Annex D: Priority Actions Technical Notes

J698-AJ-XXXX-ZZZZ-TN-ZD-100001

Standard Gate three submission for London Water Recycling SRO

Notice – Position Statement

This report has been produced as part of the process set out by RAPID for the development of the Strategic Resource Options (SROs). This is a regulatory gated process allowing there to be control and appropriate scrutiny on the activities that are undertaken by the water companies to investigate and develop efficient solutions on behalf of customers to meet future drought resilience challenges.

This report forms part of a suite of documents that make up the 'Gate 3 submission'. Gate 3 of the RAPID programme represents a checkpoint on the way to solutions being prepared for consent applications. The intention at this stage is to provide RAPID with an update on activities being undertaken in preparation for consent application submission; activities' progress including programme through to completion; and consideration of specific activities to address particular risks or issues associated with a solution. The regulatory gated process does not form part of the consenting process and will not determine whether an SRO is granted planning consent.

Given the stage of the SROs in the planning process, the information presented in the Gate 3 submission includes material or data which is still in the course of completion, pending further engagement, consultation, design development and technical / environmental assessment. Final proposals will be presented as part of consent applications in due course.

Disclaimer

This document has been written in line with the requirements of the RAPID Gate 3 Guidance and to comply with the regulatory process pursuant to Thames Water's statutory duties. The information presented relates to material or data which is still in the course of completion. Should the solutions presented in this document be taken forward, Thames Water will be subject to the statutory duties pursuant to the necessary consenting process, including environmental assessment and consultation as required. This document should be read with those duties in mind.

Contents

1 Introduction

1.1 Overview of RAPID Gate 3 Priority Actions

1.1.1 The design and assessment of the London Water Recycling (LWR) Strategic Resource Option (SRO) has progressed to RAPID Gate 3: Developed design, finalised feasibility, pre-planning investigations and planning applications. As part of this process, RAPID set 12 Priority Actions for the LWR SRO as part of the Gate 2 Final Decision with eight related to Teddington Direct River Abstraction (Teddington DRA) scheme, one for Mogden, two for Beckton and a further shared action for Mogden and Beckton.

1.1.2 The Priority Actions are specific steps identified by RAPID for the SRO to undertake in preparation of submission at Gate 3. The Priority Actions relevant to the Teddington DRA Project are aimed at addressing key environmental issues, in order to understand the environmental risks of the Project and the mitigation measures that might be available as the Project progresses through pre-application planning.

1.1.3 This Technical Note provides an overview of actions undertaken aligned to the LWR SRO Gate 2 Priority Actions. Recognising that Gate 4 activities include continuing pre-application investigations for planning work associated with applications for a development consent order, where appropriate, further assessment work has been identified to support the progression of Teddington DRA beyond Gate 3.

1.1.4 The Priority Actions assigned to LWR SRO at Gate 2 are presented in Table 1.1.

1.2 Approach to Priority Actions

1.2.1 The Priority Actions have been approached using the following fundamental principles.

- Regular engagement through technical working groups.
- Open sharing of methods, results and investigations and conclusions.
- Iterative feedback cycle on the development of work through 2023 and 2024 to address each Priority Action.
- Aligned understanding of issues and challenges.

1.3 Structure of Document

1.3.1 The following sections provide an overview of the actions undertaken related to each Priority Action.

Table 1.1 London Water Recycling SRO Priority Actions

1	Solution design	Provide information as to why Mogden (MOG) should be taken forward beyond Gate two when not featured in any plans
2	Environment	Teddington DRA: Work with the Environment Agency to assess indicative permit limits and design tertiary treatment works to meet permit requirements. Work with the Environment Agency to discuss permit conditions and other temperature mitigation measures required to protect the environment. Undertake bench and pilot testing of treatment works
3	Environment	Teddington DRA: Work with the Environment Agency to scope and progress further work to understand the impacts on Olfactory chemicals from scheme operation and any subsequent impact on migratory fish
4	Environment	Teddington DRA: Improve modelling capability to extend water quality modelling over Teddington weir and into the upper tideway to fully understand any changes to water quality flowing over/down fish passes and into Teddington weir pool and the upper tideway.
5	Environment	Teddington DRA: Work with Environment Agency fisheries teams to design the intakes and outfalls, specifically to work with us to manage and mitigate any impacts on velocity, fish and the environment of scheme operation and the depleted reach.
6	Environment	Teddington DRA: Extend assessment of fisheries impacts to include other migratory fish in the freshwater Thames
7	Environment	Teddington DRA: Work with the Environment Agency to undertake a review of potential environmental impacts and mitigation measures available and then ensure appropriate mitigation measures can be implemented. This is for aquatic environment impacts as a minimum.
8	Environment	Teddington DRA: Provide further information on how operation of the scheme will interface with the Lower Thames Operating Agreement and Teddington Target Flow TTF to ensure that the environment is not impacted upstream in the River Thames.
9	Environment	Teddington DRA: Work with the Environment Agency to scope any further modelling requirements to understand how operation of the scheme may impact on the environment under different environmental conditions – for example consecutive years use or if needed at other times of the year.
10	Environment	Beckton: Work with the Environment Agency to scope environmental assessments required to meet a gate three checkpoint for Beckton and Mogden Water Recycling, ensuring that any further work for Beckton includes water quality analysis and modelling of the freshwater River Lee and Water Framework Directive (WFD) assessment of Lee valley reservoirs
11	Environment	Beckton: Provide information on mitigation measures to be applied at Beckton, including water treatment AWRP, intake/outfall designs, operating regime options and any other mitigation measures required to protect the environment.

