PR24

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WASTEWATER TREATMENT GROWTH SUPPLEMENTARY

NES26A

1. INTRODUCTION

1. In query OFW-OBQ-NES-083, we explained that we spent much less than we forecast during AMP7 on Howdon WWTW growth. Howdon is our largest STW covering all of Newcastle city, Gateshead and the surrounding area. Due to the impact of COVID the growth in this area slowed, especially due to a drop in occupation of office and commercial premises. There were also drops in trade effluent into the site.

2. In addition to this, we have carried out work to delay the need for growth expenditure at Howdon. We have undertaken five surface water removal projects since 2013 and have delivered a number of flood alleviation schemes which have reduced inflow to Howdon.

3. This work, along with reductions in forecast demand growth, has allowed us to delay the need for growth expenditure - but the site is still projected to exceed the DWF permit consent by 2030. We have begun work in AMP7 to prepare for this, including land purchase, treatment process trials, modelling and initial design work. It is highly likely that we will have new quality and flow permit conditions, but these have not yet been agreed by the EA. They are likely to include a new ammonia consent (the site currently doesn't require an ammonia consent), a total nitrogen consent (the site doesn't have a total nitrogen consent), tightening of BOD, suspended solids, and new validated dose requirements for UV. There will also be a requirement for an increase to FFT, and potentially a significant increase in storm tank size.

4. In our PR19 business plan, we requested £111m which included £90.96m for Howdon – Ofwat did not allow this expenditure as enhancement but assumed that it was included in base expenditure models at PR19 (with Howdon growth being a "lumpy" investment). As we had spent £28.4m in AMP7, we deferred £82.5m of funding into AMP8 that would have otherwise been spent in 2023/24 and 2024/25, and we had not requested this funding again in our business plan as we had accepted that Ofwat would not allow this. We spent most of our allowance for growth that was in base models from PR19 (as set out in the PR24 growth model).

5. Since our business plan, we have grown increasingly concerned that investment to tackle growth at Howdon could be significantly more expensive than we had forecast for AMP7. Our initial costs estimate that this could be as much as £320m, and this is supported by Ofwat's cost models at PR24 which estimate that this could be even higher at £329m. These costs are based on high level estimates rather than the specific permit requirements which are not yet certain, and they are very strongly influenced by requirements for a greatly increased storm tank size (compared to when this was assessed for PR19). This is because the guidance for U-IMP6 in WINEP at PR19 excluded all sites which discharged into a "transitional and coastal" (TraC) waterbody – based on the dilution of the receiving waterbody which meant that there was a low environmental need.

6. However, this guidance has changed, and the storm tank size would need to be increased from its current permit level to the modern formula of 68l/hd. We estimate that this alone would cost around £122m, a significant proportion of the overall scope cost.

7. We have not included this in our plan in response to DD. There is some uncertainty around the scope and costs, which are not yet as well developed as they need to be, and we would like to explore alternative options to storm tanks of this size.

8. However, we ask Ofwat to include this in **the large scheme gated process**. There will need to be a better developed project scope and detailed costs for delivery after further discussions and agreement with the Environment Agency, and this should be possible for the submission date of 3 November 2025. We do not think there is a need for the inclusion of any delivery costs at PR24 before this, as we would expect to carry out the initial preparatory work through base expenditure.

9. In this supplement to our enhancement case, we provide some of the similar information to our original enhancement case NES26 – but for an additional growth enhancement at Howdon. This is not intended as a full enhancement case, as we are not proposing new investment to be included at PR24 FD. However, we provide these details to explain our concerns and why we expect to need to do more work on this.

2. NEED FOR ENHANCEMENT INVESTMENT

10. We explained our approach to forecasting new development in section 2.2 of NES26. We do not repeat this information here.

11. We expected work to be required at Howdon to meet its DWF permit during AMP7 – but as Figure 1 shows, the actual DWF was below the permit level from 2018 to 2022; and below the historic average level despite the increase in resident population. Our trend analysis shows that this investment is likely to be needed in AMP8, but it is not yet certain.

