Our PR24 Enhancement Strategies

PR24 Draft Determination Representations – August 2024

Part 2: Work with others to achieve significant improvements in ecological quality of catchments

PR24 Enhancement Strategies Part 2: Working with others to achieve significant improvements in ecological quality of catchments

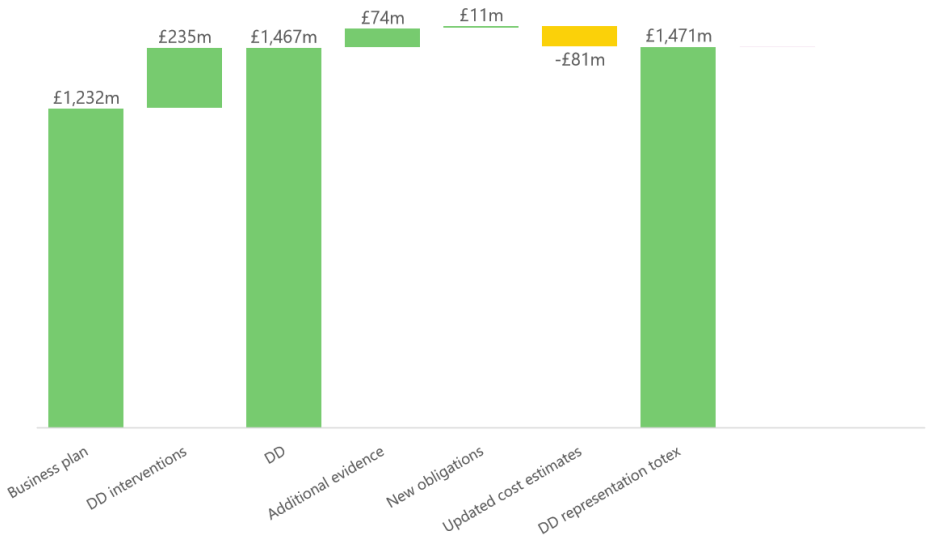
Working with others to achieve significant improvements in ecological quality of catchments

1 Overview

This document sets out our representations on the enhancement investments that we propose to make to help us achieve the ambitions set out in our Strategic Direction Statement. This specific section sets out investment to Work with others to achieve significant improvementsin ecological quality of catchments. It follows on from our 'Ecological Improvement' (ANH27) enhancement strategies published alongside our original PR24 business plan. For each enhancement strategy we set out:

- **Investment summary** - In this section we summarise our requested totex for each enhancement strategy and highlight where these costs are reported in our updated data tables. We set out how our requested totex compares with our original plan (as at March 2024) and Ofwat's Draft Determination allowance
- **Context** - In this section, we summarise the investments that were included in our enhancement strategy in our business plan submission, and how this was assessed by Ofwat in its Draft Determination.
- **Our Representations** - This section contains our Representations on Ofwat's Draft Determination. Here, we set out whether our Representations align with Ofwat's Draft Determination; or whether we are providing further evidence or presenting new information such as updated cost data, evidence of need or wider drivers such as new obligations.

Figure 1 Adjustments to our investments rom business plan to DD Representations



2 Advanced WINEP

2.1 Investment Summary

	March 24 Business Plan (£m)	DD Ofwat position (£m)	Representation (£m)
Capex	19.8		19.8
Opex	6.5		6.5
Totex	26.3	24.0	26.3

In our updated data tables, these costs are reported against lines CWW3.127-CWW3.129 (Advanced WINEP (not covered elsewhere) and associated CWW12 and CWW17 lines.

2.2 Context

Our Advanced WINEP investment aims to demonstrate an approach to maximise value by going even further for the environment through partnership working (including leveraging significant partnership funding), focus on the use of nature-based solutions, implementing solutions to water management challenges at scale, and improved multi-stakeholder governance.

The details of the investment as presented in our business plan (ANH27) and query ANH227 remain correct.

2.2.1 Ofwat's DD approach

This investment was assessed through a deep dive. Ofwat did not propose a cost challenge in this area, stating there is relative confidence that the expenditure addresses the need, is the best option for customers and is efficient.
The investment was subject to the WINEP capping adjustment applied after the assessment process. This resulted in an allowance of £24m.

2.3 Our Representations

We welcome Ofwat's support for our Advanced WINEP proposal and support the deep dive assessment undertaken. We consider that the WINEP capping adjustment should be updated to reflect the revised costs and evidence of our WINEP programme, and allow the efficient costs for this programme as assessed in the deep-dive.

We have kept our view of totex unchanged from our business plan at £26.2m. This reflects our view of the appropriate efficient costs of this investment and reflects the efficient view of costs as assessed by Ofwat's A-WINEP deep-dive.

3 Nutrient removal and sanitary parameters

3.1 Investment summary

	March 24 Business Plan (£m)	DD Ofwat position (£m)	Representation (£m)
Capex	689.5		1,029.3
Opex	38.2		24.6
Totex	727.8	1,030.6	1,054.0

In our updated data tables, these costs are reported against lines:

- CWW3.55-CWW3.57 (Treatment for total nitrogen removal (chemical) (WINEP/NEP)) and associated CWW12 and CWW17 lines
- CWW3.64-CWW3.66 (Treatment for phosphorus removal (chemical) (WINEP/NEP)) and associated CWW12 and CWW17 lines
- CWW3.70-CWW3.72 (Treatment for nutrients (N or P) and / or sanitary determinands, nature based solution (WINEP/NEP)) and associated CWW12 and CWW17 lines
- CWW3.73-CWW3.75 (Treatment for tightening of sanitary parameters (WINEP/NEP)) and associated CWW12 and CWW17 lines

3.2 Context

This enhancement strategy covered a major programme of investments to improve the environment by removing nutrients such as phosphorous and nitrogen, and through the tightening of sanitary determinands such as ammonia Our nutrient programme is set to be the most ambitious in our history, aligned with Government statutory targets for phosphorus loading reduction and restoring our water bodies to good ecological status.

We partnered with Oxera and the COCE Alliance to benchmark the phosphorus removal and WINEP nutrient neutrality schemes within this investment.

3.2.1 Ofwat's DD approach

The components of this investment strategy were assessed as set out below:

Table 1 Ofwat's DD assessment

Investment area	Draft Determination assessment method	Comment
Treatment for phosphorus removal	Modelled	Ofwat determined allowances through a model (which used estimated regression coefficients and cost driver data). Five of our sites were assessed through deep dive assessment as outliers; all five sites received the requested allowance. The investment was subject to the WINEP capping adjustment applied after the assessment process. Due to the assessed efficiency of our costs, our final allowance was set above our requested allowance, at a final allowance of £923.4m.
Treatment for nitrogen removal	Deep dive	Our full requested allowance of £67.62m was permitted through the deep dive assessment. The investment was subject to the WINEP capping adjustment applied after the assessment process.
Treatment for nutrients (N/P) and/or sanitary determinands, nature based solutions	Deep dive	£20.95 was rejected prior to deep dive, as Ofwat stated this was funded within the PR19 WINEP uncertainty mechanism. We received a cost challenge on this investment. Ofwat raised minor concerns on whether the investment is the best option for customers, requesting additional evidence to demonstrate the chosen options are the most cost beneficial against alternatives On cost benchmarking, Ofwat request additional supporting evidence for the costing methodology and third-party benchmarking for wetlands

Investment area	Draft Determination assessment method	Comment
Treatment for tightening of sanitary parameters	Modelled	Ofwat determined allowances through a model (which used estimated regression coefficients and cost driver data). Due to the assessed efficiency of our costs, our final allowance was set above the requested allowance, at a final allowance of £26.69m.The investment was subject to the WINEP capping adjustment applied after the assessment process.

3.3 Our Representations

3.3.1 Phosphorus removal

Our business plan proposals for our phosphorus removal programme was developed using the most accurate available bottom-up and top-down benchmarks.

We applied our cost efficiency 'double-lock' to this investment strategy during the development of our business plan to ensure that the costs we presented were efficient, or to challenge our costs where not. We combined the costs developed from our scheme outturn costs and internal cost models from our AMP7 nutrient removal programme, with external cost benchmarking from TR61 as well as Ofwat's PR19 cost models for Phosphorus removal. Using two PR19 Final Determination P removal models as a top-down benchmark, we were able to benchmark our costs which were found to be 12% efficient.

In addition, we sought assurance on efficiency of costs for costs components such as tertiary Pile Cloth Media Filtration, ferric dosing, and pumping stations, by benchmarking the parametric model built by WRC's TR61. These assets cover 86% of the total direct asset costs of the P-removal programme. This benchmarking exercise showed that our cost estimations are in line with the TR61 industrybenchmark, providing assurance that these costs are efficient.

Ofwat's PR24 cost model provides a significant additional external benchmark to support our double-lock approach. This model provides a strong like-for-like benchmark for our costs against all other WaSCs which was not available to us when developing our PR24 costs. This model suggests that the industry benchmark for the scope of our P removal enhancement is around £32m more than the costs we included in our business plan. As part of our double-lock approach, we aim to continuously utilise the most recent available benchmarks in our proposed costs, have built Ofwat's PR24 cost model into our view of the required costs.

