



**Addressing the nations failing infrastructure
and creating sustainability for the future...**

Anthony Harrison
Regional Project Manager



1

Introduction

Project Manager

- USMC Veteran
- 5 Years with Suez/USCI
- Home Office Watertown NY
- PM Manager in the Suez North Region



Anthony Harrison – Watertown, NY

2

Suez Advanced Solutions

North American Leader in Water Asset Management Solutions

4,000+

Municipal & industrial customers

8,000+

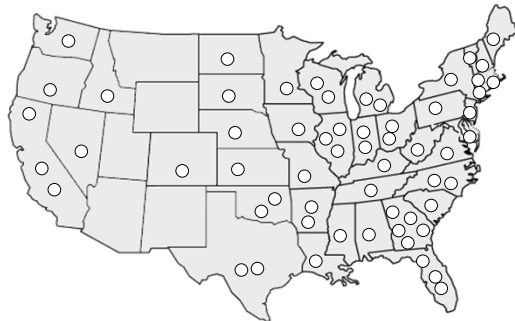
Water assets managed

100+

Owned or operated utilities by Suez worldwide

Water Tower Maintenance

Us Leader



- Corporate Office
- 19 Service Centers
- Water System Consultants

5

lines of business

Tank Services

Steel Tanks

Water Quality

TRS, RCS, Mixers

Concrete and Plant Rehabilitation

Concrete Tanks, Filter Plants, MBR

Network Asset Management

SIPP, Pipe Asset Management Plan

Metering Asset Management

AMI



3

Asset Management

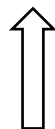
**Preventive
Maintenance**

VS

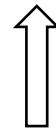
**Corrective
Maintenance**

Before a failure
Has occurred

after a failure
has occurred



Asset Management



Run to Failure

4 | SUEZ Pipeline Asset Management Program



4

What are some common items that we run to failure?



5 | SUEZ Pipeline Asset Management Program



5

What are some common items that we run to failure?



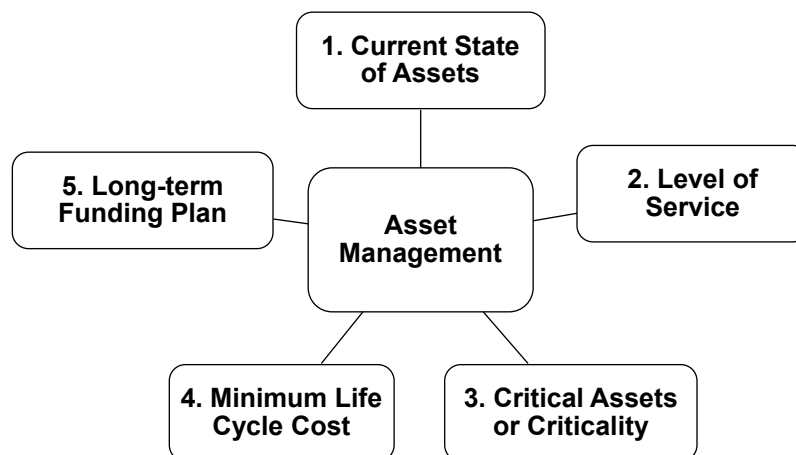
6 | SUEZ Pipeline Asset Management Program



6

Asset Management: A Best Practices Guide

- ★ **Purpose** - Promote responsible investment and rehabilitation of drinking water infrastructure
- ★ **Requirement** - Develop plan to reduce cost while increasing efficiency and the reliability of the Asset



EPA's 5 Core Questions of Asset Management Framework

7

Asset Management

1. Current State of Assets

2. Level of Service

3. Critical Assets or Criticality

4. Minimum Life Cycle Cost

5. Long-term Funding Plan

1. Asset Inventory and Condition Assessment

- Locate/Identify the assets
- Evaluate asset condition
- Determine the remaining life and value of the assets
- Determine the energy use of the assets

2. Level of Service

- Determine the expected levels of service demanded by its customers of each asset (i.e. Prioritize the maintenance, repair and service of critical assets)

