



Long Term System Planning

Glenn Barnes

Environmental Finance Center

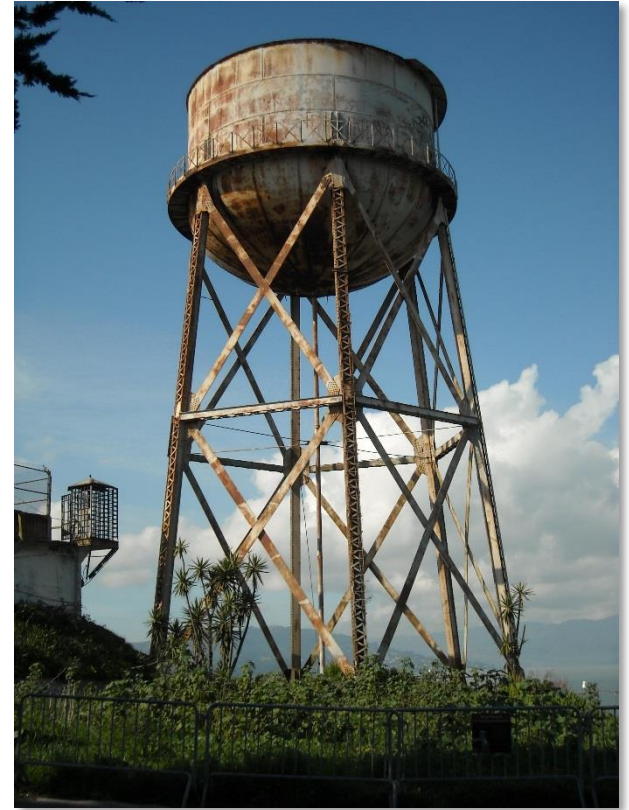
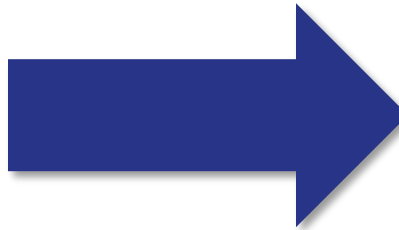
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Infrastructure Wears Out





There are two ways to keep up
your infrastructure...

Ways to Keep Up Infrastructure



Mike Daly · White Cliffs MDWUA, NM

Ways to Keep Up Infrastructure



Source: <https://www.youtube.com/watch?v=rH867Y-8-VM>

Two Ways to Fix Things



Proactively
Repair, rehabilitation
and replacement on
a set schedule



Reactively
You wait for it to
break



Being Proactive

- Requires long term system planning—
Asset Management and Capital
Planning
- Has its advantages, according to people
in the field...

