Future Water Association

Informing, Innovating, Influencing

Horizon Water Infrastructure

AHS PIPELINE INNOVATION

OVARRO

Leakage and Metering Conference

Meeting Leakage Targets for AMP8

ARUP

Welcome to Birmingham Office

Fire Alarm

Test takes place on **Fridays at 09.30am.**

If you hear the fire alarm and the instructions to evacuate, please follow our Fire Marshals out of the building using the marked escape routes and proceed to the Assembly Point in **City Centre Gardens** behind Birmingham Library.

DO NOT use the central stairs to evacuate

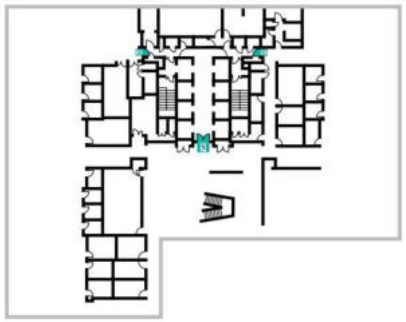
When using the stairs please always observe the following

Do Not use mobile phones or other devices while using the stairs.

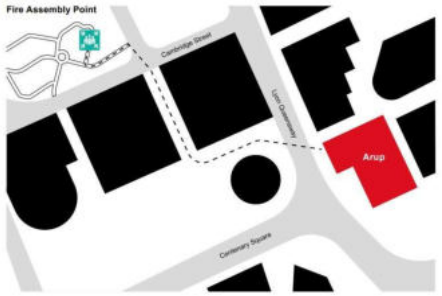
Hot drinks and food should not be carried on the stairs.

Hold on to handrails wherever possible.

Please always wear your ID whilst in the building



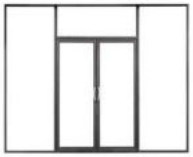
Fire Exit x3 on each floor plate



Assembly Point
Cite Centre Gardens

First Aid

For First Aid assistance contact **Reception** or call **0121 213 3888** from any phone.



The glass doors leading to the lift lobby and toilets are automatic and activated by using your ID/ Visitor pass. Please **DO NOT** push or pull these doors.

Future Water Association

Informing, Innovating, Influencing

Horizon Water Infrastructure

AHS PIPELINE INNOVATION

OVARRO

Opening Remarks

Paul Horton, CEO
Future Water Association

Our Mission

Future Water Association

Informing, Innovating, Influencing

Since forming in 1986, Future Water Association has aimed to shape the future of our industry by informing, innovating and influencing.

We are the voice of the water sector, advocating with Government, industry, members, and the public.

Through collaboration, innovation and honest dialogue, we can facilitate positive change in the UK water industry.

Our theme for 2025 is Transformation of the Water Sector.

Future Water Association

Informing, Innovating, Influencing

What are the Future Water Working Groups?

- Future Water's working groups are collaborative hubs bringing together experts from across the water sector to tackle key challenges and drive transformation.
- Each Future Water working group is made up of a diverse range of professionals from across the entire water supply chain: Water companies, Regulators, Tier 1 and Tier 2 contractors, Consultancies and specialists, Startups and innovators, Suppliers and manufacturers
- Each group benefits from real-world perspective, technical expertise, and strategic alignment, while also creating space for new voices, bold ideas, and collaborative problem solving. It's this diversity that enables Future Water to take a truly system-wide view and drive forward meaningful, sector-wide transformation.

Future Water Association

Informing, Innovating, Influencing

OVARRO CONNECTING TECHNOLOGIES

AHS PIPELINE INNOVATION

eps

TRANSFORMATION PARTNER

Horizon Water Infrastructure

Leakage Group

Future Water Association
Informing, Innovating, Influencing

+

Horizon Water Infrastructure

AHS PIPELINE INNOVATION

OVARRO

The challenge being addressed is to create place where water company network managers and operators, and the supply chain, can share knowledge and/or collaborate on innovations and emerging products and services aimed at specific areas (such as managing leakage, meeting leakage targets, making networks smarter) for mutual benefit.

Bring suppliers together to focus on meeting the leakage challenges, current & future. Drive innovation among suppliers in the leakage space.
Share updates on current challenges that members are working on. Identify the standards and regulations that are challenging for the sector.
Showcase or highlight where interventions are effective in tackling leakage – bringing a focus to detection.
Engage with other organisations, regulators, professional bodies and water utilities to develop forward thinking around leakage.
Facilitate the exchange of information between the supplier and customer.

This year at FWA

Future Water Association

Informing, Innovating, Influencing

Horizon Water Infrastructure

Hosted 20+ events.

Awards Ceremony recognising the incredible people that make up our sector.

Represented our members at multiple industry events across cyber, net zero, innovation, skills.

Released a series of 3 podcasts on transforming the sector with Horizon Water Infrastructure.

This year at FWA

Future Water Association

Informing, Innovating, Influencing

Horizon Water Infrastructure

Policy impact

Held 3 webinars to inform our response to the Cunliffe Commission.

Worked directly with the Commission.

From the draft report, there were areas of significant correlation with our input.

Future Water Association

Informing, Innovating, Influencing

Cunliffe Report

Thematic Area	Alignment Level	Notes
Strategic Planning & Vision	✅ Strong	Shared call for long-term, integrated strategy
Regulatory Architecture & Culture	✅ Strong	Agreement on systemic reform and culture shift
Environmental Integration	✅ Strong	Aligned on coherence, priority-setting
Ownership & Governance	✅ Medium-High	Different emphasis but same reform goals
Infrastructure & Innovation	✅ Strong	Agreement on visibility, standards, incentives
Workforce & Skills	✅ Medium-High	FWA stronger on detail (cyber, skills strategy)

Upcoming Events

14 July 12.30-1.30pm Online	Networks November Launch Webinar
15 July 12.30-1pm Online	A Year in the Life of a Future Water member
09 September 10.30-3pm Bristol	Cyber Resiliency in the Water Sector

Future Water Association

Informing, Innovating, Influencing

Networks November 2025

4 Nov — 9:30am - 3:30pm — A Year in Water Review — London

6 Nov — 9:30am - 3:30pm — Asset Resilience and National Standards Workshop — Stantec London

11 Nov — 9:30am - 4:00pm — Thinking as a system: Digitising Assets and Data Standards — Bristol University

13 Nov — 9:30am - 3:45pm — Could the future of water be grown not built? — Online

18 Nov — 9:30am - 3:30pm — Leakage Workshop with Spring, WRc and Ofwat — Swindon

19 Nov — 9:00am - 4:00pm — Networks for Growth - Making Water Connections Work for New Builds — Online

20 Nov — 9:30am - 3:30pm — Emerging Talent Sector Entry Session — L+G Manchester

25 Nov — 9:00am - 12:00pm — Procurement for Innovation Roundtable — Xylem Letchworth

27 Nov — 9:00am - 4:00pm — Water Dragons at FloodEx — London

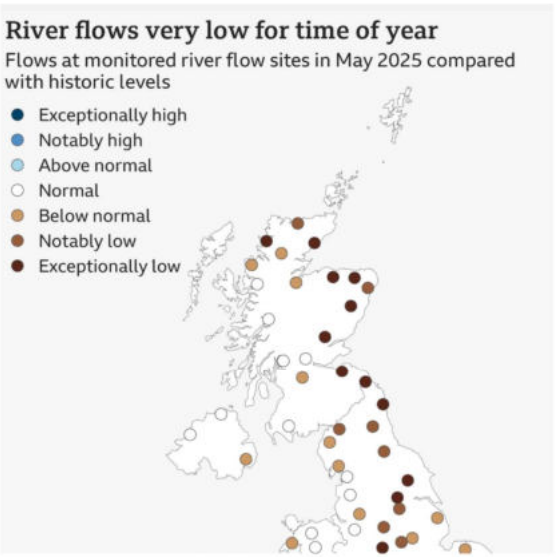
02 Dec — 10:00am - 12:00pm — **Future Water Report Card 2.0 Release** — London

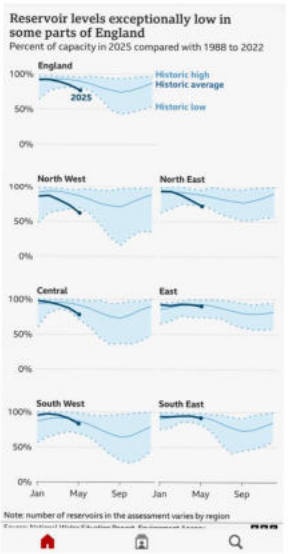
WWW.FUTUREWATERASSOCIATION.COM

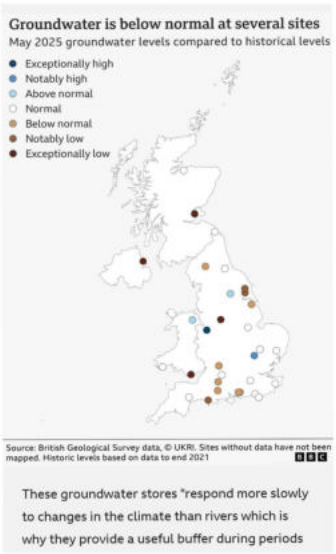
Future Water Association

Informing, Innovating, Influencing

Horizon Water Infrastructure







Future Water Association

Informing, Innovating, Influencing

Horizon Water Infrastructure

AHS PIPELINE INNOVATION

OVARRO

- *Speaker:*
  - *James Hargrave, Anglian Water*

AMP8 and the Leakage Targets – Realistic or Reckless?

me

James Hargrave

my job

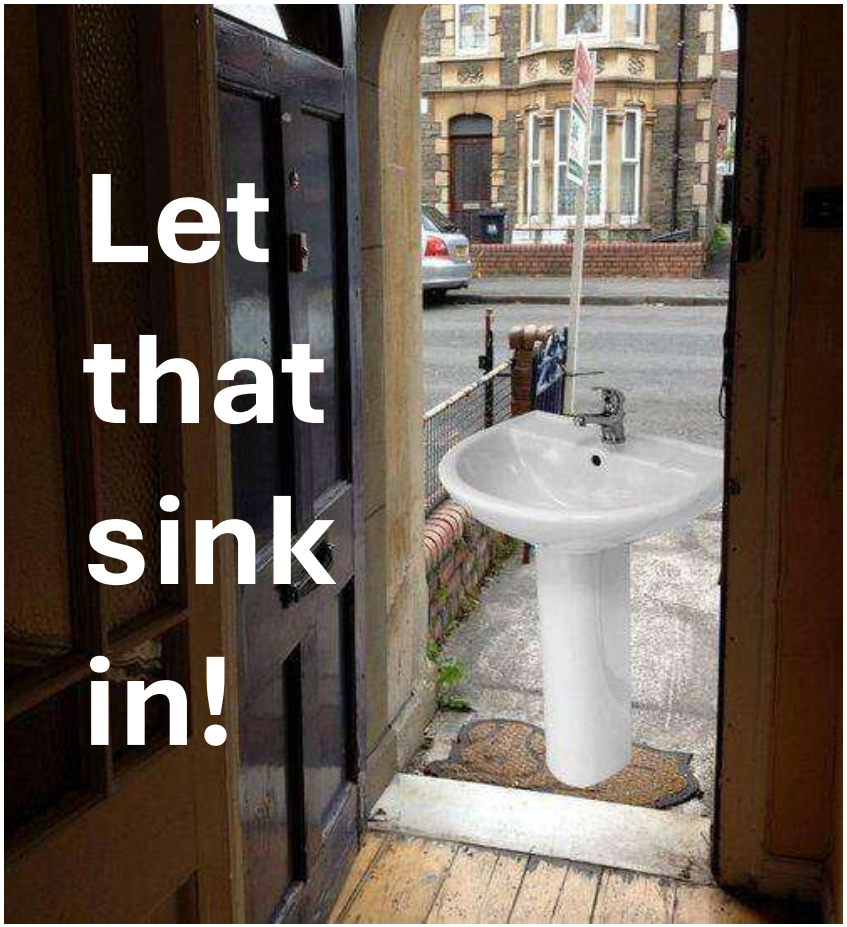
Head of Leakage Operations

where I work

More than 1 trillion litres lost each year!

(in England & Wales)

That’s enough water to supply the worlds most most water stressed country!


Let
that
sink
in!

KW

#1 most water stressed country

Kuwait

Rank	Country	Key Challenges
1	Kuwait	Virtually no renewable water; relies almost entirely on desalination

According to published data; real leakage is relatively low (5-12% real losses), but NRW may be as much as **50%** due to metering issues and unbilled use

Plans to install 500,000 smart water meters with the first batch of 125,000 to be installed in 2025

(smartwatermagazine.com)

Top 5 most water stressed nations...

Rank	Country	Key Challenges
1/164	Kuwait	Virtually no renewable water; relies almost entirely on desalination
2/164	Cyprus	Limited rainfall and high tourism-driven demand
3/164	Oman	Arid climate; heavy reliance on desalinated water
4/164	Qatar	No rivers; high domestic water use and agricultural demand
5/164	Bahrain	Overexploited groundwater and minimal rainfall

These countries withdraw over 80% of their available water supply annually...
(Water Stress Index, 2025)

UK ranking **94th** / 164

So, where could we look for inspiration?

DK
Denmark

Denmark's combination of **innovation and technology, governance, and culture of efficiency** makes it a standout...

Global Water Stress Index score: **107th** / 164

DK
Denmark

- Consistently achieve NRW levels below **7%**
  (1.2-1.5m^3/day /km)

- **LEAKman initiative:** A collaboration of nine Danish partners – including utilities, tech firms, and the Technical University of Denmark – developed a holistic leakage management model that combines **smart metering, pressure management, rapid leak detection, and pipeline rehabilitation**

- **Policy and pricing:** Water is priced to reflect its true value, incetivising both utilities and consumers to minimise waste

€808.21 / year (€9.85 per cubic metre)

What do we need?

Innovation!

When do we want it?

Now!

Or do we...

How do we know our organisations are prepared and capable of driving change through innovation?

Why are people so important to innovation?

#1

People are the heart of innovation

- not just because they invent things, but because they imagine what *could be*.

#2

Creativity & Imagination

Machines can mimic patterns, but only people dream up new worlds, new solutions, and impossible ideas.

Think of the leap from candles to electric light - that wasn't just efficiency; it was vision.

#3

Collaboration & diversity

Innovation thrives on different perspectives. People from varying backgrounds bring unique insights that challenge the status quo.

The magic often happens not in isolation, but in teams bouncing ideas off each other, building something richer together.

#4

Empathy & purpose

Human problems are what drive innovation in the first place - how do we live better, communicate more easily, cure diseases?

People empathize with other people, and that emotional intelligence guides meaningful, human-centered solutions.

#5

Intuition & adaptability

When faced with uncertainty or an unexpected challenge, humans can pivot, improvise, and “feel” their way through the unknown.

Many breakthroughs happen when people notice a problem others overlooked and reframe it in a new light.

“So, while AI and tools (like me!) can support and accelerate the process, it's people - curious, bold, and beautifully imperfect - who light the spark of innovation and keep it burning”

(CoPilot, 2025).

Thank-you

شكرًا

Ευχαριστώ

Tak

Panel session

Is Ofwat's 17% leakage reduction target by 2030 realistic – or is it setting up the sector to fail?

- **Who should be held accountable for delivering these targets -** water companies, the supply chain, or the regulators themselves?
- **Do current metrics and incentives support long-term leakage reduction -** or do they encourage short-term box ticking?
- **How critical is culture, skills, and workforce development in meeting leakage targets -** are we investing in the people behind the pipes?

Future Water Association

Informing, Innovating, Influencing

Horizon Water Infrastructure

AHS PIPELINE INNOVATION

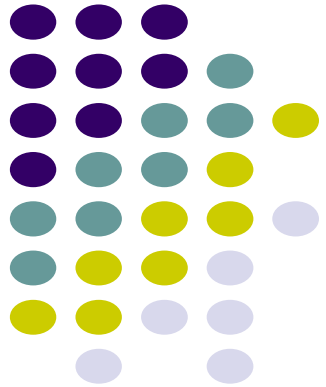
OVARRO

- *Speaker:*
  - *Jo Parker, Watershed Associates*

The Reality of Mains Installation and Replacement

The Reality of Mains Installation and Replacement

Jo Parker



WATERSHED ASSOCIATES
TECHNICAL AND MANAGEMENT CONSULTANTS

NEW INSTALLATION

New pipe networks can be leak free

e.g. PE Electrofusion

- Correct wipes used
- Pipe kept clean
- Fittings kept clean
- Properly clamped
- Machine calibrated
- Cooling times not rushed

i.e. observe the proper processes

Reference: Achieving zero leakage by 2050; Laying leak free new networks17/WM/08/64

2010 UKWIR Report: Leakage from Polyethylene Pipe Systems

- Electrofusion joints are more likely to fail than other joints e.g. butt fusion, fluid filled
- 20% of electrofusion joints have a lifespan < 50 years
- Failure rates examined at that time showed 3-4 failures per 100km per year

Reference:
Leakage from Polyethylene pipe systems 10/WM/08/43

Do new networks still leak?

Subsequent UK studies

- Confirmed that some PE pipe networks are still leaking
- Overall leakage lower than average for the companies studied
- Some PE networks show negative leakage
- A lack of information about the networks
  - Who installed them?
  - Type of joints
  - Make of pipe/joints
  - Information about pressure tests

Managing leakage is enough of a challenge .....

…..without adding to it

What can water utilities do?

