Asset Management

Case Study
in
Arenas Valley, New Mexico

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Prepared by

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ENVIRONMENTAL
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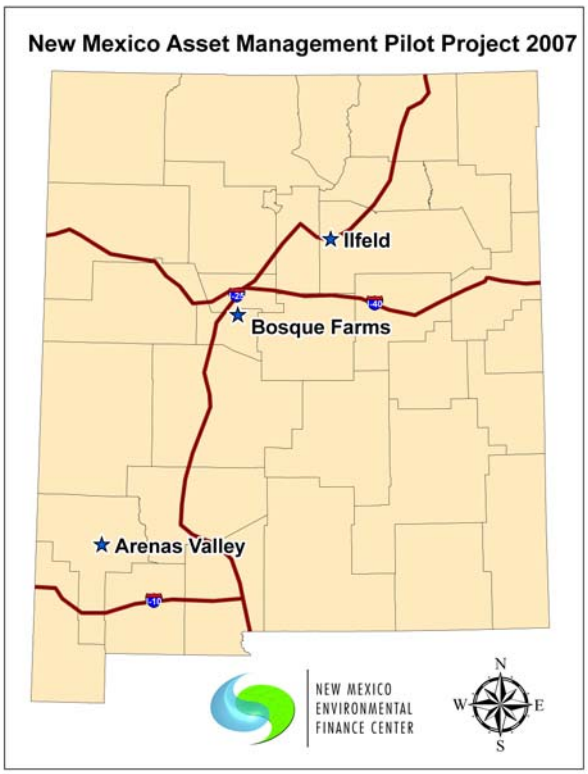
INTRODUCTION

In 2006, the New Mexico Water Infrastructure Investment Team (WIIT) tasked the New Mexico Environmental Finance Center (NMEFC), the New Mexico Rural Water Association (NMRWA) and the Rural Community Assistance Corporation (RCAC), with conducting a pilot study for three New Mexico communities. The purpose of the pilot study was to develop a process that could be used to assist New Mexico's drinking water and wastewater systems in implementing new administrative and management procedures to adapt to the regulatory, water quality and quantity challenges of the future. The three activities selected for the pilot study were asset management, water audits, and financial planning. The goal was to move these systems to long-term sustainability.

The NMEFC was tasked with developing an asset management manual for water and wastewater systems, with a focus on the needs of smaller systems. In addition the NMEFC was tasked with piloting the approach for three communities. The three systems that were selected were Arenas Valley Water Development Association, Bosque Farms Water Supply System, and Ilfeld Mutual Domestic Water Consumers Association. The three water systems were selected based on their relative size, number of connections, and location throughout the state. Map 1 is a vicinity map showing the location of the three systems that were the focus of the case studies.

Map 1 – Vicinity Map



CASE STUDY: ARENAS VALLEY

The Arenas Valley Water Development Association (AVWDA) was created in 1976 to provide water services to the residents of Arenas Valley, New Mexico. The community is located in southwestern, New Mexico very close to the town of Silver City.

Background Regarding The Water System

The water system buys treated water from Silver City. It does not do any additional treatment to the water. The system is relatively new, built in the 1980s, and currently serves approximately 430 service connections. The system contains approximately 20 miles of PVC pipe with 25 fire hydrants and 100 valves.

Initial Starting Point

One of the first steps in the process was to determine the starting point in terms of data, information, and existing knowledge. The NMEFC met with staff and board members of the AVWDA to make this assessment. During the initial meetings, the NMEFC determined that AVWDA had the following resources:

- As-built map mounted on wall of office with push pins indicating some asset locations
- Fire hydrant and meter numbering system
- Electronic billing records
- Operator and board member's extensive knowledge
- Record of main waterline breaks
- Record of operator's daily activities

In addition, the AVWDA board members informed us that they were looking into funding to replace significant portions of the water distribution system. The reason cited was that the pipe in the system was old and degrading.

Asset Management Checklist

As part of the asset management manual, the NMEFC developed a checklist that could be used to determine which portions of the asset management plan were completed and what method was used to complete that portion. The resulting checklist for the AVWDA system is presented in Table 1. Additional information regarding the methodology used to complete the asset management plan is also presented in the table.

