

Improving Water System Control Through Effective Valve Management



AGENDA

- **Who We Are**
- **Major Water Industry Challenge – Visibility**
- **Good Stewardship**
- **Asset Management Lifecycle**
- **Common Problems in the Field**
- **Kansas City Case Study**
- **Large Valves & Case Studies**
- **Wrap Up Discussion**

About Wachs Water Services

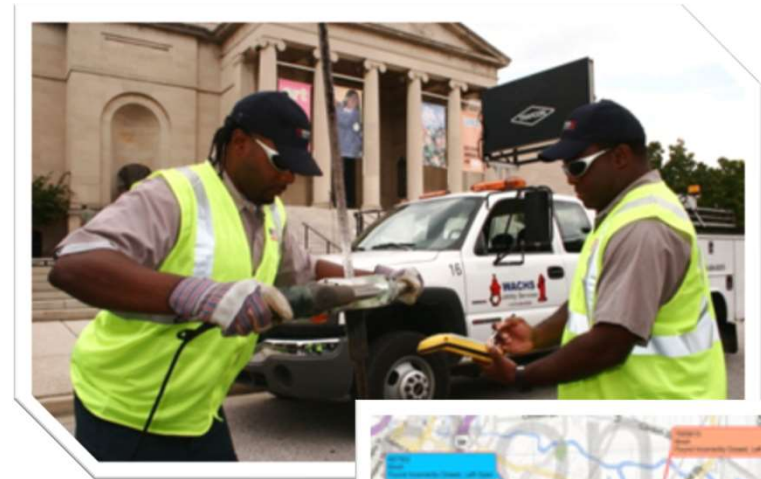
Serving Water Utilities since 2000

Division of Pure Technologies 2015

Condition Assessment Services

- Distribution System Valves
- Fire Hydrants
- Large & Critical Valve Programs
- Leak Detection & Non-Revenue Water Programs
- GIS & Information Services

Over 300 Utilities Served



VISIBILITY CHALLENGE

We Can't Get Past Obstacles Without Good Information...



Trigger Event Before Acting...



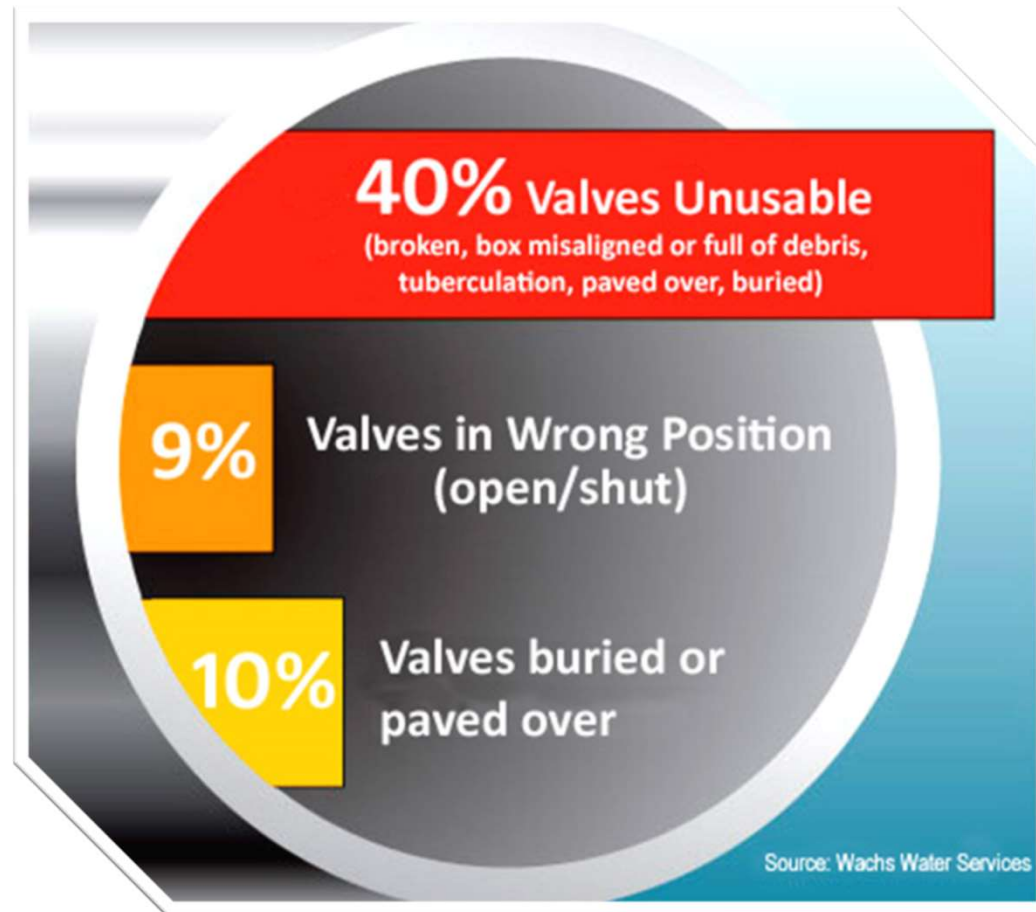
Trigger Event Before Acting...



Trigger Events Before Acting...



Valve Inventory Problems Lurking..



AWWA M44 Refresher

- **Non-Critical Valves**
 - Smaller than 16” should be prioritized for a 3 to 5-year rotation schedule for 100% of system valves
- **Critical Valves** – maintenance and testing done annually
 - 16” and larger
 - Near critical facilities like schools, police/fire, hospitals
 - First valve off the main

Assessments = Visibility For Your assets

- System Control
- Data Management
- Water Quality
- System Optimization
- Prioritization



IMPORTANCE OF STEWARDSHIP

Are you a Good Steward?

