

Public Utilities Committee

Water Loss Management

Rick Coronado, P.E., Chris Chen, P.E.
Assistant Directors
Austin Water

October 21, 2015

Overview

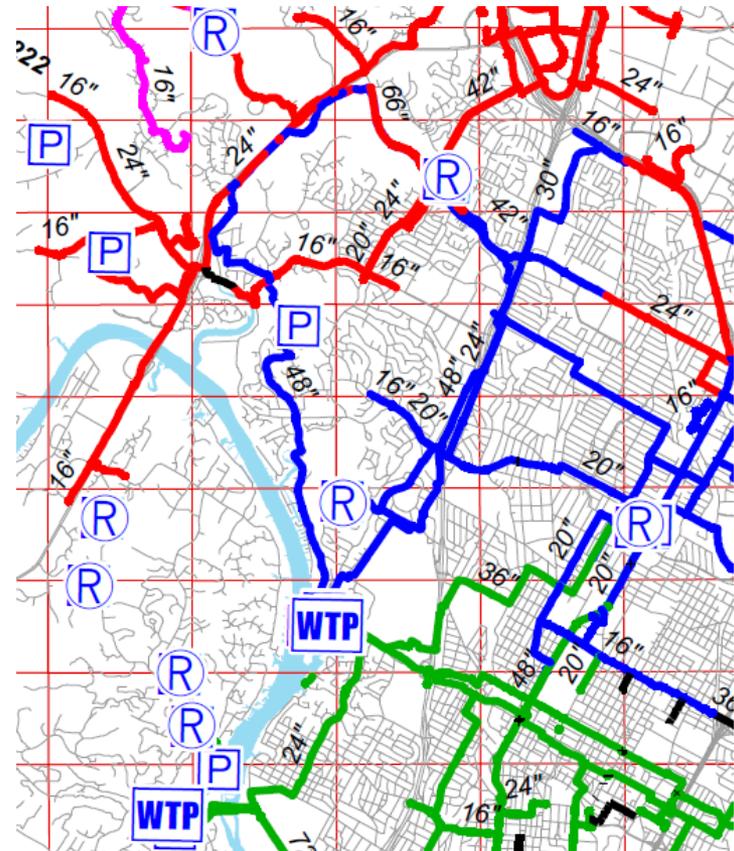
- Terminology
- Austin Water System
- Water Losses
- Meter Management Program
- Leak Management Performance
- Real Loss Management Strategies
 - Leak Response
 - Pressure Management
 - Actively Leakage Control
 - Asset Management
- Questions?

Terminology

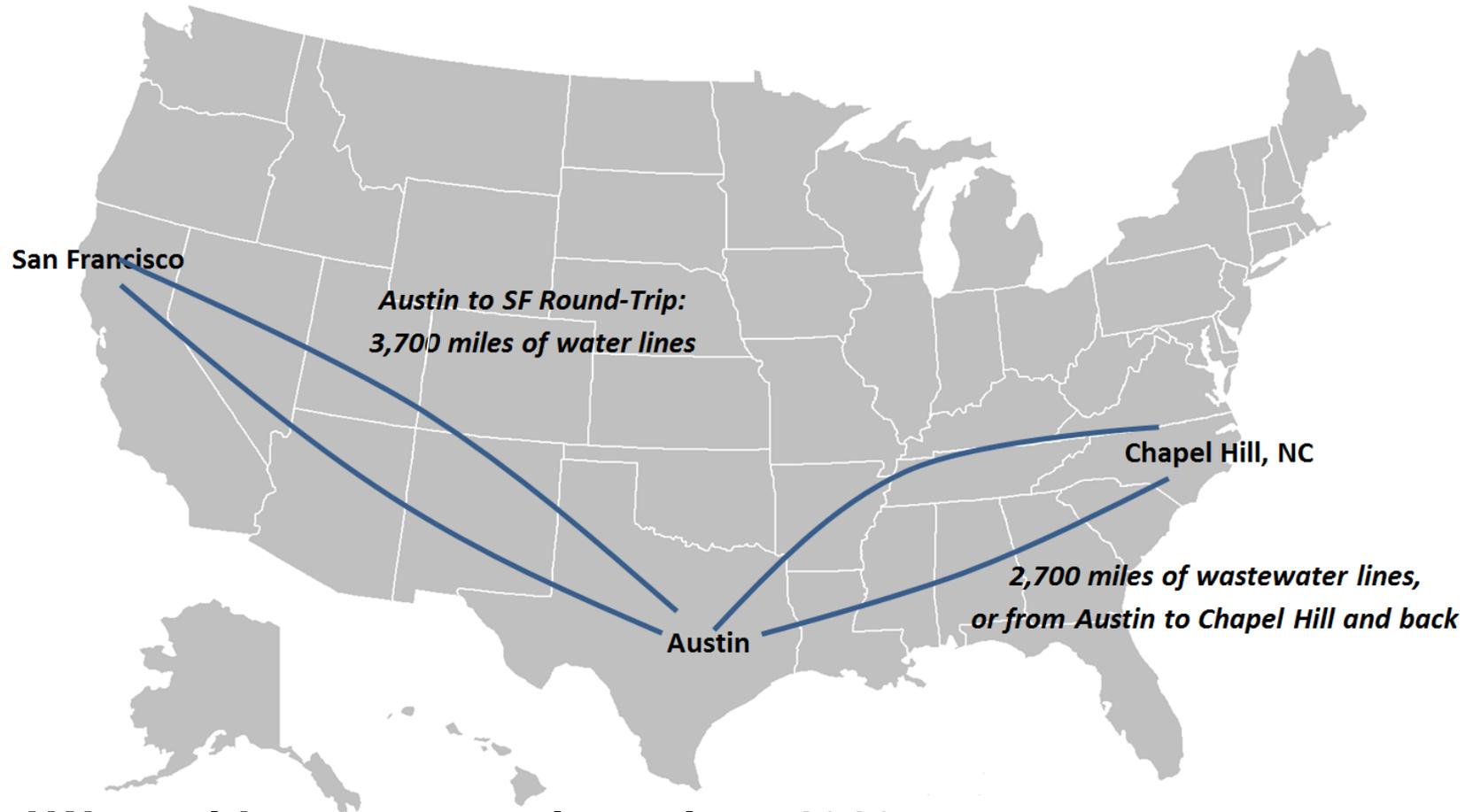
- **Real Losses** – Physical losses of water from leakage from pipes, joints, fittings, reservoirs, hydrants etc.
- **Unavoidable Annual Real Losses (UARL)** – Represents the lowest technically achievable annual real losses.
- **Infrastructure Leak Index (ILI)** – is a performance indicator of how well a distribution system is managed for the control of real losses. $ILI = \text{Total Annual Real Losses} / \text{UARL}$
- **Apparent Losses** – Accounting losses of water that is being used but not billed. This is caused by inaccuracies with customer metering, consumption and billing data handling errors, assumptions of unmeasured use, and any unauthorized use such as theft.

