high water alarms at 10.4% and 95.8%.

Table 5-2 below summarizes important information regarding the Utility’s existing storage facilities.

**Table 5-2
Storage Facilities Summary**

Storage Facility	Location	Capacity	Overflow Elev. (Feet msl)
Ground Storage Tank	Whispering Woods Drive	100,000 Gallons	617
Ground Storage Tank	Alpine Drive	500,000 Gallons	913

The 100,000-gallon storage tank is twenty-four (24) feet tall and has a twenty-seven (27) foot diameter. The tank was built in 1976 and is located near Whispering Woods Drive on the south side of the lake. The 500,000-gallon storage tank is fifty (50) feet tall and is forty (40) feet in diameter. The tank was built in 1972 and is located off Alpine Drive on the north side of the lake.

5.3 Monthly Reports of Operation (MROs)

Monthly Reports of Operation (MROs) were obtained from IDEM Virtual File Cabinet. **Table 5-3** below summarizes the maximum, minimum, and average daily flows in gallons from January 2020 to October 2023.

**Table 5-3
Valley Rural Utility Company Water Usage (gpd)**

Year	Month	Total	Maximum	Minimum	Average
2020	January	9,281,400	412,100	212,300	299,400
	February	9,175,500	533,000	223,800	316,397
	March	9,818,800	629,200	114,300	316,735
	April	9,693,500	406,800	242,200	323,117
	May	10,613,200	481,600	220,800	342,361
	June	11,403,200	506,400	277,000	380,107
	July	11,702,400	487,000	281,800	377,497
	August	10,884,600	440,100	273,300	351,116
	September	10,659,400	494,700	269,000	355,313
	October	8,964,400	373,700	236,000	289,174
	November	8,475,200	357,200	189,600	282,507
	December	9,249,300	479,500	236,000	298,365
2021	January	9,166,700	349,500	248,400	295,700
	February	8,777,700	424,300	226,100	313,489
	March	8,901,400	353,000	243,200	287,142
	April	8,864,000	382,500	237,100	295,467
	May	9,433,600	412,700	200,000	304,310
	June	10,221,000	441,000	220,800	340,700
	July	11,166,800	490,500	194,100	360,219

Year	Month	Total	Maximum	Minimum	Average
	August	11,655,900	597,300	178,400	375,997
	September	10,247,900	454,700	223,700	341,597
	October	9,739,700	421,000	239,300	314,184
	November	9,934,700	440,800	277,700	331,157
	December	9,852,600	406,300	256,700	317,826
2022	January	10,423,800	445,700	267,900	336,252
	February	9,544,000	398,900	251,600	340,857
	March	10,139,600	370,900	287,300	327,084
	April	10,344,400	400,800	294,700	344,813
	May	11,060,600	419,000	319,700	356,794
	June	10,911,100	509,200	291,700	363,703
	July	12,212,900	694,800	219,600	393,965
	August	11,394,300	582,700	169,300	367,558
	September	10,540,000	477,400	292,200	351,333
	October	10,746,000	429,000	247,000	346,645
	November	10,108,100	399,600	285,900	336,937
	December	11,461,000	510,000	198,000	369,710
2023	January	11,230,800	687,800	252,100	362,284
	February	9,748,100	415,600	297,800	348,146
	March	10,501,700	461,400	219,300	338,765
	April	10,628,700	472,200	222,000	354,290
	May	12,399,600	621,300	279,600	399,987
	June	12,424,500	579,300	278,400	414,150
	July	12,292,100	612,900	233,800	396,519
	August	11,199,800	558,200	125,600	361,284
	September	10,540,000	477,400	292,200	351,333
	October	10,940,400	484,200	218,300	352,916
	November	-	-	-	-
	December	-	-	-	-
Average		10,405,965	473,548	240,557	341,852

5.4 Regulatory Synopsis

The Safe Drinking Water Act (SDWA) requires that all Public Water Systems (PWS) provide an adequate supply of safe drinking water to their customers and consumers. The Indiana Department of Environmental Management's (IDEM) Drinking Water Branch (DWB) is responsible for implementing and managing the SDWA at the state level. On April 1st, 2016, the Revised Total Coliform Rule (RTCR) became effective. The RTCR establishes a maximum contaminant level (MCL) for E. coli, a specific indicator of fecal contamination, providing greater public health protection by reducing pathways through which fecal contamination and pathogens can enter distribution systems. The RTCR also

established a total coliform treatment technique requirement for corrective actions of any discovered defects.

The Lead and Copper Rule (LCR) became effective in 1992 and requires treatment when lead and/or copper exceed certain action levels. When the stipulated action levels are exceeded, it triggers the water system to take further action. Concentrations must be under action levels in at least 90% of the samples collected. Lead and copper contamination can occur from corrosion of lead-containing household plumbing, which can cause adverse health effects. The Lead Action Level is 0.015 mg/L (or 15ppb) and the Copper Action Level is 1.3mg/L. Public notices are required if contamination is discovered.

In 2021, the EPA adopted the Lead and Copper Rule Revisions (LCRR) which requires public water systems to perform additional actions to better protect communities from exposure to lead in drinking water. One of these revisions requires that all public water systems perform a Lead Service Line Inventory (LSLI) of all service lines connected to their distribution system, including the portions owned by the utility and the customer. Additional provisions will take effect in 2025 which will include increased lead testing at schools and childcare facilities connected to public water systems, annual communication by the utility to homes connected to lead service lines, and requirements to remove those lines.

The Stage 1 Disinfectant and Disinfection Byproduct Rule (DBPR) reduces water exposure to disinfection byproducts. Stage 2 DBPR strengthens protection by tightening compliance monitoring for Trihalomethanes (TTHM) and Haloacetic Acids (HAA5). Disinfection Byproducts (DBPs) can form in the water when disinfectants used to control microbial pathogens combine with naturally occurring materials found in source water.

Since this updated rule was released by the EPA, the Indiana Department of Environmental Management (IDEM) has requested site sampling plans for bacteria, lead, and copper. **Table 5-4** discusses the Utility’s Sampling and Testing Plan.

**Table 5-4
Valley Rural Utility Company Sampling and Testing Plan**

Major Provisions of the RTCR (See the Quick Reference Guide in Appendix C)	Valley Rural Utility Company Sampling and Testing Plan
Routine Sampling Requirements	
Total coliform samples must be collected by PWSs at sites which are representative of water quality throughout the distribution system according to a written Sample Siting Plan subject to state review and revision.	Six samples are taken at separate locations in the distribution system. Locations are not the same each month.
For PWSs collecting more than one sample per month, collect total coliform samples at regular intervals throughout the month, except that ground water systems serving 4,900 or fewer people may collect all required samples on a single day if the samples are taken from different sites.	Valley Rural collects six samples monthly. Three are taken on the first Tuesday of the month and three are taken on the second week of the month.

Major Provisions of the RTCR (See the Quick Reference Guide in Appendix C)	Valley Rural Utility Company Sampling and Testing Plan
Each total coliform-positive (TC+) routine sample must be tested for the presence of E. coli. If any TC+ sample is also E. coli-positive (EC+), then the EC+ sample result must be reported to the state by the end of the day that the PWS is notified.	Each total coliform-positive (TC+) routine sample must be tested for the presence of E. coli. If any TC+ sample is also E. coli-positive (EC+), then the EC+ sample result must be reported to the state by the end of the day that the PWS is notified.
If any routine sample is TC+, repeat samples are required. PWSs on quarterly or annual monitoring must take a minimum of three additional routine samples (known as additional routine monitoring) the month following a TC+ routine or repeat sample.	If any routine sample is TC+, repeat samples are required. PWSs on quarterly or annual monitoring must take a minimum of three additional routine samples (known as additional routine monitoring) the month following a TC+ routine or repeat sample.
Reduced monitoring may be available for PWSs using only ground water and serving 1,000 or fewer persons that meet certain additional PWS criteria.	N/A
Repeat Sampling Requirements	
Within 24 hours of learning of a TC+ routine sample result, at least 3 repeat samples must be collected and analyzed for total coliform: One repeat sample must be collected from the same tap as the original sample. One repeat sample must be collected from within five service connections upstream. One repeat sample must be collected from within five service connections downstream. The PWS may propose alternative repeat monitoring locations that are expected to better represent pathways of contamination into the distribution system.	Within 24 hours of learning of a TC+ routine sample result, at least 3 repeat samples must be collected and analyzed for total coliform: One repeat sample must be collected from the same tap as the original sample. One repeat sample must be collected from within five service connections upstream. One repeat sample must be collected from within five service connections downstream. The PWS may propose alternative repeat monitoring locations that are expected to better represent pathways of contamination into the distribution system.
If one or more repeat sample is TC+: The TC+ sample must be analyzed for the presence of E. coli. If any repeat TC+ sample is also EC+, then the EC+ sample result must be reported to the state by the end of the day that the PWS is notified. The PWS must collect another set of repeat samples, unless an assessment has been triggered and the PWS has notified the state.	If one or more repeat sample is TC+: The TC+ sample must be analyzed for the presence of E. coli. If any repeat TC+ sample is also EC+, then the EC+ sample result must be reported to the state by the end of the day that the PWS is notified. The PWS must collect another set of repeat samples, unless an assessment has been triggered and the PWS has notified the state.
IDEM Drinking Water Branch Sample and Compliance Schedules (Routine)	Utility's Sampling and Testing Plan
Lead and Copper	20 / 3 Years
Total Haloacetic Acids (HAA5)	1 / Years
TTHM	1 / Years

5.5 Customer Base

As of 2023, the Utility was serving a population of approximately 5,529 residents and a total of 2,074 customer connections. The majority of the connections correspond with residential users; however, the Utility has sixteen (16) commercial connections.

5.6 Asset Inventory

An inventory was assembled to document existing assets. The inventory summary is presented below in **Table 5-5**, **Table 5-6A**, and **Table 5-6B** which provide water utility supply and storage, water mains, and hydrants and valves, respectively. A detailed inventory can be found in **Appendix A**.

Table 5-5
Water Utility Supply Assets

Supply Assets	Capacity / Size	Year Installed
Above Ground Tank	500,000-gallon - Stateline Tank	1972
Above Ground Tank	100,000-gallon - Valley Woods Tank	1976
Meter Vault	For Stateline Tank - (Concrete Cost + Miscellaneous Piping)	1972
Flow Meter	4" Flow Meter - Neptune E-Coder R900	1972
Altitude Valve	8"	1972
Pressure Reducing Valve	8"	1972
Ball Valve	1/2" Ball Valve	1972
Gate Valve	8" Gate Valve	1972
Meter Vault	Valley Woods Tank - 4" Flow Meter Within Not Owned by Utility - (Concrete Cost + Miscellaneous Piping)	1976
Altitude Valve	8"	1976
Pressure Reducing Valve	8"	1976
Ball Valve	1/2" Ball Valve	1976
Gate Valve	8" Gate Valve	1976
Pumping Facility	(Building Cost) - 80 SF	1972
High Service Pumps	450 GPM	1976
Pump Motors	50 HP - NIDEC Motor	1976
Pressure Switch	Dweyer Series EDA Electronic Pressure Switch	1976
Gate Valve	8"	1976
Check Valve	8"	1976
Butterfly Valve	8"	1976
Colorimeter	Hach Cl2 Colorimeter	Unknown
Mobile Generator	Kohler - 60 Hz - 1800 RPM - 3 Ph - 280 KW Diesel Generator	2011

**Table 5-6A
Distribution System Assets**

Distribution System Assets	Capacity/ Size	Length (foot)	Length (mile)	Percent of Total
Water Main	1-inch	822	0.16	0.49%
Water Main	2-inch	76,342	14.46	45.18%
Water Main	4-inch	24,356	4.61	14.41%
Water Main	6-inch	35,838	6.79	21.21%
Water Main	8-inch	31,618	5.99	18.71%

**Table 5-6B
Distribution System Assets**

Distribution System Assets	Capacity/ Size	Quantity
Fire Hydrants		34
Isolation Valves	2-inch	53
Isolation Valves	4-inch	28
Isolation Valves	6-inch	33
Isolation Valves	8-inch	23
Pressure Reducing Valves	2-inch	4
Pressure Reducing Valves	6-inch	1

5.7 Electrical, Mechanical, Control Asset Inventory

A specific inventory of assets associated with Electrical, Mechanical, and Control equipment was performed. This inventory summary is presented in the below **Tables 5-7**. A detailed inventory can be found in **Appendix A**.

**Table 5-7
Water Utility Supply Electrical, Mechanical and Control Assets**

Electrical, Mechanical, and Control Assets	Year Installed
Level Controllers	2022
SCADA	2022
200-Amp 460V/3-Phase Panel Board	1972
5 KVA Transformer	1976
HSP Control Panel	1976
230V/60-Amp Control Panel	1976
30-Amp Disconnect Switch	1976
200 A 600V 60 HZ Disconnect Switch	1976
Heater	1976
Tank Level Control Panel	1998

Section 6 – Asset Inventory and Conditions Assessment Criteria

6.1 Overview

The conditions assessment is the process of summarizing condition, capacity, consequence and probability of failure for the various utility assets. The Conditions Assessment Protocol (CAP) includes:

- Assembling the Asset Inventory
- Scoring the Asset to Identify Condition
- Identifying Remaining Useful Life of the Asset
- Determining if the Asset has Redundancy
- Identifying the Status of the Asset
- Identifying the Asset's Capacity
- Relaying Consequence of Failure of Asset

The Water Utility Assessment Team performed Visual Site Inspections (VSIs) of utility equipment. Conversations with respect to operation and reliability of the assets were held with the operations staff. Record documents regarding maintenance and repair were solicited and reviewed. With this information, an asset assessment score was determined. The scoring variables and formulas utilized to score the assets are described in this section. See **Appendix A** for inventory of assets associated with the condition assessment.

6.2 Remaining Useful Life

The remaining useful life is generally obtained by subtracting the years since the asset's installation (asset age) to the expected useful life. The expected useful life is based on typical values provided by equipment manufacturers and industry standards. An asset's actual useful life is highly impacted by its operation and maintenance. Equipment that is well maintained or that is operated only sporadically will likely have a longer useful life than what it is typically expected. It is anticipated that if an asset has been replaced, the expected useful life restarts from the replacement date. It is also anticipated that if an asset has been maintenance/cleaned/rehabilitated, the expected useful life is extended by 30% of the original expected useful life from the date of maintenance/ cleaning/ rehabilitation.

Expected Useful Life – Years Since Asset Installation = Remaining Useful Life

6.3 Condition Assessment

A condition rating is assigned to each asset based on the level of deterioration observed during field assessments and discussion with operation staff. Ratings are assigned from one (1) through five (5) as described in **Table 6-1** below.

**Table 6-1
Condition Assessment Rating**

Condition Rating	Description
5	Unserviceable/End of useful life - Over 50% of asset requires replacement
4	Significant Deterioration - 20-40% requires renewal/upgrade
3	Moderate Deterioration - 10-20% requires significant maintenance
2	Minor Deterioration - Requires minor maintenance
1	New or Excellent Condition - Only normal maintenance required

6.4 Probability of Failure

An asset's probability of failure is determined based on discussion with the staff about the asset's current condition. As assets near the end of their useful life the probability of failure increases. A rating is assigned to each asset based on the expected recurrence of failure during the expected useful life and it is estimated based on past operation, maintenance history and discussion with staff, as well as a visual assessment of the asset's condition. Ratings are assigned from one (1) through five (5) as described in **Table 6-2** below.

**Table 6-2
Probability of Failure Rating**

Performance Rating	Description
5	Imminent - Likely to occur in the near future
4	Probable - Likely to occur several times in the life of an item
3	Occasional - Likely to occur sometime in the life of an item
2	Remote - Unlikely but possible to occur in the life of an item
1	Improbable - So unlikely, it can be assumed occurrence may not be experienced

6.5 Consequence of Failure

A consequence of failure rating is assigned to each asset based on the potential impact to the system that would occur as a product of taking the asset out of service, or failure of the asset. This is an estimator that takes into consideration the type and number of customers impacted, availability of parts and time associated with repair efforts, redundancy, and additional consequences associated with failure of the asset. Ratings are assigned from one (1) through five (5) as described in **Table 6-3** below.

**Table 6-3
Consequence of Failure Rating**

Performance Rating	Description
5	Catastrophic disruption
4	Major disruption
3	Moderate disruption
2	Minor disruption
1	Insignificant disruption

6.6 Asset Criticality Score

A criticality score (CS) is based on the probability of failure and the consequence of failure. These evaluation ratings take into consideration all of the ratings previously described in **Sections 6.2** through **6.4**. The CS is calculated for every asset using the equation presented below:

$$CS = (\textit{Consequence of Failure}) \times (\textit{Probability of Failure})$$

The CS score thresholds and corresponding recommendations associated with risk factor / criticality are as presented in **Table 6-4**.

Table 6-4
Asset Conditions Assessment

Criticality Score (CS)	Risk Factor / Criticality
$CS \leq 7$	<p>Routine Maintenance is Recommended</p> <p><i>This recommendation is made if the asset is in good shape but is below its Expected Useful Life</i></p>
$7 < CS < 16$	<p>Close Monitoring is Recommended</p> <p><i>This recommendation is made if the asset is nearing its Expected Useful Life or in average condition</i></p>
$CS \geq 16$	<p>Immediate Action is Required</p> <p><i>This recommendation is made when the asset is beyond it's Expected Useful Life or evaluated to be in poor condition</i></p>

Additionally, if the asset was deemed to be at the end of its useful life and in need of replacement, a corresponding recommendation of "Immediate Action is Required" was provided.

Section 7 – Aging Service Lines Assessment

Material composition of water pipes utilized for distribution and service lines changed and improved through the Safe Drinking Water Act (SDWA) enacted by the US Environmental Protection Agency (US EPA) in 1974. The SDWA enforces the regulation of contaminants regularly found in drinking water that pose a threat to public health, such as lead contamination. Regulation of these contaminants was established by setting maximum contaminant levels that were allowed in the distribution system. Since the SDWA was implemented, utilities have had to meet these maximum contaminant levels by introducing advance water treatment, such as filtration, and changing materials of distribution pipe.

The Asset Management Plan for the Valley Rural Utility Company (Utility) is a tactical plan for managing and organizing infrastructure and other assets to provide the level of service that Utility customers desire. Although the Utility’s responsibility for the water utility ends at the water meter, each customer evaluates their water received from the Utility by what comes out of their tap.

The Utility should ensure that service lines from the water main to the meter installed prior to 1975 are upgraded to meet US EPA standards established by the SDWA in order to avoid negatively impacting water quality. The water lines are primarily made from PVC and there is no known lead in the system.

Service lines between the meter to the house, including internal plumbing, could also negatively impact water quality and deposit harmful contaminants that were not previously present in the distribution system. It is important that the Utility monitor contaminant levels in water samples from the tap and educate the homeowner of the importance of assuring their service line and plumbing are not depositing harmful contaminants.

In 2021, the EPA adopted the Lead and Copper Rule Revisions (LCRR) which requires public water systems to perform additional actions to better protect communities from exposure to lead in drinking water. One of these revisions requires that all public water systems perform a Lead Service Line Inventory (LSLI) of all service lines connected to their distribution system, including the portions owned by the utility and the customer. IDEM has required that public water systems in Indiana submit the LSLI to them by the compliance deadline of October 16, 2024.

Section 8 – Evaluation of System Assets

An Asset Conditions Assessment was performed for the Valley Rural Utility Company (Utility). The complete assessment is presented in **Appendix A**, including remaining useful life, assessment ratings (condition, probability of failure, consequence of failure, and redundancy), and criticality score and recommendations.

8.1 Replacement Cost Determination

Table 8-1 is intended to emphasize the treatment and supply assets within the utility identified to have a remaining useful life of 20 years or less and are anticipated to require Immediate Action prior to any other items identified by the Water Utility Asset Conditions Assessment.

The table also identifies the value associated with replacement of the asset after it has exhausted its useful life in current day dollars. The Estimated Future Funds Required for Replacement factors inflation into the asset's value with respect to the schedule for replacement utilizing the single payment compound to future value given present value:

$$\text{Future Value} = \text{Present Value} * (1+i)^n$$

The period of time considered in the analysis of each asset, n , is its Remaining Useful Life. The analysis is dependent on the discount (interest) rate, i . In planning work for public water treatment facilities, the federal discount rate is used. This is found in the OMB Circular No. A-94, **Appendix B**. The last published values are that of February 2023. The interest rate per planning period is shown below.

<u>3 YR</u>	<u>5 YR</u>	<u>7 YR</u>	<u>10 YR</u>	<u>20 YR</u>	<u>30 YR</u>
1.2 %	1.3 %	1.4 %	1.5 %	2.0 %	2.0 %

Linear interpolation with the above percentages was used to determine the interest rate with respect to the remaining useful life in years if it was between two numbers. If the remaining useful life was less than two years, then a percentage of zero was used, and if two years were remaining then the three-year percentage was used. This value was then multiplied by the replacement cost and divided by the remaining useful life in years. This calculated value is the annual reserve funds required for replacement. This value represents the estimated amount of reserve funds required annually for the utility to replace the asset at the end of its useful life.

8.2 Supply and Storage Assets

**Table 8-1
Supply and Storage Assets with Remaining Useful Life Less than Planning Period**

Asset	Quantity / Length	Remaining Useful Life in Years	Asset Criticality Score (CS)	Recommendation	Estimated Future Funds Required for Complete Replacement*	Annual Reserve Funds Required for Complete Replacement (Year 1)**
Above Ground Tank	1	8	15	Monitor Closely	\$ 507,700.00	\$ 63,462.50
Above Ground Tank	1	12	20	Immediate Action Required	\$ 302,500.00	\$ 25,208.33
Meter Vault	1	8	8	Monitor Closely	\$ 11,300.00	\$ 1,412.50
Flow Meter	1	0	15	Monitor Closely	\$ 3,500.00	\$ 3,500.00
Altitude Valve	1	0	15	Monitor Closely	\$ 15,000.00	\$ 15,000.00
Pressure Reducing Valve	1	0	15	Monitor Closely	\$ 9,500.00	\$ 9,500.00
Ball Valve	2	0	10	Monitor Closely	\$ 500.00	\$ 500.00
Gate Valve	1	0	10	Monitor Closely	\$ 8,000.00	\$ 8,000.00
Meter Vault	1	12	8	Monitor Closely	\$ 12,100.00	\$ 1,008.33
Altitude Valve	1	0	12	Monitor Closely	\$ 15,000.00	\$ 15,000.00
Pressure Reducing Valve	1	0	12	Monitor Closely	\$ 9,500.00	\$ 9,500.00
Ball Valve	2	0	8	Monitor Closely	\$ 500.00	\$ 500.00
Gate Valve	1	0	8	Monitor Closely	\$ 8,000.00	\$ 8,000.00
Pumping Facility	1	8	8	Monitor Closely	\$ 13,500.00	\$ 1,687.50
High Service Pumps	2	0	20	Immediate Action Required	\$ 50,000.00	\$ 50,000.00
Pump Motors	2	0	20	Immediate Action Required	\$ 16,000.00	\$ 16,000.00
Pressure Switch	2	0	15	Monitor Closely	\$ 1,500.00	\$ 1,500.00
Gate Valve	1	0	10	Monitor Closely	\$ 8,000.00	\$ 8,000.00
Check Valve	1	0	10	Monitor Closely	\$ 5,000.00	\$ 5,000.00
Butterfly Valve	4	0	10	Monitor Closely	\$ 8,400.00	\$ 8,400.00

Asset	Quantity / Length	Remaining Useful Life in Years	Asset Criticality Score (CS)	Recommendation	Estimated Future Funds Required for Complete Replacement*	Annual Reserve Funds Required for Complete Replacement (Year 1)**
Colorimeter	1	0	10	Monitor Closely	\$ 800.00	\$ 800.00
Mobile Generator	1	7	12	Monitor Closely	\$ 137,800.00	\$ 19,685.71

* Cost associated with complete replacement of the asset at the end of its remaining useful life utilizing Single Payment Compound to Future Given Present. “i%” is based on remaining useful life and linear extrapolation of real discount rate and “n” is remaining useful life.

** Annual Reserve Funds Required for Replacement is identifying the amount of money required to save each year in order to replace the asset at the end of its identified useful life. In most cases where the Remaining Useful Life is identified as “0”, yet the recommendation is identified as “Monitor Closely,” it means that the asset is still in operational condition and its remaining useful life and likely be extended by maintenance/repair.

8.3 Distribution Assets

Aging water mains in the system increase the chance of a water main leak and/or break. Leaks and breaks in the system can create a dangerously low system pressure providing potential for contaminants to enter the pipe network. The pipe network that makes up the distribution system is detailed in **Figure 5-1**.

**Table 8-3
Distribution Assets with Remaining Useful Life Less than Planning Period**

Asset	Quantity / Length	Remaining Useful Life in Years	Asset Criticality Score (CS)	Recommendation	Estimated Future Funds Required for Complete Replacement*	Annual Reserve Funds Required for Complete Replacement (Year 1)**
Meter	552	2	8	Monitor Closely	\$ 219,700.00	\$ 109,850.00
Meter	1	2	8	Monitor Closely	\$ 700.00	\$ 350.00
Meter	1	2	8	Monitor Closely	\$ 1,300.00	\$ 650.00
Meter	859	3	6	Routine Maintenance	\$ 346,000.00	\$ 115,333.33
Meter	1	3	6	Routine Maintenance	\$ 700.00	\$ 233.33
Meter	1	3	6	Routine Maintenance	\$ 1,000.00	\$ 333.33
Meter	100	4	6	Routine Maintenance	\$ 40,900.00	\$ 10,225.00
Meter	130	5	6	Routine Maintenance	\$ 53,900.00	\$ 10,780.00
Meter	18	7	4	Routine Maintenance	\$ 7,800.00	\$ 1,114.29
Meter	12	9	4	Routine Maintenance	\$ 5,400.00	\$ 600.00
Meter	60	10	4	Routine Maintenance	\$ 27,100.00	\$ 2,710.00
Meter	18	11	4	Routine Maintenance	\$ 8,300.00	\$ 754.55
Meter	36	12	4	Routine Maintenance	\$ 17,000.00	\$ 1,416.67
Meter	96	13	2	Routine Maintenance	\$ 46,200.00	\$ 3,553.85
Meter	50	14	2	Routine Maintenance	\$ 24,700.00	\$ 1,764.29
Meter	12	2	10	Monitor Closely	\$ 4,800.00	\$ 2,400.00
Meter	143	2	10	Monitor Closely	\$ 57,000.00	\$ 28,500.00
Brookridge Circle Drive					\$ -	\$ -
Water Main	1860	5	8	Monitor Closely	\$ 158,800.00	\$ 31,760.00

Asset	Quantity / Length	Remaining Useful Life in Years	Asset Criticality Score (CS)	Recommendation	Estimated Future Funds Required for Complete Replacement*	Annual Reserve Funds Required for Complete Replacement (Year 1)**
Water Main	1010	5	8	Monitor Closely	\$ 107,800.00	\$ 21,560.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00
Greenlawn Way					\$ -	\$ -
Water Main	1537	5	8	Monitor Closely	\$ 131,200.00	\$ 26,240.00
Isolation Valve	2	0	15	Monitor Closely	\$ 4,000.00	\$ 4,000.00
Fieldcrest Dr	0				\$ -	\$ -
Water Main	2567	15	8	Monitor Closely	\$ 333,000.00	\$ 22,200.00
Isolation Valve	1	0	15	Monitor Closely	\$ 5,500.00	\$ 5,500.00
Hydrant	1	10	8	Monitor Closely	\$ 10,500.00	\$ 1,050.00
Greenhill Court					\$ -	\$ -
Water Main	362	5	8	Monitor Closely	\$ 30,900.00	\$ 6,180.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00
Foxridge Drive					\$ -	\$ -
Water Main	526	5	8	Monitor Closely	\$ 44,900.00	\$ 8,980.00
Water Main	189	15	8	Monitor Closely	\$ 27,000.00	\$ 1,800.00
Isolation Valve	1	0	15	Monitor Closely	\$ 6,500.00	\$ 6,500.00
Bellemeade Drive					\$ -	\$ -
Water Main	4104	15	8	Monitor Closely	\$ 585,700.00	\$ 39,046.67
Isolation Valve	4	0	15	Monitor Closely	\$ 26,000.00	\$ 26,000.00
Hydrant	1	10	8	Monitor Closely	\$ 10,500.00	\$ 1,050.00
Bellemeade Court					\$ -	\$ -
Water Main	132	5	8	Monitor Closely	\$ 11,300.00	\$ 2,260.00
Sunnyridge Drive	0				\$ -	\$ -
Water Main	1078	5	8	Monitor Closely	\$ 92,000.00	\$ 18,400.00
Isolation Valve	2	0	15	Monitor Closely	\$ 4,000.00	\$ 4,000.00
Clearview Court					\$ -	\$ -
Water Main	196	5	8	Monitor Closely	\$ 16,800.00	\$ 3,360.00