As outlined in the letter to Ofwat titled 'PR24 Business Plan update - Nutrient removal and sanitary parameters - Phosphorus removal' (dated 15th May 2024), we outlined that as a result of our learning from the delivery of our PR24 transition programme for accelerated phosphorus removal at some of our sites, new information which impacts our cost estimation has emerged since October business plan. A combination of changes resulting from this (including further learning on the inefficiency of pile clothe filters for meeting the required standards at some sites) have a material impact on the scope of activity required to deliver the suite of AMP8 P-removal obligations in our Business Plan. We estimate the additional cost of this investment scope currently not reflected in our pre-DD PR24 Plan to be in the region of £120m capex.

To reflect the latest of the available benchmarks and our matured view on the costs on achieving the required standards, we are adjusting our Phosphorus removal enhancement investment requirement to align with Ofwat's P removal enhancement cost model. Ofwat's modelling gives an allowance of £923.4m. Based on this latest view of industry top-down benchmarking, we consider that the Ofwat permitted allowance provides a reasonable allowance which balances the view of external cost benchmarks and our bottom-up cost build up. Therefore, we update our requested totex for P removal to align with Ofwat's allowance.

3.3.2 Nitrogen Removal

We welcome Ofwat's assessment of our Nitrogen removal costs, and its assessment of the need, optioneering and cost efficiency of our N-removal investments.

We have received confirmation from the EA that the obligation at Ludham is no longer required. Therefore as part of our Draft Determination representations, we remove £3m of costs from our requested allowance for nitrogen removal to reflect this change.

Aside from the £3m reduction, we update our business plan position, with an updated requested totex of £64m. This reflects our view of the appropriate efficient costs of this investment and reflects the efficient view of costs as assessed by Ofwat's Nitrogen removal deep-dive.

We request that the scale of the WINEP adjustment is reduced to reflect the revised costs and evidence in other areas of our WINEP enhancement programme.

3.3.3 Nature based solutions:

We outlined below our Representations relating to Ofwat's removal of 12 deferred schemes through the assessment process, as well as provide further information relating to our optioneering process as requested by Ofwat.

Removal of 12 deferred schemes

Ofwat state within 'PR24-DD-WW-Nutrients-or-sanitary-dets-NbS' that 12 schemes have been removed from modelling and allowance as they were included in PR19 and the EA confirm no new requirement for PR24. We set out in our business plan (ANH27 page 30), that these schemes were phased from AMP7 into early AMP8 as a measure to address affordability at PR19, as well as to enable additional time for landowner negotiation and design solution. The deferral of these schemes was agreed with the EA; and these changes were reflected before the submission of our PR19 business plan submission.

Whilst the costs of these schemes were not requested in our PR19 business plan, we note that these schemes were included in Ofwat's PR19 P-removal cost model, with £6.1m being allowed for these schemes through the WINEP AMP7 carryover allowance [1]. We have therefore reduced our requested allowance to reflect this PR19 allowance. We retain the outstanding amount in our plan, as the expected costs of these schemes exceeds this PR19 allowance, which was set using a P-removal model which has been replaced with an updated P-removal model at PR24 that uses much more granular data on costs than was available at PR19 and a deep-dive approach for nature based schemes. We request Ofwat sets an allowance for these 12 schemes using its PR24 approach, netting off the £6.1m which has already been allowed for these schemes through the AMP7 WINEP carry-over.

Best option for customers

Ofwat requested further detail regarding evidence demonstrating our options are cost efficient in comparison to alternative solutions. We provide this information below.

As outlined in our business plan, in line with the preference of our customers and regulators to implement more nature-based solutions, where feasible and cost beneficial we've taken a 'green solution first' approach to developing options for P and N removal. Below, we provide a summary of the cost-benefit analysis conducted for the preferred option and alternative option at each site. For these sites, the nature-based solution was selected as it was identified as creating greater long-term value for customers than the alternative traditional solution.

Table 2 Cost-benefit analysis summary - Great Casterton

Investment Title	Great Casterton WRC WFD_IMP P > 1mg/l					
Investment Code	I038945					
Option	Capex	Whole Life Cost	Equivalent Annualised Benefit	Risk Index	Equivalent Annualised Value	Explanation
Preferred option - Great Casterton WRC Treatment Wetland	2,145,750.36	2,354,971.64	306,040.75	4.45	182,677.24	AW Strategy to select NBS where appropriate with this site meeting the EA guidelines parameters of less than 1000 p.e and 1mg/l P limit or more. AMP9 Delivery
Alternative solution - Great Casterton WRC New dosing plant and ancillaries	1,380,643.17	1,678,909.51	180,647.91	5.43	92,699.08	

1 in 2022/23 price base

Table 3 Cost-benefit analysis summary - Hail Weston

Investment Title	Hail Weston WRC WFD_IMP P > 1mg/l					
Investment Code	I038949					
Option	Capex	Whole Life Cost	Equivalent Annualised Benefit	Risk Index	Equivalent Annualised Value	Explanation
Preferred option - Hail Weston WRC Treatment Wetland	2,985,735.92	3,704,701.84	410,333.46	6.62	216,265.03	AW Strategy to select NBS where appropriate with this site meeting the EA guidelines parameters of less than 1000 p.e and 1mg/l P limit or more.
Alternative solution - Hail Weston WRC New dosing plant and ancillaries	1,388,784.50	2,067,926.17	164,473.26	9.97	56,145.98	

Table 4 Cost-benefit analysis summary - Morcott

Investment Title	Morcott WRC WFD_IMP P > 1mg/l					
Investment Code	I038950					
Option	Capex	Whole Life Cost	Equivalent Annualised Benefit	Risk Index	Equivalent Annualised Value	Explanation
Preferred option - Morcott WRC Treatment Wetland	1,831,460.57	2,576,519.53	281,950.66	8.25	146,981.06	AW Strategy to select NBS where appropriate with this site meeting the EA guidelines parameters of less than 1000 p.e and 1mg/l P limit or more.
Alternative solution - Morcott WRC New dosing plant and ancillaries	1,318,454.05	1,908,991.18	189,072.96	8.95	89,071.41	

Table 5 Cost-benefit analysis summary - Shouldham

Investment Title	Shouldham WRC WFD_ND Growth P > 1mg/l					
Investment Code	I038962					
Option	Capex	Whole Life Cost	Equivalent Annualised Benefit	Risk Index	Equivalent Annualised Value	Explanation
Preferred option - Shouldham WRC Treatment Wetland	2,390,600.32	2,988,769.55	339,944.98	6.32	183,380.21	AW Strategy to select NBS where appropriate with this site meeting the EA guidelines

Investment Title	Shouldham WRC WFD_ND Growth P > 1mg/l					
Investment Code	I038962					
Option	Capex	Whole Life Cost	Equivalent Annualised Benefit	Risk Index	Equivalent Annualised Value	Explanation
						parameters of less than 1000 p.e and 1mg/l P limit or more.
Alternative solution - Shouldham WRC New dosing plant and ancillaries	981,598.71	1,436,197.68	148,242.60	7.14	73,008.11	Site is an RBC works and not conducive to traditional P removal. Therefore Works would require an upgrade to facilitate Iron dosing.

Table 6 Cost-benefit analysis summary - Stibbard

Investment Title	Stibbard WRC HD_IMP P >1mg/l					
Investment Code	I040380					
Option	Capex	Whole Life Cost	Equivalent Annualised Benefit	Risk Index	Equivalent Annualised Value	Explanation
Preferred option - Stibbard WRC Treatment Wetland	1,619,437.96	2,179,466.02	234,827.61	6.91	120,657.55	AW Strategy to select NBS where appropriate with this site meeting the EA guidelines parameters of less than 1000 p.e and 1mg/l P limit or more.
Alternative solution - Stibbard WRC New dosing plant and ancillaries	1,728,355.87	2,431,049.60	195,310.09	9.82	67,960.79	Site is an RBC works <250 p.e and not conducive to traditional P removal. Therefore Works would require an upgrade to facilitate Iron dosing.

Table 7 Cost-benefit analysis summary - Grasby

Investment Title	Grasby WRC EnvAct_Imp1 P 1mg/l					
Investment Code	I040629					
Option	Capex	Whole Life Cost	Equivalent Annualised Benefit	Risk Index	Equivalent Annualised Value	Explanation
Preferred option - Grasby WRC Treatment Wetland	2,122,197.95	2,689,103.58	233,201.67	8.29	92,334.62	AW Strategy to select NBS where appropriate with this site meeting the EA guidelines parameters of less

Investment Title	Grasby WRC EnvAct_Imp1 P 1mg/l					
Investment Code	I040629					
Option	Capex	Whole Life Cost	Equivalent Annualised Benefit	Risk Index	Equivalent Annualised Value	Explanation
						than 1000 p.e and 1mg/l P limit or more.
Alternative solution - Grasby WRC New dosing plant and ancillaries	785,161.45	1,080,049.80	148,940.37	5.35	92,362.50	

Table 8 Cost-benefit analysis summary - Preston Capes

Investment Title	Preston Capes WRC WFD_IMP MOD P 1mg/l					
Investment Code	I040701					
Option	Capex	Whole Life Cost	Equivalent Annualised Benefit	Risk Index	Equivalent Annualised Value	Explanation
Preferred option - Preston Capes WRC Treatment Wetland	1,578,484.49	2,212,707.26	428,555.92	4.07	312,644.45	AW Strategy to select NBS where appropriate with this site meeting the EA guidelines parameters of less than 1000 p.e and 1mg/l P limit or more.
Alternative solution - Preston Capes WRC New dosing plant and ancillaries	1,980,122.09	2,851,649.66	247,575.35	9.04	98,193.12	Site is an RBC works <250p.e and not conducive to traditional P removal. Therefore Works would require an upgrade to facilitate Iron dosing.