stewardship noun

stew·ard·ship | \ 'stü-ərd-, ship, 'styü-; 'st(y)ürd-\

Definition of stewardship

1: the office, duties, and obligations of a steward

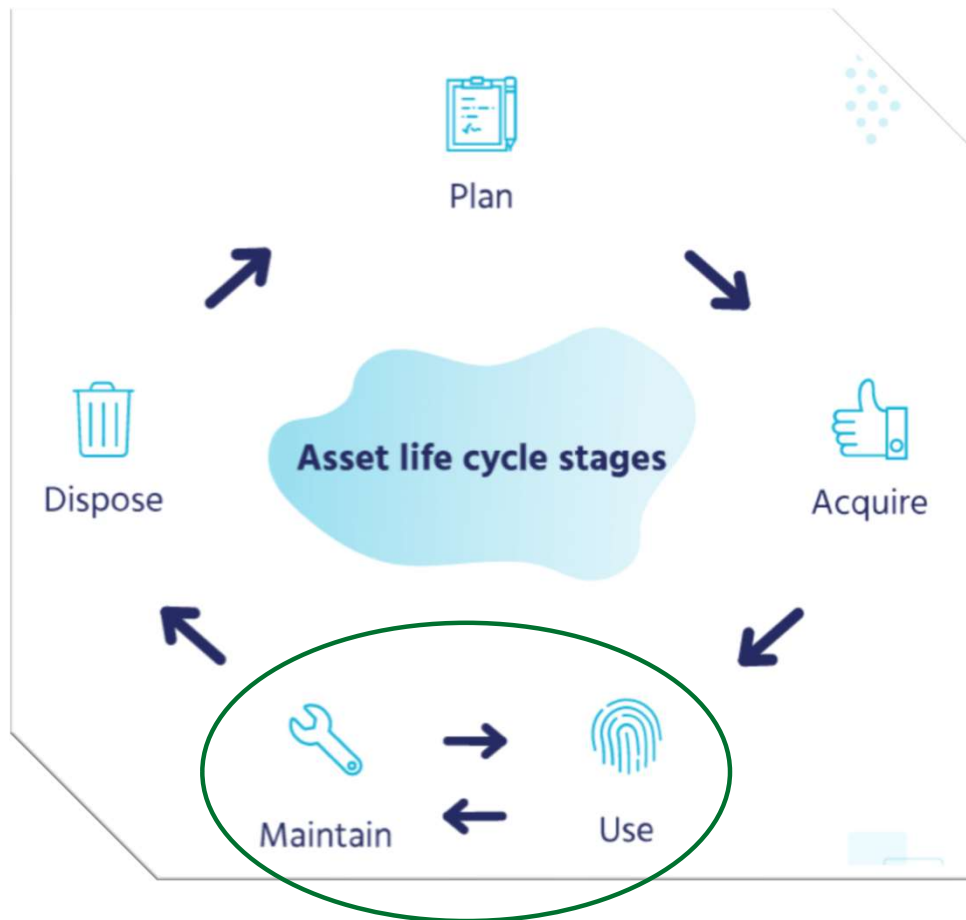
2: the conducting, supervising, or managing of something,
Especially, the careful and responsible management of something entrusted to one's care
stewardship of natural resources

States Legislating Stewardship



ASSET LIFE CYCLE MANAGEMENT

Asset Life Cycle Stages



Benefits Of Asset Life Cycle Management

- 1) Extend asset lifespan
- 2) Decrease downtime
- 3) Improve efficiency
- 4) Save Money
- 5) Inform decision making process

COMMON PROBLEMS

Common Problems : Incorrectly Closed Valves

Closed Valves = Dead Ends

- Aged Water
- Reduced Chlorine Residuals
- Potential for Increased Disinfectant By- Products
- Reduced Fire Fighting Capacity
- Reduced System Pressure (Low Flow)
- Increased System Pumping Costs



Common Problems: Buried/Paved Over Valves

- Inaccessible during emergencies, must move back and find available valve
- Longer duration, and wider footprint
- Condition of valve unknown



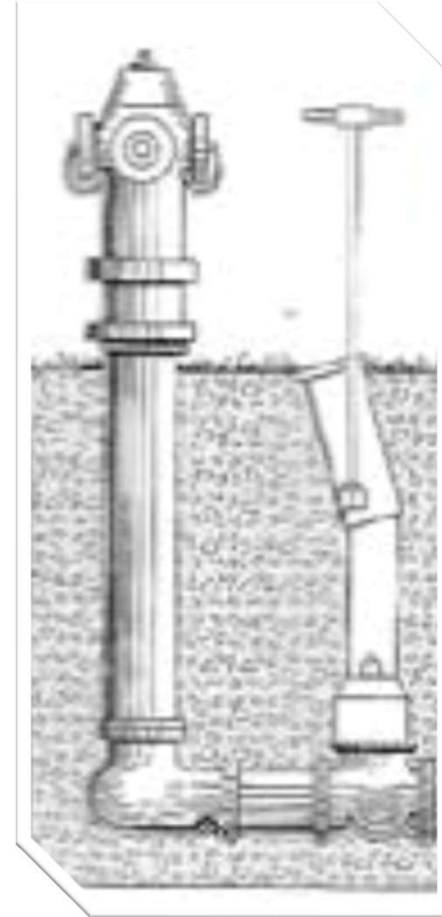
Common Problems: Debris in Valve Box

- Overtime mother nature can easily shift debris into the valve box
- In order to key the valve, must vacuum debris out
- We use a combination of vac and high-pressure water source to create a mini hydro-vac



Common Problems: Misaligned Structures

- Ground shift or other external force, such as snowplows can misalign the valve box
- Impossible to key the valve in some instances
- Status of underlying valve is unknown



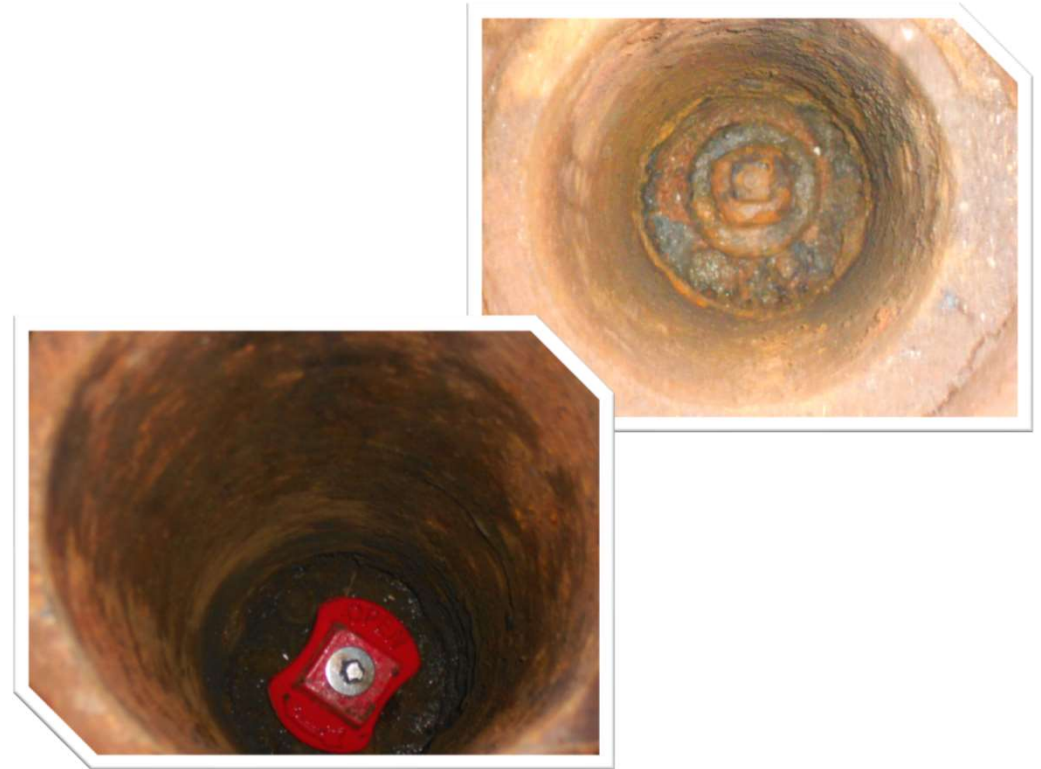
Common Problems: Seized Valves

- Valve fails to operate at recommended manufacturer torque
- Use of hydraulically operated and micro-processor-controlled equipment is recommended for this repair
- Wachs Water Services has 93%+ success rate with this repair



