

## Assurance Report - NWL PR19 Enhancement Performance Commitments - Howdon WWTW Resilience

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Northumbrian Water Limited  
B245770B

AMP 7 Enhancement Programme Independent Assurance  
9 July 2024



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## Executive summary

Through the Price Review (PR)19 business planning process, Northumbrian Water Limited (NWL) was awarded funding for enhancement and resilience schemes requiring delivery in line with the scope described in the PR19 Performance Commitment (PC) document by March 31st, 2025. NWL has commissioned Jacobs to supply third-party assurance to fulfil Ofwat requirements of independently assessing progress of the delivery of Howdon Sewage Treatment Works (STW) enhancement programme for Wastewater (PR19NES\_BES29) resilience prior to PR24 business plan (BP) submission. This stipulation is set out in the *PR19 Final Determination Outcomes Performance Commitments Appendix* section 1.2.35.

The purpose of the assurance was to review the alignment in scope, benefit, and completion date regarding NWL's submitted AMP7 enhancement case for Howdon WWTW. The scheme that makes up PR19NES\_BES29 was subject to review and challenge to assess the likelihood of an on-time delivery of a benefit equal to or greater to that given in PR19 PC annex 1 document. The audit took place remotely via Microsoft Teams and was completed by 30<sup>th</sup> May 2024.

Based upon the presented method, the scheme's risk was assessed. We conclude that;

- 100% of the Howdon wastewater resilience programme is assessed to deliver on scope.
- 3 of the 5 milestones of the Howdon wastewater resilience programme have already been completed and the programme required to complete the remaining milestones has been released for delivery.
- 4 of the 5 milestones of the Howdon wastewater resilience programme are expected to be delivered by the 31<sup>st</sup> of March 2025, with the remaining milestone due to be delivered by May 2027.
- Adherence to this timescale will result in delivering the scheme 25 months behind schedule.

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## 1. Introduction

This report holds the third-party assurance required by Ofwat which assesses the progress of the enhancement programme according to the requirements defined in *PR19 Final Determinations: Northumbrian Water – Outcomes performance commitments appendix* document section 1.2.35, shown below, for Wastewater (PR19NES\_BES29)