Asset	Quantity / Length	Remaining Useful Life in Years	Asset Criticality Score (CS)	Recommendation	Estimated Future Funds Required for Complete Replacement*	Annual Reserve Funds Required for Complete Replacement (Year 1)**
Ridgewood Circle					\$ -	\$ -
Water Main	1225	5	8	Monitor Closely	\$ 104,600.00	\$ 20,920.00
Water Main	1291	5	8	Monitor Closely	\$ 137,800.00	\$ 27,560.00
Isolation Valve	2	0	15	Monitor Closely	\$ 11,000.00	\$ 11,000.00
Hydrant	1	10	8	Monitor Closely	\$ 10,500.00	\$ 1,050.00
Ridgecliff Court					\$ -	\$ -
Water Main	437	5	8	Monitor Closely	\$ 37,300.00	\$ 7,460.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00
Brabamhurst Drive					\$ -	\$ -
Water Main	2027	3	8	Monitor Closely	\$ 168,100.00	\$ 56,033.33
Isolation Valve	2	0	15	Monitor Closely	\$ 4,000.00	\$ 4,000.00
Raba Court					\$ -	\$ -
Water Main	195	3	8	Monitor Closely	\$ 16,200.00	\$ 5,400.00
Sandamont Drive					\$ -	\$ -
Water Main	3128	3	8	Monitor Closely	\$ 259,400.00	\$ 86,466.67
Water Main	1004	3	8	Monitor Closely	\$ 104,100.00	\$ 34,700.00
Isolation Valve	3	0	15	Monitor Closely	\$ 16,500.00	\$ 16,500.00
Tyrolean Way					\$ -	\$ -
Water Main	1473	3	8	Monitor Closely	\$ 122,200.00	\$ 40,733.33
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00
Kym Court	0				\$ -	\$ -
Water Main	121	3	8	Monitor Closely	\$ 10,100.00	\$ 3,366.67
Highridge Court					\$ -	\$ -
Water Main	729	2	8	Monitor Closely	\$ 59,800.00	\$ 29,900.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00
Crestview Court					\$ -	\$ -

Asset	Quantity / Length	Remaining Useful Life in Years	Asset Criticality Score (CS)	Recommendation	Estimated Future Funds Required for Complete Replacement*	Annual Reserve Funds Required for Complete Replacement (Year 1)**
Water Main	769	2	8	Monitor Closely	\$ 63,100.00	\$ 31,550.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00
Zurich Trail					\$ -	\$ -
Water Main	1092	2	8	Monitor Closely	\$ 89,500.00	\$ 44,750.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00
Moritz Court					\$ -	\$ -
Water Main	617	2	8	Monitor Closely	\$ 50,600.00	\$ 25,300.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00
Lucerne Lane					\$ -	\$ -
Water Main	835	2	8	Monitor Closely	\$ 68,500.00	\$ 34,250.00
Water Main	491	2	8	Monitor Closely	\$ 50,300.00	\$ 25,150.00
Isolation Valve	1	0	15	Monitor Closely	\$ 5,500.00	\$ 5,500.00
Berne Court					\$ -	\$ -
Water Main	356	2	8	Monitor Closely	\$ 29,200.00	\$ 14,600.00
Interlochen Lane					\$ -	\$ -
Water Main	501	2	8	Monitor Closely	\$ 41,100.00	\$ 20,550.00
Isolation Valve	1	2	12	Monitor Closely	\$ 2,100.00	\$ 1,050.00
Road to Upper Water Tank					\$ -	\$ -
Water Main	215	12	8	Monitor Closely	\$ 31,300.00	\$ 2,608.33
Isolation Valve	2	0	15	Monitor Closely	\$ 16,000.00	\$ 16,000.00
Hydrant	1	7	8	Monitor Closely	\$ 10,000.00	\$ 1,428.57
Walnut Ridge Trail					\$ -	\$ -
Water Main	965	2	8	Monitor Closely	\$ 79,100.00	\$ 39,550.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00
Ferngrove Court	0				\$ -	\$ -
Water Main	633	2	8	Monitor Closely	\$ 51,900.00	\$ 25,950.00

Asset	Quantity / Length	Remaining Useful Life in Years	Asset Criticality Score (CS)	Recommendation	Estimated Future Funds Required for Complete Replacement*	Annual Reserve Funds Required for Complete Replacement (Year 1)**
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00
Geneva Court					\$ -	\$ -
Water Main	616	2	8	Monitor Closely	\$ 50,500.00	\$ 25,250.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00
Thornhill Lane					\$ -	\$ -
Water Main	570	2	8	Monitor Closely	\$ 46,800.00	\$ 23,400.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00
Chalet Court					\$ -	\$ -
Water Main	1050	2	8	Monitor Closely	\$ 86,100.00	\$ 43,050.00
Hollyhedge Lane					\$ -	\$ -
Water Main	1044	2	8	Monitor Closely	\$ 85,600.00	\$ 42,800.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00
Sports Complex					\$ -	\$ -
Water Main	198	2	8	Monitor Closely	\$ 16,300.00	\$ 8,150.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00
Sunset Drive					\$ -	\$ -
Water Main	34	2	8	Monitor Closely	\$ 2,800.00	\$ 1,400.00
Water Main	3741	12	8	Monitor Closely	\$ 497,900.00	\$ 41,491.67
Isolation Valve	2	0	15	Monitor Closely	\$ 13,000.00	\$ 13,000.00
Hydrant	1	7	8	Monitor Closely	\$ 10,000.00	\$ 1,428.57
Edelweiss Lane					\$ -	\$ -
Water Main	1011	2	8	Monitor Closely	\$ 82,900.00	\$ 41,450.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00
Echo Trace	0				\$ -	\$ -
Water Main	207	2	8	Monitor Closely	\$ 17,000.00	\$ 8,500.00
Skyview Circle					\$ -	\$ -
Water Main	363	2	8	Monitor Closely	\$ 29,800.00	\$ 14,900.00

Asset	Quantity / Length	Remaining Useful Life in Years	Asset Criticality Score (CS)	Recommendation	Estimated Future Funds Required for Complete Replacement*	Annual Reserve Funds Required for Complete Replacement (Year 1)**
Water Main	1844	12	8	Monitor Closely	\$ 245,500.00	\$ 20,458.33
Isolation Valve	1	0	15	Monitor Closely	\$ 6,500.00	\$ 6,500.00
Maple Knoll Court					\$ -	\$ -
Water Main	734	2	8	Monitor Closely	\$ 60,200.00	\$ 30,100.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00
Oak Court					\$ -	\$ -
Water Main	379	2	8	Monitor Closely	\$ 31,100.00	\$ 15,550.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00
Springdale Court					\$ -	\$ -
Water Main	644	2	8	Monitor Closely	\$ 52,800.00	\$ 26,400.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00
Ashwood Court					\$ -	\$ -
Water Main	322	2	8	Monitor Closely	\$ 26,400.00	\$ 13,200.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00
Hawthorne Heights					\$ -	\$ -
Water Main	1240	2	8	Monitor Closely	\$ 101,600.00	\$ 50,800.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00
Aspen Hill Court					\$ -	\$ -
Water Main	321	2	8	Monitor Closely	\$ 26,400.00	\$ 13,200.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00
Beau Vista Drive					\$ -	\$ -
Water Main	622	2	8	Monitor Closely	\$ 51,000.00	\$ 25,500.00
Water Main	354	2	8	Monitor Closely	\$ 36,300.00	\$ 18,150.00
Isolation Valve	1	0	15	Monitor Closely	\$ 5,500.00	\$ 5,500.00
Windemere Hill					\$ -	\$ -
Water Main	1092	2	8	Monitor Closely	\$ 89,500.00	\$ 44,750.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00

Asset	Quantity / Length	Remaining Useful Life in Years	Asset Criticality Score (CS)	Recommendation	Estimated Future Funds Required for Complete Replacement*	Annual Reserve Funds Required for Complete Replacement (Year 1)**
Cedarview Court					\$ -	\$ -
Water Main	589	2	8	Monitor Closely	\$ 48,300.00	\$ 24,150.00
Woodland Circle					\$ -	\$ -
Water Main	468	2	8	Monitor Closely	\$ 38,400.00	\$ 19,200.00
Water Main	350	2	8	Monitor Closely	\$ 35,900.00	\$ 17,950.00
Isolation Valve	1	0	15	Monitor Closely	\$ 5,500.00	\$ 5,500.00
Rustic Court					\$ -	\$ -
Water Main	822	2	8	Monitor Closely	\$ 67,400.00	\$ 33,700.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00
Beechwood Circle					\$ -	\$ -
Water Main	678	2	8	Monitor Closely	\$ 55,600.00	\$ 27,800.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00
Elm Drive					\$ -	\$ -
Water Main	599	2	8	Monitor Closely	\$ 49,100.00	\$ 24,550.00
Water Main	1014	2	8	Monitor Closely	\$ 103,900.00	\$ 51,950.00
Hydrant	1	7	8	Monitor Closely	\$ 10,000.00	\$ 1,428.57
Eagleview Drive					\$ -	\$ -
Water Main	1075	2	8	Monitor Closely	\$ 88,100.00	\$ 44,050.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00
Water Main	557	2	8	Monitor Closely	\$ 57,100.00	\$ 28,550.00
Isolation Valve	2	0	15	Monitor Closely	\$ 11,000.00	\$ 11,000.00
Hydrant	1	7	8	Monitor Closely	\$ 10,000.00	\$ 1,428.57
Crest Haven Drive					\$ -	\$ -
Water Main	1178	2	8	Monitor Closely	\$ 96,600.00	\$ 48,300.00
PRV	1	0	15	Monitor Closely	\$ 3,000.00	\$ 3,000.00
Water Main	1526	2	8	Monitor Closely	\$ 156,300.00	\$ 78,150.00
Isolation Valve	3	0	15	Monitor Closely	\$ 16,500.00	\$ 16,500.00

Asset	Quantity / Length	Remaining Useful Life in Years	Asset Criticality Score (CS)	Recommendation	Estimated Future Funds Required for Complete Replacement*	Annual Reserve Funds Required for Complete Replacement (Year 1)**
Ivy Hill Drive					\$ -	\$ -
Water Main	1008	2	8	Monitor Closely	\$ 82,600.00	\$ 41,300.00
PRV	1	0	15	Monitor Closely	\$ 3,000.00	\$ 3,000.00
Water Main	836	2	8	Monitor Closely	\$ 85,700.00	\$ 42,850.00
Isolation Valve	2	0	15	Monitor Closely	\$ 11,000.00	\$ 11,000.00
Hydrant	1	7	8	Monitor Closely	\$ 10,000.00	\$ 1,428.57
Overlook Circle	0				\$ -	\$ -
Water Main	946	2	8	Monitor Closely	\$ 77,600.00	\$ 38,800.00
Water Main	651	2	8	Monitor Closely	\$ 66,700.00	\$ 33,350.00
Isolation Valve	1	0	15	Monitor Closely	\$ 5,500.00	\$ 5,500.00
Hickory Road					\$ -	\$ -
Water Main	4599	12	8	Monitor Closely	\$ 612,100.00	\$ 51,008.33
Isolation Valve	6	0	15	Monitor Closely	\$ 39,000.00	\$ 39,000.00
Hydrant	1	7	8	Monitor Closely	\$ 10,000.00	\$ 1,428.57
Longview Drive					\$ -	\$ -
Water Main	879	2	8	Monitor Closely	\$ 72,100.00	\$ 36,050.00
Water Main	459	2	8	Monitor Closely	\$ 37,700.00	\$ 18,850.00
Isolation Valve	1	0	15	Monitor Closely	\$ 5,500.00	\$ 5,500.00
Water Main	8175	12	8	Monitor Closely	\$ 1,088,000.00	\$ 90,666.67
Isolation Valve	5	0	15	Monitor Closely	\$ 32,500.00	\$ 32,500.00
PRV	1	0	10	Monitor Closely	\$ 6,000.00	\$ 6,000.00
Hydrant	2	7	8	Monitor Closely	\$ 19,900.00	\$ 2,842.86
Buckeye Court					\$ -	\$ -
Water Main	669	12	8	Monitor Closely	\$ 89,100.00	\$ 7,425.00
Isolation Valve	1	0	15	Monitor Closely	\$ 6,500.00	\$ 6,500.00
Greentree Road					\$ -	\$ -
Water Main	2531	2	8	Monitor Closely	\$ 259,300.00	\$ 129,650.00

Asset	Quantity / Length	Remaining Useful Life in Years	Asset Criticality Score (CS)	Recommendation	Estimated Future Funds Required for Complete Replacement*	Annual Reserve Funds Required for Complete Replacement (Year 1)**
Isolation Valve	2	0	15	Monitor Closely	\$ 11,000.00	\$ 11,000.00
Water Main	38	12	8	Monitor Closely	\$ 5,100.00	\$ 425.00
Ryan Court					\$ -	\$ -
Water Main	311	2	8	Monitor Closely	\$ 25,500.00	\$ 12,750.00
Marina					\$ -	\$ -
Water Main	822	2	8	Monitor Closely	\$ 42,100.00	\$ 21,050.00
Hidden Valley Drive					\$ -	\$ -
Water Main	413	2	8	Monitor Closely	\$ 33,900.00	\$ 16,950.00
Water Main	447	2	8	Monitor Closely	\$ 45,800.00	\$ 22,900.00
Newcom Knoll					\$ -	\$ -
Water Main	802	3	8	Monitor Closely	\$ 66,500.00	\$ 22,166.67
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00
Between Montera Circle and Hampton Drive					\$ -	\$ -
Water Main	939	10	8	Monitor Closely	\$ 109,000.00	\$ 10,900.00
Monterey Circle	0				\$ -	\$ -
Water Main	1442	4	8	Monitor Closely	\$ 121,300.00	\$ 30,325.00
Isolation Valve	2	0	15	Monitor Closely	\$ 4,000.00	\$ 4,000.00
Hydrant	1	9	8	Monitor Closely	\$ 10,300.00	\$ 1,144.44
Knollwood Drive					\$ -	\$ -
Water Main	2177	4	8	Monitor Closely	\$ 183,100.00	\$ 45,775.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00
Montclair Court					\$ -	\$ -
Water Main	738	4	8	Monitor Closely	\$ 62,100.00	\$ 15,525.00
Water Main	334	4	8	Monitor Closely	\$ 35,200.00	\$ 8,800.00
Isolation Valve	1	0	15	Monitor Closely	\$ 5,500.00	\$ 5,500.00
Cliftmont Circle					\$ -	\$ -

Asset	Quantity / Length	Remaining Useful Life in Years	Asset Criticality Score (CS)	Recommendation	Estimated Future Funds Required for Complete Replacement*	Annual Reserve Funds Required for Complete Replacement (Year 1)**
Water Main	1505	4	8	Monitor Closely	\$ 126,600.00	\$ 31,650.00
Water Main	666	4	8	Monitor Closely	\$ 70,000.00	\$ 17,500.00
Isolation Valve	1	0	15	Monitor Closely	\$ 5,500.00	\$ 5,500.00
Brindlestone Drive					\$ -	\$ -
Water Main	581	4	8	Monitor Closely	\$ 48,900.00	\$ 12,225.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00
Ventura Drive					\$ -	\$ -
Water Main	1749	4	8	Monitor Closely	\$ 147,100.00	\$ 36,775.00
Isolation Valve	2	0	15	Monitor Closely	\$ 4,000.00	\$ 4,000.00
Heidi Haven Drive					\$ -	\$ -
Water Main	957	4	8	Monitor Closely	\$ 80,500.00	\$ 20,125.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00
Water Main	587	4	8	Monitor Closely	\$ 61,700.00	\$ 15,425.00
Water Main	451	14	8	Monitor Closely	\$ 62,900.00	\$ 4,492.86
Isolation Valve	1	0	15	Monitor Closely	\$ 6,500.00	\$ 6,500.00
Ray Lynn Drive					\$ -	\$ -
Water Main	601	4	8	Monitor Closely	\$ 50,600.00	\$ 12,650.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00
Water Main	437	14	8	Monitor Closely	\$ 60,900.00	\$ 4,350.00
Isolation Valve	1	0	15	Monitor Closely	\$ 6,500.00	\$ 6,500.00
Hydrant	1	9	8	Monitor Closely	\$ 10,300.00	\$ 1,144.44
Ravenda Drive					\$ -	\$ -
Water Main	1772	4	8	Monitor Closely	\$ 149,000.00	\$ 37,250.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00
Aqua Vista Drive					\$ -	\$ -
Water Main	1890	4	8	Monitor Closely	\$ 159,000.00	\$ 39,750.00
Byrd Court	0				\$ -	\$ -

Asset	Quantity / Length	Remaining Useful Life in Years	Asset Criticality Score (CS)	Recommendation	Estimated Future Funds Required for Complete Replacement*	Annual Reserve Funds Required for Complete Replacement (Year 1)**
Water Main	321	4	8	Monitor Closely	\$ 27,000.00	\$ 6,750.00
Cravenhurst Drive					\$ -	\$ -
Water Main	1614	4	8	Monitor Closely	\$ 135,700.00	\$ 33,925.00
Isolation Valve	2	0	15	Monitor Closely	\$ 4,000.00	\$ 4,000.00
Water Main	426	14	8	Monitor Closely	\$ 59,400.00	\$ 4,242.86
Redwood Way					\$ -	\$ -
Water Main	668	5	8	Monitor Closely	\$ 57,100.00	\$ 11,420.00
Water Main	446	5	8	Monitor Closely	\$ 47,600.00	\$ 9,520.00
Isolation Valve	1	0	15	Monitor Closely	\$ 5,500.00	\$ 5,500.00
Cedar Cliff Drive					\$ -	\$ -
Water Main	1070	5	8	Monitor Closely	\$ 91,400.00	\$ 18,280.00
Lawson Court					\$ -	\$ -
Water Main	128	5	8	Monitor Closely	\$ 11,000.00	\$ 2,200.00
Cove Circle West					\$ -	\$ -
Water Main	908	5	8	Monitor Closely	\$ 77,500.00	\$ 15,500.00
Water Main	374	5	8	Monitor Closely	\$ 39,900.00	\$ 7,980.00
Isolation Valve	1	0	15	Monitor Closely	\$ 5,500.00	\$ 5,500.00
Cove Circle East					\$ -	\$ -
Water Main	1509	5	8	Monitor Closely	\$ 128,800.00	\$ 25,760.00
Timberline Trail					\$ -	\$ -
Water Main	648	5	8	Monitor Closely	\$ 76,100.00	\$ 15,220.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00
Rosemade Lane					\$ -	\$ -
Water Main	1159	5	8	Monitor Closely	\$ 99,000.00	\$ 19,800.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00
Deer Court					\$ -	\$ -
Water Main	365	5	8	Monitor Closely	\$ 31,200.00	\$ 6,240.00

Asset	Quantity / Length	Remaining Useful Life in Years	Asset Criticality Score (CS)	Recommendation	Estimated Future Funds Required for Complete Replacement*	Annual Reserve Funds Required for Complete Replacement (Year 1)**
PRV	1	0	10	Monitor Closely	\$ 3,000.00	\$ 3,000.00
Matterhorn Drive					\$ -	\$ -
Water Main	280	3	8	Monitor Closely	\$ 23,300.00	\$ 7,766.67
Water Main	1521	3	8	Monitor Closely	\$ 157,700.00	\$ 52,566.67
Isolation Valve	1	0	15	Monitor Closely	\$ 5,500.00	\$ 5,500.00
Water Main	1732	13	8	Monitor Closely	\$ 235,700.00	\$ 18,130.77
Isolation Valve	2	0	15	Monitor Closely	\$ 13,000.00	\$ 13,000.00
Hydrant	1	8	8	Monitor Closely	\$ 10,100.00	\$ 1,262.50
Tuppence Trail					\$ -	\$ -
Water Main	1309	3	8	Monitor Closely	\$ 108,600.00	\$ 36,200.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00
Heather Court					\$ -	\$ -
Water Main	1512	3	8	Monitor Closely	\$ 125,400.00	\$ 41,800.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00
Tali Trail					\$ -	\$ -
Water Main	298	3	8	Monitor Closely	\$ 24,800.00	\$ 8,266.67
Yodelodel Lane					\$ -	\$ -
Water Main	551	3	8	Monitor Closely	\$ 45,700.00	\$ 15,233.33
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00
Liesl Court					\$ -	\$ -
Water Main	463	3	8	Monitor Closely	\$ 38,400.00	\$ 12,800.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00
Meercham Way					\$ -	\$ -
Water Main	832	3	8	Monitor Closely	\$ 69,000.00	\$ 23,000.00
Water Main	1237	3	8	Monitor Closely	\$ 128,300.00	\$ 42,766.67
Isolation Valve	1	0	15	Monitor Closely	\$ 5,500.00	\$ 5,500.00
Liebchen Court					\$ -	\$ -

Asset	Quantity / Length	Remaining Useful Life in Years	Asset Criticality Score (CS)	Recommendation	Estimated Future Funds Required for Complete Replacement*	Annual Reserve Funds Required for Complete Replacement (Year 1)**
Water Main	326	3	8	Monitor Closely	\$ 27,100.00	\$ 9,033.33
Hampton Drive					\$ -	\$ -
Water Main	1243	7	8	Monitor Closely	\$ 109,700.00	\$ 15,671.43
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00
Water Main	2037	17	8	Monitor Closely	\$ 333,900.00	\$ 19,641.18
Isolation Valve	4	0	15	Monitor Closely	\$ 32,000.00	\$ 32,000.00
Hydrant	1	12	8	Monitor Closely	\$ 10,900.00	\$ 908.33
Hanover Drive					\$ -	\$ -
Water Main	768	8	8	Monitor Closely	\$ 68,900.00	\$ 8,612.50
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00
Hartford Court					\$ -	\$ -
Water Main	876	8	8	Monitor Closely	\$ 78,600.00	\$ 9,825.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00
Hydrant	1	13	8	Monitor Closely	\$ 11,200.00	\$ 861.54
Hanby Court					\$ -	\$ -
Water Main	423	7	8	Monitor Closely	\$ 37,300.00	\$ 5,328.57
Road to Lower Water Tank					\$ -	\$ -
Water Main	611	17	6	Routine Maintenance	\$ 100,200.00	\$ 5,894.12
To Valley Woods					\$ -	\$ -
Water Main	1129	17	8	Monitor Closely	\$ 169,600.00	\$ 9,976.47
Fairway Drive / Mitchell Road					\$ -	\$ -
Water Main	1348	4	8	Monitor Closely	\$ 113,300.00	\$ 28,325.00
Water Main	2111	14	8	Monitor Closely	\$ 294,100.00	\$ 21,007.14
Isolation Valve	3	0	15	Monitor Closely	\$ 19,500.00	\$ 19,500.00
Hydrant	1	9	8	Monitor Closely	\$ 10,300.00	\$ 1,144.44
Putter Place	0				\$ -	\$ -

Asset	Quantity / Length	Remaining Useful Life in Years	Asset Criticality Score (CS)	Recommendation	Estimated Future Funds Required for Complete Replacement*	Annual Reserve Funds Required for Complete Replacement (Year 1)**
Water Main	354	4	8	Monitor Closely	\$ 29,800.00	\$ 7,450.00
Par Drive	0				\$ -	\$ -
Water Main	552	4	8	Monitor Closely	\$ 46,500.00	\$ 11,625.00
Water Main	1670	14	8	Monitor Closely	\$ 232,600.00	\$ 16,614.29
Isolation Valve	1	0	15	Monitor Closely	\$ 6,500.00	\$ 6,500.00
Golf View Court					\$ -	\$ -
Water Main	1871	4	8	Monitor Closely	\$ 196,700.00	\$ 49,175.00
Isolation Valve	1	0	15	Monitor Closely	\$ 5,500.00	\$ 5,500.00
Hydrant	1	9	8	Monitor Closely	\$ 10,300.00	\$ 1,144.44
Kathy Court					\$ -	\$ -
Water Main	1044	14	8	Monitor Closely	\$ 145,500.00	\$ 10,392.86
Isolation Valve	1	0	15	Monitor Closely	\$ 6,500.00	\$ 6,500.00
Lakeview Drive					\$ -	\$ -
Water Main	188	2	8	Monitor Closely	\$ 15,500.00	\$ 7,750.00
PRV	1	0	15	Monitor Closely	\$ 3,000.00	\$ 3,000.00
Water Main	8751	12	8	Monitor Closely	\$ 1,270,500.00	\$ 105,875.00
Isolation Valve	7	0	15	Monitor Closely	\$ 56,000.00	\$ 56,000.00
Hydrant	3	7	8	Monitor Closely	\$ 29,800.00	\$ 4,257.14
Alpine Drive					\$ -	\$ -
Water Main	1059	2	8	Monitor Closely	\$ 86,800.00	\$ 43,400.00
Water Main	173	4	8	Monitor Closely	\$ 14,600.00	\$ 3,650.00
Water Main	3479	12	8	Monitor Closely	\$ 463,000.00	\$ 38,583.33
Isolation Valve	4	0	15	Monitor Closely	\$ 26,000.00	\$ 26,000.00
Water Main	3887	12	8	Monitor Closely	\$ 564,400.00	\$ 47,033.33
Water Main	1598	13	8	Monitor Closely	\$ 237,300.00	\$ 18,253.85
Water Main	6113	14	8	Monitor Closely	\$ 928,900.00	\$ 66,350.00
Water Main	7424	15	8	Monitor Closely	\$ 1,155,700.00	\$ 77,046.67

Asset	Quantity / Length	Remaining Useful Life in Years	Asset Criticality Score (CS)	Recommendation	Estimated Future Funds Required for Complete Replacement*	Annual Reserve Funds Required for Complete Replacement (Year 1)**
Isolation Valve	2	0	15	Monitor Closely	\$ 16,000.00	\$ 16,000.00
Isolation Valve	5	0	15	Monitor Closely	\$ 40,000.00	\$ 40,000.00
Isolation Valve	3	0	15	Monitor Closely	\$ 24,000.00	\$ 24,000.00
Hydrant	3	7	8	Monitor Closely	\$ 29,800.00	\$ 4,257.14
Hydrant	1	8	8	Monitor Closely	\$ 10,100.00	\$ 1,262.50
Hydrant	2	9	8	Monitor Closely	\$ 20,600.00	\$ 2,288.89
Hydrant	4	10	8	Monitor Closely	\$ 41,800.00	\$ 4,180.00
Morningside Drive					\$ -	\$ -
Water Main	1293	4	8	Monitor Closely	\$ 135,900.00	\$ 33,975.00
Isolation Valve	1	0	15	Monitor Closely	\$ 5,500.00	\$ 5,500.00
To Greendale Water Tower From 100k Tank					\$ -	\$ -
Water Main	982	17	8	Monitor Closely	\$ 161,000.00	\$ 9,470.59
Additional Alpine and St Rd (Outside of Map)					\$ -	\$ -
Water Main	976	2	8	Monitor Closely	\$ 80,000.00	\$ 40,000.00

* Cost associated with complete replacement of the asset at the end of its remaining useful life utilizing Single Payment Compound to Future Given Present. “i%” is based on remaining useful life and linear extrapolation of real discount rate and “n” is remaining useful life.

** Annual Reserve Funds Required for Replacement is identifying the amount of money required to save each year in order to replace the asset at the end of its identified useful life. In most cases where the Remaining Useful Life is identified as “0”, yet the recommendation is identified as “Monitor Closely,” it means that the asset is still in operational condition and its remaining useful life and likely be extended by maintenance/repair.

8.4 Electrical Assets

**Table 8-3
Electrical Assets with Remaining Useful Life Less than Planning Period**

Asset	Quantity / Length	Remaining Useful Life in Years	Asset Criticality Score (CS)	Recommendation	Estimated Future Funds Required for Complete Replacement*	Annual Reserve Funds Required for Complete Replacement (Year 1)**
Level Controllers	4	13	3	Routine Maintenance	\$ 9,900.00	\$ 761.54
SCADA	1	18	4	Routine Maintenance	\$ 61,800.00	\$ 3,433.33
200-Amp 460V/3-Phase Panel Board	1	0	15	Monitor Closely	\$ 18,000.00	\$ 18,000.00
5 KVA Transformer	1	0	15	Monitor Closely	\$ 3,000.00	\$ 3,000.00
HSP Control Panel	1	0	20	Immediate Action Required	\$ 26,000.00	\$ 26,000.00
230V/60-Amp Control Panel	1	0	15	Monitor Closely	\$ 3,000.00	\$ 3,000.00
30-Amp Disconnect Switch	3	0	10	Monitor Closely	\$ 1,500.00	\$ 1,500.00
200 A 600V 60 HZ Disconnect Switch	1	0	15	Monitor Closely	\$ 1,500.00	\$ 1,500.00
Heater	1	0	10	Monitor Closely	\$ 700.00	\$ 700.00
Tank Level Control Panel	1	0	15	Monitor Closely	\$ 25,000.00	\$ 25,000.00

* Cost associated with complete replacement of the asset at the end of its remaining useful life utilizing Single Payment Compound to Future Given Present. “i%” is based on remaining useful life and linear extrapolation of real discount rate and “n” is remaining useful life.

