



Deliverability of PR24 Schemes

Northumbrian Water Group

Final Report

Jacobs

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Deliverability of PR24 Schemes – Final Report

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Executive summary

This report pulls together all of the work that Jacobs were commissioned to do by Northumbrian Water Limited (NWL). Our brief was to undertake a maximum six-week study to assess all aspects of deliverability and provide recommendations to improve the deliverability of NWL's AMP 8 plans.

NWL is forecasting a significant increase in the capital plan for AMP8 (2025 – 2030) chiefly as a result of increases in requirements in the areas of environmental improvements (wastewater treatment and storm overflows) and water resource / demand management. Estimates from PR24 work to date indicate that the capital spend in AMP8 could be £3.9bn compared to a current estimate for AMP7 spend of £1.7bn (with £200m of the AMP7 spend occurring in the AMP8 period). We note however that there is still a level of uncertainty in the plan in particular nutrient neutrality (£650m) and water quality monitoring (£200m).

With potentially such a significant increase in spend and activity NWL wished to undertake a review to assess the capacity and capabilities within the national and regional supply chains as well as within NWL's business to accommodate and deliver such a level of spend.

The work was carried out in 4 phases:

1. We analysed the current state by interviewing stakeholders to better understand NWL's organisation, current approach to delivery and the context of the programme and its challenges. We also interviewed a number of water industry SMEs and analysed documentation provided to the team.
2. We evaluated the impact of the PR24 plan considering the key findings from the current state and identifying the gaps and major risks to the deliverability of the programme.
3. We focused on identifying and analysing options and opportunities to mitigate the impacts and bridge the gaps we identified in phase 2.
4. We developed recommendations that we believe will improve NWL's success in delivering PR24. The recommendations were developed in collaboration with our subject-matter experts in each of the areas and categories of schemes identified.

The whole of the assignment was developed in close cooperation with NWL, through regular meetings with the Sponsor and the Steering Group, to discuss progress and ensure alignment with our thinking and direction of travel.

Our analysis suggests that without changes to the current state significant parts of PR24 will be undeliverable. Because of new requirements around phosphorus removal and nutrient neutrality and around storm overflows the majority of this challenge lies within the wastewater side of the business.

We highlight in particular the following weaknesses:

- A large shortfall in the number of project managers potentially requiring a doubling in headcount.
- A similar shortage of staff in the engineering team.
- Smaller increases in headcount in the programme management office and the asset intelligence team. On the supply side there appear to be major challenges around capacity



and capability. UK infrastructure spending is at record levels meaning that contractors are being very selective about the work they bid for. NWL also face geographic challenges with Northumbria, Suffolk and parts of Essex all being relatively remote and more difficult for contractors in terms of project set-up. Given these issues NWL will have to work harder than ever to be a client that the supply chain wants to work for.

We have made 7 core recommendations to maximise deliverability of the PR24 plan:

1. The creation of two Integrated Delivery Teams to focus on the delivery of the circa £1.9b of work across storm overflows and treatment works.
2. The creation of a Runway 3 delivery route and supplier frameworks dedicated to the Suffolk area to deliver circa £160m of Water Supply Resources schemes.
3. The procurement of a small number (probably 2 or 3) of suppliers to deliver area-wide smart metering in Suffolk and Essex.
4. The procurement of a small number (probably 1 or 2) suppliers to deliver river water quality monitoring.
5. The PR24 Plan should be reviewed and the spend rephased to the extent possible to achieve a smoother growth curve.
6. A review of project manager skills and competence to deliver this larger level of investment competently and reliably.
7. Careful consideration of the scale of NWL establishment headcount across all directorates to satisfy itself that the implications of the PR24 Plan are properly understood and adequate provision is made in the plan for growing all areas of the business in proportion to the planned increase in capital expenditure.

The PR24 Plan, as envisaged and considering all of the recommendations above, will still be a considerable challenge with a low likelihood of complete success.

We therefore further recommend the following:

- That the PR24 Plan be reviewed, and careful consideration be given to the removal of discretionary spend where possible.
- That NWL engage with Ofwat and DEFRA directly and indirectly (for example through Water UK) to relook at the requirements to be imposed in AMP8 and to either rephrase some of these or to engage with Water Companies and their suppliers to establish a plan which will minimise the overheating and localised inflation in the market.

Given the benefits of reducing the programme for NWL we have undertaken a rapid and high-level assessment of which projects could be considered for an external procurement under Ofwat's 'Direct Procurement for Customers' (DPC) model. Generally we do not consider that any of the projects are obviously strong candidates for a DPC-like approach. All are below the c.£200m threshold Ofwat has suggested and most are smaller more integrated schemes that are not easily separable. However, across the programmes of work the metering programme might represent the best candidate.

We have not considered how the plan would be financed as part of our work. However, based on comments we have received, we understand this may be a challenge given the scale of the



proposed AMP8 investment. Reducing the scale of the programme and looking for alternative models that involve delivery by other parties could ease the size of the financing challenge.



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Acronyms and abbreviations

AMPx	Asset Management Plan for Period x
ASP	Activated Sludge Process
AWS	Anglian Water Services Limited
CPx	Control Period (for year x)
DEFRA	Department of Environment, Food & Rural Affairs
DPC	Direct Procurement for Customers
DWF	Dry Weather Flow
DWMP	Drainage and Wastewater Management Plan
EA	Environment Agency
EBPR	Enhanced Biological Phosphorous Removal
ECI	Early Construction Involvement
GPC	Geopolymer Concrete
HS2	High Speed 2
IAM	Identity and Access Management
IDD	Integrated Design and Delivery
IDT	Integrated Delivery Team
IoT	Internet of Things
MIECA	Mechanical, Electrical, Instrumentation, Control and Automation
MMB	Mott MacDonald Bentley
NWL	Northumbrian Water Limited
PM	Project Manager
PMO	Programme Management Office
PRxx	Price Review (for year xx)
RWQM	River Water Quality Monitoring
SDS	Service Delivery Strategies
SESRO	South East Strategic Reservoir Option
SME	Subject Matter Expert
SPA	Strategic Pipeline Alliance
SRO	Strategic Resource Options
STW	Sewage Treatment Works
WFD	Water Framework Directive
WINEP	Water Industry National Environment Programme
WRMP	Water Resources Management Plan



1 Introduction

1.1 Context

In preparation for the next Asset Management Plan (AMP) period – AMP8, and the PR24 business plan, Northumbrian Water (NWL) has identified a significant increase in their capital investment for the period 2025-2030. Current estimates show a growth of two to three times the level of investment in AMP7, from £1.7bn¹ to £3.9bn², driven mainly by requirements in the environmental improvement arena and water resource/demand management.

Given this significant increase and the challenges it might represent, NWL commissioned Jacobs to undertake a review to assess the deliverability of its PR24 programme from an internal organisational perspective as well as an external one, looking at the impacts on the supply chain. The results of this study and the recommendations will form part of NWL's PR24 submission to give confidence to Ofwat that challenges have been identified and are being addressed to ensure the successful delivery of AMP8.

1.2 Purpose and Structure of this report

In response to NWL's brief, this report captures the outputs from the study we have conducted over the past five weeks in close collaboration with the NWL team to assess PR24 deliverability and make recommendations around any deliverability issues we have identified.

We start by providing some context around NWL's PR24 investment plan in **Section 3. Context – Current and Future Challenges**, setting out our understanding of what constitutes the programme and particularly addressing the contribution from the four major sets of enhancement schemes: "Water resources supply options", "Accelerating smart metering", "Improvements at treatment works" and "Storm overflows". We continue building this context by providing a view of the water sector, its trends, and how other water companies plan to address similar challenges.

In **Section 4. Overview of the AMP8 challenge**, we begin our analysis by illustrating the magnitude of the challenge and indicating where the pressures will likely be felt the most. This is supported by a series of graphical representations of AMP7 and AMP8 spend profiles.

In **Section 5. Analysis of AMP7 Current State**, we set out our findings based on the interviews and the evidence we gathered, addressing NWL's internal organisation and Procurement and Supply Chain. We follow by assessing the likely impact of PR24 (in **Section 6. The Impact of the PR24 Plan**), considering the current state and AMP7 strategies. We proceed to identify the gaps, significant deliverability risks, and opportunities to overcome those gaps. We finish this chapter by presenting a high-level risk map, mapping deliverability risk against the four categories of schemes.

In **Section 7. Opportunities to mitigate the impact of the PR24 Plan** we detail the opportunities and options to address the identified risks, both for NWL organisation and NWL's approach to procurement and the supply chain.

¹ NWL Variance Report P07

² AMP8 High Level Capex Profile



In **8. Recommendations for AMP8 – The Way Forward**, we address the key issues and opportunities identified and set out proposals to support NWL delivering AMP8. These recommendations will focus on changes to NWL resources (capability and capacity needs), the use of different delivery models and procurement approaches and enabling activities before AMP8.

In **Section 9. Conclusions**, we present the key takeaways of the report, and finally, in **Section 10. Next Steps**, and based on the recommendations, we propose a list of immediate actions and an indicative implementation plan that will improve APM8 deliverability



2 Methodology

Our high-level approach to developing the current PR24 deliverability assessment is shown in **Figure 1** below.

During the first phase of the assignment, we analysed the current state by interviewing stakeholders to better understand NWL’s organisation, current approach to delivery and the context of the programme and its challenges (see **Appendix A – List of interviews held** for a complete list of NWL interviews undertaken). We also interviewed water industry SMEs to understand challenges, current trends and opportunities for innovation in the industry in general and in the four categories of enhancement schemes. This phase was further supported by the analysis of NWL documentation provided to the team, a Jacobs’ supply chain market research study and further desktop research (see **Appendix B – List of documents consulted** and **Appendix C – Supply Chain Market Research**).

Having formed a view of the current situation and its challenges, both at NWL business and supply chain level, we then moved to a second phase, where we evaluated the impact of the PR24 plan considering the key findings from the current state and identifying the gaps and major risks to the deliverability of the programme.

In the following phase, our work focused on identifying and analysing options and opportunities to mitigate the impacts and bridge the gaps we identified.

Finally, based on the options assessment, we proposed recommendations that we believe will improve your success in delivering PR24. The recommendations were developed in collaboration with our subject-matter experts in each of the areas and categories of schemes identified. These were developed considering your organisational constraints and current challenges, level of maturity as an intelligent client, market appetite and industry trends.

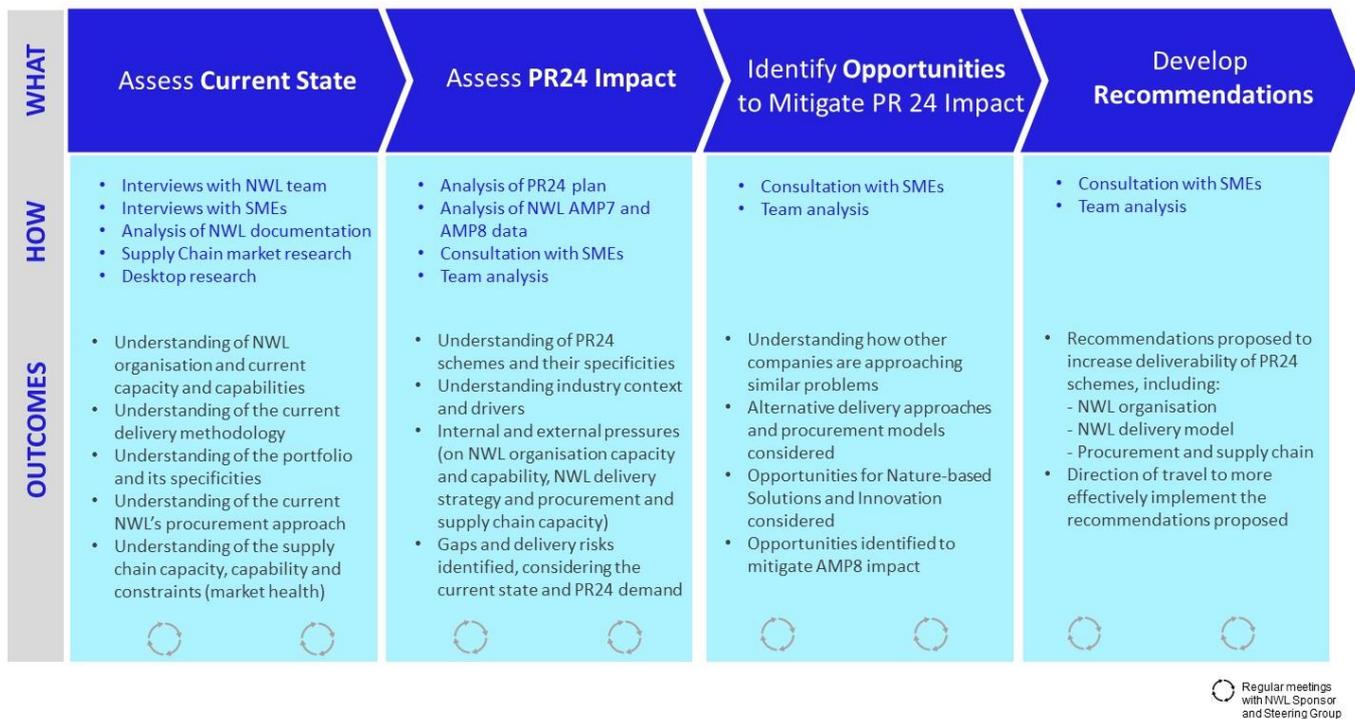


Figure 1 - Approach to undertaking the PR24 deliverability assignment and developing recommendations



The whole of the assignment was developed in close cooperation with NWL, through regular meetings with the Sponsor and the Steering Group, to discuss progress and ensure alignment with our thinking and direction of travel.



3 Context – Current and Future Challenges

3.1 PR24 business planning comes at a difficult time

The water sector is facing into a significant period of change as we head into the next AMP cycle. The post-COVID demographics in our cities are changing, compounded by other factors such as the impacts of climate change to affect our water sourcing, use patterns and exposure to flooding. The economic regulator is under pressure to perform in a post CMA world and is looking to promote new markets and regulatory methods to improve efficiency. This is while the industry is on course to set out a 5-year programme of work during a period of the highest inflation in 40 years. All the while trying to manage public perception of water company environmental performance which is receiving media scrutiny.



Figure 2 – Significant upward and downward pressure will likely squeeze the PR24 business plan

3.2 AMP8 will see an unprecedented increase in investment

Investment in capital works in the water sector, adjusted for inflation, has remained relatively static since privatisation, as shown in *Figure 3*, however early indications are that AMP8 will see an unprecedented increase in investment in the sector. *Figure 4* sets out how we anticipate expenditure AMP8 will increase significantly, this is based on trends across the industry for AMP7 and the forecast additional expenditure over and above the average capital expenditure as a result of increases in Storm Overflows and Water Resources investment during AMP8 based on current industry expectations.

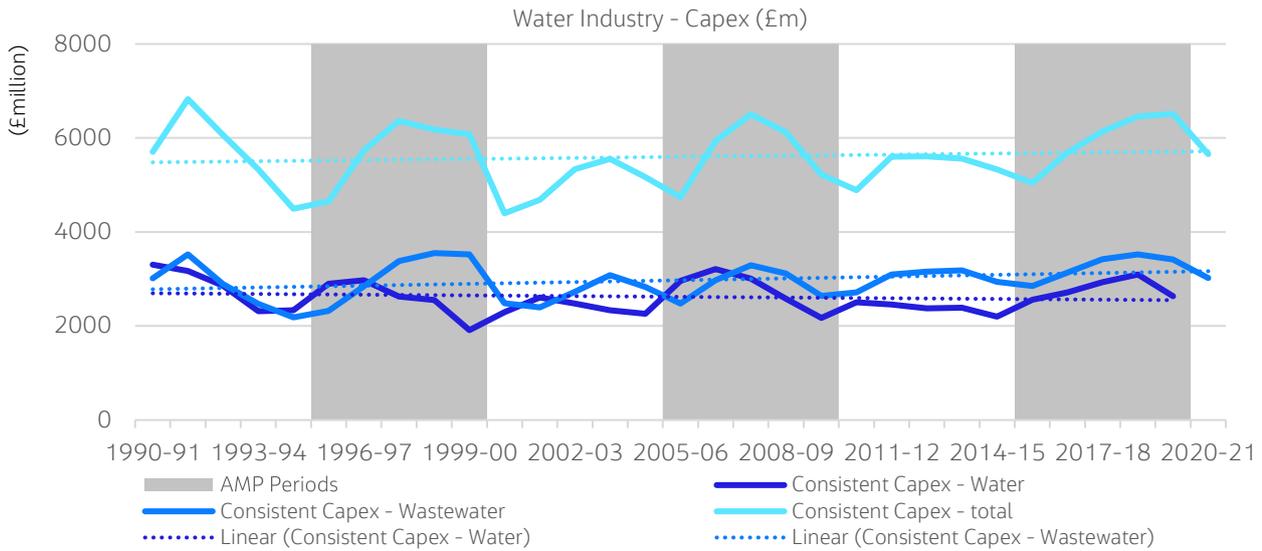


Figure 3 – Water industry CAPEX yearly spend since privatisation³

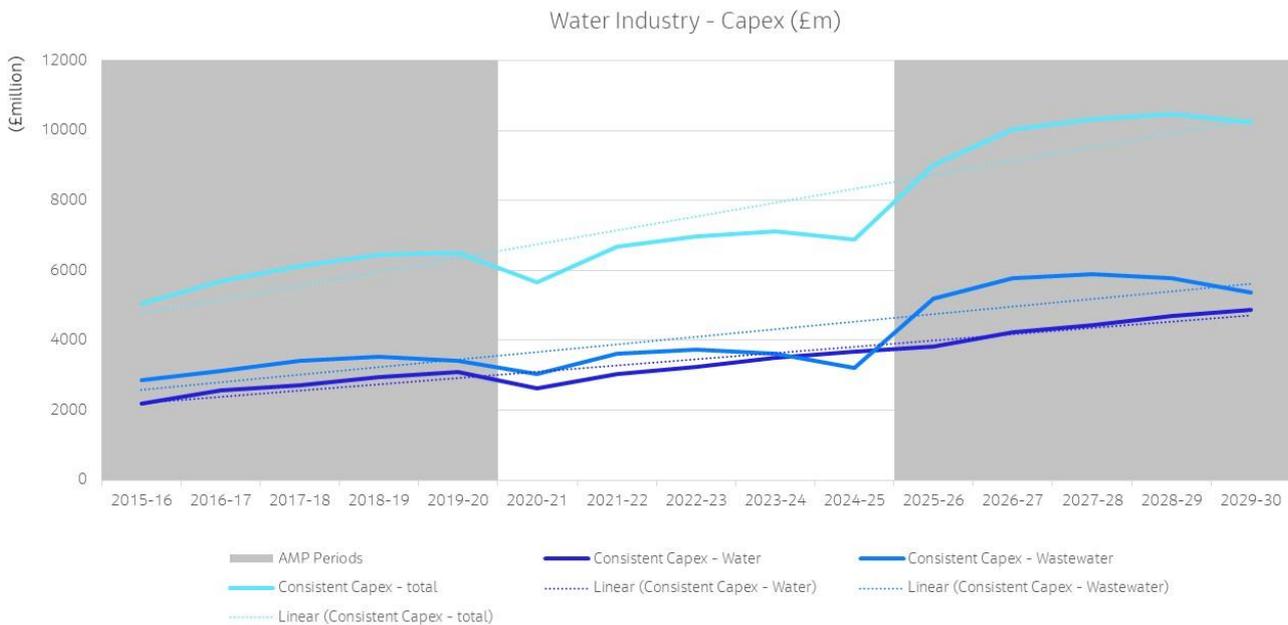


Figure 4 – Infrastructure New Build 2014-2020 and projection to 2030⁴

The factors driving increased investment across the sector are being felt particularly by NWL due to its geographical spread with climate change driving increased storm events in the Northumbria and drought conditions in Suffolk and Essex. The areas that NWL identified as requiring increased investment, Storm Overflows, Water Resources, Phosphate Removal and Smart Metering are the areas where there is increased pressure across the sector.

