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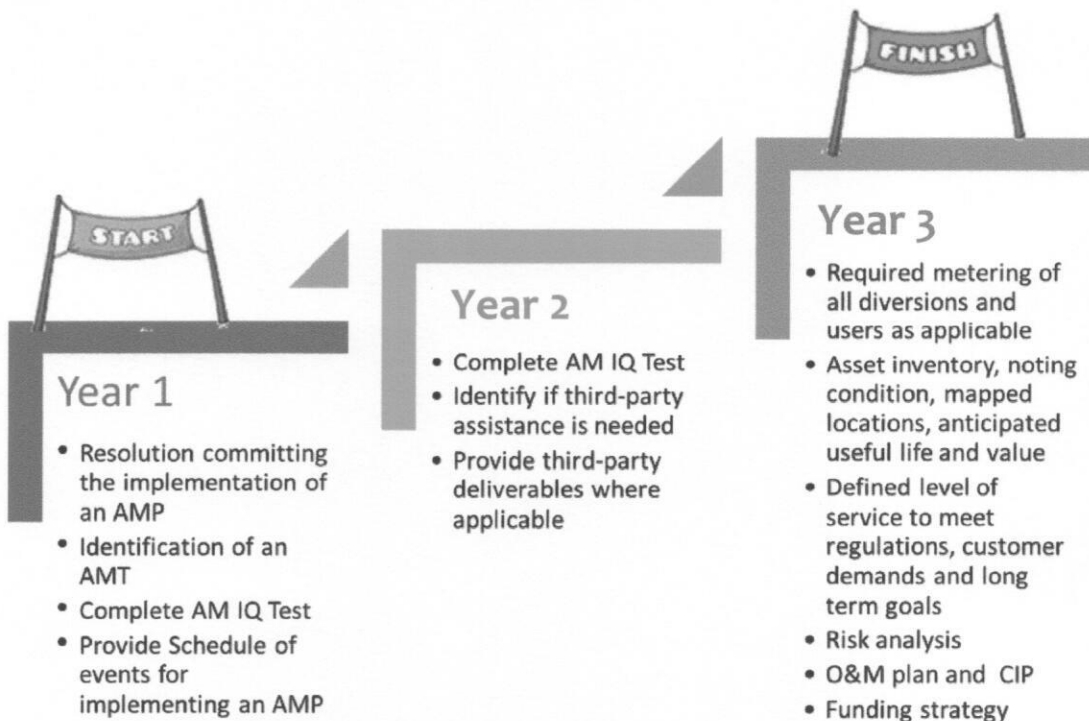
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Executive Summary

Beginning with the 2014-15 application cycle, several funding agencies are requiring as part of the funding application, documentation showing that the applicant is in the process of developing an asset management plan. Such funding agencies include the New Mexico Finance Authority (NMFA) and the Water Trust Board (WTB). The goal of the asset management plan allows is to provide the utility provider a framework to operate, maintain, rehabilitate and replace infrastructure in the most cost effective manner to ensure a sustained level of service at the lowest life cycle cost. In preparation for the asset management planning requirement by the funding agencies, Alto Lakes Water and Sanitation District (ALWSD) initiated the asset management documentation process.

ALWSD reviewed NMFA's and WTB's asset management requirements and is aware of the implementation schedule that requires the following to be accomplished over the next three years:



Commitment

ALWSD has committed to the implementation of an Asset Management Plan by putting in motion the required activities to complete the plan in the allotted three years. The development of this implementation plan conducted in conjunction with the development of a preliminary engineering report and a master plan, ensuring alignment with the infrastructure needs identified in the engineering report and master plan.

A resolution committing to the implementation of the plan will be presented to the District for review and adoption.

An internal Asset Management Team (AMT) was identified as including Mr. David Eddington (Manager) and Mr. Steve Osborne (Operator).

The ALWSD's AMT is committed to lead and follow through with the development and implementation of an asset management plan. This commitment involves identifying resources to implement the program, focusing on making cost-effective decisions, and providing a sustainable level of customer service. The Team will work together to solve problems and think critically about the asset management process, develop ideas and opportunities for sharing information and work to implement asset management within the ALWSD.

Mission

The Alto Lakes Water & Sanitation District is committed to meeting the water, wastewater, and solid waste needs of the residential community and the golf course, now and in the future.



1. Introduction and Overview

This plan follows the structure and objectives of the *A.M. Kan Work Manual* developed by Southwest Environmental Finance Center and the asset management report criteria requested by the infrastructure project funding agencies of the State of New Mexico.

There are five core components of the *A.M Kan Work* asset management framework and this report presents ALWSD's data processes as they relate to:

1. Current State of the Assets
2. Level of Service
3. Critical Assets
4. Life Cycle Costing
5. Long-term Funding Strategy

These core components are guiding principles which, when implemented as a coherent whole, result in a comprehensive infrastructure asset management plan. This Asset Management Plan sets forth the methodology, process, and approach for complying with the funding agencies' requirements.

AWSD initiated the development of an asset management plan by addressing the required activities, which included:

- ✓ Adoption of a resolution committing to AM within the Alto Lakes Water and Sanitation District
- ✓ Forming an Asset Management Team to develop and lead Alto Lakes Water and Sanitation District's implementation effort
- ✓ Conducting several baseline assessments as a benchmark for measuring advancement of the AM Process.

During this phase, the AMT identified level of service goals and an implementation schedule, both presented in their respective sections of this document. Level of service goals were determined through discussion with the AMT and were established to be realistic and measurable.

General Overview and Planning Area

Alto Lakes Water and Sanitation District is a water district located in Lincoln County. The community of Alto is a planned, residential and recreational community covering almost 1,700 acres across two mountain ridges. Alto Lakes was conceived and developed by Don Blaugrund beginning in 1967. At the heart of the community is the Alto Lakes Golf & Country Club which includes a private 18-hole golf course, dining, swimming and tennis facilities. ALWSD provides water, wastewater and solid waste services for the Alto Lakes community, Kokopelli subdivision, and Eagle Creek II subdivision.



Alto Lakes Water and Sanitation District Preliminary Asset Management Plan

As a water and sanitation district, the purpose of the ALWSD is to:

“... improve the public health of rural communities in New Mexico by providing for the establishment and maintenance of a political subdivision of the state that is empowered by the state to receive public funds for acquisition, construction and improvement of water supply, reuse, storm drainage and wastewater facilities in communities, and to operate and maintain such facilities for the public good.”

– NMSA 1978 3-29-1

ALWSD must comply with various legal requirements to build, operate and maintain a reliable water supply, wastewater collection and treatment and solid waste system. Such requirements include that the board members are trained in the topics of the general responsibilities of governing bodies, safe drinking water act, New Mexico drinking water regulations, New Mexico water system operator requirements, the Open Meetings Act and Inspection of Public Records Act, the State Audit Act and Procurement Code, State Engineer reporting requirements, and basic accounting, budgeting and rate setting.

Service Area

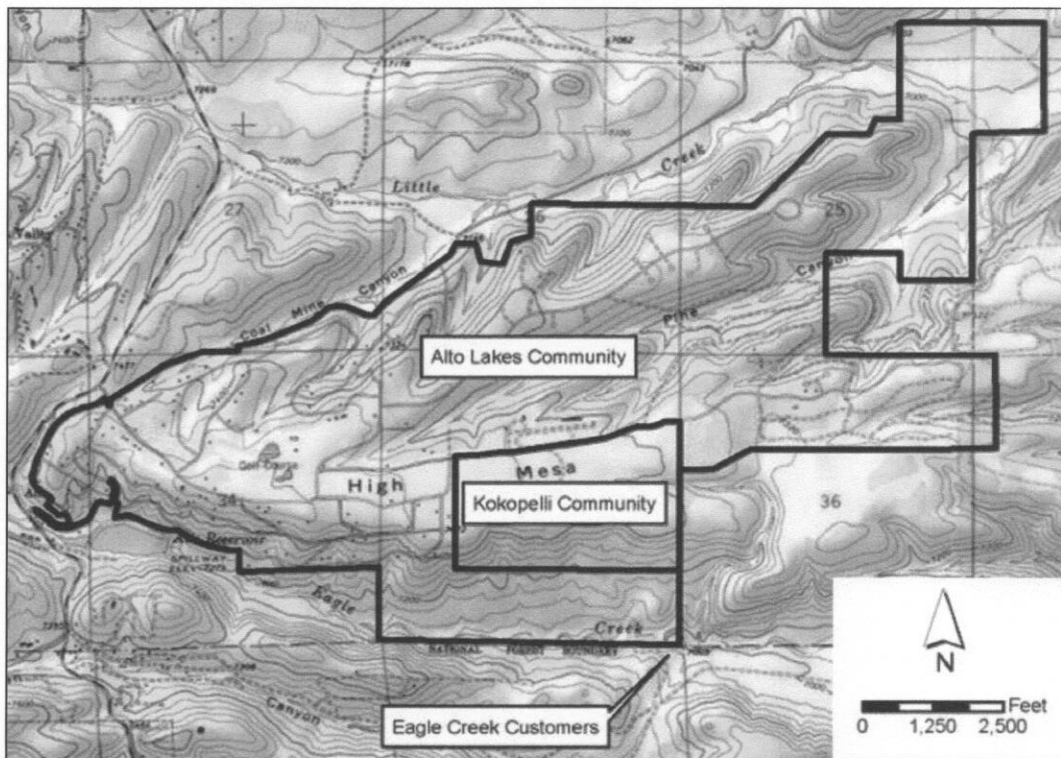


Figure 1. Alto Lakes W&SD Service Area Map

Alto Lakes Water and Sanitation District Preliminary Asset Management Plan

The District serves an area of approximately 3.15 square miles, extending almost 3.3 miles east west and about 2.3 miles north south. The service area includes the residential community of Alto Lakes subdivision and the Alto Lakes Golf and Country Club (ALGCC). The service area ranges in elevation from 6,915 to 7,550 feet above sea level. The customer base includes a high number of vacation homes which seasonally utilize the golf course and country club facilities. Currently, the Alto Lakes subdivision is approximately 50% built-out, with just over 1,200 of the 2,200 lots occupied.

