Pollution Incident Reduction Plan

Wessex Water
YTL GROUP
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Document version control

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1.0	As published on website	Matt Wheeldon	8 Aug 2021

Pollution Incident Reduction Plan January to June 2021 update

1. Introduction

This is the first quarterly update of 2021 following our latest [Pollution Incident Reduction Plan](#) update – which was published in May 2021. This update covers the first two quarters of the year (Jan-Jun).

Our plan is divided into 4 themes: People and Process, Assets and Maintenance, Customers and Stakeholders, Telemetry Data and Analysis.

In this update, we report on progress with delivering the plan, present case studies and examples of what we have delivered and report on the effectiveness of the plan on our way to our aspiration to cause no pollution incidents.

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2. Quarterly progress report

2.1 Numerical quarterly activity analysis against the plan

Theme	Activity (in-period unless otherwise stated)	Unit	2020 Totals	Q1 2021	Q2 2021
People and Process	Pollution incident training (cumulative since Sept 2019)	Nr	358	139	139
Assets and Maintenance	Length of sewer surveyed	Km	51.243	12.009	12.453
	Sewerage Investigation Assessments completed	Nr	146	33	27
	Treatment Investigation Assessments completed	Nr	2	4	2
	Rising Main Assessments completed	Nr	2	1	1
	Length of sewer rehabilitated	Km	2.004	2.198	0
Customers and Stakeholders	Summer shows: number of people engaged	Nr	0	0	0*
	Student fairs: number of people engaged	Nr	0	0	0*
	Attendees at Open Doors events	Nr	0	0	0*
	Social media reach	Nr	479,798	42,967	24,239
	FSEs investigated	Nr	617	471	48*
	Personalised letters following blockage incidents	Nr	1045	33	65
	Water rangers engaged	Nr	27	34	40
Telemetry Data and Analysis	Cumulative number of intermittent overflows monitored (and % of total)	Nr	1056 (82%)	1085 (82%)	1091 (83%)

*Output impacted by COVID-19

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2.2   Qualitative quarterly progress report on initiatives – Q1 (Jan-Mar) 2021 Progress Report

Theme	Activity or Initiative	Q1 2021 Progress Report
People and Process	Additional equipment roll-out	No new equipment rolled out
Assets and Maintenance	Artificial Intelligence sewer scanning initiative	Following a 2019 market-place challenge we are investigating the use of artificial intelligence for coding defects in sewers. Four companies were selected for the final trials, bulk uploading of our initial data to their platforms was done in order to test their AI software. The results are now being collated to be reviewed by experts within the business. The aim is to improve Health and Safety, due to saving time on site (for example when working in the highway) and also increase the cost benefit by reducing the costs of scanning sewers per meter.
Customers and Stakeholders	Update on events	No events attended in Q1 2021.
	Anti-FOG initiatives	ECAS are currently active in the following areas, Bath, Bridgewater, Bridport, Bristol, Cheddar, Chippenham, Claverham, Congresbury, Dorchester, Everleigh, Evershot, Farrington, Gurney, Fordingbridge, Gillingham, Glastonbury, Melksham, Midsomer Norton, Minehead, Poole, Ringwood, Salisbury, Sandbanks, Shaftesbury, Sparkford, Swanage, West Bay, Weymouth, Wincanton, Yatton. Both in signing off new installs and carrying out site visits, to existing contacts.
	Hotspot competition/promotions	No longer updating due to revised sewer misuse strategy
	Joint waste messaging with local authorities	No longer updating due to revised sewer misuse strategy