** Annual Reserve Funds Required for Replacement is identifying the amount of money required to save each year in order to replace the asset at the end of its identified useful life. In most cases where the Remaining Useful Life is identified as “0”, yet the recommendation is identified as “Monitor Closely,” it means that the asset is still in operational condition and its remaining useful life and likely be extended by maintenance/repair.

Section 9 – Future Improvement Expenses

9.1 Future Growth

HVL was originally intended to be a vacation community, however, it has since become more of a year-round residence for many of the community’s occupants. The community was not listed as a census designated place until the 1990 census; population data is not available prior to this designation. The population has seen a steady increase since its census designation and this trend is expected to continue over the planning period of 20 years. The community has approximately 803 lots available for development. To be conservative, it is assumed that all lots will be developed by the end of the planning period. According to census data, Dearborn County averages 2.56 persons per household. Applying this to the available lots, approximately 2,056 additional persons are expected to join the community in the planning period. Applying a straight-line projection, this equates to a population increase of approximately 103 people per year.

While the above approach is conservative, it is unlikely that all undeveloped lots will be developed with single-family homes. Approximately 500 of the lots included in the count above are owned and utilized by an adjacent home for additional land area (yard, recreation area, etc.). While the lots could be sold to be developed, it is unlikely to occur on a scale that impacts the overall population of the community. For a more moderate estimate, it has been assumed that the remaining 300 undeveloped lots will be developed with an average of 2.56 persons per household. This equates to an additional 768 people, or approximately 38 people per year.

9.2 Improvement Projects

A number of projects have been identified to address the items lined out in **Section 8**. These projects cover improvements that should take place within the next 20 years. These include the Utility’s plans to eventually upsize all the existing two (2)-inch and four (4)-inch water mains and add additional fire hydrants as indicated in the previous Valley Rural Utility Water Main Distribution *Preliminary Engineering Report* that was completed by HREZO Engineering, Inc. in March 2023. The six (6)-inch and eight (8) water mains, storage tanks, and pumping facilities will also reach the end of their expected useful life over the Planning Period. **Table 9-1** summarizes the projects, anticipated costs at time of construction, and potential funding sources. A detailed table can be found in **Appendix A**.

**Table 9-1
Future Improvement Projects**

Projects	Years Until Project Must Begin	Estimated Annual Debt Repayment for 20 yr loan	Estimated Future Capital Funds Required for 20 yr loan	20 yr Loan Interest rate
Recommended Improvements from 2023 PER	5	\$ 480,600	\$ 9,612,000	2.0%
Upsize Existing 2" & 4" WM and Add Additional Hydrants	5	\$ 1,463,700	\$ 29,274,000	2.0%
Pumping Facility Improvements	1	\$ 7,300	\$ 146,000	2.0%
Storage Tank Maintenance	1	\$ 12,600	\$ 252,000	2.0%
Replace Existing 6" & 8" WM and Hydrants	10	\$ 1,124,700	\$ 22,494,000	2.0%
Total Improvement Expense Required in the Current Year		\$ 3,088,900	\$ 61,778,000	

9.3 Recommended Improvements from Previous PER

In this project, recommended improvements from the previous PER would be performed. These improvements include the construction of an 8" water main to form a loop around Hidden Valley Lake. This loop will extend from the current storage tank near the City of Greendale and connect at Longview Drive near the Marina. This loop will create a secondary route to fill the 500,000-gallon tank on Alpine Drive. Thus, when there is a water main break on Alpine that needs to be fixed the whole community will not be out of water. This project will also fix the issue of not having enough valves within the distribution system by adding additional new valves with the proper spacing as well as replacing old valves that are no longer useful. The proposed valves will either be 8" or 6" as Valley Rural has plans to replace all the 4" and 2" lines in the Community in the future. Thus, the valves will be in place for future upgrades to the system. Tuppence Trail will replace an existing 2" water main with a 6" water main and connect to both Alpine Drive and Matterhorn Drive. This improvement will allow for more circulation within the distribution system. The Longview Drive 2" water main currently stops short of connecting to Lakeview Drive. This project will replace the existing 2" water main with a 6" water and will connect to the 8" water main along Lakeview Drive. Additionally, a 6" water main loop will be installed from Hickory Road to Overlook Circle to eliminate two dead end mains and will go through an easement between yards to create the loop. Lastly, there are a few 2" water mains that have needed several fixes in the last 5 years. These 2" water mains located along Clifmont Circle, Sandamont Drive, & Tyrolean Way will be replaced with 6" water main. This project will require funding from SRF, OCRA, and/or USDA.

9.4 Upsize Existing 2” & 4” WM and Add Additional Hydrants

In this project, the remaining 2” and 4” water main not already upgraded in previous project will be replaced with 6” water main. The existing lines are becoming obsolete and are not sufficient to handle any fire flow. This upgrade would also include adding additional hydrants throughout the entire system to ensure that they are properly spaced, have fire flow capacity, and to ensure that the Utility will have the ability to properly isolate the system. This project will require funding from SRF, OCRA, and/or USDA.

9.5 Pumping Facility Improvements

In this project, the existing high service pump system would be replaced. The installation of the current high service pumps is unknown, and they are likely nearing the end of their useful life. This upgrade would also include replacing the existing pumps, pump motors, and valves within the high service pump system. This project will require funding from SRF, OCRA, and/or USDA.

9.6 Storage Tank Maintenance

In this project, maintenance would be performed on the 100,000-gallon and 500,000-gallon storage tanks to address the issues noted on the 2021 Tank Inspection Reports and allow for continued use of the tanks. Based on an estimated service life of 60 years the tanks are currently nearing their end of useful life, however, the useful life of both tanks can be extended by performing maintenance. This maintenance includes adding submersible tank mixers, installing water access ladders, cleaning the tank, replacing corroded beams and hardware on the 100,000-gallon tank, and other improvements mentioned in the reports. The Tank Inspection Reports are included in **Appendix C**. This project will require funding from SRF, OCRA, and/or USDA.

Section 10 – Water and Energy Conservation Efforts

The Clean Water State Revolving Fund's (CWSRF) defines Water Efficiency as the use of "improved technologies and practices to deliver equal or better services with less water. Water efficiency encompasses conservation and reuse efforts, as well as water loss reduction and prevention, to protect water resources for the future." Currently the Community tracks water loss in the system through the difference of water that enters the system versus water consumed by its customers.

The CWSRF defines Energy Efficiency as the "use of improved technologies and practices to reduce the energy consumption of water quality projects, use energy in a more efficient way, and /or produce/utilize renewable energy." The Community is currently transitioning from radio to cellular water meters which will allow them to track their customer's water consumption more efficiently.

10.1 Storage and Distribution

Section 9 – Future Improvement Expenses outlines distribution improvement projects. Pursuance of these distribution improvements and regular maintenance on items such as valves and hydrants will improve the efficiency of the Utility as well as reduce the number of water main breaks/leaks, in turn conserving water and revenue.

The American Water Works Association (AWWA) has developed a free Water Audit Software, available for free public download. In general, a water audit is an evaluation of the amount of water a utility produces compared to the amount of water it sells. Utilities incur real water losses from pipeline leakages and apparent water losses when customer consumption is not properly measured or billed. In 2020, the Indiana Finance Authority (IFA) mandated that an audit be completed every year and validated every other year. Validated audits are due on August 1st of every even-numbered year. The main benefit of doing an audit, in lieu of determining water loss as the difference between water produced versus water consumed, is to identify these losses to the utility may take corrective actions, which often lead to financial savings. That is why having basic water loss management policies in place for the community is an excellent means to minimize non-revenue water loss within the distribution system. In 2022 the Utility performed a water loss audit on the data from 2021. The water loss audit results in a moderately-high water loss of approximately 29.47% with a data validity tier of Tier III, which means a moderate confidence level in these results. Typical average water loss results are between 17% and 22%. See below for a brief breakdown of typical water consumption and loss:

- **Billed Authorized Water Consumption**
 - Household Fixture Leaks
 - Household Appliance Leaks
- **Unbilled Authorized Water Consumption**
 - Fire Department Hydrant Use for Fire Events
 - Flushing of Hydrants Authorized un-metered water usage

- **Unbilled Apparent Water Loss**
 - Inaccurate Water Meters/Readings
 - Water Theft
 - Customer Billing Adjustment
- **Unbilled Real Water Loss**
 - Pipe Joint Leakage
 - Main Breaks
 - Storage Tank Overflows

Section 11 – Existing Asset Maintenance and Replacement Schedule

11.1 Maintenance Schedule

Maintaining equipment at an optimal performance level is essential to a well-functioning utility. To keep equipment properly maintained, a regular maintenance and inspection schedule can be an effective tool in guiding the utility. The existing maintenance schedule established by the Utility can be found in **Table 11-1**. Maintenance reports are stored at the Utility Office.

Table 11-1
Regular Maintenance Activities Performed

Item	Regular Maintenance Activities
Storage Tanks	Regular maintenance and inspection to be determined by the utility *
High Service Pumps	Regular maintenance and inspection to be determined by the utility **
Customer Meters	Regular maintenance and inspection to be determined by the utility ***

* *It is recommended that elevated storage tanks be inspected every 5 years.*

** *It is recommended that all pumps be inspected every 2-4 years.*

*** *It is recommended that customer meters be replaced every 15-20 years. The Utility should phase this replacement to accomplish a 10-15% system replacement annually.*

11.2 Replacement Schedule

The Valley Rural Utility Company Water does not have a current long-term replacement schedule in place for their existing equipment. On an annual basis, and as funds become available, the General Manager evaluates equipment that needs to be replaced based on observations by the operating staff.

Aging and malfunctioning hydrants and customer meters are replaced as needed and as funds allow. The Utility currently relies on the operating staff to determine hydrants and meters that need replacement.

One of the goals of the Asset Management Plan is to guide the Utility in their planning efforts and future resource allocation. **Section 8** provide a complete list of assets that have been determined to require maintenance/rehabilitation within the next 20 years.

PART B
MANAGERIAL SECTION

**PART B – MANAGERIAL SECTION
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Section 1 – Introduction

The purpose of the Water Utility Asset Management Plan is to ensure long term sustainability of the Utility. Proper operation and maintenance of the Water Utility is essential for public health and safety; therefore, it is important for the Utility to identify managerial components that address structure, organization, and support necessary to operate and maintain a water system capable of consistently and responsibly meeting the needs of its users. The Managerial Section presented herein is provided as a living document that is to be referenced, utilized, and updated on a consistent basis.

Effectively managed Utilities are more efficient, less fiscally volatile, have a reduced risk of system failure, and are more insulated from loss of knowledge when compared to poorly managed Utilities. The Managerial Section will include the following sections:

- Section 2 - Property Documentation – general information of record keeping and location of Utility properties, such as deeds, titles, easements, leases, and/or receipts
- Section 3 - Operator Certifications and Licenses – documentation of all Certified Operators employed by the Utility
- Section 4 - Overview and Description of System – a non-technical summary of the water utility
- Section 5 - Operating Plan – details regarding the operating structure and processes
- Section 6 - Written Procedures – procedures on security, customer complaints, internal controls, collections, ordinances, and training
- Section 7 - External Contact Information – contact information for emergency, permits, and suppliers
- Section 8 - Internal Contracting and Purchasing Procedures – general information on methods and procedures for contracting work and operating costs

Section 2 – Property Documentation

Most water system assets (i.e. distribution/transmission mains, valves, hydrants, meters, etc....) are located within Community streets or the public Right-of-Way. Select water system assets (i.e., water storage tanks, specific portions of water main, etc....) cannot be located within Community streets/public right-of-way and are therefore located on parcels of land purchased or easements obtained by the Utility. The Utility retains all titles, deeds, and easements associated with water system assets on file in the Utility Office. In general, all purchasing and recording of property/easements is done through the Utility Office. There are no known properties on which Utility assets are located, that are not properly recorded and kept on file.

Table 2-1
Valley Rural Water Utility Property Documentation

Parcel Number	Assets Included
15-06-26-404-054.000-020	100,000-gallon Storage Tank and High Service Pumps
15-06-13-302-008.000-020	500,000-gallon Storage Tank
15-06-25-204-024.000-012	Utility Office

Section 3 – Operator Certifications and Licenses

The Water Utility staff possess a variety of different certifications and licenses. A listing of these staff members and their licensing information is provided below. This license information has been verified through the State of Indiana Search and Verify Website for Indiana Professional License Holders (<https://mylicense.in.gov/EVerification/Search.aspx>):

**Table 3-1
Water Utility Staff Licenses**

Name	License Number	Issuance Date	Expiration Date	Type of Classification	License Status
William Neyer	DS210202	11/22/2021	6/30/2024	DSS	Active
Brian Nieman	DS200016	1/13/2020	6/30/2025	DSL	Active

Copies of the certification statues and the certification rule are available online. The minimum requirements to sit for an exam are one year of hands-on experience in the operation of a water treatment plant or water distribution system and a GED or high school diploma. Two years of experience are required for WT 3 and WT 4, and three years of experience is required for WT 5. One year of hands-on experience in the operation of the classes system applied for is required for the DSS, DSM, and DSL licenses.

One year of experience may be substituted by education at the distribution level in an area related to drinking water for the WT 3 and WT 4 classifications. Two years of experience may be substituted by education at the college level in an area related to drinking water for the WT 5 classification.

3.1 Taking the Test

The IDEM Office of Water Quality, Drinking Water Branch, offers drinking water operator certification examinations by computer-based testing at twenty-four (24) Ivy Tech locations throughout the State. Applications may be submitted to IDEM via mail. There is a \$30 (nonrefundable) fee per grade of certification examination being requested. For individuals who qualify, Ivy Tech has a testing site fee of \$40 per grade of certification examination administered.

There is a pencil and paper exam session offered annually in November.

3.2 Water Supply Classifications

Class DSS – Distribution System serving a population of fewer than 3,301 consisting of only pressure or storage tanks.

Class DSM – Distribution System serving a population between 3,301-10,000 and no mechanical means of movement of water other than pressure or storage tanks, booster pumps to storage tanks and consist of one of the following: pumps, not including well pumps, before the entry point to the distribution system; or booster pumps to storage tanks

Class DSL – Distribution System serving a population of 10,001 or more or consisting of booster pumps to the distribution system or mechanical devices for movement of water beyond storage.

Class WT 1 – Community purchase or ground water plants serving a population fewer than 501 and have ion exchange softening process for cation removal, or in-line filtration device with no chemical treatment.

Class WT 2 – Ground water or purchase water plants regardless of population served which either use chemical feed or have one of the following: an ion exchange softening process for cation removal if the population served is greater than 500 and less than 3,301 or an inline filtration device if the population served is greater than 500 and less than 3,301.

Class WT 3 – Ground water or purchase water plants with chemical treatment and have either pressure or gravity filtration, ion exchange process if the population served is greater than 3,300, lime soda softening, reverse osmosis, or inline filtration if the population served is greater than 3,300.

Class WT 4 – Surface water plants or ground water plants under the direct influence of surface water serving a population less than or equal to 10,000.

Class WT 5 – Surface water plants or ground water plants under the direct influence of surface water serving a population equal to or greater than 10,001.

Section 4 – Overview and Description of System

4.1 Water Supply

The Valley Rural Utility Company (Utility) does not produce or treat their own water. The Utility currently purchases 100% of their water supply from the City of Greendale. The system also has a connection to the Tri-Township Water Corporation; however, they do not have an existing purchase agreement. This connection is currently for emergency purposes only. On average, the daily demand (January 2020 to October 2023) is approximately 341,852 gallons per day (gpd), with an average maximum day demand of approximately 473,548 gpd.

4.2 Distribution System

The Utility currently has two (2) ground storage tanks. One storage tank has a capacity of 500,000 gallons, a diameter of 40 feet, and a height of 50 feet. The second storage tank has a capacity of 100,000 gallons, a diameter of 27 feet, and a height of 24 feet. The Utility also includes two (2) 450 gpm high service pumps which alternate operation to distribute water to the 500,000-gallon storage tank. The WTP serves a population of approximately 5,529 people with 1,942 customer connections. The Utility consistently monitors water loss by monitoring water purchased versus water consumed. A difference in the two indicates a leak/break in the system or unmetered water use and prompts the Utility to investigate and remediate the source.

A. Distribution System Inventory

In general, the Utility's water distribution system is comprised of approximately 32 miles of distribution mains ranging in size from one (1)-inch to eight (8)-inches in diameter and includes various fittings, valves, meters, hydrants, and service connections/meters to provide water to the Utility's customers.

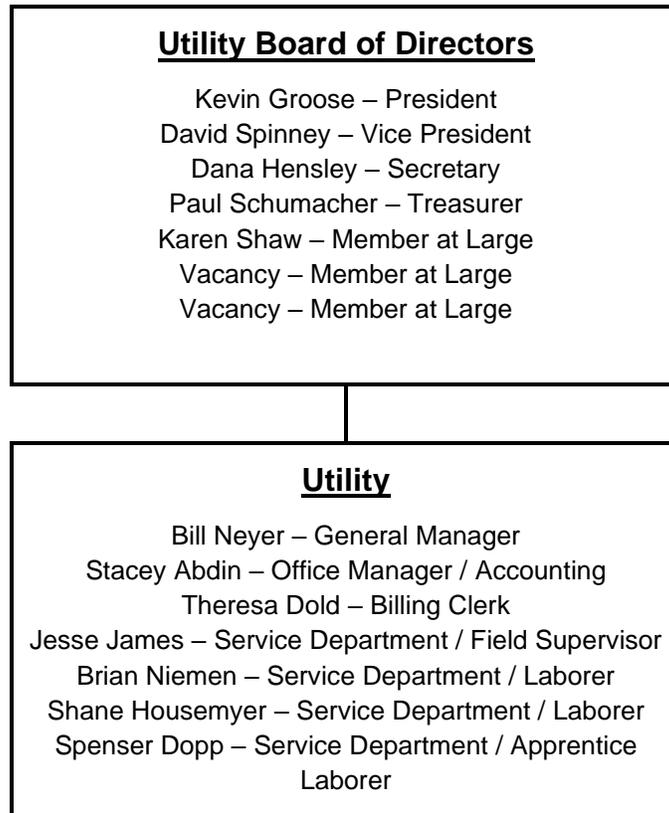
B. Storage Facilities

As discussed above, the Utility's public water supply system includes one (1) ground storage tank with a capacity of 500,000 gallons near Alpine Drive, one (1) ground storage tank with a capacity of 100,000 gallons near Whispering Woods Drive, and two (2) 450 gpm high service pumps. The 100,000-gallon ground storage tank feeds the 500,000-gallon ground storage tank via the high service pumps. The 500,000-gallon ground storage tank then feeds the rest of the distribution system via gravity.

Section 5 – Operating Plan

The Water Utility is operated and maintained by the Valley Rural Utility Company. The Utility Board of Directors is the governing body over the Utility. The Utility is run by the General Manager.

5.1 Organizational Chart – 2024



5.2 Job Duties

Each position’s general requirements, duties, and summaries with respect to the Water Utility are described below.

A. Board President

The President shall be elected from among the Directors and shall be the chief executive officer of the Corporation and shall preside at all meetings of the Corporation and of the Board, shall have and discharge all the general powers and duties usually vested in the office of president or chief executive officer of an association or a stock corporation organized under the laws of the State of Indiana, including, but not limited to, the power to appoint committees from among the Members as he may deem necessary to assist in the affairs of the Corporation and to perform such other duties as the Board may from time to time prescribe.

The Utility Board of Directors is the governing body for the Utility; the Board is composed of a President, a Vice President, three (3) Members at Large, a

Secretary, and a Treasurer. As of the time of writing this AMP, there were vacancies for the Vice President and a Member position. The seats are elected for staggered three-year terms. The Board makes executive decisions regarding major projects related to the Water Utility (i.e., color of water towers, logo design, scope of project, etc.). The Board also manages the Water Utility Fund, including approving purchases greater than \$5,000.

B. Vice President

The Vice President shall perform all duties incumbent upon the President during the absence or disability of the President. The Vice President shall also perform such other duties as the By-Laws prescribe or as shall, from time to time, be imposed upon the Vice President by the Board of Directors or the President.

C. Secretary

The Secretary shall attend all meetings of the Corporation and of the Board and shall keep or cause to be kept a true and complete record of the proceedings of such meetings, shall perform all other duties incident to the office of the Secretary, and such other duties as from time to time may be prescribed by the Board of Directors or the President. The Secretary shall specifically see that all notices of the Corporation or of the board are duly given, mailed, or delivered, in accordance with the provisions contained in the By-Laws.

D. Treasurer

The Treasurer shall maintain a correct and complete record of account showing accurately at all times the financial condition of the Corporation and such other duties incident to the office of Treasurer. The Treasurer shall be the legal custodian of all monies, notes, securities, and other valuables which may from time to time come into the possession of the Corporation. The Treasurer shall cause all funds of the Corporation coming under the control of the Treasurer to be deposited immediately in some reliable bank or other depository to be designated by the Board and shall keep such bank account in the name of the Corporation.

E. General Manager

The General Manager (Manager) assures proper operation and maintenance of the Water Utility including day to day operation of the distribution system. The Manager oversees projects and manages water main breaks and equipment malfunctions. The Manager ensures safe work practices and efficient operation of the Water Utility. The Water Utility Manager is certified and assures the Utility is compliant with current State and Federal Regulations and that the distribution is being properly operated.

F. Accounting/Office Administrator

The Accounting/Office Administrator position performs Payroll, Accounts Payable, manages bank accounts, manages collections, assists accounts receivable/billing, and creates the annual budget.

G. Billing Clerk

The Billing Clerk position performs accounts receivable, billing, customer service, reconnects/disconnects service, performs readings for specific areas, manages deeds, and sends delinquent accounts to collections.

H. Field Supervisor

The Field Supervisor is responsible for the supervision of all field personnel and assists the General Manager with the operation and maintenance of the water and wastewater systems.

I. Laborer

Laborers work in the service department under the Field Supervisor and General Manager. Their duties include completing work orders, reading water meters, performing repairs, and other related functions as assigned by the Field Supervisor or General Manager.

5.3 Daily Operating Procedures

The general manager directs daily operations. The Board of Directors meets quarterly and once for an annual meeting. Special meetings are held as needed and the general manager directs daily operations. The General Manager has daily interaction (Mon – Fri) with service techs and office staff. The General Manager also has routine interaction with the Board of Directors.

The high service pumps have monthly preventative maintenance and quarterly grease added to them. Regarding emergency procedures, high service pumps have a backup in case of failure, the tanks have overflow pipes, main line breaks are responded to as soon as possible, and service line leaks are responded to as needed.

5.4 Operation and Maintenance Manuals

Operation and Maintenance Manuals are primarily kept in the shop at the Utility Office. The SCADA system O&M manual is kept on the PC in the General Manager’s Office.

Section 6 – Written Procedures

6.1 Security

The main Utility building has an alarm system and auxiliary buildings are locked. The 500,000-gallon tank additionally has a fence with a locked gate. The General Manager and service technicians have the access code to the Utility Office and keys to auxiliary buildings, while office staff have the access code to the Utility Office. There are also camera systems throughout the facilities, however, the cameras for the 500,000-gallon storage tank were noted as not working. Records are stored on-site in both locked and unlocked compartments. There is no disposal policy for Utility records.

The cyber security procedures include a secure log-in with limited users. The SCADA system is also setup to not connect to the internet. In case of a security incident the appropriate authority is notified, whether that be the police or the General Manager. The Utility Crew has unrestricted facility and equipment access, while the remaining employees and some vendors have accompanied facility access.

6.2 Customer Complaints

To leave complaints, customers are able to call the office, leave a voicemail, email, or contact the emergency after hours line. Billing complaints are addressed by office staff, while most other complaints are addressed by service techs. The General Manager will be involved with any complaints as necessary. If a credit is merited based on a billing issue, then the General Manager must approve. When responding to complaints, Service Techs are issued a work order and respond accordingly. Service Techs make notes on the work order regarding the status, such as whether additional work will be needed or that it can be closed.

6.3 Purchasing Authority

Service techs can make small purchases or pre-approved purchases. The Office manager can purchase office supplies or additional items with approval by the General Manager. For purchases greater than \$5,000, the General Manager requires approval by the Board. The General Manager and Office Manager are both able to add and remove Utility personnel to and from accounts. The General Manager is responsible for verifying satisfactory completion of work prior to payment. To spend Utility revenue on non-Utility expenses the purchase must be reviewed by the General Manager and signed by two (2) board members.

6.4 Internal Controls

A. The Board and General Manager shall perform an annual internal review of their written policies and procedures and execution of policies and procedures. The Board and General Manager shall determine when updates are necessary and approve updates prior to implementation.

1. Internal review on written policies and procedures shall include:

- a. Review of the Utility Asset Management Plan (AMP) to assure all written policies and procedures correlate to current practices,
 - b. Review of water use ordinances to assure all written policies and procedures correlate to current practices.
 - c. Review of rate structure to assure it is up to date and affords sufficient coverage of the utility's operational costs and debt service.
2. Internal review on execution of policies and procedures include:
- a. Review of annual flow test/calibration reports on all meters (i.e., production, customer)
 - b. Review of annual volumetric productions and consumption comparative to the previous year.
 - c. Review summary reports of monthly billings to summarize the number of customers (active and inactive) in each billing category (billed metered, billed unmetered, unmetered billed, unbilled unmetered).
 - d. Utility to maintain above documents and note them during the time of water loss audit and validation.
- B. Utility must perform annual Water Loss Audits and biennial Water Loss Audit validations; an Indiana certified Water Loss Audit Validator must perform validations every even numbered year.
- 1. Utility must submit biennial water loss audits/validations to IFA by August 1 on each even-numbered year starting August 1, 2020.

6.5 Customer Deposits/Payments

Water Utility payments are done in conjunction with sewer payments for residents. Payments are due on or before the 20th of the month and can be made with on-line bill pay, mail, automatic bank draft, and payment by drop-off. Availability is due annually on June 1st.

6.6 Collections

Payments are due by the 20th of the month. On the morning of the 21st, the crew supervisor collects all payments from the payment boxes and the office staff posts those payments. Late fees are added to the remaining customer accounts that haven't paid. Late notices are printed and mailed that day. Customers are given 14 or 15 days from the 20th to pay and then they are disconnected if payment is not made. The crew is given door hangers and work orders for those that they have to disconnect. Customers are charged a \$100.00 reconnect fee. The outside field staff goes to the door to see if anybody is home before they disconnect. The customer can pay at that point, but they still have to pay the \$100.00 reconnect fee. The crew is not allowed to take cash, only checks. The office staff

prints a “Past Due Report” and makes work orders / payment arrangements for the people who say when they are going to pay. Availability late fees are added on June 11th.

6.7 Connection Charges

New customers for the Water Utility with an existing connection must fill out a user agreement, but no fees are required. Renters, however, will be charged a deposit of \$300.00. When adding new customers, a sump pump inspection is performed.

The office staff receives the payment for tap fees. The customer must fill out a tap paper packet and pay the availability fee of \$96. The customer pays the water and sewer tap of \$1,240 and the Greendale system development fee of \$3,350 for which Greendale invoices Valley Rural. The office staff faxes the tap paperwork to the Health Department. The office staff keeps a spreadsheet of the tap fees paid and when the customer was set up in the billing system. The bookkeeper uses the spreadsheet for posting the taps to the general ledger. The payments for these are recorded when the deposit is made into GL software.

- A.** Each new water tap connection
 - 1.** Must include a type customer check list
 - a.** List installation charges and payment status
 - b.** List connection fees/deposits and payment status
 - c.** Confirm if backflow prevention is necessary
 - d.** List size of meter
 - 2.** Must include pre/post inspection with written report to ensure proper installation of service line and meter.
 - 3.** Customer must pay appropriate fees as established in water rate ordinances.
 - 4.** Utility must determine and approve appropriately sized customer meter for each new connection.
 - 5.** Utility shall meter all connections to water system. The Utility shall work to remediate any existing unmetered connection by installing a meter. There is an exception for the Utility Office which is unmetered.

6.8 Routine Billing – AMI, Monthly/Quarterly

The Utility sends out billings for water services on a monthly basis. Collections are described above.

- A.** Utility shall read and record a minimum of once per month all billed metered accounts.
- B.** Utility shall read and record a minimum of once per month all unbilled metered accounts. (provide a list of accounts and usage and units for each at time of water loss audit and validation).

- C.** Internal auditing shall occur, at minimum, on an annual basis to include:
 - 1.** Review status of accounts to ensure each account is metered. Accounts that are found to be unmetered shall be subject to a meter installation and placed on volume-based billing.
 - 2.** Review any billing lapses to determine any unquantified consumption. Yearly water loss audit shall account for discrepancies in billing dates by pro-rating monthly billing between the December of the previous year and the January of the upcoming year.
- D.** The Utility shall be subject to a performance audit of the Water Utility's water billing operations at least once every three (3) years. The intent of the audit is to assure reliable implementation of billing procedures and reduction of oversight.
 - 1.** Reports and findings shall be maintained by Utility and provided during time of water loss audit and validation process.
- E.** The following accounts shall be metered and subject to monthly billing based on volumetric consumption. No accounts shall be subject to a billing exemption.

