

## LEAK DETECTION PRODUCT & SERVICES CATALOG

# 2024

### DELTA PRESSURIZED WATER LEAK DETECTION



### ES-600 SEWER



### TRIDENT PRESSURIZED WATER LEAK DETECTION



### SWORDFISH LEAD DETECTION



### ES-600 SEWER PORTABLE



## AWARDS

### 2024

SAUDI ARAMCO ENGINEERING REQUIREMENT (SAER 12366)

### 2023

BEST SENSOR AWARD, Cleantech/Sustainability Category  
BUILT WORLD, TOP 50 in Infrastructure

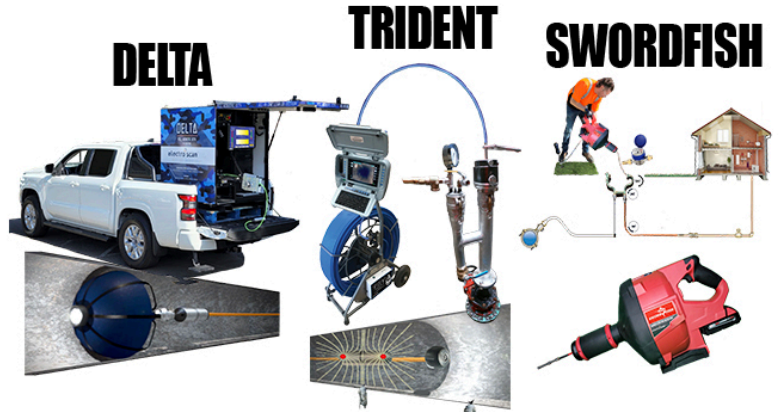
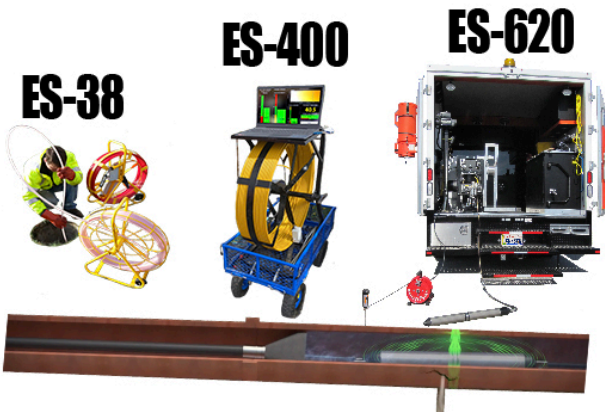
### 2022

UKSTT Detection, Location, and Inspection Product of the Year  
Environment & Energy Product of the Year - SWORDFISH  
IoT Breakthrough Awards: Leak Detection Solution of the Year IoT  
Innovator Awards: Best of IoT - Platform. Finalist  
Winner of Builtworlds Venture West Demo Days



#### GRAVITY & UNPRESSURIZED PIPELINES

#### GRAVITY & PRESSURIZED PIPELINES



International Patents  
AU 2015238903, AU 2017329037, CA 2864503, CA 2874808, CA 2905492, EP 2748576, EP 3516359, EP 13275131.4, JP 6062541, JP 6193893, JP 6514284, NZ 713053, US 9143740, US 9304055, US 9933329, US 10451515, US 10557772, US 10816431.



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saudi aramco



THE  
**NEW ECONOMY**

## TABLE OF CONTENTS

Product Overview .....	1
SWORDFISH .....	10
Multi-Sensor DELTA Probe for Pressurized Pipes .....	13
Multi-Sensor TRIDENT Probe for Pressurized Pipes.....	20
ES-600 Series CCTV Truck.....	26
ES-600 Series Portable .....	28
ES-400 Push Reel .....	29
ES-200 Push Reel .....	30
Multi-Sensor DELTA Probe for Sewer Force Mains.....	31
Services .....	36



INTERNATIONAL PATENTS & PATENTS PENDING

CA 2864503, CA 2874808, CA 2905492, EP 2748576, JP 6062541, JP 6193893, NZ 713053,  
US Patents: 9143740, 9304055, 9933329, 10451515, 10557772, 10816431

## PRODUCT OVERVIEW

	<b>DELTA</b> Multi-Sensor Probe	Small-to-Medium Pressurized Water Mains or Sewer Force Mains / Rising Mains up to 60 inches (1500mm). Up to 3,300 ft (1km) per survey, or 6,600 ft (2km) with special upgrades.	Only available for service-related projects. Not for sale to utility customers or contractors. Contractor licensing subject to training, qualifications, and annual support agreement.
	<b>TRIDENT</b> Multi-Sensor Probe - American Version - British Version	Small-to-Medium Pressurized Water Mains or Sewer Rising Mains, up to 60 inches (1500mm). Up to 240m per survey (120m in a single direction).	Available for sale to municipal or investor-owned utilities. Available for licensing to contractors on a daily or per meter basis.
	<b>SWORDFISH</b> 	Buried lead pipe detection. Very small diameter water pipes 0.5-3 inches (13-75mm).	Available for sale to utilities and plumbers. Available for licensing to contractors on a daily or per meter basis.
	<b>CriticalH<sub>2</sub>O®</b> Cloud App	Web-based data management & storage, including SQL database for storing real-time inspection results for Low Voltage Conductivity, Acoustic, and CCTV surveys.	Requires set-up fee, per seat licensing, and minimum 2-year software support agreement.
	<b>ES-600 CCTV</b> Optional: ES-670, ES-660, ES-650 ES-400	Medium-to-Large diameter Sewer or Stormwater Pipes, or Gravity Water Mains 6-72 inches (150-1800mm). Rack-mounted onto an existing CCTV truck or van. 1,500ft (460m) range.	Available for sale to municipal or investor-owned utilities. Available for licensing to contractors on a daily or per meter basis.
	<b>ES-600 Portable</b> Optional: ES-670, ES-660, ES-650 ES-400	Medium-to-Large diameter Sewer or Stormwater Pipes, or Gravity Water Mains 6-72 inches (150-1800mm) that are difficult to access by vehicle. 1,000ft (305m) range.	Available for sale to municipal or investor-owned utilities. Available for licensing to contractors on a daily or per meter basis.
	<b>ES-400 Push Rod</b> Optional: Plug Reel, Hand Cart ES-200, ES-50	Small-to-Medium diameter Sewer or Stormwater Pipes 4-24 inches (150-600mm). Push rod length is limited to approximately 490 ft (150m).	Available for sale to municipal or investor-owned utilities. Available for licensing to contractors on a daily or per meter basis.
	<b>ES-200 Push Rod</b> Optional: Plug Reel, Hand Cart ES-50	Small diameter Sewer or Stormwater Pipes 3-8 inches (76-150mm). Best for private laterals. Push rod length is limited to approximately 490 ft (150m).	Available for sale to municipal or investor-owned utilities. Available for licensing to contractors on a daily or per meter basis.
	<b>ES-25 &amp; 50 Push Rod</b> Optional: Plug Reel, Hand Cart	Very small diameter Plumbing Fixtures or Industrial Tubing 0.5-4 inches (25-100mm).	Scheduled for release in late 2023.
	<b>CriticalSewers®</b> Cloud App	Web-based data management & storage, including SQL database for storing real-time inspection results for Low Voltage Conductivity.	Requires set-up fee, per seat licensing, and minimum 2-year software support agreement.

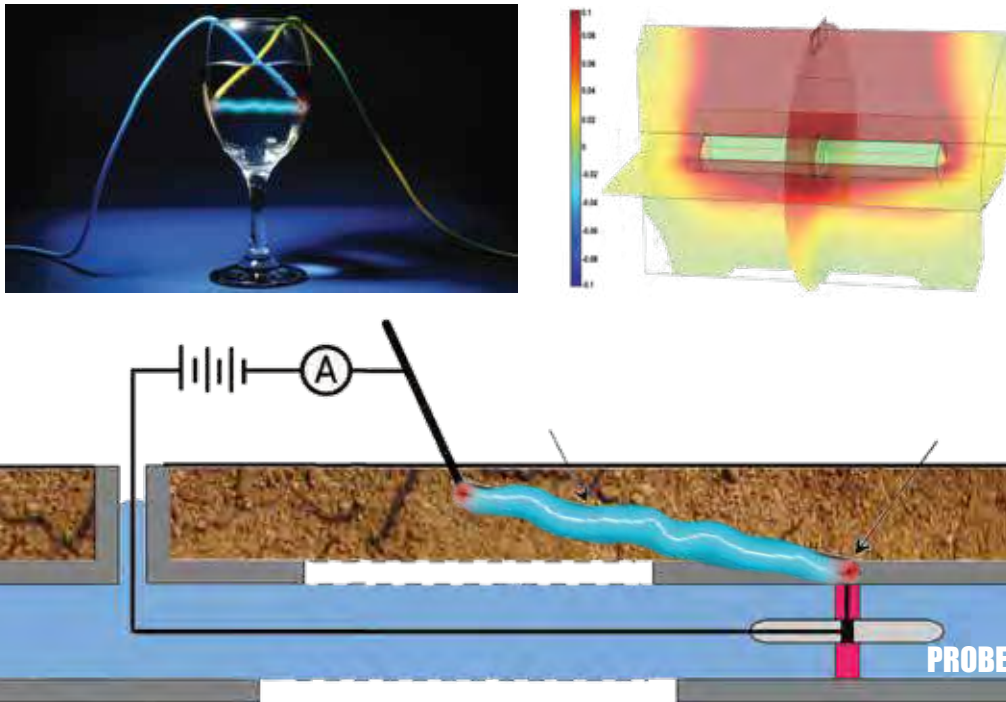
1. All products are available for international projects, and require detailed maps and a project plan addressing permitting, traffic control, and pipe access.



## NON-ACOUSTIC LEAK DETECTION

### How Leaks Are Found & Measured in GPM

*If a pipe leaks electricity, it leaks water, and can be measured in Gallons per Minute or Liters per Second.*



- **Machine-Based Leak Location.**
- **Measures the Size of Hole by Focused Electric Current.**
- **Machine-Based Leak Quantification in GPM or LPS.**
- **As Featured in AWWA M77, ASTM F2550, JACSOMA #7**

**± 0.4 INCH ACCURACY  
REPEATABLE RESULTS**





**CONDUCTIVITY**



**QUESTIONABLE ACCURACY  
INCONSISTENT RESULTS**



## COMPETITIVE ADVANTAGES

Company	YES ✓	NO	electro <sup>3</sup> scaninc.	Aquam	Xylem/Pure/WRC	Aganova	Ingu	Utilis		
Features / Product			Delta	Trident	JD7	Sahara	SmartBall®	Nautilus	Recon	Satellite
Technology			Acoustic, CCTV, Conductivity	CCTV, Conductivity	Acoustic, CCTV	Acoustic, CCTV	Acoustic	Acoustic	Acoustic	Synthetic Aperture Radar
In-Pipe Connection			Tethered	Tethered	Tethered	Tethered	Free Flowing	Free Flowing	Free Flowing	
Device										
Visual Inspection with Camera			✓	✓	✓	✓				
Joint Spacing			✓	✓						
Leak Location – Accuracy 1cm			✓	✓						
Leakage Severity – Expressed in Gallons per Minute or Litres per Second			✓	✓						
Finds & Measures Leaks in Plastic Pipe			✓	✓						
Pressurised Water & Gravity Sewers			✓	✓						
Wall Thickness for Cement Asbestos			✓	✓						
Able to Find Leaks With 'NO FLOW'			✓	✓						
Repeatability of Leak Location +2years			✓	✓						

## KEY ADVANTAGES

- No Lost Balls or Spheres. **100% Retrieval Since We're Tethered.**
- No False-Positives from Hitting the Pipe Wall like Acoustic. **Not Possible With Ohm's Law.**
- No Missed Leaks. **We Find Them All.**
- No Guessing 'Which Leak is Larger?' **Each Has a Liters per Second or GPM.**
- No High Pressure Needed. **We're Pressure-Independent; Able to Scan 0-175 psi (12 bar).**
- No Long Wait for Reports. **Data is Available in Minutes!**
- No Estimated Locations or Ranges. **Pinpoint Locational Accuracy of 1cm (0.4in).**
- No Late Night / Early Morning Testing. **Ambient Noise & Customer Pipe Usage Is Not a Factor.**
- No Effect from High Groundwater Surrounding Pipes. **Electro Scan Measures Size of Hole.**
- No Need to Increase Pipe Pressure to Hear Leak. **Electro Scan Is Non-Acoustic.**





