ENVIRONMENTAL STATEMENT: 6.3 APPENDIX 11-1: WATER FRAMEWORK DIRECTIVE ASSESSMENT

DECARBONISATION

Cory Decarbonisation Project

PINS Reference: EN010128

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Revision A

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations (2009) - Regulation 5(2)(a)

TABLE OF CONTENTS

1. INTRODUCTION 1
1.2. Purpose of Report 2
1.3. Study Area 2
1.4. Alternatives 3
2. DEVELOPMENT PROPOSALS 4
2.2. Construction Phase 4
2.3. Operation Phase 7
3. BACKGROUND TO THE WFD 12
4. METHODOLOGY 14
4.1. Data Collection 14
4.2. Consultation 17
4.3. WFD Assessment Process 23
4.4. Limitations and Assumptions 27
5. BASELINE 28
5.1. Catchment Characteristics 28
5.2. Baseline Characteristics Against WFD Quality Elements 29
6. WFD SCREENING 53
6.1. Stage 1: WFD Screening 53
6.2. Stage 2 and 3: WFD Scoping 56
6.3. WFD Compliance 81
7. WFD MITIGATION 83
7.2. Construction Phase 83
7.3. Operation Phase 86
8. REFERENCES 95

TABLE

Table 4-1: Location of Fish Beam Trawls 15
Table 4-2: Location of Intertidal and Subtidal Benthic Sampling Stations 16

Table 4-3: Scoping Opinion Response on WFD Matters 17
Table 4-4: Environment Agency Engagement Summary 19
Table 4-5: Habitat Sensitivity as Defined by WFD Guidance 25
Table 5-1: WFD Status of the Thames Middle Transitional Water Body (GB530603911402) 29
Table 5-2: WFD Status of the Greenwich Tertiaries and Chalk Groundwater Body (GB40602G602500) 32
Table 5-3: Fish Species Data Obtained from the 2022 TraC Fish Counts, Woolwich, River Thames (TQ 45430 81420) 33
Table 5-4: Fish Species Data Obtained from the 2019 TraC Fish Counts, West Thurrock, River Thames (TQ 60774 77518) 34
Table 5-5: Results from the Beam Trawl on 18 May 2023 and 21 September 2023 36
Table 5-6: Water Quality Data from Environment Agency Monitoring Point (Thames at Erith) 42
Table 5-7: Water Quality Readings for Station 14 43
Table 5-8: Mean concentration of contaminants from monitoring points within Thames Middle Transitional Water Body (as µg/l) (ND=No Data) 47
Table 5-9: Potential Contaminant Concentrations as a Result of Capital Dredge in the Thames Middle Transitional Water Body 50
Table 5-10: Habitats of Principal Importance 52
Table 6-1: Stage 1 – Screening of Activities 54
Table 6-2: WFD Scoping of the Proposed Scheme Activities Against WFD Hydromorphology Receptors for Screened in Surface Water Bodies (Thames Middle Transitional Water Body) 56
Table 6-3: WFD scoping of the Proposed Scheme Activities against WFD Biological Receptors 58
Table 6-4: WFD scoping of the Proposed Scheme Activities against WFD Water Quality Receptors for Screened Surface Water Bodies (Thames Middle Transitional Water Body) 60
Table 6-5: WFD Scoping of the Proposed Scheme Activities against WFD Protected Areas and INNS Receptors 62
Table 6-6: Potential Impacts of the Proposed Scheme Activities against WFD Quality Elements for Transitional and Coastal Water Bodies 63
Table 6-7: Scoping Summary against WFD Receptors 77
Table 6-8: Compliance Assessment of the Proposed Scheme against WFD Status 81

ANNEXES

ANNEX A

WFD Study Area

ANNEX B

Intertidal and Subtidal Benthic Sampling

ANNEX C

Cory CCUS Sediments - CEFAS Screen

ANNEX D

Cory CCUS Sediments - Canadian Standards

ANNEX E

Combined

ANNEX F

MMO Template

1. INTRODUCTION

1.1.1. WSP has been commissioned by Cory Environmental Holdings Limited (hereafter referred to as the Applicant) to prepare a Water Framework Directive (WFD) Impact Assessment for the Cory Decarbonisation Project, to be located at Norman Road, Belvedere in the London Borough of Bexley (LBB; National Grid Reference/NGR 549572, 180512). The following figures are available in this ES:

- **Figure 1-1: Site Boundary Location Plan (Volume 2)**; and
- **Figure 1-2: Satellite Imagery of the Site Boundary Plan (Volume 2)**.

1.1.2. The Applicant intends to construct and operate the Proposed Scheme to be linked with the River Thames. It comprises of the following key components, which are described below, and further detail is provided within **Chapter 2: Site and Proposed Scheme Description (Volume 1)**:

- The Carbon Capture Facility (including its associated Supporting Plant and Ancillary Infrastructure): the construction of infrastructure to capture a minimum of 95% of carbon dioxide (CO_2) emissions from Riverside 1 and 95% of CO_2 emissions from Riverside 2 once operational, which is equivalent to approximately 1.3Mt CO_2 per year. The Carbon Capture Facility will be one of the largest carbon capture projects in the UK.
- The Proposed Jetty: a new and dedicated export structure within the River Thames as required to export the CO_2 captured as part of the Carbon Capture Facility.
- The Mitigation and Enhancement Area: land identified as part of the **Outline LaBARDS (Document Reference 7.9)** to provide improved access to open land, habitat mitigation, compensation and enhancement (including forming part of the drainage system and Biodiversity Net Gain delivery proposed for the Proposed Scheme) and planting. The Mitigation and Enhancement Area provides the opportunity to improve access to outdoor space and to extend the area managed as the Crossness LNR.
- Temporary Construction Compounds: areas to be used during the construction phases for activities including, but not limited to office space, warehouses, workshops, open air storage and car parking, as shown on the **Works Plans (Document Reference 2.3)**. These include the core Temporary Construction Compound, the western Temporary Construction Compound and the Proposed Jetty Temporary Construction Compound.
- Utilities Connections and Site Access Works: The undergrounding of utilities required for the Proposed Scheme in Norman Road and the creation of new, or the improvement of existing, access points to the Carbon Capture Facility from Norman Road.

1.1.3. Together, the Carbon Capture Facility (including its associated Supporting Plant and Ancillary Infrastructure), the Proposed Jetty, the Mitigation and Enhancement Area, the Temporary Construction Compounds and the Utilities Connections and Site Access Works are referred to as the 'Proposed Scheme'. The land upon which the Proposed Scheme is to be located is referred to as the 'Site' and the edge of this land referred to as the 'Site Boundary'. The Site Boundary represents the Order Limits for the Proposed Scheme as shown on the **Works Plans (Document Reference 2.3)**.

1.2. PURPOSE OF REPORT

1.2.1. This report presents the Water Framework Directive (WFD) Assessment for the Proposed Scheme. This report supersedes the WFD Screening submitted as Annex A of the EIA Scoping Report[1] and has been prepared through ongoing design evolution and consultation with statutory bodies, including the Environment Agency.

1.2.2. The Environment Agency requires an assessment of the impact of any works/modifications to water bodies in the UK under the European Union's Water Framework Directive (WFD) 2000[2]. The WFD is transposed into law in England and Wales under The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (the 2017 Regulations)[3]. For groundwater, the WFD is transposed into law in England and Wales under The Groundwater (Water Framework Directive) (England) Direction 2016[4].

1.2.3. The purpose of this WFD Assessment is to evaluate the potential construction and operation impacts of the Proposed Scheme for WFD compliance, and present mitigation that is required to ensure this.

1.3. STUDY AREA

1.3.1. The Study Area covers approximately 1km of the River Thames from approximately TQ 49380 80761 at the upstream extent of the Site Boundary to approximately TQ 50314 80616 at the downstream extent of the Site Boundary. The Study Area is shown within **Annex A** and is based on the location of water bodies which may be impacted by the Proposed Scheme. Where no potential impact is expected due to distance, lack of hydrological connectivity and the nature of the Proposed Scheme's activities, water bodies have been scoped out of further assessment.

1.3.2. Based on this Study Area, the Proposed Scheme could potentially impact the following water bodies:

- Thames Middle Transitional Water Body (GB530603911402), which lies within the Tidal Thames TraC Transitional and Coastal (TraC) Operational Catchment, the Thames TraC Management Catchment, and the Thames River Basin District; and
- The Greenwich Tertiaries and Chalk (GB40602G602500) groundwater body lies in the Greenwich Tertiaries Operational Catchment, the Thames Groundwater Management Catchment, and the Thames River Basin District.

1.4. ALTERNATIVES

1.4.1. Alternative locations for the Proposed Jetty have been considered as part of the design process, and justification for discounted options is set out in **Chapter 3: Consideration of Alternatives (Volume 1)**.

2. DEVELOPMENT PROPOSALS

2.1.1. This section outlines the WFD context of the Proposed Scheme for which development consent is being sought. Further detail on the Proposed Scheme holistically is provided within **Chapter 2: Site and Proposed Scheme Description (Volume 1)**.

2.2. CONSTRUCTION PHASE

2.2.1. The Proposed Scheme will comprise the following construction activities, which may have potential impacts upon the WFD water bodies and quality elements:

2.2.2. As set out in **Chapter 2: Site and Proposed Scheme Description (Volume 1)**, two options for the construction programme of the Proposed Scheme are being considered: Option 1 and Option 2. The estimated construction period is approximately 60 months (five years) for Option 1 and approximately 42 months (three and a half years) for Option 2. The construction assessment presented in this chapter is appropriate for either of the construction programme options (being a single-phase or two-phase construction) and either a one or two Carbon Capture Plant design as described in **Chapter 2: Site and Proposed Scheme Description (Volume 1)**.

TEMPORARY CONSTRUCTION COMPOUNDS

The Core Temporary Construction Compound

2.2.3. The core Temporary Construction Compound will be located centrally within the Site, within the Carbon Capture Facility component.

2.2.4. The core Temporary Construction Compound will be used during construction for uses including but not limited to, construction activities, site offices, welfare, warehouses, workshops, open air storage and car parking. The core Temporary Construction Compound will be located across Borax North, Borax South, Creekside, Munster Joinery and Gannon land parcels. These land parcels other than Munster Joinery are currently in use as part of the construction of Riverside 2. This is beneficial in that these sites are already set up, surfaced and have utilities connections (drainage, water and power). Additionally, there are appropriately made, existing accesses from Norman Road.

2.2.5. Site clearance, levelling and ground preparation works for Temporary Construction Compounds (not utilised as part of the construction of Riverside 2) may be completed to provide a suitable working compound. The surface material of construction compounds will be permeable to allow rainwater to percolate to ground, with suitably bunded locations identified as storage areas for any hazardous, polluting materials or chemicals to prevent the risk of pollution.

2.2.6. Following completion of the construction works, the land in the core Temporary Construction Compound will be utilised as part of the Caborn Capture Facility.

2.2.7. Designated appointed Contractor(s) car parking will be focussed on the core Temporary Construction Compound, for further information see the **Framework CTMP (Document Reference 7.7)**.

The Western Temporary Construction Compound

2.2.8. The western Temporary Construction Compound will be utilised to support the construction of flue gas ducting from Riverside 2, which borders the southern, western and partial northern perimeters of Riverside 2. The western Temporary Construction Compound can be accessed via the Riverside 2 internal access roads, which are currently under construction.

2.2.9. Following completion of the construction works of the Proposed Scheme the majority area of the western Temporary Construction Compound will be reinstated to its original use. A small section along the eastern border of the compound, will be utilised for the Flue Gas Supply Ductwork (Work No. 2B) once the Proposed Scheme becomes operational.

Proposed Jetty Temporary Construction Compound and Laydown

2.2.10. The Proposed Jetty Temporary Construction Compound will be used to facilitate construction activities related to the Proposed Jetty and Belvedere Power Station Jetty (disused), specifically to support construction of the Access Trestle for the Proposed Jetty.

2.2.11. The Proposed Jetty Temporary Construction Compound will be accessed via the Iron Mountain Records Storage and Asda Access Road.

2.2.12. Following completion of the construction works of the Proposed Scheme, the Proposed Jetty Temporary Construction Compound will be reinstated to its prior use but will be available for maintenance access during the operational phase.

CONSTRUCTION DELIVERIES AND ACCESS

2.2.13. Assumptions for the transport of construction plant and materials of the Proposed Scheme differ across the landside and marine elements.

2.2.14. For the landside elements transport will primarily be road-based.

Indicative Construction Vehicle Movements

2.2.15. It is projected that at the construction peak, there will be 25 HGV deliveries (50-two-way movements) per day. This is based upon an assessment of similar sized schemes and taking into consideration localised factors (for example, HGV loading areas within the Temporary Construction Compounds) and is considered a robust estimation of the anticipated peak construction movements.

2.2.16. There are likely to be Abnormal Indivisible Loads (AIL) required for the construction of the Proposed Scheme; however, the frequency of these vehicles is likely to be small and AIL movements will be actively managed under the **Framework CTMP (Document Reference 7.7)**.

2.2.17. The Transport Assessment for the adjacent Riverside 2 (now under construction) has anticipated construction traffic routing from the north/west via the A2016 Eastern Way (25%), and the southeast (towards the M25) via the A2016 Bronze Age Way and A206 (75%). Yarnton Way has a 3.0t weight restriction so would not be suitable for any HGV. The Riverside 2 Transport Assessment17 was developed with input and approval from the local highways authorities; therefore, the same assumptions have been applied for the Proposed Scheme Agreement on these assumptions was sought from the relevant local highways authorities through the engagement undertaken in October 2023 (see **Table 18-2** in **Chapter 18: Landside Transport (Volume 1)**).

2.2.18. Further information regarding vehicle movements is provided in **Chapter 18: Landside Transport (Volume 1)** and the associated **Appendix 18-1: Transport Assessment (Volume 3)**.

Indicative Construction Vessel Movements

2.2.19. For the Proposed Jetty (i.e. steel piles, precast concrete units and marine equipment such as fenders) transport will primarily be via the River Thames, where practicable.

2.2.20. The plant and materials brought in for the construction of the Proposed Jetty will be limited to the material quantities needed for construction activities being undertaken at that time, and which are designed to be constructed within the River Thames. Where appropriate, plant and materials may be temporarily stored on a jack-up barge.

2.2.21. The number of vessel movements will depend on the construction activities being undertaken at that point in time. However, it is estimated that on average two barges per working day will be required to visit the Site. This includes delivery of materials and removal of the capital dredging arising if this is to be to a licensed offsite location. Each barge movement will require the assistance of a tugboat. In addition to the tugs, a small passenger boat is expected at the end of each working shift. The boat will transport construction workers to and from the terrestrial Site.

2.2.22. The jack-up barge used for piling will be in close proximity to the construction area and will be moved within Proposed Jetty location every few days throughout the duration of the construction process. Once no longer required the jack-up barge will be removed from the Site.

2.2.23. A safety vessel will be present when construction activities for the Proposed Jetty are underway.

2.2.24. Additionally, vessels will be required for capital dredging. Further information on capital dredging is provided below.

CAPITAL DREDGING

2.2.25. To ensure that vessels can berth, capital dredging of the berth pocket will be required prior to the construction of the Proposed Jetty; the volume of dredging is related to the location of the Proposed Jetty.

2.2.26. As described in **Chapter 3: Consideration of Alternatives (Volume 1)** the preferred position for the location of the Proposed Jetty is Option 3 (halfway between Option 1 and 2 positions).

2.2.27. The capital dredge volume for Option 3 is approximately 110,000m^3, to a depth of approximately -10.5m (CD).

2.2.28. Backhoe dredging will be adopted for the Proposed Scheme and the assessments presented within this ES and this WFD Assessment are based upon this method. Backhoe dredging is where an excavator mounted on the edge of a floating pontoon or barge is utilised, which reaches into the water and scoops bed material out. A separate vessel or barge will be moored alongside, which the dredged material is deposited directly into.

2.2.29. The dredged arisings will be managed in accordance with relevant legislation and will be disposed of offsite (via vessel and only if dredged arisings are deemed suitable for this disposal method and conform with the permits for disposal sites). The removal of the dredged arisings will be undertaken by an appropriately licenced waste carrier.

BELVEDERE POWER STATION JETTY (DISUSED)

2.2.30. As described in **Chapter 3: Consideration of Alternatives (Volume 1)**, both the demolition and retention of the Belvedere Power Station Jetty (disused) are currently under consideration. This report is based on the retention of the Belvedere Power Station Jetty (disused) (with modifications), but in some instances, for completeness or where relevant, and using a worst case scenario assessment approach, there is a brief description of the impacts associated with the demolition of the Belvedere Power Station Jetty (disused), for example within **Table 6-6**.

2.3. OPERATION PHASE

DESIGN LIFE

2.3.1. The Proposed Scheme is intended to operate for at least 25 years. However, for the purpose of assessing a reasonable worst case scenario it is assumed that it could have a design life of 50 years, as per typical design life of the civil and structural elements of the Proposed Scheme.

2.3.2. At the end of the 50 year period, the Proposed Scheme may have some residual life remaining, and an investment decision will be made as to whether the operational life of the Proposed Scheme is to be extended. If it is not appropriate to continue operation, the plant will be decommissioned.

CARBON CAPTURE FACILITY

2.3.3. Up to two carbon capture plants are intended[1], to be located in the centre of the Site to the south of existing Riverside 1 and under construction Riverside 2 (anticipated to be operational in 2026).

2.3.4. This activity could lead to impacts to WFD quality elements such as water quality and biological in the freshwater zone due to associated construction activities.

THE PROPOSED JETTY

2.3.5. A new and dedicated export structure is required to export the LCO_2. The Proposed Jetty will be located in the River Thames approximately 130m downstream of the existing Middleton Jetty, with its front face approximately 140m from the southern bank of the River. The Proposed Jetty will comprise the following key features:

- Loading Platform;
- Breasting Dolphins;
- Mooring Dolphins;
- Access Trestle; and
- Access Catwalks.

2.3.6. The main function of the Loading Platform is to facilitate the loading of LCO_2 into the tanks within the vessels. The LCO_2 will be loaded through one or more manifolds located around the centre of the vessels. The loading equipment would be sized so that vessel turnaround time is less than 12 hours. To provide a level of redundancy, three marine loading arms are envisaged.

2.3.7. The structure will be formed of a concrete reinforced deck supported by steel piles (approximately 45 piles). In addition to quick release hooks, the topside infrastructure will feature the following elements: the marine loading arms and vapour return arm; elevated process pipe bridge; lighting; fire suppression systems; and space for a standard London Fire Brigade fire engine to manoeuvre. The Loading Platform will also be equipped with a gangway which will allow embarkation and disembarkation of the LCO_2 vessel.

[1] The evolving design is on the basis of two Carbon Capture Plants, however as part of ongoing design development the potential for a single Carbon Capture Plant will be considered.

2.3.8. The CO_2 vapour will be combined with the boil-off gas (BOG) from the Above Ground Storage Tanks and sent to be re-liquefied at either of the Carbon Capture Plant(s). If there is any BOG that is unable to be re-liquefied, it would be vented via a separate supported CO_2 vent. However, venting of BOG will not be a normal operation and will be a very infrequent event.

2.3.9. The Breasting Dolphins will be positioned either side of the Loading Platform, comprising two fender cones arranged vertically with fender panels. The fenders will be supported by steel piles. The purpose of the Breasting Dolphins is to absorb some of the loads whilst the vessels are berthing.

2.3.10. The Mooring Dolphins will be positioned on either side of the Loading Platform, to secure the vessels with mooring lines. The concrete decks will support a double-quick release hook, assisting vessel berthing, and will be supported by steel piles. The Mooring Dolphins will be positioned back from the Loading Platform to ensure mooring lines are of a suitable length and angle.

2.3.11. The Access Trestle will connect the Loading Platform to land and support Above Ground Pipelines, including LCO_2, running the length of the Proposed Jetty. It will also provide access for pedestrians, emergency and maintenance vehicles. The Access Trestle will run from the eastern side of the Riverside 1 building, over the England Coast Path (FP3/NCN1) and flood wall, to the rear edge of the Loading Platform. The Access Trestle comprises a deck featuring a concrete and tarmac roadway atop a steel frame structure, which will be supported by steel piles.