- Provide detailed information in their design and construction specification
- A picture speaks a thousand words
- Ensure all contractors work to the same standards
- Provide adequate oversight
- Ensure pressure testing is done to standard
- Maintain full records
- Use new DMAs to check night use assumptions

Pipe Testing

WATER INDUSTRY SPECIFICATION

WIS 4-01-03

Issue 1
March 2024
(Page 1 of 33)

UK Water Industry

Specification for hydrostatic pressure testing of polyethylene and polyethylene barrier water supply pipelines and sewer rising mains

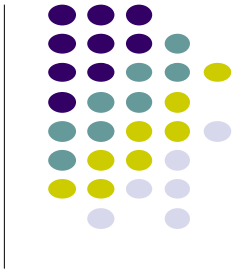
CONTENTS

Current tests don’t always show future problems

Will multi-utility design and installation help?

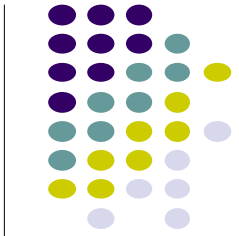
UK Self lay vv directly employed

Areas covered (1)



- Responsibilities
- Risk of losing accreditation
- Scope
- Competency
- Sub-contractors
- Methods of working – method statements
- Work control & management

Areas covered (2)



- Approved suppliers and management
- Audit
  - More now using audit apps
- Contract documents and record control
- Legislation and standards
- Quality and safety systems
- Human Resources and Training

Human Resources and Training

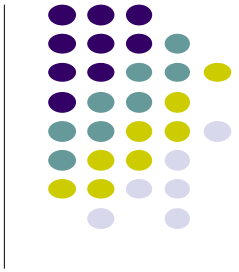
- Under WIRS all staff should be competency assessed annually
  - Sadly this can often just be a paperwork exercise
- Energy and Utility Skills Registration Scheme
  - Network Construction Operations
    - Now required for all operatives, not just self lay
  - Safety, Health and Environmental Awareness
  - National Water Hygiene

External Audit

- Do the staff have the relevant experience and knowledge
- Are we checking the important issues
- Could we make more use of photos and videos?

Summary

- Managing new mains installation **IS** a leakage matter
- PE pipe systems can be leak free
- PE pipes can leak if not installed properly
- Do you have the information you need to verify the process is under control?
- Will the pipes and fittings last for their design life?



REPLACEMENT

The challenge of replacing mains

- AMP 7 rate around 0.4% per annum
- In 2023 the NIC stated that underground asset renewal rates should be significantly higher
- Ofwat's response was
  - average mains renewal rate of 1.4% per year before 2008
  - 40% of network less than 30 years old
  - wants to see a more holistic and complete view of asset health
- In this AMP replacement rate due to triple

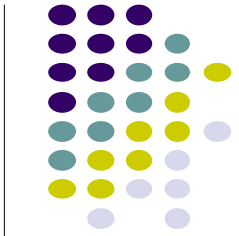
Are we measuring the right things?

- Ofwat records ‘mains bursts’
- Ferrules, fittings (hydrants etc.) and comm pipes excluded
- Supply pipes are also excluded
- Do we understand enough about pipe deterioration?

There has been research……..

- 2007 Linking distribution mains rehabilitation to performance
- 2018 The Impact of Burst-Driven Mains Renewals on Network Leakage Performance
- 2025 Understanding how the deterioration of cast iron pipes evolves into leakage (to be published shortly)
- 2025 A Review of the success of previous mains renewal methods (to be published shortly)

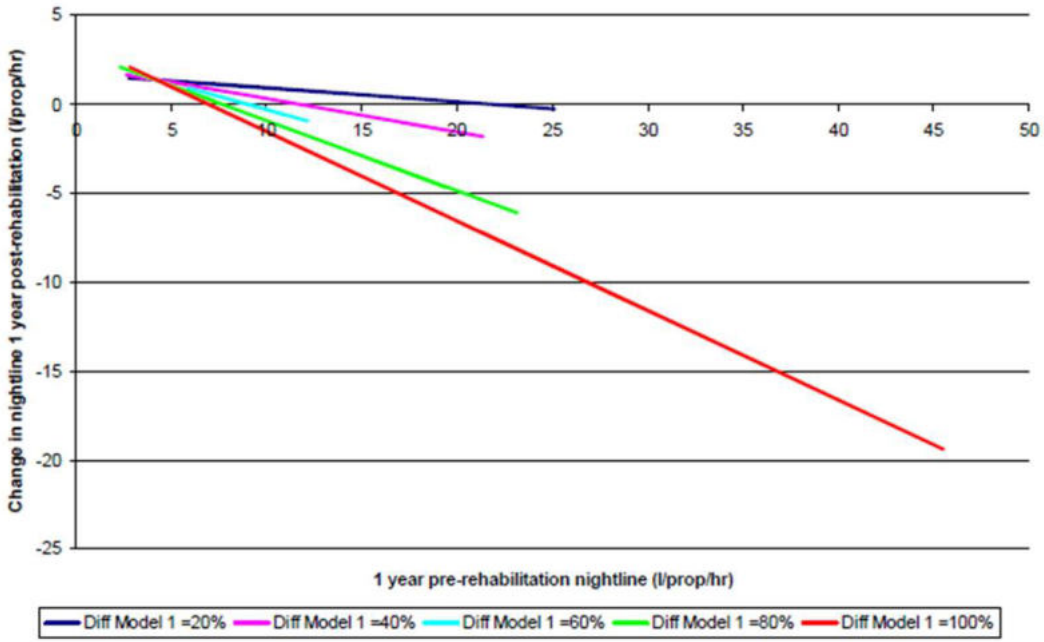
2007



- Most benefit in DMAs with high nightlines
- Reductions strongly correlated with amount of mains replaced in the DMA
- Significant reduction in repairs on replaced sections
- Customer side leakage may increase
- Replacing com pipes and stop taps further reduces nightlines

Relationship to % mains replaced in a DMA

Figure 15 Modelled change in nightline 1 year pre- to 1 year post-rehabilitation for different percentages of mains replacement



2018 Impact of a burst-driven mains renewal programme on leakage control effort

- Took data from 4 water companies in renewed areas
- Balanced against non-renewal areas to eliminate e.g. weather
- Developed models to predict:
  - Leakage
  - Natural Rate of Rise of Leakage
  - Minimum Achieved Leakage (MAL)
  - Leak Detection Hours
  - Mains Repairs (4 companies)
  - Repairs on Renewed Mains (1 company)
  - Supply Interruptions (2 companies)

Improvements in DMA metrics

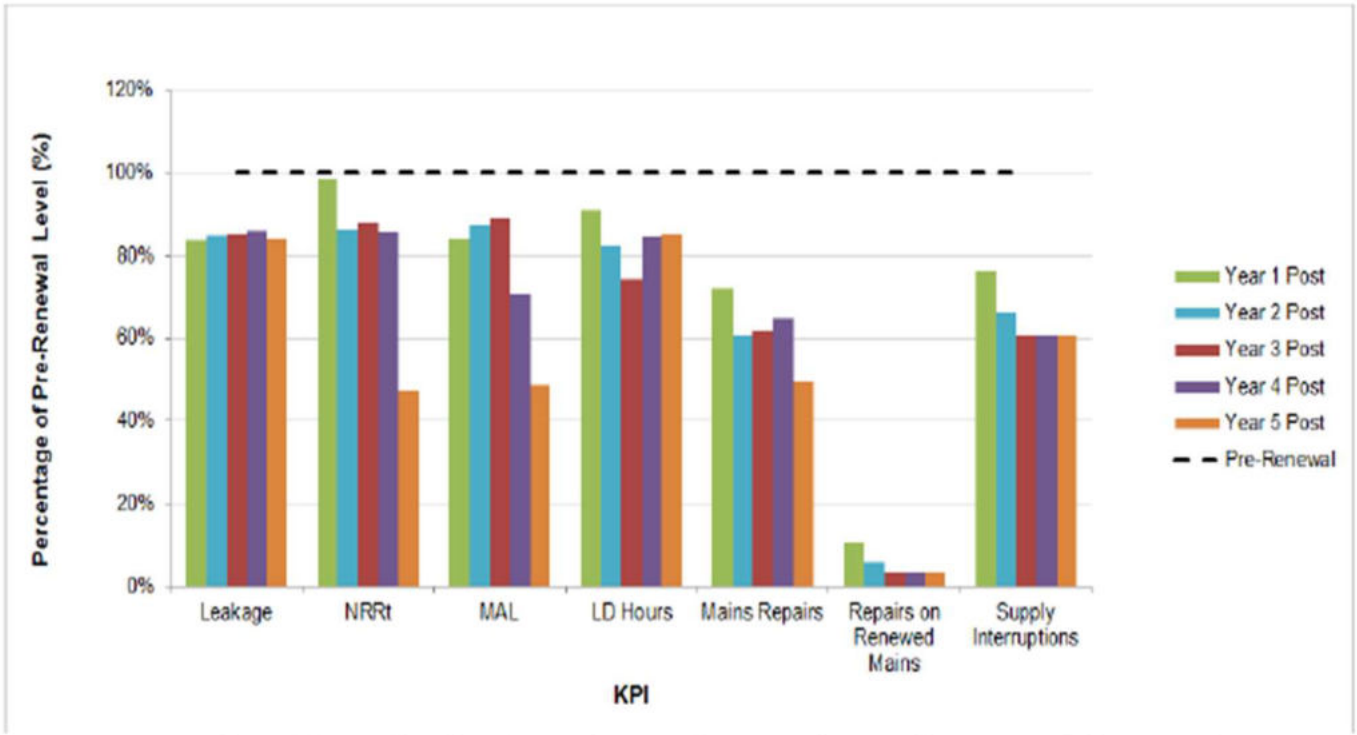
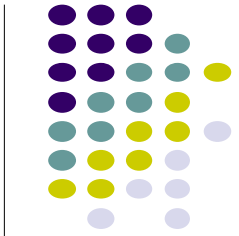


Figure 4-1 Predicted benefits for the industry data set by application of the actual amount of burst-driven mains renewal undertaken by DMA.

2025

- Wide variety of methods available
- New methods being developed
  - E.g. designer liner project
- Some skills lost in the UK
  - Organisations like UKSTT and PIG working to develop these
- Need to take the following into account
  - Length, depth and diameter of main
  - Urban or rural location
  - Traffic management costs
  - Future performance
- Regulation



WATCH OUT FOR NEW UKWIR REPORTS

THANK YOU

QUESTIONS?


Future Water Association
Informing, Innovating, Influencing
Horizon Water Infrastructure
AHS
PIPELINE INNOVATION
OVARRO
Water Dragons:
Leakage Heat
HYDROSAVE
wrc
Independent | trusted | innovative

Innovative solutions
for valuable resources

GWF

THE £[BILLIONS] LEAKAGE PREDICAMENT

GWF BALANCE: Driving Results with Purpose: Stop Guessing, Start Knowing.

03 July 2025 Alessandro Gori, Mark Shepherd, Brynn Williams

Against a backdrop of high leakage, strict targets and stiff penalties, Why are results not being achieved?

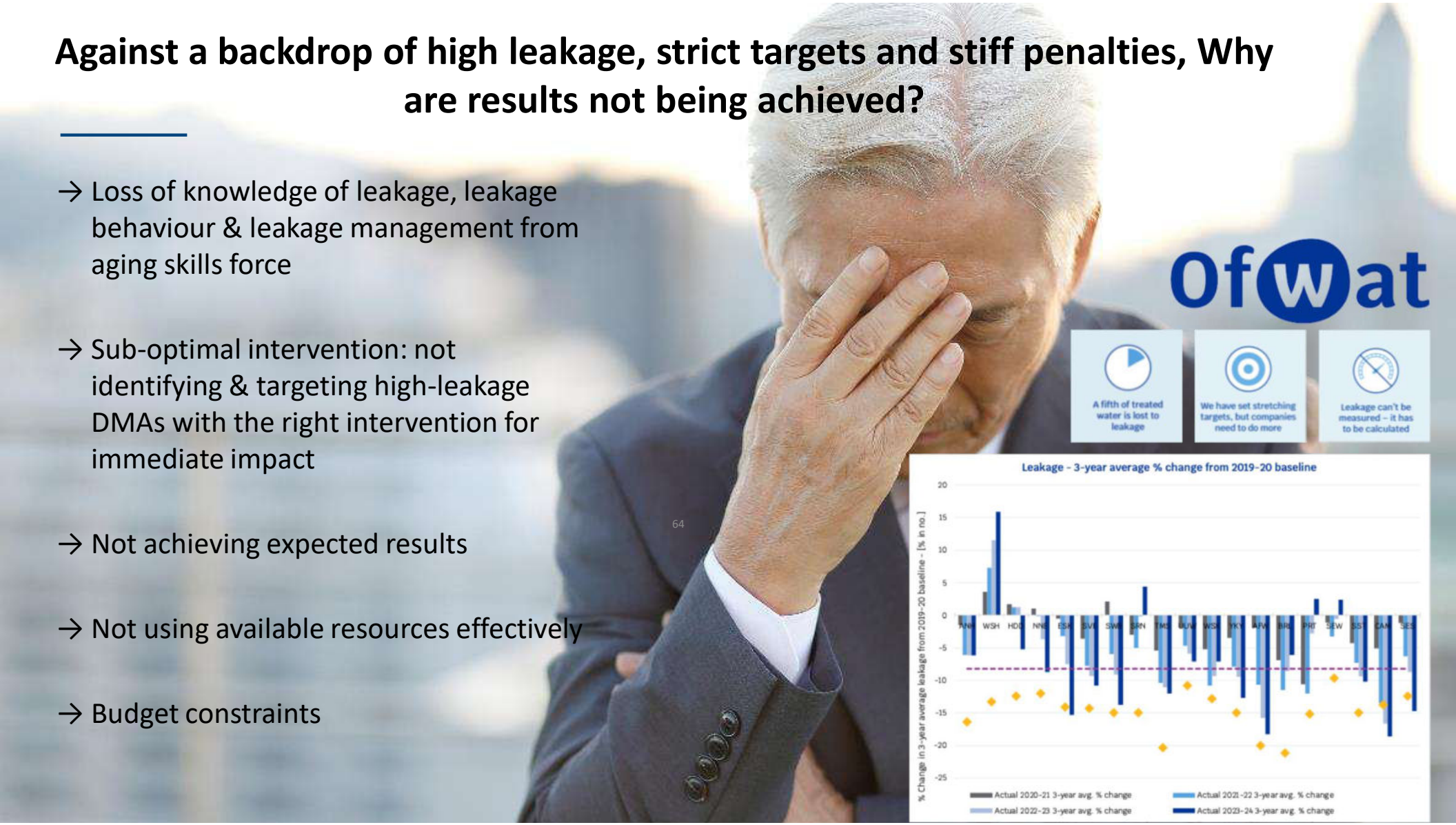
→ Loss of knowledge of leakage, leakage behaviour & leakage management from aging skills force

→ Sub-optimal intervention: not identifying & targeting high-leakage DMAs with the right intervention for immediate impact

→ Not achieving expected results

→ Not using available resources effectively

→ Budget constraints



BALANCE ig gwf

Direction, Strategy, Targets, Budgets, Reporting

System Modelling

BALANCE Data-Driven Decision Intelligence

Network Information

Hardware & Equipment

Resource & Effort Allocation Optimisation

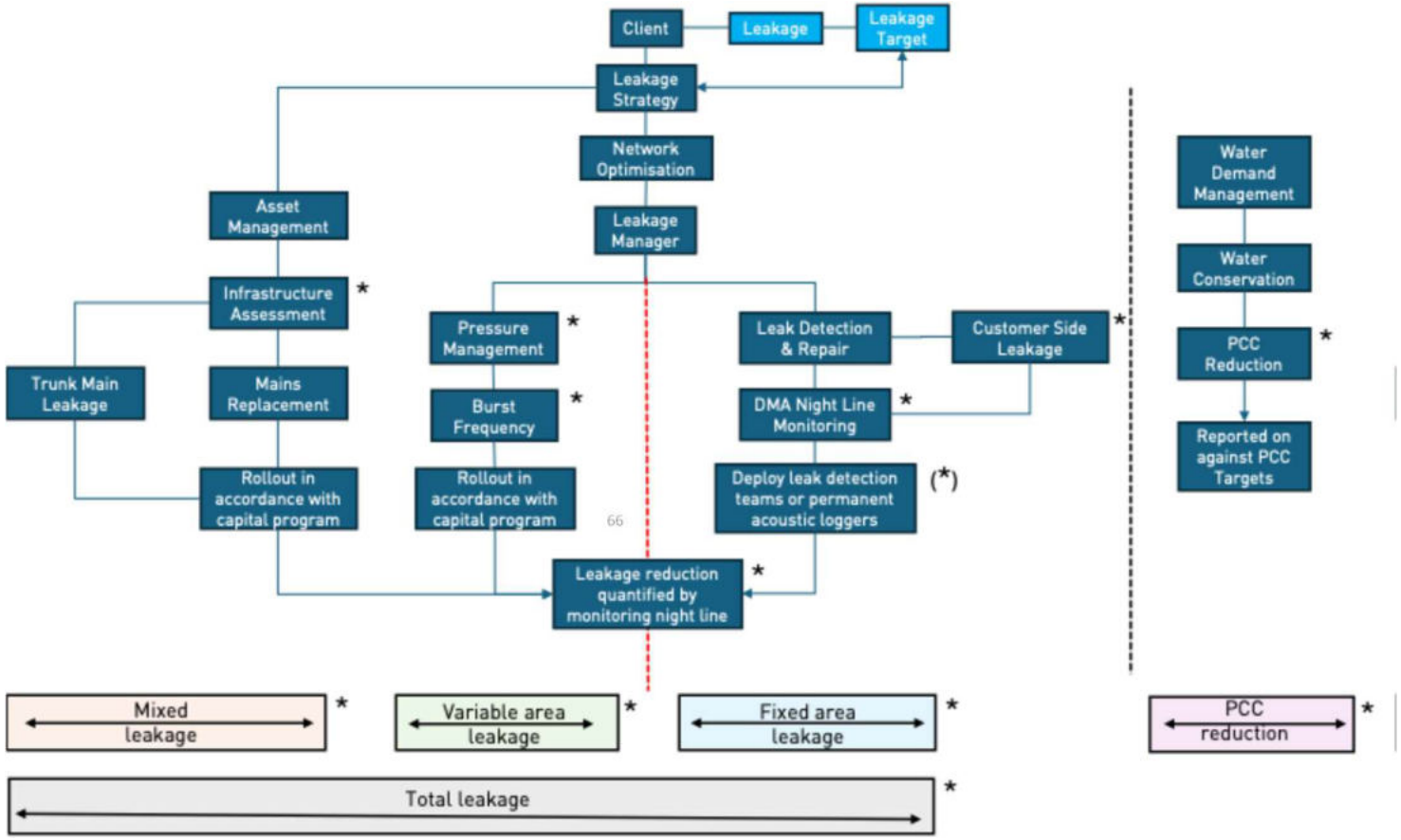
Leakage Reduction Implementation

Detailed Hydraulic Modelling

Impact & Results Validation

Digital Twinning, AI & Algorithms

Which leakage intervention is the right one?



