

# AN INTRODUCTION TO ASSET MANAGEMENT

Webinar 4: Life Cycle Costs



*When you know better you do better*

*Maya Angelou*

# WELCOME TO THE EFCN WEBINAR SERIES



# AN INTRODUCTION TO ASSET MANAGEMENT

# WHY ASSET MANAGEMENT?

PROVIDES COMMON SENSE  
FRAMEWORK FOR DECISION-MAKING

RELIES ON KNOWLEDGE OF THE  
ENTIRE ORGANIZATION

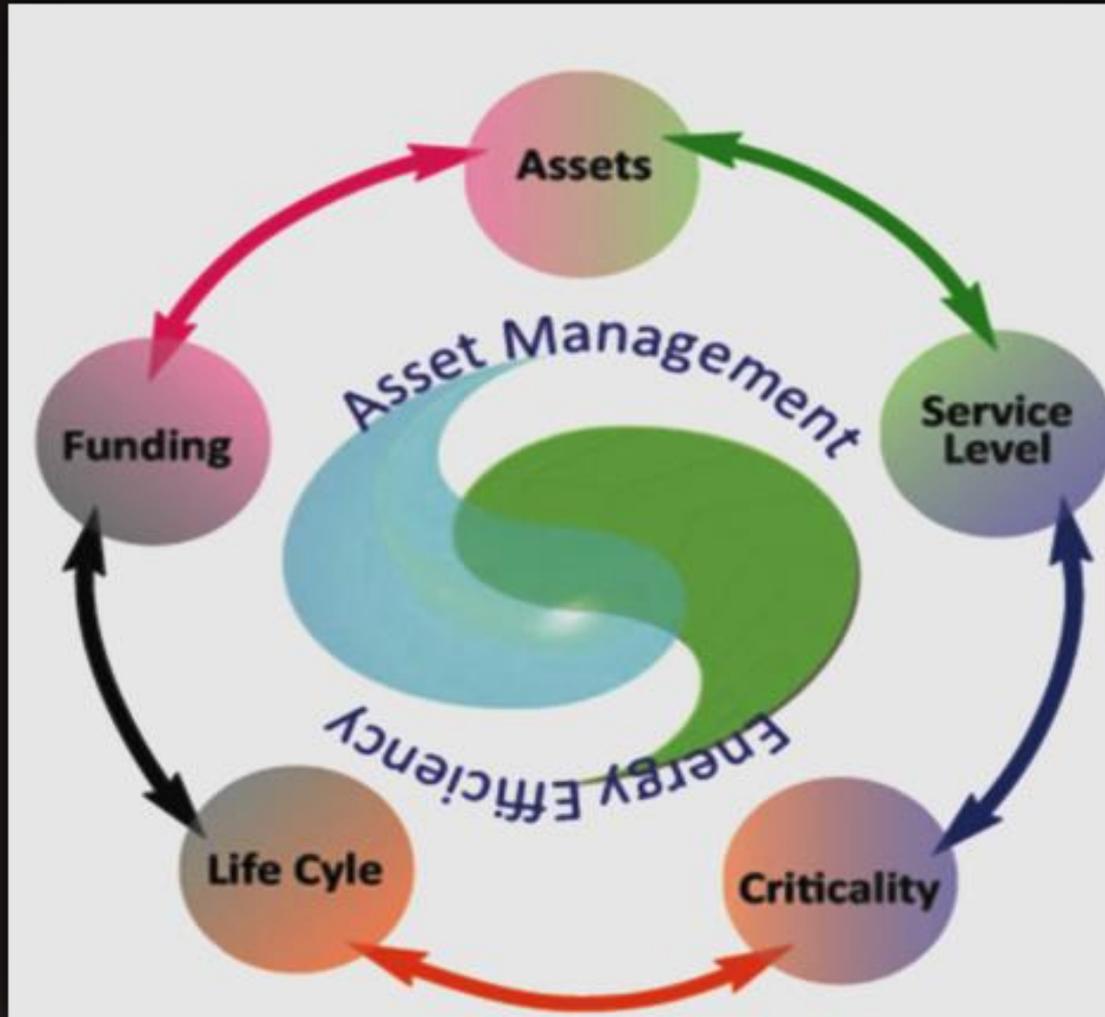
PROVIDES ABILITY TO PASS ON  
INFORMATION (OUT OF HEAD ONTO  
PAPER)

MOVES ORGANIZATION AWAY FROM  
REACTIVE OPERATION

**ENCOURAGES  
BEST O&M AND  
CAPITAL  
DECISIONS**



# The 5 Core Components of Asset Management



# CURRENT STATE OF THE ASSETS

**DIFFICULT TO  
MANAGE  
EFFECTIVELY  
WHEN YOU  
DON'T KNOW  
WHAT YOU OWN**

What assets  
do I own?

Where are  
they  
located?

What  
condition are  
they in?

What is their  
remaining  
useful life?

What is their  
replacement  
value?