³ Ofwat - Long-term time series of company costs - Version 1.0. 27 January 2022

⁴ AMP7 data post year 1 is based on projections from AMP6; AMP8 projections are based on an informed forecast of increases in capital programmes from AMP7 based on current industry insight.



Storm Overflows are one of the primary drivers for projected increased investment. DEFRA's consultation on the Government's Plan for Storm Overflows Reduction Plan⁵ outlined a projected £54bn spend to deal with Storm Overflow spills based on estimates from The Storm Overflow Evidence Project. While draft DWMPs indicated spending across the industry in the billions, Ofwat issued a clear rebuke to the projected investment, stating "company plans on storm overflows are lacking"⁶. As a result, they have indicated that they expect investment to be accelerated, which will drive water companies PR24 plans to be front loaded. Two of the three most impacted companies will need the greatest investment are NWL's neighbouring companies, Yorkshire Water and United Utilities⁷. This will likely drive competition for resources compounding this issue.

Other water quality issues driving increased sector investment affecting NWL is meeting the tightening phosphorus permits. This is both in terms of meeting the tight permits, many of the new permits are sub 1 mg/l with a significant number below 0.5 mg/l, and the cost of achieving compliance (capital and operational). This is compounded by the fact that Ofwat has been driving to apply greener (nature based) solutions for phosphorous removal but progress in this area has run into a number of difficulties due to technical, cost and capability challenges. Some approaches specifically EBPR (Enhanced Biological Phosphorous Removal) Activated Sludge Processes (ASPs) are dependant on the nature of the influent sewage and require more complex control than standard ASPs and as there are only a very few Nature Based Solutions (including Algae Bioreactors) in the UK there is no real operational data and/or experience to tap into. The cost challenges are driven by the capital cost; the Chemical Phosphorous Removal approach often comes out cheaper and Nature Based Solutions (Reactive Media Reed Beds, Tertiary Wetland) require a significant land area. Nature Based Solutions are disadvantaged by the current methods of assessing technologies i.e. mainly based on costs. If a more holistic approach was taken considering embedded and operational carbon and natural capital (biodiversity) they would appear to be a much more favourable solution. This means that the solution most favoured by Ofwat is the one carrying additional risk and increased capital.

In contrast to wastewater, drought conditions are driving Investment in water resources to handle water shortages across the south of the UK. With £18bn of spend being forecast in spend over the next 15 years this is likely to attract considerable focus from the supply chain, the shortlisted companies for United Utilities Haweswater Aqueduct project demonstrates that the programme is already gathering international interest. Locally to Essex and Suffolk there is substantial investment being put into water resources, the £1bn for each of the South Lincolnshire and Fens Reservoirs, £1.5bn South East Strategic Reservoir Option (SESRO) and £500m in London Reuse consuming a considerable amount of the resources. This will put considerable strain on the supply chain or at least mean there will be significant competition for resources.

Smart Metering capacity is already beginning to be tested in regions local to Essex and Suffolk. We are aware Anglian Water are having difficulty reaching their target of 1 million installation by AMP7 having been impacted by supply chain issues and is pursuing aggressive action to meet the AMP7 cumulative target. We anticipate that AMP8 will see significant activity from Yorkshire Water; recently

⁵ [Consultation on Government's Plan for Storm Overflows Reduction Plan](#)

⁶ Letter to CEOs – DWMP Consultation Response

⁷ [Storm Overflow Discharge Reduction Plan](#)



awarded their future programme to Netmore (an IoT operator)⁸ as sole provider for a value up to £47m and Severn Trent Water who have successfully implemented their £20million Green Recovery Smart Metering trial⁹.

3.3 External challenges will put further strain on the PR24 plan

All this investment is also coming at a time where the external factors will be increasing pressure on the sector:

- **Cost of living crisis** – While Energy companies are the lightning rod for public fury at the moment, it looks as though water bills will be rising at PR24 draft submission in late 2023, while the country is still in recession, Ofwat will come under media pressure to push back.
- **Regulatory Pressure** – Ofwat have set 'Affordability' as one of the four core themes of this PR24 business plan, which means that there will be a huge focus on whether the plans proposed are possible without stretching companies' balance sheets. Ofwat and the EA are also holding firm on their commitments that WINEP drivers must be considered now and in the coming AMP periods to tackle the long-term environmental goals. This is coupled with a more punitive stance from Ofwat, with fines for environmental pollution incidents likely to increase by 1000%.¹⁰
- **Inflationary Pressure** – Setting the PR24 business plan in the context of inflation at a 40 year high poses a difficult challenge, particularly with increased exposure to elevated inflation in the construction sector. This will add further complications to the process of procuring the Construction partners in the first half of 2023 as agreeing commercial terms will be difficult.
- **Wider Industry Supply Chain Challenges** – While the water industry supply chain will be under pressure there is also the wider impact of significant investment in major programmes such as HS2, Sizewell C and the wider energy transition, which alone is projected to consume 75% of public sector spending after 2025. The increased spend across transport and energy over the last 10 years, as shown in *Figure 5*, has driven considerable investment by the supply chain and shift in focus of target market.

⁸ [Yorkshire Water chooses Netmore's solutions for smart water metering framework October 2022](#)

⁹ [Severn Trent's £20m smart meter roll out hits ambitious early target](#)

¹⁰ [Pollution penalties for water companies could increase 1,000-fold](#)

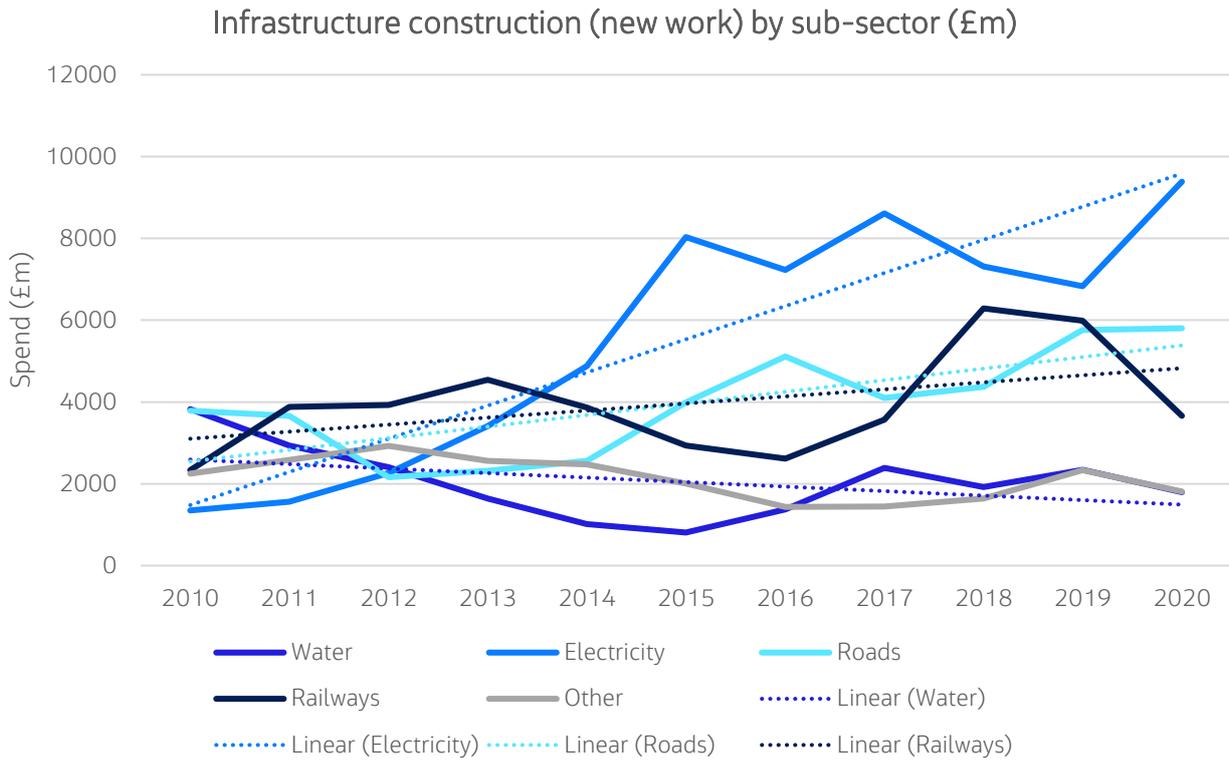


Figure 5 – Infrastructure New Build 2010-2020 ¹¹

This perfect storm is likely to pose a challenge for getting a PR24 plan through the approval process. All the while the company transitions to new ways of working as the intelligent client model is embedded.

¹¹ ONS – [Developing New Measures of Infrastructure Investment](#)



4 Overview of the AMP8 challenge

In this section we:

- Give a high-level overview of the PR24 plan and the scale up of investment needed when compared to AMP7;
- Provide a detailed analysis of the PR24 plan, breaking down the investment in the different areas and providing a profile view throughout AMP7 to AMP8.

4.1 The PR24 plan

NWL’s current forecasted AMP7 capital spend amounts to ca. **£1.7bn** (including ~£200m that will be spent during the first 2 years of AMP8). Early estimates for the PR24 programme show an investment of around **£3.9bn**, more than twice that in the previous period.

This steep increase in investment is, as mentioned previously in this report, mostly driven by regulatory and government requirements and by water resource / demand management needs.

Of the investment needed for AMP8, and considering a stable base plan of around £1.1bn, 70% will correspond to enhancement works (£2.75bn), nearly five times the spend in AMP7 – see **Figure 6** below for an illustration of the expected growth.



Figure 6 – Comparison of investment in AMP7 and AMP8 ¹²

¹² Based on *NWL Variance Report P7* (for AMP7) and *High-Level Capex Profile* (for AMP8)



Four areas of investment contribute to the majority of the enhancement spend.

In Water:

- Water resource supply options
- Smart metering

In Wastewater:

- Improvement at treatment works
- Storm overflows
- Nutrient neutrality
- River water quality monitoring

It is worth noting that, both investments in Nutrient Neutrality (ca. £650m) and Water Quality Monitoring (ca. £200m) have a high degree of uncertainty around whether they will be required.

In the table below, we describe the principal areas of growth in enhancements in the PR24 plan (based on the commission brief provided by NWL) and present a high-level characterisation of each one of them, against a set of features.

The features include:

Complexity: complexity of individual schemes in the category (high-medium-low)

Volume: number of similar schemes in the category (high-medium-low)

Approximate Total Cost: estimated investment for the programme / set of schemes (extracted from the commission brief)

Potential to cluster: ability to create clusters of work which can be delivered as a single project (high-medium-low)

Discrete / Not-discrete: this distinction is important from a DPC perspective

Continuity of demand into AMP 9: need for further investment in the category of schemes in AMP9



Table 1 - Characterisation of the principal enhancement growth areas

Category of Schemes	Summary Description	Features / Characteristics					
		Complexity	Volume	Approx. Total Cost ¹⁾	Ability to cluster	Discrete / Not-discrete (for DPC)	Continuity of Demand into AMP 9
Water resource supply options	<ul style="list-style-type: none"> - Small number of large (£5m - £80m) schemes; - Includes storage, network improvements and possible water reuse plan 	High	Low	£160m (including various schemes)	Low	Discrete	Not known
Improvement at treatment works	<ul style="list-style-type: none"> - 23 STWs with exceedances on dry weather consents by 2030 (£186m) - 40 plus STWs require phosphorous removal now (£425m) - Need to improve resilience at some sites (against the impact extreme weather events and asset renewal) 	High	Medium	£610m (including £185m for 23 STWs, and £425 for 40 STWs P-removal)	High	Not-discrete	Yes (to meet long term Environment Act requirements)
Storm Overflows	<ul style="list-style-type: none"> - A broad range of possible options ranging from lowest cost (circa £200m) through to best value addressing storm overflow and sewer flooding (circa £790m) (estimates mostly based on concrete storage options) 	Medium	High	£200m - £790m ²⁾	High	Not-discrete	Yes (with continuous investment over the next 20 years)
Smart metering	<ul style="list-style-type: none"> - Whole area Metering in Essex and Suffolk (£109m Totex) - Optant metering with some targeted smart metering in North East (£57m Totex) - Circa 3 times volume compared to AMP7 	Low	High	£170m Totex	Medium (High in Suffolk and Essex)	Discrete	Probably Yes

¹⁾ Figures from NWL's Brief

²⁾ Figures estimates mostly based in concrete storage options

Although we will consider the whole of the AMP8 investment in our analysis, we will focus our subsequent analysis on the challenges and opportunities for the four areas mentioned above, given their importance for the programme and its likely continuity beyond AMP8.

4.2 Analysis of the investment and spend profile through to AMP8

NWL are expecting to deliver capital projects in AMP7 with a combined value of £1.7 bn ¹³ (including capital overhead, management and general, and Ofwat Innovation). This covers the AMP7 period of April 2020 -March 2025 including 2 years of work running until March 2027 to complete the AMP7 projects (~£200m). AMP8 is currently projected to have an expenditure of £3.9 bn¹⁴ in the period of April 2025 – March 2030, 2.5 times larger than the AMP7 programme. This is illustrated in **Figure 6**, showing the significant increase in planned expenditure from AMP7 to AMP8.

¹³ NWL Variance Report P7

¹⁴ High Level Capex Profile

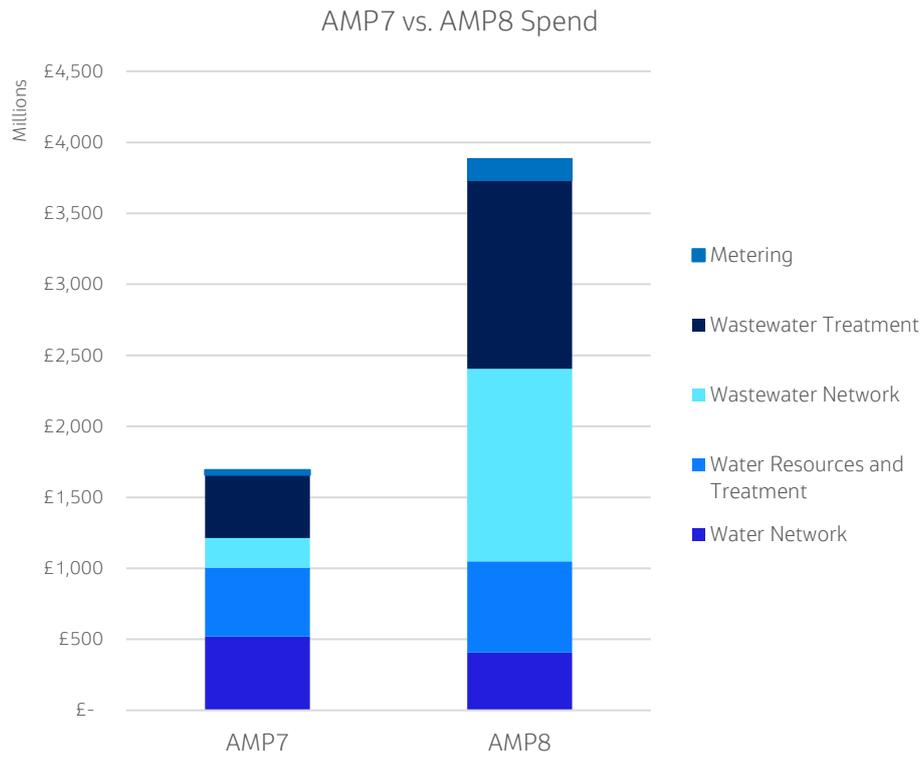


Figure 7 - Spend forecast for AMP 7 and AMP8 by investment area

This chart further demonstrates that the scale-up from AMP7 to AMP8 is not spread equally across all areas, with most growth happening in the Wastewater categories (total £2.7bn) and investment in Water maintaining a relatively stable profile (total investment circa £1bn, excluding Smart Metering). A break down by area of investment is provided in **Figure 8**.