12	Environment	Work with the Environment Agency to scope environmental assessments for Beckton and Mogden Water Recycling, ensuring that any further work for Beckton includes water quality analysis and modelling of the freshwater River Lee and WFD assessment of Lee valley reservoirs

2 Priority Action 1

Priority Action No. 1

Topic Area: Solution design.

Detail: Provide information as to why Mogden (MOG) should be taken forward beyond Gate two when not featured in any plans.

2.1 Priority Action Progress

2.1.1 Mogden and Beckton are considered viable alternative solutions to the Teddington DRA Project and this has been set out in the published WRMP24.

2.1.2 At an option-level, Mogden solutions could be lower cost than the Beckton solutions however more work is required to determine this through AMP7.

2.1.3 At a programme-level, additional sensitivity testing using the WRSE investment model suggests solutions involving Mogden or Beckton are closely matched – i.e. Beckton is not sufficiently less cost or better overall value, to rule out Mogden at this stage.

2.1.4 Mogden is close to our existing major water supply infrastructure, which has significant existing connectivity across London, including with regional partners. This could offer integrated solutions with resilience benefits alongside GUC and SESRO, which would be bringing water from the West.

2.1.5 Mogden solutions could potentially be integrated with solutions for the Lower Thames, e.g. as part of the Lower Thames to West London Reservoirs (or Teddington to QM Reservoir) and the River Thames Scheme (flood alleviation), the latter of which threatens to derogate our supplies.

2.1.6 As the only major water recycling option in the West, dropping Mogden would effectively rule this option type out of a resource development solution.

2.1.7 We have set out a plan to continue investigating the Mogden water recycling scheme so that it can be compared on a like for like basis with Beckton early in 2025 so that a preferred alternative scheme can be selected at the beginning of AMP8.

2.2 Priority Action Status:

2.2.1 Ongoing in-line with the plan shared with RAPID through check-points. Due to be closed by end of AMP7.

3 Priority Action 2

Priority Action No. 2

Topic Area: Environment.

Detail: Teddington DRA: Work with the Environment Agency to assess indicative permit limits and design tertiary treatment works to meet permit requirements. Work with the Environment Agency to discuss permit conditions and other temperature mitigation measures required to protect the environment. Undertake bench and pilot testing of treatment works.

3.1 Priority Action Progress:

3.1.1 The Teddington DRA water quality monitoring programme (continuous sondes and monthly spot samples) was scoped in Gate 1 in consultation with the National Appraisal Unit (NAU). Monitoring relevant to the Teddington DRA scheme commenced in late 2020 and is now approaching four full years of data collection. The water quality monitoring programme has now delivered the necessary data for the permit application. Monitoring will continue in Gate 4 to strengthen the dataset further.

3.1.2 The project team has worked with the National Permitting Service (NPS) to define the appropriate approach to adopt for pre-application. An agreed approach for the pre-application assessment was reached with the NPS in November 2023, covering the river and discharge flows to be used, the chemicals monitoring dataset available and the scheme operating scenarios to be screened.

3.1.3 The Environment Agency (EA) H1 risk assessment tool was used to screen the collected water quality monitoring data to identify risks and indicative screening limits. These interim results were shared with the NPS via an informal pre-application submission.

3.1.4 Workshops were held with the NPS from February 2023 through to July 2024 to discuss the interim results on chemicals in relation to available Environmental Quality Standards (EQS) and appropriate Minimum Reporting Values (MRV) and their associated indicative permit limits identified by Thames Water through the EA H1 Risk assessment tool. The next steps in terms of potential timing of a future pre-application or formal application were also discussed. It was agreed that sufficient data was held to make a pre-application submission, but that the latest rounds of data would be added to further strengthen the robustness of the dataset prior to a submission (noting that the scheme is still around 18 months from development consent submission and nine years from operation).