**MOST STRAIGHT  
- FORWARD  
COMPONENT**

**CORE COMPONENT 1 - A REVIEW**

# CORE COMPONENT 2 - A REVIEW

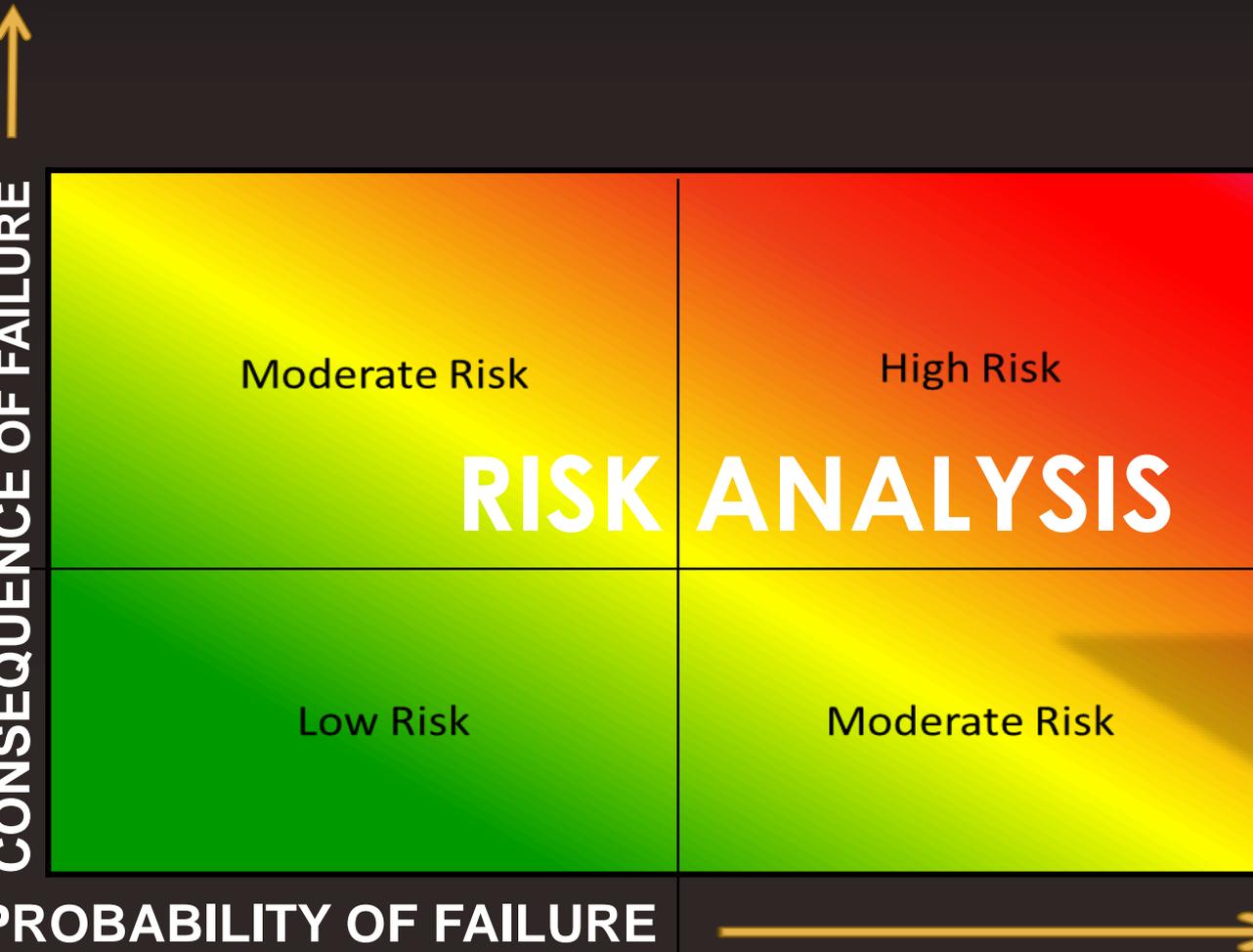
*Water utilities are first and foremost customer service businesses*

**DIFFICULT TO  
MANAGE  
EFFECTIVELY WHEN  
YOU DON'T KNOW  
WHAT YOU WANT  
YOUR ASSETS  
TO DO**

**MOST UNDER-  
APPRECIATED  
COMPONENT**

**Level of Service defines how you will  
operate the utility (the goals of the utility)**

# Core Component 3 – A Review



**DIFFICULT TO  
HAVE MAXIMUM  
IMPACT WITH  
LIMITED DOLLARS  
IF YOU DON'T  
KNOW WHICH  
ASSETS ARE  
MOST CRITICAL  
TO THE  
OPERATION**