Measuring Needs, Not Guessing



Ted Riehle · Old Forge, NY

Better Board Communication



Chris Jacobs · Somersworth, NH

Fewer Emergencies



Mike Daly · White Cliffs MDWUA, NM

Justification for Rate Increases



Ted Riehle · Old Forge, NY

Five Core Components of AM



Current State of the Assets



Level of Service



Criticality



Life Cycle Costing



Long-Term Funding

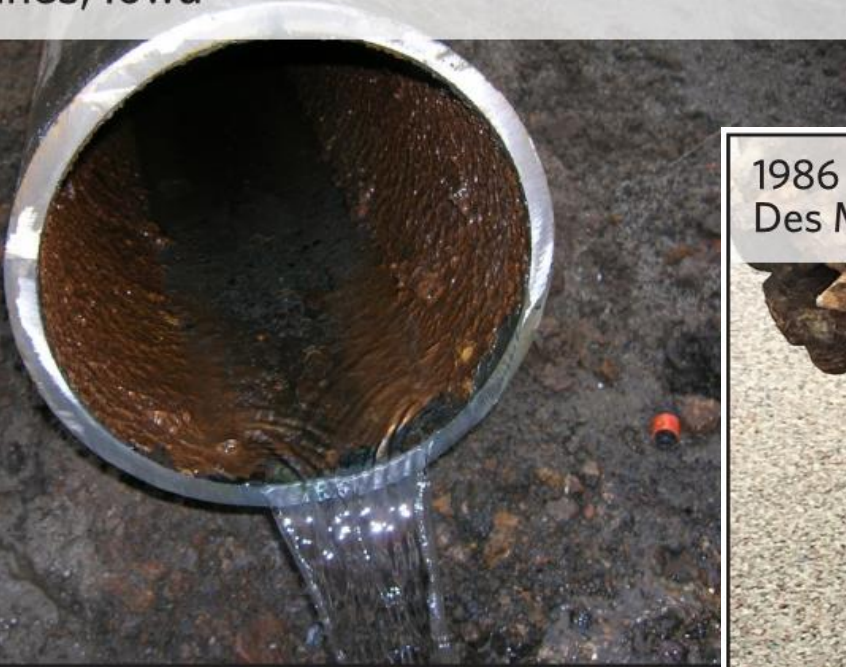


Current State of the Assets

- What do I own?
- Where are the assets?
- What condition are they in?
- How much useful life is remaining?
- What is the replacement value?

Age \neq Condition

1896 - 12" Cast Iron Water Main
Des Moines, Iowa



1986 - 8" Ductile Iron Service Lateral
Des Moines, Iowa





Level of Service

Involve
Customers



Measurable
Goals: Internal
and External



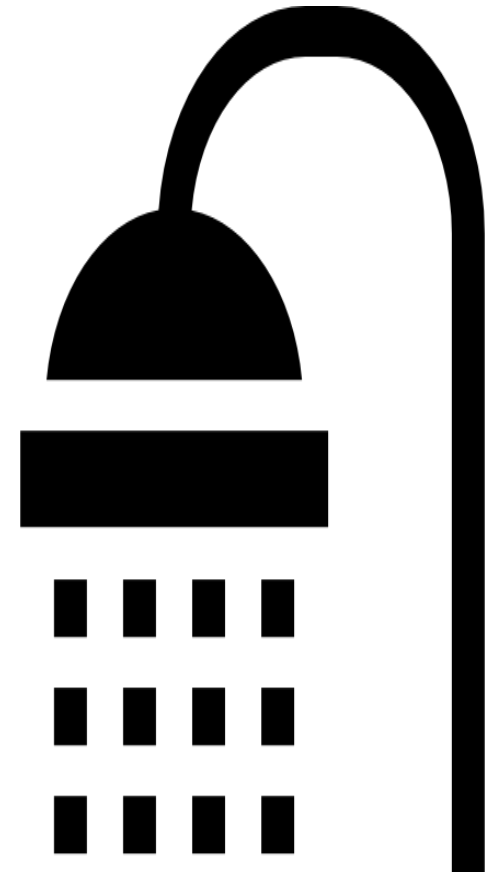
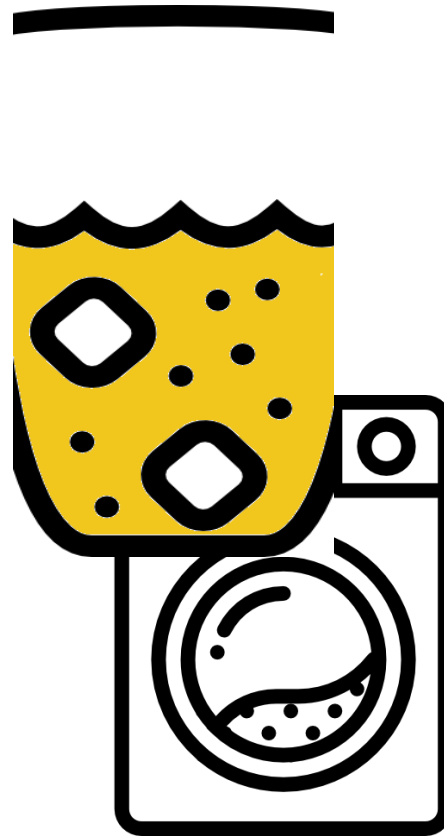
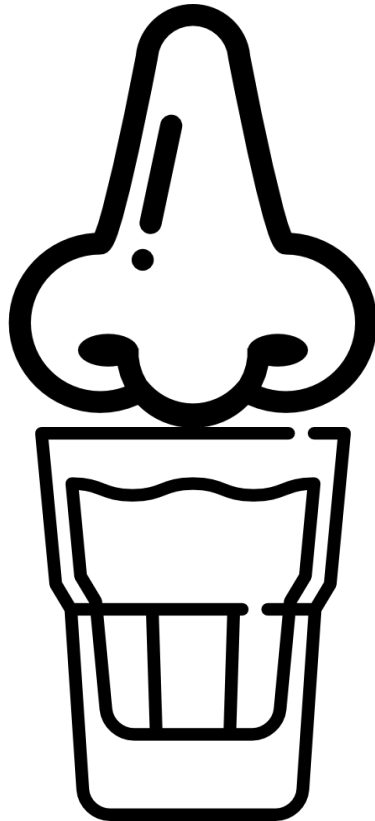
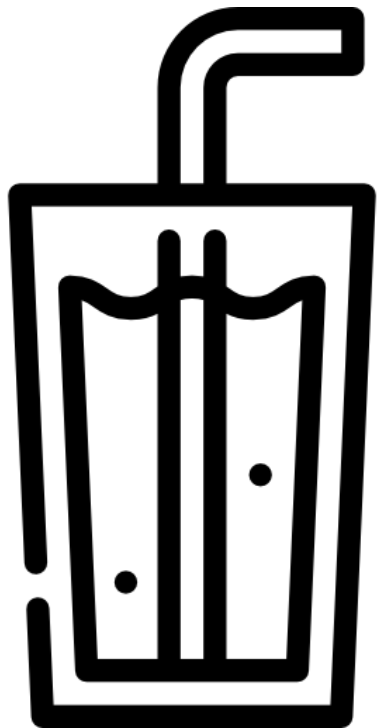
Track Progress
Towards
Meeting Goals