Data-driven solutions. Maximum impact.

Not a magic wand. A powerful system with a brutally simple purpose.

BALANCE guides you to:

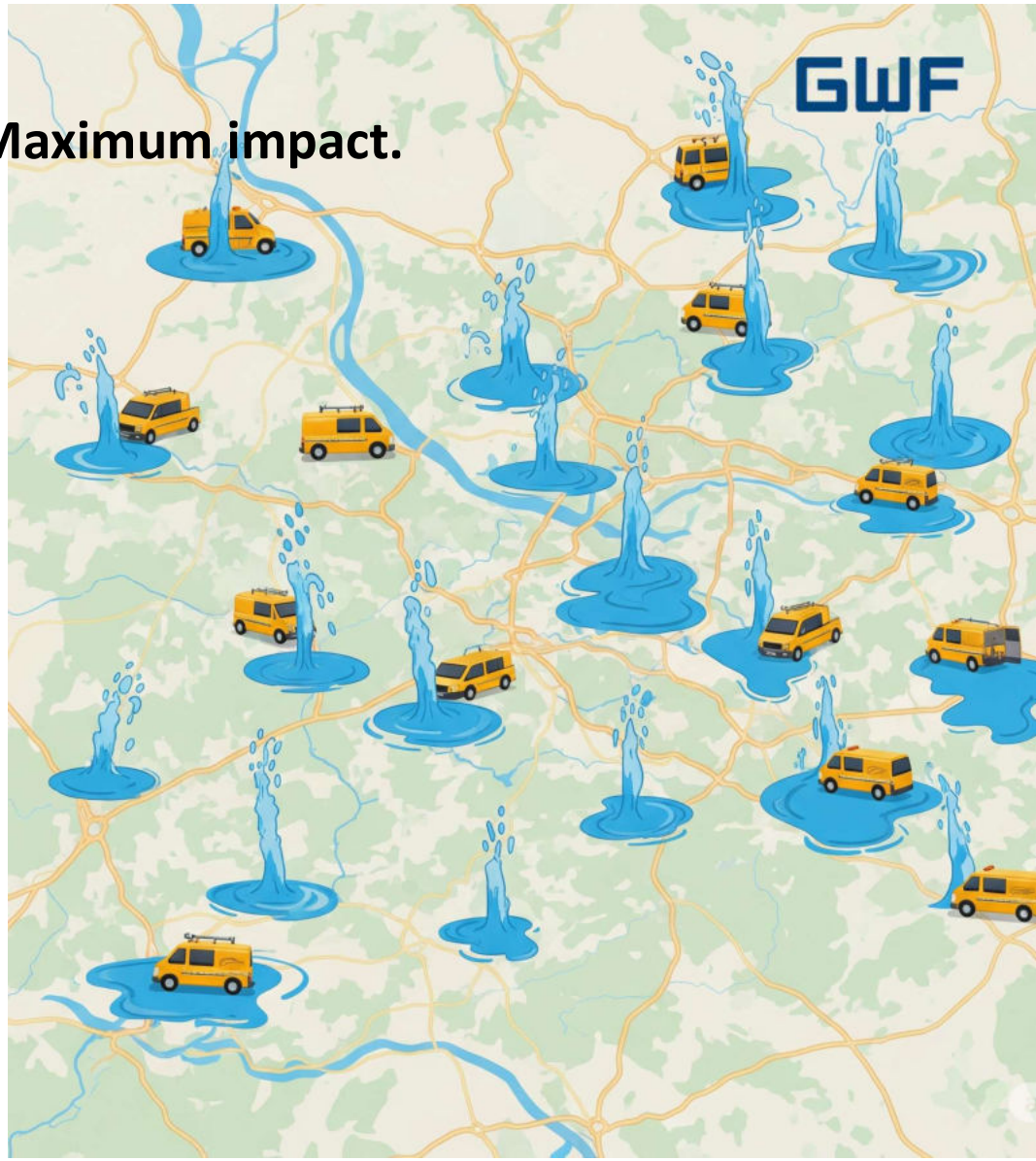
→Send the right people

→to the right place

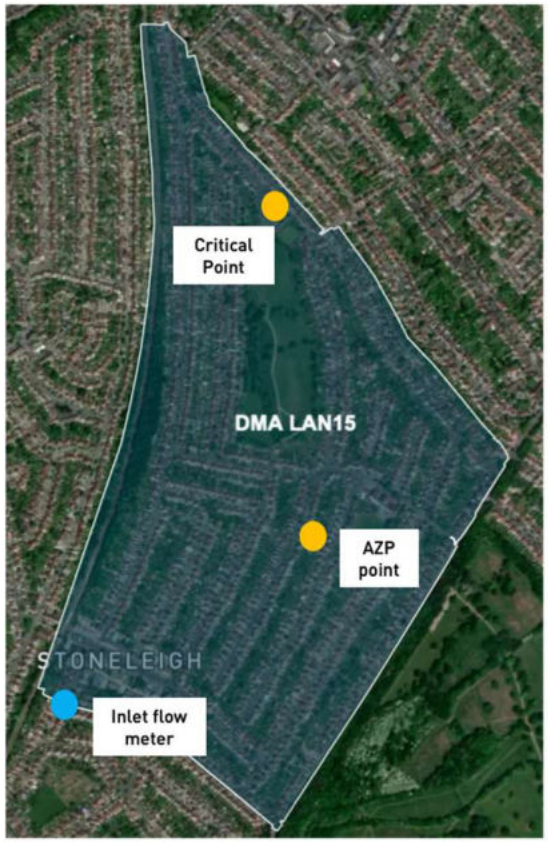
→to do the right thing

→in the right priority

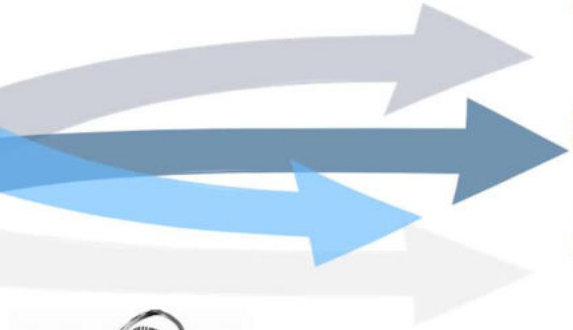
Move from reactive firefighting to proactive intervention.



”We are surrounded by data, but starved for insights”



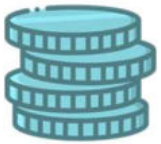
Measurements from
<u>just three points</u>
(inflow, AZP and CP)



One 45 min off-peak pressure drop test
(if necessary)

- Provides a comprehensive leakage analysis at DMA level
- Accurately quantifies the leakage reduction achievable from pressure management, & provides recommendations for intervention
- Calculates how many equivalent leaks will need to found and fixed in a DMA, allowing for more efficient resource utilisation
- Indicates condition of network infrastructure for both mains and connections through an Infrastructure Condition Index
- Accurately calculates unmetered consumption volume & estimates illegal connection volume
- Calculates Per Capita Consumption & recommends extent of customer water conservation measures
- Burst Frequency Analysis & Burst Predictor functionality
- Resource management by sending the right people to do the right thing in the right place in the right order

This is what BALANCE helps you achieve



Immediate Savings

- Identify quick wins through simple adjustments like optimising PRV pressure – especially critical for variable area leakage.

Definitive Action

→Guides active leak detection with clear guidelines. Ensures teams find real leaks in the right places.

Asset Life Extension

→Assesses Infrastructure Leakage Index and Infrastructure Condition Index to extend asset life and delay costly pipeline replacement.

THE ULTIMATE PROOF: 54% Leakage Reduction. 8.3-Month ROI.

2024 – BEST UK PROJECT

South West Water

Across 7 DMAs in Cornwall

54%

Leakage Reduction

SWW achieved an unbelievable 54% reduction in leakage volume

£20,058

Annual Savings

Direct cost benefits delivered to SWW

8.3

Month ROI

Remarkable return on investment. That's tangible impact, fast.

101 tCO_2e

Green House Gas Reduction

Associated reduction to green house gas emissions

2025 - ACTIVE PROJECTS…

Severn Trent (Birmingham)

Using Balance for critical **CAPEX decisions and prioritisation** of pipe replacement based on *actual asset condition* and leakage.

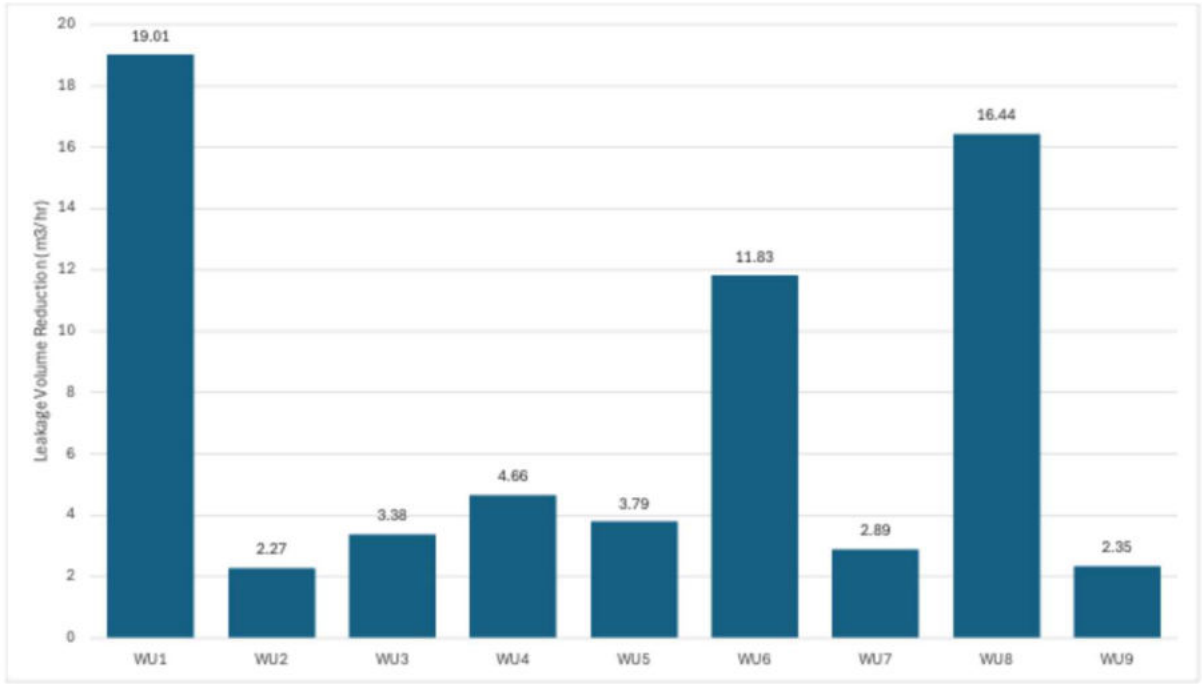
Southern Water (Guildford)

We are bringing these same **high-impact results** to their network, starting in Guildford

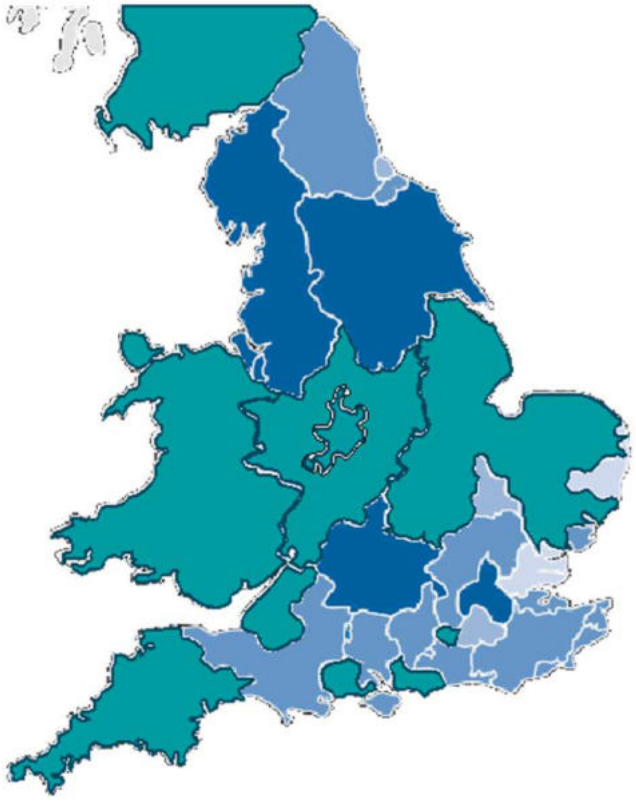
United Utilities (Cumbria)

Actively **optimizing pressure and targeting leak detection** in even the most rural areas, driving down per capita consumption.

UK Projects



	WU1	WU2	WU3	WU4	WU5	WU6	WU7	WU8	WU9
Leakage Reduction %	54.0%	35.5%	28.5%	57.7%	24.1%	17.5%	22.1%	48.2%	19.7%
	7 DMAs	1 DMA	2 DMAs	2 DMAs	2 DMAs	1 DMA	1 DMA	2 DMAs	2 DMAs



YOUR NEXT STEP: PROVE IT FOR YOURSELF

Proof of Concept Trial

→Currently offering POC trials for all UK water utilities. See the results in your own network

Schedule a Call

→Let's discuss how a tailored POC trial can provide clarity and savings for your utility

Stop Estimating, Start Knowing

→Ensure that maximum leakage reduction impact is achieved with optimal resource utilisation

Schedule POC Trial

Learn More

Innovative solutions
for valuable resources

GWF

GWF Ltd

No 3 The Workshops, Pulloxhill Business Park
Greenfield Road
Pulloxhill MK45 5EU

info@gwf.ch
www.gwf.ch

HIGHLOW WATER
COMMERCIAL WATER USE ASSESSORS

How to quickly reduce Leakage & NHH Demand through two little-known & largely untapped opportunities

What is the size of this untapped opportunity?

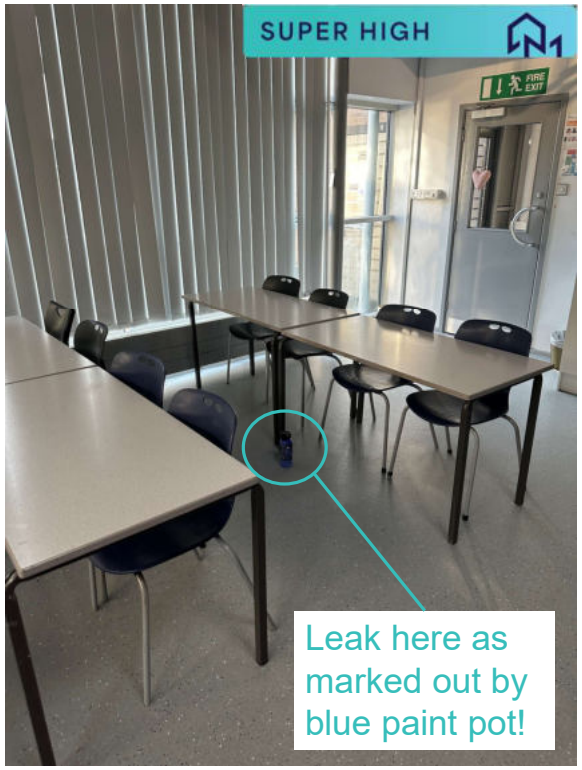
Every year, water co's in Eng & Wales are missing out on:

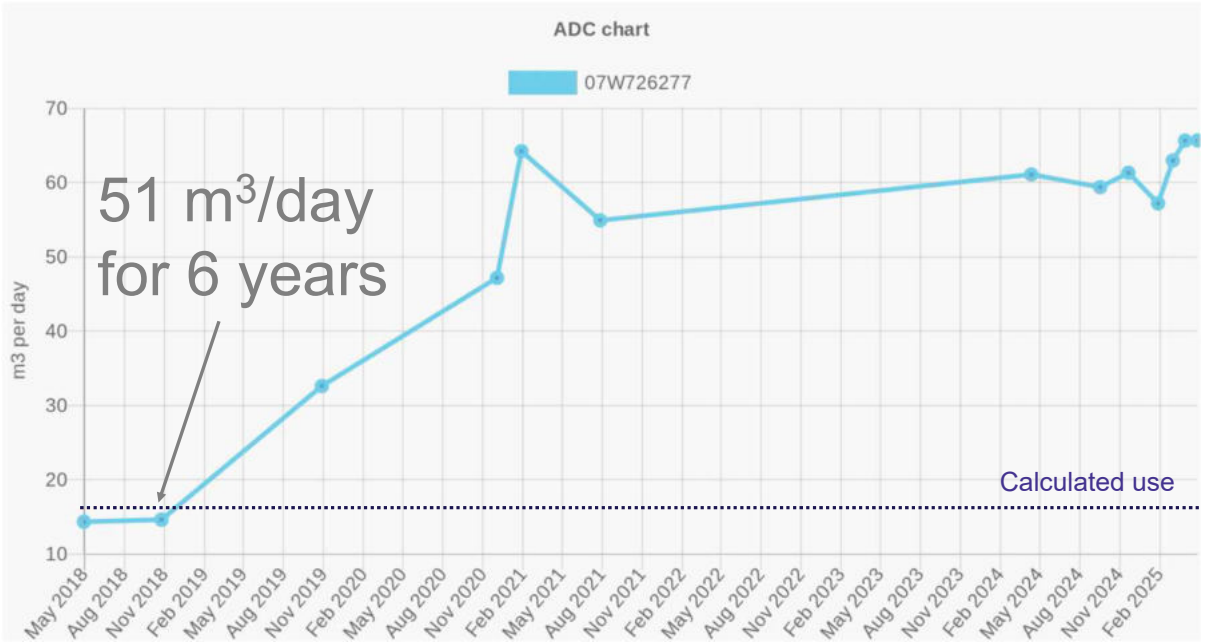
- **£45,335,374** of Billing
- **21 ML/d** of Leakage Reduction
- **30 ML/d** of Demand Reduction

...At a relatively small number of Non-Household properties

Not your average leak...