## SURVEY REPEATABILITY

**1.** Low Accuracy  
Low Repeatability



ACOUSTIC

**2.** Low Accuracy  
High Repeatability



SATELLITE

**3.** Medium Accuracy  
Low Repeatability

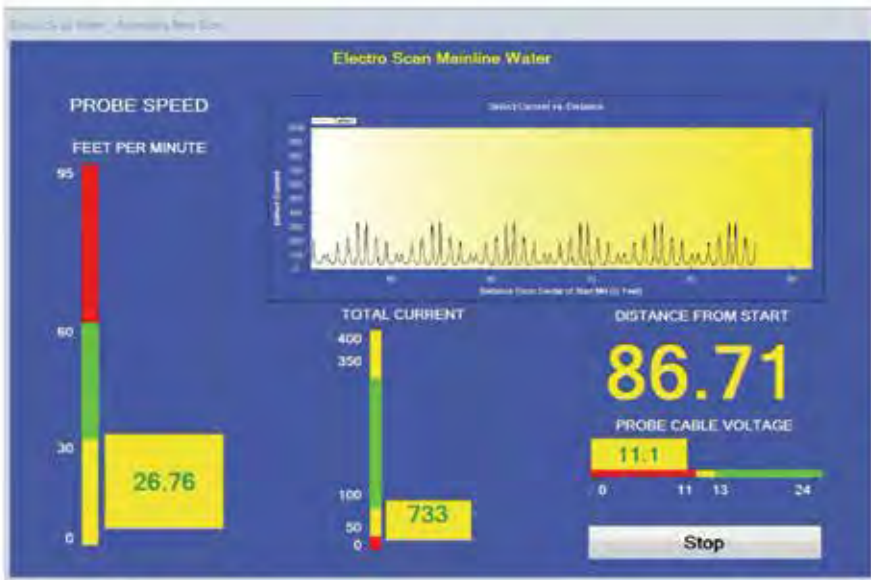


HELIUM

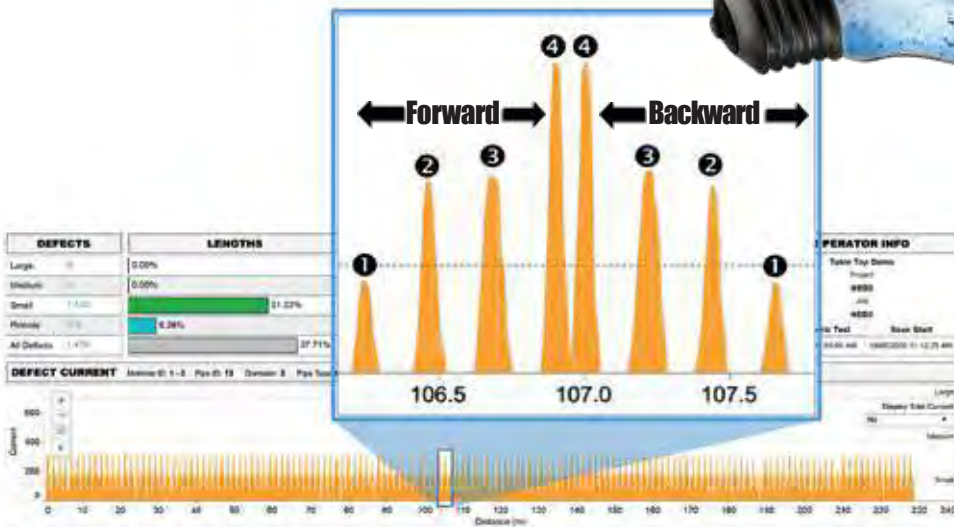
**4.** High Accuracy  
High Repeatability



CONDUCTIVITY



### Conductivity Benchmark Testing



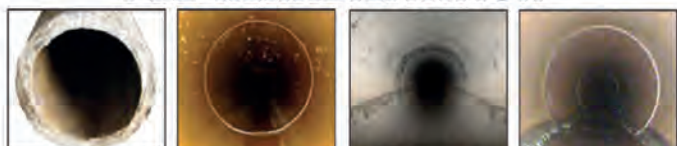


## PIPE MATERIALS

ABS	Acrylonitrile-butadiene-styrene	PCCP	Prestressed Concrete Cylinder Pipe
ACP	Asbestos Cement Pipe	PE	Polyethylene
BRK	Brick	PFP	Pitch Fiber Pipe
CMLSP	Cement Mortar Lined Steel	PP	Plastic Pipe
CON	Concrete	PVC	Polyvinyl Chloride
CIPP	Cured-In-Place Pipe	RCP	Reinforced Concrete Pipe
DIP	Ductile Iron (w/Protector 401)	RPM	Reinforced Plastic Mortar
FRP	Fiberglass Reinforced Pipe	RTR	Reinforced Thermosetting Resin
FRPM	Fiberglass Reinforced Polymer	SIPP	Spray-in-Place Pipe
GRP	Glass Reinforced Pipe	SPR	Spiral Wound Pipe
HDPE	High Density Polyethylene	TC	Terracotta or Clay Pipe
ORP	Orangeburg Pipe	VCP	Vitrified Clay Pipe
PB	Polybutylene		



### PRE-REHABILITATION



**Asbestos Cement Pipe**

**High Density Polyethylene Pipe**

**Prestressed Concrete Cylinder Pipe**

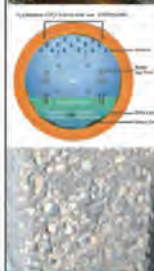
**Vitrified Clay Pipe**

Electro Scan FELL is unique in its ability to geometrically map the remaining wall, i.e. corrosion of ACP.

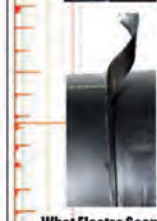
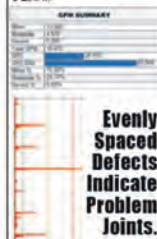
**Finding & Measuring Pipe Corrosion Using Electro Scan's Patented Data Analytics**



As demonstrated by independent benchmarks, since acoustic and transient pressure sensors are unable to provide detail geometric assessments of pipe walls, and therefore unable to estimate remaining pipe walls, Electro Scan represents a game changing solution to assess & prioritize ACP.



Poor mechanical or fused joints are the Achilles heel of HDPE, and not seen by CCTV cameras or heard by acoustic data loggers or sensors. But, found & quantified by FELL in accordance with ASTM F2550.



**What Electro Scan Finds Most?**  
Inadequate Clamping or Restraint during Fusion (Below)

Electro Scan represents the only technology able to reliably & consistently find & measure leaks in GPM. While other devices may attempt to locate corroded wire mesh that may or may not indicate a weakness in the pipe wall, Low Voltage Conductivity represents a game-changing solution to provide unbiased leak locations & severity for each defect.



Superior to acoustic and electromagnetic sensors, Electro Scan's Low Voltage Conductivity detects leaks other technologies miss.

**How PCCP Fails?**



It doesn't matter whether you evaluate VCP from the outside or inside of a pipe, CCTV, Laser, LIDAR, Sonar, GPR, or Acoustic, are not able to detect or measure defect flows.



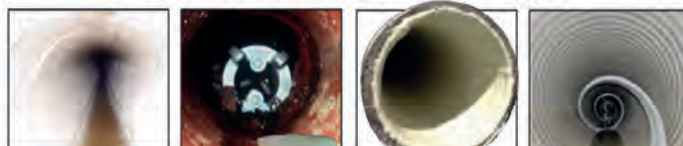
Electro Scan's FELL is the only technology, representing a Non-Destructive Test (NDT) able to follow a 90° pipe bend to locate a pathway for water to enter or exit a pipe.

By measuring the change in current and the amount of flow, the size of the opening can be computed and translated into an estimated GPM.



Open trench evaluation of FELL located defects, missed by CCTV, exactly showed three matching leaks due to fittings that were never tightened. Just one of over a dozen tests proving FELL superiority.

### POST-REHABILITATION



**Cured-In-Place Pipe**

**Grout**

**Spray-In-Place Pipe**

**Spiral Wrap Pipe**

CIPP liners may not be watertight and defects not seen by certified operators using CCTV cameras. As a result, ASTM F2550 should be added to CIPP specifications to ensure pipe quality & integrity.



**RECOMMENDED USE:**  
To Find & Quantify Leakage From:  
• Accelerant Burns  
• Accidental Cuts  
• Bad Service Reconnect  
• Bad Lateral Liners  
• Blisters  
• Delamination  
• Defective Epoxy  
• Equipment Damage  
• Foreign Objects  
• Pinholes  
• Poor Curing  
• Overcooking  
• Stretching  
• Top-Hat Defects  
• Wet-Out Failures  
• Wrinkles, including: Buckling, Fins, Folds, Lifts, and Ridges

FELL is now preferred over using traditional packers to test joints for water tightness, due to FELL's Non-Destructive Testing (NDT) of joints, laterals, and cracks.



Unlike air testing, FELL does not force any added pressure on joints or laterals. Since air testing can open joints, shift pipes, and even temporarily correct out-of-round conditions in plastic pipes as areas around joints are inflated, packers are no longer recommended for testing the quality of joints or laterals.

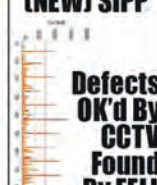


**GOOD GROUT**  
All Readings Above 1,000 amps

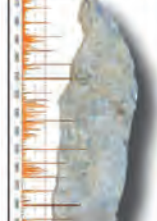


**RECOMMENDED USE:**  
1. All Pre-Grouted Pipes.  
2. Post-Grouted Pipes, 6-12 Months After Grout to Detect Drying or Shrinkage.  
3. Prior to Warranty Acceptance.

Locking individual wraps is key to any successful Spiral Wrap Pipe project, with problems not identified by CCTV. In contrast, Electro Scan FELL inspection can find defects to individual couplings.

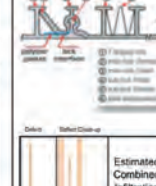


**DEFECTIVE (NEW) SIPP**

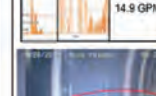


**RECOMMENDED USE:**  
1. Pre-SIPP.  
2. Post-SIPP All Liners.  
3. Prior to Warranty Acceptance.

Estimated Combined Infiltration Flow: 14.9 GPM



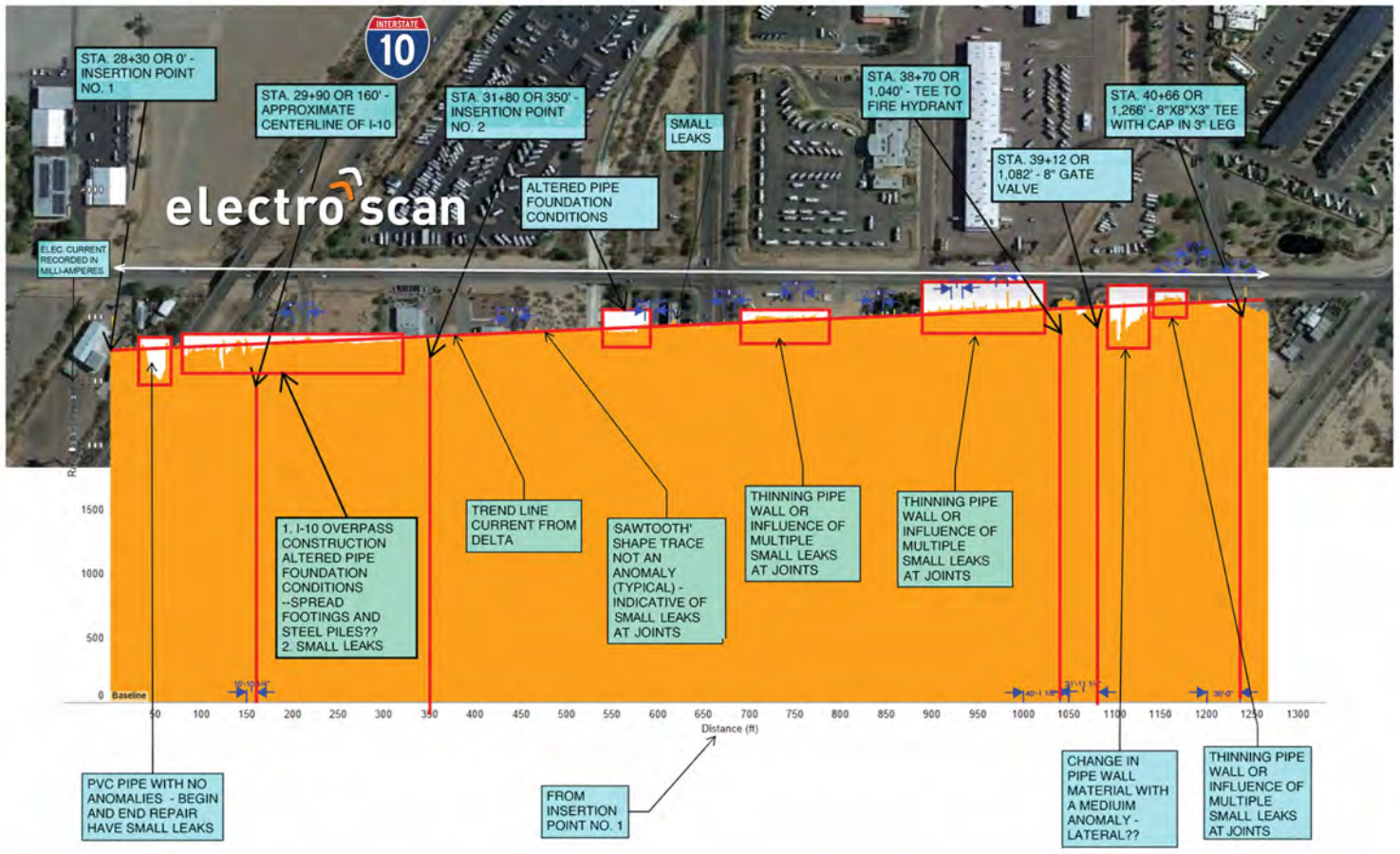
Estimated Combined Infiltration Flow: 14.9 GPM



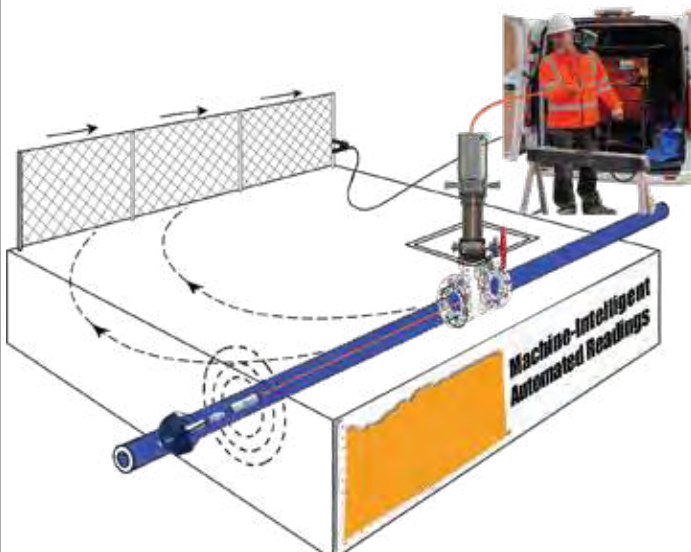
**RECOMMENDED USE:**  
1. Pre-Spiral Wrap.  
2. Post-Spiral Wrap.  
3. Prior to Warranty Acceptance.