**HEART &  
SOUL OF  
AM**

# Core Component 4 – Life Cycle Costing



# CAPITAL COSTS



# VS. LIFE CYCLE COSTS



**MANAGEMENT**



**O&M**



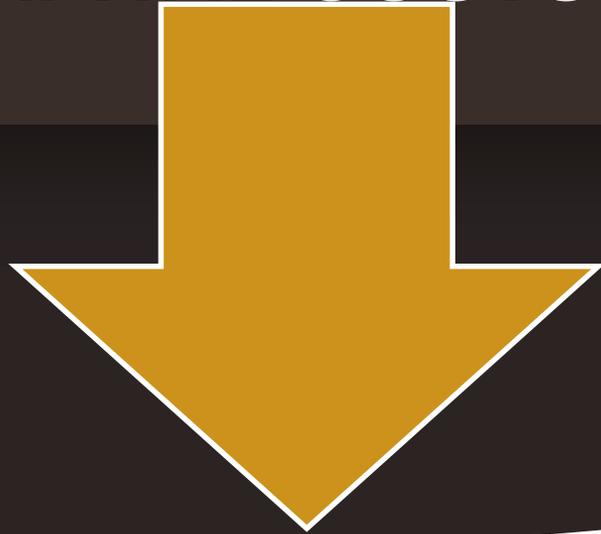
**Rehab**



**Repairs**

**COSTS OVER ENTIRE LIFE**

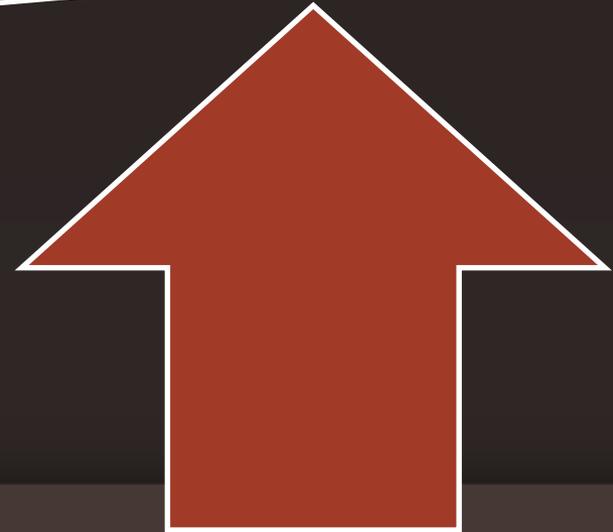
# CAPITAL COSTS VS. LIFE CYCLE COSTS



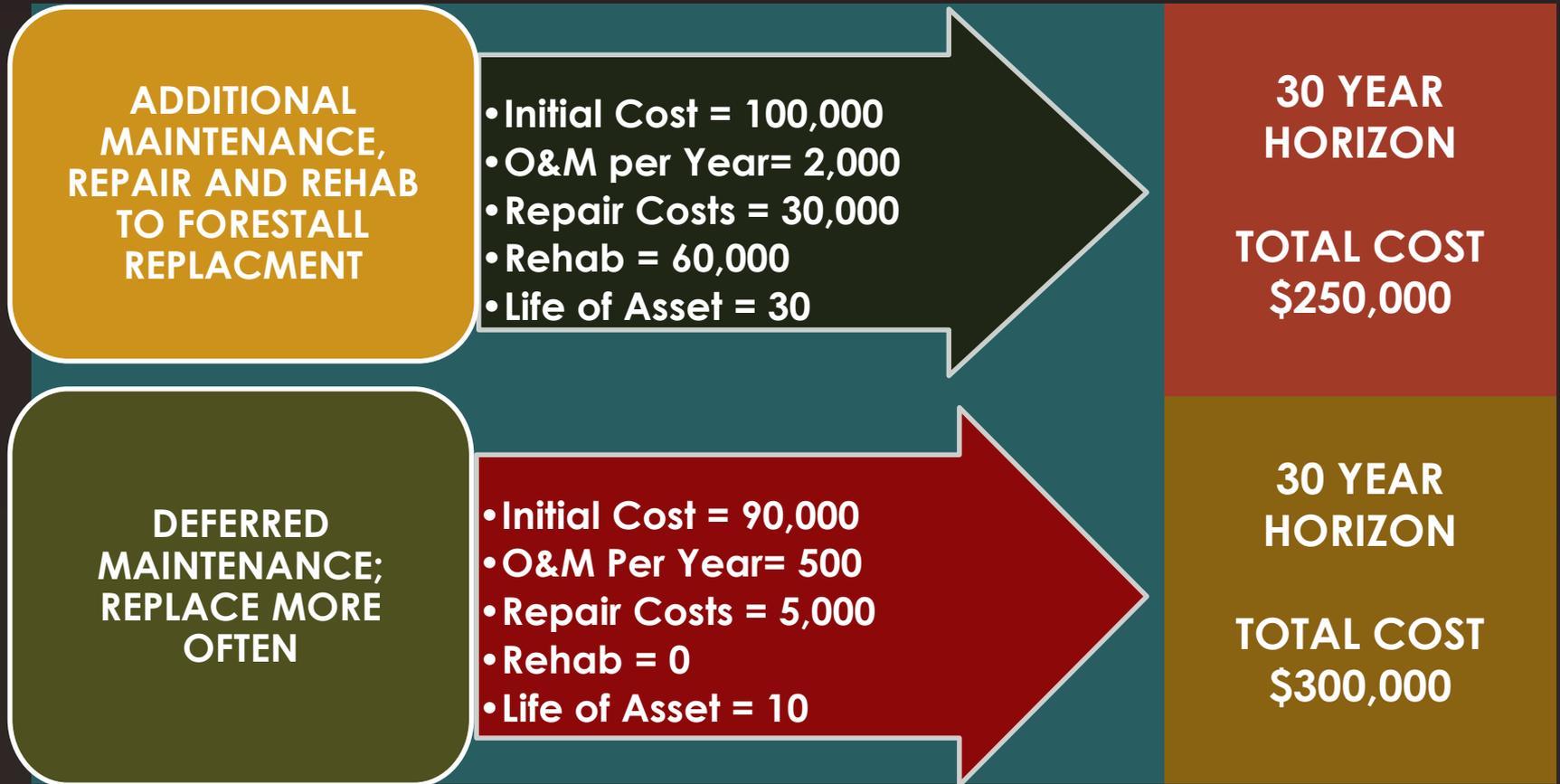
Capital  
Cost

Impact on what you choose to do?