1.2.35 Delivery of Howdon STW enhancement		Unique Reference	PR19NES_BES29	Unique Reference	PR19NES_BES29												
<p><b>Purpose:</b> This performance commitment incentivises the company to deliver the Howdon sewage treatment works (STW) expansion scheme.</p> <p><b>Benefits:</b> This performance commitment protects customers from non-delivery of the Howdon STW expansion scheme. Current customers and future customers will benefit from the provision of continuous wastewater service and a reduced risk of environmental effects from future discharge volumes at Howdon.</p> <p><b>Performance commitment definition and parameters</b></p>		<p>asset in use, customers receiving benefit</p> <p>Howdon STW, located on the north bank of the River Tyne is the largest wastewater treatment facility on the East Coast between Edinburgh and Humberside. It serves the population of the Tyneside conurbation with a population equivalent of 926,539.</p> <p>The facility is nearing dry weather flow capacity once future growth and climate change impacts are considered and therefore presents a risk of regulatory compliance failure and associated environmental impacts.</p> <p>The proposed investment Howdon STW expansion addresses these risks and provides the capacity required as per the company growth projections but also to improve the resilience of the facility.</p>		<p><b>Price control allocation</b></p> <p>100% wastewater network plus</p> <p><b>Frequency of reporting</b></p> <p>Annual</p> <p><b>Any other relevant information</b></p> <p>NA</p> <p><b>Links to relevant external documents</b></p> <p>NA</p>													
<p><b>Detailed definition of performance measure</b></p> <p>This performance commitment measures the progress of the delivery of the company's Howdon STW expansion scheme. Progress will be expressed in the number of months delivered late.</p> <p>The scheme comprises of building new assets which will complement existing treatment processes on site at Howdon STW to accommodate future growth and also to build in redundancy when required to safeguard from loss of service now and into the future. The upgrades include upgrading at least the following:</p> <ul style="list-style-type: none"> <li>Preliminary Treatment;</li> <li>Howdon South Bank Pumping Station;</li> <li>Primary Effluent Pumping Station (PEPS);</li> <li>Secondary Treatment;</li> <li>Sludge Pumping Systems, ie the Return Activated; Sludge (RAS) and Surplus Activated Sludge (SAS);</li> <li>Ultraviolet Disinfection System; and</li> <li>Sludge Treatment</li> </ul> <p>Completion of the upgrades is scheduled for 2024-25 and to the following project milestones:</p> <table border="1"> <thead> <tr> <th>Year</th> <th>Process Unit Milestone</th> </tr> </thead> <tbody> <tr> <td>2020-21</td> <td>Permit assessment, option selection</td> </tr> <tr> <td>2021-22</td> <td>Land acquisition, planning application</td> </tr> <tr> <td>2021-22</td> <td>Successful procurement, company defined delivery key performance indicators</td> </tr> <tr> <td>2023-24</td> <td>Company defined delivery key performance indicators</td> </tr> <tr> <td>2024-25</td> <td>Company defined delivery key performance indicators.</td> </tr> </tbody> </table>		Year	Process Unit Milestone	2020-21	Permit assessment, option selection	2021-22	Land acquisition, planning application	2021-22	Successful procurement, company defined delivery key performance indicators	2023-24	Company defined delivery key performance indicators	2024-25	Company defined delivery key performance indicators.	<p><b>Additional detail on measurement units</b></p> <p>Each process unit milestone is considered to be delivered once the asset concerned is functionally completed and successfully commissioned. Proof of commissioning will be used to demonstrate each element of the scheme is complete.</p> <p>Independent technical assurance will be sought to review progress against the project delivery plan during the 2020-25 period. The milestone is to demonstrate and evidence that all elements are on track for completion and commissioning by the completion date.</p>			
Year	Process Unit Milestone																
2020-21	Permit assessment, option selection																
2021-22	Land acquisition, planning application																
2021-22	Successful procurement, company defined delivery key performance indicators																
2023-24	Company defined delivery key performance indicators																
2024-25	Company defined delivery key performance indicators.																
		<p><b>Specific exclusions</b></p> <p>None</p>															
		<p><b>Reporting and assurance</b></p> <p>An independent report will be provided in July 2024 setting out the expected date that all milestones will be functionally completed and successfully commissioned.</p>															
		<p><b>Measurement unit and decimal places</b></p> <p>Months to zero decimal places</p>															
		<p><b>Measurement timing</b></p> <p>Reporting year</p>															
		<p><b>Incentive form</b></p> <p>Revenue</p>															
		<p><b>Incentive type</b></p> <p>Underperformance payments based on performance in 2024-25 only</p>															
		<p><b>Timing of underperformance and outperformance payments</b></p> <p>End of period</p>															

Figure 1 PR19 Performance Commitment Outcome Detail

In particular, the assurance will focus on the following areas:

- Confirming the scope expected to be delivered for each milestone is equivalent to or greater than the required scope
- Confirming expected completion of the scheme and to assess any likely delay in any individual milestone beyond 31 March 2025

### 1.1 Audit Assessment Benchmark

The original scope defined in the document *Appendix 3.2 Enhancement Business Case*, Section 'Wastewater Howdon' included several aspects to enhance resilience and improve capacity to meet projected growth in the catchment. The resilience portion requested was £14.73m to improve resilience at:

- South bank pumping station (SBPS)
- Primary effluent pumping station (PEPS)
- RAS/SAS sludge Pumping Station

In their final determination, Ofwat accepted the need for resilience at the South Bank and Primary Effluent pumping stations but rejected the need for resilience at the 'Activated sludge' pumping station (RAS/SAS), therefore they allowed an extra £6m compared to draft determination for these activities (see **Appendix 5.1**). However, the commentary in Section 1.2.35 (PR19NES\_BES29) of the document *PR19 Final Determinations:*

*Northumbrian Water – Outcomes performance commitments appendix* (shown above in **Figure 1**), did not reflect this scope change and still includes resilience for the RAS/SAS pumping station.

This was believed to be an oversight on Ofwat's part and therefore, this assurance audit will only consider the resilience improvements for SBPS and PEPS.

We understand that this is in line with a correction to the ODI which NWL sought from Ofwat in writing in July 2022. NWL sought to further clarify the position in 2023.

## 2. Methodology

Our approach taken to investigate scope alignment, delivery and projected delays has included interviews with Programme and Project Managers and a review of the following information:

1. The specification of the scheme as set out in the company's V1.1 of the CMA (Capital Market Authority) final determination PC document.
2. Timeline of activities linking from the annex 1 document through to current forecast position.
3. Evidence of benefit from the scheme delivery
4. Information on project programmes.
5. Details of scope changes – data collected, analyses carried out and conclusions reached.
6. Current status for each project.
7. Risk registers and current status of outstanding risk for each project

For each scheme, we have considered the evidence and risk-assessed the information supplied to determine the risk of achieving the outcomes currently being reported and the delivery date currently being forecast.