2.3.12. The Access Trestle for the Proposed Jetty will span over the Belvedere Power Station Jetty (disused). A decision is yet to be made on whether to retain or demolish and remove this jetty as part of the construction process for the Proposed Jetty. Further detail on these options is provided in **Section 3.4** and in **Chapter 3: Consideration of Alternatives (Volume 1)**. In the event that the Belvedere Power Station Jetty (disused) is retained (with modifications), the proposed Access Trestle will have to be designed and constructed to accommodate the Belvedere Power Station Jetty (disused) being left in place (i.e. wider pile spacing at that location). The England Coast Path (FP3/NCN1) will be retained; however, overhead construction activities will be undertaken across the England Coast Path (FP3/NCN1).

2.3.13. Access Catwalks will connect the Mooring Dolphins to the Loading Platform providing pedestrian access (with railings for safety).

2.3.14. A minimum water depth will be required alongside the berth to provide vessel access at all states of the tide. Construction dredging will therefore be required to provide access to/from the River Thames shipping channel to the Proposed Jetty, including the creation of a berthing pocket for berthing of vessels, further information is provided in **Section 2.2**.

2.3.15. To reduce the extent of dredging required, a sheet pile retaining wall equipped with a capping beam will be installed. The wall will be positioned under the Loading Platform at the edge of the berth pocket and run between the outer Mooring Dolphins towards the riverbank. The top of the capping beam will be approximately at the existing riverbed level.

2.3.16. As explained in **Chapter 2: Site and Proposed Scheme Description (Volume 1)**, it is proposed that berthing facilities for Cory tugs operating at the Middleton Jetty are integrated to the Proposed Jetty. The berthing of Cory tugs will be facilitated via a landing pontoon which will be located at the rear of the Proposed Jetty. The envisaged form of construction is a proprietary pontoon restrained by steel piles for vessel access at various states of the tide. Access to the landing pontoon will be via a linkspan connected to the Loading Platform. To ensure access to the tug berth dredging will be required at the tug berth location.

MITIGATION AND ENHANCEMENT AREA

2.3.17. The Mitigation and Enhancement Area is located in the south and west of the Site. The proposals here are set out in the Outline **LaBARDS (Document Reference 7.9)**.

SURFACE WATER DRAINAGE

2.3.18. The Proposed Scheme will require a new drainage system within the Site. The drainage system will use the existing ditches within the Site as a point of connection, with attenuation tanks, filter drains and ponds utilised to control the discharge quality and rate to the ditches. The proposed drainage would include a system of containment to mitigate the potential risk of pollution to the surrounding site area and/or environment. This would include bunded areas around chemicals for the Direct Contact Cooler and the Absorber Column(s), solvent storage/make up system, Intermediate LCO_2 Storage, diesel generator and storage, compressor lube oil and refrigerant area. Additionally, a downstream defender will be installed at all outfall locations. These, in combination with the filter drains and any open Sustainable Drainage Systems (SuDS) (such as attenuation ponds) will provide an adequate level of pollution control from the Proposed Scheme.

2.3.19. An **Outline Drainage Strategy (Document Reference 7.2)** has been developed and is included within the application.

OPERATION VEHICLE MOVEMENTS AND ACCESS

2.3.20. As detailed in **Chapter 18: Landside Transport (Volume 1)** the Proposed Scheme will generate a small number of vehicle movements during the operation phase which, in agreement with the Planning Inspectorate and LBB[5], have not been scoped into the landside transport assessment. The vehicle movements will be from the following:

- operation staff travelling to/from the Proposed Scheme;
- additional Contractor(s) for maintenance activities not undertaken by the operational workforce;
- delivery of diesel for the back-up diesel generators;
- delivery of chemicals and proprietary amine-based solvent; and
- emergency services.

2.3.21. Access to the Site will be via Norman Road. Primary pedestrian access would be via Norman Road and the PRoW network.

2.3.22. The Proposed Jetty will provide the riverside access point to be used for the export of LCO_2.

OPERATION VESSEL MOVEMENTS

2.3.23. Based on a preliminary operational capacity assessment, up to five marine vessels will call at the Proposed Jetty each week to collect and transport LCO_2 to meet the annual throughput; this forms the basis of assessment in this ES. The marine vessel number has been calculated on an assumed marine vessel capacity and the anticipated weekly CO_2 capture rate of the Two-Phase Construction (Option 1) approach for the Proposed Scheme, at peak capacity. For the purposes of assessment, it has been assumed that the marine vessels will have a LCO_2 capacity of approximately 7,500m^3 each.

2.3.24. To provide flexibility for prospective change in vessel type, the Proposed Jetty will be designed to accommodate marine vessels with a capacity of up to 15,000m^3 per vessel, which would then result in a lower number of calls per week than the five referenced above. There will also be up to ten tug movements from the rear of the structure of the Proposed Jetty, to assist in the berthing of the vessels.

MAINTENANCE DREDGING REQUIREMENTS

2.3.25. Periodic maintenance dredging will be required to ensure the Proposed Jetty remains accessible. The typical frequency of the maintenance dredging is approximately 12 months however, this may vary depending on the intensity of coastal processes and frequency of berth usage. It is anticipated that the annual maintenance dredge volume will be approximately 9,000m^3.

2.3.26. Similarly, to capital dredging, maintenance dredging will be managed in accordance with relevant legislation and will be disposed of offsite (via vessel and only if dredged arisings are deemed suitable for this disposal method and conform with the permits for disposal sites). The removal of the dredged arisings will be undertaken by an appropriately licenced waste carrier.

3. BACKGROUND TO THE WFD

3.1.1. The primary aim of the WFD is to improve/maintain the Ecological Status or Potential of water bodies and to prevent deterioration in status of the water bodies and their associated WFD quality elements. Ecological Status or Potential is determined by a suite of biological, physico-chemical and hydromorphological quality elements. This WFD Assessment aims to establish the baseline conditions, evaluate potential impacts of the Proposed Scheme and assess compliance against WFD objectives.

3.1.2. The overarching objective of the WFD is for water bodies in Europe (and the UK) to attain overall 'Good Ecological Status' (GES) or 'Good Ecological Potential' (GEP). GES refers to situations where the ecological characteristics show only a slight deviation from natural/near natural conditions. In such a situation, the biological, chemical, physico-chemical and hydromorphological conditions are associated with limited or no human pressure. Artificial and heavily modified water bodies which cannot meet GES due to human uses have a target to achieve GEP, which recognises their important uses, whilst ensuring the quality elements are protected as far as possible.

3.1.3. The WFD sets a number of objectives including:

- preventing deterioration in status for water bodies;
- aiming to achieve Good biological and Good surface water chemical status in water bodies. Those water bodies that did not achieve GES by 2015 need to achieve compliance by 2021 or 2027;
- for water bodies that are designated as artificial or heavily modified (A/HMWB), the objective is to achieve GEP - those A/HMWB that did not achieve GEP by 2015 need to achieve compliance by 2021 or 2027;
- where is it considered either technically infeasible or disproportionately expensive to achieve GES or GEP by 2021 or 2027, alternative objectives have been set for the water body, such as a target to achieve Moderate status;
- complying with objectives and standards for protected areas where relevant; and
- reducing pollution from priority substances and cease discharges, emissions and losses of priority hazardous substances.

3.1.4. The introduction of a new modification, change in activity or change to structure on a water body needs to be considered in relation to whether it could cause deterioration in the Ecological Status or Potential of any water body. New modifications or changes to activities or structures may also result in any proposed mitigation measures or actions to achieve GES/GEP being ineffective. This could result in the water body failing to meet GES/GEP.

3.1.5. Following case law, there is a deterioration of the Ecological Status as soon as the status classification of at least one of the quality elements falls by one class, even if that fall does not result in a drop of the overall classification of the body of surface water as a whole. If a quality element is already in the lowest class (and deterioration is not possible), any deterioration of that element would constitute a deterioration of the Ecological Status.

3.1.6. Where a development is considered to cause deterioration or where it may contribute to the failure of the water body to meet GES/GEP, then an Article 4.7 compliance assessment would be required which makes provision for deterioration of status provided that certain conditions are met, in particular, that the development is necessary for reasons of overriding public interest and the benefits of the development outweigh the benefits of compliance with the objectives of the WFD.

4. METHODOLOGY

4.1. DATA COLLECTION

4.1.1. This section describes the data collected and surveys undertaken that have informed this assessment.

DESK STUDY

4.1.2. A desk-based study was carried out to collect baseline information and inform the WFD Assessment. The following data sources were used for the desk study:

- contemporary OS maps[6];
- geology and soil maps[7];
- current aerial photography[8];
- WFD status and objectives from Catchment Data Explorer[9]
- Environment Agency Ecology Explorer[10] ;
- Environment Agency Water Quality Archive[11]
- hydrological data[12];
- historic maps[13];
- Magic Map for designated areas, habitats and species, landscape and marine data[14] ;
- various literature sources, including published articles and technical reports;
- WFD status and objectives from the 2022 Thames River Basin Management Plan (RBMP)[15]; and
- Environment Agency Annual average baseline data for specific pollutants and priority hazardous substances 2016-2018[16].

FIELD SURVEY

Intertidal Walkover Surveys

4.1.3. Intertidal walkover surveys were undertaken on 4th November 2022 and 17th May 2023. The surveys were undertaken according to standard intertidal survey methodologies as outlined in the Joint Nature Conservation Committee (JNCC) Marine Monitoring Handbook[17] There was no safe access to the intertidal area during the walkovers and therefore all observations were made from the England Coast Path (FP3/NCN1) adjacent to the intertidal area. The surveys were conducted on an outgoing tide, starting approximately two hours prior to low tide and finishing approximately one hour after low tide.

4.1.4. The surveys comprised a general walkover of the Site noting changes in ecological and physical characteristics. All conspicuous macrofauna species present were identified where possible and recorded onsite. All species names were taken from the Marine Life Information Network[18]. Field notes were also taken on the physical characteristics, including sediment type, shore type and wave exposure, alongside photographs. Any other features within the intertidal zone were also noted, including artificial structures and habitats/species of conservation importance.

Fish Surveys

4.1.5. A spring fish survey was undertaken on the 18th May 2023 and an autumn fish survey was undertaken on 21st September 2023. During each of the surveys, two 2m scientific beam trawl transects were carried out within the Survey Area which is defined in **Figure 8-2: Spring and Autumn Fish Trawl Locations and Water Quality Sampling Locations (Volume 2)**. Each beam trawl transects extended over a minimum distance of 200m, with the start and end points recorded using a Global Navigation Satellite System (GNSS) logger. On retrieval of the beam trawl, all fish were carefully handled, identified to species level (where practicable), counted and fork length measured to the nearest mm. Once processed, fish were returned safely to the River Thames.

Table 4-1: Location of Fish Beam Trawls

Trawl Location	Spring		Autumn	
	Latitude (WGS84)	Longitude (WGS84)	Latitude (WGS84)	Longitude (WGS84)
Trawl 1 Start Point	51°30.4938N	0°09.2300E	51°30.4507N	0°09.4287E
Trawl 1 End Point	51°30.4302N	0°09.4741E	51°30.4942N	0°09.2577E
Trawl 2 Start Point	51°30.3737N	0°09.6806E	51°30 3284N	0°09.8384E
Trawl 2 End Point	51°30.3564N	0°09.7742E	51°30.3760N	0°09.6276E

Subtidal and Intertidal Benthic Surveys

4.1.6. On the 17th May 2023, grab sampling was carried out at six points across the intertidal zone and on the 18th May 2023, sampling was carried out at an additional six points across the subtidal area. On 21st September 2023, an additional three sites were sampled within the subtidal area to capture potential changes to the Proposed Scheme capital dredge area. All sampling was undertaken from appropriately equipped and coded survey vessels. Locations of the sampling stations are detailed in **Figure 8-2: Spring and Autumn Fish Trawl Locations and Water Quality Sampling Locations (Volume 2)**.

4.1.7. The intertidal and subtidal benthic surveys followed the established and recognised procedures outlined in the Recommended Operational Guidelines (ROG) for Grab Sampling and Sorting and Treatment of Samples[19] and the Marine Monitoring Handbook, Procedural Guideline No. 3-9[20].

4.1.8. The subtidal and intertidal samples were collected using a 0.1m^2 Day grab deployed from the stern of the survey vessel. The grab samples were sieved on deck using a 0.5mm stainless steel mesh sieve and then sent to a laboratory for macrofauna analysis (faunal composition, abundance and biomass). An additional sample was taken at each station for determination of Particle Size Analysis (PSA) and sediment contaminant analysis.

4.1.9. The benthic invertebrate samples were analysed by an accredited Marine Biological Analytical Quality Control (NMBAQC) laboratory. All the macroinfaunal specimens were identified to species level (where practicable) and enumerated.

4.1.10. The PSA and sediment chemistry samples were analysed by an accredited physico-chemical laboratory to Marine Management Organisation (MMO) dredging standards.

4.1.11. **Table 4-2** gives details of the location of intertidal and subtidal benthic sampling stations. The results are shown in **Annex B**.

Table 4-2: Location of Intertidal and Subtidal Benthic Sampling Stations

Station Number	Latitude (WGS84)	Longitude (WGS84)
Intertidal Surveys		
Intertidal 1	51°30′24″N	000°09′08″E
Intertidal 2	51°30′23″N	000°09′15″E
Intertidal 3	51°30′22″N	000°09′22″E
Intertidal 4	51°30′21″N	000°09′30″E
Intertidal 5	51°30′21″N	000°09′36″E
Intertidal 6	51°30′18″N	000°09′49″E
Subtidal Surveys		
Subtidal 7	51º30.4907	000º09.1677
Subtidal 8	51º30.3741	000º09.5448
Subtidal 9	51º30.4281	000º09.5176
Subtidal 10	51º30.4087	000º09.6488
Subtidal 11	51º30.3306	000º09.8323
Subtidal 12	51º30.4017	000º09.5685
Subtidal 13	51º30.4620	000º09.5260
Subtidal 14	51º30.4334	000º09.6490
Subtidal 15	51º30.4038	000º09.7414

Water Quality Samples

4.1.12. Water quality samples were collected using a Niskin bottle on 21st September 2023 within the proposed capital dredge area over a six hour period to determine baseline sediment concentrations and to calibrate a sediment transport model. They were then sent for analysis at a MMO accredited laboratory. In addition to the water quality samples, hourly water quality readings using a water quality probe, including temperature, salinity and total dissolved solids were recorded. Water quality information is provided within **Annex E**.

HYDROMORPHOLOGY WALKOVER SURVEY

4.1.13. The hydromorphology site walkover undertaken on 4th November 2022 was used to identify WFD baseline conditions and potential areas for enhancement opportunities. A photo showing the bank of the River Thames is shown in **Section 5.2**.

4.1.14. The hydromorphology survey and assessment has been undertaken in accordance with the CEN/ISO Water Quality Guidance Standard on assessing the Hydromorphological Features of Transitional and Coastal Waters[21] and Water Quality Guidance Standard on Determining the Degree of Modification of the Hydromorphological Features of Transitional and coastal Waters[22]. This is a requirement under Annex V of the WFD legislation[43].

4.2. CONSULTATION

4.2.1. The EIA Scoping Opinion[23] and its associated appendices, issued by the Planning Inspectorate on the 26th May 2023 included three comments related to the WFD assessment, shown in **Table 4-3.** Responses to the statutory consultation are detailed within **Table 11-3** of **Chapter 11: Water Environment and Flood Risk (Volume 1)**.

4.2.2. Further engagement was undertaken with the Environment Agency regarding the findings of the WFD Screening and Scoping Assessment on 1st and 13th December 2023. The outcome of this engagement is summarised in **Table 4-4.**

Table 4-3: Scoping Opinion Response on WFD Matters

Respondee	Section ID	Scoping Opinion Comments	Response
Planning Inspectorate	3.7.1	"The Scoping Report indicates that there is one WFD surface water body within the study area, which falls within a management (but not operational) catchment. The Scoping Report does not make reference to any WFD groundwater bodies within the	The Greenwich Tertiaries and Chalk Water Body WFD Groundwater Body (GB40602G602500) is the only WFD groundwater body located within the

Respondee	Section ID	Scoping Opinion Comments	Response
		study area, despite Table 10-5 noting that groundwater quality is to be scoped in. The ES and/ or accompanying WFD assessment should include any relevant groundwater bodies."	Study Area and is assessed within this document.
	3.7.4	*"The Inspectorate is in agreement that a WFD screening assessment is not required for non WFD (undesignated) water bodies. However, the ES should consider whether any of the biological, physio-chemical and hydromorphological parameters are to be assessed under general surface water/ groundwater quality as per the first two lines of Table 10-5."*	**Chapter 11: Water Environment and Flood Risk (Volume 1)** and **Chapter 7: Terrestrial Biodiversity (Volume 1)** includes an assessment of the effects of the Proposed Scheme on the biological, physicochemical and hydromorphological quality elements of the non WFD designated watercourses as outlined in Table 10-5 of the EIA Scoping Report[1].
Environment Agency		*"In general, we feel that water quality potential concerns have been correctly identified and we are confident that Water Framework Directive (WFD) water quality compliance will be fully considered within appropriate impact assessments that should follow once more appropriate data has been gathered. The report states that*	This comment has been responded to within Table 11-2 of the PEIR[24]. The WFD impact assessment is presented as a standalone document and the screening and scoping process

Respondee	Section ID	Scoping Opinion Comments	Response
		they are proposing to scope in water quality for an "impact assessment" which we support. We do not support the qualifying phrase Scoped in as a precaution_ pending design options as leaves room for the design options to allow water quality to be "scope out" later. If any dredging or piling is undertaken, then the proposal will not be able to "scope out" those activities. We would prefer the final WFD impact assessment to be a standalone document (for ease of comment without the need to cross-reference to larger documents where facts may be embedded in large chapters)."	have been updated to account for the Proposed Scheme as submitted.

Table 4-4: Environment Agency Engagement Summary

Respondee	Comments	Response
Environment Agency (Marine Team)	The sediment data should be used as part of any water quality arguments. As the sediment is not 'clean', the scoping (before consideration of any mitigation) should lead to an impact assessment stage to define whether the activity with mitigation will be WFD compliant. We have concerns regarding the potential sediment impacts to both ecological and chemical status. Sediment sampling needs to take place at depth.	An assessment of the impacts to water quality from sediment releases has been included within **Section 5.2**. In addition, sediment sampling (to be agreed with the MMO in consultation with CEFAS prior to commencement of works) will be undertaken in line with the controls in the Deemed Marine Licence. Should unacceptable impacts be determined following the sediment sampling then

Respondee	Comments	Response
		appropriate mitigations measures will be implemented in discussion with the Environment Agency.
Environment Agency (Fisheries, Biodiversity and Geomorphology)	We have an aspirational mitigation measure for the rock revetment between the mudflat and the tidal defence to be ecologically enhanced. This states: 'Riverside to Fishers Way – At end of life, undertake technical study to review options for armour replacement and opportunities to improve habitat'. The WFD assessment should make reference to this and ideally ensure that it isn't precluded by the works. There could be opportunity for delivery of this as well which could achieve BNG in the intertidal environment e.g. planting of the rock revetment or enhancement of it into rock pools.	The WFD assessment refers to this measure in **Paragraph 4.3.17**.
	The dredge pocket and new jetty in combination with or without the old jetty (because there is indecision as to whether this will be demolished) should be modelled hydrodynamically to understand any loss of priority mudflat (likely to be negligible at a waterbody scale as a habitat) but importantly the possibility of contaminants being redissolved into the water column (possibly significant at a waterbody scale).	Dredge impacts have been modelled hydrodynamically and are presented in the **Appendix 11-3: Coastal Modelling Studies (Volume 3)**. An assessment of the impacts to water quality from sediment releases has been included within **Section 5.2**, building on Appendix 11-3.
	The landward boat dock does have the possibility for having its own risk to the mudflat through wave wash, turning etc. This especially is the case if vessels of high power are	Vessel movements and impacts therefrom are assessed in **Table 6-1** below. An assessment of the impacts to water quality from

Respondee	Comments	Response
	regularly used as RIBs. Although this is likely to be negligible at a waterbody scale as a habitat, it could importantly cause contaminants to be redissolved into the water column which could be significant at a waterbody scale. Vessel type and operation should be considered under its own element heading.	sediment releases has been included within **Section 5.2**.
	May be worth specifically mentioning the sheet steel pile retaining wall within this section (**Section 6.1**). This is likely critical to wave break and retention of the mudflat.	Sheet piling has been included within the description and justification for the screening in of this activity.
	The demolition of Belvedere Power Station Jetty (disused) has been scoped in because of reasons mentioned above.	This report is based on the retention of the Belvedere Power Station Jetty (disused) (with modifications), in some instances, for completeness and using a worst case scenario assessment approach, there is a brief description of the impacts associated with the demolition of the Belvedere Power Station Jetty (disused), for example within **Table 4-6**.
	'The footprint of the Proposed Scheme is 9.18% of intertidal soft sediment' – this seems a surprisingly high percentage. It should be the area of mudflat covered by the red line boundary represented as a percentage of the total mudflat of the Thames middle waterbody. We would have	This has now been amended to 0.3% as shown in **Table 6-3**.

