Appendix 9 – Maintaining our services: Response to IAP

Wessex Water

March 2019

Wessex Water
YTL GROUP

Summary

This appendix provides additional evidence in relation to Ofwat's initial assessment of plans regarding our maintenance plan.

We provide additional information about our asset health indicators, in particular about:

- Working with the sector to develop forward looking asset health indicators
- Transparency of how asset health indicators influence operational decision making for water and wastewater services.

Information on the level of stretch of asset health performance commitments is provided in our main response document. Supplementary information is given in this appendix.

Contents

1. Introduction

This appendix provides additional evidence in relation to Ofwat's initial assessment of plans regarding our maintenance plan. The relevant document in our business plan submission in September 2018 was *Supporting document 5.6 – Maintaining our services*.

In this document we provide additional evidence and responses in relation to Ofwat's IAP actions:

Action WSX.LR.A3:

- Providing greater transparency of how asset health indicators influence our operational decision making for water and sewerage services
- Working with the sector to develop robust forward looking asset health metrics.

Action WSX.OC.26

- Challenging our proposed stable sewer collapse rate.

Section 3 of *Supporting document 5.6 – Maintaining our services* set out the indicator measures that we use to manage our water and wastewater services. It also included our asset health expectations in response to the request in the PR19 methodology statement.

2. Water services

2.1 Asset health indicators

Ofwat detailed a list of asset health measures for water services in Appendix 2 of the PR19 methodology. Table 2-1 below shows:

- the common asset health related performance commitments
- the additional bespoke asset health performance commitments from the list that have been adopted by Wessex Water
- the related customer service measures that are also partially related to asset health and also contribute to our maintenance planning.

Table 2-1: Asset health indicators for water

Performance commitment	Comment
Water mains bursts	Common asset health performance commitment
Unplanned outage	Common asset health performance commitment
Water quality customer contacts (appearance and taste & odour)	Selected from the long list of asset health measures
Event risk index (ERI)	Selected from the long list of asset health measures
Compliance risk index (CRI)	Customer service measure

2.2 Maintenance and operational planning

We have an integrated asset management and operational decision making framework for water distribution which involves increasing or decreasing the level of activities taken from the potential options shown below as part of a holistic and integrated strategy for managing our water distribution network based around our asset health performance commitments.

<table>
<tr><th></th><th>Trunk mains</th><th>Distribution mains</th><th>Service pipes</th><th>Service reservoirs</th><th>Booster pumping stations</th><th>Meters</th></tr>
<tr><td>Reduced Leakage</td><td colspan="3">Active leakage control
Pressure management
Metering
Asset replacement</td><td>Metering
Survey frequency</td><td>Monitoring
Pressure optimisation</td><td>Metering at all levels</td></tr>
<tr><td>Leaks fixed within a day</td><td colspan="2">Flexing of current response strategy</td><td colspan="3">Not applicable</td></tr>
<tr><td>Customer water quality contacts</td><td colspan="3" rowspan="2">Asset replacement
Mains conditioning
Customer relationship management
Treatment – conditioning and/or dosing</td><td rowspan="2">More frequent cleaning, improved outlet arrangements, more proactive maintenance</td><td>Flow conditioning</td><td>Not applicable</td></tr>
<tr><td>Water Quality Compliance</td><td colspan="2">Not applicable</td></tr>
<tr><td>Supply Interruptions</td><td colspan="3">Change in response times
Monitoring & enhanced response
Asset replacement
Repair/replacement without interruption</td><td>Storage volume
Monitoring</td><td>Monitoring
Standby capacity</td><td>Not applicable</td></tr>
<tr><td>Mains bursts</td><td colspan="2">Active leakage control
Pressure management
Asset replacement</td><td colspan="2">Not applicable</td><td>Pressure optimisation</td><td>Not applicable</td></tr>
</table>

For above ground assets, we have business as usual maintenance framework to maintain stable asset health, with risks and needs captured through our Drinking Water safety plan system and reporting available via a QlikView risk application for investment prioritisation.

2.3 Link to operational planning

The following sections provide an overview of how each measure relates to our operational planning.

2.3.1 Water main bursts

We have just under 2,000 mains burst per year on just under 12,000 km of water mains, equal to around one burst per 6 km of main per year. Where we have "hot spots" of repeated bursts in one specific area we look to understand the underlying cause before deciding on the appropriate action. As well as mains replacement we can look at pressure reduction, and/or the application of "calm network" management as burst can often be initiated by pressure surges.

Mains bursts data is also used in leakage prioritisation and also in the assessment of our network resilience. Where a mains burst leads to a significant interruption to supply we will look to see what actions can be taken to minimise the impact of a similar incident.

In one sense all mains are critical as failure can lead to a loss of service to our customers. The criticality of any one pipe is dependent on the local network configuration and interconnection, which is held in both our Geographic Information System (GIS) and in our 100% coverage of hydraulic models of our treated water distribution network.

We have undertaken deterioration modelling of our 12,000 km of distribution mains to estimated future capital maintenance required to sustain service and a stable risk profile. This has been used to verify current expenditure and to forecast expenditure requirements, level of service and risk profile for the future see section 4.3.1 of *Supporting document 5.6 – Maintaining our services* for further details.

2.3.2 Unplanned outage

This is a common performance commitment which aims to show the extent to which unplanned events lead to a reduction in the maximum sustainable water treatment production capacity including the length of time and impact of those events.

It is defined as the annualised unavailable output based on the peak week production capacity. Our proposed performance commitment level for 2020-21 to 2024-25 has been set at a level below the worst experienced over the past 10 years (<2.34 %).