Three-year Asset Management Plan

Over the next three years, ALWSD is committed to improve their implementation of asset management principles and policies. Through the asset management IQ test and evaluation of how asset management is currently taking place, specific areas of improvement were identified. The following implementation schedule identifies when those key areas will be addressed over the next three years.

Alto Lakes WSD Asset Management Implementation Plan				
Core Component	Action Items	Year 1	Year 2	Year 3
Current State of the Assets	Complete the asset inventory, such as condition assessment and approach to maintaining data			
	Refine useful life estimation			
	Refine replacement value determination			
	Continue tracking energy usage			
Level of Service	Initial LOS goals and performance assessment			
	Communicate goals to customers			
	Measure progress towards goals and update as necessary			
Critical Assets	Formalize definition of critical assets and asset failure			
	Document the process of prioritizing asset investment and O&M decisions			
	Document process for considering non-construction solutions			
Life Cycle Cost	Develop and systematize work order system and cost tracking			
	Develop asset repair or replacement strategy			
Long Term Funding	Conduct comprehensive utility rate study and long term funding needs evaluation as done previously every our years.			

Table 1. Asset Management Plan Implementation Schedule

Alto Lakes Water and Sanitation District Preliminary Asset Management Plan

Baseline Assessment

ALWSD has committed to the implementation of an Asset Management Plan by putting in motion the required activities to complete the plan in the allotted three years. An internal asset management team that will lead the development of the asset management plan. The team consists of David Eddington, Manager, and Steve Osborne, Operator.

AM Kan Work IQ Test

The AMT completed the initial Asset Management IQ test as required by New Mexico Finance Authority (NMFA) and Water Trust Board (WTB) and the results indicate a strong understanding of asset management concepts with regards to financing and a good understanding with regards to levels of services and life cycle cost concepts. Even with the higher scores in the aforementioned categories, this baseline assessment identified areas where ALWSD could improve, such as the documentation of critical assets and communication of the District's asset management program to the community. Developing an asset management plan will assist with the communication of the program throughout the community.

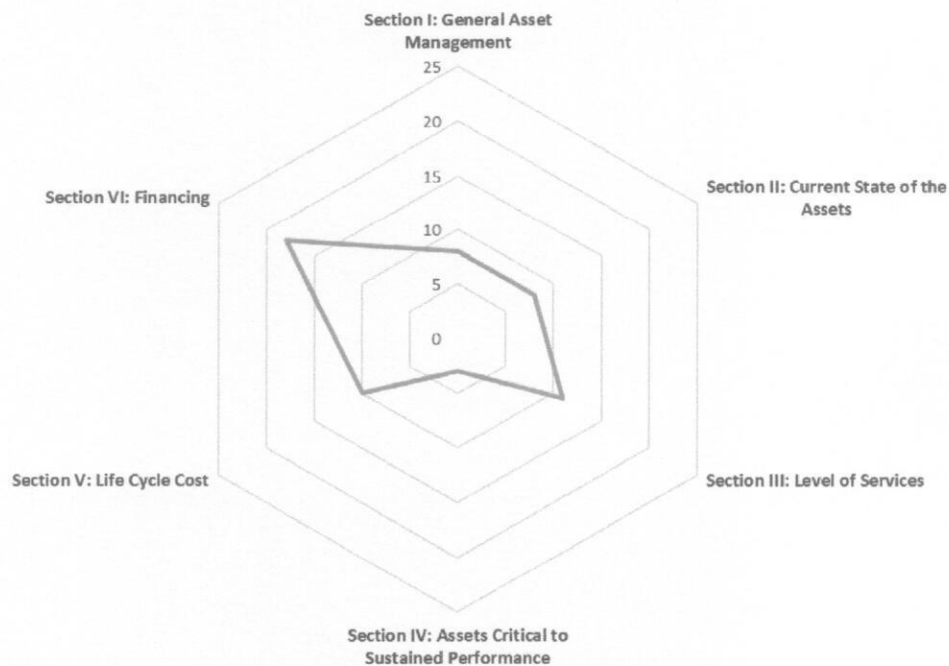


Figure 2. Asset Management IQ Results

Alto Lakes Water and Sanitation District Preliminary Asset Management Plan

Section	4/21/2016
General Asset Management	8
Current State of the Assets	8
Level of Service	11
Assets Critical to Sustained Performance	3
Life Cycle Cost	10
Financing	18
Total (out of 150 points)	58

Table 2. Asset Management IQ Section Scores



Figure 3. Asset Management IQ results summary



Alto Lakes Water and Sanitation District Preliminary Asset Management Plan

Baseline data gathering

In addition to completing the required asset management IQ test, ALWSD provided additional documents to assist with the development of the asset management plan. These documents included:

- Previous master plans
- Preliminary engineering reports
- 2016 Master Plan
- 2015 Water Conservation Plan
- System maps prepared by Parkhill Smith and Cooper
- Financial data
- Electrical costs

2. Asset Inventory – Current State of the Assets

a. Definition of Assets

The definition of an asset, as determined by the AMT is:

- Equipment having a cost of \$2,500 or greater and therefore documented as a fixed asset, or
- A Maintenance Managed Item (MMI) which is equipment that may cost less than \$2,500 but requires long term maintenance.

A MMI is defined as the smallest unit of equipment or grouping of equipment that would be considered an asset, typically identified as something that would receive an asset identification number to enable work order and information tracking.

b. Asset Inventory

Presented in the following respective sub-sections, are overviews and maps of the water, wastewater, and solid waste systems. Provided in the appendix is the asset inventory list that includes attribute information pertaining to:

- Asset ID** – sequential number system of the asset.
- Asset Name** – type of asset.
- Asset Location** – GIS data natively is geographic in nature and therefore stores locational information.
- Asset Condition and Performance** – a preliminary condition rating was assigned to the assets based on a 1 through 10 scale, with 10 being the poorest condition.
- Asset Remaining Useful Life** – calculated based on useful life tables.
- Asset Replacement Value and if available, Current Asset Value** – to be documented as part of the long-term implementation plan.
- Type and Amount of Energy Usage of the Asset** – to be documented as part of the long-term implementation plan.

c. Asset Mapping and Inventory Maintenance Plan

As part of this effort, the District's utility assets were mapped in a geographic information system (GIS). The asset mapping will be updated as part of the engineering design phase when new assets are designed or existing assets are improved. Asset maps will be maintained in GIS with third party assistance.

d. Asset Maps

Asset mapping is provided in the respective write-ups for water, wastewater, and solid waste.



Water Distribution Asset Network

ALWSD's water distribution system consists primarily of 2, 3 and 4-inch diameter pipe dating to the 1960s and 1970s, with some segments of 6 and 8-inch pipe. In 2012, an 8-inch waterline was installed (including necessary pressure reducing stations) to replace the existing waterline along French Drive, Deer Park Drive and High Mesa Drive from the water tanks towards the east end of the line. In 2015, the District upgraded waterlines on Midiron Drive and Deer Valley Drive to facilitate fire flows in those areas. The system has over 25 pressure reducing stations to regulate pressure.

Water is pumped from supply wells to a 60,000-gallon storage tank prior to treatment. Water is drawn from the storage tank through an iron and manganese treatment system, stored in a 6,000-gallon finish storage tank at the treatment plant and chlorinated prior to being pumped into the two main storage tanks. Water is drawn from the main storage tanks and pumped to the distribution system through an adjacent booster station.

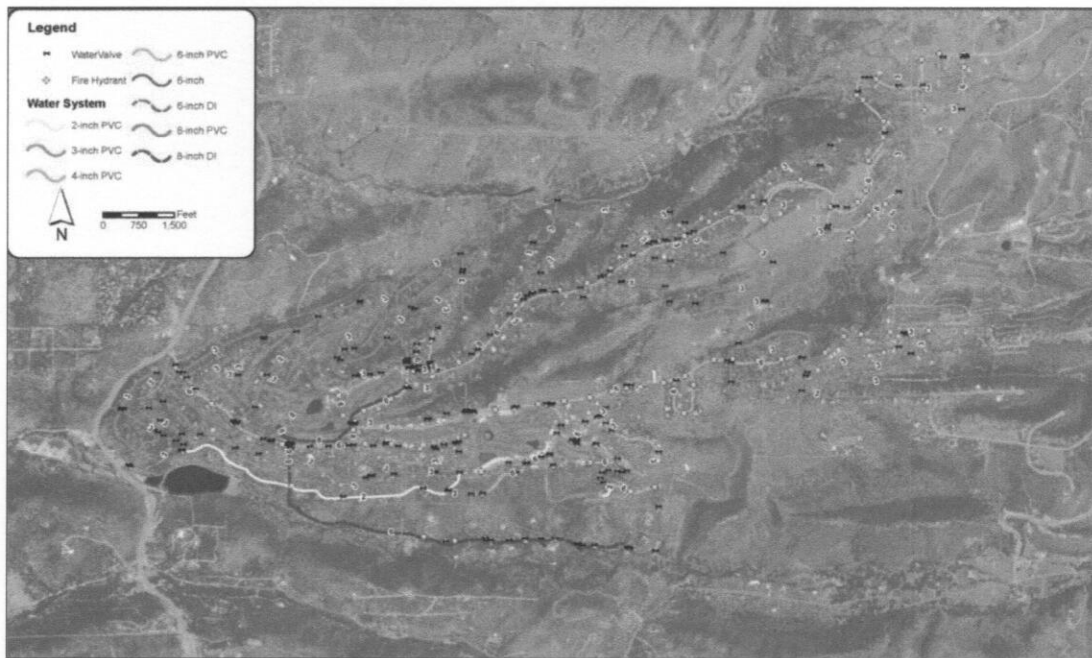


Figure 4. Alto Lakes W&SD Water System

Alto Lakes Water and Sanitation District Preliminary Asset Management Plan

Asset Type	Quantity, LF
Distribution lines	
2-inch PVC	7,244
3-inch PVC	11,702
4-inch PVC	178
6-inch PVC	65,017
8-inch PVC	18,412
Transmission lines	
6-inch Ductile Iron	14,129
8-inch Ductile Iron	4,600
8-inch HDPE	12,696
Water Supply & Storage	
Water supply wells	4
Irrigation wells	3
Storage tanks	4
Other assets	
Water treatment system	1
Booster station	1
Pressure relief valves	25
Fire hydrants	111

Table 3. Alto Lakes W&SD Water System Summary

Wastewater Asset Network

This system includes 74 residential connections (condominiums) and 3 commercial connections. The sewer line which serves the condominiums runs along Midiron Drive, from the WWTP to the Moss Lift Station. The sewer line serving the clubhouse flows from the clubhouse north to the WWTP. The sewer collection system consists of three segments:

1. Gravity flow west to the WWTP from the west end of the condominiums;
2. Gravity flow north to the WWTP from the Alto Lakes GCC clubhouse and;
3. Gravity flow from the central portion of the condominiums to the east into the Moss Lift Station, then pumped back west to the WWTP via 1,500' of force main piping.





