

Appendix 8.10.A – Claim WSX06 – Pollution reduction strategy

Wessex Water

September 2018

Business plan section	Supporting document
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2	Addressing affordability and vulnerability
3	Delivering outcomes for customers
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8	8.1 Input cost and frontier shift assumptions
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1. Summary

This cost adjustment claim relates to our pollution reduction strategy. The table below provides a summary of the claim and the following sections provide more detail.

Heading	Summary
Brief description	Pollution reduction strategy, which will provide a further step change reduction in the number of pollutions incidents beyond our current industry leading position.
Business plan table lines where the totex value of this claim is reported.	WWn8 Block D
Total value of claim for AMP7 (totex)	£27.89m (gross of any implicit allowance)
Total opex of claim for AMP7	£4.08m
Total capex of claim for AMP7	£23.81m
Price control	Wastewater network plus
Need for investment	<p>The need for the investment is set out in section 5 of the main narrative, as included below.</p> <p>Although we have been a regular industry leader in terms of the number of pollution incidents per 10,000km of sewer, our board is clear that we aim to have zero pollutions (of any category), in accordance with the statutory obligation on us.</p> <p>In line with our aspiration to continue to be an industry leader on environmental performance, we will continue to have the EA's Environmental Performance Assessment as a Key Performance Indicator for the company and it will continue to be an integral part of performance targets across the business, including at executive level.</p> <p>In addition WISER sets out the EA's expectations for excellent performance. We will plan to meet the performance targets set out in WISER, including:</p> <ul style="list-style-type: none"> • no serious (category 1 and 2) pollutions. • 40% reduction in all pollution incidents compared with the number of incidents recorded in 2016, which requires a reduction from 75 pollutions in 2016 to 45 by 2025, equivalent to 13 incidents per 10,000 km of sewer. Our plan enables us to, and we plan to meet the 40% reduction target in a way that is in the long-term interests of customers. • high levels of self-reporting. <p>Separate from the statutory and policy requirements described above, the PR19 methodology includes a common</p>

Heading	Summary
	<p>performance commitment for wastewater pollution incidents (categories 1, 2 and 3), with a requirement to set a stretching target and accompanying outcome delivery incentive package.</p> <p>In accordance with the PR19 methodology we have set our performance commitment target as a 25% reduction in the number of pollution incidents by 2025 (equivalent to 17 incidents per 10,000 km of sewer), which we forecast will keep us as a leading company on this measure. The ability to gain outperformance payments that are in line with customers willingness to pay means that we have a strong incentive to deliver a greater reduction and that customers are protected. This separate regulatory mechanism does not diminish our ambition to minimise all pollutions and meet the performance targets in WISER.</p> <p>We consider our proposals comply with the three sets of requirements that we need to meet:</p> <ol style="list-style-type: none"> 1. the statutory obligation not to pollute by aiming for zero pollutions of any category 2. the expectations for excellent performance set out in WISER, including a target to have no serious pollutions and 40% reduction in all pollutions by 2025 3. a separate regulatory mechanism in accordance with the PR19 methodology including a performance commitment with a stretching target that protects customers from both under-delivery and from paying too much.
Need for cost adjustment	<p>We are an industry leader in terms of the number of pollution incidents per 10,000 km of sewer, as shown on the Environment Agency's Environmental Performance Assessment for 2016.</p> <p>The additional costs required to deliver a step change in the frontier performance are not currently reflected in Ofwat's cost baselines.</p>
Management control	<p>Some of the factors are beyond management control such as sewer misuse and groundwater inundation. Our area is prone to groundwater inundation due to the chalk geology, and therefore vulnerable to pollutions from continuous overflow operation during wet winters.</p>
Best option for customers	<p>A variety of options are required to address the various causes of pollution. A mix of activities will be used to achieve the most cost beneficial solution to meet the outcome. The proposed improvements are cost beneficial.</p> <p>Additional activities will be required including:</p>

Heading	Summary
	<ul style="list-style-type: none"> • Customer behaviour change through engagement • Lobbying • Inspection and jetting of sewers to reduce blockages • Monitoring and data analytics • Rising main replacement and monitoring.
Robust and efficient costs	<p>Section 8 of the main business plan narrative describes how we have ensured our proposals are efficient across all price controls, as well as explaining how we estimate efficient costs of new projects.</p> <p>Through external benchmarking we have demonstrated that our cost estimates are efficient and competitive compared with the market place.</p>
Customer protection	There is a common performance commitment for pollutions.
Affordability	<p>The programme of work outlined in the Cost Adjustment Claim was included in our draft business plan that was tested with customers between January and June 2018.</p> <p>The acceptability testing was designed to test customers' acceptance of our overall package of service improvements and bill impacts. Testing has shown that 96% of our customers find our business plan acceptable. Acceptability is above 90% across all demographic subgroups.</p>
Board assurance	The proposals have been subject to our board assurance process, which is described in detail in section 12 of the main business plan narrative and supporting documents 12.1 to 12.8

2. Background

The day-to-day performance of our wastewater network is good but is coming under increasing strain from misuse of the sewer network, ageing assets and heavier and prolonged rainfall events. Our long-term wastewater plan identifies that, to avoid pollution and sewer flooding, we need to continue our programme of strategic capital investment in our network and combine this with a focus on working with customers to reduce sewer misuse

We are the industry leader in terms of the number of pollution incidents per 10,000 km of sewers. Figure 2-1 shows that we have consistently achieved a better performance than the sector average.