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	Proactive customer engagement	The new Stop the Block pack will be launching to all customers in June. Customers will be able to order gunk pots, sink strainers, hair catchers, and a sewer misuse leaflet. During 21/22 we will add limited offers to the pack, including products such as Fresh X (a toilet paper gel) and bathroom bin liners. This pack is designed to help customers better understand how to prevent blockages and provide products to help them adopt positive behaviours.
	Reactive customer engagement	A full review of reactive blockage letters is being undertaken by the Customer Insight and Participation team. A new process is currently being developed with the intention that it becomes data driven and more automated. This will ensure all repeat blockage incidents are sent a letter and any subsequent incidents are identified immediately. We have also engaged Behaviour Change to review the customer correspondence, ensuring we capitalise on this engagement opportunity.
	Targeted hotspot engagement	In Q1 of 21/22 we will be launching a programme of engagement with domestic households in hotspot areas. Customers in hotspot areas will receive a letter explaining that there have been repeat blockages in their local area. This will be followed up by a visit from our Environmental Educational Officers who will offer advice on how customers can help prevent future blockages. Customers will be invited to take part in a survey where they will be asked what type of products they use around the house and how they dispose of them. We hope the engagement will reduce blockage numbers and the survey will provide insight into customer behaviour and help shape future engagement.
	Partnership working	The Resource West Group (RW) has been developing plans to facilitate shifts in consumer behaviour to reduce resource consumption (electricity, gas and water) and promote the correct disposal of waste, as well as protecting more vulnerable members of our community from resource poverty. In late 20/21 RW submitted a bid for the Spring Ofwat innovation fund. Unfortunately, this bid has been unsuccessful, and the group is now exploring alternative funding options and how the project might proceed if self-funded by the member organisations.

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	Water Guardians	The project is still ongoing building our relationship up, both with the Somerset Wildlife Trust and the individual Guardians. We are in consultation with the Wiltshire WT and have received a proposal from them to expand the project into Wiltshire. Which we will proceed with in the next financial year.
Telemetry Data and Analysis	Sewer depth monitor machine learning	The competitive tender is ongoing and due to be completed by the beginning of May. The tools are still in use and have been operating in the Bath area with continued success.
	Rising main burst detection & Rising main burst prevention	Work underway with IT to link alerts generated in detection software to ScopeX alarms
	Pumping station enhanced diagnostics	There are a few areas of development here - the SPS Scorecard (Qlikview), Pump Health Monitoring (Amulet), Flow Compliance (including Virtual drop tests, Qlikview) and Screen compliance (Qlikview). The SPS Scorecard is checked weekly with many different problems identified such as airlocked pumps, stuck floats and blockages. Now that there is less wet weather, more of the filtered sites display genuine issues. A Pump Health Monitoring Amulet dashboard has been set up for each division which shows the red/amber/green health of each pump at a site. 77 high criticality SPSs have been nominated; 17 sites have been set up so far, with 8 more being configured. The remaining 52 sites from the 77 given were reviewed, and only a further four can currently be monitored due to no or erratic/uncalibrated flowmeters. A Flow Compliance Qlikview report has been developed that uses the 95th percentile flow during high level.

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| | | This is reviewed on a monthly basis to highlight sites which are not meeting consent and those which have had long term consent issues; these are reviewed with divisional SPS teams to rectify. A virtual drop test Python script has been developed as a guidance flow for sites with no flow meter; this will be of particular use to pick up downward deterioration in pump performance.

A Qlikview report has been developed for Screen compliance, currently looking at the number of times a screen has run and the last time the screen ran. There is also the option to filter the last x number of days since the screen ran. All SPSs that have a screen mentioned in their permit have been added and all CSOs with a screen. Future work will look at the relationship between screen run times and rainfall. |
| | Inlet works low flow detection | There are currently 35 WRCs set up on an Amulet dashboard. After 7 consecutive hours of flows lower than expected for that particular site, a low flow email alert is sent out so it can be looked into further. So far only 3 false alerts have been produced which is positive given the relatively small amount of rainfall recently. The goal for this dashboard is to continue adding sites with a flow meter at the inlet and a regular daily flow pattern in order to quickly identify bursts, blockages or other issues in the upstream network.

This analysis is in addition to the other burst detection work in Amulet as, although the delay in sending out email alerts is greater, this method can be used for almost all WRCs with a flow meter at the inlet.
The next phase is to develop a methodology for low flows coming into SPSs to alert us of upstream catchment issues. |