Table 1: Asset Management Checklist for Arenas Valley

Component of Asset Management	Specific Item	Completed Y or N	Method of Completion	Comments
Asset	List of Assets	Y	Access Database	

Component of Asset Management	Specific Item	Completed Y or N	Method of Completion	Comments
Inventory	Map of Assets	Y	GIS Map	
	Asset Condition Assessment	Y	Access Database	Ranked 0-5
	Remaining Useful Life of the Assets	Y	Access Database	Estimates
	Asset Value (Optional)	N		
Level of Service	Level of Service Agreement	Y	Microsoft Word Document	
Critical Assets	Criticality Analysis	Y	Access Database	
Life Cycle Costing	Operation and Maintenance Program	N In the process		Association will draft a program based on the examples provided and the operator's log
	Repair Replacement Schedule	Y	Valves inspected every 6 months, Fire hydrants inspected monthly	
	Capital Improvement Plan (CIP)	N Plans are to complete it next year		Considering looping the system waterlines, working with engineers, completed PER. Discussing meter replacement and pipe replacement along Hwy. 180
Long-Term Funding	5 Year Financial Plan		Completed by RCAC	

Component of Asset Management	Specific Item	Completed Y or N	Method of Completion	Comments
Strategy	Funding Strategy for Repair and Replacement Schedule		Completed by RCAC	
	Funding Strategy for CIP		Completed by RCAC	

Asset Inventory:
The asset inventory was created from the information collected from As-Built engineering drawings, visual observations of the system, input from the operator and board member president, and published information on asset life expectancy.

The inventory was compiled and documented into two types of files, an Access database and a set of custom maps. The Access database listed assets by type and included: a list of assets, the asset condition assessment, the estimated remaining useful life of the assets, and the criticality analysis.

The maps of the assets were created using Geographical Information System (GIS) software called ArcGIS™ to visually display all the assets documented in the inventory. The GIS software was used to easily show different assets on one map for the entire system. The data used for the map was compiled from the as-built drawings, operator input, and physical inspection of the system.

Level of Service Agreement:
The Level of Service Agreement was completed by the AVWDA, and defines what the customers can expect from the AVDWA. The document was created using Microsoft Word and includes the following components:
•Introduction
•Purpose
•Financial Performance
•Operating Cost/Invoicing
•Responsiveness
•Reliability
•Regulatory Requirements
•Quantity
•Customer Satisfaction

An example of the map, excerpt from the database and a page from the level of service agreement are presented in the Appendix at the end of this document.

Immediate Benefits of Asset Management

Before the project began, AVWDA was looking into replacing significant portions of the water distribution system under the belief that the current system was old and degrading. Through the asset management process, the NMEFC was able to discuss issues of operation and maintenance expenses verses capital expenses. For example, when pipes are repaired those expenses are considered operation and maintenance expenses. When pipes are installed to replace existing infrastructure, those expenses are considered to be capital expenses. One of the basic premises of asset management is to look at the entire life cycle cost of the asset, including the capital and operational expenses, and try to manage the assets in such a way that over the life of the asset you spend the least amount of money. This approach requires a balance between not spending too much on either capital or operation and maintenance expenses.

In the case of the AVWDA, they knew the cost of a repair as well as the overall number of repairs for a given year, and were tracked in a notebook. To determine if the replacement of infrastructure was necessary or the most efficient course of action, the following information was considered:

- The pipe in the system is PVC and is generally 25 years old or less. PVC pipe is expected to last a minimum of 50 years and may last longer
- Replacing pipe will only eliminate breaks due to degradation of the pipe. Replacement will not address breaks related to service lines (unless service lines are also replaced) nor will it address breaks due to hit lines caused by construction contractors.
- The number of breaks that occurred in the system over time were largely due to service lines or construction problems.
- Some breaks were clustered on one particular section of pipe, which may indicate a problem due to placement and not related to materials. Discussions with the operator and board members indicated that a construction related issue may be to blame for this cluster of breaks.
- The remainder of mainline breaks were spread out across the distribution system indicating that there was no overall indication of degradation within the system.
- Although the cost of repairs have increased, they were still relatively low, and.
- Initial construction costs to replace a portion of the system were estimated to be several million dollars. This costs would have to be funded by loans. In order to repay the loans the system would have to increase user charges.

To assist the AVWDA, the breaks that the system had documents were plotted on the asset inventory map. In looking at the map, the board members and operator could see that the system was not in bad shape. As mentioned above, the map showed that one section of pipe may needed to be replaced in order to address the original construction issues.

One other concept that the NMEFC brought up in regards to the need for pipe replacement was customer service. In asset management, it is important for the owners, operators, and managers of the system to understand that they are in the business of customer service. The managers and operators need to keep this focus as they examine various options for the system. For example, if

funds were to be expended to replace the distribution lines, the customer service level would not change. In fact, there would be disruptions to customer service as the lines were installed and customers would be inconvenienced as the roads were dug up to put in pipe trenches. In addition, customers would most likely have to pay an increased user rate to cover the cost of replacing the pipe prematurely. Conversely, there may be other capital projects that the system could pursue that would benefit customer service. The managers and operator were asked to consider other alternatives to replacing the distribution lines and came up with several ideas that would improve customer service, decrease disruption, and keep overall costs down.

