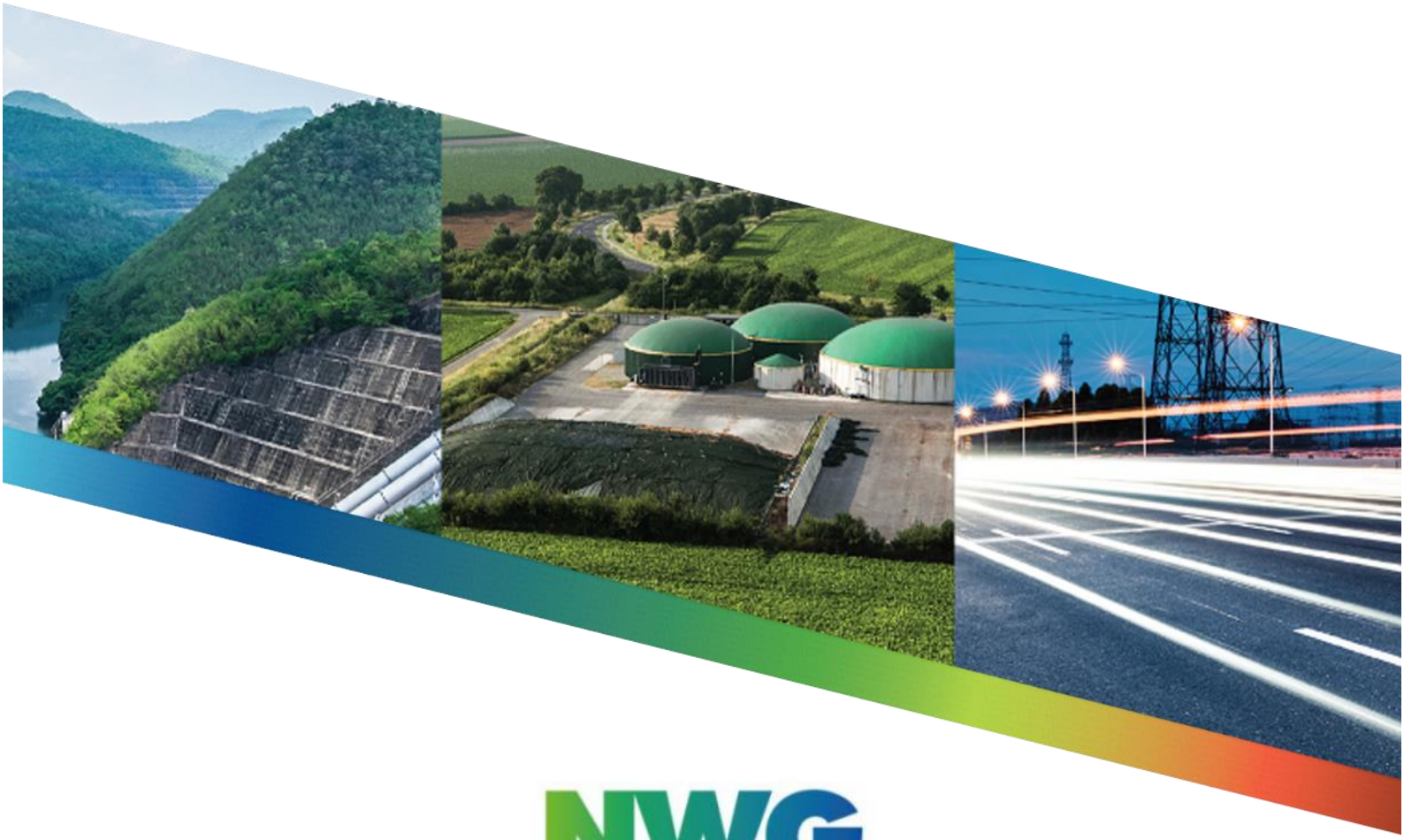
NWG Benchmark Report – Power Resilience Water

August 2024



Northumbrian Water Group

Version	Status	Originator	Checker	Approved	Date
1.0	First Draft	T.Morgan	M.Bahia	T.Anderson	19/8/24
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1 Introduction

Aqua Consultants have been engaged to conduct a benchmarking exercise and third-party assurance on the iMOD estimates conducted by Mott Macdonald for the enhancement case NES32 'A3-18 Climate Change Resilience- Flooding and Power' submitted as part of the business case in October 2023. Ofwat has challenged the cost efficiency of the schemes provided in the business case. This benchmark exercise will undertake looking at the highlighted issues raised by Ofwat.