Figure 5. Alto Lakes W&SD Wastewater System

Asset Type	Quantity, LF
Collection system	
Gravity	3,990
Forcemain	1,490
Other assets	
Lift stations	2
Clean outs	1
Manholes	22

Table 4. Alto Lakes W&SD Wastewater System Summary

Solid Waste

The District-owned solid waste convenience station is a secured facility, permitted and operated by the District. All containers on-site are maintained by the District. In 2009, the District completed \$175,000 in improvements to the solid waste center. The facility which is secured and staffed on a regular basis, accepts household waste, recyclables, bulk waste, metal, and green waste.

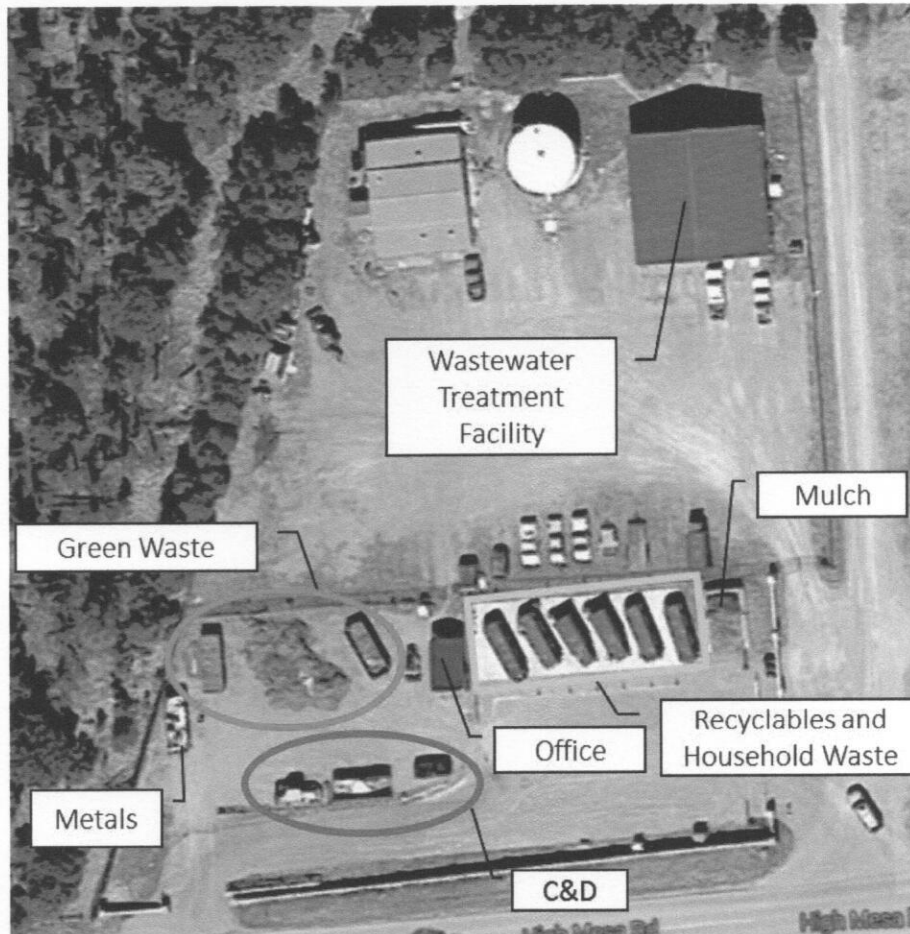


Figure 6. Alto Lakes W&SD Solid Waste Collection Center

Initial Condition Assessment

The initial condition of the assets was based on the estimated installation dates. Although the exact installation dates of the assets are not known, the District knows when different phases of the community were built. Using the map shown on the next page, assets located within the respective phases were assigned the corresponding installation date. Of course, assets installed more recently were assigned the appropriate installation date.

The AMT recognizes that in addition to asset age, environmental variables such as water quality and soil conditions are affecting the asset condition. ALWSD operators are aware of how assets degrade over time and will be developing a method for systematically documenting and tracking asset condition over time. For the development of this initial asset management plan, age will be the primary indicator of condition.



Figure 7. Approximate Installation Year

Presented below are summaries of the asset condition based on age. Condition was calculated based on the residual life and assigned a value ranging from 1 to 10, with a score of 1 indicating “excellent” condition to a score of 10 indicating “poor/failure” condition.

Age-based Asset Groups Condition Assessments

Fire Hydrants

Based on the District’s fire hydrant maintenance records, the District has 111 fire hydrants with estimated installation dates ranging from the 1970s to 2015. The most recently installed fire hydrants were part of the distribution B water system improvement project during which 35 hydrants were installed. Given the installation dates and using 60 years as the life span of a fire hydrant, the recommended replacement dates range from 2020 to 2065.

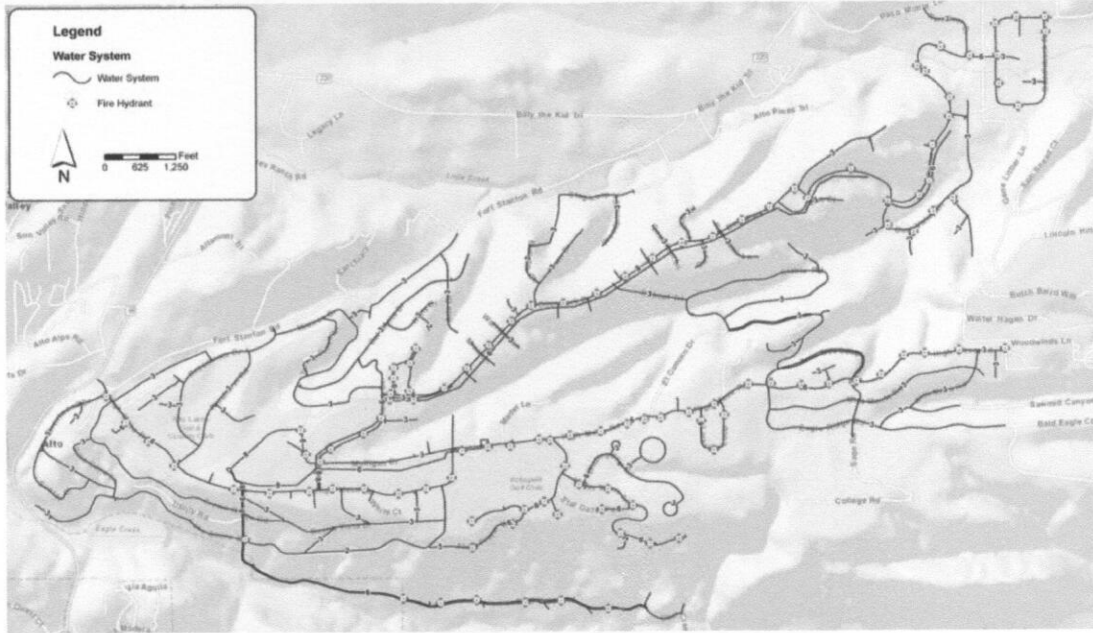


Figure 8. Water System Fire Hydrant Map

Using age as an indicator, the distribution of fire hydrants on a 1 to 10 scale of condition, identifies that 93% of the assets are in above average condition, i.e. have a score below 5. The 7% of the fire hydrants that rate below average should be monitored and replaced as necessary.

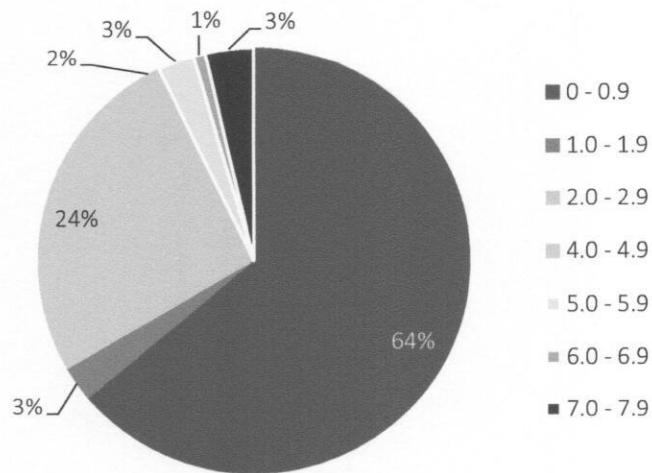


Figure 9. Condition Distribution of Fire Hydrants

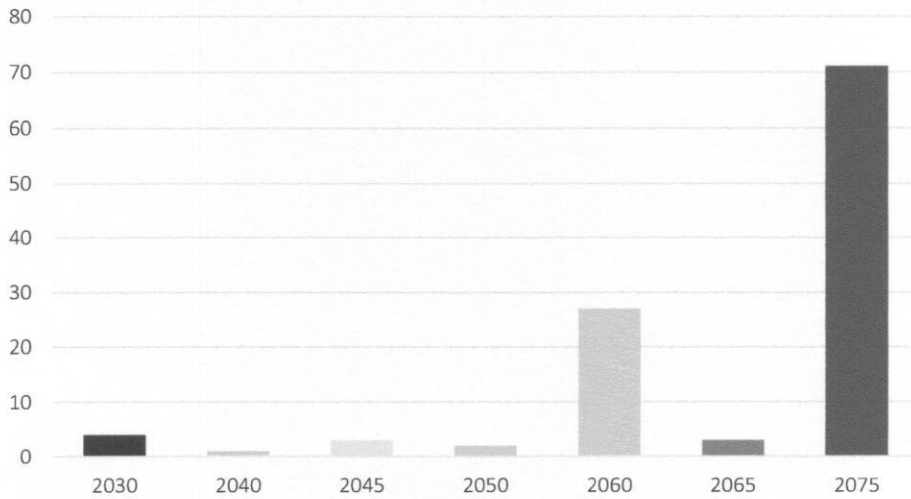


Figure 10. Fire Hydrant Replacement Schedule

Valves

Based on the asset inventory, the District has over 200 valves with estimated installation dates ranging from the late 1960s to early 2012. This data indicates that 118 valves exceed the assumed 40-year lifespan of a valve. Therefore, 57% of the valves have a condition rating of 10 and should be replaced soon. Recent efforts to replace aging valves included the replacement of 13 valves in 2010 and 18 valves in 2012.