Table 9 Cost-benefit analysis summary - Good Easter

Investment Title	Good Easter WRC WFD_IMP P 3mg/l					
Investment Code	I041736					
Option	Capex	Whole Life Cost	Equivalent Annualised Benefit	Risk Index	Equivalent Annualised Value	Explanation
Preferred option - Good Easter WRC Treatment Wetland	1,656,248.71	2,221,165.76	484,093.93	3.42	367,739.43	AW Strategy to select NBS where appropriate with this site meeting the EA guidelines parameters of less than 1000 p.e and 1mg/l P limit or more.

Investment Title	Good Easter WRC WFD_IMP P 3mg/l					
Investment Code	I041736					
Option	Capex	Whole Life Cost	Equivalent Annualised Benefit	Risk Index	Equivalent Annualised Value	Explanation
Alternative solution - Good Easter WRC New dosing plant and ancillaries	1,943,406.51	2,419,673.44	347,497.51	4.43	220,744.13	Site is an Oxyjet Process works circa 250 p.e and not conducive to traditional P removal. Therefore Works would require an upgrade to facilitate Iron dosing.

Table 10 Cost-benefit analysis summary - Arrington

Investment Title	Arrington WRC WFD_IMP P 1.5mg/l					
Investment Code	I041757					
Option	Capex	Whole Life Cost	Equivalent Annualised Benefit	Risk Index	Equivalent Annualised Value	Explanation
Preferred option - ArringtonWRC Treatment Wetland	2,114,098.94	2,734,446.69	479,552.36	4.22	336,310.05	AW Strategy to select NBS where appropriate with this site meeting the EA guidelines parameters of less than 1000 p.e and 1mg/l P limit or more.
Alternative solution - Arrington WRC New dosing plant and ancillaries	1,279,349.69	1,553,308.81	249,721.37	3.64	168,352.07	

Table 11 Cost-benefit analysis summary - Broxted

Investment Title	Broxsted WRC WFD_IMP P 1 mg/l					
Investment Code	I041755					
Option	Capex	Whole Life Cost	Equivalent Annualised Benefit	Risk Index	Equivalent Annualised Value	Explanation
Preferred option - Broxsted WRC Treatment Wetland	1,454,507.29	1,999,386.17	462,565.89	3.23	357,829.14	AW Strategy to select NBS where appropriate with this site meeting the EA guidelines parameters of less than 1000 p.e and 1mg/l P limit or more.

Investment Title	Broxsted WRC WFD_IMP P 1 mg/l					
Investment Code	I041755					
Option	Capex	Whole Life Cost	Equivalent Annualised Benefit	Risk Index	Equivalent Annualised Value	Explanation
Alternative solution - Broxsted WRC New dosing plant and ancillaries	3,828,041.73	4,796,050.86	307,318.32	8.87	56,079.61	Site is a Descriptive works and requires a major upgrade to facilitate Iron dosing and meet Sanitary parameters

Table 12 Cost-benefit analysis summary - Shudy Camps

Investment Title	Shudy Camps WRC AMP8 Phased build Wetland for P					
Investment Code	I040829					
Option	Capex	Whole Life Cost	Equivalent Annualised Benefit	Risk Index	Equivalent Annualised Value	Explanation
Preferred option - Shudy Camps WRC Treatment Wetland	2,246,411.40	3,299,658.46	445,593.32	6.33	272,742.66	

Table 13 Cost-benefit analysis summary - West by Welland

Investment Title	West by Welland WFD _IMP P 2.5mg/l					
Investment Code	I041718					
Option	Capex	Whole Life Cost	Equivalent Annualised Benefit	Risk Index	Equivalent Annualised Value	Explanation
Preferred option - West by Welland WRC Treatment Wetland	2,369,680.44	3,012,714.02	512,671.12	4.33	354,851.99	AW Strategy to select NBS where appropriate with this site meeting the EA guidelines parameters of less than 1000 p.e and 1mg/l P limit or more.
Alternative solution - West by Welland WRC New dosing plant and ancillaries	1,401,324.64	1,690,825.92	278,141.01	3.55	189,567.94	

Table 14 Cost-benefit analysis summary - Manthorpe

Investment Title	Manthorpe WRC WFD_IMP P 1,5mg/l					
Investment Code	I041732					
Option	Capex	Whole Life Cost	Equivalent Annualised Benefit	Risk Index	Equivalent Annualised Value	Explanation
Preferred option - Manthorpe WRC Treatment Wetland	2,965,484.72	3,833,211.05	421,578.45	7.07	542,169.03	AW Strategy to select NBS where appropriate with this site meeting the EA guidelines parameters of less than 1000 p.e and 1mg/l P limit or more.
Alternative solution - Manthorpe WRC New dosing plant and ancillaries	812,363.11	1,191,113.39	193,156.43	4.96	130,760.55	

Table 15 Cost-benefit analysis summary - Tugby

Investment Title	Tugby WRC WFD_IMP P > 1mg/l					
Investment Code	I038951					
Option	Capex	Whole Life Cost	Equivalent Annualised Benefit	Risk Index	Equivalent Annualised Value	Explanation
Preferred option - Tugby WRC Treatment Wetland	1,662,240.34	1,895,126.67	218,738.00	5.04	119,463.02	AW Strategy to select NBS where appropriate with this site meeting the EA guidelines parameters of less than 1000 p.e and 1mg/l P limit or more. AMP9 Delivery
Alternative solution - Tugby WRC New dosing plant and ancillaries	1,286,549.16	1,558,293.17	147,268.67	6.18	65,638.27	

Table 16 Cost-benefit analysis summary - Northrepps

Investment Title	Northrepps WRC WFD_ND Growth P > 1mg/l					
Investment Code	I038955					
Option	Capex	Whole Life Cost	Equivalent Annualised Benefit	Risk Index	Equivalent Annualised Value	Explanation
Preferred option - Northrepps WRC Treatment Wetland	2,995,960.02	3,154,820.91	314,922.18	5.73	149,659.29	AW Strategy to select NBS where appropriate with this site meeting the EA guidelines parameters of less than 1000 p.e and 1mg/l P limit or more. AMP9 Delivery
Alternative solution - Northrepps WRC New dosing plant and ancillaries	875,866.49	1,038,539.09	119,173.07	5.15	64,769.73	

Table 17 Cost-benefit analysis summary - Earl Soham

Investment Title	Earl Soham WRC WFD_ND Growth P > 1mg/l					
Investment Code	I038956					
Option	Capex	Whole Life Cost	Equivalent Annualised Benefit	Risk Index	Equivalent Annualised Value	Explanation
Preferred option - Earl Soham WRC Treatment Wetland	1,888,291.89	2,104,504.14	212,023.62	5.74	101,780.61	AW Strategy to select NBS where appropriate with this site meeting the EA guidelines parameters of less than 1000 p.e and 1mg/l P limit or more. AMP9 Delivery
Alternative solution - Earl Soham WRC New dosing plant and ancillaries	765,053.75	918,308.92	120,105.80	4.54	72,000.65	

Table 18 Cost-benefit analysis summary - Sandon

Investment Title	Sandon WRC WFD_ND Growth P > 1mg/l					
Investment Code	I038959					
Option	Capex	Whole Life Cost	Equivalent Annualised Benefit	Risk Index	Equivalent Annualised Value	Explanation
Preferred option - Sandon WRC Treatment Wetland	1,865,496.17	2,086,989.34	210,903.89	5.75	101,578.38	AW Strategy to select NBS where appropriate with this site meeting the EA guidelines parameters of less than 1000 p.e and 1mg/l P limit or more. AMP9 Delivery
Alternative solution - Sandon WRC New dosing plant and ancillaries	1,974,295.56	2,833,806.74	150,902.12	14.74	2,454.58	

Table 19 Cost-benefit analysis summary - Fincham

Investment Title	Fincham WRC WFD_ND Growth P > 1mg/l					
Investment Code	I038960					
Option	Capex	Whole Life Cost	Equivalent Annualised Benefit	Risk Index	Equivalent Annualised Value	Explanation
Preferred option - Fincham WRC Treatment Wetland	2,173,696.74	2,379,561.22	241,876.38	5.69	117,224.77	AW Strategy to select NBS where appropriate with this site meeting the EA guidelines parameters of less than 1000 p.e and 1mg/l P limit or more. AMP9 Delivery
Alternative solution - Fincham WRC New dosing plant and ancillaries	1,436,922.72	1,758,175.51	116,302.36	8.84	24,201.22	

Table 20 Cost-benefit analysis summary - Barton Bendish

Investment Title	Barton Bendish WRC WFD_ND Growth P > 1mg/l					
Investment Code	I038961					
Option	Capex	Whole Life Cost	Equivalent Annualised Benefit	Risk Index	Equivalent Annualised Value	Explanation
Preferred option - Barton Bendish WRC Treatment Wetland	2,145,092.55	2,351,892.04	242,007.74	5.62	118,805.56	AW Strategy to select NBS where appropriate with this site meeting the EA guidelines parameters of less than 1000 p.e and 1mg/l P limit or more. AMP9 Delivery
Alternative solution - Barton Bendish WRC New dosing plant and ancillaries	1,242,862.58	1,535,553.74	116,940.58	7.72	36,501.37	

