A dynamic splash of clear blue water against a white background, with a blue gradient at the bottom. The water is captured in mid-air, creating a sense of movement and freshness.

# **Water System Resiliency RENEW Program**

June 22, 2020

# RENEW

## Purpose

Provide best possible water quality and utility service



Reducing the likelihood of future disruptive and costly emergency repairs



Proactively addressing aging infrastructure now



# About RENEW

## Water for the Future

In order to provide customers with the best water quality and utility service, Middlesex Water Company (MWC) is in the process of replacing pipes within its distribution system that are at the end of their useful life.

- Middlesex Water Company has approximately 732 miles of transmission and distribution mains in service area.
- Main driver for the RENEW program is to maintain 100 Year Replacement schedule for all distribution system assets.
- Equates to  $\pm 38,000$  LF of pipe replacement per year.



# The Future of RENEW

## Goals of RENEW



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“Our RENEW Program helps us to better preserve our water resources by methodically restoring the integrity of our water distribution system within the project scope area, thereby minimizing the potential of future leaks or main breaks in that vicinity”

- Dennis Doll , Chief Executive Officer  
Middlesex Water Company



1

**Optimize the  
Selection of Assets**

2

**Design Most  
Practical Solution**

3

**Efficiently Construct  
& Implement New  
Assets**

# RENEW

## Three Year Model



**Planning  
Phase**

**Design  
Phase**

**Implementation  
Phase**

### **Year One: Planning**

Year one will focus on identifying the next ideal location for the RENEW

### **Year Two: Design**

Year two will focus on designing an appropriate solution

### **Year Three: Implementation**

Year three will focus on the ideal implementation and construction of the RENEW Project

An aerial photograph showing a large-scale construction project. A massive black pipe is being lowered into a deep trench by a crane. Several workers in hard hats and safety gear are positioned around the pipe, some standing on the trench walls and others on the ground. The scene is set in a construction site with visible rebar and concrete structures.

Year One

# PLANNING PHASE

# Planning Phase

## Year 1

**1.1**

Identify Potential  
Areas

**1.2**

Partner with  
Peer Utilities

**1.3**

Condition  
Assessment

**1.4**

Selection

# Identify Potential Areas

Factors that will contribute to the selection of RENEW replacement assets:

- Pipe Prioritization Model
- Historical Main Break Data
- Customer Complaints
- Valve Inspection Results
- Unlined Cast Iron Pipe
- Age of Pipe
- Input from operations

1.1

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Selection



# Pipe Prioritization Model

MWC utilizes a prioritization model as a tool in the selection of assets for replacement. The model ranks various criteria and leverages GIS scripts to determine an asset's overall risk ranking.

- Probability of Failure
- Consequence of Failure

**1.1**  
Identify Potential  
Areas

**1.2**  
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Peer Utilities

**1.3**  
Condition  
Assessment

**1.4**  
Selection

# Probability of Failure

## Criteria include:

- Major Roadways
- Rail Crossings
- Past Break History
- Pipe Age/ Vintage
- Pipe Wrapping
- Pipe Class/ Material
- Bury Depth
- Soil Resistivity
- Pressure
- Slide Areas
- Number of Connections
- Lined/ Unlined
- Transients
- Pressure Fluctuations
- Proximity to Saltwater
- Groundwater
- Electrical Transmission Lines
- Known Manufacturing issues
- Joint Types
- Water Temperature Differential

1.1

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Assessment

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Selection

# Consequence of Failure

## Criteria include:

- Damage to Sensitive Areas
- Damage to Critical Roadways
- Damage to Railways
- Damage to Other Utilities
- Service Outage of Priority Customers
- Service Outage- Number of Customers
- Service Outage- Negative Pressure
- Fire Flow Capacity
- Duration of Outage due to Deep Pipes
- Flooding Potential
- Specialty Crossings
- Hydraulic Criticality
- Tank Feeds