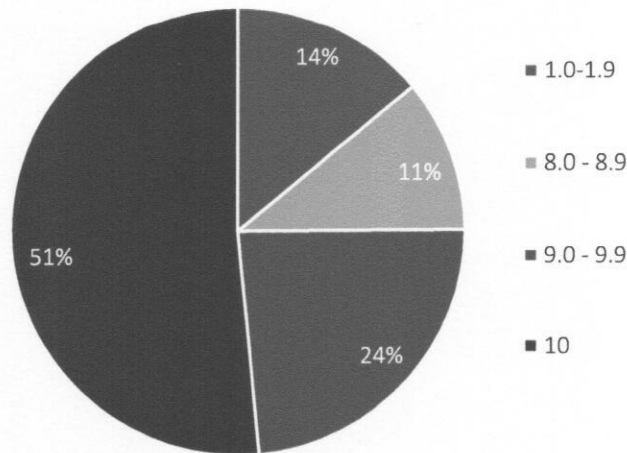


Figure 11. Condition Distribution of Water Valves

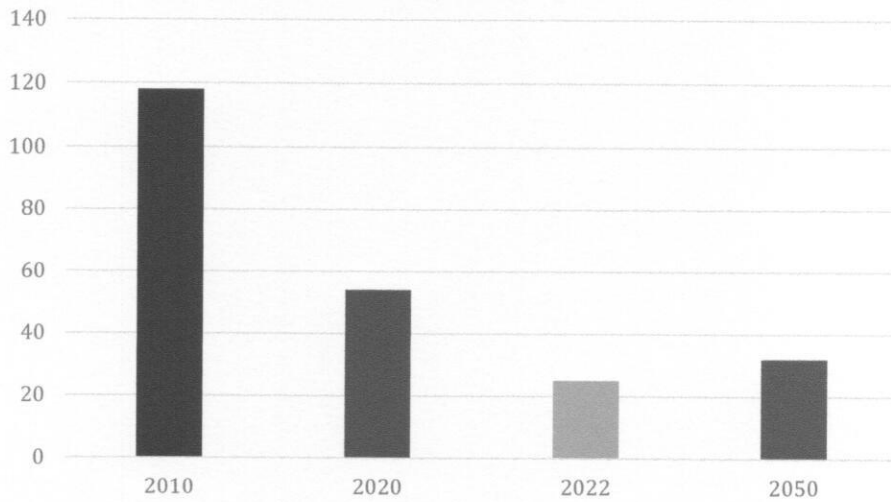


Figure 12. Valve Replacement Schedule

Pressure Release Valves

ALWSD has 20 pressure reducing valves (PRVs) installed between 1967 to 2012. The recent waterline improvement along French Drive, Deer Park Drive and High Mesa Drive from the water tanks towards the east end of the line included the installation of PRVs. Based on age, over 50% of the valves should be evaluated for performance as they are nearing or have exceeded the design life of 40 years.

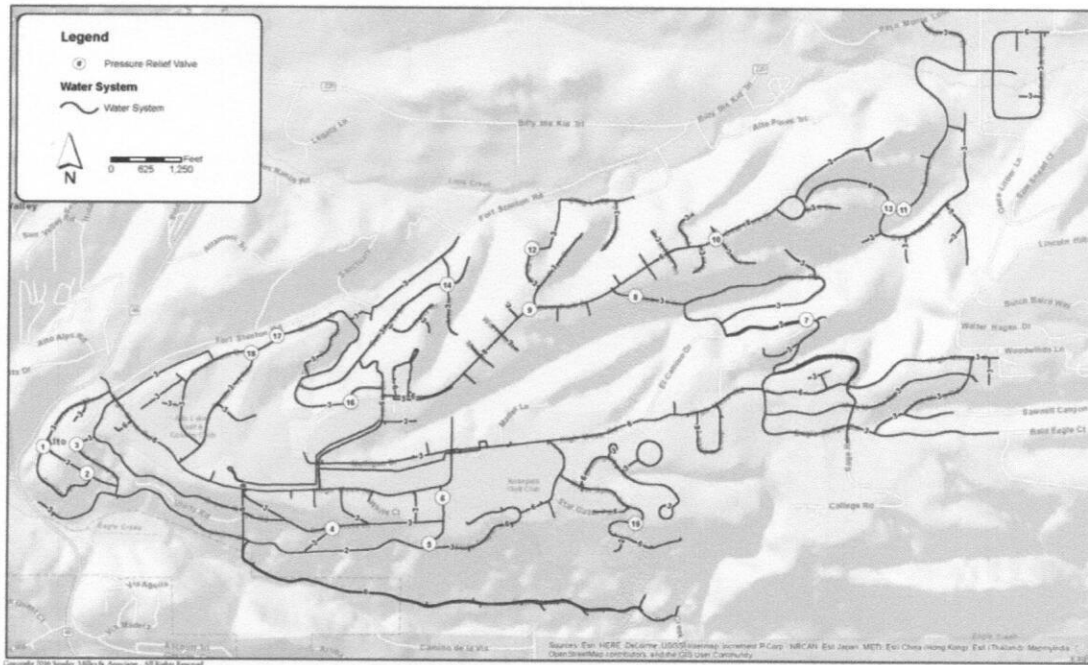


Figure 13. Water system PRV Map

The District is in the process of repairing and replacing inoperable PRV's and installing new PRV's to manage pressure zones within the service area.

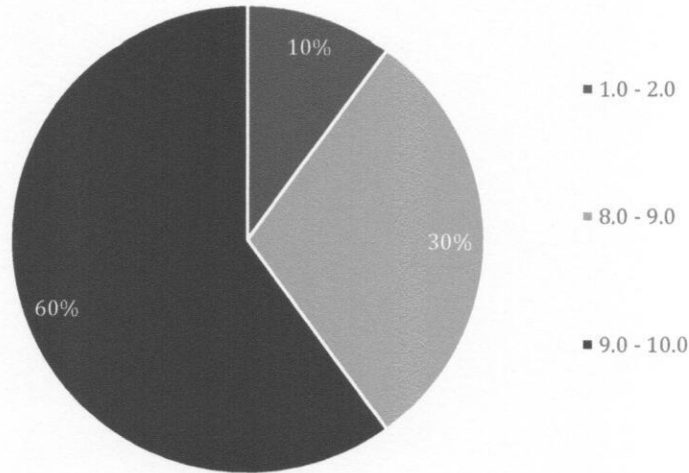


Figure 14. Condition Distribution of Pressure Release Valves

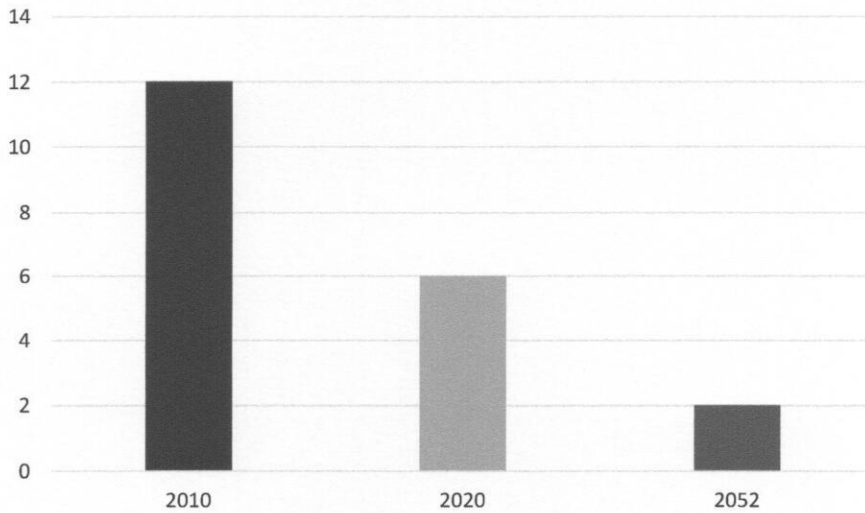


Figure 15. Pressure Release Valve Replacement Schedule

Waterlines

Based on the asset inventory, the District has 21.5 miles of waterlines with estimated installation dates ranging from the late 1960s to 2012. Using 75 years as the lifespan of a waterline, the replacement dates for the pipes range from 2042 to 2087 and with corresponding condition ratings ranging from 0.5 to 6.5, with 62% of the waterlines being of

above average condition, i.e. have a score below 5 and the remaining 38% being of below average condition.