Common Problems: Operating Nut Damage

- Typically occurs when the wrong key is used to operate a valve or excessive torque
- Op nut can be replaced without digging up the surface cover



Common Problems: Packing Leaks

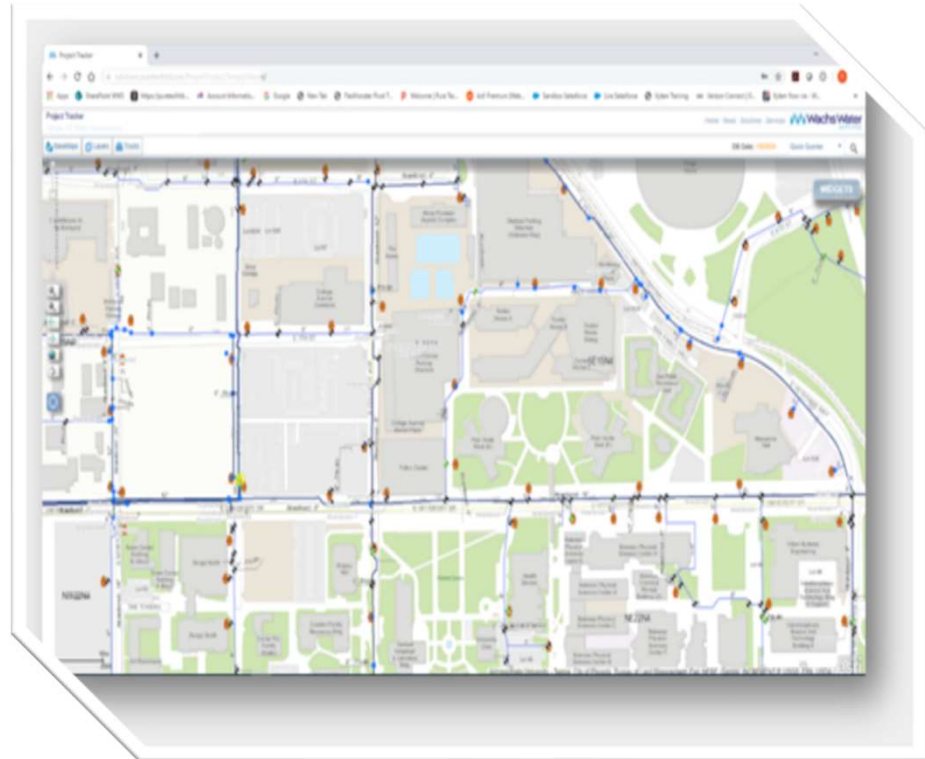
- A packing leak can be present or begin when valve is operated. Most of these leaks can be “snugged” up and leak will stop
- If valve is accessible in a vault or manhole these packing can be repaired or replaced under pressure
- We document these occurrences



Common Problems: GIS Mismatches

- Incorrect Valve Type
- Incorrect Valve Size, turn conflict
- Location
- Incorrect main size
- Not on map
- This is unreliable information for your field crews

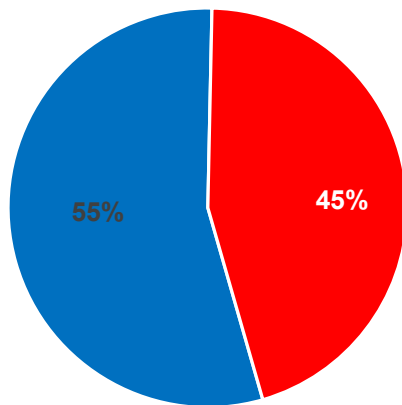
- Our deliverable will provide the accurate information for each unique valve identifier so you can correct your maps



Kansas City Findings

Valve Operability Overall

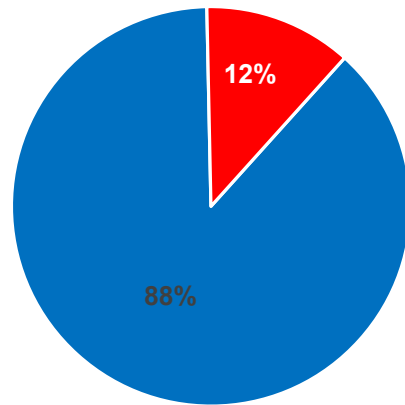
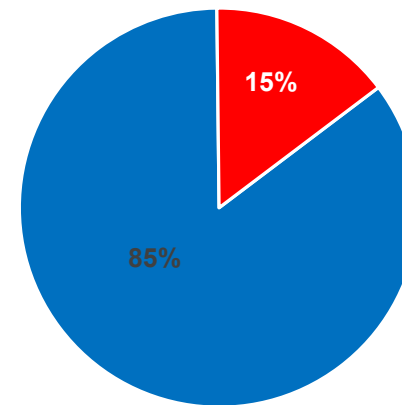
Initial Operability



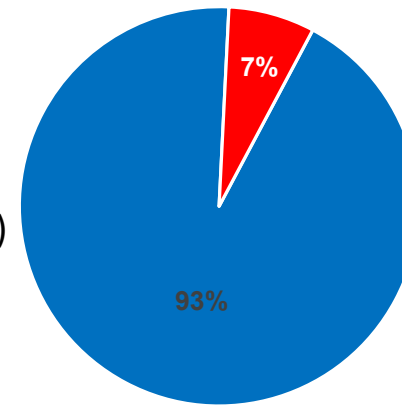
44,160 Valves
(2011-2022)

■ Operable ■ Inoperable

Current Operability

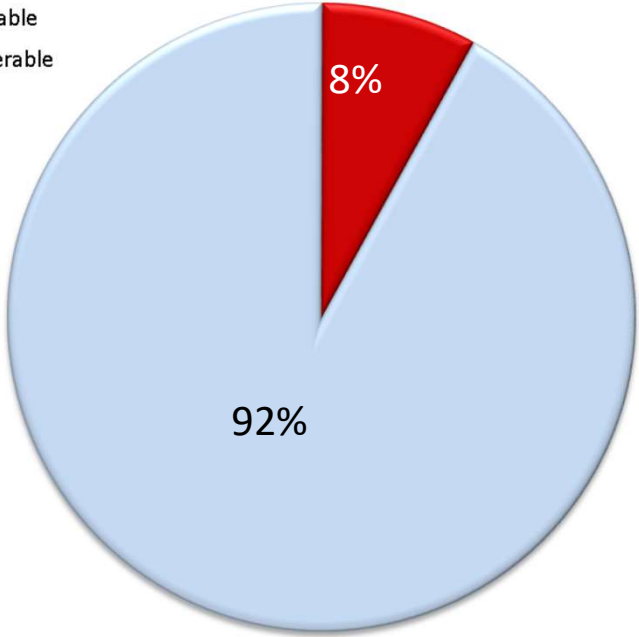


9,976 Valves
(November '21- December '22)



