
Machine-Intelligent Non-Acoustic Leak Detection
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Dallas, TX
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Sacramento, California 95825
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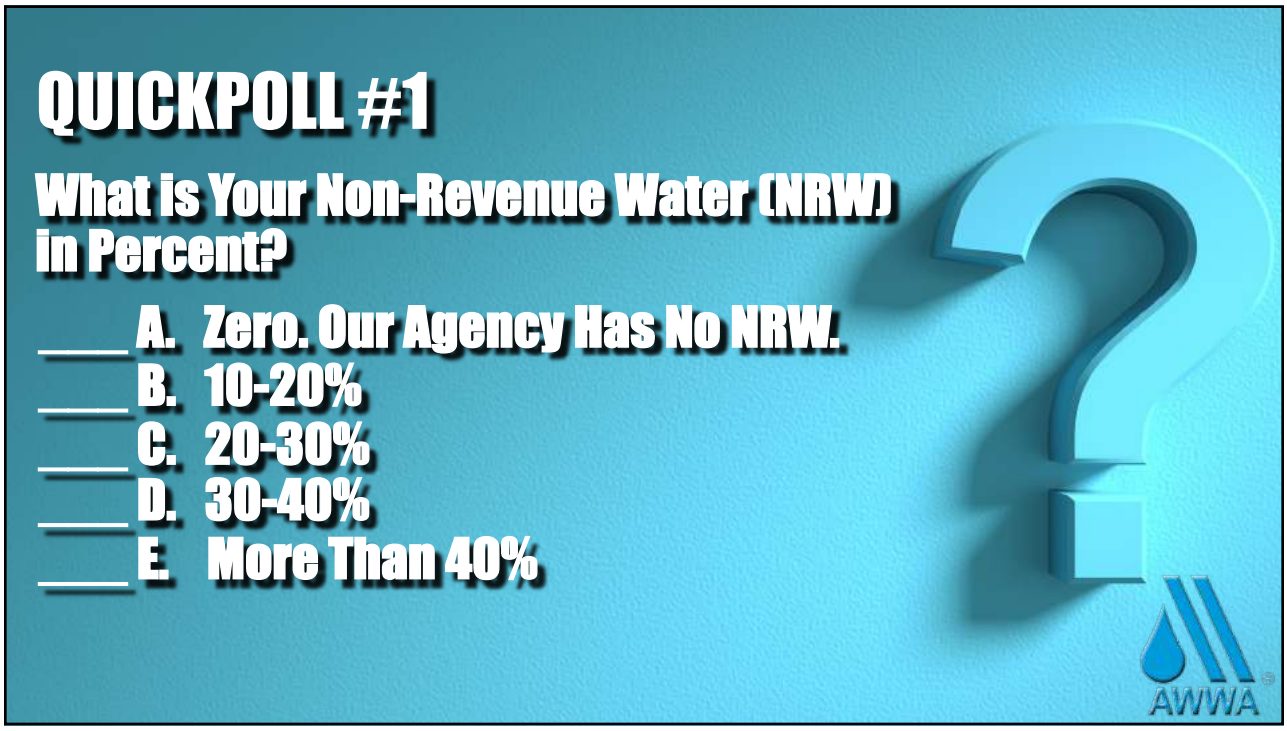
QUICKPOLL #1
What is Your Non-Revenue Water (NRW) in Percent?
____A. Zero. Our Agency Has No NRW.
____B. 10-20%
____C. 20-30%
____D. 30-40%
____E. More Than 40%
AWWA

Chuck Hansen
Sacramento, CA

Founder & Chairman.
Multi-Patent Holder.
+40 Years Sewer & Water Asset Management. Working with over 2,000 utilities, worldwide.

AWWA Water Main Committee.

Founder & CEO
Hansen Software Inc.
1980-2007 (27 years).

Charles Wilmut, PE
Dallas, TX

Senior Advisor,
Electro Scan Inc.
+50 Years of Civil Engineering, including Pipe Condition Assessment & Evaluations.
Former SVP, Burgess & Niple, Former Founder, GSW Engineers.

US EPA Region VI, Construction Grants Division.

Brad Weston
Swindon, England, UK

Managing Director,
Electro Scan (UK) Ltd.
+10 Years of Field Inspection, including +3,000 Sahara & Untethered Acoustic Ball Insertions.

Member, British Water

Member, Future Water Association

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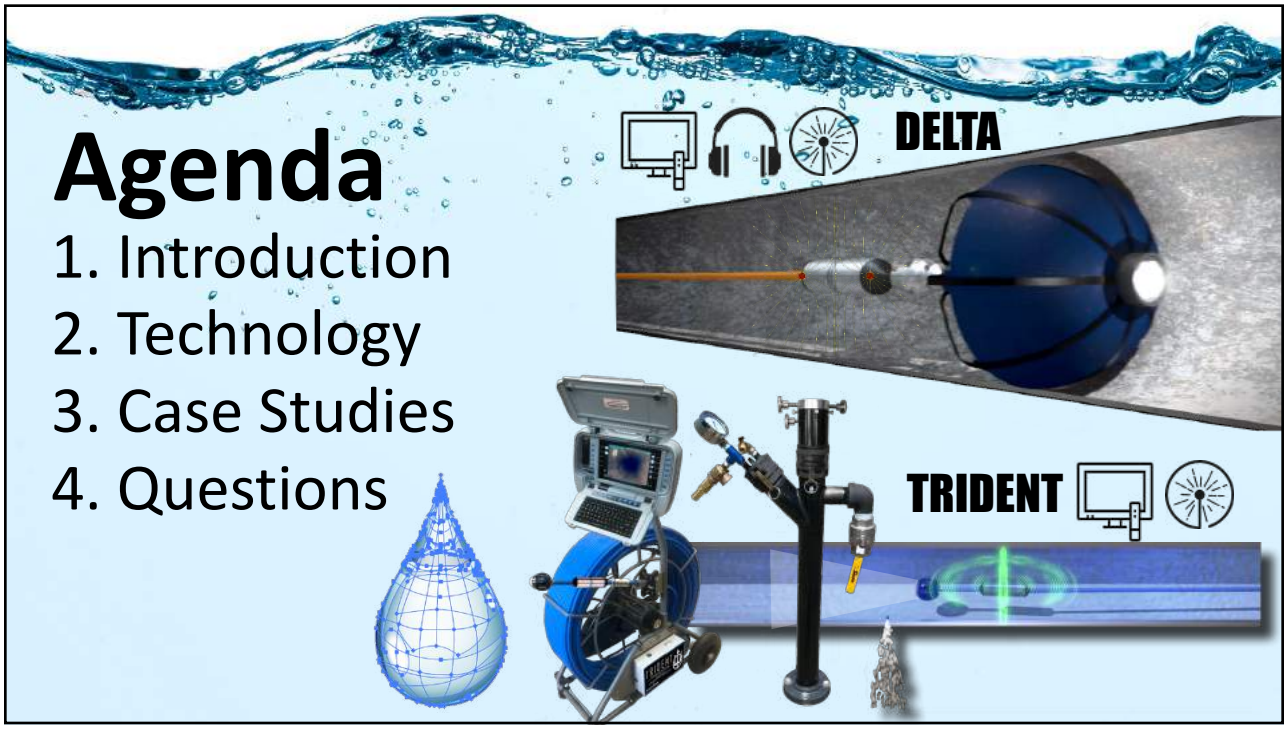
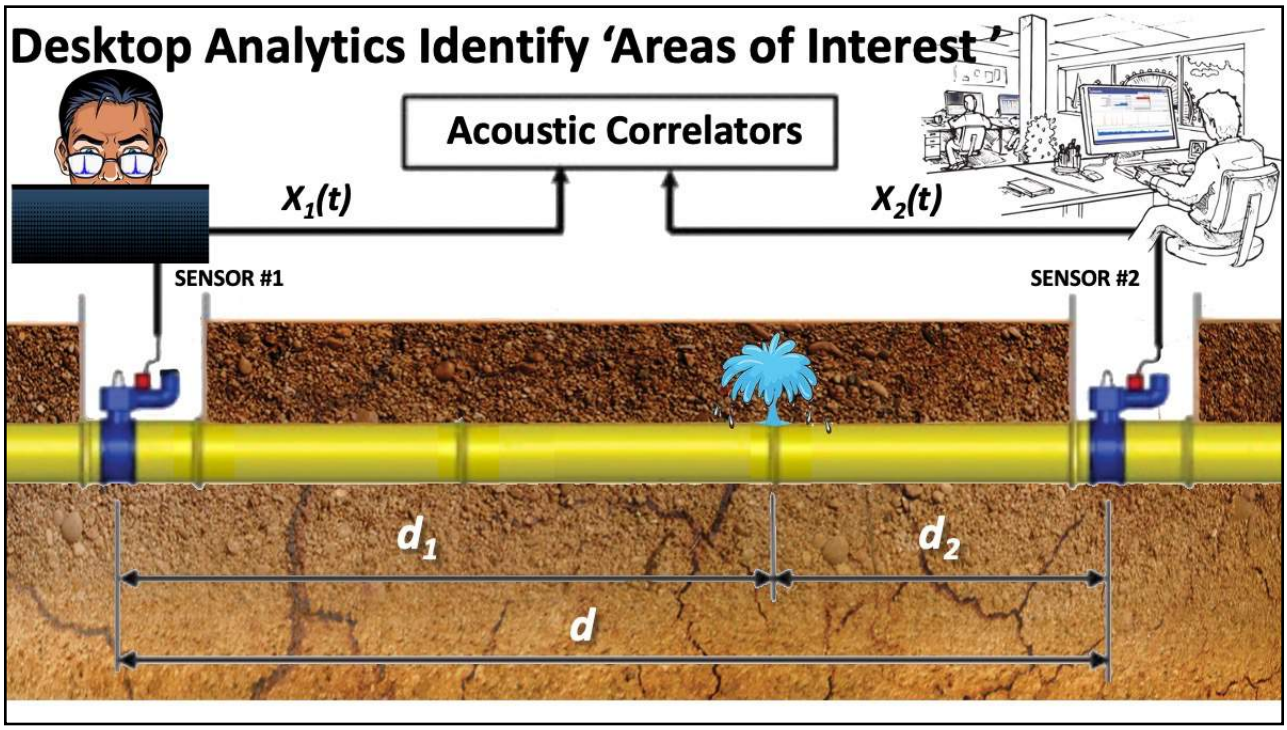
Charles Wilmut, P.E., Mobile: +1 214 529 7584, charles.wilmut@electroscan.com
Brad Weston, Mobile: +44 7739 358611, brad@electroscan.com




Part 1
Introduction
Chuck Hansen
Sacramento, CA

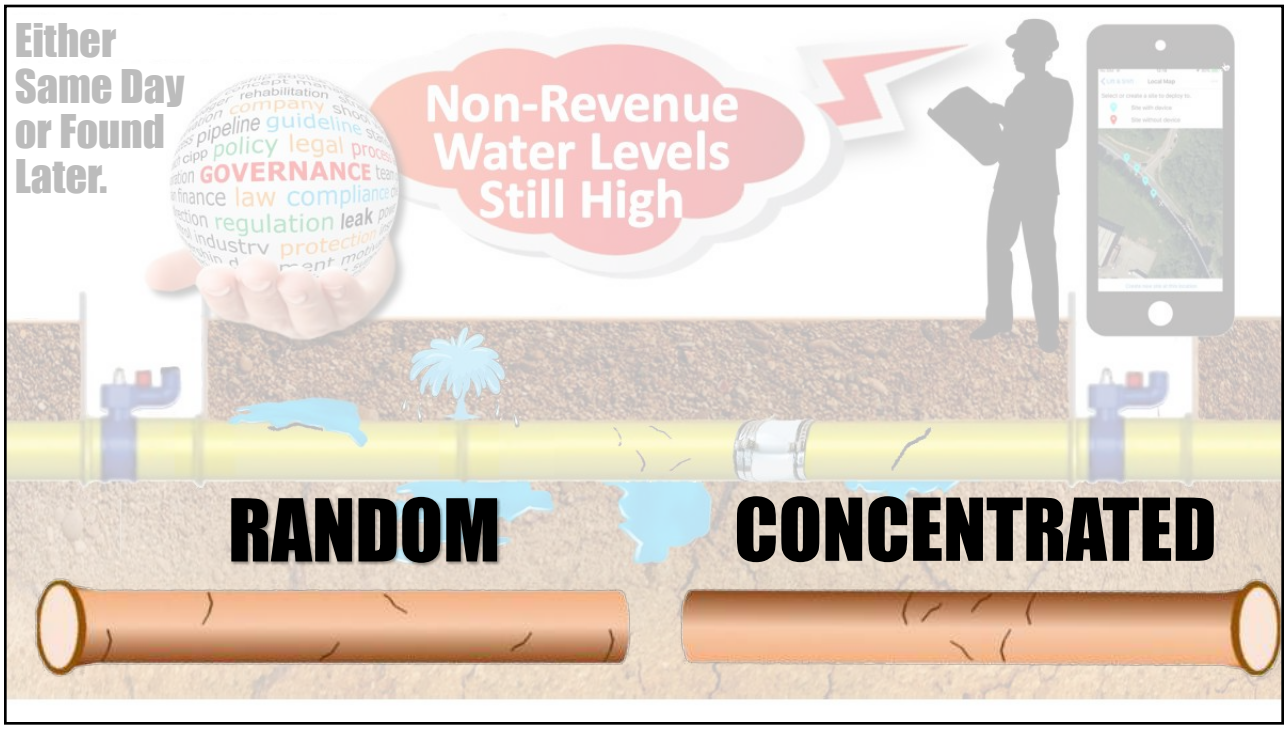

DO WE REALLY NEED ANOTHER WAY TO FIND A LEAK?
Acoustic Data Loggers, Hydrophones
Acoustic + CCTV
Helium Gas Tracer
Untethered Acoustic
Sahara Leak Detection
Electro-Magnetic
Transient Pressure
Magnetic Flux
FitBit Sensors
LiDAR LIGHT DETECTION AND RANGING
Self-Fixing Leak Detection
BEFORE AFTER
Low Flying Aerials
Low Elevation Drone
Satellite
Dye Testing
Smoke Testing
CCTV Inspection
Zoom CCTV Cameras
3D Cameras
Laser Profiling
Measures Pipe Ovality
Acoustic Sensors
Sonar
Measures Debris on Bottom of Pipe.
Laser + Sonar
Multi-Sensor
Video Micrometer
Measures Crack Opening, but Not Whether It Goes Through Wall
Infrared Thermograph
Ground Penetrating Radar
Wall Thickness Testing
Not Reliable for Finding or Measuring Leaks.
Fiber Optics

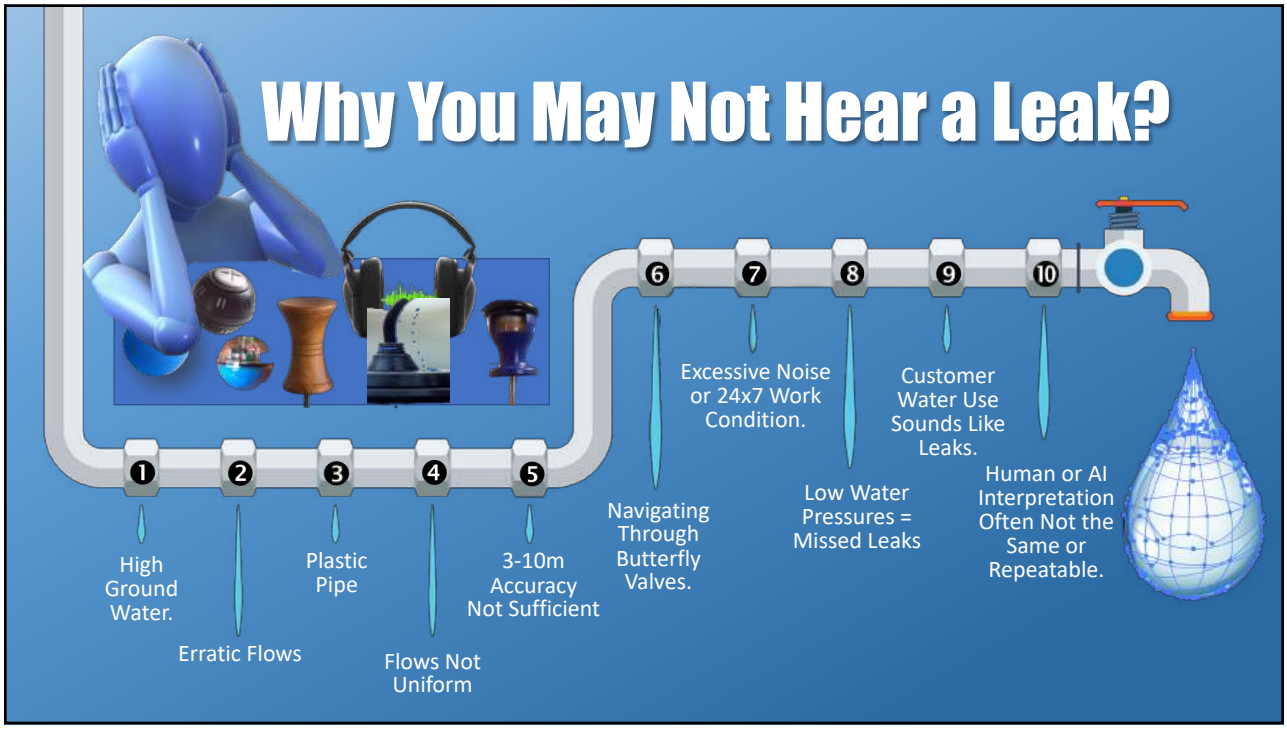

Leak Detection: Past & Present
2
He
Helium
4.0026
ATOMIC NUMBER
SYMBOL/NAME
ATOMIC MASS
NO PARKING AT ANYTIME


Desktop Analytics Identify 'Areas of Interest
Acoustic Correlators
$X_1(t)$
$X_2(t)$
SENSOR #1
SENSOR #2
d_1
d_2
d


Either
Same Day
or Found
Later.
Non-Revenue
Water Levels
Still High

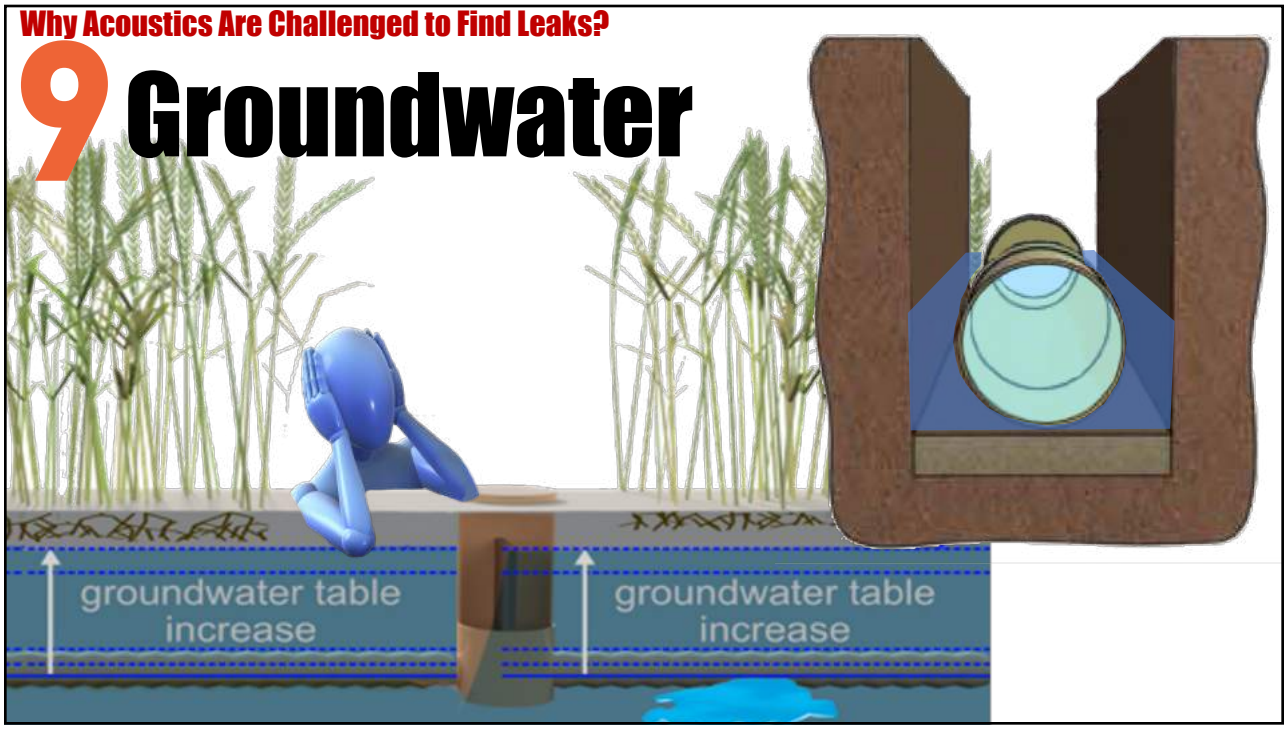

Either
Same Day
or Found
Later.
Non-Revenue
Water Levels
Still High
SINGLE
EVERY JOINT


Either Same Day or Found Later.
Non-Revenue Water Levels Still High
RANDOM
CONCENTRATED


Why You May Not Hear a Leak?
1
2
3
4
5
6
7
8
9
10
High Ground Water.
Erratic Flows
Plastic Pipe
Flows Not Uniform
3-10m Accuracy Not Sufficient
Navigating Through Butterfly Valves.
Excessive Noise or 24x7 Work Condition.
Low Water Pressures = Missed Leaks
Customer Water Use Sounds Like Leaks.
Human or AI Interpretation Often Not the Same or Repeatable.

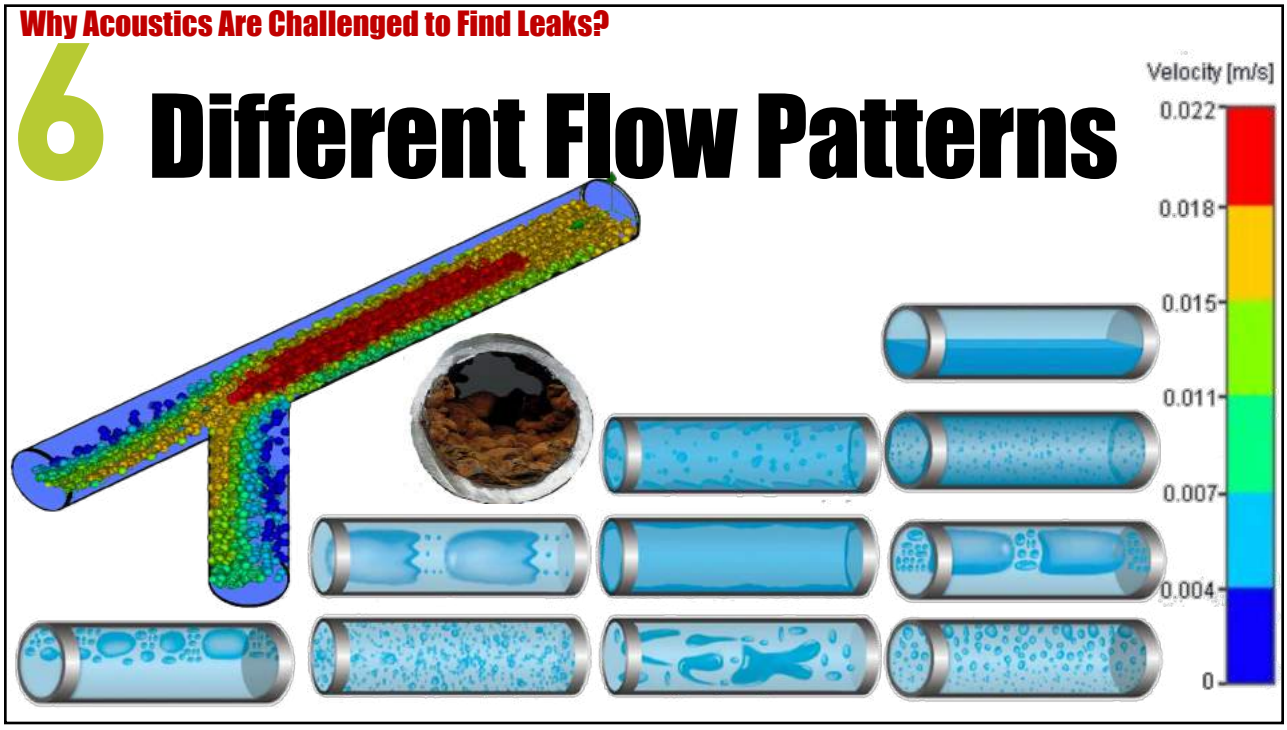

THE
TOP TEN
LIST
Why Acoustic Sensors & Data Loggers Are Challenged To Find Water Leaks?