Having completed the water supply grid project, we now have significant resilience in our supply system. We also have a supply demand balance surplus and the vast majority of our customers can be supplied from more than one source of treated water. We have five surface water treatment works and 61 ground water treatment works of varying complexity feeding the grid, with the latter asset group contributing to 75% of the total production

capability. This level of resilience enables us to prioritise how and when best to respond to unplanned outage events to ensure efficient and effective management of our resources.

For example, where we have alternative sources or sufficient network storage, it can be more cost effective to leave a failed site out of service for a period of time so that corrective work can be undertaken in a more planned way (e.g. minimising out of hours working). In many cases this approach is appropriate in the event of a single site failing due to random equipment failure. However, an unacceptable scenario that would significantly impact the resilience of the supply system, customer service levels and delivery of this performance commitment is the risk of multiple, simultaneous site failures and outages. Key to avoiding this scenario is making operational planning decisions that are aimed at maintaining the availability and capacity of our more critical sites and assets. We aim to achieve this through:

- proactive operational maintenance and capital investment planning informed by inspection and condition based monitoring
- organisational arrangements for responding to critical asset failures where a reactive maintenance management approach is more optimal.

Examples of such activity included in our operational maintenance plan and capital works programmes are:

- Investment programmes for the replacement of obsolete and unsupportable control and instrumentation equipment
- One-off projects to improve the resilience of site power supply and site control systems
- Routine inspection and test programmes for chemical and gas storage facilities and pressure vessels
- Annual inspection programme of boreholes to include CCTV surveys, pump testing and water quality monitoring (turbidity) – generating planned work programmes for casing and head plate relining/replacement, borehole cleaning and rehabilitation work
- Deploying an in-house team for fast response replacement of critical borehole pumps, requiring a maintained stock of critical borehole pumps and rapid response agreements with crane framework suppliers.

2.3.3 Water quality contacts

All water quality contacts come into our one customer relationship management system, from where they are then visible within our geographical information system.

During an incident near real time information from customer contacts is used by our incident management team to make decisions and choices on appropriate actions. After significant incidents water quality contact data is reviewed as part of a lessons learn business as usual approach which can then lead to operational changes, such as more mains flushing and/or mitigation actions due to changes in water chemistry from alternative water sources being used for example.

We also review all water quality contacts on a monthly basis looking for underlying trends and geospatial cluster analysis to identify potential actions and/or changes to current operational procedures.

2.3.4 Event risk index (ERI)

This is a new measure being developed by DWI. ERI is a measure designed to monitor how well companies respond to water quality events and manage the risk to the quality of the drinking water quality that we provide to customers.

We have chosen this measure as we believe responding well to water quality events is crucial to meeting our customers' expectations for excellent water quality at all times. Our approach is to act quickly to identify and resolve issues and to proactively put measures in place to prevent recurrences. We have a positive, open and honest relationship with our regulator and generally the feedback we receive is that the DWI are satisfied with our response.

We also consider that ERI can be a measure of how well the company is maintaining the health of its assets. It is important that we are held to account for this over the long-term.

ERI is a brand new measure, and as such, the industry is still interpreting the definition and putting the methods in place to track progress. Using the recently published definition, we will aim to calculate the ERI score for each notified event, but it should be noted that our internal calculation is a prediction only. The final assessment is made by the DWI, and the subsequent score given to each event is currently not published until July for the previous calendar year.

2.3.5 Compliance risk index (CRI)

CRI is a new measure of drinking water quality introduced by the DWI in 2017.

As it stands, we have to predict the impact of each exceedance to track our performance throughout the year. Predicting scores is not simple as there is a subjective element to the calculation, which is made by the assessing Inspector and currently not confirmed to the company. The DWI do not finalise and release companies' end of year scores until at least April the following year.

Changes are due to be made to the drinking water quality legislation over the next few years which are likely to increase CRI scores in the next AMP. Recent changes to the regulation will allow companies to undertake risk based monitoring following accreditation of their drinking water safety plan methodology. An approved method for accreditation is likely to be available from 2019. We believe that these changes will have a negative impact on CRI. Furthermore, changes to the Drinking Water Directive are currently in consultation and are likely to result in a tightening of standards and inclusion of new regulatory parameters, which will come in to force around 2021. Again, these changes are more than likely to have a detrimental effect on CRI as the number of exceedances of regulatory standards are likely to increase.

All compliance failures are investigated to understand the underlying causes and our business as usual approach feeds back to front line operational staff and tactical planning teams. Our approach is to act quickly to identify and resolve issues and to proactively put measures in place to prevent recurrences. We have a positive, open and honest relationship

with our regulator and generally the feedback we receive is that the DWI are satisfied with our response.

3. Sewerage services

3.1 Asset health indicators

Ofwat detailed a list of asset health measures for water services in Appendix 2 of the PR19 methodology. Table 3-1 below shows:

- the common asset health related performance commitments
- the additional bespoke asset health performance commitments from the list that have been adopted by Wessex Water
- the related customer service and environmental measures that are also partially related to asset health and also contribute to our maintenance planning.

Table 3-1: Asset health indicators for wastewater

Performance commitment	Comment
Sewer collapses (including rising main bursts)	Common asset health performance commitment
Internal sewer flooding	Customer service measure
External sewer flooding	Selected from the long list of asset health measures
Wastewater pollutions incidents	Environmental performance measure
Treatment works compliance	Common asset health performance commitment

3.2 Maintenance and operational planning

We have an asset management and operational decision making framework for our wastewater operation which involves increasing or decreasing the level of activities taken from the potential options shown below as part of a holistic and integrated strategy for managing our sewerage collection and treatment operations based around our asset health and service performance commitments.