It only takes 20 leaks like this to save 1 ML/d



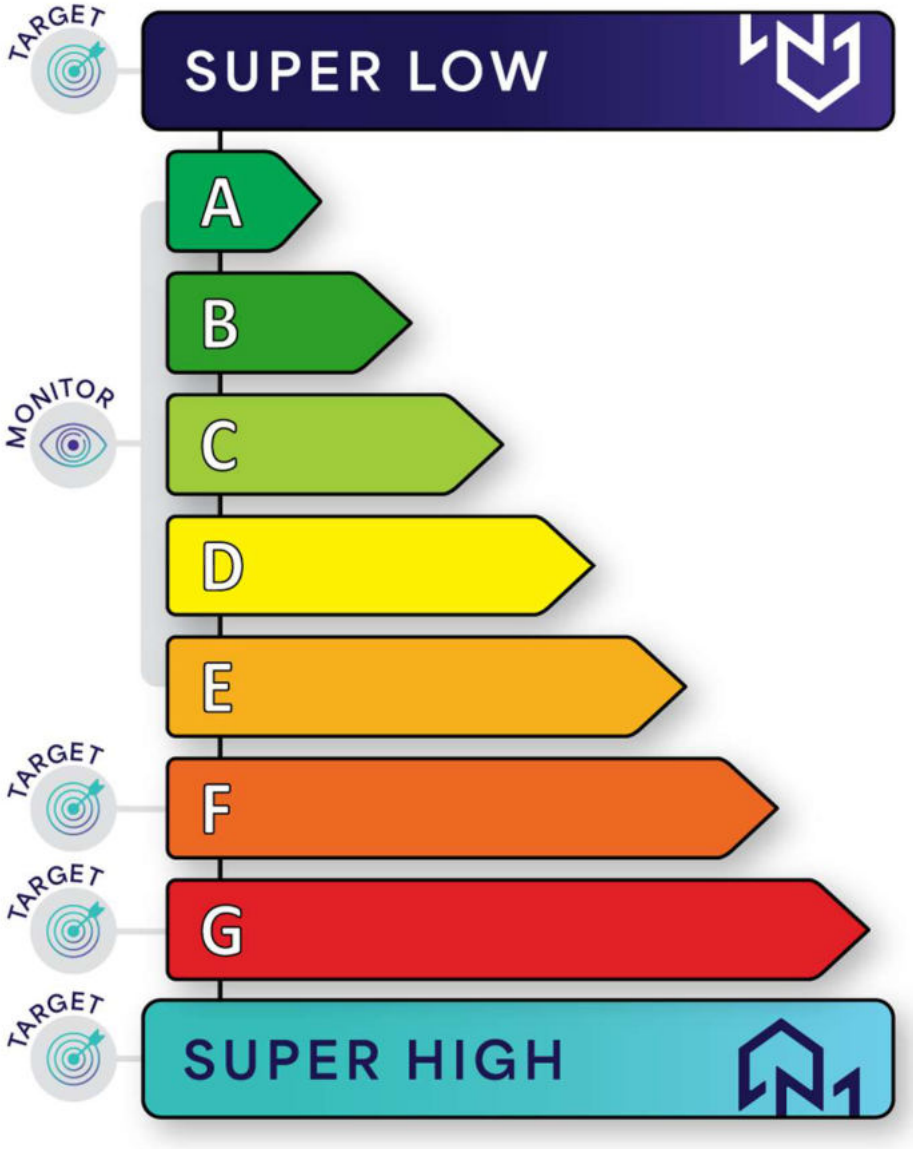


4 x unbilled Ghost Meters with £391,767 of missed billing

- 4 x NHH meters not on system
- 4 x Postcode Lottery sums of missed billing
- 4 x very happy accountants with low water bills
- 4 x stressed Leakage Engineers chasing Ghost Leaks in the wrong DMA

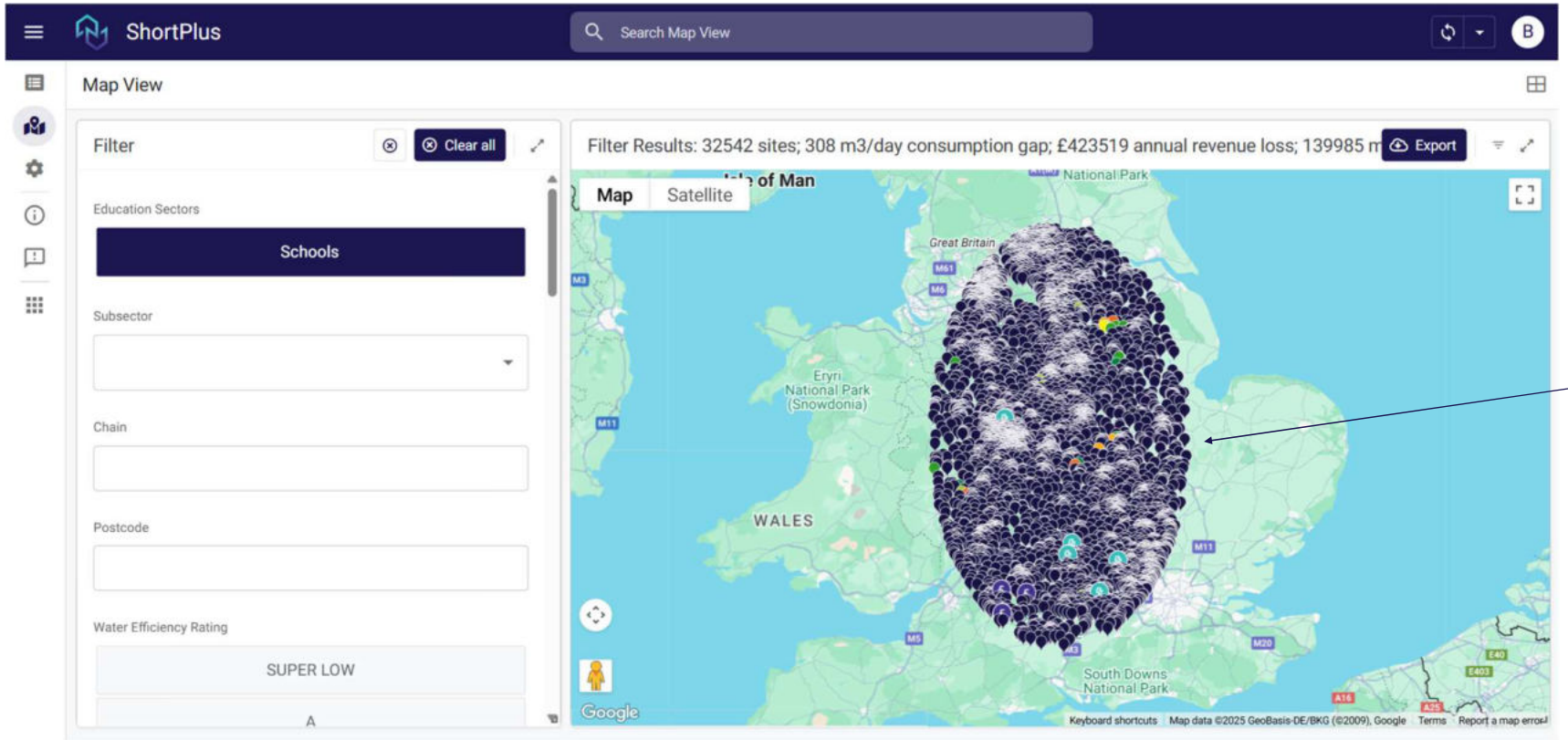
How we uncover hidden issues

1. **Calculate**
   - We calculate water use for NHH properties
   - Multi-component
2. **Link**
   - Match to metered consumption data
   - Compare calculated & metered use
3. **Rate**
   - Each property given a rating
   - Focus on ‘Super Low’ & ‘Super High’



HIGHLOW WATER

This filters out the gold from the thousands of other sites



1 in 50 of these schools will have a large leak,

And 1 in 50 will have unbilled water.

How do you find them?

The benefits of this approach

- Detectable issues, that can be resolved
- Fast
- Low risk
- Low cost
- Low effort

Quickly reduce Leakage & NHH Demand

- 25 sectors
- 189,670 non-household properties
- Just need some metered consumption data
- Immediate results

Ben Beattie

0776 500 6574

ben.beattie@highlowwater.com

Future Water Association

Informing, Innovating, Influencing

Horizon Water Infrastructure

AHS PIPELINE INNOVATION

OVARRO

Break

Future Water Association

Informing, Innovating, Influencing

Horizon Water Infrastructure

AHS PIPELINE INNOVATION

OVARRO

Speaker: Andy Godley, WRc

Standards for Success – What needs to change?

Standards for Success – What Needs to Change?

Andy Godley

July 2025

Introduction

- What do we mean by Standards?
- Good practice and challenges
  - Case studies
    - Sewer CIPP linings
    - Water meters
    - MCERTS
- Summary
  - What needs to change?

Andy Godley

Principal Consultant – Flow Measurement and Metering

About WRc

We are **dedicated staff with a range of skillsets** who care about delivering a **positive legacy in partnership** with our clients.

Our priority is **creating a better tomorrow** through helping to solve problems with technical expertise and innovative solutions.

Our work as **consultants and service providers** supports the achievements of the United Nations Sustainable Development Goals (SDGs).

We are **focused on doing the right thing** – protecting the environment, reducing our carbon footprint and that of our clients, and above all ensuring safe, healthy, populations and habitats.

This is achieved through demonstrating our core values: underpinning our **trusted, innovative solutions** with **technical excellence** and **independence** of thought.

Flow and Metering areas of work

Research (Portfolio)

- New technology meters
- Performance of large meters
- Open channel velocity area flowmeters
- Meter verification
- Very low flow sensor development
- Smart DMAs

Specialist services / consultancy

- Failure analysis
- Expert witness
- Training
- Meter audits
- Standards and codes
- Smart metering

Testing

- Meter under-registration
- Customer dispute meters
- Procurement support
- Meter aging & environmental testing
- AMR performance
- MCERTS product approval

Tools

- Meter right sizing
- Large meter uncertainty
- MUR modelling
- Verification uncertainty modelling

What do we mean by “Standards”?

- International Standards (ISO)
- Directives
- European Standards (EN)
- British Standards (BS)
- International Electrotechnical Commission (IEC)
- Legal metrology (OIML)
- Open standards / protocols (e.g. Modbus)
- Regulatory, e.g. Environment Agency MCERTS, Water regs
- Water Industry Standards (WIS)
- Industry Guidance Notes (IGN)
- Water Industry Mechanical & Electrical Specifications (WIMES)
- Codes of practice
- Good practice guides
- Company standards
- …

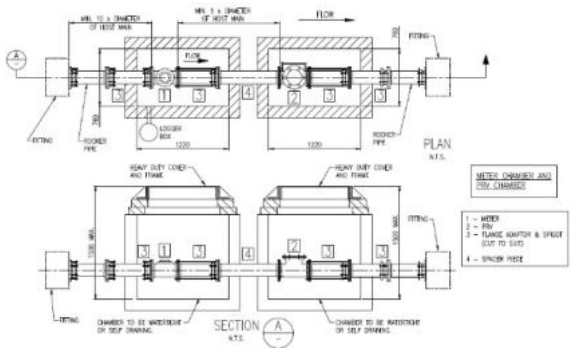
Is there a “Standard” for it?

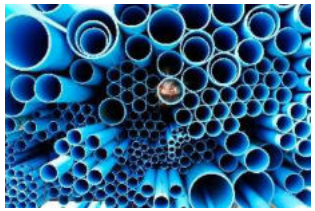
High level

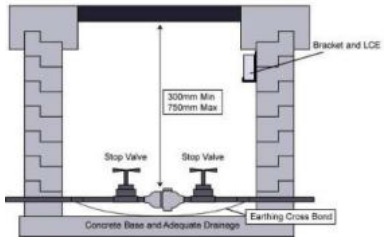
- H&S
- Quality
- Environmental
- …

Technical

- Performance
- Metrology
- Technology
- Design
- Communications
- Installation
- Electrical
- Asset maintenance
- …







Case Study – CIPP Infiltration Testing

AMP8 requires Water Companies to reduce storm overflow spills

Ground water infiltration reduction is key for many planned schemes to reduce the number of spills

Leak tightness is a functional requirement of drain and sewer systems (EN 752:2017 §5.1.9)

Sewer linings are required to remain leak tight throughout their service life (SRM Type 2 Structural Design).

Currently no test method is specified in BS EN 13380:2001 or BS EN ISO 11296-4:2018 for proving leaktightness of sewer repairs

WRc developed a test method (CP308) to investigate infiltration resistance of CIPP liners

Water companies wish to formalise a test method to create a Water Industry Specification (WIS)

CIPP Infiltration Testing - Benefits

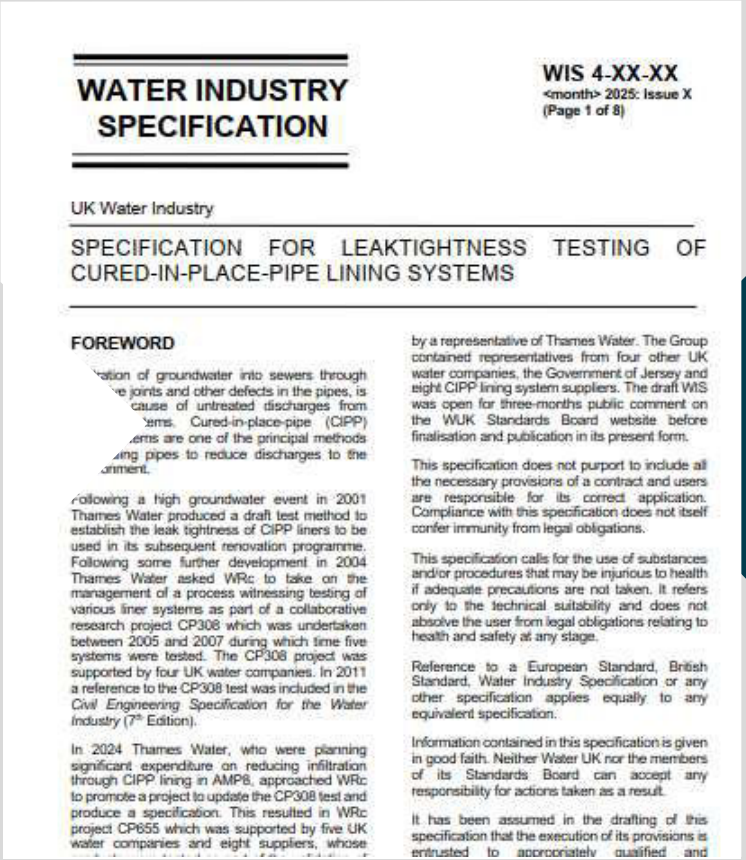
Confidence	Specification	Compliance
Have greater confidence in the deliverability of the AMP8 programmes through early access to a range of CIPP liner products tested to ensure that they meet their needs for infiltration prevention works during AMP8.	Be able to use the WIS to specify requirements for leak tightness complementary to BS EN ISO 11296-4 for CIPP liners in accordance with BS EN ISO 11296-1 §8.2.	Have product(s) tested in accordance with the agreed test method and if successful will be issued with a test certificate

Case study - CIPP Infiltration Testing

- WRc collaborative Portfolio project
  - 7 utilities funding
- Draft WIS developed
- Test rig designed and commissioned
- 8 systems and installers tested
- Performance combination of product and installer skill
- Intention to move to formal approval against WIS

Public Comments needed

- Currently the draft WIS is out for public comment
- The Task and Finish Group would welcome public comments on the document
- Comments need to be received by 18th August 2025
- Task and finish group will address these comments and then document goes live



WATER INDUSTRY SPECIFICATION

WIS 4-XX-XX
<month> 2025: Issue X
(Page 1 of 8)

UK Water Industry

SPECIFICATION FOR LEAKTIGHTNESS TESTING OF CURED-IN-PLACE-PIPE LINING SYSTEMS

FOREWORD

...ation of groundwater into sewers through ...e joints and other defects in the pipes, is ...cause of untreated discharges from ...ems. Cured-in-place-pipe (CIPP) ...ems are one of the principal methods ...ing pipes to reduce discharges to the ...nment.