Op Nut Repairs is Kansas City

Operable
Inoperable



598 Found Closed Position (20%)

Op Nuts Repaired 3,046 of 3,562 Size Breakdown

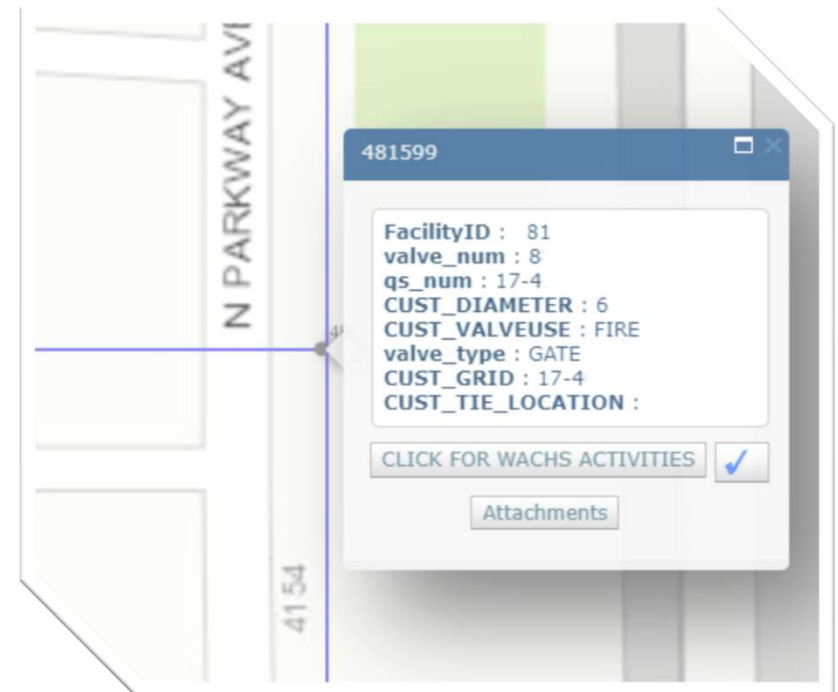
Unknown	15
3"	1
4"	92
6"	2,224
8"	415
10"	92
12"	181
15"	1
16"	13
20"	3
30"	1
36"	2
72"	1

Kansas City Work Orders – 2011 through 2022

Defect Category	Work Order Description	Inline	%	Hyd Lead	%
Locatability	Cannot Locate	1468	3.3	1053	4.5
Access	Covered Over	251	0.6	391	1.7
	Stuck Lid	76	0.2	135	0.6
	Misaligned/Damaged Box	1122	2.5	862	3.7
	Debris in Box/Large Vac Needed	237	0.5	285	1.2
Mechanical Operability	Frozen	46	0.1	27	0.1
	Spins Free	318	0.7	97	0.4
	Operator Missing/Damaged	197	0.5	213	3.8
Other Work Orders	Need to Raise (Asphalt)	149	0.3	146	0.6
	Need to Raise (Non-Asphalt)	217	0.5	433	1.9
	Other	230	0.5	85	0.4

Getting Started: Field Collection Tool

- Project tracker is our in-house proprietary collector application and crew routing tool
- The client provides us with their water asset geodatabase, at minimum, valves, hydrants, and water main layers
- Use clients in house collector application. This workflow doesn't allow for contractor to QA/QC data



CASE STUDY: CLINTON TWP, MI

Case Study: Clinton Township, MI Pre-Program

- System is on average 35 years old
- Some water mains 72 years old
- Valve maintenance
 - Never systematically evaluated their valve inventory prior to program
 - Only visited valves as the need arose
 - A few hundred times per year
- GIS
 - Using GIS since late 2000's in a limited capacity
 - Only in last 5 years has their GIS been used extensively for water and sewer assets



What Were Clinton Township's Concerns?

- Inaccuracies in their GIS from what is in the field
- Valve Sizes, types, location, if some exist in the field
- Older neighborhoods and less accessible locations
- Minor structural repairs to VB's, new operating nuts, frozen valves
- Did these concerns come true?

Total Assets by Size

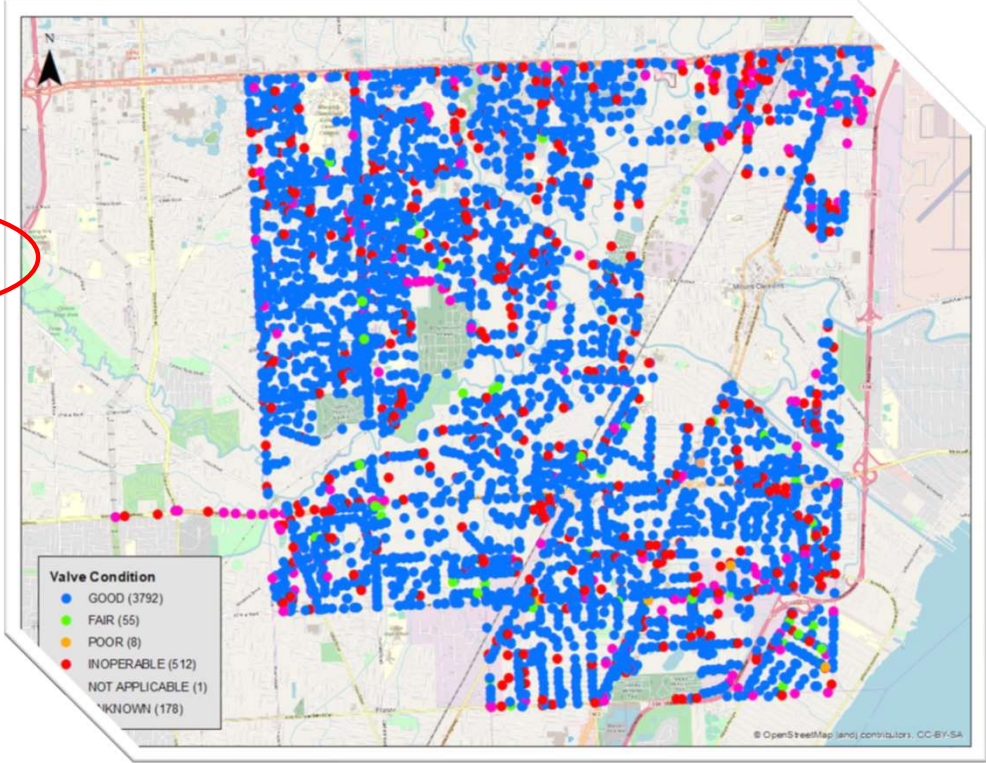
Valve Size	Count
(No Turns, No Size in GIS)	68
4"	5
6"	395
8"	3201
10"	46
12"	560
14"	8
16"	156
20"	17
24"	13
36"	13
Total	4475