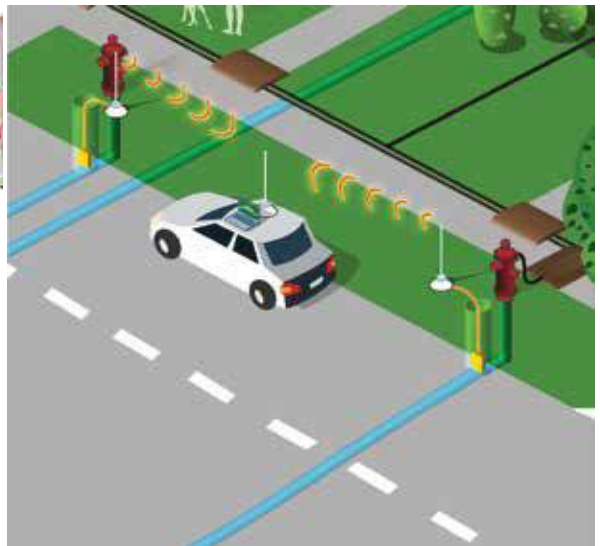
## PIPE WALL THICKNESS



### Full-Length 360-Degree vs. Average for Entire Pipe



**ACTIONABLE DATA**



**NO ACTIONABLE DATA**



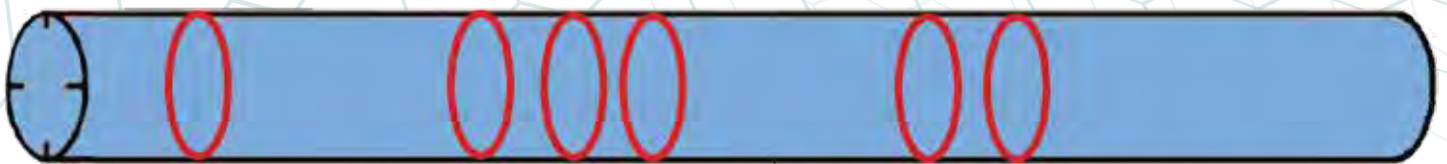
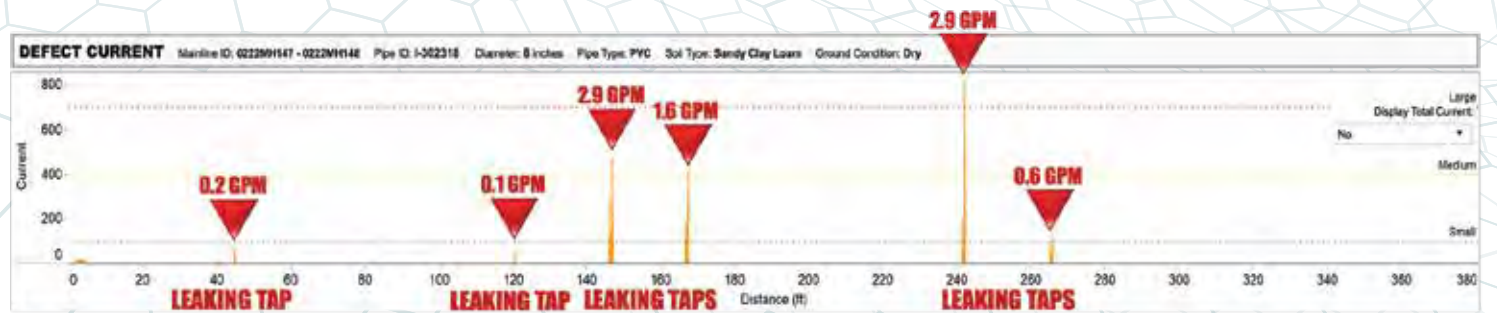


# electro scan inc.

## ILLEGAL & LEAKING TAP CONNECTION ASSESSMENTS



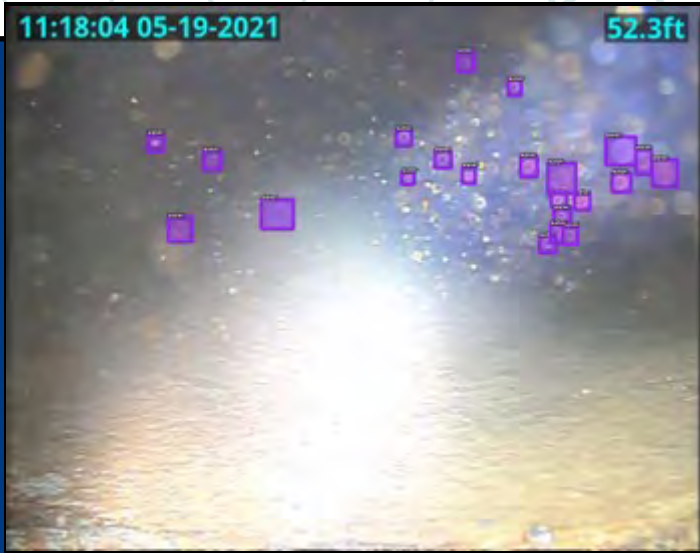
**ELECTRO SCAN USES PINPOINT ACCURACY AND AI-CCTV TO ACCURATELY IDENTIFY LEAKS AT TAPS v. PIPE WALLS**





# electro<sup>scan</sup>inc.

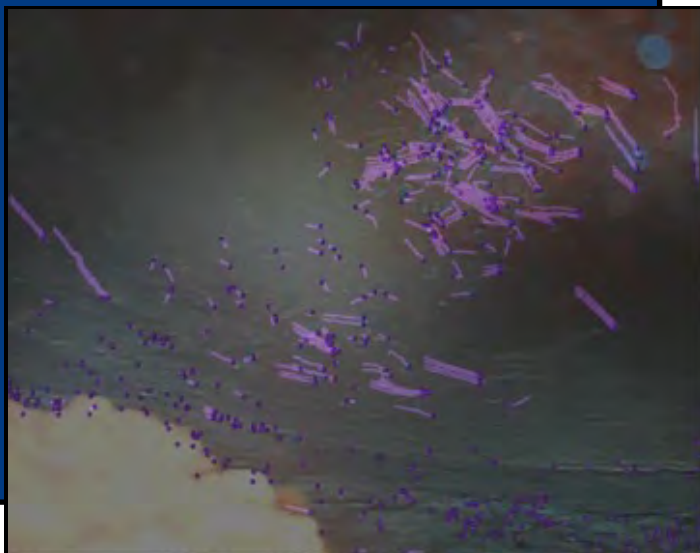
## AI PARTICLE TRACKING



Electro Scan is developing an AI model that finds leaks in pressurized pipes by tracking the flow of suspended particles. When the program detects particles flowing directly into the pipe wall, indicating a leak, it flags the location.



While we routinely find leaks with our FELL technology not found by other inspection methods, we believe it's important to continue innovating, as our goal is to provide you with as much quality, actionable data as possible.



We continue to train the model with real world inspections, and look forward to bringing this one-of-a-kind kind program to the market.

## DETECT LEAKS IN PRESSURIZED PIPES USING AI AND CCTV

- Tracks particles in three dimensions
- Vastly improves the ability of CCTV to detect leaks
- Works with Delta and Trident multi-sensor probes for unparalleled accuracy

**WATER  
LEAK DETECTION PRODUCTS**



NEW PRODUCT

# SWORD FISH



THE NO-DIG SOLUTION FOR FINDING LEAD IN BURIED PIPES



# LEAD DETECTION

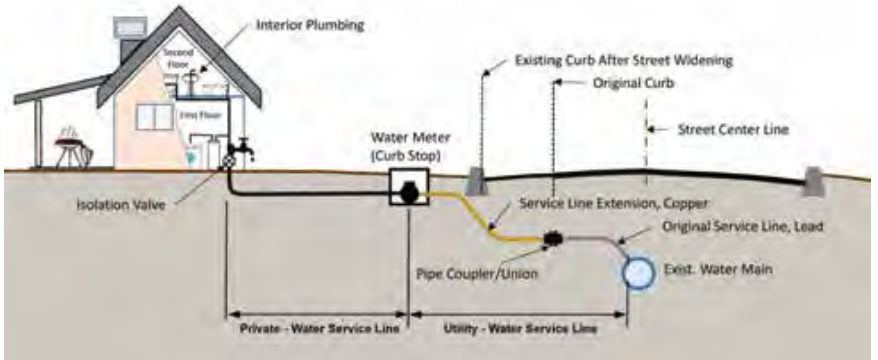
# electro scan inc.

## SWORDFISH



## APPLICATIONS

SWORDFISH IS THE WORLD'S FIRST HAND-HELD BURIED LEAD PIPE DETECTION TOOL. USING AN AUTO-FED CABLE AND LOW-VOLTAGE CONDUCTIVITY PROBE, SWORDFISH AUTOMATICALLY IDENTIFIES LEAD PIPES. READINGS ARE TRANSMITTED IN REAL-TIME TO ELECTRO SCAN'S CRITICAL H2O CLOUD APPLICATION, WITH RESULTS INDEPENDENTLY VERIFIED USING 3M LEAD TEST KITS FOR 100% VERIFICATION OF LEAD PIPE.