Table 21 Cost-benefit analysis summary - Benefield

Investment Title	Benefield WRC WFD_ND Growth P > 1mg/l					
Investment Code	I038963					
Option	Capex	Whole Life Cost	Equivalent Annualised Benefit	Risk Index	Equivalent Annualised Value	Explanation
Preferred option - Benefield WRC Treatment Wetland	1,995,927.82	2,208,180.55	190,456.93	6.70	329,481.11	AW Strategy to select NBS where appropriate with this site meeting the EA guidelines parameters of less than 1000 p.e and 1mg/l P limit or more. AMP9 Delivery
Alternative solution - Benefield WRC New dosing plant and ancillaries	1,304,923.08	1,915,746.41	157,837.88	9.62	57,482.47	

Table 22 Cost-benefit analysis summary - Gipsey Bridge

Investment Title	Gipsey Bridge WRC WFD_ND Growth P > 1mg/l					
Investment Code	I038968					
Option	Capex	Whole Life Cost	Equivalent Annualised Benefit	Risk Index	Equivalent Annualised Value	Explanation
Preferred option - Gipsey Bridge WRC Treatment Wetland	2,348,407.92	2,540,197.23	636,940.55	2.29	503,873.60	AW Strategy to select NBS where appropriate with this site meeting the EA guidelines parameters of less than 1000 p.e and 1mg/l P limit or more. AMP9 Delivery
Alternative solution - Gipsey Bridge WRC New dosing plant and ancillaries	2,068,412.39	2,370,629.38	111,215.16	12.32	-12,969.06	

Table 23 Cost-benefit analysis summary - Westbury

Investment Title	Westbury WRC WFD_IMP P > 1mg/l					
Investment Code	I038952					
Option	Capex	Whole Life Cost	Equivalent Annualised Benefit	Risk Index	Equivalent Annualised Value	Explanation
Preferred option - Westbury WRC Treatment Wetland	3,111,035.99	3,846,420.60	1,014,665.94	2.78	813,173.69	AW Strategy to select NBS where appropriate with this site meeting the EA guidelines parameters of less than 1000 p.e and 1mg/l P limit or more.
Alternative solution - Westbury WRC New dosing plant and ancillaries	1,440,146.80	2,139,060.84	794,381.16	2.13	682,327.54	

Cost efficiency

Ofwat requested further detail on our cost methodology, we provide this information below.

Currently there is limited cost outturn information related to nature based solutions. In partnership with Norfolk River Trust, we created our first wetland in 2018 at Ingoldisthorpe. This was a combined solution with ferric dosing and further nitrifying sand filters at the WRC and the wetland. Ingoldisthorpe WRC had been identified by the EA under a 'no deterioration' driver and required additional measures to address the tightening of ammonia and phosphorus levels in order to sufficiently treat all required flow, meet discharge consents and maintain the quality of receiving water bodies. Norfolk River Trust developed the specification, design, led landowner discussions, constructed and commissioned the wetland area in its entirety. We provided a financial contribution towards the wetland project of £0.502m. However, this does not representthe full cost of the wetland project. The full cost breakdown for the entire wetlandproject has not been provided by the Norfolk River Trust. Therefore, this number cannot be used tocalculate a unit rate. Currently the outturn costs of our AMP7 feasibility studies are unavailable due to difficulties we have encountered related to land acquisition and planning approval.

For PR24, we applied our bottom-up and top-down cost efficiency 'double-lock' approach to ensure the efficiency of the schemes in our plan. We estimated the PR24 cost for the wetland component of the project, based on the unit prices and supplier quotes. We also benchmarked our wetland project unitcost rate to WRc's TR61 model. Where the most update data available is for the construction of reedbeds with a range of £90-300/m2 (2021 prices), compared to our unit cost of £75/m2. The below table is an extract taken from nature- based solutions technology costs and case studies

Table 24 Technology manufacturers and costs

Nature based solution	To solve...	Funding Source	main manufacturers	Lifetime	Costs (a)	Cost year
Reedbeds	Improve water quality (3)	Government grant funded by Rural payments agency, Natural England	Numerous manufacturers approved by the construction wetland association (e.g. ARM reed beds) (4)	Horizontal reed bed: 5-15 years Vertical reed bed: 25 years (5)	£90-£300/M²(6) capex £15,950; opex £2,512/year (7) capex £3000-£7000; opex £100/year (8)	2021

We welcome Ofwat's clarification of its expectations for third party assurance of costs in response to our query OFW-IBQ-ANH-025. Following this query response, we have sought additional third party assurance on targeted enhancement investments that meet Ofwat's expectations. We will provide the outputs of this assurance separately following the submission of our Draft Determination Representations.

3.3.4 Sanitary parameters

We have considered Ofwat's Draft Determination allowance for sanitary parameters alongside the evidence we used to develop our costs.

Ofwat's PR24 cost model provides a significant additional external benchmark to support our double-lock approach. This model utilises site-based granular detail of costs and cost drivers from all WaSCs. It thereby provides a strong like-for-like benchmark for our costs which was not available to us ahead of the Draft Determination. This model suggests that the industry benchmark for the scope of our Sanitary Parameters enhancement is £24.4m, circa £13.5m more than the costs we included in our business plan.

Along with other parts of our plan, we have used our double-lock approach to make use of both our own and external cost benchmarks to inform the efficient costs to include in our enhancement plan. Our external cost intelligence, most notably the additional industry cost data and Ofwat's DD cost model suggests that our requested allowance could be insufficient for the level of investment required for the treatment of sanitary parameters at our sites.

As a result we align with Ofwat's enhancement cost model, which we consider provides a reasonable allowance and balances the view of external cost benchmarks and our bottom-up cost build up. We have therefore updated our requested totex for Sanitary Parameters to £24.4m.

4 Chemicals removal and investigations

4.1 Investment Summary

	March 24 Business Plan (£m)	DD Ofwat position (£m)	Representation (£m)
Capex	66.6		68.3
Opex	0.8		0.6
Totex	67.4	41.2	69.0

In our updated data tables, these costs are reported against lines:

- CWW3.49-CWW3.51 (Treatment for chemical removal (WINEP/NEP)) and associated CWW12 and CWW17 lines
- CWW3.52-CWW3.54 (Chemicals and emerging contaminants monitoring, investigations, options appraisals) and associated CWW12 and CWW17 lines

4.2 Context

Our PR24 enhancement plan for chemicals removal and investigations reflected the statutory WINEP investments to improve our understanding of the risk that emerging chemicals may present and inform subsequent interventions to protect the environment. Following investigations between 2015-2023, there is a new statutory requirement to meet chemical limits for cypermethrin at designated sites. Our PR24 plan includes investments to improve river water quality by monitoring, investigating and delivering treatment to remove cypermethrin and other chemicals from water.

Our plan included £43.5m for chemical removal investments, and £23.9m for chemicals and emerging contaminants monitoring, investigations, options appraisals.

4.2.1 Ofwat's DD approach

In its Draft Determination for chemicals removal, Ofwat separated the assessment of costs for treatment and non-treatment solutions. For treatment solutions, Ofwat use a linear regression using PE cost driver data from all sites with a treatment solution at a company level (excluding Thames). The regression and the modelled allowance do not use the number of sites as a cost driver. For non-treatment solutions, allowances were determined through a shallow dive assessment.

We received a modelled allowance of £28.176m for treatment schemes, and a shallow dive allowance of £0.21m for non-treatment schemes.

For chemicals investigations, our costs were assessed by Ofwat through a deep dive assessment. The proposed investment passed the enhancement assessment criteria for need and best options for customers. On cost efficiency, Ofwat raised concerns about the lack of sufficient detail to justify the large cost of the Transitional and Coastal Water (TRaC) models which makes up most of the requested allowance. The models will be delivered for average cost of £6.77m, while Ofwat benchmarking shows TRaC models at an average cost of £1.67m each. Ofwat also ask for evidence of external assurance for the cost estimation process for this investment.

Ofwat applied a 30% adjustment on the requested allowance reducing the allowance to £16.74m.

4.3 Our Representations

4.3.1 Chemical removal

Currently, the linear regression used to determine the modelled allowance for treatment schemes only uses population equivalent (p.e.) as a cost driver. As this regression does not capture the number of sites we have a statutory obligation to make improvements at, it excludes a key cost driver for this investment.

Whilst there is rationale for a population based driver for this cost model, not factoring in the number of sites each company has to deliver these schemes at doesn't appropriately reflect the economies of scale benefits of delivering schemes at a small number of sites with a large p.e. The constant in the regression model accounts for some economies of scale, this simply acts to give a disproportionately large allowance to companies who have fewer schemes in their plan. This is shown in the table below which compares four companies that have a similar average p.e. per site with investment. This shows the costs per site varying by an order of magnitude between Anglian's allowed costs and other companies.

