

WSX-C12 – Enhancement costs – pollutions

Response to
Ofwat's PR24 draft
determination



Wessex Water
YTL GROUP

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Representation reference: **WSX-C12**

Representation title: **Enhancement costs – pollutions**

CONTENTS

1.	Serious pollution incidents – Smart Wastewater Network	1
1.1.	Need for enhancement investment	1
1.2.	Best option for customers	1
1.3.	Cost efficiency	4
1.4.	Customer protection	5
2.	Total pollution incidents – Resilience – PIRP	6
2.1.	Need for enhancement investment	6
2.2.	Best option for customers	7
2.3.	Cost efficiency	10
2.4.	Customer protection	10
	Annex 1 – In-sewer monitor Marketplace challenge	11

1. Serious pollution incidents – Smart Wastewater Network

This representation addresses the feedback provided by Ofwat on our proposed Smart Wastewater Network investment which will contribute to achieving our serious pollution incidents PC. We note the costs relating to this, have been reallocated to base in our response, consistent with Ofwat's view that this increase in activity should be funded from base.

1.1. Need for enhancement investment

The investment does not meet the requirements of resilience enhancement investment and additional customer funding. The company does not provide clear evidence to demonstrate if this investment is overlapping with base expenditure.

Consistent with Ofwat's view that these activities should be funded by base, we have reallocated these in our response. However, we are clear that we do not consider these activities are funded by Ofwat's approach to setting base costs, by definition. This is because this proposal represents a step-up in the activity. This is acknowledged by Ofwat in setting out that we have conducted trials in the current period (i.e. only a small amount of activity).

Ofwat's approach to setting the industry wide cost adjustment claims assumes that base costs fund the average level of investment in a given area (e.g. in relation to metering, or mains replacement). Whilst we do not agree with Ofwat's approach to these adjustments (as set out in WSX-C20). We think that reallocating this here, although consistent with Ofwat's DD is inconsistent with the logic applied elsewhere. However, given we are proposing a base cost allowance driven by the bottom up replacement needs of our underlying assets, there is more rationale to include it in base, hence we have reallocated it in our response

The company does not provide sufficient and convincing evidence to demonstrate why additional allowances are required for installing monitors and deliver CCTV for nearby watercourse when it has been delivering the same scheme in 2020-2025 period through base expenditure allowances.

Additional allowances are required to install monitors and deliver our CCTV programme because we are proposing to undertake more than in previous AMPs. Additional CCTV is required to help us better understand parts of our network so we can effectively prioritise the install of monitors to enable us to reduce pollution incidents. Our justification for additional CCTV allowance is outlined in detail in our original submission WSX47 – Outcomes Table Summary section 1.13.4.

1.2. Best option for customers

1.2.1. Options selection

We [Ofwat] have significant concerns whether the investment is the best option for customers. The company does not provide sufficient details in their price review submission or query response that alternative types of monitors have been considered or does not provide details of a cost benefit analysis to demonstrate that chosen option is the right solution.

We complete root cause analysis on all our pollution incidents. We have identified that when we do have incidents they often occur in inaccessible locations which are harder to identify and can increase the severity if we are not able to identify them quickly. In-sewer monitoring is particularly helpful in tackling this issue, hence why it is an investment priority to help us to manage pollution incidents.

To ensure that we considered all alternative types of monitoring we completed a Marketplace challenge in September 2022. We provided a summary of our business requirements for in sewer monitoring to the industry to allow suppliers to prepare responses for review and trial. This was framed as an open question so that alternative options (i.e. other than sewer monitors) could be put forward by suppliers. A further detailed outline of the Marketplace challenge can be found in Annex 1. The outcome of the Marketplace challenge was that there were three different types of solutions available:

1. Simple / low tech pressure gauges which were significantly cheaper than the other options but the opportunities for data usage were smaller.
2. In-sewer monitors which we could use data to feed into our hydraulic models.
3. Flow monitors which would provide depth and velocity information. These would be expensive to operate and the data needs calibration. Flow monitors also perform poorly in small diameter pipes.