Operability Findings

4,546 Total Valve Operations	
NOT APPLICABLE	1
UNKNOWN	178
INOPERABLE	512
OPERABLE	3855



Operable Condition	
POOR	8
GOOD	3792
FAIR	55

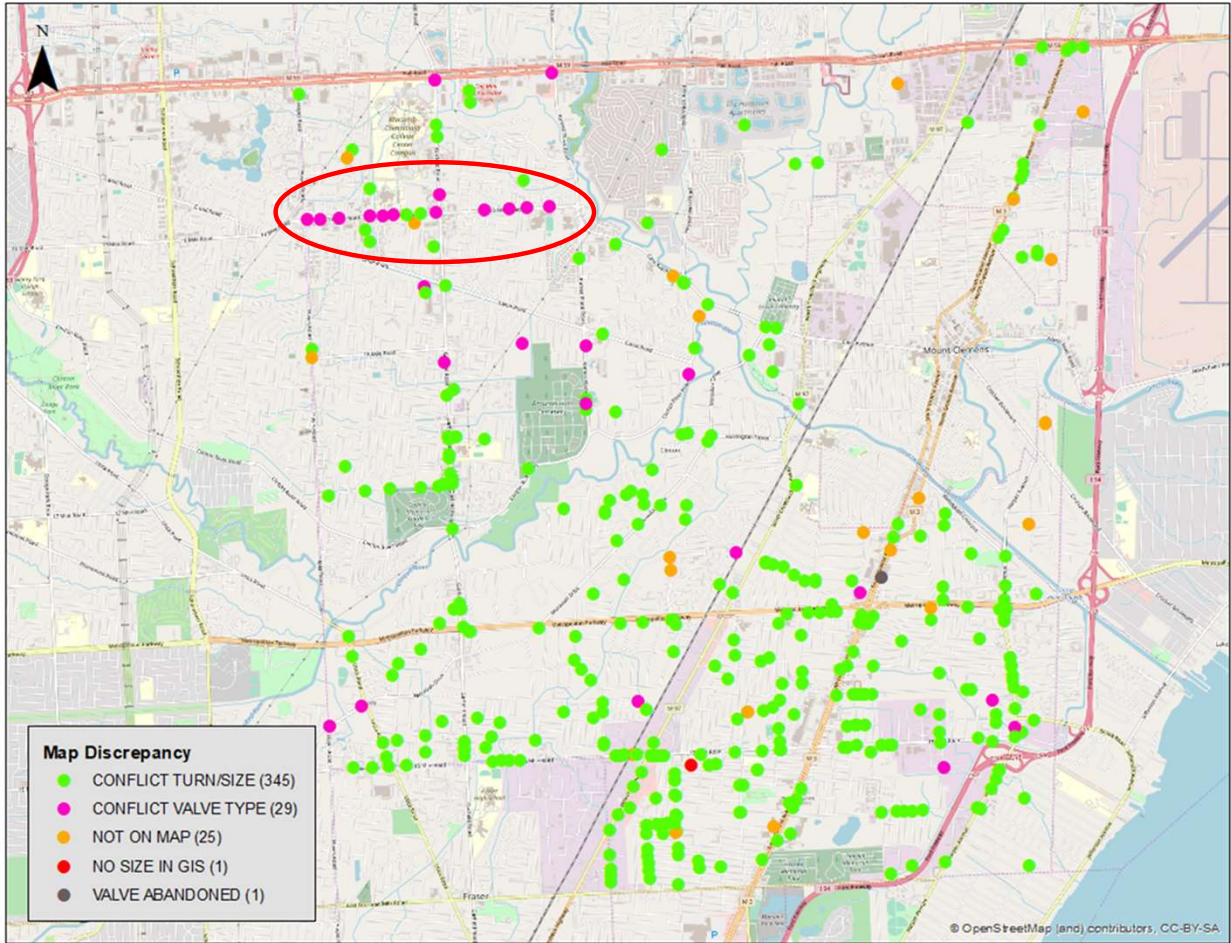


Inoperability Findings (*Current)

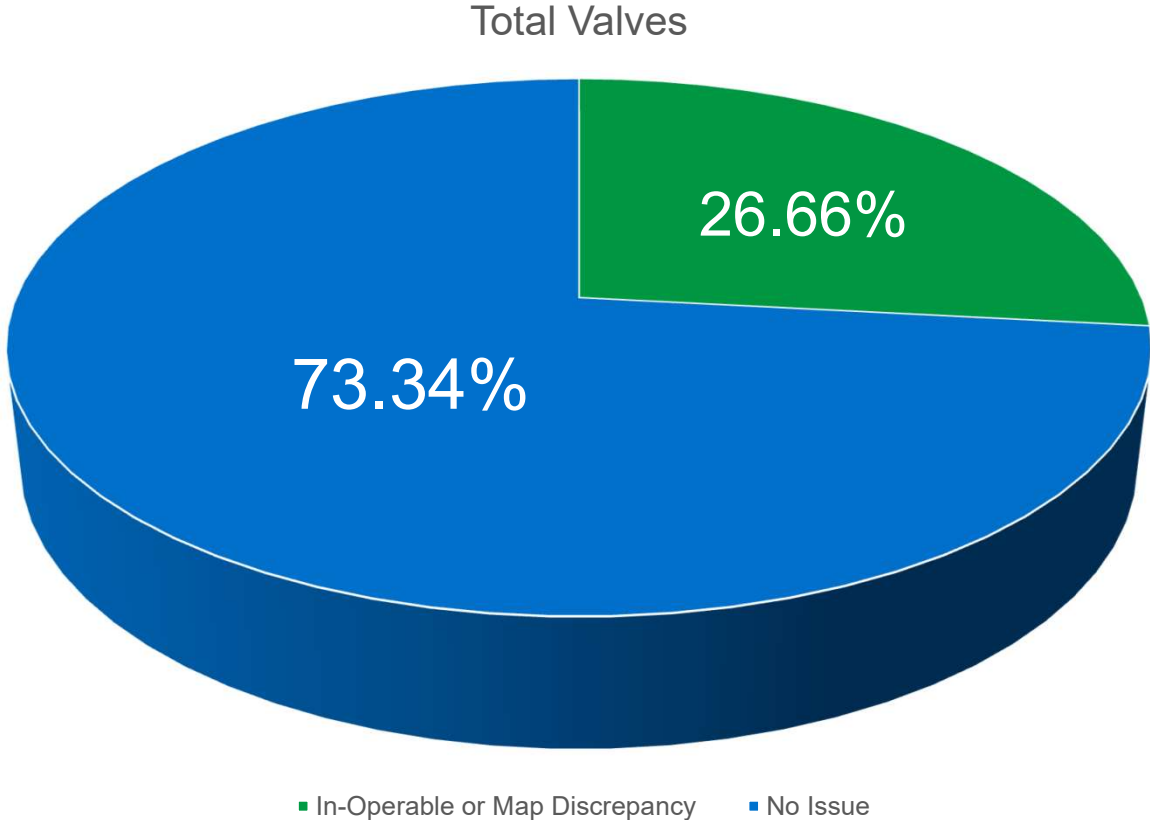
Description	Quantity
Cannot Locate	230
Covered Over	208
Misaligned	16
Frozen	9
Spins Free	9
Operating Nut Damaged	8
Operating Nut Missing	7
Behind Fence	6
Other	6
Equipment Problem	3
Stuck Lid	3
Under Vehicle	3
Bent Stem	2
Large Vac Needed	1
Packing Bolt Damage	1
Total Inoperable	512