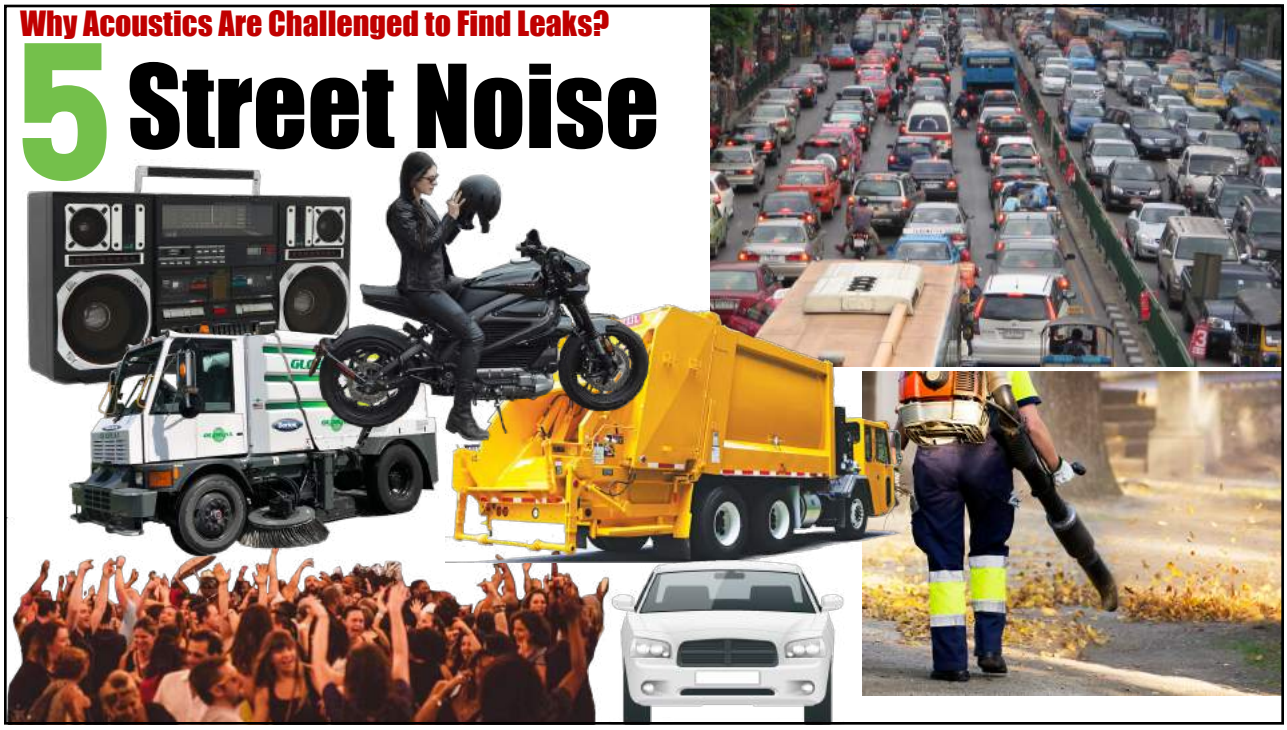

Why Acoustics Are Challenged to Find Leaks?
10 Household Water Usage


Why Acoustics Are Challenged to Find Leaks?
9 Groundwater
groundwater table increase
groundwater table increase


Why Acoustics Are Challenged to Find Leaks?
8 Pipe Size & Material


Why Acoustics Are Challenged to Find Leaks?
7 Coupling & Repairs

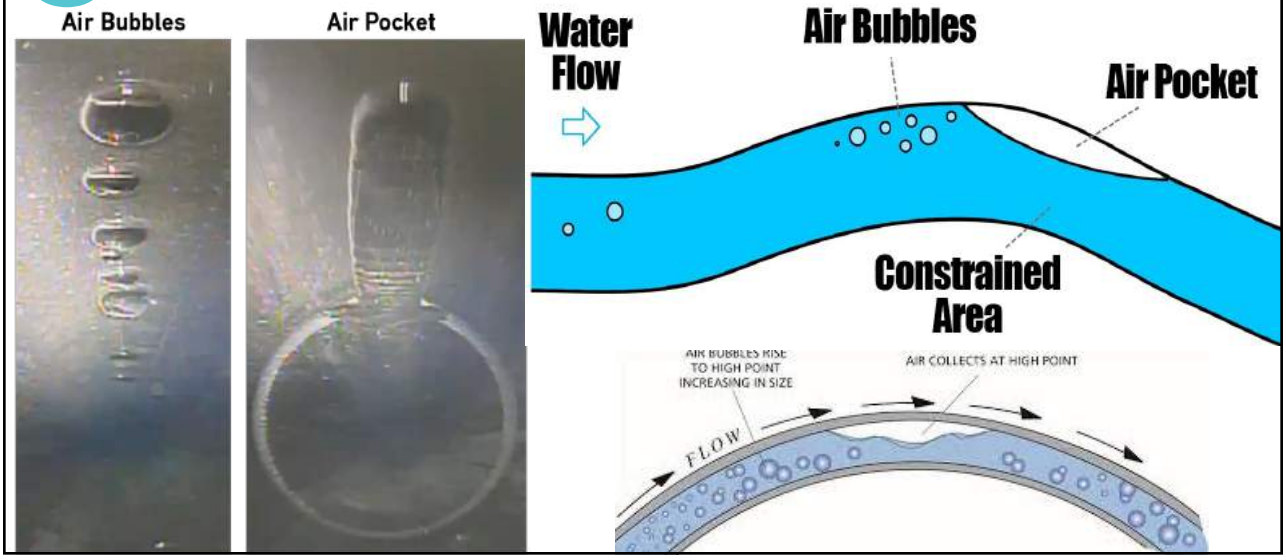

Why Acoustics Are Challenged to Find Leaks?
6 Different Flow Patterns
Velocity [m/s]
0.022
0.018
0.015
0.011
0.007
0.004
0


Why Acoustics Are Challenged to Find Leaks?
5 Street Noise


Why Acoustics Are Challenged to Find Leaks?
4 Trenching & Bedding

Why Acoustics Are Challenged to Find Leaks?

3 Air Bubbles & Pockets



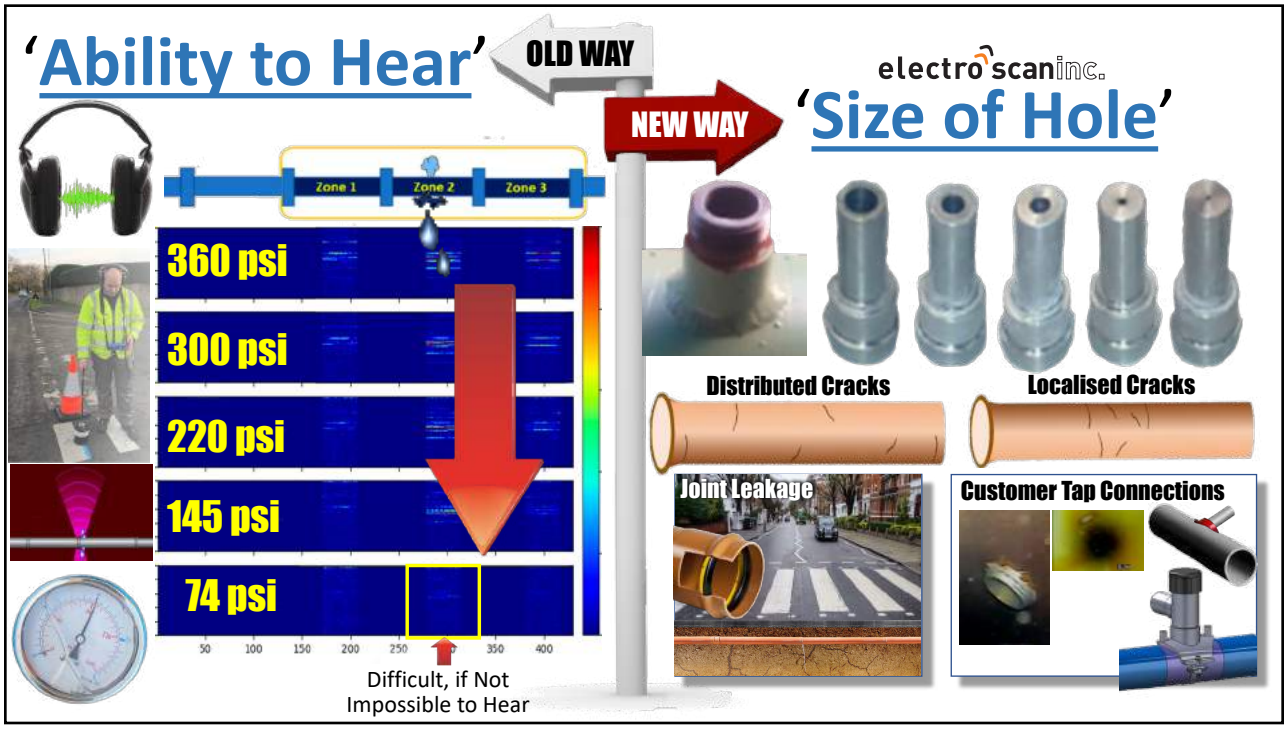
Why Acoustics Are Challenged to Find Leaks?

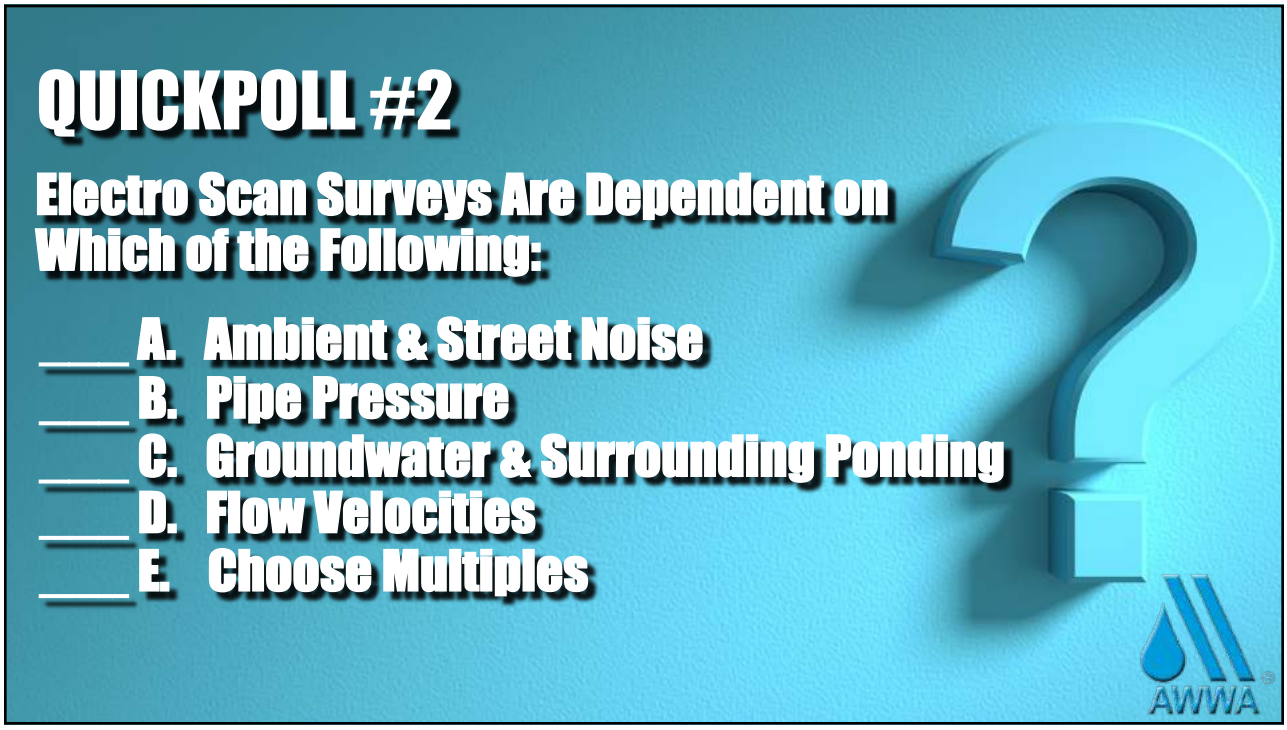
2 Judgment: AI & Human

What?

AI for Acoustic Leaks is Our Entire Business!


The 'Biggest' Challenge...
1
Acoustics Can't Hear
Leaks at Low Pressures
OLD WAY
And, Can't Provide GPM.


'Ability to Hear'
OLD WAY
NEW WAY
electroscaninc.
'Size of Hole'
Zone 1
Zone 2
Zone 3
360 psi
300 psi
220 psi
145 psi
74 psi
50
100
150
200
250
350
400
Difficult, if Not
Impossible to Hear
Distributed Cracks
Localised Cracks
Joint Leakage
Customer Tap Connections


QUICKPOLL #2
Electro Scan Surveys Are Dependent on Which of the Following:
____A. Ambient & Street Noise
____B. Pipe Pressure
____C. Groundwater & Surrounding Ponding
____D. Flow Velocities
____E. Choose Multiples
AWWA


Part 2
Technology
Chuck Hansen
Sacramento, CA
Charles Wilmut, PE
Dallas, TX
5.4 GPM

Recent Awards

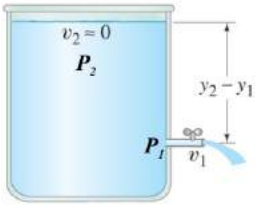
NOV 2020

JAN 2021

JUNE 2021

FAQ #1 How Are Leaks Measured in Gallons Per Minute

Torricelli's Law



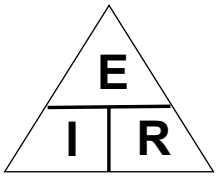
$$v_1 = \sqrt{2g(y_2 - y_1)}$$

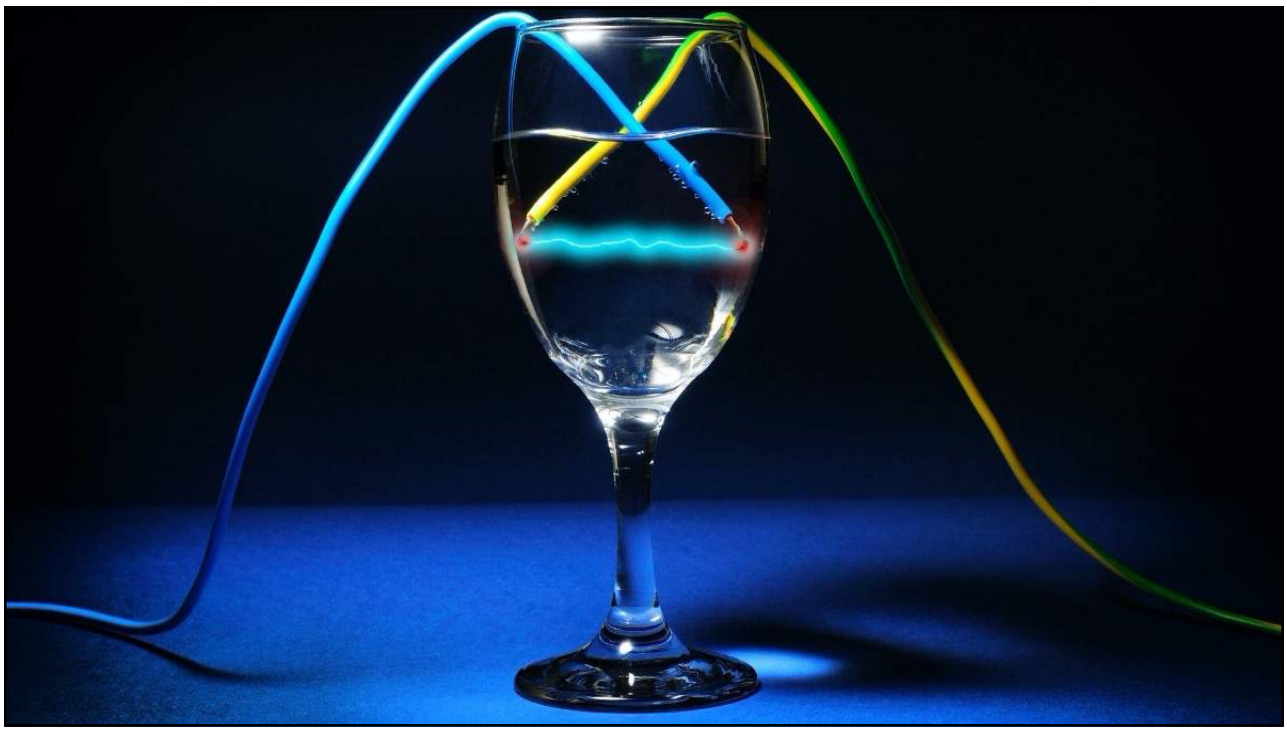
$$P_1 = P_2$$

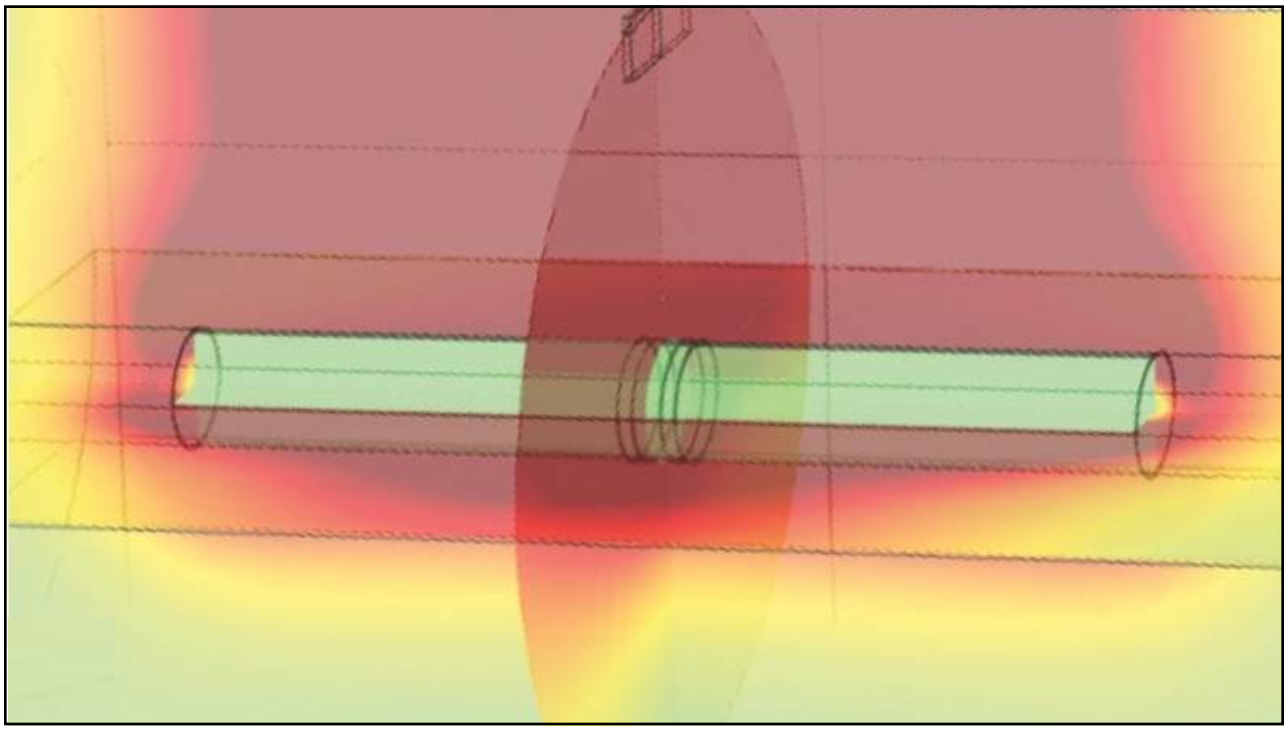
$$P_1 + (\tfrac{1}{2})\rho(v_1)^2 + \rho g y_1 = P_2 + (\tfrac{1}{2})\rho(v_2)^2 + \rho g y_2$$