3.1.5 The discussions with the EA have identified the need for further EA guidance being required with respect to the approach to be used with chemicals that do not have an EQS.

3.1.6 Detailed temperature assessment, supported by 3D river modelling of the discharge at Teddington, was carried out and discussed with the NAU in November and December 2023. The work undertaken has confirmed that the scheme is compliant with Water Framework Directive (WFD) high status for temperature change and BEEMS guidance on mixing zone area. This is set in the context of the published 2022 status for the water body in the 3rd Cycle River Basin Management Plan as being Moderate status.

3.1.7 Options for temperature mitigation measures, including heat reuse, have been considered jointly with the EA including a workshop in December 2023. The option of reusing low grade heat was discussed with the local planning authority but ultimately discounted as unfeasible due to the intermittent nature of the scheme and inefficiency of low grade heat reduction required under the majority of operating scenarios.

3.1.8 Design measures including both bankside and in-river discharge options have been considered and remain options for further development as set out in the submitted EIA Scoping report.

3.1.9 Further work and workshops with the EA fisheries teams have been undertaken in relation to the development of a range of potential further mitigation options for the outfall design. These further measures include consideration of measures to reduce temperature and velocity change on more sensitive marginal areas. The mitigation and enhancement measures identified are considered able to protect the environment.

3.1.10 An outline approach to Tertiary Treatment Plant (TTP) and bench/pilot testing was discussed with the NAU (November 2023 workshop), including potential additional /alternative treatment processes to be included. The pilot plant and bench testing were commissioned in Autumn 2024. A RAPID site visit to the functioning Pilot Plant was undertaken October 2024.

3.1.11 Acknowledging that there will be continuation of the pilot plant testing and ongoing engagement with the NAU and NPS over developing further draft and final permit limits for Teddington DRA as the scheme progresses through Gate 4 and the planning and consenting processes, the requirements to work with the NAU, develop indicative limits and progress a pilot plant have all been completed.

3.2 Priority Action Status:

3.2.1 This PA has been progressed as far as possible without further guidance from the NAU on PNECs and LODs being available which we understand will be available in early January 2025. A Permitting Technical Note (informal pre-app) was submitted to the NPS 21 July 2024 which sets out the H1 screening and modelling undertaken, the indicative permit limits derived, and identified those determinands that required further guidance from the EA on PNECs and LOD issues.

3.2.2 There will be ongoing engagement with the NAU and NPS to develop draft and final permit limits for Teddington DRA once further guidance is available through Gate 4.

3.2.3 This Gate 2 Priority Action has been progressed as far as possible without further guidance from the NAU.

4 Priority Action 3

Priority Action No. 3

Topic Area: Environment.

Detail: Teddington DRA: Work with the Environment Agency to scope and progress further work to understand the impacts on olfactory chemicals from scheme operation and any subsequent impact on migratory fish

4.1 Priority Action Progress:

4.1.1 The scope of the olfactory suite of chemicals requiring assessment for Teddington DRA were defined by identifying the migratory fish species to be considered for the scheme and then conducting an extensive literature review of the olfactory blockers and inhibitors for each species. The scope of the olfactory suite of chemicals requiring assessment for Teddington DRA has been discussed and agreed with the NAU.

4.1.2 The olfactory suite of chemicals has been added to the monthly water quality spot sampling programme for in river monitoring sites and for the Mogden STW final effluent site. In addition, the olfactory suite has been added to the monitoring programme for the TTP pilot plant to provide data on the efficacy of the TTP in treating olfactory chemicals.

4.1.3 The olfactory results to date for river sample sites and Mogden STW final effluent have been assessed to identify chemicals above limits of detection and/or with no EQS.

4.1.4 Chemicals in the olfactory suite which do not have an EQS have been identified and shared with the NAU. The NAU is reviewing this submitted information and has stated that it will subsequently provide guidance on how these chemicals should be assessed in relation to lowest observed effect concentration (LOEC) to predict no effect concentrations (PNEC) for non-regulated chemicals.

4.1.5 Acknowledging that the monitoring programme will continue to provide results on baseline conditions, the TTP pilot plant will continue to provide results on the efficacy of treatment of olfactory chemicals and the NAU has still to provide guidance on dealing with olfactory chemicals that do not have EQS, the work to progress understanding of impacts on olfactory chemicals from the Teddington DRA scheme as set out in Priority Action 3 is considered to have been completed.

