



# Annex B7: Swanscombe MCZ Assessment Report

Standard Gate two submission for London  
Water Recycling SRO

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This document has been produced as the 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 suite of documents that make up the 'Gate 2 submission.' That submission details all the work undertaken by Thames Water in the ongoing development of the proposed SRO. The intention at this stage is to provide RAPID with an update on the concept design, feasibility, cost estimates and programme for the schemes, allowing decisions to be made on their progress.

Should a scheme be selected and confirmed in the Thames Water final Water Resources Management Plan (WRMP), in most cases it would need to enter a separate process to gain permission to build and run the final solution. That could be through either the Town and Country Planning Act 1990 or the Planning Act 2008 development consent order process. Both options require the designs to be fully appraised and, in most cases, an environmental statement to be produced. Where required that statement sets out the likely environmental impacts and what mitigation is required.

Community and stakeholder engagement is crucial to the development of the SROs. Some high-level activity has been undertaken to date. Much more detailed community engagement and formal consultation is required on all the schemes at the appropriate point. Before applying for permission Thames Water will need to demonstrate that they have presented information about the proposals to the community, gathered feedback and considered the views of stakeholders. We will have regard to that feedback and, where possible, make changes to the designs as a result.

The SROs are at a very early stage of development, despite some options having been considered for several years. The details set out in the Gate 2 documents are still at a formative stage.

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# LONDON EFFLUENT REUSE SRO

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## Swanscombe MCZ Assessment Report

Report for: Thames Water Utilities Ltd

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**Customer:**

Thames Water Utilities Ltd

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# 1. INTRODUCTION

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## 1.1 OVERVIEW

This Marine Conservation Zone (MCZ) assessment is part of the series of environmental assessment reports which catalogue the set of environmental assessment of the London Effluent Reuse Strategic Resource Option (SRO) through Regulators' Alliance for Progressing Infrastructure Development (RAPID) Gate 2. The reports set out the environmental assessments, which will in turn support regulatory assessment requirements proportionate to RAPID Gate 2 (*Detailed feasibility, concept design and multi-solution decision making*) and onward to RAPID Gate 3 (*Developed design, finalised feasibility, pre-planning investigations and planning applications*). The scope and approach to the environmental evidence provided in these reports was set out in the London Effluent Reuse SRO Gate 2 Scoping Report<sup>1</sup> and consulted on with the National Appraisal Unit (NAU) in November 2021.

This document has been produced as the 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 suite of documents that make up the 'Gate 2 submission.' That submission details all the work undertaken by Thames Water (TWUL) in the ongoing development of the proposed SRO. The intention at this stage is to provide RAPID with an update on the concept design, feasibility, cost estimates and programme for the schemes, allowing decisions to be made on their progress.

Should a scheme be selected and confirmed in the TWUL final Water Resources Management Plan (WRMP), in most cases it would need to enter a separate process to gain permission to build and run the final solution. That could be through either the Town and Country Planning Act 1990 or the Planning Act 2008 development consent order process. Both options require the designs to be fully appraised and, in most cases, an environmental statement to be produced. Where required that statement sets out the likely environmental impacts and what mitigation is required.

Community and stakeholder engagement is crucial to the development of the SROs. Some high-level activity has been undertaken to date. Much more detailed community engagement and formal consultation is required on all the schemes at the appropriate point. Before applying for permission TWUL will need to demonstrate that they have presented information about the proposals to the community, gathered feedback and considered the views of stakeholders. We will have regard to that feedback and, where possible, make changes to the designs as a result.

The SROs are at a very early stage of development, despite some options having been considered for several years. The details set out in the Gate 2 documents are still at a formative stage.