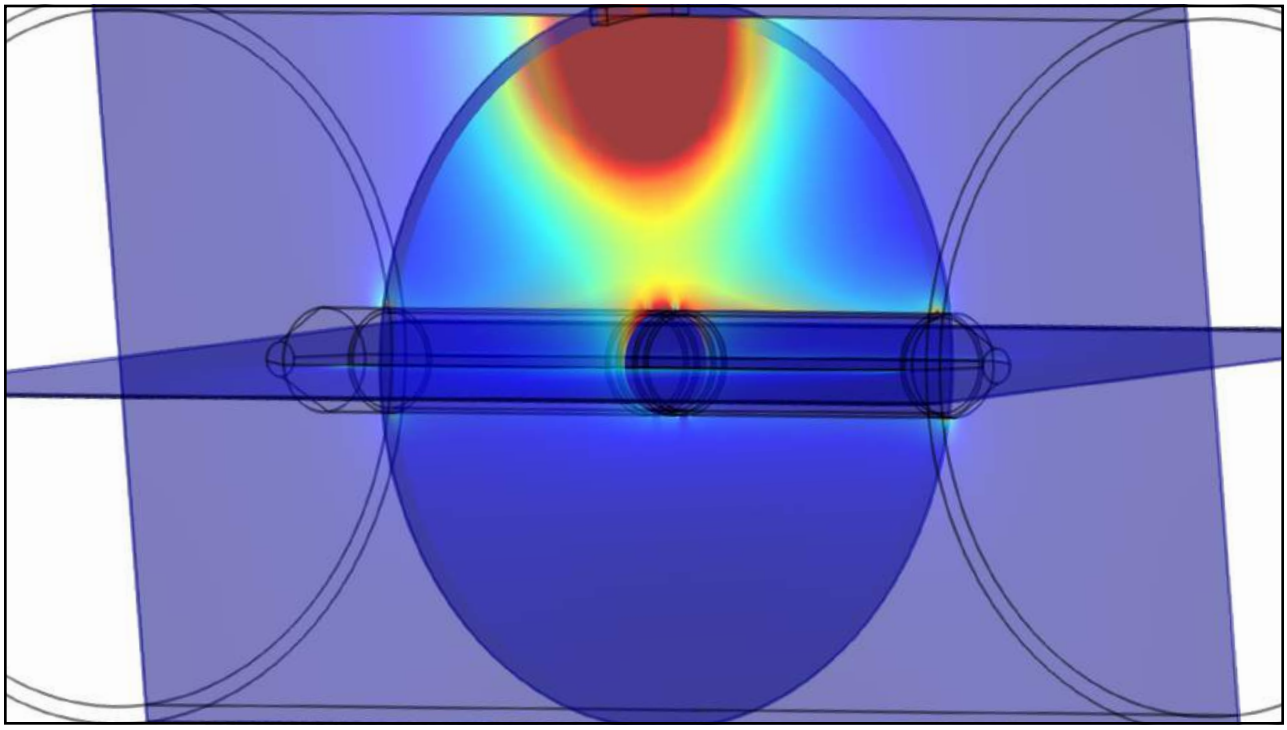
Ohm's Law

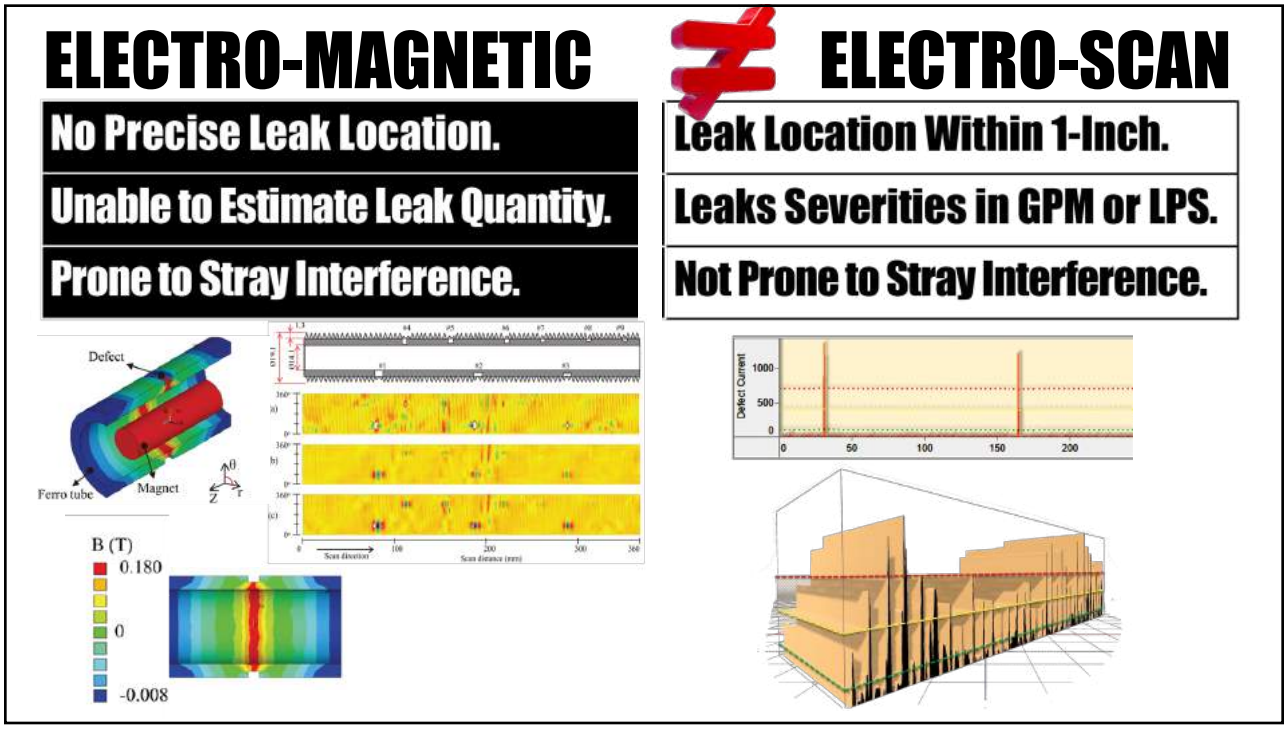
E = IR	Where:
I = E/R	"E" *volts*
R = E/I	"I" *amps*
	"R" *ohms*

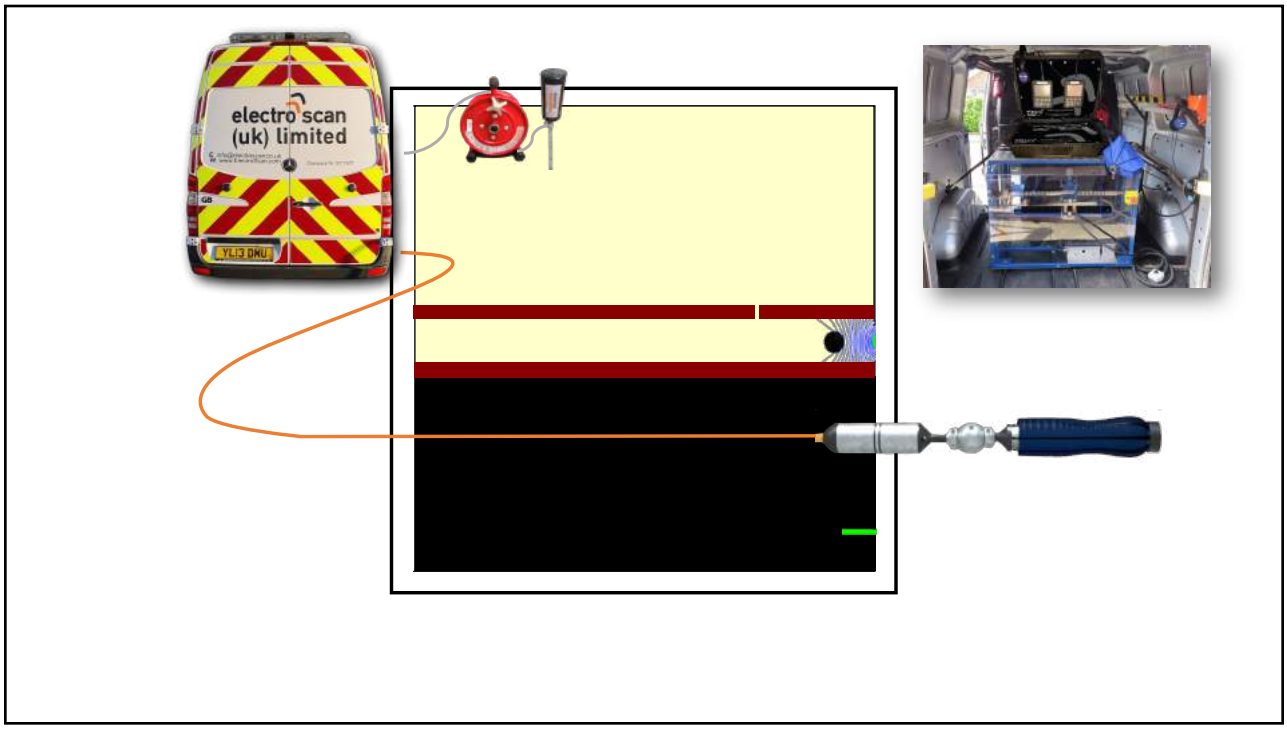


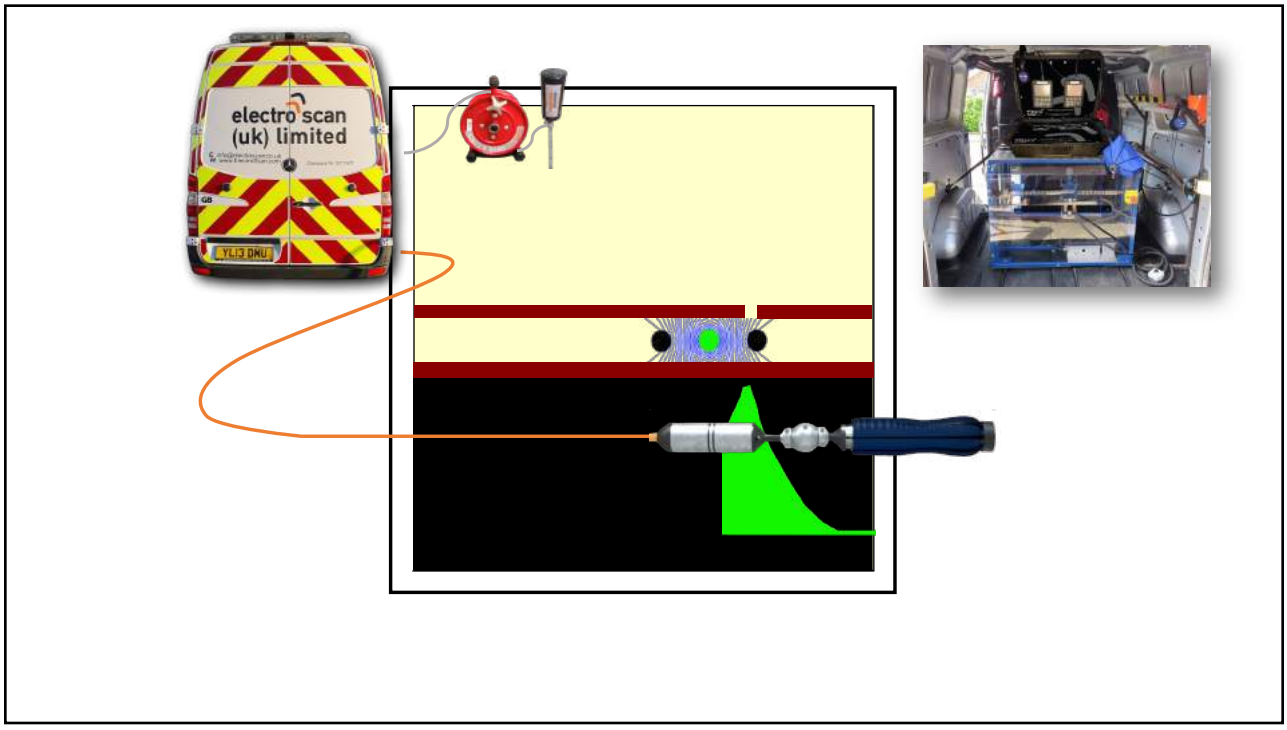






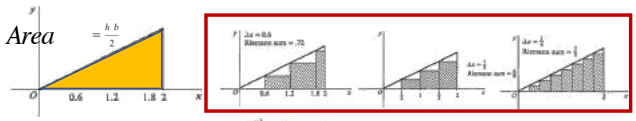

ELECTRO-MAGNETIC
No Precise Leak Location.
Unable to Estimate Leak Quantity.
Prone to Stray Interference.
ELECTRO-SCAN
Leak Location Within 1-Inch.
Leaks Severities in GPM or LPS.
Not Prone to Stray Interference.
Defect
Ferro tube
Magnet
B (T)
0.180
0
-0.008
Defect Current
1000
500
0
0
50
100
150
200


electro scan
(uk) limited
YL13 OMU

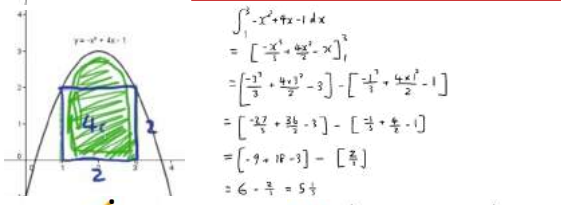

electro scan
(uk) limited
YL13 OMU

How are Leaks Calculated?

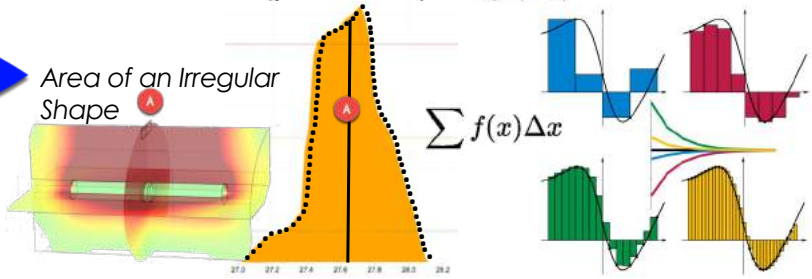
A *Area of a Triangle*

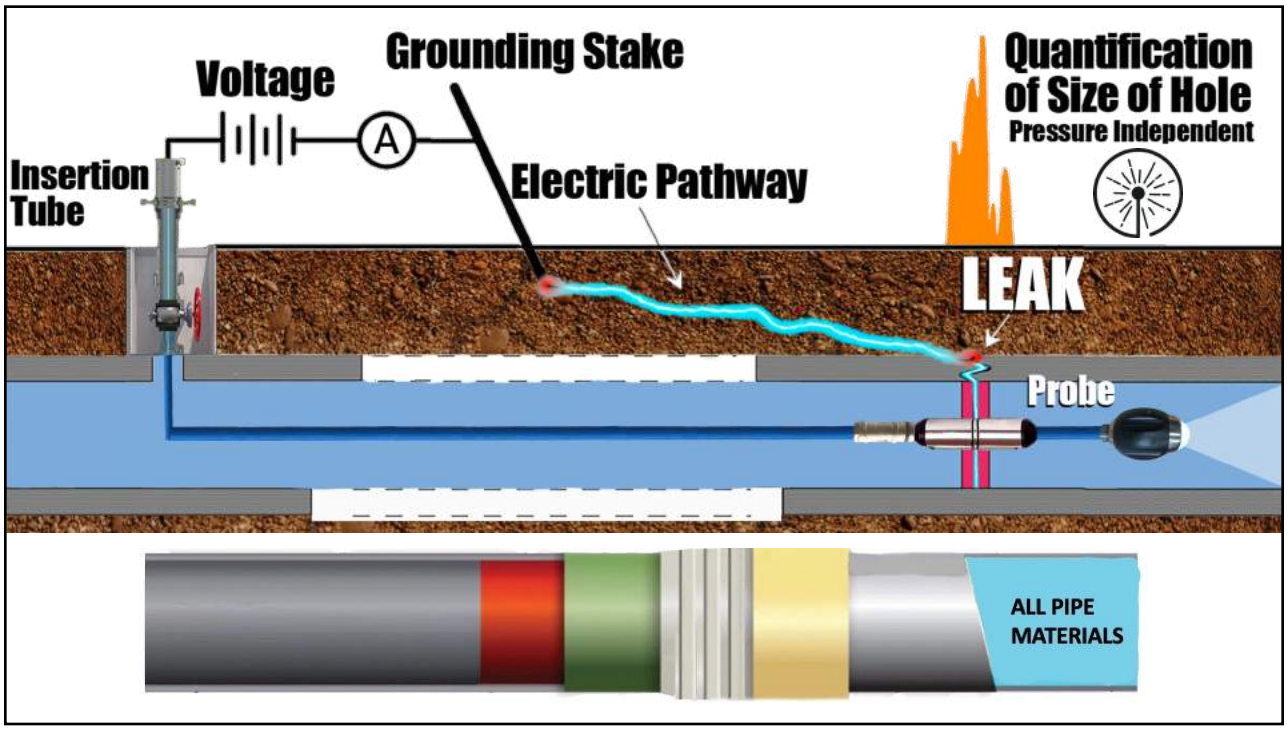


B *Area of a Curve*



C *Area of an Irregular Shape*





Defect Flow Rate Calculation

Lab Testing
Measured values from known defect sizes and pressure conditions

Cross-check and Calibration

Calculations
Pressure – Orifice Formula
Gravity – Torricelli's Law

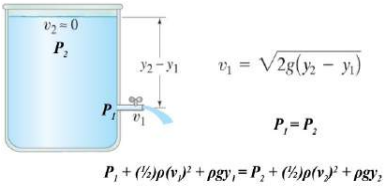
LPS/mm²

Geophysical Equations
Relates known defect leakage to low voltage conductivity signals

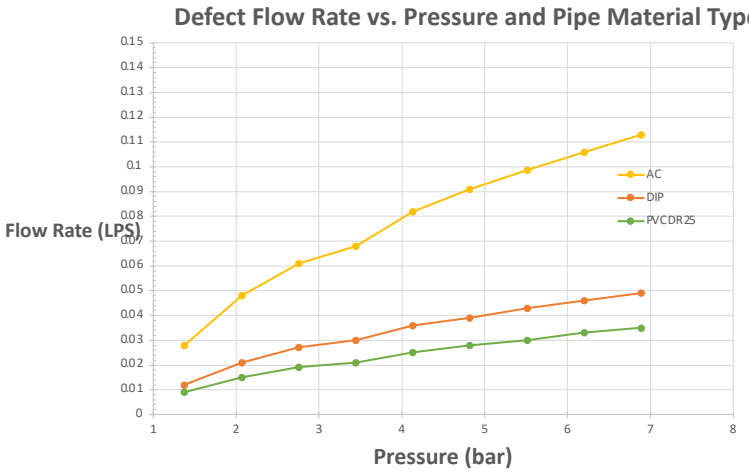
LPS

CriticalH$_2$0 Platform
Calculates defect leak rates for specific defect signals

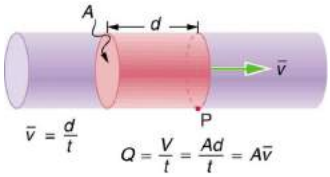
Tables/Graphs



Defect flow = *f* (Conductance, Material, & Pressure)



Flow Rate & Its Relation to Velocity



Calculation Process Summary

Laboratory Tests

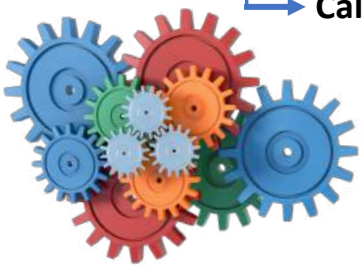
→ **Calculations**

→ **Calibration**

→ **Field Application**

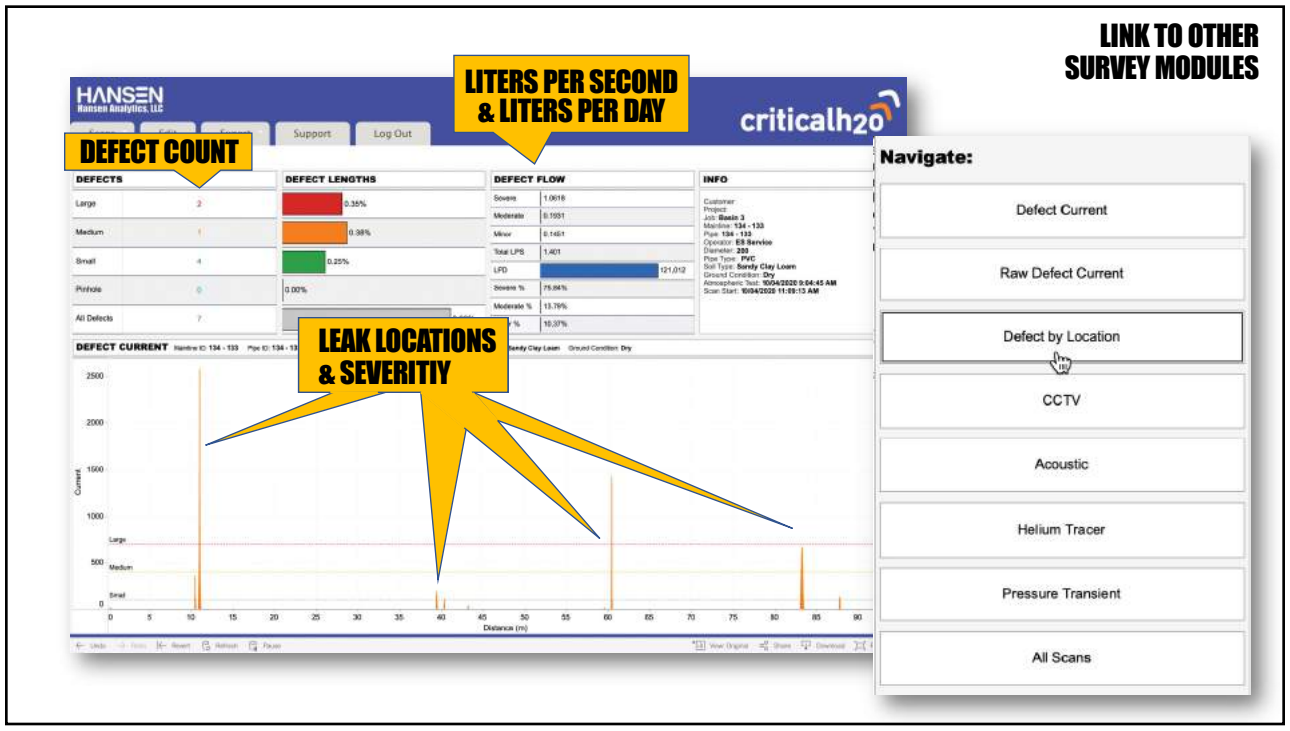
→ **Verification**

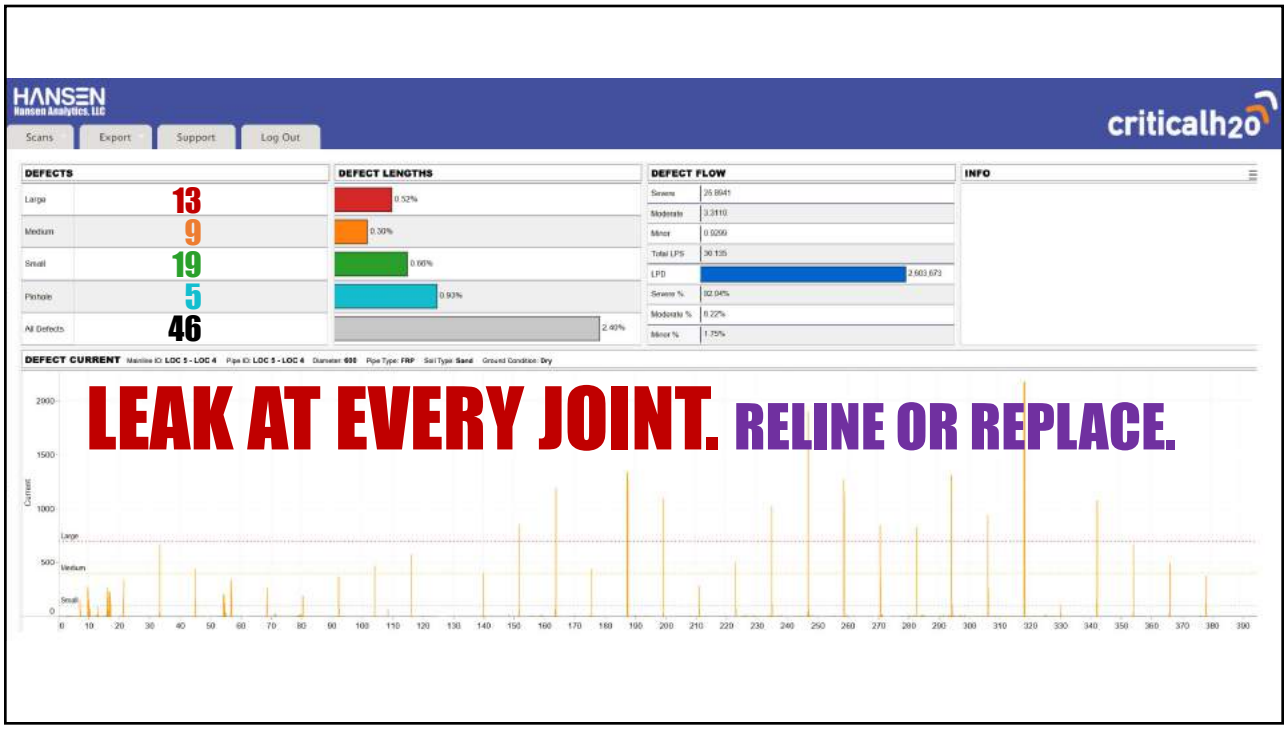
→ **Comparison**

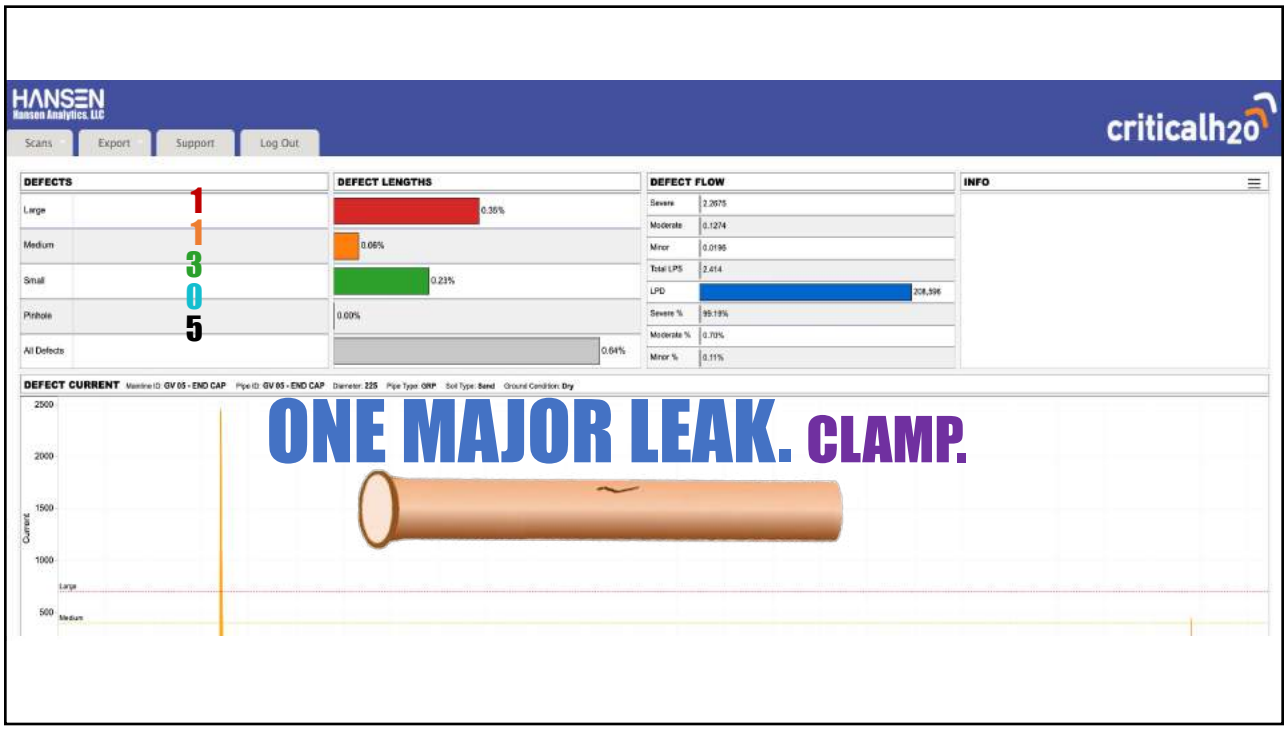


Calculating GPM for Each Leak, Across An Entire Pipe Length, Is a Gamechanger!