Figure 2-1: Water sector pollutions (Category 1 to 3)

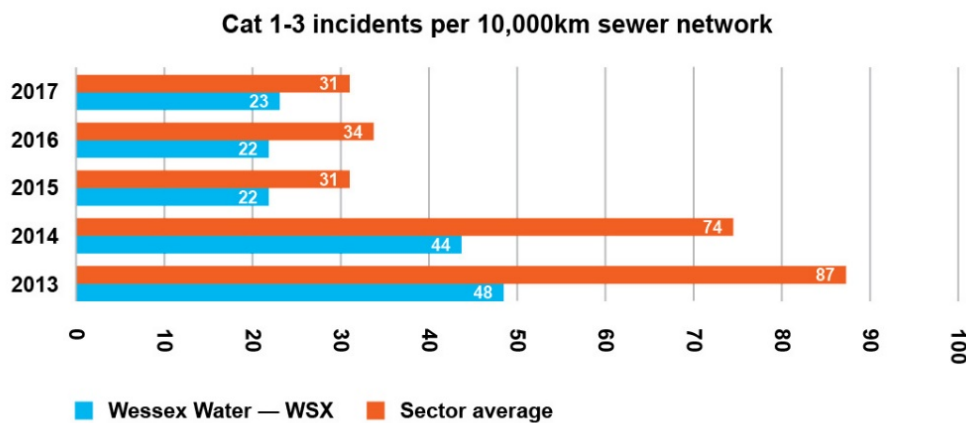
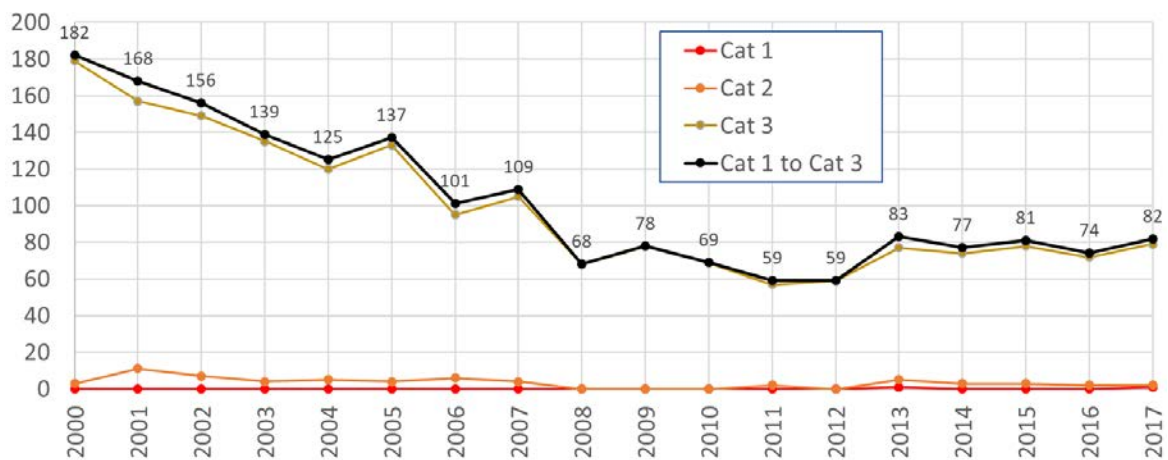


Figure 2-2 shows that we have been achieving this high standard for the past 10 years, having less than 100 pollution incidents (Category 1 to 3) per year.

Figure 2-2: WSX Number of sewerage pollution incidents (Category 1 to 3)



We have engaged extensively with the Wessex Water Partnership and the Environment Agency on the subject of pollutions. The position we have agreed is reproduced below.

Although we have been a regular industry leader in terms of the number of pollution incidents per 10,000km of sewer, our board is clear that we aim to have zero pollutions (of any category), in accordance with the statutory obligation on us.

In line with our aspiration to continue to be an industry leader on environmental performance, we will continue to have the EA's Environmental Performance Assessment as a Key Performance Indicator for the company and it will continue to be an integral part of performance targets across the business, including at executive level.

In addition WISER sets out the EA's expectations for excellent performance. We will plan to meet the performance targets set out in WISER, including:

- no serious (category 1 and 2) pollutions.
- 40% reduction in all pollution incidents compared with the number of incidents recorded in 2016, which requires a reduction from 75 pollutions in 2016 to 45 by 2025, equivalent to 13 incidents per 10,000 km of sewer. Our plan enables us to, and we plan to meet the 40% reduction target in a way that is in the long-term interests of customers.
- high levels of self-reporting.

Separate from the statutory and policy requirements described above, the PR19 methodology includes a common performance commitment for wastewater pollution incidents (categories 1, 2 and 3), with a requirement to set a stretching target and accompanying outcome delivery incentive package.

In accordance with the PR19 methodology we have set our performance commitment target as a 25% reduction in the number of pollution incidents by 2025 (equivalent to 17 incidents per 10,000 km of sewer), which we forecast will keep us as a leading company on this measure. The ability to gain outperformance payments that are in line with customers willingness to pay means that we have a strong incentive to deliver a greater reduction and that customers are protected. This separate regulatory mechanism does not diminish our ambition to minimise all pollutions and meet the performance targets in WISER.

We consider our proposals comply with the three sets of requirements that we need to meet:

1. the statutory obligation not to pollute by aiming for zero pollutions of any category
2. the expectations for excellent performance set out in WISER, including a target to have no serious pollutions and 40% reduction in all pollutions by 2025
3. a separate regulatory mechanism in accordance with the PR19 methodology including a performance commitment with a stretching target that protects customers from both under-delivery and from paying too much.

It should be noted that our alternative approach to delivery of the WINEP (as described in the main narrative and supporting document 5.1), which generated savings of £52m, was made conditional by the EA on us agreeing the approach set out above.

3. Need for cost adjustment

In this section we provide evidence that the cost claim is not included in Ofwat's modelled baseline; and, that the allowances would, in the round, be insufficient to accommodate this without a special factor claim.