6.9 Use Ordinances

- A.** Use ordinances shall be reviewed by Utility Board and updated as needed on an annual basis.
- B.** Use of Unmetered/Unbilled water.
 - 1.** Unmetered/Unbilled water can be defined as "any authorized consumption that is neither metered nor billed, such as water used for firefighting or system flushing (water and sewer) only."
 - a.** Unmetered/unbilled accounts associated with water consumption are unacceptable and should be remediated upon discovery.
 - 2.** No unmetered/unbilled accounts other than those defined above are acceptable.
 - 3.** Operator and utility staff shall meter water usage for hydrant flow tests and keep an electronic record with authorized name(s), water volumes, and dates, purpose, and location of use. Provide year end summary at time of water loss audit and validation.
 - 4.** Fire department shall meter water use associated with fire events. Fire department to keep electronic record with authorized name(s), water volumes, and dates, purpose, and location of use. Provide year end summary at time of water loss audit and validation.
- C.** System Operating Pressure
 - 1.** Operator shall perform annual hydrant flow tests at various locations throughout the distribution system (and throughout different pressure zones in the system, as applicable) and record the results. Operator to

provide flow test and pressure reports at time of water loss audit and validation.

2. Community to provide hydrant flow tests and pressure reports to Engineer that maintains water system's hydraulic model.

6.10 Training and Safety

The Utility has recently begun using the Alliance of Rural Water Apprenticeship Program to train their new employees. The Utility does not have a formal written work or sampling procedure or a written reporting process for injuries. The General Manager addresses safety at the Utility team meetings to ensure safe and efficient day-to-day operations.

Utility safety equipment includes eye protection, hearing protection, hard hats, steel toe boots, rubber boots, rubber gloves, trench box, and first aid kits.

- A. In accordance with the 2019 Indiana General Assembly enacted State Enrolled Act 4 (SEA 4), the Operator/member of the utility must attend annual regional planning meetings held by the Indiana Finance Authority (IFA). The regional planning meeting is intended to enable drinking water and wastewater utilities to work together to address long term needs.
 1. The Utility must report on their participation to IFA by March 1 of each odd-numbered year starting on March 1, 2021.

6.11 Master Meter Accuracy and Replacement

- A. Meters
 1. There shall be a four (4)-inch influent water meter at the start of each end of the distribution system to determine the quantity of water purchased and shall be read daily. This will be compared to the water consumed to determine the water loss.
- B. Operator Responsibilities.:
 1. Each master meter shall be flow tested and/or calibrated annually. Operator to maintain test reports for each meter and provide it during the water loss audit/validation process.
 2. If the meter is not owned by the purchasing utility, purchasing utility shall request that meter's owner complete a flow test and calibration annually. Operator to maintain flow test reports stating accuracy. (provide test reports during the water loss audit and validation process)
 3. All meters shall be repaired or replaced if they are found to be outside a +/- 3% accuracy.
- C. Operator may choose to flow test/calibrate the meters by the following methods:
 1. Operator may outsource flow tests and calibrations to third-party vendor knowledgeable in the M6 methodology.

6.12 Customer Meter Accuracy and Replacement

- A.** Customer Meters Larger than 1" – inclusive of all billed and unbilled accounts
 - 1. Meters shall be replaced every two (2) to five (5) years and shall be on a phased replacement plan. 1/5th of the meters shall be replaced every year for a five (5) year replacement plan and 1/2 of the meters shall be replaced every year for a two (2) year replacement plan. Operator to keep track of which meters were replaced in which year. At the end of the cycle, the cycle is to repeat itself with the oldest meters in the system (i.e., the meters replaced in year one.)
- B.** Customer Meters Smaller than 1" – inclusive of a billed and unbilled accounts
 - 1. Meters shall be replaced every 15 to 20 years and shall be on a phased replacement plan. 1/15th of the meters shall be replaced every year for a 15-year replacement plan and 1/20th of the meters shall be replaced every year for a 20-year replacement plan.
 - 2. Operator to request and maintain the factory flow test report stating the accuracy of the new meter being installed.
 - 3. Operator to flow test the customer meters that are replaced and maintain the flow test report stating the accuracy of the meter being taken out of the system.
 - 4. Operator to keep track of which meters were replaced in which year. At the end of the cycle, the cycle is to repeat itself with the oldest meters in the system (i.e., the meters replaced in year one.)
- C.** Operator Responsibilities:
 - 1. Request and maintain the factory flow test report stating the accuracy of the new meter being installed. (provide these records at time of water loss audit and validation).
 - 2. Flow test customer meters that are replaced and maintain flow test report stating accuracy of meter being taken out of system. (provide these records at time of water loss audit and validation).
 - 3. Coordinate with Clerk Treasurer to electronically record which year each meter was replaced in the reading/billing software. (provide these records at time of water loss audit and validation).
- D.** Operator may choose to flow test/calibrate the meters by the following methods:
 - 1. Operator may outsource flow tests and calibrations to third-party vendor knowledgeable in M6 methodology.

6.13 System Data and Maintaining Record Documents

- A.** Operator and Utility staff to field verify water mains on an annual basis. Field verification can be phased by breaking the distribution system into sections and

completing a section each year. The Utility map and asset management plan will be updated to reflect annual field verification on lengths of water mains and service lines.

1. Field verification shall include, but not be limited to:
 - a. Location, size, material of water mains
 - b. Water main connection points
 - c. Location, size, condition of valves
 - d. Location, size, condition of hydrants
 - e. Location, size, installation date, condition, model, setting of customer meters.
 - f. Location, size, length, material of service lines.
 2. In the event that Utility maintains a GIS system; field verification shall be completed with a GIS locator/handheld device.
- B.** The installation of any new water main, or water main replacement, will be fully documented and updated in the Utility map and asset management plan on an annual basis.
- C.** Operator and Utility staff to field verify the number of active and inactive service connections annually.
- D.** Operator and Utility staff to electronically record water main break events inclusive of date, location, water main diameter, time until water was shut-off, and estimated/calculated amount of water lost due to leak/break recorded in gallons.
- E.** Provide documentation of field verifications, as-builts for the previous year, updated mapping/asset management plan, number of service connections (active and inactive), and summary of breaks/leaks at the time of water loss audit and validation.

6.14 Financial Data and Maintaining Record Documents

- A.** Utility Board of Directors to perform an internal review of the rate structure on a yearly basis in comparison to total operational costs to determine whether rate adjustments are needed to support necessary operations and maintenance programs.
- B.** Clerk Treasurer shall track water utility operational costs via an industry standard electronic software, monthly, including but not limited to following categories:
- a. Salaries and Wages
 - b. Employee Benefits
 - c. Purchased Power
 - d. Purchased Water (If Applicable)

- e. Chemicals
 - f. Repairs and Maintenance
 - g. Materials and Supplies
 - h. Contractual Services
 - i. Rent
 - j. Transportation
 - k. Other
- C.** Utility shall participate in a financial audit performed by the State Board of Accounts (SBA) every two (2) to three (3) years. In the event that the SBA does not perform a third-party audit/review of the financial data, the Utility shall find a third-party CPA to perform an audit/review within three (3) years from the previous audit.
- 1. Utility shall maintain any applicable reports/summaries and provide them during the water loss audit and validation process.
 - 2. Utility shall maintain any applicable reports/summaries and provide them during the water loss audit and validation process.
- D.** Utility shall retain the services of an individual that is knowledgeable in the AWWA M36 methodology (i.e., an Indiana certified water loss audit validator) to perform a review of the most current rate structure and calculations that develop the customer retail unit cost at least once every five (5) years.
- 1. Recommendations by the third-party vendor shall be retained by the Utility and provided during the water loss audit and validation process for review. Recommendations can be in the form of a previously completed water loss audit validation performed by an Indiana certified water loss audit validator.

6.15 Cyber Security

A. Cyber Security Procedures (SCADA Included)

- 1. Access to the Water Utility SCADA system is only permitted to Valley Rural Utility Company personnel
- 2. All SCADA equipment is secured by lock and key or within an area only Water Utility employees have access.
- 3. Internal/ External Communication Procedure During a Breach:
 - a. Internal communication will be through phones (landlines will be used when available) when a cyber security breach is active.
 - b. External communication to the customers will be through the use of a reverse 911 when a cyber security breach is active.

- c. Contingency for communication, if these methods fail, will be for use of 2-way radio for internal communication and an emergency radio broadcast for external communication to the public.

B. Annual Cyber Security Vulnerability Assessment and Training

1. Financing completed on or after July, 1st, 2024 must complete an annual Cyber Vulnerability Assessment to remain eligible for funding opportunities. Therefore the Valley Rural Utility Company shall participate in an annual Cyber Vulnerability Scanning Assessment through The Cybersecurity & Infrastructure Security Agency. This service is a “no-cost” continual monitoring and scanning program that will remain effective the entire year the Town participates in this service. The Town has not performed the vulnerability scan yet but the AWWA Cybersecurity Risk Management Tool Questionnaire has been filled out (can be found in **Appendix D**) as a first step. The vulnerability scan will include:
 - a. Identifies internet-accessible assets
 - b. Identifies vulnerabilities in assets connecting to the internet
 - c. Weekly reports on scanning status and recommendations for identified vulnerabilities
 - d. Significant reduction in identified vulnerabilities in the first few months of scanning for newly enrolled water utilities
 - e. Ongoing detection and reporting with continuous scanning for new vulnerabilities
2. Instructions on how to enroll in the Cyber Vulnerability Scanning Assessment are listed below:
 - a. Email vulnerability@cisa.dhs.gov with subject line “Requesting Vulnerability Scanning Services.” Include name of utility, point of contact, physical address.
 - b. CISA will reply with a “service request form” and “vulnerability scanning acceptance letter” to get information about the utility and authorization to scan networks
 - c. Scanning typically begins 10 days after receiving all completed forms
3. All Water Utility Employees will undergo annual cyber security training including:
 - a. Cyber phishing/scamming training.
 - b. Information on how best to avoid a breach including
 - 1) Not writing down passwords
 - 2) Locking computer screens when leaving the area

- 3) Keep all physical systems locked when not in use
 - 4) Avoid using similar passwords
 - 5) Change passwords regularly
 - 6) Monitoring and applying software updates
- c. Training to identify a cyber security breach.
 - d. Response steps to a cyber security incident/breach
 - e. Recovery steps after a cyber security incident/breach
 - f. Additional information on this can be seen in the Cyber Security checklist located in **Appendix D**.

Section 7 – External Contact Information

Below is a list of important contacts for the Valley Rural Utility Company:

**Table 7-1
Valley Rural Utility Company Contacts**

Contact Type	Organization	Contact	
		Phone	Website
EMERGENCY			
Police	Police Dept	Non-Emergency – (812) 537-3431 Emergency – 911	N/A
Fire	Fire Dept	Non-Emergency – (812) 637-3473 Emergency – 911	N/A
PERMITS / COMPLIANCE			
Permit Violations	IDEM	(800) 451-6027	www.in.gov/idem
Spill Reporting	IDEM	(317) 233-7745	www.in.gov/idem
SUPPLIERS			
SCADA	TNT Technologies	(812) 941-0300	https://tnttechnologiesinc.com/
Meters	Badger Meters	(800) 616-3837	https://www.badgermeter.com/
Meters	Midwest Meter	(641) 456-4802	https://www.midwestmeter.com/
Meters	Master Meter	(800) 765-6518	https://www.mastermeter.com/
Meters	Wallers Meter	(812) 265-3565	https://www.wallersmeterinc.com/
Chemicals	Chemicals Inc.	(281) 576-5000	https://www.chemicalsinc.com/
Water Equipment	USA Bluebook	(800) 548-1234	https://www.usabluebook.com/
Electricity	Southeastern Indiana REMC	(812) 689-4111	https://www.seiremc.com/
Building Materials	Martin Marietta		https://www.martinmarietta.com/
Electrical Contractor	Lohrum Electrical	(812) 593-6573	https://lohrumelectrical.com/index.html
Distribution System Equipment	Core & Main	(314) 432-4700	https://coreandmain.com/
Generators	Buckeye Power Sales	(513) 757-0934	https://buckeyepowersales.com/
Water	Tri-Township Water Corporation	(812) 637-1039	https://www.tritownshipwater.com/
Water & Sewer	Greendale Utilities	(812) 537-2125	https://www.cityofgreendale.net/electric-department
Fuel & Energy	World Kinect / Lykins	(513) 831-8820	https://www.world-kinect.com/Lykins

Section 8 – Internal Contracting and Purchasing Procedures

The Water Utility is operated and maintained through the Valley Rural Utility Company (Utility). The Utility Department includes staff and equipment capable of performing regular maintenance and repairs. All regular maintenance is documented and recorded. All work that is beyond the scope of the Utility Department is approved by the Board of Directors and contracted out.

When major alterations are necessary, the Utility will obtain necessary funding, hire an engineering consultant to design the work and assemble construction plans and specifications. Once assembled the project is publicly bid and awarded to the lowest responsible responsive bidder. Often times the consultant will also have a representative on site to keep record information, which will be passed on to the Utility once construction is complete.

Appendix A
Asset Inventory

APPENDIX A
Asset Inventory

2024

Utility Name:	Water
Current Plan Year:	2024

Assets	Capacity / Size	Quantity	Unit	Unit Cost (2023)	Replacement Cost	Year Installed	Expected Useful Life in Years	Remaining Useful Life in Years	Condition	Probability of Failure	Consequence of Failure	Criticality	Recommendation
Water Main	2"	362	LF	\$80	\$28,960	1974	55	5	4	4	2	8	Monitor Closely
Isolation Valve	2"	1	EA	\$2,000	\$2,000	1974	40	0	5	5	3	15	Monitor Closely
Foxridge Drive													
Water Main	2"	526	LF	\$80	\$42,080	1974	55	5	4	4	2	8	Monitor Closely
Water Main	6"	189	LF	\$110	\$20,790	1974	65	15	4	4	2	8	Monitor Closely
Isolation Valve	6"	1	EA	\$6,500	\$6,500	1974	40	0	5	5	3	15	Monitor Closely
Bellemeade Drive													
Water Main	6"	4,104	LF	\$110	\$451,440	1974	65	15	4	4	2	8	Monitor Closely
Isolation Valve	6"	4	EA	\$6,500	\$26,000	1974	40	0	5	5	3	15	Monitor Closely
Hydrant		1	EA	\$9,000	\$9,000	1974	60	10	4	4	2	8	Monitor Closely
Bellemeade Court													
Water Main	2"	132	LF	\$80	\$10,560	1974	55	5	4	4	2	8	Monitor Closely
Sunnyridge Drive													
Water Main	2"	1,078	LF	\$80	\$86,240	1974	55	5	4	4	2	8	Monitor Closely
Isolation Valve	2"	2	EA	\$2,000	\$4,000	1974	40	0	5	5	3	15	Monitor Closely
Clearview Court													
Water Main	2"	196	LF	\$80	\$15,680	1974	55	5	4	4	2	8	Monitor Closely
Ridgewood Circle													
Water Main	2"	1,225	LF	\$80	\$98,000	1974	55	5	4	4	2	8	Monitor Closely
Water Main	4"	1,291	LF	\$100	\$129,100	1974	55	5	4	4	2	8	Monitor Closely
Isolation Valve	4"	2	EA	\$5,500	\$11,000	1974	40	0	5	5	3	15	Monitor Closely
Hydrant		1	EA	\$9,000	\$9,000	1974	60	10	4	4	2	8	Monitor Closely
Ridgecliff Court													
Water Main	2"	437	LF	\$80	\$34,960	1974	55	5	4	4	2	8	Monitor Closely
Isolation Valve	2"	1	EA	\$2,000	\$2,000	1974	40	0	5	5	3	15	Monitor Closely
Brabamhurst Drive													
Water Main	2"	2,027	LF	\$80	\$162,160	1972	55	3	4	4	2	8	Monitor Closely
Isolation Valve	2"	2	EA	\$2,000	\$4,000	1972	40	0	5	5	3	15	Monitor Closely
Raba Court													
Water Main	2"	195	LF	\$80	\$15,600	1972	55	3	4	4	2	8	Monitor Closely
Sandamont Drive													
Water Main	2"	3,128	LF	\$80	\$250,240	1972	55	3	4	4	2	8	Monitor Closely
Water Main	4"	1,004	LF	\$100	\$100,400	1972	55	3	4	4	2	8	Monitor Closely
Isolation Valve	4"	3	EA	\$5,500	\$16,500	1972	40	0	5	5	3	15	Monitor Closely
Tyrolean Way													
Water Main	2"	1,473	LF	\$80	\$117,840	1972	55	3	4	4	2	8	Monitor Closely
Isolation Valve	2"	1	EA	\$2,000	\$2,000	1972	40	0	5	5	3	15	Monitor Closely
Kym Court													
Water Main	2"	121	LF	\$80	\$9,680	1972	55	3	4	4	2	8	Monitor Closely
Highridge Court													
Water Main	2"	729	LF	\$80	\$58,320	1971	55	2	4	4	2	8	Monitor Closely
Isolation Valve	2"	1	EA	\$2,000	\$2,000	1971	40	0	5	5	3	15	Monitor Closely
Crestview Court													
Water Main	2"	769	LF	\$80	\$61,520	1971	55	2	4	4	2	8	Monitor Closely
Isolation Valve	2"	1	EA	\$2,000	\$2,000	1971	40	0	5	5	3	15	Monitor Closely
Zurich Trail													
Water Main	2"	1,092	LF	\$80	\$87,360	1971	55	2	4	4	2	8	Monitor Closely
Isolation Valve	2"	1	EA	\$2,000	\$2,000	1971	40	0	5	5	3	15	Monitor Closely
Moritz Court													
Water Main	2"	617	LF	\$80	\$49,360	1971	55	2	4	4	2	8	Monitor Closely
Isolation Valve	2"	1	EA	\$2,000	\$2,000	1971	40	0	5	5	3	15	Monitor Closely
Lucerne Lane													
Water Main	2"	835	LF	\$80	\$66,800	1971	55	2	4	4	2	8	Monitor Closely
Water Main	4"	491	LF	\$100	\$49,100	1971	55	2	4	4	2	8	Monitor Closely
Isolation Valve	4"	1	EA	\$5,500	\$5,500	1971	40	0	5	5	3	15	Monitor Closely
Berne Court													
Water Main	2"	356	LF	\$80	\$28,480	1971	55	2	4	4	2	8	Monitor Closely

APPENDIX A
Asset Inventory

2024

Utility Name:	Water
Current Plan Year:	2024

Assets	Capacity / Size	Quantity	Unit	Unit Cost (2023)	Replacement Cost	Year Installed	Expected Useful Life in Years	Remaining Useful Life in Years	Condition	Probability of Failure	Consequence of Failure	Criticality	Recommendation
Interlochen Lane													
Water Main	2"	501	LF	\$80	\$40,080	1971	55	2	4	4	2	8	Monitor Closely
Isolation Valve	2"	1	EA	\$2,000	\$2,000	1971	55	2	4	4	3	12	Monitor Closely
Road to Upper Water Tank													
Water Main	8"	215	LF	\$120	\$25,800	1971	65	12	4	4	2	8	Monitor Closely
Isolation Valve	8"	2	EA	\$8,000	\$16,000	1971	40	0	5	5	3	15	Monitor Closely
Hydrant		1	EA	\$9,000	\$9,000	1971	60	7	4	4	2	8	Monitor Closely
Walnut Ridge Trail													
Water Main	2"	965	LF	\$80	\$77,200	1971	55	2	4	4	2	8	Monitor Closely
Isolation Valve	2"	1	EA	\$2,000	\$2,000	1971	40	0	5	5	3	15	Monitor Closely
Ferngrove Court													
Water Main	2"	633	LF	\$80	\$50,640	1971	55	2	4	4	2	8	Monitor Closely
Isolation Valve	2"	1	EA	\$2,000	\$2,000	1971	40	0	5	5	3	15	Monitor Closely
Geneva Court													
Water Main	2"	616	LF	\$80	\$49,280	1971	55	2	4	4	2	8	Monitor Closely
Isolation Valve	2"	1	EA	\$2,000	\$2,000	1971	40	0	5	5	3	15	Monitor Closely
Thornhill Lane													
Water Main	2"	570	LF	\$80	\$45,600	1971	55	2	4	4	2	8	Monitor Closely
Isolation Valve	2"	1	EA	\$2,000	\$2,000	1971	40	0	5	5	3	15	Monitor Closely
Chalet Court													
Water Main	2"	1,050	LF	\$80	\$84,000	1971	55	2	4	4	2	8	Monitor Closely
Hollyhedge Lane													
Water Main	2"	1,044	LF	\$80	\$83,520	1971	55	2	4	4	2	8	Monitor Closely
Isolation Valve	2"	1	EA	\$2,000	\$2,000	1971	40	0	5	5	3	15	Monitor Closely
Sports Complex													
Water Main	2"	198	LF	\$80	\$15,840	1971	55	2	4	4	2	8	Monitor Closely
Isolation Valve	2"	1	EA	\$2,000	\$2,000	1971	40	0	5	5	3	15	Monitor Closely
Sunset Drive													
Water Main	2"	34	LF	\$80	\$2,720	1971	55	2	4	4	2	8	Monitor Closely
Water Main	6"	3,741	LF	\$110	\$411,510	1971	65	12	4	4	2	8	Monitor Closely
Isolation Valve	6"	2	EA	\$6,500	\$13,000	1971	40	0	5	5	3	15	Monitor Closely
Hydrant		1	EA	\$9,000	\$9,000	1971	60	7	4	4	2	8	Monitor Closely
Edelweiss Lane													
Water Main	2"	1,011	LF	\$80	\$80,880	1971	55	2	4	4	2	8	Monitor Closely
Isolation Valve	2"	1	EA	\$2,000	\$2,000	1971	40	0	5	5	3	15	Monitor Closely
Echo Trace													
Water Main	2"	207	LF	\$80	\$16,560	1971	55	2	4	4	2	8	Monitor Closely
Skyview Circle													
Water Main	2"	363	LF	\$80	\$29,040	1971	55	2	4	4	2	8	Monitor Closely
Water Main	6"	1,844	LF	\$110	\$202,840	1971	65	12	4	4	2	8	Monitor Closely
Isolation Valve	6"	1	EA	\$6,500	\$6,500	1971	40	0	5	5	3	15	Monitor Closely
Maple Knoll Court													
Water Main	2"	734	LF	\$80	\$58,720	1971	55	2	4	4	2	8	Monitor Closely
Isolation Valve	2"	1	EA	\$2,000	\$2,000	1971	40	0	5	5	3	15	Monitor Closely
Oak Court													
Water Main	2"	379	LF	\$80	\$30,320	1971	55	2	4	4	2	8	Monitor Closely
Isolation Valve	2"	1	EA	\$2,000	\$2,000	1971	40	0	5	5	3	15	Monitor Closely
Springdale Court													
Water Main	2"	644	LF	\$80	\$51,520	1971	55	2	4	4	2	8	Monitor Closely
Isolation Valve	2"	1	EA	\$2,000	\$2,000	1971	40	0	5	5	3	15	Monitor Closely
Ashwood Court													
Water Main	2"	322	LF	\$80	\$25,760	1971	55	2	4	4	2	8	Monitor Closely
Isolation Valve	2"	1	EA	\$2,000	\$2,000	1971	40	0	5	5	3	15	Monitor Closely
Hawthorne Heights													
Water Main	2"	1,240	LF	\$80	\$99,200	1971	55	2	4	4	2	8	Monitor Closely
Isolation Valve	2"	1	EA	\$2,000	\$2,000	1971	40	0	5	5	3	15	Monitor Closely
Aspen Hill Court													

APPENDIX A
Asset Inventory

2024

Utility Name:	Water
Current Plan Year:	2024

Assets	Capacity / Size	Quantity	Unit	Unit Cost (2023)	Replacement Cost	Year Installed	Expected Useful Life in Years	Remaining Useful Life in Years	Condition	Probability of Failure	Consequence of Failure	Criticality	Recommendation
Water Main	2"	321	LF	\$80	\$25,680	1971	55	2	4	4	2	8	Monitor Closely
Isolation Valve	2"	1	EA	\$2,000	\$2,000	1971	40	0	5	5	3	15	Monitor Closely
Beau Vista Drive													
Water Main	2"	622	LF	\$80	\$49,760	1971	55	2	4	4	2	8	Monitor Closely
Water Main	4"	354	LF	\$100	\$35,400	1971	55	2	4	4	2	8	Monitor Closely
Isolation Valve	4"	1	EA	\$5,500	\$5,500	1971	40	0	5	5	3	15	Monitor Closely
Windemere Hill													
Water Main	2"	1,092	LF	\$80	\$87,360	1971	55	2	4	4	2	8	Monitor Closely
Isolation Valve	2"	1	EA	\$2,000	\$2,000	1971	40	0	5	5	3	15	Monitor Closely
Cedarview Court													
Water Main	2"	589	LF	\$80	\$47,120	1971	55	2	4	4	2	8	Monitor Closely
Woodland Circle													
Water Main	2"	468	LF	\$80	\$37,440	1971	55	2	4	4	2	8	Monitor Closely
Water Main	4"	350	LF	\$100	\$35,000	1971	55	2	4	4	2	8	Monitor Closely
Isolation Valve	4"	1	EA	\$5,500	\$5,500	1971	40	0	5	5	3	15	Monitor Closely
Rustic Court													
Water Main	2"	822	LF	\$80	\$65,760	1971	55	2	4	4	2	8	Monitor Closely
Isolation Valve	2"	1	EA	\$2,000	\$2,000	1971	40	0	5	5	3	15	Monitor Closely
Beechwood Circle													
Water Main	2"	678	LF	\$80	\$54,240	1971	55	2	4	4	2	8	Monitor Closely
Isolation Valve	2"	1	EA	\$2,000	\$2,000	1971	40	0	5	5	3	15	Monitor Closely
Elm Drive													
Water Main	2"	599	LF	\$80	\$47,920	1971	55	2	4	4	2	8	Monitor Closely
Water Main	4"	1,014	LF	\$100	\$101,400	1971	55	2	4	4	2	8	Monitor Closely
Hydrant		1	EA	\$9,000	\$9,000	1971	60	7	4	4	2	8	Monitor Closely
Eagleview Drive													
Water Main	2"	1,075	LF	\$80	\$86,000	1971	55	2	4	4	2	8	Monitor Closely
Isolation Valve	2"	1	EA	\$2,000	\$2,000	1971	40	0	5	5	3	15	Monitor Closely
Water Main	4"	557	LF	\$100	\$55,700	1971	55	2	4	4	2	8	Monitor Closely
Isolation Valve	4"	2	EA	\$5,500	\$11,000	1971	40	0	5	5	3	15	Monitor Closely
Hydrant		1	EA	\$9,000	\$9,000	1971	60	7	4	4	2	8	Monitor Closely
Crest Haven Drive													
Water Main	2"	1,178	LF	\$80	\$94,240	1971	55	2	4	4	2	8	Monitor Closely
PRV	2"	1	EA	\$3,000	\$3,000	1971	40	0	5	5	3	15	Monitor Closely
Water Main	4"	1,526	LF	\$100	\$152,600	1971	55	2	4	4	2	8	Monitor Closely
Isolation Valve	4"	3	EA	\$5,500	\$16,500	1971	40	0	5	5	3	15	Monitor Closely
Ivy Hill Drive													
Water Main	2"	1,008	LF	\$80	\$80,640	1971	55	2	4	4	2	8	Monitor Closely
PRV	2"	1	EA	\$3,000	\$3,000	1971	40	0	5	5	3	15	Monitor Closely
Water Main	4"	836	LF	\$100	\$83,600	1971	55	2	4	4	2	8	Monitor Closely
Isolation Valve	4"	2	EA	\$5,500	\$11,000	1971	40	0	5	5	3	15	Monitor Closely
Hydrant		1	EA	\$9,000	\$9,000	1971	60	7	4	4	2	8	Monitor Closely
Overlook Circle													
Water Main	2"	946	LF	\$80	\$75,680	1971	55	2	4	4	2	8	Monitor Closely
Water Main	4"	651	LF	\$100	\$65,100	1971	55	2	4	4	2	8	Monitor Closely
Isolation Valve	4"	1	EA	\$5,500	\$5,500	1971	40	0	5	5	3	15	Monitor Closely
Hickory Road													
Water Main	6"	4,599	LF	\$110	\$505,890	1971	65	12	4	4	2	8	Monitor Closely
Isolation Valve	6"	6	EA	\$6,500	\$39,000	1971	40	0	5	5	3	15	Monitor Closely
Hydrant		1	EA	\$9,000	\$9,000	1971	60	7	4	4	2	8	Monitor Closely
Hydrant		1	EA	\$9,000	\$9,000	2002	60	38	2	2	2	4	Routine Maintenance
Longview Drive													
Water Main	2"	879	LF	\$80	\$70,320	1971	55	2	4	4	2	8	Monitor Closely
Water Main	4"	459	LF	\$80	\$36,720	1971	55	2	4	4	2	8	Monitor Closely
Isolation Valve	4"	1	EA	\$5,500	\$5,500	1971	40	0	5	5	3	15	Monitor Closely
Water Main	6"	8,175	LF	\$110	\$899,250	1971	65	12	4	4	2	8	Monitor Closely
Isolation Valve	6"	5	EA	\$6,500	\$32,500	1971	40	0	5	5	3	15	Monitor Closely