All leaks in pipe segments evaluated using the same criteria



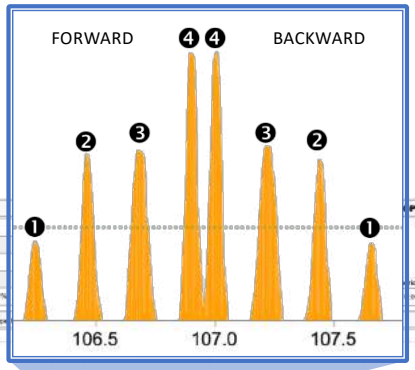

HANSEN
Hansen Analytics, LLC
criticalh2o
Scans
Export
Support
Log Out
DEFECTS
DEFECT LENGTHS
DEFECT FLOW
INFO
Large 13
Medium 9
Small 19
Pinhole 5
All Defects 46
DEFECT CURRENT
LEAK AT EVERY JOINT. RELINE OR REPLACE.

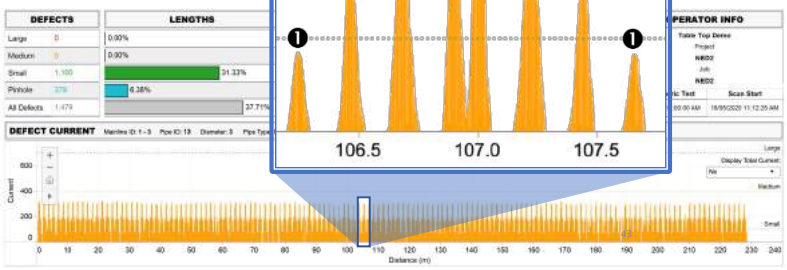

HANSEN
Hansen Analytics, LLC
criticalh2o
Scans
Export
Support
Log Out
DEFECTS
DEFECT LENGTHS
DEFECT FLOW
INFO
Large 1
Medium 1
Small 3
Pinhole 0
All Defects 5
DEFECT CURRENT
ONE MAJOR LEAK. CLAMP.

Scientific Principle

Bernoulli Equation, Plus Ohms' Law, Plus Torricelli's Law.

Scientific Principle

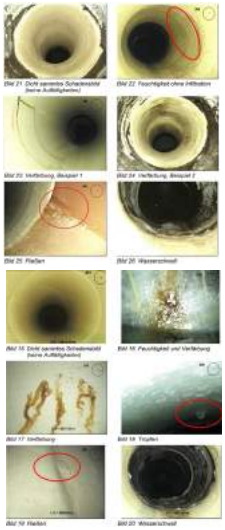




Electro Scan's Use of Ohms Law Provides Unmatched Data Repeatability.

CIPP Study

neutral independent non-profit institute
IKT - Institute for Underground Infrastructure

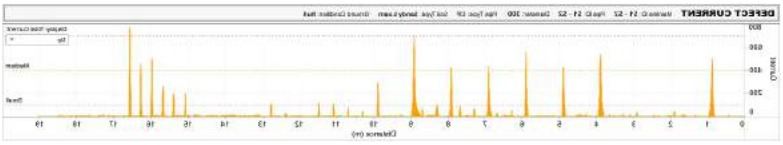


neutral independent non-profit institute
IKT - Institute for Underground Infrastructure

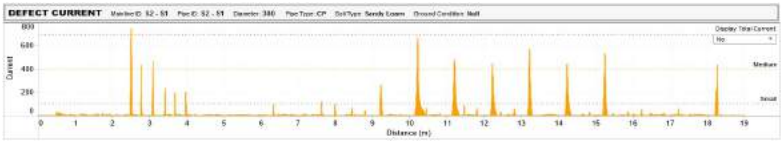
Example IKT Repeatability Testing

Scan 1
Upstream

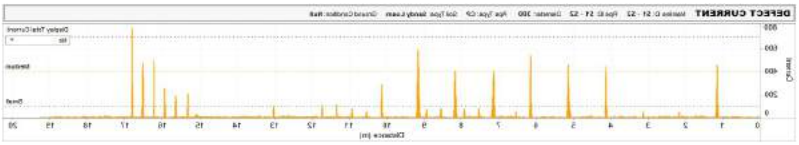
Scan 2
Downstream

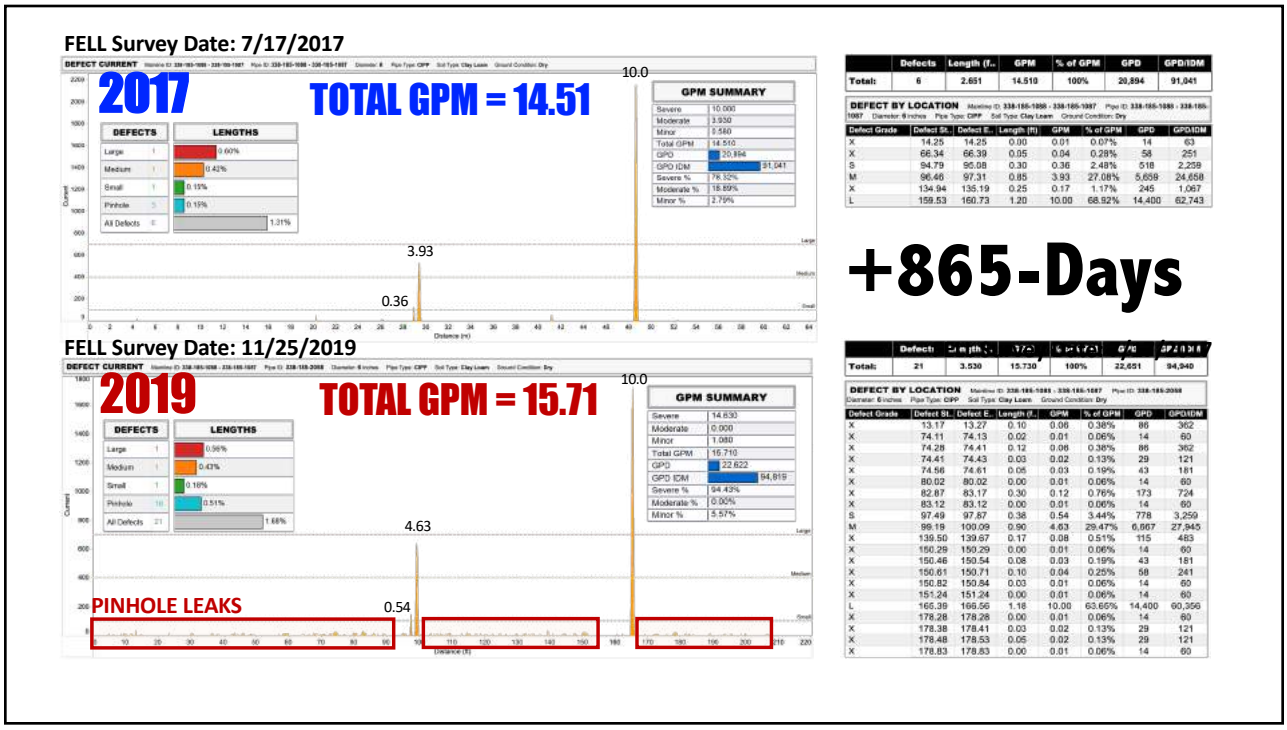


Scan 3
Upstream



Scan 4
Downstream



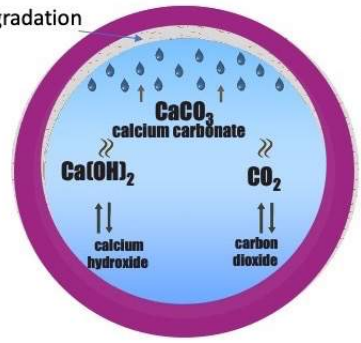

FELL Survey Date: 7/17/2017
2017
TOTAL GPM = 14.51
10.0
3.93
0.36
+865-Days
FELL Survey Date: 11/25/2019
2019
TOTAL GPM = 15.71
10.0
4.63
0.54
PINHOLE LEAKS

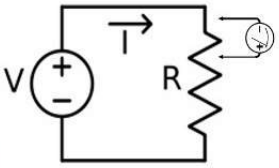

Testing Pipe Walls That May Not Leak
GOOD CIPP
BAD CIPP
0.0
6.52

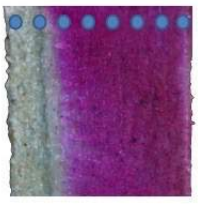
Testing Pipe Walls That May Not Leak

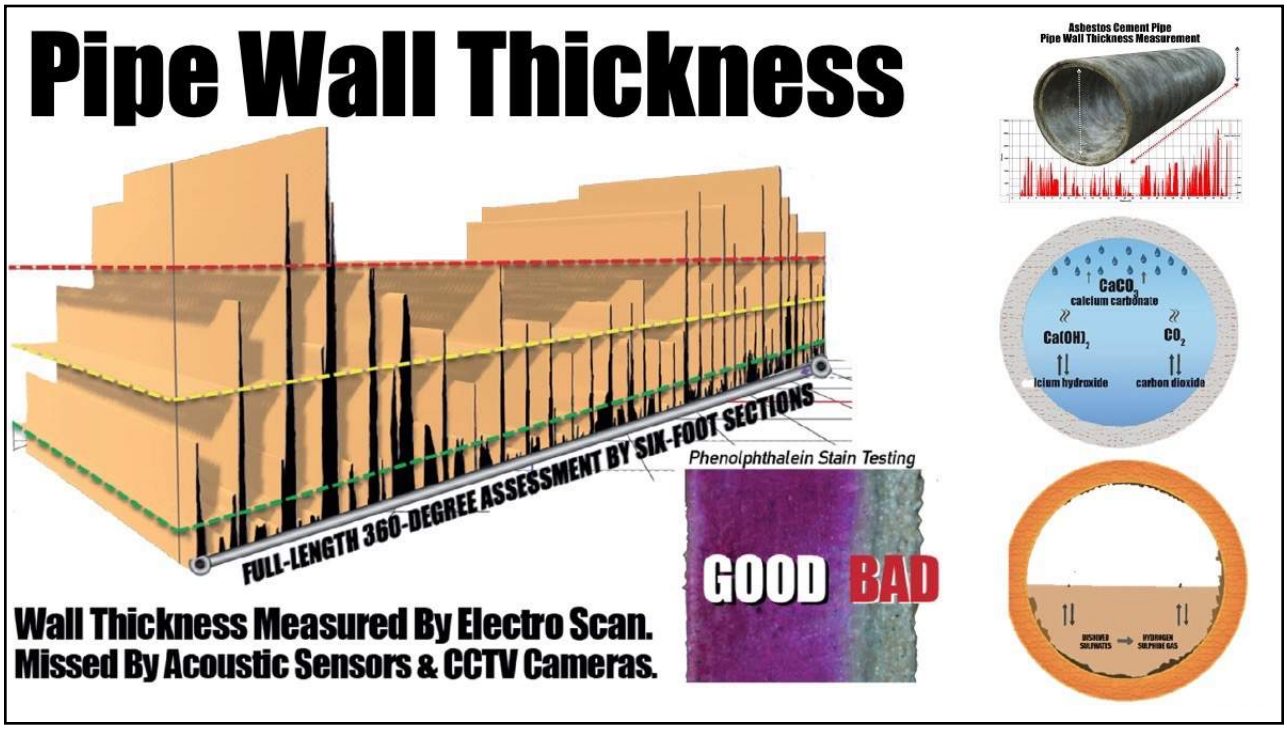
GOOD CIPP

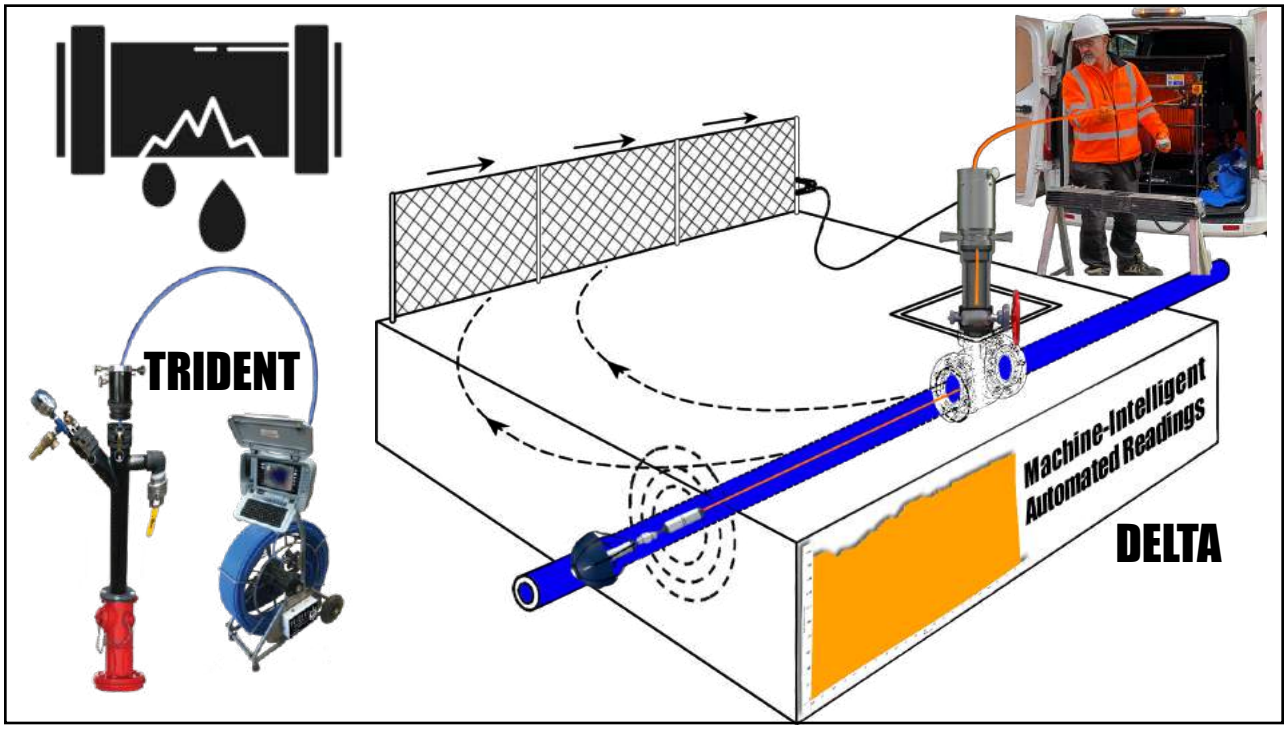
Testing Pipe Walls That May Not Leak

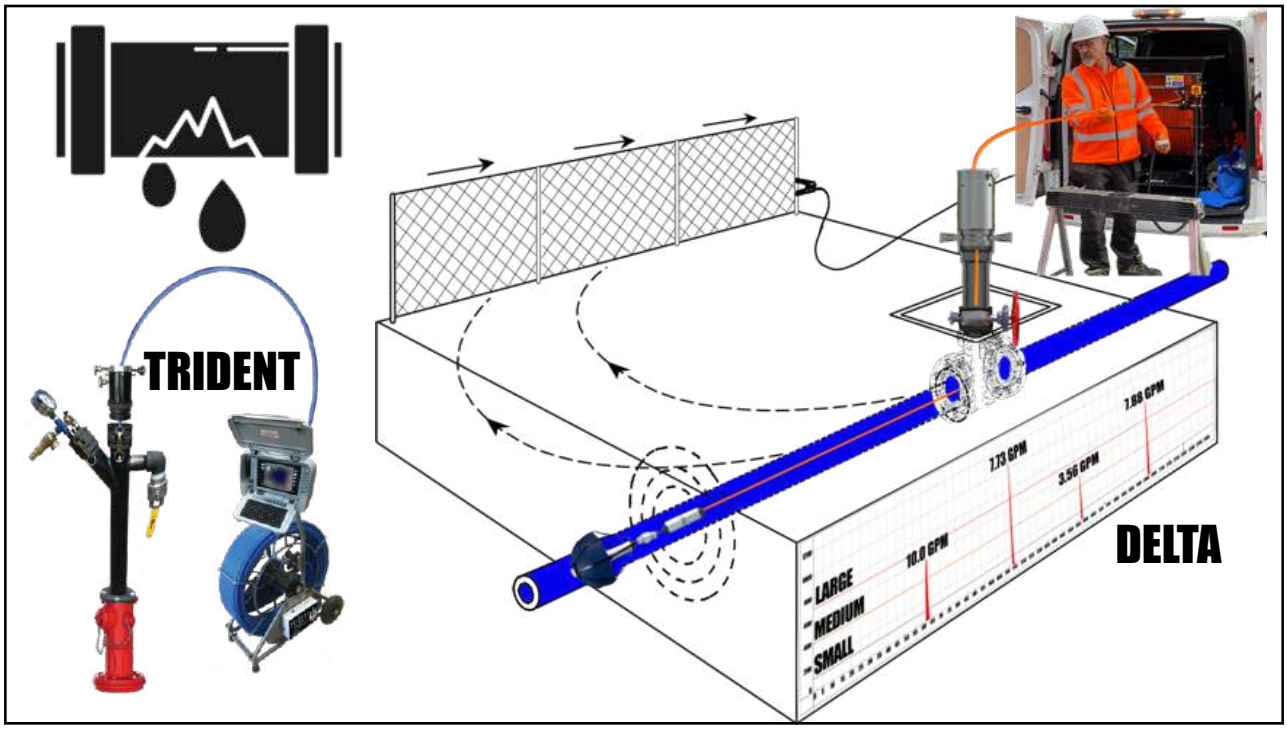




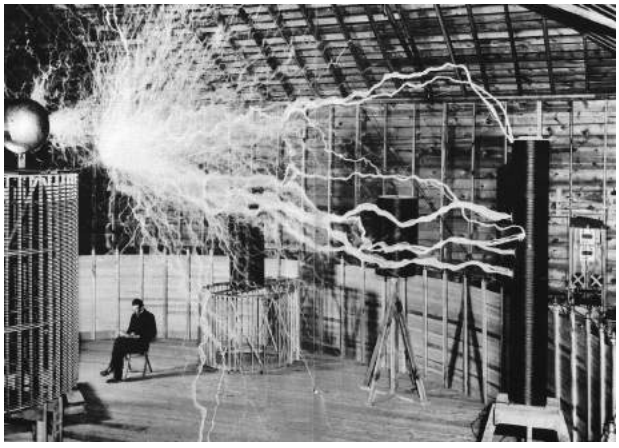


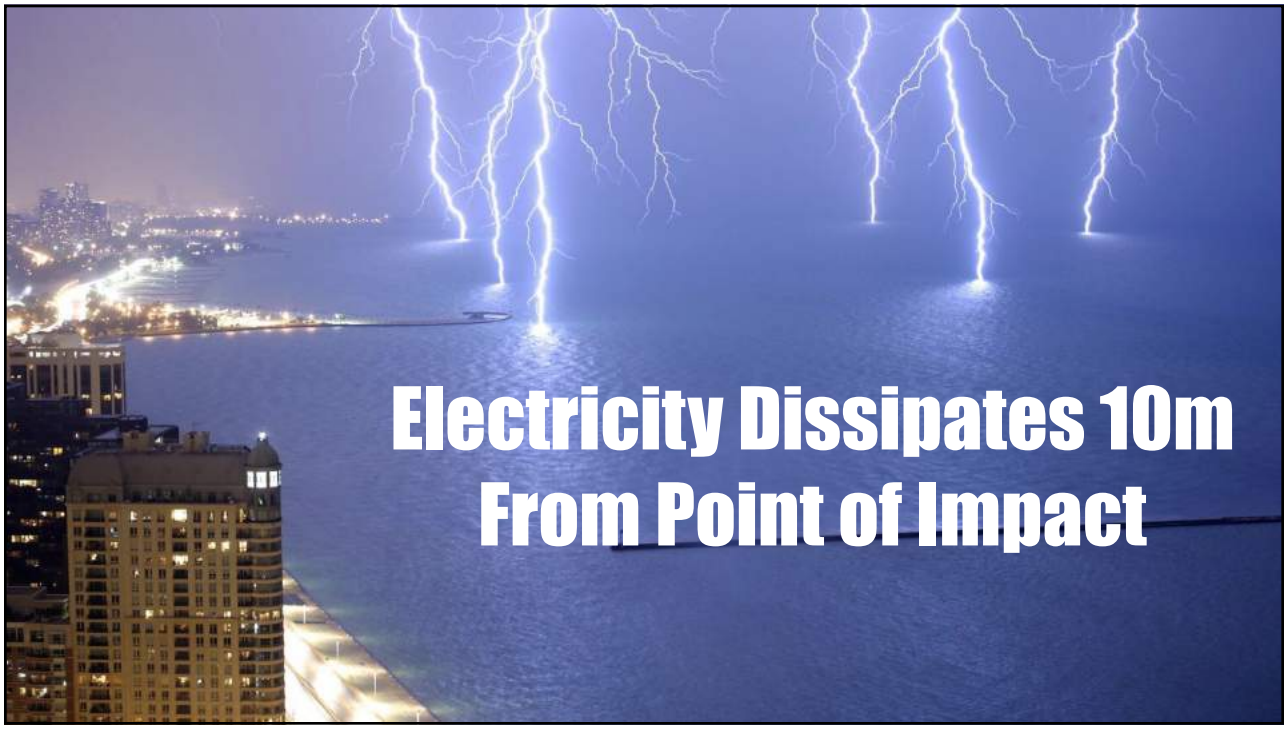

Pipe Wall Thickness
Asbestos Cement Pipe
Pipe Wall Thickness Measurement
FULL-LENGTH 360-DEGREE ASSESSMENT BY SIX-FOOT SECTIONS
Phenolphthalein Stain Testing
GOOD
BAD
Wall Thickness Measured By Electro Scan.
Missed By Acoustic Sensors & CCTV Cameras.
calcium carbonate
carbon dioxide


TRIDENT
Machine-Intelligent
Automated Readings
DELTA

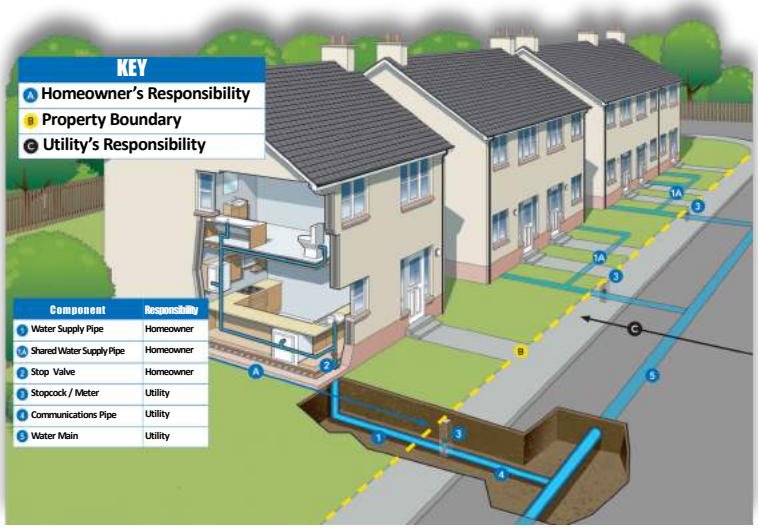

TRIDENT
DELTA
LARGE
MEDIUM
SMALL
10.0 GPM
7.73 GPM
3.56 GPM
1.88 GPM

Is It Safe?