Life  
Cycle  
Cost



# An Example

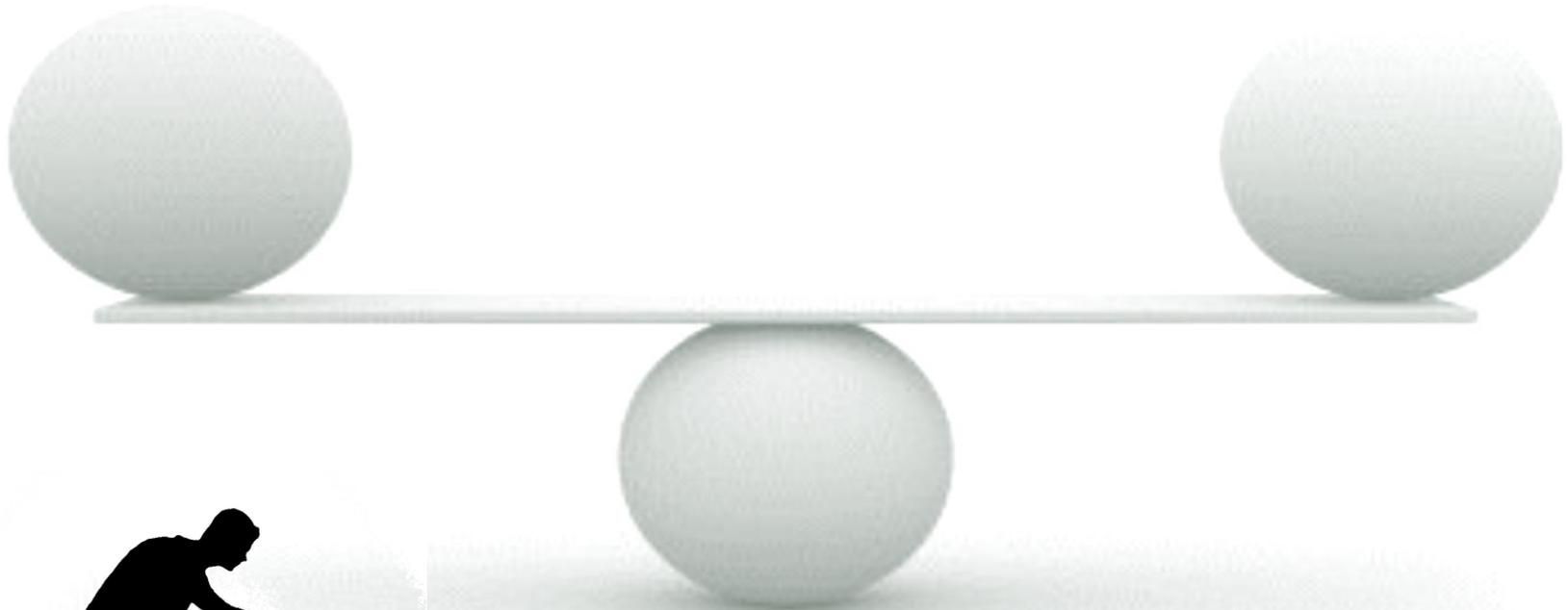


# Life Cycle Costing is About Balance

**O&M**

**REPAIR & REHAB**

**REPLACEMENT**



# MAINTENANCE ACTIVITIES



ROUTINE



PREDICTIVE



PREVENTATIVE



# Planning the Budget

6792  
-814  
-----  
5978

697  
5673  
277  
498  
1266  
32107  
5906

88  
8/704

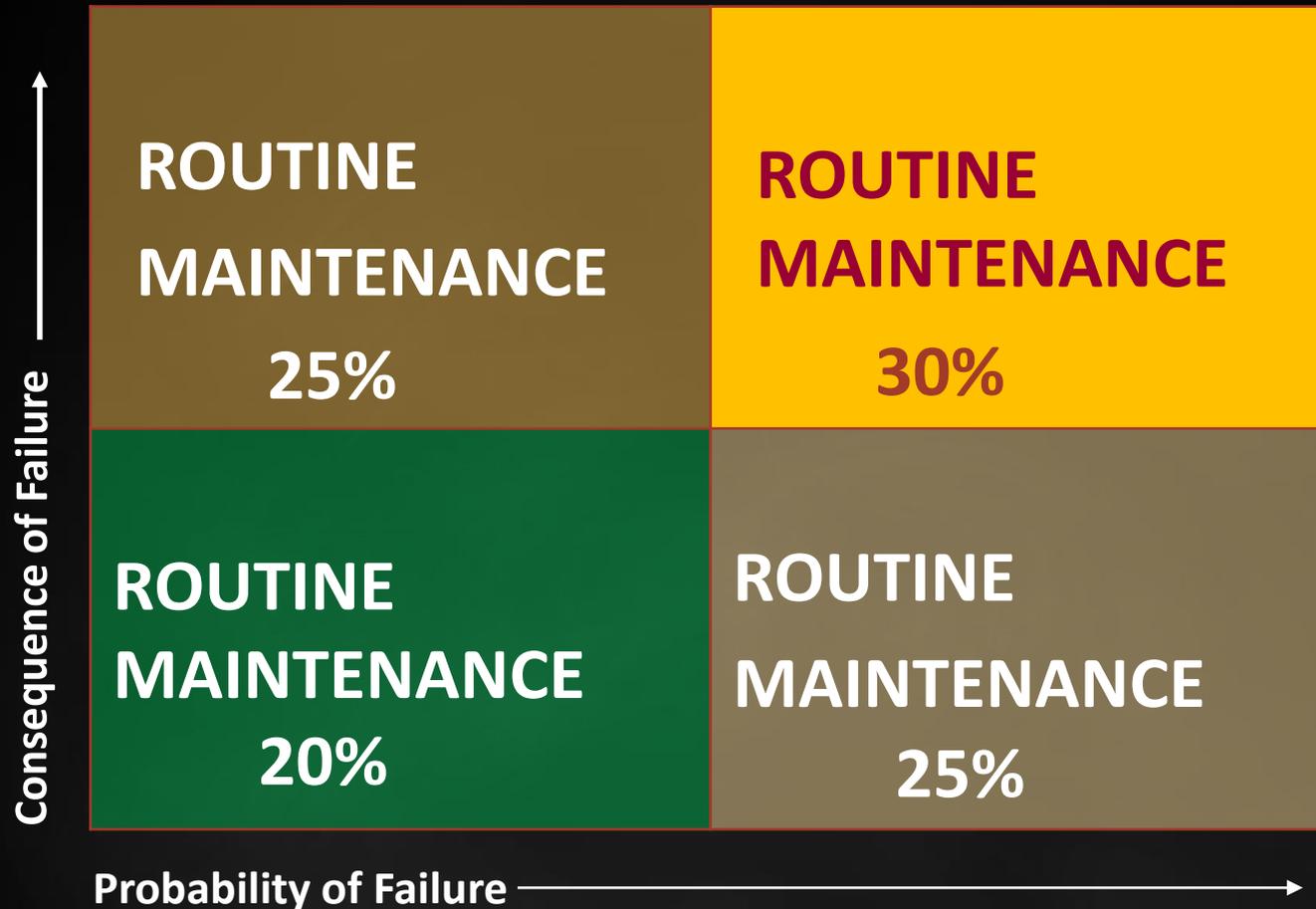
2004  
2005

WATER  
PAINT  
CARPET