1.1

Identify Potential  
Areas

1.2

Partner with  
Peer Utilities

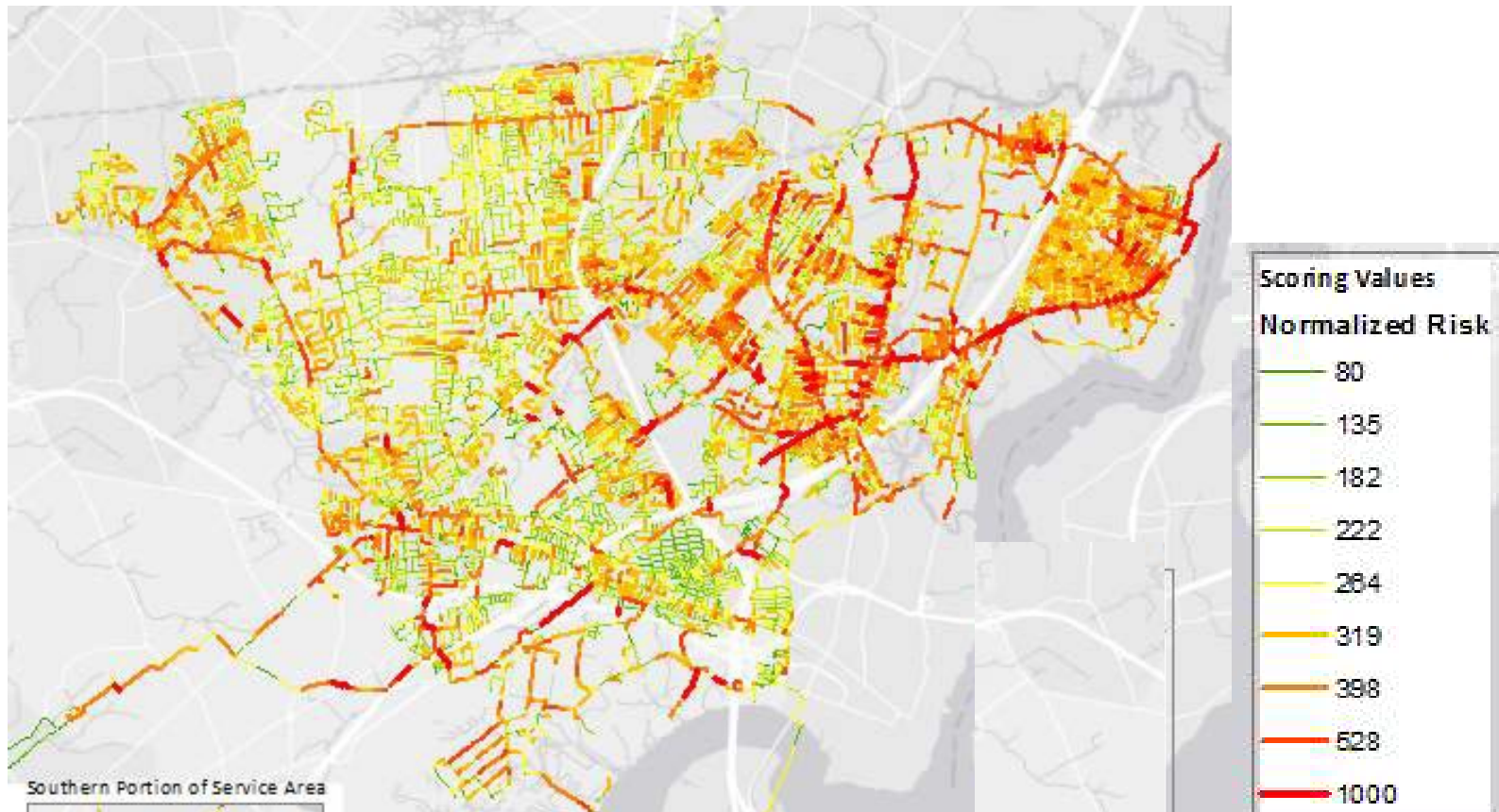
1.3

Condition  
Assessment

1.4

Selection

# Normalized Risk Results



1.1

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Areas

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Assessment

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Selection

# Partnering with Peer Utilities

Middlesex Water Company will attempt to secure a partner for the project, preferably a peer utility:

- Gas Company
- Telecommunications Utility
- Electric Company
- Sanitary Sewer (Municipal)
- Storm Sewer (Municipal)

1.1

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Areas

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Assessment

1.4

Selection

# Partnering with Peer Utilities

## Benefits of Partnering:

- Reduce customer disruption by having utility construction take place once in a particular area.
- Project restoration costs can be split among utility companies.