Electro Scan 'Fully & Safely' Dissipates in Less Than 1 Meter

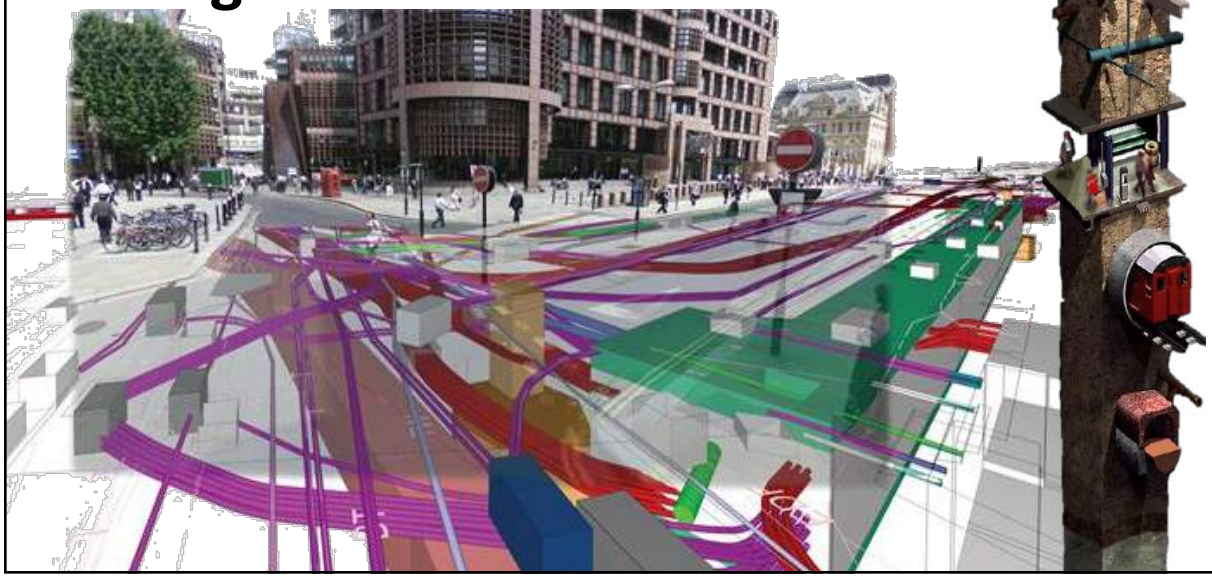


Low Voltage – 40mA

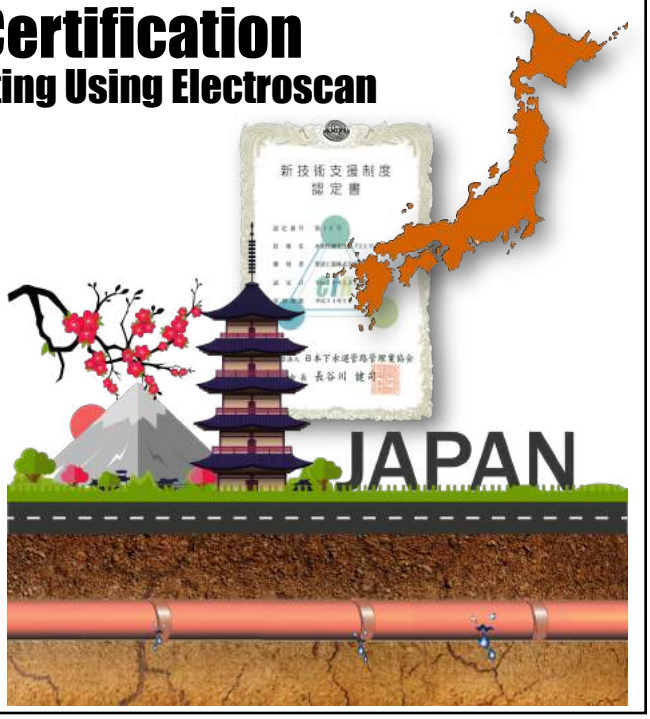
High Frequency

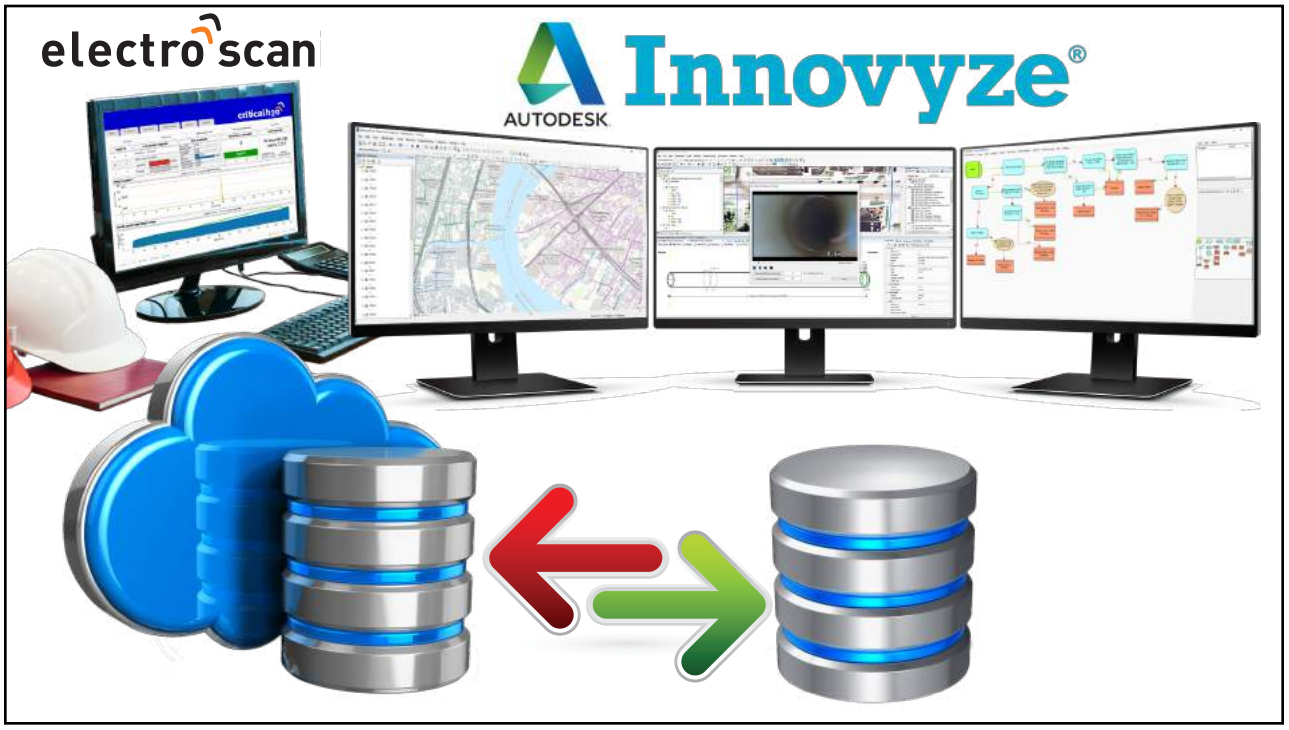
Using 24v DC, w/Probe output of 11v AC.

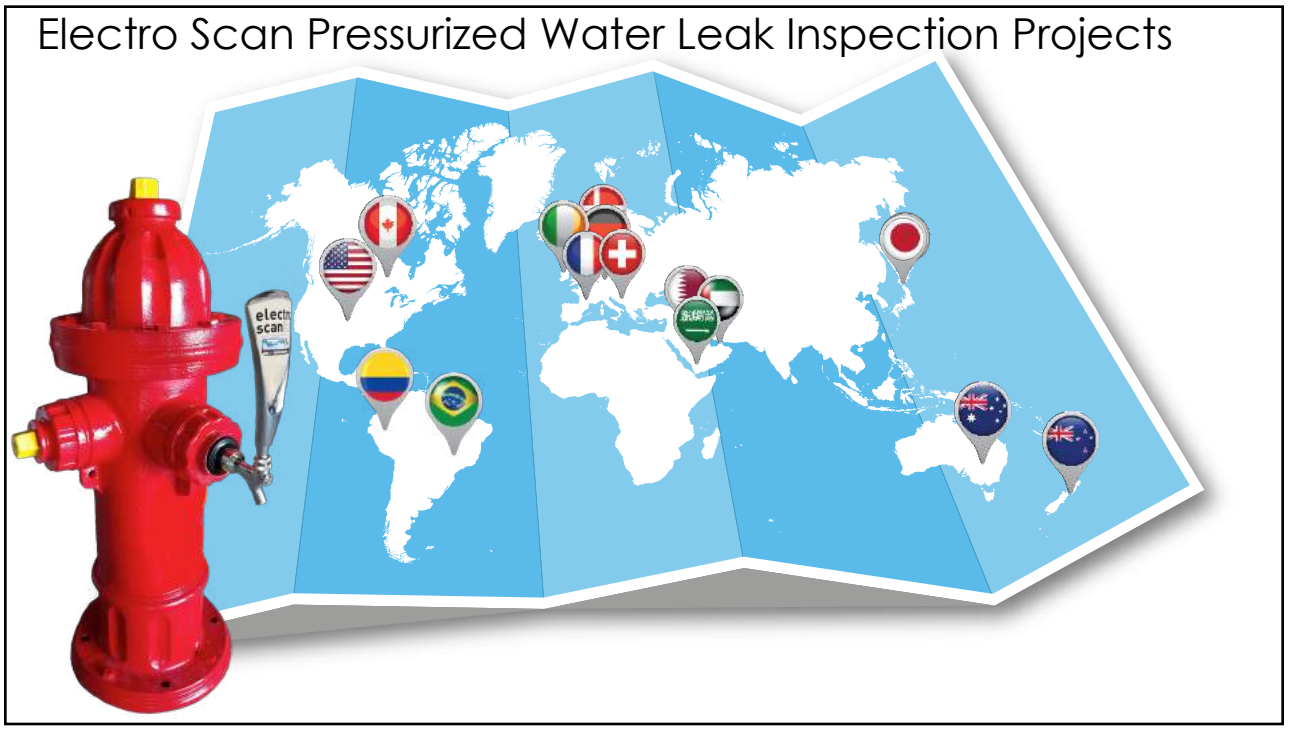
What About Interference from Underground Lines?

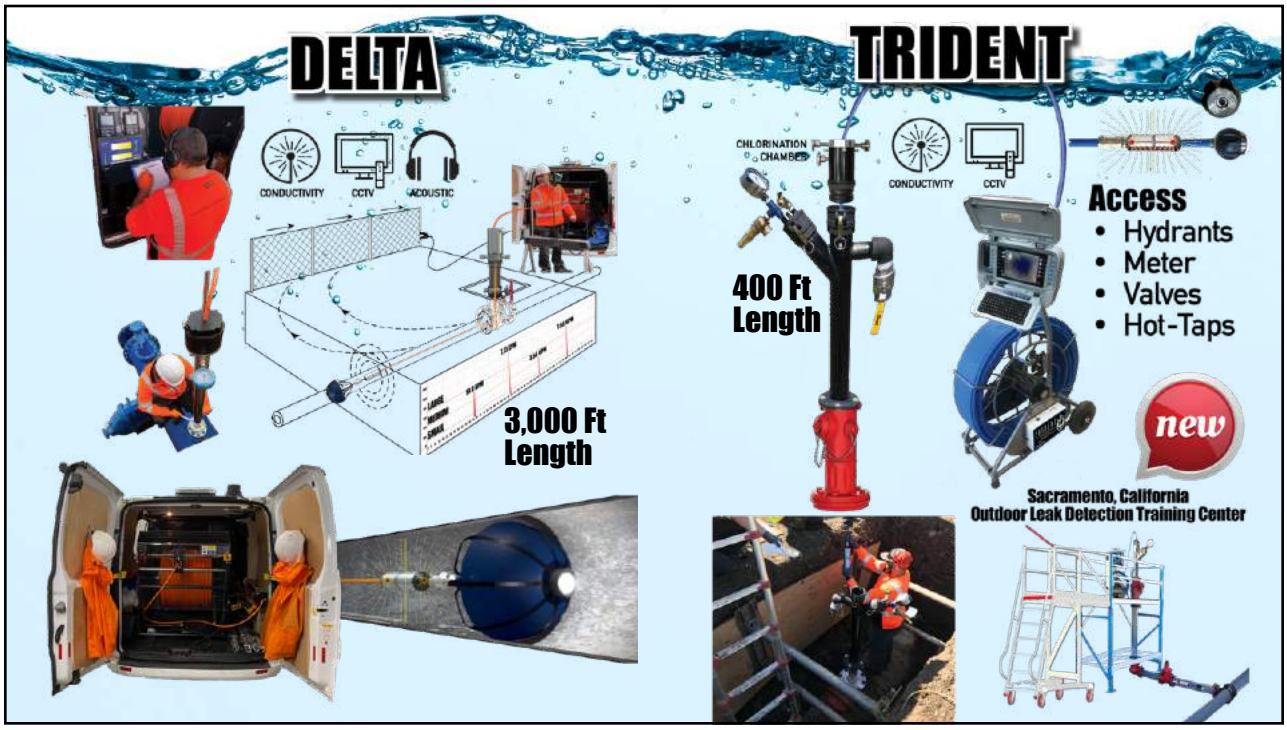


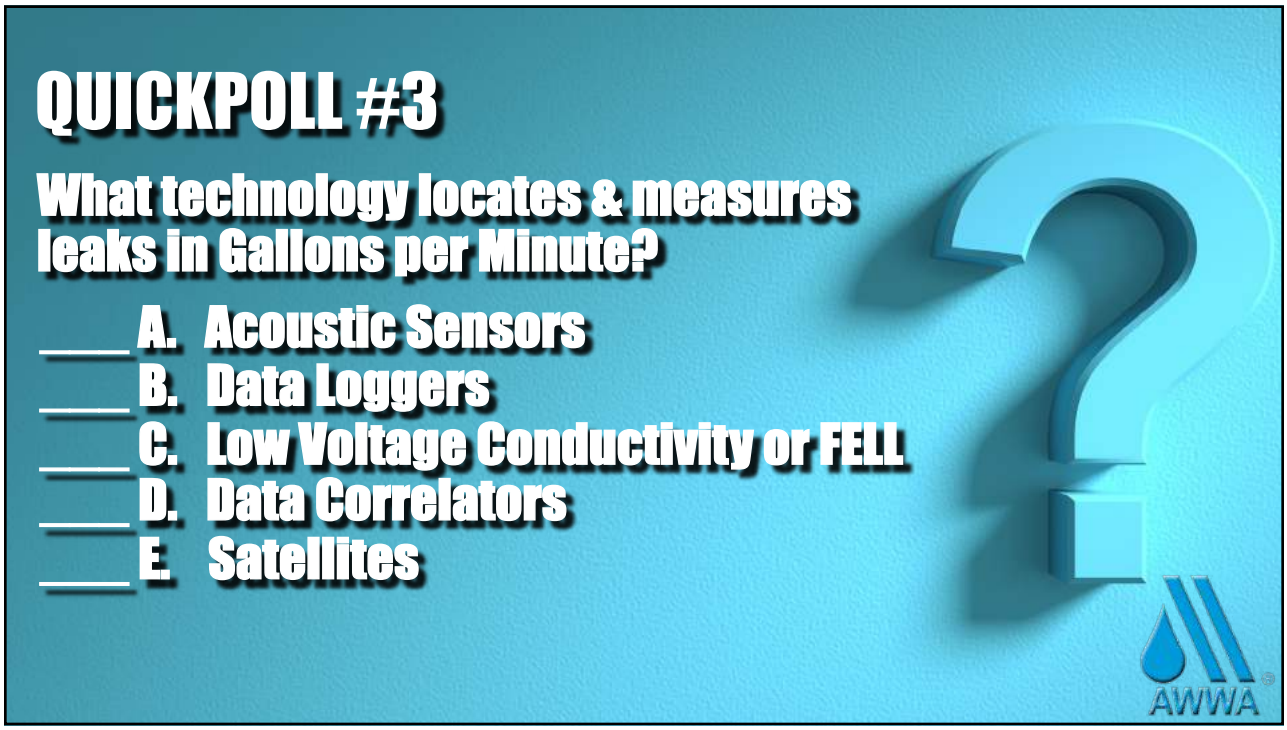
Japanese Certification
Water Tightness Testing Using Electroscan




electroscan
AUTODESK
Innovyze®

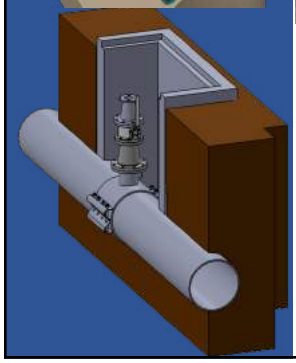

Electro Scan Pressurized Water Leak Inspection Projects


DELTA
TRIDENT
CONDUCTIVITY
CCTV
ACOUSTIC
3,000 Ft Length
CHLORINATION CHAMBER
400 Ft Length
Access
• Hydrants
• Meter
• Valves
• Hot-Taps
new
Sacramento, California
Outdoor Leak Detection Training Center


QUICKPOLL #3
What technology locates & measures leaks in Gallons per Minute?
____A. Acoustic Sensors
____B. Data Loggers
____C. Low Voltage Conductivity or FELL
____D. Data Correlators
____E. Satellites
AWWA

Part 3

Case Studies



Brad Weston
Swindon, England, UK

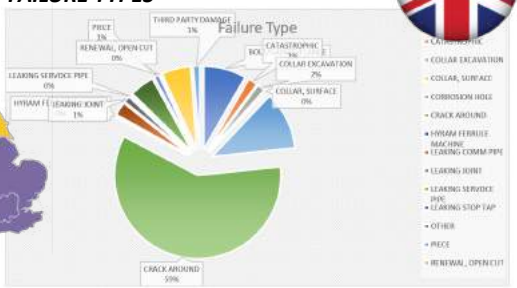
Chuck Hansen
Sacramento, CA

Water Services Agreement
Lot 5 – Clean R&M 'Innovation Market Place'

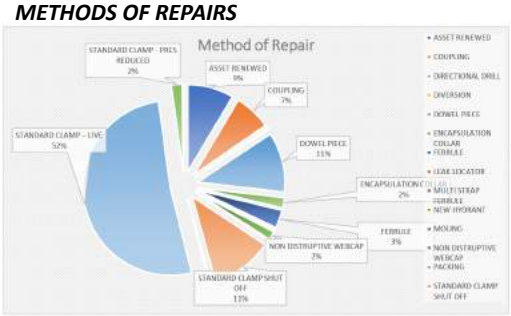
- **Value** – £500 million (US$700 million)
- **Term** – 8 years – 5 year Framework Agreement, Plus 3 Year Ext.
- **Participants** – Target 50, Max 200, FINAL 31
- **Chronology**

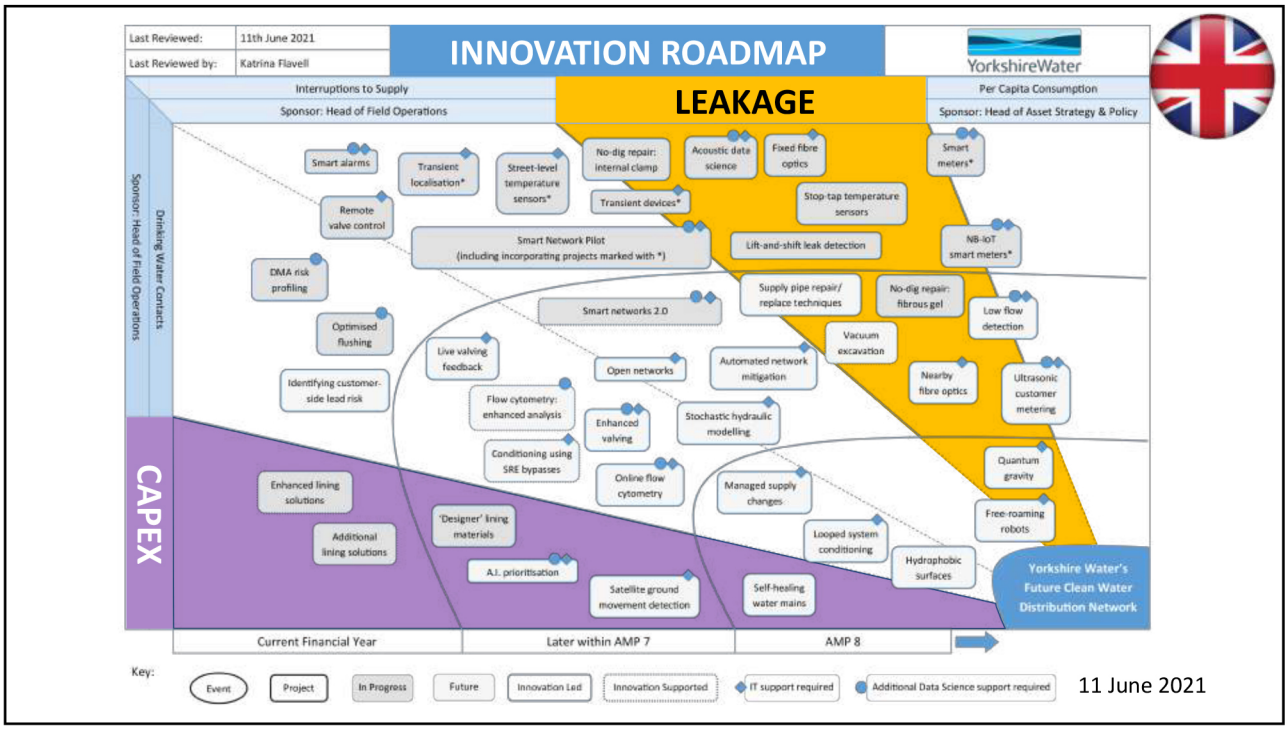
07/04/2020	'Call for Competition Stage'
10/01/2020	Live Q&A
10/16/2020	Clean Water Roadmap Publication
01/25/2021	Round 1 – Selection Letter
03/19/2021	Challenge Statement Submissions
05/10/2021	Lot 5 Framework Agreement – DRAFT
08/9/2021	Lot 5 Framework Award