Involve
Staff



What would my customers want?

What do customers care about?

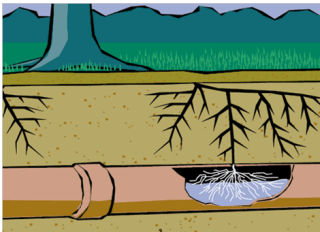


Asset Criticality

What is the probability or likelihood that a given asset will fail?

How do my assets fail?

What's the condition of my assets?



Asset Criticality

What is the consequence if the asset does fail?

What is the cost of the repair?

Are there legal consequences, environmental consequences, social consequences?

Are there redundant assets?



Asset Criticality





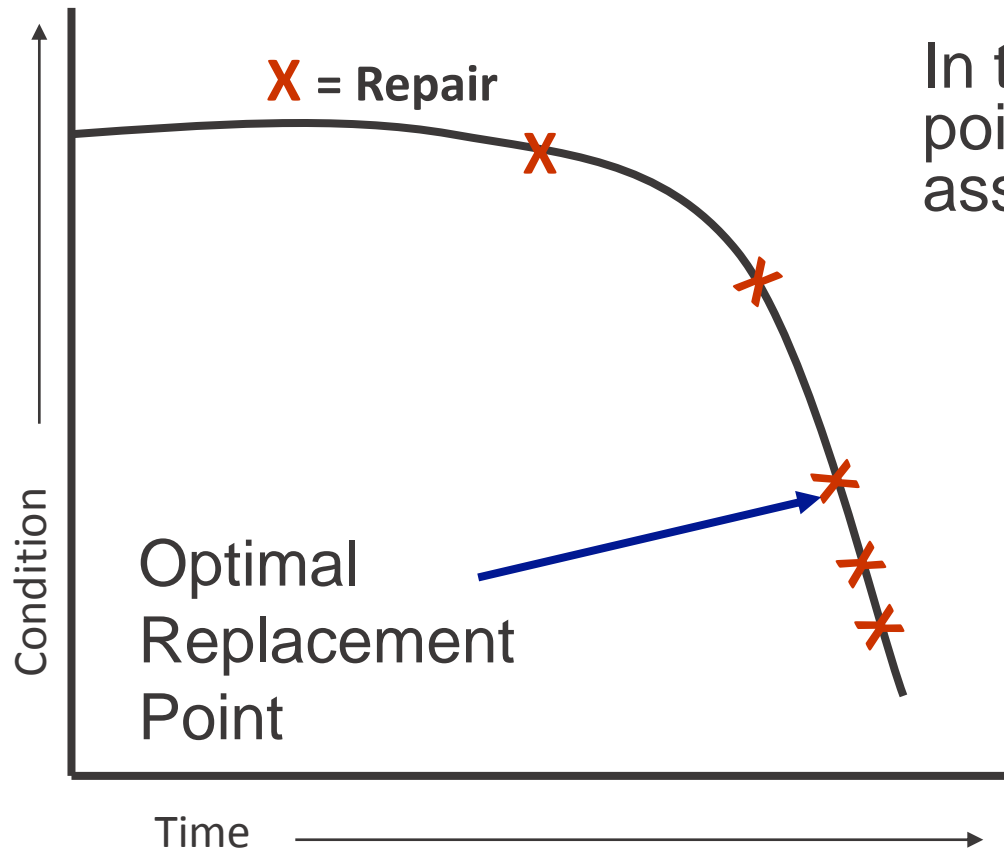
Quick Exercise—4 Assets

1. Brand new well
2. Aging portable generator used in emergencies in an area with a hospital and a neighborhood
3. 20 year old lines on Forest Drive, a typical residential neighborhood
4. 20 year old meters

Asset Criticality



Life Cycle Costing: Replacement of Assets



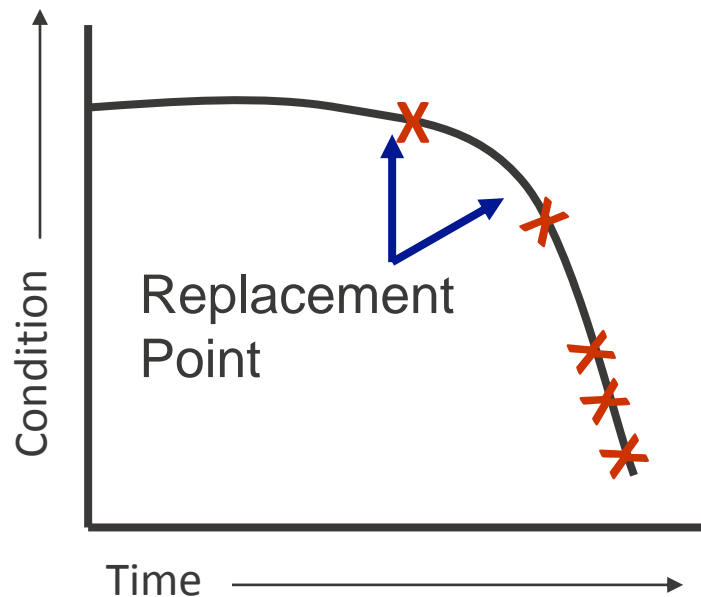
In theory, there is an exact right point at which to replace an asset

Not possible to know the optimal time to replace every asset

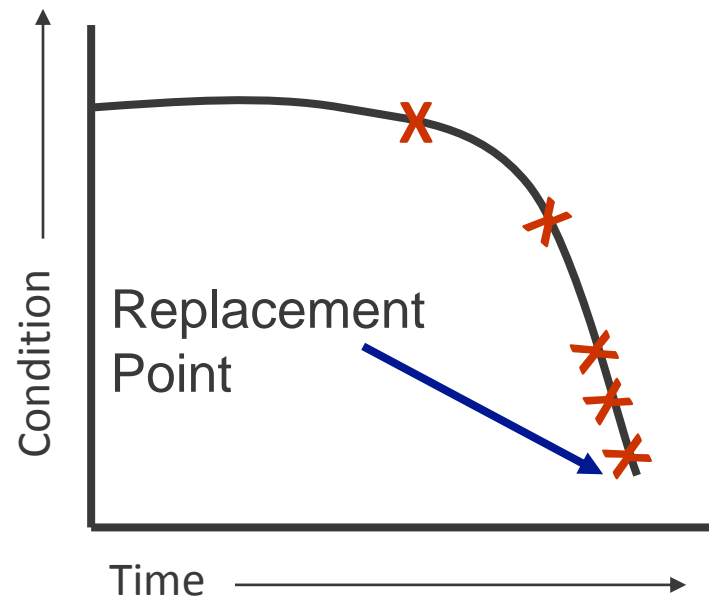
So... need to use the concept of risk

Life Cycle Costing & Risk

High risk assets:
replace assets early,
before failure



Low risk assets:
run to failure and
replace afterwards





Long Term Funding

- This is where capital planning comes in
- Once you figure out how to get the longest life out of your assets, plan to have the money you need to replace them when necessary



Long Term Capital Planning

- This is strongly related to asset management
- An official multi-year document that identifies and prioritizes capital projects, identifies funding sources, and sets timelines



Ways To Pay

- Pay as you go
- Save in advance and pay
- Borrow and pay later

Money
from your
customers

- Grants (let someone else pay)

Not easy to come by



Grants Aren't *Really* Free Money

- Application for the grant can be expensive – staff time and money
- Applications can take months to process
- Often lots of strings attached
- Often require a percentage match
- Lots of competition
- Difficult to sustain

A blue-tinted photograph of industrial machinery, possibly a factory or power plant, with large pipes and mechanical components.