Austin Water System

- 230,000 meters
- 3,700 miles main
- 27,000 hydrants (City)
- 73,000 valves
- 170 MG Storage Tanks



Introduction of AW's Pipeline



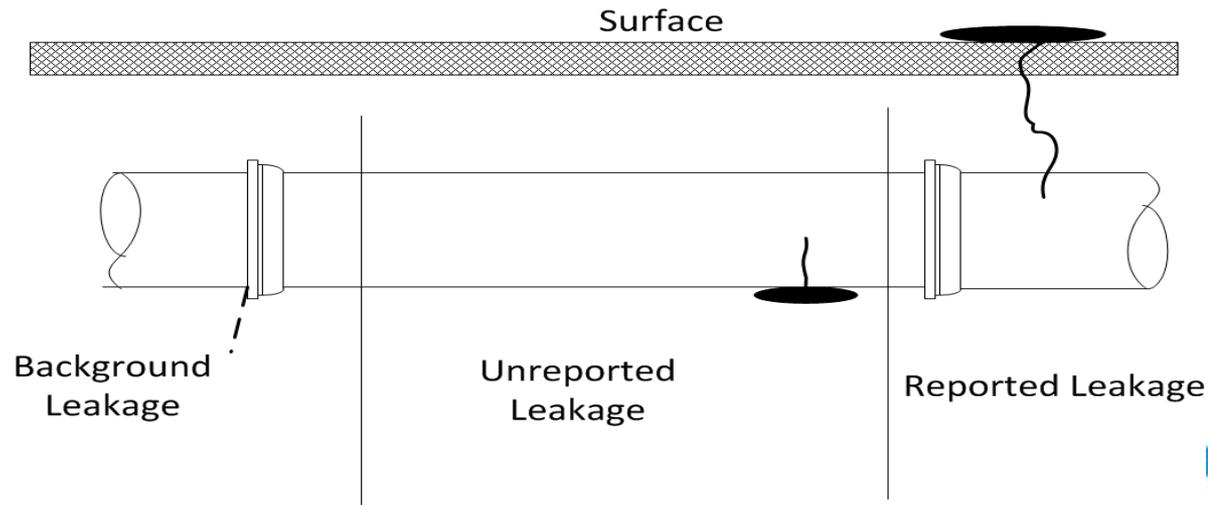
AW provides water services since 1912.