4.1.6 In light of the ongoing work set out above, further work with the EA and assessment of potential impacts on olfactory chemicals from the Teddington DRA scheme operation will continue in Gate 4.

4.2 Priority Action Status:

4.2.1 Further work is required through 2025/26 as the scheme progresses through planning and consenting. The requirements to work with the NAU on olfactory chemicals are considered to have been completed with work progressed as far as possible without further guidance from the NAU.

5 Priority Action 4

Priority Action No. 4

Topic Area: Environment.

Detail: Teddington DRA: Improve modelling capability to extend water quality modelling over Teddington weir and into the upper tideway to fully understand any changes to water quality flowing over/down fish passes and into Teddington weir pool and the upper tideway.

5.1 Priority Action Progress:

5.1.1 The approach to modelling of the River Thames and the Thames Tideway was discussed and agreed with the NAU between March and June 2023.

5.1.2 The river model's representation of Teddington weir was updated to improve the flow distribution through the side weir, radial gates and fish passes. Details of these updates were set out to the NAU in December 2023.

5.1.3 Modelled outputs were shared with the NAU in workshops in September and November 2023 and showed that the discharge is fully mixed upstream of the weir and thus the fish passes would not receive unmixed water from the discharge.

5.1.4 The outputs of the modelling of the discharge have been used to inform initial assessments of the effect on migratory and coarse fish species as set out in the Teddington DRA Scoping Report Aquatic Ecology chapter.

5.1.5 Acknowledging modelling will continue through Gate 4 to support the requirements of the preparation of the Preliminary Environmental Information (PEI) Report and subsequent full Environmental Impact Assessment (EIA), the work to progress improve modelling capability through Gate 3 as set out in Priority Action 4 is considered to have been completed.

5.2 Priority Action Status:

5.2.1 Addressed and complete.

6 Priority Action 5

Priority Action No. 5

Topic Area: Environment.

Detail: Teddington DRA: Work with Environment Agency fisheries teams to design the intakes and outfalls, specifically to work with us to manage and mitigate any impacts on velocity, fish and the environment of scheme operation and the depleted reach.

6.1 Priority Action Progress:

6.1.1 Regular workshops have been held with the NAU through 2023 and 2024 to discuss the intake and outfall design, scope assessments, review results, consider alternative designs/options and identify mitigation requirements and options. Additional engagement was held with the EA waterways team to factor in navigation considerations of alternative intake and outfall designs.

6.1.2 A high-level design for a mid-channel outfall located on the river bed was developed, modelled and assessed as an alternative to a bankside outfall. While this moved the discharge away from the right hand bank, concerns have been shared with the EA around the potential for interaction of the discharge plume with the proposed new River Thames Scheme fish pass on the left hand bank. A further outfall design was identified, with the outfall moved partway into the channel to avoid a discharge into the margin and discussed with the NAU. Both bankside and in-river outfalls remain options for further development as set out in the submitted EIA Scoping report.

6.1.3 A review of alternative bankside intake/outfall design velocities was undertaken in consultation with the NAU, with modelling of the Gate 2 design outfall velocity of 0.3m/s compared to 0.1m/s, 0.05m/s and 0.02m/s designs and the Gate 2 intake velocity of 0.1m/s compared to 0.05m/s and 0.02m/s, which were then assessed against relevant fish species' swimming speeds (sustainable and burst) in December 2023. The assessments concluded that the full range of intake (0.02-0.1m/s) and outfall (0.02-0.3m/s) bankside design velocities were compatible with the species assessed. The modelling did identify that a reduction in bankside discharge velocity also reduced the effectiveness of the mixing of the discharge within the river. In addition, a multi-criteria assessment of the alternative bankside outfall and intake designs identified that the larger physical footprints required for reduced velocity designs increased potential impacts related to land take, biodiversity, landscape and visual, recreation and other receptors.

6.1.4 Modelling of the intake and outfall outlined above also highlighted that the 'depleted reach' between the intake and outfall saw no change in velocity bands when the scheme operates for river flows of 700Ml/d (most common flow condition) and 400Ml/d. For 300Ml/d flow conditions, a slight reduction in velocity band from 0.01-0.25m/s to 0-0.01m/s was shown, however this was

not viewed as a significant effect on account of the low magnitude of change and very low return frequency.

6.1.5 A detailed literature review of the potential velocity impacts on fish species was undertaken. These results along with further assessment of effects on fish species using the Gate 2 design discharge velocity of 0.3m/s were discussed with the NAU in Spring 2024.