3. Critical Assets

- Evaluate most critical assets
- Evaluate most vulnerable assets

4. Life Cycle Costing

- Determine original lifespan of assets
- Determine remaining lifespan of assets

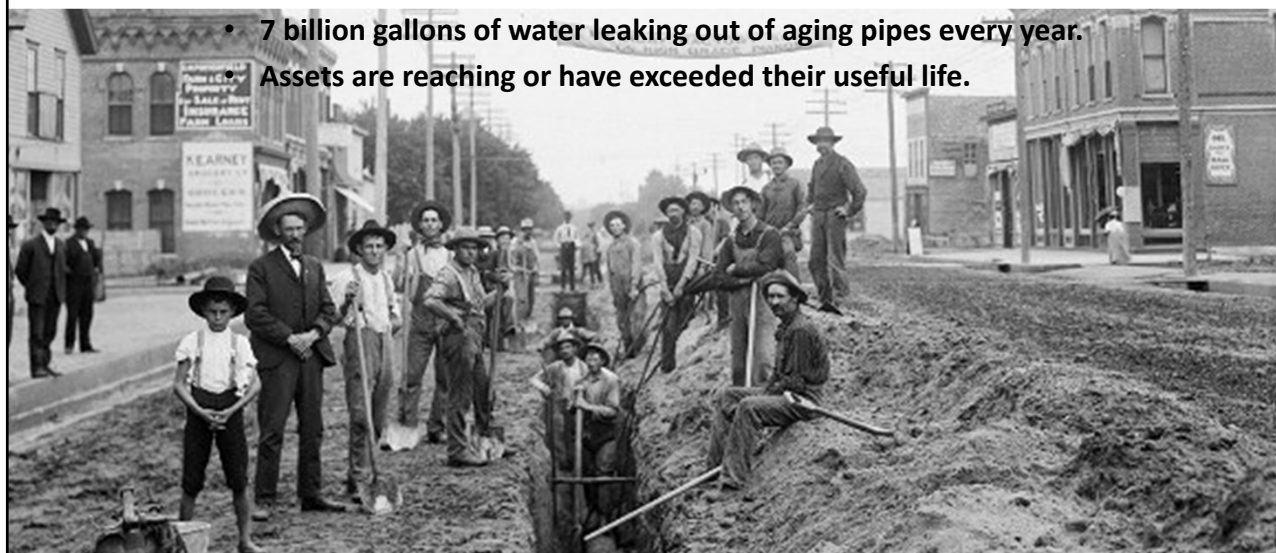
5. Long-term Funding Strategy

- Determine long-term repair/replacement cost
- Identify funding plan

8

Water Infrastructure in the U.S.A.

- Estimated 240,000 water main breaks per year in the United States.
- 7 billion gallons of water leaking out of aging pipes every year.
- Assets are reaching or have exceeded their useful life.



9

2012 American Water Works Association (AWWA) report entitled “Buried No Longer: Confronting America’s Water Infrastructure Challenge”

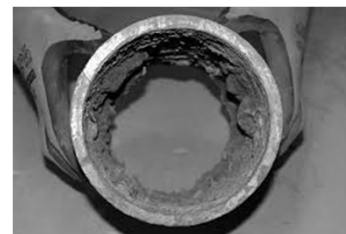
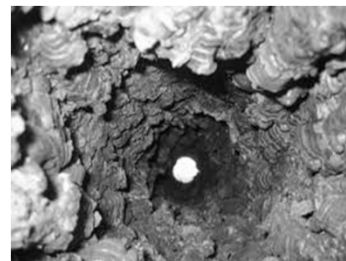
The cost of repairing the existing damage and keeping up with ongoing maintenance is staggering.

- *“Restoring existing water systems as they reach the end of their useful lives and expanding them to serve a growing population will cost at least \$1 trillion over the next 25 years,”* according to the AWWA report.
- *“Through 2050, the costs escalate to \$1.7 trillion, or \$30 billion annually”.*
- Municipal water systems have been systematically underfunded, in part because raising rates is unpopular politically.

BURIED NO LONGER:
Confronting America's Water Infrastructure Challenge

10

What Is The Problem



 **suez**

11

The Problem

- ⇒ Water Quality – Poor water quality resulting in red water complaints, taste and odor problems.
- ⇒ Frequent Main Breaks – Resulting in higher labor costs to maintain system
- ⇒ Reduced Hydraulic Efficiency – Resulting in increased pumping pressures and higher operating costs
- ⇒ Water Loss – LOST REVENUE!!!

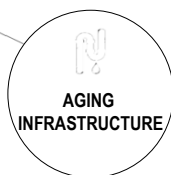


 **suez**

12

THE PROBLEM

1 Million miles of water pipes over 100 years old



Aging US water pipe infrastructure suffering from pipe degradation, **Water Quality** issues and **Main breaks**

Out of sight, out of mind... until it leaks!