The conclusion was that in-sewer monitoring would provide us with the best balance between value and data. This is a decision which we understand the majority of the water industry has taken, we therefore see this as an indication of good practice.

We are currently undergoing the tender process following the Marketplace challenge. Once this has concluded we will be able to demonstrate that we have procured monitors from a supplier which offers the best value for money.

The company does not provide sufficient and convincing evidence to demonstrate the monitors will be installed at the most beneficial locations.

We have engaged with our contacts at other water companies and third-party suppliers to determine best approach to selecting monitor install locations which would be most beneficial.

We have developed a risk model based on survey data, multiple additional criteria and operations field teams requests and used this to develop target locations. This has provided a better coverage of 'high risk' pollution incident locations as well as combating inconsistent data quality across some of the areas.

Applying the risk model:

1. Obtain manhole data from our asset data base.
2. Filter out manholes where monitor install would be unfeasible without significant enabling works e.g buried or sealed.
3. Apply risk model criteria to remaining manhole population (e.g repeat pollution site, hydro slide/hydro break installed). This includes risk criteria and a spatial rule where applicable. When applied the risk model then allocates a score to each manhole.
4. Potential monitor install sites are then prioritised based on the score output, with 10 being the most beneficial and 1 being the least.

This approach is continuously refined if a new criteria is identified.

When target locations have been identified, sometimes it is not possible to install a monitor and we need to complete a secondary assessment to identify where would be the next best location, Figure 1 shows our installation dashboard:

Secondary assessment (alternate locations)

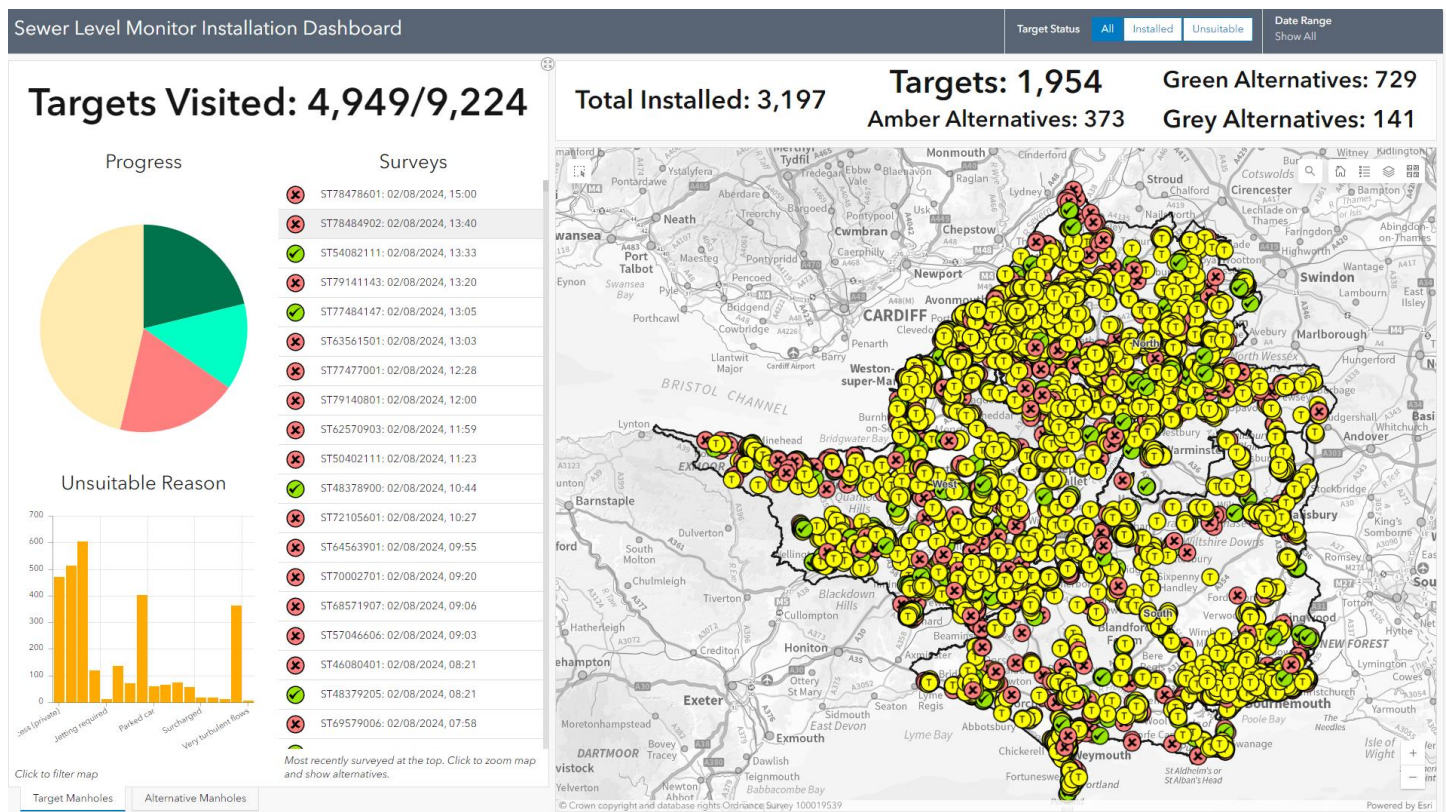
Additional analysis is completed on sewer lengths that are thought to be contributing to pollution (e.g syphon, sewer length prone to blockages). We complete traces on the sewer network and U/S invert on this length is defined as "lowest trace invert"