6.1.6 Further work and workshops with the EA fisheries teams has been undertaken in relation to the development of a range of potential further mitigation options for the outfall design. These further measures include consideration of measures to reduce temperature and velocity change on more sensitive marginal areas, enhance eel migration over Teddington Weir, habitat planting and diversification, and operational control to reduce scheme interaction during periods of overtopping of the weir. The mitigation and enhancement measures identified and generally agreed with by Thames Water and the NAU require further refinement but are considered able to suitably manage and mitigate potential impacts on velocity, fish, depleted reach and the environment.

6.1.7 A thorough review of Best Available Technologies (BAT) for eel and fish screens appropriate for the River Thames location at Teddington has been undertaken. This included detailed industry engagement to identify the latest available solutions. Workshops were held with the NAU to set out the approach, provide interim findings and review the viable solutions identified by the assessment. It was agreed with the NAU that an impact assessment of the viable intake screen(s) would be required to assess the impact, which is planned for Gate 4.

6.1.8 Acknowledging that the assessment of potential effects and development of appropriate mitigation measures on the aquatic environment will continue through Gate 4 during pre-application with the preparation of the Preliminary Environmental Information (PEI) Report and subsequent full Environmental Impact Assessment (EIA), the work to progress the management and mitigation of potential impacts on velocity, fish and the environment of scheme operation and the depleted reach as set out in Priority Action 5 is considered to have been completed.

6.2 Priority Action Status:

6.2.1 Significant progress has been made against this Priority Action with detailed investigations undertaken through the Gate to explore different options and designs for the outfall and fish screening options for the intake.

6.2.2 Further work is required through Gate 4 to develop further design details and mitigation which also takes in considerations raised through Statutory Consultation.

6.2.3 We expect a new Priority Action linked to design development, for the next Gate aligned to the planning and consenting processes.

7 Priority Action 6

Priority Action No. 6

Topic Area: Environment.

Detail: Teddington DRA: Extend assessment of fisheries impacts to include other migratory fish in the freshwater Thames.

7.1 Priority Action Progress:

7.1.1 Workshops were undertaken with the NAU between September - October 2023 to discuss potential impacts on migratory fish in the freshwater Thames. These discussions led to the agreement that Allis shad and sea lamprey would be added to the migratory fish assessment (which will be completed in Gate 4 as part of the consenting process) and the NAU confirmed that they considered the priority action to be completed.

7.1.2 The agreed migratory fish species list for Gate 3 assessment is as follows:

Atlantic salmon	Sea trout
European eel	European smelt
Twaite shad	Allis shad
River lamprey	Sea lamprey

7.2 Priority Action Status:

7.2.1 Addressed and complete.

8 Priority Action 7

Priority Action No. 7

Topic Area: Environment.

Detail: Teddington DRA: Work with the Environment Agency to undertake a review of potential environmental impacts and mitigation measures available and then ensure appropriate mitigation measures can be implemented. This is for aquatic environment impacts as a minimum.

8.1 Priority Action Progress:

8.1.1 Engagement, including workshops, with the NAU identified four key aquatic concerns potentially requiring mitigation. These being:

- Discharge water quality.
- Discharge temperature.
- Intake/Outfall velocities.
- Intake fish entrainment.

8.1.2 In terms of discharge water quality, the design of the TTP has been developed to target the risk chemicals identified as part of the discussions with the NPS and NAU related to permit and olfactory work. The discussions with the NAU have included the design of bench/pilot plant, which has been the subject of discussion at various workshops with the NAU between September – December 2023. The TTP pilot plant and bench testing was commissioned in Autumn 2024. A RAPID site visit to the functioning Pilot Plant was undertaken in October 2024. The TTP pilot plant was commissioned in summer 2024 and will start to provide results through Autumn 2024 on the indicative water quality of the discharge. The TTP pilot plant data will be used through Gate 4 to assess the risk to the environment and whether further mitigation may be required.

8.1.3 As described in the summary responses provided in relation to Priority Actions 2, 4 and 5 above, Gate 3 modelling and analysis of temperature change and velocity change have been undertaken and discussed with the NAU. In addition, further work and workshops with the EA have been undertaken in relation to the development of a range of potential further mitigation and enhancement options for the outfall design.