Respondee	Comments	Response
	expected a smaller percentage for a waterbody of this size.	
	We would expect to see adequate demonstration of the effects of lighting on fish.	Additional assessment and detail has been provided regarding biological elements. Specifically, additional detail has been provided in relation to the effects of lighting on fish.
	In relation to the BPS Jetty, it is generally considered that a natural mudflat without a jetty above it has wider benefit to the environment than keeping an artificial structure. This may be different for the subtidal. The benefits of fish of the old jetty in terms of shelter should not outweigh its removal.	**Section 3.4** of **Chapter 3: Consideration of Alternatives (Volume 1)** discusses the options for retention/removal of the Belvedere Power Station Jetty (disused). The Applicant will make a decision regarding this at the detailed design stage.
	The majority of the new jetty is over the subtidal. However, this section states that the majority of the construction works will be over the intertidal. Does this infer that a floating pontoon for construction related activities will be positioned over the intertidal? Please clarify in the full WFD assessment. The loss of intertidal area from the new jetty will be very minimal. Possibly only 2 to 4 piles to support the access ramp. This is entirely acceptable for navigational activities. Loss of mudflat landward of the older jetty, as a result of its removal and consequent changes in waves or currents is more important to focus upon than the mudflat area lost to new jetty piles.	This has now been amended within **Table 6-6** to say that the majority of the Proposed Jetty is located over the subtidal. The additional comments made have been acknowledged.

Respondee	Comments	Response
	Advisory: We would have preferred the design to have placed the berth further out into the channel to avoid the need for the sheet pile retaining wall. Retaining walls are further unnecessary hardening. This is only advice and does not require a change of design at this stage. This loss or gain in mudflat should be included in BNG calculations. This is mandatory as of January 2024. We would like to remind the applicant that some of the works are on a Local Nature Reserve.	Comments noted. Further detail on BNG calculations can be found within **Appendix 7-1: Biodiversity Net Gain Report (Volume 3).**

4.2.3. Responses to the wider comments raised in the Scoping Opinion can be found in the PEIR[24].

4.3. WFD ASSESSMENT PROCESS

4.3.1. For Projects of National Significance (PNS) (of which the Proposed Scheme is), the guidance set out in the Planning Inspectorate Advice Note 18: Water Framework Directive Assessment[25] (AN18) has been taken into account. This advice note follows the same methodology as set out for transitional water bodies in the Clearing the Waters for All - Water Framework Directive Assessment: estuarine and Coastal Waters Guidance[26]. Both AN18 and this guidance sets out three stages for the WFD assessment process for transitional waters, and the outcome of each stage determines whether the assessment needs to progress to the next stage. The three stages are:

- Stage 1 Screening – this stage excludes any activities that do not need to go through the scoping or impact assessment stages.
- Stage 2 Scoping – identifies the receptors that are potentially at risk from the Proposed Scheme, which need impact assessment. Potential risks to hydromorphology, biology (habitats and fish), water quality, WFD protected areas and invasive non-native species (INNS) should be assessed. These are then considered against specific criteria provided by the Environment Agency[26] by means of the recommended scoping template.
- Stage 3 Impact Assessment – considers the potential impacts of the Proposed Scheme on scoped in receptors, identifies ways to avoid or minimise impacts, and determines whether the Proposed Scheme may cause deterioration or jeopardise the water body achieving Good status.

4.3.2. Low risk activities, as defined in the guidance[26], may be screened out and not progressed to the scoping stage. During scoping, a more detailed assessment is undertaken, examining the risks to each potential receptor, which are associated with the WFD quality elements. The key receptors for assessment are:

- hydromorphology;
- biology – habitats;
- biology – fish;
- water quality;
- protected Areas; and
- INNS.

4.3.3. Potential construction impacts may have detrimental impacts on the WFD quality elements or have impacts detrimental to the WFD quality elements. Thus, construction impacts are considered in **Section 4** of this assessment along with mitigation to reduce or eliminate potential impacts on the water body and WFD quality elements.

4.3.4. There is no definition in the WFD for a 'short period of time'. For this assessment, short term (also referred to as temporary) is defined as three years or less (it is recognised that this differs from the short term and temporary timeframes used in the EIA, as the timeframes for the WFD assessment are more reflective of the RBMP cycles).

4.3.5. As this assessment has progressed to Stage 3 following consultation with the Environment Agency, further assessment has been undertaken to review mitigation measures set for the water body and an assessment of the proposed activities against WFD status objectives has been undertaken.

HYDROMORPHOLOGY

4.3.6. Hydromorphology is a physical characteristic which supports biological elements. Where the hydromorphology of a surface water body has been significantly altered for anthropogenic purposes (e.g. navigation), it can be designated as A/HMWB. An alternative environmental objective, Good Ecological Potential (GEP), would apply in these cases.

BIOLOGY – HABITATS

4.3.7. An assessment should be undertaken where the footprint of the activity is:

- 0.5km² or larger;
- 1% or more of the water body's area;
- within 500m of any higher sensitivity habitat; or
- 1% or more of any lower sensitivity habitat.

4.3.8. As per Environment Agency guidance[26], benthic habitats are divided into higher sensitivity and lower sensitivity habitats and are listed in **Table 4-5**.

Table 4-5: Habitat Sensitivity as Defined by WFD Guidance[26]

Higher Sensitivity	Lower Sensitivity
Chalk reef	Cobbles, gravel and shingle
Clam, cockle and oyster beds	Intertidal soft sediments like sand and mud
Intertidal seagrass	Rocky shore
Maerl	Subtidal boulder fields
Mussel beds, including blue and horse mussel	Subtidal rocky reef
Polychaete reef	Subtidal soft sediments
Saltmarsh	-
Subtidal kelp beds	-
Subtidal seagrass	-

BIOLOGY – FISH

4.3.9. Fish species should be considered if activities:

- are in an estuary (Proposed Scheme footprint is within the Thames Estuary),
- are outside an estuary but could delay or prevent fish from entering an estuary; or
- could affect fish migration through an estuary to freshwater.

WATER QUALITY

4.3.10. Water quality encompasses the chemical status of the water body, but also clarity, temperature, salinity, oxygen levels, nutrients and microbial patterns. Water quality should be considered as a receptor if activities:

- could affect water clarity, temperature, salinity, oxygen levels, nutrients or microbial patterns continuously for longer than a spring neap tidal cycle (about 14 days);
- are in a water body with a phytoplankton status of moderate, poor or bad; or
- are in a water body with a history of harmful algae.

WFD PROTECTED AREAS

4.3.11. WFD protected areas encompass sites protected under National Site Network (i.e. Special Areas of Conservation (SAC) and Special Protection Areas (SPA), bathing waters, shellfish waters and Nutrient Sensitive Areas (NSA)). Ramsar sites should also be considered in line with advice from Natural England's Designated Sites Database[27]. Environment Agency guidance stipulates that WFD protected areas located within 2km of the proposed activity must be identified[26]. It also acknowledges that the footprint of an activity may be extended as a result of temperature or sediment plume, and for dredging activity, a footprint is considered to be 1.5 times the proposed dredge area.

4.3.12. The Medway Estuary Marine Conservation Zone (MCZ) and Swanscombe MCZ are not considered necessary to be assessed as part of the WFD assessment as these MCZ's are located approximately 25km and 11km downstream of the Site Boundary respectively. Any potential indirect impacts as a result of the Proposed Scheme on the MCZ are considered as part of the separate EIA process, further information is provided within **Chapter 8: Marine Biodiversity (Volume 1)**.

INVASIVE NON-NATIVE SPECIES

4.3.13. The introduction and spread of INNS can occur directly through the release of individuals of INNS species into the environment via activities, e.g. through release of ballast water[28] on the hull of ships, even if recently cleaned or anti-fouled[29,30] or indirectly by creating opportunities for organisms to settle or spread (e.g. habitat creation or disturbance) thereby allowing for them to out-compete native species. Therefore, activities should be considered where:

- materials or equipment that have come from, have been used in or travelled through other water bodies; or
- activities that help spread existing INNS, either within the immediate water body or to other water bodies.

MEASURES TO ACHIEVE ENVIRONMENTAL OBJECTIVES

4.3.14. For each River Basin District, a programme of measures has been drawn up to enable the achievement of objectives of the RBMP. These include:

- current measures;
- measures to enable improvements by 2021; and
- additional measures identified to achieve objectives beyond 2021.

4.3.15. These are integrated with measures for protected areas via site specific action plans. Current measures in the Thames RBMP include:

- preventing and reducing pollution in drinking water protected areas;
- protection or improvement to support shellfish;

- preserving, protecting and improving bathing water areas;
- reducing water pollution caused by nitrates from agricultural sources;
- reducing nutrients in sewage effluent in areas sensitive to nutrient pollution; and
- maintaining or restoring water dependent SAC, SPA and Ramsar sites.

4.3.16. These are managed through the application of relevant legislation, policy and guidance by regulators and operators, as well as future planning, joint planning and coordination between regulators and operators. Additional measures include improved flood resilience, climate change adaptation, increased biodiversity and social cohesion.

4.3.17. The Environment Agency has an aspirational measure for the rock revetment between the mudflat and tidal defence at a nearby location to be ecologically enhanced. This states: *"Riverside to Fishers Way - At end of life, undertake technical study to review options for armour replacement and opportunities to improve habitat".* This measure, amongst other options will be considered during the detailed design and the post consent BNG process.

4.4. LIMITATIONS AND ASSUMPTIONS

4.4.1. Whilst this report was prepared using the reasonable skill and care ordinarily exercised by consultants practicing under similar circumstances and reasonable checks have been made on data sources and the accuracy of the data, WSP accepts no liability in relation to the report should any third party data, information or condition be incorrect or have been concealed, withheld, misrepresented, or otherwise not fully disclosed to WSP.

4.4.2. The substrate at Subtidal Point 14 (see **Figure 8-3: Intertidal and Subtidal Trawl Sample Stations within the Study Area (Volume 2)**) comprised mainly gravel and pebbles and subsequently a full grab sample could not be collected at this sample point. Therefore, this may have an impact on the abundance and biomass recorded at Subtidal Point 14 in comparison to the other sample points.

4.4.3. No borehole/vibrocore samples have been taken within the dredge pocket. Therefore, a worst case and precautionary assessment is provided for the potential mobilisation and deposition of contaminated sediments. Sediment data at depth will be collected and presented prior to or during the DCO examination period. Dredging activity will be controlled through the Deemed Marine License in the **Draft DCO (Document Reference 3.1)**.

5. BASELINE

5.1. CATCHMENT CHARACTERISTICS

5.1.1. The River Thames rises to approximately 110m above ordnance datum (m AOD) at its source, near Kemble in the Cotswold Hills of Gloucestershire. It then flows southeasterly to its tidal limit at Teddington Weir, Teddington, London. Downstream of the tidal limit, the River Thames transitions into an estuarine environment and eventually flows into the North Sea near Southend-on-Sea.

5.1.2. Working downstream from its source, the main left bank tributaries of the River Thames are the River Coln, Leach, Windrush and Evenlode, whilst the main right bank tributaries are the River Churn, Ock, Kennet and Loddon. Additionally, smaller tributaries join the main channel of the River Thames from both the left and right banks. Examples of this include the Wey, Mole, Wandle, Lee, Roding and Crane tributaries.

5.1.3. Land uses within the catchment of the River Thames vary, with rural and agricultural land dominating in the west of the catchment and extensive urban land cover of London and the surrounding towns in the east of the catchment.

5.1.4. The Thames Basin catchment is approximately 16,000km^2, whilst the surface area of the Thames Middle Transitional Water Body is approximately 44.16km^2.

CATCHMENT GEOLOGY AND SOILS

5.1.5. The River Thames catchment has a mixed bedrock geology, broadly comprising chalk, mudstone and limestone lithologies to the west of the catchment and clay, chalk and mudstone lithologies to the east of the catchment.

5.1.6. Concerning the superficial geology, the River Thames catchment broadly comprises a mixture of sediments of varying origin, including clays, silts, sands and gravels.

5.1.7. The soils have a more complex spatial distribution. In the lower catchment, near the River Thames' mouth with the North Sea, loamy and clayey soils of coastal flats with naturally high groundwater are predominant. In the middle catchment, freely draining slightly acid loamy/base-rich soils dominate, whilst in the upper catchment, loamy and clayey floodplain soils with naturally high groundwater and shallow lime-rich soils over chalk or limestone dominate.

CATCHMENT HYDROLOGY

5.1.8. Data indicates that the River Thames catchment is one of the driest catchments in the United Kingdom, receiving an annual average rainfall of approximately 690 millimetres (mm) per year compared to the United Kingdom's national average of approximately 900mm according to the British Geological Survey[31]. Therefore, the main channel of the River Thames generally responds slowly to rainfall events compared to its smaller tributaries, especially those underlain by clay and mudstone, which are likely to respond more quickly**Error! Bookmark not defined.**.

5.1.9. The lithological structure of bedrock geology within the River Thames catchment provides a rich source of groundwater. However, major water stresses, including groundwater and surface water abstractions, are likely to influence the hydrological character of the River Thames catchment.

HISTORICAL CHANNEL CHANGE

5.1.10. The Thames Estuary has experienced a long history of anthropogenic influence. Therefore, it is difficult to confirm baseline conditions and fully appreciate the extent to which such anthropogenic influence has impacted the estuary system[32]. However, since the late 1960s, dredging activities within the channel, riverside developments, and the discharge of polluted effluent has been regulated more stringently. As a result, it is understood that the Thames Estuary now functions more naturally (albeit within the significant confines of its urban setting) than it did prior to the mid to late 20th century[32].

5.2. BASELINE CHARACTERISTICS AGAINST WFD QUALITY ELEMENTS

5.2.1. A summary of the WFD status of the Thames Middle Transitional Water Body (GB530603911402) is provided in **Table 5-1**.

Table 5-1: WFD Status of the Thames Middle Transitional Water Body (GB530603911402)[9]

Thames Middle Transitional Water Body	GB530603911402
Water body type	Transitional
River Basin District	Thames River Basin District
Water body area	44.161km^2
Hydromorphological designation	Heavily modified
Reason for not achieving good status	*Unknown (pending investigation)* – Benzo(g-h-i)perylene Benzo(b)fluoranthene, Dissolved Inorganic Nitrogen,

Thames Middle Transitional Water Body	**GB530603911402**
	Perfluorooctane sulphonate (PFOS) and Zinc; *Point source* – Tributyltin Compounds; *Measures delivered to address reason, awaiting recovery* – Mercury and Its Compounds and Polybrominated diphenyl ethers (PBDE); and, *Physical modification* – Angiosperms, Mitigation Measures Assessment and Phytoplankton.
For what use is the water body designated heavily modified?	Coastal protection, flood protection, navigation, ports, and harbours
Overall ecological status/potential	Moderate
Current overall status/potential	Moderate
Status objective (overall)	Moderate (2019)
Justification for not achieving Good Status by 2015 (from Catchment Data Explorer)	Disproportionately expensive: Disproportionate burdens; Natural conditions: Chemical status recovery time; Disproportionately expensive: Unfavourable balance of costs and benefits; Technically infeasible: No known technical solution is available; Good status prevented by A/HMWB designated use: Action to get biological element to good would have significant adverse impact on use; and, Technically infeasible: Cause of adverse impact unknown.
Higher sensitivity habitats present	Saltmarsh (130.06 hectare (ha))
Lower sensitivity habitats present	Intertidal soft sediment (838.78 ha)
Phytoplankton status	Good
History of harmful algae	Not monitored

Thames Middle Transitional Water Body	GB530603911402
Protected Area Designation	Thames Middle Transitional Water Body - UKGB530603911402
Biological Quality Elements	
Overall biological quality element status objective	Moderate
Angiosperms	Moderate
Fish	Good
Invertebrates	Good
Macro-algae	Good
Phytoplankton	Good
Physico-chemical Quality Elements	
Overall physico-chemical quality element status objective	Moderate
Dissolved inorganic nitrogen	Moderate
Dissolved oxygen	Good
Specific pollutants	Moderate
Arsenic	High
Copper	High
Zinc	Moderate
Priority substances	Good
Other pollutants	Good
Priority hazardous substances	Fail - (Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(g-h-i)perylene, Mercury and Its Compounds, Perfluorooctane sulphonate (PFOS), Polybrominated diphenyl ethers (PBDE), Tributyltin Compounds).
Overall chemical status	Fail
Overall chemical quality element status objective	Good (2063)
Hydromorphological Quality Elements	

Thames Middle Transitional Water Body	GB530603911402
Hydromorphology supporting elements status	Not Assessed
Hydrological Regime	Not Assessed
Supporting elements (Surface Water)	Moderate
Mitigation measures assessment	Moderate or Less

Table 5-2: WFD Status of the Greenwich Tertiaries and Chalk Groundwater Body (GB40602G602500)[9]

Greenwich Tertiaries and Chalk	GB40602G602500
Water body name	Greenwich Tertiaries and Chalk
Water body type	Groundwater
Water body area	8146.16 Ha
Current Overall Status/Potential	Poor
Reason for not Achieving Good status	Ground water abstraction, and unknown (pending investigation)
Current Quantitative Status	Poor
Current Chemical Status (GW)	Poor
Status Objective (overall)	Good (2027 - low confidence)
Justification for not Achieving Good Status by 2027	Disproportionately expensive: Disproportionate burdens
Protected Area Designation	Drinking Water Protected Area (UKGB40602G602500); Safeguard Zone (GWSGZ0208)
Quantitative Elements	
Saline intrusion	Poor
Water balance	Good
GWDTEs	Good
Dependent surface water body	Good
Chemical (GW) Elements	
Drinking water protected area	Poor

Greenwich Tertiaries and Chalk	GB40602G602500
General chemical test	Good
Chemical GWDTEs	Good
Chemical dependent surface water body status	Good

BIOLOGICAL QUALITY ELEMENTS

Fish

5.2.2. The Thames Estuary supports diverse fish fauna, with over 115 species recorded in Environment Agency fish surveys[33]. The Thames Estuary is commonly split into the inner, middle and outer.

5.2.3. Fish are currently assessed as being of Good WFD status within the Thames Middle Transitional Water Body.

5.2.4. A search of the Environment Agency's Ecology and Fish data explorer[10] returned records from two monitoring locations; 'Woolwich' (using an Otter trawl; TQ 45430 81420), approximately 4.25km upstream of the Site Boundary, and 'West Thurrock' (Seine and beam combined; TQ 60774 77518), located approximately 13.3km downstream of the Site Boundary. The most recent surveys were conducted in 2022 and 2019, respectively. The data is presented in **Table 5-3** (Woolwich) and **Table 5-4** (West Thurrock).