For Gate 1, the London Effluent Reuse SRO was set out as four source options and a range of sizes. One option was in east London, utilising final effluent from Beckton Sewage Treatment Works (STW) (Beckton water recycling scheme) via either a tunnelled or a trenchless pipeline conveyance. The other three options were in west London, utilising crude sewage or final effluent from Mogden STW to a maximum total reduction of 200 Ml/d, with differing discharge locations in the freshwater River Thames: Mogden water recycling scheme, Mogden South Sewer scheme and Teddington Direct River Abstraction (DRA) scheme. During the course of Gate 2, Thames Water took the decision to pause development of the Mogden South Sewer scheme due to limitations on available flow within the sewer, cost of the scheme and regional modelling not selecting the scheme under any water resources planning horizon scenario<sup>2</sup>. Similarly, development of the pipeline variant associated with the Beckton water recycling scheme was paused due to the increasing costs associated with trenchless pipeline installation for greater lengths of the route to avoid environmental and planning issues, with the Beckton water recycling scheme progressed through Gate 2 featuring a tunnel conveyance.

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<sup>1</sup> Ricardo Energy and Environment (November 2021) London Effluent Reuse SRO Gate 2 Environmental Studies Scoping Report. On behalf of Thames Water.

<sup>2</sup> Mogden South Sewer scheme has not been progressed through Gate 2 environmental assessments, and so a dedicated assessment section is not included within this report. However, due to the similarities with the 50 Ml/d Mogden Effluent Reuse scheme (AWRP, discharge location and volume), the outcomes of that assessment can be considered representative of a 50 Ml/d Mogden South Sewer scheme.

Therefore, the Gate 2 IEA has revisited the three remaining options, informed by a more detailed conceptual design<sup>3</sup> produced by the team engineers; notably the refinement of the conveyance routes and associated infrastructure (e.g., shaft locations), to identify if any of the elements could lead to a significant adverse impact on receptors within the Zone of Influence of the scheme.

## 1.2 SCOPE OF THE MARINE CONSERVATION ZONE ASSESSMENT

The MCZ assessment approach has been informed by the guidance published by the Marine Management Organisation<sup>4</sup>. The document outlines the proposed procedure of undertaking MCZ assessments in the context of marine licensing decisions. The document recommends a staged approach to the assessment, with three sequential stages:

- Screening;
- Stage 1 assessment; and
- Stage 2 assessment.

Where specific activities, impacts or MCZs and their features are screened into the MCZ assessment process, these are then considered within the Stage 1 assessment. Should a significant risk of the activity hindering the conservation objectives be identified within Stage 1, then specific impact receptor pathways need to be considered in Stage 2 assessment.

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<sup>3</sup> Jacobs (2022) London Effluent Reuse Strategic Resource Option, Gate 2 Conceptual Design Reports.

<sup>4</sup> Marine Management Organisation (2013). Marine conservation zones and marine licensing.



## 2. SCREENING

There is one MCZ within the London Effluent Reuse SRO study area; Swanscombe MCZ. The only scheme with a potential pathway for impact is the Beckton water recycling scheme which is located c.13km upstream on the estuarine Thames Tideway. A high level summary of the scheme is provided in Section 2.1.2.

### 2.1.1 Swanscombe Marine Conservation Zone

Swanscombe MCZ is located within the Thames estuary, covering an area of approximately 3km<sup>2</sup> (see location map **Figure 2-1**). The seabed of Swanscombe MCZ is composed largely of shells, pebbles, sands and mud. Designation of Swanscombe MCZ protects the following features:

- **Tentacled Lagoon Worm** (*Alkmaria romijni*) are found in the intertidal and subtidal soft sediments. These worms are scarce throughout the UK and live within tubes made of mud in sheltered lagoons and estuaries. The tentacled lagoon worm is particularly vulnerable to activities that cause changes in its habitat. The tentacled lagoon worm is protected under Schedule 5 of the Wildlife and Countryside Act 1981.
- **Intertidal mud** supports the tentacled lagoon worm feature, and is a highly productive ecosystem that provides important feeding grounds for wading and migratory birds.