8.1.4 The potential discharge temperature and velocity mitigation options investigated and presented to NAU include:

- Reduction of outfall and intake discharge rates as set out in the modelling undertaken of different velocities
- Re-location of the discharge to a mid-channel or near right bank outfall rather than bankside outfall with the option of both bankside and in-river discharge being included in the EIA Scoping report

- Splitting the discharge into a number of smaller outfalls and/or direction of the discharge upwards to add greater dispersal of the discharge and mitigate localised temperature and velocity changes around the river bed.
- Operational controls to stop the abstraction and discharge at critical times during periods of tidal overtopping of Teddington Weir.
- Use of cooling plant technology to reduce the temperature of recycled water, investigations included discussions with a local planning authority

8.1.5 Further work and workshops with the EA have been undertaken in Summer / Autumn 2024 in relation to the development of a range of potential further mitigation options for temperature and velocity change from the outfall design. This concluded with a general agreement with the EA in October 2024 that through a package of design changes to the outfall and mitigation and enhancement options (see Priority Action 5) that a solution could be developed that would ensure appropriate mitigation measures can be implemented.

8.1.6 In terms of intake fish entrainment a thorough review of BAT for eel and fish screens appropriate for the River Thames location at Teddington has been undertaken and discussed with the EA. It was agreed with the NAU that an impact assessment of the viable intake screen(s) would be required to assess the impact, which is planned for Gate 4.

8.1.7 Wider mitigation requirements (e.g. terrestrial environment) will be developed through the Environmental Impact Assessment through Gate 4.

8.1.8 Acknowledging that the assessment of potential effects and appropriate mitigation measures on the aquatic environment will continue through Gate 4 during pre-application with the preparation of the PEI Report and subsequent full EIA, the work to review potential environmental impacts and available mitigation measures as set out in Priority Action 7 is considered to have been completed.

8.2 Priority Action Status:

8.2.1 Significant progress has been made against this Priority Action with detailed investigations undertaken through the Gate to explore aquatic risks and impacts and develop mitigation measures.

8.2.2 The principles of a mitigation and enhancement package of works has been developed to address aquatic risks.

8.2.3 Further work is required to develop impact assessments and mitigation measures as the Project progresses through the planning and consenting process in 2025/26.

8.2.4 We expect a new Priority Action, for the next Gate aligned to undertaking further investigations, impact assessment and minimising risks through the planning and consenting process.

9 Priority Action 8

Priority Action No. 8

Topic Area: Environment.

Detail: Teddington DRA: Provide further information on how operation of the scheme will interface with the Lower Thames Operating Agreement and Teddington Target Flow TTF to ensure that the environment is not impacted upstream in the River Thames.

9.1 Priority Action Progress:

9.1.1 Detail on the scheme's operation was presented to the NAU during workshops through September-December 2023, covering likely operating frequency, duration and seasonality for both 1 in 5 year and 1 in 20 year river flow conditions. This included reference to the Strategic Scheme triggers (see below) which would govern the scheme's operation and the relationship with the Lower Thames Operating Agreement (LTOA) and its Teddington Target Flows (TTF). Selected TTF were used as the river flows in the environmental assessments to provide analysis of the schemes environmental effect under moderate low flow conditions and extreme low flow conditions.

9.1.2 The scheme would operate as a take-put with a separate abstraction licence to Thames Water's current M2 licence.

9.1.3 The scheme would operate as a Strategic Scheme at the onset of a serious drought, as set out in Thames Water's Drought Plan 2022 using triggers in the existing LTOA / Lower Thames Control Diagram (LTCD) linked to the Teddington Target Flows (TTF).

9.1.4 Each of Thames Water's large strategic schemes will have separate operating agreements agreed with the EA detailing under what conditions the schemes can be used.

9.1.5 Thames Water intends to seek an operating agreement for the Teddington DRA scheme in line with that of the Thames Gateway Water Treatment Works (TGWTW). There would be no requirement to amend the LTOA.

9.1.6 Conditions relating to take-put are anticipated to be included in the operating agreement.

9.2 Priority Action Status:

9.2.1 Thames Water considers this action to have been fully addressed and complete with the confirmation that the 'sweetening flow' will not be discharged into the River Thames above Teddington Weir.

10 Priority Action 9

Priority Action No. 9

Topic Area: Environment.

Detail: Teddington DRA: Work with the Environment Agency to scope any further modelling requirements to understand how operation of the scheme may impact on the environment under different environmental conditions – for example consecutive years use or if needed at other times of the year.

10.1 Priority Action Progress:

10.1.1 An aquatic environmental modelling programme for the Teddington DRA scheme in Gate 3 was discussed and agreed with the NAU between March and June 2023.