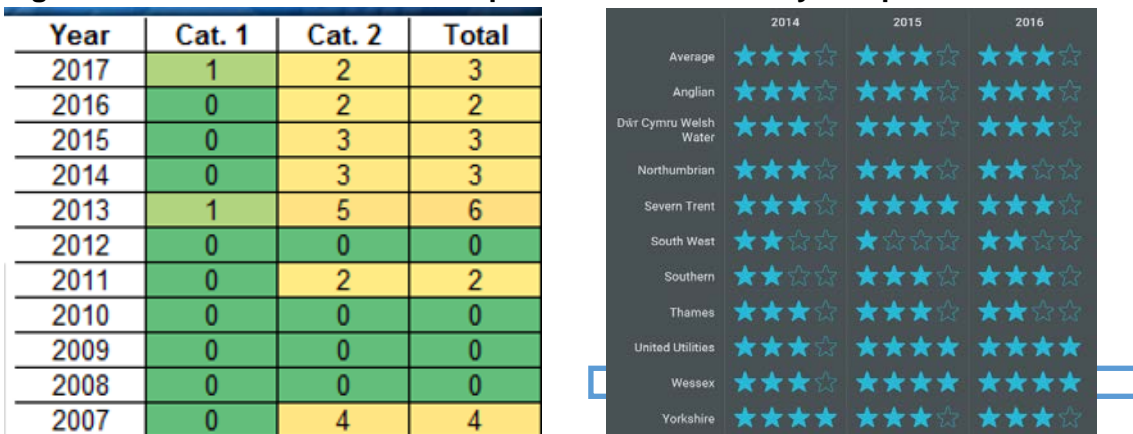
This claim concerns an increase in cost due to the step change in service. The additional costs are not reflected in historic costs or in Ofwat's baselines, given the significant reduction in pollutions required, beyond our current industry leading position.

Achieving any further reduction in pollution incidents from our current industry leading position over just 5 years will require a major step change in investment that is not allowed for in our historic costs or in Ofwat's baselines. This will be challenging for us to achieve because:

- Sewer misuse has increased significantly since wet-wipes are being labelled 'flushable' despite the 21st Century Drainage Programmes efforts to address this
- Our rising mains are ageing and becoming vulnerable to bursting
- Our sewers are vulnerable to inundation by groundwater and need to be made watertight to conform with the Environment Agency's Groundwater Regulatory Position statement.

Wessex Water is one of the best performing companies as shown in Figure 3-1. Achieving any improvements will require us to target more difficult activities and significantly more proactive investment.

Figure 3-1: WSX historical serious pollutions and Industry comparison of EPA¹



To achieve the reduction will require additional activities above normal company levels.

These are described in this report in the following areas:

- Customer behaviour change through participation
- Inspection and jetting of sewers to reduce blockages
- Monitoring and data analytics
- Rising main replacement and monitoring programmes.

¹ Environment Agency's Environmental Performance Assessment, reported on Discover Water

4. Management control

In this section we demonstrate that the cost is driven by factors beyond management control and that we have taken all reasonable steps to control the cost.

The factors that are out of our control affecting pollution risks, include.

- Customer misuse
- Asset deterioration of rising mains

A customer engagement programme to convince all our customers to stop flushing wet-wipes down their toilets will take many years, possibly decades, to have a notable effect. However, we need to start this immediately and focus in the areas that will benefit most.

We have a legacy of rising mains that are reaching the end of their useful life expectancy. We have recently had some rising mains under rivers that have burst for the first time leading to serious pollution incidents and we want a step change in our investment to reduce the risk of future bursts on critical assets.

Section 6 details our customer engagement and rising main replacement programme.

5. Need for investment

In this section we set out the incremental improvement that the proposal will deliver, provide the evidence that the investment is required and show how we have engaged with customers and our customer challenge group.

The targets are explained in section 2 above. Such a step change cannot be achieved without significant additional capital and operational investment.

It is estimated that the additional totex expenditure required over the 2020-2025 period is £27.9m which is a significant increase above our current expenditure.

The need for the investment and this cost adjustment claim has been discussed with our customer challenge group (Wessex Water Partnership). Customer willingness to pay for pollution reduction was very high, and our research into customers views on resilience highlighted the value they place on protecting the environment.

Our analysis shows that most pollution incidents occur in the sewerage network and that the vast majority are due to blockages caused by sewer misuse. Many of these sewer blockages are random and it will take time for our customer engagement plans to change society's awareness to change their behaviour. For this reason, and because we are starting at an industry leading low level of pollutions, we could not set our performance commitment at 40% improvement.

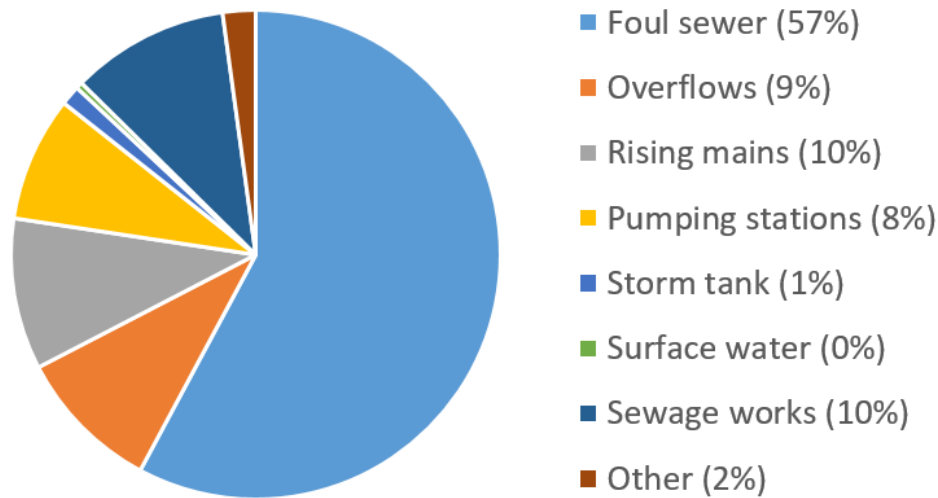
5.1 Background

Our assets continue to be managed and perform well and our sewerage customers receive upper quartile performance. However, there are extra challenges with wet wipes being promoted as being flushable, reduced asset life and pressures groundwater inundation.

Wastewater in the foul and combined sewers is conveyed by the sewerage network to the treatment works, where the flows are treated before discharging back into the environment. However, sewage does occasionally escape for various reasons which can impact the environment.

The percentage of the causes of pollution incidents are shown in the figure below and described in this section.

Figure 5-1: Cause of pollution



5.1.1 Pollution from sewers

Over 50% of our historical pollution events were caused by blockages in our foul and combined sewer network. We have 250 blockages every week. These incidents do not all cause pollutions but do affect our customers in some form for them to call us, either; restricted toilet use, gurgling sewers, sewers backed up causing smells, flushability issues and flooding.