REGULATORY PRESSURE

New State Laws require Pipe Asset Management Programs

Some State Laws already in place:

- New Jersey Water Quality Accountability Act
- Michigan's Safe Drinking Water Act Amendment. Rule 1606 of the Administrative Rules of Act 399.

New mandatory requirements:

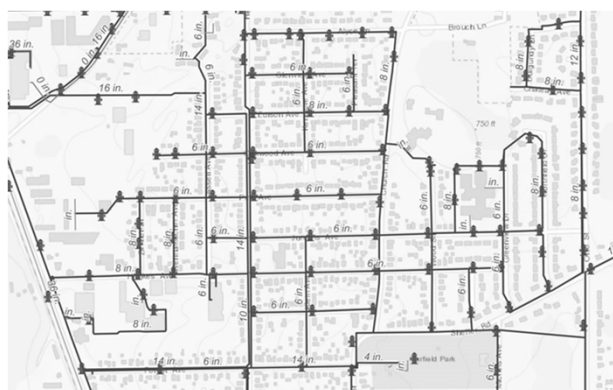
- Water main renewal program with 150-year replacement cycle or detailed replacement analysis
- Dedicated funds
- Certified by licensed operator and PE
- CIP reporting to DEP



13

- Have a risk-based, strategic process that helps allocate your pipe replacement budget to the most critical areas of your system and avoid costly errors
- Use of rehabilitation and maintenance technologies that ensure the implementation of the most cost-effective solution for each pipe.
- An asset management program that extends the life of your water distribution system, reduces leaks and improves water quality.

14 | SUEZ Pipeline Asset Management Program



14



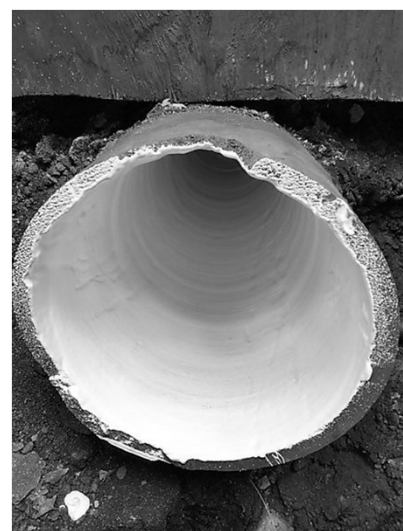
**Addressing the nations failing infrastructure
and creating sustainability for the future...**

Anthony Harrison
Regional Project Manager



15

Spray In Place Pipe

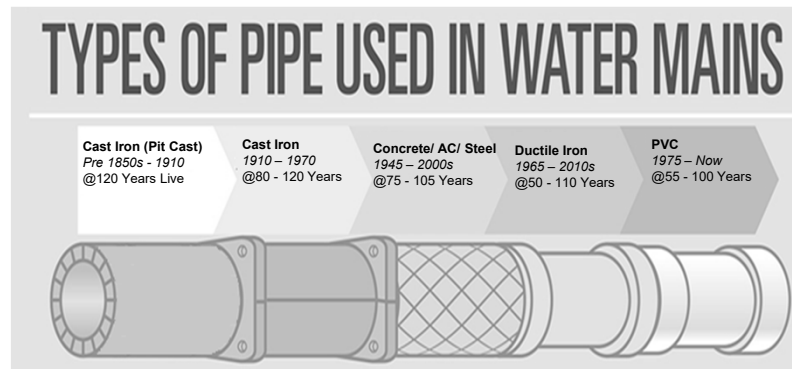


16

•

Results

- Enhances Strength of Existing Pipelines / Reduces Breaks
- Expedited Return to Service Compared to Dig and Replace
- Small Footprint Compared to Traditional Dig and Replace
- No Service Cut Outs
- No Solvents
- Seals Cracks, Pin Holes, Leaks

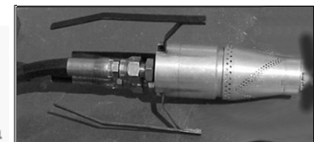


17

•
•

Improved Coatings

- Patented Two Part, Highly Thixotropic Epoxy Systems
- Enhance Water and Chemical Resistance
- Ability to Build up to 6 mm / ¼" / 250 mils, in a Single Pass
- NSF-61 Certified, No VOC, Bisphenol Free, No Leachate Risk
- 16 Hour Cure Time and Quickly Returned to Service



Improved Application Technology

- Apply 100% Solids Coating in Pipes 4" and Larger
- Patented Mapping and Computer Controlled Process



SOE2

18

Coatings Specification Details

	ASTM F-1743	SUEZ	%
Tensile Strength	3,000	7,000	233%
Flexural Strength	4,500	11,000	244%
Compressive Strength	Not Listed	12,000	--
Flexural Modulus	250,000	500,000	200%

AWWA M-28 Standards for rehabilitation of water mains. This specifies ASTM F-1743 as the class 4 Structural lining standard.