NOTE - These may differ from the original PR19 customers protected figures and delivery dates.

We have used the risk scale below for this assessment:

**Table 1** Risk assessment matrix

A	B	C	D
<p><b>No issues identified (low risk)</b></p> <p>Appendix A. The benefit/delivery date is fully supported by all the evidence provided, which is robust and compelling.</p> <p>Appendix B. Evidence appears clear, relevant and of good quality</p> <p>Appendix C. Low level risks with appropriate plan to remedy</p> <p>Appendix D. Appropriate assumptions</p> <p>Appendix E. Solution offers described resilience enhancement</p>	<p><b>Non-material issues identified (low to medium risk)</b></p> <ul style="list-style-type: none"> <li>• Like A, but with some uncertainties.</li> <li>• Evidence is not as conclusive, but work is ongoing to mitigate the risk.</li> <li>• Medium risk areas but with appropriate plans to remedy</li> <li>• Solution offers some resilience enhancement</li> </ul>	<p><b>Material issues identified (medium to high risk)</b></p> <ul style="list-style-type: none"> <li>• Material areas of deficiency in the evidence provided</li> <li>• Many areas are incomplete and no clear or realistic plans to remedy</li> <li>• High-risk areas but with appropriate plans to remedy</li> <li>• Evidence does not support the figures presented</li> <li>• Solution offers little resilience enhancement</li> </ul>	<p><b>Significant material issues identified (high risk)</b></p> <ul style="list-style-type: none"> <li>• Significant gaps, incoherent, no plans to remedy deficiencies etc.</li> <li>• No evidence to justify the figures</li> <li>• High risk areas with no appropriate plan to remedy</li> <li>• Solution offers no resilience enhancement</li> </ul>

### 3. Findings

**Table 2** Assessment of Progress to scope

BP reference	Project Milestone	Complete	Forecast Completion Date	Schedule Risk
				RAG
South Bank Pumping Station	Permit Assessment, option selection	Y	Complete	A
South Bank Pumping Station	Land Acquisition, planning application	Y	Complete	A
South Bank Pumping Station	Successful procurement, company defined delivery Key Performance Indicators (KPIs)	Partial (see detail in section 3.1)	August '24	B
South Bank Pumping Station	Company defined KPIs	Y	Complete	A
South Bank Pumping Station	Company defined delivery KPIs, asset in use, customers receiving benefit	Partial (see detail in section 3.1)	May '27	C
Primary Effluent Pumping Station	Permit Assessment, option selection	Y	Complete	A
Primary Effluent Pumping Station	Land Acquisition, planning application	Y	Complete	A
Primary Effluent Pumping Station	Successful procurement, company defined delivery KPIs	Partial (see detail in section 3.2)	August '24	B
Primary Effluent Pumping Station	Company defined KPIs	Y	Complete	A
Primary Effluent Pumping Station	Company defined delivery KPIs, asset in use, customers receiving benefit	Partial (see detail in section 3.2)	October '26	C

## 3.1 South Bank Pumping Station (SBPS)

### 3.1.1 Scope

The successful outcome of the South Bank Pumping Station scheme is to enhance resilience of the pumping station and associated rising main. This included the following aspects:

- Reduce the risk of failure of the Glass Reinforced Plastic (GRP) rising main
- Improve reliability of the power supply (reduce brown outs)
- Improve pump reliability
- Increase the availability of spares

NWL's plan to improve the resilience of the SBPS is to install a new rising main and completely refurbish the mechanical and electrical components of the existing pumping station.

The rising main will be made of ductile iron, which is significantly stronger than GRP, and sized for future flows.

The only components that are remaining of the existing pumping station are the concrete wet and dry wells and a section of existing pump suction pipework that is captive in a core drilled hole in the chamber. None of these items have been highlighted as a risk to resilience.

There will be new pumps installed (upsized for future flows), new pipework in the dry well, new valves instrumentation, Motor Control Centres (MCC), software and cabling.

The new mechanical and electrical components will be of modern design and follow NWL's asset standards. This inherent modernity of equipment will increase the reliability of the pumping station and will also ensure that it is easier to source and hold spare components.