1.1

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Areas

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1.3

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Selection

# Condition Assessment

Performing Condition Assessments will allow the following:

- Tailor RENEW project to better match conditions of the main.
- Estimate likelihood that the main may continue to provide satisfactory service
- Help determine remaining service life of main
- Make better decisions regarding main renewal:
  - Allow some water mains to remain in service longer
  - Prevent some pipeline failures from occurring by intervening sooner
  - Increase confidence in decisions (less chance of error)

1.1

Identify Potential  
Areas

1.2

Partner with  
Peer Utilities

1.3

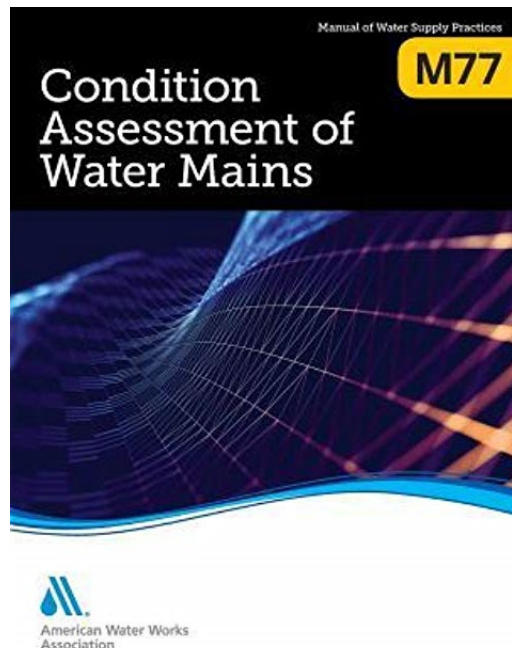
Condition  
Assessment

1.4

Selection

# Condition Assessment

- Identify loss of integrity
- Identify loss of structural competence or weakening of the pipe (diminished wall thickness)
- Find evidence of liner or coating failure
- Recognize other conditions of concern, e.g., pipe is unacceptably out of round.



1.1

Identify Potential  
Areas

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Partner with  
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1.3