} 88% or 454 Valves

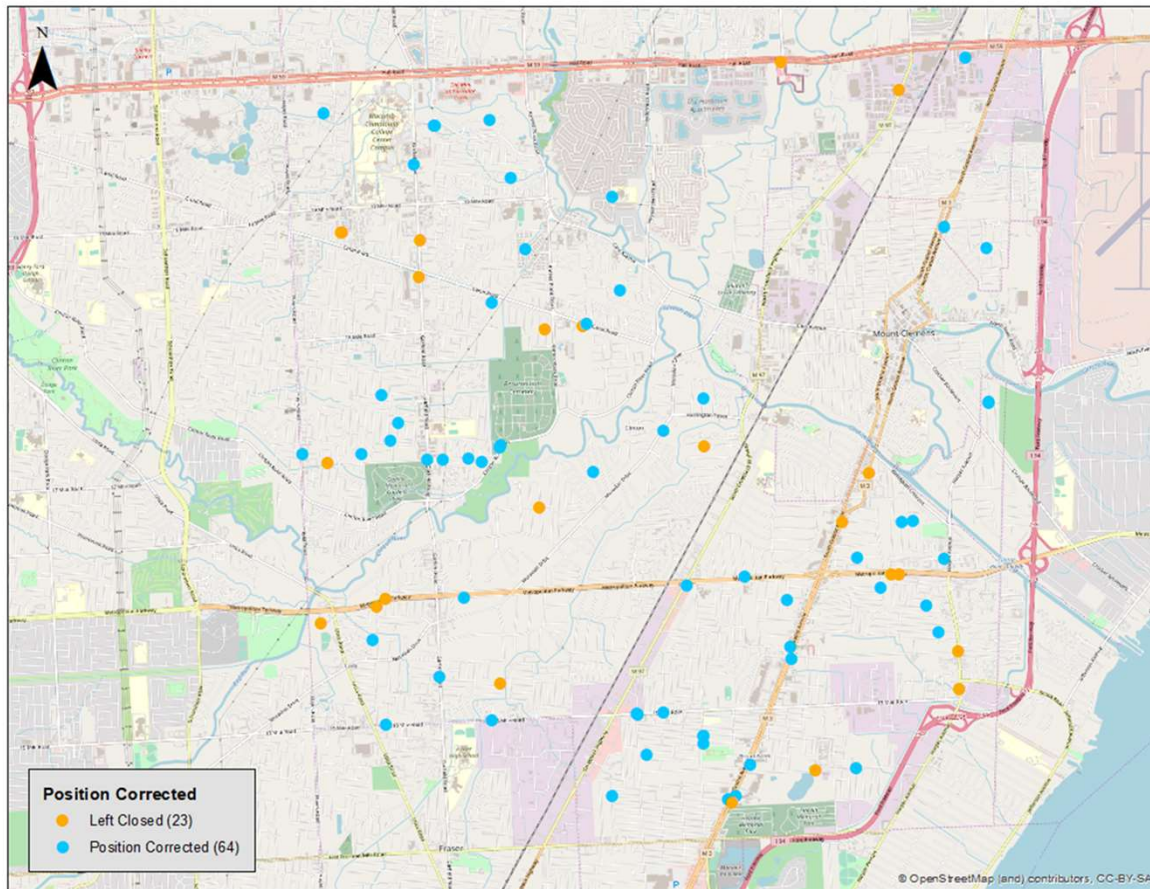
Clinton Township Map Discrepancies



Inoperable & Map Discrepancies Add Up To Frustration



Water Quality Improvements



- 87 Valves found closed
- 64 Incorrectly closed
- 128 unnecessary dead ends eliminated

LARGE VALVES & CASE STUDIES

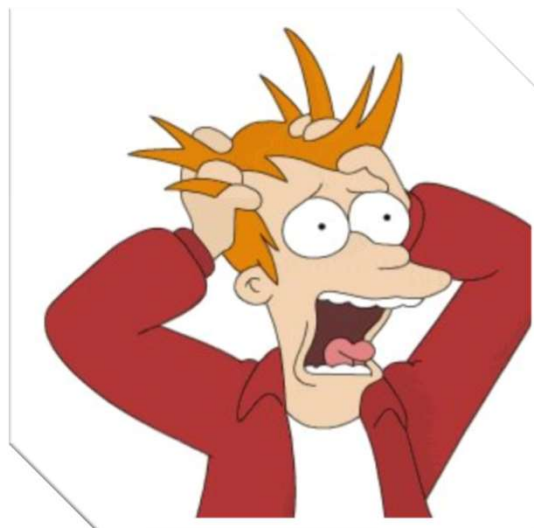
Definition

- Large Valves that Control Transmission
 - 16" – 24"+
- The 1st Valve Off the Main – Can't Isolate Mains w/o Them
- Valves Near Critical Facilities
 - Hospitals
 - Schools & Universities
 - Police & Fire
- Valves that Control Flow Across / Under Crossings
 - Rivers
 - Highways
 - Rail



Biggest Challenges – Status Quo

- Inexperience operating large valves
- Fear – “When we operate large valves, they break, and break in the closed position”
- Resources

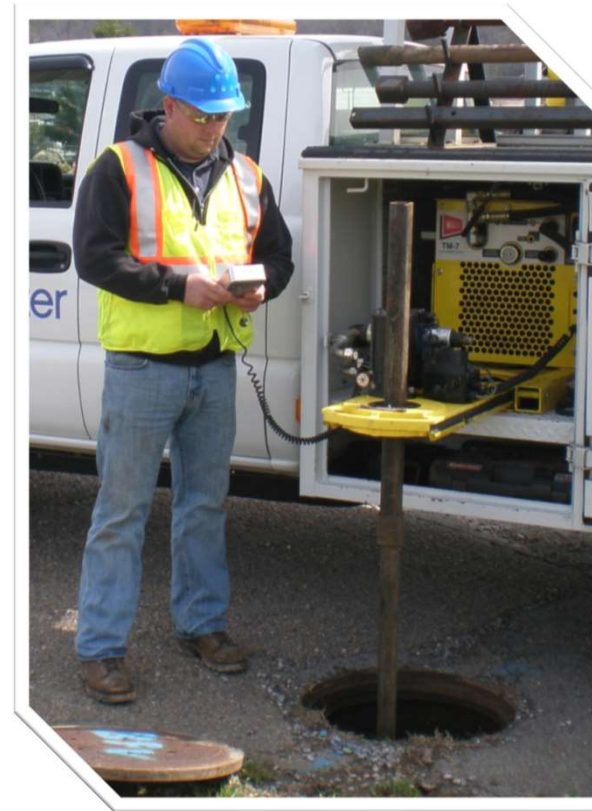


The result of the status quo is we see many utilities lack a maintenance strategy, which typically leads them into emergencies when valves do not operate.