Water Loss Management

APPARENT LOSS MANAGEMENT

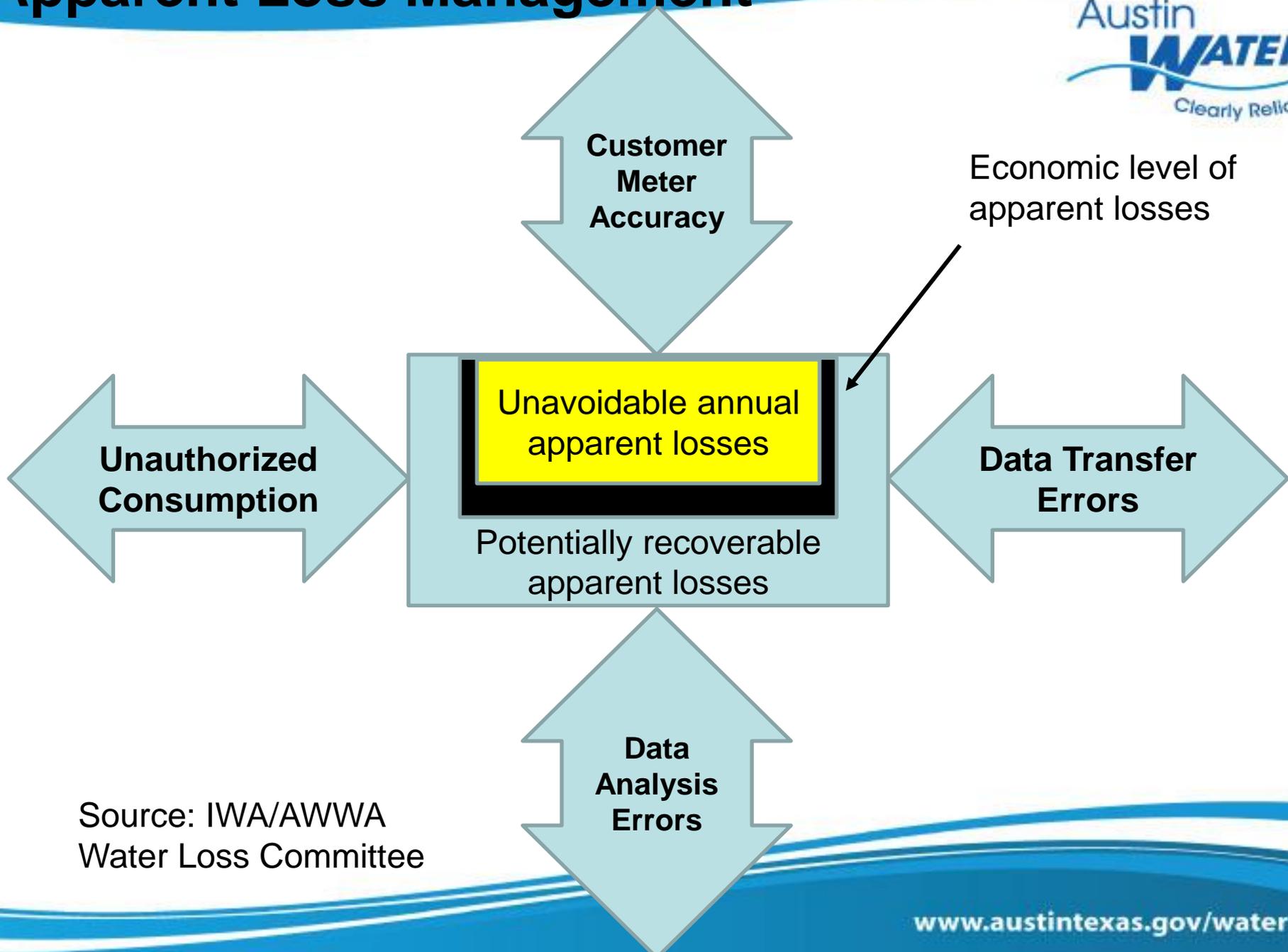


REAL LOSS MANAGEMENT



Source: M36, Third Edition, p. 116

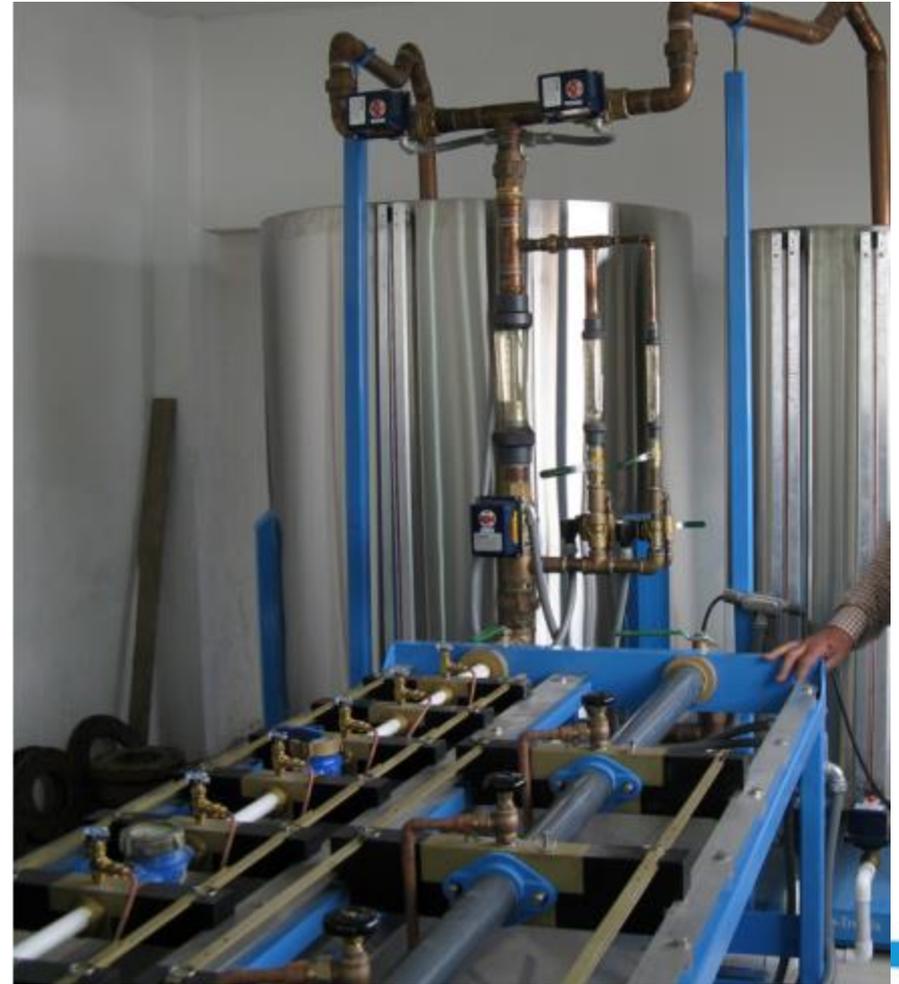
Apparent Loss Management



Source: IWA/AWWA
Water Loss Committee

Meter Management

- Meter Accuracy Testing 3"+ (Field)
- New Meter Testing (Bench)
- 728 Randomly Selected Meters tested in 2010
 - 97.9% Accuracy (Used for Water Loss Audit Purposes)
- Small meter replacement program – 12/2014
- Reactive meter replacement