By understanding their assets fully and thinking in terms of customer service allowed AVWDA to reevaluate their proposed infrastructure replacement project and save considerable expense. By using the information generated from this asset management project, AVWDA decided that the money for replacement would be better spent to loop the existing water lines and add additional appurtenances to the system, such as fire hydrants and valves.

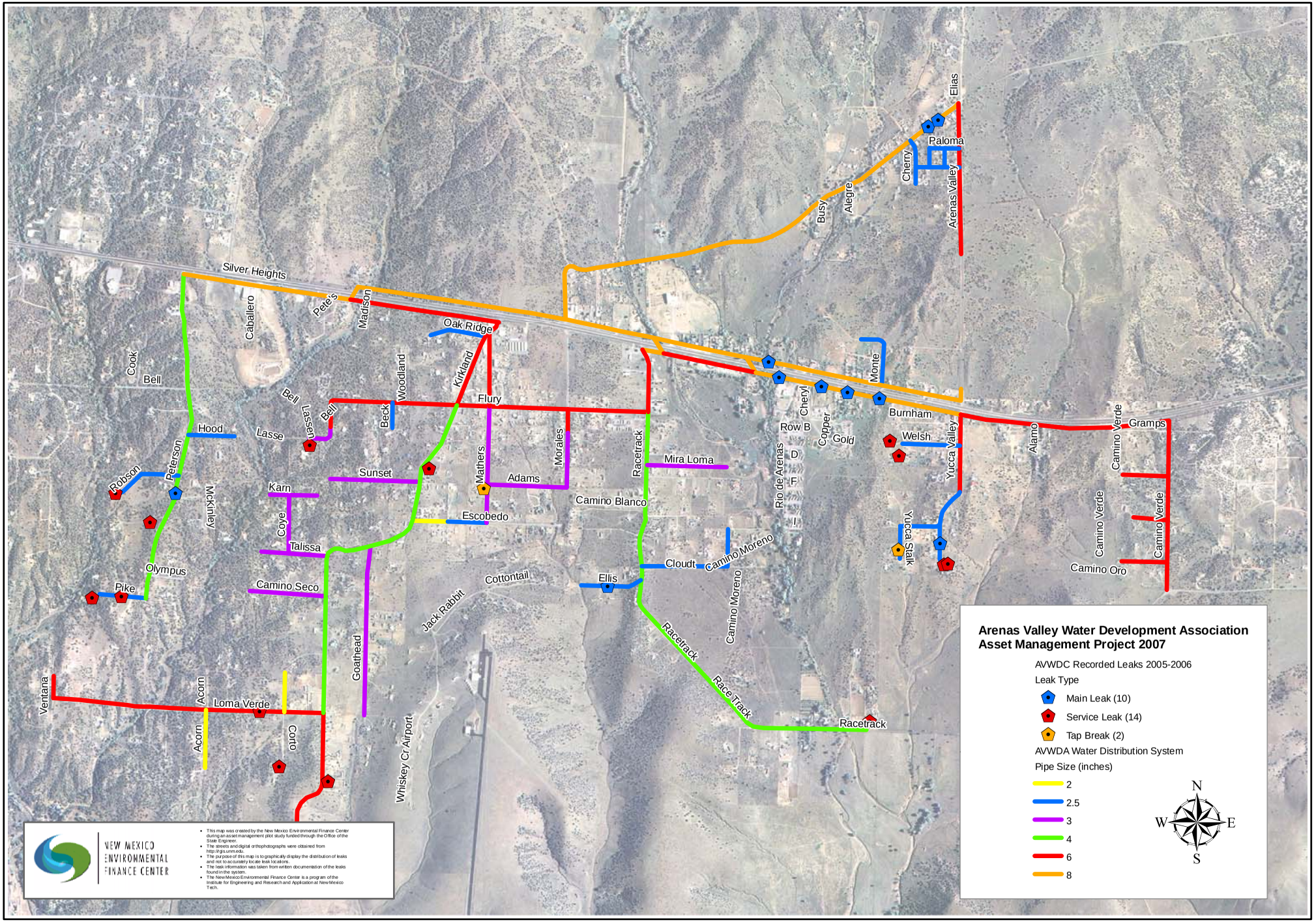
When asked for their opinion on being part of the case study, the AVWDA stated, “It’s been great. It was a very helpful process and we can now use the PER to plan replacement and loop lines. The discussions on criticality helped to change our point of view.”