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2.3 Qualitative quarterly progress report on initiatives – Q2 (April-June) 2021 Progress Report

| Theme	Activity or Initiative	Q2 2021 Progress Report
People and Process	Additional equipment roll-out	No new equipment required
Assets and Maintenance	Artificial Intelligence sewer scanning initiative	Following a 2019 Marketplace challenge we are investigating the use of artificial intelligence for coding defects in sewers - The AI/algorithm results have been reviewed and compared with CCTV operator results by our Sewerage Asset Analyst. An internal paper outlining the next steps is being submitted for consideration
Customers and Stakeholders	Update on events	No customer events were attended in Q2.
	Anti-FOG initiatives	ECAS are now investigating and working with over 1100 FSE's across the WW region. 360 FSE's (34.99%) have installed grease trapping equipment and are now being monitored to ensure effective maintenance of equipment is being undertaken. Over 210'000 litres of FOG has now been prevented from entering the drains and sewers. Full engagement with FSE's will re-commence on 19th July 2021 when current COVID rules are relaxed further. ECAS continue to visit and work with new FSE's (reactive) where heightened risk of environmental impact is determined. Recharges for Sandbanks, Salisbury and Shaftesbury are being collated.
	Proactive customer engagement	The new sewer misuse prevention free pack is launching in summer 2021. Customers will be able to order gunk pots, sink strainers, hair catchers, and a sewer misuse prevention leaflet from our online site to be delivered to their homes. We plan to add other products such as FreshX (a toilet paper gel), reusable wipe alternatives and bathroom bin liners as limited promotional offers in line with wider campaign and hotspot targeting activity over the coming year. The pack is designed to help customers better understand how to prevent blockages and provide products to help them adopt positive behaviours.

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	Reactive customer engagement	The review of reactive blockage letters and the development of a new data driven process is ongoing. We have worked with a specialist agency, Behaviour Change, to review wording in our communication materials to enhance their impact.
	Targeted hotspot engagement	In Summer 2021 we are launching a programme of engagement with households in blockage hotspot areas. The programme will include letters and doorstep engagement to notify for the blockage issue in their area and encourage habits that don't cause blockages. Householders will also be encouraged to complete an online survey (incentivised with a monthly prize draw) that acts as a mechanism to deliver additional education and also will collect insight on customer behaviours. Customers will also be shown how to order items from the free pack of products.
	Partnership working	The Resource West Group (Bristol Waste, Wessex Water, Bristol Water, Western Power plus UWE) has submitted a bid for funding in the Ofwat Water Breakthrough Challenge. The bid which focusses on engaging customers in a community on lowering resource use (i.e. multi-utility) has successfully made it through stage 1 and been invited to submit a stage 2 entry. The Group is working towards delivering phase one of this project as self-funded by the member organisations in a targeted area of Bristol, if the Ofwat funding is granted this will enable the project to be rolled out in multiple locations.
	Water Guardians	We now have 40 Water Guardian volunteers recruited with Somerset Wildlife Trust and have a yearly project review with them in September. We have also started the project with Wiltshire Wildlife Trust (WWT) which started on the 1st June 2021. They have recruited the Project Officer for the role and are starting to recruit volunteers. We will have a 6-month review with them in Nov/Dec 2021. We are expanding the project with Dorset Wildlife Trust (DWT), which will officially begin 1st September 2021, with a 6-month review in March 2022. Lastly, we are hoping to liaise & assist with Bristol Avon Rivers Trust (& BART Beacons project) - meeting TBC (possibly in September).
Telemetry Data and Analysis	Sewer depth monitor machine learning	Procurement is now complete with StormHarvester winning the contract. We are now beginning the process of rolling the technology out to all of our existing EDM sites. This process is expected to take 2 years to complete and accounts for the business upskilling process.

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	Rising main burst detection Rising main burst prevention	Work underway with IT to link alerts generated in detection software to telemetry alarms.
	Pumping station enhanced diagnostics	SPS Scorecard: this is now also being used to look at number of pump starts and duration per instance to aid with a condition-based maintenance trial in the West whereby full pump maintenance (including lifting pumps) is based on their known performance rather than as time-based maintenance. Virtual drop tests: this is now primarily done in our data reporting tool: Qlikview, as pump signals are readily available for all sites. Also allows the sump level to automatically be taken into account, meaning only dry weather periods are selected. Rainfall: we are now using a Python script to extract Met Office rainfall data on a daily basis. This can be used alongside drop test calculations and with the screen compliance Qlikview dashboard to make more informed decisions.
	Inlet works low flow detection	Alongside the low flows into WRCs, a trial in the West has been set up to monitor pump run times at SPSs. Email alerts have been set up in Amulet for a few selected sites to alert when the 6 hourly averaged run times fall below a certain threshold. The goal for this trial is to detect blockages or bursts upstream of the pumping station while also minimising the number of false alerts.