Real Loss Management

Losses flex with
Pressure



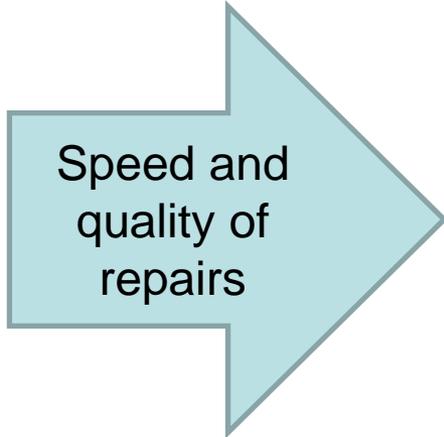
**Pressure
Management**

Economic level of real
losses



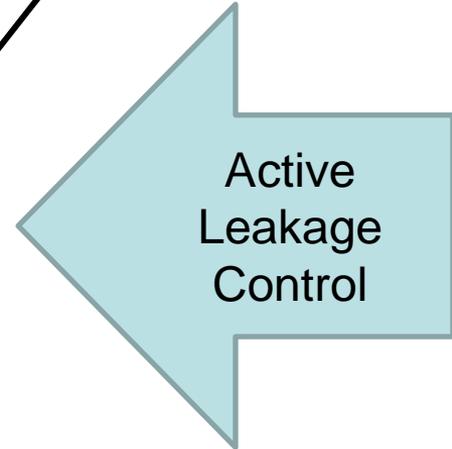
**Unavoidable annual
real losses**

Speed and
quality of
repairs

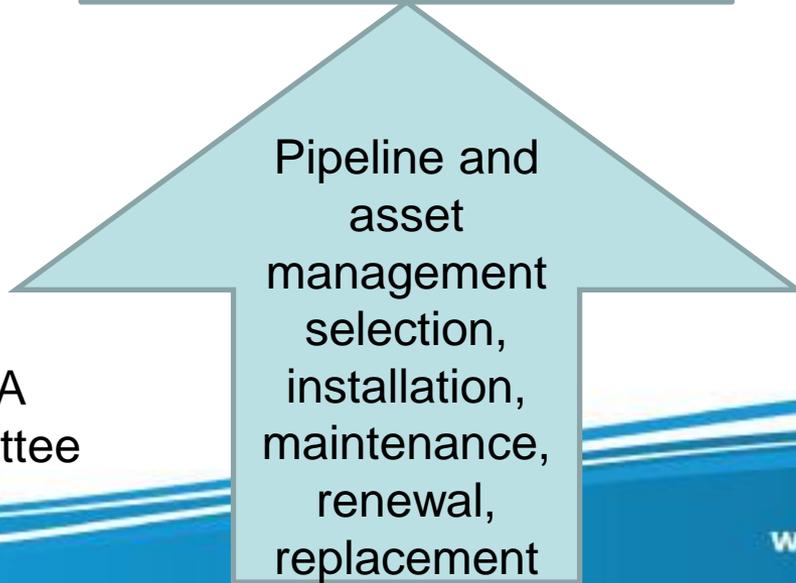


Potentially recoverable real
losses

Active
Leakage
Control

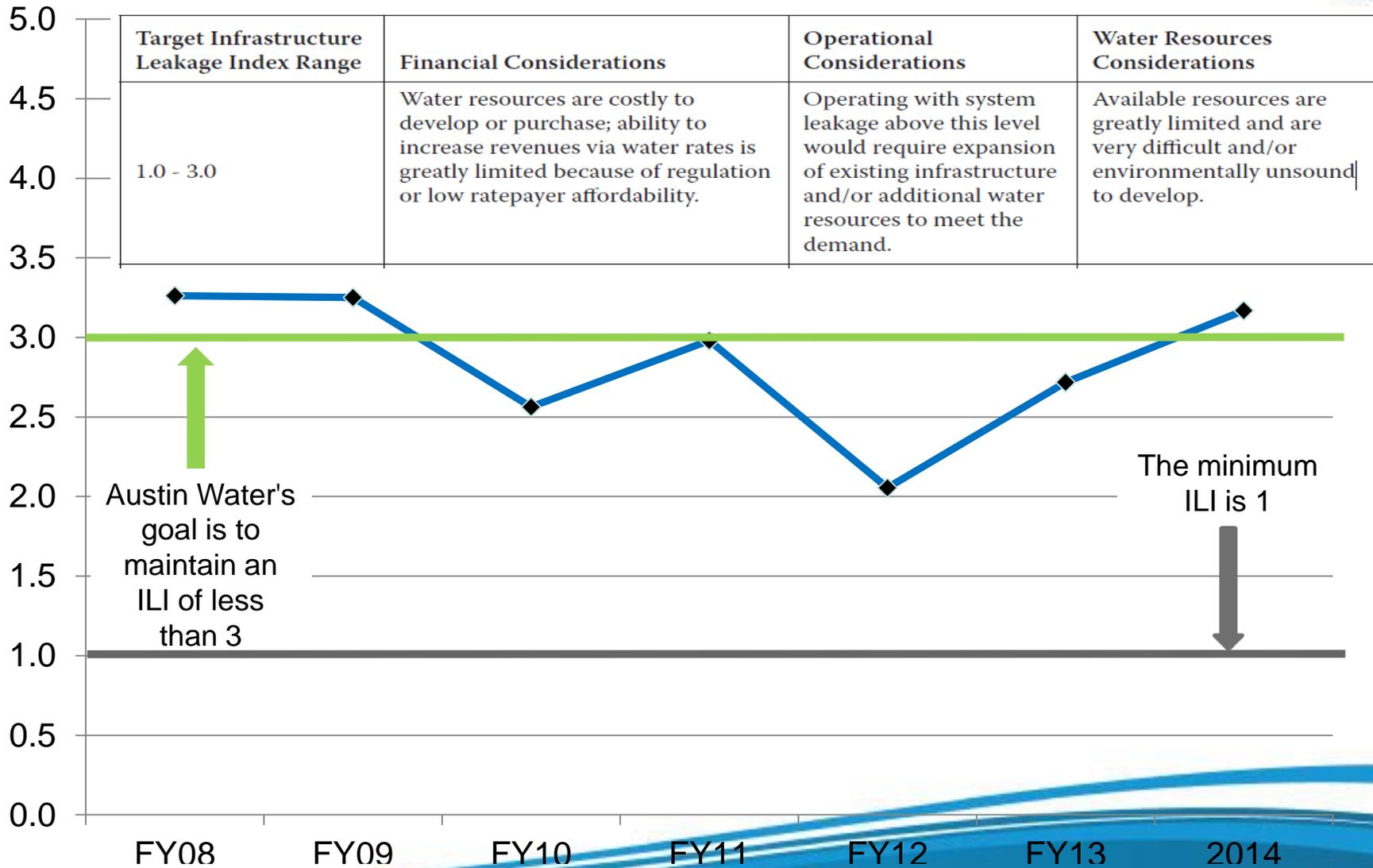


Pipeline and
asset
management
selection,
installation,
maintenance,
renewal,
replacement