- GIS trace on connected sewers upstream.
- Identify lowest cover level in trace set

- **Red:** manholes where lowest invert > lowest cover level in trace set
- **Amber:** manholes where:
 $(\text{lowest cover level} - \text{Manhole invert level}) / (\text{lowest cover level} - \text{lowest trace invert}) > 0 \text{ and } < 0.5$
- **Green:** manholes where:
 $(\text{lowest cover level} - \text{Manhole invert level}) / (\text{lowest cover level} - \text{lowest trace invert}) > 0.5$

The highest priority target areas are where we find the highest concentration of pollution incidents. There is a master programme of works that can be reprioritised based on the new requirements and requests. The monitoring team have regular meetings to discuss reprioritisations. Future monitor locations are consolidated onto a viewpoint layer which includes a rationale as to why it has been chosen and also the history if it has been aborted. We maintain an audit trail of where we have previously considered sites.

Figure 1 – Sewer Level Monitor Installation Dashboard - snapshot August 2024.



1.2.2. Deliverability

The company does not provide any certainty if the proposed number of monitors will be delivered in 2025-2030 period.

Since submitted the October 2023 PR24 submission we have proven that we are able to deliver in-sewer monitoring at pace as we have delivered >3,000 monitors. 500 of these monitors are now operational after spending between 2-3 months gathering baseline data to support the AI system and machine learning.

We have amended our existing contract for installation and this is under review. Our new contract has been operational for two months and been based on units installed rather than a day rate approach, we will be completing a review of its effectiveness to understand the impact of this change on efficiency and delivery.

[Wessex Water] provides no cost-benefit analyses to confirm what would be the best options to further reduce pollution incidents so a 'step-change' in service would be achieved.

Please refer to section 1.2.1 for our response regarding cost-benefit analysis and best option.

In terms of delivering a step change in service, early indications suggest that in-sewer monitors will help to achieve this. After a review of the first three months of in-sewer monitor installation, of which 500 are fully operational, we believe the approach may have prevented a possible nine pollution incidents (see Table 1), with four potentially being a Category 2 or higher. Taking into account the extensive monitoring we are rolling out we expect this pattern to be reflected across the network, leading to a reduction in pollution incidents. These monitors will help us manage our serious pollution incident risk, particularly capturing incidents which may not have been observed or reported by the public due to their inaccessible location.

Table 1 – Number of potential near miss pollution incidents which were raised as a result of in-sewer monitors over a 3 month period.

Sr no	Potential worst case impact	Blockages cleared
1	CAT 2	4
2	CAT 3	4
4	External Flooding	2
5	Cat4/self cleared	11
Total		21

1.3. Cost efficiency

We have significant concerns that the investment is efficient. The company does not provide sufficient and convincing evidence that the proposed costs are efficient.