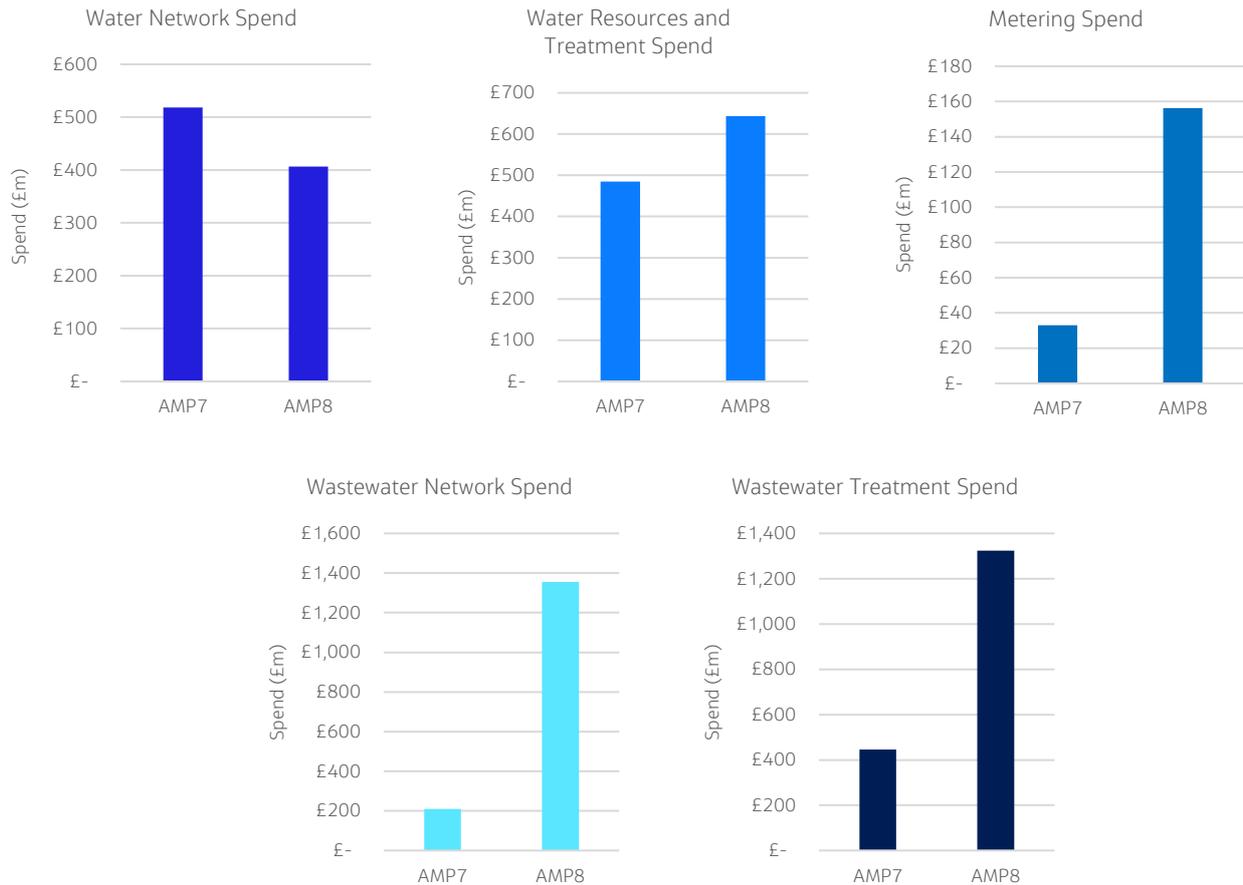


Figure 8 – Breakdown of spend in AMP 7 and AMP 8 by the five investment areas considered¹⁵

These charts highlight the fact that whereas expected investment in Water is stable, Wastewater is expecting a three to seven times increase in investment from AMP7 to AMP8. Also in Smart Metering, it is anticipated that AMP8 will see a fivefold increase in investment. In summary, and based on our assessment, growth between AMP7 and AMP8 will be as follows:

- Wastewater network: 550% increase in investment from £210 m to £1.35 bn
- Metering has a 375% increase in investment from £33m to £155 m
- Wastewater treatment: 200% increase in investment from £445 m to £1.32 bn
- Water resources: 33% increase in investment from £485 m to £645 m
- Water network: 22% reduction in investment from £520 m to £405 m

The breakdown of AMP8 data in Water Network, Water Resources and Treatment, Wastewater Network, and Wastewater Treatment is based on a series of assumptions defined in Appendix D. This has enabled the data to be compared and contrasted against the AMP7 APG categorisation.

¹⁵ Ref Appendix D Table 1 and Table 2 for AMP8 assumed distribution between water network and treatment, and wastewater network and treatment.



The pressure to deliver the AMP8 programme will be further increased by the £213m tail-off of AMP7 (as can be seen by the spend profile represented in **Figure 8**)¹⁶. This raises the AMP7 spend from £1.48bn to £1.69bn and is formed primarily of 3 projects:

1. £77m for Howdon STW Growth in AMP7 Enhancement – Wastewater – STW discharge compliance
2. £50m for Tees Central Mains PH2 in AMP7 Enhancement – Water – Interruption > 3hrs
3. £21m for CFG Refurb V2 in Reliable Resilient – Water – Interruption 1-3 hrs

This has a significant impact on the spend profile illustrated in **Figure 10** where according to the current plan, in Year 1 of AMP8 (2025 – 26) NWL will need to deliver 2.5 times the average spend delivered in AMP7, scaling up to 3.5 times the following year.

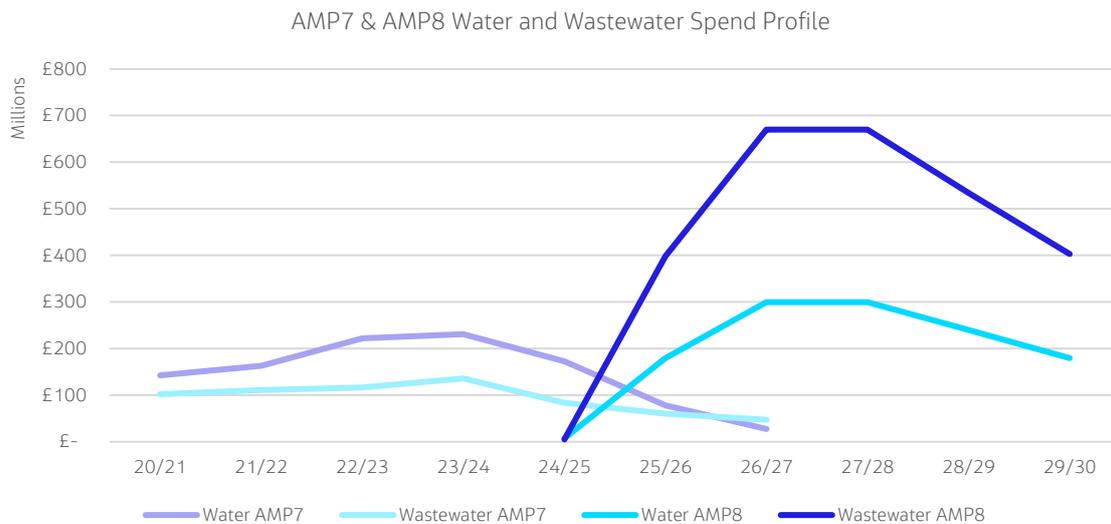


Figure 9- AMP7 and AMP8 Spend profiles in water and wastewater

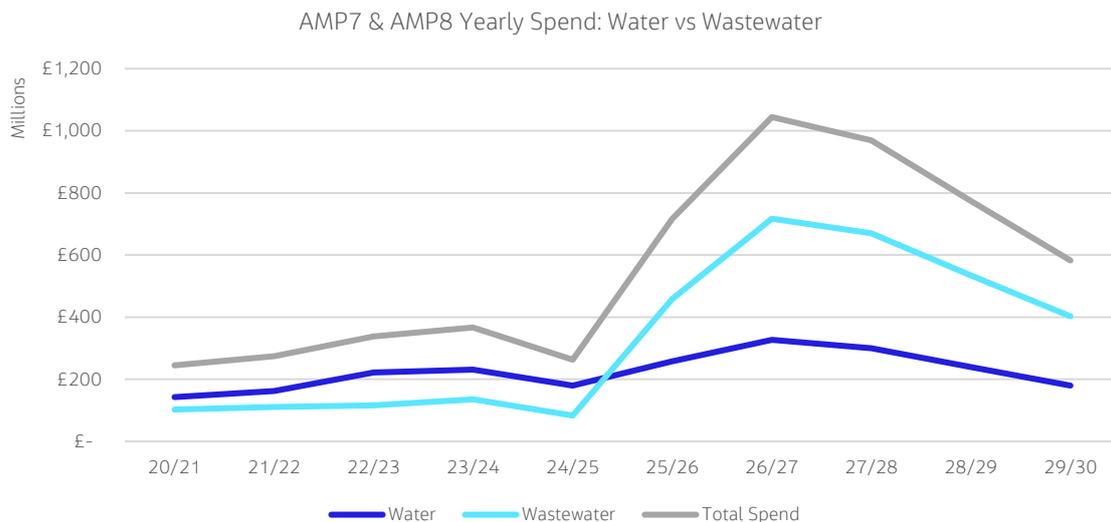


Figure 10 - AMP7 & AMP8 combined spend profile

¹⁶ NWL Variance report P07



As mentioned previously, investment in wastewater represents the biggest delivery challenge in AMP8 as can be seen in **Figure 9** and **Figure 10** above, showing a significant increase in investment from 24/25 onwards.

When compared to AMP7, the average spend per year in AMP8 (£556m) is five times greater when compared to AMP7 (£111m).

If we breakdown Wastewater further (see **Figure 11**) we observe that investment will be of similar magnitude in the Networks and Treatment areas. A major contributor to the increase in Wastewater from AMP7 to AMP8 is the £1.8 bn investment in WINEP¹⁷. Of which according to the Deliverability of PR24 Schemes Brief¹⁸ this is mostly driven by improvement at treatment works (for capacity increase and to address phosphorous removal and nutrient neutrality), and storm overflows (with “best value” costs potentially significantly higher).

The level of spend in Wastewater across AMP7 and AMP8 is very irregular, with a trough of £88m in 2024/2025 and a peak of £717m in 2026/2027 - an increase of over 700% in just 2 years. This is then followed by a decrease of 45% until the end of AMP8.

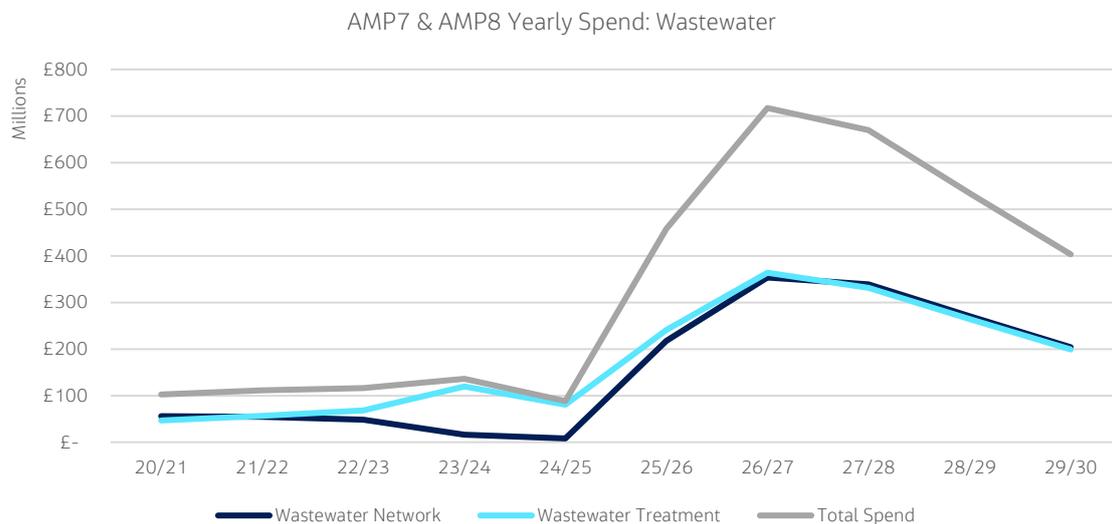


Figure 11 - AMP7 & AMP8 combined spend profile - Wastewater

Investigating the spend profile of Water in AMP7 through to AMP8 with a zoomed in view on network, resources and treatment, and metering, it is evident that the increase in investment in water is not as great as that for wastewater as shown in **Figure 12**.

¹⁷ AMP8 High Level Capex Profile

¹⁸ Deliverability of PR24 Schemes Project Brief

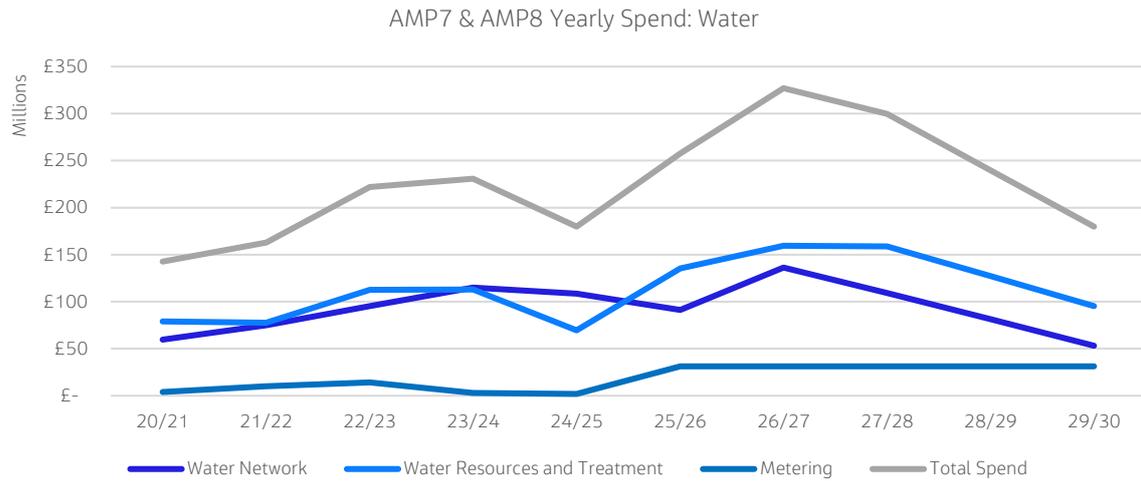


Figure 12 - AMP7 and AMP8 combined spend profile - Water

There is a dip in spend during the period 2024-2025 where AMP7 comes to completion, followed by a steady increase in spend from 2025 to 2028 during the commencement of AMP8, and then a gradual decline to close off AMP8. If the spend profile were to be distributed more evenly then a small but gradual increase in spend would be seen across water. The dip is more notable in water resources and treatment with a peak spend of £160 m in 2026/2027 and a trough of £62m in 2024/2025, equivalent to a 150% increase over 2 years. Though, the average spend across AMP7 is £186m compared to £261m in AMP8, equivalent to a 40% increase in yearly spend, translating into a more stable profile across the tail of AMP7 and AMP8.

Please refer to **Appendix D** for a deeper insight into the analysis including any assumptions made, supporting data tables for the plots presented in this section, base and enhancement analysis, projects and project management workload analysis, and an analysis by runway.

In the next two chapters we will address the challenges these spend profiles represent internally to the NWL organisation and its delivery model, and externally to the supply chain.



5 Analysis of AMP7 Current State

5.1 NWL organisation

NWL is organised into 3 operational directorates (Water, Wastewater and Customer Service), the Assets Directorate and other Corporate Functions (Procurement, Estates and Planning, Legal and Finance). A simplified organisation diagram is shown in **Figure 13**.

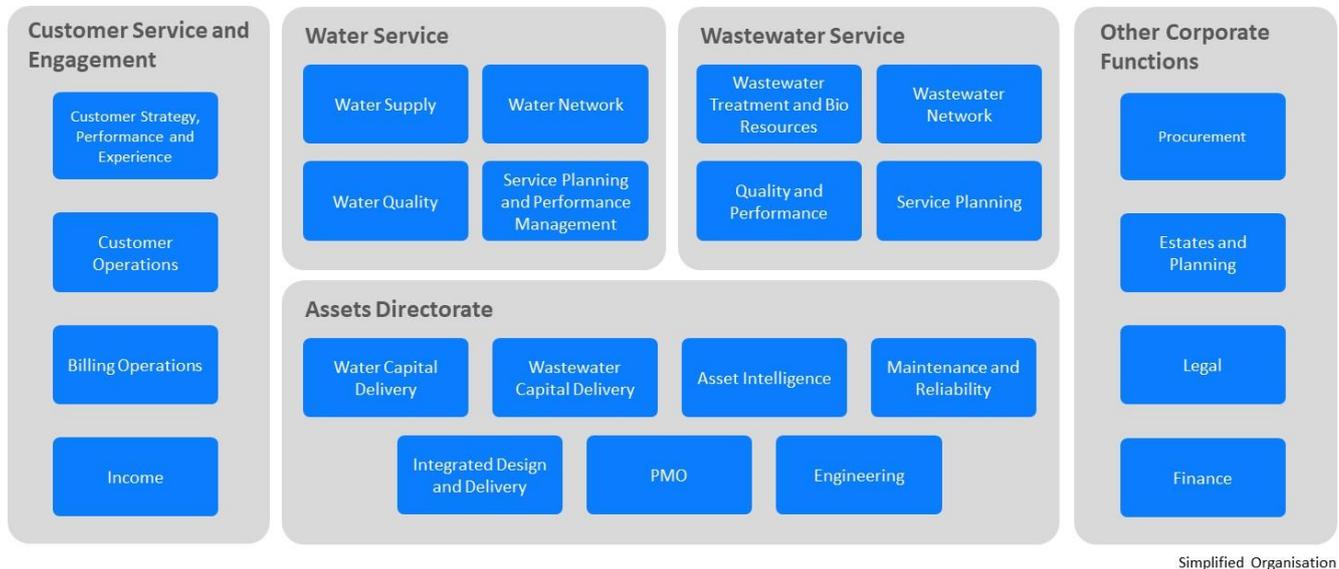


Figure 13 - Simplified NWL Organisation Chart

From the perspective of AMP 8 capital plan deliverability the Directorates and functions whose capability and capacity will impact on delivery are:

- the Assets Directorate;
- the Water and Wastewater Service Tactical Planning and Quality and Performance teams; and,
- Corporate functions such as Procurement (to a large extent), Estates and Planning and Legal (potentially to a large extent), and Finance (to a limited extent).