- **AWWA M-28 Standards** for rehabilitation of water mains. This specifies ASTM F-1743 as the class 4 Structural lining standard.
- **ASME PCC-2 Design** considerations for buried pipe test standards were utilized and documented by Madero Engineering, Houston, TX. Certified wall thickness for our lining material for partially deteriorated pipe to resist both internal and external loads.
- **ASTM F1216 Standard** practice for rehabilitation of existing pipeline standards were utilized and documented by Madero Engineering, Houston, TX. Certified wall thickness of our material comply with this standard.

“the ultimate capacity of all specimens exceeds 400 psi hydrostatic pressure”

– Kent Harries, Ph.D., F.ACI, P.Eng.

Associate Professor of Structural Engineering and Mechanics University of Pittsburgh.

19

Lining Access Pit



20

Lining Access Pit



21

Lining Access Pit



22

Drag Scrapping



23 I



23

Wyandotte, MI - 3,402' 6" & 8" Water Main



24 I



24

Drag Scrapping



25 I

25

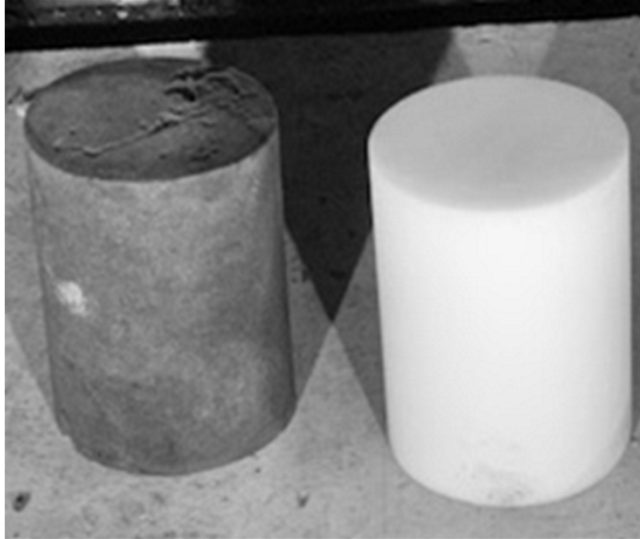
Drag Scrapping



26 I

26

Foam Swabs

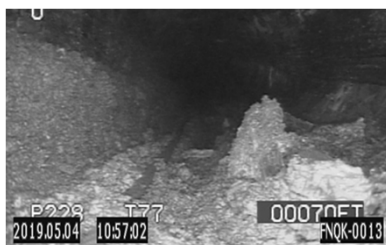


27 I

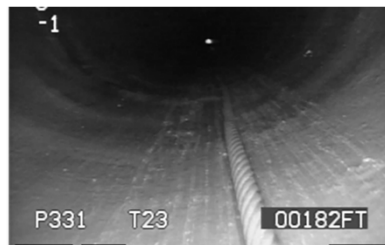
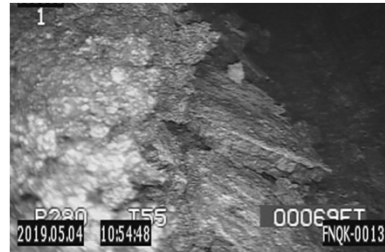