Revised costs have been submitted as part of our response which are now based on installation of in-sewer monitors since October 2023. Cost estimates for install are lower than our original submission.

The cost of installation was originally based on £ per monitor. In our revised submission our assumptions are based on £ per monitor based on experience of installation costs in past 12-18 months. A breakdown of the cost can be found in Table 2 below.

The company states there is a marketplace challenge around smart monitoring but does not provide any unit cost data per monitor or any cost built-up approach. In addition, the company increases the cost of this scheme in their query response but does not provide any explanation.

In-sewer monitors costs are based on the following build up in Table 2.

Table 2 – In-sewer monitor cost breakdown.

Updated Installation and Associated Costs (£)		Opex (£)	
Monitor	⌘	Maintenance Crew Visits	⌘
RTU Battery	⌘	Breakage / replacement sensor	⌘
Bracket/arm	⌘	Staff resources	⌘
Antenna	⌘	Stormharvester hosting	⌘
Data Transfer for 5 years	⌘	Other (e.g. IT)	⌘
Installation	⌘		
Programme Manager / IT / Other	⌘		
TOTAL	1,040	TOTAL	112

We have provided details of the Marketplace challenge completed in section 1.2.

The change in costs outlined in the Ofwat query, OFW-OBQ-WSX-173, and further queried in the deep dive are superseded by Table 2 above.

Additionally, the company states that its cost estimation process has external assurance but does not provide sufficient evidence to demonstrate the cost estimation for this claim have been assured by third-party assurer.

The external cost consultants have assured aspects of our PR24 programme but have not specifically reviewed our in-sewer monitoring programme.

1.4. Customer protection

The company does not present a price control deliverable (PCD) for this investment.

This investment will be delivered through base expenditure. As such, we do not believe it is appropriate to suggest a PCD which should predominantly be applied to enhancement investment.

2. Total pollution incidents – Resilience – PIRP

This section of the document sets out our response to the feedback receive at draft determination on PIRP. We have structured this section with feedback in red and our response below.

2.1. Need for enhancement investment

2.1.1. Base allocation

For Draft Determination, we [Ofwat] make no specific enhancement allowance for pollution reduction...the company does not provide sufficient and convincing evidence to demonstrate the investment will drive a step-change in the current level of service to a new 'base' level and if this investment is overlapping with base expenditures.

Consistent with Ofwat's view that these activities should be funded by base, we have reallocated these in our response. However, we are clear that we do not consider these activities are funded by Ofwat's approach to setting base costs, by definition. This is because this proposal represents a step-up in the activity. This is acknowledged by Ofwat in setting out that we have conducted trials in the current period (i.e. only a small amount of activity).

Ofwat's approach to setting the industry wide cost adjustment claims assumes that base costs fund the average level of investment in a given area (e.g. in relation to metering, or mains replacement). Whilst we do not agree with Ofwat's approach to these adjustments (as set out in WSX-C20). We think that reallocating this here, although consistent with Ofwats DD is inconsistent with the logic applied elsewhere. However, given we are proposing a base cost allowance driven by the bottom-up replacement needs of our underlying assets, there is more rationale to include it in base, hence we have reallocated it in our response

2.1.2. Step change in pollution reduction

[Wessex Water] does not provide sufficient and convincing evidence to demonstrate the proposed activities would reduce pollution incidents significantly from the current underperformed level and achieve the step-change as suggested. The company provides a list of activities to be delivered through this investment, which includes pollution focused inspection and rehabilitation, maintenance, enhanced investigations, and additional jetting for blockage removal at its network and water recycling centres (WRCs) pipework, plus a range of tactical interventions and customer engagement.

We will achieve a step-change in pollution reduction through the proposed activities in our PIRP.

We are focusing investment on developing a proactive operational framework across more asset types. 3,500 in-sewer depth monitors are expected to be installed by the end of 2024, with ambitions for 12,000 monitors by the end of AMP 8. This will be combined with the expansion of the Network Monitoring Team to allow wider reaching analysis and manage the increase in alerts generated by the additional monitors. As well as this the machine learning services provided by Storm harvester are also being expanded to include additional sensors and development of WRC and SPS analysis and alerting. The focus on innovative proactive approaches in combination with the other options proposed (see section 2.2.1) will deliver a step change.