Table 3-2: Wastewater asset health action matrix

<table>
<tr><th></th><th>Sewers</th><th>Combined sewer overflows</th><th>Sewage pumping stations & rising mains</th><th>Sewage treatment</th></tr>
<tr><td>Sewer collapses</td><td>• Proactive inspection
• Proactive rehabilitation</td><td>Not applicable</td><td>• Rising main monitoring & burst detection
• Air valve maintenance
• Proactive rising main replacement
• Septicity control</td><td>Not applicable</td></tr>
<tr><td>Internal sewer flooding</td><td rowspan="3">• Reduce sewer misuse (FOG)
• Behavioural campaigns (non flushables)
• Proactive sewer jetting
• Proactive repairs & maintenance
• In sewer monitoring</td><td>Not applicable</td><td rowspan="2">• Planned wet well cleaning
• Pass forward flow compliance monitoring
• Planned maintenance and asset renewal programmes
• Septicity control
• Telemetry data analytics</td><td>Not applicable</td></tr>
<tr><td>External sewer flooding</td><td>Not applicable</td><td>Not applicable</td></tr>
<tr><td>Wastewater pollutions incidents</td><td rowspan="2">• Event duration monitoring
• Frequent spilling overflow improvement programme
• Proactive jetting
• Screen maintenance and asset renewal programmes</td><td rowspan="2">• Compliance monitoring
• Condition surveys
• Planned maintenance and asset renewal programmes
• Telemetry data analytics</td></tr>
<tr><td>Treatment works compliance</td><td>Not applicable</td><td>Not applicable</td></tr>
</table>

For each asset group operational and renewal maintenance planning objectives are aligned with the delivery of the performance commitments. We have a business as usual maintenance framework to maintain stable asset health and service, with risks and needs captured through our Waste Asset Risk Management system and reporting available via a QlikView risk application for investment prioritisation.

3.3 Link to operational planning

The following sections provide an overview of how each measure relates to our operational planning. See also supporting document 5.6 from our September submission.

3.3.1 Sewer collapses

This is a common performance commitment and includes sewer collapses and burst rising mains causing an impact on service to customers or the environment. It excludes proactively discovered collapses.

It is defined as the number of sewer collapses per thousand kilometres of all sewers causing an impact on service to customers or the environment. Our proposed performance commitment level for 2020-2025 is 18.1 collapses per 1000 km.

For many years our interpretation of the definition of collapses has included all incidents that may have been caused by a partial or complete collapse of the sewer or rising main. This included many partial collapses that other companies may have excluded from their reported numbers.

Full collapses are clear asset failures and are identified quickly because dry weather flow (DWF) backups meaning these are found regardless of the weather. However, partial collapses can allow DWF to pass to treatment without consequences. It is only when rainfall occurs that these are identified, which is why in wet years more collapses are reactively identified, compared to dry years. Rising mains are also more prone to bursting in wet years as they are under more strain. So reactive identification of collapses is proportional to the rainfall patterns and this explains the lower numbers identified in recent years compared to the wet years of 2012 to 2014.

Our performance in this measure has been stable since the transfer in 2011. However, keeping a stable level of collapses and bursts is challenging because our sewer deterioration modelling suggests that every year we would expect an additional 10 collapses compared with the previous year. We are not expecting a sudden increase in the number of collapses because sewers are long life assets. However, we have identified that our rising mains are more vulnerable assets. We have therefore included a larger proactive replacement programme for rising mains.

Our sewer deterioration modelling methodology was developed a decade ago and is still valid. We regularly update it to include recent data and information. It continues to suggest we should be having a step change in proactive sewer rehabilitation to match the deterioration rate. We are again proposing a step towards this.

Influencing operational decisions

The collapse asset health metric has significantly influenced our operational decision making. Without the metric, we could choose not to invest proactively – instead we could just wait for assets to fail and respond reactively.

Therefore, we have for the past decade ringfenced maintenance funding to ensure operational decisions are made focussed on improving our asset health.

This funding is targeted at sewers vulnerable to collapse as we described in Document 5.6, Section 7.2. This targets sewers that our geospatial modelling predicts are either high likelihood or high impact. This is a step change from AMP5 when we only proactively looked at sewers that were high risk (i.e. both high likelihood and high consequence) or high consequence (critical assets).