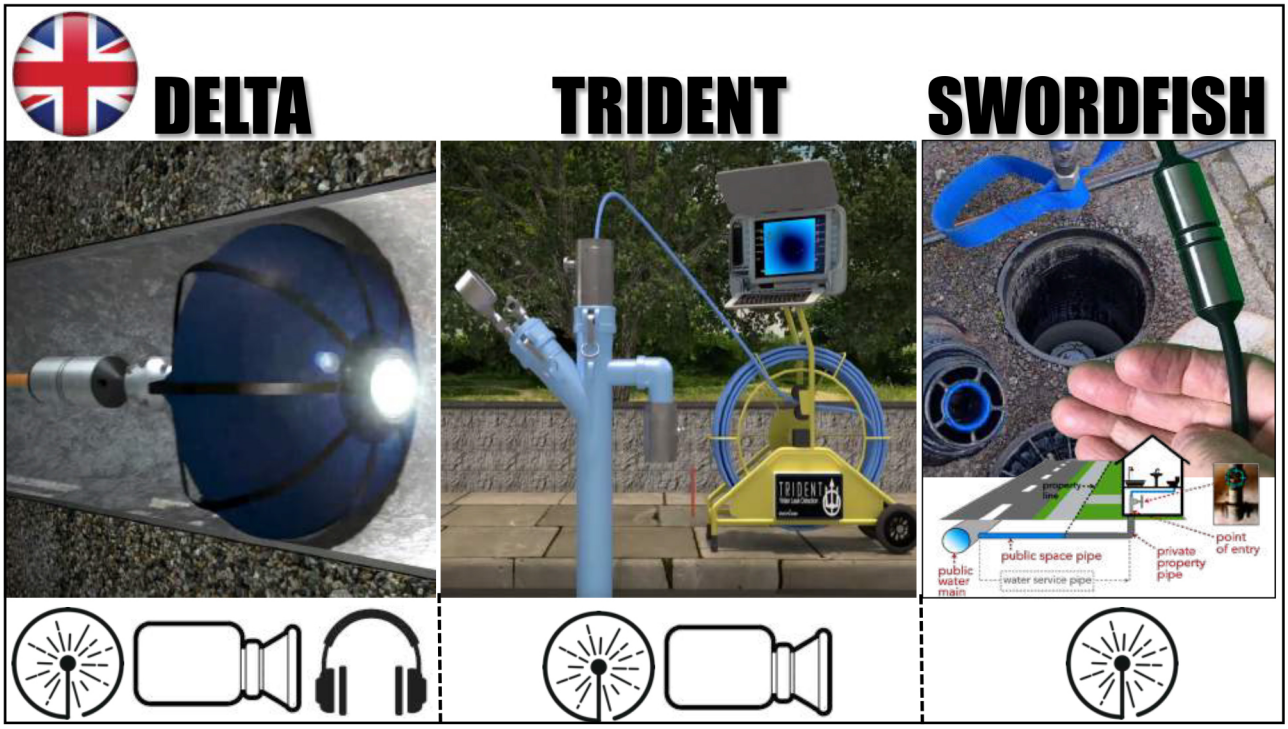
FAILURE TYPES



METHODS OF REPAIRS




Last Reviewed: 11th June 2021
Last Reviewed by: Katrina Flavell
INNOVATION ROADMAP
YorkshireWater
LEAKAGE
Interruptions to Supply
Sponsor: Head of Field Operations
Per Capita Consumption
Sponsor: Head of Asset Strategy & Policy
Drinking Water Contacts
Sponsor: Head of Field Operations
CAPEX
Smart alarms
Transient localisation*
Street-level temperature sensors*
No-dig repair: internal clamp
Acoustic data science
Fixed fibre optics
Smart meters*
Remote valve control
Transient devices*
Stop-tap temperature sensors
Smart Network Pilot (including incorporating projects marked with *)
Lift-and-shift leak detection
NB-IoT smart meters*
DMA risk profiling
Supply pipe repair/ replace techniques
No-dig repair: fibrous gel
Low flow detection
Smart networks 2.0
Optimised flushing
Vacuum excavation
Live valving feedback
Open networks
Automated network mitigation
Nearby fibre optics
Ultrasonic customer metering
Identifying customer-side lead risk
Flow cytometry: enhanced analysis
Enhanced valving
Stochastic hydraulic modelling
Conditioning using SRE bypasses
Quantum gravity
Enhanced lining solutions
Online flow cytometry
Managed supply changes
'Designer' lining materials
Free-roaming robots
Additional lining solutions
Looped system conditioning
A.I. prioritisation
Hydrophobic surfaces
Satellite ground movement detection
Self-healing water mains
Yorkshire Water's Future Clean Water Distribution Network
Current Financial Year
Later within AMP 7
AMP 8
Key:
Event
Project
In Progress
Future
Innovation Led
Innovation Supported
IT support required
Additional Data Science support required
11 June 2021


DELTA
TRIDENT
SWORDFISH
property line
point of entry
public space pipe
private property pipe
public water main
water service pipe


Trenchless Pressurized Water Main Rehabilitation
CIPP By Curing Method
1. THERMAL-CURED CIPP
3. UV-CURED CIPP
Missed By Acoustic Sensors & CCTV Cameras. Leaks Found & Measured by Electro Scan.
UV-Cured Fiberglass CIPP
2. STEAM-CURED CIPP
Defective CIPP
4. LED-CURED CIPP
And, Other Lining Materials
5. SPIRAL WOUND PIPE
6. SPRAY-IN-PLACE PIPE


UK Project Video
electro scan

DELTA

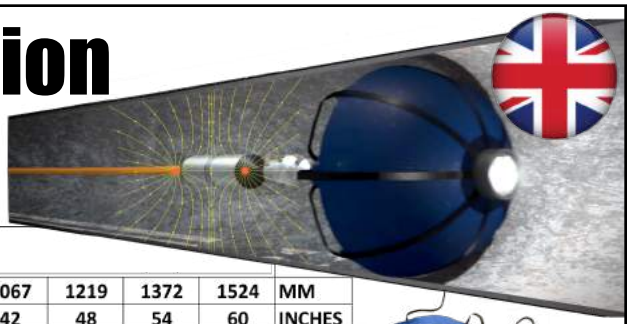
Case Study #1

561ft (171m) Pipe Length
24in (800mm) Diameter
Cement Mortar Lined Ductile Iron

1. FAILED Multiple Hydrostatic Test
2. NO LEAKS RECORDED by Previous Tests
   a. Acoustic Hydrophone
   b. Data Loggers & Helium Tracer
   c. In-Pipe Tethered Acoustic Sensors
3. PRESSURES are Erratic
4. FLOW is Turbulent
5. NOISEY Street Traffic

Hydrochute Selection

By Pipe Diameter & Flow



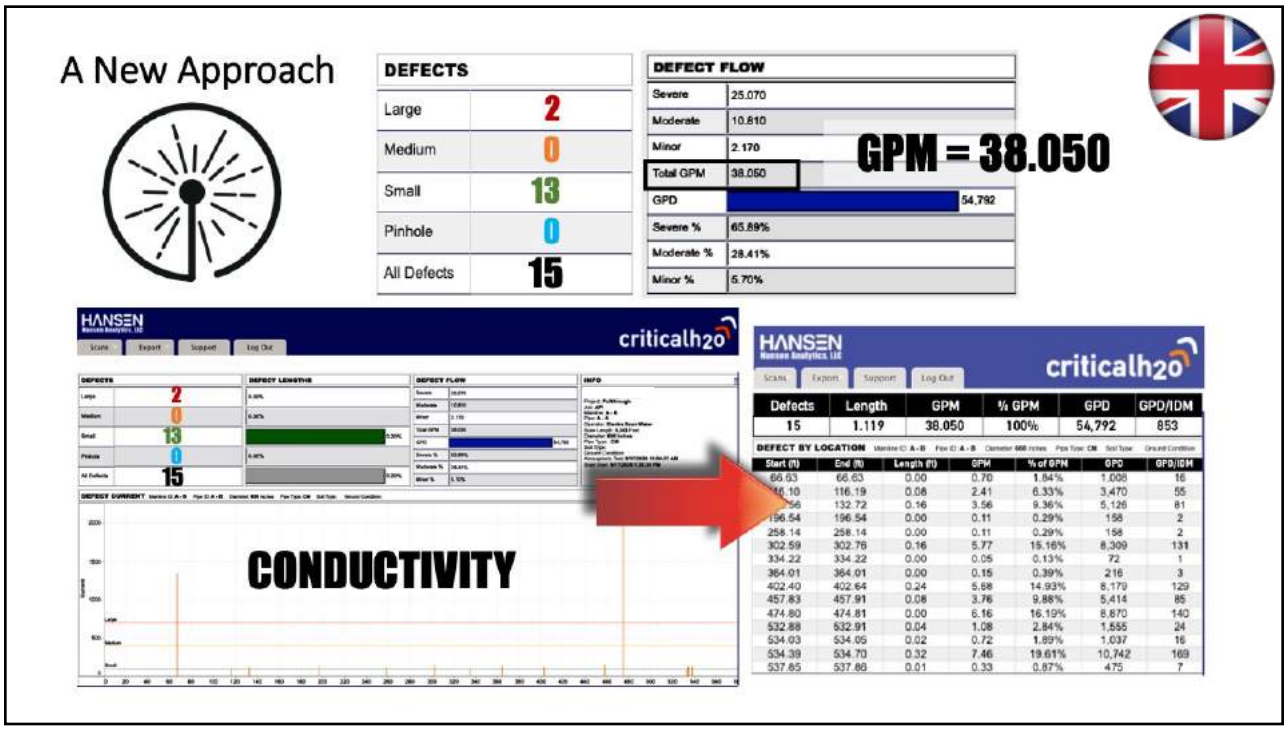
PIPE SIZES IN MM AND INCHES

FLOW M/S	305 / 12	381 / 15	457 / 18	533 / 21	610 / 24	686 / 27	762 / 30	832 / 33	914 / 36	1067 / 42	1219 / 48	1372 / 54	1524 / 60	MM / INCHES
0.1	250	300	400	500	550	600	600	700	700	700	700	700	700	
0.2	250	300	400	500	550	600	600	600	700	700	700	700	700	
0.3	250	300	400	450	500	600	600	600	600	600	700	700	700	
0.4	250	300	400	450	500	550	600	600	600	600	700	700	700	
0.5	250	300	400	400	450	500	550	550	600	600	600	700	700	
0.6	200	300	350	400	450	450	500	500	550	550	600	600	600	
0.7	200	250	300	400	400	450	450	450	500	500	550	550	600	
0.8	200	250	300	400	400	400	400	400	450	450	500	500	550	
0.9	200	200	300	300	300	300	400	400	400	400	450	450	450	
1	200	200	250	250	300	300	350	350	400	400	400	400	400	
>1	100	200	250	250	250	250	300/50	300/50	300/50	300/50	300/50	300/50	300/50	
>1.5	100	200	200	200	200	200	200	200	200	200	200	200	200	

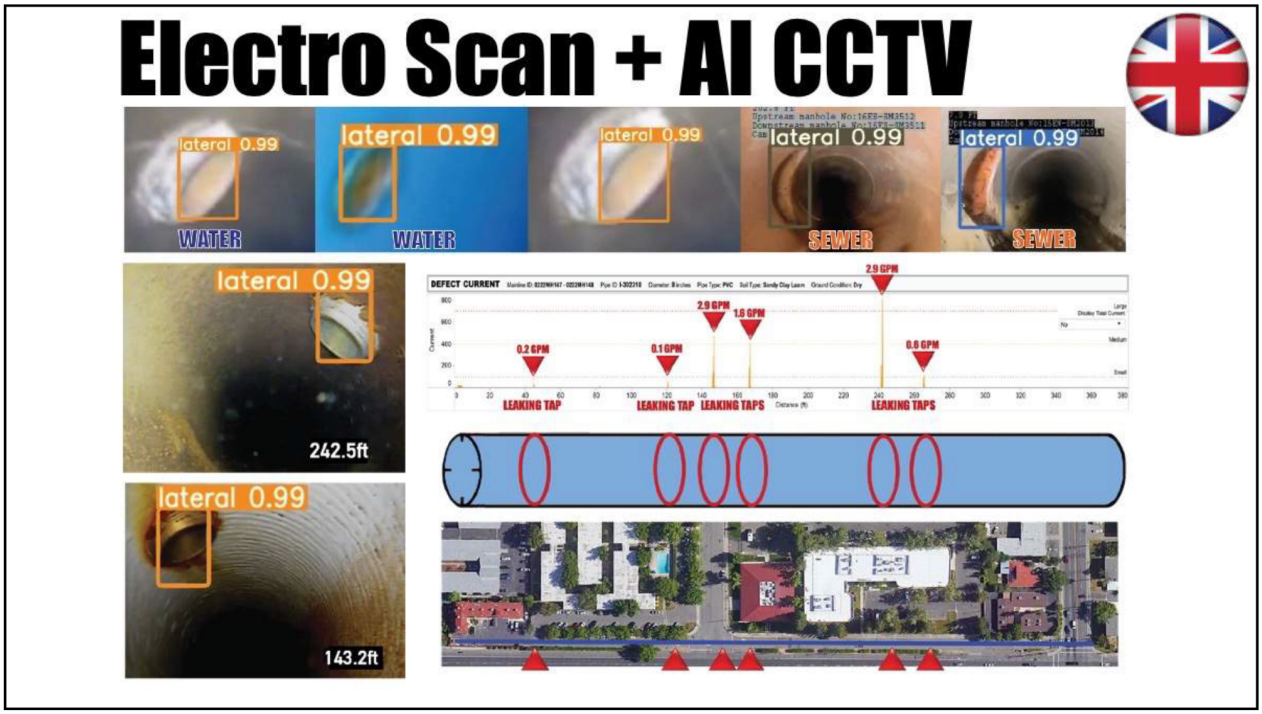

144.722

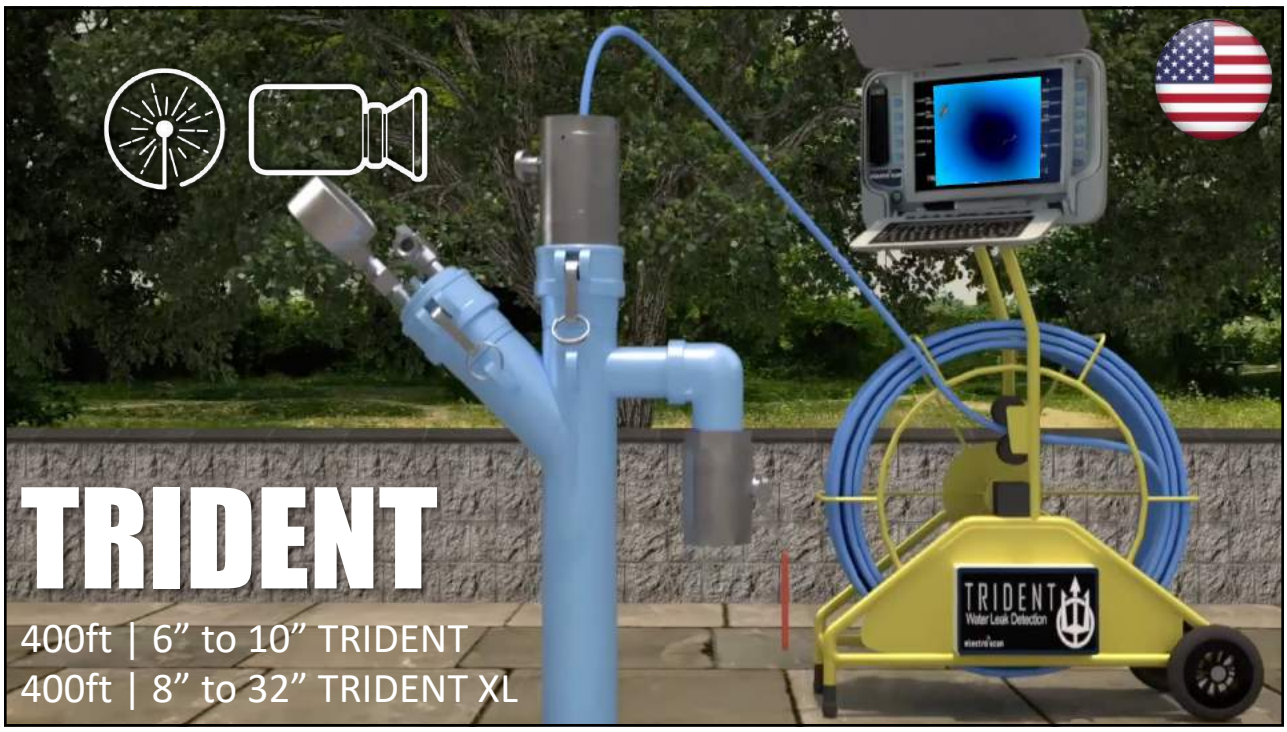

amazon
web services
criticalh2o
+ a b | e a u
T4S
10
Minutes
or Less
electro scan
(uk) limited


BAD NEWS
Acoustic Found No Leaks.
ALL FALSE-POSITIVES.
HANSEN
criticalh2o
Scans
Upload
Edit
Export
Support
Log Out


A New Approach
DEFECTS
Large 2
Medium 0
Small 13
Pinhole 0
All Defects 15
DEFECT FLOW
Severe 25.070
Moderate 10.810
Minor 2.170
Total GPM 38.050
GPD 54,792
Severe % 65.89%
Moderate % 28.41%
Minor % 5.70%
GPM = 38.050
HANSEN
criticalh2o
CONDUCTIVITY
Defects 15
Length 1.119
GPM 38.050
% GPM 100%
GPD 54,792
GPD/IDM 853
DEFECT BY LOCATION

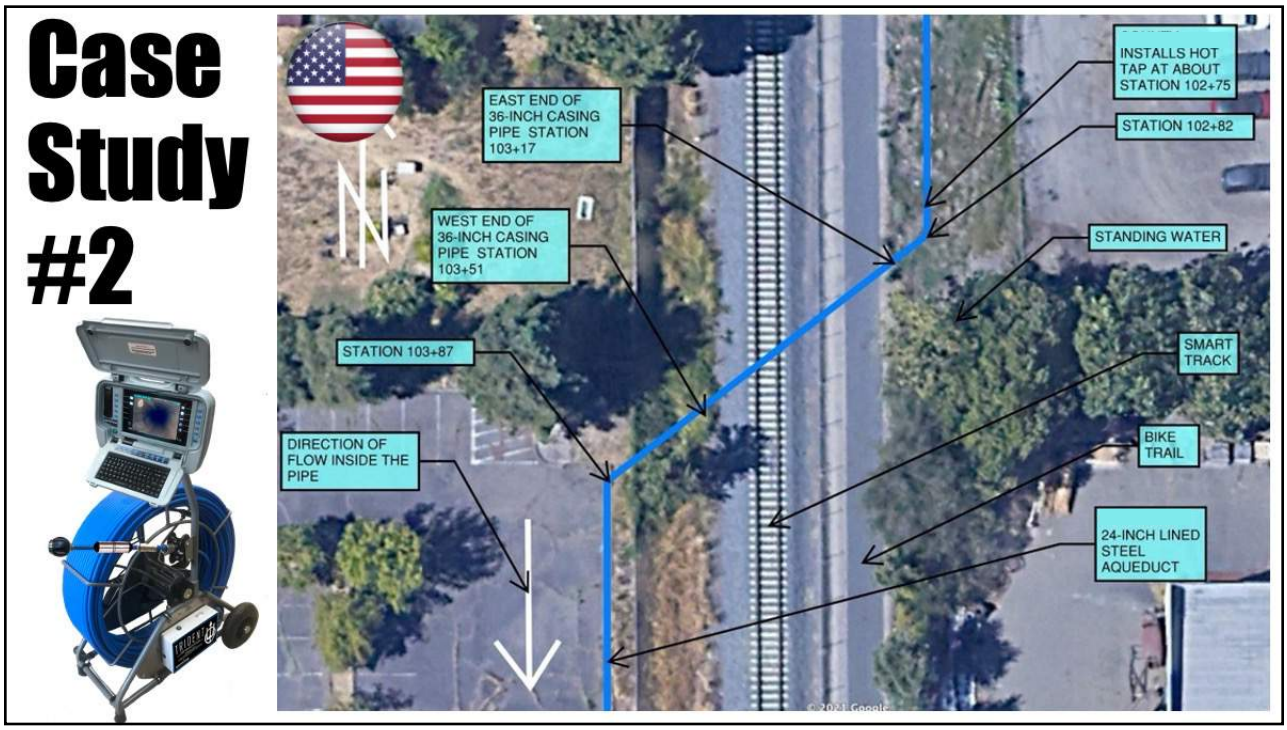

MORE
GOOD NEWS
HANSEN
criticalh2o
Scans
Upload
Edit
Export
Support
Log Out
10.2m

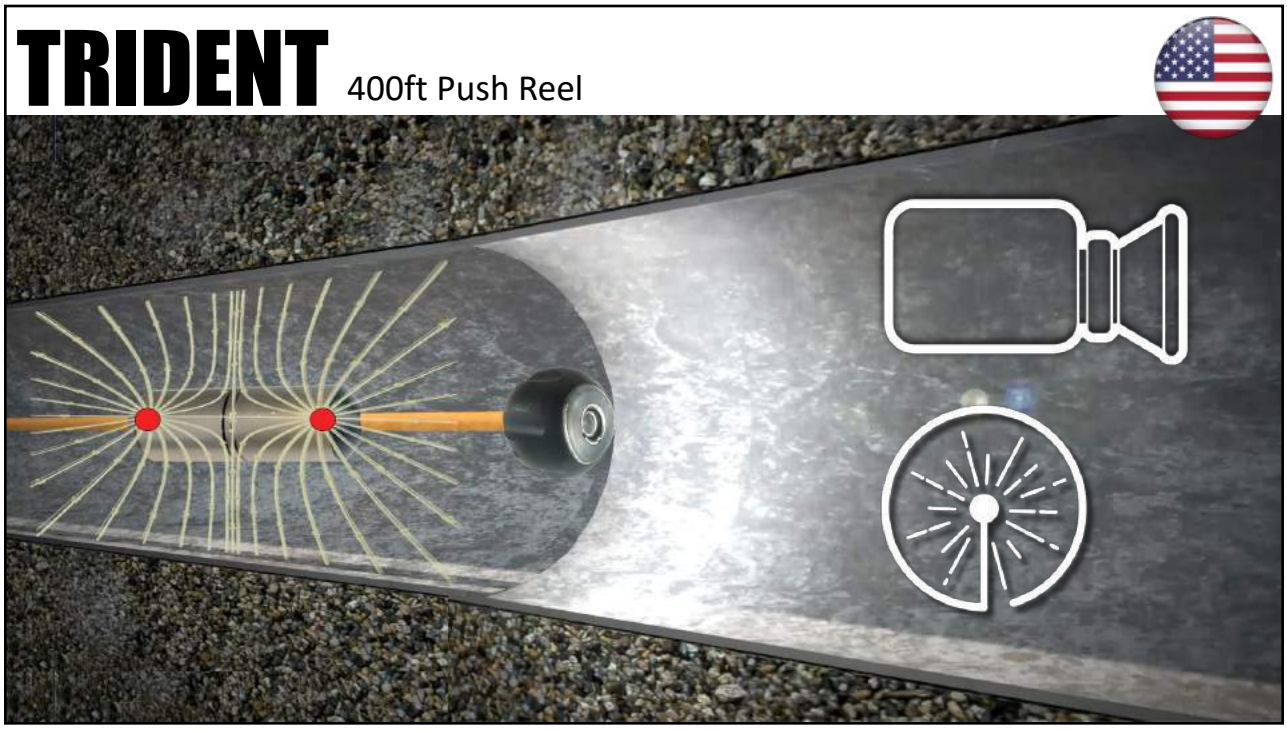

Electro Scan + AI CCTV
lateral 0.99
WATER
lateral 0.99
WATER
lateral 0.99
lateral 0.99
SEWER
lateral 0.99
SEWER
lateral 0.99
242.5ft
lateral 0.99
143.2ft
DEFECT CURRENT
0.2 GPM
0.1 GPM
2.9 GPM
1.6 GPM
2.9 GPM
0.6 GPM
LEAKING TAP
LEAKING TAP
LEAKING TAPS
LEAKING TAPS