Table 2-1 Overview of Swanscombe MCZ protected features

Protected feature	Type of feature	Conservation objective
Intertidal mud	Seabed habitat	Maintain in favourable condition
Tentacled Lagoon Worm ( <i>Alkmaria romijni</i> )	Protected species	

### 2.1.2 Overview of Beckton water recycling scheme

Final effluent from Beckton STW would be treated at a new Advanced Water Recycling Plant (AWRP) within Beckton STW for advanced treatment. Recycled water would be conveyed via a new tunnel from the Beckton AWRP to Lockwood Reservoir Pumping Station and then a Thames-Lee-Tunnel (TLT) extension from Lockwood Pumping Station to a proposed new outfall located on a side channel of the freshwater Lee Diversion, known as the Enfield Island Loop, upstream of the existing Thames Water Enfield intake to the King George V Reservoir. Additional abstraction for public water supply on a put/take basis would be through existing intakes in the lower Lee, to supplement the raw water supply to the Lee Valley reservoirs. The option reduces the final effluent at the extant Beckton STW outfall to the estuarine Thames Tideway.

The Beckton water recycling scheme has been assessed for Gate 2 independently at 100 MI/d, 200 MI/d, and 300 MI/d. A schematic of the scheme is provided in **Figure 2.2**.

### 2.1.3 Screening conclusions

The following questions are tested through the screening process:

- Is the licensable activity taking place within or near an area being put forward for or already designated as an MCZ? and;
- Is the activity capable of affecting (other than insignificantly) either (i) the protected features of an MCZ; or (ii) any ecological or geomorphological process on which the conservation of any protected feature of an MCZ is (wholly or in part) dependant.

Although the Swanscombe MCZ is at a considerable distance downstream from the Beckton water recycling scheme, further consideration of the diversion of the effluent and potential changes this may cause to flows, salinity and other parameters within the estuarine Thames Tideway, is required through the Stage 1 assessment.



Figure 2.1 Swanscombe MCZ Assessment: Location map in relation to Beckton water recycling scheme components