27

CCTV

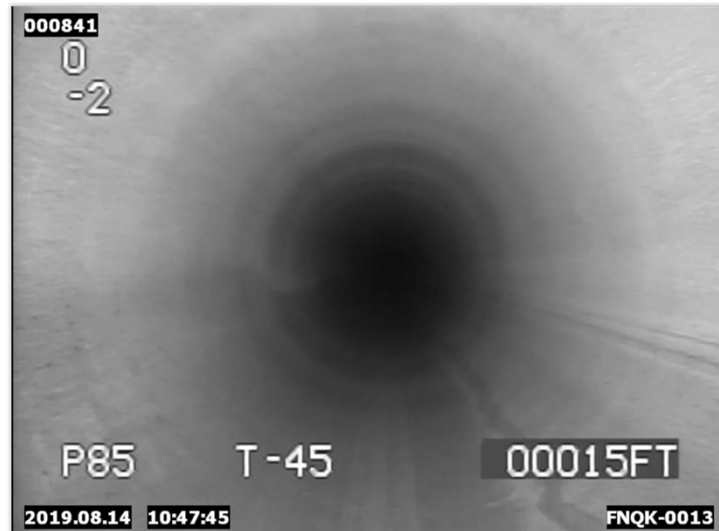


28 I



28

CCTV



29 I

29

SIPP Application Rig



30 I

30

SIPP Spray Application



31 I



31

SIPP Application Rig

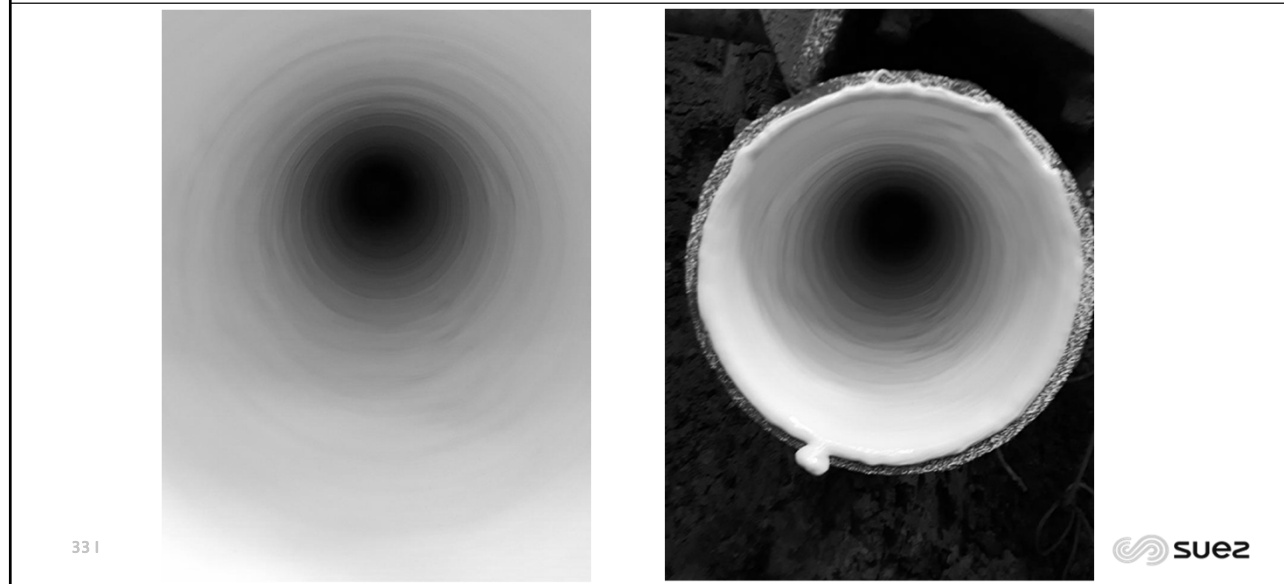