1.1 Enhancement case overview

Under sections 37 and 94 of the Water Industry Act 1991, water companies have a general duty to develop and maintain an economical system of water supply, making supplies available to those who demand them; and to provide a sewerage system to effectively drain and treat the content of sewers. Ofwat expects NWG to incorporate some aspects of climate change into base allowances, but it has also retained a resilience category under enhancement. The refined definition allows companies to request investment to manage increasing risks, or changing acceptance/acceptability of risk, from hazards that are beyond their control. It is for investment not covered by other enhancement areas, and for purposes such as "fluvial or and coastal flooding of company assets and… mitigating failures of other infrastructure systems such as power networks"[1].

NES32 sets out NWG's plan for increasing the level of resilience at water and wastewater treatment works and pumping stations. It helps to make sure these sites can operate in adverse conditions, and so customers can continue to receive drinking water. It also allows NWG to speed up their response and recovery time for wastewater assets, which helps avoid pollution incidents.

The proposed plan is set in the context of NWG's Long-term strategy (NES_LTDS), therefore the most critical sites are addressed during AMP8. This helps to manage affordability, as well as meeting customer expectations to address only those issues where there are immediate impacts on services.

[1] PR24 Final Methodology Guidance Appendix 9 Setting Expenditure Allowances

1.2 Approach

1. NWG carried out a resilience assessment to identify the potential hazards and the impact of their assets.

2. NWG commissioned Mott MacDonald to undertake a climate assessment to understand whether they are more/less at risk than other areas of the country. Mott MacDonald carried out historical analysis to assign metrological weather patterns to each of the hurricanes and extratropical cyclones that have affected the Northumbrian and Essex and Suffolk Regions. Then Mott MacDonald forecasted the likelihood of such extreme weather events to be occurring in the future, up to 2060 and 2080 in some scenarios. This considered both the severity and frequency of extreme rainfall, wind events during the summer and winter periods. NWG used the outputs of their historical and forward-looking analysis to populate the likelihoods in their flooding and power resilience assessments for sites.

3. NWG assessed the impact of their sites being at risk of a 1 in 100 Fluvial and 1 in 200 tidal events occurring now and in the future. They used EA flood maps and Fathom depth data to validate their assessment and to understand the impact on individual assets.

4. NWG assessed the consequence and likelihood of power outages on their sites impacting on service levels both in normal and extreme weather conditions.

5. NWG engaged with both UK Power Networks and Northern PowerGrid. Northern PowerGrid advised that their standards for power interruptions are less stringent than within the water industry, meaning that pollution incidents and interruptions to supply can occur when DNOs are meeting their regulatory standards. They are aware that the asset health of their electricity poles is worse than other areas of the country which can lead to a greater level of longer duration power outages (particularly during storms). They are not yet able to share specific locations as the regulatory periods for RIIO-ED2 price control is from 1 April 2023 to 31 March 2028 whereas the Ofwat submission is due in October 2023.

2 Methodology

2.1 Approach

Many of the Water Companies carryout high-level costing using cost models, especially at early stages of a project or business planning. Cost models are developed from captured actual costs on historical projects, which has been assigned to process groups, assets and components. These are then plotted against an appropriate yardstick measure for that item of work, which will dictate the size of the work or asset, to find a trendline formula. This formula is then used to cost future work.

We have generated individual data sets, using historical cost data we have collected across the UK water industry, to allow us to cost the scope and provide three benchmark costs. This exercise gives us an industry comparison for the scoped work and gives us an insight into the cost efficiency of NWG costed PR24 Plan.