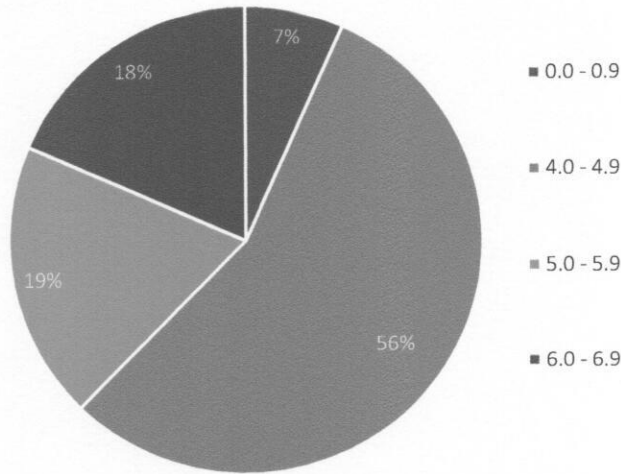


Figure 16. Condition Distribution of Waterlines

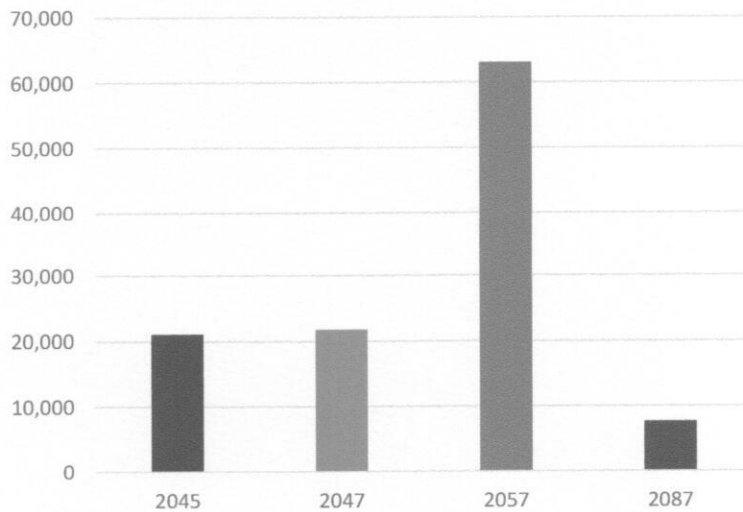


Figure 17. Waterline Replacement Schedule

The 2008 Water System Improvements PER recommended a series of improvements identified as Phases I through VI to replace small and substandard piping to improve fire flow

throughout the District. Alternative A was completed in 2012. Distribution B was completed in 2015.

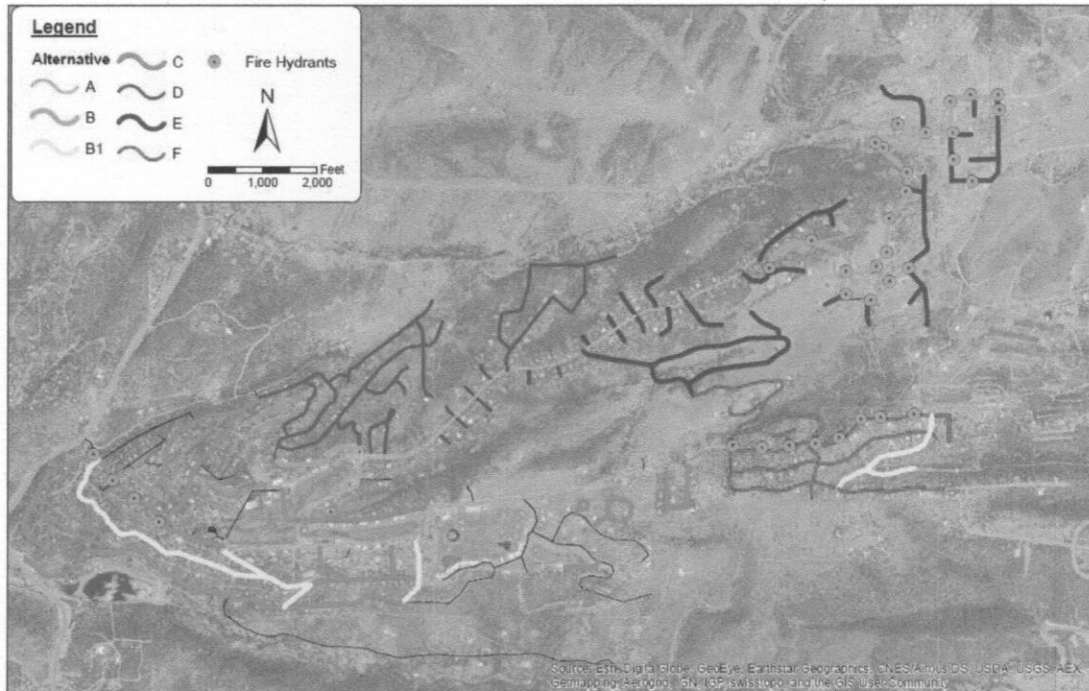


Figure 18. Water System Phase Improvements

Water Tanks

Based on age, the condition of both tanks is rated a 5.5 since the tanks were constructed over forty years ago. Due to the criticality of this asset, the condition of the tanks should be closely monitored.

In 2013, Parkhill, Smith and Cooper, Inc. prepared a preliminary engineering report proposing the rehabilitation and replacement of existing ground water tanks originally installed in 1975. In 2005 and 2008, both tanks were inspected. A 2004 inspection consisted of a visual inspection, while a 2008 inspection consisted of both a visual and a dive inspection. The 2008 report stated that the exterior coating for both tanks was in good condition with little to no corrosion being present, but the interior of both tanks were found to be in poor condition with heavy corrosion and pitting. In addition, both the 2004 and 2008 reports stated that some of the water tank appurtenances were not up to current Occupational Safety and Health Administration (OSHA) and American Water and Wastewater Association (AWWA) standards and need upgrading.

The 2013 PER recommended that the existing 150,000-gallon steel ground water storage tank be demolished and replaced with the construction of a new 500,000-gallon ground water storage tank in the same location. This approach has the benefit of providing space for future

expansions on the tank site. The 300,000-gallon storage tank would be rehabilitated to address interior corrosion and exterior lead issues.

Wastewater Collection System

Due to the lack of details, the wastewater collection system as a whole was reviewed in terms of condition and replacement timeframe. Based on age, the sewerlines and manholes are in above average condition.

The District is scheduled to inspect the manholes and adjoining sewer lines in order to better document and assess the condition of the wastewater collection system.

Asset	Replacement Year	Condition
Sewerlines/Forcemains	2055	4.8
Lift Stations	2030	7.2
Manholes/Clean-outs	2080	3.6

Table 5. Wastewater System Asset Replacement and Condition Summary

Solid Waste Convenience Center

Since the solid waste collection containers are provided by an independent contractor, those assets are not included in this plan. In 2009, the District assumed management and operation of the center and invested \$75,000 to improve and upgrade operations and efficiencies. The upgrades included:

- New signage and traffic control
- A new gatehouse
- Skid loader

Since these assets are less than ten years old, the initial condition assessment of all assets are above average.

Current State of the Assets Summary

The majority of the District's asset inventory has been mapped in a geographic information system (GIS) and includes a basic asset registry. The data will be updated at least annually and possibly updated by a consulting engineer as part of the delivery of project as-builts.

As the data becomes more complete and refined, calculations associated with useful life estimation, replacement value determination will be improved.

3. Levels of Service

Level of service (LOS) is the level at which the District plans to provide services related to water treatment and distribution, wastewater collection and treatment, and solid waste management. At a minimum, the core levels of service that the District has in place is meeting regulatory requirements to safely provide such services. Beyond the regulatory requirements, the District has limited documentation on level of service goals.

ALWSD is committed to providing the community with safe drinking water, sanitary services and solid waste collection. As a result, the AMT developed the initial list of list of level of service goals provided below.

a. and b. LOS Goals, Performance Measures and Review Frequency

Water Distribution Asset Network

Goal	Performance Measure	Frequency of Review
Meeting regulatory requirements.	Regulatory requirements will be met 100%.	Annual
Maintain adequate water pressure in the distribution system.	System pressure measured at the booster station will be within 50-80 PSI 90% of the time.	Annual
Capture accurate water usage readings.	No meters will be in service for over 10 years or 1MG (whichever comes first).	Annual
Maintain valve reliability.	Exercise valves on an annual basis.	Annual
Maintain water quality throughout the water system	Flush lines quarterly.	Annual
Maintain fire hydrant reliability.	Flush and flow test fire hydrants semi-annually.	Annual by Fire Department
Maintain high level of customer service through prompt response to customers.	Respond to non-emergency customer requests within 8 hours.	Annual
Maintain high level of customer service through prompt response to customers.	Respond to emergency customer requests within 1 hour.	Annual

Alto Lakes Water and Sanitation District Preliminary Asset Management Plan

Wastewater Collection Asset Network

Goal	Performance Measure	Frequency of Review
Meeting regulatory requirements.	Regulatory requirements will be met 100%.	Annual
Maintain manholes.	Visually inspect manholes quarterly	Annual
Maintain lift stations.	Visually inspect lift stations daily	Annual
Keep wastewater treatment facility operational.	Operation wastewater treatment plant daily and have operational reliability of 95%.	Annual
Maintain leach field.	Visually inspect leach field daily.	Annual
Maintain alternate leach field.	Visually inspect alternate leach field discharge location quarterly.	Annual
Maintain regular water sampling schedule.	Complete weekly and monthly process control sampling.	Annual
Maintain high level of customer service through prompt response to customers.	Respond to non-emergency customer requests within 8 hours.	Annual
Maintain high level of customer service through prompt response to customers.	Respond to emergency customer requests within 1 hour.	Annual

Solid Waste Asset Network

Goal	Performance Measure	Frequency of Review
Meeting regulatory requirements.	Regulatory requirements will be met 100%.	Annual
Keep convenience center facility clean and safe	Clean up site daily and conduct fire prevention activities.	Monthly
Always have capacity in containers.	Full containers will be emptied/removed from the site within four days.	Monthly



Alto Lakes Water and Sanitation District Preliminary Asset Management Plan

Goal	Performance Measure	Frequency of Review
Provide sufficient storage for green waste.	200 CY and 2 containers will be made available.	Annual
Assist customers with trash transfer from their vehicles to the containers.	There will be fewer than five complaints a year from customers regarding having no assistance.	Annual
Maintain availability of mulch.	Mulch will be available at all times.	Annual

c. Frequency of Review

Once a year, the AMT will review their performance against the targets presented above. The results of the review can be communicated to the community through a variety of venues, including the District's website, CCR or at a public meeting. Based on the results, the AMT will evaluate whether the goals are still appropriate, if additional goals should be added and if the respective targets as appropriate.

d. Evaluate Current Water and Energy Conservation Efforts and Plan for Future Implementation of Water and Energy Conservation Efforts

Energy Conservation

The electrical costs associated with providing water and wastewater service have been tracked since 2010, specifically the following assets:

- Wells
- DPV
- Tank
- Shop
- WTP
- WWTP
- Lift stations
- Office

The total electrical costs since 2010 have ranged from \$131,205 to \$178,963, averaging \$152,591. Between 2013 and 2015, the District documented lower energy usage and therefore decreased electrical costs by 26% over those two years. The reduction was the direct results of lower water needs due to wetter and cooler Summers. Another factor that resulted in the reduction of energy usage was the installation of more efficient pumps at wells E2 and E5. It appears that the Variable Frequency Drive (VFD) controller at well E5 is resulting in savings of \$300 per month on average.