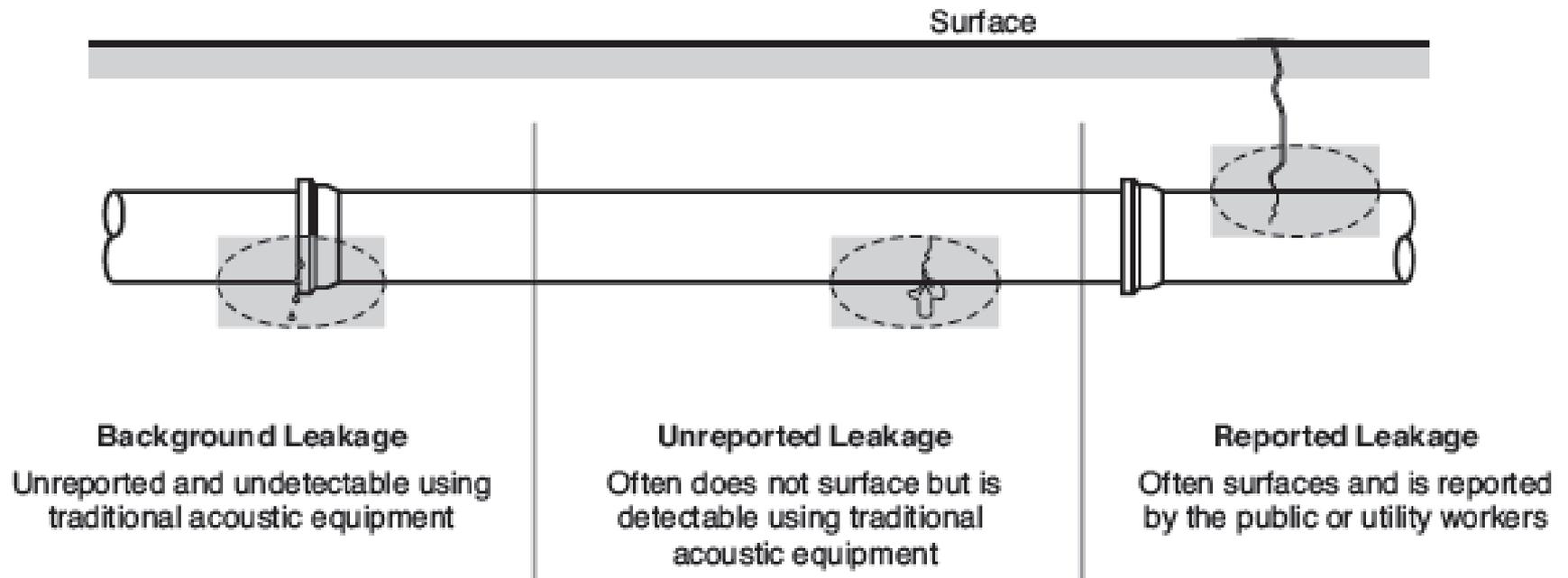


Source: IWA/AWWA
Water Loss Committee

Austin Water Infrastructure Leakage Indexes (ILI)



Components of Real Losses

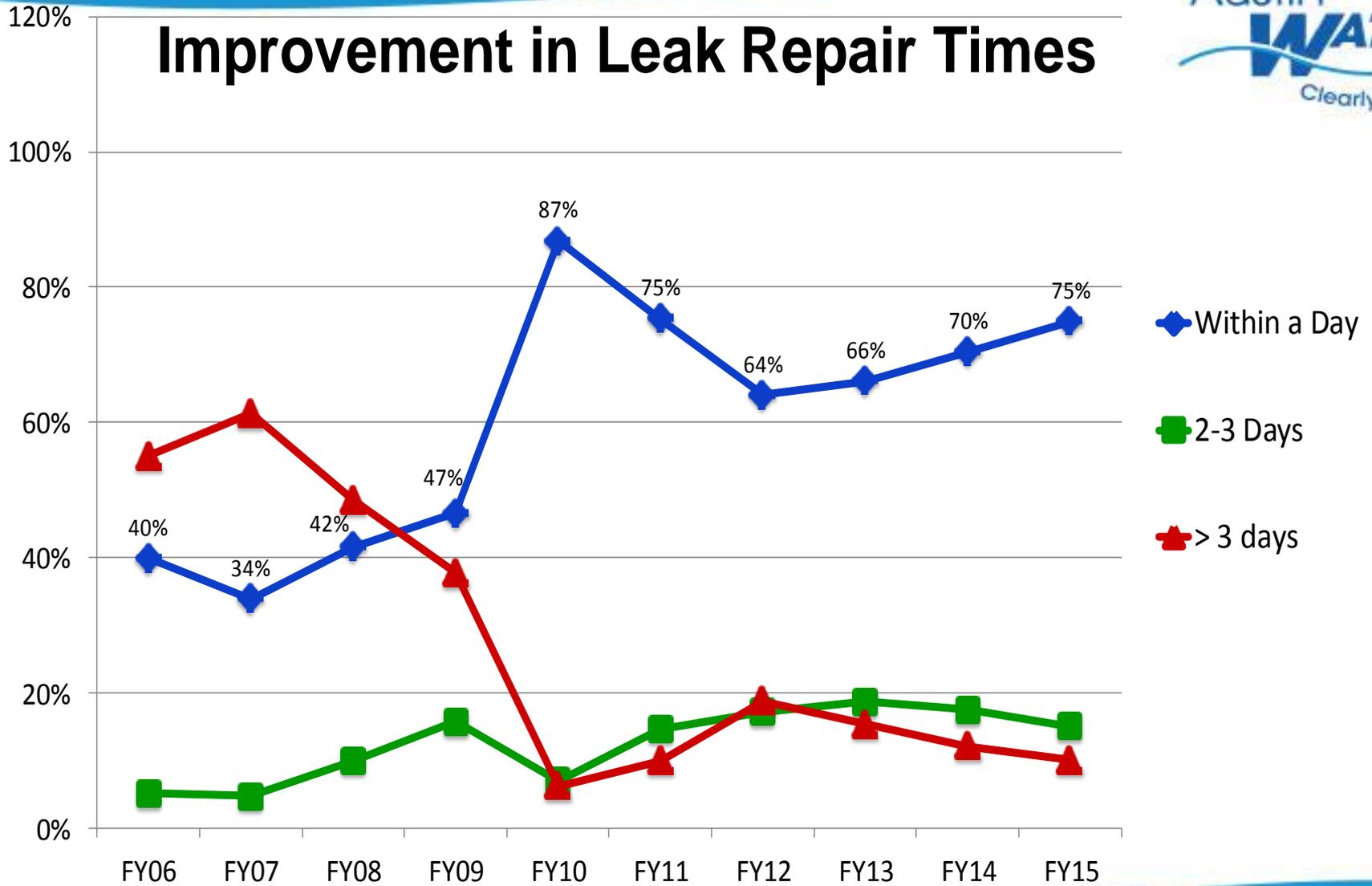


Leak Response and Repair

- In FY 2009, Austin Water added a second shift to its leak response
- Most leaks now repaired in one day or less. (75%)
- Austin Water Leak Map