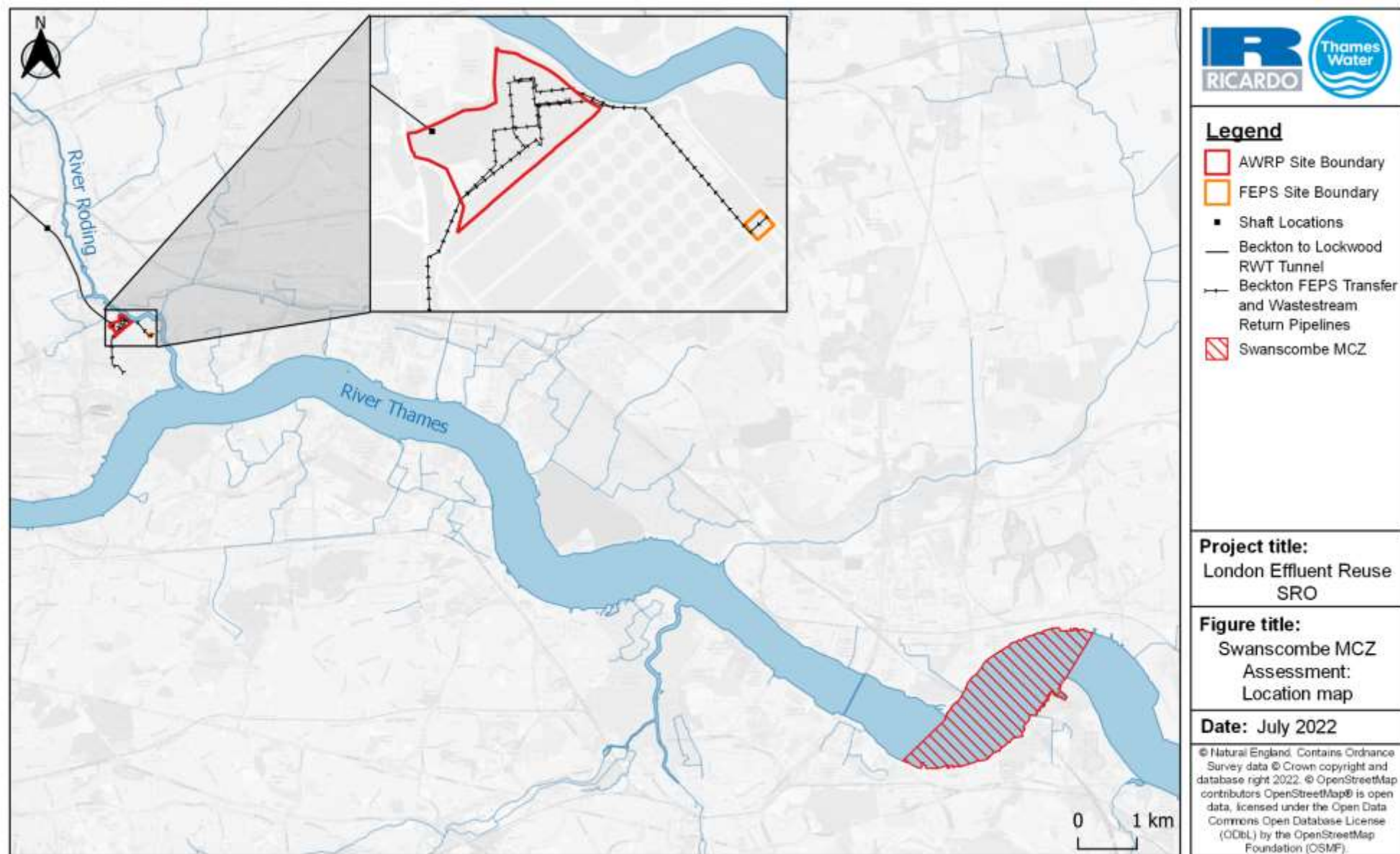
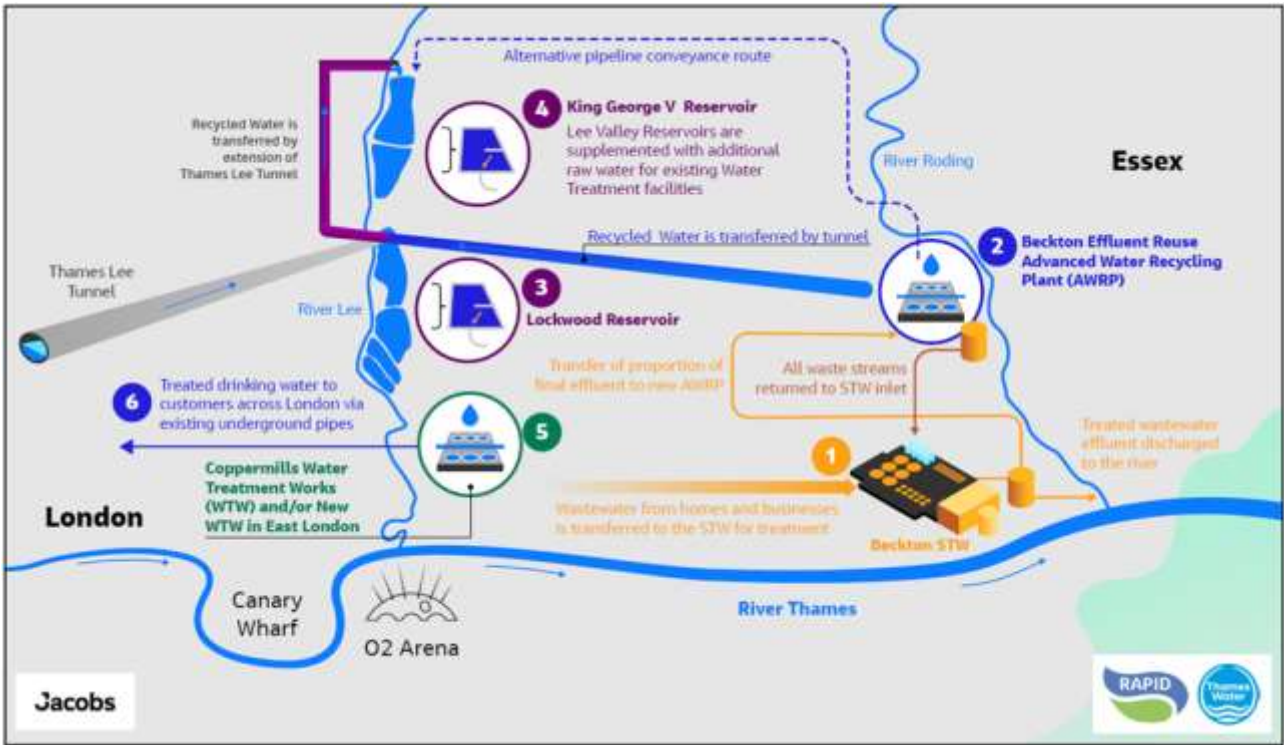