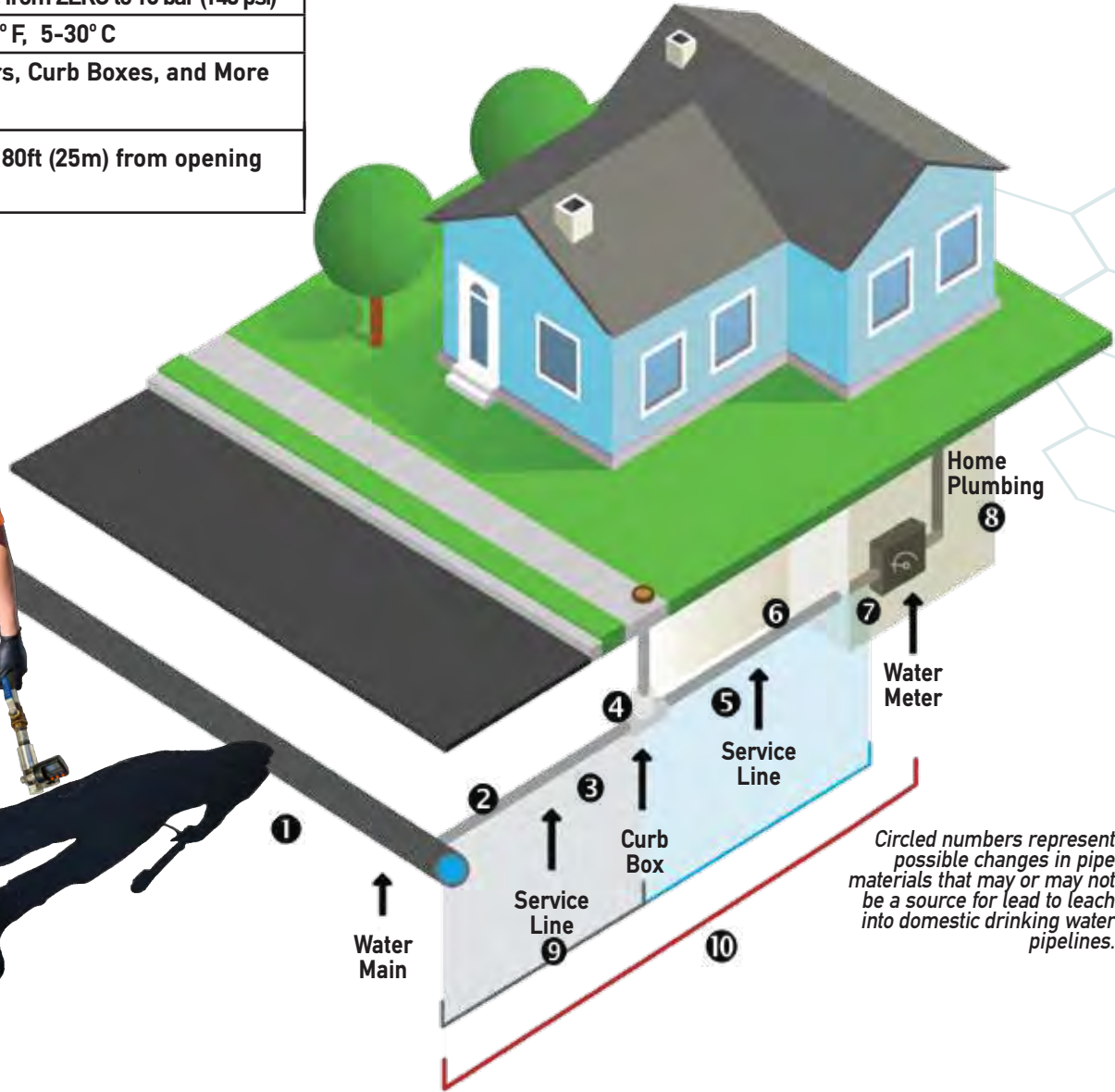


## BURIED LEAD PIPE DETECTION



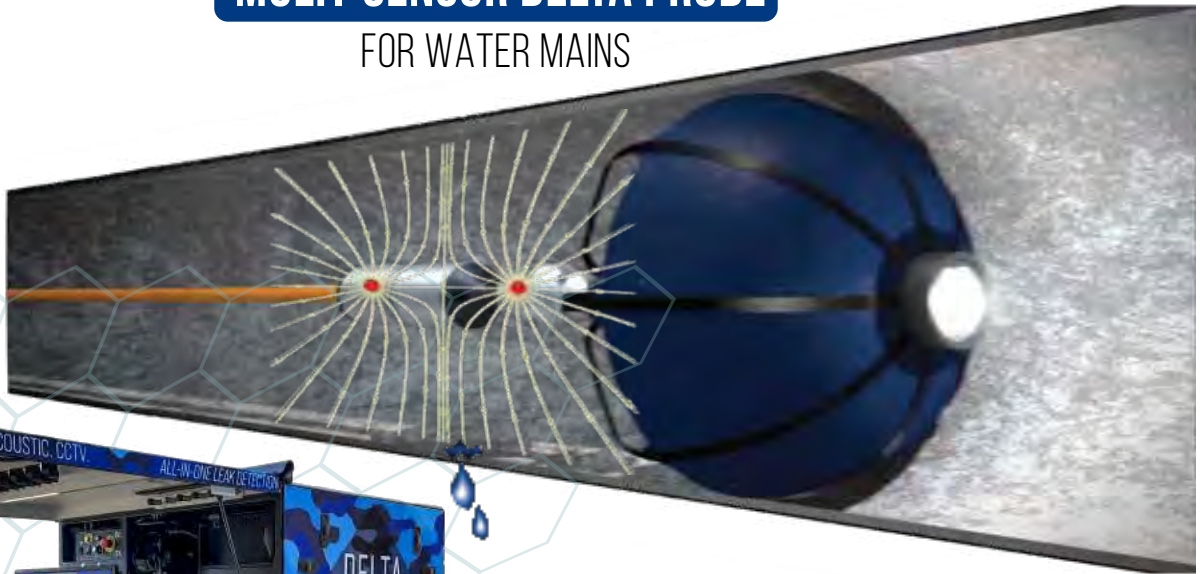
## SWORDFISH

Features	Buried lead pipe detection
Pipe Diameters	0.5" to 3" (13mm to 75mm)
Pressure	Range from ZERO to 10 bar (145 psi)
Temperatures	41-86° F, 5-30° C
Common Launch Points	Meters, Curb Boxes, and More Points
Pipe Lengths Per Survey	Up to 80ft (25m) from opening



**MULTI-SENSOR DELTA PROBE**

FOR WATER MAINS



**DWI Reg 31**



**ACOUSTIC\***

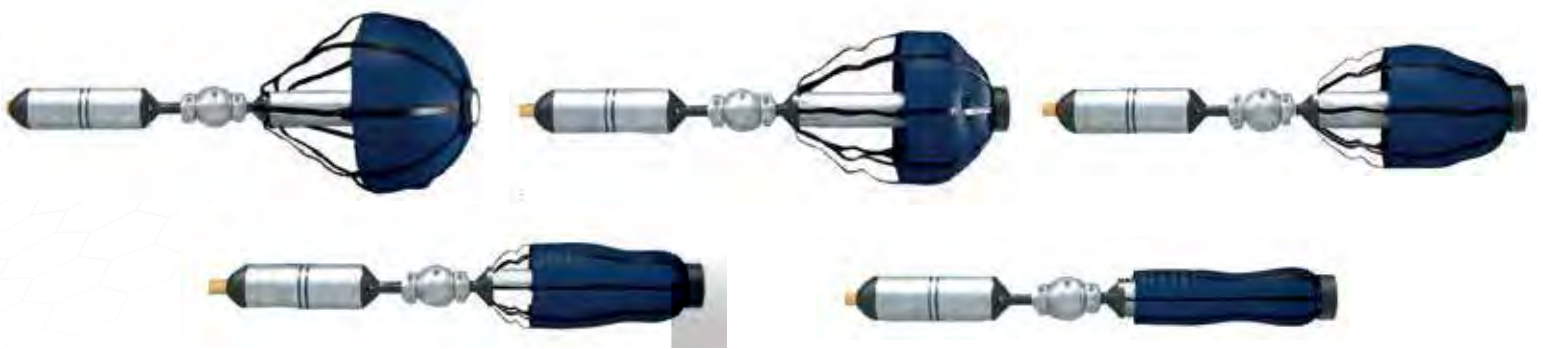


**CONDUCTIVITY**



**CCTV**

Condition	Performance
Features	Low Voltage Conductivity FELL, CCTV, Acoustic Hydrophone, Pressure Sensor
Pipe Diameters	8-60 inches (200-1500mm)
Pressure	ZERO to 12 bar (175 psi)
Temperatures	41-86° F / 5-30° C
Common Launch Points	Installed 4 inch (100mm) or larger hot tap with a corresponding isolation gate or ball valve
Flow Rate	Min. Flow Rate for Hydrochute Propulsion is 0.3m/sec. Pull-Through able to handle NO FLOW conditions.
Pricing	Per Day or Per Meter Based on Project Size, Access Difficulty, Insertion Points, Diameters, and Traffic Control
Pipe Lengths Per Survey	1km Recommended for CCTV. Up to 2km with specialized equipment.
Average Production	1-2 Pipe Sections per Day



Integrated Acoustic Sensor lets utilities compare results with Conductivity, revealing what they are not hearing.