Improvement in Leak Repair Times



Austin Water Leaks Map

Leaks Repaired Last 24hrs



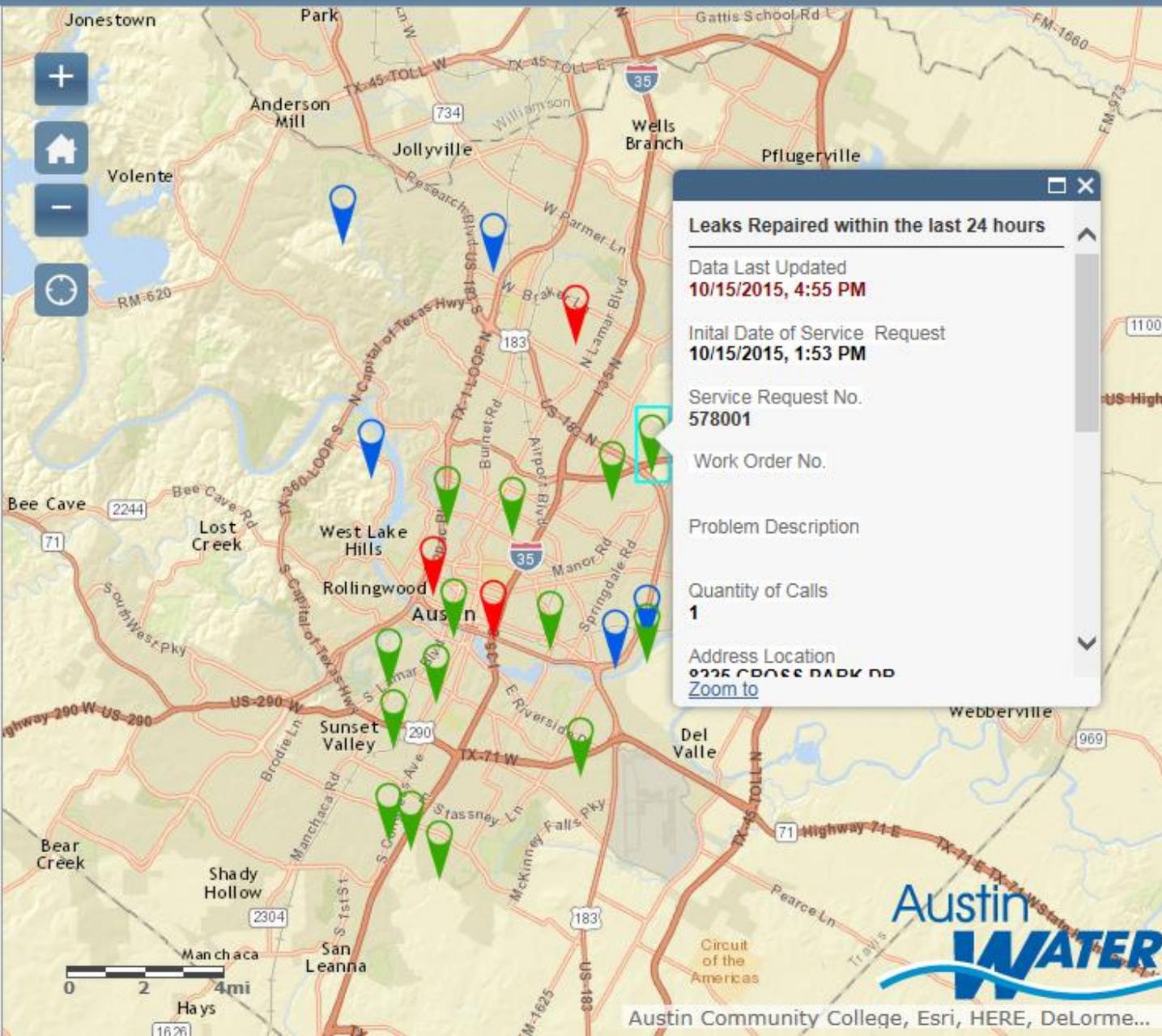
Leaks Work Orders Pending Repair



Leaks Pending Inspection



Map navigation controls: +, Home, -, Refresh



Pressure Management

- > 170 MG Storage
- 40+ Pump Stations
- Overflow Control
- Monitoring Tank Levels, pressure points (SCADA)
- Calibration of tank level sensor
- Calculating or trending water loss from overflows

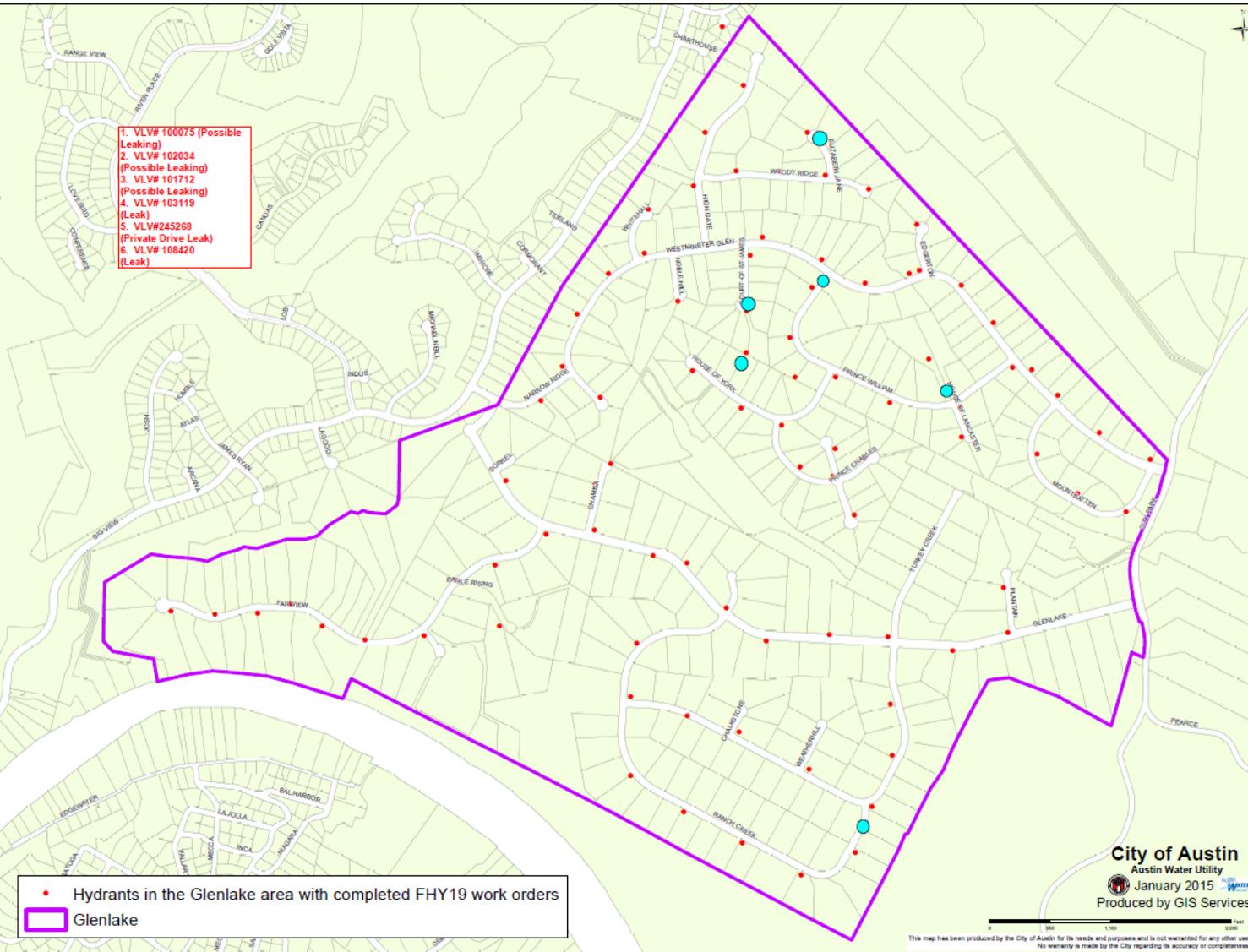


Leak Detection Resources (AW)