The illustration shows a person standing on a ladder, holding a pencil up to a large sheet of paper. The paper is covered with various numbers and mathematical symbols, suggesting a budgeting or accounting task. A small calendar icon is also visible on the paper.

## The Case for Maintenance

# ROUTINE MAINTENANCE BASED ON CRITICALITY



# ROUTINE MAINTENANCE BASED ON CRITICALITY

ROUTINE  
MAINTENANCE

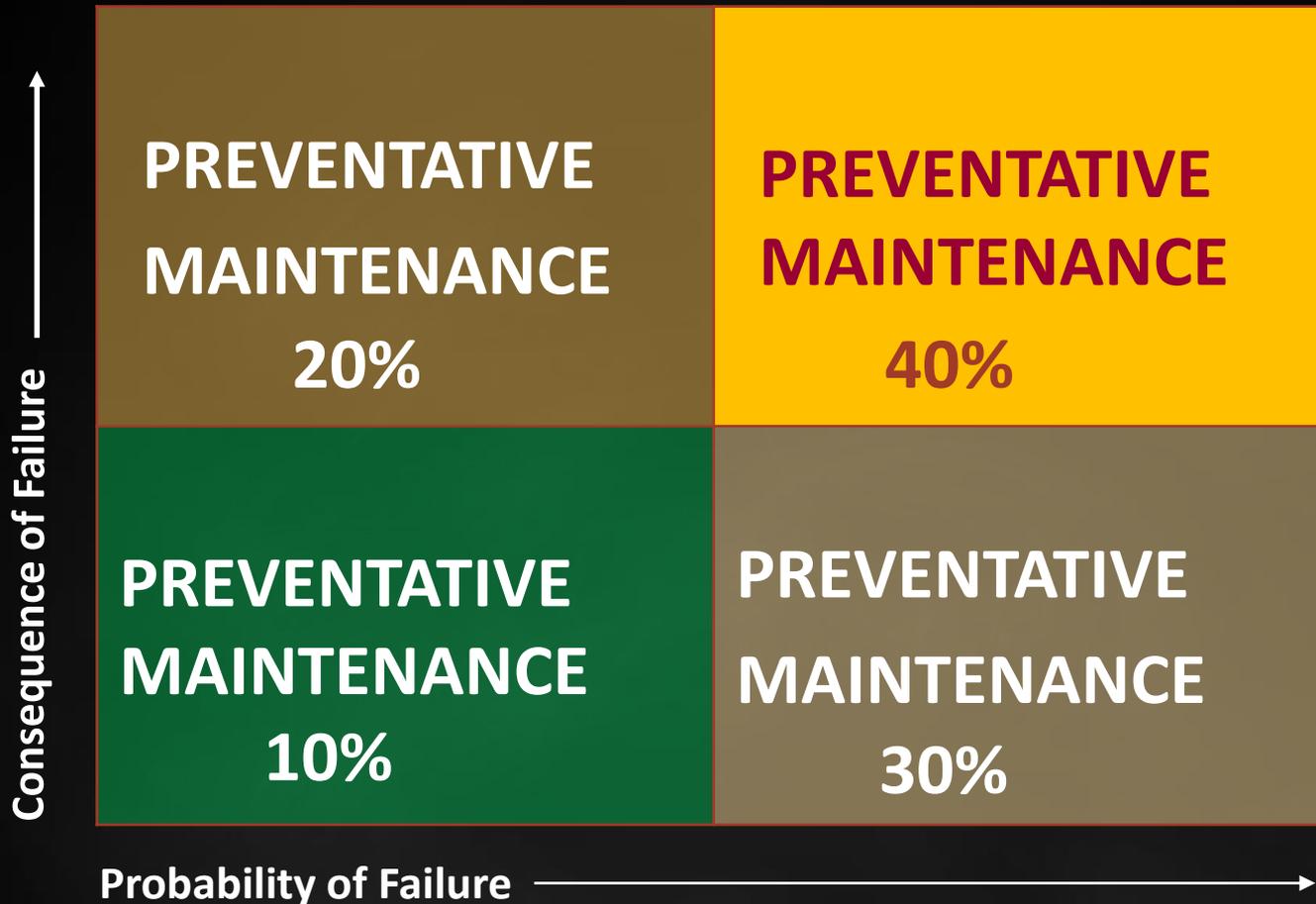
WHY? IF WE PROPERLY  
MAINTAIN OUR ASSETS, THEY  
WILL LAST LONGER &  
WARRANTIES PRESERVED