The quantum of investment is also significantly more than we have ever planned before which will also help to deliver the step change in performance as we will be able to reach more assets.

A summary of our proposed activities can be found in Table 4 in section 2.3.

The company does not provide sufficient and convincing evidence why enhancement allowances are required for these types of activities.

We proposed to deliver these types of activities through base expenditure. See response in section 2.1.1.

2.2. Best option for customers

2.2.1. Assessing alternative options

The company does not provide sufficient and convincing evidence that alternative pollution reduction options have been considered, and it provides no cost-benefit analysis to demonstrate that the chosen option is the right solution... The company provides no evidence alternative options have been considered to reduce pollution incidents. The company provides no cost-benefit analyses to confirm what would be the best options to enhance pollution reduction and deliver the proposed step-change.

Alternative pollution options have been considered in developing our PIRP for AMP8. We have used root cause analysis to identify the most effective interventions. Examples of this can be seen below:

Table 3 – Pollution root causes and associated PIRP activities.

Asset base	Incidents by Asset		Root cause	Baseline		Activities
	Cat 1-2	Cat 3		No. pollutions (cat 1/2)	No. pollutions (cat 3)	
Sewer	0 to 4	34	Blockage - Rag, Fat, Other	⌘	⌘	TP - Rehab, TP - Customer Engagement, Flood - ERCAs TP - Maintenance, SP - Smart Networks
			Blockage - Silt, Roots	⌘	⌘	TP - Maintenance, TP - Customer Engagement, Flood - ERCAs TP - Rehab, SP - Smart Networks
			Hydraulic Capacity	⌘	⌘	Flood - Flood Alleviation
			Sewer Collapse	⌘	⌘	TP - Rehab, SP - Smart Networks, Flood - ERCAs
			Various	⌘	⌘	-
Rising main	0 to 3	10	Asset failure - burst	⌘	⌘	Base - Rising Main Replacement
Sewage pumping station	0 to 1	26	Pump Failure	⌘	⌘	TP- Optimisation Base - Add. Asset Maintenance
			Power Failure	⌘	⌘	
			Panel Failure	⌘	⌘	
			Asset Failure	⌘	⌘	DWMP - SPS resilience
			Various	⌘	⌘	-

		Incidents by Asset		Baseline		
Asset base	Cat 1-2	Cat 3	Root cause	No. pollutions (cat 1/2)	No. pollutions (cat 3)	Activities
WRC	0 to 1	39	Blockage - Inlet & WRC process	⌘	⌘	TP - Maintenance, <i>Base - Screen, Base - Grit Removal</i>
			WRC Process	⌘	⌘	TP - Trade Effluent Permit Compliance
			Pump Failure	⌘	⌘	TP - MIR/Tactical Interventions
			Asset Failure	⌘	⌘	
			Human Error	⌘	⌘	
			Hydraulic Capacity	⌘	⌘	
			Failing FFT/FPF	⌘	⌘	<i>Base - FPF control</i>
			Flooding/Run-Off	⌘	⌘	
			Power Failure	⌘	⌘	Resilience - Generator, <i>Base - Generator</i>
			Structural Failure	⌘	⌘	
			Various	⌘	⌘	
Storm overflow	0 to 2	6	Various	⌘	⌘	SP - Smart Networks
Surface water outfall	0	0	Various	⌘	⌘	-

Based on the PIRP annual return we and all other WaSCs have completed for the Environment Agency, these types of interventions are in line with their expectations and what activities the industry has been undertaking.

We are always seeking to innovate and try new pollution reduction measures to ensure we are delivering the most effective solutions to manage pollution. This is demonstrated through our participation in the National Pollution Group, the industry forum where good practice and new ideas are shared so we can seek improvements across the industry. Examples of where we have used this forum to develop new options for pollution reduction are as follows.