FIGURE 1 - DWF COMPLIANCE TRENDS AT HOWDON

HOWDON PROJECT
DWF COMPLIANCE TRENDS (20102040)

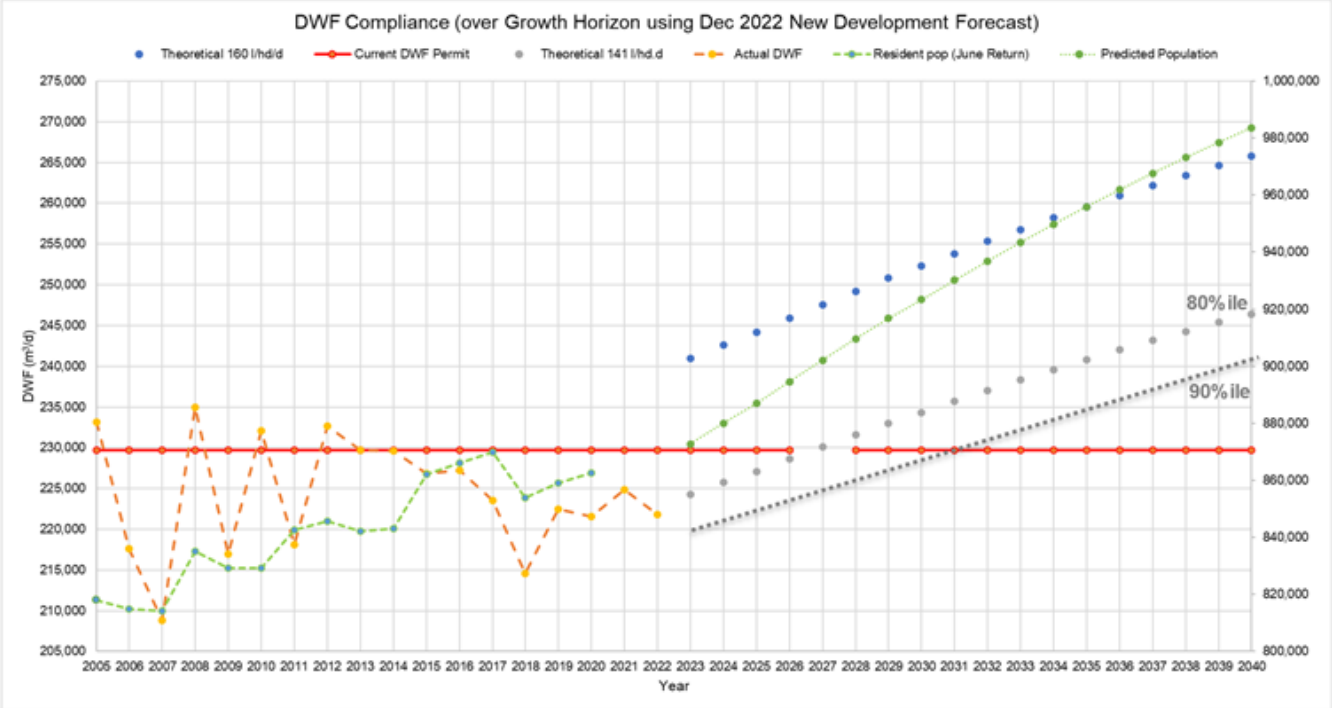

FIGURE 2 - EQUIVALENT ADD19 TABLES FOR HOWDON

Population equivalent served						
2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	After 2029-30
915,532.000	923,194.000	931,778.000	940,145.000	948,918.000	957,584.000	964,352.000