Consequence

MAINTENANCE  
20%

Probability of Failure

# PREVENTATIVE MAINTENANCE BASED ON CRITICALITY



# PREVENTATIVE MAINTENANCE BASED ON CRITICALITY

PREVENTATIVE  
MAINTENANCE

WHY? IF WE PREVENT ASSET  
FAILURES, WE CAN GREATLY  
REDUCE THE CONSEQUENCES  
(FINANCIAL, ENVIRONMENTAL,  
SOCIAL)

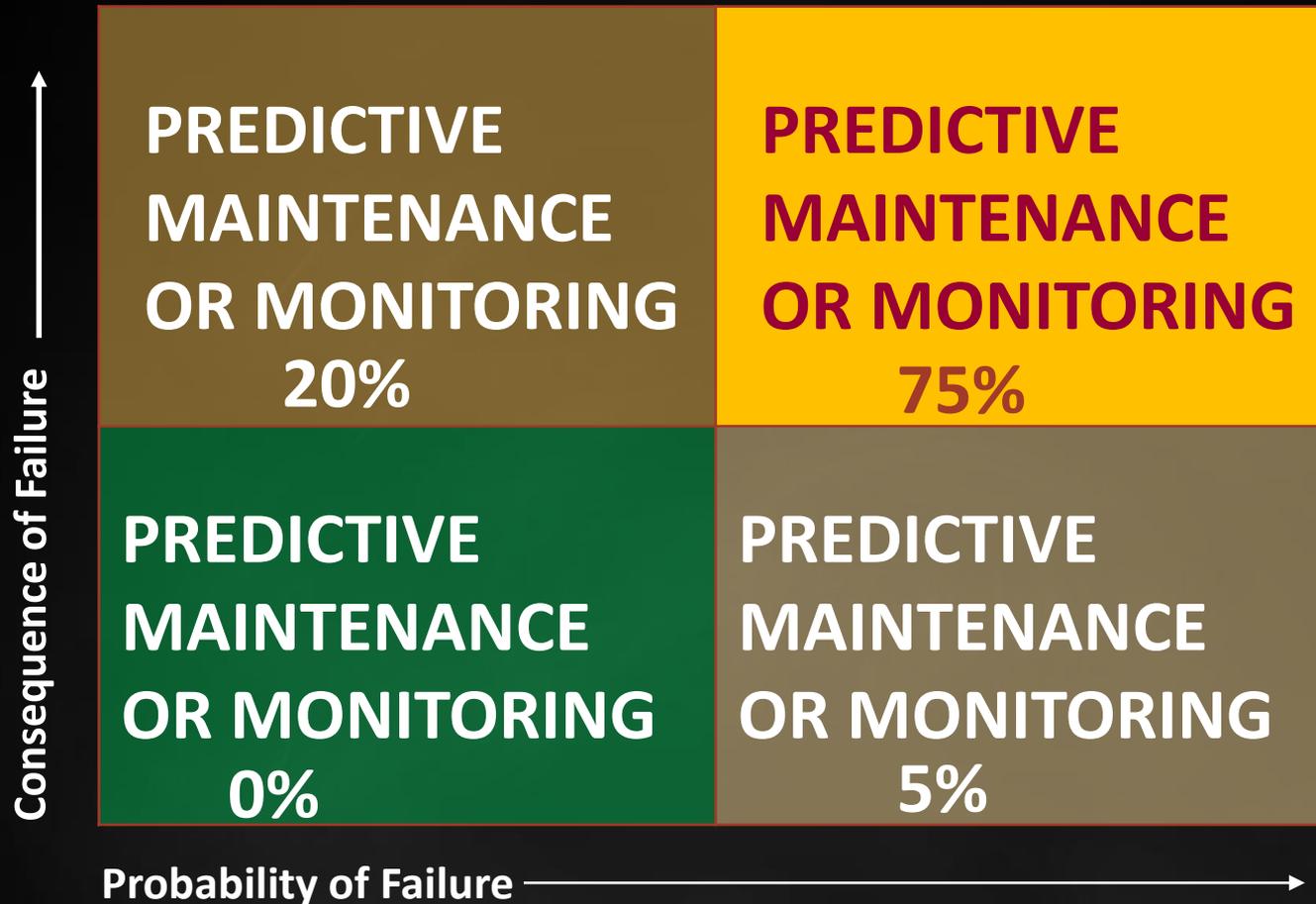
Consequence

MAINTENANCE

10%

Probability of Failure

# PREDICTIVE MAINTENANCE OR MONITORING BASED ON CRITICALITY



# PREDICTIVE MAINTENANCE OR MONITORING BASED ON CRITICALITY

WHY? IF WE CAN BETTER  
PREDICT AN ASSET'S FAILURE,  
WE CAN USE AS MUCH OF THE  
LIFE AS POSSIBLE BEFORE  
REPLACING

Consequence of

MAINTENANCE  
OR MONITORING

0%

PREDICTIVE  
MAINTENANCE

5%

Probability of Failure

# SHIFT FROM REACTIVE TO PLANNED OPERATION



# REACTIVE VS. PLANNED OPERATION: AN EXAMPLE

<b>Bio Solids land filled</b>	<i>(to date)</i>	<i>(month)</i>
<u>900.66</u> w/tons;	<u>5044</u> w/tons	<u>5</u>
	<i>(to date)</i>	
Odor Complaints	<u>1</u>	<u>2</u>
Preventive work orders	<u>861</u>	<u>4336</u>
Corrective work orders	<u>159</u>	<u>629</u>
		<u>14.5 %</u>
<b><u>Collections</u></b>		
• Lines cleaned	<u>59.77</u> miles	<u>238.42</u> miles

**JOHNSON COUNTY, KANSAS**

# TRACKING O&M COSTS

Asset ID	Asset Category	Asset Type	Annual O&M Costs
RW1PHB	Raw Water	Pump	\$4,523
RW2PHB	Raw Water	Pump	\$6,955
RW1PHA	Raw Water	Pump	\$3,760
RW2PHB	Raw Water	Pump	\$4,145