Capital Planning Exercise

- For this example small town, let's look at their annual budget



Find Budget Expenses

What here is related to regular repair and maintenance, if anything?
(Operating cost)

What here is related to asset rehabilitation or replacement, if anything?
(Capital cost)

Note: Don't include salaries



Repairs and Maintenance

25	30-810-07 W/S OVERTIME	\$4,500.00
26	30-810-08 MERIT BONUS	\$3,000.00
27	30-810-09 HOLIDAY/EMPLOYEE APREC	\$1,200.00
28	30-810-10 POSTAGE	\$2,700.00
29	30-810-11 Office Supplies/Repairs	\$4,700.00
30	30-810-12 PHONE	\$3,400.00
31	30-810-13 W/S UTILITES	\$30,000.00
32	30-810-14 TRAINING	\$2,400.00
33	30-810-15 Employee Screening	\$105.00
34	30-810-16 MAINT/REPAIR:SYST-EQUIP	\$30,000.00
35	30-810-17 Mayor Salary	\$1,800.00
36	30-810-18 Board Salary	\$10,500.00
37	30-810-20 W/S UNIFORMS	\$2,000.00
38	30-810-30 GAS AND OIL FOR VEHICLES	\$4,500.00
39	30-810-31 TIRES FOR VEHICLES	\$600.00
40	30-810-32 REPAIRS TO VEHICLES	\$1,000.00
41	30-810-33 SUPPLIES & MATERIALS	\$3,000.00
42	30-810-34 CHEMICALS AND SALT	\$20,000.00
43	30-810-45 CONTRACTED SERVICES	\$36,500.00



Rehabilitation and Replacement

40	30-810-32 REPAIRS TO VEHICLES	\$1,000.00
41	30-810-33 SUPPLIES & MATERIALS	\$3,000.00
42	30-810-34 CHEMICALS AND SALT	\$20,000.00
43	30-810-45 CONTRACTED SERVICES	\$36,500.00
44	30-810-46 STATE PERMITS	\$1,700.00
45	30-810-48 DUES/SUBSCRIPTIONS	\$1,500.00
46	30-810-50 DEPRECIATION	\$0.00
47	30-810-54 INSURANCE	\$13,608.00
48	30-810-55 HOSPITAL INSURANCE	\$22,443.00
49	30-810-57 MISC EXPENSE	\$500.00
50	30-810-60 W/S - LGERS	\$9,272.00
51	30-810-70 WATER STUDY EXPENSES	\$24,000.00
52	30-810-74 Online Payments SVC	\$1,600.00
53	30-810-75 ARRA LOAN PRINCIPAL	\$8,875.00
54	30-810-76 PURCHASE WATER BILL	\$2,400.00
55	30-810-79 Banking Fees	\$500.00
56	30-810-89 CAPITAL OUTLAY NEW EQUIP	\$0.00
57	30-810-90 TRANSFER TO OTHER FUND	\$0.00
58	30-810-95 FINES AND PENALTIES	\$1,500.00



What is Depreciation?

- Loss of value of an asset not restored by current maintenance
- An economic fact for any water system
- From both physical factors and functional or non-physical factors



So What Can Systems Do?

- Pay as you go
- Save in advance and pay
- Borrow and pay later
- Grants (let someone else pay)
- Defer rehabilitation/replacement

*Tip!
You can
mix and
match
approaches*

A blue-tinted photograph of industrial machinery, including pipes and valves, is positioned at the top of the slide.