**MULTI-SENSOR DELTA PROBE**

FOR WATER MAINS



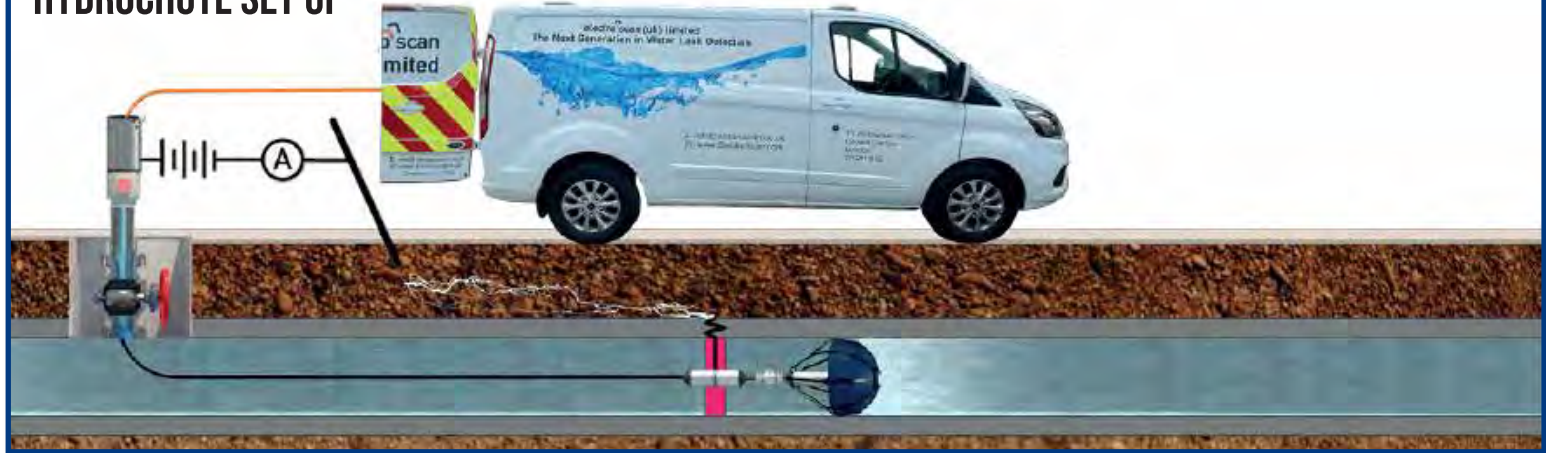


## MULTI-SENSOR DELTA PROBE

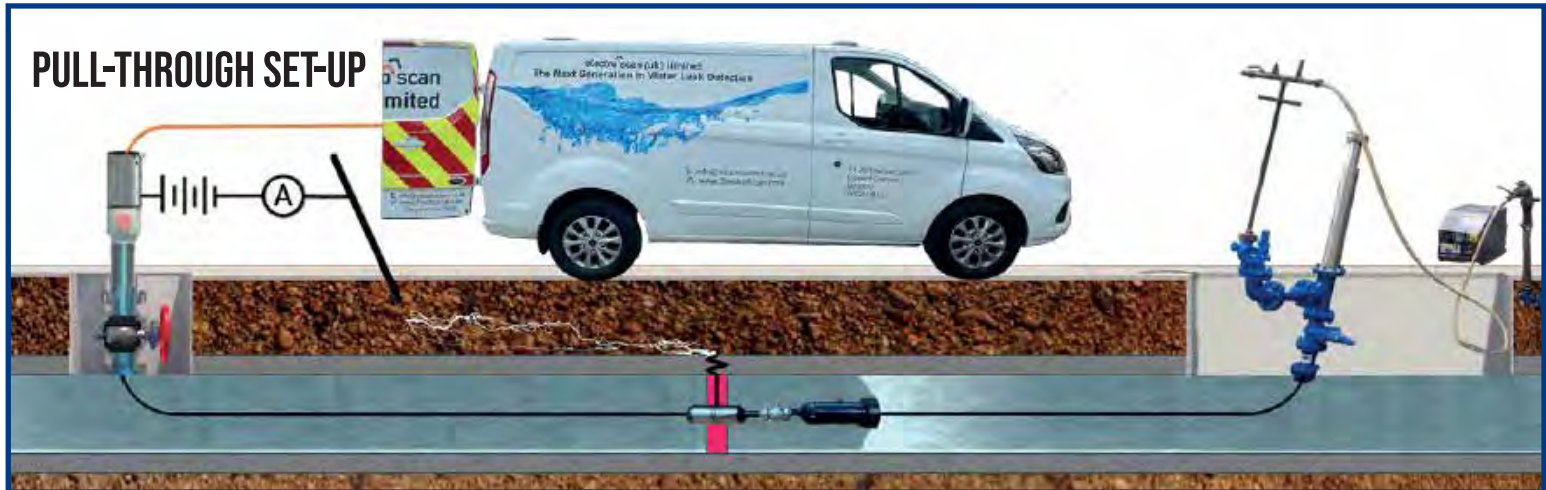
FOR WATER MAINS

**ONLY AVAILABLE AS A SERVICE BY AUTHORIZED CONTRACTORS**

**HYDROCHUTE SET-UP**



**PULL-THROUGH SET-UP**

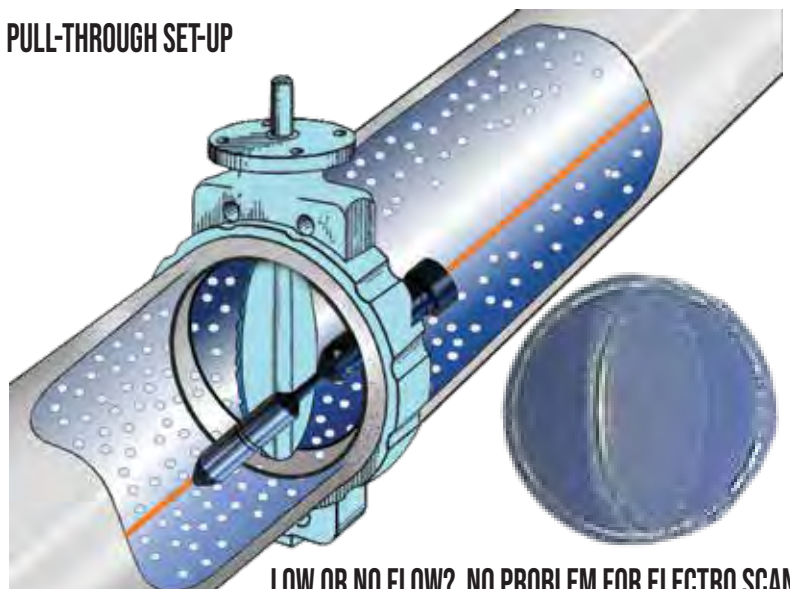


**OVER 3,000 PRESSURIZED PIPE INSERTIONS**

**HYDROCHUTE SET-UP**



**PULL-THROUGH SET-UP**





## SAMPLE SURVEY DATA

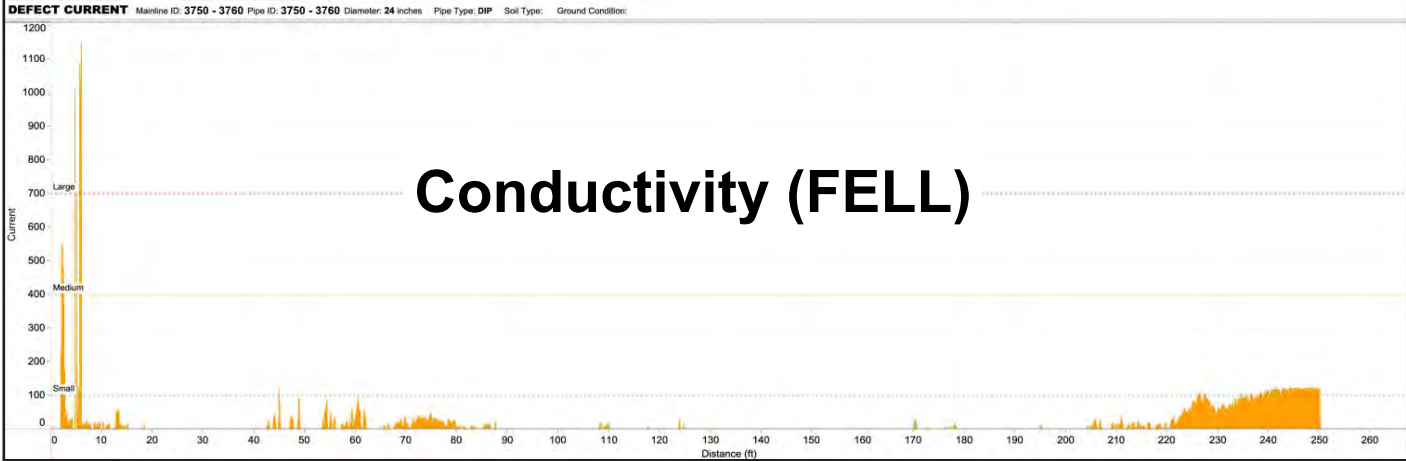
Pipe	Description
Length	170m (560ft)
Diameter	600mm (24in)
Material	Cement Mortar Lined Ductile Iron
Pressure	130.5 psi (9 bar)
Test Date	17 September 2020
Prior Leak Testing	Hydrostatic Pressure Test (FAILED) Tethered Acoustic (NO LEAKS) Un-Tethered Sphere (NO LEAKS) Surface Data Logger (NO LEAKS) Listening Stick (NO LEAKS)



1 of 3

1745 Markleton Road Sacramento, California 95825-4026  
Toll Free: 800 975 6149 Direct: 916 779 0660

DEFECTS		DEFECT LENGTHS		INFO
Large	7	0.21%		Customer: Sample Utilities Project: 24" DIP FORCE MAIN Job: IP4 Mainline: 3750 - 3760 Pipe: 3750 - 3760 Operator: Electro Scan Water Scan Length: 254.7 Feet Diameter: 24 Inches Pipe Type: DIP Soil Type: Ground Condition: Atmospheric Test: 8/10/2021 11:00:12 AM Scan Start: 8/10/2021 11:25:54 AM
Medium	1	0.28%		
Small	3	11.11%		
Pinhole	75	4.39%		
All Defects	86	15.99%		



### Acoustic - ONLY FALSE-POSITIVES



### CCTV



Data Partner



Smart Wireless Solution





## IN THE FIELD





IN THE FIELD





## IN THE FIELD



**ACOUSTIC**

**ELECTRO SCAN**

**Real-Time  
Data Display  
& Acquisition**



**CCTV**





# MULTI-SENSOR TRIDENT PROBE

Pressurized Water Main Leak Detection.  
Finding & Measuring Leaks in GPM or LPS.



CONDUCTIVITY



CCTV



CHLORINATION CHAMBER

Condition	Performance
Probe Sensors	Low Voltage Conductivity FELL and CCTV
Pipe Diameters	4-10 inches (100-255mm)
Pressure	0 to 160 psi (11 bar)
Temperatures	5-30 °C, 41-86 °F
Flow Rate	Push Cable handles low flow or no-flow conditions
Pricing	Per Day or Per Meter based on total project size
Launch Points	-Installed 4 inch (100mm) or larger hot tap with a corresponding isolation gate or ball valve -Fire hydrant with a 4 inch (100mm) or larger barrel served by a corresponding isolation gate valve
Pipe Length Per Survey	Up to 400ft (120m) in either direction from access
Construction	High impact ABS & powder-coated, zinc-plated mild steel
Dimensions (Length x Width)	5 inches x 1.6 inches
Camera Features	Display: 10.1", 1280 x 800 HD color TFT Storage: Internal 128Gb, USB flash storage supported Power Options: Mains Input (100-240 VAC), DC Output (16 VDC) or Built-In Battery (4S2P) Focal Range: 10mm to ∞ Active Pixels: 768 x 492 (NTSC) / 765 x 582 (PAL) LED Luminance: ≥ 208 Lumens Resolution: ≥ 460 TVL



## STANDARD OPERATING PROCEDURE

### 1 Hydrant, Hot Tap, or Valve

Hydrant Entry



Hot Tap



Actual Field Insertion



### 2 Flow Meter

Electro Scan first measures flow velocity and flow direction before any leak survey.



### 3 Chlorination & Cleaning



In addition to passing "materials in contact" testing requirements, Electro Scan does not use any equipment except as designed for water networks, with all components cleaned & sanitized before its use in pressurized water mains.

### 4 Insertion Tube



Electro Scan's insertion tube is carefully lowered into place and secured before inserting its multi-sensor probe.

### 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

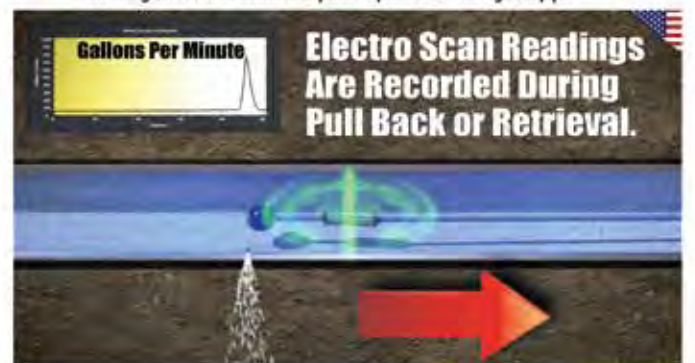
### 8 CCTV Push Forward Direction

Closed-Circuit Television (CCTV) video is automatically captured and streamed real-time so operators can navigate through valves and around obstructions.



### 9 Electro Scan Pull Back Direction

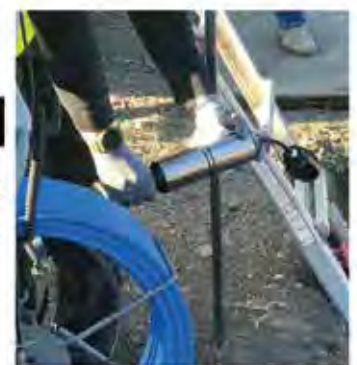
Once a maximum distance is achieved (up to 400ft or 120m), then the operator begins recording Electro Scan data as the probe is pulled back through the pipe.



Electro Scan Readings Are Recorded During Pull Back or Retrieval.