What You Need To Do To Ensure Success

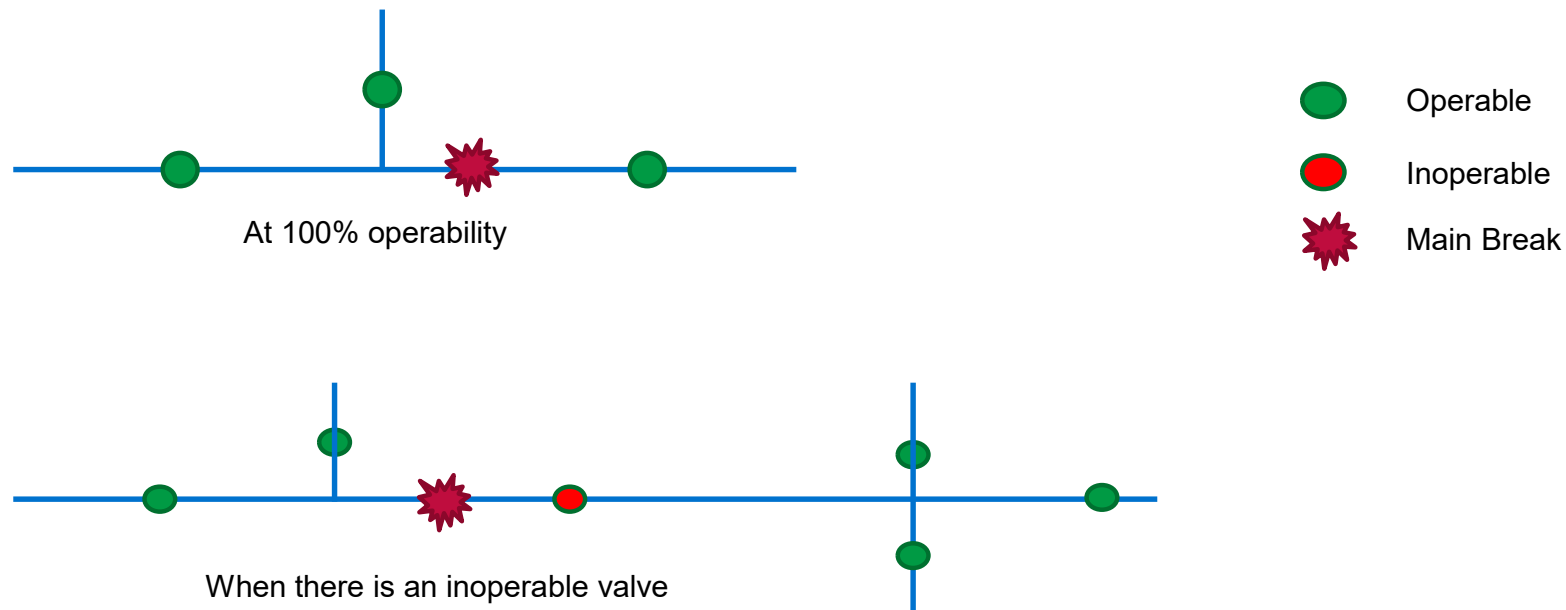
Successful Program

- Intentional selection of personnel
- Fit for purpose equipment
- Maintenance of equipment
- Comprehensive classroom training
- Extensive, practical field training
- Documented process and procedures
– S.O.P
- Monitoring, oversight and ownership



What Is The Goal?

Identify isolatable pipe segments based on criticality of the water main – typically transmission mains