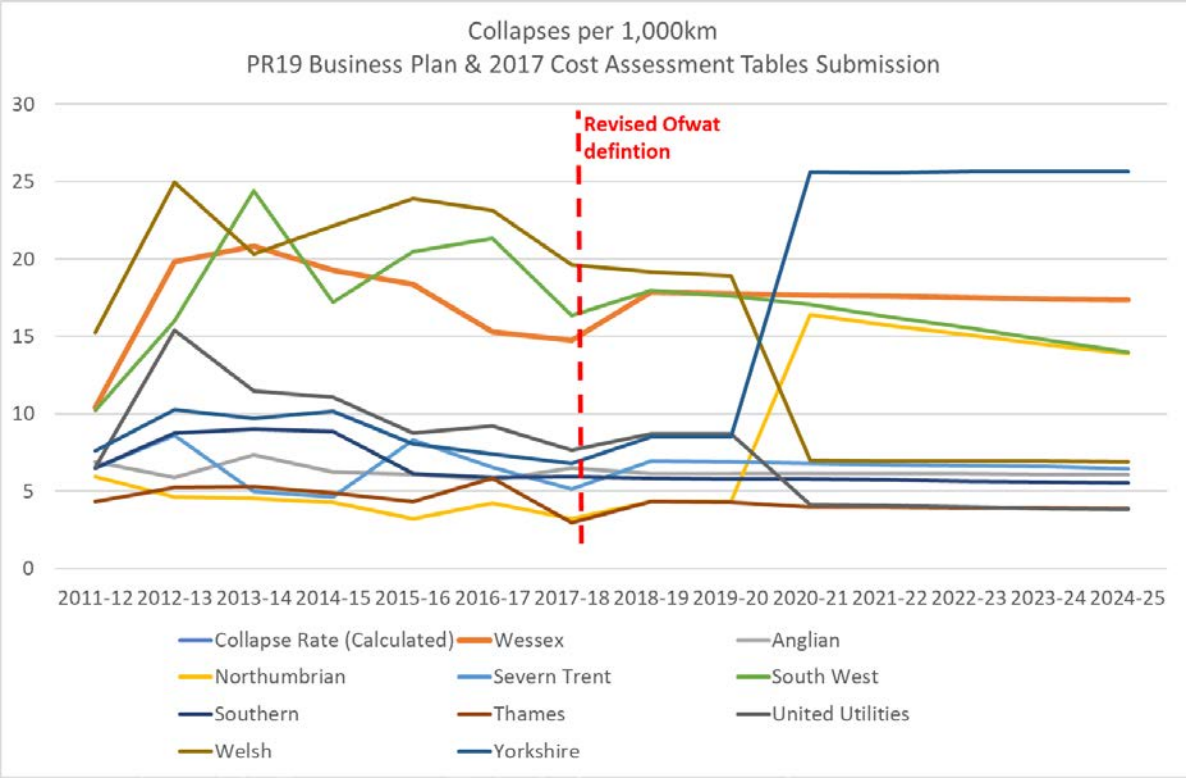
Sewer collapse definition

In the past, companies were compared against their own historical performance in order to monitor trends. Until it can be confirmed that there is consistent reporting across the industry we do agree that the metric should be used to compare water company reported numbers.

A revised definition for collapses was issued for shadow reporting in 2017/18, following concerns that the previous definition was not being applied consistently. Our analysis of this shadow reported data is shown in Figure 3-1. This shows that there are still confusions in the definition.

Water UK has coordinated a series of meetings to propose some changes to the definition, as shown in Figure 3-2, in an attempt to get greater consistency.

Figure 3-1: Collapse reporting using the 2017/18 collapse definition



There is a proposal for minor changes to the definition for APR shadow reporting, which we support and await Ofwat's response.

Our APR commentaries will report both our old interpretation of the definition and the new definition. Our restated numbers using the proposed definition will be significantly lower than the numbers we currently report.

Figure 3-2: Water UK proposal for more consistent collapse definition

Sewer collapses common performance commitment

All companies have come together, facilitated by Water UK, to share experiences of shadow reporting for 2017-18 of the new sewer collapse measure, and have identified opportunities to improve the consistency of reporting through clarifying and in some cases expanding the reporting guidance.

As a result, we – in agreement with all other companies - propose a limited number of revisions to the reporting guidance aimed at providing clarity in reporting. The rationale for these revisions is provided below, and the specific proposed changes are provided in the annex (in track changes).

Rationale for proposed revisions to reporting guidance

The proposed changes relate to clarifications in five areas: the scope of the measure, the definition of customer and environmental impact, which assets that should be included, report timing and exclusions covering proactive status and impact of root ingress.

- **Clarification of the scope of the measure**

  Making clearer that the measure is for sewer collapses that have not been identified proactively by the company and cause an impact on service to customers or the environment

- **Clarification of the definition of customer and environmental impact**

  Making clearer that 'impact' covers any contact with the company (i.e. an impact on service has caused someone to contact the company), or any unplanned escape of wastewater, that results in the need to replace or repair the pipe to reinstate normal service; this revision aims at providing clarity that an impact to customer and environment should not be limited to a flooding or pollution event.

- **Clarification of assets that should be included**

  Making clearer that a reportable sewer collapse also applies to pipe bridges, and failures on the infrastructure network, including inputs into the inlet of treatment works and terminal pumping station rising mains (in accordance with RAG guidance 4.07).

- **Clarification of the report timing**

  Making clearer that a sewer collapse should be reported in the reporting year when the service incident was reported to the company and not when the repair was completed.

- **Clarification of exclusions covering proactive status, impact of root ingress**

  Making clearer, via an updated flow diagram, the distinction between the proactive and reactive sewer collapse. Additionally, removing two exclusions (fractured assets and minor pipe breaks), providing clarity on how root ingress and patch repairs should be treated, making the wording on exclusions less ambiguous

3.3.2 Internal sewer flooding

We have a low number of customers affected by internal flooding, but when it happens it has high consequences and is our worst serviceability failure. External flooding often occurs alongside internal flooding, so if we focus on preventing external flooding (see 3.3.3) this will reduce the risk of internal flooding.

Also see below and Appendix 7 – *Minimising sewer flooding* for our approach to reducing flooding risks.

3.3.3 External sewer flooding

Operational planning for reducing external flooding focusses on preventing blockages. This is because 80% - 85% of external flooding incidents are caused by flooding 'other causes', rather than lack of sewer capacity.

Our 'reducing escape of sewerage' strategy includes operational actions such as:

- Reducing sewer misuse (fats oils and grease campaigns)
- Behavioural campaigns (non flushables campaigns)
- Proactive sewer jetting
- Proactive repairs & maintenance
- In-sewer monitoring.

Appendix 7 – Minimising sewer flooding: Response to IAP contains more details on our approach to reducing flooding risks and *Appendix 4 - Protecting and enhancing the environment: Response to IAP* contains more details about our pollution reduction strategy.

Operationally, we cannot proactively monitor all of our 35,000km of sewers. We therefore have geospatial models that allow us to analyse incident details and proactive inspections, so we can proactively target operational interventions, such as planned sewer cleaning (jetting). Table 3-4 in Appendix 7 shows the historical planned jetting lengths, which are all proactively undertaken to reduce flooding incidents. We plan to almost double this by 2025.

Also see our escape of sewage reduction plan summarised in Table 3-9 of *Appendix 7 – Minimising sewer flooding: Response to IAP*.