10.1.2 Modelling of the freshwater River Thames to understand the potential effects of the intake and outfall on the river level, velocity and water temperature has been undertaken and discussed with the NAU. The modelling undertaken has included a range of 'normal operation' and 'worst case' scenarios of:

- Receiving river flow and river water temperature.
- Intake velocity.
- Outfall velocity and discharge water temperature.

10.1.3 Modelling of the estuarine Thames Tideway to understand the effects of mixing of the freshwater river into the tidal estuary and the Mogden STW discharge into the tidal estuary on tidal water level, tidal water depth, intertidal exposure of aquatic margins, tidal velocity, salinity, water temperature, suspended sediment, dissolved oxygen; and through use of dispersion tracers a full representation of nutrients and chemicals, has been undertaken and discussed with the NAU. The modelling scenarios include:

- 1:5 year return frequency moderate-low river flows, with scheme operation for 99 consecutive days through August to November including river flows as low as 600Ml/d.
- 1:20 year return frequency very low flow, with scheme operation for 161 consecutive days between July to December and an additional period of 5 days in January; including river flows as low as 300Ml/d.
- 2050s futures representation of the above taking account for climate change.

10.1.4 Further modelling has been undertaken as the need has arisen through the course of Gate 3, including alternative intake and outfall design velocities, alternative bankside outfall locations and a mid-channel riverbed outfall alternative design.

10.2 Priority Action Status:

10.2.1 The NAU confirmed that this Priority Action was complete in March 2024.

11 Priority Action 10

Priority Action No. 10

Topic Area: Environment

Detail: Beckton: Work with the Environment Agency to scope environmental assessments required to meet a gate three checkpoint for Beckton and Mogden Water Recycling, ensuring that any further work for Beckton includes water quality analysis and modelling of the freshwater River Lee and Water Framework Directive (WFD) assessment of Lee valley reservoirs

11.1 Priority Action Progress

Beckton Water Recycling scheme

11.1.1 The scope of the May 2024 mid-Gate 3 checkpoint assessments for the Beckton Water Recycling scheme was discussed and agreed with the NAU during December 2023, with a focus of the Beckton assessments being on building upon the Gate 2 assessments to progress understanding around critical issues and fill gaps identified.

11.1.2 The Beckton assessment was supported by a new hydrodynamic model of the Enfield Island Loop providing mixing characteristics of the discharge in relation to velocity and temperature:

- Modelling approach was set out to the NAU in May 2023.
- Initial model outputs were discussed with the NAU in December 2023.

11.1.3 A site visit was organised for the NAU in September 2023 to the Enfield Island Loop to review the discharge site, existing abstraction to the King George V (KGV) reservoir and the downstream connections with the Flood Relief Channel.

11.1.4 The water quality monitoring programme was continued for the River Lee, Lee Valley reservoirs, Beckton STW and Thames tideway, which continues to build the baseline dataset required for the water quality analysis of the Beckton Water Recycling scheme.

11.1.5 The wider environmental monitoring programmes were continued for key sites relating to the Beckton Water Recycling scheme, with data added to the consolidated baseline dataset.

11.1.6 WFD assessment and Habitat Regulations Assessment (HRA) of the Lee Valley reservoirs continued to be progressed as further baseline data (e.g. water quality data, wintering bird survey data, etc) and scheme design information became available.

11.1.7 The mid-Gate 3 check point was completed in May 2024.

Mogden Water Recycling scheme

11.1.8 The scope of the mid-Gate 3 checkpoint assessments for the Mogden Water Recycling scheme was discussed and agreed with the NAU during December 2023, with a focus being on building upon the Gate 2 assessments to progress understanding around critical issues and fill gaps identified.

11.1.9 The wider environmental monitoring programmes were continued for key sites relating to the Mogden Water Recycling scheme, with data added to the consolidated baseline dataset.

11.1.10 The main focus of the scope was to fully understand critical issues and fill any data gaps to allow for the scheme to be compared on a like for like basis with Beckton Water Recycling scheme early in 2025 so that a preferred alternative scheme can be selected at the beginning of AMP8.

11.1.11 The mid-Gate 3 check point was completed in May 2024.

11.2 Priority Action Status:

11.2.1 Complete.

12 Priority Action 11

Priority Action No. 11

Topic Area: Environment.

Detail: Beckton: Provide information on mitigation measures to be applied at Beckton, including water treatment AWRP, intake/outfall designs, operating regime options and any other mitigation measures required to protect the environment.

12.1 Priority Action Progress

12.1.1 The Gate 2 environmental assessments were further developed using updated baseline survey data and the newly developed hydrodynamic model showing the recycled water discharge entering the Enfield Island Loop. The assessment findings were discussed with the NAU in May 2024.