In addition, directorates and functions who will be impacted by the increased capital investment in AMP8 are:

- Water Supply and Water Network;
- Wastewater Treatment and Wastewater Network; and
- Assets Maintenance Team

We investigate the potential impacts on each of these business functions in Section 6.

5.1.1 The Assets Directorate

The Assets Directorate consists of Capital Delivery, Engineering, Programme Management Office, Integrated Design and Delivery, Asset Intelligence and Maintenance and Reliability Engineering.



5.1.1.1 Capital Delivery

Capital Delivery is split into a Water and a Wastewater Team.

The Water Team consists of a Portfolio Manager, 4 Programme Managers, 1 Principal Project Manager and 28 Project Managers (11 PM1s, 8 PM2s, 2 PM3s, a PM Tech, and 6 framework supplier seconded Project Managers).

The Wastewater Team consists of a Portfolio Manager, 3 Programme Managers, 1 Principal Project Manager and 29 Project Managers (15 PM1s, 7 PM2s, 6 PM3s and a PM Tech).

The tables below are extracted from the Period 7 Variance Report and show the average number of active projects per project manager type broken down by runway.

Table 2 - Average number of active projects per Project Manager in Water

	No. PMs	Projects per PM	Runway 1	Runway 2	Runway 3	Internal	Specialist
PM1	11	4.7	1.1	2.5	0.5	0.0	0.6
PM2	8	5.4	1.3	3.5	0.0	0.4	0.3
PM3	2	4.5	2.0	1.5	0.0	0.0	1.0
Framework Partner	6	3.0	0.5	1.8	0.7	0.0	0.0

Table 3 - Average number of active projects per Project Manager in Wastewater

	No. PMs	Projects per PM	Runway 1	Runway 2	Runway 3	Internal	Specialist
PM1	13	6.5	0.8	5.4	0.2	0.0	0.2
PM2	6	4.7	0.8	3.2	0.2	0.5	0.0
PM3	6	4.5	1.7	2.3	0.0	0.0	0.5
PM Tech	1	14.0	11.0	1.0	0.0	1.0	1.0
Secondees	2	3.5	0.5	3.0	0.0	0.0	0.0

The tables above illustrate that all project manager grades appear to have a healthy workload and appear on average to be well utilised.



5.1.1.2 Engineering

The Assets Engineering Team provides technical support to Tactical Planning to review the root cause and business need of emerging issues and supports development and challenge during the early phases (Concept and Definition) of the project delivery lifecycle. During the delivery phases the Engineering Team provides a critical technical assurance and acceptance role within the end-to-end process.

5.1.1.3 Programme Management Office

The PMO monitors and controls project execution performance. The team provides: estimating at the front end of the project lifecycle; on-going review of capital project delivery performance; central reporting to provide “one version of the truth”; and governance of capital approval processes. The team is currently largely outsourced but the intention is that it will be brought in-house over the next 12 months.

5.1.1.4 Integrated Design and Delivery

The Integrated Design & Delivery (IDD) team deliver low complexity capital investment works on the asset base in Water and Wastewater, Infrastructure and Non-infrastructure. These works largely sit within the Runway 1 delivery route. The IDD team works across the 3 operating regions and comprise largely internal resource who can ably deliver works in the Civils', MEICA and mains laying/alterations specialisms. The team also manage and oversee work by various tier 2 contractor partners.

5.1.1.5 Asset Intelligence

The Asset Intelligence team owns and manages asset information using it to provide intelligence that can be used to help make decisions and strategic choices about the asset base. The Asset Information Team works closely with Water and Wastewater Service Strategic and Tactical Planning Teams using Copperleaf to improve the quality of strategic and tactical planning.

5.1.1.6 Maintenance and Reliability Engineering

The Maintenance team provide planned and reactive maintenance services as part of an overall asset management approach. Reliability Engineering focus on identifying and eliminating repeat failures to improve both reliability and equipment longevity and provide oversight on the efficacy of the technical maintenance plan. The Buildings and Civils maintenance team co-ordinate a reactive repair service through 3rd party framework contractors for minor repairs to civils assets and administer the operational elements of the grounds maintenance framework. The Maintenance Team administer a wide range of specialist support contracts to deliver both statutory and regulatory compliance.

5.1.2 Water and Wastewater Directorates

In the context of capital delivery the Water and Wastewater Directorates provide 4 vital functions.

1. The Strategic Planning team leads on the creation of the 5-year plans which form the basis of regulatory submissions to Ofwat.



2. The Tactical Planning team works with Capital Delivery to create an annual Programme Plan for Water and Wastewater and produces the brief which initiate a project in the Project lifecycle process.
3. Sponsorship of the annual programme and sponsors for projects.
4. They accept handover of completed projects from Capital Delivery and put them into operation.

5.1.3 Corporate Functions

In addition to the Assets Directorate and the Water and Wastewater Directorates a number of corporate functions also have a role in the delivery of the capital plan. These include:

- Procurement: responsible for procuring and managing the relationship with Runway 1 and Runway 2 framework suppliers and procurement events using the Runway 3 select List;
- Estates and Planning, and Legal: providing expert support in all matters associated with purchasing land or acquiring wayleaves where projects involve building outside of NWL owned land; and providing expert support in all matters associated with obtaining Town and Country Planning Act approvals;
- Finance: providing support if and when innovative financing and funding approaches are investigated or applied, for example Direct Procurement for Customers (DPC). In addition, they have a role in processing payments to suppliers.

5.2 NWL AMP7 Investment Framework

5.2.1 Introduction

The NWL framework for delivering capital investment is set out in the Investment Handbook and the Capital Delivery booklet.

The key components of the framework are:

1. A programme lifecycle process
2. A project lifecycle process
3. Delivery route selection
4. Runways
5. In-house Integrated Design and Delivery for Runway 1
6. Pre-appointed framework suppliers for Runways 1 and 2
7. A select list of pre-qualified suppliers for Runway 3

5.2.2 The Programme lifecycle

The programme lifecycle is illustrated in the Investment Handbook. The principal purpose of the programme lifecycle is to create or update and monitor annualised programme plans.

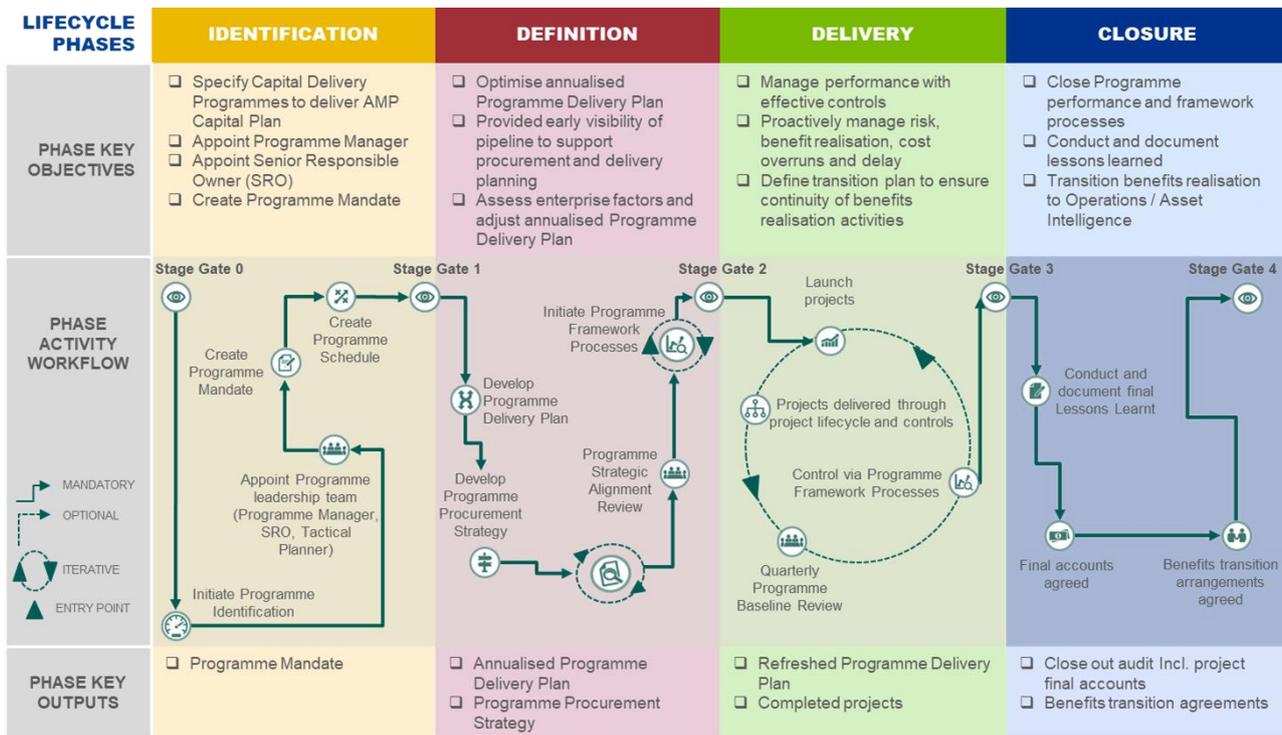


Figure 14 - The Programme Lifecycle

Prior to the commencement of the Programme Identification Phase NWG Business Plan and Service Delivery Strategies (SDS) are defined by NWG leadership and Strategic Service Planning functions. These bring together regulatory and business requirements and are informed by the Asset Intelligence team and the output from Copperleaf.

During the Programme Identification Phase the Water and Wastewater Tactical Planning teams develops 0 to 5 years prioritised intervention plans using the Service Delivery Strategies and NWG business plan and will consult with the Asset Intelligence team and PMO on initial cost and duration estimating.

5.2.3 The Project lifecycle

The project lifecycle is illustrated in the Investment Handbook. There is a generic lifecycle (see **Figure 15**) and 3 different specified routes through the lifecycle based on the different runways. Lifecycle gates and Control Points vary depending on the specified route. A typical example is provided in **Figure 16**. Runway 2 and 3 projects have to pass through all 6 stage gates while Runway 1 projects pass through only gates 1, 3, 5 and 6.



LIFECYCLE PHASES	1 ISSUE & BRIEF	2 CONCEPT	3 DEFINITION	4 DESIGN	5 BUILD & COMMISSION	6 HANDOVER & CLOSEOUT
PHASE KEY OBJECTIVES	<ul style="list-style-type: none"> Understand the project brief Understand the business case Set CP2 budget Review proposed delivery route and resources (DRSM output) 	<ul style="list-style-type: none"> Appoint resources for Concept and Definition phases Develop the business case Investigate the issues Review options Identify preferred solution Identify risks and stakeholders Create project schedule 	<ul style="list-style-type: none"> Define scope of preferred option Develop risk, stakeholder, customer and communication plans Define project constraints Develop project schedule Set project budget (CP3) Appoint contract management resources for build phase 	<ul style="list-style-type: none"> Secure CP4 contract approvals Appoint resources for Design and Build phases Undertake detailed design Develop the commissioning plan Develop Health and Safety documents Manage risks, stakeholders and customers 	<ul style="list-style-type: none"> Build solution Manage Health and Safety Manage risks, stakeholders and customers Commission solution Handover asset to operations 	<ul style="list-style-type: none"> Finalise handover procedures Learn lessons Close project
PHASE KEY OUTPUTS	<ul style="list-style-type: none"> Initial MAP Initial DRL CP2 approval 	<ul style="list-style-type: none"> Initial Project Risk Register Initial Stakeholder Management Plan Initial Customer Engagement Plan Initial Communications Plans Initial Project Schedule Initial IM/D estimate Revised MAP Revised DRL Revised DRI Concept Report Procurement Plan Scrutiny Panel approval 	<ul style="list-style-type: none"> Detailed Project Risk Register Detailed Stakeholder Management Plan Detailed Customer Engagement Plan Detailed Communications Plan Revised Project Schedule Revised MAP Revised DRL Initial Commissioning Plan Detailed IM/D estimate Definition Report CP3 project budget approval Contract documents, (for build) 	<ul style="list-style-type: none"> Designer appointed (or D&C appointment) Detailed designs Detailed commissioning plan Contractor appointed (or D&C appointment) Detailed construction schedule Revised Project Schedule Revised DRL Revised MAP 	<ul style="list-style-type: none"> New assets constructed DRL documentation substantially complete Training provided New assets handed over to operations NWL systems updated Revised MAP CP5 approval (financial commissioning) 	<ul style="list-style-type: none"> DRL documentation completed Post Project Review CP6 approval

Figure 15 - The generic Project Lifecycle

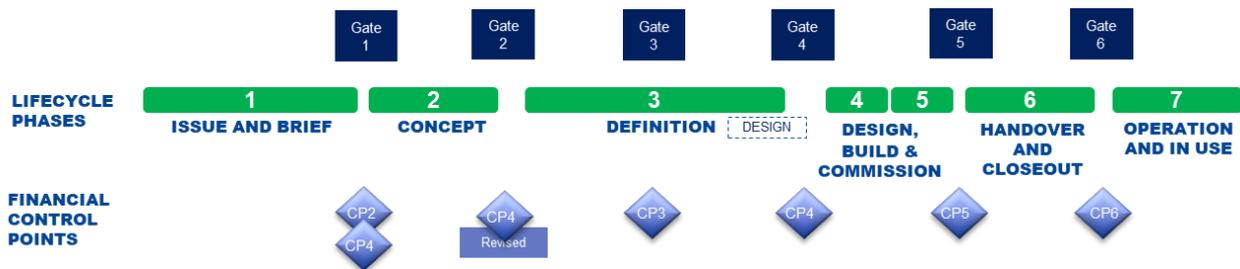


Figure 16 – Gates and Financial Control Points

During the Project Issue and Brief Phases the Water and Wastewater Tactical Plannings teams prepare and issue project briefs.

Capital Delivery are responsible for Definition, Delivery and Closure Programme Phases and Concept, Definition, Design, Build and Commission, and Handover and Closeout Project Phases. At project closeout new assets pass into the ownership of Water or Wastewater Directorates who operate and maintain the asset with support from the Assets Directorate Maintenance and Reliability Engineering Team.

5.2.4 Delivery Route Selection

Upon receiving the brief from Tactical Planning, Capital Delivery assess the optimal delivery approach using the Delivery Route Selection tool (*Figure 17*).

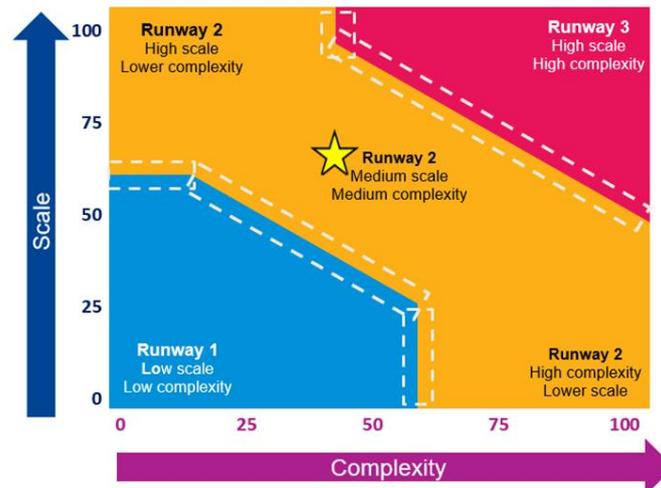


Figure 17 - Delivery Route Selection Tool

The Delivery Route Selection Tool initially enables the identification of an appropriate delivery “runway”, and a second stage identifies the specific delivery route, either: the Internal Integrated Design and Delivery team; a Runway 1 or Runway 2 framework supplier; or a bespoke competitive procurement of a supplier from the Runway 3 prequalified select list.

5.3 Procurement and Supply Chain

In this section we:

- Summarise the current NWL procurement arrangements.
- Describe some of the historic issues around procurement and supply chain management.

5.3.1 Current NWL Procurement Arrangements

NWL have put in place procurement arrangements aligned with the ‘Runway’ delivery routes (known as runways) described in *Figure 17*.

The overall procurement approach is structured as follows:

- Area based framework contracts based on a schedule of rates for Runway 1 which covers high volume short-duration works.
- Frameworks for Runway 2 (with either 1 or 2 suppliers per framework) with works allocated without competition with prices negotiated on the basis of rates submitted at tender stage.
- 3 no. select lists for Runway 3 (Water & Wastewater Networks, Water and Wastewater Treatment (NE) and Water Treatment (ESW)) with work awarded based on either a mini-tender or direct award based on a negotiated target price. For Runway 3 works NWL also have the option, where considered appropriate, to go to the wider market with a full tender process.



These arrangements are tabulated below.