Blockages are the cause of 85% to 90% of all incidents and affect customers throughout our area. There has been an increase in blockages recently due to manufacturers promoting wet-wipes as 'flushable'. See our claim WSX05 Sewer flooding programme for more details.

By targeting blockage hotspots next to rivers, blockage hotspots downstream of overflows and predicted frequent hydraulic flooding near watercourses we could monitor these risks in near-real time and intervene before pollution incidents occur or escalate.

We can address this by the following activities detailed in Section 6:

- Customer behaviour change - wet wipes
- Inspection and jetting of sewers to reduce blockages
- Monitoring and data analytics.

5.1.2 Pollution risk from overflows

Almost 10% of our pollution incidents are from combined sewer overflows (CSO). CSOs act as a flood relief mechanism and are there to prevent property flooding. CSOs are permitted by the Environment Agency and as such we are able to discharge storm flows to the environment during heavy rainfall provided we are compliant with the permit.

However, blockages can occasionally occur downstream of a CSO and spill can occur when it is not raining heavily. If a full blockage occurs, then it is possible for sewage to be spilled to the environment during dry weather. This flow can have an impact on the environment and be classified as a pollution incident.

The National Environmental Programme (NEP) includes a programme of monitoring CSOs. Event Duration Monitoring (EDM) will be installed at almost 1000 of our CSOs by 2020. We are aiming to deliver the EDM contained in the Water Industry NEP (WINEP) for 2020- 2025 early to achieve full EDM coverage by 2023. EDM is funded through the business plan and is not part of this claim.

However, we need to use the vast quantities of data from the EDM and other monitoring more wisely. Last year we had two pollution incidents from CSOs where EDM had been installed. We need to increase our ability to identify incidents in near real-time to respond faster to spills when they should not be spilling.

We can address pollution reduction from CSOs by the following activities, detailed in Section 6:

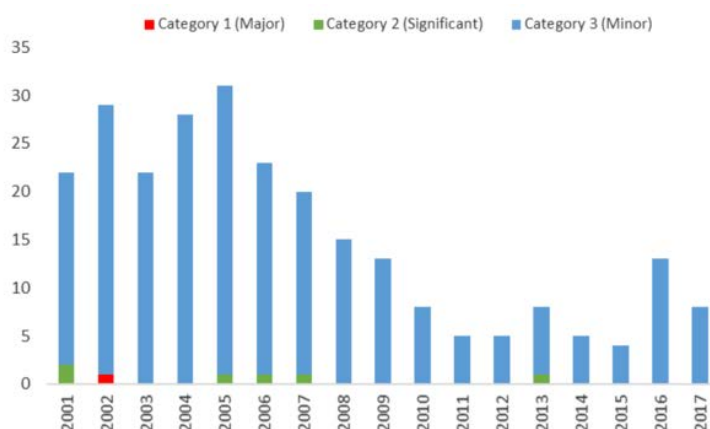
- Customer behaviour change
- Inspection and jetting of sewers downstream of CSOs to reduce blockages
- Monitoring and data analytics

5.1.3 Pollution from pumping stations

Sewage pumping stations (SPS) often have CSOs or Emergency Overflows (EO). When pumps block or fail, for example during a power outage, the EO is there to protect properties from flooding by the permitted emergency discharge to the environment.

Over the past decade we have already implemented a proactive SPS wet well cleaning programme and have seen a significant improvement in pollution incidents, as shown in the Figure below. Improving our performance further is challenging.

Figure 5-2: Pollution incidents from pumping stations



Fats, oils and grease (FOG) and wet-wipes can cause pumps to block. When this occurs, we can have spills from the CSO or the EOs, which can cause pollution incidents. By being more proactive in addressing FOG and wet wipe misuse, we should see the number of SPS pollutions reduce further.

Trade and commercial flows such as food outlets are not currently being checked proactively by us. Historically we have expected the Councils' Environmental Health Officers to undertake this role. However, this is low on most Councils' priorities and is not currently proactively investigated in the Wessex area. We want to start being more proactive ourselves. This claim includes employing more staff to ensure the food outlets are maintaining their grease traps.

We can address pollution reduction from SPSs by the following activities, detailed in Section 6:

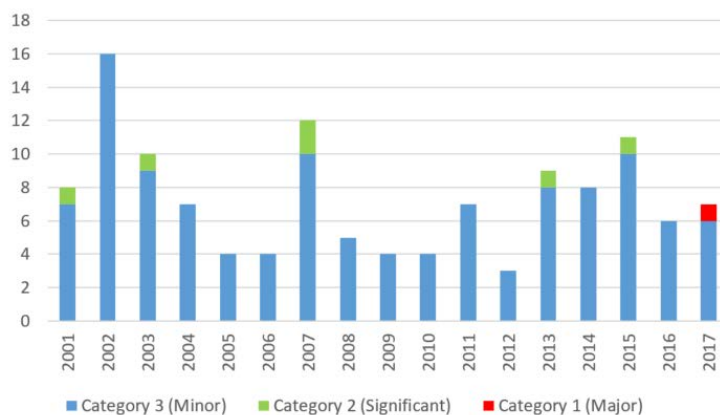
- Customer and traders engagement
- Inspection and jetting of SPS wet wells to reduce blockages
- Monitoring and data analytics.

5.1.4 Pollution from rising mains

SPSs pump flow uphill through rising mains, under pressure, to lift the flow over hills. The rising mains are subject to a cycle of positive and negative pressures and may have a shorter life expectancy than previously understood. When rising mains burst their impact can be significant to the environment.

Last year, we experienced our first serious pollution from a rising main in recent history, as shown in the Figure below. Our review of the incident has driven a desire to have a step change in proactive replacement of rising mains. This will take many decades, but we need to start now.