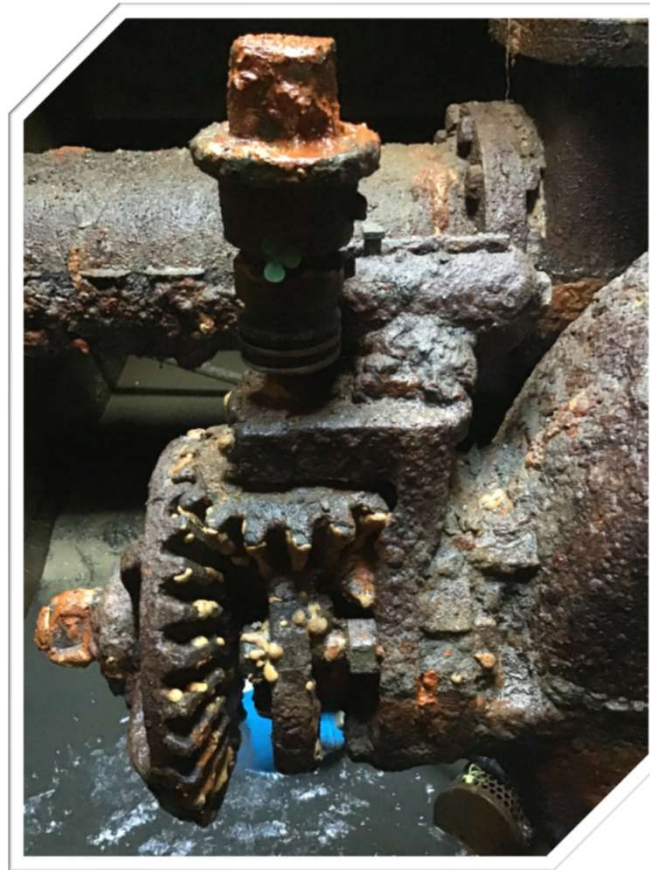
Sterling Heights, MI – 24” Cone Valve

- New bull and Pinon gear / shaft
- New stem
- New grease
- New bearings

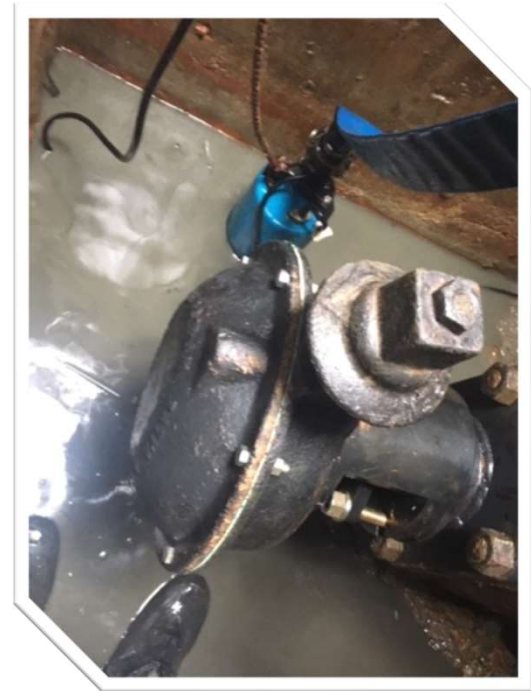
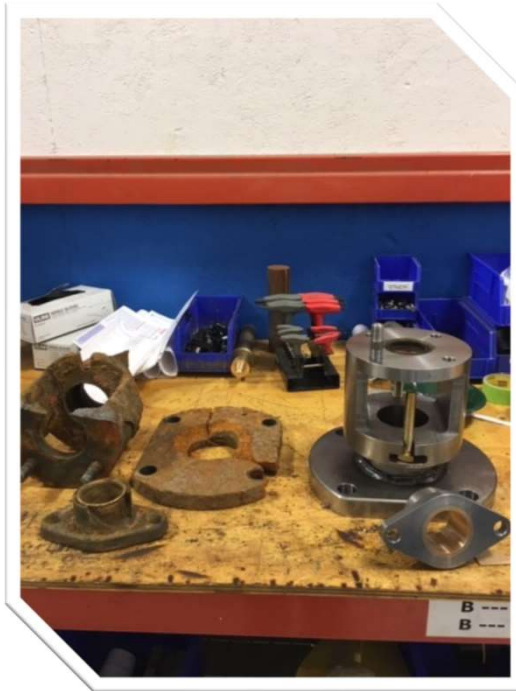


Bay City, MI - DDG

- 1921 24" Clow DDG
- City observation was a packing leak
- Valve also need new bull and pinion gears and shaft



Wilmette, IL



Grand Rapids, MI – 36 “ DDG Seized And Repaired

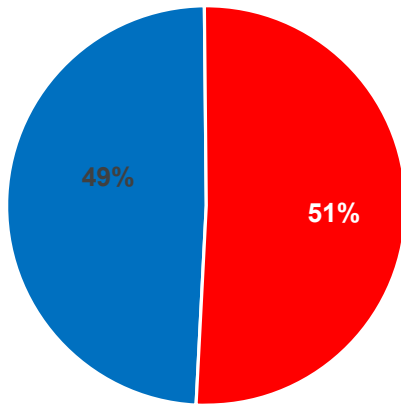
Watch!

**Bringing an 87
Year-Old Valve
Back to Life!**



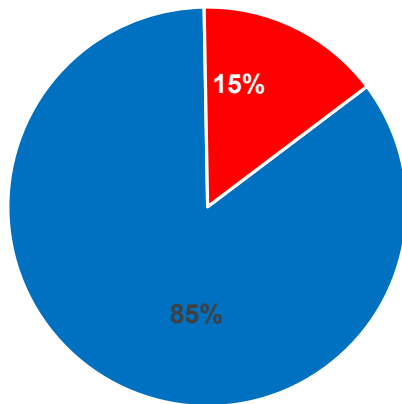
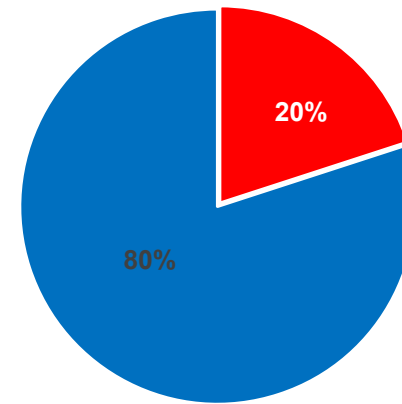
Valve Operability 16" and Greater

Initial Operability

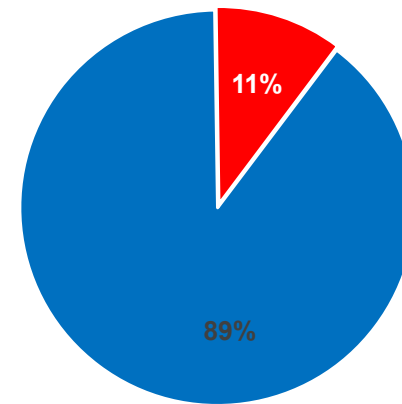


1,490 Valves
(2011-2022)

Current Operability



754 Valves
(September '21- December '22)



■ Operable ■ Inoperable

**LET'S TALK ABOUT
YOU!**

Reap the Benefits

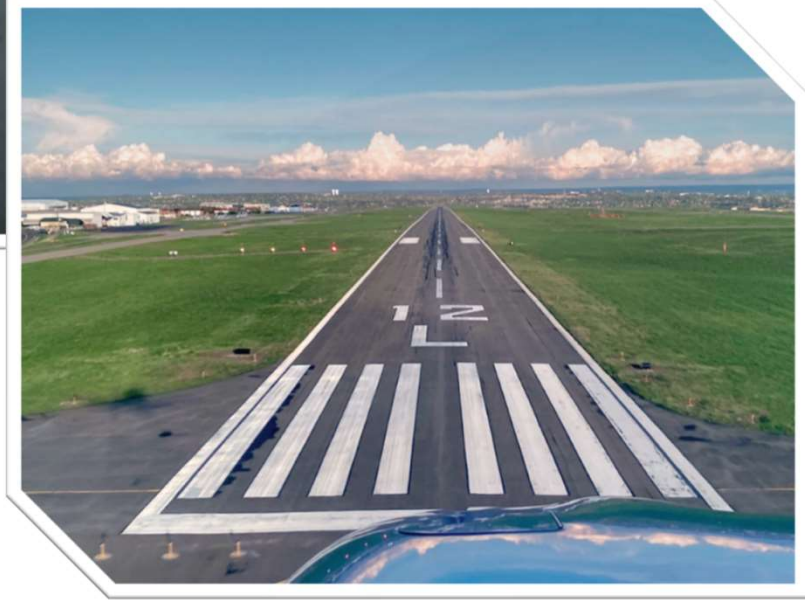
- Know where everything is located
- Understand what works and what does not
- Better water quality
- Higher water pressure
- Lower pumping cost
- Reduced number of main breaks
- Maintain a low profile / stay out of the news
- Prioritize maintenance & capital spending
- Advance your asset management program – Capacity Tests (M17), UDF, C-factor...



First Steps

- Commit to doing something
- Evaluate Self Perform vs Outsource
- Break the system in to parts
- Get budgetary pricing
- Establish goals, so you can put together a logical plan
- Just get started!
- Reap the benefits





Questions & Discussion

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