We have determined that the successful completion of the items listed above will deliver 100% of the scope required.

### 3.1.2 Programme Status

There are 5 key milestones as set out by Ofwat in the *PR19 Final Determination Outcomes Performance Commitments Appendix* document section 1.2.35.

We have determined from evidence presented that NWL have delivered 3 out of 5 of the milestones (Milestones 1,2 and 4), and we are confident that they will deliver Milestone 3 by 31<sup>st</sup> March 2025.

The remaining milestone (Milestone 5) is on track to deliver by May 2027, approximately 25 months behind the date set by Ofwat.

Milestone 1: Permit assessment and option selection has been completed, NWL decided on full refurbishment of this pumping station. As part of our assessment, we reviewed the presentation documentation submitted to us by NWL during the audit in May and therefore confirm completion of Milestone 1.

Milestone 2: Required land was acquired in March 2022 and full planning permission was granted in April 2024, evidence of which was reviewed during our assessment process and included discussions and presentation given during the audit in May as well as review of planning application online (Ref. 22/02241/FUL)

Milestone 3: Full contract has not been awarded yet due to NWL seeking additional cost assurance, but this is planned to be completed by August 2024. In the meantime, an enabling contract is underway to allow speedier delivery once the full contract is awarded. These works include diversion of services, site layout

amendments and land clearance, wash-water booster station installation, procurement of high risk early start items.

Milestone 4: The key project step of 'Detailed Design' was completed in June 2024.

Milestone 5: Asset will not be fully completed until May 2027, but there will be aspects coming online prior to that, such as the new rising main, which is planned to be in service from November 2026.

Mitigation works have been undertaken to reduce some of the resilience issues between now and project completion.

These include:

- Employing a third party to install ultrasound and vibration condition monitoring (CM)
- Pump vibration reduced using improved dampening material and levelling bases
- Enhanced proactive maintenance based on CM early warnings
- Increased spares inventory

### **3.1.3 Risks**

The complete scheme will not be delivered by March 2025

There were three main reasons contributing to the delayed delivery of this scheme beyond the March 2025 regulatory completion date, including:

- Land Purchase – land adjacent to the site was required to facilitate both the scope of this resilience scheme and the future growth plans. This procurement took longer than anticipated due to ground contamination and delays in the previous owner surrendering their installation permit.
- Planning – the planning application for this scheme (full and permitted development) was submitted in December 2022 with a view that it would take 14 weeks to complete. However, complications due to the presence of a protected species under Section 41 of the Natural Environment and Rural Communities (NERC) Act, resulted in planning approval not being granted until April 2024.
- Contractual – there was limited appetite from contractors to take on the work, NWL received no Pre-Qualification Questionnaire (PQQ) responses from their design and construction tender, the scheme was then sent out for construct only tender and received only one PQQ response. Responses were sought as to why contractors did not return PQQ responses, and it was determined to be down to the risk associated with the project.

The reason SBPS will be fully delivered after PEPS is due the fact that the PEPS station work needs to be completed before work can begin on SBPS.

## **3.2 Primary Effluent Pumping Station (PEPS)**

### **3.2.1 Scope**

The successful outcome of the Primary Effluent Pumping Station scheme is to enhance resilience of the pumping station and associated rising main. This included the following aspects:

- Reduce the risk of failure of the GRP rising main.
- Improve the reliability of Variable Speed Drives (VSD's).
- Address pump under-performance and improve reliability.

- Increase the availability of spares.

NWL's plan to improve the resilience of the PEPS is to build a new pumping station and install a new rising main.

The route of this rising main is to be diverted away from Natural gas assets and will be made of ductile iron, which is significantly stronger than GRP, and sized for future flows.

The new mechanical and electrical components will be of modern design and follow NWL's asset standards. This inherent modernity of equipment will increase the reliability of the pumping station and will also ensure that it is easier to acquire and hold spare components.

We have determined that the successful completion of the items listed above will deliver 100% of the scope required.

### 3.2.2 Programme Status

There are 5 key milestones as set out by Ofwat in the *PR19 Final Determination Outcomes Performance Commitments Appendix* document section 1.2.35.

We have determined from evidence presented that NWL have delivered 3 out of 5 of the milestones (Milestones 1,2 and 4), and we are confident that they will deliver Milestone 3 by 31<sup>st</sup> March 2025.

The remaining milestone (Milestone 5) is on track to deliver by October 2026, approximately 18 months behind the date set by Ofwat.