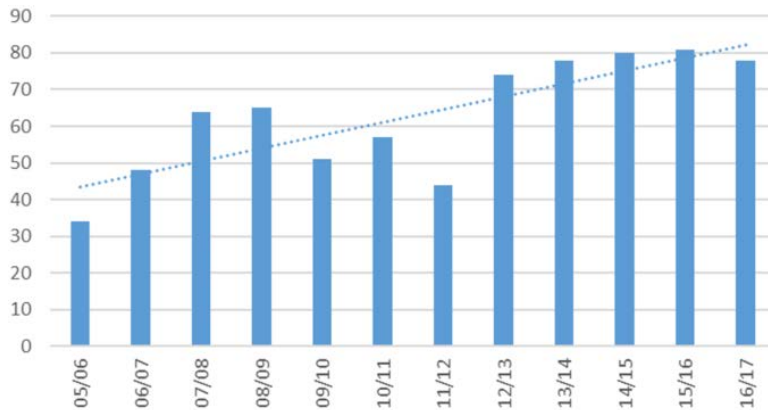
Figure 5-3: Pollution incidents from rising mains



Our current approach for planning proactive investment in rising mains is risk based, with prioritisation of investment influenced by recent burst history. This process informed by material, size and age data, burst history, societal and environmental consequence of failure, and other factors. The output from this process is a prioritised list of highest risk mains, which gives the business visibility of where to target future proactive investments.

Given the rate of increase in rising main bursts, shown in Figure below, and ageing rising main assets, we know that the historical levels of proactive investment in mains replacement are no longer sufficient to keep pace with the rate of asset deterioration.

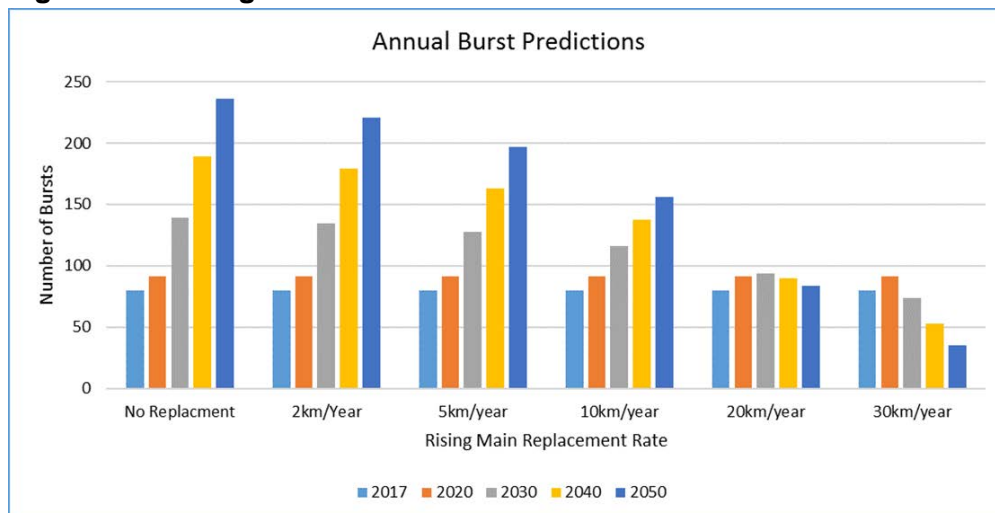
Figure 5-4: Increase in rising main bursts (number bursts / year)



The figure below is an output from our rising main deterioration model showing predicted annual bursts for different replacements rates. It suggests for a state of inter-generational stability, we need to replace mains at a rate nine times (i.e. 20km per year) above our current rate (2.4km per year) of replacement.

We are not considering such an increase immediately, but it is considered that a greater rate of replacement is required.

Figure 5-5: Rising main deterioration



This proposed replacement rate will not be sufficient to eliminate the risk of pollution. Therefore, we also need to provide monitoring of these assets. We have already identified over 300 ‘critical’ rising mains that cross under rivers which will require monitoring by 2025.

Section 6 details how mitigation of pollution reduction from bursts, such as real-time monitoring, is the best option for our customers in addition to a modest increase in rising main replacement.

- Rising mains.

5.1.5 Pollution from sewage treatment works

Pollution incidents from Sewage Treatment Works (STW) are not covered by this claim. This is because our WINEP programme should be improving the STWs at highest risk of non-compliance, through more monitoring and more storage.

5.2 What will additional investment achieve?

To achieve a 25% reduction in pollution incidents, from an already upper quartile position is challenging.

We will need to implement a multi-track approach to reduce the number of pollution incidents, including:

- *Behavioural engagement strategy.* As well as the national campaign to reduce sewer misuse, we will work with traders and environmental health officers and run local campaigns called 'Stop the block'. We will continue to work in partnership with our customers to help us deliver our objectives, including initiatives such as Stop the block and Only flush the 3 P's.
- *Jetting of sewers.* Additional inspection of sewers in areas assessed as high risk and improved targeting of sewer jetting
- *Monitoring and data analytics.* Installation of depth monitors in sewers at historical pollution sites and blockage hotspots and flow and pressure monitors on rising mains, together with data analytics, visualisation and assessment tools, with the aim of proactively identifying pollution risks before they happen
- *Rising mains.* Prioritisation of rising mains for replacement and more monitoring.
- *Self-reporting.* By achieving the above, we will increase our ability to self-report pollution incidents.

The technology to develop 'smart manholes' that will enable us to make the next step-change in pollutions is in its infancy and costs are high, so it is important we ensure this is delivered in a cost-effective way.