APPENDIX A
Asset Inventory

2024

Utility Name:	Water
Current Plan Year:	2024

Assets	Capacity / Size	Quantity	Unit	Unit Cost (2023)	Replacement Cost	Year Installed	Expected Useful Life in Years	Remaining Useful Life in Years	Condition	Probability of Failure	Consequence of Failure	Criticality	Recommendation
PRV	6"	1	EA	\$6,000	\$6,000	1971	40	0	5	5	2	10	Monitor Closely
Hydrant		2	EA	\$9,000	\$18,000	1971	60	7	4	4	2	8	Monitor Closely
Buckeye Court													
Water Main	6"	669	LF	\$110	\$73,590	1971	65	12	4	4	2	8	Monitor Closely
Isolation Valve	6"	1	EA	\$6,500	\$6,500	1971	40	0	5	5	3	15	Monitor Closely
Greentree Road													
Water Main	4"	2,531	LF	\$100	\$253,100	1971	55	2	4	4	2	8	Monitor Closely
Isolation Valve	4"	2	EA	\$5,500	\$11,000	1971	40	0	5	5	3	15	Monitor Closely
Water Main	6"	38	LF	\$110	\$4,180	1971	65	12	4	4	2	8	Monitor Closely
Ryan Court													
Water Main	2"	311	LF	\$80	\$24,880	1971	55	2	4	4	2	8	Monitor Closely
Marina													
Water Main	1"	822	LF	\$50	\$41,100	1971	55	2	4	4	2	8	Monitor Closely
Hidden Valley Drive													
Water Main	2"	413	LF	\$80	\$33,040	1971	55	2	4	4	2	8	Monitor Closely
Water Main	4"	447	LF	\$100	\$44,700	1971	55	2	4	4	2	8	Monitor Closely
Newcom Knoll													
Water Main	2"	802	LF	\$80	\$64,160	1972	55	3	4	4	2	8	Monitor Closely
Isolation Valve	2"	1	EA	\$2,000	\$2,000	1972	40	0	5	5	3	15	Monitor Closely
Between Montera Circle and Hampton Drive													
Water Main	4"	939	LF	\$100	\$93,900	1979	55	10	4	4	2	8	Monitor Closely
Monteray Circle													
Water Main	2"	1,442	LF	\$80	\$115,360	1973	55	4	4	4	2	8	Monitor Closely
Isolation Valve	2"	2	EA	\$2,000	\$4,000	1973	40	0	5	5	3	15	Monitor Closely
Hydrant		1	EA	\$9,000	\$9,000	1973	60	9	4	4	2	8	Monitor Closely
Knollwood Drive													
Water Main	2"	2,177	LF	\$80	\$174,160	1973	55	4	4	4	2	8	Monitor Closely
Isolation Valve	2"	1	EA	\$2,000	\$2,000	1973	40	0	5	5	3	15	Monitor Closely
Montclair Court													
Water Main	2"	738	LF	\$80	\$59,040	1973	55	4	4	4	2	8	Monitor Closely
Water Main	4"	334	LF	\$100	\$33,400	1973	55	4	4	4	2	8	Monitor Closely
Isolation Valve	4"	1	EA	\$5,500	\$5,500	1973	40	0	5	5	3	15	Monitor Closely
Cliftmont Circle													
Water Main	2"	1,505	LF	\$80	\$120,400	1973	55	4	4	4	2	8	Monitor Closely
Water Main	4"	666	LF	\$100	\$66,600	1973	55	4	4	4	2	8	Monitor Closely
Isolation Valve	4"	1	EA	\$5,500	\$5,500	1973	40	0	5	5	3	15	Monitor Closely
Brindlestone Drive													
Water Main	2"	581	LF	\$80	\$46,480	1973	55	4	4	4	2	8	Monitor Closely
Isolation Valve	2"	1	EA	\$2,000	\$2,000	1973	40	0	5	5	3	15	Monitor Closely
Ventura Drive													
Water Main	2"	1,749	LF	\$80	\$139,920	1973	55	4	4	4	2	8	Monitor Closely
Isolation Valve	2"	2	EA	\$2,000	\$4,000	1973	40	0	5	5	3	15	Monitor Closely
Heidi Haven Drive													
Water Main	2"	957	LF	\$80	\$76,560	1973	55	4	4	4	2	8	Monitor Closely
Isolation Valve	2"	1	EA	\$2,000	\$2,000	1973	40	0	5	5	3	15	Monitor Closely
Water Main	4"	587	LF	\$100	\$58,700	1973	55	4	4	4	2	8	Monitor Closely
Water Main	6"	451	LF	\$110	\$49,610	1973	65	14	4	4	2	8	Monitor Closely
Isolation Valve	6"	1	EA	\$6,500	\$6,500	1973	40	0	5	5	3	15	Monitor Closely
Ray Lynn Drive													
Water Main	2"	601	LF	\$80	\$48,080	1973	55	4	4	4	2	8	Monitor Closely
Isolation Valve	2"	1	EA	\$2,000	\$2,000	1973	40	0	5	5	3	15	Monitor Closely
Water Main	6"	437	LF	\$110	\$48,070	1973	65	14	4	4	2	8	Monitor Closely
Isolation Valve	6"	1	EA	\$6,500	\$6,500	1973	40	0	5	5	3	15	Monitor Closely
Hydrant		1	EA	\$9,000	\$9,000	1973	60	9	4	4	2	8	Monitor Closely
Ravenda Drive													
Water Main	2"	1,772	LF	\$80	\$141,760	1973	55	4	4	4	2	8	Monitor Closely
Isolation Valve	2"	1	EA	\$2,000	\$2,000	1973	40	0	5	5	3	15	Monitor Closely

APPENDIX A
Asset Inventory

2024

Utility Name:	Water
Current Plan Year:	2024

Assets	Capacity / Size	Quantity	Unit	Unit Cost (2023)	Replacement Cost	Year Installed	Expected Useful Life in Years	Remaining Useful Life in Years	Condition	Probability of Failure	Consequence of Failure	Criticality	Recommendation
Water Main	2"	326	LF	\$80	\$26,080	1972	55	3	4	4	2	8	Monitor Closely
Hampton Drive													
Water Main	2"	1,243	LF	\$80	\$99,440	1976	55	7	4	4	2	8	Monitor Closely
Isolation Valve	2"	1	EA	\$2,000	\$2,000	1976	40	0	5	5	3	15	Monitor Closely
Water Main	8"	2,037	LF	\$120	\$244,440	1976	65	17	4	4	2	8	Monitor Closely
Isolation Valve	8"	4	EA	\$8,000	\$32,000	1976	40	0	5	5	3	15	Monitor Closely
Hydrant		1	EA	\$9,000	\$9,000	1976	60	12	4	4	2	8	Monitor Closely
Hanover Drive													
Water Main	2"	768	LF	\$80	\$61,440	1977	55	8	4	4	2	8	Monitor Closely
Isolation Valve	2"	1	EA	\$2,000	\$2,000	1977	40	0	5	5	3	15	Monitor Closely
Hartford Court													
Water Main	2"	876	LF	\$80	\$70,080	1977	55	8	4	4	2	8	Monitor Closely
Isolation Valve	2"	1	EA	\$2,000	\$2,000	1977	40	0	5	5	3	15	Monitor Closely
Hydrant		1	EA	\$9,000	\$9,000	1977	60	13	4	4	2	8	Monitor Closely
Hanby Court													
Water Main	2"	423	LF	\$80	\$33,840	1976	55	7	4	4	2	8	Monitor Closely
Road to Lower Water Tank													
Water Main	8"	611	LF	\$120	\$73,320	1976	65	17	3	3	2	6	Routine Maintenance
To Valley Woods													
Water Main	6"	1,129	LF	\$110	\$124,190	1976	65	17	4	4	2	8	Monitor Closely
Fairway Drive / Mitchell Road													
Water Main	2"	1,348	LF	\$80	\$107,800	1973	55	4	4	4	2	8	Monitor Closely
Water Main	6"	2,111	LF	\$110	\$232,210	1973	65	14	4	4	2	8	Monitor Closely
Isolation Valve	6"	3	EA	\$6,500	\$19,500	1973	40	0	5	5	3	15	Monitor Closely
Hydrant		1	EA	\$9,000	\$9,000	1973	60	9	4	4	2	8	Monitor Closely
Putter Place													
Water Main	2"	354	LF	\$80	\$28,320	1973	55	4	4	4	2	8	Monitor Closely
Par Drive													
Water Main	2"	552	LF	\$80	\$44,160	1973	55	4	4	4	2	8	Monitor Closely
Water Main	6"	1,670	LF	\$110	\$183,700	1973	65	14	4	4	2	8	Monitor Closely
Isolation Valve	6"	1	EA	\$6,500	\$6,500	1973	40	0	5	5	3	15	Monitor Closely
Golf View Court													
Water Main	4"	1,871	LF	\$100	\$187,100	1973	55	4	4	4	2	8	Monitor Closely
Isolation Valve	4"	1	EA	\$5,500	\$5,500	1973	40	0	5	5	3	15	Monitor Closely
Hydrant		1	EA	\$9,000	\$9,000	1973	60	9	4	4	2	8	Monitor Closely
Kathy Court													
Water Main	6"	1,044	LF	\$110	\$114,840	1973	65	14	4	4	2	8	Monitor Closely
Isolation Valve	6"	1	EA	\$6,500	\$6,500	1973	40	0	5	5	3	15	Monitor Closely
Lakeview Drive													
Water Main	2"	188	LF	\$80	\$15,040	1971	55	2	4	4	2	8	Monitor Closely
PRV	2"	1	EA	\$3,000	\$3,000	1971	40	0	5	5	3	15	Monitor Closely
Water Main	8"	8,751	LF	\$120	\$1,050,120	1971	65	12	4	4	2	8	Monitor Closely
Isolation Valve	8"	7	EA	\$8,000	\$56,000	1971	40	0	5	5	3	15	Monitor Closely
Hydrant		3	EA	\$9,000	\$27,000	1971	60	7	4	4	2	8	Monitor Closely
Hydrant		1	EA	\$9,000	\$9,000	2002	60	38	2	2	2	4	Routine Maintenance
Alpine Drive													
Water Main	2"	1,059	LF	\$80	\$84,720	1971	55	2	4	4	2	8	Monitor Closely
Water Main	2"	173	LF	\$80	\$13,840	1973	55	4	4	4	2	8	Monitor Closely
Water Main	6"	3,479	LF	\$110	\$382,690	1971	65	12	4	4	2	8	Monitor Closely
Isolation Valve	6"	4	EA	\$6,500	\$26,000	1971	40	0	5	5	3	15	Monitor Closely
Water Main	8"	3,887	LF	\$120	\$466,440	1971	65	12	4	4	2	8	Monitor Closely
Water Main	8"	1,598	LF	\$120	\$191,760	1972	65	13	4	4	2	8	Monitor Closely
Water Main	8"	6,113	LF	\$120	\$733,560	1973	65	14	4	4	2	8	Monitor Closely
Water Main	8"	7,424	LF	\$120	\$890,880	1974	65	15	4	4	2	8	Monitor Closely
Isolation Valve	8"	2	EA	\$8,000	\$16,000	1971	40	0	5	5	3	15	Monitor Closely
Isolation Valve	8"	5	EA	\$8,000	\$40,000	1973	40	0	5	5	3	15	Monitor Closely
Isolation Valve	8"	3	EA	\$8,000	\$24,000	1974	40	0	5	5	3	15	Monitor Closely

APPENDIX A
Asset Inventory

2024

Utility Name:	Water
Current Plan Year:	2024

Assets	Capacity / Size	Quantity	Unit	Unit Cost (2023)	Replacement Cost	Year Installed	Expected Useful Life in Years	Remaining Useful Life in Years	Condition	Probability of Failure	Consequence of Failure	Criticality	Recommendation
Hydrant		3	EA	\$9,000	\$27,000	1971	60	7	4	4	2	8	Monitor Closely
Hydrant		1	EA	\$9,000	\$9,000	1972	60	8	4	4	2	8	Monitor Closely
Hydrant		2	EA	\$9,000	\$18,000	1973	60	9	4	4	2	8	Monitor Closely
Hydrant		4	EA	\$9,000	\$36,000	1974	60	10	4	4	2	8	Monitor Closely
Hydrant		1	EA	\$9,000	\$9,000	2002	60	38	2	2	2	4	Routine Maintenance
Morningside Drive													
Water Main	4"	1,293	LF	\$100	\$129,300	1973	55	4	4	4	2	8	Monitor Closely
Isolation Valve	4"	1	EA	\$5,500	\$5,500	1973	40	0	5	5	3	15	Monitor Closely
To Greendale Water Tower From 100k Tank													
Water Main	8"	982	LF	\$120	\$117,840	1976	65	17	4	4	2	8	Monitor Closely
Additional Alpine and St Rd (Outside of Map)													
Water Main	2"	976	LF	\$80	\$78,080	1971	55	2	4	4	2	8	Monitor Closely
Electrical Assets													
Level Controllers	Stations with PD6000 Controllers for Level Control	4	EA	\$2,000	\$8,000	2022	15	13	1	1	3	3	Routine Maintenance
SCADA	Aqua IQ SCADA	1	EA	\$44,000	\$44,000	2022	20	18	1	1	4	4	Routine Maintenance
200-Amp 460V/3-Phase Panel Board	HSP Building	1	EA	\$18,000	\$18,000	1972	20	0	5	5	3	15	Monitor Closely
5 KVA Transformer	HSP Building	1	EA	\$3,000	\$3,000	1976	30	0	5	5	3	15	Monitor Closely
HSP Control Panel	HSP Building	1	EA	\$26,000	\$26,000	1976	20	0	5	5	4	20	Immediate Action Required
230V/60-Amp Control Panel	HSP Building	1	EA	\$3,000	\$3,000	1976	20	0	5	5	3	15	Monitor Closely
30-Amp Disconnect Switch	HSP Building	3	EA	\$500	\$1,500	1976	30	0	5	5	2	10	Monitor Closely
200 A 600V 60 HZ Disconnect Switch	HSP Building	1	EA	\$1,500	\$1,500	1976	30	0	5	5	3	15	Monitor Closely
Heater	HSP Building	1	EA	\$630	\$630	1976	13	0	5	5	2	10	Monitor Closely
Tank Level Control Panel	500k Tank	1	EA	\$25,000	\$25,000	1998	20	0	5	5	3	15	Monitor Closely

Replacement and/or Rehabilitation Expenses APPENDIX A

	Real Discount Rate	https://www.whitehouse.gov/wp-content/uploads/2023/02/M-23-12-Appendix				*typical PWA
Year (YR)	3	5	7	10	20	30
Percentage (%)	1.20%	1.30%	1.40%	1.50%	2.00%	2.00%
Planning Period (YR)	20.00					

Assets	Quantity/ Length	Remaining Useful Life in Years	Criticality Score (CS)	Recommendation	Replacement Cost (Current Day Dollars, Unit Price)	Replacement Cost (2023 Dollars)	Inflation Rate Based on Remaining Useful Life	Multiplication Factor for Future Worth	Estimated Future Funds Required for Replacement*	Annual Reserve Funds Required for Replacement (Year 1)	Annual Reserve Funds Required for Replacement (Subsequent Years)
Supply Assets											
Above Ground Tank	1	8	15	Monitor Closely	\$ 453,000.00	\$ 453,000.00	1.43%	1.12	\$ 507,700.00	\$ 63,462.50	\$ 63,462.50
Above Ground Tank	1	12	20	Immediate Action Required	\$ 250,000.00	\$ 250,000.00	1.60%	1.21	\$ 302,500.00	\$ 25,208.33	\$ 25,208.33
Meter Vault	1	8	8	Monitor Closely	\$ 10,000.00	\$ 10,000.00	1.43%	1.12	\$ 11,300.00	\$ 1,412.50	\$ 1,412.50
Flow Meter	1	0	15	Monitor Closely	\$ 3,500.00	\$ 3,500.00	0.00%	1.00	\$ 3,500.00	\$ 3,500.00	\$ -
Altitude Valve	1	0	15	Monitor Closely	\$ 15,000.00	\$ 15,000.00	0.00%	1.00	\$ 15,000.00	\$ 15,000.00	\$ -
Pressure Reducing Valve	1	0	15	Monitor Closely	\$ 9,500.00	\$ 9,500.00	0.00%	1.00	\$ 9,500.00	\$ 9,500.00	\$ -
Ball Valve	2	0	10	Monitor Closely	\$ 250.00	\$ 500.00	0.00%	1.00	\$ 500.00	\$ 500.00	\$ -
Gate Valve	1	0	10	Monitor Closely	\$ 8,000.00	\$ 8,000.00	0.00%	1.00	\$ 8,000.00	\$ 8,000.00	\$ -
Meter Vault	1	12	8	Monitor Closely	\$ 10,000.00	\$ 10,000.00	1.60%	1.21	\$ 12,100.00	\$ 1,008.33	\$ 1,008.33
Altitude Valve	1	0	12	Monitor Closely	\$ 15,000.00	\$ 15,000.00	0.00%	1.00	\$ 15,000.00	\$ 15,000.00	\$ -
Pressure Reducing Valve	1	0	12	Monitor Closely	\$ 9,500.00	\$ 9,500.00	0.00%	1.00	\$ 9,500.00	\$ 9,500.00	\$ -
Ball Valve	2	0	8	Monitor Closely	\$ 250.00	\$ 500.00	0.00%	1.00	\$ 500.00	\$ 500.00	\$ -
Gate Valve	1	0	8	Monitor Closely	\$ 8,000.00	\$ 8,000.00	0.00%	1.00	\$ 8,000.00	\$ 8,000.00	\$ -
Pumping Facility	1	8	8	Monitor Closely	\$ 12,000.00	\$ 12,000.00	1.43%	1.12	\$ 13,500.00	\$ 1,687.50	\$ 1,687.50
High Service Pumps	2	0	20	Immediate Action Required	\$ 25,000.00	\$ 50,000.00	0.00%	1.00	\$ 50,000.00	\$ 50,000.00	\$ -
Pump Motors	2	0	20	Immediate Action Required	\$ 8,000.00	\$ 16,000.00	0.00%	1.00	\$ 16,000.00	\$ 16,000.00	\$ -
Pressure Switch	2	0	15	Monitor Closely	\$ 750.00	\$ 1,500.00	0.00%	1.00	\$ 1,500.00	\$ 1,500.00	\$ -
Gate Valve	1	0	10	Monitor Closely	\$ 8,000.00	\$ 8,000.00	0.00%	1.00	\$ 8,000.00	\$ 8,000.00	\$ -
Check Valve	1	0	10	Monitor Closely	\$ 5,000.00	\$ 5,000.00	0.00%	1.00	\$ 5,000.00	\$ 5,000.00	\$ -
Butterfly Valve	4	0	10	Monitor Closely	\$ 2,100.00	\$ 8,400.00	0.00%	1.00	\$ 8,400.00	\$ 8,400.00	\$ -
Colorimeter	1	0	10	Monitor Closely	\$ 750.00	\$ 750.00	0.00%	1.00	\$ 800.00	\$ 800.00	\$ -
Mobile Generator	1	7	12	Monitor Closely	\$ 125,000.00	\$ 125,000.00	1.40%	1.10	\$ 137,800.00	\$ 19,685.71	\$ 19,685.71
Distribution Assets											
Meter	552	2	8	Monitor Closely	\$ 388.60	\$ 214,507.20	1.20%	1.02	\$ 219,700.00	\$ 109,850.00	\$ 109,850.00
Meter	1	2	8	Monitor Closely	\$ 591.25	\$ 591.25	1.20%	1.02	\$ 700.00	\$ 350.00	\$ 350.00
Meter	1	2	8	Monitor Closely	\$ 1,230.50	\$ 1,230.50	1.20%	1.02	\$ 1,300.00	\$ 650.00	\$ 650.00
Meter	859	3	6	Routine Maintenance	\$ 388.60	\$ 333,807.40	1.20%	1.04	\$ 346,000.00	\$ 115,333.33	\$ 115,333.33
Meter	1	3	6	Routine Maintenance	\$ 591.25	\$ 591.25	1.20%	1.04	\$ 700.00	\$ 233.33	\$ 233.33
Meter	1	3	6	Routine Maintenance	\$ 910.88	\$ 910.88	1.20%	1.04	\$ 1,000.00	\$ 333.33	\$ 333.33
Meter	100	4	6	Routine Maintenance	\$ 388.60	\$ 38,860.00	1.25%	1.05	\$ 40,900.00	\$ 10,225.00	\$ 10,225.00
Meter	130	5	6	Routine Maintenance	\$ 388.60	\$ 50,518.00	1.30%	1.07	\$ 53,900.00	\$ 10,780.00	\$ 10,780.00
Meter	18	7	4	Routine Maintenance	\$ 388.60	\$ 6,994.80	1.40%	1.10	\$ 7,800.00	\$ 1,114.29	\$ 1,114.29
Meter	12	9	4	Routine Maintenance	\$ 388.60	\$ 4,663.20	1.47%	1.14	\$ 5,400.00	\$ 600.00	\$ 600.00
Meter	60	10	4	Routine Maintenance	\$ 388.60	\$ 23,316.00	1.50%	1.16	\$ 27,100.00	\$ 2,710.00	\$ 2,710.00
Meter	18	11	4	Routine Maintenance	\$ 388.60	\$ 6,994.80	1.55%	1.18	\$ 8,300.00	\$ 754.55	\$ 754.55
Meter	36	12	4	Routine Maintenance	\$ 388.60	\$ 13,989.60	1.60%	1.21	\$ 17,000.00	\$ 1,416.67	\$ 1,416.67
Meter	96	13	2	Routine Maintenance	\$ 388.60	\$ 37,305.60	1.65%	1.24	\$ 46,200.00	\$ 3,553.85	\$ 3,553.85
Meter	50	14	2	Routine Maintenance	\$ 388.60	\$ 19,430.00	1.70%	1.27	\$ 24,700.00	\$ 1,764.29	\$ 1,764.29
Meter	12	2	10	Monitor Closely	\$ 388.60	\$ 4,663.20	1.20%	1.02	\$ 4,800.00	\$ 2,400.00	\$ 2,400.00
Meter	143	2	10	Monitor Closely	\$ 388.60	\$ 55,569.80	1.20%	1.02	\$ 57,000.00	\$ 28,500.00	\$ 28,500.00

Replacement and/or Rehabilitation Expenses APPENDIX A

	Real Discount Rate	https://www.whitehouse.gov/wp-content/uploads/2023/02/M-23-12-Appendix				*typical PWA
Year (YR)	3	5	7	10	20	30
Percentage (%)	1.20%	1.30%	1.40%	1.50%	2.00%	2.00%
Planning Period (YR)	20.00					

Assets	Quantity/ Length	Remaining Useful Life in Years	Criticality Score (CS)	Recommendation	Replacement Cost (Current Day Dollars, Unit Price)	Replacement Cost (2023 Dollars)	Inflation Rate Based on Remaining Useful Life	Multiplication Factor for Future Worth	Estimated Future Funds Required for Replacement*	Annual Reserve Funds Required for Replacement (Year 1)	Annual Reserve Funds Required for Replacement (Subsequent Years)
Brookridge Circle Drive					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	1860	5	8	Monitor Closely	\$ 80.00	\$ 148,800.00	1.30%	1.07	\$ 158,800.00	\$ 31,760.00	\$ 31,760.00
Water Main	1010	5	8	Monitor Closely	\$ 100.00	\$ 101,000.00	1.30%	1.07	\$ 107,800.00	\$ 21,560.00	\$ 21,560.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00	0.00%	1.00	\$ 2,000.00	\$ 2,000.00	\$ -
Greenlawn Way					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	1537	5	8	Monitor Closely	\$ 80.00	\$ 122,960.00	1.30%	1.07	\$ 131,200.00	\$ 26,240.00	\$ 26,240.00
Isolation Valve	2	0	15	Monitor Closely	\$ 2,000.00	\$ 4,000.00	0.00%	1.00	\$ 4,000.00	\$ 4,000.00	\$ -
Fieldcrest Dr	0				\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	2567	15	8	Monitor Closely	\$ 100.00	\$ 256,700.00	1.75%	1.30	\$ 333,000.00	\$ 22,200.00	\$ 22,200.00
Isolation Valve	1	0	15	Monitor Closely	\$ 5,500.00	\$ 5,500.00	0.00%	1.00	\$ 5,500.00	\$ 5,500.00	\$ -
Hydrant	1	10	8	Monitor Closely	\$ 9,000.00	\$ 9,000.00	1.50%	1.16	\$ 10,500.00	\$ 1,050.00	\$ 1,050.00
Greenhill Court					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	362	5	8	Monitor Closely	\$ 80.00	\$ 28,960.00	1.30%	1.07	\$ 30,900.00	\$ 6,180.00	\$ 6,180.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00	0.00%	1.00	\$ 2,000.00	\$ 2,000.00	\$ -
Foxridge Drive					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	526	5	8	Monitor Closely	\$ 80.00	\$ 42,080.00	1.30%	1.07	\$ 44,900.00	\$ 8,980.00	\$ 8,980.00
Water Main	189	15	8	Monitor Closely	\$ 110.00	\$ 20,790.00	1.75%	1.30	\$ 27,000.00	\$ 1,800.00	\$ 1,800.00
Isolation Valve	1	0	15	Monitor Closely	\$ 6,500.00	\$ 6,500.00	0.00%	1.00	\$ 6,500.00	\$ 6,500.00	\$ -
Bellemeade Drive					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	4104	15	8	Monitor Closely	\$ 110.00	\$ 451,440.00	1.75%	1.30	\$ 585,700.00	\$ 39,046.67	\$ 39,046.67
Isolation Valve	4	0	15	Monitor Closely	\$ 6,500.00	\$ 26,000.00	0.00%	1.00	\$ 26,000.00	\$ 26,000.00	\$ -
Hydrant	1	10	8	Monitor Closely	\$ 9,000.00	\$ 9,000.00	1.50%	1.16	\$ 10,500.00	\$ 1,050.00	\$ 1,050.00
Bellemeade Court					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	132	5	8	Monitor Closely	\$ 80.00	\$ 10,560.00	1.30%	1.07	\$ 11,300.00	\$ 2,260.00	\$ 2,260.00
Sunnyridge Drive	0				\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	1078	5	8	Monitor Closely	\$ 80.00	\$ 86,240.00	1.30%	1.07	\$ 92,000.00	\$ 18,400.00	\$ 18,400.00
Isolation Valve	2	0	15	Monitor Closely	\$ 2,000.00	\$ 4,000.00	0.00%	1.00	\$ 4,000.00	\$ 4,000.00	\$ -
Clearview Court					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	196	5	8	Monitor Closely	\$ 80.00	\$ 15,680.00	1.30%	1.07	\$ 16,800.00	\$ 3,360.00	\$ 3,360.00
Ridgewood Circle					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	1225	5	8	Monitor Closely	\$ 80.00	\$ 98,000.00	1.30%	1.07	\$ 104,600.00	\$ 20,920.00	\$ 20,920.00
Water Main	1291	5	8	Monitor Closely	\$ 100.00	\$ 129,100.00	1.30%	1.07	\$ 137,800.00	\$ 27,560.00	\$ 27,560.00
Isolation Valve	2	0	15	Monitor Closely	\$ 5,500.00	\$ 11,000.00	0.00%	1.00	\$ 11,000.00	\$ 11,000.00	\$ -
Hydrant	1	10	8	Monitor Closely	\$ 9,000.00	\$ 9,000.00	1.50%	1.16	\$ 10,500.00	\$ 1,050.00	\$ 1,050.00
Ridgecliff Court					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	437	5	8	Monitor Closely	\$ 80.00	\$ 34,960.00	1.30%	1.07	\$ 37,300.00	\$ 7,460.00	\$ 7,460.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00	0.00%	1.00	\$ 2,000.00	\$ 2,000.00	\$ -
Brabamhurst Drive					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	2027	3	8	Monitor Closely	\$ 80.00	\$ 162,160.00	1.20%	1.04	\$ 168,100.00	\$ 56,033.33	\$ 56,033.33
Isolation Valve	2	0	15	Monitor Closely	\$ 2,000.00	\$ 4,000.00	0.00%	1.00	\$ 4,000.00	\$ 4,000.00	\$ -
Raba Court					\$ -		2.00%	0.00	\$ -	\$ -	\$ -

Replacement and/or Rehabilitation Expenses APPENDIX A

	Real Discount Rate	https://www.whitehouse.gov/wp-content/uploads/2023/02/M-23-12-Appendix				*typical PWA
Year (YR)	3	5	7	10	20	30
Percentage (%)	1.20%	1.30%	1.40%	1.50%	2.00%	2.00%
Planning Period (YR)	20.00					