5.2.5. A total of 17 species were recorded in the Environment Agency surveys[10], with one protected species, European smelt Osmerus eperlanus being captured. European smelt are listed under Section 41 of the NERC Act (2006)[34] as a Species of Principal Importance (SPI) and is a priority species within the London Borough of Bexley (LBB) Local Biodiversity Action Plan (LBAP)[35] and UK Biodiversity Action Plan (UK BAP)[36]. The Tidal Thames supports nationally important populations[37]. A further eight species of commercial interest were recorded.

Table 5-3: Fish Species Data Obtained from the 2022 TraC Fish Counts, Woolwich, River Thames (TQ 45430 81420)

Common Name	Scientific Name	No. of Individuals
Whiting[a]	*Merlangius merlangus*	44
Dover Sole[a]	*Solea solea*	16
Atlantic herring[a]	*Clupea harengus*	10
Sand goby	*Pomatoschistus minutus*	9
Flounder[a]	*Platichthys flesus*	7
European smelt[b]	*Osmerus eperlanus*	6

Common Name	Scientific Name	No. of Individuals
Sea bass[a]	*Dicentrarchus labrax*	3
Pouting / Bib	*Trisopterus luscus*	1
Notes: [a] Denotes species of commercial importance. [b] Denotes protected species.		

Table 5-4: Fish Species Data Obtained from the 2019 TraC Fish Counts, West Thurrock, River Thames (TQ 60774 77518)

Common Name	Latin Name	No. of Individuals	
		10/06/2019	16/10/2019
Flounder[a]	*Platichthys flesus*	22	-
Dover Sole[a]	*Solea solea*	-	1
Sand goby	*Pomatoschistus minutus*	6	4
Atlantic Herring[a]	*Clupea harengus*	243	10
Common goby	*Pomatoschistus microps*	3	5
Three-spined stickleback	*Gasterosteus aculeatus*	-	1
Sea bass[a]	*Dicentrarchus labrax*	13	33
Sand smelt	*Atherina presbyter*	-	6
Sprat[a]	*Sprattus sprattus*	35	1
Greater pipefish	*Syngnathus acus*	1	-
Plaice[a]	*Pleuronectes platessa*	3	-
Sandeel sp.[a]	*Ammodytidae*	5	-
Thin lipped grey mullet	*Liza ramada*	-	11
Grey mullet sp.	*Mugilidae*	4	5
Notes: [a] Denotes species of commercial importance.			

5.2.6. European eel *Anguilla anguilla* are recorded in high densities within the Tidal Thames, utilising the Thames as a migratory corridor. Whilst it was not detected in 2022, European eel has been detected at the Woolwich monitoring location in recent years[10] Additionally, freshwater fish surveys and monitoring programmes have recorded European eel in the River Roding (TQ 46367 85159) and Mayes Brook (tributary of the River Roding; TQ 42701 86672)[1038]. The River Roding joins the River Thames approximately 4km upstream from the Site. This migratory species is likely present in the vicinity of the Site. It is listed as Critically Endangered under The International Union for Conservation of Nature (IUCN) Red List of Threatened Species (2008)[39]. It is also listed as an SPI under Section 41 of the NERC Act (2006)[34] and afforded protection under The Eels (England and Wales) Regulations (2009)[40].

5.2.7. Atlantic salmon *Salmo salar,* brown/sea trout *Salmo trutta*, lamprey sp *Petromyzontidae* and twaite shad *Alosa fallax* migrate from marine water though the tidal River Thames to reach freshwater spawning sites. Whilst none of these species have been regularly detected within the vicinity of the Site, absence of these protected/notable species in surveys does not preclude their presence, as survey methodology and timing can impact catch return. Therefore, a precautionary principle has been applied, with species assumed to be present within the vicinity of the Site during migratory periods. All species are: Species on the Species Protection Index (SPIs) under Section 41 of the Natural Environment and Rural Communities Act (NERC) Act (2006)[34], LBAP priority species[35], and UK BAP priority species[36]. Atlantic salmon (Annex II, Annex V) and twaite shad (Annex II) are also listed in the European Commission (EC) Habitats Directive (2019)[41], and twaite shad is afforded further protection under Schedule 5 of the Wildlife and Countryside Act (1981)[42].

5.2.8. Two subtidal beam trawl transects were undertaken on 18th May 2023 (spring) and an additional two beam trawl transects on 21st September 2023 (autumn) to determine the fish community present within the Study Area. Five species were recorded within the first spring transect; European smelt, sea bass *Dicentrarchus labrax*, dover sole *Solea solea*, flounder *Platichthys flesus* and transparent goby *Aphia minuta*. The second trawl in spring recorded three species of fish; sea bass, flounder and the body of a European eel which was decaying. Five species were recorded in transect one during the autumn survey; European smelt, dover sole, pouting *Trisopterus luscus*, sand goby *Pomatoschistus minutus* and sprat *Sprattus sprattus*. Three species were recorded in transect two during the autumn survey; flounder, sand goby and common goby *Pomatoschistus microps*.

5.2.9. It should be noted that during the autumn surveys, juveniles of all species were recorded. Sand goby ranged in length from 34 to 64mm and flounder ranged from 55 to 88mm demonstrating the variation in age classes present within the Survey Area. The presence of juveniles may indicate the presence of a nursery or spawning habitat for the species recorded.

5.2.10. European eel and European smelt are protected species. Results from this survey are presented in **Table 5-5**Table 5-5.

Table 5-5: Results from the Beam Trawl on 18 May 2023 and 21 September 2023

Common Name	Latin Name	Trawl No.1	Trawl No.2	Trawl No.1	Trawl No.2
		Spring		Autumn	
European smelt	*Osmerus eperlanus*	1	-	1	-
Sea bass	*Dicentrarchus labrax*	3	2	-	-
Dover sole	*Solea solea*	29	-	1	-
Transparent goby	*Aphia minuta*	1	-	-	-
Flounder	*Platichthys flesus*	2	1	-	18
European eel (decaying)	*Anguilla anguilla*	-	1	-	-
Pouting	*Trisopterus luscus*	-	-	1	-
Sand goby	*Pomatoschistus minutus*	-	-	25	42
Sprat	*Sprattus sprattus*	-	-	1	-
Common goby	*Pomatoschistus microps*	-	-	-	9

Benthic Macroinvertebrates

5.2.11. Benthic macroinvertebrates are currently assessed as being of Good status within the Thames Middle Transitional Water Body. The infaunal quality index sub-element is also currently classified as Good.

5.2.12. A search of the Environment Agency's Ecology and Fish data explorer[10] returned records from a TraC monitoring location located 8km downstream from the Site Boundary (TQ 56000 77000). The most recent surveys were conducted in May 2015. The benthic macroinvertebrate assemblage was dominated by Corophiidae (amphipods), with Tubificoides (annelids), Streblospio (polychaetes) and whip mudworm *Polydora cornuta* also found in high abundance.

5.2.13. One protected species, the tentacled lagoon worm *Alkmaria romijni*, was identified. This species is listed under Schedule 5 and 9 of the Wildlife and Countryside Act[42] and is a feature of conservation importance within Marine Conservation Zones (MCZs). The tentacled lagoon worm is a feature on the Swanscombe MCZ (located approximately 10km downstream of the Site Boundary). Due to the distance of the MCZ from the Site Boundary and the sessile nature of the tentacled lagoon worm, it is not considered further within this assessment.

5.2.14. The INNS bay barnacle *Amphibalanus improvises* (also referred to as the European acorn barnacle) was also present.

5.2.15. Subtidal benthic communities at Gallions Reach, approximately 4km upstream from the Site, were found to support Trembling sea mat *Victorella* sp.[43] This nationally rare bryozoan is protected under Schedule 5 of the Wildlife and Countryside Act (WCA)[44] and as a Species of Principal Importance (SPI) under Section 42 of the NERC Act[34]. It is also listed in the UK BAP[36] as a priority species. Sea mat *Einhornia crustulenta*, which is a nationally rare species[45] was also present.

5.2.16. Benthic ecology surveys were conducted in May 2023 and September 2023. These surveys, which were undertaken in intertidal habitats and subtidal habitats adjacent to Middleton Jetty and the Belvedere Power Station Jetty (disused), demonstrated the benthic infaunal community present is impoverished, with low diversity and dominated by a few species of little conservation value (oligochaetes). No species of conservation value were detected in the May 2023 samples. The impoverished benthic community detected has high recoverability and therefore capable of rapid recolonisation and recovery. One rare/scarce species was recorded at S13; the mud shrimp *Apocorophium lacustre*. Results from these surveys are detailed in **Annex D**.

5.2.17. Two non-native species were recorded across the sample sites; *Incisocalliope aestuarius* and *Maranzellaria* spp.).

5.2.18. Brown shrimp *Crangon crangon*, mysis shrimp *Mysid* spp. and *Gammarus* spp. were observed within the beam trawl transect surveys carried out on 18th May and 21st September 2023.

5.2.19. Sediment across the sites consisted of primarily muddy sand, specifically at survey sites Subtidal Point 7 to Subtidal Point 12 (see **Figure 8-3: Intertidal and Subtidal Trawl Sample Stations within the Study Area (Volume 2)** for location). Subtidal Point 14 consisted of gravel and pebbles, and it should be noted that the sample was approximately a quarter full due to the composition of the substrate within the sample area. Therefore, this may have had an impact on the abundance and biomass of taxa recorded at the sample point in comparison to other locations.

Angiosperms

5.2.20. The current WFD classification for angiosperms is Moderate. The saltmarsh sub-element is also classified as Moderate. Physical modifications linked to land drainage usage were identified as a reason this element has not achieved Good status.

5.2.21. Saltmarsh habitat is present in the vicinity of the Site, being recorded within the Site on the south bank, and directly opposite the Site on the north bank). Saltmarsh is a higher sensitivity habitat listed as a Habitat of Principal Importance (HPI) under Section 41 of the NERC Act[34].

Macroalgae

5.2.22. Macroalgae is currently assessed as Good, with fucoid extent and opportunistic macroalgae sub-elements classified as Good and High, respectively.

5.2.23. A macroalgae survey was conducted in 2020 for the Thames Middle Transitional Water Body approximately 2km upstream from the Site Boundary. Two species were detected, sea lettuce Ulva spp. and bladder wrack Fucus vesiculosus, accounting for 84% and 16% of cover, respectively. Sea lettuce is considered an opportunistic species which is often present in eutrophic areas and both species were detected growing on hard substrate.

5.2.24. The site visit undertaken on the 4th of November 2022 determined the composition of marine plants and algae within the intertidal regions of the Study Area. The top section of the wall is within the splash zone and has some growth of salt-tolerant terrestrial plant species. The mid-section of the wall was colonised by filamentous green algae, with a band of seaweed, comprising fucoid species, present along the base of the wall. A small area of fringing saltmarsh comprising mainly common reed *Phragmities australis* is located to the west of the Study Area in a small embayment, approximately 500m west of the Site Boundary.

Phytoplankton

5.2.25. The current WFD classification for the phytoplankton quality element is Good.

5.2.26. Environment Agency TraC phytoplankton monitoring data for the Thames Middle Transitional Water Body was available from surveys conducted in 2019 at one survey location within the Study Area at NGR TQ5057580610 (the most recent TraC data available). The assemblage was predominantly diatoms and protozoans, with no INNS detected.

HYDROMORPHOLOGY QUALITY ELEMENTS

Depth Variation

5.2.27. According to high-resolution LiDAR (2m of spatial resolution), the lowest elevation of the intertidal area of the River Thames in the vicinity of the Proposed Scheme is 2.6m AOD, and the average elevation is 2.7m AOD in the area adjacent to the Site Boundary. The small difference between the lowest and the average elevation (0.1m) shows that channel depth variation is subtle along the investigated section of the River Thames. Over time, the Thames Middle Transitional Water Body subtidal channel has deepened and narrowed accompanied by a gain in intertidal area. The recent regime of morphological change in the estuary is characterised by intertidal accretion with some subtidal erosion[46].

Quality, Structure and Substrate of the Bed

5.2.28. According to the British Geological Survey[31], the River Thames is marked by fine alluvial deposits, primarily silt, clay, sand, and minor content of gravel. The quality of the bed along the River Thames is known to be very low with typical features of a heavily engineered urban system in recovery, with a very high silt content as a result of centuries of human modification at a catchment-scale[47]. The material that comprises the substrate local to the location of the Proposed Jetty originates from a range of sources, including estuarine sediments (salt marsh and mudflats in intertidal areas), freshwater gravels and underlying geologic deposits. In addition, anthropogenic sources of sediment include those derived from industry, marine transportation, and waste treatment and disposal**. Figure 5-1** below offers a visualisation of the quality, structure and substrate of the bed.

Figure 5-1: Photograph from the Southern Bank of the River Thames, Looking North (Taken 4th November 2022)

Structure of the Intertidal Zone

5.2.29. The most common structure of the intertidal zone is unconsolidated gravel, sand, and silt deposits (bar formations), often termed 'foreshore', in the littoral and supra-littoral zones[47]. These are formed by sediment aggradation in channel edge areas, where water velocity is reduced on the inside of river bends and in association with roughness features such as jetties and embayments. Through central London, intertidal foreshore deposits remain largely unvegetated, presumably due to the frequency of inundation disturbance, the high shear stresses and significant tidal ranges that result from channel narrowing by embankment construction, and the brackish water conditions, which restrict the number of species that can establish.

Freshwater Zone

5.2.30. The River Thames is tidally influenced up to its tidal limit at Teddington Weir, Teddington, London. Therefore, the primary source of freshwater is the main, fluvial influenced, River Thames channel located upstream of the tidal limit at Teddington Weir. Additionally, smaller tributaries joining the main channel of the River Thames from both the left and right banks, downstream of the tidal limit at Teddington Weir, are also like to contribute freshwater into the tidally influenced section of the River Thames.

Wave Exposure

5.2.31. Given the location of the Proposed Jetty within the Site, wind-born waves originating from the North Sea are unlikely to have a significant impact on the section of the River Thames within the Site when, and if, they reach the Site due to fetch limitation and location away from open coast. Therefore, it is understood that the primary source of wave exposure to the Site is likely to be generated by marine traffic within the navigable channel of the River Thames.

PHYSICO-CHEMICAL QUALITY ELEMENTS AND WATER QUALITY

5.2.32. Data has been obtained from an Environment Agency sampling point[11] in proximity to the Site to provide an indication of the baseline conditions within the River Thames. The water quality monitoring point closest to the Site is the 'Thames at Erith' (ID: TH-PTTR0095) which is located within the River Thames, approximately 13m east (TQ 50550 80600) of the Site Boundary. Data is collected at this location on a monthly basis and is considered to be representative of conditions within the River Thames near the Site. The most recent available data is from June 2023. Monthly data from the previous year is summarised in **Table 5-6**.

Table 5-6: Water Quality Data from Environment Agency Monitoring Point (Thames at Erith)

Determinand	Units	11 Apr 2022	4 May 2022	11 Jun 2022	6 Jul 2022	15 Jul 2022	10 Aug 2022	7 Sept 2022	13 Oct 2022	4 Nov 2022	9 Dec 2022	5 Jan 2023	2 Feb 2023	3 Mar 2023	3 Apr 2023	5 May 2023	3 Jun 2023
pH	pH	8	7.78	7.85	7.76	7.77	7.8	7.72	7.55	-	7.69	7.92	7.92	7.84	8.78	7.87	8.02
Temperature	°C	10.2	13.5	17.7	19.5	21.4	22.1	20.8	15.5	14.5	8.7	9.2	5.7	7.7	10.9	13.5	16.4
Salinity	ppt	7.88	10.26	12.38	15.69	17.26	16.26	15.08	10.5	10.98	6.48	0.44	4.01	8.37	0.73	2.9	5.9
Oxygen (%saturation)	%	85.3	79.3	90	74.2	83.1	82.9	73.8	78.2	74.9	76.2	83.5	86.1	83.6	79.9	83.9	91.6

5.2.33. In addition, water quality readings and samples were taken within the vicinity of the Proposed Scheme at Station 14, located at OS NGR TQ 50092 80955, on 21st September 2023, across a five hour period (full tidal cycle) using a water quality meter with the exception of the Total Suspended Solids results which were derived from sampling and laboratory testing. Readings are presented in **Table 5-7**.

Table 5-7: Water Quality Readings for Station 14

Sample	Total Suspended Solids (ug/l)	Total Dissolved Solids (mg/l)	Temperature (°C)	Dissolved Oxygen (%)	Salinity (ppt)	pH	Conductivity (uS/cm)
S14A	89,600	7,241	19.8	60.5	6.44	7.69	10,230
S14B	29,500	6,396	19.7	62.5	5.62	7.69	9,266
S14C	29,300	7,423	19.7	63.9	6.55	7.69	10,326
S14D	68,200	11,466	19.7	66	10.47	7.72	15,941
S14E	236,000	13,552	19.7	66.9	12.51	7.75	18,690
S14F	93,900	14,950	19.5	67.6	13.92	7.76	20,551

Dissolved Oxygen

5.2.34. Dissolved oxygen concentrations present variability between sampling events at the Environment Agency monitoring point. Dissolved oxygen concentrations taken at Station 14 during the autumn surveys ranged from 60.5% to 67.6% and increased throughout the tidal cycle. These readings indicate that the River Thames is generally well oxygenated at these monitoring points at the time of the survey. However, dissolved oxygen concentrations within the lower Thames are considered likely to present variability throughout the year due to seasonal changes and changes to activities and processes within the water body.

pH Value

5.2.35. Measured pH values at the Environment Agency monitoring point ranged from 7.55 (13th October 2022) to 8.78 (3rd April 2023). pH values at Station 14 during the autumn surveys ranged from 7.69 to 7.76. The measured pH values are considered to be within the normal pH range expected for the River Thames.

Salinity

5.2.36. Salinity presented a range of values across the sampling events at the Environment Agency monitoring point, ranging from 0.73 ppt (03 April 2023) to 17.26 ppt (15 July 2022). Likewise, salinity measurements taken at Station 14 during the autumn survey ranged from 5.62ppt to 13.92ppt.

5.2.37. The observed variations in salinity are likely to be a result of the River Thames being a transitional (estuarine) environment. As such, the range in salinity is likely to be related to the tidal cycle at the time of each sampling event, as well as the flow conditions of the river.

Total Suspended Solids

5.2.38. During the survey on 21 September 2023 at Station 14, total suspended solids ranged from 29,300 ug/l to 236,000 ug/l. The range was likely impacted by the tidal cycle, variation in sampling and also the estuarine nature of the water body. This part of the estuary is highly turbid and is known as the 'Muddy Reaches' of the River Thames.

Water Temperature

5.2.39. Water temperature exhibits seasonal variations in temperature at the Environment Agency sampling point, with the lowest temperature recorded in February 2023 (5.7°C) and the highest recorded in August 2022 (22.1°C). Water temperature at Station 14 during the autumn survey remained relatively stable across the tidal cycle at around 19.7°C.

Conductivity

5.2.40. Conductivity readings from the autumn survey at Station 14 presented variability across the tidal cycle. Conductivity readings ranged from 9,266 uS/cm to 20,551 uS/cm.

SEDIMENT SAMPLING AND CHEMICAL ANALYSIS

5.2.41. Sediment sampling was undertaken within the area of the Site within the River Thames to identify the baseline conditions relating to sediments.

Sediment Sampling

5.2.42. Sediment sampling was undertaken on three occasions; 18th May, 19th June and 21st September 2023. Fifteen sediment grab samples were collected from a number of subtidal and intertidal locations and submitted to MMO approved Socotec Marine Department Laboratory for chemical analysis. The suite of analysis included parameters listed under CEFAS Action Levels including metals, polycyclic aromatic hydrocarbons polychlorinated biphenyls and organotins. Samples were also analysed for other supporting parameters including total organic carbon and particle size distribution. The MMO results template is provided in **Annex F**.

5.2.43. In the absence of UK standards, the sediment chemical data has been compared against CEFAS guideline actions levels[48] and Canadian Sediment Quality Guidelines[49], an approach used by the Port of London Authority. The dredged arisings associated with the Proposed Scheme (during both capital dredging and maintenance dredging) will be managed in accordance with relevant legislation and will be disposed of offsite (via vessel and only if dredged arisings are deemed suitable for this disposal method and conform with the permits for disposal sites). The removal of the dredged arisings will be undertaken by an appropriately licenced waste carrier.