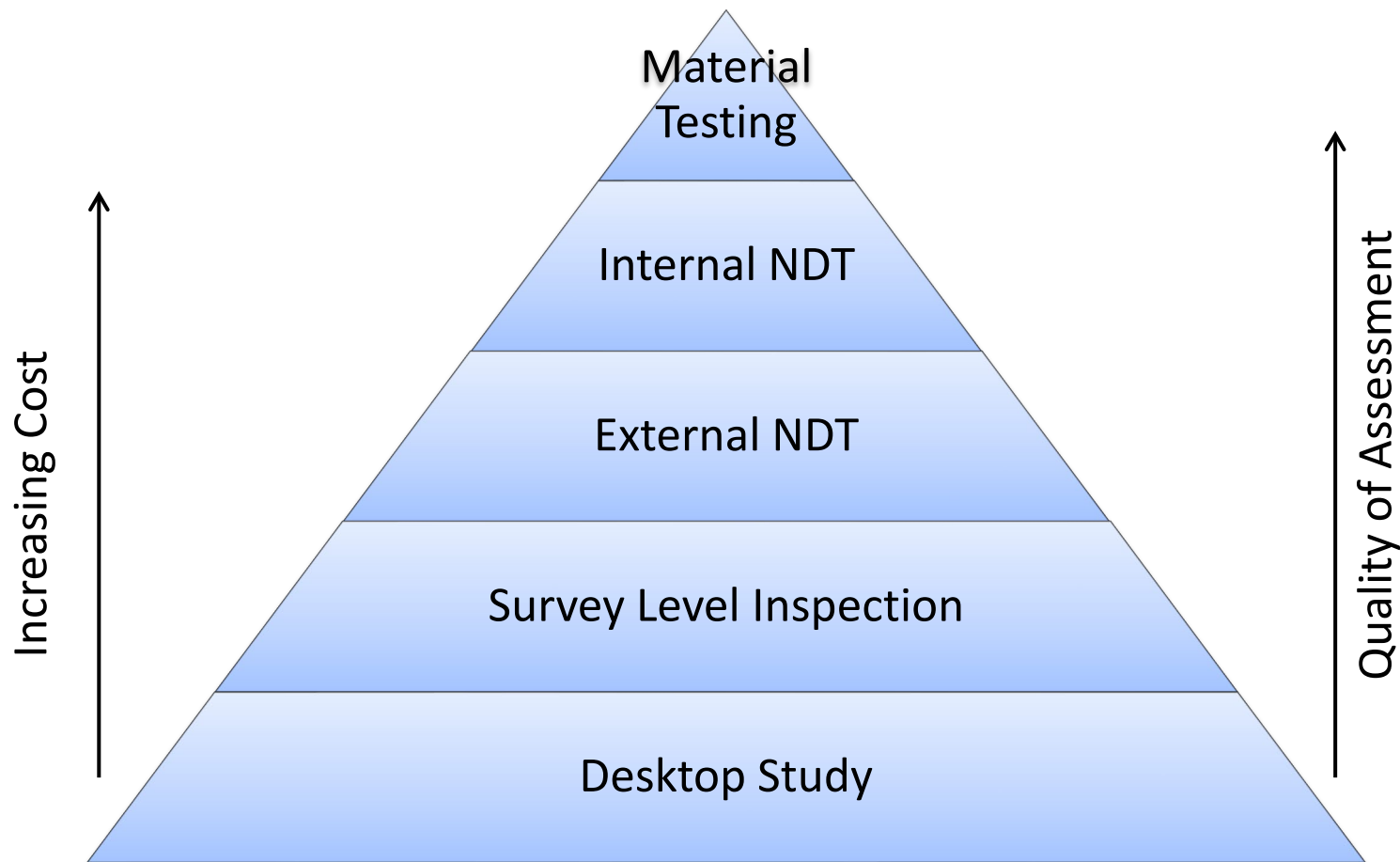
Condition  
Assessment

1.4

Selection



# Condition Assessment



1.1  
Identify Potential  
Areas

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Condition  
Assessment

1.4  
Selection

# Condition Assessment

Segment ID	Street	Distance (ft)	Material	Size (in)	Nominal Equivalent Thickness (in)	Measured Thickness (in)	Change from Nominal
8011-26	Hermann St	430	Pit CI	6	0.43	0.51	0%
8011-27	Hermann St	604	Spun CI	6	0.38	0.41	0%
8011-28	Hermann St	346	Spun CI	6	0.38	0.41	0%
8011-29	D'Alessio Dr	396	Spun CI	6	0.38	0.34	-11%
8011-30	Clauss St	430	Spun CI	6	0.38	0.42	0%
8011-31	Oakwood Pl	297	Spun CI	6	0.38	0.38	0%
8011-32	Skitka Ave	755	Spun CI	6	0.38	0.18	-53%
8011-33	Clauss St	234	Spun CI	6	0.38	0.41	0%
8011-34	Clauss St	452	Pit CI	6	0.43	0.37	-14%
8011-35	Clauss St	220	Pit CI	6	0.43	0.46	0%

1.1

Identify Potential Areas

1.2

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1.3

Condition Assessment

1.4

Selection

# Condition Assessment



1.1

Identify Potential Areas

1.2

Partner with Peer Utilities

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Condition Assessment

1.4

Selection

# Selection

The Selection Phase of the Planning process will have the following goals:

- Review condition assessment results and prepare recommendation on specific assets to replace
- Coordinate with Peer Utilities on specific locations
- Award Design contract to a Consulting Engineer

1.1  
Identify Potential  
Areas

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Condition  
Assessment

1.4  
Selection

An aerial, top-down view of a construction site. A large, dark-colored pipe is being lowered into a deep trench. A crane's arm is visible at the top, holding the pipe with straps. Several workers in hard hats and safety gear are positioned around the pipe, some appearing to guide it into place. The trench walls are concrete, and there are various construction materials and equipment scattered on the ground.

Year Two

# DESIGN PHASE

# Design Phase

## Year 2

The Design Phase of the RENEW program will focus on taking the area identified in the planning phase and preparing the project for construction by fully engineering a design, obtaining all external authorizations, and completing all procurement and bidding requirements.

1

Design

2

External  
Authorizations

3

Procurement  
Bidding



Year Three

# IMPLEMENTATION PHASE

# Implementation Phase

## Year 3

The Implementation Phase of the RENEW Program will focus on the effective construction and implementation of the new assets that were designed in the previous stages of the project lifecycle.

CONSTRUCTION- MWC will handle the Construction Administration and Inspection associated with the RENEW project.

ACCEPTANCE- The acceptance component of the RENEW Project will include completion reports, GIS Data Updates, and updates to the pipe prioritization model.

*Tailor* RENEW to better  
*match the conditions* of  
the mains







Questions?