Table 25 Company comparison of cost allowance per site

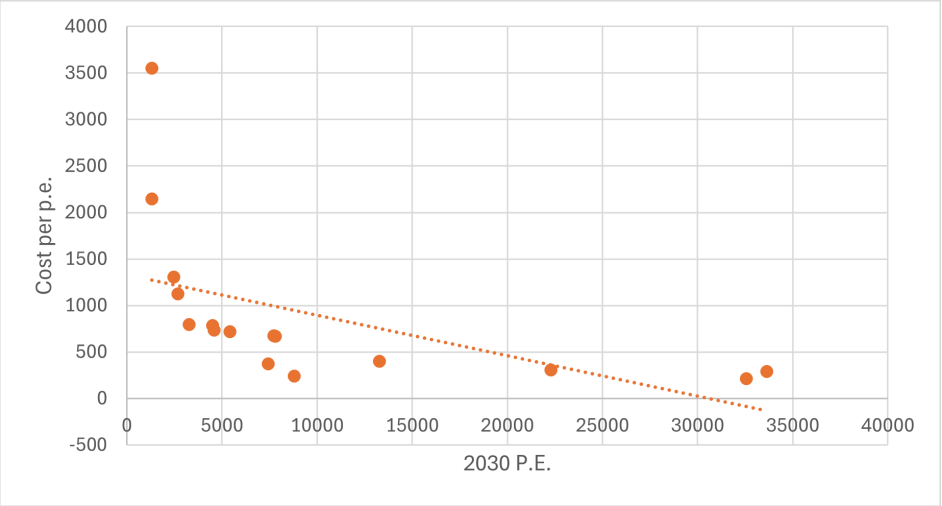
Company	Average population equivalent per site	DD Cost allowance per site (£m)
Anglian Water	9,840	1.76
South West	7,574	4.90
Southern Water	10,178	5.16
Wessex Water	8,260	13.26

We recognise that larger sites will require some additional costs, but once size of sites is taken into account we would expect to see similar costs between companies. We consider that the cost variance per site for similar sized investment shown above is implausible as a suitable cost allowance. It is a range which is also far larger than put forward in these companies proposed costs (ranging from £2.71m per site for Anglian, to £6.28m per site for Southern). This is supported by engineering logic, cost data and Ofwat's regression model for number of schemes (once an outlier is removed). We highlight these in turn below.

The required solutions to deliver our chemical removal requirements including tertiary pile clothes filters, and tertiary deep-bed sand filters and other solutions which have significant fixed costs that cannot benefit from the same scales of economy than larger sites. Put simply, such solutions would be required at each site regardless of population size. Although the solutions will need to be sized to meet the flow at the site, where this is done at larger sites, it can be done without the fixed costs that are required for companies with a large number of smaller sites, such as Anglian.

This trend can be seen in our own cost data. In the chart below, we have ordered each of our sites by population equivalent, and show the cost per p.e. for each site. This clearly shows that the unit cost per p.e. is affected by the size of the site and there is evidence of a strong economies of scale.

Figure 2 2030 P.E vs Cost per P.E



Ofwat's analysis compares its population equivalent based model with a model driven by the number of sites. The R-squared value for the models were 0.9449 for the p.e based model and 0.0754 for the model driven by the number of sites. This suggests that p.e. is much more powerful explanatory variable for the efficient costs of chemical removal treatment schemes. However, this is heavily skewed by data from Severn Trent which has a small number of large site (3 sites with a total p.e. of 578,973). This is a clear outlier in Ofwat's cost graph. Once this outlier is removed, the R-squared value for the site based model increases from 0.0754 to 0.8236.

Figure 3 Treatment schemes: drive 1 - number of schemes with Severn Trent

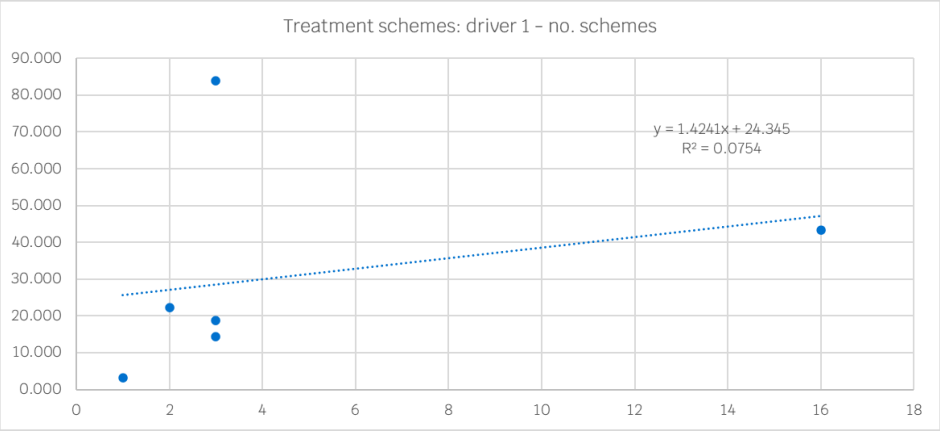


Figure 4 Treatment schemes: drive 1 - number of schemes without Seven Trent

The potential for economies of scale must be taken into account in Ofwat's modelling approach to reach an appropriate allowance for chemical removal. As a result of our concerns with the modelling approach highlighted above, we have retained our assessed enhancement costs of £43.5m for this investment.

We consider that Ofwat has several options available to resolve this issue. We would recommend that Ofwat takes the approach of assessing the costs for the four companies with a similar p.e. per site (listed in the table above) on a cost per site basis. This would recognise that Northumbrian Water and Severn Trent Water (who have significantly larger p.e. per site) would expect to have some higher costs per site. Alternatively, Ofwat could take alternative approaches such as triangulating the models for population equivalent and number of sites (excluding Severn Trent as a significant and influential outlier). Given that Ofwat has data sets from four companies with similar sized schemes, we consider that an approach which seeks to give these companies a similar allowance per site would be the most intuitive approach to take.

4.3.2 Chemicals investigations

Ofwat raised concerns regarding the cost of the Transitional and Coastal Water (TRaC) models we proposed in comparison to the industry.

We used our expert framework contractor to arrive at a reasonable and efficient cost to include for these investigations. There is currently a high degree of uncertainty over the precise scope of these investigations (and therefore their costs) and so we sought cost estimates based on the upper and lower estimates of scope for the individual elements of the investigations. We provide a breakdown of the scope of these investigations below along with the upper and lower cost estimates.

Table 26 Chemical Investment cost comparison

Phase	Description	Description detail	Lower (£k)	Upper (£k)
1	Review of chemicals, including sediment interaction	Desktop review, literature review, Intertek experience in industrial chemical analysis and oil and gas industry permitting and licensing (chemical discharge analysis)	30	60
2	Review of existing models	Implementation of models to 3D, suitability for studies, etc.	10	20
3	Data collation, review and gap analysis	Establish knowledge of chemicals, data relating to load and concentration in environment, establish backgrounds if possible, establish sources and gaps, inform data collection programme	40	75

Phase	Description	Description detail	Lower (£k)	Upper (£k)
4	Data collection	Terrestrial and boat based data collection is envisaged, over a 12 month period to define seasonal and tidal and meteorological changes in input loads and background concentrations, as well as to obtain data for model validation	2000	10000
5	Model build and calibration	Use of standard calibration techniques to deliver calibrated hydrodynamic model and water quality (nutrient and chemical) models	75	200
6	Model validation	Use of standard validation techniques (e.g. data independent of calibration data), use of, or development of, validation criteria	75	150
7	Permit scenarios	Model runs and scenarios to develop understanding of required limits and thresholds, to develop permitting protocols	50	150
			2280	**10655**

This cost range (£2,280 lower bound and £10,655 upper bound) was applied to all three estuary areas to build a lower (£6,840k), middle (£19,403k) and upper (£31,965k) bound estimate for the total cost of all three schemes as part of our overall cost build up.

Table 27 Cost build up of 3 proposed schemes

	Lower (£k)	Middle (£k)	Upper (£k)
Investigations	6,840	19,403	31,965
Humber modelling (1)	600	600	600
Humber modelling (2)	21	21	21
Thames modelling	260	260	260
Wash modelling	27	27	27
Total	7,748	**20,311**	32,873

We have derived our TraC enhancement investment requirement by using the mid-range of these cost estimates. Using only the upper bound would risk an allowance which is greater than is ultimately required, and requesting the lower cost estimate would likely lead to insufficient allowance. We considered that using the mid-range to reasonably reflect the risk of cost being significantly different from either the upper or lower allowance.

We expect the scope of the nutrients TraC investigations to exceed those of the chemical TraC investigations, due to the additional sampling and consideration of wider process interactions that need to be factored into the modelling. We believe this may be an underlying factor in the cost variability across TraC investigations between companies, as some companies may have reported nutrient TraC investigations within their wider investigations but not chemical investigations. Given this broad range of investigations falling under TRaC investigations, estimating the efficient costs for these schemes by comparing a simple unit rates per investigation is not appropriate for this investment area.

We consider that the evidence above should address the challenges raised by Ofwat in its chemical investigations deep-dive. We have therefore retained the costs in our original business plan for this investment, to cover 43 investigations.