Sediment Chemical Results – CEFAS Screening

5.2.44. Sediment analysis results have been compared against CEFAS Action Levels 1 and 2. In general, contaminant concentrations below Action Level 1 (AL1) are of no concern when disposing of dredged sediments to sea. Concentrations between Action Levels 1 and 2, indicate a concern and require consideration and resting before disposal decisions can be made. Concentrations above Action Level 2 (AL2) are generally considered to be unsuitable for disposal to sea.

5.2.45. It should be noted that the CEFAS Action Levels are used to assess the suitability of sediments to be disposed of at sea. However, should dredged sediments be disposed of via an alternative route, additional testing may be required.

5.2.46. The screened data is presented in **Annex C**.

5.2.47. In summary, sediment concentrations of metals and polycyclic aromatic hydrocarbons (PAH) were encountered above AL1 criteria in a number of locations. Additionally, the concentration of dichlorodiphenyltrichloroethane (PPDDT) encountered in the sediment sampling obtained from ‘Subtidal 12’, was identified at 0.0018mg/kg found to exceed AL1 criteria (0.001mg/kg). In addition, the concentration of Mercury identified within sediment sampling location ‘S3’ was identified at 4.71mg/kg, which is above the AL2 criteria (3.00mg/kg).

Sediment Chemical Results – Canadian Sediment Quality Guidelines

5.2.48. Sediment chemical results have also been compared to the Canadian Sediment Quality Guidelines for the Protection of Aquatic Life (2001)[4949] to provide an indication of the degree of contamination and the likely impact on aquatic ecosystems. The Canadian Sediment Quality Guidelines are used as a broadly protective tool to support the functioning of healthy aquatic ecosystems.

5.2.49. The Guidelines consist of threshold effect levels (TEL) and probable effect levels (PELs). The TELs and PELs are used to identify the following ranges of chemical concentrations with regards to biological effects.

- below TEL – minimal effect within which adverse effects rarely occur;
- between TEL and PEL – the possible effect range, within which adverse effects occasionally occur; and

- above the PEL – the probable effect range within which adverse effects frequently occur.

5.2.50. The screened data is presented in **Annex D**.

5.2.51. In summary, concentrations of metals and PAH were encountered in excess of the TEL in all sediment samples obtained from the Site, indicating the potential for adverse effects to occasionally occur. In addition, a number of samples exhibited concentrations of Mercury, Lead and PAHs above the PEL indicating the potential for adverse effects to frequently occur.

Baseline Water Quality

5.2.52. The Environment Agency provided contaminant baseline concentration data following a request which were calculated over a three-year period 2016-2018 (inclusive) for the Thames Middle Transitional Water Body (Waterbody ID GB530603911402). Six monitoring points are located within this waterbody:

- Thames at London Bridge;
- Thames at Victoria Dock (11.4km below London Bridge);
- Thames at Erith (26.6km below London Bridge);
- Thames at Greenhithe (34.8km below London Bridge);
- Thames at Gravesend (42.5km below London Bridge); and
- Thames at Ovens Buoy (47.7km below London Bridge).

5.2.53. **Table 5-8** provides a summary of the mean chemical results between 2016-2018 from each of these monitoring points. For clarity only those contaminants which were also included with the sediment analysis results from sediment grab samples have been included.

Table 5-8: Mean concentration of contaminants from monitoring points within Thames Middle Transitional Water Body (as µg/l) (ND=No Data)

Determinand	Thames at Erith	Thames at Gravesend	Thames at Greenhithe	Thames at London Bridge	Thames at Northern Outfall	Thames at Ovens Buoy
Lead	0.15	0.15	ND	0.15	ND	0.15
Cadmium	0.0476	0.0521	0.0464	0.035	ND	0.0517
Nickel	2.7533	2.2917	ND	2.7969	ND	2.0692
Tributyltin (TBT)	0.0005	0.0011	ND	0.0005	ND	0.0006
Anthracene	0.005	0.005	ND	0.005	ND	0.005
Naphthalene	0.015	0.015	ND	0.0217	ND	0.015

Assessment of Impact of Capital Dredge on Thames Middle Transitional Water Body Quality

5.2.54. As described in **Table 5-1**, the Thames Middle Transitional Water Body has not achieved good chemical status due to exceedances of priority hazardous substances benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, mercury and its compounds, perfluorooctane sulphonate (PFOS), polybrominated diphenyl ethers (PBDE), and tributyltin compounds.

5.2.55. It is understood that no agreed published methodology currently exists to determine the impact of contaminant impact sediment on Controlled Waters during dredging. However, for completeness, a conservative preliminary assessment has been undertaken.

5.2.56. A particle tracking dispersion model was completed within **Appendix 11-4: Coastal Modelling Studies (Volume 3)** for the proposed capital dredging. The following information from **Appendix 11-4: Coastal Modelling Studies (Volume 3)** is considered relevant to this assessment (including relevant model assumptions):

- It was assumed that sediment could be released at any point in the dredge process so losses would be instantaneously and equally distributed between the surface, mid-depth and bed layers.
- Each dredge campaign lasted 18.5 hours with a dredge volume of 1,423m^3. The model was then allowed to continue until either the mass of each individual particle fell below 0.0001kg or falls to the seabed.
- It was assumed that the river would reach a morphological equilibrium state in the 5.5 hours between dredging operations, therefore accumulative impacts were not considered, and the system was assumed to ‘reset’ after each daily dredge campaign.
- The excursion length of the mud material released during the dredging was projected approximately 3km upstream and downstream of the Proposed Jetty. The dredge plume was not predicted to extend the full width of the estuary (approximately 650m) but instead, was shown to keep within a narrow (< 100m) band.
- The results of the dispersion of expected dredge arisings show that for all scenarios considered that the average concentration of excess suspended sediment (Silt or Sand) is likely to be very low (<10mg/l) and limited to a maximum of 3km upstream and downstream of the dredge operation. The higher concentration is predicted to occur immediately adjacent to the dredging activity for both sand and silt sediment types.
- In summary, the study concluded the predicted impacts from the capital dredge operations are not considered significant primarily due to the mechanism of the dredge operation (backhoe) where material is removed from the system and disposed offsite. The findings are based on reasonable worst case assumptions, in particular a working window of 18.5 hours with a loss rate of 1kg/s. Sensitivity of

adjusting these parameters did not result in any significant changes, suggesting that the results presented are reasonable.

5.2.57. **Table 5-9** below shows a preliminary assessment of the potential increase of contaminants within the water column as a result of the capital dredge works. This is to determine if the increase in suspended sediment (impacted by contaminants) would result in the baseline concentration exceeding the threshold annual average (AA) Environmental Quality Standard (EQS). Calculations were undertaken to determine the potential uplift in contaminant concentrations. The following conservative assumptions were used:

- it is assumed that 100% of the contaminant concentrations present within the sediment enter solution within the water column (which is unlikely especially for less soluble compounds such as some PAH); and
- no dilution calculation has been undertaken.

Table 5-9: Potential Contaminant Concentrations as a Result of Capital Dredge in the Thames Middle Transitional Water Body

Determinand	EQS AA ug/l	Mean sediment concentration mg/kg[a]	Background Concentration ug/l	Predicted concentration (background and dredging) ug/l	Concentration increase from background as %
Arsenic	25	0.0109	ND	ND	-
Cadmium	0.2	0.001	0.046575	0.056575	2.15%
Chromium (Total)	0.6	0.030	ND	ND	-
Copper	3.76	0.031	ND	ND	-
Mercury	0.07	0.001	ND	ND	-
Nickel	8.6	0.018	2.477772	2.661239	0.73%
Lead	1.3	0.069	0.15	0.838933	46.00%
Zinc	6.8	0.106	ND	ND	-
Tributyltin	0.0002	0.000014	**0.000687**	**0.000824**	2.04%
Anthracene	0.1	0.000210	0.005	0.007103	4.20%
Benzo(a)pyrene	0.00017	**0.000801**	ND	ND	-
Benzo(b)fluoranthene	0.00017[b]	**0.000681**	ND	ND	-
Benzo(g,h,i)perylene	0.00017 [b]	**0.000536**	ND	ND	-
Naphthalene	2	0.000640	ND	ND	-
Notes: [a] Directly converted to ug/l. [b] Benzo (a)pyrene EQS used as proxy. Exceedances of EQS AA criteria shown in bold.					

5.2.58. Based on this preliminary assessment of sediment samples taken from surface grab samples, the predicted concentrations show exceedances of tributyltin, benzo(a)pyrene, benzo(b)fluoranthene and benzo(g,h,i)perylene. However, it should be noted the background concentration of tributyltin already exceeds the EQS AA and the additional predicted uplift from the sediment which did not breach the 3% uplift threshold suggested by the Environment Agency as a practical threshold to determine the boundary between no deterioration and deterioration of the water body.

5.2.59. No background concentration values were available for benzo(a)pyrene, benzo(b)fluoranthene and benzo(g,h,i)perylene however, predicted concentrations whilst in exceedance of EQS AA criteria are within the same order of magnitude and are not considered to be significant. It should also be noted that the EQS AA value for benzo(a)pyrene is derived for the protection goal of human health via consumption of fishery products. No commercial fishing is understood to occur within the water body. Furthermore, it is likely that, rather than becoming fully soluble in the water column, the majority of the PAHs will stay bound to the sediment and settle back to the riverbed between dredging campaigns (or be removed for offsite disposal).

5.2.60. The assumptions for this assessment were highly conservative. The results of the particle tracking dispersion model showed that using the backhoe method resulted in an average excess suspended solid concentration as a result of the dredging to be <10mg/l and the system would be reset between each daily dredging campaign. This would mean any exceedances of EQS AA would likely be highly localised and short lived and it is highly unlikely that dredging using this technique would lead to a temporally significant deterioration of the assessed water quality elements within the Thames Middle Transitional Water Body and will thus not prevent the water body from meeting its WFD objectives.

PROTECTED AREAS

Statutory Sites

5.2.61. Protected areas reported in the Environment Agency's Catchment Data Explorer[9] within the Thames Middle Transitional Water Body are as follows:

- Thames Estuary & Marshes (Special Protection Area (UK9012021) and Ramsar Site (UK11069));
- Lea Navigation & River Lee (Urban Waste Water Treatment Directive (UKENRI59)); and
- Thames Middle Transitional Water Body (Drinking Water Protected Area (UKGB530603911402)).

WFD and Other Protected Area Features

5.2.62. Three habitats listed as HPI to Nature Conservation under the NERC Act[34] were identified within 500m of the Site. These habitats are coastal and floodplain grazing marsh, coastal saltmarsh and mudflats. Details of the habitats are presented in **Table 5-10.**

Table 5-10: Habitats of Principal Importance

Habitat Type	Area within 500m of Site (ha)
Coastal and floodplain grazing marsh	5.20
Coastal saltmarsh	0.63
Intertidal Mudflats	9.10
Total	**14.93**

INVASIVE NON-NATIVE SPECIES

5.2.63. INNS are widespread throughout the Thames Estuary, with many species being well established. Marine INNS present within the Thames Estuary include[50]:

- Zebra mussel *Dreissena polymorpha*;
- Quagga mussel *Dreissena rostriformis bugensis*;
- Chinese mitten crab *Eriocheir sinensis*;
- Asiatic clam *Corbicula fluminea*;
- Slipper limpet *Crepidula fornicata*;
- Carpet sea squirt *Didemnum vexillum*;
- Pacific oyster *Magallana gigas*;
- Polychaete *Boccardiella ligerica*;
- New Zealand mudsnail *Potamopyrgus antipodarum*; and
- Bay barnacle *Amphibalanus improvisus*.

5.2.64. Many of these species have been detected at Environment Agency TraC monitoring sites both upstream and downstream of the Site and are likely to be present within the Study Area.

5.2.65. The species set out in the list above reflect marine and aquatic macroinvertebrate INNS present within the Thames Estuary. However, it must be noted that there are likely further INNS present within the Thames that are not listed within this section and have been assumed to be present.

5.2.66. Benthic ecology surveys were conducted in May 2023 and September 2023. Two non-native species were recorded across the sample sites; *Incisocalliope aestuarius* and *Maranzellaria spp*.

6. WFD SCREENING

6.1. STAGE 1: WFD SCREENING

6.1.1. The purpose of the WFD screening stage is to identify the extent to which the Proposed Scheme may affect WFD water bodies.

SCREENING OF WFD WATER BODIES

6.1.2. The Proposed Scheme lies within the Thames Middle Transitional Water Body (GB530603911402) and therefore this water body could be directly impacted by the Proposed Scheme. Due to the proximity of the Proposed Scheme, this water body is screened **in** for further assessment.

6.1.3. The downstream water body is the Thames Lower Transitional Water WFD Water Body (GB530603911401). The Thames Lower Transitional Water WFD Water Body lies approximately 26km downstream of the Proposed Scheme. Due to the significant distance downstream and the likely small scale of potential impacts of the Proposed Scheme on the water body, this water body is screened **out** for further assessment.

6.1.4. The upstream water body is the Thames Upper Transitional Water WFD Water Body (GB530603911403). The Thames Upper Transitional Water WFD Water Body lies approximately 33km upstream of the Proposed Scheme. Due to the significant distance upstream and the likely small scale of potential impacts of the Proposed Scheme on the water body, this water body is screened **out** for further assessment.

6.1.5. The Greenwich Tertiaries and Chalk Groundwater WFD Water Body (GB40602G602500) is screened **out** for further assessment due to construction activities not being expected to impact the aquifer. The Site is underlain by superficial deposits comprising Alluvium and Shepperton Gravel Member with a total combined average thickness of approximately 2.5 to 3.0m. The London Clay Formation (bedrock geology) underlies the superficial deposits and is the confining layer above the Lambeth Group and Principal Chalk aquifer. The Lambeth Group is considered to be in hydraulic continuity with the underlying Chalk. The average thickness of the London Clay Formation at the Site is on average around 11.0m and the top of the formation is recorded on average at around -11.43m AOD. The dredging pocket is proposed for -13.78m AOD (-10.5m CD). It is expected to “scrape” only the upper layer of the London Clay Formation where the top of the formation has been recorded at -10.7m AOD in BH106A and BH107 (see **Appendix 11-3: Groundwater Impact Assessment (Volume 3)** for further information). The London Clay Formation overall is considered to be of sufficient thickness to provide protection to the underlying Lambeth Group and Principal Chalk aquifer. It is unlikely that contamination pathways resulting from dredging activities for the Site to the groundwater body (being the Principal Chalk Aquifer) are expected and on this basis, impacts can be screened **out**.

6.1.6. It should be noted that the assessment (and mitigation measures) of impacts to controlled water bodies (including WFD groundwater bodies) from terrestrial piling activities are presented within **Chapter 17: Ground Conditions and Soils (Volume 1)**.

SCREENING OF ACTIVITIES

6.1.7. **Section 1.3** outlines the activities associated with the construction and operation of the Proposed Scheme. These activities are screened in/out of further WFD assessment in **Table 6-1.** Those activities screened in are taken forward to the Stage 2.

Table 6-1: Stage 1 – Screening of Activities

Activity	Screen In/Out	Justification
Construction Phase		
Construction of the Proposed Jetty	IN	Construction activities, particularly sheet piling, have the potential to impact the watercourse, aquatic ecology and water quality elements due to activities being carried out within the River Thames. The dredging has potential to lead to the release of sediment and contaminants from the riverbed and subsequent siltation. Noise, visual disturbance and vibration from construction processes could also impact upon fish species; appropriate mitigation would be required to minimise these impacts.
Temporary Construction Compounds	OUT	Activity judged unlikely to impact WFD receptors, as 'static' structures. Drainage from Temporary Construction Compounds will be managed through measures included within the **Outline CoCP (Document Reference 7.4)**.
Construction Access Routes (via River Thames)	IN	Activity has the potential to impact the estuarine mudflat and watercourse, as the activity will be carried out wholly or in part on the River Thames.

Activity	Screen In/Out	Justification
Capital Dredging	IN	Activity has potential for hydromorphology and water quality impacts due to the volume of contaminated riverbed that is expected to be dredged.
Demolition of the Belvedere Power Station Jetty (disused)	OUT	Any potential impacts associated with demolition of the Belvedere Power Station Jetty (disused) are not material in comparison to those associated with the construction of the Proposed Jetty (considered above) in the worst case scenario.
Tug Berth Pontoon	OUT	The landward pontoon will only be used by slow-moving tugs and therefore no impacts from vessel movements on habitat are anticipated.
Operation Phase		
Carbon Capture Facility	OUT	Activity is judged unlikely to impact watercourse.
Proposed Jetty	IN	Activity has the potential to impact with estuarine mudflat, watercourse, ecological and water quality elements due to the activity being carried out wholly within the River Thames. This may lead to potential sediment and contaminant release, disturbance of the bed, and subsequent siltation. Noise, vibration, and visual disturbance may also impact upon fish species, for which mitigation would be required.
Drainage Infrastructure	OUT	Activity not taking place in WFD designated waterbody. Discharge from site will be in accordance with the **Outline Drainage Strategy (Document Reference 7.2)**, which contains measures to ensure adverse effects are avoided.

Activity	Screen In/Out	Justification
Operational Access and Transport Routes (via River Thames)	IN	Activity has the potential to impact the estuarine mudflat and watercourse with a change in marine traffic patterns, as the activity will be carried out wholly or in part within the River Thames.
Maintenance Dredging	IN	Activity has the potential to impact water quality and marine habitats and species.

6.2. STAGE 2 AND 3: WFD SCOPING

6.2.1. The WFD scoping stage defines the need and level of detail required for the WFD impact assessment. This includes identifying risks to the WFD receptors from the activities associated with Proposed Scheme that are screened in above. These results are presented for each receptor in **Table 6-2** to **Table 6-5** below using the Environment Agency's scoping template for estuarine and coastal waters. The scoping against WFD quality elements is provided in **Table 6-6** and **Table 6-7**.

HYDROMORPHOLOGY

6.2.2. **Table 6-2** assesses the potential impact of the Proposed Scheme against the WFD hydromorphology receptors for the screened surface water bodies. Mitigation measures that will be adopted are listed in **Section 7**.

Table 6-2: WFD Scoping of the Proposed Scheme Activities Against WFD Hydromorphology Receptors for Screened in Surface Water Bodies (Thames Middle Transitional Water Body)

Consider If your Activity may Impact Hydromorphology:	Risk to Receptor (Yes/No)	Scoping Outcome Justification
Hydromorphology		
Could the Proposed Scheme impact on the hydromorphology (for example morphology or tidal patterns) of a water body at high status?	No	The Thames Middle Transitional Water Body is heavily modified and is not currently at high status.

Consider If your Activity may Impact Hydromorphology:	Risk to Receptor (Yes/No)	Scoping Outcome Justification
Could the Proposed Scheme significantly impact the hydromorphology of any water body?	No	Construction activities within the River Thames may stir up silt and other sediments that could have an adverse impact on the hydromorphology of the River Thames. However, the surface area of the water body (44.16km²) far exceeds the footprint of the Proposed Scheme (within the River Thames) (0.77km²), which is 0.02% of the Thames Middle Transitional Water Body. Therefore, the Proposed Scheme is unlikely to *significantly* impact the hydromorphology status of the Thames Middle Transitional Water Body, as concluded within **Appendix 11-4: Coastal Modelling Studies (Volume 3)**.
Is the Proposed Scheme in a water body that is heavily modified for the same use as your activity?	Yes	The Thames Middle Transitional Water Body has been historically heavily modified for use as a navigational river for the purposes of trade and transport. The Proposed Scheme uses marine corridors to transport goods in both construction and operational phase. This has potential to impact hydromorphology elements.

BIOLOGY

6.2.3. **Table 6-3** assesses the potential impact of the Proposed Scheme against the WFD biological receptors for the screened surface water bodies.