- **In sewer monitors** – learning from other companies' experience of implementation

The Smart Network forum is a joint forum with water industry and equipment/software manufacturers plus service providers – anyone who sees their organisation in this space – to share knowledge and experience. This regularly has sharing opportunities from the other water companies on manhole selection criteria, monitors, install consideration and good ideas as well as practical experience in changing cultures from reactive to proactive from a front-line operator point of view. All of these have been at high level, giving areas of good practice without sharing company confidential information. This has created new ideas, sparked discussions or flagged challenges to be aware of in planning and execution for our deployment. We have benchmarked our planned roll out number per km of sewer to the other companies as we knew when making the PR24 plan and this was not abnormal to the other companies' ratios (not considering outliers).

- **Pollution Spotter signs at outfalls**

At the National Pollution Group, Welsh Water showed how they have developed and used an appropriate sign. We have added similar signs near SPS and WRC outfalls and near CSOs, if they have a suitable location to attach them. The signs include Wessex Water contact details and have helped customers and passersby quickly report to our customer services, who arrange for a suitable operator to be dispatched to site.



- **Built a training jetting rig**

Following a Welsh Water presentation at the NPG on a jetting rig for training, Wessex Water staff developed a list of requirements and designed a rig which has been built in Yeovil Pen Mill WRC. This specifically allows the operators to practise jetting a blockage, understanding the difference with rag, brick etc, in different sized pipes and how to do this safely. This allows for training for sewerage crew, WRC operators and JetVac operators and has been in use since April 2022. We will continue to use this training rig in AMP8.



- **Water Guardians** – not effective at identifying pollutions but has raised other issues which other parties have delivered.

Northumbrian Water have presented on their River Rangers programme, showing how they engage with local communities on understanding and caring for their river environment. From this idea we worked with our Community and Customer Engagement teams to develop our Water Guardians programme. The programme consists of partnerships with local Wildlife and Rivers Trusts, providing funding for a project co-ordinator to be embedded in these organisations and co-ordinate volunteers who “own” a stretch of river. The volunteers walk this all year round, understanding what normal looks like and reporting any signs of pollution to Wessex Water. This has led to a great partnership with these volunteers in their awareness of what a pollution is and a better understanding of Wessex Water and the wider water industry.

- Our Supply Planning, Control and Optimisation team presented to the National Pollution Group recently on our Smart Waste System project. This initiative is building a digital twin for a catchment, developing ways to use our existing data to provide insights and trigger actions in a proactive/predictive way, taking into consideration the systems as a whole.

2.3. Cost efficiency

The company provides a list of total costs per type of the proposed activities but does not provide sufficient details of the unit costs and the quantity will be delivered per activity.

A breakdown of the proportion of expenditure by intervention type for the AMP8 PIRP has been summarised in the table below:

Table 4 – PIRP activities and cost per incident reduction

Activities	Asset	Expenditure, £m			Reductions in Year by 2029/30		Cost Per Incident Reduction
		Capex	Opex	Totex	Cat 1/2	Cat 3	
Enhanced Investigation	All	⌘	⌘	⌘			-
Pollution Focused Inspection & Rehab	Sewerage	⌘	⌘	⌘		⌘	2.49
Pollution Focused Maintenance - Networks	Sewerage	⌘	⌘	⌘		⌘	2.52
Customer Engagement Teams	Sewerage	⌘	⌘	⌘		⌘	4.11
SPS Performance & Optimisation	SPS	⌘	⌘	⌘		⌘	4.19
Trade Effluent Permit Compliance	WRC	⌘	⌘	⌘		⌘	2.23
Pollution Focused Maintenance - WRCs	WRC	⌘	⌘	⌘		⌘	2.52
MIR/Tactical Interventions - WRCs	WRC	⌘	⌘	⌘		⌘	7.76
Smart Networks	Sewerage	⌘	⌘	⌘	⌘	⌘	5.34
Proactive CCTV - Watercourses	Sewerage	⌘	⌘	⌘	⌘	⌘	13.72
ERCAs	Sewerage	⌘	⌘	⌘		⌘	2.73
Power & Generator Standby Resilience at WRCs	WRC	⌘	⌘	⌘		⌘	18.50
SPS resilience	SPS	⌘	⌘	⌘		⌘	1.00
Premature spill to storm (FPF control)	WRC	⌘	⌘	⌘		⌘	10.53
Screen Service (refurb)	WRC	⌘	⌘	⌘			
Screen Replacement	WRC	⌘	⌘	⌘			
Grit Removal Service (refurb)	WRC	⌘	⌘	⌘			
Grit Removal Replacement	WRC	⌘	⌘	⌘			
Generator servicing (enhanced servicing)	WRC	⌘	⌘	⌘			
Generator replacement	WRC	⌘	⌘	⌘			
Additional Asset maintenance on SPS - MCC, panels, pumps	SPS	⌘	⌘	⌘			