Runway 1

Scheme Type	Area	Contractor(s)	End Date
Water Network Repair and Maintenance	North-East	Fastflow Pipeline Solutions	31 March '23
Common Supply Pipe Renewals	Essex	Lowman	31 March '23
Water Network Repair and Maintenance	Suffolk	T4 Survey	31 March '23
Water Network Repair and Maintenance	Essex	Crossglade	31 March '23
Wastewater Network Repair and Maintenance	North-East	ESH Construction	31 March '23

Frameworks are also in place for backfill and reinstatement work and for support to NWL's in-house provider Phoenix.

All of these frameworks are currently being re-procured on an as-is basis although NWL have allowed for the option of alternative proposals to test the markets' appetite for alternative delivery approaches around for example self-scheduling of works.

Runway 2

Scheme Type	Area	Contractor/s	End Date
Water Network Improvements	North-East	Fastflow Pipeline Solutions	31 March '24
Water Network Improvements	Suffolk	T4 Survey	31 March '23
Wastewater Infrastructure	North-East	ESH-Stantec MMB	30 September '25
Water and Wastewater Treatment	North-East	MMB	30 September '25
Water Treatment	Essex & Suffolk	IWS	30 September '25

The framework for water network improvements in the Suffolk area is a combined arrangement that includes the repair and maintenance activity shown under Runway 1. Water network improvements in the Essex area are carried out by Phoenix, NWL's in-house delivery organisation.



Runway 3

Scheme Type	Area	Contractor/s	End Date
Water and Wastewater Networks	North-East, Essex & Suffolk	ESH-Stantec Farrans Construction MMB Fastflow Pipeline Services Seymour Civil Engineering Galliford Try Avove Kier Integrated Services Clancy Docwra Morrison Utility Services	31 March '24
Water and Wastewater Treatment	North-East	ESH-Stantec Farrans Construction MMB Galliford Try Kier Integrated Services Cleantech Civils	31 March '24
Water Treatment	Essex & Suffolk	Farrans Construction Kier Integrated Services Mott MacDonald Bentley Galliford Try Morrison Utility Services Cleantech Civils Enisca Browne Aquazone	31 March '24

This arrangement was a development of the original Runway 3 approach which envisaged work being contracted solely through open tenders.

5.3.2 AMP 6/7 Procurement Issues

The majority of the contracts listed above are now more than 7 years old and perhaps unsurprisingly there have been some supply chain challenges in delivering capital investment:

- The limited numbers of contractors on the Runway 2 frameworks has been problematic. In particular the failure of Interserve and subsequent difficulties with Tilbury Douglas was the driver behind the development of the select lists which can now be accessed through Runway 3.



- There have been ongoing issues with the willingness of contractors to submit prices for work. The most obvious example of this was the Howdon Upgrade Project where only a single expression of interest was received for what is expected to be a £45m project.
- We have been told (although it is difficult to evidence) that NWL are inconsistent in their commercial approach to engaging with the supply chain. This manifests itself as a lack of clarity around whether to engage collaboratively or to use a more traditional lowest tendered price approach.



6 The Impact of the PR24 Plan

6.1 NWL Organisation

6.1.1 The Assets Directorate

The principal impact of the PR24 Plan on the Assets Directorate will be on Capital Delivery and in particular on the Wastewater, Engineering and PMO teams.

6.1.1.1 Capital Delivery

Figure 18 shows the growth in planned capital expenditure over the AMP7-AMP8 cycle split between Water and Wastewater.

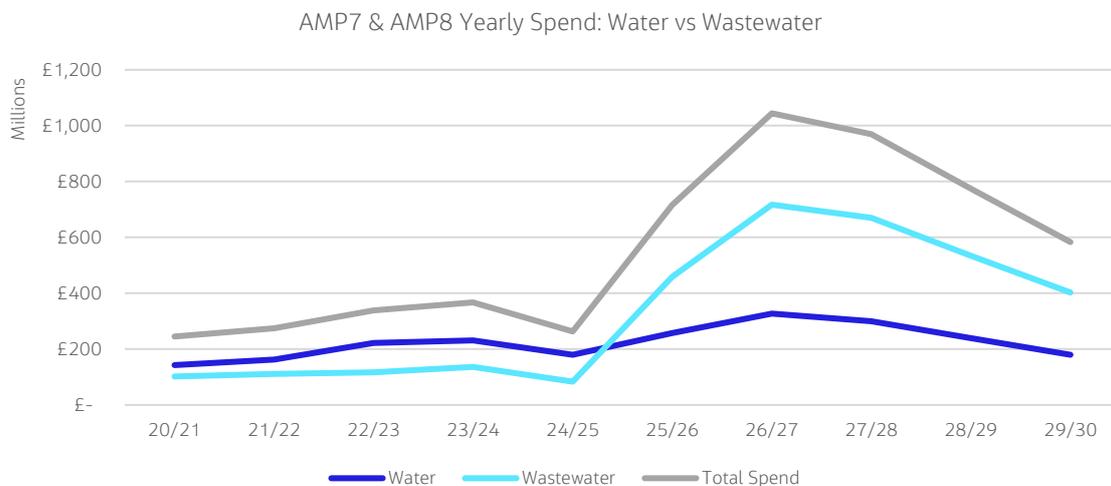


Figure 18 – AMP7 and AMP8 Yearly Spend

Figure 19 shows the planned Water capital expenditure over the AMP7-AMP8 cycle split between Water Resources and Treatment, Water Network and Smart Metering.

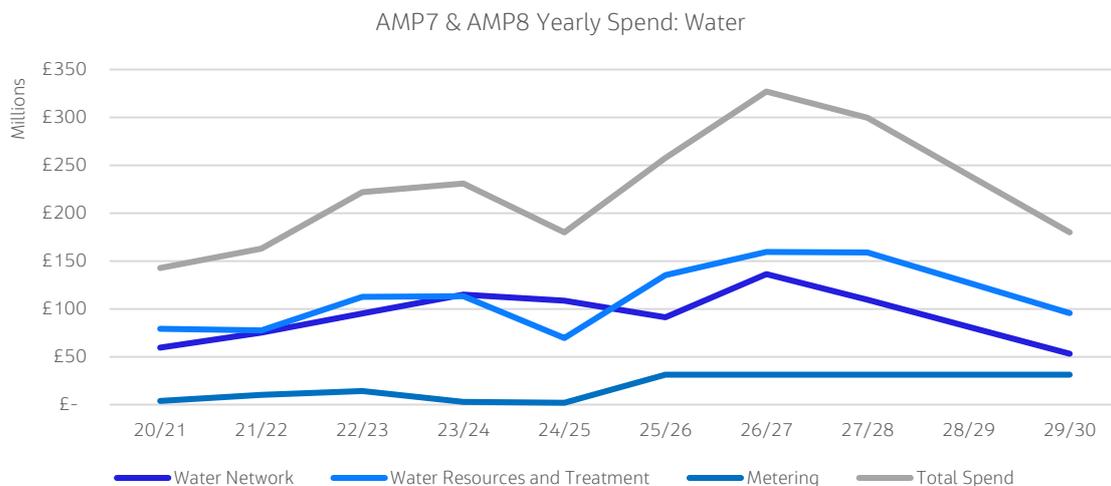


Figure 19 – AMP7 and AMP8 Water Yearly Spend



Figure 20 shows the planned Wastewater capital expenditure over the AMP7-AMP8 cycle split between Wastewater Treatment and Wastewater Network.

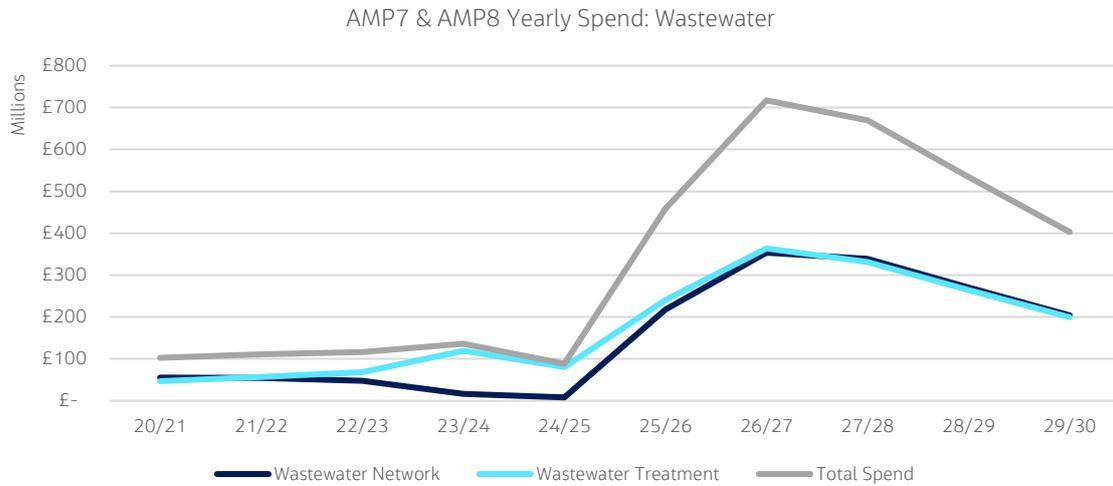


Figure 20 – AMP7 and AMP8 Wastewater Yearly Spend

Figure 21 shows what the increase in the number of individual projects would be in AMP 8 should the ratio of projects to spend be the same in AMP8 as it is in AMP7

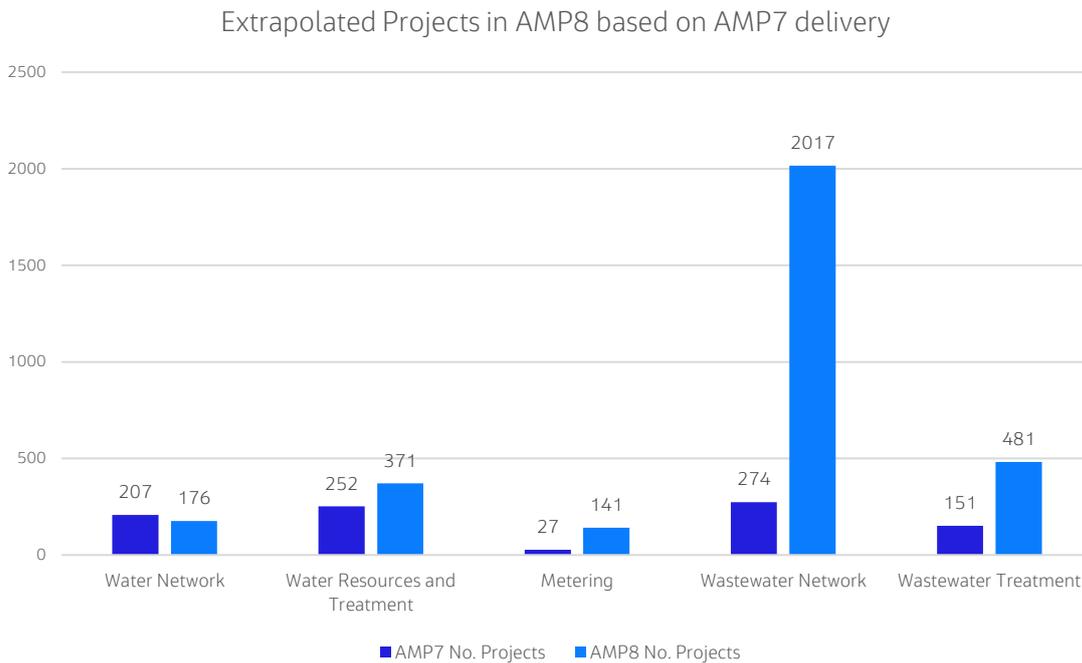


Figure 21 – An estimate of the number of projects to be managed in AMP 8

Table 4 shows for illustration purposes the possible number of project managers required in AMP 8 assuming the same utilisation of project managers in AMP 8 as AMP 7.



Table 4 - Assessment of the number of Project Managers required to deliver the PR24 Plan

	Current	AMP 8	Increase
Water			
PM1s	10	10	0
PM2s	5	5	0
PM3s	2	2	0
Secondees/Framework Partners	5	5	0
PM Tech	1	1	0
Not visible in Variance Report	5	5	0
Total Water	28	28	0
Wastewater			
PM1s	10	41	31
PM2s	6	24	18
PM3s	5	20	15
PMTech	1	4	3
Secondees	2	8	6
Not visible in Variance Report	5	0	-5
Total Wastewater	29	97	68
Total Capital Delivery	57	125	68

6.1.1.2 Engineering

To enable Engineering to provide the same level of support to Capital Delivery as it does currently we estimate that the size of the team providing that support would need to increase broadly in line with the overall growth in the number of Project Managers, approximately twice as many.



6.1.1.3 Programme Management Office

To enable the Programme Management Office to provide the same level of support to Capital Delivery as it does currently, we estimate that the size of the team providing that support would need to increase to a small extent, perhaps extra 3 to 6 additional Project Controls Managers to support the Wastewater portfolio.

6.1.1.4 Integrated Design and Delivery

The impact on the Integrated Design and Delivery Team need not be directly linked to the growth in spend in the PR24 Plan as the increase could be taken on by Runway 1 framework suppliers (subject to such capacity being secured through the procurement exercise).

6.1.1.5 Asset Intelligence

The impact of the PR24 Plan on the Asset Intelligence Team we believe is relatively small. They will be receiving, reviewing and managing additional Health and Safety Files (as built drawings, operating and maintenance manuals). We would expect this to need a small increase in team size.

6.1.2 Water and Wastewater Directorates

The principal immediate impacts of the PR24 Plan on Water and Wastewater directorates will be on the Tactical Planning Team and on the number of sponsors required to service the greater number of projects being delivered.

Towards the middle and later parts of AMP 8 additional impacts will emerge. These will include:

1. The need for additional outages to enable new projects to be commissioned and made operational
2. The need for operational staff to be involved in commissioning new assets
3. Potentially the need for operational staff to undertake training to operate new systems and equipment

In addition, as new projects are handed over there will be a larger and in some cases possibly new types of asset base to operate and maintain. Towards the end of AMP8 therefore we would anticipate the need for some level of growth in the operating and maintenance teams.

Based on our limited level of knowledge of Water and Wastewater operations and maintenance we are unable at this time to estimate the impact of the PR24 Plan on team size.

6.1.3 Corporate Functions

6.1.3.1 Procurement

Procurement are in the process of procuring new Runway 1 framework suppliers and during 2023/24 will procure new Runway 2 and potentially Runway 3 framework suppliers. The procurement of these Runway 2 and 3 suppliers, in particular if new delivery and targeted approaches are adopted to enable the PR24 Plan to be delivered, will require a significantly greater effort than was required during the AMP7 procurement. We see this as an immediate challenge and an immediate priority. There appears to be a limited amount of time to design new delivery approaches, test these with the market, develop the associated commercial and contractual thinking and design and implement procurement events.



Risk / opportunity: Urgently consider if new Runway 2 and 3 approaches are needed to Deliver the PR24 Plan. If yes, urgently develop a plan to develop the details, engage with the market, design and implement procurement events., and based upon this recruit or procure additional procurement resources accordingly.

Once in place that larger supply chain will require on-going relationship management. We therefore anticipate a need for a relatively small increase in the number of Category Managers within the Procurement function from the beginning of AMP8.

6.1.3.2 Estates and Planning and Legal

The impact on the Estates and Planning and Legal functions will be dependent on the extent to which Nature Based Solutions are adopted to reduce Storm Overflows. Our current level of knowledge of these functions and how they operate is insufficient for us to assess the impact on team size.

6.1.3.3 Finance

The impact on Finance of the PR24 Plan we estimate to be relatively small. An increased number of projects and an increased supply chain will result in more processing of monthly payments, but we do not anticipate this having a significant impact on team size.

6.2 The Investment Framework

6.2.1 The Programme lifecycle framework

We see no fundamental issues with the Programme lifecycle and from the perspective of the PR24 Plan we see no great need to make changes.

However, we have heard during our interviews that the creation of a 5 year plan at the commencement of the AMP period and the creation each year of annual programmes of work has in the past not necessarily been done in a way that has enabled the effective bundling of work into projects. Our understanding is that current practice largely results in delivery on a project-by project-basis.

We believe therefore that there is a potential opportunity to improve the practice around the use of the Programme lifecycle to make the delivery of projects more efficient. We explore this more in Section 7.

6.2.2 The Project lifecycle

We would characterise the Project lifecycle as being “control heavy”. We would not necessarily judge this as a bad thing, but inevitably it results in a burden of work on Project Managers which will limit how many projects they are able to manage at any one time.

With the potentially dramatic increase in the number of projects that will need to be delivered under the PR24 Plan we believe that the Project lifecycle will create a constraint on delivery, particularly in Runway 1 and Runway 2.

We believe that there is opportunity to reduce the level of control on Runway 1 and possibly Runway 2 which could increase the number of projects which individual Project Managers could deliver. We recognise however that to assure delivery performance this lifting of procedural control



would need to be sensibly balanced by an increase in other types of assurance activity (for example by the Programme Management Office) to minimise the likelihood of less control resulting in poor delivery performance.

We explore this more in *Section 7*.

6.2.3 Delivery Route Selection and Delivery Routes

The Delivery Route Selection methodology, and the Runway 1, 2 and 3 approach, looks to us to be fundamentally sound.

The limited range of Delivery Routes available within runways is a constraint on the deliverability of the PR24 Plan.

We explore opportunities to add new delivery routes in *Section 7*.

6.3 Procurement and Supply Chain

The AMP8 plan presents NWL with a very significant challenge in terms of the supply chain with what is a step change in the volume of work that will need to be delivered. It is important to note however that this increase is not uniform across all areas of delivery.