6.2.4. The assessment against biological receptors requires consideration against the presence of higher and lower sensitivity habitats. The Proposed Scheme could potentially impact upon:

- Higher sensitivity habitats:
  - Saltmarsh (13.06ha) Thames Middle Transitional Water Body.
- Lower sensitivity habitats:
  - Intertidal soft sediment (838.78ha) Thames Middle Transitional Water Body.

Table 6-3: WFD scoping of the Proposed Scheme Activities against WFD Biological Receptors

Consider if the Footprint of the Activity may Impact the Biological Receptors	Risk to Receptor (Yes/No)	Scoping Outcome Justification
Is the footprint of the Proposed Scheme 0.5km^2 or larger?	Yes	The total footprint of the Proposed Scheme (within the River Thames) is 0.77km^2.
Is the footprint of the Proposed Scheme 1% or more of the water body's area?	No	The total footprint of the Proposed Scheme (within the River Thames) is 0.77km^2 which is 0.02% of the size of the Thames Middle Transitional Water Body.
Is the footprint of the Proposed Scheme within 500m of any higher sensitivity habitat?	Yes	The Proposed Scheme is located approximately 500m from saltmarsh habitat.
Is the footprint of the Proposed Scheme 1% or more of any lower sensitivity habitat?	Yes	The footprint of the Proposed Scheme is 0.3% of intertidal soft sediment, where the footprint is defined as the area within the Site Boundary.
Biology – Fish		
Is the Proposed Scheme in an estuary and could it affect fish in and outside the estuary, could it delay or prevent fish entering it and could it affect fish migrating through the estuary?	Yes	The Proposed Scheme is located within an estuary and includes activities that could disturb fish through the mobilisation of sediments and associated sediment bound contaminants and noise and vibration disturbance.

Consider if the Footprint of the Activity may Impact the Biological Receptors	Risk to Receptor (Yes/No)	Scoping Outcome Justification
Could the Proposed Scheme impact on normal fish behaviour like movement, migration or spawning (for example creating a physical barrier, noise, chemical change or a change in depth or flow)?	Yes	Noise and vibration, predominantly from piling (construction) and dredging (construction and operation), and the mobilisation of sediments and associated sediment bound contaminants has the potential to have an impact on fish behaviour.
Could the Proposed Scheme cause entrainment or impingement of fish?	Yes	Dredging will be undertaken by adopting the backhoe dredging method. The dredged arisings associated with the Proposed Scheme (during both capital dredging and maintenance dredging) will be managed in accordance with relevant legislation and will be disposed of offsite (via vessel and only if dredged arisings are deemed suitable for this disposal method and conform with the permits for disposal sites). The removal of the dredged arisings will be undertaken by an appropriately licenced waste carrier.

WATER QUALITY

6.2.5. **Table 6-4** assesses the potential impact of the Proposed Scheme against the WFD water quality receptors for the screened surface water bodies.

Table 6-4: WFD scoping of the Proposed Scheme Activities against WFD Water Quality Receptors for Screened Surface Water Bodies (Thames Middle Transitional Water Body)

Consider if the Activity may Impact Water Quality:	Risk to Receptor (Yes/No)	Scoping Outcome Justification
Could the Proposed Scheme affect water clarity, temperature, salinity, oxygen levels, nutrients or microbial patterns continuously for longer than a spring neap tidal cycle (about 14 days)?	Yes	Construction activities (including dredging and piling) have the potential to increase suspended sediment concentration and therefore reduce water clarity within the Study Area although it is noted that this section of the River Thames has high turbidity and is known as the Muddy Reaches. Based on the scale of the Proposed Scheme, changes to temperature, salinity, oxygen levels, nutrients and microbial patterns may occur locally, however are not likely to considerably impact the water body overall.
Is the Proposed Scheme in a water body with a history of harmful algae?	No	The Thames Middle Transitional Water Body is not monitored for history of harmful algae.
Is the Proposed Scheme in a water body with a phytoplankton status of moderate, poor or bad?	No	The current WFD classification for the phytoplankton quality element is Good.

Consider if the Activity may Impact Water Quality:	Risk to Receptor (Yes/No)	Scoping Outcome Justification
If your activity uses or releases chemicals (for example through sediment disturbance or building works) consider if the chemicals are on the Environmental Quality Standards Directive (EQSD) list.	Yes	Sediment sampling and chemical analysis (presented within **Section 5**) has identified elevated concentrations of chemicals (including priority substances) on the EQSD list; therefore, the disturbance of sediments has the potential to mobilise contaminants to the water column of the River Thames, thus potentially degrading water quality. It should be noted the impact on water quality is anticipated span the duration of the dredging works (approximately 6 months) and piling works during construction and during maintenance dredging during the operation phase.
If your activity uses or releases chemicals (for example through sediment disturbance or building works) consider if it disturbs sediment with contaminants above CEFAS Action Level 1 or Canadian Sediment Quality Guidelines TEL.	Yes	There is the potential for the mobilisation of sediments with contaminant concentrations above AL1 and/or the TEL during dredging and piling activities during construction, and during maintenance dredging during the operational phase. The mobilisation of contaminants to the water column within the River Thames has the potential to degrade the water quality within the waterbody although the impact on water quality is anticipated to span the duration of dredging works (approximately 6 months) and piling works.

Consider if the Activity may Impact Water Quality:	Risk to Receptor (Yes/No)	Scoping Outcome Justification
If your activity has a mixing zone (like a discharge pipeline or outfall) consider if the chemicals released are on the Environmental Quality Standards Directive (EQSD) list.	No	There will not be an outfall associated with the Proposed Scheme which directly discharges to the River Thames. Given this, the release of potential chemicals on the EQSD list from the outfall have been scoped out of further assessment.

PROTECTED AREAS AND INNS

6.2.6. **Table 6-5** assesses the potential impact of the Proposed Scheme against the WFD Protected Areas and INNS receptors for the screened surface water bodies.

Table 6-5: WFD Scoping of the Proposed Scheme Activities against WFD Protected Areas and INNS Receptors

Consider if the Activity may Impact Protected Areas or INNS:	Risk to Receptor (Yes/No)	Scoping Outcome Justification
Is the Proposed Scheme within 2km of any WFD protected area?	No	The Proposed Scheme is over 2km in distance from any WFD protected area. No direct or indirect impacts are therefore anticipated.
Could the Proposed Scheme introduce or spread INNS?	Yes	Two INNS have recently been recorded within the Site during spring and autumn grab sampling; *Incisocalliope aestuarius* and *Maranzellaria* spp. Many other invasive species are also known to be present within the Thames Estuary. It is possible that other invasive species could be introduced or spread to other areas of the Thames during the construction and operation phase, on construction machinery and vessels that operate in or near the water.

WFD QUALITY ELEMENTS

6.2.7. **Table 6-6** assesses the potential impact of the Proposed Scheme against each of the WFD quality elements for transitional and coastal water bodies in terms of physico-chemical quality which supports biological quality elements.

Table 6-6: Potential Impacts of the Proposed Scheme Activities against WFD Quality Elements for Transitional and Coastal Water Bodies

WFD Quality Elements	Potential Impacts Summary
Biological Quality Elements	
Fish	**Construction** The construction of the Proposed Jetty, piling (noise and vibration), lighting, construction of the access routes and construction and operational dredging activities have the potential to cause fish mortality or injury and impact fish behaviour, spawning, movement, and migration. Juvenile fish were recorded for each species caught during the fish surveys, indicating that suitable nursery or spawning habitat is present within the Study Area. Construction activities therefore have the potential to impact upon spawning and nursery grounds for these species and therefore the subsequent development and survival of juvenile fish species. In addition, the activities may impact upon fish migration, feeding and movement. However, these impacts are anticipated to be temporary and localised. **Sediment Mobilisation** Construction activities may mobilise sediments and associated sediment bound contaminants. Mobilisation of sediment and sediment bound contaminants could directly impact fish health. This section of the water body, referred to as the 'Muddy Reaches', is already highly turbid, experiencing high levels of suspended sediment and sediment deposition. Therefore, activities which may mobilise sediment are not expected to cause a significant variation from baseline conditions, and consequently no significant impact on fish health is anticipated from mobilised sediment alone. However, dredging activities have the potential to release contaminants that could have an adverse effect on fish. Results from surface sediment analysis indicate elevated levels of a number of toxic chemicals within close proximity to the potential dredge areas, therefore there

WFD Quality Elements	Potential Impacts Summary
	is a potential for adverse effects to frequently occur. Sediment modelling has indicated that use of backhoe dredging will result in only a small increase in concentrations of total suspended solids in the water column. Using these predicted suspended solids concentrations and sediment contaminant concentrations from seabed surface sediments, predicted additional contaminant concentrations in the estuary are small compared with AA EQS values. Whilst this is considered robust, the EA has asked that, the analysis be repeated for deeper sediments. For this reason, effects on fish from the release of sediment bound contaminants during construction related dredging activities has been assessed under a worst case scenario of contaminants being present at depths below the surface. In such a scenario, additional mitigation measures such as a reduced speed of dredging can be employed to reduce the levels of released contaminant from sediment at depth. The dredged arisings associated with the Proposed Scheme (during both capital dredging and maintenance dredging) will be managed in accordance with relevant legislation and will be disposed of offsite (via vessel and only if dredged arisings are deemed suitable for this disposal method and conform with the permits for disposal sites). The removal of the dredged arisings will be undertaken by an appropriately licenced waste carrier. Further information about onward sediment sampling is described in **Section 8.9** and **8.10** of **Chapter 8: Marine Biodiversity (Volume 1)**. Additionally, sediment sampling (to be agreed with the MMO in consultation with CEFAS prior to commencement of works) will be undertaken. Should unacceptable impacts be determined following sediment sampling then appropriate mitigations measures will be implemented in discussion with the Environment Agency. For this assessment, with mitigation measures (as detailed in **Section 7**) implemented and, taking account of the limited extent of the sediment plume (both longitudinally in the estuary and as a proportion of the estuary cross-section), it is anticipated that impacts from construction dredging activity will not be significant at a waterbody scale.

WFD Quality Elements	Potential Impacts Summary
	Notwithstanding this, the Applicant is in the process of collecting sediment data at depth and will update on the position prior to or during the early stages of the DCO examination period. This is expected to validate the conclusions provided above but will help to confirm the necessity of the mitigation measures set out above. In-depth assessment of potential impacts from sediment mobilisation on the marine environment is detailed in the **Chapter 8: Marine Biodiversity (Volume 1)**. **Noise and Vibration** There is the potential for noise and vibration impacts on fish during construction from activities such as impact piling, vibro piling, vessel movement and the potential demolition of the Belvedere Jetty, which could result in morality, injury, disturbance and a barrier to spawning migration or movement. However, with the mitigation measures in place (as detailed in **Section 7**), the potential effects will be temporary and localised. Therefore, it is not anticipated that noise and vibration will have a significant effect at the waterbody scale. In-depth assessment of potential impacts from construction noise and vibration on the marine environment that supports the conclusion above, is detailed in the **Appendix 6-4: Underwater Noise Assessment (Volume 3)** and **Chapter 8: Marine Biodiversity (Volume 1)**. **Lighting** Construction lighting is unlikely to have a significant effect on fish communities within the Thames Middle Transitional Water Body, as there is already a considerable amount of artificial lighting affecting the wider River Thames and consequently marine ecological receptors all along the Thames. However, there is potential for certain species of fish to be affected by artificial lighting. The potential range of effects from artificial lighting on marine ecological receptors varies according to species and life stage but can lead to a wide range of behavioural changes. These can include: • photopositive (attracted to light) responses; • photonegative (repelled by light) responses;

WFD Quality Elements	Potential Impacts Summary
	• disorientation; • changes in diel vertical migration for feeding and avoiding predation (e.g., in zooplankton and fish); and • subsequent indirect alterations in predator/prey interactions; disturbance of migratory patterns. The **Outline Lighting Strategy (Document Reference 7.3)** includes measures to minimise lighting impacts to designated areas, habitats and species. Construction and Operation mitigation included within the **Outline Lighting Strategy (Document Reference 7.3)** and **Outline CoCP (Document Reference 7.4)** can be found in **Section 7**. With these mitigation measures, and with consideration of the turbid nature of the River Thames and the localised extent of the lighting in relation to the width of the river, the impact is not likely to be significant at the waterbody scale. Following the above-mentioned assessments of construction activities on fish as a receptor and implementation of mitigation measures (as detailed in **Section 7**), no significant effect is expected at the waterbody scale during the construction phase. Construction activities and their potential effects on fish are assessed in detail within **Chapter 8: Marine Biodiversity (Volume 1)** and concluded that effects will be not significant with the implementation of embedded and additional mitigation.
Fish	**Operation** **Loss of intertidal and subtidal habitat** The operation of the Proposed Scheme will lead to the reduction of intertidal and subtidal habitat available due to the presence of the Proposed Jetty. The Applicant is currently exploring the potential options of retention or demolition of the Belvedere Power Station Jetty (disused) which needs to be considered alongside the installation of the new Proposed Jetty. If the Belvedere Power Station Jetty (disused) is retained (with modifications), it will result in an overall net loss of subtidal and intertidal habitat but the retention of an element of shelter for fish. Whereas, if it is removed, it will result in a net gain of

WFD Quality Elements	Potential Impacts Summary
	intertidal habitat (as its footprint within that habitat is larger than the footprint that will be created by the Proposed Jetty). As a result, the operation of the Proposed Jetty and retention of the Belvedere Power Station Jetty (disused) (with modifications), may lead to the loss of nursery areas for fish. Subsequently, the presence of the Proposed Jetty and the retention of the Belvedere Power Station Jetty (disused) (with modifications) has the potential to have an impact upon the behaviour of fish within the local area. However, the presence of the Proposed Jetty and its associated underwater structures may provide additional habitat which has the potential to be colonised by algae and invertebrates. These structures may therefore provide a potential food source and nursery cover for fish. **Sediment Mobilisation** Operational activities could mobilise sediments and associated sediment bound contaminants, cause noise and vibrational disturbance and cause behavioural disturbances to fish and their food source. Additionally, the completion of the Proposed Jetty could result in habitat loss for fish. Periodic maintenance dredging during the operation phase will likely lead to disturbance of the habitat and therefore the fish communities present. This would be controlled through the controls set out in the Deemed Marine Licence within the **Draft DCO (Document Reference 3.1)**. The results from the hydrodynamic modelling of the dredge dispersion, as well as surface sediment modelling, are detailed within **Appendix 11-4: Coastal Modelling Studies (Volume 3).** The study concludes that the proposed backhoe dredging and removal of this material from the river is unlikely to result in any detrimental impacts in the River Thames system with the modelling showing very modest changes in excess suspended sediments. **Lighting** Operational lighting is unlikely to have a significant effect on fish communities within the Thames Middle Transitional Water Body, as there is already a considerable amount of artificial lighting affecting the wider River Thames and consequently marine ecological receptors all along the

WFD Quality Elements	Potential Impacts Summary
	Thames. However, there is potential for certain species of fish to be affected by artificial lighting. The potential range of effects from artificial lighting on marine ecological receptors varies according to species and life stage but can lead to a wide range of behavioural changes. These can include: • photopositive (attracted to light) responses; • photonegative (repelled by light) responses; • disorientation; • changes in diel vertical migration for feeding and avoiding predation (e.g., in zooplankton and fish); and • subsequent indirect alterations in predator/prey interactions; disturbance of migratory patterns. The **Outline Lighting Strategy (Document Reference 7.3)** includes measures to minimise lighting impacts to designated areas, habitats and species. Operation lighting mitigation included within the **Outline Lighting Strategy (Document Reference 7.3)** can be found in **Section 7**. With these mitigation measures, and with consideration of the turbid nature of the River Thames and the localised extent of the lighting in relation to the width of the river, the impact is not likely to be significant at the waterbody scale. **Vessel Movement** The operation of the Proposed Scheme will involve the movement of large vessels on up to five occasions per week. Given that there are already large volumes of barge traffic within the River Thames each day and that the footprint of the Site is small in comparison with the Thames Middle Transitional Water Body, in addition to the implementation of mitigation (as detailed in **Section 7**), no significant operational impacts are expected from vessel movement (including noise and vibration). Further detail on potential impacts from operational noise and vibration is detailed in **Appendix 6-4: Underwater Noise Assessment (Volume 3)** and **Chapter 8: Marine Biodiversity (Volume 1)** which conclude that effects will be not significant with the implementation of embedded mitigation. Following the above mentioned assessments of operational activities on fish as a receptor and implementation of

WFD Quality Elements	Potential Impacts Summary
	mitigation measures (as detailed in **Section 7**), no significant effect is expected at the waterbody scale during the operational phase. Operational activities and their potential effects on fish are assessed in detail within **Chapter 8: Marine Biodiversity (Volume 1)**.
Benthic Invertebrates	Construction of the Proposed Jetty, construction of access routes, piling and construction and operational dredging will lead to the mobilisation of sediments, which could affect benthic invertebrates through indirect impacts such as smothering caused by settling of sediment plumes. Additionally, mobilisation of sediment bound contaminants could impact the health of benthic invertebrate communities. Results from surface sediment analysis indicate elevated levels of a number of toxic chemicals within close proximity to the potential dredge areas, therefore there is a potential for adverse effects to frequently occur. However, the community within the Survey Area is already highly impoverished (as described within **Section 5**) and of low conservation value and therefore the community is unlikely to be affected at the water body scale. Additionally, these activities would be controlled through the controls set out in the Deemed Marine Licence in the **Draft DCO (Document Reference 3.1)**. It should be noted that this section of the water body is already highly turbid, experiencing high levels of suspended sediment and sediment deposition. Therefore, activities that result in the sedimentation of benthic environments are common within this section of the water body, and consequently the sedimentation related to the construction phase is not anticipated to have a significant effect on benthic invertebrates. These construction activities also have the potential to directly disturb/kill benthic invertebrate communities through the removal of their habitat. The benthic community within the Study Area is considered impoverished and of low conservation value and is considered to have a high recoverability to disturbance. Therefore, disturbance and removal of the habitat is unlikely to have a significant impact on the benthic invertebrate community at a waterbody scale.

WFD Quality Elements	Potential Impacts Summary
	Additionally, a number of mitigation measures (as detailed in **Section 7**), will minimise impacts to benthic communities during the construction phase. Construction activities and their potential effects on benthic communities are assessed in detail within **Chapter 8: Marine Biodiversity (Volume 1)**. The operational presence of the Proposed Jetty will lead to the reduction of soft sediment habitat available for the settlement of benthic invertebrates. The Applicant is currently exploring the potential options of retention or demolition of the Belvedere Power Station Jetty (disused). As discussed for fish above, if the Belvedere Power Station Jetty (disused) is retained (with modifications), it will result in an overall loss of subtidal and intertidal habitat. Whereas, if it is removed, it will result in a gain of intertidal habitat. As a result, the operation of the Proposed Jetty and retention of the Belvedere Power Station Jetty (disused) (with modifications), will lead to the reduction of soft sediment habitat available for the settlement of benthic invertebrates. The presence of the Proposed Jetty and its associated underwater structures may provide additional habitat which has the potential to be colonised by algae and invertebrates. Periodic maintenance dredging during the operation phase will likely lead to disturbance of benthic communities, but this would be controlled through the controls in the Deemed Marine Licence in the **Draft DCO (Document Reference 3.1)**. The results from the hydrodynamic modelling of the dredge dispersion, as well as surface sediment modelling, is detailed within **Appendix 11-4: Coastal Modelling Studies (Volume 3).** The study concludes that the proposed backhoe dredging and removal of this material from the river is unlikely to result in any detrimental impacts in the River Thames system with the modelling showing very modest changes in excess suspended sediments. The community within the Survey Area is already highly impoverished (as described within **Section 5** and of low conservation value and therefore the community is unlikely to be affected at the waterbody scale.