Cost driver 1	Cost driver 2	Cost driver 3	Cost driver 4	Cost driver 5	Cost driver 6	Cost driver 7	Cost driver 8	Cost driver 9	Cost driver 10
Current DWF permit (m3/day)	Expected DWF permit (m3/day)	Current FFT permit (l/s)	Expected FFT permit (l/s)	Historical BOD permit (mg/l)	Expected enhanced BOD permit (mg/l)	Historical ammonia permit (mg/l)	Expected enhanced ammonia permit (mg/l)	Historical suspended solids permit (mg/l)	Expected enhanced suspended solids permit (mg/l)
229,720.000	252,650.243	4,500.000	5,677.000	250.000	212.5	none	25	60.000	51.000

Cost driver 11	Cost driver 12	Cost driver 13	Cost driver 14	Cost driver 15	Cost driver 16	Cost driver 17	Cost driver 18	Cost driver 19
Historical phosphorus permit (mg/l)	Expected enhanced phosphorus permit (mg/l)	Storm tank capacity added (m3)	WINEP quality scheme at site (Y/N)	Type of WINEP quality scheme at site	Process capacity added to meet current quality permits (PE)	Process capacity added to meet expected quality permits (PE)	STW compliant with DWF permit in 2022 (Y/N)	STW compliant with DWF permit under "3-in-5 rule" in 2022 (Y/N)
none	none	60,620.020	N	N/A	0.000	162,523	Y	Y

3. BEST OPTION FOR CUSTOMERS

12. In NES26, we explained our approach to considering a range of applicable interventions.

13. We assessed and implemented a range of options to create capacity at Howdon STW - as shown in Figure 2. This has helped to create capacity in the Network and at Howdon STW to accommodate additional growth flows.

FIGURE 3 - OPTIONS TO CREATE CAPACITY AT HOWDON STW

Project	Description	Date delivered
Killingworth and Longbenton	This scheme removed the Longbenton Letch from the combined sewer network, resulting in a reduction of 685m^3 of surface water entering the network per day.	June 2019
Marden Quarry	A strategic surface water sewer was installed to provide a discharge point directly to the North Sea, enabling the separation of 830m^3 surface water flows per day from Marden Quarry and Briar Vale from the combined sewer network. This project reduced flood risk and diverted surface water from unnecessary treatment at Howdon STW.	August 2016
Heworth Burn	The removal of Heworth Burn from the combined sewer network resulted in the removal of 2,775m^3 surface water per day.	May 2020
Monkton Village	This project was carried out in partnership with South Tyneside Council and reduced flood risk through the removal of surface water from the combined sewer network.	January 2014
Fellgate Estate	This project removed surface water and across ground flow from the combined sewer network at the Fellgate Estate in South Tyneside.	October 2014
Cramlington South West Sector	A feasibility study was completed and recommended that all foul water from this strategic development should be directed to Cramlington STW rather than to Howdon STW. This approach has been implemented as developments are being constructed on site.	October 2018
River Tyne flap valves	A total of 92 flap valves on the River Tyne were assessed, with remedial work being undertaken at 16 sites to prevent the ingress surface water from the estuary.	December 2013
Newburn (North Farm Court)	This project removed an area of 3,116m^2 that was contributing surface water to the combined sewer.	May 2014
Jarrow (Front Street)	This project removed an area of 9,465m^2 that was contributing surface water to the combined sewer.	September 2014
Interceptor flow monitors	Permanent flow monitors were installed on the Tyneside interceptor sewer network to enhance our understanding of flows draining to Howdon STW.	December 2016

14. Although the measures listed above have removed 4,290m3/day of dry weather flow (and a reduction in per capita consumption has driven this further), this has not been enough to prevent a predicted exceedance of DWF in AMP8.

15. We have therefore assessed options to upgrade Howdon to take this additional flow capacity and meet the tightened quality consents. We have undertaken a pre application request with the EA to gain the new quality and flow standards that would be required. However, this pre application has been ongoing since 2019, and is yet to

be finalised. Despite this, we have prepared our best assessment of the requirements, noting that the requirements could change depending on our final DWF application determination.