Assets	Quantity/ Length	Remaining Useful Life in Years	Criticality Score (CS)	Recommendation	Replacement Cost (Current Day Dollars, Unit Price)	Replacement Cost (2023 Dollars)	Inflation Rate Based on Remaining Useful Life	Multiplication Factor for Future Worth	Estimated Future Funds Required for Replacement*	Annual Reserve Funds Required for Replacement (Year 1)	Annual Reserve Funds Required for Replacement (Subsequent Years)
Water Main	195	3	8	Monitor Closely	\$ 80.00	\$ 15,600.00	1.20%	1.04	\$ 16,200.00	\$ 5,400.00	\$ 5,400.00
Sandamont Drive					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	3128	3	8	Monitor Closely	\$ 80.00	\$ 250,240.00	1.20%	1.04	\$ 259,400.00	\$ 86,466.67	\$ 86,466.67
Water Main	1004	3	8	Monitor Closely	\$ 100.00	\$ 100,400.00	1.20%	1.04	\$ 104,100.00	\$ 34,700.00	\$ 34,700.00
Isolation Valve	3	0	15	Monitor Closely	\$ 5,500.00	\$ 16,500.00	0.00%	1.00	\$ 16,500.00	\$ 16,500.00	\$ -
Tyrolean Way					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	1473	3	8	Monitor Closely	\$ 80.00	\$ 117,840.00	1.20%	1.04	\$ 122,200.00	\$ 40,733.33	\$ 40,733.33
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00	0.00%	1.00	\$ 2,000.00	\$ 2,000.00	\$ -
Kym Court	0				\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	121	3	8	Monitor Closely	\$ 80.00	\$ 9,680.00	1.20%	1.04	\$ 10,100.00	\$ 3,366.67	\$ 3,366.67
Highridge Court					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	729	2	8	Monitor Closely	\$ 80.00	\$ 58,320.00	1.20%	1.02	\$ 59,800.00	\$ 29,900.00	\$ 29,900.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00	0.00%	1.00	\$ 2,000.00	\$ 2,000.00	\$ -
Crestview Court					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	769	2	8	Monitor Closely	\$ 80.00	\$ 61,520.00	1.20%	1.02	\$ 63,100.00	\$ 31,550.00	\$ 31,550.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00	0.00%	1.00	\$ 2,000.00	\$ 2,000.00	\$ -
Zurich Trail					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	1092	2	8	Monitor Closely	\$ 80.00	\$ 87,360.00	1.20%	1.02	\$ 89,500.00	\$ 44,750.00	\$ 44,750.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00	0.00%	1.00	\$ 2,000.00	\$ 2,000.00	\$ -
Moritz Court					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	617	2	8	Monitor Closely	\$ 80.00	\$ 49,360.00	1.20%	1.02	\$ 50,600.00	\$ 25,300.00	\$ 25,300.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00	0.00%	1.00	\$ 2,000.00	\$ 2,000.00	\$ -
Lucerne Lane					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	835	2	8	Monitor Closely	\$ 80.00	\$ 66,800.00	1.20%	1.02	\$ 68,500.00	\$ 34,250.00	\$ 34,250.00
Water Main	491	2	8	Monitor Closely	\$ 100.00	\$ 49,100.00	1.20%	1.02	\$ 50,300.00	\$ 25,150.00	\$ 25,150.00
Isolation Valve	1	0	15	Monitor Closely	\$ 5,500.00	\$ 5,500.00	0.00%	1.00	\$ 5,500.00	\$ 5,500.00	\$ -
Berne Court					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	356	2	8	Monitor Closely	\$ 80.00	\$ 28,480.00	1.20%	1.02	\$ 29,200.00	\$ 14,600.00	\$ 14,600.00
Interlochen Lane					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	501	2	8	Monitor Closely	\$ 80.00	\$ 40,080.00	1.20%	1.02	\$ 41,100.00	\$ 20,550.00	\$ 20,550.00
Isolation Valve	1	2	12	Monitor Closely	\$ 2,000.00	\$ 2,000.00	1.20%	1.02	\$ 2,100.00	\$ 1,050.00	\$ 1,050.00
Road to Upper Water Tank					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	215	12	8	Monitor Closely	\$ 120.00	\$ 25,800.00	1.60%	1.21	\$ 31,300.00	\$ 2,608.33	\$ 2,608.33
Isolation Valve	2	0	15	Monitor Closely	\$ 8,000.00	\$ 16,000.00	0.00%	1.00	\$ 16,000.00	\$ 16,000.00	\$ -
Hydrant	1	7	8	Monitor Closely	\$ 9,000.00	\$ 9,000.00	1.40%	1.10	\$ 10,000.00	\$ 1,428.57	\$ 1,428.57
Walnut Ridge Trail					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	965	2	8	Monitor Closely	\$ 80.00	\$ 77,200.00	1.20%	1.02	\$ 79,100.00	\$ 39,550.00	\$ 39,550.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00	0.00%	1.00	\$ 2,000.00	\$ 2,000.00	\$ -
Ferngrove Court	0				\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	633	2	8	Monitor Closely	\$ 80.00	\$ 50,640.00	1.20%	1.02	\$ 51,900.00	\$ 25,950.00	\$ 25,950.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00	0.00%	1.00	\$ 2,000.00	\$ 2,000.00	\$ -

Replacement and/or Rehabilitation Expenses APPENDIX A

	Real Discount Rate	https://www.whitehouse.gov/wp-content/uploads/2023/02/M-23-12-Appendix				*typical PWA
Year (YR)	3	5	7	10	20	30
Percentage (%)	1.20%	1.30%	1.40%	1.50%	2.00%	2.00%
Planning Period (YR)	20.00					

Assets	Quantity/ Length	Remaining Useful Life in Years	Criticality Score (CS)	Recommendation	Replacement Cost (Current Day Dollars, Unit Price)	Replacement Cost (2023 Dollars)	Inflation Rate Based on Remaining Useful Life	Multiplication Factor for Future Worth	Estimated Future Funds Required for Replacement*	Annual Reserve Funds Required for Replacement (Year 1)	Annual Reserve Funds Required for Replacement (Subsequent Years)
Geneva Court					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	616	2	8	Monitor Closely	\$ 80.00	\$ 49,280.00	1.20%	1.02	\$ 50,500.00	\$ 25,250.00	\$ 25,250.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00	0.00%	1.00	\$ 2,000.00	\$ 2,000.00	\$ -
Thornhill Lane					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	570	2	8	Monitor Closely	\$ 80.00	\$ 45,600.00	1.20%	1.02	\$ 46,800.00	\$ 23,400.00	\$ 23,400.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00	0.00%	1.00	\$ 2,000.00	\$ 2,000.00	\$ -
Chalet Court					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	1050	2	8	Monitor Closely	\$ 80.00	\$ 84,000.00	1.20%	1.02	\$ 86,100.00	\$ 43,050.00	\$ 43,050.00
Hollyhedge Lane					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	1044	2	8	Monitor Closely	\$ 80.00	\$ 83,520.00	1.20%	1.02	\$ 85,600.00	\$ 42,800.00	\$ 42,800.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00	0.00%	1.00	\$ 2,000.00	\$ 2,000.00	\$ -
Sports Complex					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	198	2	8	Monitor Closely	\$ 80.00	\$ 15,840.00	1.20%	1.02	\$ 16,300.00	\$ 8,150.00	\$ 8,150.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00	0.00%	1.00	\$ 2,000.00	\$ 2,000.00	\$ -
Sunset Drive					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	34	2	8	Monitor Closely	\$ 80.00	\$ 2,720.00	1.20%	1.02	\$ 2,800.00	\$ 1,400.00	\$ 1,400.00
Water Main	3741	12	8	Monitor Closely	\$ 110.00	\$ 411,510.00	1.60%	1.21	\$ 497,900.00	\$ 41,491.67	\$ 41,491.67
Isolation Valve	2	0	15	Monitor Closely	\$ 6,500.00	\$ 13,000.00	0.00%	1.00	\$ 13,000.00	\$ 13,000.00	\$ -
Hydrant	1	7	8	Monitor Closely	\$ 9,000.00	\$ 9,000.00	1.40%	1.10	\$ 10,000.00	\$ 1,428.57	\$ 1,428.57
Edelweiss Lane					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	1011	2	8	Monitor Closely	\$ 80.00	\$ 80,880.00	1.20%	1.02	\$ 82,900.00	\$ 41,450.00	\$ 41,450.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00	0.00%	1.00	\$ 2,000.00	\$ 2,000.00	\$ -
Echo Trace					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	207	2	8	Monitor Closely	\$ 80.00	\$ 16,560.00	1.20%	1.02	\$ 17,000.00	\$ 8,500.00	\$ 8,500.00
Skyview Circle					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	363	2	8	Monitor Closely	\$ 80.00	\$ 29,040.00	1.20%	1.02	\$ 29,800.00	\$ 14,900.00	\$ 14,900.00
Water Main	1844	12	8	Monitor Closely	\$ 110.00	\$ 202,840.00	1.60%	1.21	\$ 245,500.00	\$ 20,458.33	\$ 20,458.33
Isolation Valve	1	0	15	Monitor Closely	\$ 6,500.00	\$ 6,500.00	0.00%	1.00	\$ 6,500.00	\$ 6,500.00	\$ -
Maple Knoll Court					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	734	2	8	Monitor Closely	\$ 80.00	\$ 58,720.00	1.20%	1.02	\$ 60,200.00	\$ 30,100.00	\$ 30,100.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00	0.00%	1.00	\$ 2,000.00	\$ 2,000.00	\$ -
Oak Court					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	379	2	8	Monitor Closely	\$ 80.00	\$ 30,320.00	1.20%	1.02	\$ 31,100.00	\$ 15,550.00	\$ 15,550.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00	0.00%	1.00	\$ 2,000.00	\$ 2,000.00	\$ -
Springdale Court					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	644	2	8	Monitor Closely	\$ 80.00	\$ 51,520.00	1.20%	1.02	\$ 52,800.00	\$ 26,400.00	\$ 26,400.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00	0.00%	1.00	\$ 2,000.00	\$ 2,000.00	\$ -
Ashwood Court					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	322	2	8	Monitor Closely	\$ 80.00	\$ 25,760.00	1.20%	1.02	\$ 26,400.00	\$ 13,200.00	\$ 13,200.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00	0.00%	1.00	\$ 2,000.00	\$ 2,000.00	\$ -
Hawthorne Heights					\$ -		2.00%	0.00	\$ -	\$ -	\$ -

Replacement and/or Rehabilitation Expenses APPENDIX A

	Real Discount Rate	https://www.whitehouse.gov/wp-content/uploads/2023/02/M-23-12-Appendix				*typical PWA
Year (YR)	3	5	7	10	20	30
Percentage (%)	1.20%	1.30%	1.40%	1.50%	2.00%	2.00%
Planning Period (YR)	20.00					

Assets	Quantity/ Length	Remaining Useful Life in Years	Criticality Score (CS)	Recommendation	Replacement Cost (Current Day Dollars, Unit Price)	Replacement Cost (2023 Dollars)	Inflation Rate Based on Remaining Useful Life	Multiplication Factor for Future Worth	Estimated Future Funds Required for Replacement*	Annual Reserve Funds Required for Replacement (Year 1)	Annual Reserve Funds Required for Replacement (Subsequent Years)
Water Main	1240	2	8	Monitor Closely	\$ 80.00	\$ 99,200.00	1.20%	1.02	\$ 101,600.00	\$ 50,800.00	\$ 50,800.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00	0.00%	1.00	\$ 2,000.00	\$ 2,000.00	\$ -
Aspen Hill Court					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	321	2	8	Monitor Closely	\$ 80.00	\$ 25,680.00	1.20%	1.02	\$ 26,400.00	\$ 13,200.00	\$ 13,200.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00	0.00%	1.00	\$ 2,000.00	\$ 2,000.00	\$ -
Beau Vista Drive					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	622	2	8	Monitor Closely	\$ 80.00	\$ 49,760.00	1.20%	1.02	\$ 51,000.00	\$ 25,500.00	\$ 25,500.00
Water Main	354	2	8	Monitor Closely	\$ 100.00	\$ 35,400.00	1.20%	1.02	\$ 36,300.00	\$ 18,150.00	\$ 18,150.00
Isolation Valve	1	0	15	Monitor Closely	\$ 5,500.00	\$ 5,500.00	0.00%	1.00	\$ 5,500.00	\$ 5,500.00	\$ -
Windemere Hill					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	1092	2	8	Monitor Closely	\$ 80.00	\$ 87,360.00	1.20%	1.02	\$ 89,500.00	\$ 44,750.00	\$ 44,750.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00	0.00%	1.00	\$ 2,000.00	\$ 2,000.00	\$ -
Cedarview Court					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	589	2	8	Monitor Closely	\$ 80.00	\$ 47,120.00	1.20%	1.02	\$ 48,300.00	\$ 24,150.00	\$ 24,150.00
Woodland Circle					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	468	2	8	Monitor Closely	\$ 80.00	\$ 37,440.00	1.20%	1.02	\$ 38,400.00	\$ 19,200.00	\$ 19,200.00
Water Main	350	2	8	Monitor Closely	\$ 100.00	\$ 35,000.00	1.20%	1.02	\$ 35,900.00	\$ 17,950.00	\$ 17,950.00
Isolation Valve	1	0	15	Monitor Closely	\$ 5,500.00	\$ 5,500.00	0.00%	1.00	\$ 5,500.00	\$ 5,500.00	\$ -
Rustic Court					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	822	2	8	Monitor Closely	\$ 80.00	\$ 65,760.00	1.20%	1.02	\$ 67,400.00	\$ 33,700.00	\$ 33,700.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00	0.00%	1.00	\$ 2,000.00	\$ 2,000.00	\$ -
Beechwood Circle					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	678	2	8	Monitor Closely	\$ 80.00	\$ 54,240.00	1.20%	1.02	\$ 55,600.00	\$ 27,800.00	\$ 27,800.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00	0.00%	1.00	\$ 2,000.00	\$ 2,000.00	\$ -
Elm Drive					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	599	2	8	Monitor Closely	\$ 80.00	\$ 47,920.00	1.20%	1.02	\$ 49,100.00	\$ 24,550.00	\$ 24,550.00
Water Main	1014	2	8	Monitor Closely	\$ 100.00	\$ 101,400.00	1.20%	1.02	\$ 103,900.00	\$ 51,950.00	\$ 51,950.00
Hydrant	1	7	8	Monitor Closely	\$ 9,000.00	\$ 9,000.00	1.40%	1.10	\$ 10,000.00	\$ 1,428.57	\$ 1,428.57
Eagleview Drive					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	1075	2	8	Monitor Closely	\$ 80.00	\$ 86,000.00	1.20%	1.02	\$ 88,100.00	\$ 44,050.00	\$ 44,050.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00	0.00%	1.00	\$ 2,000.00	\$ 2,000.00	\$ -
Water Main	557	2	8	Monitor Closely	\$ 100.00	\$ 55,700.00	1.20%	1.02	\$ 57,100.00	\$ 28,550.00	\$ 28,550.00
Isolation Valve	2	0	15	Monitor Closely	\$ 5,500.00	\$ 11,000.00	0.00%	1.00	\$ 11,000.00	\$ 11,000.00	\$ -
Hydrant	1	7	8	Monitor Closely	\$ 9,000.00	\$ 9,000.00	1.40%	1.10	\$ 10,000.00	\$ 1,428.57	\$ 1,428.57
Crest Haven Drive					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	1178	2	8	Monitor Closely	\$ 80.00	\$ 94,240.00	1.20%	1.02	\$ 96,600.00	\$ 48,300.00	\$ 48,300.00
PRV	1	0	15	Monitor Closely	\$ 3,000.00	\$ 3,000.00	0.00%	1.00	\$ 3,000.00	\$ 3,000.00	\$ -
Water Main	1526	2	8	Monitor Closely	\$ 100.00	\$ 152,600.00	1.20%	1.02	\$ 156,300.00	\$ 78,150.00	\$ 78,150.00
Isolation Valve	3	0	15	Monitor Closely	\$ 5,500.00	\$ 16,500.00	0.00%	1.00	\$ 16,500.00	\$ 16,500.00	\$ -
Ivy Hill Drive					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	1008	2	8	Monitor Closely	\$ 80.00	\$ 80,640.00	1.20%	1.02	\$ 82,600.00	\$ 41,300.00	\$ 41,300.00

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	Real Discount Rate	https://www.whitehouse.gov/wp-content/uploads/2023/02/M-23-12-Appendix				*typical PWA
Year (YR)	3	5	7	10	20	30
Percentage (%)	1.20%	1.30%	1.40%	1.50%	2.00%	2.00%
Planning Period (YR)	20.00					

Assets	Quantity/ Length	Remaining Useful Life in Years	Criticality Score (CS)	Recommendation	Replacement Cost (Current Day Dollars, Unit Price)	Replacement Cost (2023 Dollars)	Inflation Rate Based on Remaining Useful Life	Multiplication Factor for Future Worth	Estimated Future Funds Required for Replacement*	Annual Reserve Funds Required for Replacement (Year 1)	Annual Reserve Funds Required for Replacement (Subsequent Years)
PRV	1	0	15	Monitor Closely	\$ 3,000.00	\$ 3,000.00	0.00%	1.00	\$ 3,000.00	\$ 3,000.00	\$ -
Water Main	836	2	8	Monitor Closely	\$ 100.00	\$ 83,600.00	1.20%	1.02	\$ 85,700.00	\$ 42,850.00	\$ 42,850.00
Isolation Valve	2	0	15	Monitor Closely	\$ 5,500.00	\$ 11,000.00	0.00%	1.00	\$ 11,000.00	\$ 11,000.00	\$ -
Hydrant	1	7	8	Monitor Closely	\$ 9,000.00	\$ 9,000.00	1.40%	1.10	\$ 10,000.00	\$ 1,428.57	\$ 1,428.57
Overlook Circle	0				\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	946	2	8	Monitor Closely	\$ 80.00	\$ 75,680.00	1.20%	1.02	\$ 77,600.00	\$ 38,800.00	\$ 38,800.00
Water Main	651	2	8	Monitor Closely	\$ 100.00	\$ 65,100.00	1.20%	1.02	\$ 66,700.00	\$ 33,350.00	\$ 33,350.00
Isolation Valve	1	0	15	Monitor Closely	\$ 5,500.00	\$ 5,500.00	0.00%	1.00	\$ 5,500.00	\$ 5,500.00	\$ -
Hickory Road					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	4599	12	8	Monitor Closely	\$ 110.00	\$ 505,890.00	1.60%	1.21	\$ 612,100.00	\$ 51,008.33	\$ 51,008.33
Isolation Valve	6	0	15	Monitor Closely	\$ 6,500.00	\$ 39,000.00	0.00%	1.00	\$ 39,000.00	\$ 39,000.00	\$ -
Hydrant	1	7	8	Monitor Closely	\$ 9,000.00	\$ 9,000.00	1.40%	1.10	\$ 10,000.00	\$ 1,428.57	\$ 1,428.57
Hydrant	1	38	4	Routine Maintenance	\$ 9,000.00	\$ 9,000.00	2.00%	0.00	\$ -	\$ -	\$ -
Longview Drive					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	879	2	8	Monitor Closely	\$ 80.00	\$ 70,320.00	1.20%	1.02	\$ 72,100.00	\$ 36,050.00	\$ 36,050.00
Water Main	459	2	8	Monitor Closely	\$ 80.00	\$ 36,720.00	1.20%	1.02	\$ 37,700.00	\$ 18,850.00	\$ 18,850.00
Isolation Valve	1	0	15	Monitor Closely	\$ 5,500.00	\$ 5,500.00	0.00%	1.00	\$ 5,500.00	\$ 5,500.00	\$ -
Water Main	8175	12	8	Monitor Closely	\$ 110.00	\$ 899,250.00	1.60%	1.21	\$ 1,088,000.00	\$ 90,666.67	\$ 90,666.67
Isolation Valve	5	0	15	Monitor Closely	\$ 6,500.00	\$ 32,500.00	0.00%	1.00	\$ 32,500.00	\$ 32,500.00	\$ -
PRV	1	0	10	Monitor Closely	\$ 6,000.00	\$ 6,000.00	0.00%	1.00	\$ 6,000.00	\$ 6,000.00	\$ -
Hydrant	2	7	8	Monitor Closely	\$ 9,000.00	\$ 18,000.00	1.40%	1.10	\$ 19,900.00	\$ 2,842.86	\$ 2,842.86
Buckeye Court					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	669	12	8	Monitor Closely	\$ 110.00	\$ 73,590.00	1.60%	1.21	\$ 89,100.00	\$ 7,425.00	\$ 7,425.00
Isolation Valve	1	0	15	Monitor Closely	\$ 6,500.00	\$ 6,500.00	0.00%	1.00	\$ 6,500.00	\$ 6,500.00	\$ -
Greentree Road					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	2531	2	8	Monitor Closely	\$ 100.00	\$ 253,100.00	1.20%	1.02	\$ 259,300.00	\$ 129,650.00	\$ 129,650.00
Isolation Valve	2	0	15	Monitor Closely	\$ 5,500.00	\$ 11,000.00	0.00%	1.00	\$ 11,000.00	\$ 11,000.00	\$ -
Water Main	38	12	8	Monitor Closely	\$ 110.00	\$ 4,180.00	1.60%	1.21	\$ 5,100.00	\$ 425.00	\$ 425.00
Ryan Court					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	311	2	8	Monitor Closely	\$ 80.00	\$ 24,880.00	1.20%	1.02	\$ 25,500.00	\$ 12,750.00	\$ 12,750.00
Marina					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	822	2	8	Monitor Closely	\$ 50.00	\$ 41,100.00	1.20%	1.02	\$ 42,100.00	\$ 21,050.00	\$ 21,050.00
Hidden Valley Drive					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	413	2	8	Monitor Closely	\$ 80.00	\$ 33,040.00	1.20%	1.02	\$ 33,900.00	\$ 16,950.00	\$ 16,950.00
Water Main	447	2	8	Monitor Closely	\$ 100.00	\$ 44,700.00	1.20%	1.02	\$ 45,800.00	\$ 22,900.00	\$ 22,900.00
Newcom Knoll					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	802	3	8	Monitor Closely	\$ 80.00	\$ 64,160.00	1.20%	1.04	\$ 66,500.00	\$ 22,166.67	\$ 22,166.67
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00	0.00%	1.00	\$ 2,000.00	\$ 2,000.00	\$ -
Between Montera Circle and Hampton Drive					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	939	10	8	Monitor Closely	\$ 100.00	\$ 93,900.00	1.50%	1.16	\$ 109,000.00	\$ 10,900.00	\$ 10,900.00
Monteray Circle	0				\$ -		2.00%	0.00	\$ -	\$ -	\$ -

Replacement and/or Rehabilitation Expenses APPENDIX A

	Real Discount Rate	https://www.whitehouse.gov/wp-content/uploads/2023/02/M-23-12-Appendix				*typical PWA
Year (YR)	3	5	7	10	20	30
Percentage (%)	1.20%	1.30%	1.40%	1.50%	2.00%	2.00%
Planning Period (YR)	20.00					

Assets	Quantity/ Length	Remaining Useful Life in Years	Criticality Score (CS)	Recommendation	Replacement Cost (Current Day Dollars, Unit Price)	Replacement Cost (2023 Dollars)	Inflation Rate Based on Remaining Useful Life	Multiplication Factor for Future Worth	Estimated Future Funds Required for Replacement*	Annual Reserve Funds Required for Replacement (Year 1)	Annual Reserve Funds Required for Replacement (Subsequent Years)
Water Main	1442	4	8	Monitor Closely	\$ 80.00	\$ 115,360.00	1.25%	1.05	\$ 121,300.00	\$ 30,325.00	\$ 30,325.00
Isolation Valve	2	0	15	Monitor Closely	\$ 2,000.00	\$ 4,000.00	0.00%	1.00	\$ 4,000.00	\$ 4,000.00	\$ -
Hydrant	1	9	8	Monitor Closely	\$ 9,000.00	\$ 9,000.00	1.47%	1.14	\$ 10,300.00	\$ 1,144.44	\$ 1,144.44
Knollwood Drive					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	2177	4	8	Monitor Closely	\$ 80.00	\$ 174,160.00	1.25%	1.05	\$ 183,100.00	\$ 45,775.00	\$ 45,775.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00	0.00%	1.00	\$ 2,000.00	\$ 2,000.00	\$ -
Montclair Court					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	738	4	8	Monitor Closely	\$ 80.00	\$ 59,040.00	1.25%	1.05	\$ 62,100.00	\$ 15,525.00	\$ 15,525.00
Water Main	334	4	8	Monitor Closely	\$ 100.00	\$ 33,400.00	1.25%	1.05	\$ 35,200.00	\$ 8,800.00	\$ 8,800.00
Isolation Valve	1	0	15	Monitor Closely	\$ 5,500.00	\$ 5,500.00	0.00%	1.00	\$ 5,500.00	\$ 5,500.00	\$ -
Cliftmont Circle					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	1505	4	8	Monitor Closely	\$ 80.00	\$ 120,400.00	1.25%	1.05	\$ 126,600.00	\$ 31,650.00	\$ 31,650.00
Water Main	666	4	8	Monitor Closely	\$ 100.00	\$ 66,600.00	1.25%	1.05	\$ 70,000.00	\$ 17,500.00	\$ 17,500.00
Isolation Valve	1	0	15	Monitor Closely	\$ 5,500.00	\$ 5,500.00	0.00%	1.00	\$ 5,500.00	\$ 5,500.00	\$ -
Brindlestone Drive					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	581	4	8	Monitor Closely	\$ 80.00	\$ 46,480.00	1.25%	1.05	\$ 48,900.00	\$ 12,225.00	\$ 12,225.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00	0.00%	1.00	\$ 2,000.00	\$ 2,000.00	\$ -
Ventura Drive					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	1749	4	8	Monitor Closely	\$ 80.00	\$ 139,920.00	1.25%	1.05	\$ 147,100.00	\$ 36,775.00	\$ 36,775.00
Isolation Valve	2	0	15	Monitor Closely	\$ 2,000.00	\$ 4,000.00	0.00%	1.00	\$ 4,000.00	\$ 4,000.00	\$ -
Heidi Haven Drive					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	957	4	8	Monitor Closely	\$ 80.00	\$ 76,560.00	1.25%	1.05	\$ 80,500.00	\$ 20,125.00	\$ 20,125.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00	0.00%	1.00	\$ 2,000.00	\$ 2,000.00	\$ -
Water Main	587	4	8	Monitor Closely	\$ 100.00	\$ 58,700.00	1.25%	1.05	\$ 61,700.00	\$ 15,425.00	\$ 15,425.00
Water Main	451	14	8	Monitor Closely	\$ 110.00	\$ 49,610.00	1.70%	1.27	\$ 62,900.00	\$ 4,492.86	\$ 4,492.86
Isolation Valve	1	0	15	Monitor Closely	\$ 6,500.00	\$ 6,500.00	0.00%	1.00	\$ 6,500.00	\$ 6,500.00	\$ -
Ray Lynn Drive					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	601	4	8	Monitor Closely	\$ 80.00	\$ 48,080.00	1.25%	1.05	\$ 50,600.00	\$ 12,650.00	\$ 12,650.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00	0.00%	1.00	\$ 2,000.00	\$ 2,000.00	\$ -
Water Main	437	14	8	Monitor Closely	\$ 110.00	\$ 48,070.00	1.70%	1.27	\$ 60,900.00	\$ 4,350.00	\$ 4,350.00
Isolation Valve	1	0	15	Monitor Closely	\$ 6,500.00	\$ 6,500.00	0.00%	1.00	\$ 6,500.00	\$ 6,500.00	\$ -
Hydrant	1	9	8	Monitor Closely	\$ 9,000.00	\$ 9,000.00	1.47%	1.14	\$ 10,300.00	\$ 1,144.44	\$ 1,144.44
Ravenda Drive					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	1772	4	8	Monitor Closely	\$ 80.00	\$ 141,760.00	1.25%	1.05	\$ 149,000.00	\$ 37,250.00	\$ 37,250.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00	0.00%	1.00	\$ 2,000.00	\$ 2,000.00	\$ -
Aqua Vista Drive					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	1890	4	8	Monitor Closely	\$ 80.00	\$ 151,200.00	1.25%	1.05	\$ 159,000.00	\$ 39,750.00	\$ 39,750.00
Byrd Court	0				\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	321	4	8	Monitor Closely	\$ 80.00	\$ 25,680.00	1.25%	1.05	\$ 27,000.00	\$ 6,750.00	\$ 6,750.00
Cravenhurst Drive					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	1614	4	8	Monitor Closely	\$ 80.00	\$ 129,120.00	1.25%	1.05	\$ 135,700.00	\$ 33,925.00	\$ 33,925.00

Replacement and/or Rehabilitation Expenses APPENDIX A

	Real Discount Rate	https://www.whitehouse.gov/wp-content/uploads/2023/02/M-23-12-Appendix				*typical PWA
Year (YR)	3	5	7	10	20	30
Percentage (%)	1.20%	1.30%	1.40%	1.50%	2.00%	2.00%
Planning Period (YR)	20.00					