WFD Quality Elements	Potential Impacts Summary
	The operation of the Proposed Scheme will involve the movement of large vessels on up to five occasions per week. Given that there are already large volumes of barge traffic within the River Thames each day and that the footprint of the Site is small in comparison with the Thames Middle Transitional Water Body, no significant operational impacts are expected. Operational activities and their potential effects on benthic communities are assessed in detail within **Chapter 8: Marine Biodiversity (Volume 1)**.
Phytoplankton and Macroalgae	Construction activities including construction of the Proposed Jetty, piling, construction of the access routes and construction and operational dredging have the potential to mobilise sediments which could affect the water quality within the Study Area and therefore affect phytoplankton and macroalgae communities. This section of water body is already highly turbid, experiencing high levels of suspended sediment and sediment deposition. The Proposed Scheme is therefore unlikely to have a significant impact on macroalgae and phytoplankton as a result of an increase in suspended sediment or direct disturbance to the intertidal/subtidal habitats during the construction and operational phase at a water body scale. However, results from surface sediment analysis indicate elevated levels of a number of toxic chemicals within close proximity to the potential dredge areas, therefore there is a potential for adverse effects to frequently occur. However, this would be controlled through the controls in the Deemed Marine Licence in the **Draft DCO (Document Reference 3.1)**. With implementation of mitigation measures (as detailed within **Section 7**), it is anticipated that construction dredging activity will not have significant effect on phytoplankton or macroalgae at the waterbody scale. Periodic maintenance dredging during the operation phase may lead to increased suspended sediments. Dredging would be controlled through the controls in the Deemed Marine Licence in the **Draft DCO (Document Reference 3.1)**. The results from the hydrodynamic modelling of the dredge dispersion, as well as surface sediment modelling, is

WFD Quality Elements	Potential Impacts Summary
	detailed within **Appendix 11-4: Coastal Modelling Studies (Volume 3)**. The study concludes that the proposed backhoe dredging and removal of this material from the river is unlikely to result in any detrimental impacts in the River Thames system with the modelling showing very modest changes in excess suspended sediments. Therefore, the phytoplankton and macroalgae assemblage is unlikely to be affected and therefore the effects from this activity not significant at the waterbody scale. Construction of the Proposed Jetty and access routes and construction and operational dredging have the potential to disturb any macroalgae community present. However, the substrate within the area of the Proposed Jetty is primarily soft sediment and therefore sub optimal for the growth of most species of macroalgae. The operational presence of the Proposed Jetty has the potential to provide a substrate for colonisation by macroalgae and therefore increase the habitat available for the growth of macroalgae. However, it should be noted that macroalgae recorded within the Study Area is considered to be of low ecological value (as detailed within **Section 3.2**). The operation of the Proposed Scheme will involve the movement of large vessels on up to five occasions per week. Given that there are already large volumes of barge traffic within the River Thames each day and that the footprint of the Site is small in comparison with the Thames Middle Transitional Water Body, no significant operational impacts are expected. Construction and operational activities and their potential effects on phytoplankton and macroalgae are assessed in detail within **Chapter 8: Marine Biodiversity (Volume 1)**. With the implementation of the mitigation measures (as detailed in **Section 7**), no significant effect on phytoplankton or macroalgae is expected at the waterbody scale during the construction or operational phase.
Chemical/Physico-Chemical Quality Elements	
Turbidity	Construction of the Proposed Jetty, access routes and construction and operational dredging have the potential to
Water Temperature	

WFD Quality Elements	Potential Impacts Summary
Oxygenation Conditions **Nutrient Conditions** **Contaminant release from sediments**	increase suspended sediment concentration, mobilisation of sediment-bound contaminants and their subsequent deposition, due to the scale of dredging activities (up to 110,000m^3 for capital dredging), piling and demolition. These activities also have the potential of accidental release of contaminants due to potential fuel (or other chemical) releases; these should be mitigated through the implementation of the **Outline CoCP (Document Reference 7.4)** and subsequent full CoCP. However, it should be noted that the Study Area is a transitional estuarine environment where mobilisation and deposition of sediment occurs naturally. The Study Area is located within an area referred to as 'the Muddy Reaches' reflective of the presence of the waters from high levels of turbidity. As discussed in **Section 3.2** dredging activities (construction and operation phases) may result in additional contaminant loading for some priority substances which would negatively impact on the water quality due to contaminant release from historically contaminant impacted sediment during the capital dredge and maintenance dredges. These impacts are considered to be temporary and localised in the context of the wider water body and are unlikely to have a significant impact on the water body. However, this assessment is based upon surface grab samples only and further testing of sediments from the full depth of the proposed capital dredge area will be required to confirm the findings of this assessment. Additionally, sediment sampling (to be agreed with the MMO in consultation with CEFAS prior to commencement of works) will be undertaken in line with the controls in the Deemed Marine Licence. Should unacceptable impacts be determined following the sediment sampling then appropriate mitigations measures will be implemented in discussion with the Environment Agency. During the operation phase, there is the potential for an increase in boat movements associated with the Proposed Scheme. This would contribute to an increase in boat wash and turbulence within the River Thames that could result in disturbance of sediments. Given that there are already large volumes of barge traffic across the Thames each day and that the footprint of the Site is small in comparison with the

WFD Quality Elements	Potential Impacts Summary
	Thames Middle Transitional Water Body, no significant operational impacts are expected. Construction and operational activities are unlikely to have a significant impact upon the water temperature, nutrient conditions and oxygenation conditions of the waterbody overall.
Hydromorphological Quality Elements	
Depth Variation	The construction activities, primarily dredging down to -10.5m CD, could potentially release the contaminants located on the riverbed and alter the existing depth variation. Mitigation described in **Section 7** has been incorporated into the **Outline CoCP (Document Reference 7.4)** will render the release of contaminants as negligible. The scale of the works also renders potential alterations to the depth variation as negligible, as the footprint of the Proposed Scheme is far smaller than the Thames Middle Transitional Water Body. In addition, activities that cause fine sediment accumulation are common within this section of the water body both because of human intervention (e.g. navigation and physical constraints) and natural river processes typical of estuaries. Therefore, the construction phase is not anticipated to have a significant cumulative effect on river depth variation. The operation of the Proposed Scheme will involve the movement of large vessels on up to five occasions per week. Given that there are already large volumes of barge traffic within the River Thames each day and that the footprint of the Site is small in comparison with the Thames Middle Transitional Water Body, no significant operational impacts are expected.
Quality, Structure and Substrate of the bed	Construction activities could include the cutting/removal, where required, of the existing sheet piles at the downstream section of the Proposed Scheme, and the pouring of new concrete are construction activities that can release natural (e.g. sediments) and man-made particles (e.g. concrete) on to the riverbed, hence, altering the existing substrate characteristics. In addition, construction activities such as dredging that cause sediment accumulation in areas outside the dredging site are common within this section of the water body both

WFD Quality Elements	Potential Impacts Summary
	because of human intervention (e.g. navigation and physical constraints) and natural river processes typical of estuaries. Therefore, the construction phase is not anticipated to have a significant cumulative effect on the quality, structure, and substrate of the bed. The operation of the Proposed Scheme will involve the movement of large vessels on up to five occasions per week. Given that there are already large volumes of barge traffic within the River Thames each day and that the footprint of the Site is small in comparison with the Thames Middle Transitional Water Body, no operational impacts are expected.
Structure of the intertidal zone	The majority of the construction works are expected to take place in the subtidal zone due to the location of the Proposed Jetty. As such, associated construction works, including dredging, sheet piling and the pouring of new concrete to construct the retaining wall, which could release natural and man-made particles into the water body, are unlikely to impact the structure of the intertidal zone. Mitigation implemented included within the **Outline CoCP (Document Reference 7.4)**, for example a silt curtain and carrying out works at low tide, would render the release of particles from the riverbed to be negligible. The footprint of the Proposed Scheme is also significantly smaller than the Thames Middle Transitional Water Body that it lies within. Potential enhancements to the intertidal habitat are being explored and further information has been provided separately as part of the BNG assessment which can be found within **Appendix 7-1: Biodiversity Net Gain Report (Volume 3)**. In addition, construction activities such as dredging that cause sediment accumulation in areas outside the dredging site are common within this section of the water body both because of human intervention (e.g. navigation and physical constraints) and natural river processes typical of estuaries. Therefore, the construction phase is not anticipated to have a significant cumulative effect on the structure of the intertidal zone.

WFD Quality Elements	Potential Impacts Summary
	The operation of the Proposed Scheme will involve the movement of large vessels on up to five occasions per week. Given that there are already large volumes of barge traffic within the River Thames each day and that the footprint of the Site (and Proposed Jetty) is small in comparison with the Thames Middle Transitional Water Body, no operational impacts are expected. The Applicant is currently exploring the potential options of retention or demolition of the Belvedere Power Station Jetty (disused). If the Belvedere Power Station Jetty (disused) is retained (with modifications), it will result in an overall loss of subtidal and intertidal habitat. Whereas, if it is removed, it will result in a gain of intertidal habitat. As a result, the operation of the Proposed Jetty and retention of the Belvedere Power Station Jetty (disused) (with modifications), will lead to the loss of subtidal and intertidal habitat. This impact will be negligible on the hydromorphological status of waterbody.
Freshwater Zone	The Proposed Jetty is located approximately 45km downstream from the Teddington Weir, which is the tidal limit for the River Thames. It is therefore unlikely that the Proposed Scheme will impact the freshwater reaches of the River Thames due to the distance between the Site and the freshwater reaches upstream. Similarly, it is equally unlikely that the Proposed Scheme would affect any of the freshwater reaches of any of the smaller tributaries feeding into the River Thames. Therefore, the construction phase is not anticipated to have a significant cumulative effect on the structure of the freshwater zone.
Wave Exposure	It is understood that the primary source of wave exposure to the Proposed Scheme is likely to be generated by traffic, specifically boats, within the channel of the River Thames. The Proposed Scheme is not expected to significantly change wave exposure patterns caused by traffic as slow-moving barges are expected to be used during construction. Therefore, the construction phase is not anticipated to have a significant cumulative effect on the structure of the wave exposure. The operation of the Proposed Scheme will involve the movement of large vessels on up to five occasions per week.

WFD Quality Elements	Potential Impacts Summary
	Given that there are already large volumes of barge and large vessel traffic within the River Thames each day, no operational impacts are expected.

SCOPING SUMMARY

6.2.8. The summary of the WFD scoping stage is provided in **Table 6-7** below. Mitigation measures that will be adopted are listed in **Section 7** and secured by virtue of their inclusion in the **Outline CoCP (Document Reference 7.4),** the **Outline Drainage Strategy** and **Outline Lighting Strategy** (and the final versions of those documents needing to be in substantial accordance with those outlines, as secured by DCO Requirement), and/or the Deemed Marine Licence within the **Draft DCO (Document Reference 3.1)**.

Table 6-7: Scoping Summary against WFD Receptors

Receptor	Potential Risk to Receptor without Mitigation	Scoping Outcome Justification	Potential Risk to Receptor with Mitigation
Thames Middle Transitional Waterbody			
Biology Habitats	Yes	No significant water body scale impacts are anticipated, subject to the implementation of appropriate mitigation measures and controls as outlined in the **Outline CoCP (Document Reference 7.4)** and the Deemed Marine Licence in the **Draft DCO (Document Reference 3.1)** during the construction and operation phases. Impacts will be restricted to the immediate area around the Proposed Scheme.	No
Biology Fish	Yes	No significant water body scale impacts are anticipated, subject to the implementation of appropriate mitigation measures and controls as outlined in the **Outline CoCP (Document Reference 7.4)** and	No

Receptor	Potential Risk to Receptor without Mitigation	Scoping Outcome Justification	Potential Risk to Receptor with Mitigation
		the Deemed Marine Licence in the **Draft DCO (Document Reference 3.1)** during the construction and operation phases.	
Biology Benthic Invertebrates	Yes	No significant water body scale impacts are anticipated, subject to the implementation of appropriate mitigation measures and controls as outlined in the **Outline CoCP (Document Reference 7.4)** and the Deemed Marine Licence in the **Draft DCO (Document Reference 3.1)** during the construction and operation phases.	No
Biology Phytoplankton	No	No significant water body scale impacts are anticipated, with impacts restricted to the local scale around the Proposed Scheme. Implementation of appropriate mitigation measures and controls as outlined in the **Outline CoCP (Document Reference 7.4)** and the Deemed Marine Licence in the **Draft DCO (Document Reference 3.1)** during the construction and operation phases will minimise risk further.	No
Biology Macroalgae	No	No significant water body scale impacts are anticipated, with impacts restricted to the local scale around the Proposed Scheme. Implementation of appropriate mitigation measures and controls as outlined in the **Outline CoCP (Document Reference 7.4)** and the Deemed Marine Licence in the **Draft DCO (Document Reference**	No

Receptor	Potential Risk to Receptor without Mitigation	Scoping Outcome Justification	Potential Risk to Receptor with Mitigation
		3.1) during the construction and operation phases will minimise risk further.	
Hydromorphology	No	No significant water body scale impacts are anticipated, with impacts restricted to the local scale around the Proposed Scheme. Measures have been included within the **Outline CoCP (Document Reference 7.4)** to mitigate against hydromorphology impacts. Operational impacts are expected to have a negligible impact on hydromorphology due to the water body already experiencing large volumes of vehicle traffic.	No
Water Quality	Yes	No significant adverse effects are anticipated with respect to water quality within the Thames Middle Transitional Water Body during the construction and operational phases of the Proposed Scheme assuming that mitigation measures and controls as outlined in the **Outline CoCP (Document Reference 7.4)** and the Deemed Marine Licence in the **Draft DCO (Document Reference 3.1)** are implemented during the construction and operation phases.	No
Protected Areas	No	No impacts are anticipated on the protected areas at a waterbody scale.	No
Invasive Non-native Species	Yes	There is the potential for the introduction and increased spread	No

Receptor	Potential Risk to Receptor without Mitigation	Scoping Outcome Justification	Potential Risk to Receptor with Mitigation
		of INNS within the marine environment as a result of construction activities. These include: • the introduction of new vessels, equipment and infrastructure into the River Thames from other water bodies during construction and operation of the Proposed Jetty; • increased vessel movements during construction and operation of the Proposed Jetty and • creation of opportunities for organisms to settle or spread through habitat disturbance. Appropriate biosecurity measures will need to be incorporated to ensure the risk of introducing or spreading INNS is minimised. These measures are detailed in the **Outline CoCP (Document Reference 7.4)**.	

6.3. WFD COMPLIANCE

6.3.1. The WFD compliance assessment for the Proposed Scheme is summarised in **Table 6-8**. With the inclusion of the mitigation measures included in **Section 7**, the Proposed Scheme is assessed as being **WFD Compliant.**

Table 6-8: Compliance Assessment of the Proposed Scheme against WFD Status

Water Body ID	GB530603911402
Water body name	Thames Middle Transitional Water Body
Deterioration in the status/potential of the water body	**Biological:** The Proposed Scheme is not anticipated to cause any long lasting or widespread deterioration to the biological status of the water body on the assumption that the mitigation measures and controls as outlined in the **Outline CoCP (Document Reference 7.4)** and the conditions of the Deemed Marine Licence in the **Draft DCO (Document Reference 3.1)** are implemented during the construction and operation phases. **Physico-chemical:** The Proposed Scheme is not likely to cause a deterioration in the status/potential of the water body with respect to water quality during the construction and operation assuming that the mitigation measures and controls as outlined in the **Outline CoCP (Document Reference 7.4)** and the conditions of the Deemed Marine Licence in the **Draft DCO (Document Reference 3.1)** are implemented. **Hydromorphology:** The Proposed Scheme is not likely to cause a deterioration in the status/potential of the water body for hydromorphological elements, neither during the construction nor the operational phases if mitigation measures as outlined in the **Outline CoCP (Document Reference 7.4)** are implemented during the construction phase.
Ability of the water body to achieve Good Ecological Potential/Status	The Proposed Scheme is not likely to impact negatively on the ability of the water body to achieve Good Ecological Potential/Status with the implementation of mitigation measures through the

Water Body ID	GB530603911402
	construction and operation phases, as set out by the **Outline CoCP (Document Reference 7.4)** and **Mitigation Schedule (Document Reference 7.8)**. Full CoCP(s) and an Operational EMP will be prepared prior to the commencement of construction in substantial accordance with this outline and the Mitigation Schedule, which is secured through by a requirement in the **Draft DCO (Document Reference 3.1)**.
Impact on the WFD objectives of other water bodies within the same RBD	No other WFD water bodies are anticipated to be impacted by the Proposed Scheme.
Ability to contribute to the delivery of the WFD objectives	With appropriate mitigations measures in place, the Proposed Scheme will not cause deterioration in WFD objectives for the Thames Middle Transitional Water Body with the implementation of mitigation measures during the construction and operation phases, as set out by the **Outline CoCP (Document Reference 7.4)** and **Mitigation Schedule (Document Reference 7.8)**. Full CoCP(s) and an Operational EMP will be prepared prior to the commencement of construction in substantial accordance with this outline and the Mitigation Schedule, which is secured through by a requirement in the **Draft DCO (Document Reference 3.1)**.

7. WFD MITIGATION

7.1.1. The following section sets out the WFD mitigation measures that will be put in place during the construction and operation of the Proposed Scheme.

7.1.2. The high level WFD Mitigation Measures set out in the Thames RBMP[51] that are relevant to the Proposed Scheme are considered below. In addition, an analysis of the mitigation measures provided by the Environment Agency in the RBMP is also undertaken to ensure that the Proposed Scheme does not prevent the achievement of these mitigation measures and how the Proposed Scheme may contribute towards the achievement of these measures.

7.1.3. Proposed mitigation measures associated with the Proposed Scheme are summarised in the **Mitigation Schedule (Document Reference 7.8)**.

7.2. CONSTRUCTION PHASE

7.2.1. Sediment sampling at depth (to be agreed with the MMO in consultation with CEFAS prior to commencement of works) will be undertaken. Should unacceptable impacts be determined following sediment sampling then appropriate mitigations measures will be implemented in discussion with the Environment Agency. Information gathered through this sampling will inform subsequent additional mitigation if sediments are shown to be elevated in contaminant concentrations. Should contamination be identified which is considered to pose a risk to sensitive receptors then appropriate measures will be undertaken. Potential measures could include dredging for a reduced time period each day; use of a closed grab for dredging; dredging on a certain phase of the tide; and avoidance of very elevated levels at depth. A silt curtain will also be considered; however, it may be impractical in this location due to tidal flows. These measures would be confirmed pursuant to the discharge of conditions under the Deemed Marine Licence contained within the **Draft DCO (Document Reference 3.1)**.

7.2.2. Construction mitigation measures are outlined below and included within the **Outline CoCP (Document Reference 7.4)**.

General Mitigation

7.2.3. The following general mitigation is proposed:

- all operatives would be made aware of the legal obligation to protect the water bodies from contamination;
- best environmental practice outlined in Construction Industry Research and Information Association (CIRIA) guidance would be followed[52];
- all activities should be managed to prevent fine sediment from entering the water bodies. Construction activities involving working on tidal/intertidal zones, such as sheet pile installation construction, should, where practicable, occur during low

tide conditions to ensure that structures are constructed within a dry working environment;

- silt/sediment fences will be used to prevent fine sediment from reaching the water bodies, where practicable, taking account the high tidal current velocities in this part of the River Thames;
- construction activities will follow the Environment Agency's Approach to groundwater protection guidance[53] to avoid saline water spread in the aquifers;
- A surface water management plan would be prepared for the construction phase, to ensure that runoff (in terms of both quality and quantity) is appropriately managed, so it does not increase risk of pollution to the environment;
- chemicals and fuels must be stored in secure containers located away from water bodies;
- no refuelling of plant or machinery will take place near water bodies.
- pollution spill kits will be kept onsite and used in the event of an incident.
- bins will be provided onsite for debris;
- noise and vibration must be controlled and kept to the minimum necessary.
- lighting used for construction must be switched-off when not in use and, where possible, positioned so as not to spill onto watercourses;
- cleaning of tools and shuttering will be carried out in water not draining directly to the watercourse;
- soft start or non-percussive piling techniques will be used to minimise the disturbance and subsequently mobilisation of sediment within the watercourse during construction, as discussed in more detail below;
- dredging will be undertaken pursuant to the Deemed Marine Licence presented within in the **Draft DCO (Document Reference 3.1)**; and
- construction activities such as piling, and capital dredging should occur outside of migratory periods for sensitive fish species (April-September based upon the fact that the closest recorded spawning location for Smelt is in the vicinity of Wandsworth bridge, which is 30km upstream of the Site, and therefore the avoidance period does not need to extend into March)) as agreed with the Environment Agency. This is clearly stated in the **Outline CoCP (Document Reference 7.4)**.