3.3.4 Wastewater pollutions incidents

Pollution incidents can be caused by many reasons, including asset failure. The most common cause of pollution is external flooding that flows into a watercourse.

10% of our historical pollution incident are from legal discharges from combined sewer overflows (CSO). We operationally proactively clean pumping station wet wells and ensure pumps are operational to reduce the risk of asset failure. We also plan to regularly inspect sewers downstream of CSOs so that the chance of premature spills is reduced.

This performance commitment is a key measure of the adverse impact we have on the environment.

It is defined as the number of Category 1-3 pollution incidents per 10,000km of wastewater network, as reported to the Environment Agency.

We 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.

Appendix 4 – Protecting and enhancing the environment: Response to IAP, section 3.4 contains more details on our approach to reducing pollution risks. See also Table 3-9 in *Appendix 7 – Minimising sewer flooding: response to IAP* contains more details on our approach to escape of sewage reduction plan.

3.3.5 Treatment works compliance

This is a common performance commitment and is an important indicator of whether levels of operational activity and investment in assets has been sufficient to maintain performance and effective treatment capacity.

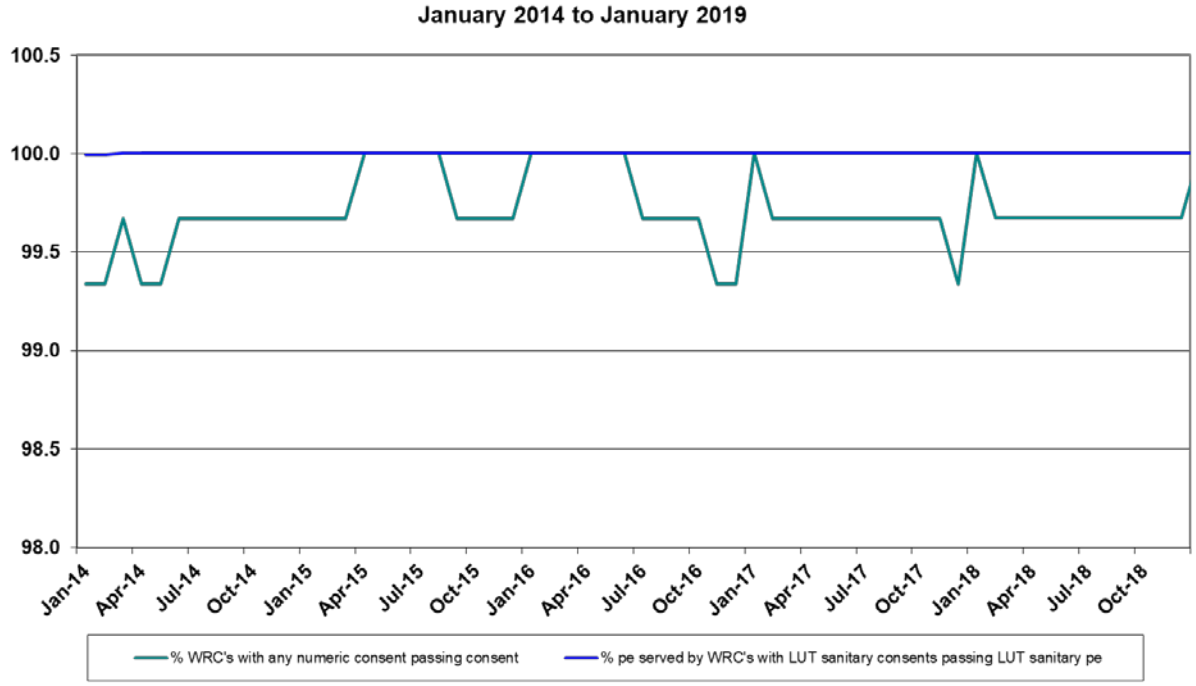
It is defined as the percentage of sewage treatment works and water treatment works that are compliant with their discharge permit as reported to the Environment Agency. The proposed performance commitment level for 2020 to 2025 is 100%.

Historically, the key indicators that we use to monitor the environmental performance of our STW include:

- % of STW with any numeric consent passing consent
- % of population equivalent served by STW compliant with Look Up Table (LUT) sanitary consents

These metrics continue to be used to measure progress and drive performance which has consistently been industry leading amongst the Water and Sewerage Companies (WaSCs). Recent STW compliance performance data is shown in the figure below.

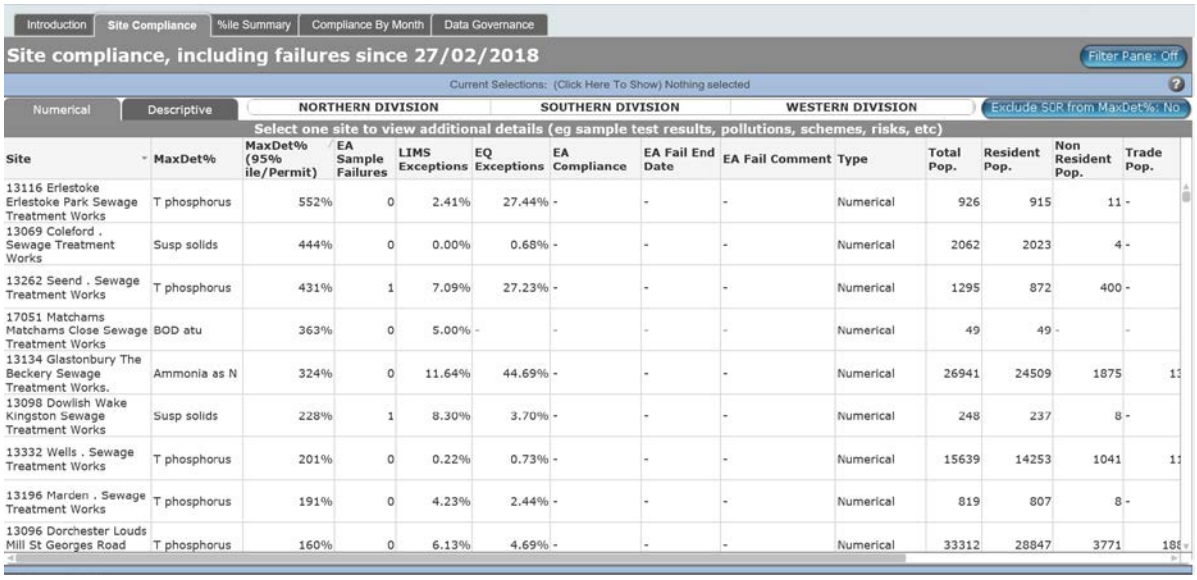
Figure 3-2: Sewage Treatment Works Compliance