Assets	Quantity/Length	Remaining Useful Life in Years	Criticality Score (CS)	Recommendation	Replacement Cost (Current Day Dollars, Unit Price)	Replacement Cost (2023 Dollars)	Inflation Rate Based on Remaining Useful Life	Multiplication Factor for Future Worth	Estimated Future Funds Required for Replacement*	Annual Reserve Funds Required for Replacement (Year 1)	Annual Reserve Funds Required for Replacement (Subsequent Years)
Isolation Valve	2	0	15	Monitor Closely	\$ 2,000.00	\$ 4,000.00	0.00%	1.00	\$ 4,000.00	\$ 4,000.00	\$ -
Water Main	426	14	8	Monitor Closely	\$ 110.00	\$ 46,860.00	1.70%	1.27	\$ 59,400.00	\$ 4,242.86	\$ 4,242.86
Redwood Way					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	668	5	8	Monitor Closely	\$ 80.00	\$ 53,440.00	1.30%	1.07	\$ 57,100.00	\$ 11,420.00	\$ 11,420.00
Water Main	446	5	8	Monitor Closely	\$ 100.00	\$ 44,600.00	1.30%	1.07	\$ 47,600.00	\$ 9,520.00	\$ 9,520.00
Isolation Valve	1	0	15	Monitor Closely	\$ 5,500.00	\$ 5,500.00	0.00%	1.00	\$ 5,500.00	\$ 5,500.00	\$ -
Cedar Cliff Drive					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	1070	5	8	Monitor Closely	\$ 80.00	\$ 85,600.00	1.30%	1.07	\$ 91,400.00	\$ 18,280.00	\$ 18,280.00
Lawson Court					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	128	5	8	Monitor Closely	\$ 80.00	\$ 10,240.00	1.30%	1.07	\$ 11,000.00	\$ 2,200.00	\$ 2,200.00
Cove Circle West					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	908	5	8	Monitor Closely	\$ 80.00	\$ 72,640.00	1.30%	1.07	\$ 77,500.00	\$ 15,500.00	\$ 15,500.00
Water Main	374	5	8	Monitor Closely	\$ 100.00	\$ 37,400.00	1.30%	1.07	\$ 39,900.00	\$ 7,980.00	\$ 7,980.00
Isolation Valve	1	0	15	Monitor Closely	\$ 5,500.00	\$ 5,500.00	0.00%	1.00	\$ 5,500.00	\$ 5,500.00	\$ -
Cove Circle East					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	1509	5	8	Monitor Closely	\$ 80.00	\$ 120,720.00	1.30%	1.07	\$ 128,800.00	\$ 25,760.00	\$ 25,760.00
Timberline Trail					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	648	5	8	Monitor Closely	\$ 110.00	\$ 71,280.00	1.30%	1.07	\$ 76,100.00	\$ 15,220.00	\$ 15,220.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00	0.00%	1.00	\$ 2,000.00	\$ 2,000.00	\$ -
Rosemade Lane					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	1159	5	8	Monitor Closely	\$ 80.00	\$ 92,720.00	1.30%	1.07	\$ 99,000.00	\$ 19,800.00	\$ 19,800.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00	0.00%	1.00	\$ 2,000.00	\$ 2,000.00	\$ -
Deer Court					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	365	5	8	Monitor Closely	\$ 80.00	\$ 29,200.00	1.30%	1.07	\$ 31,200.00	\$ 6,240.00	\$ 6,240.00
PRV	1	0	10	Monitor Closely	\$ 3,000.00	\$ 3,000.00	0.00%	1.00	\$ 3,000.00	\$ 3,000.00	\$ -
Matterhorn Drive					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	280	3	8	Monitor Closely	\$ 80.00	\$ 22,400.00	1.20%	1.04	\$ 23,300.00	\$ 7,766.67	\$ 7,766.67
Water Main	1521	3	8	Monitor Closely	\$ 100.00	\$ 152,100.00	1.20%	1.04	\$ 157,700.00	\$ 52,566.67	\$ 52,566.67
Isolation Valve	1	0	15	Monitor Closely	\$ 5,500.00	\$ 5,500.00	0.00%	1.00	\$ 5,500.00	\$ 5,500.00	\$ -
Water Main	1732	13	8	Monitor Closely	\$ 110.00	\$ 190,520.00	1.65%	1.24	\$ 235,700.00	\$ 18,130.77	\$ 18,130.77
Isolation Valve	2	0	15	Monitor Closely	\$ 6,500.00	\$ 13,000.00	0.00%	1.00	\$ 13,000.00	\$ 13,000.00	\$ -
Hydrant	1	8	8	Monitor Closely	\$ 9,000.00	\$ 9,000.00	1.43%	1.12	\$ 10,100.00	\$ 1,262.50	\$ 1,262.50
Tuppence Trail					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	1309	3	8	Monitor Closely	\$ 80.00	\$ 104,720.00	1.20%	1.04	\$ 108,600.00	\$ 36,200.00	\$ 36,200.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00	0.00%	1.00	\$ 2,000.00	\$ 2,000.00	\$ -
Heather Court					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	1512	3	8	Monitor Closely	\$ 80.00	\$ 120,960.00	1.20%	1.04	\$ 125,400.00	\$ 41,800.00	\$ 41,800.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00	0.00%	1.00	\$ 2,000.00	\$ 2,000.00	\$ -
Tali Trail					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	298	3	8	Monitor Closely	\$ 80.00	\$ 23,840.00	1.20%	1.04	\$ 24,800.00	\$ 8,266.67	\$ 8,266.67
Yodelodel Lane					\$ -		2.00%	0.00	\$ -	\$ -	\$ -

Replacement and/or Rehabilitation Expenses APPENDIX A

	Real Discount Rate	https://www.whitehouse.gov/wp-content/uploads/2023/02/M-23-12-Appendix				*typical PWA
Year (YR)	3	5	7	10	20	30
Percentage (%)	1.20%	1.30%	1.40%	1.50%	2.00%	2.00%
Planning Period (YR)	20.00					

Assets	Quantity/ Length	Remaining Useful Life in Years	Criticality Score (CS)	Recommendation	Replacement Cost (Current Day Dollars, Unit Price)	Replacement Cost (2023 Dollars)	Inflation Rate Based on Remaining Useful Life	Multiplication Factor for Future Worth	Estimated Future Funds Required for Replacement*	Annual Reserve Funds Required for Replacement (Year 1)	Annual Reserve Funds Required for Replacement (Subsequent Years)
Water Main	551	3	8	Monitor Closely	\$ 80.00	\$ 44,080.00	1.20%	1.04	\$ 45,700.00	\$ 15,233.33	\$ 15,233.33
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00	0.00%	1.00	\$ 2,000.00	\$ 2,000.00	\$ -
Liesl Court					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	463	3	8	Monitor Closely	\$ 80.00	\$ 37,040.00	1.20%	1.04	\$ 38,400.00	\$ 12,800.00	\$ 12,800.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00	0.00%	1.00	\$ 2,000.00	\$ 2,000.00	\$ -
Meercham Way					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	832	3	8	Monitor Closely	\$ 80.00	\$ 66,560.00	1.20%	1.04	\$ 69,000.00	\$ 23,000.00	\$ 23,000.00
Water Main	1237	3	8	Monitor Closely	\$ 100.00	\$ 123,700.00	1.20%	1.04	\$ 128,300.00	\$ 42,766.67	\$ 42,766.67
Isolation Valve	1	0	15	Monitor Closely	\$ 5,500.00	\$ 5,500.00	0.00%	1.00	\$ 5,500.00	\$ 5,500.00	\$ -
Liebchen Court					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	326	3	8	Monitor Closely	\$ 80.00	\$ 26,080.00	1.20%	1.04	\$ 27,100.00	\$ 9,033.33	\$ 9,033.33
Hampton Drive					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	1243	7	8	Monitor Closely	\$ 80.00	\$ 99,440.00	1.40%	1.10	\$ 109,700.00	\$ 15,671.43	\$ 15,671.43
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00	0.00%	1.00	\$ 2,000.00	\$ 2,000.00	\$ -
Water Main	2037	17	8	Monitor Closely	\$ 120.00	\$ 244,440.00	1.85%	1.37	\$ 333,900.00	\$ 19,641.18	\$ 19,641.18
Isolation Valve	4	0	15	Monitor Closely	\$ 8,000.00	\$ 32,000.00	0.00%	1.00	\$ 32,000.00	\$ 32,000.00	\$ -
Hydrant	1	12	8	Monitor Closely	\$ 9,000.00	\$ 9,000.00	1.60%	1.21	\$ 10,900.00	\$ 908.33	\$ 908.33
Hanover Drive					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	768	8	8	Monitor Closely	\$ 80.00	\$ 61,440.00	1.43%	1.12	\$ 68,900.00	\$ 8,612.50	\$ 8,612.50
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00	0.00%	1.00	\$ 2,000.00	\$ 2,000.00	\$ -
Hartford Court					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	876	8	8	Monitor Closely	\$ 80.00	\$ 70,080.00	1.43%	1.12	\$ 78,600.00	\$ 9,825.00	\$ 9,825.00
Isolation Valve	1	0	15	Monitor Closely	\$ 2,000.00	\$ 2,000.00	0.00%	1.00	\$ 2,000.00	\$ 2,000.00	\$ -
Hydrant	1	13	8	Monitor Closely	\$ 9,000.00	\$ 9,000.00	1.65%	1.24	\$ 11,200.00	\$ 861.54	\$ 861.54
Hanby Court					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	423	7	8	Monitor Closely	\$ 80.00	\$ 33,840.00	1.40%	1.10	\$ 37,300.00	\$ 5,328.57	\$ 5,328.57
Road to Lower Water Tank					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	611	17	6	Routine Maintenance	\$ 120.00	\$ 73,320.00	1.85%	1.37	\$ 100,200.00	\$ 5,894.12	\$ 5,894.12
To Valley Woods					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	1129	17	8	Monitor Closely	\$ 110.00	\$ 124,190.00	1.85%	1.37	\$ 169,600.00	\$ 9,976.47	\$ 9,976.47
Fairway Drive / Mitchell Road					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	1348	4	8	Monitor Closely	\$ 80.00	\$ 107,800.00	1.25%	1.05	\$ 113,300.00	\$ 28,325.00	\$ 28,325.00
Water Main	2111	14	8	Monitor Closely	\$ 110.00	\$ 232,210.00	1.70%	1.27	\$ 294,100.00	\$ 21,007.14	\$ 21,007.14
Isolation Valve	3	0	15	Monitor Closely	\$ 6,500.00	\$ 19,500.00	0.00%	1.00	\$ 19,500.00	\$ 19,500.00	\$ -
Hydrant	1	9	8	Monitor Closely	\$ 9,000.00	\$ 9,000.00	1.47%	1.14	\$ 10,300.00	\$ 1,144.44	\$ 1,144.44
Putter Place					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	354	4	8	Monitor Closely	\$ 80.00	\$ 28,320.00	1.25%	1.05	\$ 29,800.00	\$ 7,450.00	\$ 7,450.00
Par Drive					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	552	4	8	Monitor Closely	\$ 80.00	\$ 44,160.00	1.25%	1.05	\$ 46,500.00	\$ 11,625.00	\$ 11,625.00
Water Main	1670	14	8	Monitor Closely	\$ 110.00	\$ 183,700.00	1.70%	1.27	\$ 232,600.00	\$ 16,614.29	\$ 16,614.29
Isolation Valve	1	0	15	Monitor Closely	\$ 6,500.00	\$ 6,500.00	0.00%	1.00	\$ 6,500.00	\$ 6,500.00	\$ -

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	Real Discount Rate	https://www.whitehouse.gov/wp-content/uploads/2023/02/M-23-12-Appendix				*typical PWA
Year (YR)	3	5	7	10	20	30
Percentage (%)	1.20%	1.30%	1.40%	1.50%	2.00%	2.00%
Planning Period (YR)	20.00					

Assets	Quantity/ Length	Remaining Useful Life in Years	Criticality Score (CS)	Recommendation	Replacement Cost (Current Day Dollars, Unit Price)	Replacement Cost (2023 Dollars)	Inflation Rate Based on Remaining Useful Life	Multiplication Factor for Future Worth	Estimated Future Funds Required for Replacement*	Annual Reserve Funds Required for Replacement (Year 1)	Annual Reserve Funds Required for Replacement (Subsequent Years)
Golf View Court					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	1871	4	8	Monitor Closely	\$ 100.00	\$ 187,100.00	1.25%	1.05	\$ 196,700.00	\$ 49,175.00	\$ 49,175.00
Isolation Valve	1	0	15	Monitor Closely	\$ 5,500.00	\$ 5,500.00	0.00%	1.00	\$ 5,500.00	\$ 5,500.00	\$ -
Hydrant	1	9	8	Monitor Closely	\$ 9,000.00	\$ 9,000.00	1.47%	1.14	\$ 10,300.00	\$ 1,144.44	\$ 1,144.44
Kathy Court					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	1044	14	8	Monitor Closely	\$ 110.00	\$ 114,840.00	1.70%	1.27	\$ 145,500.00	\$ 10,392.86	\$ 10,392.86
Isolation Valve	1	0	15	Monitor Closely	\$ 6,500.00	\$ 6,500.00	0.00%	1.00	\$ 6,500.00	\$ 6,500.00	\$ -
Lakeview Drive					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	188	2	8	Monitor Closely	\$ 80.00	\$ 15,040.00	1.20%	1.02	\$ 15,500.00	\$ 7,750.00	\$ 7,750.00
PRV	1	0	15	Monitor Closely	\$ 3,000.00	\$ 3,000.00	0.00%	1.00	\$ 3,000.00	\$ 3,000.00	\$ -
Water Main	8751	12	8	Monitor Closely	\$ 120.00	\$ 1,050,120.00	1.60%	1.21	\$ 1,270,500.00	\$ 105,875.00	\$ 105,875.00
Isolation Valve	7	0	15	Monitor Closely	\$ 8,000.00	\$ 56,000.00	0.00%	1.00	\$ 56,000.00	\$ 56,000.00	\$ -
Hydrant	3	7	8	Monitor Closely	\$ 9,000.00	\$ 27,000.00	1.40%	1.10	\$ 29,800.00	\$ 4,257.14	\$ 4,257.14
Hydrant	1	38	4	Routine Maintenance	\$ 9,000.00	\$ 9,000.00	2.00%	0.00	\$ -	\$ -	\$ -
Alpine Drive					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	1059	2	8	Monitor Closely	\$ 80.00	\$ 84,720.00	1.20%	1.02	\$ 86,800.00	\$ 43,400.00	\$ 43,400.00
Water Main	173	4	8	Monitor Closely	\$ 80.00	\$ 13,840.00	1.25%	1.05	\$ 14,600.00	\$ 3,650.00	\$ 3,650.00
Water Main	3479	12	8	Monitor Closely	\$ 110.00	\$ 382,690.00	1.60%	1.21	\$ 463,000.00	\$ 38,583.33	\$ 38,583.33
Isolation Valve	4	0	15	Monitor Closely	\$ 6,500.00	\$ 26,000.00	0.00%	1.00	\$ 26,000.00	\$ 26,000.00	\$ -
Water Main	3887	12	8	Monitor Closely	\$ 120.00	\$ 466,440.00	1.60%	1.21	\$ 564,400.00	\$ 47,033.33	\$ 47,033.33
Water Main	1598	13	8	Monitor Closely	\$ 120.00	\$ 191,760.00	1.65%	1.24	\$ 237,300.00	\$ 18,253.85	\$ 18,253.85
Water Main	6113	14	8	Monitor Closely	\$ 120.00	\$ 733,560.00	1.70%	1.27	\$ 928,900.00	\$ 66,350.00	\$ 66,350.00
Water Main	7424	15	8	Monitor Closely	\$ 120.00	\$ 890,880.00	1.75%	1.30	\$ 1,155,700.00	\$ 77,046.67	\$ 77,046.67
Isolation Valve	2	0	15	Monitor Closely	\$ 8,000.00	\$ 16,000.00	0.00%	1.00	\$ 16,000.00	\$ 16,000.00	\$ -
Isolation Valve	5	0	15	Monitor Closely	\$ 8,000.00	\$ 40,000.00	0.00%	1.00	\$ 40,000.00	\$ 40,000.00	\$ -
Isolation Valve	3	0	15	Monitor Closely	\$ 8,000.00	\$ 24,000.00	0.00%	1.00	\$ 24,000.00	\$ 24,000.00	\$ -
Hydrant	3	7	8	Monitor Closely	\$ 9,000.00	\$ 27,000.00	1.40%	1.10	\$ 29,800.00	\$ 4,257.14	\$ 4,257.14
Hydrant	1	8	8	Monitor Closely	\$ 9,000.00	\$ 9,000.00	1.43%	1.12	\$ 10,100.00	\$ 1,262.50	\$ 1,262.50
Hydrant	2	9	8	Monitor Closely	\$ 9,000.00	\$ 18,000.00	1.47%	1.14	\$ 20,600.00	\$ 2,288.89	\$ 2,288.89
Hydrant	4	10	8	Monitor Closely	\$ 9,000.00	\$ 36,000.00	1.50%	1.16	\$ 41,800.00	\$ 4,180.00	\$ 4,180.00
Hydrant	1	38	4	Routine Maintenance	\$ 9,000.00	\$ 9,000.00	2.00%	0.00	\$ -	\$ -	\$ -
Morningside Drive					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	1293	4	8	Monitor Closely	\$ 100.00	\$ 129,300.00	1.25%	1.05	\$ 135,900.00	\$ 33,975.00	\$ 33,975.00
Isolation Valve	1	0	15	Monitor Closely	\$ 5,500.00	\$ 5,500.00	0.00%	1.00	\$ 5,500.00	\$ 5,500.00	\$ -
To Greendale Water Tower From 100k Tank					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	982	17	8	Monitor Closely	\$ 120.00	\$ 117,840.00	1.85%	1.37	\$ 161,000.00	\$ 9,470.59	\$ 9,470.59
Additional Alpine and St Rd (Outside of Map)					\$ -		2.00%	0.00	\$ -	\$ -	\$ -
Water Main	976	2	8	Monitor Closely	\$ 80.00	\$ 78,080.00	1.20%	1.02	\$ 80,000.00	\$ 40,000.00	\$ 40,000.00
Electrical Assets											
Level Controllers	4	13	3	Routine Maintenance	\$ 2,000.00	\$ 8,000.00	1.65%	1.24	\$ 9,900.00	\$ 761.54	\$ 761.54
SCADA	1	18	4	Routine Maintenance	\$ 44,000.00	\$ 44,000.00	1.90%	1.40	\$ 61,800.00	\$ 3,433.33	\$ 3,433.33

Replacement and/or Rehabilitation Expenses APPENDIX A

	Real Discount Rate	https://www.whitehouse.gov/wp-content/uploads/2023/02/M-23-12-Appendix				*typical PWA
Year (YR)	3	5	7	10	20	30
Percentage (%)	1.20%	1.30%	1.40%	1.50%	2.00%	2.00%
Planning Period (YR)	20.00					

Assets	Quantity/ Length	Remaining Useful Life in Years	Criticality Score (CS)	Recommendation	Replacement Cost (Current Day Dollars, Unit Price)	Replacement Cost (2023 Dollars)	Inflation Rate Based on Remaining Useful Life	Multiplication Factor for Future Worth	Estimated Future Funds Required for Replacement*	Annual Reserve Funds Required for Replacement (Year 1)	Annual Reserve Funds Required for Replacement (Subsequent Years)
200-Amp 460V/3-Phase Panel Board	1	0	15	Monitor Closely	\$ 18,000.00	\$ 18,000.00	0.00%	1.00	\$ 18,000.00	\$ 18,000.00	\$ -
5 KVA Transformer	1	0	15	Monitor Closely	\$ 3,000.00	\$ 3,000.00	0.00%	1.00	\$ 3,000.00	\$ 3,000.00	\$ -
HSP Control Panel	1	0	20	Immediate Action Required	\$ 26,000.00	\$ 26,000.00	0.00%	1.00	\$ 26,000.00	\$ 26,000.00	\$ -
230V/60-Amp Control Panel	1	0	15	Monitor Closely	\$ 3,000.00	\$ 3,000.00	0.00%	1.00	\$ 3,000.00	\$ 3,000.00	\$ -
30-Amp Disconnect Switch	3	0	10	Monitor Closely	\$ 500.00	\$ 1,500.00	0.00%	1.00	\$ 1,500.00	\$ 1,500.00	\$ -
200 A 600V 60 HZ Disconnect Switch	1	0	15	Monitor Closely	\$ 1,500.00	\$ 1,500.00	0.00%	1.00	\$ 1,500.00	\$ 1,500.00	\$ -
Heater	1	0	10	Monitor Closely	\$ 630.00	\$ 630.00	0.00%	1.00	\$ 700.00	\$ 700.00	\$ -
Tank Level Control Panel	1	0	15	Monitor Closely	\$ 25,000.00	\$ 25,000.00	0.00%	1.00	\$ 25,000.00	\$ 25,000.00	\$ -
Supply Assets Subtotal					\$978,600	\$1,019,150			\$1,144,100	\$271,665	\$112,465
Distribution Assets Subtotal					\$607,246	\$18,127,063			\$20,556,500	\$4,755,012	\$4,080,512
Electrical Assets Subtotal					\$123,630	\$130,630			\$150,400	\$82,895	\$4,195
Total of All Collection and Disposal Assets					\$1,709,476	\$19,276,843			\$21,851,000	\$5,109,571	\$4,197,171

Future Improvement Expenses

APPENDIX A

Directions:

A. List projects to be completed
B. Determine how long before the project must begin
C. Enter the total projected cost of the project
D. Enter "C" in column D for large replacement expenses that would be funded as a capital project separate from the reserve money set aside each year.
E. To add more improvement expenses, use insert function and add rows then copy first row to new rows to transfer formulas
F. Enter information in yellow cells.
G. Remaining cells will calculate automatically.

Guidance Note:

<p>Include improvements here which are related to:</p> <ol style="list-style-type: none"> 1. Future/upcoming regulations 2. Major asset replacement, such as structures, tanks, or interceptors 3. System expansion to provide additional capacity or service area 4. System consolidation or regionalization 5. Improved technology to replace obsolete technology 6. Climate resiliency <p>Include only projects expected to occur within the next 20 years.</p>
--

Real Discount Rate [Discount History \(whitehouse.gov\)](https://www.whitehouse.gov) *typical PWA

3 YR	5 YR	7 YR	10 YR	20 YR	30 YR
4	3.8	3.8	3.9	4.2	4.2

Nominal Discount Rate-20 year [Discount History \(whitehouse.gov\)](https://www.whitehouse.gov) *typical Rate Impact

3 YR	5YR	7 YR	10 YR	20 YR	30 YR
1.2	1.3	1.4	1.5	2	2

A	B	C	D		F	G	
Projects	Years Until Project Must Begin	Estimated Cost of Construction* (2023 dollars)	Estimated Future Cost of Construction at Project Start**	20 Yr Loan Interest Rate	Estimated Annual Debt Repayment***	Estimated Future Capital Funds Required****	Potential Funding Source
Recommended Improvements from Previous PER	5	\$ 6,573,100	\$ 7,920,580	2.0%	\$ 480,600	\$ 9,612,000	SRF, OCRA, USDA
Upsize Existing 2" & 4" WM and Add Additional Hydrants	5	\$ 20,022,300	\$ 24,126,856	2.0%	\$ 1,463,700	\$ 29,274,000	SRF, OCRA, USDA
Pumping Facility Improvements	1	\$ 115,000	\$ 119,600	2.0%	\$ 7,300	\$ 146,000	SRF, OCRA, USDA
Storage Tank Maintenance	1	\$ 198,300	\$ 206,232	2.0%	\$ 12,600	\$ 252,000	SRF, OCRA, USDA
Replace Existing 6" & 8" WM and Hydrants	10	\$ 12,645,100	\$ 18,538,635	2.0%	\$ 1,124,700	\$ 22,494,000	SRF, OCRA, USDA
Total Improvement Expense Required in the Current Year		\$ 39,553,800	\$ 50,911,903				
Total Future Capital Funds Required					\$ 3,088,900	\$ 61,778,000	

*Not Including Non-Construction Fees

**Utilizing Single Payment Compound to Future Given Present. i% is based on years until project must begin and linear extrapolation of real discount rate and n is years until project must begin. Projects to begin in less than three years as

Appendix B
OMB Circular No. A-94



EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF MANAGEMENT AND BUDGET
WASHINGTON, D.C. 20503

THE DIRECTOR

February 17, 2023

M-23-12

MEMORANDUM FOR THE HEADS OF EXECUTIVE DEPARTMENTS AND AGENCIES

FROM: Shalanda D. Young *Shalanda D. Young*
SUBJECT: 2023 Discount Rates for OMB Circular No. A-94

On October 29, 1992, OMB issued a revision to OMB Circular No. A-94, "Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs." That revision established new discount rate guidelines for use in benefit-cost and other types of economic analysis and specified certain discount rates that will be updated annually when the interest rate and inflation assumptions in the Budget are changed. These discount rates are found in Appendix C of the Circular, which is included as an attachment to this memorandum and provides for discount rates that will be in effect for the calendar year 2023.

The rates presented in Appendix C do not apply to regulatory analysis or benefit-cost analysis of public investment. They are to be used for lease-purchase and cost-effectiveness analyses, as specified in the Circular.

Attachment

APPENDIX C
(Revised December 12, 2022)

**DISCOUNT RATES FOR COST-EFFECTIVENESS, LEASE PURCHASE,
AND RELATED ANALYSES**

Effective Dates. This appendix is updated annually. This version of the appendix is valid for calendar year 2023. A copy of the updated appendix can be obtained in electronic form through the OMB home page at <https://www.whitehouse.gov/wp-content/uploads/2023/02/Appendix-C.pdf>. The text of the Circular is found at www.whitehouse.gov/wp-content/uploads/legacy_drupal_files/omb/circulars/A94/a094.pdf, and a table of past years' rates is located at <https://www.whitehouse.gov/wp-content/uploads/2023/02/discount-history.pdf>. Updates of the appendix are also available upon request from OMB's Office of Economic Policy (a94@omb.eop.gov).

Nominal Discount Rates. A forecast of nominal or market interest rates for calendar year 2023 based on the economic assumptions for the 2024 Budget is presented below. These nominal rates are to be used for discounting nominal flows, which are often encountered in lease-purchase analysis.

**Nominal Interest Rates on Treasury Notes and Bonds
of Specified Maturities (in percent)**

<u>3-Year</u>	<u>5-Year</u>	<u>7-Year</u>	<u>10-Year</u>	<u>20-Year</u>	<u>30-Year</u>
4.0	3.8	3.8	3.9	4.2	4.2

Real Discount Rates. A forecast of real interest rates from which the inflation premium has been removed and based on the economic assumptions from the 2024 Budget is presented below. These real rates are to be used for discounting constant-dollar flows, as is often required in cost-effectiveness analysis.

**Real Interest Rates on Treasury Notes and Bonds
of Specified Maturities (in percent)**

<u>3-Year</u>	<u>5-Year</u>	<u>7-Year</u>	<u>10-Year</u>	<u>20-Year</u>	<u>30-Year</u>
1.2	1.3	1.4	1.5	2.0	2.0

Analyses of programs with terms different from those presented above may use a linear interpolation. For example, a four-year project can be evaluated with a rate equal to the average of the three-year and five-year rates. Programs with durations longer than 30 years may use the 30-year interest rate.

Appendix C
Tank Inspection Reports



Ground Tank/Standpipe/Clearwell Inspection

Valley Rural Utility Company Inspection #2 / Alpine

Complete

Failed items	5
Inspection Title	Valley Rural Utility Company Inspection#2
Client Specific Tank Name	Alpine
Client	Valley Rural Utility Company
Job Number	S216722IN.00
Prepared by	Dive One
Conducted on	3 Aug 2021 08:15 CDT

Recommended Maintenance

5 failed

External Inspection

Condition of Fall Protection System

N/A

Recommend a slider fall protection system be installed

External Inspection

Condition of Water Access Hatch

Good

Undersized

Recommend a new 30" AWWA standard water access hatch be installed

Internal Inspection

Condition of Water Access Ladder

No Ladder

Recommend a water access ladder be installed

Internal Inspection

Does Facility Have a Mixer?

No

Recommend installing a submersible tank mixer

Internal Inspection

Is Facility Free of Sediment/Debris?

No

Recommend the 1/16", 100% coverage, of sandy silt sediment be removed from the floor plates

External Inspection

2 failed

Reference Photo of Facility



Photo 1

Facility Type	Ground
Facility Construction	Metal- Welded
Capacity	750K
Height	52'
Diameter	50'
Does Facility Extend Underground?	No
Tank ID Plate?	Yes

Tank ID Plate Photo



Photo 2

Tank Builder	Horton Tank
Year Built	1972
Serial/ID Number	71-312

Lower Level

Condition of Intruder Protection Fence	Good
Condition of Foundation	Good

Photo of Foundation



Photo 3



Photo 4



Photo 5



Photo 6



Photo 7



Photo 8



Photo 9

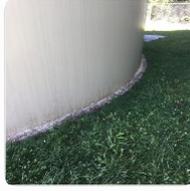


Photo 10

Water Level Indicator Type(s)

SCADA

Condition of Water Level Indicator(s)

N/A

Condition of Overflow

Good

Does Overflow Extend to Ground/Accessible?