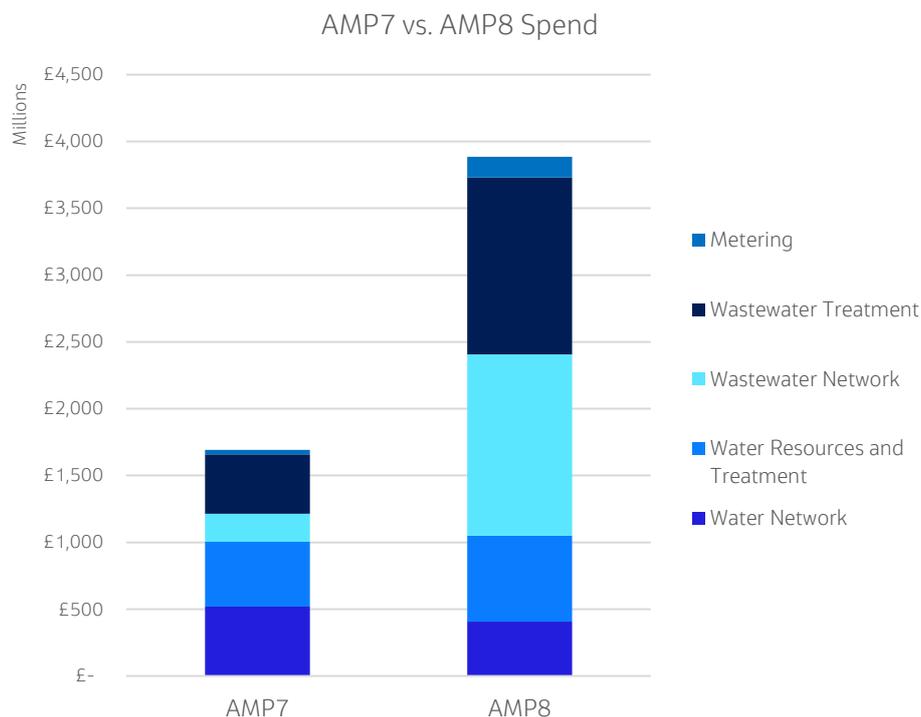


Figure 22 - Spend forecast for AMP 7 and AMP8 by investment area¹⁹

¹⁹ Ref Appendix D Table 1 and Table 2 for AMP8 assumed distribution between water network and treatment, and wastewater network and treatment.



As set out in Section 4 of this report (and based on the assumptions set out there):

- Wastewater network has a 550% increase in investment from £210 m to £1.35 bn
- Metering has a 375% increase in investment from £33m to £155 m
- Wastewater treatment has a 200% increase in investment from £445 m to £1.32 bn
- Water resources has a 33% increase in investment from £485 m to £645 m
- Water network has a 22% reduction in investment from £520 m to £405 m

This very marked difference between Water Investment on the one hand and Wastewater and Metering investment on the other will clearly need to be reflected in the procurement strategy going forward.

The increases in Wastewater investment are probably unprecedented and this is likely to be repeated across the sector making this an issue for the national supply chain not just NWL and its suppliers.

We must also consider the historically high levels of infrastructure spending in the UK which following the government’s Autumn statement appears to be set to continue. It is difficult to think of a period, certainly in recent times when contractors have had a bigger range of opportunities to bid for. Our Market research (**Appendix C**) seems to confirm this with a number of contractors thought to be unable to take on more work and one withdrawing from the water sector completely.

NWL has already seen evidence of this trend during AMP 7 where difficulty in finding contractors to bid through Runway 3 has demonstrated that the supply chain will make choices based on issues such as risk, potential margin and a shortage of resources to develop designs and to price them.

Taken together all of this demonstrates that NWL will have to work harder than ever to be a client that the supply chain wants to work for whilst continuing to demonstrate that it is delivering value for money. We explore opportunities for doing this in **Section 7**.

6.4 Ongoing NWL transformational work which should continue

Below we highlight some of the work currently being done by NWL which we believe is contributing to the transformation of the organisation and will support the business in preparing for the ramp up towards AMP8. Please note that this list is based purely on our interviews and may not be comprehensive.

Table 5 – Ongoing NWL transformational work which should continue

Area / Initiative	Description
Assets Directorate (general)	General trajectory and direction of travel toward change; do differently and better. Continue to build in-house Intelligent Client capability
PMO	Making the PMO an inhouse capability (focused on investment planning: programme visibility, resource planning, managing risks and opportunities)



Area / Initiative	Description
Service Planning Wastewater (Including Strategic and Tactical Planning)	Value-based decision making Outcomes focused based thinking – clear line of sight between schemes and supply chain performance and outcomes Better and wider value/benefits assessment for business planning
Service Planning Water (Including Strategic and Tactical Planning)	Agile team to address programme needs
Engineering	Focus on the front end – solution ideation and options assessment and influencing concept design
Procurement	Vision to move to a programmatic approach and empowering the supply chain, incentivising outperformance, and providing a stable forward look to enable sustainable growth
Smart Metering Programme	Currently creating the capability to deliver more efficiently
Appointment of a Strategic Technical Partner	Appointment of an STP to support with innovation, solution ideation and upfront engineering
Copperleaf	Deployment and optimisation of copperleaf should continue

6.5 Deliverability heatmap

The Deliverability Heatmap (*Figure 23*) below provides an overview of the scale of the PR24 Plan deliverability. This is split between Water (Network, Resources and Treatment, and Smart Metering) and Wastewater (Treatment and Network) and brings together a view of NWL and Procurement and supply chain constraints on deliverability. The heatmap represents the current state fit to deliver the PR24 plan (which we called “pre-mitigation”) and is based on a qualitative assessment using a Red-Amber-Green scoring. Red signifies a large constraint, Amber a constraint and green a small or no constraint to deliverability of PR24.

**DELIVERABILITY HEATMAP
(pre-mitigation)**

Area of Investment \ Risk Themes		NWL organisation				Procurement & Supply Chain		
		Assets Capacity	Operating Directorate Capacity	Corporate Function Capacity	Delivery Frameworks	National Market Capacity	Regional Market Capacity	Attractiveness of opportunities
WATER	Water networks	Green	Green	Green	Green	Green	Green	
	Water resources and treatment (Including Water Resource Supply Options enhancements)	Yellow	Green	Green	Yellow	Green	Yellow	
	Metering	Red	Yellow	Green	Yellow	Yellow	Yellow	
WASTEWATER	Wastewater Treatment (Including Improvement at Treatment Works enhancements)	Red	Red	Red	Red	Red	Red	
	Wastewater networks (Including Storm Overflows enhancements)	Red	Red	Red	Red	Red	Red	

Figure 23 – Deliverability heatmap: pre-mitigation



7 Opportunities to mitigate the impact of the PR24 Plan

We set out in the sections below a range of opportunities to improve deliverability of the PR24 Plan for NWL to consider. Some of these may be mutually exclusive. In **Section 8** we review opportunities and propose our consolidated recommendations.

7.1 NWL Organisational view

7.1.1 Assets Directorate

Our view is that the PR24 Plan will be undeliverable without as a minimum an increase in the size of Capital Delivery, Programme Management Office and Engineering.

7.1.1.1 Capital Delivery

There are a number of ways that this increase can be achieved, and the scale of the increase will in part be dependent on the selection of other opportunities around the Investment Framework (see **Section 7.2**) and the way that suppliers are procured and put to work (**Section 7.4**). The selection of opportunities from these other areas may also change the capability required of the Capital Projects, but this is not considered in this section.

Ways that Capital Delivery could build capacity include:

1. Direct recruitment of new NWL employees;
2. Additional secondments from framework (and potentially non-framework suppliers) including the Strategic Technical Partners;
3. Internal recruitment from within NWL; and
4. Buying project management as a service (outsourcing) of part of the Capital Projects portfolio.

In view of the potential scale of the up-sizing required (which will depend on the extent to which different delivery models and routes are adopted – see **Section 8**) we believe that all of these routes will be required to enable the PR24 Plan to be delivered.

7.1.1.2 Programme Management Office

Our understanding is that the current Programme Management office will become an in-house function during AMP7. We agree that a strong in-house Programme Management Office capability is desirable.

We suggest that the increase in the size of the PMO is less extreme than that of Capital Delivery, and we anticipate the need for it to grow by circa 3 to 6 Project Controls managers, primarily to support the considerably expanded Wastewater programme in the PR24 Plan. We do not consider that recruitment in this area should be a significant problem.

The opportunities to grow PMO capacity and build in-house capability include:

1. Direct recruitment of experienced senior and less senior project control managers and specialists.



2. Secondments from framework suppliers including the Strategic Technical Partner.
3. Extension of the existing PMO services contract or the procurement of a new supplier to provide some PMO services.

We believe that all of these approaches are viable, and it is likely that elements of all three may be required.

7.1.1.3 Engineering

For the Engineering function to provide the support to Capital Delivery that it aspires to do it will need to grow in size to reflect the increased number of projects required under the PR24 Plan.

We do anticipate that this increase will be significant and may be achieved through direct recruitment or secondees from framework suppliers including the Strategic Technical Partner.

7.1.1.4 Integrated Design and Delivery

Growth of the Integrated Design and Delivery Team is clearly an option NWL. Self-delivery can be a very cost-efficient delivery approach when done well. However rapid growth in the size of this team could result in poor quality and less effective outcomes.

The opportunities are:

1. Grow the team slowly over the course of AMP7 and AMP8
2. Grow the team more rapidly

In either case it is likely that the majority of the increased work resulting from the PR24 Plan will be delivered by Runway 1 and Runway 2 framework suppliers and the procurement events for these frameworks should be sized accordingly.

7.1.1.5 Asset Intelligence

In the later part of AMP 8 we anticipate an increased burden on Asset Intelligence, and we believe this team will need to grow in size. This will sensibly be a gradual growth over a number of years and will most likely benefit from the recruitment activity required by other parts of the Assets Directorate.

7.1.2 Water and Wastewater Services Directorates

In **Section 6.1.2** we identified that the impact of the PR24 Plan on the Water and Wastewater Directorates includes:

1. Immediate pressure on the Tactical Planning teams;
2. Immediate pressure for more Project Sponsors;
3. Pressure on the Quality and Performance teams;
4. The need for additional outages to enable new projects to be commissioned and made operational;
5. The need for operational staff to be involved in commissioning new assets;



6. Potentially the need for operational staff to undertake training to operate new systems and equipment; and
7. A quite significant increase in the size of the operational asset base with a consequent impact on the size of the operations and maintenance teams.

We recognise that the appointment of the two Strategic Technical Partners could provide a good way to rapidly strengthen the Tactical Planning Team, and in view of the comments we have heard about the creation of briefs being a bottleneck which constrains initiation of projects we suggest this is a priority action.

We see the potential need for additional Project Sponsors as a high priority and a strategy for addressing this constraint needs to be developed and agreed quickly. In our interviews we heard that Water and Wastewater approach the sponsor role differently. In Water there is a team of “professional” Sponsors, where in Wastewater sponsorship is a role delivered by a wider number of individuals. Both approaches are valid and can work. The over-arching need is to ensure that the need to provide Project Sponsors of sufficient experience and gravitas is planned for, budgeted for, and properly resourced. Our experience is that all too often adequate provision for these roles is not included in Operational plans and budgets, and as a consequence there are insufficient resources available to deliver the support and value to Capital Delivery that can make such a significant difference to the success of projects.

An opportunity for AMP8 is to plan for, budget for and resource sufficient competent and experienced operational staff to fulfil “project sponsor” roles. This will make the size of this commitment visible and allow both new sponsors to be recruited or where operational staff choose to focus on a sponsor role to allow recruitment to backfill operational roles.

The planning of outages and commissioning always becomes of greater importance as operational assets become more fully utilised (and therefore mission critical) and the amount of capital replacement, renewal and enhancement increases.

This is not an area we have investigated in depth through our interviews, but we have heard that it has become difficult to get new assets commissioned and into use as a consequence of the non-availability of outages.

An opportunity for the rest of AMP7 and AMP8 is to improve asset investment planning and improve the arrangements for planning and booking outages. It is likely this will place an additional burden on the Tactical Planning Team and is a further reason to grow that team as a priority.

The need for operational staff to be involved in commissioning of new assets, and potentially to attend training in the use of new equipment, will increasingly become an issue during AMP 8. This problem is not imminent however and there is time to develop a plan to address this constraint.

There is an opportunity to develop a strategic approach now to address the need for operational staff to support commissioning of new assets and training in the operation of new equipment.

A longer-term challenge is to assess the size of the operating and maintenance teams that will be required to operate and maintain the extended asset base that will be created in AMP8. This is not an immediate priority.



There is an opportunity as part of the PR24 Plan to develop the resourcing profile needed to operate and maintain the extended asset base that will be created during AMP8.

7.1.3 Corporate Functions

7.1.3.1 Procurement

The procurement function is currently procuring suppliers for Runway 1 and in 2023/24 will commence a procurement event for Runway 2 and potentially Runway 3. The scale of these events is likely to require growth in the Procurement Team.

We highlighted in *Section 6* that this is a high priority as there is limited time to procure the AMP8 supply chain, and only one opportunity to do this right.

The opportunities to address this growth are:

1. Recruit externally;
2. Recruit internally; and
3. Procure procurement services from the market

We anticipate a combination of these approaches may be required.

7.1.3.2 Estates and Planning

Dependent upon the scale of adoption of Nature Based Solutions the Estates and Planning team may need to provide additional support to Capital Delivery compared to AMP7.

There is an opportunity for the Estates and Planning function to grow its capacity through a combination of recruitment and placing and/or extending professional service call-off contracts (or similar) with pre-qualified organisations.

7.1.3.3 Legal

Dependent upon the scale of adoption of Nature Based Solutions the Legal team may need to provide additional support to Capital Delivery compared to AMP7.

There is an opportunity for the Legal function to grow capacity through a combination of recruitment and placing and/or extending professional service call-off contracts (or similar) with pre-qualified organisations.

7.2 The Investment Framework

7.2.1 The Programme lifecycle framework

There is an opportunity to improve capital project delivery effectiveness by directing more effort and focus into the creation of well-developed 5 year and annual delivery programmes with an emphasis on enabling work to be bundled together into a smaller number of projects.

This opportunity inevitably is linked to growing the capacity and possibly the capability of the Tactical Planning Team (*Section 7.1.2*), the Capital Delivery Team (*Section 7.1.1.1*) and the Programme Management Office (*Section 7.1.1.2*).



7.2.2 The Project lifecycle

The opportunities to improve the effectiveness and efficiency of the Project lifecycle include:

- Reducing the level of control exercised on Runway 1 projects
- Better utilisation of the “multiple output” delivery routes in Runway 1 and Runway 2 (links to *Section 7.2.1*)
- Creation of new delivery routes in all runways (see *Section 7.3*)

7.3 New Delivery Routes

In the sections above we have predominantly focussed on our “top down” analysis of the impact of the PR24 Plan on the existing business organisation and delivery lifecycles. In this section we look more specifically at the major areas of growth in expenditure in the PR24 Plan, and suggest targeted opportunities for improving delivery in these areas.

7.3.1 Storm Overflows and Wastewater Treatment

Storm Overflows and Wastewater Treatment are a significant portion (63%) of the total growth in the PR24 Wastewater Plan.

Storm Overflows will almost certainly consist of a combination of traditional “on-network” solutions and new nature based solutions.

Wastewater treatment projects will be a combination of phosphorous removal, nutrient neutrality, water quality monitoring, capacity, renewal and replacement.

Broadly speaking projects in Wastewater currently are delivered on a project by project and supplier by supplier basis.

The opportunities to do things differently are:

1. Create a holistic “enterprise” approach to the delivery of the entire 5 year Wastewater programme.
2. Create an Integrated Delivery Team (IDT) approach to deliver Wastewater “sub-programmes”. For example an IDT for Storm Overflows and an IDT for Wastewater Treatment.
3. Create an Integrated Delivery Team approach to definable elements. For example an IDT for Phosphorous Removal and an IDT for Sewerage Treatment Replacement and Renewal.

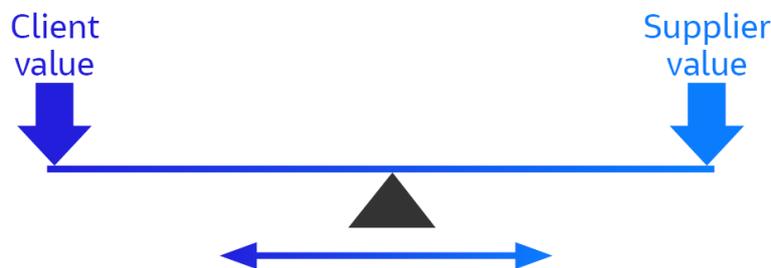
An enterprise approach (based upon the Institution of Civil Engineers / Infrastructure Clients Group Project 13 Report “From Transactions to Enterprise”) involves the creation of a delivery vehicle, enabled by procurement and contracts, bringing together all of the necessary capability and capacity to deliver agreed outcomes to the benefit of client and suppliers. Good examples of an enterprise approach are the Anglian Water Strategic Pipeline Alliance (SPA) and National Highways Smart Motorway Alliance. A number of Network Rail Regions are in the process of procuring suppliers to form enterprises for their next regulatory control period (CP7) commencing in April 2024.



An Integrated Delivery Team approach enables closer cooperation between client teams and suppliers, integrated planning of work and enables many (but not all) of the benefits of an enterprise approach. Examples of an Integrated Delivery Team approach are Highways England’s Managed Motorways / Smart Motorway Programme and Heathrow Airport Limited’s Expansion Programme. Both Highways England and Heathrow adopted an Integrated Delivery Team approach as a stepping stone between conventional project by project delivery and the adoption of a “full” enterprise approach.

The intent of both approaches is to get supplier knowledge and expertise involved in investment and delivery planning and solution ideation / options selection at a much earlier stage than traditional “design – buy – build” approaches and more front end involvement in planning than “design and build” and Early Construction Involvement (ECI) approaches. The benefits of this involvement in investment planning is that it enables plans and solutions to be optimised for both the client and for suppliers. This may include smoothing the investment spend profile, better balancing resource constraints (by removing peaks and troughs in the plan), reducing the impact on operations by better consideration of the impact of construction from the outset, and better solutions which better align client requirements and supplier capability and expertise.