This asset health metric is a lagging indicator so to provide earlier warning of potential compliance risk we use effluent quality sample data and inter-process quality measurements to identify deteriorating site performance.

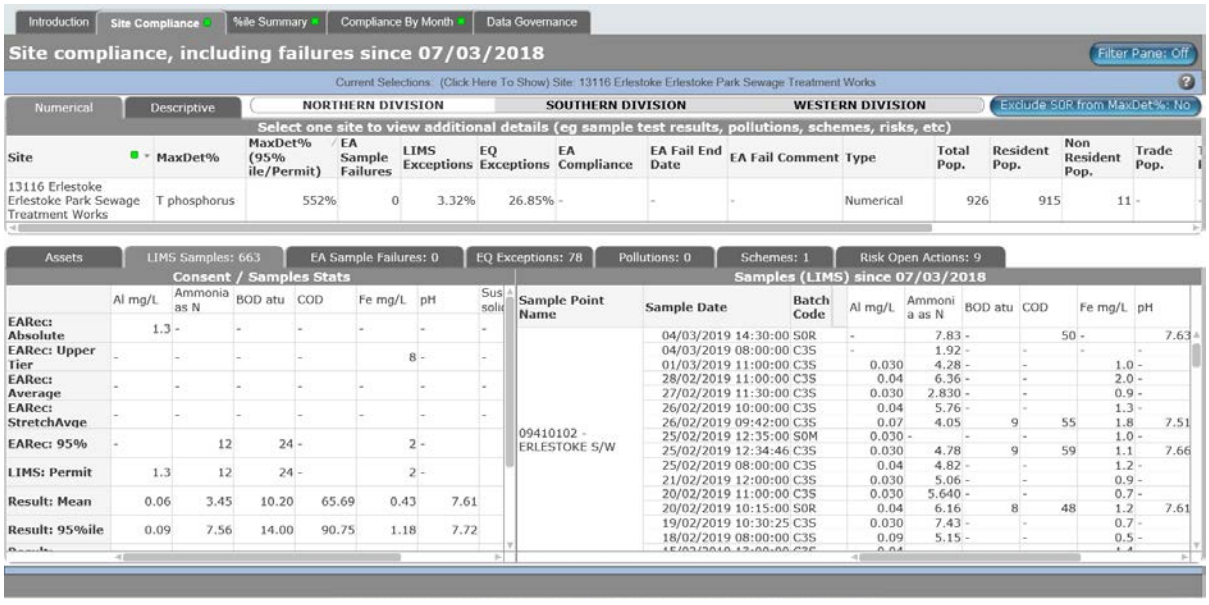
A waste water site compliance dashboard reporting tool is used by operational scientists and supervisory staff as a way of looking at the performance of STW, in particular those most at risk of failure. To help users understand the data the reporting tool also brings together multiple sources of related site information, such as details of asset work order history, consents, effluent quality sample data and failures, pollutions, recorded risks and planned investments. Examples of various reporting tables are shown in the screenshots below.

The screenshot below highlights sites that are at risk of failure but may not have failed yet. In this screenshot the table is sorted by the MaxDet% (95%ile/Permit) which compares 95%ile sample for each determinand with the related permit limit.



Site	MaxDet%	MaxDet% (95% ile/Permit)	EA Sample Failures	LIMS Exceptions	EQ Exceptions	EA Compliance	EA Fail End Date	EA Fail Comment	Type	Total Pop.	Resident Pop.	Non Resident Pop.	Trade Pop.
13116 Erlestoke Erlestoke Park Sewage Treatment Works	T phosphorus	552%	0	2.41%	27.44%	-	-	-	Numerical	926	915	11	-
13069 Coleford . Sewage Treatment Works	Susp solids	444%	0	0.00%	0.68%	-	-	-	Numerical	2062	2023	4	-
13262 Seend . Sewage Treatment Works	T phosphorus	431%	1	7.09%	27.23%	-	-	-	Numerical	1295	872	400	-
17051 Matchams Matchams Close Sewage Treatment Works	BOD atu	363%	0	5.00%	-	-	-	-	Numerical	49	49	-	-
13134 Glastonbury The Beckery Sewage Treatment Works.	Ammonia as N	324%	0	11.64%	44.69%	-	-	-	Numerical	26941	24509	1875	13
13098 Dowlish Wake Kingston Sewage Treatment Works	Susp solids	228%	1	8.30%	3.70%	-	-	-	Numerical	248	237	8	-
13332 Wells . Sewage Treatment Works	T phosphorus	201%	0	0.22%	0.73%	-	-	-	Numerical	15639	14253	1041	11
13196 Marden . Sewage Treatment Works	T phosphorus	191%	0	4.23%	2.44%	-	-	-	Numerical	819	807	8	-
13096 Dorchester Louds Mill St Georges Road	T phosphorus	160%	0	6.13%	4.69%	-	-	-	Numerical	33312	28847	3771	188

The screenshot below shows further detail for a specific site and provides access to related sources of asset and quality data – in this case consent and sample data.