6. Best option for customers

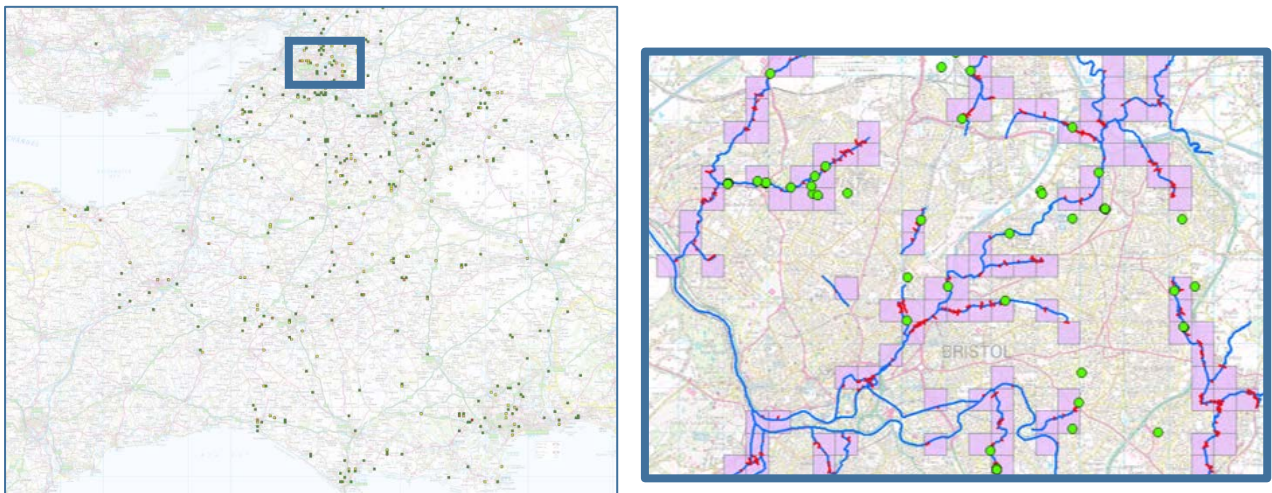
In this section we demonstrate how we have selected the best options for customers, including how the proposal delivers outcomes that reflect customers' priorities, identified through customer engagement and the assurance from our customer challenge group.

Our multi-track approach to reducing the number of pollution incidents and increasing the level of self-reporting, are described below.

6.1 Customer behavioural engagement strategy

Locations of blockages and pollution incidents are widespread across our region and can appear random. Figure 6-1 shows historical pollution incidents from foul or combined sewers.

Figure 6-1: Historical pollution incidents from foul or combined sewers



The 21st Century Drainage Programme promoted a national campaign to reduce sewer misuse. Wessex Water has been playing a leading role in this national campaign which includes a strategy of trying to prevent products being promoted as being 'flushable'.

Although these wet wipes pass the manufacturers 'flushability test' they do not degrade like toilet paper. They remain intact and are heavy so do not flow down sewers unless there is a large flow. Most section 105a sewers are small diameter and take flow from only a few houses, so there are no significant velocities in the sewers to flush the products down the sewer. They settle in the sewer and can quickly build up to cause complete sewer blockages. 90% of pollution incidents from foul sewers due to blockages occurred in small (150mm or 225mm diameter) pipes.

We will continue to work with our customers to help us deliver our objectives, including initiatives such as Stop the block and Only flush the 3 P's.

On a local scale we can use spatial analysis to highlight hotspots of blockages (pink squares above) and highlight previous pollution incidents to identify where we should target our efforts:

- Blockages caused by low velocities in the dry weather flow conditions can be proactively inspected and jetted to reduce the risk of these recurring (see Section 6.2).
- Blockages caused by sewer misuse are much more difficult to address, because many of these incidents are random. Where repeat blockage occurs, then the properties upstream could be targeted for educational campaigns. We currently do this, letter dropping 'bag it and bin it' leaflets if repeats occur within the same year. However, to improve our customer experience and reduce the risk of pollutions we should be looking at repeats over a longer timescale and do more.

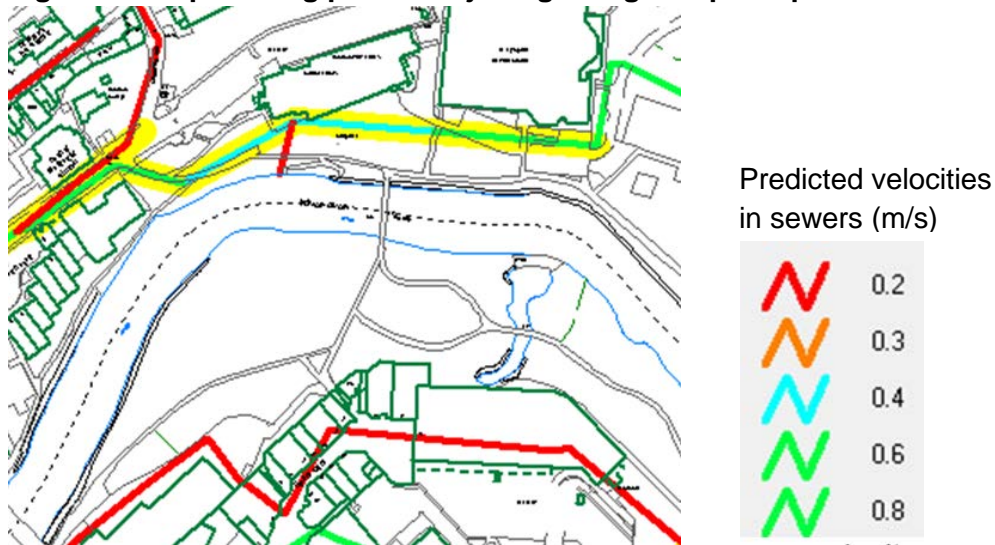
As well as residential customers, we need to focus on commercial activities. Our proposal is to work with traders and environmental health officers and run a local campaign called 'Stop the block'.

We are considering using the Environmental Health Officers powers by funding a member of council to act on our behalf. These resources could focus on grease traps maintenance so food outlets to prevent this entering our sewers.

6.2 Inspection and jetting of sewers

We already have a proactive jetting programme to ensure problematic sewers remain clean. The figure below shows an example area with the proactively jetted sewers highlighting in yellow. By overlaying our computer predictions of velocities, we can optimise these jetting rounds. Velocities in sewers less than 0.6 m/s are prone to build up of sedimentation and rags causing partial blockages. This can lead to reducing the capacity during storm conditions and risk of flooding or pollution. However, where velocities are greater than 0.7m/s these are normally self-cleansing so should not require jetting.

Figure 6-2 shows that we currently regularly clean the sewer (highlighted yellow) to the north of the river, probably because of a historical blockage incident, caused by the slow velocity of 0.4 m/s. However it also highlights that the sewer at the bottom left of the picture which has a lower velocity, should be added to the cleaning schedule.