Figure 2.2 Schematic of Beckton water recycling scheme



## 3. STAGE 1 ASSESSMENT

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### 3.1 SCOPE OF THE ASSESSMENT

The following questions need to be satisfied in the Stage 1 assessment:

- Is the authority satisfied there is no significant risk of the activity hindering the conservation objectives stated for the MCZ?; and
- Can the authority exercise its functions to further the conservation objectives of the site?

### 3.2 STATUS OF THE SWANSCOMBE MARINE CONSERVATION ZONE

#### 3.2.1 Conservation objectives

Natural England have provided the following conservation objectives for the Swanscombe MCZ<sup>5</sup>:

*The conservation objective of the zone is that the protected features:*

1. *are maintained in favourable condition if they are already in favourable condition*
2. *be brought into favourable condition if they are not already in favourable condition*

*For each protected feature favourable condition means that, within a zone:*

1. *its extent is stable or increasing*
2. *its structure and function, its quality and the composition of its characteristic biological communities (including the diversity and abundance of the species forming part of or inhabiting the habitat) are sufficient to ensure that its condition remains healthy and does not deteriorate*

*Any temporary deterioration in condition is to be disregarded if the habitat is sufficiently healthy and resilient to enable its recovery.*

*For each species of marine fauna, favourable condition means that the population within a zone is supported in numbers which enable it to thrive, by maintaining:*

1. *the quality and quantity of its habitat*
2. *the number, age and sex ratio of its population*

*Any temporary reduction of numbers of a species is to be disregarded if the population is sufficiently thriving and resilient to enable its recovery.*

*Any alteration to a feature brought about entirely by natural processes is to be disregarded when determining whether a protected feature is in favourable condition.*

#### 3.2.2 Condition assessment

A condition assessment of the protected marine features has not been undertaken.

#### 3.2.3 Supplementary Advice on Conservation Objectives

The Supplementary Advice on Conservation Objectives (SACOs) present attributes which are ecological characteristics or requirements of the designated species and habitats within a site. The listed attributes are considered to be those which best describe the site's ecological integrity and which if safeguarded will enable achievement of the Conservation Objectives. These attributes have a target which is either quantified or qualified depending on the available evidence.

The following attributes are considered relevant to both qualifying features, given the potential pathway for impact:

- Supporting processes: physico-chemical properties (habitat) – The physico-chemical properties that influence habitats include salinity, pH and temperature.

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<sup>5</sup> [Marine site detail \(naturalengland.org.uk\)](https://naturalengland.org.uk)

- Supporting processes: sediment movement and hydrodynamic regime (habitat) – Maintain sediment transport pathways to and from the feature to ensure replenishment of habitats that rely on the sediment supply.
- Supporting processes: water quality - dissolved oxygen (habitat) - Maintain the dissolved oxygen (DO) concentration at levels equating to Good Ecological Status (Specifically  $\geq 4.0$  mg l<sup>-1</sup> standardised to a salinity of 35 using the 5th percentile of DO data (WFD Good/Moderate Boundary)), avoiding deterioration from existing levels.