Following a high groundwater event in 2001 Thames Water produced a draft test method to establish the leak tightness of CIPP liners to be used in its subsequent renovation programme. Following some further development in 2004 Thames Water asked WRc to take on the management of a process witnessing testing of various liner systems as part of a collaborative research project CP308 which was undertaken between 2005 and 2007 during which time five systems were tested. The CP308 project was supported by four UK water companies. In 2011 a reference to the CP308 test was included in the *Civil Engineering Specification for the Water Industry* (7th Edition).

In 2024 Thames Water, who were planning significant expenditure on reducing infiltration through CIPP lining in AMP8, approached WRc to promote a project to update the CP308 test and produce a specification. This resulted in WRc project CP655 which was supported by five UK water companies and eight suppliers, whose ... by a representative of Thames Water. The Group contained representatives from four other UK water companies, the Government of Jersey and eight CIPP lining system suppliers. The draft WIS was open for three-months public comment on the WUK Standards Board website before finalisation and publication in its present form.

This specification does not purport to include all the necessary provisions of a contract and users are responsible for its correct application. Compliance with this specification does not itself confer immunity from legal obligations.

This specification calls for the use of substances and/or procedures that may be injurious to health if adequate precautions are not taken. It refers only to the technical suitability and does not absolve the user from legal obligations relating to health and safety at any stage.

Reference to a European Standard, British Standard, Water Industry Specification or any other specification applies equally to any equivalent specification.

Information contained in this specification is given in good faith. Neither Water UK nor the members of its Standards Board can accept any responsibility for actions taken as a result.

It has been assumed in the drafting of this specification that the execution of its provisions is entrusted to appropriately qualified and

https://standards-board.water.org.uk/document/specification-for-leaktightness-testing-of-cured-in-place-pipe-lining-systems/

Case study - “New” metering technologies

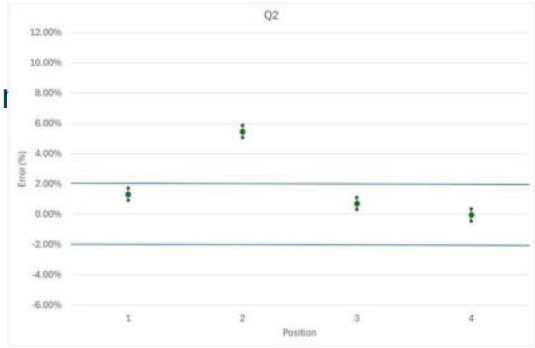
- Movement away from traditional mechanical meters to electromagnetic and ultrasonic types for revenue and network metering
  - Battery powered
  - Integrated comms
  - Some on board processing and data storage

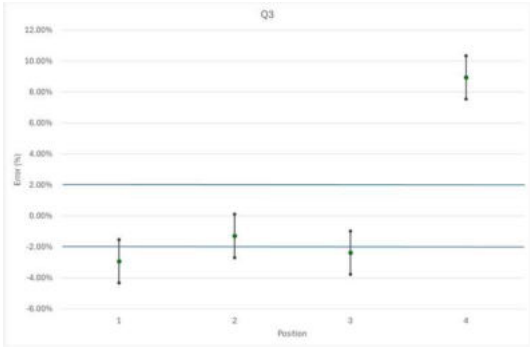
  - Better long term stability – no moving parts to wear or block
  - Claimed to have better low flow sensitivity
  - Integrated meter – no clip-on module
  - More tolerant to particulate in water
  - Better security - more tamper resistant
  - U0/D0 – no need for up and downstream straight pipe

- But…
  - Do not measure continuously – flow is sampled to increase battery life
  - Velocity based measurement – not direct volume
  - Claims for long battery life not always being met
  - Higher than expected failure rates

New technology meters - Metrological testing

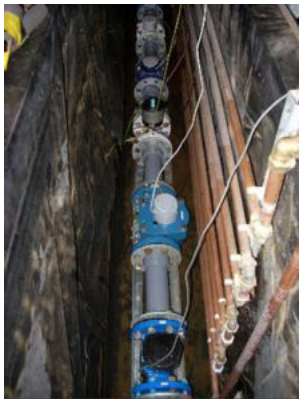
- Activation of test or verification mode
  - Higher frequency sampling and updating
  - *Does this give the same results as if the meter was in operational mode?*
    - Example: Meter gave different starting flow in verification mode to operational mode
  - At 2s screen update time – test error in register readings can be significant – 1.4% for 100 litre test at Q3
- Standing v flying stop start
  - Less suited to standing stop start
  - As meter samples flow, it can take several secon to settle on a stable rate reading
- More sensitive to microbubbles in the water
- Sensitivity to small differences in installation
  - E.g. rig position





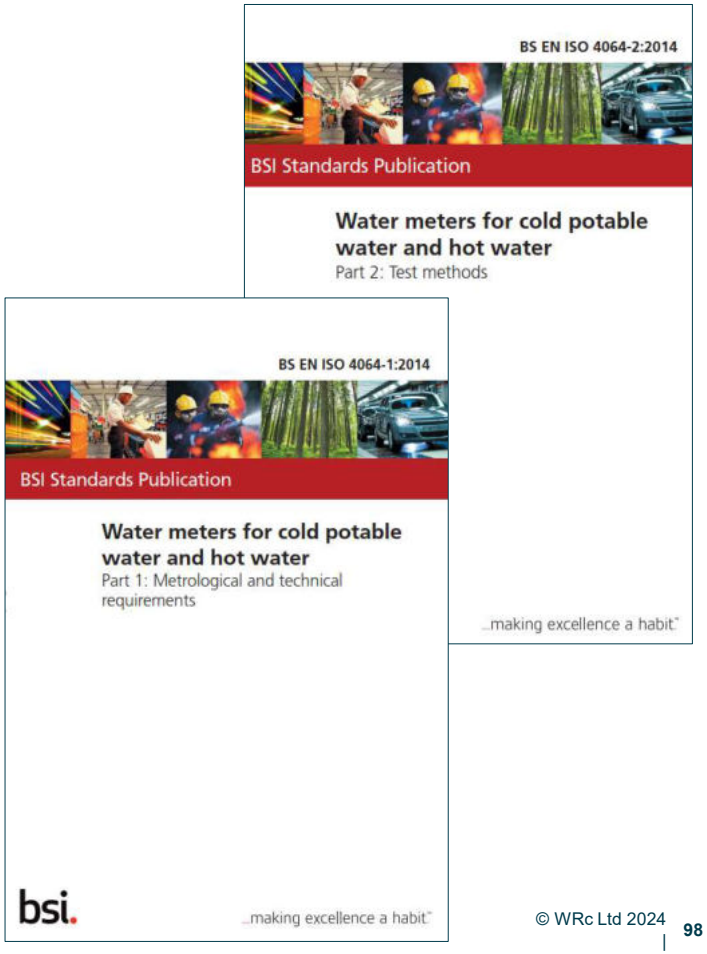
New technology meters – Need for enhanced testing

- Extended environmental testing
  - Prolonged operation with variations in temperature and humidity
- Strength testing
  - Static pressure *after* uv exposure, heat and humidity exposure
  - Connection thread strength
- Accelerated aging
  - 15 years consumption
  - Variable flows, stop / starts
- Submergence testing
  - Contaminated water (road salt, run off)
- Installation conditions
  - Rotated axially
  - Misalignment of connections
  - Configurations other than specified in ISO4064
  - U0/D0 - Doesn’t mean no change
- Battery life projections



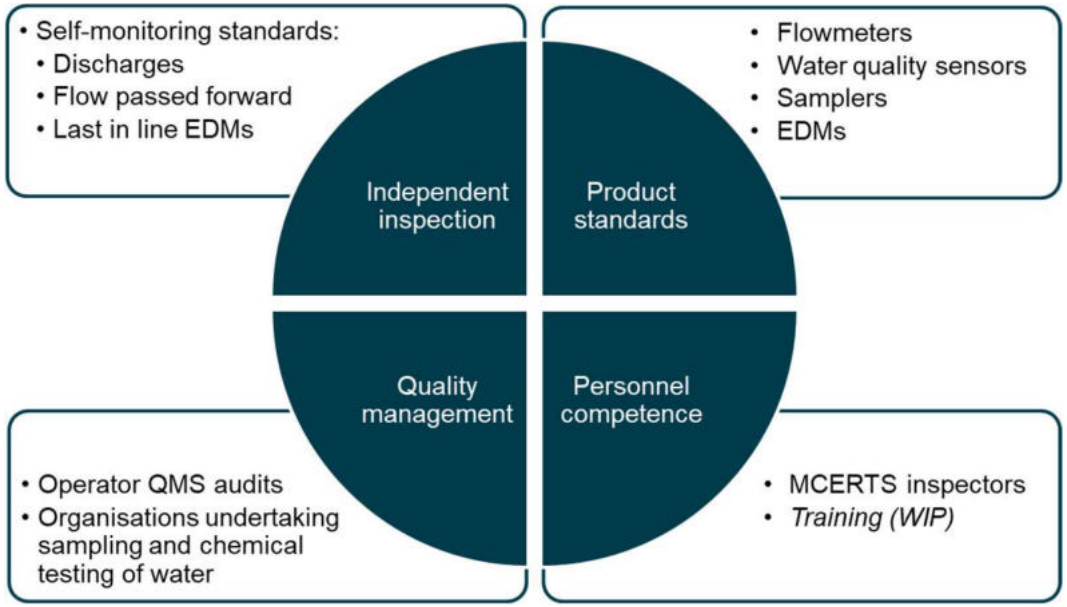
New technology meters – changes needed to ISO 4064

- Tests in largely static flow conditions
  - *Real life not like that – frequent intermittent and periodic flows*
- High temperature test
  - 55°C for 2 hours
  - *Insufficient for many parts of the world (Middle East)*
- Damp heat (humidity)
  - Meter error nor measured during exposure time
  - *Higher risk for electronic components in humid conditions*
- Influence of air and bubbles
  - Not tested
  - *Bubbles are present in real water supplies*
- No validation of verification mode
- Incorporate BS8614 Meter with polymer casings
  - Mechanical strength (threads and pressure)
  - Contamination risk
- U0/D0
  - Specific pipe configurations
  - Doesn't mean no change

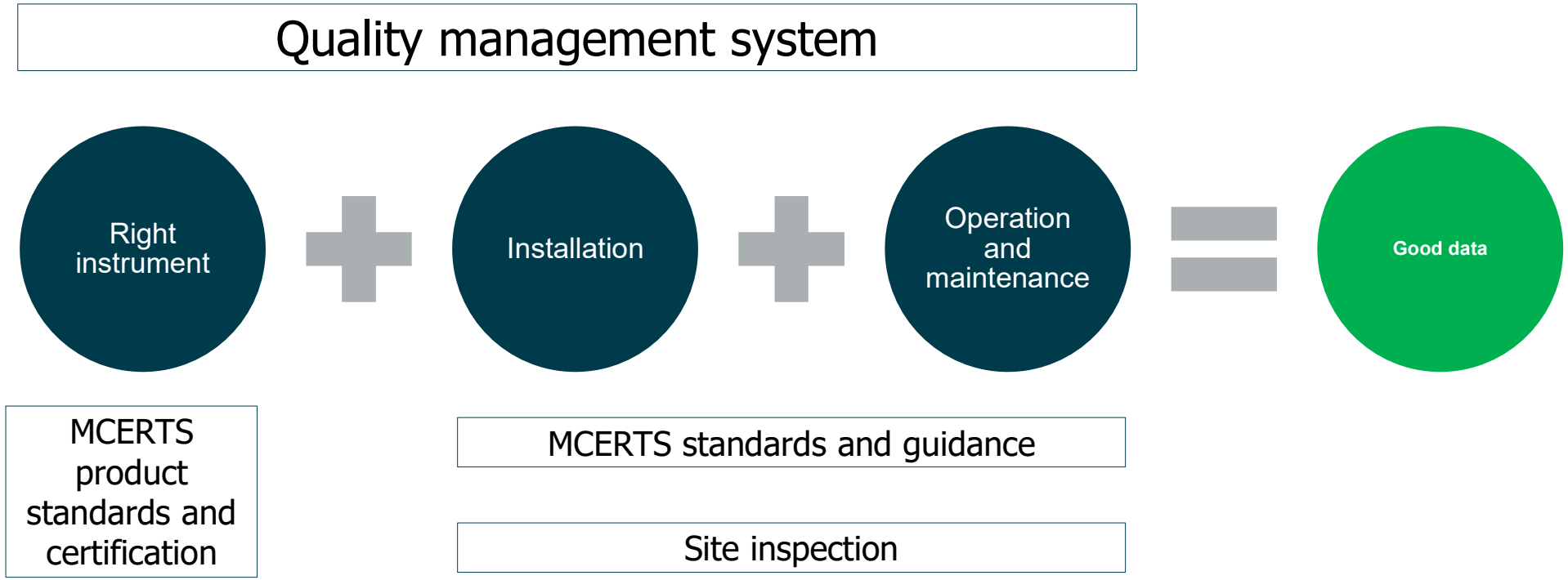


Case Study - MCERTS

- **M**onitoring **Cert**ification **S**cheme
- Environment Agency created and owns the MCERTS schemes
- Ensuring quality of regulatory data submitted under Operator Self-Monitoring on emissions to air and water
  - Also soil monitoring and Environmental Data Management systems
- Supported by standards / documentation including:
  - product standards,
  - personnel competence,
  - reporting software,
  - installation guidance,
  - quality management systems,
  - accreditation of laboratories
- **Standards specify accuracy**
- Independent inspections and audits
- Dedicated pages on gov.uk

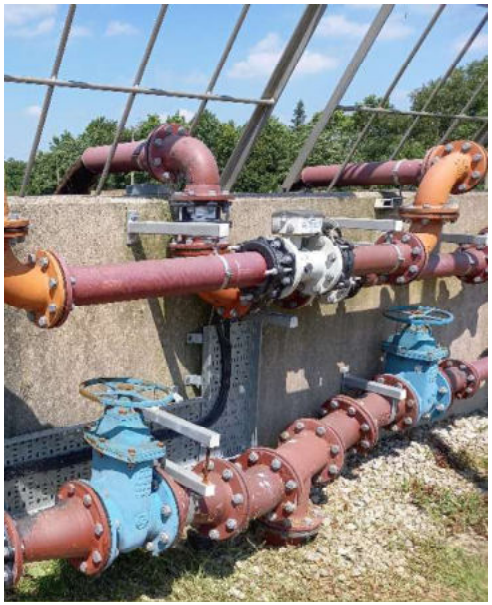


Ensuring good quality data

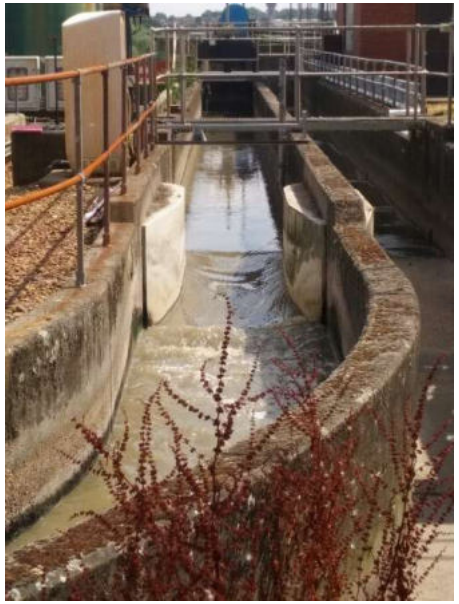


Case study - MCERTS

Equipment fit for purpose



Installed correctly



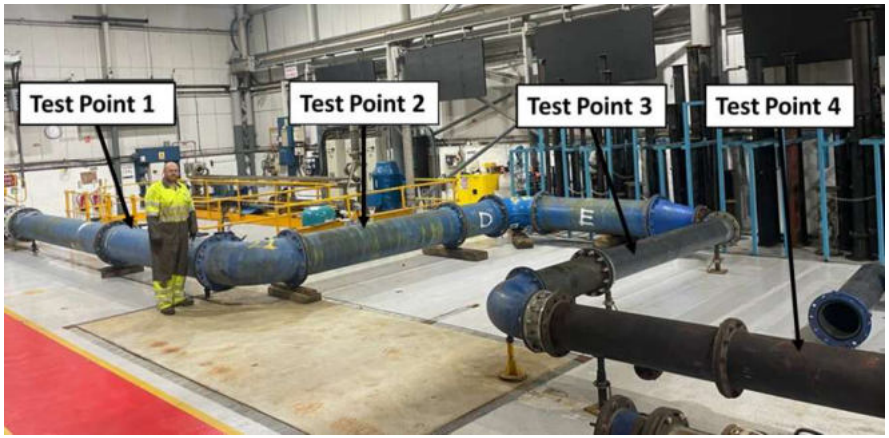
Well maintained installations

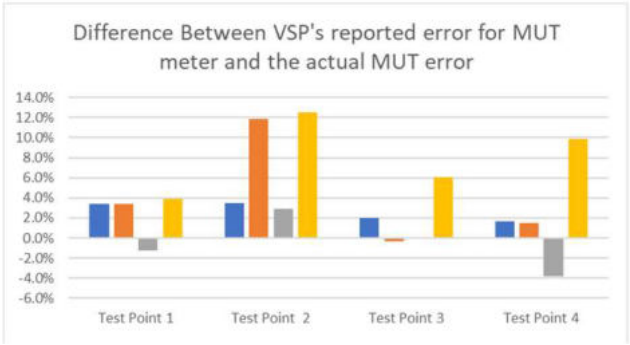
Independently verified

Meter verification

- Project led by STW and I&P
- 4 service providers using clamp-on meters
- Simulated verification exercise
- Range of conditions
  - Hydraulics
  - Pipe material / quality
  - Flow rates
- Phase 1 – Hams Hall
- Phase 2 – WRc

- Highlighted:
  - Results affected by
    - People
    - Processes
    - Equipment
  - Inconsistencies in results presentation





Summary

- The industry has hundreds of standards but not being used to full effect
  - Often a lack of knowledge of what's applicable
    - procurement
  - No single / easy source of information
  - In most cases regulator doesn't mandate use
  - In many cases water companies do not mandate compliance…
  - …or ask for evidence
  - Suppliers not always proactive in seeking testing / verification / accreditation
- Good standards needed
  - Key to consistency and quality
  - Exemplar – MCERTS
- Users need to challenge
  - Ask for evidence to support compliance statements
  - Use accredited installers
- Gaps in standards
  - Water companies need to engage with Standards committees

Thank you

Whether you are a multi-national corporate, a regulated utility company, a government department, a contractor or an independent technology developer or supplier, our team will work with you to deliver exceptional service and create valued solutions for your needs.