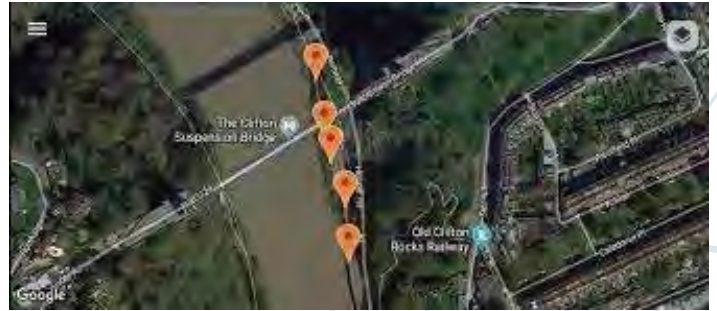
### 10 Probe Retrieval

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

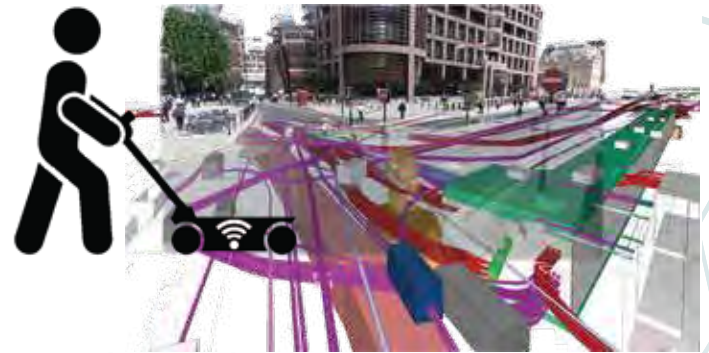




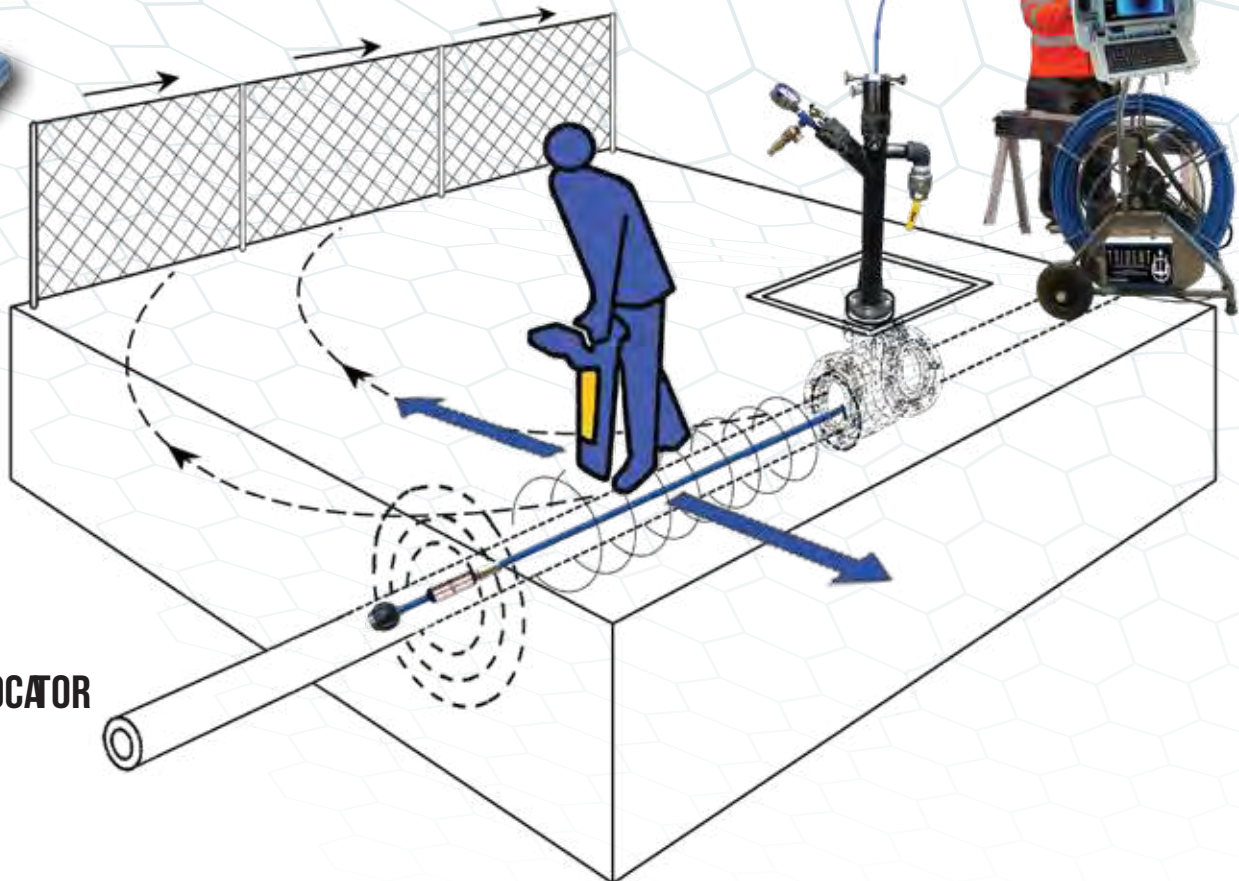
**LINE LOCATION**



**DRAWBACK OF GROUND PENETRATING RADAR:  
DIFFICULT TO LOCATE WATER MAINS**



**PRECISION SONDE LOCATOR**



**LOCATE LINES WITH THE TRIDENT PROBES BUILT-IN SONDE**



**NEW**

## WATER LEAK TRAINING CENTER

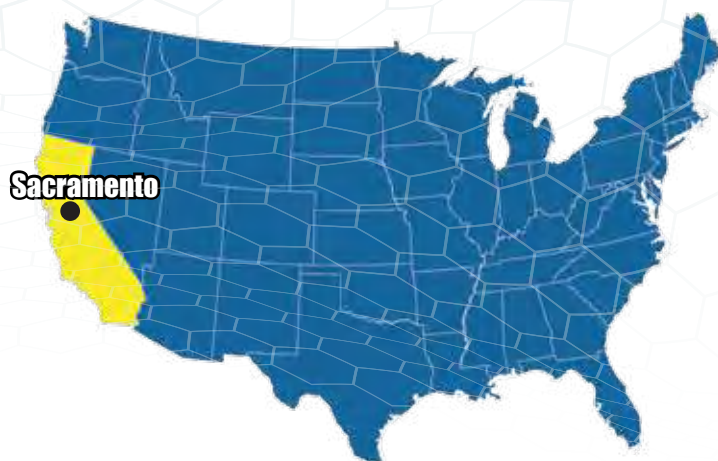


**INSTRUCTION**

**HANDS-ON TRAINING**

**IN-PIPE MAGATION**

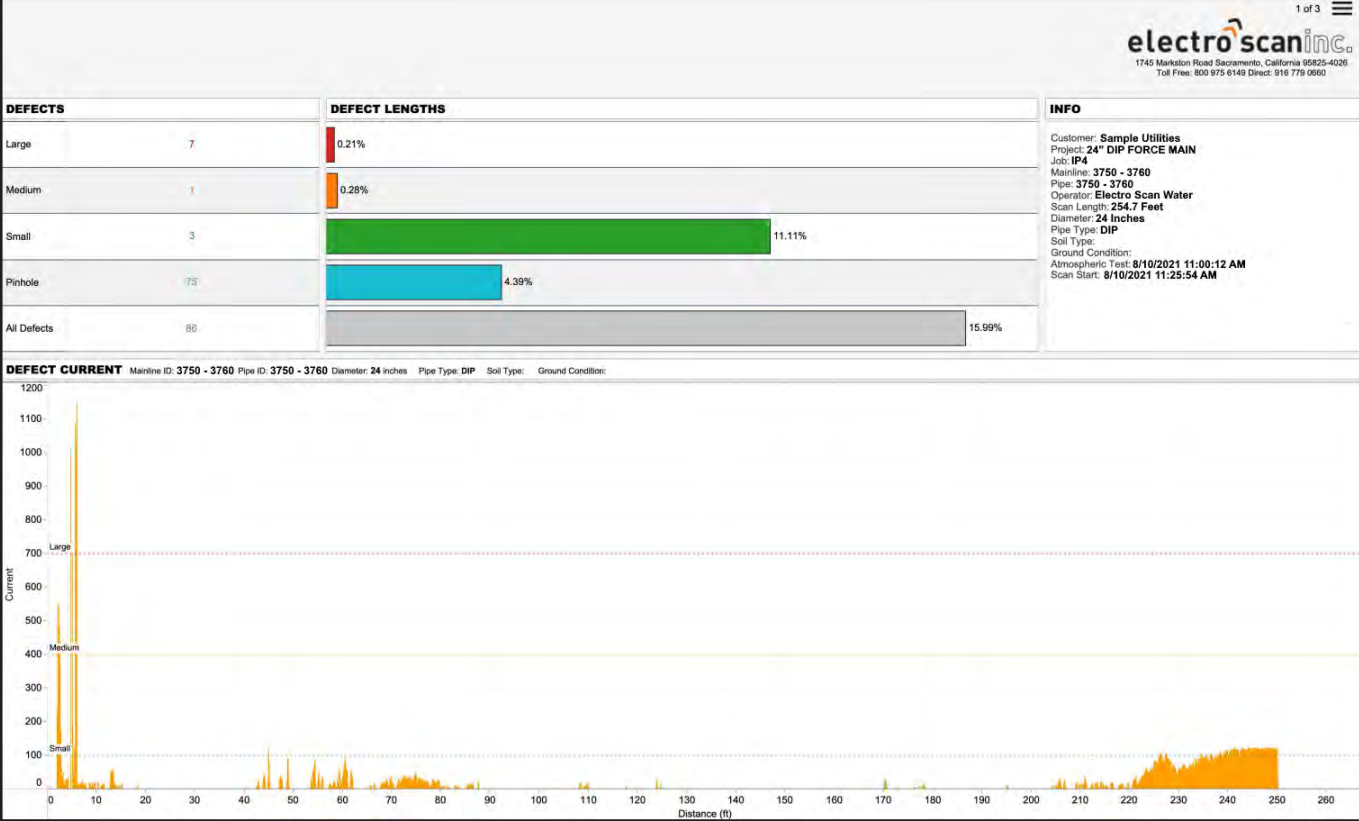
**AUTOMATIC DATA CAPTURE**





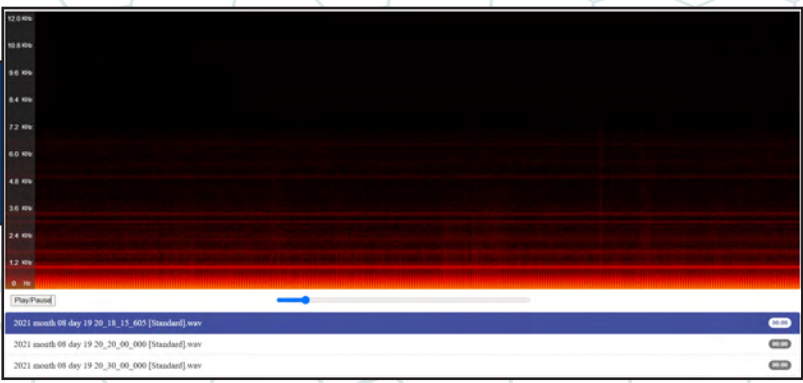
## CRITICAL H2O CLOUD APPLICATION

Critical H2O stores inspection data from the Delta and Trident multi-sensor probes (FELL, CCTV, & ACOUSTIC). Inspection results are uploaded live from the field for immediate viewing.



FELL

## ACOUSTIC



CCTV

**SEWER  
INFILTRATION PRODUCTS**





# electroscaninc.

## ES-600 CCTV TRUCK INTEGRATION ES-670, ES-660, ES-650, ES-400

**Aries**



**Cues**



**IBAK**



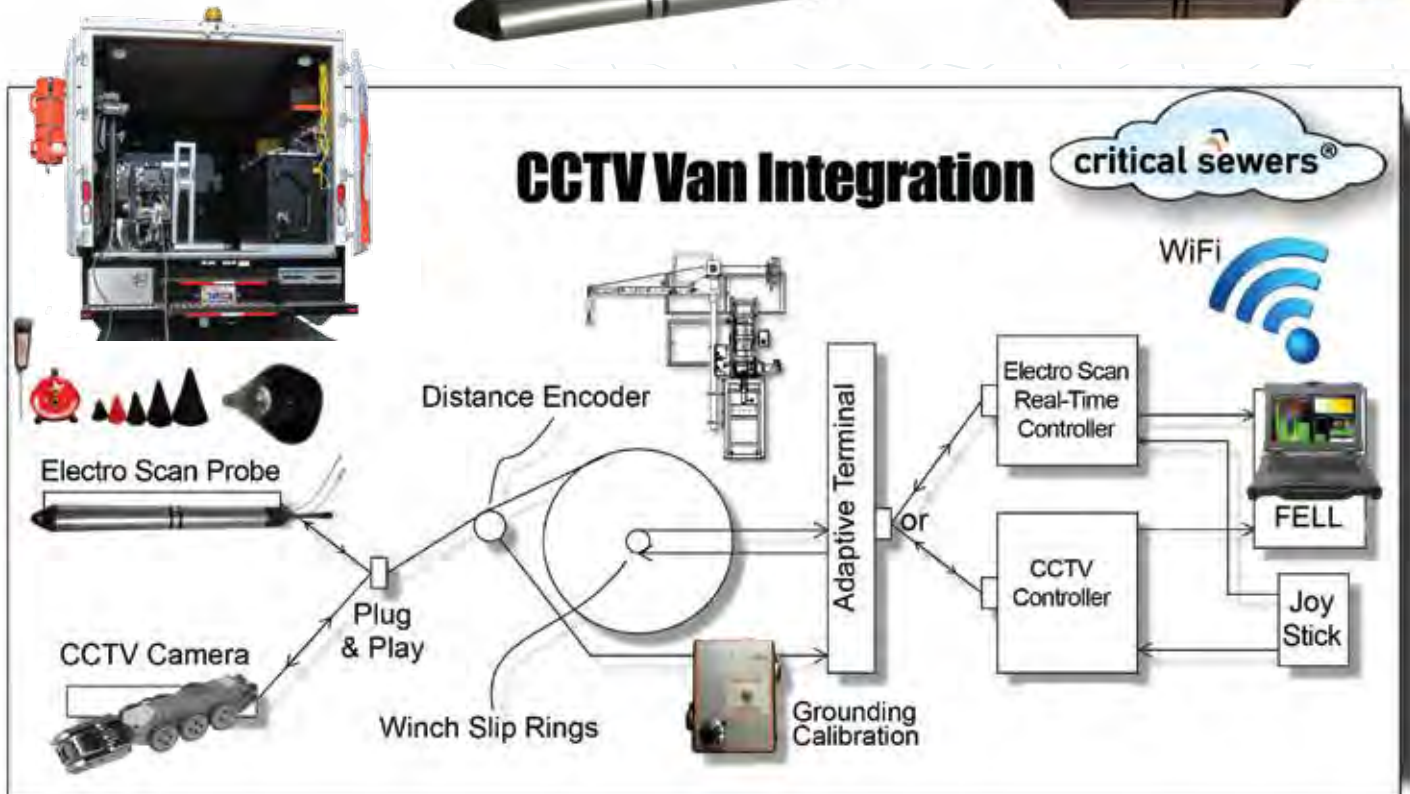
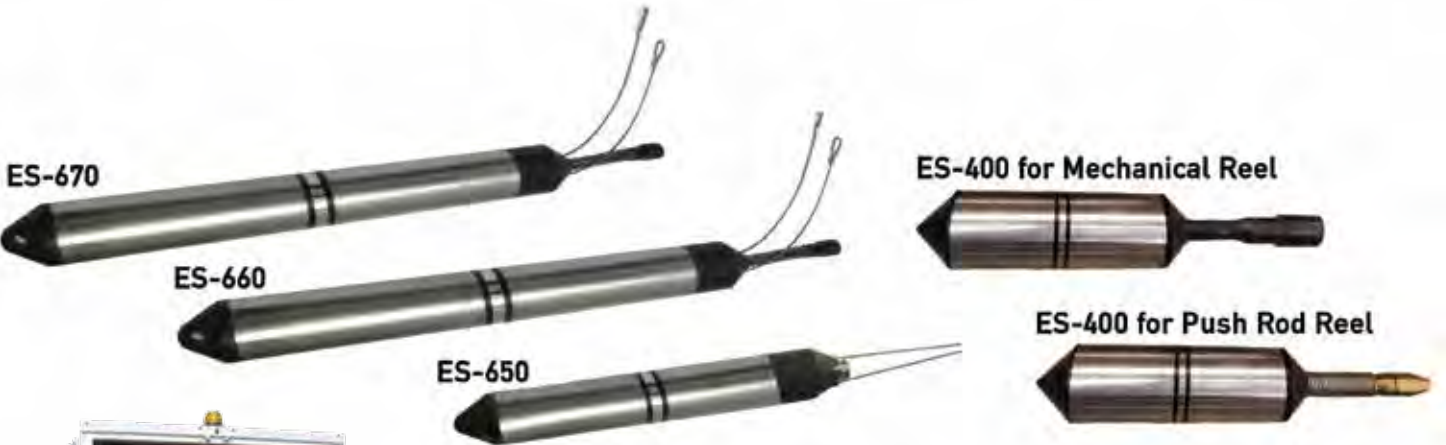
**Ipek**



**Rausch**



**Custom**



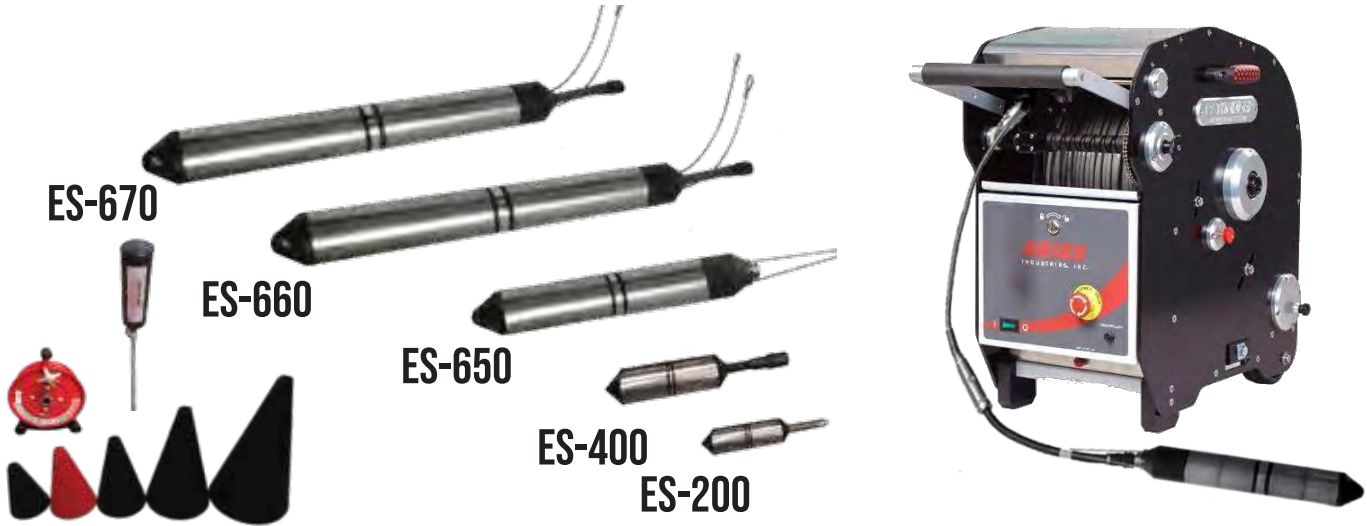
## ES-600 STANDARD SPECIFICATIONS AND FEATURES