Changes since business plan submission

Since business plan submission, we have identified the need to increase our requested totex for chemical investigations by £2m. This is to reflect updates to the technical specification for the CIP4 programme which was finalised in July 2024. We provide a breakdown of the cost components that make up this requested totex increase below, and outline where this relates to the technical specification where applicable:

Table 28 Breakdown of cost components of totex increases

Cost component	Requested increase in totex	Justification of requested cost
Groundwater, Soils and Biosolids investigation	Increase value from £2k to £216k	This amendment is required due to an error in the calculated input value with £2.16k included rather than £216k. This is a contribution to a joint-industry investigation and therefore needs to be rectified following draft determination.
PFOS investigations	Increase value from £430k to £1230k	This totex adjustment is required due to missing scope identified through programme clarifications post initial business plan submission. This identified a gap in the

Cost component	Requested increase in totex	Justification of requested cost
		number of samples required to satisfy the regulatory obligation scope. Costs are inclusive of an increased number of samples taken across the catchment and management costs associated with the ongoing engagement required to ensure that these can be collected safely and efficiently. The technical specification clarified the number of samples and the work associated with scoping and executing the investigations. The increased cost requirement is driven by an increase in the number of samples required.
Microplastics	Increase in costs by 108k	This increase reflects the scope of the analytical costs required alongside the groundwater, soils and biosolids club project costs.
Sampling Programme Management - addition of sampling logistics and data systems costs	Addition of £487k to requested totex	Confirmation of the regulatory requirements for digital integration and reporting of data across the CIP4 programme requires additional laboratory resources. The technical specification outlines the guidance on how we must undertake the sampling to ensure quality assurance across the programme. Clarification of the sampling methodology has demonstrated that additional investment is required for critical planning and logistical coordination. Without this, the programme would not be able to be delivered to the standards specified in the technical specification.
Project Reporting - addition of reporting costs	Addition of £63.3k to requested totex	These additional costs are required to generate reports to satisfy the regulatory needs identified above. Within Chapter 1 of the technical specification, further detail is provided around the sign-off expectations, including clarification on reporting requirements. The sign-off expectations allowed us to confirm the new reporting expectations.

We have retained our March 2024 allowance request for this enhancement strategy, plus the additional £2m to reflect the additional regulatory requirements of the CIP4 programme. We ask Ofwat to consider the additional evidence we have provided to support our requested allowances.

5 Water WINEP

5.1 Investment summary

	March 24 Business Plan (£m)	DD Ofwat position (£m)	Representation (£m)
Capex	40.3		39.6
Opex	16.1		16.1
Totex	56.4	44.2	55.6

In our updated data tables, these costs are reported against lines:

- CW3.1-CW3.3 (Biodiversity and conservation; (WINEP/NEP)) and associated CW12 and CW17 lines
- CW3.4-CW3.6 (Eels/fish passes; (WINEP/NEP)) and associated CW12 and CW17 lines
- CW3.10-CW3.12 (Invasive Non Native Species; (WINEP/NEP)) and associated CW12 and CW17 lines
- CW3.13-CW3.15 (Drinking Water Protected Areas; (WINEP/NEP)) and associated CW12 and CW17 lines
- CW3.16-CW3.18 (Water Framework Directive; (WINEP/NEP)) and associated CW12 and CW17 lines
- CW3.37-CW3.39 (Investigations total; (WINEP/NEP)) and associated CW12 and CW17 lines

5.2 Context

This enhancement strategy comprises of statutory WINEP investments related to the Water price control. This includes obligations for biodiversity and conservation, invasive non native species, Drinking Water Protected Areas, investigations, and Water Framework Directive river restoration.

5.2.1 Ofwat's DD approach

Ofwat determined its view of our allowance for each of the water WINEP enhancement areas where we proposed costs as set out below:

Table 29 Summary of Ofwat's assessment methods

Shallow dive	Deep dive	Unit cost benchmarking
Biodiversity and conservation	Water Framework Directive	Investigations (water WINEP)
Eels/fish passes Invasive Non Native Species	Habitats Directive investigations	
Drinking Water Protected Areas (after a base adjustment)		

For each of the areas assessed through shallow dive (aside from DWPA), costs were not individually challenged but an 8% company-specific challenge was applied to all.

For DWPA, £1.942m was removed for the Raw Water Cloves scheme, as Ofwat stated there was insufficient evidence that this scheme links to the WINEP.

For the Water Framework Directive investment, a 10% adjustment was applied due to Ofwat's concerns on cost efficiency. This challenge was related to evidence of third-party assurance of cost estimates.

Across the three categories of investigations, we requested an allowance of £12.451m. £3.25m of costs associated with Habitats Directive investigations were reallocated to Freeform models. After the modelled benchmark was applied, the DD totex allowance for investigations was £3.572m, plus £1.625m for Habitats Directive investigations. The biggest driver of this cost reduction is Environmental Destination investigations; while we requested £7.085m per scheme, the modelled scheme allowance was £0.506m. We believe this large cost challenge simply reflects different presentations of investigations cost data between Anglian and other companies, so Ofwat compared costs of our entire programme to efficient costs for only a small part of comparators' equivalent programmes. We therefore present the cost estimates here on a similar line-by-line basis to those presented by other companies and when assessed on this like-for-like basis, our costs are below the benchmark.

5.3 Our Representations

5.3.1 Biodiversity, eels/fish passes and Invasive non-native species

For the following areas, we have retained our business plan view of totex:

- Biodiversity and conservation: £3.1m
- Invasive Non Native Species: £0.9m

We have updated our costs for eels/fish passes from £0.8m to £0.9m to reflect our updated view of efficient cots to deliver these schemes

This reflects our view of the appropriate efficient costs of this investment. We consider that the shallow dive company specific efficiency adjustment should be updated to reflect the revised costs and evidence of our water enhancement programme, and allow the efficient costs for this programme as assessed in these shallow-dives.

5.3.2 Investigations

Ofwat combines an overall unit cost per investigation (£430k) with a median unit cost for types of individual types of investigations (for INNS, biodiversity, environmental destination etc.) to arrive at its view of efficient costs for water WINEP investigations.

In principle, we consider this to be a reasonable approach to setting investigations cost allowances (although individual investigations will deviate from this unit rate for reasons other than efficiency). With exception however we have significant concerns with how this approach has been applied to our Environmental Destination investigations, which is leading to a shortfall in our enhancement allowance of £8m.

We believe the cost gap relates to how the Environmental Destination investigations are presented in company submissions to Ofwat and the EA. In line with the advice of the Environment Agency, we submitted our costs for Environmental Destination investigations in a single line with a single WINEP ID. Other companies split their Environmental Destination investigation investments across multiple lines and WINEP IDs. This results in other companies receiving an allowance per Environmental Destination Investigation, whereas we have been allowed that same unit rate for the whole of our Environmental Destination Programme.

We therefore split out our Environmental Destination investigations to the same level of granularity as presented by other companies. To align with the approach of other companies we have split out the 17 individual investigations, as listed in the table below along with their scope. If these are reflected as individual investment lines, as other companies have provided, we estimate our cost allowance would be £8.602m for environmental destination investigations, and not £0.506m (based on the average of the £430k (generic) and £582k (environmental destination) investigation unit costs). This compares to our requested allowance of £7.085 for these investigations.

Table 30 Breakdown of 17 schemes

Line name	Proposed WINEP IDs	Breakdown
Broadland Rivers	08AW103003	For each catchment, the following workstreams will be considered: · Groundwater and surface water review and updates · Hydro ecological review and modelling · Flood risk review and updates · Estuary analysis · Monitoring gap analysis and update · Catchment level simulator · Catchment knowledge and collaboration
Cam and Ely Ouse	08AW103004	As per above
Essex Combined	08AW103005	As per above
Louth Grimsby and Ancholme	08AW103006	As per above
Lower Trent and Erewash	08AW103007	As per above
Nene	08AW103008	As per above
North Norfolk Rivers	08AW103009	As per above
North West Norfolk	08AW103010	As per above
Ouse Upper and Bedford	08AW103011	As per above
Suffolk East	08AW103012	As per above
Welland	08AW103013	As per above

Line name	Proposed WINEP IDs	Breakdown
Witham	08AW103014	As per above
WRE Regional contribution to simulator modelling	08AW103015	Contribution towards the Regional Simulator and decision-making process for the environmental destination investigations.
WRE Regional contribution to catchment options appraisal	08AW103016	Contribution towards the regional options appraisal, exploring alternative options for WRMP29 and the Regional Plan, and the locations for these.
WRE Regional contribution to GW modelling	08AW103017	Contribution towards the regional review of the EA GW models and any potential updates.
WRE Regional contribution to hydroecology	08AW103018	Contribution towards the regional hydroecology pooled data exercise and tool review.
WRE Regional contribution to estuary ED methodology	08AW103019	Contribution towards the review and development of the ED methodology for assessing estuaries.

We request that Ofwat re-model our costs in light of this representation of investigation scope the current unit cost of £0.529m is insufficient to fund these investigations, which are crucial for our future investment planning.

Habitats Directive investigations

Ofwat has undertaken a separate deep-dive on Habitats Directive investigations on the basis that these have not yet been confirmed in the WINEP. It stated that "*We expect the company to provide evidence of the inclusion of these investigation to its WINEP.*" [2] Since these schemes were added to our plan, we have received confirmation from the EA that these are now included within our AMP8 WINEP. Alongside this enhancement case, we have provided letters from the EA highlighting the inclusion of these investigations in the WINEP. These cover 48 investigations at 36 sites. The WINEP IDs for these sites are:

- HD_INV 08AW103000 a - z
- HD_INV 08AW104990 a - v

2 See Ofwat model PR24-DD-W-Freeform.

We consider that these investigations should be included within Ofwat's WINEP cost assessment. We have crossed checked our costs for these schemes against Ofwat's view of efficient costs in the Investigations model. Our costs for these schemes is £3.25m. This equates to an average of £0.07m per investigation. This is below the efficient unit cost for investigations that Ofwat uses in its Investigations model.