- In-house Leak Detection/Surveying
 - Perform Reactive Leak Detection
 - Pinpointing Leaks
 - Occasional night surveying.
- Equipment
 - Listening Devices – geophones, ground microphones
 - Leak noise correlators
 - Leak noise loggers
- Noise Loggers - 50 Permalog+
 - Used on occasion for overnight surveying
 - Lift and Shift (downloadable)



Glenlake Water District



Permalog+

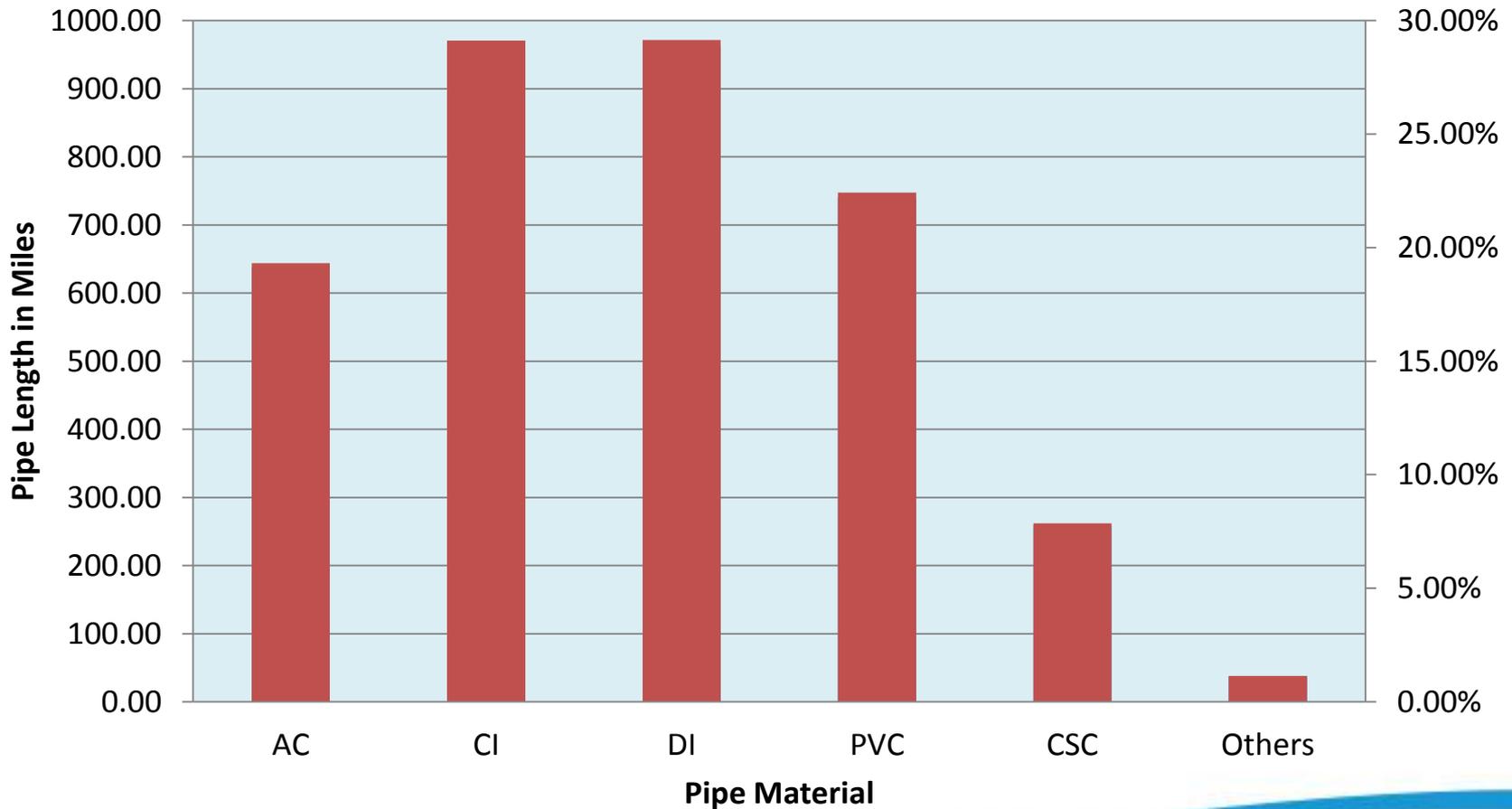


- 50 Logger
- 5 Leaks
- Water Loss Control

AW's Active Leakage Control & Asset Management

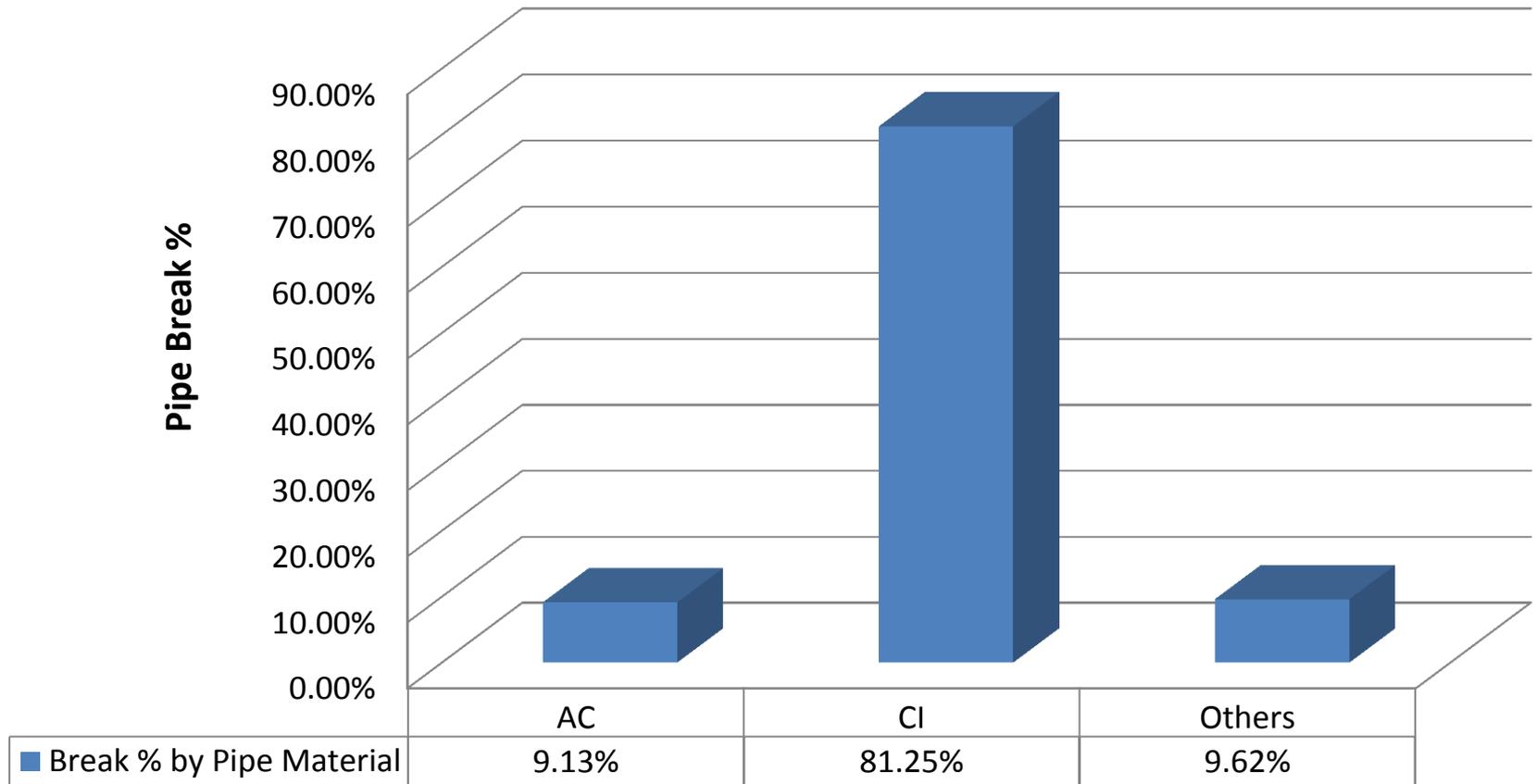
- Leak Detection Program
 - Small Diameter Leak Detection Contract
 - Large Diameter Leak Detection and Condition Assessment Contract
- Renew Austin Program
 - Replacing aging and deteriorating water mains