If you would like more information about any of our products or services, or have a question, please do not hesitate to get in touchand I will get back to you promptly.

andy.godley@wrcgroup.com

wrc

creating a better tomorrow

Trusted globally to deliver innovative sustainable solutions

Swindon | Stirling | Manchester

Contact us
solutions@wrcgroup.com

Visit us
www.wrcgroup.com

Follow us
@WRcGroup
WRc Group

Future Water Association

Informing, Innovating, Influencing

Horizon Water Infrastructure

AHS PIPELINE INNOVATION

OVARRO

- *Speakers:*
  - *Abby Stern, Hydrosave*
  - *George Miller, Hydrosave*

Drawing the Line: Ownership, Accountability and What Data Tells us about Unaccounted for Water

Drawing the line: Ownership, accountability & what the data is telling us

Abby Stern & George Miller

WATER INDUSTRY EXPERTS

HYDRO SAVE

Field Services specialists in asset health assessment, smart network installation, and leak detection

Abby Stern

UFW programme lead

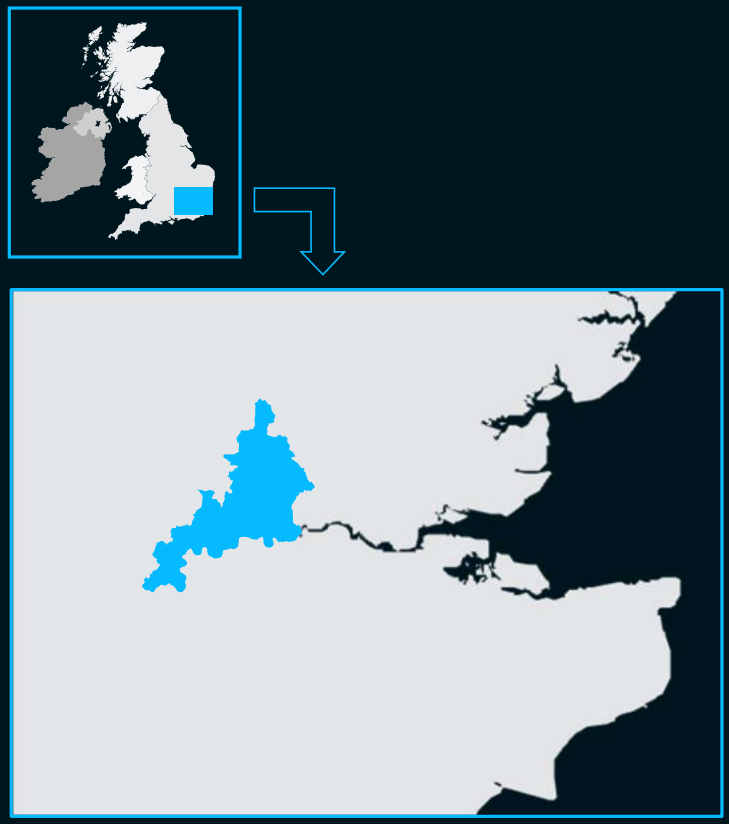
George Miller

Performance insight & operations support lead

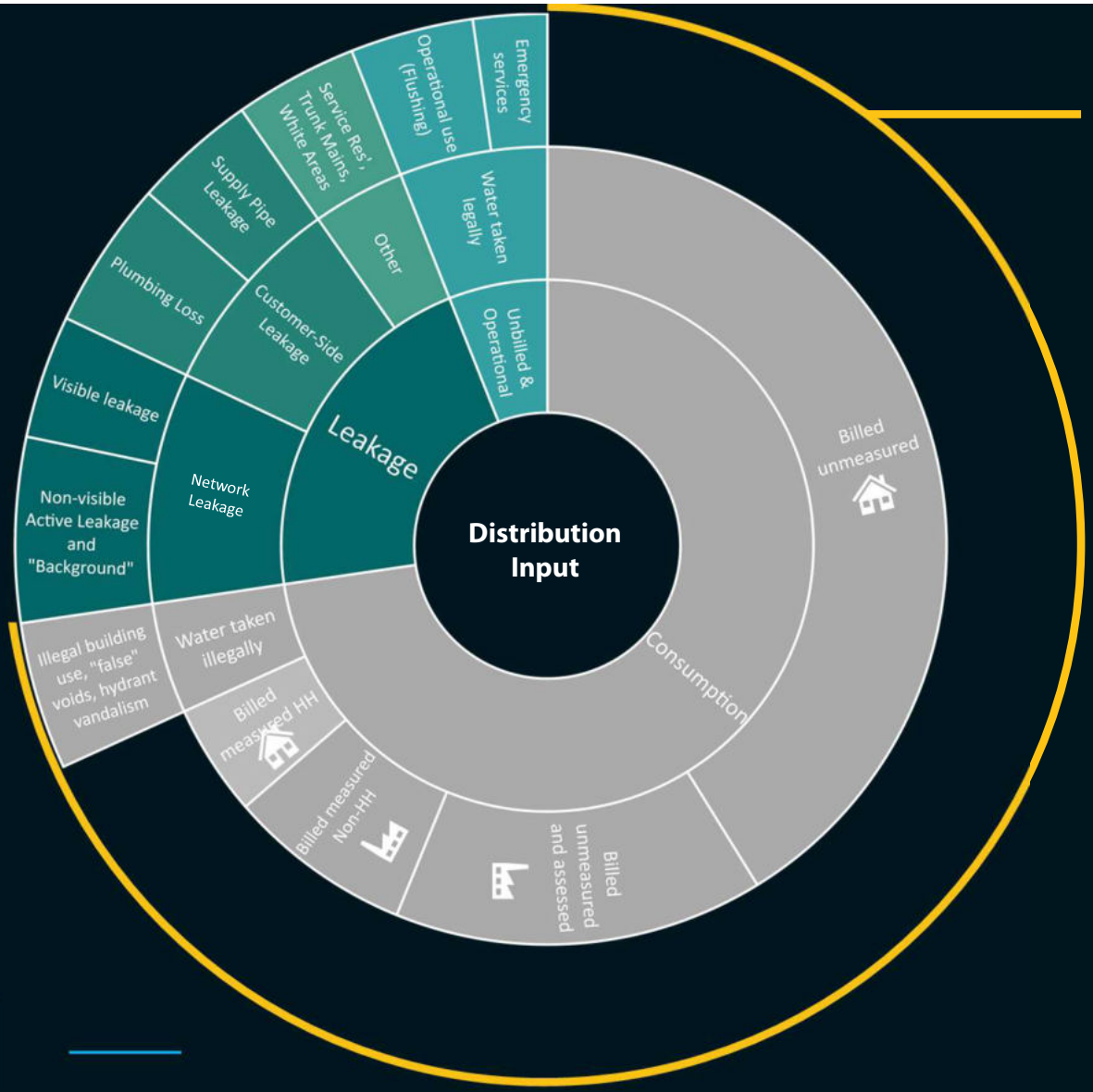
Introduction

Overview of the TW North London Framework

- The largest single, private, leakage detection framework in the UK.
- Service footprint of 1.75m properties and 7,335 km of network
- The framework began in 2019 with an 8-year term
- The Framework has ~133 field-based FTE's detecting leaks
- Dense urban networks with complex interconnectivity
- The framework operates as a 'payment by performance' framework
- Leakage performance is measured in Ml/d delivered, based on:
    1. DMA Campaign performance ([Start]–[Exit])
    2. Quantified leakage outside of Campaigns
    3. Unaccounted for Water (UfW)



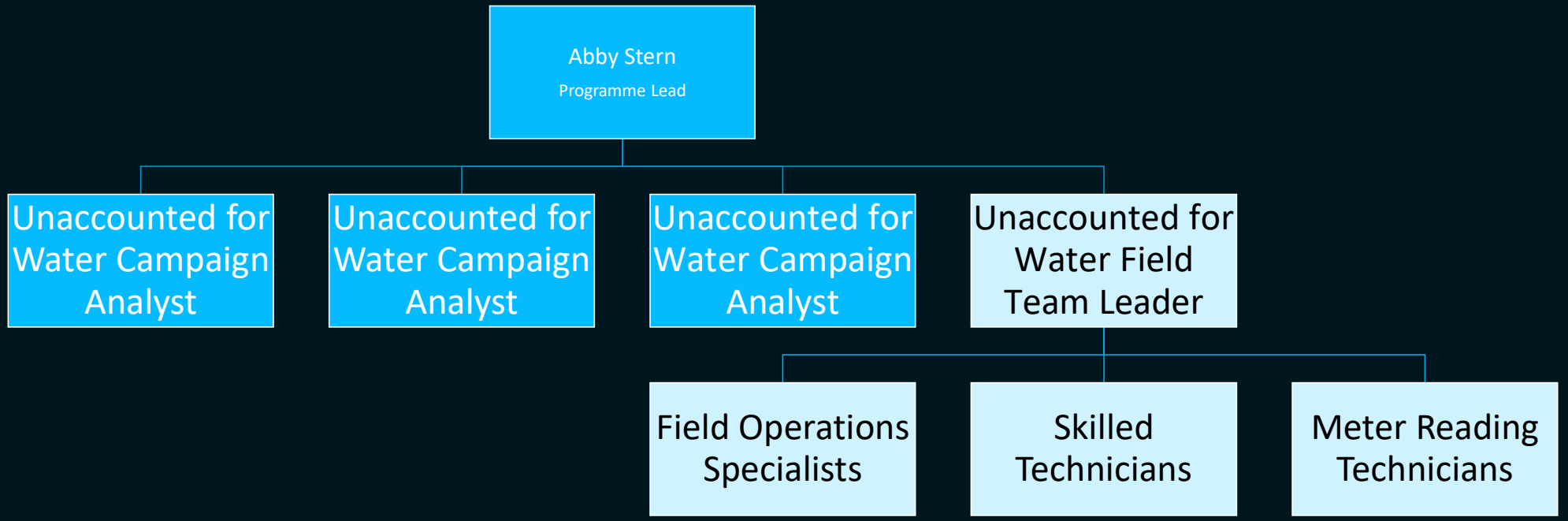
‘Unaccounted for Water’ (UfW) and data anomalies



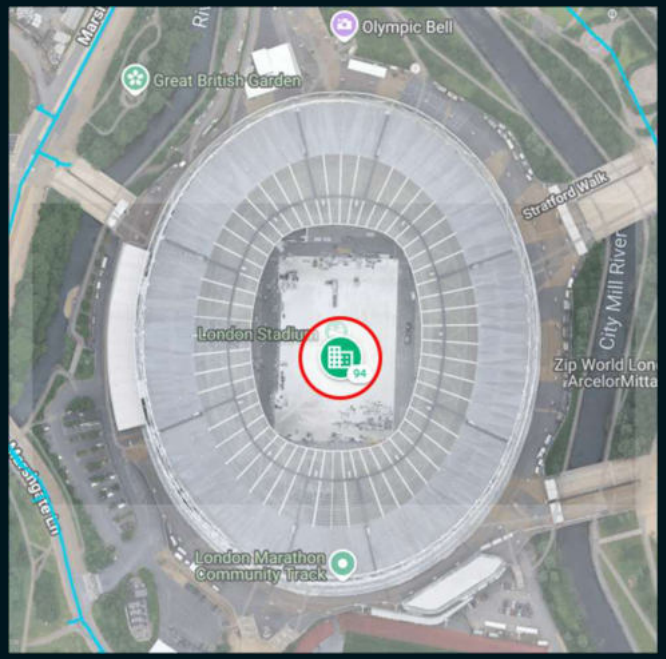
Unaccounted for Water (UfW) & Data Anomalies

- **Missing consumption/property**
- **“False” Voids**
- **Property missing from leakage system, e.g. “Gap” or incorrectly assigned**
- Revenue Metering issue
- Meter reading issue
- DMA integrity error/breach
- Commercial Logger Required / Issue with Logger
- Incorrect property allowances
- Illegal Connection to the Water Network
- DMA/Zonal Metering or telemetry Issue

How we have structured ourselves



Football Stadium Comparison

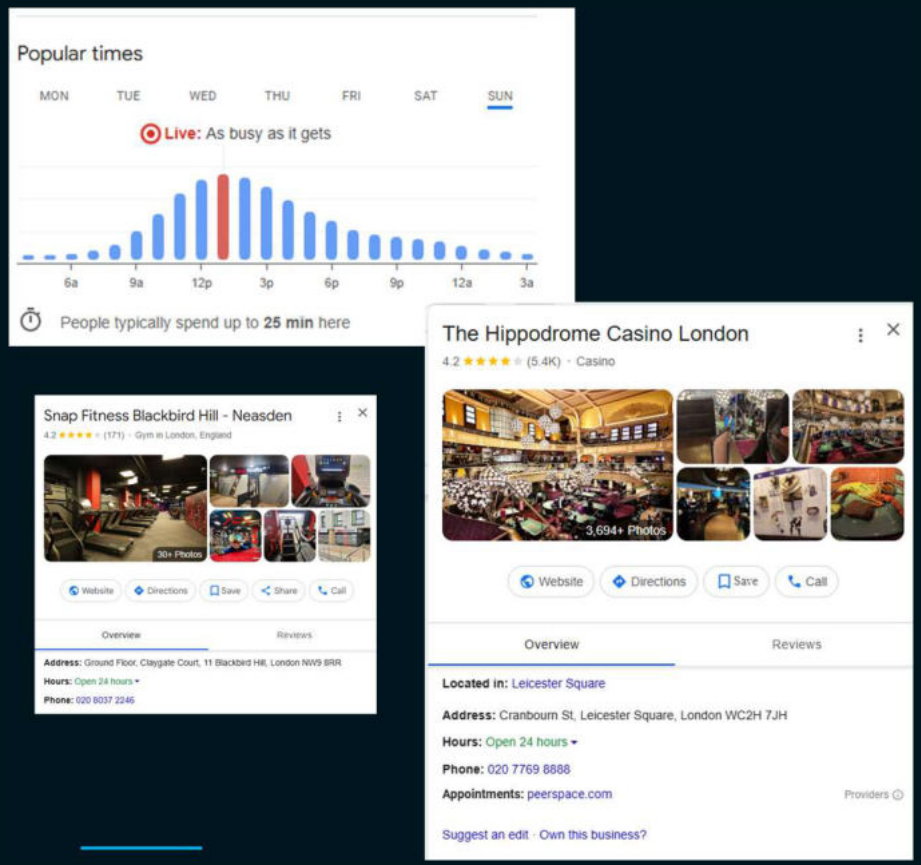


- In 2025, we completed in-depth analysis of the highest users in North London
- We compared sites to see if all their water usage is being captured
- At the London Stadium, we compared the consumption of similar sized stadiums and realised the London Stadium is using half the amount of water as Tottenham Football Stadium
- We identified unmetered feeds going into the stadium
- We also found that this Stadium is being fed from a trunk main area, which may account for zonal discrepancy

Non-Household Missing Meters

- Carried out an in-depth comparison looking at all properties using between 24 m□/day - 48m□/day within a Bulk Metered Area.
- We investigated a District Metered Area with a Bulk Meter Supply for a block of flats and found the meter to be missing from the system
- We raised a job to process getting this added to and accounted for in the system
- We also found a visible Burst Main on the 3” distribution main supplying the court
- The quantification for this came in at around 0.5 lps night use / 43.2 m□/day

AI Driven Identification



- As part of the UfW and data improvement work that we have been completing, we have been using AI to identify NHH Properties and Businesses that are open 24/7 in London.
- Through this identification, we can cross-reference the business systems to see if the property is allocated any night use Allowances and verify their daily consumptions
- Through the use of AI and Google we can see these properties peak operating hours and average footfall to ascertain how much water they may be using
- Through this process, we have been looking at restaurants, bars, gyms and casinos

Illegal Connections

- When investigating onsite, we found a tanker illegally drawing water from the Fire Hydrant, they are a huge organisation contracted for cleaning the pavements/roads in central London
- This is a 24-Hour Business, mainly operating at unsociable hours, meaning water is being drawn from the network in Leakage Reporting Hours
- This Company do not have a licence for a metered standpipe
- Our Client were unaware of this. We processed a job and passed it over to the illegal connections team to investigate further

How do we tie this all together?