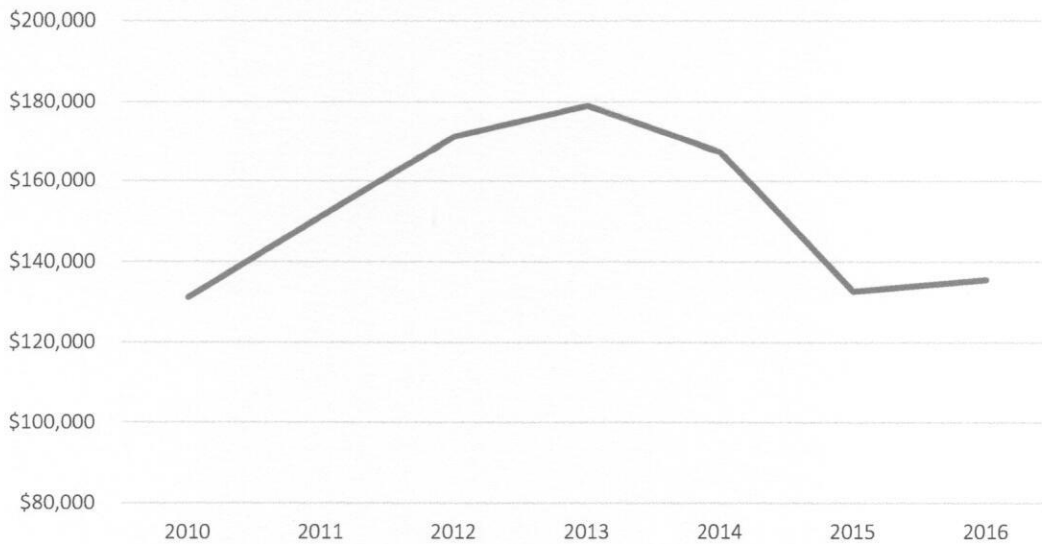


Figure 19. Historical Energy Costs

Water Conservation

A water conservation plan was prepared in 2015 and a 40-year water plan in 2016. The plans evaluated the District's water use and defined the plans for expansion of the water conservation program. As part of the conservation plan, the District completed an AWWA Water Audit and NMOSE GPCD analysis which resulted in a validity score of 85. The GPCD analysis indicated that District residents use an average of 74 GPCD. The ALWSD water demands have averaged 364 acre-feet per year (afy) over the past eight years, and are expected to grow 58% to around 576 afy in forty years.

As part of the effort to complete the water conservation plan, the District has adopted the following goals for the water conservation program:

- Reduce nonrevenue water to below 15% by 2025,
- Maintain residential gallon per capita day (GPCD) at or below 75 for the next five years,
- Reduce outdoor water use,
- Reduce water waste,
- Reduce peak summer demands for more efficient system operation and reduced energy use,
- Reduce pumping and treatment costs,
- Educate the public about water conservation, and
- Increase the water audit data validity score from 85 to 90 by 2025

ALWSD has a robust existing conservation program that includes watering restrictions based on projected supply and prohibition of water waste. In addition, the District adopted a stringent conservation ordinance that mandated the use of drip irrigation by December 31,

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2016. The recently completed plan and ordinance directly correlate to the District's goal to reduce residential per capita use, reduce outdoor water use, reduce water waste and reduce summer demands.

Levels of Service Summary

The District identified level of service goals for the water, wastewater and solid waste services provided to the community. In addition, the District recently completed a master plan and conservation plan. Both plans were developed to evaluate and identify recommendations to continue providing the high level of service by planning for future growth and needs.

Performance goals will be communicated to the customers and the District's performance will be assessed annually.

4. Prioritization – Critical Assets Analysis

a. Critical Asset Definition

The AMT defines a critical asset as one that upon failure or low performance, has the greatest negative impact on the ability of the District to stay on mission. To identify the critical assets, the AMT completed a criticality analysis by identifying the probability and consequence of failure of key assets.

An asset with a high probability of failure and high consequence is considered a very critical asset. Not only is that asset more likely to fail, but upon failure would prevent the District from delivering its desired level of service to the community. High risk assets require more attention in terms of maintenance and operation and generally receive priority if repairs or rehabilitation are required to keep the asset in working condition.

The AMT recognizes that some assets are more important than others. The critical assets were identified using the risk chart below by placing assets on the chart based on their probability and consequence of failure.

b. Defining Likelihood of Failure

An asset was given a score between 1 and 10 for probability of failure, with the lower score indicating a low probability. The probability of failure was primarily based on the current knowledge of the condition of the asset, such as run time, estimated age, repair history and anecdotal information.

c. Defining the Consequence of Failure

An asset was given a score between 1 and 10 for the consequence of failure, with the lower score indicating a low consequence. The consequence of failure was based on the effect the asset failure would have on the community. If redundancy is in place or alternative methods are available to provide the service, then interruption of service is minimal and therefore consequence of failure is low.

d. Accounting for Redundancy

Redundancy was accounted for in the scoring of the consequence of failure.

e. Overall Risk or Criticality

Asset criticality and risk was calculated as follows:

$$\text{Asset Criticality} = \text{PoF} \times \text{CoF}$$

Redundancy was accounted for in the CoF scoring

f. Criticality Matrix

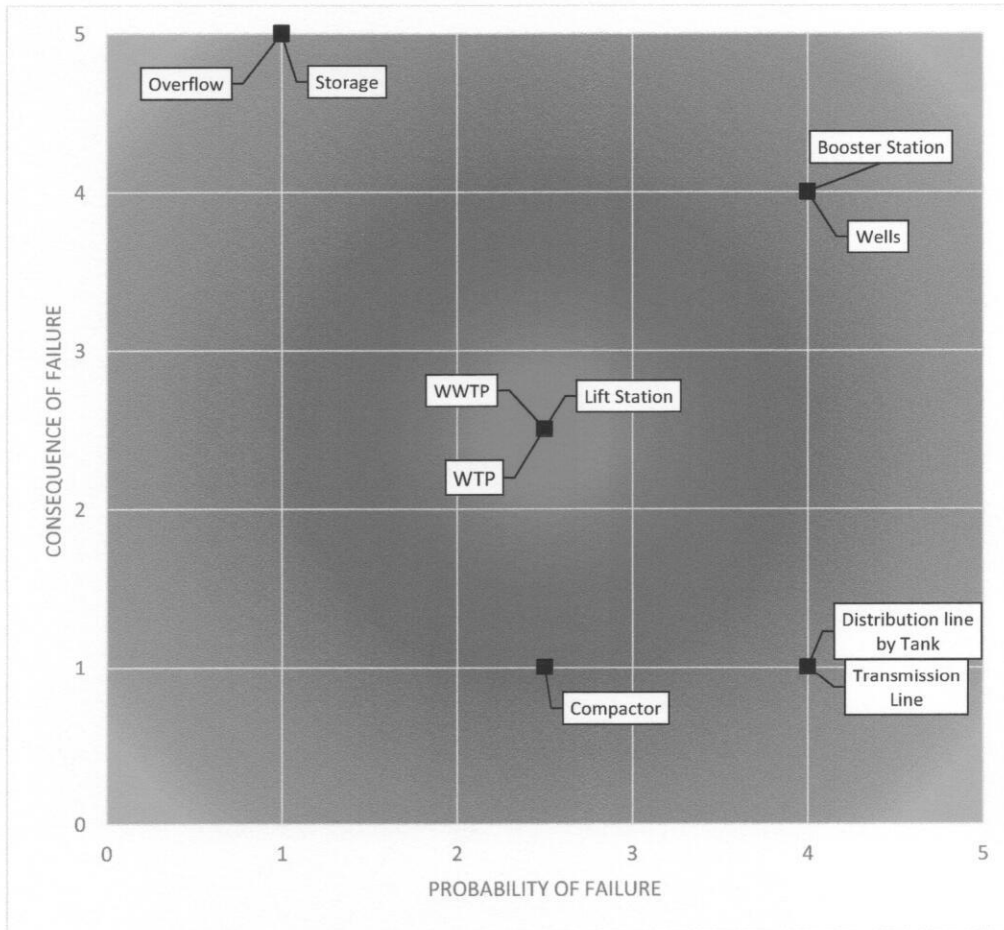


Figure 20. Criticality matrix

g. System for Prioritization

Based on the risk index value, the assets were categorized into low, medium and high priority assets.

Overall risk was calculated as a product of the probability of failure, consequence of failure and redundancy, resulting in a risk rating ranging from asset 0 to 25. An asset with a high

probability of failure and high consequence of failure with little to no redundancy would have a score close to 25. This calculation supports what is displayed on the criticality matrix that identifies the booster station and wells as being higher risk assets.