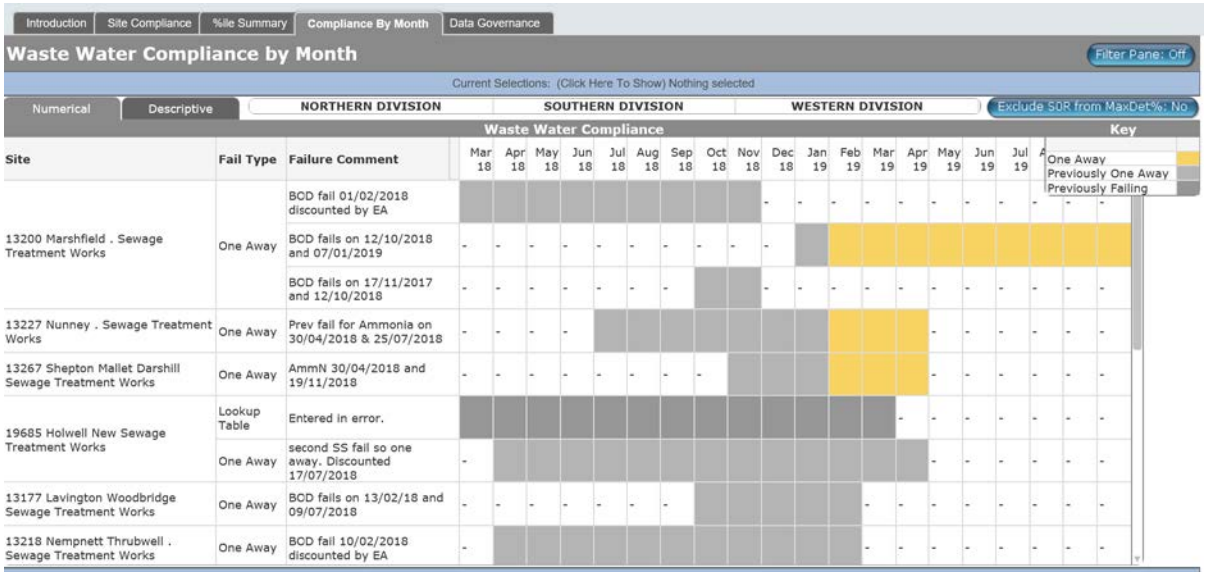


Site	MaxDet%	MaxDet% (95% ile/Permit)	EA Sample Failures	LIMS Exceptions	EQ Exceptions	EA Compliance	EA Fail End Date	EA Fail Comment	Type	Total Pop.	Resident Pop.	Non Resident Pop.	Trade Pop.
13116 Erlestoke Erlestoke Park Sewage Treatment Works	T phosphorus	552%	0	3.32%	26.85%	-	-	-	Numerical	926	915	11	-

	Al mg/L	Ammonia as N	BOD atu	COD	Fe mg/L	pH	Sus
EARec: Absolute	1.3	-	-	-	-	-	-
EARec: Upper Tier	-	-	-	-	8	-	-
EARec: Average	-	-	-	-	-	-	-
EARec: StretchAvge	-	-	-	-	-	-	-
EARec: 95%	-	12	24	-	2	-	
LIMS: Permit	1.3	12	24	-	2	-	
Result: Mean	0.06	3.45	10.20	65.69	0.43	7.61	
Result: 95%ile	0.09	7.56	14.00	90.75	1.18	7.72	

Sample Point Name	Sample Date	Batch Code	Al mg/L	Ammonia as N	BOD atu	COD	Fe mg/L	pH
09410102 - ERLESTOKE S/W	04/03/2019 14:30:00	S0R	-	7.83	-	50	-	7.63
	04/03/2019 08:00:00	C3S	-	1.92	-	-	-	-
	01/03/2019 11:00:00	C3S	0.030	4.28	-	-	1.0	-
	28/02/2019 11:00:00	C3S	0.04	6.36	-	-	2.0	-
	27/02/2019 11:30:00	C3S	0.030	2.830	-	-	0.9	-
	26/02/2019 10:00:00	C3S	0.04	5.76	-	-	1.3	-
	26/02/2019 09:42:00	C3S	0.07	4.05	9	55	1.8	7.51
	25/02/2019 12:35:00	S0M	0.030	-	-	-	1.0	-
	25/02/2019 12:34:46	C3S	0.030	4.78	9	59	1.1	7.66
	25/02/2019 08:00:00	C3S	0.04	4.82	-	-	1.2	-
	21/02/2019 12:00:00	C3S	0.030	5.06	-	-	0.9	-
	20/02/2019 11:00:00	C3S	0.030	5.640	-	-	0.7	-
	20/02/2019 10:15:00	S0R	0.04	6.16	8	48	1.2	7.61
	19/02/2019 10:30:25	C3S	0.030	7.43	-	-	0.7	-
	18/02/2019 08:00:00	C3S	0.09	5.15	-	-	0.5	-

The screenshot below shows sites that are already One Away or Failing and how long before a site is due to return to compliance.



Operational managers and scientists are automatically alerted to sites being at risk of compliance failure. This initiates a site investigation and potentially a step up in operational activity, such as increased sampling, and increased site attendance and front line maintenance in order to mitigate the risk or to gain a better understanding of the root cause.