32 I



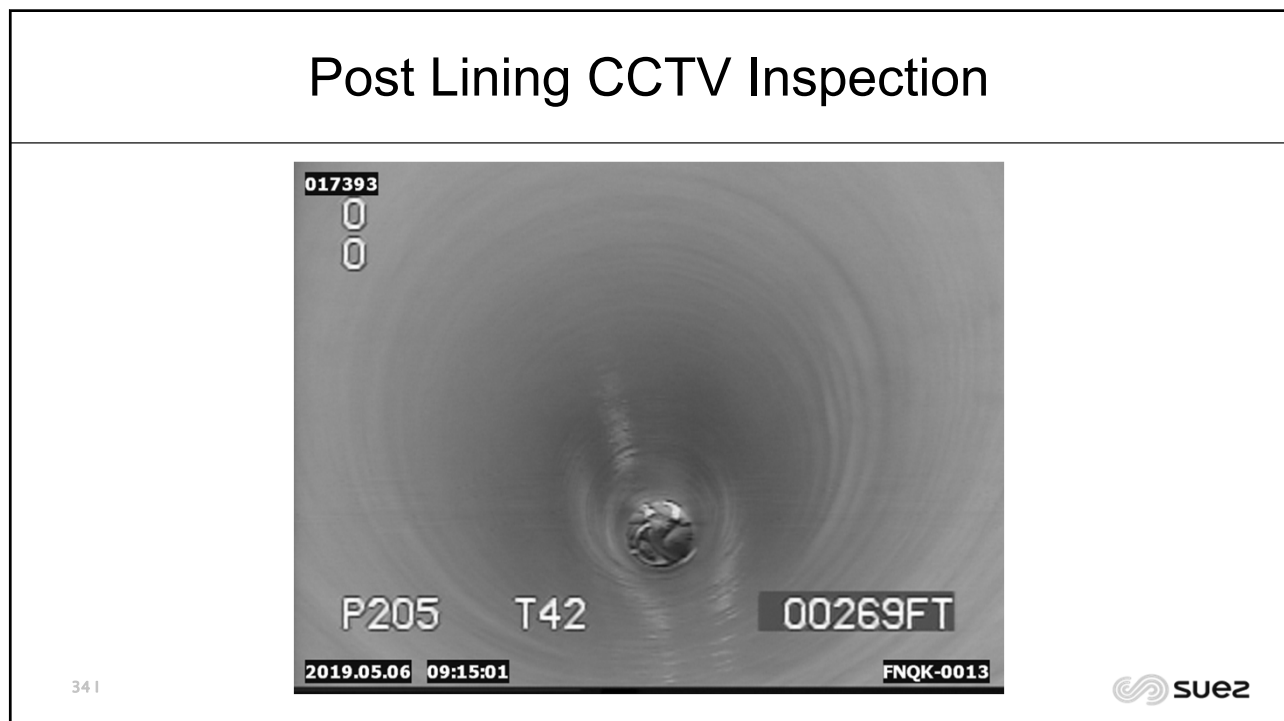
32

Wyandotte, MI - 3,402' 6" & 8" Water Main



33

Post Lining CCTV Inspection



34

SIPP Test Run

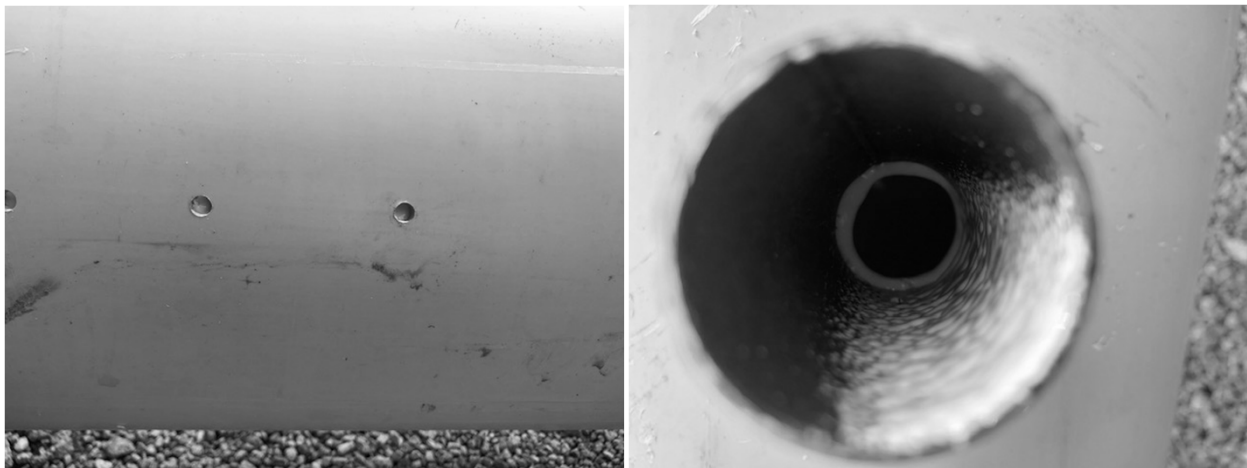