ARENAS VALLEY WATER DEVELOPMENT ASSOCIATION

- ASSET MANAGEMENT PLAN

Examples

- Base Map
- Database Excerpt
- Level of Service Agreement


Arenas Valley Water Development Association
Asset Management Project 2007
AVWDC Recorded Leaks 2005-2006
Leak Type
Main Leak (10)
Service Leak (14)
Tap Break (2)
AVWDA Water Distribution System
Pipe Size (inches)
2
2.5
3
4
6
8
N
W
E
S
NEW MEXICO ENVIRONMENTAL FINANCE CENTER
This map was created by the New Mexico Environmental Finance Center during an asset management pilot study funded through the Office of the State Engineer.
The streets and digital orthophotographs were obtained from http://rgis.unm.edu.
The purpose of this map is to graphically display the distribution of leaks and not to accurately locate leak locations.
The leak information was taken from written documentation of the leaks found in the system.
The New Mexico Environmental Finance Center is a program of the Institute for Engineering and Research and Application at New Mexico Tech.
Silver Heights
Caballero
Pete's
Madison
Oak Ridge
Cook
Bell
Woodland
Kirkland
Flury
Bell
Lasseu
Bell
Beck
Hood
Lasse
Peterson
Robson
McKinley
Karn
Sunset
Mathers
Adams
Morales
Escobedo
Coye
Talissa
Olympus
Pike
Camino Seco
Goathead
Jack Rabbit
Cottontail
Racetrack
Mira Loma
Camino Blanco
Cloudt
Camino Moreno
Ellis
Racetrack
Race Track
Racetrack
Camino Moreno
Rio de Arenas
Row B
D
F
I
Cheryl
Copper
Gold
Monte
Burnham
Welsh
Yucca Valley
Yucca Stalk
Alamo
Camino Verde
Gramps
Camino Verde
Camino Verde
Camino Oro
Busy
Alegre
Elias
Paloma
Cherry
Arenas Valley
Ventana
Acorn
Loma Verde
Acorn
Couto
Whiskey Cr Airport

Arenas Valley Asset Management System

Asset: Fire Hydrants

Street Name	Fire Hydrant ID	Date Installed	Condition	Estimated Year of Replacement
180 HWY Northside				
	180N2	1987	2 - Fair	2037
	180N1	1987	2 - Fair	2037
180 HWY Southside				
	180S4	1987	2 - Fair	2037
	180S3	1987	2 - Fair	2037
	180S2	1987	2 - Fair	2037
	180S1	1987	2 - Fair	2037
Arenas Valley Rd				
	AVR2	1987	2 - Fair	2037
	AVR1	1987	2 - Fair	2037
Camino Oro				
	CO1	1998	3 - Good	2048
Camino Rd N				
	CRN1	1998	3 - Good	2048
Camino Rd S				
	CRS1	1998	3 - Good	2048
Camino Verde				
	CV2	1998	3 - Good	2048
	CV1	1998	3 - Good	2048
Flurry Ln				
	FLU2	1987	2 - Fair	2037
	FLU1	1987	2 - Fair	2037
Gramps				
	G1	1998	2 - Fair	2048
Kirkland Road				
	KIR3	1998	2 - Fair	2048
	KIR2	1987	2 - Fair	2037
	KIR1	1987	3 - Good	2037

Arenas Valley Water Development Association
Level of Service Agreement with Association Members

Introduction

In 1976 the Arenas Valley Water Development Association (AVWDA) was created to provide water services to the residents of Arenas Valley, New Mexico. The AVWDA consists of a water distribution system that receives its treated water from the Town of Silver City's Water Supply System (WSS). The source of drinking water for the system is ground water and is primarily for residential use.

Purpose

As part of AVWDA's efforts to continue providing outstanding service to its members, the AVWDA board has elected to implement a level of service agreement. This agreement outlines the criteria or indicators that will help the system determine how best to manage its assets to provide a high level of service at a reasonable cost.

Level of Service Agreement

Financial Performance

- The basic charge for all meter connections is $25.00 + tax per month. This fee will be reviewed and compared to inflation and cost of materials annually.
- A new service connection includes a fee for new meter installation of $2100.00 for residential and $2500.00 for commercial.
- For disconnected water service there is a $50.00 reconnection fee plus the amount due on the unpaid water bill(s).
- New connection or reconnection will be completed within 2 weeks of payment for the service connection.

Operating Cost/Invoicing

- Annual water rate adjustments imposed by the Town of Silver City WSS will be passed on to AVWDA members.
- Water rate adjustments beyond those imposed by the Silver City WSS will be considered on annual basis to insure system maintenance and/or improvements are properly budgeted.
- Current water rates will be made available at the AVWDA office.
- Past due notices will be mailed to the customer 6 days before invoices are due, to allow sufficient time for payment.

Responsiveness

- Restoration of service within 4 hours after an unplanned interruption 90% of the time.