Figure 6-2: Optimising proactive jetting using computer predictions

Sewer crossings or sewers downstream of CSOs are also more critical for our pollution prevention strategy. We have 50km of sewers that cross rivers or canals or are downstream of CSOs that have previously not been proactively inspected. Our pollution reduction strategy proposes regularly inspecting these types of assets. If serviceability or structural issues are found, they can then be dealt with as appropriate. This additional inspection of sewers in areas assessed as high risk and improved targeting of sewer jetting will ensure our high-risk assets are fully operational.

6.3 Monitoring and data analytics

We are increasing monitoring and collecting more data, including:

- data at pumping stations (existing telemetry)
- rising main monitoring (see below)
- In-sewer monitors in the network (blockage detection),
- In-sewer monitors in the network (pollution hotspots),
- Event duration monitoring of CSOs (funded through the WINEP)
- more flow monitoring at wastewater treatment works (funded through the WINEP).

Installation of depth monitors in sewers at historical pollution sites and blockage hotspots and flow and pressure monitors on rising mains, together with data analytics, visualisation and assessment tools, with the aim of proactively identifying pollution risks before they happen.

We need to use this information intelligently, turning it into information, so we can focus on any interventions needed.

To process and make sense of all the data we need step change in how we process the data and turn it into information. Rather than an unaffordable replacement of our systems, we are developing an extension to our existing telemetry systems.

6.4 Rising mains

We have a risk-based approach to our rising mains, with each segment of main given a likelihood and consequence of failure. This enable us to prioritise investment where risk is highest, rather than simply on burst history, which tended to be done historically.

Furthermore, proactive investment in rising burst or leakage detection monitoring will improve our ability to respond to failures and gain improved knowledge of system performance and early signs of deterioration.

Thus our plan for rising mains is a combination of:

- Proactive replacement of rising mains, including making Radipole rising main in Weymouth more resilient as described below
- Additional monitoring of rising mains.

6.4.1 Proactive rising main replacement

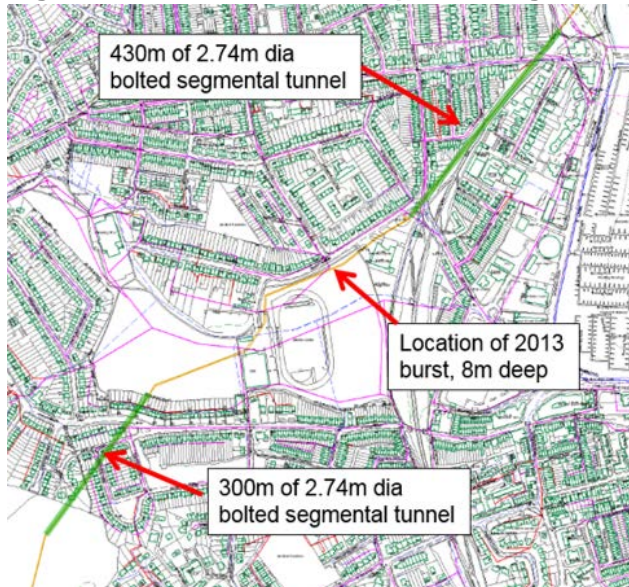
The table in Annex A identifies the highest risk rising mains for proactive replacement.

Radipole rising main

Our recent proactive inspection of one of our critical SPS rising main has identified a particular section of the main has only 3 to 4 years asset life remaining, at one point along its length. This investigation was carried out after a burst occurred in 2013.

Radipole is one of our major sewage pumping stations, serving Weymouth. There are two rising mains (alternating duty and duty/assist during storm conditions) which are 0.8m and 1.1m diameter. The mains are laid inside a tunnel for part of their length, which has allowed us to externally inspect them, as shown in the photographs below.

A recent inspection found the tunnel full of saline water. This salinity had externally corroded the rising mains. We immediately installed a dewatering pumping station to ensure that the tunnel does not fill with sea water in the future. The external corrosion combined with the internal corrosion of the cement liner has resulted in an estimated life expectancy of only 3 to 4 years, at that location. Complete replacement has been estimated to cost £7m.

Figure 6-3: Location of Radipole rising mains**Figure 6-4: Radipole rising mains, located in a tunnel**

6.4.2 Enhanced monitoring

As we are not planning to replace all rising mains we need to provide mitigation by monitoring these assets. We have already identified over 300 'critical' rising mains that cross under rivers. Flow monitoring at both ends of the rising main could detect a burst (flow mass balance). We are proposing combination of flow and pressure monitoring.

By improving our telemetry, so that information is looked at in near real time, we could significantly improve our reaction time to a burst. This will prevent pollution incidents escalating to a serious pollution.

We already have written local emergency plans for many of our 'critical' rising mains. These are documents that set out what mitigation can be done, should a burst occur. We are writing more of these, so we are better prepared.

6.5 Self-reporting

We are increasing monitoring and collecting more data, so will be able to improve our self-reporting of pollution incidents.

We employ a large number of operation staff, who have responsibility and accountability, which means we have a better workforce than if we solely relied on contractors.

6.6 Cost-benefit analysis

Our methodology and the results of cost benefit analysis are described in supporting document 3.3 Cost-benefit analysis.

For pollution reductions, it shows that a 25% reduction is the optimum approach, with a benefit cost ratio of 1.05 and net benefits of £1.4m. greater reductions are not cost beneficial.

7. Robustness and efficiency of costs

Section 8 of the main business plan narrative describes how we have ensured our proposals are efficient across all price controls, as well as explaining how we estimate efficient costs of new projects.

Through external benchmarking we have demonstrated that our cost estimates are efficient and competitive compared with the market place.

Our overall approach to developing the investment programme is to identify the lowest whole life cost option for individual projects or programmes of work on a totex basis.

The costs have a level of uncertainty as they assume that there will be benefits of increased technological efficiency and benefits of improved service levels. We recognise that the flooding Investment could also improve pollution risks as well as flooding risks. We have ensured that costs are not double counted

Costs were estimated using the best information available.