Capital Planning Exercise

- Using the assets we discussed earlier, come up with a plan of how to pay for their replacement



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Capital Planning and Asset Management Resources

<https://efc.sog.unc.edu/project/capital-planning-resources-water-and-wastewater-utilities>

Capital Planning Resources For Water And Wastewater Utilities

Funded By: North Carolina Department of Environmental Quality

Program: Drinking Water and Wastewater

[HOME](#) / [CAPITAL PLANNING RESOURCES FOR WATER AND WASTEWATER UTILITIES](#)

[← Return to All Our Programs](#)

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Summary



Partners



Resources

Contact

This project, part of the NC Water System Capacity Development Support project funded by the Public Water Supply Section of NC Department of Environment and Natural Resources, brings together many resources focused on capital planning for drinking water and wastewater utilities. Capital planning often leads

<https://efc.sog.unc.edu/resource/plan-pay-scenarios-fund-your-capital-improvement-plan>

Plan to Pay: Scenarios to Fund your C.I.P. (Capital Improvement Plan)

Version 2.6 (Updated November 2015)



20-year capital planning

Financial dashboard outputs

Debt and/or capital reserve financing options

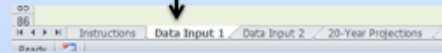
Estimates necessary rate increases over time to pay for capital projects

Guided data inputs

Simple data needs

Start

1) Use tabs at bottom of screen and buttons to navigate to different pages.



4) In "20-Year Projections", view your fund balance projections for 20 years and observe the estimated rate increases needed each year to pay for your Capital Improvement. No data entry required on this page.

	FY15	FY16	FY17	FY18
Estimated Rate Changes Needed to Maintain the Fund Balance				
3-Year Increase (Decrease) in Rates (Base and Volumetric)	N/A	0.0%	5.1%	2.6%
Increase (Decrease) in the Monthly Bill for 5,000 Gallons	N/A	\$0.00	\$1.51	\$0.79
Increase (Decrease) in the Monthly Base Charge	N/A	\$0.00	\$0.64	\$0.34
Monthly Base Charge ("Minimum Charge")	\$12.34	\$12.34	\$12.98	\$13.31
Volumetric Rate at 5,000 gallons/month (5/1000 gallons)	\$5.67	\$5.67	\$5.96	\$6.11
Volume Included with the Base Charge (1,000's of gallons)	2	2	2	2
Approximate Monthly Charge for 5,000 gallons (5)	\$29.35	\$29.35	\$30.96	\$31.65
Projected Fund Balance				
Total Revenues	\$ 3,810,000	\$ 3,801,529	\$ 3,728,347	\$ 3,764,495
Base Charges	\$ 1,776,960	\$ 1,795,322	\$ 1,907,268	\$ 1,916,733
Usage Charges	\$ 3,129,840	\$ 3,094,595	\$ 3,216,568	\$ 3,261,742
Interest Earned from Previous Year's Positive Balance	\$ -	\$ 9,485	\$ 9,187	\$ 9,697
Revenues from Other Sources Besides Charges	\$ 103,200	\$ 104,266	\$ 105,344	\$ 106,423
Total Expenses (including Debt)	\$ 3,810,000	\$ 3,801,529	\$ 3,728,347	\$ 3,764,495

INSTRUCTIONS

2) In "Data Input 1", enter utility characteristics, rates and usage information in blue cells.

Name of Utility
Team of Anytown

Type of Utility
Water and Sewer

Current Fiscal Year
FY15

Water and Sewer Rates in FY15
Input the residential combined water & sewer rates at 5,000 gallons/month of use (or 6.7 cubic feet). Convert to monthly rates.

Volumetric Rate at 5,000 gallons/month (5/1000 gallons)	\$ 5.67
Monthly Base Charge ("Minimum Charge")	\$ 12.34

Usage Billed to Customers in FY15

Number of Customers	Residential: 50,000	Non-residential: 2,000
Total Monthly Use (5,000's of gallons)	50,000	20,000
Annual Customer Rate Growth (%/year)	0.0%	0.0%

3) In "Data Input 2", enter details on capital improvement projects in the light blue cells. Each row is a different project.