35 I



35

SIPP Test Run



36 I



36

Water System Consultants

Nick Rapagnani
973-462-7381

Greg Storms
856-535-7047

Joe Jasinski
908-797-9559



37

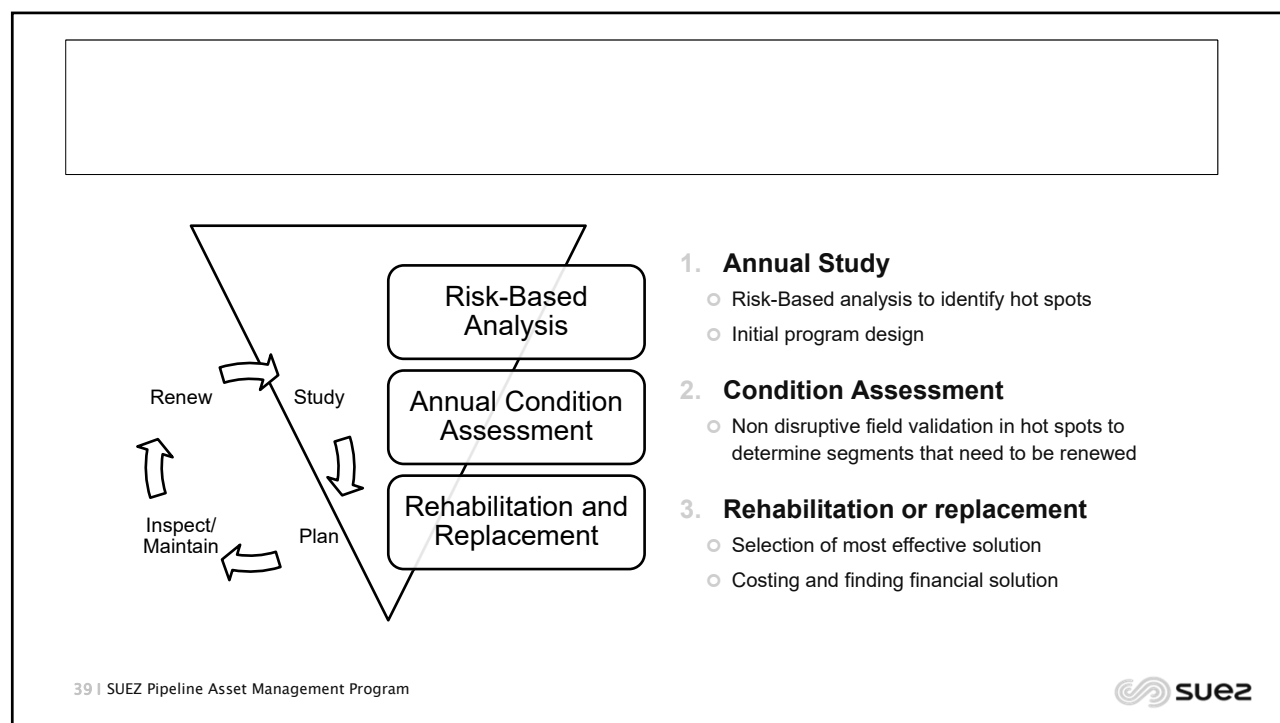
Questions?