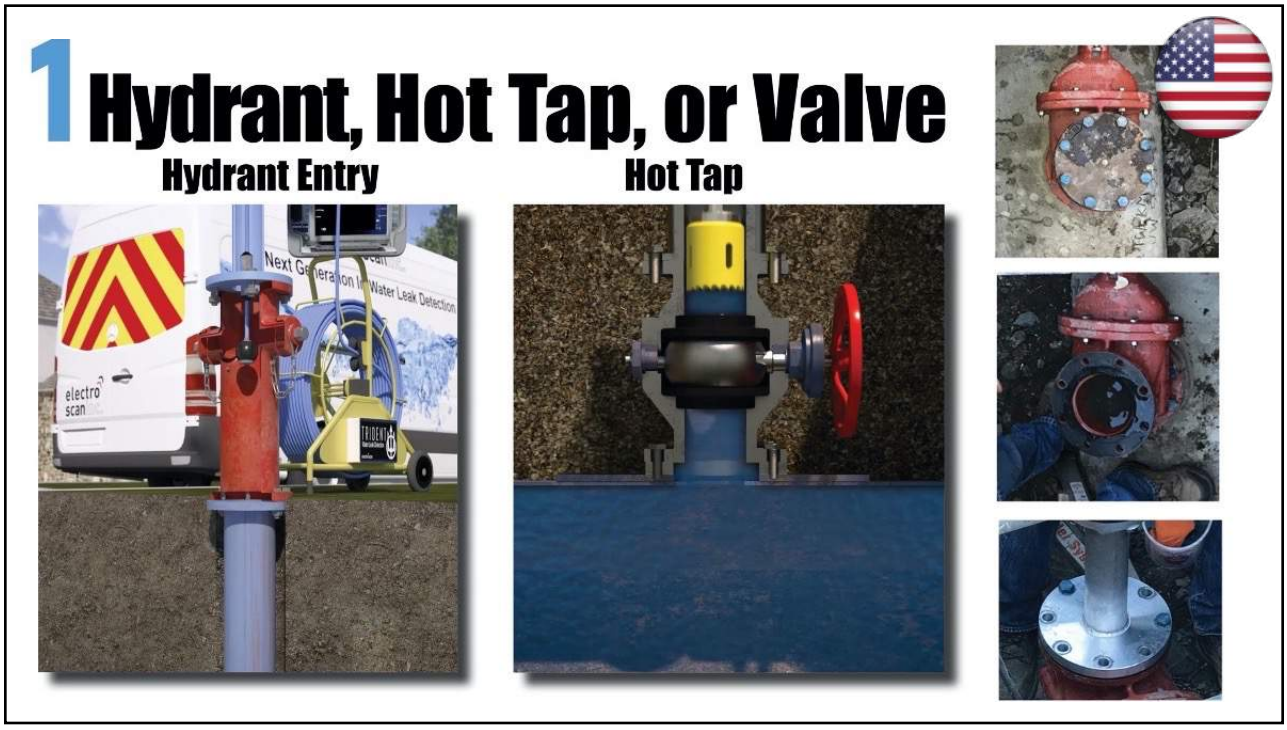

TRIDENT
400ft | 6" to 10" TRIDENT
400ft | 8" to 32" TRIDENT XL
TRIDENT
Water Leak Detection

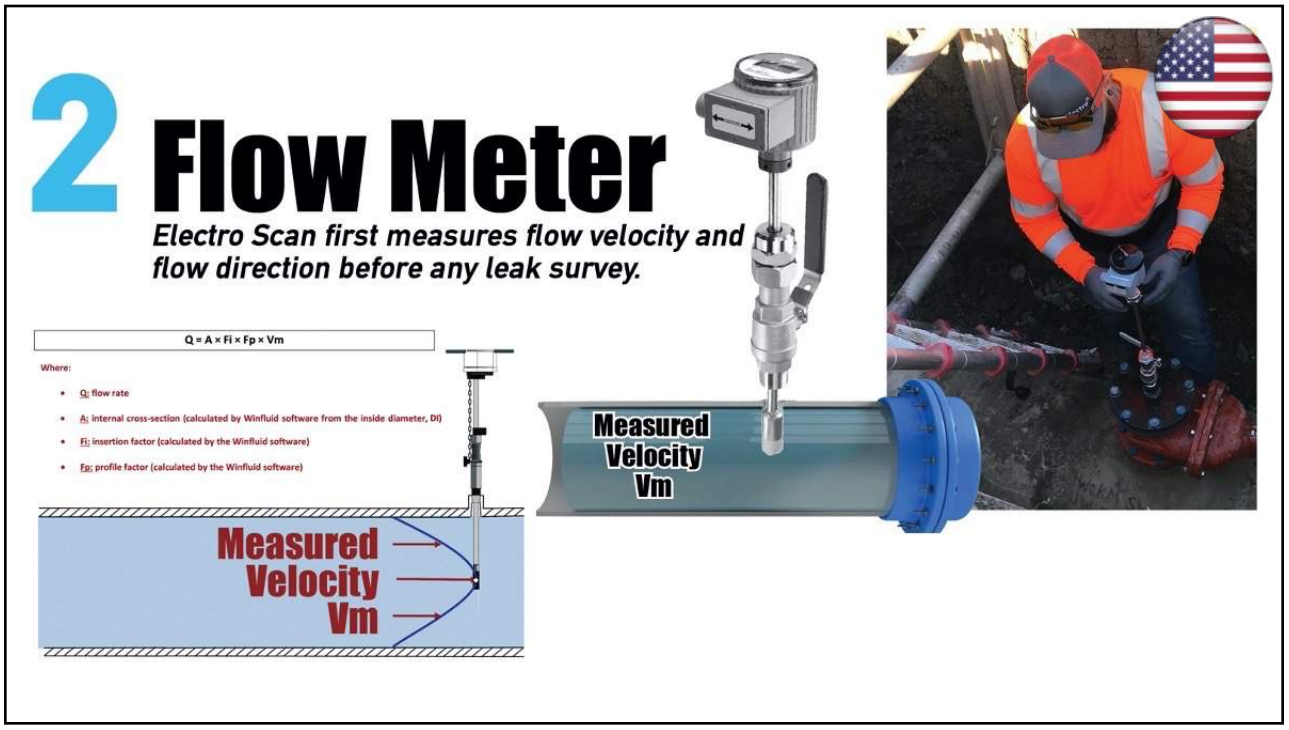

electro
scan
Water Leak Detection
electro scan


Water Leak


Case Study #2
EAST END OF 36-INCH CASING PIPE STATION 103+17
WEST END OF 36-INCH CASING PIPE STATION 103+51
STATION 103+87
DIRECTION OF FLOW INSIDE THE PIPE
INSTALLS HOT TAP AT ABOUT STATION 102+75
STATION 102+82
STANDING WATER
SMART TRACK
BIKE TRAIL
24-INCH LINED STEEL AQUEDUCT

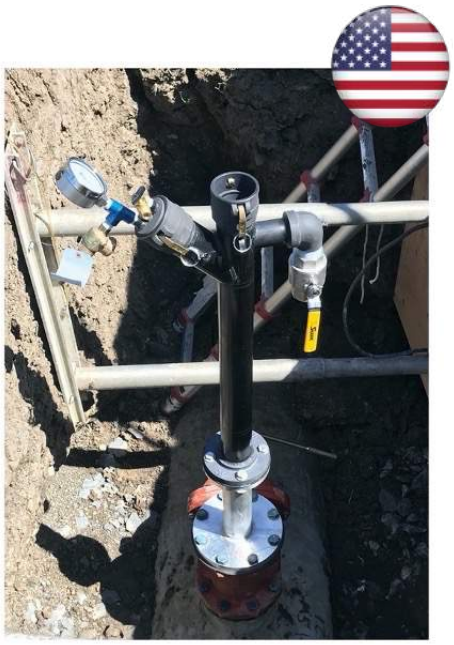

TRIDENT
400ft Push Reel


1 Hydrant, Hot Tap, or Valve
Hydrant Entry
Hot Tap


2
Flow Meter
Electro Scan first measures flow velocity and flow direction before any leak survey.
Q = A × Fi × Fp × Vm
Where:
Q: flow rate
A: internal cross-section (calculated by Winfluid software from the inside diameter, DI)
Fi: insertion factor (calculated by the Winfluid software)
Fp: profile factor (calculated by the Winfluid software)
Measured Velocity Vm
Measured Velocity Vm

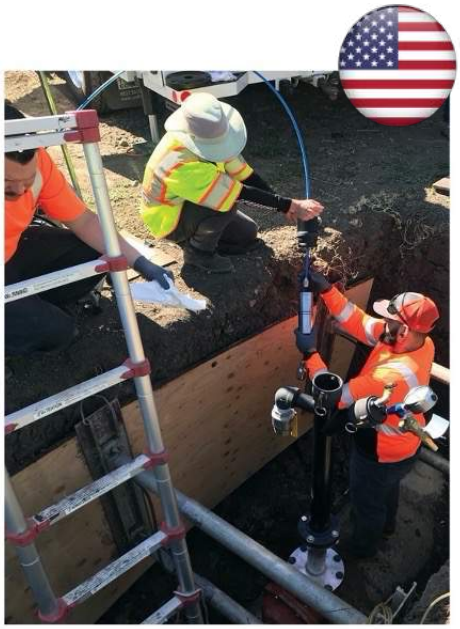

3
Chlorination & Cleaning

4 Insertion Tube



5 Probe Launch

After a final pre-insertion cleaning, the Electro Scan probe is lowered into the insertion tube with the pipe re-pressurized.



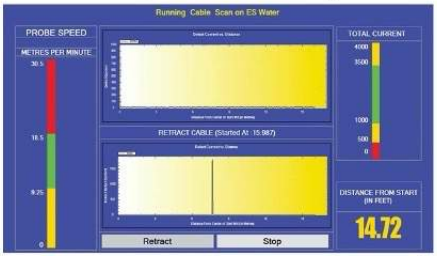
6 Push Reel

Utilizing a two-person team, Electro Scan's Trident is spooled off the reel and then pushed through the insertion tube for initial deployment.

7 Data & Video Capture

Utilizing a two-person team, Electro Scan's TRIDENT is carefully 'spooled' into its insertion tube, then 'pushed' through the insertion tube for full pipe length deployment. Representing a breakthrough, data acquisition and video do not require operator interpretation.

X-Marks The Spot

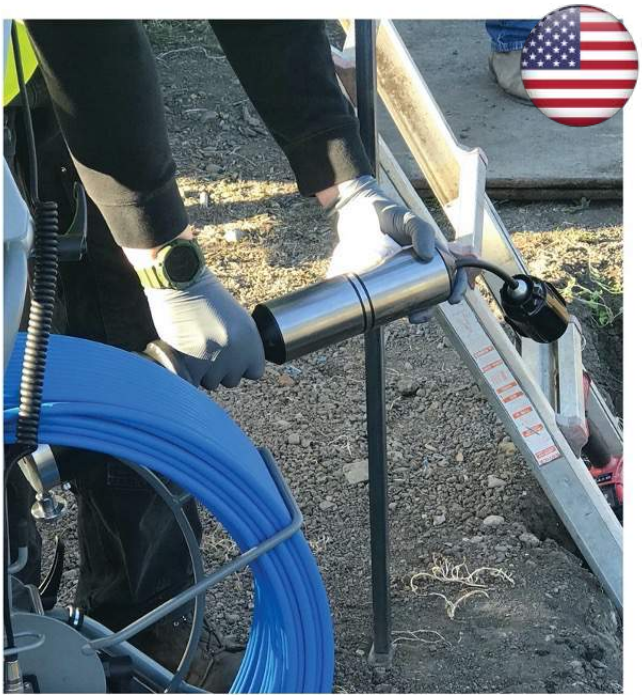



8 CCTV Push Forward Direction
11:31:56 05-19-2021 0.0ft
11:11:36 05-19-2021 9.0ft
11:16:03 05-19-2021 49.3ft
11:17:57 05-19-2021 51.5ft
11:25:13 05-19-2021 93.3ft
11:27:52 05-19-2021


9 Electro Scan Pull Back Direction
Once a maximum distance is achieved (up to 400ft or 120m), then the operator begins recording Electro Scan data as the probe is pulled back through the pipe.
Gallons Per Minute
Electro Scan Readings Are Recorded During Pull Back or Retrieval.

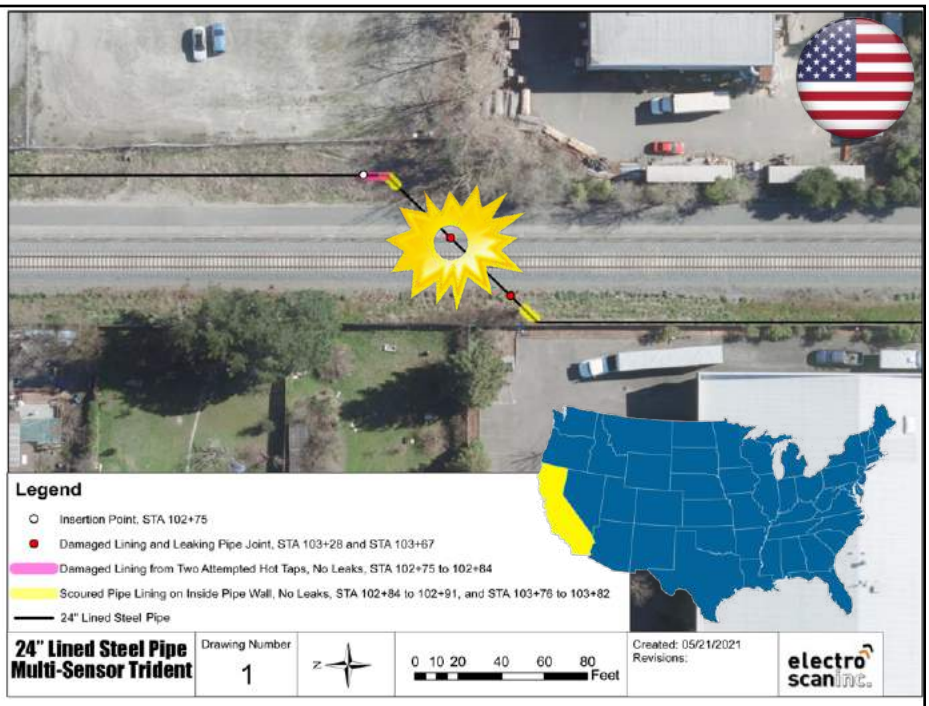
10 Probe Retrieval

After the probe has exited the water main, while still in the insertion tube, the gate valve may may be closed to allow for the probe to be fully retrieved from the pipe.