Ofwat has applied a bespoke cost challenge of 61% to our Habitats Directive investigations in a freeform cost deep-dive, based on the efficiency of our cost in the investigations model. We consider that the changes to the treatment of Environmental Destination investigations would close this cost gap, and thus flow through to remove the 61% cost challenge on the Habitats Directive investigations. We are therefore confident that the costs we are putting forward for investigations are efficient. If Ofwat decides to assess these schemes through a deep-dive for the Final Determination rather than in its investigations model, we would be happy to provide further evidence to support the need and cost efficiency of these schemes.

Following completion of Habitats Directive investigations (by 30/04/27) there is a requirement to take forward the preferred and agreed actions to enable the required environmental outcomes and/or licence changes for delivery under the HD_IMP action. If agreed licence changes cannot be implemented an exemption for Imperative Reasons for Overriding Public Interest (IROPI) will have to be submitted with a completion date by 31/03/30. We have not currently proposed any enhancement allowance for these improvement schemes as the scope will be defined through the investigations carried out earlier in the AMP and it is therefore proposed any funding required will be requested through AMP9 transition funding. This covers 51 WINEP obligations at 39 sites (3 sites have no investigation, just straight to improvement):

- HD_IMP 08AW104000 a - z
- HD_IMP 08AW104991 a - v
- HD_IMP 08AW101340 n, o, p

On the basis of the above, we have retained our totex request for Habitats Directive investigations at £3.25m in our DD representations.

5.3.3 Water Framework Directive

Our cost estimation method for the WFD measures used:

- The unit rate derived from the EA Cost Effective Measures Database. This database provides the average costs of different types of river measures across England.
- The assessment of a specialist consultant, who was appointed to evaluate the requirements for enhanced natural recovery measures and channel restoration. The consultant used site-specific data and expert judgment to estimate the costs of these measures, taking into account the local conditions and constraints.

The cost estimation method followed these steps:

- Identify the water bodies and the measures that need to be implemented according to the WFD objectives and the river basin management plans.
- Apply the unit rate from the EA cost effective measures database such as tree planting, buffer strips, fish passes, etc.
- Apply the assessment of the specialist consultant to the measures that are not covered by the database, such as enhanced natural recovery measures and channel restoration.
- Adjust the costs for inflation, prelims, using appropriate factors and assumptions.

The WINEP no deterioration benchmarking, referenced in the Cost efficiency assessment for other areas of this enhancement strategy, did not cover WINEP WFD schemes. The nature of the projects meant it was not possible to benchmark each specific unit rate.

Further, on the cost assurance of our WFD we welcome Ofwat's clarification of its expectations for third party assurance of costs in response to our query OFW-IBQ-ANH-025. Following this query response, we have sought additional third party assurance on targeted enhancement investments that meet Ofwat's expectations. We will provide the outputs of this assurance separately following the submission of our Draft Determination Representation

5.3.4 Drinking Water Protected Areas (DWPA)

In addition to its shallow-dive efficiency assessment, Ofwat removed the costs of an investment at Cloves Bridge which is planned for late in AMP8. We have decided to remove this investment from the costs included in our PR24 plan.The majority of the Raw Water Cloves Bridge scheme is scheduled to be delivered in AMP9. Although we originally included the costs of the design phase of this scheme within our business plan for the final years of AMP8, we recognise that given the delivery profile of this scheme that it would instead be more appropriate to request this funding through transition funding later within AMP8.

6 Monitoring

6.1 Investment Summary

	March 24 Business Plan (£m)	DD Ofwat position (£m)	Representation (£m)
Capex	241.6		168.8
Opex	20.8		8.7
Totex	262.4	241.8	177.5

In our updated data tables, these costs are reported against lines:

- CWW3.1-CWW3.3 (Event duration monitoring at intermittent discharges (WINEP/NEP)) and associated CWW12 and CWW17 lines
- CWW3.4-CWW3.6 (Flow monitoring at sewage treatment works; (WINEP/NEP)) and associated CWW12 and CWW17 lines
- CWW3.7-CWW3.9 (Continuous river water quality monitoring (WINEP/NEP)) and associated CWW12 and CWW17 lines
- CWW3.10-CWW3.12 (MCERTs monitoring at emergency sewage pumping station overflows (WINEP/NEP)) and associated CWW12 and CWW17 lines

6.2 Context

Four monitoring programmes are required by statutory WINEP obligations. The EA requires the installation of upstream and downstream Continuous River Water Quality Monitors (CRWQM) to gather and report real time data on the impact of wastewater dischargers on receiving watercourses. We will also install Event Duration Monitors, Flow Monitors at WRCs, and Emergency Overflow Monitors where required by the Environment Agency.

6.2.1 Ofwat's DD approach

In Ofwat's Draft Determination, the following investment areas were assessed through shallow dives :

- Event duration monitoring at intermittent discharges
- Flow monitoring at sewage treatment works
- MCERTs monitoring at emergency sewage pumping station overflows

The shallow-dive analysis was supplemented by unit cost assessments of efficiency for flow monitoring and MCERTS monitoring for sewage pumping stations. This analysis showed that our costs were £2m and £20m more efficient than the median unit benchmark for these investment areas respectively.Ofwat therefore did not propose a cost challenge in any of the three investment areas, applying the shallow-dive efficiency challenge (0% for Anglian).

The costs relating to CRWQM were assessed through a cost benchmarking approach. This applied the median unit cost per monitor (£133k) to the number of monitors to be installed. When calculated on 1258 monitors, our modelled allowance for CRWQM was £167.532m.

All three investment areas were subject to the WINEP capping adjustment applied after the assessment process. This adjustment removed £23m from the allowances for these four investments.

6.3 Our Representations

6.3.1 EDMs, flow and emergency pumping station overflow monitoring

We make a minor adjustment of our view of efficient totex for EDMs, Flow Monitors, and MCERTs monitoring. These minor adjustments to costs, in particular for MCERTS monitoring, are a result of changes in EA permit fees since business plan submission. Our updated totex request for each of these lines are:

- Event Duration Monitoring: £5.7m
- Flow Monitoring at Water Recycling Centres: £45.9m
- MCERTs monitoring at emergency sewage pumping station overflows: £48.0m

For these investment areas, we consider that the WINEP capping adjustment should be updated to reflect the revised costs and evidence of our WINEP programme. The evidence from Ofwat's Draft Determination models in these areas shows our costs are £22m lower than the median unit cost benchmark. Whilst a simple median unit rate may not set a robust cost benchmark in itself, we consider that this should be used as evidence to consider when setting broader efficiency challenges. The current WINEP efficiency challenge applied to Anglian, risks penalising companies who put forward efficient plans -which help to set the efficiency benchmark- with additional cost reductions.

We therefore request that Ofwat removes the WINEP efficiency challenge, particularly noting that the unit cost modelling in these areas suggested we were already putting forward efficient costs (especially on MCERTs monitors)

6.3.2 Continuous river water quality monitoring

The Draft Determination allowance for CRWQM has been set based on a unit rate per monitor. Ofwat has used the number of monitors included in our original business plan data tables of 1,258 to set its cost allowance. Since the early assessment of the CRWQM requirement, this number of monitors has been updated to 484 monitors. This was reflected in our business plan enhancement strategy (ANH27) costs and highlighted in our response to query OFW-OBQ-ANH-215.

Following completion of the Continuous Water Quality Prioritisation Matrix and discussion with the Environment Agency the number of monitors required has increased to 584. This number of monitors has been determined based on desktop review only and may be further amended in order to meet the requirement to monitor 25% of non-exempt assets by March 2030 following sites visits, assessment of cross-sectional mixing, and confirmation of clustering.

When updating the cost benchmarking approach used by Ofwat with our latest view of the correct number of monitors (584) our costs appear more expensive per monitor than most of the industry, with the modelled allowance when applying the median industry unit rate being £77.8m.

Following our double-lock approach to cost efficiency, where external benchmarks suggest that our bottom-up cost estimates appear to be inefficient, we seek to understand why this is the case and either explain the difference, or adjust our costs to meet the efficient external benchmark.

A likely driver of our higher unit cost is the specification of monitor we have selected in comparison to the rest of the industry. At draft determination, we adjust our requested allowance and option selection in line with the efficient unit cost and level of specification proposed by other companies.

Previously at business plan submission, as outlined in our enhancement strategy (ANH27, table 48), we considered a range of options with Option 4 (Permanent solution) being selected as the best option for delivery. This is a higher specification than Options 1 to 3 and includes provision of a power supply, security kiosk and water quality analyser. Our reasoning for previously selecting this option was outlined in our options assessment (ANH27, table 53), with the permanent solution selected as the least risk, least regret option. Our enhancement strategy outlined that this solution was the Defra preferred solution, and can be adapted to meet future requirements of the assurance and accreditation scheme and additional monitoring parameters. We also previously selected this option as we believed it best met the requirements set out in Defra Technical Guidance[3]

Costs put forward by other companies reflect the selection of a lower spec of monitor than the permanent solution we proposed (that provides less certainty of meeting Defra's requirements) which drives down the median unit cost which Ofwat uses to set allowances.