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2.4 Case studies

2.4.1 Sewerage Investigations Assessment – Brislington Broomhill

In January 2019 a Sewerage Investigation Assessment (SIA) was undertaken for Brislington Broom Hill, to identify the root cause of historical pollution incidents at the siphons, and to highlight any proactive interventions which could be implemented to prevent future pollution incidents occurring.
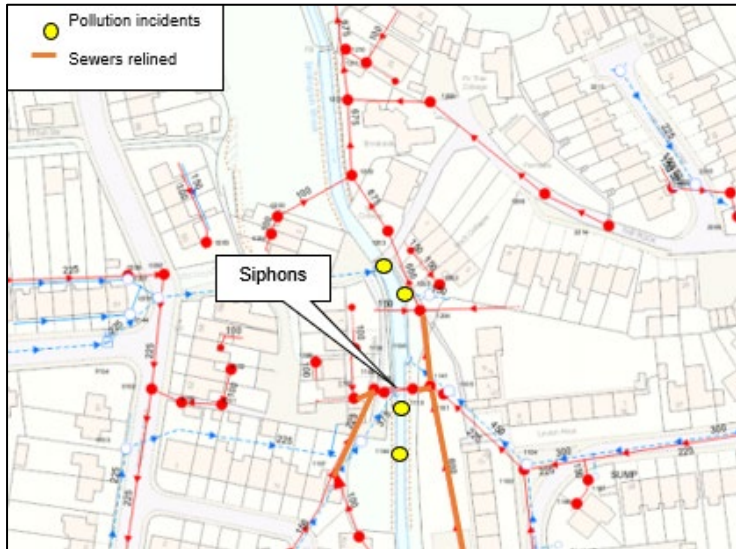
During the assessment the SIA recommended a follow up CCTV survey of the siphon and adjacent sewers. The survey revealed a blockage in the siphon which was removed at the time, as well as root ingress and several structural defects (fractures and holes) which could not be removed due to restricted access and the poor condition of the sewer.

Based on the CCTV survey the SIA report made several recommendations to our Operational team, which included reviewing access arrangements and procedures for future visits, increasing routine maintenance from every 6 months to every 3 months and undertaking a rehabilitation scheme to address the structural defects.

The rehabilitation work began in 2020 and involved installing a combination of no-dig full length and patch liners in 5 lengths of varying sized foul sewers. Additional works required for the scheme involved the construction of a new foul manhole downstream of the siphons, to control the flow during the rehabilitation works and improve access for future routine maintenance.

This is an example of where the SIA process has identified an area of concern and a cross business approach has been used to help mitigate against future pollution incidents.

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2.4.2   Near Miss Reports – Dorchester

Every week our Escapes of Sewage team undertake a Near Miss Investigation for all incidents which occur within 30m of a watercourse or environmentally sensitive area. These investigations are used to capture all the information associated with the incident, including recent CCTV surveys, local assets and routine cleaning schedules. This is used to create a history of the incident, which helps us to assess whether intervention is required to prevent a future incident.

In addition to this, the team also analyse incidents weekly to create Near Miss Reports which highlight areas where we have had repeat incidents which have been caused by sewer misuse. When a food service establishment is identified as the source of a blockage it is referred to ECAS to investigate and manage.