The emphasis of both approaches is to focus on value and outcomes, and the overarching principle is to enable “win : win : win” (you win : I win : we both win) outcomes for client and suppliers. With reference to the simple see-saw diagram below, this is achieved by both parties seeing the benefit in finding the best balance between value for the client and value for the supplier, with both parties being willing to be flexible on locating the best point for the fulcrum of the balance.



Designing, procuring and forming an enterprise requires a significant level of effort, and in our experience will typically require at least 24 months to design and procure, and another 6 to 12 months to form and reach a minimum level of maturity.

The time required to design, procure and form an IDT is not negligible, but can be significantly less than that required for an enterprise.

Direct Procurement for Customers (DPC) and other funding models

For Wastewater Storm Overflows and Wastewater Treatment we have not explored opportunities for Direct Procurement for Customers or other financing based delivery models. On the basis of our understanding of the portfolio we do not believe these approaches are either attractive for investors or practical for the operation of the network. because a) they are not 'separable' and b) whilst the programme is above £200m individual schemes are not.



7.3.2 Water Resources Supply Options

The Water Resources Supply Options in the Suffolk area consist potentially of 3 comparatively large schemes (£35m or more) and one smaller scheme of circa £5m. Collectively they are estimated at circa £160m.

All of these schemes fall into Runway 3 of the Delivery Route Selection Tool.

As single “1 off” projects there are relatively few opportunities for delivering these entirely differently. The delivery principles we would advocate would be:

1. Identification and early appointment of small group of “Suffolk/Essex” area Runway 3 framework suppliers;
2. The early selection (by competition or by direct appointment) from that framework of delivery suppliers to support solution ideation / option selection and continuity through design and construction;
3. A streamlining or refinement of the Runway 3 Delivery Route consistent with (1) and (2) above.

Direct Procurement for Customers and other funding models

For Water Resources Supply we have not explored opportunities for Direct Procurement for Customers or other financing-based delivery models. Even when taken as a whole we believe these schemes will not be attractive for investors because a) they are not 'separable' and b) whilst the programme is above £200m individual schemes are not.

7.3.3 Smart Metering

There is a significant increase in investment in smart metering in PR24 compared to AMP 7. The total spend in AMP7 is £33m. The planned spend in PR24 is circa £156m.

Our understanding of the AMP7 approach to delivery is largely based on building internal capability and capacity.

We endorse that this model can achieve highly cost effective delivery. However, a growth in the PR24 Plan to circa 5 times the AMP7 investment suggests that relying solely on self-delivery may not be a good strategy.

The opportunities for AMP8 include:

1. **Procuring additional installation capacity in a broadly conventional way (effectively installation only with work planning and work allocation done by a client team.**
2. **Procuring a complete service supply where the supplier takes on the responsibility for work planning, work allocation and installation. Service performance would then be measured on various metrics related to performance against plan, customer satisfaction and other key performance indicators.**
3. **Although the level of investment does not meet the Ofwat £200m threshold there may be opportunity to explore a DPC approach.**



7.3.4 River Water Quality Monitoring

River Water Quality Monitoring is a new requirement placed on Water Companies and therefore NWL need to decide how best to deliver this requirement in AMP8.

Similar to Smart Metering the opportunities are:

1. **Procuring installation capacity in a broadly conventional way (effectively installation only with work planning and work allocation done by a client team).**
2. **Procuring a complete installation service where the supplier takes on the responsibility for all work planning, work allocation and installation. Service performance would then be measured on various metrics related to performance against plan, customer satisfaction and other key performance indicators.**
3. **Procuring a complete planning, installation maintenance and operation service. Service performance would be measured on various contractually agreed metrics related to performance against plan, customer satisfaction and other key performance indicators.**
4. **Although the level of investment does not meet the Ofwat £200m threshold there may be opportunity to explore a DPC approach.**

7.4 Procurement and Supply Chain

Based on what you have told us it seems clear that the current procurement model struggles because it relies heavily on locally based contractors who cannot always meet your requirements but also struggles to attract larger players from outside the regions in which you operate.

Based on this premise there must be opportunities to move to a model that has some or all of the following features.

- **An approach that helps existing trusted local partners to grow**

In general companies will invest in growth where they have confidence in the reliability, scale and timing of an opportunity to increase their turnover. There is an opportunity to begin to engage, probably informally at first, with your existing supply chain to establish what factors would motivate them to grow their business to give NWL greater confidence in their capacity to deliver your increased investment.

- **An approach that acknowledges that growth is not spread equally across water / wastewater etc.**

The existing NWL model has a degree of 'one size fit all'. There is an opportunity to adjust this so that the areas of greater growth are handled differently. This might be as simple as having more contractors on a specific framework but may involve a quite different approach to engaging with the supply chain.

- **An approach that encourages new entrants (who are based locally) to at least 'dip their toe' into the water sector.**

There are always barriers to new entrants, sometimes as simple as a lack of familiarity with the nature of a new work whilst sometimes they are more complex such as a requirement for



specialist equipment. However, it may be the case that there are elements of your programme that are more accessible for newcomers to the supply chain than others and there is an opportunity to explore this in more detail.

- **An approach that gives existing players from outside the region incentives to set up a local base**

It is undeniable that the North-East, Suffolk and probably parts of Essex present a geographical challenge for medium-sized contractors who might otherwise be interested in a longer-term relationship with NWL. Given the right approach (probably in terms of reliability of workload) this should not be insurmountable. There is an opportunity to engage, probably informally at first, with a selection of these contractors to establish what factors would motivate them to set up a local base to service delivery of your investment requirements.

- **An approach that is attractive to National Scale Tier 1 suppliers for some projects.**

There is likely to be an ongoing requirement on certain (probably larger) projects to involve National Tier 1 suppliers. This is likely to involve elements such as the costs of tendering and the transfer of risk. There is an opportunity to develop a coherent strategy for these types of works that can be made visible to the supply chain.

- **The growth of in-house construction capability to take on larger, more complex work.**

There is an opportunity with a larger ongoing workload to consider the size and scope of in-house construction capability. It may be possible to improve the reliability of overall investment by self-delivering additional construction activity.

- **Performance management**

Regardless of any changes to the NWL procurement model there is an opportunity to improve the way in which the allocation of work is based on performance. This is a relatively complex area requiring proper analysis. It is important for instance not to make performance management an 'industry' in its own right or to allocate performance scores on the basis of metrics beyond the control of suppliers. There are numerous examples of 'unintended consequences' but also a good level of best practice to draw on.

- **Procurement based on Capability and Capacity**

Procurement typically focuses on capability and often carries out only a limited assessment of a bidding organisations capacity (current and future) to deliver work. There is an opportunity given the constrained nature of the supply chain to develop in this area.

Looking at NWL's challenge in terms of the 5 areas of investment these opportunities will probably apply as follows:

Water Resources – we understand that the main element of the growth of 33% flows from a number of larger schemes in the South-East; this will probably require national scale tier 1 suppliers. As described above procurement may need to focus on developing schemes for a tender exercise that is attractive to the supply chain. Communicating the new approach to potential



suppliers well in advance and giving them good information on when the opportunities will be coming to market will also be important.

Water Network – Our analysis suggests a 22% drop in investment in this area so additional capacity will not be required. Focusing procurement on capacity as well as capability will help to ensure that NWL contract with the right number and mix of suppliers and the allocation of work linked to performance should promote high quality delivery.

Wastewater Network – The massive 550% increase (with further growth in successive AMPs) in investment driven by storm overflow requirements will clearly require significant new resources. Initial engagement with MMB and ESH-Stantec could be used to establish their potential for growth and likewise conversations with your current Runway 3 suppliers should help to shape the way in which work is packaged to maximise buy-in from the supply chain. If the decision is taken to go down the IDT route (see **Section 7.3.1**) then the procurement exercise will need to include an assessment of suppliers' appetite and capability to work in this way.

We understand that NWL have an aspiration to introduce nature-based solutions in this area and this does present an opportunity to explore a new supply chain. As the construction work is relatively low-tech it should be possible to find local capacity, but this will obviously require an element of market creation. NWL might like to consider starting this process with an engagement event to build awareness amongst potential providers.

Wastewater Treatment – Another very large increase of as much as 200% and will require a similar approach to that described for Wastewater networks to establish what MMB are likely to be able to deliver and the optimum approach for securing additional support. If the decision is taken to go down the IDT route then the procurement exercise will need to include an assessment of suppliers' appetite and capability to work in this way.

Jacobs has existing relationships with a significant proportion of UK water companies and as with NWL most of them are in the process of coming to market for the delivery of their AMP8 programme. We have set out here activities we're aware of at neighbouring water companies.

- United Utilities have already started an exercise of engaging with the supply chain. An engagement exercise led by their CEO, conducted in May of this year, showed that they are also anticipating a likely doubling of investment at the start of the next AMP due to WINEP drivers. Feedback from the suppliers showed that Resources and Capability was the most dominant topic in terms of external factors affecting the delivery of the AMP8 programme. The second factor which most concerned the supply chain was inflation alongside economic uncertainty. The PIN notice issued by UU in September gave a good indication of how they are likely to procure services, with a delivery partner model called out specifically.
- In October 2022 Yorkshire Water conducted a market testing. This indicated they are considering coming to market with an alliance model which is incentivised against both outcomes and the business plan but also some multi supplier frameworks to cover other elements of scope. They have also been checking what incentive mechanisms are likely to interest the market the most.
- Anglian Water (AWS) organised a series of paid attendance workshops with the framework providers on their SRO programme, where they assessed and assisted in setting up Anglian's



delivery model and allocation of work. This allowed AWS to secure the best people early (recognising the industry-wide skills gap) and allowed the suppliers to commit to recruitment and retention that delivers the best outcomes for all (including the long-term resilience of the sector).

- Given the focus on Nature Based Solutions across the industry and the relative lack of maturity of knowhow in the UK a number of other water companies have been engaging with the supply chain to understand existing capacity and capability. Severn Trent have recently prequalified a long list of suppliers across technical and delivery elements of Nature Based Solutions. United Utilities also specifically called out in their recent PIN they are likely to come to market for a framework for “Capabilities relating to the delivery of Nature Based / Green Solutions (including project conception, design and implementation)”

In addition to these specific examples and across all companies we have engaged with there seems to be a general appreciation that given the supply side pressure that exists efforts must be made to understand what would increase attractiveness in the market.

7.5 Direct Procurement for Customers

We understand that Ofwat is moving to a position where the Direct Procurement for Customers approach is mandated for works that meet pre-determined cost and ‘separability’ criteria. Feedback from investors suggests that schemes with a value of less than £200m and/or without a very clear degree of separation are unlikely to be attractive to them. On this basis it seems unlikely that any part of the AMP8 investment programme would be deliverable through DPC.

The two areas that may be sufficiently separable, and are close to achieving the Ofwat £200m suggested threshold, are the smart metering programme and river water quality monitoring. Of the two, smart metering is the better understood at this moment in time and thus probably the stronger candidate.

It will obviously be important to keep any evolving guidance from Ofwat in this area under review.



8 Recommendations for AMP8 – The Way Forward

8.1 Recommendations

Recommendation 1 - Wastewater Storm Overflows and Treatment Works

We recommend the creation of two Integrated Delivery Teams to focus on the delivery of the circa £1.9b of work in these areas within the PR24 Plan.

The Storm Overflow Delivery Team should include all of the key capability and capacity to deliver the circa £630m of storm overflow work in the plan. This should include capability and capacity in:

- Design and delivery of conventional on-network engineering solutions;
- Design and delivery capability of nature based off-network solutions;
- Design and installation of smart networks solutions;
- Estates and Planning and Legal support for off-network solutions;
- NWL Wastewater Project Sponsors (probably not full time);
- NWL Wastewater Tactical Planning support (not full time);
- NWL stakeholder engagement team (possibly not full time);
- NWL Assets Engineering, Asset Intelligence and Maintenance and Reliability support (possibly not full time);
- Strategic Technical Partner support; and,
- NWL project management, commercial management and project controls managers.

This dedicated integrated team will own the 5-year programme of storm overflow work and will create and deliver the integrated investment / delivery plan seeking always to maximise value for both NWL and suppliers, working as a single team with clear objectives, shared values and a culture of performance excellence and continuous improvement.

The Wastewater Treatment Team should include all of the key capability and capacity to deliver the circa £1.3bn (base and enhancement) of sewage treatment works work in the plan. This should include capability and capacity in:

- Design and delivery of all renewal, replacement and enhancement works, including infrastructure and non-infrastructure;
- Design and delivery of phosphorous removal and nutrient neutrality;
- NWL Wastewater Project Sponsors (probably not full time);
- NWL Wastewater Tactical Planning support (not full time);
- NWL Assets Engineering, Asset Intelligence and Maintenance and Reliability support (possibly not full time);
- Strategic Technical Partner support;
- NWL project management, commercial management and project controls managers.

This dedicated integrated team will own the 5-year programme of wastewater treatment work (both base and enhancement) and will create and deliver the integrated investment / delivery plan



seeking always to maximise value for both NWL and suppliers, working as a single team with clear objectives, shared values and a culture of performance excellence and continuous improvement.

This recommendation will need to be supported by:

1. The appointment of specialists to support in the design of integrated delivery ways of working including procurement expertise to design and manage market engagement.
2. The design of a delivery model including consideration of operating principles, commercial principles, and contracting principles.
3. The design of a procurement strategy and plan to procure in an appropriate way the supplier capability and capacity required. This will include market engagement to ensure the market supports this approach and is “warmed up” prior to the commencement of a procurement event.
4. The sizing of the NWL elements of the integrated team including Assets, Wastewater and Corporate functions.
5. The design of an engagement and development plan for all NWL resources who may potentially be part of the integrated teams. This will need to address the behaviours, culture and practices of facilitative leadership collaborative integrated team working. The importance of this investment in people should not be overlooked or minimised.
6. The creation by NWL, and finalisation by the integrated team once formed, of a joined up, end to end programme and project lifecycle processes and procedures informed by the NWL Investment Handbook and best practices proposed by supplier team members.

Recommendation 2 - Water Supply Resources

We recommend the creation of a Runway 3 delivery route and supplier frameworks dedicated to the Suffolk area to deliver the circa £160m of Water Supply Resources schemes in the Suffolk region.

This Runway 3 framework would include a small number of delivery suppliers with the capability to deliver these schemes either on a “build only” or a “design and build” approach. We recommend that the decision on “build only” or “design and build” be taken only after comprehensive market engagement with a southeast based suppliers.

Subject to the “build only” or “design and build” decision the shape and size of the “Suffolk Area Runway 3 Framework” can be determined and a procurement event designed.

This recommendation will need to be supported by the appointment of a procurement expertise to design and manage market engagement and to design and manage the procurement event and commercial and contractual expertise to design an appropriate commercial/contractual model.

Recommendation 3 - Smart Metering

We recommend the procurement of a small number (probably 2 or 3) of suppliers to deliver area wide smart metering in Suffolk and Essex. This may be on an “install only” or “manage and install basis”, this decision to be made only after engagement with potential suppliers in the Suffolk / Essex area.



Subject to the “install only” or “manage and install” decision, an appropriate commercial and contractual model can be designed, the shape and size of the “Suffolk / Essex Smart Metering Framework” can be determined and a procurement event designed and implemented.

This recommendation will need to be supported by the appointment of procurement expertise to design and manage market engagement and to design and manage the procurement event, and commercial and contractual expertise to design an appropriate commercial/contractual model.

Recommendation 4 - River Water Quality Monitoring

We recommend the procurement of a small number (probably 1 or 2) of suppliers to deliver river water quality monitoring. This may be one national supplier or 2 regionally based suppliers. The scope of the service could be “install only”, “manage and install” or “manage, install and maintain and operate” basis. We recommend that all of these decisions are made only after engagement with potential suppliers.

Subject to these decisions the shape and size of a procurement event can be designed and implemented.

This recommendation will need to be supported by the appointment of procurement expertise to design and manage market engagement and to design and manage the procurement event. In addition, commercial and contractual expertise will be required to design an appropriate commercial / contractual model and a NWL in-house team formed to oversee the design and procurement activity and in due course to manage the appointed suppliers.

Recommendation 5 - Smoothing the spend curve

We recommend that the PR24 Plan investment phasing be reviewed and the spend be rephased to the extent possible to achieve a smoother growth curve. This should consider the phasing of the remaining AMP7 work, opportunities to bring PR24 forward (as a minimum to avoid the downturn currently seen in the AMP7 spend), to reduce the peaks in 2026/27 and 2027/28 and to avoid the sharp downturn in spend in 2028/29 and 2029/30.

This action alone will dramatically improve the likelihood of successfully delivering the P24 Plan.

Recommendation 6 - Project Manager Competence

In readiness for the significant ramp up in capital investment in AMP8 proposed in the PR24 Plan we recommend a review of project manager competence to deliver this larger level of investment competently and reliably for NWL.

Subject to the findings of this review development plans and training needs should be identified and implemented as appropriate.

Recommendation 7 - NWL establishment headcount for AMP8

Alongside the development of potential new ways of working and new frameworks proposed above, NWL should carefully consider the scale of its establishment headcount across all directorates to satisfy itself that the implications of the PR24 Plan are properly understood and adequate provision is made in the plan for growing all areas of the business in proportion to the planned increase in capital expenditure.



This exercise needs to be undertaken “bottom up” and be fully informed by the recommendations above and the associated decisions to be taken in due course.

8.2 Further considerations

8.2.1 Deliverability heatmap

Our recommendations above consider the actions/measures that NWL can take to maximise the likelihood of delivering the PR24 Plan as it currently is.

Based on the implementation of the recommendations we have re-considered the deliverability of the PR24 Plan. This is illustrated in the second heatmap in **Figure 24**, which we classified as post-mitigation (we also include the Heatmap pre-mitigation for comparison purposes).