- costs were build up from built up from first principles based on additional labour, installation of additional equipment and costs to modify and alter the existing network
- costs were based upon past trends or known unit rates for existing activities.

Table 7-1: Additional costs proposed in 2020-2025 for pollution reduction

Activity	AMP7 Cost (£ m)		Additional
	Capex	Opex	Totex
Education	0.26	0.75	1.01
Sewer jetting/ CCTV	-	2.08	2.08
Sewer monitoring	5.91	1.25	7.16
Visualisation	1.06	0.00	1.06
Rising main monitoring	7.07	0.00	7.07
Additional rising main replacement	9.50	0.00	9.50
Total	23.81	4.08	27.89

The customer engagement and jetting programme for pollution reduction is very similar to the Blockage reduction strategy detailed in appendix 8.9.A Claim WSX05 Flooding programme. We have not double counted this overlap. Instead we have allocated half of the budget to the flooding reduction and half to pollution reduction.

The costs of the sewer monitoring were derived from our AMP5 and AMP6 delivery of in-sewer monitors and Event Duration Monitoring. We have used low-cost technology of depth monitors and battery powered devices with communications using mobile phone technology, as this is best value for our customers.

Visualisation costs are required to upgrade our existing telemetry to include PRISM and other technologies to allow us to apply logic to the telemetry alarms that is affordable.

The rising main monitoring costs are based on the AMP6 installation of installing 29 flow monitors on rising mains and applying this to 300 rising mains to be installed in AMP7.

The rising main replacement is based on a bottom up calculation. We have deducted the historical base level of spend of replacement.

The additional costs of the pollution reduction strategy are 1.9% of the wastewater network plus totex, which exceeds the materiality threshold of 1%.

8. Customer protection

In this section we set out how customers are protected if the performance outcome is not achieved.

Following consultation with customers and stakeholders and development of our 25-year Strategic Plan, we are proposing eight outcomes across the five price controls for PR19.

These eight outcomes have 41 associated performance commitments. In addition, we will continue to measure and report performance against other statutory and regulatory obligations. These will be included in management reporting and exceptions reported in our Annual Performance Report.

8.1 Performance commitments

For pollutions there is a specific performance commitment that will be used to hold us to account.

8.1.1 Wastewater pollution incidents – category 1-3

This is one of 14 common measures outlined by Ofwat with a cross company target. It is a key measure of the adverse impact we have on the environment. In addition, it is also supported by our customer engagement through our conjoint analysis; although the exact definition of pollutions in this context is not the easiest to engage with customers on, we have routinely seen environmental issues high on our customers list of priorities.

The detail behind the measure is given in Environment Agency Environmental Performance Assessment (EPA) Methodology v2. It is the number of Category 1-3 pollution incidents per 10,000km of wastewater network, as reported to the Environment Agency.

Table 8-1: Pollution performance commitment

	Unit	2020-21	2021-22	2022-23	2023-24	2024-25
Pollutions PC	Incidents per 10,000 km of sewers	21	20	19	18	17

Incentive type: Outperformance and underperformance payment.

Rationale for target: Upper quartile industry performance.

See Appendix 3.1.A for more details of this performance commitment.

9. Affordability

The programme of work described in this supporting document was included in our draft business plan that was tested with customers between January and June 2018.

The customer research is designed to test whether customers find the plan acceptable and affordable. The stimulus material covered our overall package of service improvements, statutory enhancements and bill impacts. We tested our plan with household customers, business customers, retailers, those in vulnerable circumstances and industry stakeholders. Results were triangulated across a variety of qualitative and quantitative methodologies to maximise the robustness of both the sample and conclusions.

Testing has shown that 96% of our customers find our business plan acceptable. Acceptability is above 90% across all demographic subgroups. Those in vulnerable circumstances were slightly less accepting of the plan than other groups, but still at a very high level.

A large majority of household customers (92%) consider our plans are affordable for them. Over 90% of businesses found the plan to be affordable. Vulnerable customers also found the plan acceptable and affordable, and were positive about the assistance that we provide to this group.

Full details of our acceptability testing can be found in *Supporting document 1.1 Summary of research findings* and details of how we address affordability and vulnerability are included in *Supporting document 2.1 Vulnerability strategy*.

10. Board assurance

The proposals have been subject to our board assurance process, which is described in detail in section 12 of the main business plan narrative and supporting documents 12.1 to 12.8.

Section 12 of the main business plan narrative includes the following statements that are relevant to this supporting document:

The full Board confirms that, in our view, the proposals within the Business Plan are consistent with and should allow the company to deliver against its statutory obligations, now and up to 2025.

We, the Board of Wessex Water, understand our accountability for this Business Plan. We are unequivocal in our assurance that the Plan is both high-quality and deliverable. We also confirm that it is consistent with our long-term vision for the company and our strategy.

The Board assures that this plan is informed by customer engagement and the views of the Wessex Water Partnership (WWP), and that the performance commitments contained within it reflect customer priorities, are stretching and reporting is robust.

The Board confirms that the expenditure projections contained within this Business Plan are robust and efficient, and that large investments are deliverable and best for customers.

Annex A - Potential rising main replacements

Site Name	Diameter	Length	Exisitng Pipe Material
Weymouth Radipole	1100	3.5	Ductile Iron
Shirehampton Lamplighters	250	0.1	Unknown
Ferndown A31 Tricketts Cross	600	1.7	uPVC
Christchurch Scotts Hill Lane	450	0.5	uPVC
Wyke Regis Hillcrest Road	450	0.4	Ductile Iron
Bridgwater Colley Lane	600	0.6	uPVC
Baltonsborough Baltonsborough Main	150	0.1	Asbestos Cement
Long Sutton Knole	150	1.2	uPVC
Warminster Portway	400	2.4	Asbestos Cement
Corfe Castle Studland Road	190	0.6	Asbestos Cement
Blandford Langton Road (Blandford No 1)	350	1.3	Asbestos Cement
Tickenham East	150	0.7	uPVC
Blandford St Mary Brewery No 2	150	0.5	Asbestos Cement
Norton Sub Hamdon	150	3.5	uPVC
Yeovil Mudford	150	1.9	Cast Iron