AW's Water Main by Material



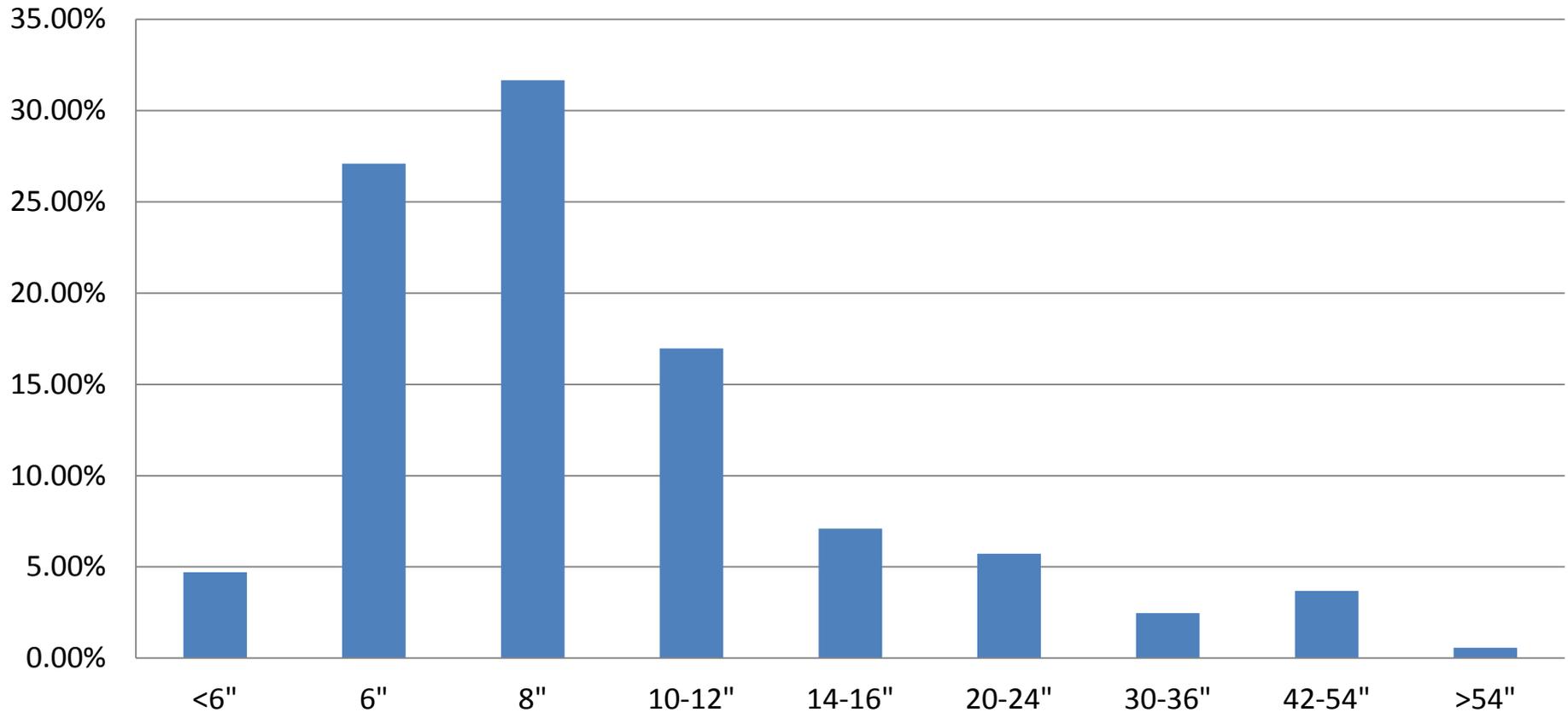
Pipe break/leak by material

Break % by Pipe Material



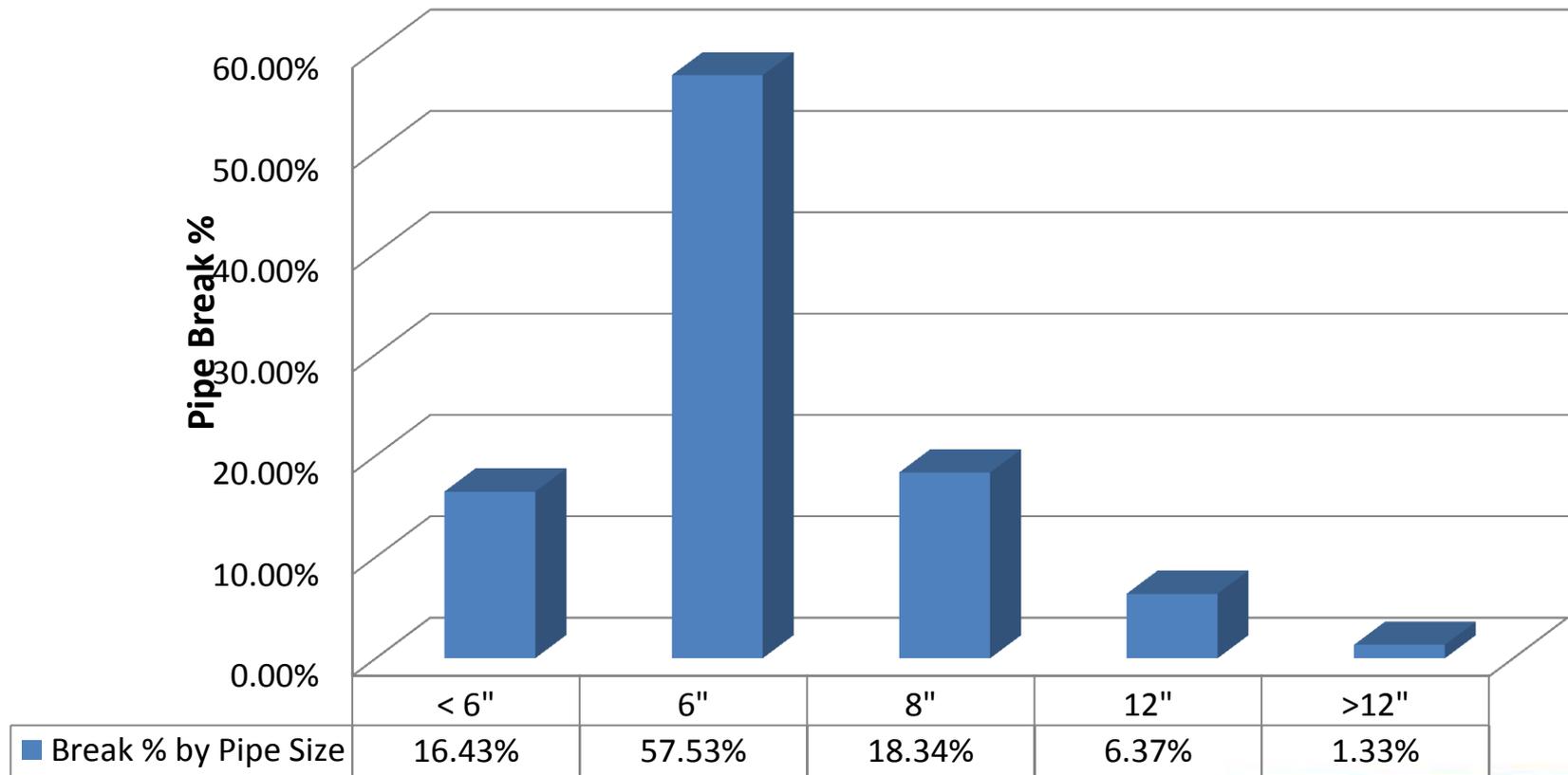
AW's Water Main by Size

Pipe Length by Size in %



Pipe break/leak by size

Break % by Pipe Size



Small Diameter Leak Detection

- Using acoustic technology combined with visual inspection for pipe size < 24” in diameter
- Conduct proactive leak detection to cover overall AW’s service area in every 6 years.

FY	Detected Total Length	Amount Spent	No. of Leaks Identified
2009	738	\$325,000	111
2010	593	\$325,000	98
2011	681	\$325,000	140
2012	869	\$191,450	169
2013	698	\$191,450	106
2014	720	\$197,412	115
2015	433	\$101,610	109

Large Diameter Leak Detection & Condition Assessment

- Focused on Concrete Steel Cylinder (CSC) Pipes.
- Using comprehensive leak detection and condition assessment technologies (SmartBall® , Sahara®, and PureEM®) to identify leaks and defects.

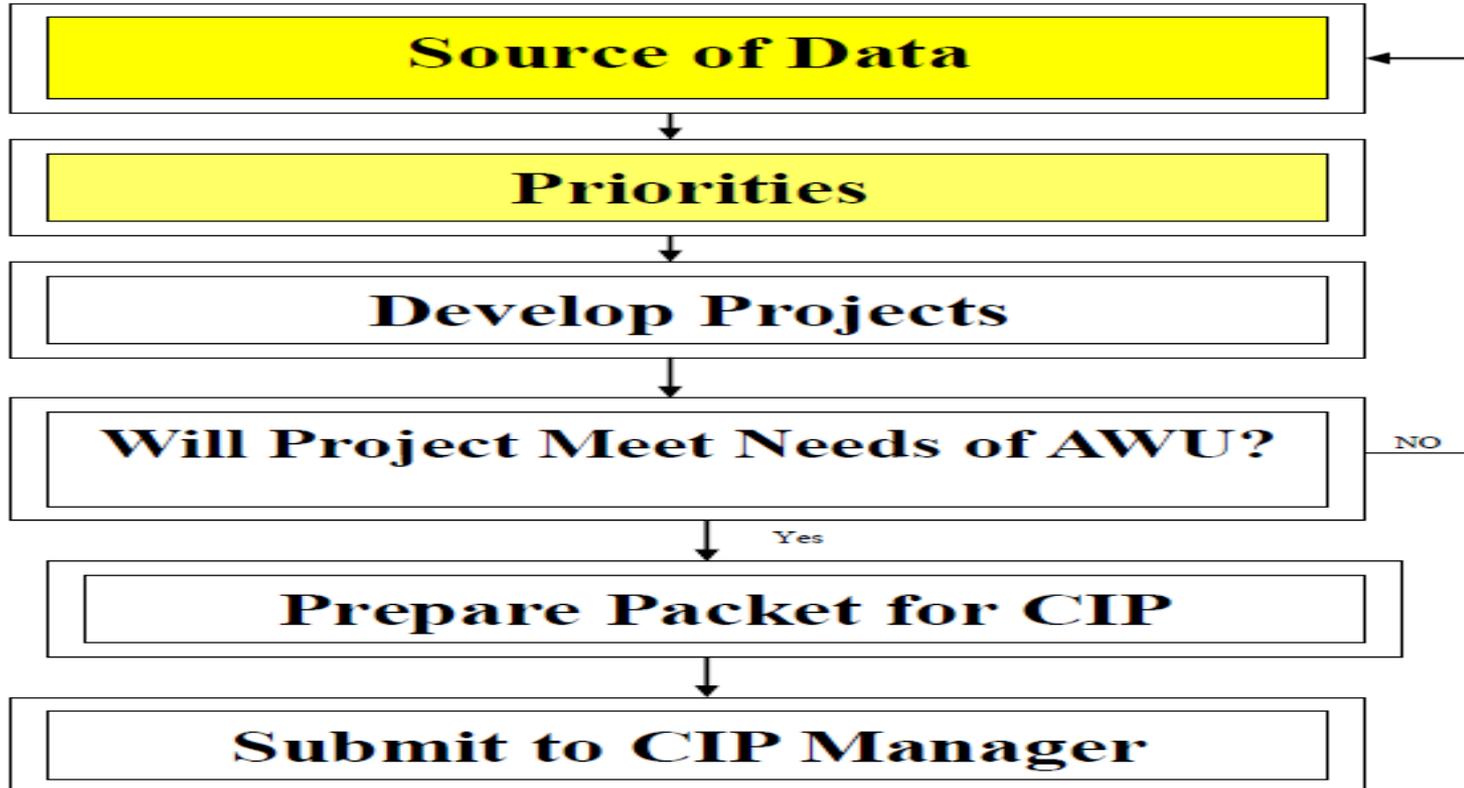
FY	Leak Detected Total Length (Miles)	Leak Detection Amount Spent	No. of Leaks Identified	Condition Detected Total Length (Miles)	Condition Assessment Amount Spent	No. of Defects Identified
2010	3.99	\$45,504	0	4.74	\$131,266	20
2011	3.9	\$42,658	5	0	\$0	0
2012	7.59	\$176,138	1	0.92	\$190,473	0
2013	9.08	\$115,557	3	1.45	\$65,000	25
2014	5.68	\$132,329	4	8.24	\$484,369	24
2015	6.33	\$136,804	1	6.96	\$437,900	23

Renew Austin Program

- Program is aimed to upgrade aging and deteriorating water mains to minimize main breaks or leaks and improve level of services
- Replaced over 50 miles of small diameter water mains since program launched in 2012.
- Aimed to replacing at least 10 miles of small diameter water mains per year.



Main Replacement Strategy



Prioritization Criteria

- Past Number of Breaks/Leaks
- Pipe Material
- Pipe Size
- Age of Pipe
- Pipe Condition
- Criticality

Other Considerations

- Coordination with other infrastructure improvements (road reconstruction, storm and wastewater sewer improvements) to minimize public impact and maximize cost-effectiveness.
- Utilize Indefinite Delivery/Indefinite Quantity (IDIQ) contract to manage large diameter related repairs.



Questions?