# OPTIONS

*REHAB*

*REPAIR*

*REPLACEMENT*



# HOW TO DECIDE WHEN TO REPAIR, REHABILITATE, REPLACE

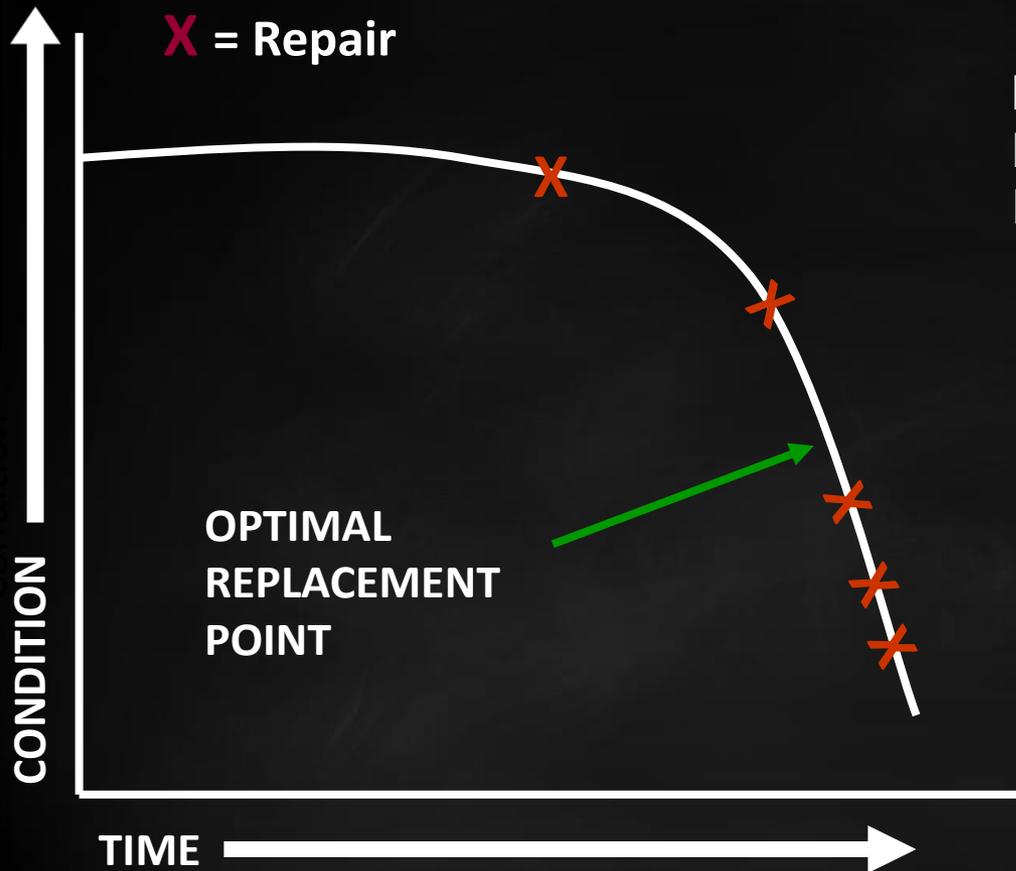


BASED ON ECONOMICS

BASED ON RISK

BASED ON AVAILABLE TECHNOLOGY

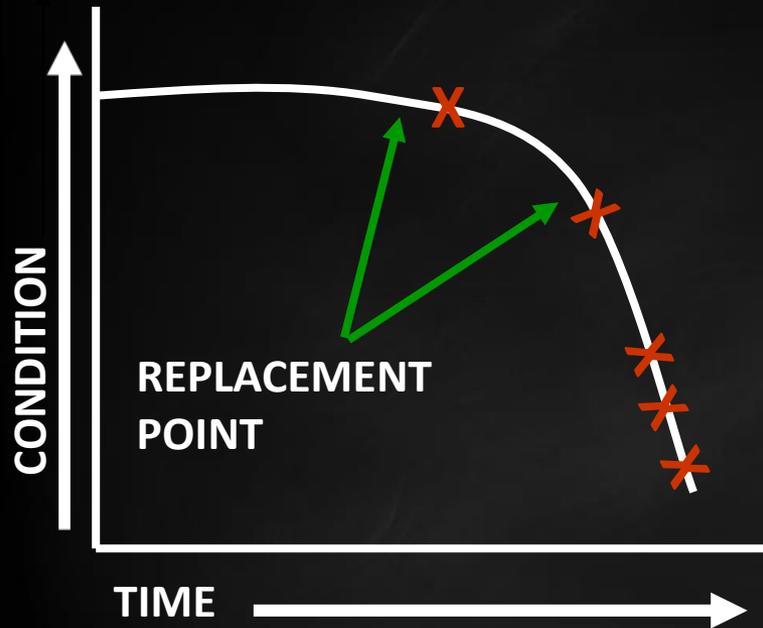
# DECIDING WHEN TO REPLACE ASSETS



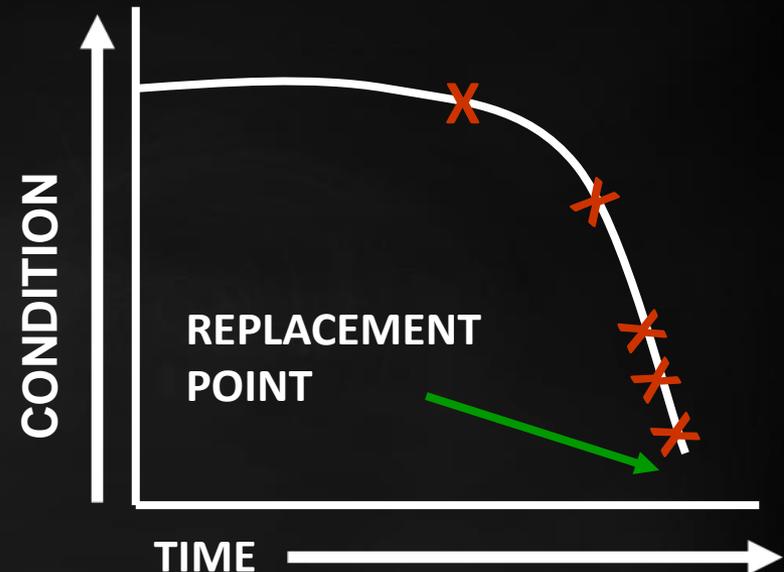
IN THEORY, THERE IS AN EXACT RIGHT TIME TO REPLACE AN ASSET

# REPLACEMENT OF ASSETS & RISK

**HIGH RISK ASSETS: REPLACE SOONER;  
PLANNED REPLACEMENT**



**LOW RISK ASSETS: REPLACE  
LATER; MANAGE FAILURE**



# OPTIONS

Summary

		5 Year Total
	\$	28,200,000
	\$	11,000,000
	\$	427,300,000
	\$	4,500,000
	\$	116,500,000
	\$	546,850,000
	\$	
	\$	956,318,000
	\$	384,053,000
	\$	84,215,000
	\$	176,000,000
	\$	56,121,000
	\$	30,300,000
	\$	125,151,000
Projects	\$	2,006,866,000
	\$	31,612,000
	\$	611,000
	\$	603,800,000
	\$	1,061,100,000
	\$	400,000
	\$	6,300,000
Subtotal Other Projects	\$	1,951,123,000
TOTAL	\$	4,968,019,000