There is no governing influence on how Water Companies should capture and use their cost data and as a result different approaches have been witnessed to generate cost models. The key difference is how water companies capture Construction Indirect Costs (Preliminary/General Items etc) Some companies have taken the approach splitting costs into the following:

- Direct Works Cost
- Indirect Works Costs
- Project Oncosts

However, some water companies have taken the approach of splitting costs to:

- Construction Costs
- Project Oncosts

With either approach taken, effectively the same costs are captured. How this data is used can affect the end outcome.

We adopt the first example approach, as we believe that this enables us to model the Indirect and Project costs by the size of the project, though models based on the Direct Works cost. NWG also adopt this approach in their costing methodology.

We have back dated our benchmark costs to align with the base date required for PR24 submissions.

2.2 Estimating Uncertainty

We have excluded the Estimating Uncertainty allowance from our benchmarking exercise as this was derived by Northumbrian Water prior to commencement of PR24 Business Plan costing. We envisage this to be the same as the Optimism Bias approach adopted by other Water Companies during PR24 Costing.

The HM Treasury Green Book looks at Optimism Bias for Project Estimates. This document provides Recommended Adjustment Ranges, with the aim to reduce the Optimisation Bias % through steps taken to address contributory factors.

The projects undertaken by Northumbrian Water fit within either two Project Types, Standard or Non-standard Civil Engineering. The Optimism Bias ranges are given in the table below.

Project Type	Optimism Bias (%)	
	Capital Expenditure	
	Upper	Lower
Standard Civil Engineering	44	3
Non-standard Civil Engineering	66	6

Table 1- Northumbrian Water Project Types

The expectation is that as projects develop and more information is known the Optimism Bias is reduced. The schemes that are included in PR24 are at early stages, so Optimism Bias would be higher in the range. However, we would expect competent Water Companies to aim to reduce this with good cost intelligence. The Optimism Bias Range compared to Northumbrian Water's 30% Estimating Uncertainty, suggests that they have aimed to reduce uncertainty, and they have a good level of cost confidence.

3 Comments and Observations

3.1 Findings

We have captured the benchmark findings in the table below:

Scheme name	Total Cost	Low	Mean	High
Water schemes	£44,306,593	£38,336,126	£40,598,009	£42,485,475
Total	**£44,306,593**	**£38,336,126**	**£40,598,009**	**£42,485,475**

In the table above the water schemes is placed outside the benchmark range. The total cost of the water schemes is 4% higher than the max value of the benchmark figure, whilst 9% higher than the mean figure.

Overall the NWG costing of Power Resilience demonstrates upper quartile in cost efficiency, benchmarking on a like-for-like scope. The review of the scope is outside this assessment.

The main cause of the overall cost being above the benchmark range appears to be the overheads. More specifically, the contract overheads are higher than the benchmark overhead costs. The contract overhead costs are typically 1.5 times higher than the benchmark cost. Since most of the water schemes are larger in scale, overheads account for a larger portion of the overall cost.

3.2 Final Observations

Overall, the optimism bias range highlighted above compared to Northumbrian waters 30% estimating uncertainty, suggests that they have aimed to reduce uncertainty, and they have a good level of cost confidence. Although Ofwat claims that the cost efficiency is low, it is not the case for the benchmarked schemes. The costs of the assets included in the generator plug-in option fall within the range shown in Appendix A together with the overall scheme cost. Ofwat has said that the oncost is inefficient; nevertheless, this appears to be true for the larger schemes but not for the smaller ones. The reason for this is because the direct costs are below the benchmark costs and therefore the overall cost is just outside the benchmark range.