Project	Project Construction Start Year	Project Expenditure Construction Period (years)	Estimated Construction Cost	Annual Construction Cost Inflation Factor (%/year)	Estimated Cost at the Start Year	% of Total CIP
Project 1 - Upgrade Wastewater Treatment Plant	FY12	1	\$ 1,000,000	2.0%	\$ 1,000,000	10.0%
Project 2 - Sewer Main Replacement	FY17	3	\$ 2,500,000	2.0%	\$ 2,324,925	23.2%
Project 3 - Capital Reserves Replenishment	FY17	3	\$ 500,000	2.0%	\$ 450,000	4.5%
Project 4 - Water Main Replacement	FY25	5	\$ 3,500,000	2.0%	\$ 4,613,167	46.1%

5) After all your utility information and capital improvement project details are entered, go to the "Dashboard" to view long term trends in your financial reserves, rate increases and average bills, and capital investments.



<http://southwestefc.unm.edu/asset-management-overview/>



WHAT WE DO

ASSET MANAGEMENT

OVERVIEW

AM IQ

AM MANUAL

RESOURCES

ENERGY MANAGEMENT

SMALL SYSTEMS PROJECTS

SOURCE WATER PROTECTION

TRIBAL DRINKING WATER

WATERCARE COMMUNITIES

WATER LOSS CONTROL

Home > Services > Asset Management – Overview

Asset Management – Overview



Assets are generally the most expensive components that a community can own, operate, maintain and replace. Making the right choice about how to manage a community's assets is key to being able to sustain the assets over time. One of the best tools to help a community manage its assets is called, Asset Management. It helps answer the questions of what should we do, how should we do it, when should we do it, and where is the best place to make an investment in our assets.

Asset Management is a proven method whose techniques have been refined by the international community, particularly in Australia and New Zealand. It has now been practiced overseas for well over 15 years and has been gaining popularity across the US for the last decade. The Southwest EFC is proud to offer this service to our clients. For more information, please contact us at 505.275.1000 or visit our website at southwestefc.unm.edu.

<http://southwestefc.unm.edu/amkan/main.php>

A.M. KAN WORK!

An Asset Management and Energy Efficiency Manual



Helping Water and Wastewater Utilities Achieve Sustainability
Through Sound Management Practices

Sponsored by:



<http://www.kdheks.gov>

Prepared by:



Southwest
Environmental
Finance
Center



<http://southwestefc.unm.edu/asset-management-iq/>

Appendix F

ASSET MANAGEMENT IQ

An Asset Management IQ Test is presented here in order to help you review the concepts of the various core components of Asset Management. Both the test and a scoring table are also available as a [printable pdf](#), which may be copied for use by multiple personnel within your utility.

In the web version of the test, clicking on a choice will automatically enter the number of points for that option and keep track of the score for each section of the Asset Management IQ as well as the total cumulative score. If a new answer is selected, the new choice and the new points will appear and the old points will be removed.

If the user completes the entire Asset Management IQ tool (all 30 questions) before starting Asset Management, it will provide a baseline evaluation at the beginning of Asset Management. Comparing the scores of each of the six sections will show which areas have the biggest gaps in terms of Asset Management activities. These scores may provide information about where efforts should be focused. You may wish to start with areas that are the weakest, offering a large improvement with a little effort, or with areas that are strong, which would offer a chance to get started in a familiar area.

As the utility progresses, the Asset Management IQ can be repeated and the scores compared to previous scores. At a minimum, you may wish to repeat the Asset Management IQ every year.

It should be noted that a total score of 150 would represent best practice in all areas of Asset Management. Not all

<http://southwestefc.unm.edu/asset-management-resources/>



SOUTHWEST
ENVIRONMENTAL
FINANCE CENTER

WHAT WE DO

ASSET MANAGEMENT

OVERVIEW

AM IQ

AM MANUAL

RESOURCES

ENERGY MANAGEMENT

SMALL SYSTEMS PROJECTS








SOURCE WATER
PROTECTION

TRIBAL DRINKING WATER




Home > Services > Asset Management – Resources

Asset Management – Resources

General

- Level of Service: Guidelies, Categories, and Example Goals |  download
- Level of Service: Goal Measurement |  download
- Criticality of Assets |  download
- Reference Guide for Asset Management Inventory and Risk Analysis |  download
- Introduction to Asset Management and Asset Management Resources |  download
- Asset Management: The Five Core Components |  download
- O&M Management Guide – DRAFT, Available for pilot
(Note: This is a zip file and must be extrated prior to opening) |  download

Asset Inventory

- Inventory Database (Note: This is a zip file and must be extrated prior to opening) |  download
- Instruction for using Asset Inventory Database |  download
- Inventory Spreadsheet |  download