- Fixed Network Process
- Customer Side Leakage
- Additional Training for BAU Leak Detection
- In-Pipe Camera Surveillance
- Mains Replacement
- Client Awareness

Thank you

0345 6040 656 | www.hydrosave.co.uk

Future Water Association

Informing, Innovating, Influencing

Horizon Water Infrastructure

AHS PIPELINE INNOVATION

OVARRO

- *Speaker:*
  - *Phil Barnaby, Director, SGB Civils*

The People Pipeline – Skills, Recruitment & Training for Leakage Technicians

FROM BUSINESS-AS-USUAL TO BEYOND BUSINESS-AS-USUAL

Creating a Roadmap to Sustainable Growth

Date: 3rd of July 2025

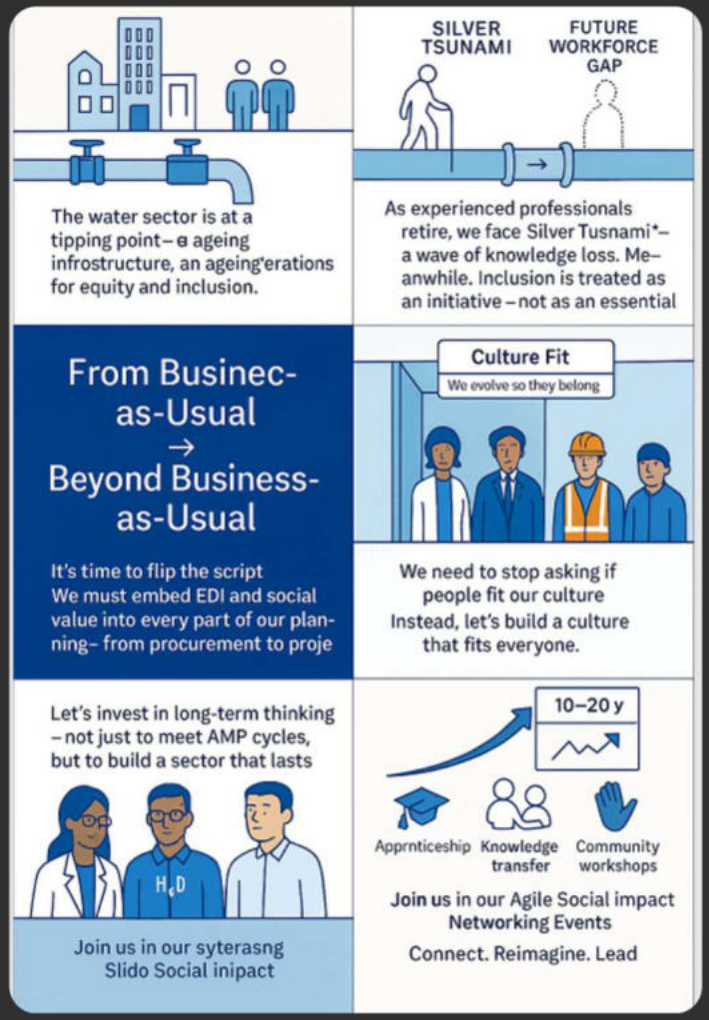
Presented by: Phil Barnaby.

Today's Strategy Session

iS A COUNTINUED CALL TO ACTION

Embedding EDI, Social Value & Long-Term Planning in the Water Sector

Presented by: Phil Barnaby



Sector Challenges

Industry Trends

Ageing infrastructure

Knowledge loss ("Silver Tsunami")

Company Position

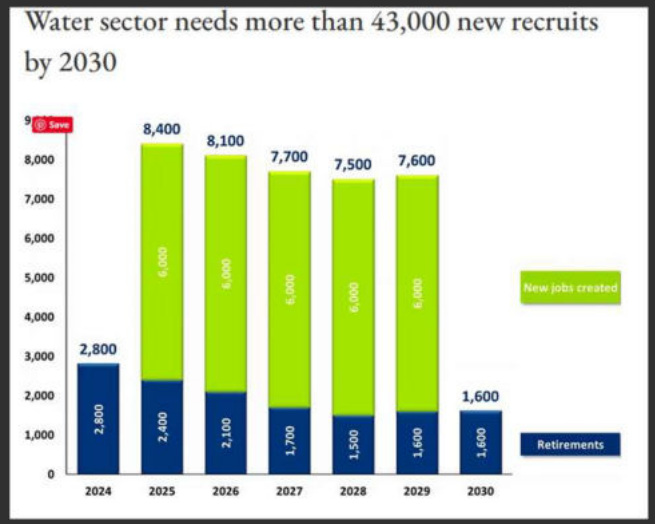
EDI seen as secondary or disruptive

Short-termism driven by AMP cycles

Competitive Analysis

Improving the Skills Gap

Current Position



There are an estimated 83,200 people currently employed in the water industry.

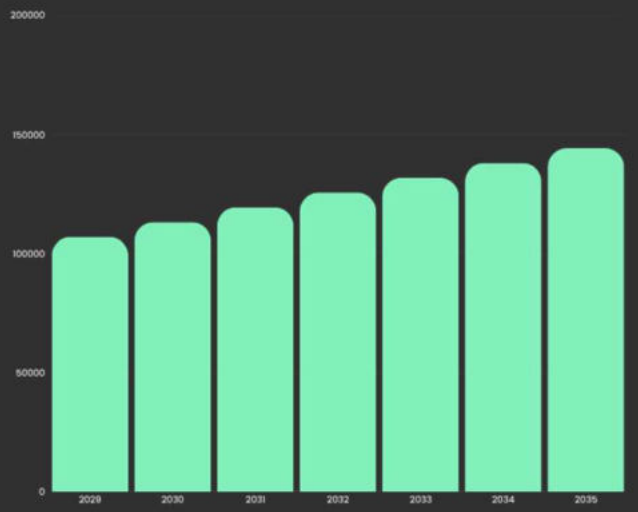
Energy & Utility Skills has estimated that the water industry will create 30,000 new jobs between **2024-30** – an average of **4,300 a year and of 36% increase over the period** taking the **water industry workforce to 113,200.**

In its latest annual summary report for the water industry, the employers' membership organisation has calculated that **a further 113,700 jobs will need to be filled due to retirements – 16% of the workforce** (see chart).

According to Energy & Utility Skills, 47% of the new recruits – some 21,000 people – will initially be working at the lowest grades of the regulated qualifications framework at grade three or below.

Source (the UK water report)

Defining Success



2 Estimated job creation and people requirements by 2030

2.1 Industry estimates

2.1.1 There are an estimated 83,200 people currently employed in the water industry. By 2030, this is forecast to increase to 113,200 – an increase of 30,000 (up 36% on 2024 levels).

2.1.2 Our headline estimates for the water industry for the period between 2024 and 2030 are:

- 30,000 **new jobs** will be created
  - Average of 4,300 per year
- 43,700 **new people** will be required to enter the industry's workforce for the first time
  - Average of 6,200 per year

Figure 2: Estimated number of new jobs created and new people required by sub-industry

Industry	Total employment		New jobs created		New people required	
	2024	2030	Number	% Growth	Total	Average per year
Water collection, treatment and supply	47,900	65,200	17,300	36%	24,800	3,500
Sewerage	29,900	40,700	10,800	36%	16,000	2,300
Construction of utility projects for fluids	5,400	7,300	1,900	35%	2,800	400
Water	83,200	113,200	30,000	36%	43,700	6,200

- Expand engagement to community projects within the next two years.
- Launch a premium deveolpment service from grass root to PhD.
- Increase employee retention rate
- A comprehensive measure in 2029 aligned with AMP 9's analytics

Cultural Inertia and Operational Resistance

Cultural inertia entails a resistance to change, unless change is already occurring.

Change is perceived differently across groups as a function of how well the groups already match the current dominant culture." — Zárate et al., 2012 (ResearchGate)

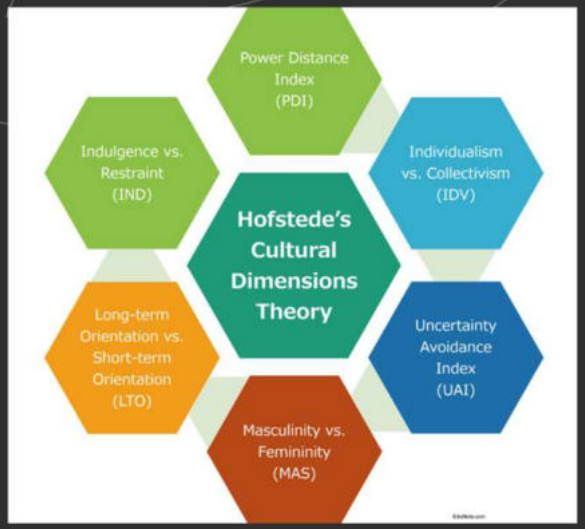
Hofstede's Cultural Dimensions Theory

01

Middle managers under pressure → EDI deprioritised

02

Tacit knowledge becomes gatekept



03

Change is often resisted unless already underway

04

match the current dominant culture.

Hofstede's Cultural Dimensions Theory - iEduNote.com

“ONE STEP AT A TIME. WE’LL GET THERE.”

How We'll Achieve Our Goals

Market Penetration

Target untapped segments with personalised marketing campaigns

Diversification

Develop new product lines for niche markets to enable training and development delivered at pace

Excellence

Streamline the supply chains growth and efficiency aligned with the the ESGs and measure the social impact through stakeholder's testimony and experiences

Leveraging Talent for Success

- ❌ “Do they fit our culture?” → reinforces sameness
- ✅ “Does our culture fit them?” → inclusion by design
- Build belonging, not conformity
- Value difference as innovation

SWOT ANALYSIS

Strengths

Project Design

Opportunities

Procurement & Supply Chain

Weaknesses

Workforce Development

Threats

EDI is not extra — it's essential

Why Long-Term Thinking?

Sector needs 10–20 year plans

Focus:

Succession pathways

Inclusive upskilling

Knowledge retention

KPIs to Monitor

5-year AMP cycles are not enough

S.M.A.R.T

Target Action

Finalise strategic goals by November 2025

Allocate resources for new product development.

Launch first market campaign by March 2026.

Action Levers

- 🧠 System Thinking → EDI embedded in all processes
- 📜 Procurement Act 2023 → Social value tied to outcomes
- 🛠️ Operational Alignment → Train middle managers
- 🗓️ 10–20 Year Vision → Planning beyond AMP cycles
- 🌍 Culture Shift → 'Culture fit' becomes 'Culture evolve'

2nd Joint Water Industry BHM

Theme - Culture Evolution

Dates: Oct 2025

Agile Networking Series

Dates: 15 Jan – 15 Mar 2026

Purpose

Bridge the skills gap

Retain critical knowledge

Inspire inclusive leadership

Live Slido Engagement

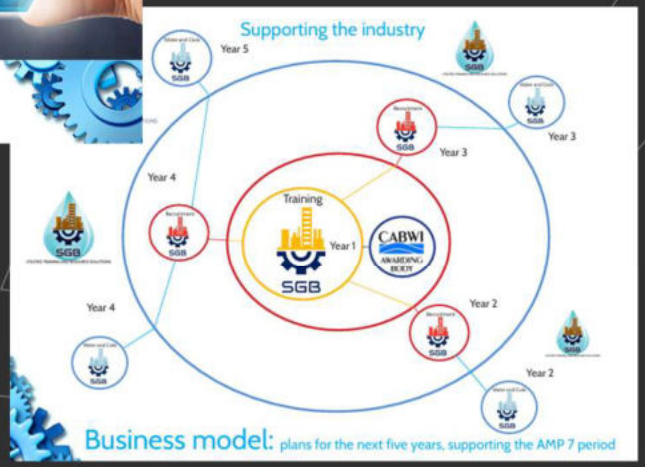
- 1. What's the biggest barrier to EDI?
- 2. Word Cloud: "Culture fit is..."
- 3. Poll: Rate your long-term strategy
- 4. Open text: One change that would improve inclusion?

Join at
slido.com
#3815 822

Together Toward Growth

"THE FUTURE BELONGS TO THOSE WHO CAN INTEGRATE EQUITY, EMPOWER PEOPLE THROUGH PURPOSE, AND BUILD SYSTEMS THAT SERVE BEYOND COMPLIANCE."

LET'S BUILD A BRIGHTER FUTURE TOGETHER.



Contact Information

Email: phil.barnaby@sgbcivils.co.uk
Phone: +44 747134391212
Website:
www.sgbwaterengineering.com

Future Water Association
Informing, Innovating, Influencing

GREATER LONDON AUTHORITY

Future Water Association

Informing, Innovating, Influencing

Horizon Water Infrastructure

AHS PIPELINE INNOVATION

OVARRO

Lunch Break

Future Water Association

Informing, Innovating, Influencing

Horizon Water Infrastructure

AHS PIPELINE INNOVATION

OVARRO

- *Speaker:*
  - *Samantha Clough, Director, Cavendish*

Engaging the Consumer – Driving Understanding and Participation

Future Water Association

Informing, Innovating, Influencing

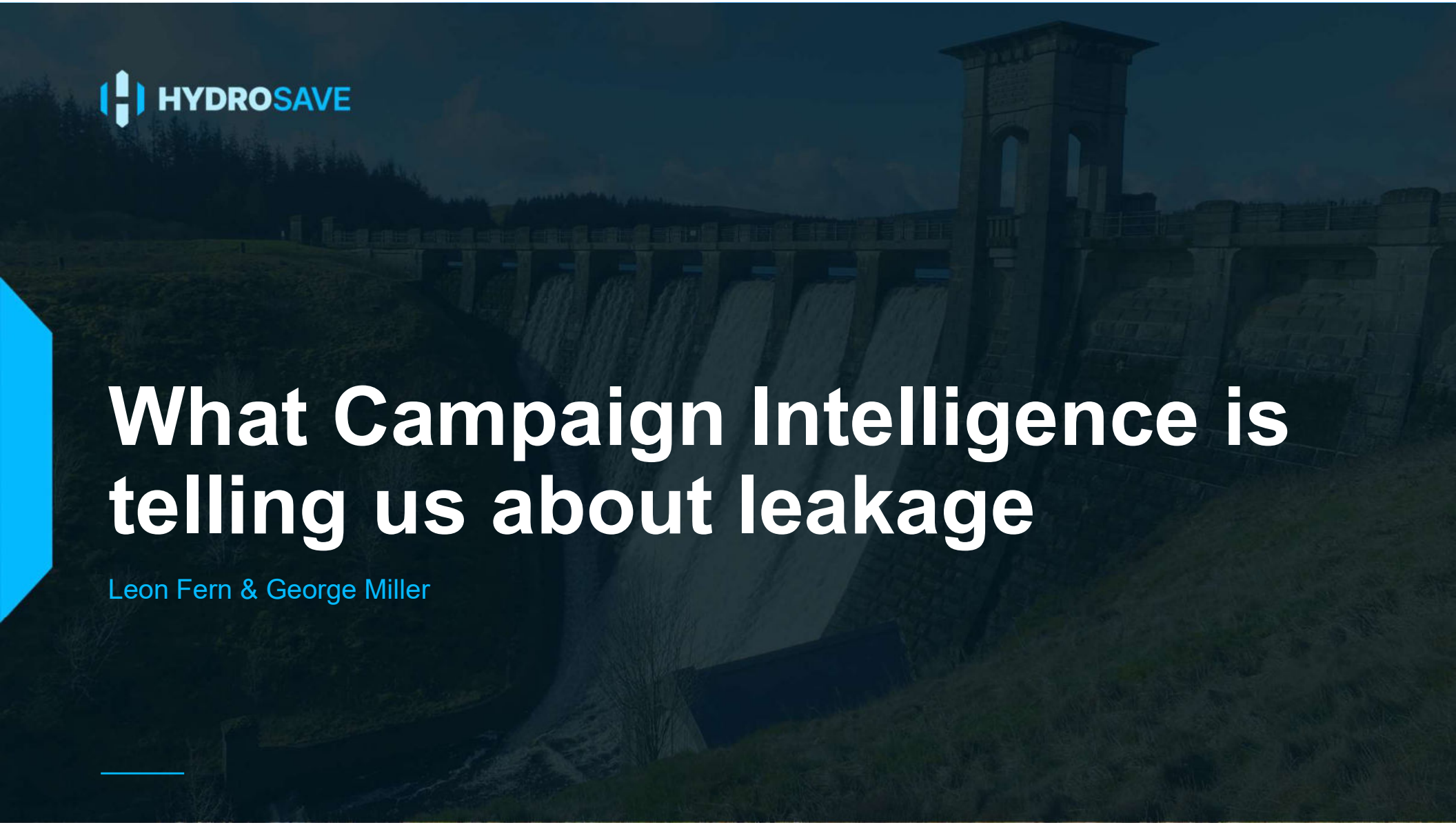
Horizon Water Infrastructure

AHS PIPELINE INNOVATION

OVARRO

- *Speaker:*
  - *Leon Fern, Hydrosave*

Campaign Intelligence: What is campaign management is telling us about leakage?