Risk Index	Priority
<5	Low
5 - 15	Medium
>15	High

Using the approach identified the booster station and wells as higher risk assets with scores over 15, thereby indicating that those specific assets should be considered a priority for future improvement projects.

Asset	Risk
Booster station	16
Wells	16
WTP	6.25
WWTP	6.25
Lift station	6.25
Overflow	5
Distribution line by tanks	4
Transmission line	5
Storage	5
Compactor	2.5

For example, the wastewater treatment plant does not have a redundant power supply in the event of power failure and should therefore consider the purchase a portable generator unit that could be used to power either the wastewater treatment facility or portions of the water supply system during power failure.

ALWSD is not without redundancy. There is looping in water distribution system, multiple water storage tanks, and backup generators for the well pumps that help minimize the consequence of failure in the event specific assets fail.

Other approaches used by the District to prioritize assets involves engaging operators and the Board in discussions on infrastructure improvement needs. The District prioritizes projects and develops an infrastructure capital improvement projects list as required by the State to qualify for funding opportunities. This is accomplished by:

- Identifying infrastructure needs based on staff/operator recommendations,
- Discussing and prioritizing within the public works department,

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- Presenting the recommended infrastructure improvement projects to the Board, and
- Reprioritizing the projects as necessary.

The District also completed a Master Plan in 2016 that evaluated the water, wastewater and solid waste systems and presented the District's Capital Improvement Plan (CIP) for accomplishing various recommendations for improvement, along with estimated costs and implementation schedule. The total water system CIP is slightly over ten million dollars during the next 20-year period, and the wastewater system CIP is slightly over four million dollars for the same period.

h. Plan for Updating the Asset List

On an annual basis, during the same time the levels of service goals are evaluated, the AMT will assess the asset list, plot the assets on the criticality chart, and update the risk index calculations and asset prioritization list.

Critical Assets Summary

To maintain the critical asset list, the District will establish the definition of a critical asset. Based on that definition, the District will review and update the critical asset list every year. Other activities that will be completed include documenting the process of prioritizing asset investment and O&M decisions which will include the consideration of non-construction solutions.

5. Life Cycle Costing

a. Cost accounting method

The measures to be included in the cost components are:

- Initial cost of installation
- Operation & maintenance (O&M) expenses
- Repair & rehabilitation costs

The initial approach to estimating future O&M costs is based on the run to failure model and therefore assumes that the asset will be operational through its theoretical expected life after which it will be replaced.

Initial Costs

The District documents the acquisition costs of their assets through the fixed asset tracking system and is able to obtain the planning and design costs from what is paid to consultants to provide those services.

OM&R Costs

Understanding the total cost of ownership of an asset can be managed effectively by performing systematic assessments and corresponding operations and maintenance activities on critical assets. Currently, the District documents the costs associated with asset acquisition, repair or parts purchased for maintenance through the purchase order system. The next step is to develop a process to systematically compile and review the data needs to be developed.

Repair Cost Tracking

The District currently does not have a formal work order system in place and will be considering a process to document the requested repairs and associated repair activities. The potential work request process could involve a standardized form to log the repair request, field crew assigned, corrective action, time completed and assets replaced. This information would contribute to the District's future life cycle cost tracking process.

b. Capital Improvement Plan (CIP)

The District's infrastructure capital improvements plan for 2018 to 2022, as submitted to the State, is provided in the appendix. Based on that plan, the annual project funding need for the projects ranges from \$100,000 to \$601,010 with the overall total project costs for the next five years estimated at \$1,201,010. The project cost estimates and descriptions are provided on the following page.

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Project	Possible funding source	2018	2019	2020	2021	2022	Total Project Cost
Wastewater System Upgrade	NMEDL/LFUNDS	\$ 601,010					\$ 601,010
Emergency Generator Purchase	NMED	\$ 100,000					\$ 100,000
Automate Meter Reading	NMED	\$ 500,000					\$ 500,000

Table 6. 2018 – 2022 ICIP Submitted to the State

Wastewater System Upgrade

The wastewater system meets the District's current needs, however it is aging and should be upgraded to comply with more stringent effluent limits. Therefore, the District plans to design, construct, equip, and furnish an upgraded wastewater system for the treatment of domestic sewage. The District recently completed a Preliminary Engineering Report to evaluate the wastewater treatment system and submitted a revised wastewater discharge permit based on the report. The report indicated that the wastewater treatment plant needs to be upgraded and the discharge point for the plant moved to the adjoining golf course ponds for irrigation reuse. The proposed improvements to the plant and lining of the golf course pond are estimated to cost \$750,000.

Emergency Generator Purchase

Since the District is located in an area served by one main electrical feed that is prone to multi-day outages due to forest fire and severe weather, the District is planning to purchase and equip a portable emergency power generator. The generator will be used to supply power to production wells to supply minimal water to customers during power outages. The generator could be used at any one of the District well sites, S6, Well 12, Well 16, E1, E2, E4 or E5.

Automate Meter Reading

The District is also planning to replace the existing 1,270 water meters with meters which can be read remotely to reduce labor costs and improve meter reading accuracy. Replacing old meters with new automated read meters will allow District to save approximately \$166,000 in estimated lost revenue over 10 years. Replacing current meters with automated read will enable the District to identify customer leaks quicker preventing water loss, property damage, and allow the District to help homeowners to prevent septic system failures due to hydraulic overload.



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In addition to the previously listed projects, the recent master planning effort identified and recommended the following projects:

- Designing and replacing the storage tanks in 2018.
- Completing the design and construction of Distribution B water system improvements in 2019.
- Completing the design and construction of Distribution C water system improvements in 2022.
- Improving operational efficiency of the water system by a Supervisory Control and Data Acquisition (SCADA) system in 2022.
- Completing the design and construction of Distribution D water system improvements in 2025.
- Completing the design and construction of Distribution E water system improvements in 2028.
- Treatment plant improvements in 2028.
- Completing the design and construction of Distribution F water system improvements in 2031.
- Coating the existing manholes with a spray applied epoxy coating, such as "Raven", to minimize concrete corrosion due to sewer gas.
- Repairing or adding grout shelving in all manholes and coat with epoxy.
- Replacing the manhole ring and cover and repairing cone on manhole No. 1.
- Cleaning horizontal joints and adding ram-neck joint filler in manhole Nos. 1, 5 and 6.
- Cleaning and painting the lift station pump and piping components with epoxy paint, and providing a carbon-filter vent to release sewer gases and inhibit corrosion.
- Performing a visual internal inspection on the sewer collection system using CCTV equipment, to check for piping defects, profile sags and obstructions.
- Grading and drainage improvements in 2017 at the solid waste convenience station, including asphalt and concrete pavement.
- Chip sealing improvements in 2020 at the solid waste convenience station.

The costs associated with these projects are provide in Table 7 on the following page.

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Project Name	Year/Capital Cost in Thousands of Dollars							
	Past	2018	2019	2020	2022-24	2025-27	2028-30	2031-32
Water								
Distribution A	\$2,100							
Distribution B	\$1,965							
Distribution B								
Design			\$213					
Construction			\$2,133					
Distribution C								
Design					\$257			
Construction					\$2,572			
Distribution D								
Design						\$129		
Construction						\$1,286		
Distribution E								
Design							\$163	
Construction							\$1,632	
Distribution F								
Design								\$155
Construction								\$1,548
Storage Tank Replacement								
Design		\$125						
Construction		\$850						
Portable Generator					\$100			
AMR / SCADA					\$500			
Treatment Improvements							\$1,180	
Total	\$4,065	\$ 975	\$2,346	\$ 0	\$ 3,429	\$1,415	\$2,975	\$1,703
Wastewater								
WWTP Design		\$148						
WWTP Construction			\$457					
Jet and Inspect Collection System		\$100						
Total	\$ 0	\$ 248	\$ 457	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
Solid Waste								
Paving/Drainage Improvements		\$36						
Chip Seal					\$20			
Total	\$ 0	\$ 36	\$ 0	\$ 0	\$ 20	\$ 0	\$ 0	\$ 0

Table 7. Capital Improvement Projects



c. Operation, Maintenance, Replacement Accounting

The District will continue tracking expenditures associated with asset operations, maintenance and replacement and will work towards managing the information at the asset level. Currently, the District's replacement approach is such that when repair cost of an asset exceeds 40%, then the asset is replaced.

The planned progression is as follows:

- Year 1: Summarize OM&R expenses by critical assets
- Year 2: Summarize OM&R expenses by asset network
- Year 3: Summarize OM&R expenses by asset

d. Plan for updating cost accounting

The District has set a goal to improve the tracking of life cycle cost. The District will consider an electronic approach to documenting work orders such that the cost associated with time and materials can be incorporated into the overall cost of the assets.

Life Cycle Costing Summary

The District identified level of service goals for the water, wastewater and solid waste services provided to the community. In addition, the District recently completed a master plan and conservation plan. Both plans were developed to evaluate and identify recommendations to continue providing the high level of service by planning for future growth and needs.

Performance goals will be communicated to the customers and the District's performance will be assessed annually.

6. Long Term Funding Strategy

a. Budget Analysis and Budget Projection

Short-term Planning Horizon (5-year)

Scheduled or recommended projects include those listed in the ICIP as submitted to the State as those included in the District's master plan. According to the master plan, the costs for the projects recommended over the next 5 years total over \$4 million. These projects will be funded through a combination of self-funding supplemented with infrastructure loans and grants.

Long-term Planning Horizon (10-year)

The master plan identified several projects for a 10-year period from 2022 to 2032. The estimated funding needed for water distribution, wastewater collection and solid waste projects totals just over \$9.5 million.

The average annual funding need to cover the asset renewal costs is estimated at \$374,000. Therefore, each household (based on 1,200 households) would need to contribute \$795 per year to collect sufficient revenue to cover the estimated average annual renewal costs in an asset renewal fund.