# **CAPITAL PROJECTS LOOK CAREFULLY AT HIGH DOLLAR PROJECTS**



# TAKING IT TO YOUR FACILITY



**DEVELOP YOUR  
TEAM**

# TAKING IT TO YOUR FACILITY



## COMPLETE INTERACTIVE ASSET MANAGEMENT TEST

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

# TAKING IT TO YOUR FACILITY



**EVALUATE YOUR  
CURRENT  
MAINTENANCE  
PROGRAM**

**HOW REACTIVE IS  
YOUR OPERATION?**

# TAKING IT TO YOUR FACILITY



**THINK ABOUT WAYS  
TO BUILD  
MAINTENANCE INTO  
YOUR CURRENT  
BUDGET**

**HOW CAN YOU GAIN  
SUPPORT FOR THIS?**

# TAKING IT TO YOUR FACILITY



**DETERMINE IF YOU  
HAVE COSTS FOR  
O&M BY ASSET**

**HOW COULD YOU  
DO THIS?**

# TAKING IT TO YOUR FACILITY



**LOOK AT YOUR CIP  
PROGRAM**

**DO YOU HAVE  
OTHER OPTIONS  
FOR THESE ITEMS?**

**WE WANT TO  
THANK EPA FOR  
PROVIDING  
FUNDING FOR THIS  
PROJECT**



# CONTACT US

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**Smart Management for  
Small Water Systems**



**Southwest  
Environmental  
Finance  
Center**