### 3.3 OVERVIEW OF POTENTIAL IMPACTS FROM THE BECKTON WATER RECYCLING SCHEME

The Physical Environment Assessment (refer to Annex B.2.1. Physical Environment Assessment Report for full details) has identified potential impacts of the Beckton water recycling as follows:

- Velocity and flow – the Beckton water recycling scheme (all sizes) is not expected to result in any changes to flow conditions within the estuarine Thames Tideway, and therefore is not considered to have any impacts at the location of the Swanscombe MCZ.
- Outfall design – there is no change to the outfall design of Beckton STW final effluent channel and so there are no predicted impacts to the estuarine Thames Tideway and therefore are not considered to have any impacts at the location of the Swanscombe MCZ.
- Wetted habitat - the changes in exposure of estuarine wetted habitat are considered to be indiscernible from baseline conditions for all scheme sizes and therefore are not considered to have any impacts at the location of the Swanscombe MCZ.
- Estuarine sediment - the potential impacts predicted for estuarine sediment are negligible for all scheme sizes, with negligible changes in suspended solids concentration within the estuary and therefore is not considered to have any impacts at the location of the Swanscombe MCZ.

The Water Quality Assessment (refer to Annex B2.2. Water Quality Assessment Report for full details) has identified the following potential impacts of the Beckton water recycling scheme:

- Water temperature - the Thames Tideway modelling predicts no changes in temperature within the Thames Tideway associated with a Beckton water recycling scheme (all sizes) and therefore is not considered to have any impacts at the location of the Swanscombe MCZ.
- General physico-chemical - within the estuarine Thames Tideway, it is predicted that there may be negligible changes to salinity, with maximum increases of 0.7 ppt. Dissolved inorganic nitrogen (DIN) decreases in concentration during scheme on periods, with reductions in concentration of up to 100  $\mu$ Mol/l. This may positively impact the Swanscombe MCZ during scheme on periods, though it is unlikely that the reductions in DIN will be detectable within the MCZ given the distance downstream.
- Water Framework Directive (WFD) chemicals - within the estuarine Thames Tideway negligible impacts are predicted with only a maximum of one additional chemical exceeding the standard and no exceedance (respectively) under the 300, 200 and 100 MI/d scheme size (A82, 1 in 5 year flow scenario)<sup>6</sup> and no further exceedances under the M96 scenario (1 in 20 year flow scenario) in the estuarine Thames Tideway. Therefore, this is not considered to have any impacts at the location of the Swanscombe MCZ.
- Environmental Quality Standards Directive (EQSD) chemicals - within the Thames Tideway negligible impacts are also predicted with one additional chemical exceeding the standard under the 300, 200 and 100 MI/d scheme size under A82 and no further chemical exceedances under M96. Therefore, this is not considered to have any impacts at the location of the Swanscombe MCZ

The proposed activities associated with the Beckton water recycling scheme have been identified as not being capable of affecting the ecological and geomorphological process on which the conservation of protected features of the Swanscombe MCZ are dependant, therefore a Stage 2 assessment is not required.

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<sup>6</sup> A 48-year series from the stochastic flow series has been selected to model the effects of the scheme and includes a suitable range of regular low and moderate low flow periods. The model reference A82 refers to a 1.5 return frequency year with moderate-low flows in the River Thames at Teddington with a 1.5 return frequency operating pattern in terms of duration and season. The model reference M96 refers to a 1:20 return frequency year with very low flow years in the River Thames at Teddington with a 1:20 return frequency operating pattern in terms of duration and season.

## 4. CONCLUSION

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The proposed activities associated with the Beckton water recycling scheme, including the operation of the AWRP, are not deemed to be capable of affecting either the protected features of the MCZ or any ecological or geomorphological process on which the conservation of any protected feature of the Swanscombe MCZ is dependent.



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