16. We assessed 3 different treatment technology types:

- IFAS - Integrated Fixed Film Activated Sludge - £326.27M
- MABR – Membrane Aerated Biofilm Reactor - £342.47m
- Novoda – a Mobile Organic Biofilm process - £320.28m

17. We chose Nuvoda as the selected technology because it was the least cost option - but also because it gave the most resilience to potential quality standards that we expect are likely to be imposed by the EA within the medium term. As well as giving greater nitrifying capacity to accommodate a new ammonia limit, the new process could denitrify if required. This also gives greater settlement opportunity which will assist with tightened suspended solids limits for the upgraded UV.

18. As Nuvoda is a new technology to the UK, we are currently trialing this technology as part of the AMP8 NTAL trials, to give us certainty on performance. Once this is complete there is potential to reduce the cost and scope further, by removing or reducing the number of the additional final settlement tanks. This could save up to £8.91m from the cost of the Howdon scheme scope cost.

19. Another area where the scope cost could be reduced is the storm tank cost. Howdon did not qualify for enhancement funding in WINEP for U-IMP6 driver in PR19. This is because the driver guidance at the time excluded all sites which discharged into a Transitional and Coastal (TraC) waterbody, due to the high dilution those sites were excluded based on the low environmental need. Howdon and the Tyne interceptor had previously been designed to Tyneside formula, which is roughly equivalent to 3 times DWF. Therefore, there is a significant gap between the current permitted size of storm storage and the requirement to be at 68l/hd.

20. We have costed our options assuming a requirement to include storm tanks to the modern formula of 68l/hd, but it is still uncertain whether we will need the full amount or whether the EA will agree a different volume requirement for no deterioration on current spill numbers. The individual scope cost for the storm tank is £121.64m which makes up a significant proportion (56.6%) of the overall scope cost for Howdon.

21. We think that there could be some scope to reduce this requirement. We note that our plans for storm overflow storage in the Howdon area are not scheduled until AMP12 in our DWMP, but for example it might be possible to bring some of this forward to reduce the flow into Howdon further or provide alternative storage.

22. In NES26, we described our cost benefit appraisal to select the preferred option. When we apply this to Howdon, we show that Nuvoda would be the preferred option if the DWF exceeds, and the site needs to be upgraded. This will be reviewed yearly.

23. We do not at this time have the carbon values for Howdon upgrade, and we will develop these as part of preparing for the gated process. The spend profile for this project will also be confirmed when we have more certainty on the year and AMP that Howdon will exceed its DWF permit.

24. We expect to incorporate some of the upgrades required into our current resilience work, including the Primary effluent and south bank pumping station refurbishments, and associated rising mains. This will not meet the likely requirements for DWF growth in full (for example, storage) but will help prepare for this efficiently.

4. COST EFFICIENCY

25. We provided our cost benchmarking in NES26, and this showed we are 12% more efficient overall than our competitors. Ofwat's model showed that we are broadly efficient on growth costs.

26. For Howdon, our comparison shows that we would be 3% more cost efficient than the Ofwat DD modelled value of £328.82m. We understand that the growth model was not intended to model the costs of growth at very large sewage treatment works, and so we do not rely on this – we will do further work on this once the full results and need are known.

27. We expect to develop full costs, including carbon costs and the valuation of benefits, before we can confirm our final costs for tackling growth at Howdon. This also relies on the final outcomes from discussions about scope and analysis of when this investment is needed. We will include cost benchmarking and independent cost assurance as part of our submission for the gated process.

28. We do not ask for any allowance at PR24 FD for this further work.

5. MINOR AMENDMENTS TO GROWTH CASE

29. In ADD19, we have updated the population equivalent numbers based on the latest forecast. We have also amended an error within the capex values where the value for Aldin Grange and Brasside STWs were switched by mistake. We have amended ADD19 to correct this error. The error does not affect the overall cost for the enhancement case.