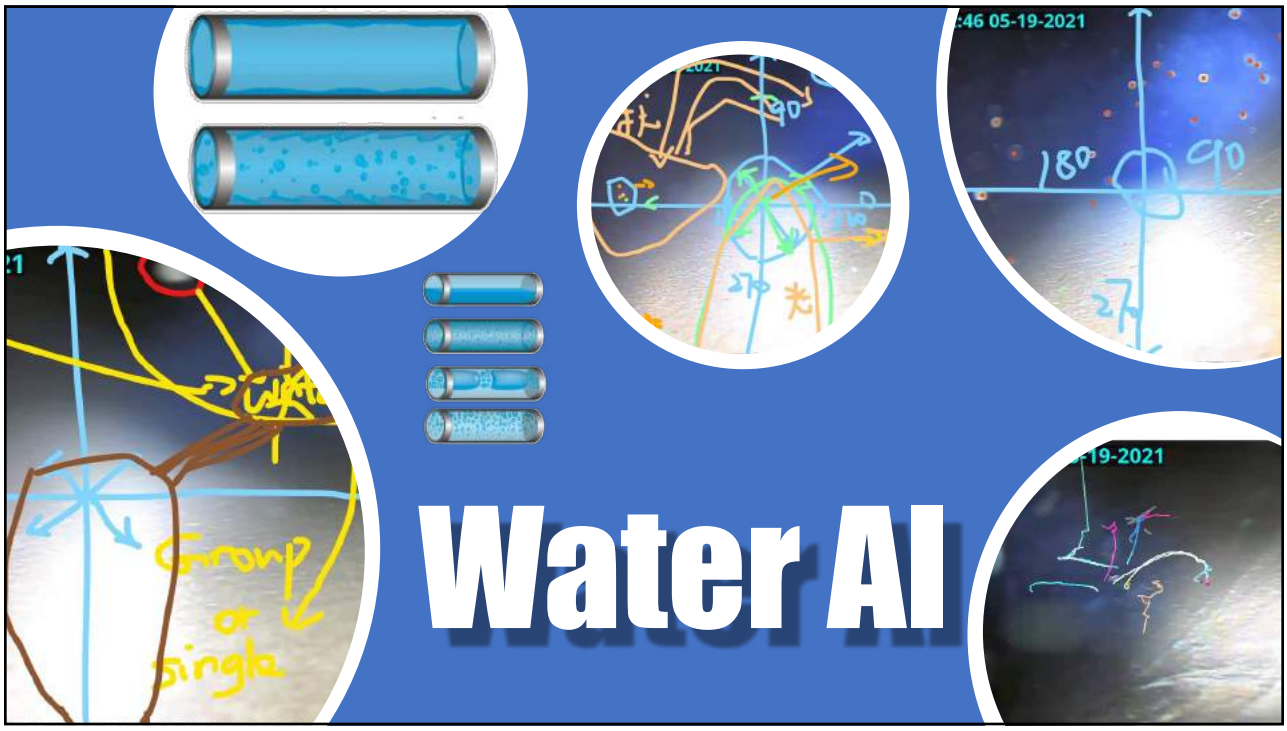


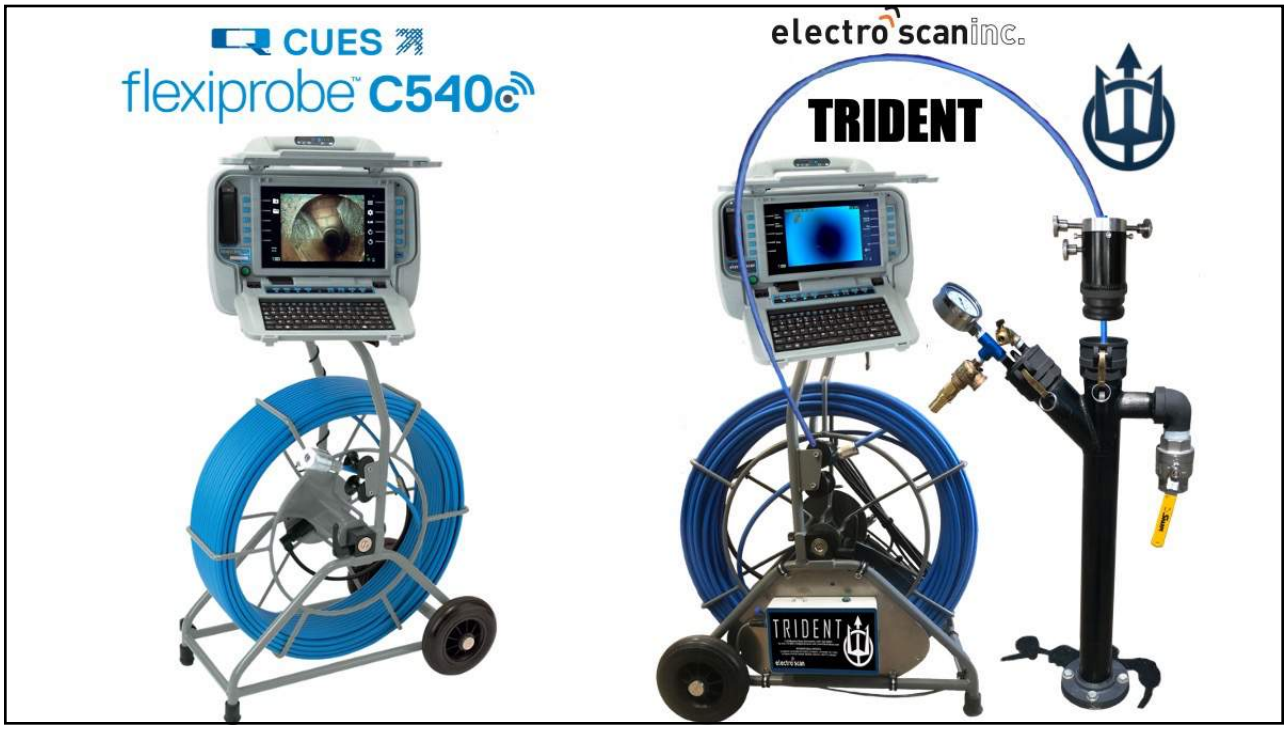
24"Lined Steel Pipe

4-Year Old Life-to-Date Leak 20 Million Gallons




14:34:23 05-19-2021
93.0ft


Water AI

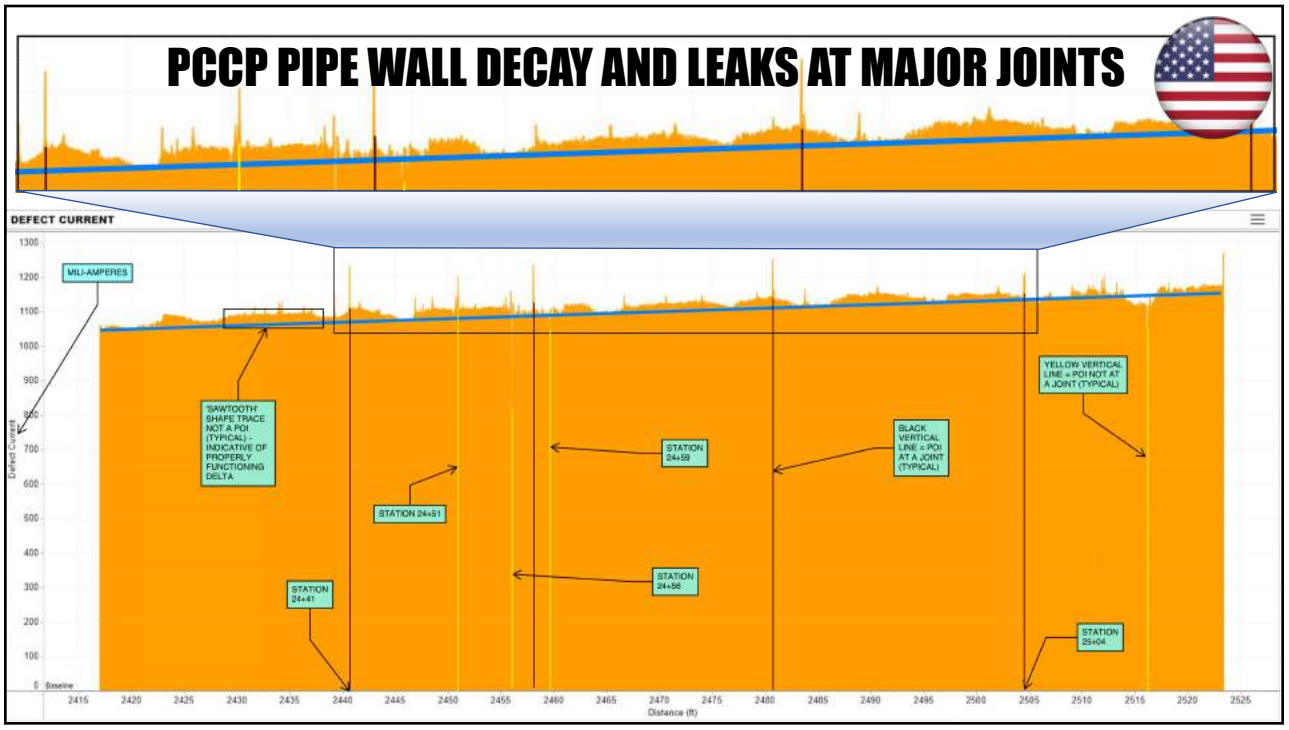


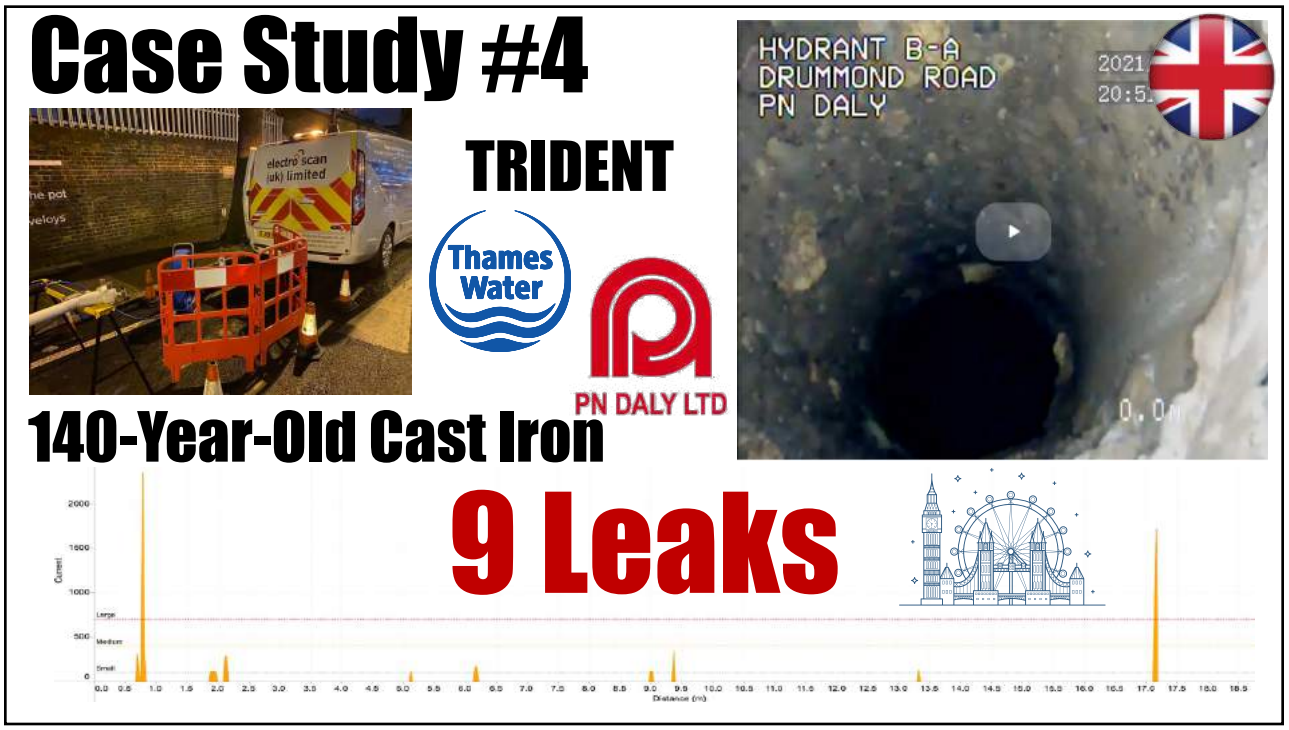
Case Study #3

36" Diameter
PCCP
4,000ft


12 O'Clock Entry
NEXT GENERATION IN WATER LEAK DETECTION
electro scan inc.


3 O'Clock Entry


PCCP PIPE WALL DECAY AND LEAKS AT MAJOR JOINTS
DEFECT CURRENT
MILI-AMPERES
SAWTOOTH SHAPE TRACE NOT A POI (TYPICAL) - INDICATIVE OF PROPERLY FUNCTIONING DELTA
STATION 24+41
STATION 24+51
STATION 24+59
STATION 24+58
BLACK VERTICAL LINE = POI AT A JOINT (TYPICAL)
YELLOW VERTICAL LINE = POI NOT AT A JOINT (TYPICAL)
STATION 25+04
Distance (ft)


Case Study #4
TRIDENT
Thames Water
PN DALY LTD
HYDRANT B-A
DRUMMOND ROAD
PN DALY
140-Year-Old Cast Iron
9 Leaks
Distance (m)

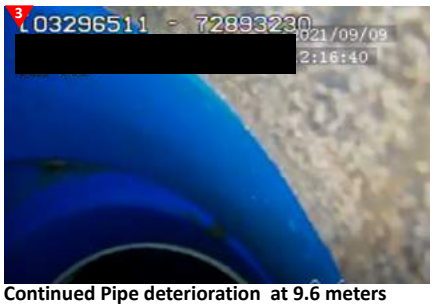
Case Study #5

Major Offset Pipe at 5.7 meters

Soil Exposed at 5.7 meters

Leaking Point Repair at 9.4 meters

Exposed pipe at 9.4 meters. Failed point repair.



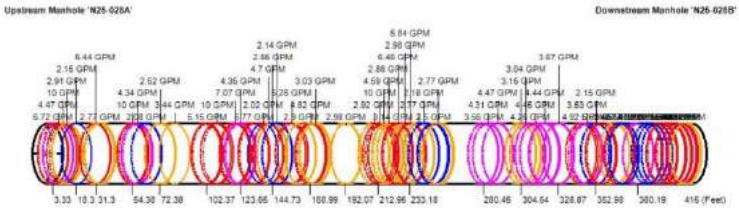
Continued Pipe deterioration at 9.6 meters

Leaking Offset Joint past point repair at 9m.

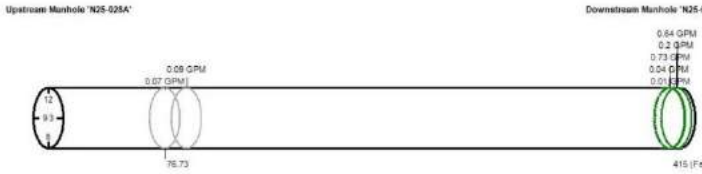
Litmus Test of Smart Leak Detection

Quantifying Rehabilitation Effectiveness

BEFORE REHAB



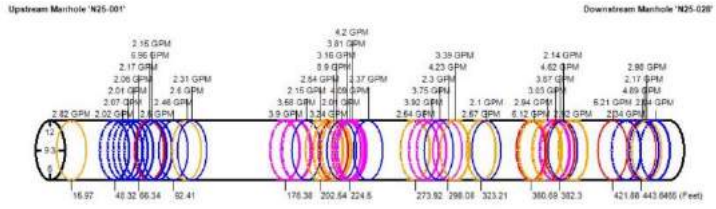
AFTER REHAB



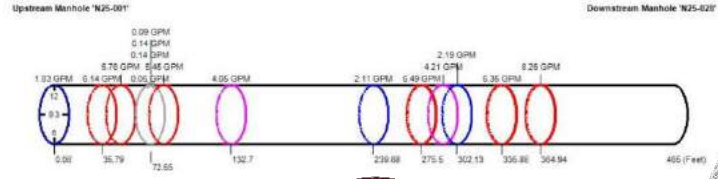
GOOD

Quantifying Rehabilitation Effectiveness

BEFORE REHAB



AFTER REHAB



BAD

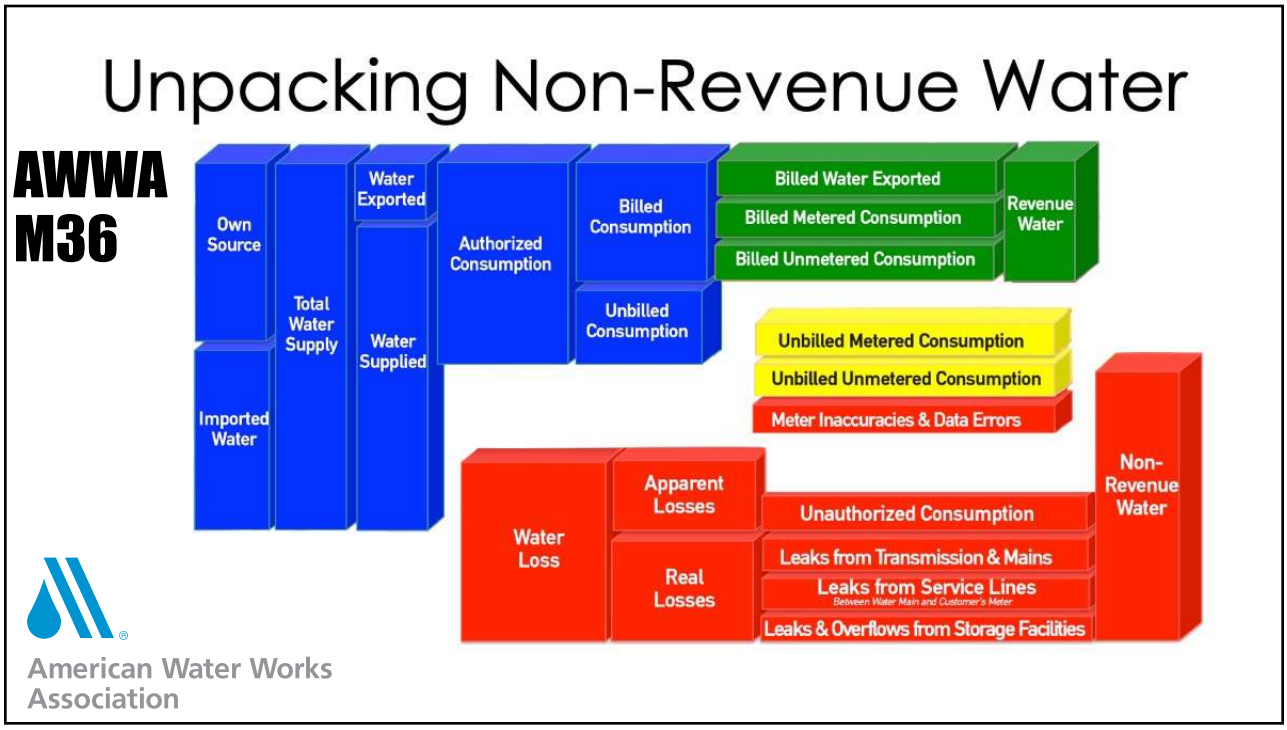
1 CAPEX Avoidance — $300 per foot

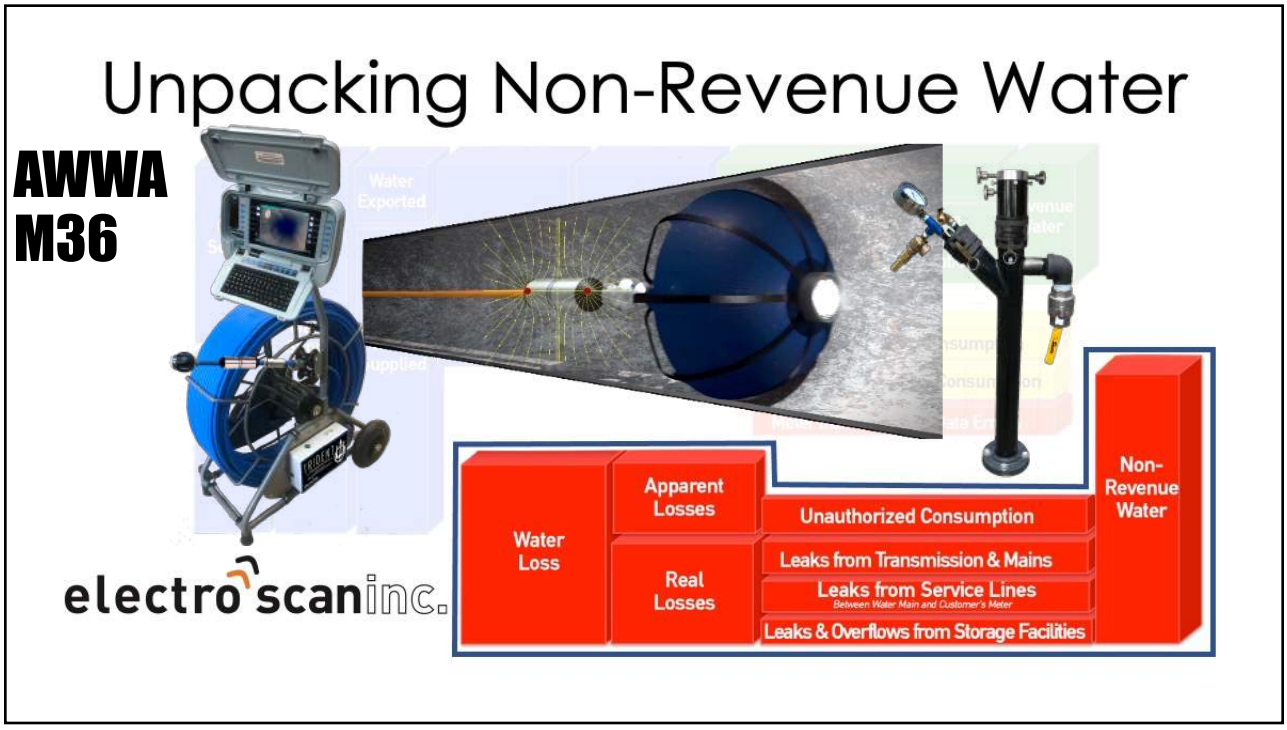
2 Targeted Leak Surveys — 100x

3 Reduction in Non-Revenue Water — % GPM

4 QA/QC for Repairs — CIPP $5Billion

5 Illegal Connections — 5-10%


Unpacking Non-Revenue Water
AWWA M36
Own Source
Imported Water
Total Water Supply
Water Exported
Water Supplied
Authorized Consumption
Billed Consumption
Unbilled Consumption
Billed Water Exported
Billed Metered Consumption
Billed Unmetered Consumption
Revenue Water
Unbilled Metered Consumption
Unbilled Unmetered Consumption
Meter Inaccuracies & Data Errors
Non-Revenue Water
Water Loss
Apparent Losses
Real Losses
Unauthorized Consumption
Leaks from Transmission & Mains
Leaks from Service Lines
Between Water Main and Customer's Meter
Leaks & Overflows from Storage Facilities
American Water Works Association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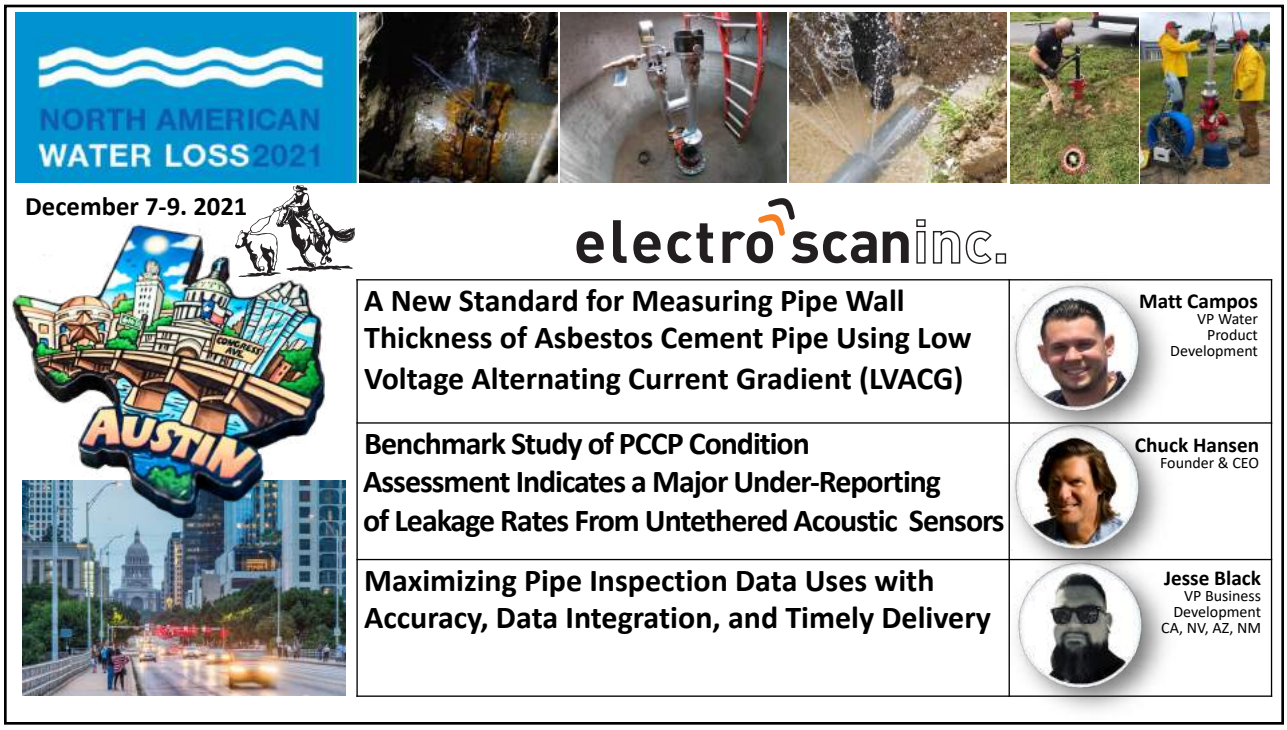
Non-Revenue Water


NORTH AMERICAN
WATER LOSS 2021
December 7-9. 2021
AUSTIN
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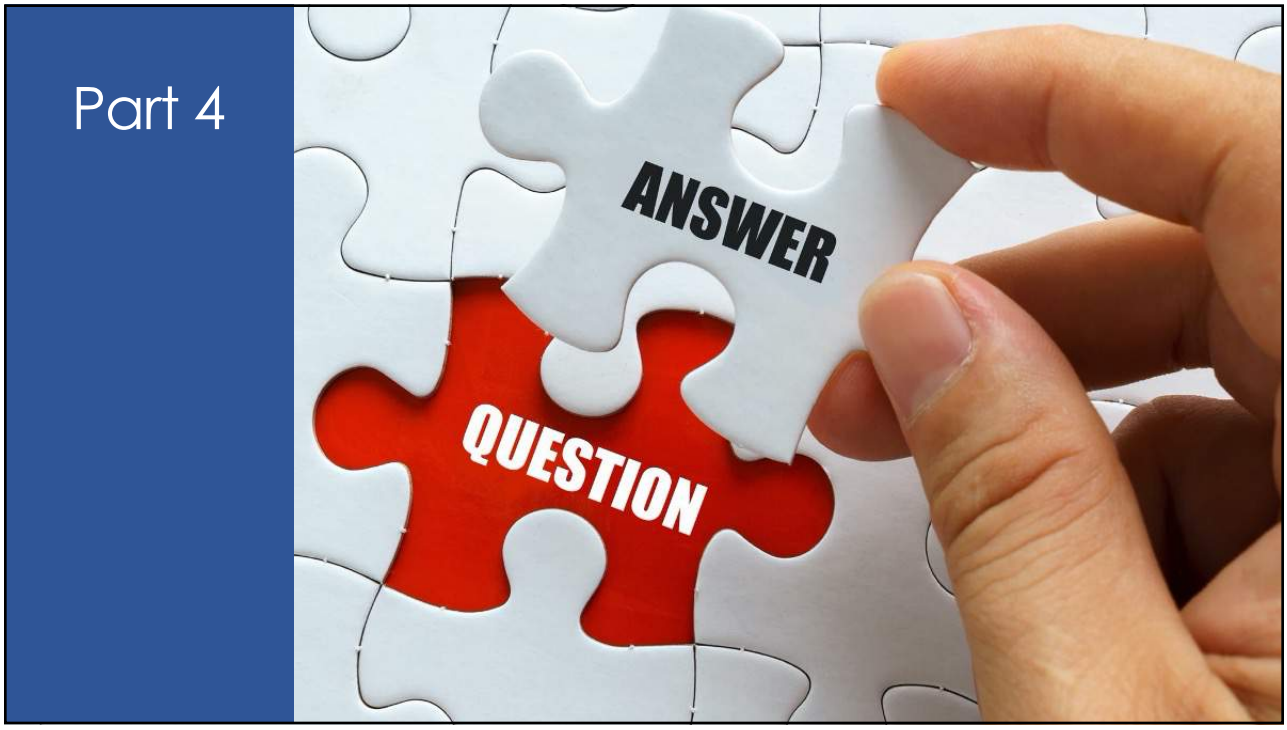
A New Standard for Measuring Pipe Wall Thickness of Asbestos Cement Pipe Using Low Voltage Alternating Current Gradient (LVACG)
Matt Campos
VP Water Product Development
Benchmark Study of PCCP Condition Assessment Indicates a Major Under-Reporting of Leakage Rates From Untethered Acoustic Sensors
Chuck Hansen
Founder & CEO
Maximizing Pipe Inspection Data Uses with Accuracy, Data Integration, and Timely Delivery
Jesse Black
VP Business Development
CA, NV, AZ, NM


Part 4
ANSWER
QUESTION

The Problem We Solve

Overcome The Inaccuracies of Acoustic Sensors*

Lack of repeatability, false-positive readings, inability to assess PVC and high-density polyethylene (HDPE) pipes, and interference from outside noises, are just some of the drawbacks that makes acoustic sensors, data loggers, and correlators, provide questionable results.

Accurately and Consistently Assess Water Main Leaks

Low Voltage Conductivity represents the first technology that provides an accurate, independent, repeatable, and unambiguous assessment of a pipe's condition, including an estimated liters per second for each defect and for the total pipe segments.

Certify Post-Repair & Rehabilitation Capital Projects

The holy grail of new construction, repairs, and renewal of pipes is the ability to certify to the owner that the pipe has zero leakage, prior to acceptance. While pressure testing before service tap restoration has provided limited assurances, Low Voltage Conductivity provides a comprehensive assessment of pipe condition, BEFORE and AFTER repair or rehabilitation.

* Including Data Loggers and Correlators.

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https://www.electroscan.com

WhatsApp

ISO 9001

ISO 14001

ISO 45001

SSIP
SAFETY SCHEMES IN PROCUREMENT

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