Compliant

Does Overflow Flapper Seal?

Compliant

Photo of Flapper



Photo 11



Photo 12



Photo 13



Photo 14



Photo 15



Photo 16



Photo 17



Photo 18



Photo 19



Photo 20

Overflow Diameter

6"

Condition of External Plumbing

N/A

Condition of Sidewall Plates

Good

UT Readings Attached.

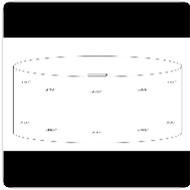


Photo 21

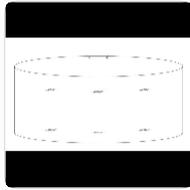


Photo 22

Condition of Sidewall Protective Coating (SSPC Rating)

9

Condition of Side Manway Access Hatch

Good

Photo of Side Manway Access Hatch



Photo 23



Photo 24



Photo 25



Photo 26



Photo 27



Photo 28

Size of Manway Access Hatch

24" & 24"

Was Manway Access Hatch Labeled 'Confined Space?'

No

Recommend (2) 'confined space entry' placards be installed

Condition of External Ladder

Good

Photo of External Ladder



Photo 29



Photo 30



Photo 31



Photo 32



Photo 33

Width of External Ladder

16 3/8"

Diameter of Rung

3/4"

Length of External Ladder

50'

Length of Standoff

9"

Condition of Intruder Protection Door

Good

Photo of Intruder Protection Door



Photo 34

Does External Ladder Have Cage?

Yes

Diameter of Cage

35"

Cage Material

Mild Steel

Photo of Cage



Photo 35



Photo 36



Photo 37

Condition of Fall Protection System

N/A

Recommend a slider fall protection system be installed

Upper Level

Photo of Roof Plates



Photo 38



Photo 39

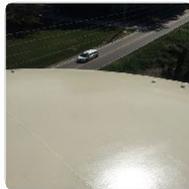


Photo 40



Photo 41



Photo 42



Photo 43

Condition of Roof Plates

Good

UT Readings Attached

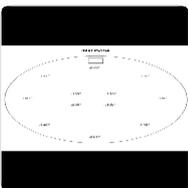


Photo 44

Condition of Roof Coating (SSPC Rating)

9

Condition of Anode Plates

N/A

No anode plates

Photo of Water Access Hatch



Photo 45



Photo 46



Photo 47

Condition of Water Access Hatch

Good

Undersized

Recommend a new 30" AWWA standard water access hatch be installed

Size of Water Access Hatch

23 1/2"

Was Water Access Hatch Labeled 'Confined Space?'

No

Recommend a 'confined space entry' placard be installed

Was Water Access Hatch Locked?

Yes, Lock in Good Condition

Type of Roof Vent

Mushroom Shape

Photo of Roof Vent



Photo 48



Photo 49

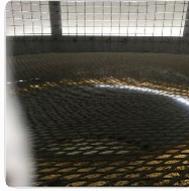


Photo 50



Photo 51

Condition of Roof Vent

Good

Vent Circumference

76 5/8"

Condition of Vent Screen

Compliant

Internal Inspection

3 failed

Condition of Water Access Ladder

No Ladder

Recommend a water access ladder be installed

Condition of Roof Supports

Good

Light staining, corrosion on hardware.



Photo 52

Condition of Water Level Indicator System

N/A

Condition of Overflow

Good

Condition of Roof Plates

Good

Light staining

Condition of Roof Plates (SSPC Rating)

7

Condition of Cathodic Protection

N/A

Condition of Sidewall Plates

Good

Light spotted corrosion and staining.

Condition of Sidewall Plates (SSPC Rating)

6

Condition of Side Manway Access

Good

Light staining

Condition of Internal Plumbing

Good

Spotted corrosion on the inside

Does Facility Have a Mixer?

No

Recommend installing a submersible tank mixer

Condition of Floor Plates

Good

UT Readings Attached.

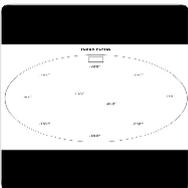


Photo 53

Condition of Floor Plates (SSPC Rating)

7

Does Tank Have Baffles?

No

Is Facility Free of Sediment/Debris?

No

Recommend the 1/16", 100% coverage, of sandy silt sediment be removed from the floor plates



Photo 54

Sediment/Debris Type

Sandy Silt

Sediment Depth

1/16"

Percentage of Sediment Coverage

100%

Field Sketch of Sediment Coverage



Photo 55

Level of Staining Inside Facility

Light

Clarity of Water

Good

Quality of Water

Good

Water Temperature

Cold (60 degrees or less)

Water Depth (Maximum)

50'

Water Depth (Actual)

47'

Inspector



Canyon Stephens

3 Aug 2021 10:50 CDT



Ground Tank/Standpipe/Clearwell Inspection

Valley Rural Utility Company Inspection #1 / Little Tank

Complete

Failed items	8
Inspection Title	Valley Rural Utility Company Inspection#1
Client Specific Tank Name	Little Tank
Client	Valley Rural Utility Company
Job Number	S216722IN.00
Prepared by	Dive One
Conducted on	2 Aug 2021 12:17 CDT

Recommended Maintenance

8 failed

External Inspection

Condition of Fall Protection System

N/A

Recommend a slider fall protection system be installed

External Inspection

Condition of Water Access Hatch

Fair

Undersized

Recommend a new 30" AWWA standard water access hatch be installed

Internal Inspection

Condition of Water Access Ladder

No Ladder

Recommend a water access ladder be installed

Condition of Roof Supports

Poor

Recommend corroded beams and hardware be replaced

Internal Inspection

Condition of Water Level Indicator System

Poor

Recommend main cable be replaced

Internal Inspection

Does Facility Have a Mixer?

No

Recommend installing a submersible tank mixer

Internal Inspection

Is Facility Free of Sediment/Debris?

No

Recommend the 1/8", 50% coverage, of sandy silt sediment, paint chips and corroded metal be removed from the floor plates

Internal Inspection

Level of Staining Inside Facility

Heavy

Recommend staining be removed with a pressure wash/floran chemical wash

External Inspection

2 failed

Reference Photo of Facility



Photo 1

Facility Type	Ground
Facility Construction	Metal- Welded
Capacity	100K
Height	24'
Diameter	27'
Does Facility Extend Underground?	No
Tank ID Plate?	Yes

Tank ID Plate Photo



Photo 2

Tank Builder	C.B.I.
Year Built	1976
Serial/ID Number	61158

Lower Level

Condition of Intruder Protection Fence	N/A
Condition of Foundation	Good

Photo of Foundation



Photo 3



Photo 4



Photo 5



Photo 6

Water Level Indicator Type(s)	Not Available
Condition of Water Level Indicator(s)	N/A
Condition of Overflow	Good
Light corrosion inside the pipe	
Does Overflow Extend to Ground/Accessible?	Compliant
Does Overflow Flapper Seal?	Compliant

Photo of Flapper



Photo 7 Photo 8 Photo 9 Photo 10 Photo 11 Photo 12

Overflow Diameter 8"

Condition of External Plumbing	N/A
Condition of Sidewall Plates	Good

UT Readings Attached

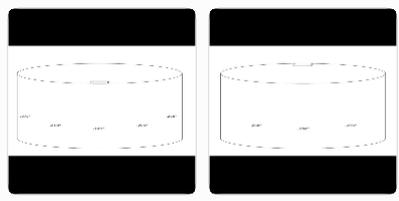


Photo 13 Photo 14

Condition of Sidewall Protective Coating (SSPC Rating)	9
Condition of Side Manway Access Hatch	Good

Photo of Side Manway Access Hatch



Photo 15 Photo 16 Photo 17

Size of Manway Access Hatch 24"

Was Manway Access Hatch Labeled 'Confined Space?'	No
---	----

Recommend a 'confined space entry' placard be installed

Condition of External Ladder	Good
------------------------------	------

Photo of External Ladder



Photo 18



Photo 19



Photo 20



Photo 21



Photo 22

Width of External Ladder

16 5/8"

Diameter of Rung

1"

Length of External Ladder

17'

Length of Standoff

9"

Condition of Intruder Protection Door

Good

Photo of Intruder Protection Door



Photo 23



Photo 24

Does External Ladder Have Cage?

Yes

Diameter of Cage

34 1/2"

Cage Material

Mild Steel

Photo of Cage



Photo 25

Condition of Fall Protection System

N/A

Recommend a slider fall protection system be installed

Upper Level

Photo of Roof Plates



Photo 26 Photo 27 Photo 28 Photo 29

Condition of Roof Plates

Good

UT Readings Attached.

Condition of Roof Coating (SSPC Rating)

9

Condition of Anode Plates

N/A

Photo of Water Access Hatch



Photo 30 Photo 31 Photo 32 Photo 33 Photo 34 Photo 35

Condition of Water Access Hatch

Fair

Undersized

Recommend a new 30" AWWA standard water access hatch be installed

Size of Water Access Hatch

24"

Was Water Access Hatch Labeled 'Confined Space?'

No

Recommend a 'confined space entry' placard be installed

Was Water Access Hatch Locked?

Yes, Lock in Good Condition

Type of Roof Vent

Mushroom Shape

Photo of Roof Vent



Photo 36 Photo 37 Photo 38 Photo 39 Photo 40

Condition of Roof Vent

Fair

Deficiency

Corrosion on inside of vent.

Photo of Deficiency



Photo 41



Photo 42



Photo 43

Vent Circumference

76"

Condition of Vent Screen

Compliant

Internal Inspection

6 failed

Condition of Water Access Ladder

No Ladder

Recommend a water access ladder be installed

Condition of Roof Supports

Poor

Recommend corroded beams and hardware be replaced
Broken support beam. All beams and hardware are heavily corroded.



Photo 44

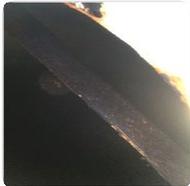


Photo 45



Photo 46



Photo 47



Photo 48

Condition of Water Level Indicator System

Poor

Recommend main cable be replaced

Deficiency

Main Cable

Condition of Overflow

Fair

Mild to heavy corrosion.



Photo 49

Condition of Roof Plates

Fair

Staining



Photo 50

Condition of Roof Plates (SSPC Rating)

6

Condition of Cathodic Protection

N/A

No cathodic protection

Condition of Sidewall Plates

Poor

Staining



Photo 51

Condition of Sidewall Plates (SSPC Rating)

4

Condition of Side Manway Access

Fair

Heavy staining and corrosion around weld seams.



Photo 52

Condition of Internal Plumbing

Poor



Photo 53

Deficiency

Heavy corrosion

Does Facility Have a Mixer?

No

Recommend installing a submersible tank mixer

Condition of Floor Plates

Fair

UT Readings Attached.

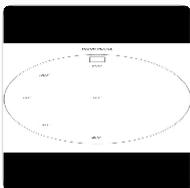


Photo 54

Deficiency

Pitting

Blistering

Condition of Floor Plates (SSPC Rating)

4

Does Tank Have Baffles?

No

Is Facility Free of Sediment/Debris?

No

Recommend the 1/8", 50% coverage, of sandy silt sediment, paint chips and corroded metal be removed from the floor plates



Photo 55



Photo 56



Photo 57

Sediment/Debris Type

Sandy Silt
Paint Chips
Other Debris

Description of Debris

Corroded metal

Sediment Depth

1/8"

Percentage of Sediment Coverage

50%

Field Sketch of Sediment Coverage



Photo 58

Level of Staining Inside Facility

Heavy

Recommend staining be removed with a pressure wash/floran chemical wash



Photo 59

Clarity of Water

Good

Quality of Water

Good

Water Temperature

Cold (60 degrees or less)

Water Depth (Maximum)

25'

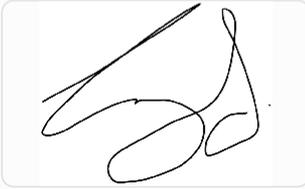
Water Depth (Actual)

22'

Additional Notes

Tank needs to be sandblasted and repainted on the inside. Support structure is falling off the roof plates needs to be replaced.

Inspector



Canyon Stephens
2 Aug 2021 14:38 CDT

Appendix D
Cybersecurity Documents

1. Are any data transferred to or from your Process Control Systems (PCS) network, by any electronic means?

Additional Details:

Examples of electronic data transfer include both automatic (e.g. automated export of data from the PCS environment) and manual (e.g. transfer of data to/from the PCS environment via thumb drive).

Examples of data that may be transferred include:

- Water quality data collected by the PCS and transferred for regulatory reporting
- Asset performance data for asset management
- Operating system / software patches and updates

Yes ()

No

Notes:

2. Do users manually transfer any electronic data to or from your Process Control Systems (PCS) environment?

Additional Details:

Users include anyone internal or external with access to PCS. This may include operators, technicians, and third-party consultants. Users are able to initiate transfer of data to and from the PCS. Examples of manual data transfer include:

- USB
- Portable media device
- Temporary network connections (an ad hoc network connection for transferring data from one computer to another)
- Shared drives
- Cloud file share (e.g. DropBox)

Yes ()

No

Notes:

3. Are any electronic data transferred to or from your PCS environment using an automated process, without user interaction?

Additional Details:

Examples of automated transfer of data include:

- Automated software or firmware updates
- Licensing
- Operating System updates
- Antivirus signatures
- Database transfer
- Network monitoring by devices external to the PCS

Yes ()

No

Notes:

4. Are any users allowed to access your PCS environment remotely?

Additional Details:

Users include any personnel with internal or external access to the PCS environment. These may include operators, technicians, and third-party consultants. Devices can be any network enabled device either corporate supplied or personal. Examples of remote access include:

- Operations staff access the PCS environment from mobile device. This includes web view and read only.
- Users have access to remote physical site using any non-PCS environment.

Yes ()

No

Notes:

5. Is remote access to your PCS network allowed via mobile devices?

Additional Details:

Devices can be any network enabled device either corporate supplied or personal. This includes web view and read only. Examples of mobile devices include:

- Laptops
- Tablets
- Cellphones
- Smart Phones

Yes ()

No

Notes:

6. Is remote access to your PCS allowed at physically secured fixed location(s)?

Additional Details:

Examples of remote access from physically secured fixed location include:

- Control center managing remote sites
- Control center remotely managing a treatment center
- Office desktop computer
- Computer at secured office used for managing remote booster station

Yes

No ()

Notes:

7. Do you use resources outside your organization to support and/or maintain your PCS environment?

Additional Details:

Examples of resources outside of the organization supporting and/or maintaining your PCS environment include:

- Subsystems owned and operated by 3rd party
- Systems Integrators
- Equipment Manufacturers
- Consultants
- Vendors

Yes

No ()

Notes:

8. Do resources (e.g. service providers) outside your organization provide PCS support via remote access?

Additional Details:

Examples of resources outside your organization providing support by remote access includes:

- "Black box" solution vendor - "Black box" refers to piece of equipment on a network with contents and/or function that are unknown to the user/owner/operator.
- Vendor panel solution - Vendor panel refers to a control panel provided by a vendor to monitor or operate a treatment or distribution process. For example: a vendor provided ultrafiltration unit would have an accompanying control panel to control the ultrafiltration process.
- Network administration, from external sources.

Yes

No ()

Notes:

9. Do internal staff provide support for your PCS via remote access?

Additional Details:

Remote access is from outside (for example, from home) of the controlled or control room environments. Devices can be any smart phone, tablet, laptop either corporate supplied or personal.

Examples of internal staff providing support by remote access include:

- Remote operation and monitoring
- Remote troubleshooting

Yes ()

No

Notes:

10. Are all changes or updates made to your PCS environment first tested in a development, testbed, non-production, and/or training environment prior to being deployed and implemented in the field/production environment?

Additional Details:

- These changes/updates include any programming of logic controllers, human machine interfaces, instrumentation, or any devices involved with the PCS.
- System changes or updates do not negatively impact PCS operation.
- PCS changes are tested in a non-production environment before they are made in the field/production environment.
- Testing is performed to ensure the proper operation and interaction with other system components before deployment.
- Changes or updates may be made by either internal or external resources.

Yes

No ()

Notes:

11. Does your PCS include 3rd party network communication services?

Additional Details:

Examples of 3rd party network communications services include:

- Cellular (3G, 4G, 5G)
- Dedicated leased line (copper, fiber)
- Communication over internet
- City/county communication network not dedicated to PCS

Yes

No ()

Notes:

V P N

12. Does your PCS network use licensed or unlicensed wireless radios between facilities?

Additional Details:

Unlicensed wireless spectrum frequencies – Unlicensed wireless devices operate in one of the frequency bands set aside by the Federal communications Commission (FCC) for industrial, scientific or medical (ISM) applications. Frequencies within the unlicensed wireless spectrum are free to use.

Licensed wireless spectrum frequencies – Frequencies or frequency bands designated by the Federal Communications Commission (FCC) as reserved for organizations with licenses.

Examples of licensed or unlicensed wireless spectrum services include:

- Radio - 450MHz
- Radio - 900MHz
- WiFi - 2.4GHz
- WiFi - 5GHz
- WiFi - 6GHz
- Microwave

Yes

No ()

Notes:

Licensed only

13. Does your PCS share a Local Area Network (LAN) or Wide Area Network (WAN) with non-PCS equipment?

Additional Details:

Examples of non-PCS equipment include:

- Security cameras
- Access control equipment
- Enterprise network services at a facility with a shared communication path
- Voice over Internet Protocol (VOIP)
- Fire Alarms
- Vault or Panel Intrusion Alarms

Yes ()

No

Notes:

14. Do you use Wi-Fi within the PCS environment to transfer data in support of operations or monitoring?

Additional Details:

- Does your PCS communication network have wireless access points?
- Wi-Fi is defined in IEEE 802.11

Yes ()

No

Notes:

15. Do you use virtualization technology for your PCS?

Additional Details:

Virtualization Technology – Technology capable of creating a virtual (rather than actual) version of something, including virtual computer hardware platforms, storage devices, and computer network resources. Examples of virtualization technology include:

- VMware
- Oracle VM
- HyperV

Yes ()

No ~~(X)~~

Notes:

16. Is the virtualization technology dedicated to PCS only?

Additional Details:

Virtualization Technology – Technology capable of creating a virtual (rather than actual) version of something, including virtual computer hardware platforms, storage devices, and computer network resources.

- A separate physical host(s) is used for PCS virtual machines.
- All non-PCS virtual machines reside on non-PCS physical host(s).

Yes ()

No ~~(X)~~

N/A DO NOT USE THIS
TECH.

Notes:

17. Does your organization accept, process, store or transmit credit card or debit card information, or accept payment with pre-paid cards branded with American Express, Discover, JCB, MasterCard or Visa International logos?

Additional Details:

This information may be collected and stored for service payment purposes. Using a third-party company for processing **Payment Card Industry (PCI)** may cut down on risk exposure but does not exclude a company from PCI Data Security Standard (DSS) compliance. Customer billing information including:

- Credit/debit card numbers
- Credit/debit card numbers with name, expiration date or service code
- Sensitive authentication data (including magnetic stripe, PINs, CVV, etc.)

NOTE: Includes organizations that have outsourced payment services.

Yes

No ()

Notes:

18. Does your organization own, license, acquire or maintain any personally identifiable information (PII)?

Additional Details:

PII is any information that may be used to identify an individual. This includes customers, employees, and contractors. Examples of PII include:

- Customer billing information and addresses
- Employee personal information, including SSN, birthdate, etc.

Yes

No ()

Notes:

19. Is your organization an employer that creates or receives health information that is HIPAA protected?

Additional Details:

HIPAA defines protected health information (written, electronic, or oral) as information, including demographic data, that identifies an individual (or there is a reasonable basis to believe it can identify an individual) and that relates to:

- the individual's past, present or future physical or mental health or condition,
- the provision of health care to the individual, or
- the past, present, or future payment for the provision of health care to the individual.

Examples of HIPAA protected information include:

- Employee medical records
- Employee vaccine records
- Health and safety records may include HIPAA protected records
- Individually identifiable health information includes many common identifiers (e.g., name, address, birth date, Social Security Number).

Yes ()

No

Notes:

20. Is your organization responsible for the engineering design and implementation of critical infrastructure?

Additional Details:

The water/wastewater sector is defined as critical infrastructure by the federal government (42 U.S.C. 5195(e)). Examples of holding responsibility for engineering services include:

- Utility has an internal engineering department
- Utility hires engineering consultants
- You are part of a stakeholder organization that has internal resources or hires external resources to design and implement critical infrastructure

Yes

No

Notes:

21. Does your organization have a supply chain risk management program?

Additional Details:

Do you currently require your supplier to provide any chain-of-custody documents? An example of supply chain risk management program includes ordering and confirming treatment chemicals are National Science Foundation (NSF) certified.

Yes

No

Notes:

We do not treat water

22. Does your organization have a supply chain risk management program that specifically addresses cybersecurity?

Additional Details:

Does the supply chain risk management program specify how delivery for procured products - hardware, software, and/or data will be validated and monitored to ensure their integrity? Examples of specifically addressing cybersecurity in supply chain risk management include:

- Documenting information protection practices of supplier
- Integrity management program for components provided by sub-suppliers
- Supplier contracts include appropriate language to meet the objectives of the organization's cybersecurity program.

Yes ()

No

Notes:

INDIANA FINANCE AUTHORITY
CYBER SECURITY PLAN CHECKLIST

INTRODUCTION

This document is a checklist of recommendations for maintaining the overall Cybersecurity posture of Water and/or Wastewater Treatment operations. At least twice a year, the utility should verify that people, systems and software continue to align with the cybersecurity plan. The checklist has been established for the utility to become compliant with Indiana Senate Enrolled Act 362.

This document and recommended actions in creating a cyber security plan are taken from EPA Water Sector Cybersecurity Brief for States and Indiana Department of Homeland Security Leadership for a Safe and Secure Indiana Cyber Security for Employees Fact Sheet.

Implementing cybersecurity best practices is critical for water and wastewater utilities. Cyber-attacks are a growing threat to critical infrastructure sectors, including water and wastewater systems. Many critical infrastructure facilities have experienced cybersecurity incidents that led to the disruption of a business process or critical operation.

CYBER THREATS TO WATER AND WASTEWATER SYSTEMS

Cyber-attacks on water or wastewater utility business enterprises or process control systems can cause significant harm, such as:

- Upset treatment and conveyance processes by opening and closing valves, overriding alarms or disabling pumps or other equipment;
- Deface the utility's website or compromise the email system;
- Steal customers' personal data or credit card information from the utility's billing system; and
- Install malicious programs like ransomware, which can disable business enterprise or processcontrol operations.

These attacks can: compromise the ability of water and wastewater utilities to provide clean and safe water to customers, erode customer confidence, and result in financial and legal liabilities.

BENEFITS OF A CYBERSECURITY PROGRAM

The good news is that cybersecurity best practices can be very effective in eliminating the vulnerabilities that cyber-attacks exploit. Implementing a basic cybersecurity program can:

- Ensure the integrity of process control systems;
- Protect sensitive utility and customer information;
- Reduce legal liabilities if customer or employee personal information is stolen; and
- Maintain customer confidence.

CHALLENGES FOR UTILITIES IN STARTING A CYBERSECURITY PROGRAM

Many water and wastewater utilities, particularly small systems, lack the resources for information technology (IT) and security specialists to assist them with starting a cybersecurity program. Utility personnel may believe that cyber-attacks do not present a risk to their systems or feel that they lack the technical capability to improve their cybersecurity.

Basic cybersecurity best practices can be carried out by utility personnel without specialized training, and user-friendly resources are available to help. You just have to know how to start and where to look!

CHECKLIST FOR CYBERSECURITY

IDENTIFY

- Keep an inventory of control system devices and ensure this equipment is not exposed to networks outside the utility
 - Never allow any machine on the control network to “talk” directly to a machine on the business network or on the Internet
- Write down the roles and responsibilities of all personnel including Managers, Operators, Clerks, Superintendents, Council Members, and Suppliers
- Identify the critical service of the utility and the minimum requirements to support the delivery of the critical service
- Identify the legal and regulatory requirements of the utility
- Conduct a risk assessment that identifies asset and data vulnerabilities, internal and external vulnerabilities, and the potential business impacts
 - Assets include physical assets, including computers, mobile devices
 - Data may include personal information related to customers or operations information
- Establish a risk management strategy that identifies the level of protection required for different information and operation and provides the implementation strategy to protect the information and operations and subsequently monitor the protection.

PROTECT

- Segregate any SCADA networks from business networks and apply firewalls
 - Classify IT assets, data, and personnel into specific groups, and restrict access to these groups.
- Use secure remote access methods
 - A secure method, like a virtual private network, should be used if remote access is required.
- Establish roles to control access to different networks and log system users
 - Based on job functions (role-based)
 - Lock the screen on computers when leaving the area
 - Keep devices physically locked up while travelling
- Require and enforce strong passwords and password management practices and policies
 - Use strong passwords, at least 8 characters
 - Have different passwords for different accounts.
 - Requires passwords to be changed regularly
 - Remember passwords; do not write them down
- Stay aware of vulnerabilities and implement patches and updates when needed
 - Monitor for and apply IT system patches and updates.
 - Update antivirus software on all devices
- Enforce policies for the security of devices
 - Limit the use of mobile devices on your networks and ensure devices are password protected.
- Have an employee cybersecurity training program
 - All employees should receive regular cybersecurity training

- Do not open unsolicited or unknown emails
- Involve utility executives in cybersecurity
 - Organizational leaders are often unaware of cybersecurity threats and needs.

DETECT

- Monitor for anomalies and events
 - Establish a baseline of network operations and expected data flow, analyze detected events to understand targets and methods, and determine the impact of the event
 - Establish when an incident gets reported (alert thresh-hold)
 - See attached Steps for Responding to a Suspected Cyber Incident at a Water or Wastewater Utility
- Continuously monitor for network intrusions and have a plan in place to respond
 - Monitor the physical environment, personnel activity, external service provider activity, unauthorized personnel, connections, devices and software
 - Perform vulnerability scans
 - Be capable of detecting a compromise quickly and executing an incident response plan.
 - Stay informed on latest risks
- Implement detection processes
 - Define the roles and responsibilities for detection and communicate the event detection information
 - Test the detection process
 - Register for cyber security alerts and advisories from water sector and government partners
 - Ensure the control system network is separated from the public network

RESPOND

- Develop a Response Plan to ensure that staff is aware of security policies and incident response/notification procedures
 - See attached Steps for Responding to a Suspected Cyber Incident at a Water or Wastewater Utility
- Communicate
 - Incidents are reported and information is shared in accordance with the established criteria
- Analysis
 - Investigate and categorize the incidents
 - Establish procedures to receive, analyze and respond to vulnerabilities
- Contain and mitigate the incident

RECOVER

- Develop a Recovery Plan that includes processes and procedures to ensure the restoration of systems and assets affected by the incident
- Improve recovery and update recovery strategies by incorporating lessons learned
- Communicate recovery activities to internal and external stakeholders, managerial teams, and the public

STEPS FOR RESPONDING TO A SUSPECTED CYBER INCIDENT AT A WATER OR WASTEWATER UTILITY

Response

1. Disconnect compromised computers from the network. Do *not* turn off or reboot systems.
2. Assess the scope of the compromise, and isolate all affected IT systems.
3. Open a ticket with your antivirus software or security service vendor.
4. Assess any potential damage, including impacts to treatment processes or service disruptions.
5. Initiate manual operation of equipment if control systems have been compromised.
6. Distribute any advisories or alerts to customers as needed, including customers whose records may have been compromised.
7. Identify methods to scan all IT assets to eradicate malicious code. Assess and implement recovery procedures.

Reporting

1. Report the incident to local law enforcement and the primary oversight agency (typically, the state).
2. Contact the National Cybersecurity and Communications Integration Center (NCCIC) at 888-282-0870 or NCCIC@hq.dhs.gov. NCCIC can assist your utility with identifying and restoring affected systems, coordinating federal assistance, and improving security.
3. Submit an incident report through [WaterISAC \(analyst@waterisac.org\)](mailto:analyst@waterisac.org); 866-H2O-ISAC).

IMPORTANT CONTACT INFORMATION

Role	Point of Contact	Phone Number	Email
IT service vendor			
Local law enforcement	Putnam County Police Department	765-653-3211	Sheriff.info@co.putnam.in.us
State agency	Travis Goodwin, IDEM Security and Counter Terrorism Coordinator	317-775-5473	tgoodwin1@idem.in.gov
National Cybersecurity and Communications Integration Center (NCCIC)		888-282-0870	NCCIC@hq.dhs.gov
WaterISAC		866-426-4722 (866-H2O-ISAC)	analyst@waterisac.org

For More Information

For more information on available cybersecurity guidance and resources:

- [WaterISAC 10 Basic Cybersecurity Measures: Best Practices to Reduce Exploitable Weaknesses and Attacks](#)
- [Department of Homeland Security Critical Infrastructure Cyber Community Voluntary Program](#)
- [American Water Works Association \(AWWA\) Cybersecurity Guidance and Tool](#)
- <https://www.epa.gov/homeland-security-research/water-system-security-and-resilience-homeland-security-research>



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