12.1.2 Based on the updated environmental assessment findings, potential adverse effects on juvenile fish relating to discharge velocity and outfall design were identified, which may require the development of mitigation measures.

12.1.3 Initial options for mitigation measures were developed and discussed with the NAU in May 2024. These options included outfall design alterations, in-channel velocity refuges, operating regime options and alternative discharge locations.

12.1.4 In addition, the Advance Water Recycling Plant (AWRP) treatment processes were further developed. A workshop was held with the NAU in May 2024 to discuss the detail of the proposed treatment processes and consider alternative options for AWRP process water discharge.

12.1.5 Potential environmental enhancement options related to the Beckton Water Recycling scheme were also identified and shared with the NAU in May 2024.

12.1.6 Acknowledging that further work on the Beckton Water Recycling scheme will continue with a further mid-Gate 3 checkpoint proposed at the end of March 2025, the work to identify and develop mitigation measures as set out in Priority Action 11 is considered to have been significantly advanced and addressed.

12.2 Priority Action Status:

12.2.1 To be fully completed by the end of AMP7.

13 Priority Action 12

Priority Action No. 12

Topic Area: Environment.

Detail: Work with the Environment Agency to scope environmental assessments for Beckton and Mogden Water Recycling, ensuring that any further work for Beckton includes water quality analysis and modelling of the freshwater River Lee and WFD assessment of Lee valley reservoirs

13.1 Priority Action Progress

Beckton Water Recycling scheme

13.1.1 Further to the progress set out for Priority Action 10, the scope of work for the Beckton Water Recycling scheme beyond the first mid-Gate 3 check point (May 2024) to a further mid-Gate 3 check point at the end of March 2025 was set out.

13.1.2 The scope of work includes further assessment of water quality in the Lee Valley reservoirs (linking into the WFD assessment) and the use of the newly developed hydrodynamic model to further analyse change to velocity, temperature and water quality within the Enfield Island Loop due to the recycled water discharge.

13.1.3 The updated assessment findings to be used to further develop mitigation requirements.

13.1.4 Acknowledging that further work on the Beckton Water Recycling scheme will continue with a further mid-Gate 3 checkpoint proposed at the end of March 2025, the work to scope the environmental assessments including water quality and modelling as set out in Priority Action 12 is considered to have been significantly advanced and addressed.

Mogden Water Recycling scheme

13.1.5 Further to the progress set out for Priority Action 10, the scope of work for the Mogden Water Recycling scheme beyond the first mid-Gate 3 check point (May 2024) to a further mid-Gate 3 check point at the end of March 2025 was set out.

13.1.6 The scope for Mogden Water Recycling scheme leading up to the second mid-Gate 3 check point focusses on the assessment of the scheme on a like for like basis with Beckton Water Recycling scheme so that a preferred alternative scheme can be selected at the beginning of AMP8.

13.1.7 Acknowledging that further work on the Mogden Water Recycling scheme will continue with a further mid-Gate 3 checkpoint proposed at the end of March 2025, the work to scope the environmental assessments including water quality

and modelling as set out in Priority Action 12 is considered to have been significantly advanced and addressed.

14 Conclusions

14.1 In Summary

14.1.1 Thames Water considers that all the priority actions relating to the Teddington DRA as set out for Gate 3 have either been fully addressed or significantly progressed in-line with the development stage of the Project and available guidance from the EA. Where relevant, viable mitigation and enhancement options have been identified and are being explored as the Project progresses towards statutory consultation in Q2 2025.

14.1.2 Recognising that Gate 4 activities include continuing pre-application investigations for planning work associated with applications for a development consent order, where appropriate, further assessment work has been identified to support the progression of the Teddington DRA beyond Gate 3.

14.1.3 A number of focus areas of the priority actions will require further work through Gate 4 as the Project is progressed through more detailed assessments and eventually a full Environmental Impact Assessment and the associated identification and refinement or mitigation measures.

14.1.4 Topics associated with the priority actions as set out for Gate 3 that Thames Water envisage will continue in Gate 4 having regard to the further assessment work required during this gate, including the preparation of the PEI Report and EIA, include:

- TTP pilot plant and permitting
- Refinement of the TTP design
- Olfactory chemicals
- Refinement of the intake and outfall design
- Refinement of mitigation measures.

14.1.5 Priority Actions set for Beckton and Mogden have also been significantly progressed through Gate 3 and as of December 2024. As these alternative schemes are on a different development programme we intend to fully address these priority actions at a Gate checkpoint at the end of AMP7 where we will make recommendations on which alternative water recycling scheme should progress into AMP8.

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