<b>ES-600 Series</b>	<b>Conveyance</b>	Combined Sewer & Storm Systems, Separated Gravity Mains, Gravity Water Mains, Force Mains, Siphons, and Stormwater Networks.		
	<b>Required Flow</b>	None. Dry, Partially, or Fully-Surcharged Flow. Aided by Jet Truck.		
	<b>Pipes</b>	<b>Pipe Diameters</b>	ES-670: Up to 72 inch (1800mm) ES-660: 6 to 60 inch (150 to 1500mm) ES-650: 6 to 30 inch (150 to 800mm) ES-400: 4 to 16 inch (100 to 400mm)	
		<b>Pipe Shape</b>	Any, including Circular, Box, Egg-shaped, Oval, and Trapezoidal.	
		<b>Pipe Materials</b>	Any Electrically Non-Conductive Pipe Walls, including Asbestos Cement, Brick, Cement Mortar Lined and Coated Steel, Cured-In-Place Pipe, Ductile Iron with Epoxy Coatings, Fiberglass Reinforced Pipe, High-Density Polyethylene Pipe, Prestressed Concrete Cylinder Pipe, Polyethylene, Polyvinyl Chloride, Reinforced Concrete, Vitrified Clay Pipe, etc.	
	<b>System Specification</b>	<b>Dimensions</b>	ES-660 & ES-670 Length: 36 in (914mm); Diameter: 3 in (76mm)	
		<b>Scan Recording</b>	Critical Sewers® Field Laptop PC, Wifi Connection to Critical Sewers® Cloud Application.	
		<b>Speed</b>	45-60 ft/minute (15-20 meters/minute)	
		<b>Operating Temperature</b>	20°F to 120°F (-7°C to 50°C)	
		<b>Power Supply</b>	120VAC / 60Hz - or - 220VAC / 50Hz	
<b>Range</b>		1,500 ft (460m) range from single point of access.		
<b>Current (max)</b>		40 mA		
<b>Electrical Array</b>		Focused tri-electrode array		
<b>Defect Flow Calculation</b>		± 30% Accuracy measured in Gallons Per Minute (GPM) or Liters Per Second (LPS).		
<b>Defect Location</b>	ES-650 & ES-660 ±0.4 inches (1cm) ES-670 ±1 inch (2.5cm)			
<b>Advantages</b>	<ol style="list-style-type: none"> <li>1. No manual coding required.</li> <li>2. Finds &amp; measures all leaks at cracks, joints, tap connections, and pipe wall.</li> <li>3. Measures leaks in GPM (LPS).</li> <li>4. No bypass pumping required for inspection.</li> <li>5. Use in field rain or shine.</li> <li>6. Recommended for all Pre- and Post-Rehabilitation.</li> <li>7. Finds defects not seen by CCTV, such as inside joints.</li> <li>8. Differentiates superficial cracks from cracks through pipe.</li> </ol>	<ol style="list-style-type: none"> <li>9. Repeatable test results, as verified by US, UK, German, Japanese, and Australian testing.</li> <li>10. Finds &amp; measures defects hidden by grease, silt, &amp; encrustation.</li> <li>11. Automatically evaluates 360° of pipe wall.</li> <li>12. Determines water tightness of sewers &amp; lateral connections.</li> <li>13. Robust design has no moving parts.</li> <li>14. Recommended by WRc, developers of NASSCO CCTV Codes.</li> <li>15. Reports available in minutes, not hours, days, or weeks.</li> </ol>		
<b>Limitations</b>	<ol style="list-style-type: none"> <li>1. Does not provide a clock position of defect location inside the pipe, but location is accurate to within 0.4 inches (1cm).</li> <li>2. Cannot scan pipes with obstructions or collapsed sections.</li> </ol>			



## ES-600 PORTABLE ES-670, ES-660, ES-650, & ES-400

PORTABLE SYSTEMS UTILIZE CUES K2 PORTABLE REEL OR EQUIVALENT



ES-600 SERIES PORTABLE*  CONTINUED FROM PRIOR PAGE	PIPES	PIPE DIAMETERS	6 TO 72 INCH (150 TO 1800MM)
		RANGE	1,000 FT (305 M). DEPENDENT ON JET TRUCK HOSE LENGTH.
		PIPE SHAPE	ANY, INCLUDING CIRCULAR, BOX, EGG-SHAPED, OVAL, AND TRAPEZOIDAL.
		PIPE MATERIALS	ELECTRICALLY NON-CONDUCTIVE PIPE WALLS, INCLUDING ASBESTOS CEMENT, BRICK, CEMENT MORTAR LINED AND COATED STEEL, CURED-IN-PLACE PIPE, DUCTILE IRON WITH EPOXY COATINGS, FIBERGLASS REINFORCED PIPE, HIGH-DENSITY POLYETHYLENE PIPE, PRESTRESSED CONCRETE CYLINDER PIPE, POLYETHYLENE, POLYVINYL CHLORIDE, REINFORCED CONCRETE, VITRIFIED CLAY PIPE, ETC.



**\*FOR DIFFICULT TO ACCESS LOCATIONS AND EQUIPMENT PORTABILITY.**



## ES-400 PUSH ROD

ES-400	PIPES	PIPE DIAMETERS	4 TO 24 INCH (100 TO 600MM)
		PIPE SHAPE	ANY, INCLUDING CIRCULAR, BOX, EGG-SHAPED, OVAL, AND TRAPEZOIDAL.
		PIPE MATERIALS	ELECTRICALLY NON-CONDUCTIVE PIPE WALLS, INCLUDING ASBESTOS CEMENT, BRICK, CEMENT MORTAR LINED AND COATED STEEL, CURED-IN-PLACE PIPE, DUCTILE IRON WITH EPOXY COATINGS, FIBERGLASS REINFORCED PIPE, HIGH-DENSITY POLYETHYLENE PIPE, PRESTRESSED CONCRETE CYLINDER PIPE, POLYETHYLENE, POLYVINYL CHLORIDE, REINFORCED CONCRETE, VITRIFIED CLAY PIPE, ETC
	SYSTEM SPECIFICATION	DIMENSIONS	LENGTH: 8 IN (203MM); DIAMETER: 2.2 IN (56MM)
		SCAN RECORDING	CRITICAL SEWERS® FIELD LAPTOP PC; WIFI CONNECTION TO CRITICAL SEWERS® CLOUD APPLICATION.
		SPEED	30 FT/MINUTE (10M/MINUTE)
		ENVIRONMENTAL	IP 67. ABLE TO WITHSTAND RAIN AND LOW PRESSURE WASH DOWN. 20°F TO 120°F (-7°C TO 50°C)
		POWER SUPPLY	12V RECHARGEABLE EXTERNAL BATTERY PACK -OR- 12V DC EXTERNAL POWER SUPPLY.
		REEL	SPOOL DIAMETER 39 INCHES L32 INCHES W20 INCHES H38 INCHES L81CM, W51CM, H96CM. LENGTH: 400 FT (120 M)
		CURRENT (MAX)	40 MA
ELECTRICAL ARRAY	FOCUSED TRI-ELECTRODE ARRAY		
DEFECT FLOW CALCULATION	±30% ACCURACY MEASURED IN GALLONS PER MINUTE (GPM) OR LITERS PER SECOND (LPS)		
DEFECT LOCATION	±0.4 INCHES (1CM)		
WEIGHT	PROBE: 2.95 LB (1.34KG)   TOTAL WEIGHT 80LBS (36KG)		





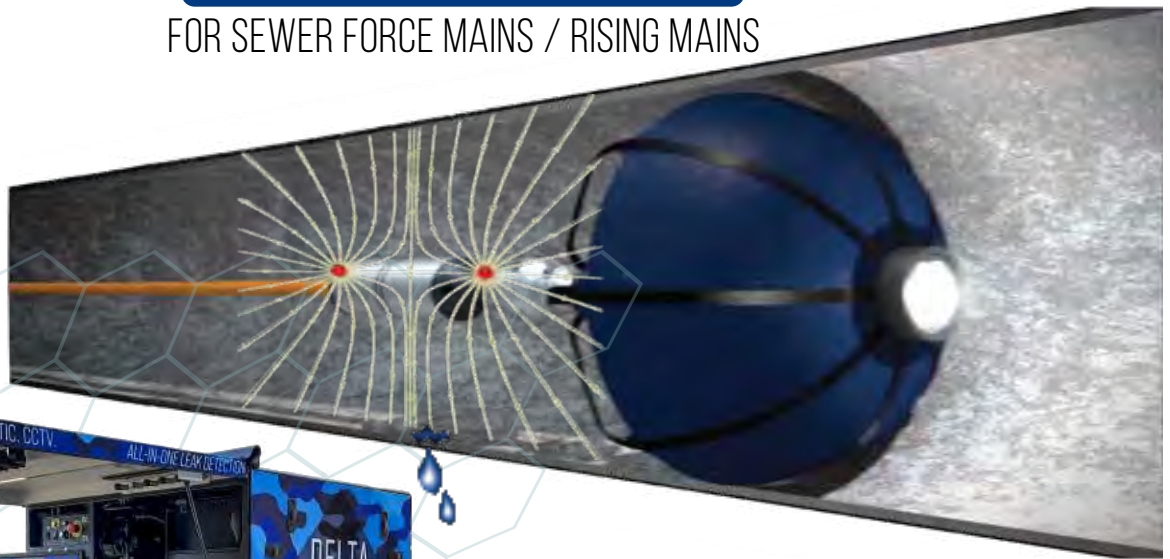
## ES-200 PUSH ROD

<b>ES-200</b>	<b>PIPES</b>	<b>PIPE DIAMETERS</b>	3 TO 8 INCH (76 TO 200MM)
		<b>PIPE SHAPE</b>	ANY, INCLUDING CIRCULAR, BOX, EGG-SHAPED, OVAL, AND TRAPEZOIDAL.
		<b>PIPE MATERIALS</b>	ELECTRICALLY NON-CONDUCTIVE PIPE WALLS, INCLUDING ASBESTOS CEMENT, BRICK, CEMENT MORTAR LINED AND COATED STEEL, CURED-IN-PLACE PIPE, DUCTILE IRON WITH EPOXY COATINGS, FIBERGLASS REINFORCED PIPE, HIGH-DENSITY POLYETHYLENE PIPE, PRESTRESSED CONCRETE CYLINDER PIPE, POLYETHYLENE, POLYVINYL CHLORIDE, REINFORCED CONCRETE, VITRIFIED CLAY PIPE, ETC.
	<b>SYSTEM SPECIFICATION</b>	<b>DIMENSIONS</b>	LENGTH: 6.5 INCHES (165MM); DIAMETER: 1.57 INCHES (39.88MM)
		<b>SCAN RECORDING</b>	CRITICAL SEWERS® FIELD LAPTOP PC; WIFI CONNECTION TO CRITICAL SEWERS® CLOUD APPLICATION.
		<b>SPEED</b>	30 FT/MINUTE (10M/MINUTE)
		<b>ENVIRONMENTAL</b>	IP 67. ABLE TO WITHSTAND RAIN AND LOW PRESSURE WASH DOWN. 20°F TO 120°F (-7°C TO 50°C)
		<b>POWER SUPPLY</b>	12V RECHARGEABLE EXTERNAL BATTERY PACK -OR- 12V DC EXTERNAL POWER SUPPLY.
		<b>REEL</b>	SPOOL DIAMETER 26 INCHES L26 INCHES W12 INCHES H32 INCHES L66CM, W30CM, H81CM. LENGTH: 400 FT (120 M)
		<b>CURRENT (MAX)</b>	40 MA
		<b>ELECTRICAL ARRAY</b>	FOCUSED TRI-ELECTRODE ARRAY
		<b>DEFECT FLOW CALCULATION</b>	±30% ACCURACY MEASURED IN GALLONS PER MINUTE (GPM) OR LITERS PER SECOND (LPS)
<b>DEFECT LOCATION</b>	±0.4 INCHES (1CM)		
<b>WEIGHT</b>	PROBE: 1.1 LB (.50KG)   50LBS (23KG)		



**MULTI-SENSOR DELTA PROBE**

FOR SEWER FORCE MAINS / RISING MAINS



**DWI Reg 31**



**ACOUSTIC\***



**CONDUCTIVITY**



**CCTV**

Condition	Performance
Features	Low Voltage Conductivity FELL, CCTV, Acoustic Hydrophone, Pressure Sensor
Pipe Diameters	8-60 inches (200-1500mm)
Pressure	ZERO to 12 bar (175 psi)
Temperatures	41-86 °F / 5-30° C
Common Launch Points	-4 inch (100mm) or larger air release valve with a corresponding gate or ball valve. -4 inch (100mm) or larger scour drain with a corresponding isolation gate or ball valve. -Installed 4 inch (100mm) or larger hot tap with a corresponding isolation gate or ball valve.
Flow Rate	Min. Flow Rate for Hydrochute Propulsion is 0.3m/sec. Pull-Through able to handle NO FLOW conditions.
Pricing	Per Day or Per Meter Based on Project Size, Access Difficulty, Insertion Points, Diameters, and Traffic Control
Pipe Lengths Per Survey	1 km Recommended for CCTV. Up to 2km with specialized equipment.
Average Production	1-2 Pipe Sections per Day



\* Integrated Acoustic Sensor lets utilities compare results with Conductivity, revealing what they are not hearing.