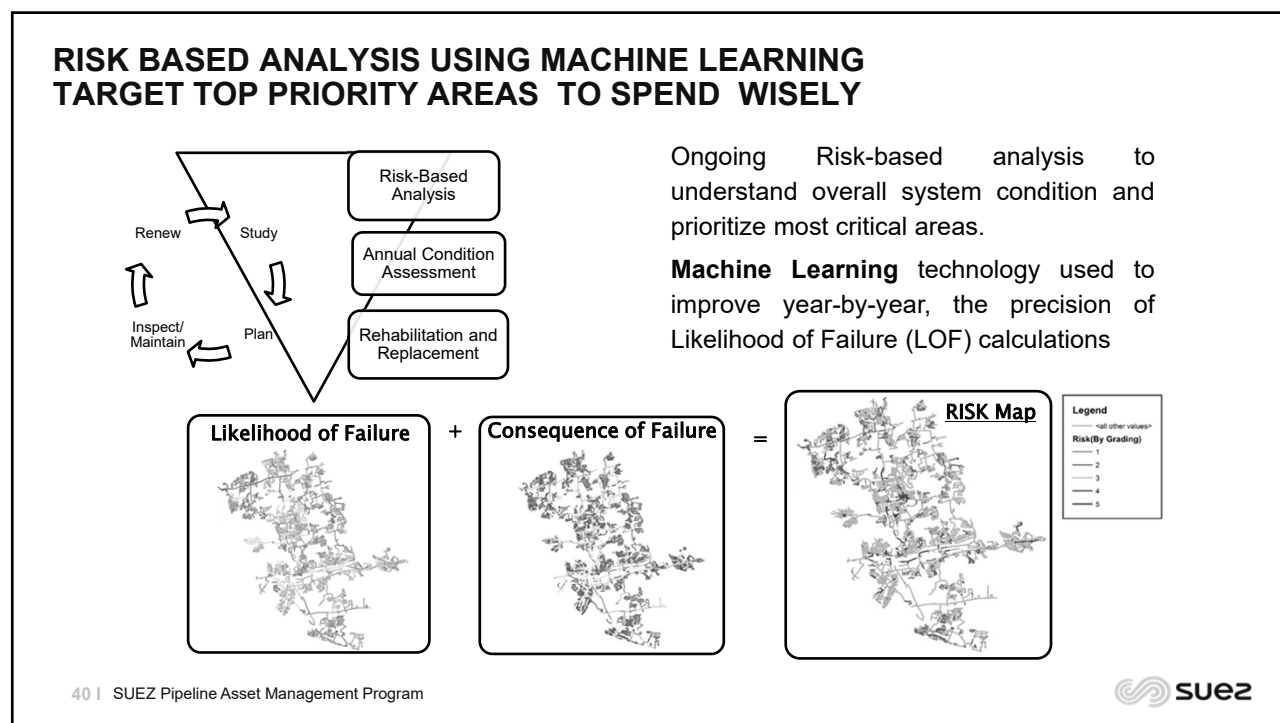
38 |



38

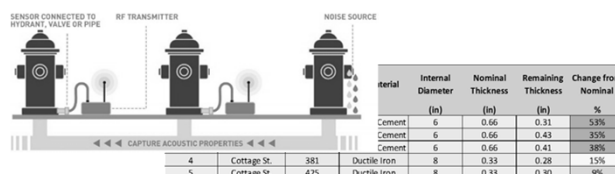
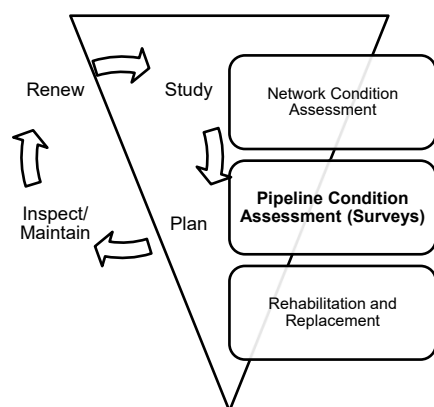


39



40

PIPELINE SURVEYS CONFIRM ASSUMPTIONS, AVOID COSTLY ERRORS



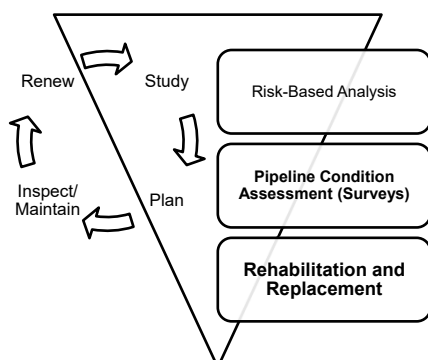
Annual **Non-Intrusive Pipeline Condition Assessment** to measure remaining pipe wall thickness and find leaks, used to:

- Validate sections to replace, rehab, repair or defer
- Data uploaded to the Machine Learning system
- Track performance of the Asset Management program



41

SUEZ TECHNOLOGIES AND ENGINEERING & OPERATOR EXPERIENCE ENSURE MOST COST-EFFECTIVE SOLUTION IS IMPLEMENTED FOR EACH PIPE



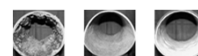
Considerations

- Actual Pipe Condition
- Different sizes may require different actions
- Paving Schedule
- Road Moratorium
- Previous Rehabilitation
- Other Utility Work



Potential Actions

- Planned Projects
- Further Investigation
- Replacement
- Rehabilitation
- Upsize
- Run until Failure



42

Pipeline Asset Management Program: Summary

- Preventive maintenance approach to **prioritize** and **minimize** investment needs
- Risk-Based analysis to identify **hot spots** using basic utility data and other external databases
- Pipe condition assessment in hot spots to **validate** segments that need to be renewed
- Data collected annually helps to improve **accuracy** and measure **performance** (WQ, leaks, pipe life)
- Unique technologies brought by SUEZ:
 - Network Condition Assessment with Machine learning
 - Non Intrusive Pipeline Surveys
 - Pipe cleaning to extend expected life
 - High Performance coatings