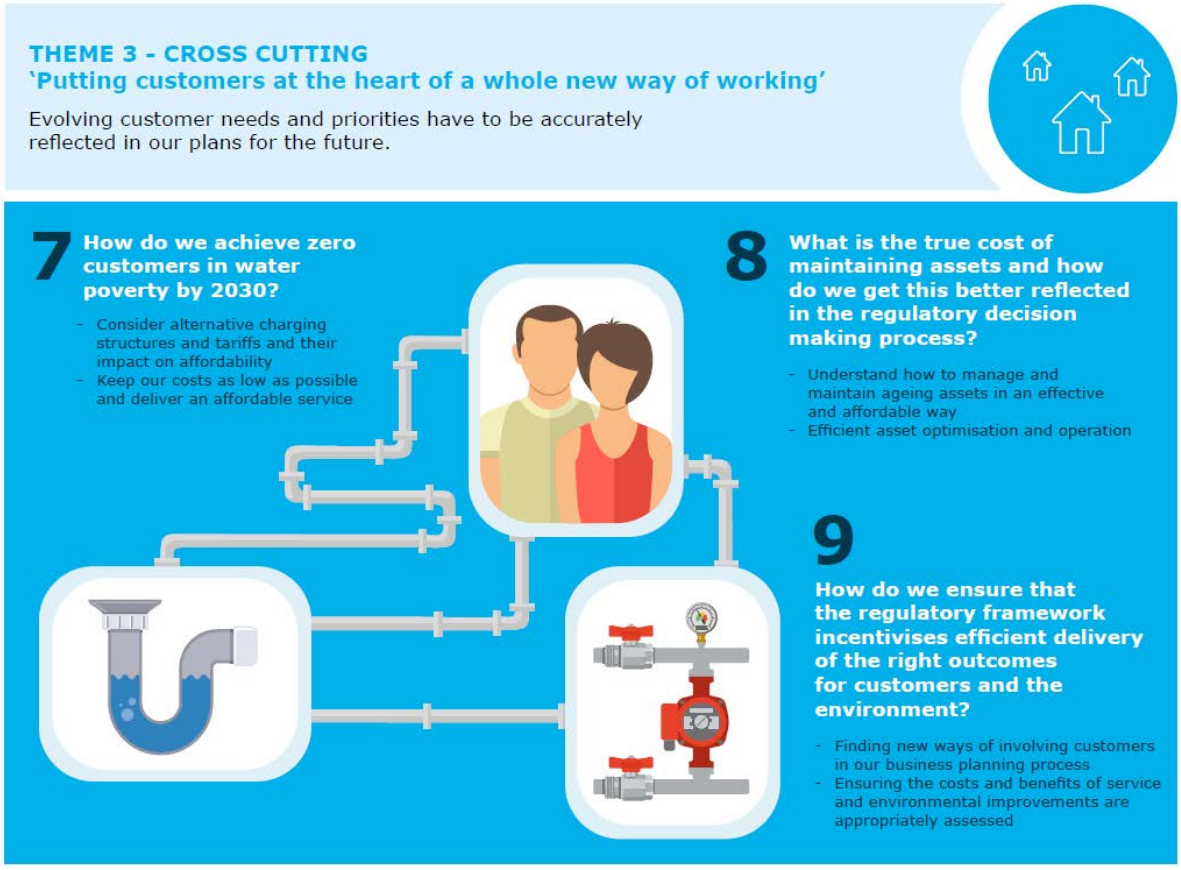
For sites at risk data and information from the reporting tool together with initial findings from investigations is reviewed at monthly compliance and risk meetings to assess the root cause of the deteriorating performance or determinand failure and to set in place short and longer term mitigation or improvement measures. Typically, these measures may include:

- Changes to operational and maintenance tasks
- Provision of temporary treatment
- Appraisal of capital solutions
- Engagement with traders or 3rd parties.

4. Developing forward looking asset health metrics

Action WSX.LR.A3 requested that we provide a commitment to work with the sector to develop robust forward looking asset health metrics, which we are happy to do.

We are fully committed to the UKWIR big questions including question 8 below and taking part in the research projects and dissemination workshops.



The programme lead - asset management for UKWIR, has drafted a proposal for the next round of UKWIR projects under the big questions programme with the intention of addressing this action (WSX.LR.A3). The draft proposal is provided in Annex A.

5. Annex A – UKWIR Asset heath proposal (draft)

UKWIR Suggestion - Asset Health Indicators - Forward Looking Metrics

Justification - Background: Ofwat in the Initial Asset of Plans (IAP) for PR19 have set a common action for the sector:
'The company should also provide a commitment to work with the sector to develop a robust forward looking asset health metrics and provide greater transparency of how its asset health indicators influence its operational decision making'.
Ofwat's recent horizontal audit of common measures demonstrated that even for long standing measures different companies approach their capture and collations of data differently, leading to inconsistencies.
This projects seeks to address both these issues.
Objectives - Aiming To Achieve: The primary objective is to develop a suite of measures that can be used by the industry against a standard method measurement. A suite of lead measures shall be developed and builds on the work completed on lead and lag measures project. Using lead and lag measure will enable companies to improve their operational decision making.
The IWA have published a set of performance indicators and their Performance Indicator Group may be a source of world-wide best practice . This could lead to more effective international benchmarking.
Other regulators use Asset Health to as output indicators and this should be reviewed as part of the project scope.
The approach needs to ensure the linkage between assets and customers is maintained.
The report needs to address the linkage to outcomes and the impact on future targets.
The report should be used by companies to both develop their approaches to the collection and assessment of data but also to support a wider understanding of underlying asset health trends across their businesses and across the overall industry.
This proposal support UKWIR's Big Question "What is the true cost of maintaining assets and how do we get this better reflected in the regulatory decision making process'
Benefits to be Achieved - Financial:
Financial Benefits?: Yes
Improved decision making could save the industry circa 1% or more on maintenance plans.
Benefits to be Achieved - Influential, Reputational:
Influential Benefits?: Yes
This project will have a significant influence of the regulatory process for PR24.

UKWIR Topic Areas:
Asset Management
Customer Issues
Regulation