The company states in their overarching strategy document that it benchmarks its costs externally against the industry but does not provide evidence of this.

We have not benchmarked costs against other companies as this information has not been shared across the industry.

2.4. Customer protection

The company does not present a price control deliverable (PCD) for this investment.

This investment will be delivered through base expenditure. As such, we do not believe it is appropriate to suggest a PCD which should predominantly be applied to enhancement investment.

Annex 1 – In-sewer monitor Marketplace challenge

In line with our vision of developing intelligent wastewater networks, we launched a Marketplace challenge in Autumn 2022 looking at cost-effective monitoring solutions for our sewer network.

The aim of the Marketplace challenge was to help us gain information and experience to inform procurement of a suitable monitor in the future.

In Autumn 2022 we published an article setting out the details of the challenge and inviting submissions. An extract from the article is included below; the full article is available on the Marketplace website¹.

Background

Following on from the success of our EDM intelligent sewers challenge, and in line with our vision of developing intelligent wastewater networks, we are launching another challenge in this space. However, for this challenge we are looking specifically for low-cost monitors rather than an analytical system/software.

We want to increase our ability to proactively monitor and identify issues in our sewer network (principally blockages and sewer health), in order to further reduce the number of flooding and pollution incidents that occur, while also improving customer service and environmental benefits.

Therefore, we are looking to significantly increase the number of in-sewer monitors across our network at key assets/locations, likely monitoring level but we are open to other options. Due to the potential scale and end user requirements, we are looking for a lower cost solution than the EDM-standard sewer level monitors.

Increased monitoring could also aid in our transition from time-based maintenance to condition-based maintenance.

¹ <https://marketplace.wessexwater.co.uk/challenges/increased-monitoring-of-our-sewerage-network-can-you-help>

Challenge overview

The aim of this Marketplace challenge is to help us gain information and experience to inform procurement of a suitable monitor in the future.

We will trial potential monitors, and we are inviting suppliers to apply to take part.

We expect the trial to proceed as follows:

- Monitors will be installed at 5-10 locations per supplier for a period of 3 months in early 2023 (installation likely to happen between January and March).
- Data will be inspected to see if it is representative during a range of operational conditions (dry/wet weather, potential issues), and where relevant for alignment with EDM-standard sewer level monitors.
- When we are alerted of issues, where appropriate we would check whether this was a valid alert by inspecting the site.

For the product identified as most successful, we envisage placing a small contract (likely no more than c.200 units) to enable further assessment.

As a regulated business, we are bound by the Utilities Contracts Directive 2016 so any subsequent larger-scale roll-out would have to go to competitive tender due to the expected value of the contract. The trial and initial contract is principally an information-gathering exercise to confirm that we can use the data and to help us inform requirements for an invitation to tender (ITT). The ITT would be opened to the market and not restricted to the successful triallists, although we would use the trial outcome to inform the tender criteria, which would not be changed. A successful trial will not guarantee a contract nor any other form of business.

A subsequent blog post updating on the progress of the challenge is available here – [An update on our in-sewer monitor challenge \(wessexwater.co.uk\)](https://marketplace.wessexwater.co.uk/blog/an-update-on-our-in-sewer-monitor-challenge)²

² <https://marketplace.wessexwater.co.uk/blog/an-update-on-our-in-sewer-monitor-challenge>