Milestone 1: Permit assessment and option selection has been completed, NWL decided on full refurbishment of this pumping station. As part of our assessment, we reviewed the presentation documentation submitted to us by NWL during the audit in May and therefore confirm completion of Milestone 1.

Milestone 2: Required land was acquired in March 2022 and full planning permission was granted in April 2024, evidence of which was reviewed during our assessment process and included discussions and presentation given during the audit in May as well as review of planning application online (Ref. 22/02241/FUL)

Milestone 3: Full contract has not been awarded yet due to NWL seeking additional cost assurance, but this is planned to be completed by August 2024. In the meantime, an enabling contract is underway to allow speedier delivery once the full contract is awarded. These works include diversion of services, site layout amendments and land clearance, wash-water booster station installation, procurement of high risk early start items. Design and procurement of a retaining wall that is being incorporated into the sites Industrial Emissions Directive (IED) bunding requirements.

Milestone 4: The key project step of 'Detailed Design' was completed in June 2024

Milestone 5: Asset will not be fully completed until October 2026.

### 3.2.3 Risks

The complete scheme will not be delivered by March '25

The reasons for delays to this scheme are the same as those detailed in Section 3.1.3

## **4. Conclusion**

### **4.1 Howdon Wastewater Resilience**

The Howdon wastewater resilience programme is made up of 2 schemes, one to improve resilience at South Bank Pumping Station (SBPS) and one to improve resilience at Primary Effluent Pumping Station (PEPS). Both have outcomes that are measured by adherence to company progress milestones. Both schemes have a delivery date of 31<sup>st</sup> March 2025 as set by Ofwat. Details of our finding at the scheme level are set out in this report.

#### **4.1.1 Scope**

This study has sought to confirm that the scope of the Howdon wastewater resilience enhancement programme is equivalent or greater to the required scope set out in *PR19 Final Determination Outcomes Performance Commitments Appendix*.

Based on our findings, we concur that 100% of the Howdon wastewater resilience programme is assessed to deliver on scope.

#### **4.1.2 Programme Delivery**

This study has sought to confirm that the Howdon wastewater resilience enhancement programme is expected to be completed in timescales set out in *PR19 Final Determination Outcomes Performance Commitments Appendix*.

Our assessment of the evidence provided leads us to conclude that 4 of the 5 Howdon wastewater resilience enhancement programme milestones will be delivered by the 31<sup>st</sup> of March 2025, with the final milestone to be delivered by May 2027.

## 5. Appendix

### 5.1 Ofwat Response to PR19 submission

Process Unit	Funding Category						TOTAL (£m)
	Growth		Maintenance		Resilience		
	Proportion (%)	Value (£m)	Proportion (%)	Value (£m)	Proportion (%)	Value (£m)	
Inlet Works	100	2.93	-		-		2.93
Inlet Odour	85	1.16	15	0.21	-		1.37
South Bank PS	15	0.85	23	1.31	62	3.52	4.83
South Bank Rising Main	100	1.82	-		-		1.82
PEPS	20	1.15	-		80	4.62	5.77
PEPS Rising Main	100	19.33	-		-		19.33
Aeration	100	15.28	-		-		15.28
FST's	100	41.00	-		-		41.00
RAS / SAS	20	1.65			80	6.59	8.24
UV	100	2.51	-		-		2.51
Sludge Thickening	100	0.88					0.88
Misc (Power supplies and hard standing)	100	2.40					2.40
<b>TOTAL</b>		<b>90.96</b>		<b>1.52</b>		<b>14.73</b>	<b>107.21</b>

Figure 2 Excerpt from PR19 Enhancement Business Case document

At Howdon sewage treatment works we accept the need for investment in duplicate assets at the primary effluent and south bank pumping stations at which the company advises there are no feasible management control options for the loss of a critical asset. Loss of these critical assets would result in a category 1 pollution incident. We do not accept the need to invest to duplicate an asset at the activated sludge pumping station to mitigate risk of failure due to fire. The company receives a base allowance for installing and maintaining appropriate fire warning and suppression equipment. We expect the company to use its base allowance to fund such activities and mitigate this risk. In addition, we apply further cost challenges to the investment on the basis of insufficient evidence that a range of options have been considered and that the proposed costs are robust and efficient. In comparison to our draft determination allowance we allow an additional £6.0 million to mitigate risks at Howdon sewage treatment works.

Figure 3 Excerpt from PR24 Final Determination