Since 2018 Wessex have attended and dealt with 7 separate incidents of backing up and flooding upstream of a hotel in Dorchester. During the majority of the visits the root cause of the blockage was Fats, Oils and Greases (FOG) entering the public sewer from the hotel. Following an incident in September 2020 a Near Miss Report was produce and ECAS began to investigate the Hotel. Once ECAS had engaged with the hotel the owners were keen to work with Wessex to reduce their possible impact on the environment and installed two grease traps. Since the traps have been installed it is estimated that they will prevent over 3500 litres of FOG from entering the sewer each year.
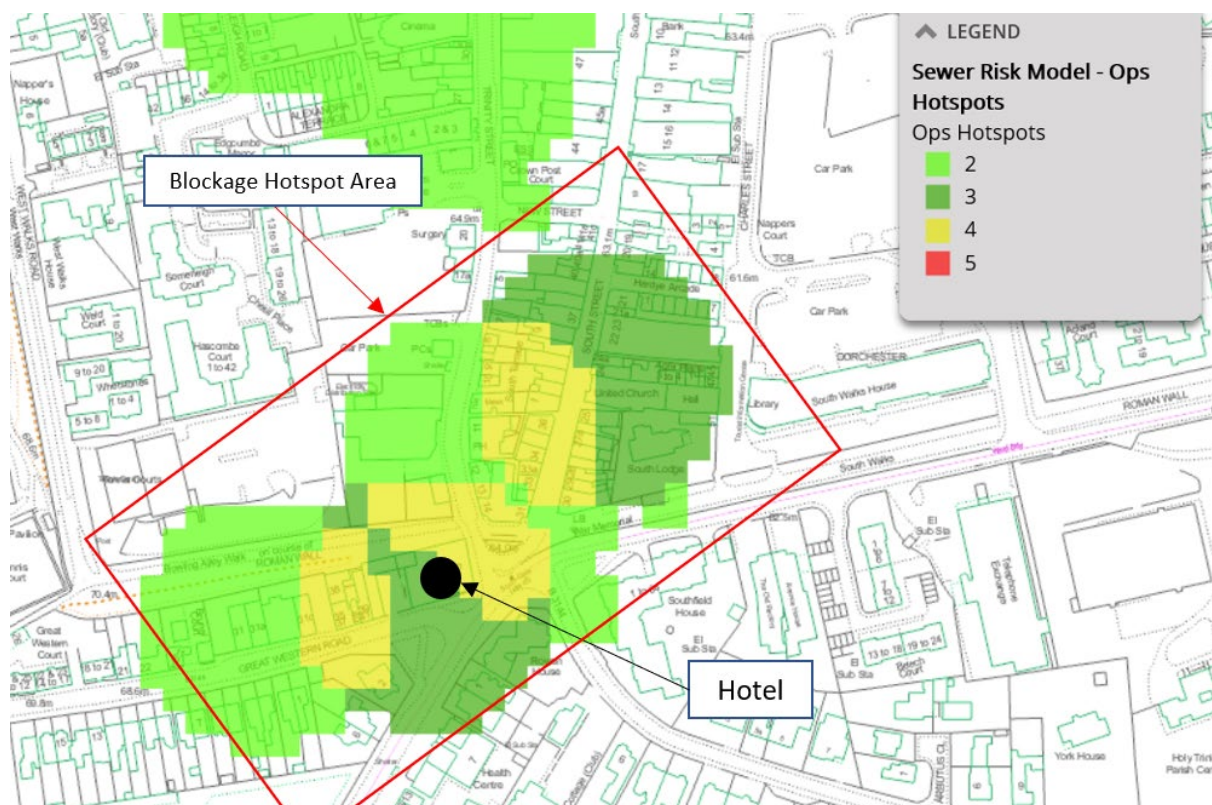
Since ECAS has begun working with Wessex to reduce the amount of FOG entering our network they have successfully engaged with over 1029 FSE's across the region and to date

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35% of them have installed grease management. This has prevented 210,000 litres of FOG from entering the public sewer system.

By undertaking Near Miss reports and investigations following blockage and flooding incidents our operational teams gain valuable information about the sewer network and its condition, allowing them to put in place preventative measures to reduce the risk of future incidents.

2.4.3 CCTV Programme – Poole

To effectively manage our capital investments and the maintenance of our sewer network Wessex Water use a Sewer Risk Model, which gives each pipe in our network a risk score based on all available date (environmental, assets, incidents surveys etc). This provides an objective and pragmatic approach to identify and prioritise areas and assets in need of investment based on real life information.

In January 2021 the Sewer Risk Model flagged several lengths of sewer in Poole as having a Structural risk of "high", based on historical CCTV surveys showing the presence of root mass. Following the identification of this section, a new CCTV Survey was raised to investigate and confirm the networks conditions. This survey confirmed that the network had poor structural grade due to the presence of root masses. Due to the proximity of the network to a watercourse and the size of the obstructions our operational team undertook an urgent clean of the network to remove the roots.

Had this section not been identified using the Sewer Risk Model and the roots had continued to build up it is likely that a flooding or pollution incident could have occurred.