4 Appendix 1

4.1 Water Schemes

Scheme name	Total Cost	Low	Mean	High
BAYBRIDGE WPS - Flowrate	£1,202,422.89	£1,023,720.52	£1,056,197.64	£1,087,411.60
Bedfords Park Booster to Havering Tower	£1,200,628.45	£1,020,927.64	£1,050,434.66	£1,080,633.37
Bleach Green Borehole, Rosemary lane	£1,220,350.65	£1,049,464.71	£1,102,575.60	£1,160,906.11
Broken Scar	£2,656,094.61	£1,759,627.44	£2,236,013.37	£2,529,893.97
Caister Booster	£1,188,966.56	£1,001,460.76	£1,018,604.13	£1,036,574.89
CARLTON BOOSTER - BUSBY HALL	£1,220,350.65	£1,049,464.71	£1,102,575.60	£1,160,906.11
COXHOE WPS - Outflow Rate	£1,197,937.62	£1,016,647.15	£1,043,262.98	£1,070,466.03
Dalton	£1,284,780.55	£1,122,843.99	£1,196,754.29	£1,244,328.53
DALTON WPS new - Flow (DALFA) INT	£1,328,080.91	£1,163,027.73	£1,258,720.02	£1,319,550.82
Danbury Tower Booster	£1,204,217.19	£1,026,467.75	£1,061,763.31	£1,099,902.06
FENHAM WPS ID RESERVED - Delivery Flow	£1,176,849.95	£977,874.97	£982,801.25	£990,821.85
Fulwell	£1,203,318.96	£1,025,099.69	£1,057,517.08	£1,090,800.71
FULWELL WPS - (FULFA)Flow aka FULLWELL PS	£1,203,318.96	£1,025,099.69	£1,057,517.08	£1,090,800.71
HAWTHORN WPS - (HAWFA)Flow	£1,242,741.60	£1,077,575.08	£1,154,169.43	£1,239,921.72
HILL END	£1,201,076.53	£1,021,630.27	£1,051,621.07	£1,082,327.93
Langford	£1,668,252.03	£1,369,831.09	£1,587,217.06	£1,722,228.38
LUMLEY WTW - FLOW (LUBFA) to Rainton	£1,220,350.65	£1,049,464.71	£1,100,671.52	£1,155,193.87
LUMLEY WTW - FLOW (LUCFA) to Stoneygate	£1,220,350.65	£1,049,464.71	£1,100,671.52	£1,155,193.87
MATFEN WPS - Flow To Supply INT	£1,220,350.65	£1,049,464.71	£1,100,671.52	£1,155,193.87
Mendlesham	£1,179,991.85	£984,430.09	£992,440.49	£1,002,683.75
MURTON WTW HIGH LIFT PS	£0.00	£-	£-	£-
New Winning	£1,302,645.26	£1,140,052.74	£1,223,200.54	£1,276,396.62
North Dalton	£1,300,858.51	£1,138,375.74	£1,220,617.21	£1,273,261.70
Ormesby	£1,443,340.74	£1,292,271.91	£1,411,840.10	£1,490,127.23
PETERLEE WPS - FLOW (PETFA)	£1,232,893.41	£1,065,653.73	£1,131,004.01	£1,202,641.47
Stifford	£1,220,350.65	£1,049,464.71	£1,100,671.52	£1,155,193.87
Stoneygate	£1,249,455.96	£1,085,363.92	£1,169,679.48	£1,265,340.07
Thorpe	£1,231,548.85	£1,063,977.40	£1,127,802.67	£1,197,557.80
THROPTON WPS - Flow To Thropton Res INT	£1,197,937.62	£1,016,647.15	£1,043,262.98	£1,070,466.03
WALBOTTLE WPS - Delivery Flow	£1,260,640.09	£1,179,733.24	£1,213,141.75	£1,261,583.03
Warkworth	£1,965,716.73	£1,947,237.76	£2,009,948.67	£2,061,725.94
Woodham Walter 30" Booster Flow	£1,720,211.44	£1,722,147.67	£1,766,984.62	£1,800,123.58

Woodham Walter 36" Booster Flow	£1,720,211.44	£1,722,147.67	£1,766,984.62	£1,800,123.58
Wortham Bore	£1,220,350.65	£1,049,464.71	£1,100,671.52	£1,155,193.87
Total cost	**£44,306,593.26**	**£38,336,125.77**	**£40,598,009.32**	**£42,485,474.94**