Budget Analysis

A budget analysis of the future funding needs versus the current budget identified that the current contribution per household is more than sufficient to cover the anticipated long term costs.

2016-17 Budget	
Budget	\$1,396,282
Budget Breakdown per household	\$1,164
2023-43 Budget Requirements	
Average annual asset renewal costs	\$9.5 million
Total annual budget	\$795 per year per household

Table 8 Budget Analysis

This analysis assumes that the asset improvements can be staggered and planned such that the costs are distributed over time. There will be occasions when the cost of the proposed infrastructure improvement project exceeds the available budget. In such situations, the District will consider State or Federal funding sources.

b. Funding Sources

The District supplements utility revenues with infrastructure loans and grants to support the planning, engineering and construction of all infrastructure projects. The District monitors rates to ensure that the revenues cover reasonable OM&R costs and the premium and interest on loans taken out for the purposes of large infrastructure projects. As a result, the District is able to financially manage expected OM&R expenses and the payment of loans and grants.

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Specifics on the water and wastewater utility rates and infrastructure loans are provided below.

Water

Category	Charge	Unit
Water Meter: New Connection Fees		
New Connection Fee- 5/8" Residential and Small Commercial	\$ 595.94	Meter
New Connection Fee 1" Large Commercial	\$ 644.42	Meter
New Connection Fee- 1-1 /2" Large Commercial	\$ 803.72	Meter
New Connection Fee 2" Large Commercial	\$ 942.26	Meter
New Connection Fee- 3" Large Commercial	\$ 1,496.35	Meter
Water Utility Expansion Fees (within District boundaries)		
Water Utility Expansion Fee- 5/8" Residential and Small Commercial	\$ 2,249.8 1	Meter
Water Utility Expansion Fee- 1" Large Commercial	\$ 2,770.63	Meter
Water Utility Expansion Fee-1-1 /2" Large Commercial	\$ 3,180.50	Meter
Water Utility Expansion Fee- 2" Large Commercial	\$ 3,610.95	Meter
Water Utility Expansion Fee- 3" Large Commercial	\$ 4,195.39	Meter
Water Meter: Connection Fee Credit		
Re-install meter removed from Kokopelli Fire through 03 /3 1/2013	\$ (350.00)	Meter
Water Meter: Transfer Fees (Disconnect or Reconnect)		
Disconnect Fee or Reconnect Fee - 5/8" Residential and Small Commercial	\$ 140.59	Meter
Disconnect Fee or Reconnect Fee- 1" Large Commercial	\$ 146.45	Meter
Disconnect Fee or Reconnect Fee- 1-1/2" Large Commercial	\$ 152.31	Meter
Disconnect Fee or Reconnect Fee - 2" Large Commercial	\$ 175.74	Meter
Disconnect Fee or Reconnect Fee - 3" Large Commercial	\$ 234.31	Meter
Temporary meter turn-on or turn-on at customer request (non-emergency)		
During regular working hours with minimum 4 hours notice	\$ 56.36	Call
Outside regular working house or less than 4 hours notice	\$ 225.44	Call
Residential & Small Commercial Water Service (5/8" meter)		
Base Charge for meters inside District boundaries	\$ 34.16	Month
Base Charge for meters outside District boundaries	\$ 34.16	Month
First five thousand (5,000) gallons per month inside District boundaries	\$ 3.56	1000 gallons
Next five thousand (5,000) gallons per month inside District boundaries	\$ 5.21	1000 gallons
Next fifteen thousand (15 ,000) gallons per month inside District boundaries	\$ 6.82	1000 gallons
Next twenty-five thousand (25,000) gallons per month inside District boundaries	\$ 10.13	1000 gallons
Over fifty thousand (50,000) gallons per month inside District boundaries	\$ 33.11	1000 gallons
First five thousand (5,000) gallons per month outside District boundaries	\$ 3.56	1000 gallons
Next five thousand (5,000) gallons per month outside District boundaries	\$ 5.21	1000 gallons
Next fifteen thousand (15,000) gallons per month outside District boundaries	\$ 6.85	1000 gallons



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Category	Charge	Unit
Next twenty-five thousand (25,000) gallons per month outside District boundaries	\$ 10.13	1000 gallons
Over fifty thousand (50,000) gallons per month outside District boundaries	\$ 33.11	1000 gallons
Large Commercial Water Service (1" to 3" meter)		
Base Charge	\$ 98.54	Month
First one hundred seventy-five thousand (175,000) gallons per month	\$ 6.20	1000 gallons
Next one hundred seventy-five thousand (175,000) gallons per month	\$ 12.10	1000 gallons
Over three hundred fifty thousand (350,000) gallons per month	\$ 33.11	1000 gallons
Irrigation Water Service (non-potable to lake)		
Base Charge	\$ 14,452.89	Month
First six million six hundred thousand (6,600,000) gallons per month	\$ 3.27	1000 gallons
Next eight million four hundred thousand (8,400,000) gallons per month	\$ 5.92	1000 gallons
Over fifteen million (15,000,000) gallons per month; However, this rate level is waived providing that:	\$ 23.82	1000 gallons

A. Lakes are maintained in a full /near-full state between February 1 and July 31, and

B. There will be surcharge of \$25.01 per 1,000 gallons on gallons in excess of eighty million (80,000,000) used in any calendar year. The purpose of this waiver is to maintain full lakes during tire season and peak irrigation season.

Wastewater

Category	Charge	Unit
Wastewater: New Connection Fees		
New Connection Fee for Residential and Small Commercial Water Customers (5/8" meter)	\$ 2221.34	Meter
New Connection Fee for Large Commercial Water Customers (>= 1" meter)	\$ 4442.7	Meter
Wastewater: Disconnect Service & Cap Line		
Disconnect Residential and Small Commercial Water Customers (5/8" meter)	\$ 333.21	Connection
Disconnect Large Commercial Water Customer (>= 1" meter)	\$ 832.99	Connection
Residential Wastewater Service		
Base Charge - Residential	\$ 40.04	Month
Commodity Charge - Residential	\$ 5.41	1000 gallons
Commercial Wastewater Service		
Base Charge - Small Commercial	\$ 141.67	Month
Base Charge - Large Commercial	\$ 3448.29	Month
Commodity Charge - All Commercial	\$ 6.72	1000 gallons



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Solid Waste

Category	Charge	Unit
Solid Waste Fees		
Solid Waste Service for each Residential Metered Customer within District	\$ 17.65	Month
Yard Waste from Fire Production Customers within District	\$ 10.53	Cubic Yard
Forest Waste from Metered and Fire Protection Customers within District	\$ 10.53	Cubic Yard
Bulk Waste from Metered and Fire Protection Customers within District	\$ 23.14	Cubic Yard
Yard Waste and Forest Waste from outside the District	\$ 15.79	Cubic Yard
Bulk Waste and Metal Waste from outside the District	\$ 31.57	Cubic Yard
Fire Protection		
Each Lot in Service Area within District without Meter	\$ 25.55	Quarter
Each Lot in Service Area outside District without Meter	\$ 25.55	Quarter
Late Payment Charges		
Insufficient Funds Fee	\$ 29.30	Payment
Interest at the Rate of	1.50%	Month
with a minimum charge of	\$ 5.86	Bill
Premises Collection Fee	\$ 58.61	Collection
Miscellaneous Fees and Charges		
System Upgrade Fee for each Metered Customer (effective 2/1/2013)	\$ 8.34	Month
System Upgrade Fee for Each Fire Protection Customer (effective 2/1/2013)	\$ 25.26	Quarter
Meter Test Fee	\$ 58.61	Test
Lien Administrative Fee	\$ 100.00	Filing
Violation of Ordinance Section 8-C - remove Waste from Property	\$ 300.00	Minimum
\$150 per hour of staff and equipment from yard and return plus 150% of container, hauling and disposal costs		
Notes		
Unless otherwise indicated, charges are identifying for service outside District boundaries		
BLS CPI-U and month indicated for last rate adjustment		

c. Funding Strategy

The District reviews the utility rates each year in March. Typically, the rates are increased year-over-year based on the consumer price index (CPI).

d. Plan for Review and Update of Funding Strategy

On an annual basis, during the budgeting season, the funding strategy for supporting the OM&R of critical infrastructure will be evaluated and adjusted as necessary. If the asset improvements cannot be self-funded, State or Federal funding sources will be considered to supplement the funding of the project.



7. Implementation

The asset management team consisting of Mr. David Eddington (Manager) and Mr. Steve Osborne (Operator) has been tasked to implement the asset management strategy and to further develop the procedures and policies. As part of addressing the action items presented in the implementation schedule, the asset management team will annually review and update the asset management plan.

Three-year Asset Management Plan

Over the next three years, the District is committed to improve their implementation of asset management principles and policies. Through the asset management IQ test and evaluation of how asset management is currently taking place, specific areas of improvement were identified. The following implementation schedule identifies when those key areas will be addressed over the next three years.

Alto Lakes WSD Asset Management Implementation Plan				
Core Component	Action items	Year 1	Year 2	Year 3
Current State of the Assets	Complete the asset inventory, such as condition assessment and approach to maintaining data			
	Refine useful life estimation			
	Refine replacement value determination			
	Continue tracking energy usage			
Level of Service	Initial LOS goals and performance assessment			
	Communicate goals to customers			
	Measure progress towards goals and update as necessary			
Critical Assets	Formalize definition of critical assets and asset failure			
	Document the process of prioritizing asset investment and O&M decisions			
	Document process for considering non-construction solutions			
Life Cycle Cost	Develop and systematize work order system and cost tracking			
	Develop asset repair or replacement strategy			
Long Term Funding	Conduct comprehensive utility rate study and long term funding needs evaluation as done previously every four years.			

Table 9. Three Year Implementation Plan

Third Party Support

There may be times in the implementation process where third-party support is helpful to the District's activities. Third party support may be most effective in a consulting capacity by assisting in areas where the District may not have capacity, such as:

- Completion of the asset inventory, condition assessment and mapping
- Lifecycle costing and replacement value determination
- Community survey and education