## MULTI-SENSOR DELTA PROBE FOR SEWER FORCE MAINS / RISING MAINS

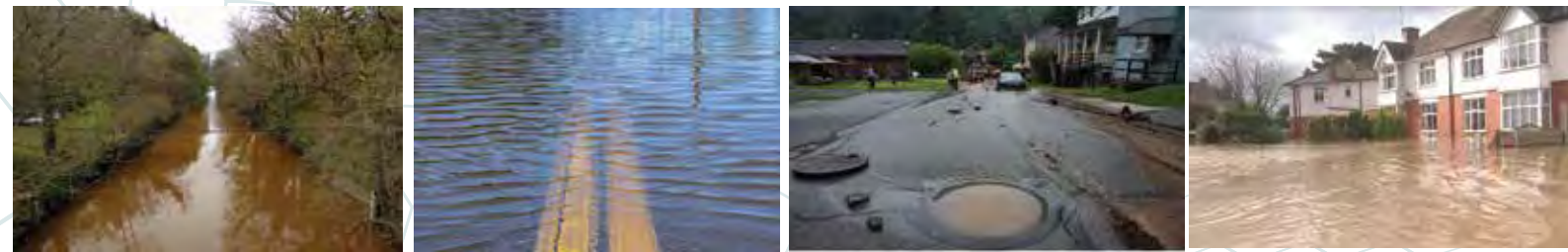
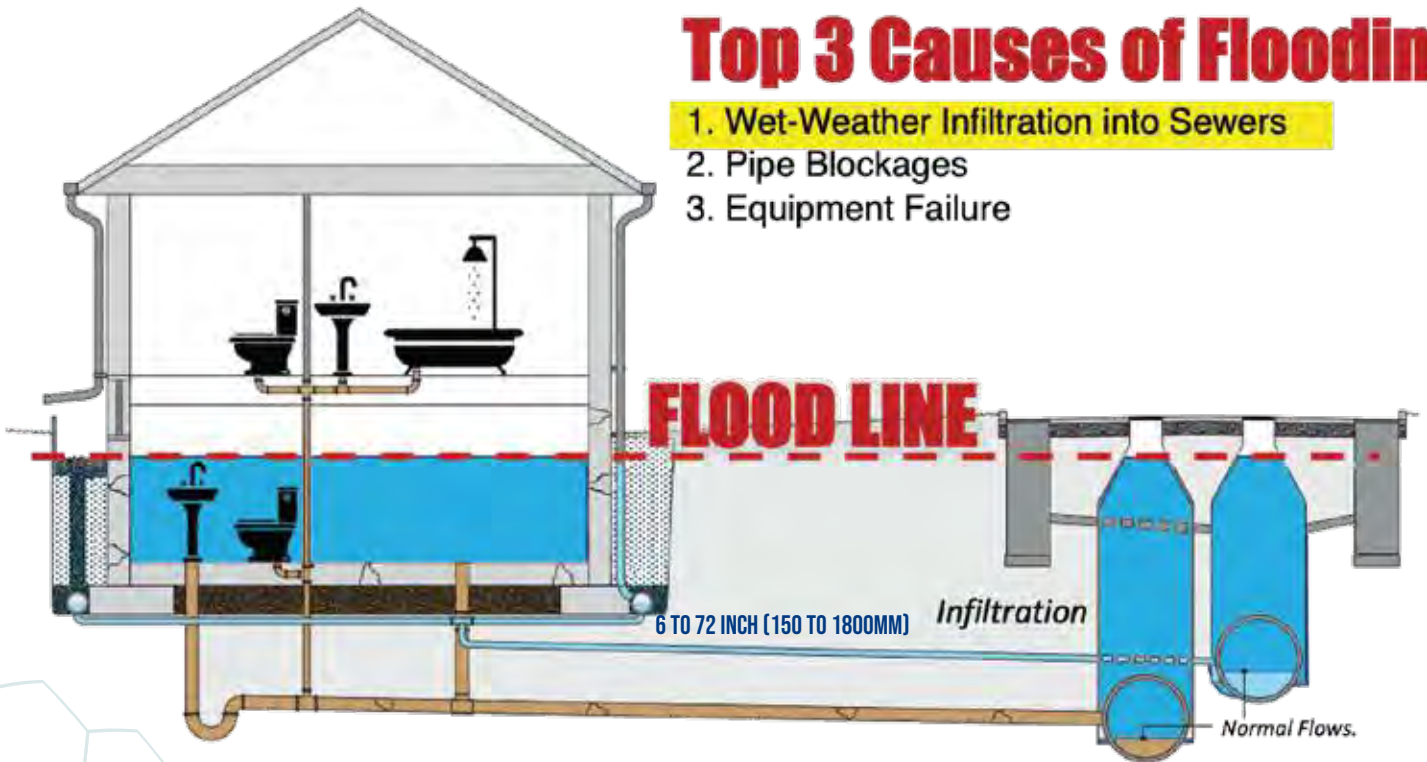




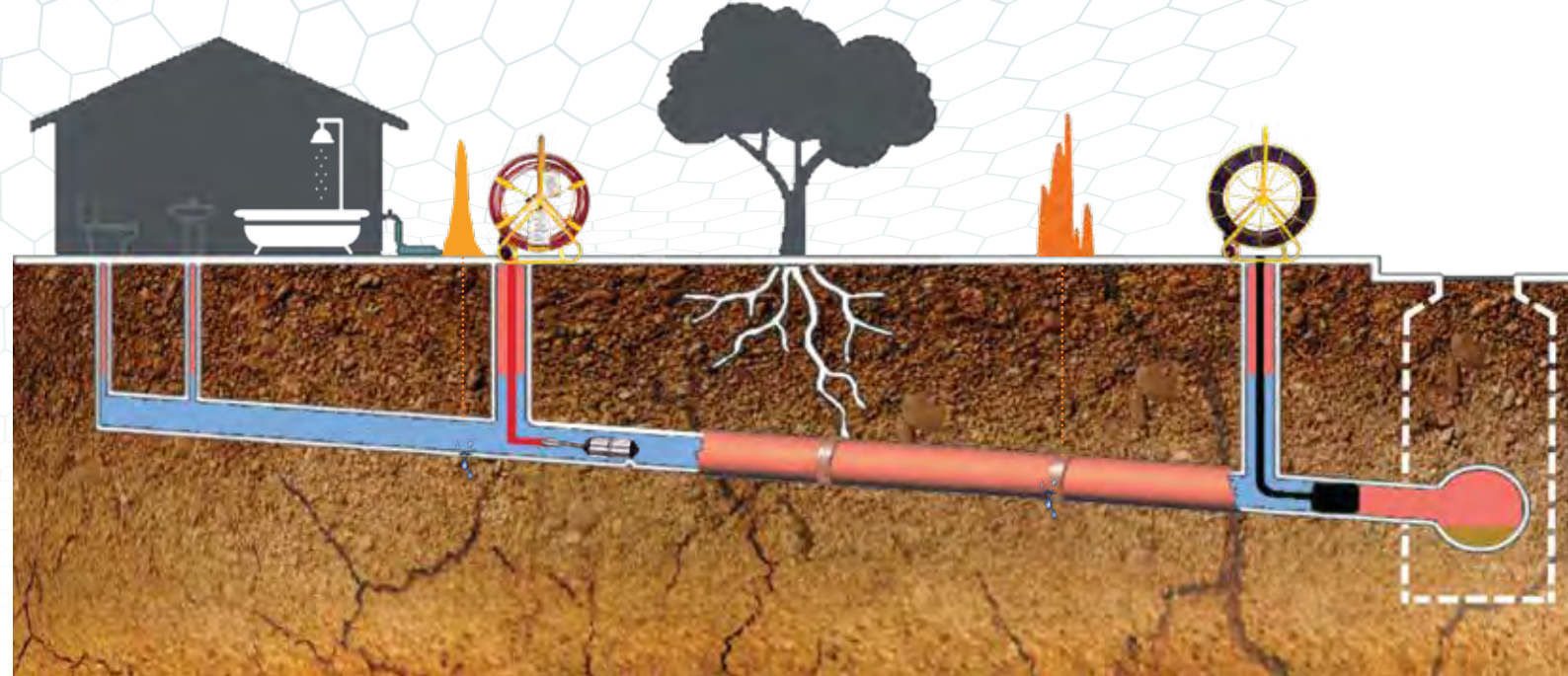
## SEWER LATERAL ASSESSMENT

### Top 3 Causes of Flooding

1. Wet-Weather Infiltration into Sewers
2. Pipe Blockages
3. Equipment Failure



**Focused Electrode Leak Location (FELL) is an “unambiguous way to detect leaks in service laterals.”**





## CRITICAL SEWERS® CLOUD APPLICATION

critical sewer®

Home
My Electro Scan
Edit Scans
Export
Support
Log Out

Scans	Distance	Pinhole	Small	Medium	Large	Total Defects	GPM	GPD	GPD/IDM
13,679	2,461,227	19,542	227,599	44,108	54,727	345,976	412,822.75	594,464,759	6,756,695,936

Date	Mainline ID	Pipe ID	Pipe Type	Diameter	Small	Medium	Large	Total Defects	GPM	GPD	GPD/IDM
8/5/2020	B05-046 - B05-074	B05-046 - B05-074	VCP	6	645	0	78	723	371	983.46	1,416,182
1/4/2019	B05-046 - B05-074	B05-046 - B05-074	VCP	6	652	0	49	701	339	839.16	1,208,390
9/16/2019	C04-294 - C04-145	C04-294 - C04-145	VCP	6	545	0	59	604	310	872.61	1,256,558
6/22/2016	85-002-11 - 85-002-10	85-002-11 - 85-002-10	VCP	8	535	0	16	551	233	901.17	1,297,885
1/7/2019	C04-092 - C04-093	C04-092 - C04-093	VCP	6	445	0	33	478	245	759.33	1,093,435
8/4/2020	C04-092 - C04-093	C04-092 - C04-093	VCP	6	509	0	59	568	259	1,532.90	2,207,376
8/22/2019	C04-094 - C04-093	C04-094 - C04-093	VCP	6	445	0	26	471	229	1,030.82	1,484,381
11/1/2016	HH0637 - HH0636	HH0637 - HH0636	VCP	12	113	0	4	117	200	1,943.35	2,798,424
12/13/2018	C05-261 - C05-229	C05-261 - C05-229	VCP	6	439	0	43	482	252	779.20	1,122,048
12/5/2018	C04-294 - C04-145	C04-294 - C04-145	VCP	6	545	0	50	595	296	729.32	1,050,221
1/7/2019	C04-094 - C04-093	C04-094 - C04-093	VCP	6	442	0	22	464	222	778.05	1,120,392
5/2/2020	Pit A - Exit Pit A	HDPE	PE	8	387	0	95	482	438	513.93	740,059
8/5/2020	C04-092 - C04-093	C04-092 - C04-093	VCP	6	445	0	17	462	223	636.36	916,358
8/5/2020	C04-083 - C04-083	C04-084 - C04-083	VCP	6	449	0	24	473	217	968.58	1,394,755
9/16/2019	C04-180 - C04-180	C04-329 - C04-180	VCP	6	386	0	8	394	179	839.87	1,209,413
11/1/2016	85-002-10 - 85-201-09	85-002-10 - 85-201-09	VCP	8	534	0	30	564	165	756.68	1,089,619



**CONFIRM SATELLITE 'POINTS OF INTEREST'**

<b>Satellite/Drones</b>			<b>Electro Scan</b>											
<b>HITS</b>		<b>MISSES</b>	<b>PIPE-SPECIFIC LEAK QUANTIFICATION</b>											
Matching Severe Leaks	Matching Moderate Leaks	Matching Small Leaks	Missed Small Leaks	Missed Moderate Leaks	Missed Severe Leaks	Pipe Material	Pipe Diameter	GPM	Pipe Length	Number of Leaks				
										Pinhole	Small	Medium	Large	Total

Satellite Imagery & Aerial Drone Water Leak Screening Technologies  
 APEM, Orbital Eye, Orbital Sidekick, Parrot, Rezatec, Satelytics, Utilis, WADI, Workswell

**Don't Let 'MISSED' Leaks Using Acoustic Sensors Turn You 'Off' to Using Satellites or Drones to Screen for Leaks!**



**USE ELECTRO SCAN AS YOUR 'BOOTS-ON-THE-GROUND' TO LOCATE WITH 0.5" / 1CM ACCURACY AND SEVERITY IN GPM / LPS**



# electro scan inc.

## SERVICES

### CONTRACT SERVICES

Direct Services By Electro Scan's International Field Teams

### TECHNOLOGY LICENSING

Licensing to 3rd Party Authorized Contractors Utilizing Electro Scan Certified Equipment

### UTILITY SALES & SOFTWARE CLOUD LICENSING

SPECIFIC PRICING AVAILABLE UPON REQUEST



# ACCURATE, FAST, REPEATABLE



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International Patents and Patents Pending.