In response to the Draft Determination, and the additional enhancement investment requirements of our revised totex we recognise that there is a need to significantly challenge the short-term costs in our plan to limit the bill increases to customers, and ensure our plan remains affordable and financeable. For CRWQM investments we have balanced the benefits of the preferred option in our plan which meets the requirements above, with the cost pressure this adds to our enhancement plan. Through this assessment, we have decided to reduce our costs significantly to match the expected cost allowance from Ofwat's cost models.

We expect to meet this cost challenge by installing a lower spec solution, and we have assumed that 50% of monitors have a power connection, and 50% instead includes battery and small solar. This alternative also reduces the kiosk security grade of the solution, and reduces the ducting length downstream to 100m. This alternative is similar to the level of specification proposed by other companies, and therefore the proposed industry costs we are assessed against through Ofwat's enhancement benchmarking assessment.

In recognition that our unit cost appears much higher than the industry average, we align our requested totex allowance with the modelled allowance. Therefore, we revise our requested totex for CRWQM to £77.8m. Our PCD should also be updated accordingly

3 'Continuous Water Quality Monitoring Programme Provisional technical guidance for sewerage undertakers on implementing s.82 of the Environment Act 2021 Date: April 2023 Version: 1.0', available https://assets.publishing.service.gov.uk/media/6436dc0dcc9980000cb89426/CWQM_programme_provisional_technical_guidance_for_sewerage_undertakers_April_2023.1.pdf

7 Investigations

7.1 Investment Summary

	March 24 Business Plan (£m)	DD Ofwat position (£m)	Representation (£m)
Capex	29.7		30.2
Opex	1.3		1.2
Totex	31.0	23.7	31.4

In our updated data tables, these costs are reported against lines:

- CWW3.61-CWW3.63 (Nitrogen technically achievable limit monitoring, investigation or options appraisal) and associated CWW12 and CWW17 lines
- CWW3.112-CWW3.114 (Investigations, total; (WINEP/NEP)) and associated CWW12 and CWW17 lines[4]

7.2 Context

WINEP investigations are statutory. We will invest to carry out investigations to identify the future actions needed, costs and feasibility of meeting required environmental outcomes in rivers in future AMPs

7.2.1 Ofwat's DD approach

As our unit cost was above the industry unit cost benchmark for the complex investigation subcategory, Ofwat assessed our investigation costs through a deep dive assessment. Although the criteria for need for enhancement investment were met, Ofwat raised minor concerns on whether the investment is the best option for customers and whether the investment is efficient.

In our business plan, we set out that there are no alternatives for the delivery of investigations beyond site selection and that options have been agreed with the EA. In response, Ofwat stated that they disagreed with our indication that there is no scope for different types of investigations, and they believe it could be reasonably expected that a large proportion of storm overflow investigations will be simple, and/or the company will be able to utilise previous studies to meet the EnvAct_INV4 requirements. Ofwat also raised concerns relating to the potential for misallocation across the large number of schemes we propose, and lack of evidence on the scope of work or complexity categorisation of investigations.

On cost efficiency, Ofwat asked for additional evidence to justify the cost of complex investigations being significantly above the industry median.

7.3 Our Representations

We believe Ofwat have assessed the wrong number of investigations. The number of investigations provided in CWW20 (1546 investigations reported in CWW20) does not match the number of investigations assessed in OFWAT's draft determination.

Following ongoing work since business plan submission, we confirm that the correct number of investigations to be assessed for this enhancement strategy is 1529 (excluding any investigations covered by the chemical investigation programme which includes six HD_INV obligations for the transitional and coastal water (TraC) estuary investigations[5]).

In response to Ofwat's concerns on the scope of work and complexity categorisation, we set out below a breakdown of our categorisation for investigations in CWW20 [6]:

Table 31

Investigation type	Number of investigations and description
Desk-based	zero investigations
Simple	1501 investigations
Complex	28 investigations
Total	**1529 investigations**

We recognise Ofwat's concerns regarding potential misallocation of investigations, as well as our complex investigations unit rate sitting above the industry median. At present, there is no standardisation in terms of the investigation categorisation in the industry. Without objective guidance standardising how companies categorise investigations at an industry level, it is currently at companies discretion how this should be undertaken, which we believe is driving the cost variance

4 Note that £7.7m of costs have been included in Microbiological treatment which should instead be classified as investigations. This allocation is highlighted in response to OBQ-REP-ANH-003
5 (see Chapter 4)
6 Please note that the figures in data table lines CWW20.61-64 also include chemical investigations, in addition to those presented in this table. CWW20.61-64 excludes all water-related investigations

between our costs and the industry median for complex investigations. Although our costs are above the median unit rate on complex investigations, our unit rate is below the median for simple investigations, demonstrating the extent of this cost variability across categories. Indeed, if all of our complex investigations had been assessed as simple investigations, our unit rate for simple investigations would still have been below the industry median and our full costs would have been allowed. We consider that this evidence should provide additional assurance that the cost of our investigations are efficient, and that this is not affected by the categorisation of investigations as simple or complex. In light of this, Ofwat should look at investigation costs in the round in parallel to assessing costs at the subcategory level. This will provide a more accurate picture given this potential inconsistency in categorisation across the industry.

Should Ofwat have reservations that we've deemed certain investigations as complex, there is the possibility to reclassify them as simple investigations for the purpose of cost assessment (in light of the lack of standardisation of investigation categorisation across the industry). Given the relative efficiency on our simple investigation unit cost in comparison to the industry, if our complex investigations were reallocated to simple investigations the benchmarking assessment based on current industry data would permit our combined (complex and simple) investigations allowance in full.

As the cost challenge on our overall investigations programme is driven solely by our unit costs for complex investigations being slightly above the industry median, we believe the adjustment made to our overall allowance in this area is disproportionate. To rectify this, we ask that Ofwat view investigation costs at an overall programme level in addition to the category level given the lack of guidance for the industry regarding categorisation.

8 First time sewerage

8.1 Investment summary

	March 24 Business Plan (£m)	DD Ofwat position (£m)	Representation (£m)
Capex	58.1		58.1
Opex	1.1		1.1
Totex	59.2	60.3	59.2

In our updated data tables, these costs are reported against lines CWW3.159-CWW3.161 (First time sewerage) and associated CWW12 and CWW17 lines.

8.2 Context

Section 101A of the Water Industry Act places a statutory obligation on Anglian Water to provide a public sewer if evidence shows that the private systems are causing harm and a cost benefit analysis shows that a new public sewer is viable.

We will invest to deliver 17 schemes for communities who are not currently connected with the ability to connect to the sewerage system through the installation of new sewage treatment and sewerage assets. Where duty to serve has been confirmed, the Environment Agency requires schemes to begin within 5 years, which means all 17 schemes must be completed within the period 2025-2030.

8.3 Our Representations

Within our PR24 business plan, we set out that our view on costs for S101a schemes based on our own internal benchmarks, drawing on scheme outturn costs was £108m. As part of our cost efficiency double-lock approach, we also sought external benchmarks to inform the requested allowance in our four our s101a enhancement schemes. One of our external benchmarks used Ofwat's PR19 cost model, which suggested an efficient allowance for our proposed scale of investment would by £59m. Whilst this was a significantly lower allowance than our internal cost intelligence suggested, we could not find clear evidence of exogenous cost drivers that would mean our costs should be higher than the industry benchmark. We therefore applied a significant cost challenge to this area of enhancement, removing £49m from our expected costs for these schemes. Our business plan therefore requested £59m for s101a schemes, aligning with our best view of the industry benchmark.

Ofwat's PR24 allowances for first time sewerage schemes were determined through benchmarking analysis using industry data, with the number of connectable properties being the principle cost driver in the model. Ofwat's approach modelled costs for our first time sewerage investment was £60.32m.

Ofwat's modelled DD allowance broadly aligns with the costs included in our plan, with a cost allowance circa £1m higher than we had forecast using Ofwat's PR19 S101a cost model. Reducing our plan to align with our early view of Ofwat's benchmark introduces the potential issue of circularity in setting allowances and we would recommend that the model could be further improved by using our bottom-up view of costs as an input to the model.

In line with other parts of our enhancement investment DD Representations, and in keeping with our double-lock approach we agree with Ofwat that our costs should be aligned with those arrived at using its PR24 S101a cost model (assuming Ofwat's approach remains similar to that used to arrive at DD allowances). Noting the potential for the modelled allowance to change at FD, for the purposes of our data tables, we have kept our view of totex unchanged from our business plan at £59.18m.

In our October Business plan we included those first time sewerage applications where we had accepted duty under the Water Industry Act. Since then the Environment Agency have upheld an appeal for a further application at Thurne in the Norfolk Broads marshes. This application was assessed in 2016 and rejected on the grounds of insufficient environmental benefit at the 60 properties for the estimated £35m cost of the new assets. This is not unusual - we have many applications where feasibility studies have reached this conclusion. At this stage, with the outcome of the appeal known late in the DD window, we have not included the costs of this scheme in our PR24 plan and will consider next steps including further legal processes. This clearly demonstrates the level of uncertainty faced in our cost requirement for AMP8 in this area, which contributes to the overall uncertainty in totex.The scale of this expenditure risk will need to be reflected in the Final Determination; either through an ex-ante allowance or the ability to recover this expenditure should it be incurred.

love every drop
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