What Campaign Intelligence is telling us about leakage

Leon Fern & George Miller

WATER INDUSTRY EXPERTS

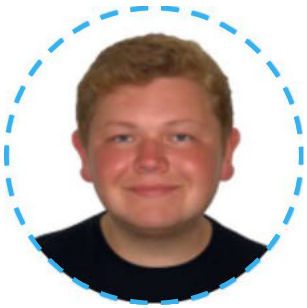
HYDRO SAVE

Field Services specialists in asset health assessment, smart network installation, and leak detection

This is a box

Leon Fern

Head of strategy & projects



George Miller

Performance insight & operations support lead

South Staffordshire Plc


HYDRO
SAVE

Our Clients

Water Utility Frameworks & Projects

Thames Water
Scottish Water
Dŵr Cymru Welsh Water
anglianwater
south east water
NORTHUMBRIAN WATER
YorkshireWater
South Staffs Water
Cambridge Water
AffinityWater
SEVERN TRENT WATER

Consultancies (field services support)

aquaconsultants
AtkinsRéalis
WSP

Technology Providers (Strategic partnerships)

HWM Global
OVARRO
GUTERMANN
Syrinix
Deer Technology
TECHNOLOG
MUELLER

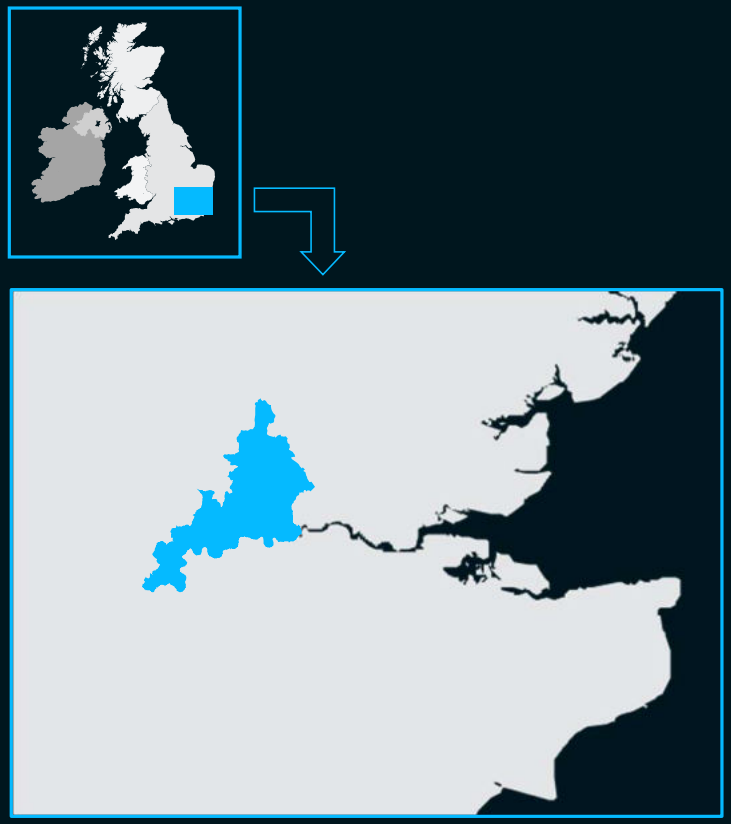
Commercial & Estate Management (Water audit services)

ANCALA WATER SERVICES
mitie
EQUANS
Environment Agency
UNIVERSITY OF BIRMINGHAM
FOREST
NEWBURY RACECOURSE
Rolls-Royce Aerospace UK
BLETCHLEY PARK
moto
AstraZeneca
THRUXTON CIRCUIT
Oasis

Introduction

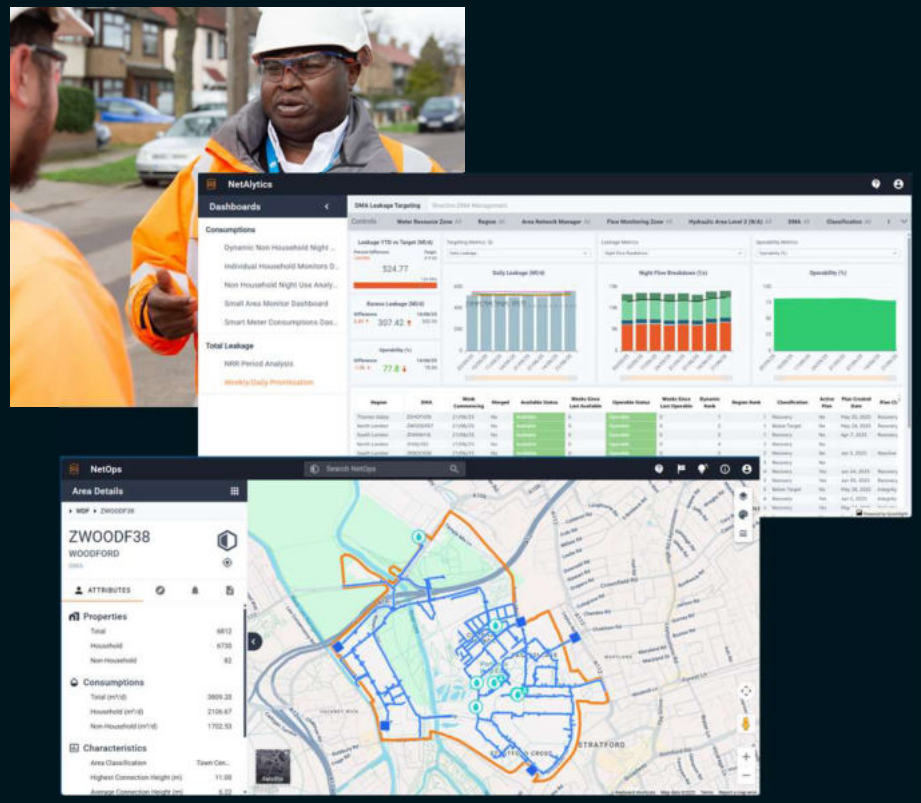
North London Framework

- The largest single, private, leakage detection framework in the UK.
- Service footprint of 1.75m properties and 7,335 km of network
- The framework began in 2019 with an 8-year term
- The Framework has ~133 field-based FTE's detecting leaks
- Dense urban networks with complex interconnectivity
- Distribution network is 61% metallic, 36% plastic, 3% other material
- The framework operates as a 'payment by performance' framework
- The commercial model has evolved over the contract term from an ESPB 'Unit Price' to a 'fixed price' volumetric model in 2023
- Volumetric model enabled through the introduction of Crowder Consulting's NetOps and NetAlytics platforms and a Campaign Management process



Scope of the Framework

Overview



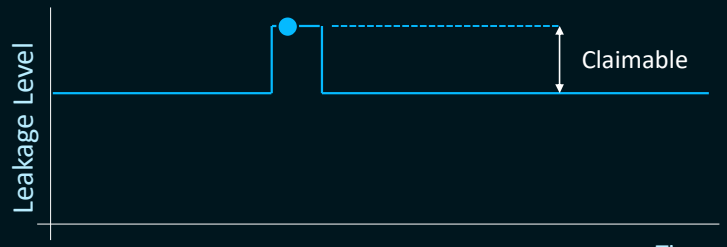
- Campaign Management
- Acoustic leak detection
  - Acoustic survey
  - Lift-and-shift correlating noise logging
  - Step testing
  - Permanent acoustic logger alarm management
- Customer-side leakage (CSL) proving
- Unaccounted for Water (UfW) and data anomaly identification
- In-pipe CCTV survey
- Upstream detection

How is performance measured?

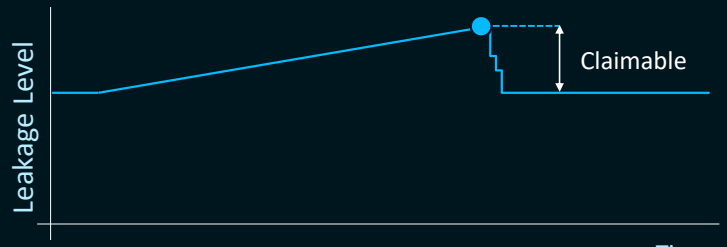
Service delivery model

- Leakage performance is measured in Ml/d delivered, based on:
  1. DMA Campaign performance ([Start]–[Exit])
  2. Quantified leakage outside of Campaigns
  3. Unaccounted for Water (UfW)
- Campaigns are categorised and issued to us for resolution
- The Ml/d delivered is aggregated and compared to a monthly target order book
- Performance is subject to any DMA data anomalies, the repair SLAs, repair process, and any leakage breakout after the Campaign has been opened

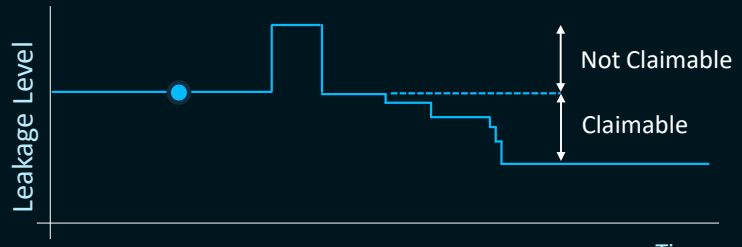
Reactive



Recovery



Reduction



Went live October 2023…

1181

Campaigns

2 winters

1.5 Summers

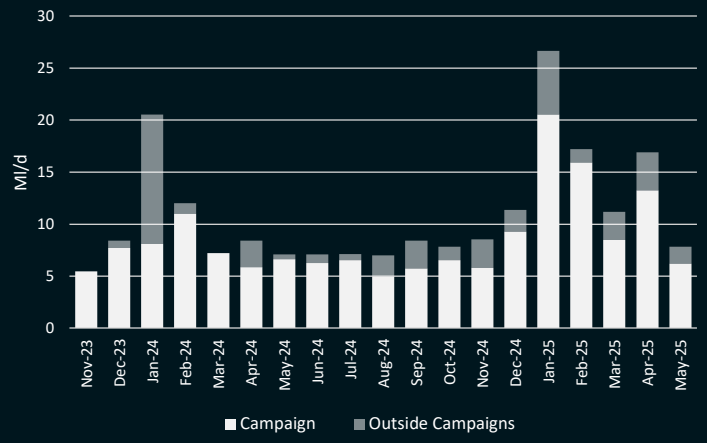
What Campaign Intelligence is telling us about leakage

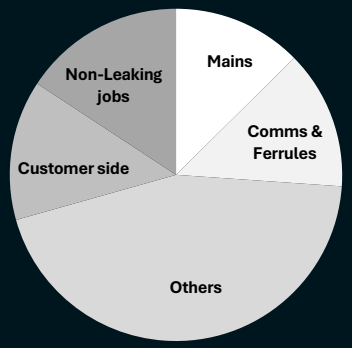
1. Reactive and Recovery versus Reduction (Seasonality)

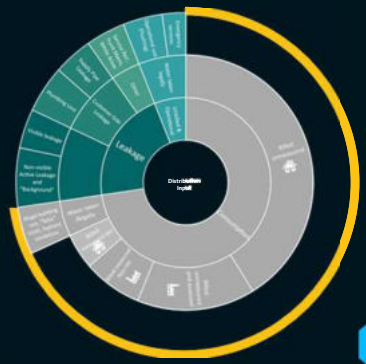
- Reducing reported leakage is harder than just offsetting the natural rate of rise.
- We find ~50% of what is targeted through real-loss leakage detection
- Reactive Campaigns yield the highest Ml/d (Nov-Mar)

2. Measuring the benefit

- We *rarely* see the benefit of leaks promoted and repaired (unless Reactive) on estimated leakage
- Secondary or tertiary sweeps *rarely* result in a different reported leakage outcome
- Entry and Exit interviews are key for scraping learning
- Not all reported leakage is real-loss leakage
- High maturity of behaviours, network metrology, and data confidence required to operate a volumetric-only field services framework







What Campaign Intelligence is telling us about leakage

3. General

- We don't know how much unaccounted for water there is. We don't know it's natural rate of rise
- Putting smart meters in the ground helps – when joined-up with BAU leakage targeting and detection
- We don't need 100% smart meter coverage to make a difference
- Fixed network acoustic loggers and lift-and-shift loggers find leaks – Last year we raised ~1,600 jobs, but only 26 jobs were claimable (5.34 Ml/d of benefit)
- Modern, empowered, specialised, smart leakage technicians with the right behaviours - trained and equipped with the latest technology - are essential to drive leakage down
- We have changed our approach as a result of Campaign intelligence:
  - Shortened end-to-end cycle time
  - Reduced "Recycling" of campaigns by introducing a comprehensive Campaign recap
  - Established DMA resilience programme
  - Established specialist UfW and Data Improvement team
  - Increased night teams
  - Audit 100% mains prior to promotion

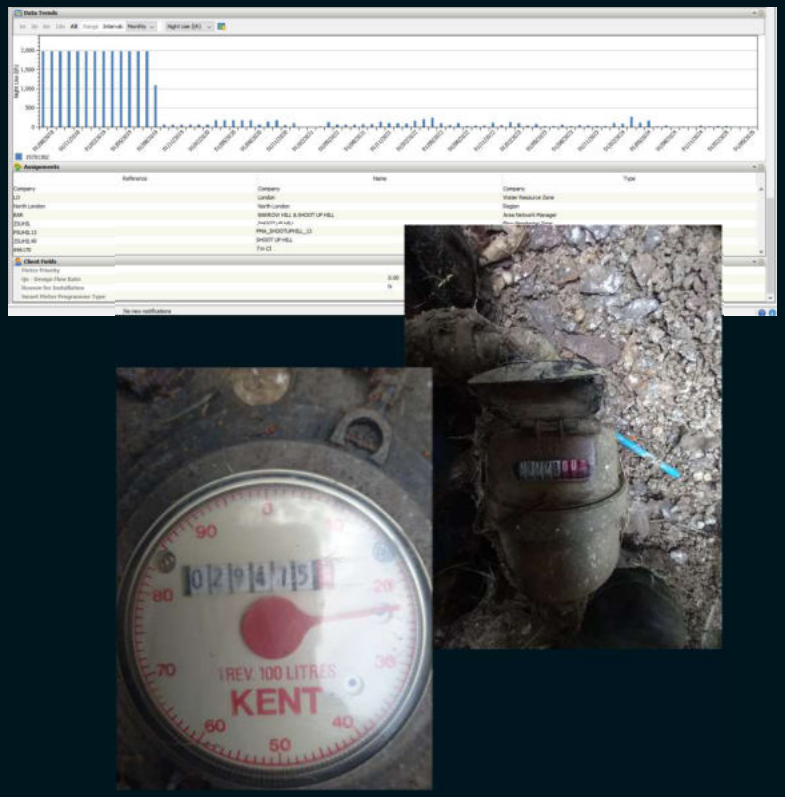
In detail

Utilising “dumb” metering data to identify customer side leakage

- Over the last 12 Months, we have been utilising algorithms on dumb meter datasets to identify customer side leaks. We:
  - Compare historic meter reads to identify increases in consumption
  - Compare consumption of neighbouring properties to identify possible leaks
  - Distinguish between internally and externally installed meters to identify potential “Wastage” Leaks
  - Identify erroneous meter reads which we can rectify in the system and improve DMA Operability

In detail

Metering penetration and how we use the data



- In high density non-household DMAs, we use metering data to identify historic issues
- Questions asked:
  - When was the last time the meter was read?
  - When was the meter installed?
  - What type of meter has been installed? e.g. combination Meter
  - Has the meter previously registered night consumption?
  - Are there any feeds going into non-household properties which are unmetered, skewing the average daily consumption/ night use allowance?
  - Are there any fire supplies which could be being used for non-firefighting use

Final Thoughts

What keeps us up at night

- What is the optimum ratio of permanent, semi-permanent, and lift-and-shift noise logging?
- Making data sexy - How do we design-in better checks, and use AI for bottom-up data anomaly identification, meter under-registration?
- Are UFW and data improvement a more cost-effective leakage solution?
- How sensitive are client supply-demand balances? Do we need reported leakage savings to be real-loss savings?
- Leaks versus leakage – Maximising the benefit. Are we storing up a problem?
- What effect will upstream tile water balances have?
- What changes do we need to make to the recruitment and skills pipeline?
- The “P” in PALM - How do we design Asset Health and leak prevention into future field services frameworks. How will we measure intervention success?

Thank you

0345 6040 656 | www.hydrosave.co.uk

Future Water Association

Informing, Innovating, Influencing

Horizon Water Infrastructure

AHS PIPELINE INNOVATION

OVARRO

Future Water Report Card Workshop

Future Water Association

Informing, Innovating, Influencing

Report Card

Mains Leakage

Overall Grade: C

A marked shift in approach has occurred in recent years, characterised by a clear roadmap towards halving leakage, a pressing issue identified by UKWIR and a target addressed by several Ofwat innovation fund recipients.

The primary obstacle remains funding, as driving down leakage necessitates investment, with the emergence of new solutions requiring time for implementation.

Achieving accurate usage data hinges on transitioning to 100% metering at the earliest feasible juncture, so that the true amount of leakage is known at the micro level.

Future Water Association

Informing, Innovating, Influencing

Report Card

Customer Side Leakage

With a significant percentage of households lacking metered water supply, the extent of customer side leakage remains enigmatic.
Unclear responsibilities compound the issue; water companies bear penalties for leakage stemming from customer pipes, even though homeowners are accountable for maintenance.

Addressing this conundrum necessitates broader metering implementation and homeowner engagement.

Centralised ownership of supply-side pipes is recommended to streamline decision-making regarding leakage remediation. It would also bring focus to the challenge of replacing lead pipes.

Future Water Association

Informing, Innovating, Influencing

Horizon Water Infrastructure

AHS PIPELINE INNOVATION

OVARRO

What does success like in 2030 and beyond?


Future Water Association
Informing, Innovating, Influencing
Horizon Water Infrastructure
AHS
PIPELINE INNOVATION
OVARRO
Thank you.

Future Water Association

Informing, Innovating, Influencing

Join us

Paul Horton, CEO
paul@futurewaterassociation.com

Hannah Spencer, Operations Manager
hannah@futurewaterassociation.com