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2.5 Pollution incident tracker

The graph below shows our historical pollution incidents and incidents 2021 up to the end of June:
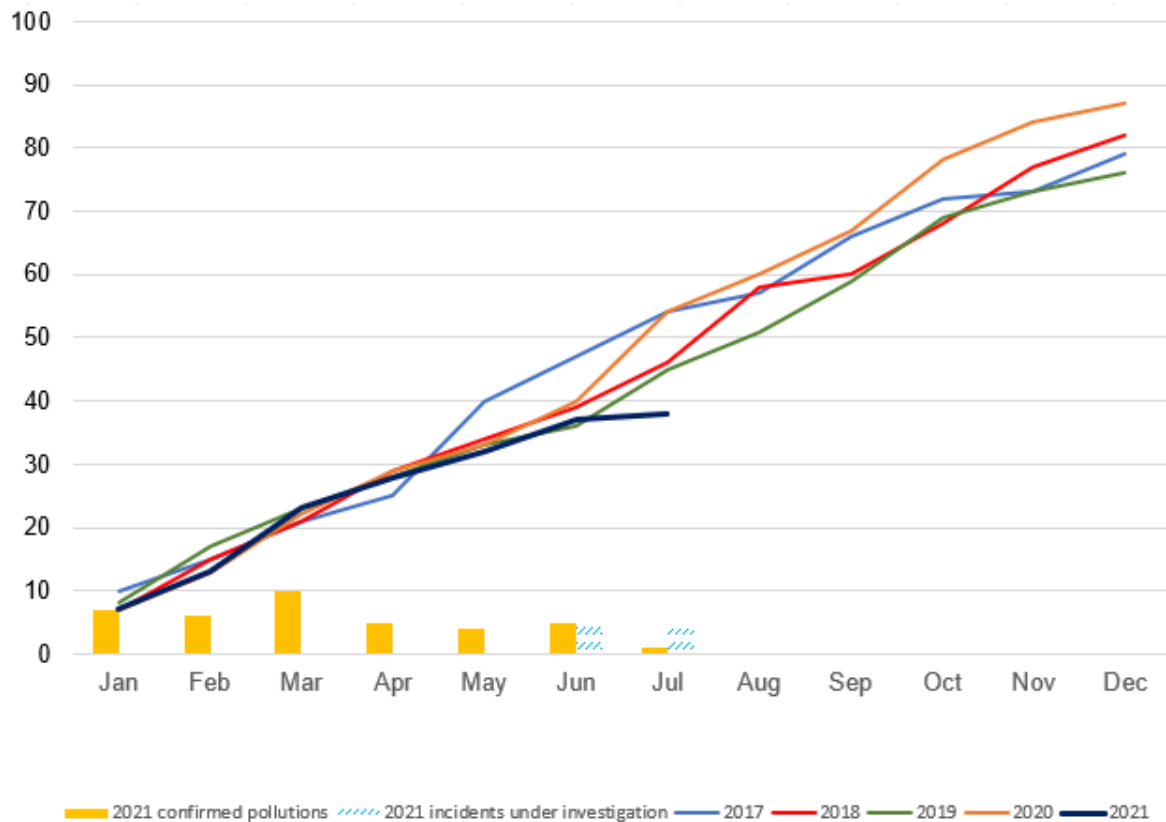
Graph 1: Category 1-3 incidents from wastewater assets

2.6 Q1 & Q2 review of PIRP effectiveness

Over the last year several of our activities have been affected by Covid-19, but this has enabled us to take a step back in some areas to review our overall approach. As the key to our PIRP is to use data to inform our actions, we continue to periodically review data to ensure that we are seeing the results that we expect and, if not, can understand the reasons for that and, if necessary, modify our approach accordingly.

The current data shows that our sewer network is an area where we can make the most gains and following our work with intelligent sewer monitoring and rising main burst detection, amongst other activities, we are modifying our plans to maximise the benefits that we have seen from early work in these areas.

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The root causes of the 2021 incidents to date are shown below:

Root cause	Number (Jan - July 2021)
Blockage	15
Burst rising main	4
Poor effluent quality (within permit)	2
Pump failure	1
Hydraulic overload	1
Other	3
Structural failure	5
Power supply failure	1
Asset Failure	3
Operator error	3

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