Figure 24– Deliverability heatmaps: pre and post-mitigation



The post-mitigation heatmap shows that in a number of areas we believe there will still be a degree of delivery risk as follows:

- For water resources and treatment, from a procurement point of view and as we have said earlier in the report, there will be an unusually large number of opportunities available to the supply chain and it may be a challenge to make the opportunities in Suffolk sufficiently attractive.
- For wastewater treatment adopting an IDT approach will require new skills and competencies which on the whole NWL are unlikely to have and the IDT approach does potentially require a higher level of input from operational departments than a traditional approach. A fully effective IDT will require configurational changes in NWL process, procedure and governance that are often difficult to secure full agreement on. Although the IDT approach should be attractive to the market it may be challenging to secure the capability and capacity you require, due to competition with other industries and within the water sector and issues with the timing of decisions from Ofwat that may make it difficult to give suppliers the confidence around future workload they might look for if they are to invest in growth.
- Much of what we have described above for wastewater treatment will equally apply for wastewater networks. The exception is for input from operational departments where the relatively more straightforward nature of the work should see this being less of an issue.

We therefore further recommend the following.

8.2.2 Removing discretionary expenditure

We recommend that the PR24 Plan be reviewed and careful consideration be given to the removal of discretionary spend where possible.

8.2.3 Challenge requirements

Much of the PR24 Plan is driven by requirements imposed by Ofwat and DEFRA. As these requirements are imposed simultaneously on all Water Companies it is inevitable that this will lead to significant pressure on the supply market and very likely to overheating and localised inflation in the sector. This will drive up the cost of delivery (over and above the already significant inflationary pressures created by the rising cost of energy) and cannot be good for water companies, the industry or for consumers.

We recommend that NWL lobby Ofwat and DEFRA directly and indirectly (for example through Water UK) to relook at the requirements to be imposed in AMP8 and to either rephrase some of these or to engage with Water Companies and their suppliers to establish a plan which will minimise the overheating and localised inflation in the market.



9 Conclusions

Our analysis of NWL's investment forecasts for AMP8 have confirmed the scale of the challenge posed by what will be an unprecedented step up in activity. We have also confirmed that this is being driven very much by activity on the wastewater side of the business.

To respond successfully to a challenge of this scale NWL will need to act across a wide range of its business activity.

This report sets out:

- **Changes NWL could make to the way it does things**

We recommend the creation of two Integrated Delivery Teams to focus on the delivery of circa £1.9b of work in within the PR24 Plan. The two teams, one for Stormwater Overflows and the other for Wastewater Treatment would include all of the capability and capacity required to deliver the work in their respective programmes.

- **Key functions where NWL should increase its headcount**

Our view is that the PR24 Plan will be undeliverable without as a minimum an increase in the size of Capital Delivery, Programme Management Office and Engineering. We have made recommendations around how this need might be met which include direct recruitment, additional secondments from framework (and potentially non-framework suppliers) including the Strategic Technical Partners and outsourcing through service contracts.

- **Changes NWL could make to the way it works with its supply chain**

The Integrated Delivery Team approach will ensure that supplier knowledge and expertise is involved in investment and delivery planning and solution ideation / options selection at a much earlier stage than traditional "design – buy – build" approaches and more front-end involvement in planning than "design and build" and Early Construction Involvement (ECI) approaches. The benefits of this involvement in investment planning is that it enables plans and solutions to be optimised for both the client and for suppliers. This may include smoothing the investment spend profile, better balancing resource constraints (by removing peaks and troughs in the plan), reducing the impact on operations by better consideration of the impact of construction from the outset, and better solutions which better align client requirements and supplier capability and expertise.

- **Changes in the way work is taken to market in order to make it more attractive to the supply chain**

It seems clear that the current procurement model struggles because it relies heavily on locally based contractors who cannot always meet your requirements but also struggles to attract larger players from outside the regions in which you operate. We have made a number of suggestions around the use of market engagement to support the development of a commercial/procurement strategy that makes NWL a 'client of choice'.



Our analysis also suggests that even if all these things are done and done well there will be residual risks around successful delivery. We suggest that in addition to all of the focused improvement activity we have recommended NWL should:

- Remove discretionary spending where possible;
- Find ways to directly and indirectly influence Ofwat and DEFRA around a more sustainable phasing of investment over AMP8 and successive investment periods.



10 Next Steps

We have set out in **Section 8** a comprehensive set of recommendations.

In this section we:

- Present a series of immediate next steps;
- Present an indicative timeline for Wastewater IDTs and Suffolk Area Runway 3 Framework procurement.

Below we present a table listing a series of immediate next steps, their priority and time proposed for completion.

Table 6 – Recommended Immediate Next Steps

#	Description	Priority
1.	Wastewater Storm Overflow and Treatment Works IDTs.	
1.1	Consider recommendation and decision	December 2022
1.2	Appoint specialists to support design of delivery model	January 2023
1.3	Appoint procurement expertise to undertake market engagement and design and implement procurement	January 2023
2.	Suffolk/Essex Runway 3 Framework	
2.1	Consider recommendation and decision	December 2022
2.2	Appoint procurement expertise to undertake market soundings	January 2023
2.3	Appoint commercial / contractual expertise to create the contractual model	January 2023
3.	Smart Metering	
3.1	Consider the recommendation and decision	December 2022
3.2	Appoint procurement expertise to undertake market soundings	TBD
3.3	Appoint commercial / contractual expertise to create the contractual model	TBD
4.	River Water Quality Monitoring	
4.1	Consider the recommendation and decision	December 2022
4.2	Appoint procurement expertise to undertake market soundings	TBD
4.3	Appoint commercial / contractual expertise to create the contractual model	TBD
4.4	Create an in-house team to manage RWQM	TBD
5.	Smoothing the spend curve	Immediate
6.	Project Manager Competence	Q2/Q3 2023
7.	NWL establishment headcount	Q1/Q2 2023
8.	Removing discretionary spend	Immediate
9.	Lobbying Ofwat and DEFRA	Immediate and on-going



An Indicative timeline for Wastewater IDTs procurement and Suffolk Area Runway 3 Framework procurement is shown below.



Figure 25 – Wastewater IDTs and Suffolk Area Runway 3 Framework procurement timeline



11 Acknowledgements

We want to express our gratitude to the NWL team who contributed to our work through the interviews and information provided, to the Steering Group for providing regular direction and feedback, and in particular to Richard Seales for facilitating the whole assignment and acting as a sponsor for the work.

Finally, we would like to thank NWL for giving us the opportunity to carry out this commission. We believe that the adoption of our recommendations will significantly improve the deliverability of the PR24 plan.



APPENDICES



Appendix A – List of interviews held

Interviews with the NWL team

Name	Role	What	Type of call	Held
Andrew Beaver	Regulation Director	Direction and Engagement	1:1	02/11/2022
Monisha Gower	Assets Director	Direction and Engagement	1:1	01/11/2022
Richard Warneford	Wastewater Director	Direction and Engagement	1:1	02/11/2022
Keith Haslett	Water Director	Direction and Engagement	1:1	01/11/2022
Phil Hicks	Head of Procurement	Frameworks	1:1	03/11/2022
Ben Clark	Head of Engineering	Strategic Technical Partners	1:1	10/11/2022
Rich Saunders	Head of Maintenance	Maintenance	1:1	03/11/2022
Andy Duff	Regulatory Programme Manager	PR24	1:1	03/11/2022
Phil Smith	Corporate Finance Manager	Finance	1:1	07/11/2022
Gary Adams	Head of Smart Metering Programme	Smart Metering	1:1	04/11/2022
Mike Madine	Head of WW Service Planning and Compliance	WW Strategy	Group Call	10/11/2022
Carol Cairns	WW Strategic Planning Manager	Wastewater PR24 Lead		
Kathryn Waugh	Wastewater Tactical Planning	WW Tactical Plan		
Colin Day	Head of Water Service Planning	Water Strategy	Group Call	11/11/2022
Josh Mitchell	Water Service Tactical Planning	Water Services Tactical Plan		
Richard Seales	Wastewater Portfolio Manager	Wastewater Delivery	Group Call	01/11/2022



Name	Role	What	Type of call	Held
Jonny Belmont	Water Portfolio Manager	Water Investment Delivery		
Alastair Tawn	Integrated Design and Delivery Manager	Internal delivery team		
Tom Silkstone	Programme Manager	Experience of delivery		
Graham Southall	Head of Commercial	Commercial	1:1	08/11/2022
John Murray	Section Manager Procurement	Commercial	1:1	16/11/2022
Neil Rutherford	Finance	Finance	1:1	11/11/2022

Interviews with Jacobs SMEs

Name	Expertise area
Neil Delaney	DPC and SRO Delivery
Alex Martin	UK Water Regulation Lead
Paul Wheeldon	Phosphorous Removal SME
Tracy Britton	Smart Metering and Smart Networks SME
Brett Korteling	Water Resources SME
Stathis Giannoustas	Storm Overflows SME
Will Barnett	Supply Chain Insight (South/ South East UK)
Chris Austin	Supply Chain Insight (North East)



Appendix B – List of documents consulted

Documents issued by NWL

Document title	Description	Category
NWL Variance Report P7	Current AMP project performance data	Project Performance
Copy of Deliverability Info Request RDS	Runway input to Variance Report P7	Project Performance
AMP7 PR19 Totex full breakdown by service & year	AMP7 Planned expenditure	Project Performance
AMP7 Spend	AMP7 Cost movement and monthly profiles	Project Performance
AMP8 High Level Capex Profile	AMP8 Planned expenditure	Project Performance
AMP8 Wastewater base plan – leadership team feedback 7-11-22	AMP8 base plan	Project performance
Adjusted N TAL Costing		Project Performance
Optioneering and costing to address poor condition civil assets (wave 1)		Project performance
High Level Capex Profile Water detail	AMP8 water detail by region	Project performance
Target Operating Model Booklet v12	Document explaining the new company structure	Delivery Structure
Capital Delivery Booklet	Document explaining the structure of frameworks	Delivery Structure
Frameworks analysis	Analysis of spend by framework	Delivery Structure
DMWP Capital Delivery session 24 August 2022	Analysis of how DMWP might influence AMP8 expenditure	AMP8 Delivery Information
Document Requirement List - Guidance Document	Guidance on use of shared documentation systems	Guidance
Document Requirement List - How to Complete	Guidance on use of shared documentation systems	Guidance
Exchange Information Requirements (EIR) Handbook	Guidance on use of shared documentation systems	Guidance
Making Digital Construction BAU	Guidance on use of shared documentation systems	Guidance
Management Assurance Plan (MAP)	Checklist for gateway signoff	Guidance
Investment Handbook v.2.0	Guidance for capital project delivery	Guidance
MPS Project Review Board Tees Central Strategic Transfer Main Sept 22	Sample report from Project Board	Sample Documentation
NWG Project Manager Career Streams	Guidance on required experience for Project Managers	Guidance



Document title	Description	Category
NWL Documentation Presentation	Guidance on how to use shared documentation system and engineering standards	Guidance
Organisation Charts	Organisation Charts	Guidance
CAL0023 – New Target Operating Model Booklet V12	Organisation principles and target operating model	Guidance
P06 Wastewater Pack - PMO Review	Output from programme review	Sample Documentation
P06 Water Pack - PMO Review revised	Output from programme review	Sample Documentation
Project Board v4	Terms of Reference for Project Board	Guidance
Howdon Upgrade Procurement Challenge	Output from project review	Sample Documentation
Strategic challenges and trade-offs for AMP8	Letter to Ofwat discussing priorities for AMP8 for Storm Overflows	Sample Documentation
Long term data series Ofwat industry totex data	Historic data	Guidance
NIA2 Baseline report charts data set	Historic data	Guidance
Revised second national infrastructure assessment baseline report 2021		Guidance
NIC NI assessment 2018		Guidance
Storm overflows final consultation document		Guidance
NIA2 Baseline report charts data set		Guidance



External documents

Document title
PR24 and beyond: Creating tomorrow, together. Ofwat, 2022
NWL plan 20-25 (various documents). NWL, 2020
PR19 final determinations: Northumbrian Water final determination. Ofwat, December 2019
Time to act, together: Ofwat’s strategy. Ofwat, October 2019
Tapping into growth. Economic impact of the water and sewerage sector in the UK. Water UK, Deloitte, March 2014
Making Direct Procurement for Customers a Success. Water Industry Forum, September 2021
Direct Procurement for Customers: Technical Review. KPMG, December 2017
The Optimal Delivery Model for AMP8. A view from the Supply Chain. British Water, July 2022



Appendix C – Supply Chain Market Research

This document has been submitted as a separate file



Appendix D – NWL Capacity: Data Support

This document has been submitted as a separate file



Appendix E – NWL Organisation

Capital Delivery – Wastewater²⁰

WASTEWATER TEAM As Is – Richard Seales

Improving the Environment Wastewater & Water	Enhancement Wastewater	Reliable and Resilient Wastewater	Donna Rawlinson
Linzie Pentleton Ian McCulloch PM2 Brian Ford PM1 Colin Short PM3 Dave Groark PM1 Graeme Ridley PM1 Ian Davison PM1 Peter Robson PM3 Ronnie Doran PM1	Phil Wallace Dean Thompson PM1 David Greensmith PM1 Charles Harman PM1 Colin Burdon PM2 Lynn Preston PM1 Vacancy PM2 Paul Davison PM1 Nick Tudberry PM1 Ben Gilbert PM2 Jamie Oyebade PM1 (seconded) Mat Simmonds PM (seconded)	Gareth Anderson Alex Corner PM3 Chris Bond PM2 Elaine Smith PM1 Emma Preston PM Tech Mark Johnston PM3 Mohammad Iqbal PM3 Paul Brewis PM3 Peter Greenan PM1 Richard Greenwell PM2 Sean Barry PM2	

Capital Delivery – Water²¹

WATER TEAM – Jonny Belmont

Reliable and Resilient Water Quality	Enhancement Water	Reliable and Resilient Water
Anthony Sotiriou (Prog Man) Paul Featherstone (PM1) Gary Cassells (PM2) Glyn Jenkins (PM1) Hedley Young (PM1) Jeremy Simmons (PM1) Jonathan Thompson (PM1) Kerri Falconer (PM2) Rory Besford (PMT) Samantha Bennett (PM3) Gemma Foster (PM2) Jake Day (PM2)	Ian Lumley (Prog Man) Kay Silver (PM1) Richard Johnson (PM2) Lowri Robbins (PM3) Matt Grimmond* Neil Yates* James Dawes* George Mok* Bryan Robson* Dean Laidler (HazRev Programme Manager)	Tom Silkstone (Prog Man)* Andy Downer (PM2) Mike Ciaraldi (PM1) Mike Foster (PM1) Nicola Wigington (PM2) Paul Wood (PM1) Victoria Jobling (PM2) Mark Hopwood (PM1) Dave Beckwith (PM1) Tina Robinson*

²⁰ WW Cap Del Team Current

²¹ Water Team Nov 22



Appendix F – Checklist against NWL’s Brief

The Table below illustrates whether and how we have addressed the requests listed in the commission’s brief.

Item (from NWL commission's brief)	Addressed / Not addressed
<p>For each of the four sets of schemes given that the whole of the water industry is likely to be seeing a similar if not greater scale up of spend, do we have the capacity to scale up in AMP8, and then can we scale up again after 2030 if required?</p> <ul style="list-style-type: none"> • Could we deliver a programme of this scale (in addition to our current programme)? What would we need to do (i) to give us the right options from the supply chain (for example, adding additional tier 1 partners); (ii) to build the right planning and management capacity into NWL? 	Addressed
<ul style="list-style-type: none"> • Would we need to initiate any enabling activity and if so what and in what time scales? What are the pre-requisites for these schemes? For example, are there lead times due to purchasing land? Is there critical plant and equipment that would need securing in advance? What would the timeline be for delivery? 	Addressed, referred to in Recommendations
<ul style="list-style-type: none"> • Does the supply chain exist in sufficient size, technology, and by geographic location to achieve this? What could be done to change this? Do potential partners exist? Is there opportunities to gain a more secure supply chain or efficiencies through partner working? (Market health and capability assessment). 	Addressed
<ul style="list-style-type: none"> • Are there any innovative alternative delivery models that we could consider from elsewhere to give greater confidence to deliver, for example could we use competition or Direct Procurement Contracts (DPCs) to deliver some or all of the programme? 	Addressed
<ul style="list-style-type: none"> • What alternative procurement approaches could be used? What advantages and disadvantages would they have? Could they be used for different schemes / programmes? This should take into account the British Water view, possible market models, or pre-market engagement (e.g. NWL publishing pipelines) and NWL's framework. 	Addressed
<ul style="list-style-type: none"> • How would we finance these investment programmes (assuming that all expenditure is within regulated price controls)? 	Discussed with the NWL finance – did not appear to be a concern
<ul style="list-style-type: none"> • What are the delivery risks? How would we manage and resolve these? How would we best allocate these? 	Addressed
<ul style="list-style-type: none"> • Are there opportunities to work with manufacturers of low carbon materials (such as GPC) to reduce future embedded carbon emissions? What would this mean for cost and skills? 	Not addressed
<ul style="list-style-type: none"> • Where the timescales for delivery are driving towards more traditional grey solutions (eg storm overflow requirements), are there alternative approaches which could be taken, are they well understood, and do we have a resilient supply chain who can tackle this? 	Alternative delivery models considered
<ul style="list-style-type: none"> • How could we best align the outcomes with the principles and ambitions of PR24 and beyond: creating tomorrow, together? 	Considered in alternative delivery models
<ul style="list-style-type: none"> • Are there opportunities for innovation from other water companies / wider industry? (For example, Severn Trent trialing methods for P removal at Packington STW led for their Green Recovery Investments) 	Addressed, made possible by alternative delivery models