Invasive Non-native Species (INNS)

7.2.1. Biosecurity measures will be implemented during the construction phase to prevent the spread of INNS.

7.2.2. Biosecurity is defined as a set of precautions that aim to minimise the risk of moving non-native species, parasites and diseases. Measures are likely to include:

- the briefing and training of workers on good biosecurity practices appropriate to their role;
- equipping workers with the necessary equipment, Personal Protective Equipment (PPE) and substances to implement biosecurity control measures, including effective hygiene and sanitation practices. This will most frequently comprise disinfectant tablets, sprayers and brushes to clean and disinfect equipment and PPE prior to leaving Site;
- where possible, workers should park vehicles on hard standing areas and check/clean tyres prior to leaving Site;
- dredged material should not be disposed of offsite without proper treatment as it provides a pathway for spreading marine INNS to other areas; and
- it is expected that construction vessels will follow standard procedures for managing INNS in their ballast water. As part of the full CoCP (to be developed based on the **Outline CoCP (Document Reference 7.4)**) a Biosecurity Management Plan will be developed and implemented with standard biosecurity measures, in line with best practice UK guidance. This will promote the effective cleaning of all marine equipment and infrastructure (if utilised in other water bodies), along with preventing the release of any subsequent waste arisings back into the marine environment. Relevant guidance such as the Check, Clean, Dry campaign led by the GB Non-native Species Secretariat will also be followed. Provision of local materials will be used where practicable, and materials should be appropriately treated to minimise the potential spread of INNS.

Habitats, Flora and Fauna

7.2.3. The following mitigation is proposed to protect habitats, flora and fauna:

- where possible, the indicative design of the Proposed Scheme has sought to reduce the footprint of land and river required to construct the development in order to reduce/avoid potential habitat loss wherever practicable. This includes the Proposed Jetty and capital dredge footprint;
- habitat enhancement opportunities will be sought during the detailed design stage to off-set potential impacts, as discussed in **Appendix 7-11: Biodiversity Net Gain Report (Volume 3)** and as described within **Chapter 8: Marine Biodiversity (Volume 1)**;
- consideration of the lighting design during construction and post-construction, avoiding use at night and directing away from water bodies;
- the Proposed Scheme will adhere to relevant Environmental Permits, best practice guidance and regulations, British Standards, and monitoring for the protection of marine biodiversity features and to ensure water quality impacts are minimised;
- works below the mean high-water springs (MHWS), such as construction of the Proposed Jetty and dredging activities, will be subject to a Deemed Marine License;

- an **Outline CoCP (Document Reference 7.4)** has been developed to reduce impacts upon the marine environment. This states that where practicable, lighting should be positioned carefully, and measures implemented to minimise light spillage into the marine environment. This includes using lights with high directionality and employing controls to reduce light levels when not required (unless for safety and navigation); and to determine suitable light intensity (minimum requirements for a given task and selection of those with low intensity) and tailorable spectrum. Screening may also be required in the intertidal areas. The lighting on the Proposed Jetty will be controlled using a combination of photocell and hard wired/switched lighting from the control room which will assist in reducing night time light pollution;
- sediment within the capital dredged area (including to dredge depth of approximately 10.5m below chart datum) should be collected and analysed for sediment bound contaminants in order to determine the most appropriate method of disposal of dredged material in discussion with the MMO and CEFAS, pursuant to the Deemed Marine Licence within the **Draft DCO (Document Reference 3.1)**. Furthermore, it will inform subsequent additional mitigation if sediments are shown to be elevated in contaminant concentrations;
- where practicable, low noise piling techniques (for example pile press in technology) or vibro piling will be used to minimise the impact on fish and marine mammals. If this is not feasible, then works will need to avoid the main migratory period for sensitive fish species, being April to September inclusive (see **Section 7.2**);
- construction vessel speeds will be moderated by following standard operating procedures. Where practicable, there will be an implementation of reduced vessel speeds (3 knots) in proximity of piers to reduce the potential for vessel strike with marine mammals and fish and to reduce the risk of any potential damage to intertidal habitats from wave wash; and
- demolition of the existing Belvedere Power Station Jetty (disused) (if progressed) and excavation activities in the intertidal zone should, where practicable, occur during low tide to minimise the dispersion of suspended sediment.

7.3. OPERATION PHASE

7.3.1. Operation mitigation measures are outlined below and included within the **Mitigation Schedule (Document Reference 7.8)**.

Managing INNS

7.3.2. It is expected that vessels will follow standard procedures for managing INNS in their ballast water. A Biosecurity Management Plan will be developed as part of the **Operational Environmental Management Plan (Operational EMP)** (which will be prepared prior to the Proposed Scheme commencing operation and will include the measures set out in the **Mitigation Schedule (Document Reference 7.8)**) and

implemented with standard biosecurity measures, in line with best practice UK guidance. This will promote the effective cleaning of all marine equipment and infrastructure (if, utilised in other water bodies), along with preventing the release of any subsequent waste arisings back into the marine environment. Relevant guidance such as the Check, Clean, Dry campaign led by the GB Non-native Species Secretariat will also be followed.

Managing Lighting

7.3.3. An **Outline Lighting Strategy (Document Reference 7.3)** has been developed to reduce impacts upon the marine environment. The **Outline Lighting Strategy (Document Reference 7.3)** includes elements such as: where practicable, lighting should be positioned carefully, and measures implemented to minimise light spillage into the marine environment. This includes using lights with high directionality and employing controls to reduce light levels when not required (unless for safety and navigation); and to determine suitable light intensity (minimum requirements for a given task and selection of those with low intensity) and tailorable spectrum. Screening may also be required in the intertidal areas. The lighting on the Proposed Jetty will be controlled using a combination of photocell and hard wired/switched lighting from the control room which will assist in reducing night time light pollution. This document will be developed into a full Lighting Strategy, pursuant to DCO requirement.

Managing Noise and Vibration Disturbance

7.3.4. Operation activities such as maintenance dredging should occur outside of sensitive periods for sensitive fish species identified within this assessment. The most appropriate timing will be agreed pursuant to the Deemed Marine Licence in the **Draft DCO (Document Reference 3.1)**.

Managing Vessel Speeds

7.3.5. Vessel speeds will be moderated by following standard operating procedures as set out in the **Appendix 19-1 Preliminary Navigation Risk Assessment (Volume 3)**.

Managing Changes to Water Quality

7.3.6. Accidental fuel leaks from vessels will be managed through the Operational EMP, which must be prepared for approval prior to commencement of construction of the Proposed Scheme.

7.3.7. All vessels will act in accordance with their own management/accident plans, as well as those of the Port of London Authority, thus limiting the potential for accidental fuel leaks.

7.3.8. Robust measures and equipment for dealing with any unexpected pollution events will be in place at all times.

7.3.9. Measures for managing water quality will be undertaken pursuant to approvals given under the Deemed Marine License included as part of the **Draft DCO (Document Reference 3.1)**.

Managing Habitat Loss

7.3.10. Where possible, the indicative design of the Proposed Scheme has sought to reduce the footprint of land and river required to construct the development in order to reduce/avoid potential habitat loss wherever practicable. This includes the Proposed Jetty and operational dredge footprint. Potential enhancements to the intertidal habitat are being explored, with the approach described in **Appendix 7-11: Biodiversity Net Gain Report (Volume 3)** and as described within **Chapter 8: Marine Biodiversity (Volume 1)**.

7.3.11. To reduce the requirement for dredging within the intertidal zone, a sheet pile wall will be installed at bed level to prevent potential erosion of intertidal sediment and reduce the size of the dredge pocket required.

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Annex A

WFD STUDY AREA

N

Great Breach Outfall

Great Breach Pumping Station

Green Level Outfall

Green Level Pumping Station

Barking Riverside

Thamesmead

Lower Belvedere

Upper Belvedere

Lessness Heath

Lesnes Abbey

Abbey Wood

Bostall Heath

South Hornchurch

Dagenham Dock

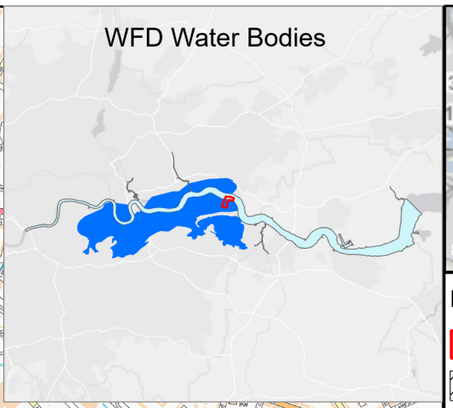
Rainham Creek

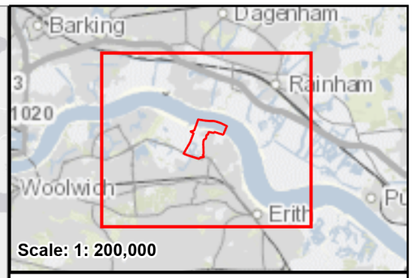
Colchharbour

0 250 500 1,000

Metres

WFD Water Bodies





Legend

- Site Boundary
- WFD Study Area
- Outfall
- Pumping Stations
- Wetland
- Pond
- Thames Middle WFD Water Body
- Greenwich Tertiaries and Chalk Water Body WFD Groundwater Body

REVISION	DRAWN	CHECKED	APPROVED	DATE
P01	NK	JF	SH	06/03/2024

DESCRIPTION: FINAL

PROJECT TITLE:

CORY DECARBONISATION PROJECT

DRAWING TITLE:

FIGURE 2:
WFD STUDY AREA

CONFIDENTIALITY: PUBLIC

DRAWN:	CHECKED:	APPROVED:	AUTHORISED:
NK	JF	SH	JW

SCALE @ A3 SIZE:	DATE:	REVISION:
1:20,000	06/03/2024	P01

DRAWING NUMBER:

70090329-WSP-00-XX-RP-EP-02-P01-S0

Annex B

INTERTIDAL AND SUBTIDAL BENTHIC SAMPLING

Station	No. of taxa (per m^2)	No. of individuals (per m^2)	Key Characterising Species (Number per m^2 shown in brackets, 'P' indicates presence of taxa)
Intertidal 1	8	417	*Baltidrilus costatus* (327) *Copepoda* (1) *Corophium volutator* (9) *Hediste diversicolor* (64) *Manayunkia aestuarina* (1) *Peringia ulvae* (1) *Streblospio* (10) *Tubificoides pseudogaster* (4)
Intertidal 2	8	1,128	*Baltidrilus costatus* (552) *Copepoda* (1) *Corophium volutator* (69) *Hediste diversicolor* (299) *Manayunkia aestuarina* (50) *Streblospio* (149) *Truncatelloidea* (1) *Tubificoides pseudogaster agg*. (7)
Intertidal 3	6	1,951	*Baltidrilus costatus* (1316) *Corophium volutator* (87) *Hediste diversicolor* (502) *Manayunkia aestuarina* (10) *Streblospio* (19) *Tubificoides heterochaetus* (17)

Station	No. of taxa (per m^2)	No. of individuals (per m^2)	Key Characterising Species (Number per m^2 shown in brackets, 'P' indicates presence of taxa)
Intertidal 4	11	955	*Amphipoda* (1) *Baltidrilus costatus* (203) *Copepoda* (1) *Corophiidae* (13) *Corophium volutator* (112) *Cyathura carinata* (4) *Hediste diversicolor* (490) *Manayunkia aestuarina* (91) *Nereididae* (10) *Streblospio* (25) *Tubificoides heterochaetus* (5)
Intertidal 5	8	1039	*Baltidrilus costatus* (515) *Corophium volutator* (111) *Cyathura carinata* (2) *Hediste diversicolor* (332) *Manayunkia aestuarina* (19) *Nereididae* (8) *Streblospio* (51) *Tubificoides heterochaetus* (1)
Intertidal 6	9	925	*Baltidrilus costatus* (93) *Corophium* (14) *Corophium volutator* (472)

Station	No. of taxa (per m^2)	No. of individuals (per m^2)	Key Characterising Species (Number per m^2 shown in brackets, 'P' indicates presence of taxa)
			Cyathura carinata (1) *Enchytraeidae* (4) *Hediste diversicolor* (326) *Manayunkia aestuarina* (5) *Scrobicularia plana* (1) *Streblospio* (9)
Subtidal 7	2	90	*Cyathura carinata* (20) *Peringia ulvae* (70)
Subtidal 8	3	40	*Tubificoides pseudogaster agg.* (20) *Corophiidae* (10) *Cyathura carinata* (10)
Subtidal 9	3	40	*Steblospio* (20) *Gammarus* (20) *Araceae* (P)
Subtidal 10	8	680	*Enchytraeidae* (30) *Tubificoides pseudogaster agg.* (130) *Maranzelleria* (10) *Steblospio* (490) *Gammarus* (10) *Peringia ulvae* (10) *Einhornia crustulenta* (P) *Araceae* (P)

Station	No. of taxa (per m^2)	No. of individuals (per m^2)	Key Characterising Species (Number per m^2 shown in brackets, 'P' indicates presence of taxa)
Subtidal 11	7	340	*Enchytraeidae* (10) *Baltidrilus costatus* (10) *Tubificoides pseudogaster agg.* (140) *Hediste diversicolor* (10) *Steblospio* (120) *Gammarus* (40) *Corophiidae* (10)
Subtidal 12	10	1,040	*Enchytraeidae* (10) *Tubificoides pseudogaster agg.* (350) *Hediste diversicolor* (20) *Polydorini* (10) *Marenzelleria* (30) *Steblospio* (590) *Cyathura carinata* (10) *Gastropoda* (10) *Peringia ulvae* (10) *Araceae* (P)
Subtidal 13	9	800	*Hediste diversicolor (10)* *Polydorini (50)* *Polydora cornuta (20)* *Streblospio (340)* *Apocorophium lacustre (140)*

Station	No. of taxa (per m^2)	No. of individuals (per m^2)	Key Characterising Species (Number per m^2 shown in brackets, 'P' indicates presence of taxa)
			Corophium (60) *Corophium volutator (30)* *Cyathura carinata (150)* *Einhornia crustulenta (P)*
Subtidal 14	7	200	*Anthoathecata (P)* *Campanulariidae (P)* *Balanus crenatus (70)* *Incisocalliope aestuarius (90)* *Corophiidae (20)* *Cyathura carinata (P)* *Idotea (20)*
Subtidal 15	11	330	*Anthoathecata (P)* *Campanulariidae (P)* *Marenzelleria (10)* *Polydora (10)* *Steblospio (200)* *Thoracica (20)* *Incisocalliope aestuarius (30)* *Idotea (50)* *Neomysis integer (10)* *Einhornia crustulenta (P)* *Aracea (P)*

Annex C

CORY CCUS SEDIMENTS - CEFAS SCREEN

Annex C - Cory Decarbonisation Project - Sediment Results - CEFAS Screen

Determinand	AL1 (mg/kg)	AL2 (mg/kg)	S13	S14	S15	Subtidal 7	Subtidal 8	Subtidal 9	Subtidal 10	Subtidal 11	Subtidal 12	Intertidal 1	Intertidal 2	Intertidal 3	Intertidal 4	Intertidal 5	Intertidal 6
Arsenic (As)	**20**	**100**	33.7	11.6	9.9	7.40	12.0	7.50	8.40	6.60	6.00	10	11.3	11	9	11.4	7.7
Cadmium (Cd)	**0.4**	**5**	0.32	0.50	0.15	0.28	0.36	0.23	0.26	0.20	0.32	0.3	0.3	0.29	0.23	0.3	0.2
Chromium (Cr)	**40**	**400**	69.2	32.8	19.6	19.6	44.9	19.2	19.9	15.6	12.6	32.1	33.7	35.5	29.9	38.7	22.1
Copper (Cu)	**40**	**400**	78.6	28.0	11.8	27.8	45.6	23.9	25.8	20.1	20.6	31.7	31.4	32.6	27.1	33.6	21.1
Mercury (Hg)	**0.3**	**3**	4.71	0.10	0.18	0.44	0.53	0.36	0.43	0.28	0.40	0.35	0.39	0.37	0.33	0.4	0.25
Nickel (Ni)	**20**	**200**	21.5	49.5	14.2	10.5	25.1	10.7	12.0	10.4	6.70	19	20.6	21.2	17	22.8	14
Lead (Pb)	**50**	**500**	320	17.4	35.7	60.1	72.1	49.7	64.5	37.0	46.3	54.8	59.4	58.5	56.7	62.7	38.5
Zinc (Zn)	**130**	**800**	216	86.4	63.0	75.4	145	81.4	78.2	61.2	53.0	121	133	135	108	142	87.6
Dibutyltin (DBT)	**0.1**	**1**	<0.005	<0.005	<0.005	<0.005	<0.005	0.010	0.012	0.031	0.012	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD
Tributyltin (TBT)	**0.1**	**1**	<0.005	<0.005	<0.005	<0.005	<0.005	0.059	0.014	0.072	<0.005	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD
Acenaphthene	**0.1**		0.425	0.125	0.0095	0.0964	0.0452	0.0449	0.131	0.225	0.0239	0.102	0.0535	0.033	0.0251	0.0291	0.0163
Acenaphthylene	**0.1**		0.21	0.0244	0.019	0.0659	0.0614	0.0407	0.129	0.133	0.0301	0.142	0.0971	0.0767	0.0678	0.0797	0.0486
Anthracene	**0.1**		1.16	0.116	0.0233	0.233	0.0973	0.096	0.302	0.444	0.0614	0.195	0.138	0.0906	0.0692	0.0757	0.0532
Benz(a)anthracene	**0.1**		3.35	0.408	0.0654	0.594	0.302	0.275	0.983	1.06	0.149	0.685	0.433	0.287	0.208	0.235	0.199
Benzo(a)pyrene	**0.1**		3.99	0.494	0.113	0.73	0.484	0.296	1.08	1.17	0.222	1.08	0.673	0.515	0.386	0.453	0.335
Benzo(b)fluoranthene	**0.1**		3.24	0.387	0.104	0.596	0.454	0.272	0.896	0.906	0.204	0.969	0.6	0.481	0.374	0.42	0.307
Benzo(g,h,i)perylene	**0.1**		2.23	0.26	0.0948	0.445	0.41	0.207	0.635	0.674	0.166	0.874	0.545	0.45	0.348	0.417	0.28
Benzo(e)pyrene	**0.1**		2.27	0.28	0.0812	0.421	0.332	0.186	0.594	0.659	0.139	0.69	0.426	0.345	0.261	0.304	0.218
Benzo(k)fluoranthene	**0.1**		3.05	0.361	0.101	0.588	0.424	0.259	0.876	0.848	0.189	0.88	0.552	0.441	0.348	0.403	0.284
C1-Naphthalenes	**0.1**		0.384	0.0177	0.0477	0.0772	0.0953	0.093	0.392	1.21	0.0429	0.219	0.104	0.0915	0.0698	0.0908	0.0575
C1-Phenanthrenes	**0.1**		1.39	0.251	0.0661	0.331	0.166	0.176	0.577	2.65	0.0798	0.384	0.243	0.149	0.103	0.131	0.0917
C2-Naphthalenes	**0.1**		0.393	0.0369	0.0558	0.0817	0.0913	0.0804	0.331	1.17	0.0491	0.216	0.122	0.102	0.0787	0.0884	0.0565
C3-Naphthalenes	**0.1**		0.377	0.0655	0.0499	0.0968	0.0899	0.0838	0.306	1.06	0.0381	0.194	0.0984	0.0924	0.0671	0.0811	0.0498
Chrysene	**0.1**		3.55	0.416	0.0798	0.635	0.356	0.285	0.923	1.14	0.177	0.78	0.467	0.352	0.235	0.277	0.22
Dibenz(a,h)anthracene	**0.1**		0.575	0.0701	0.0179	0.103	0.0809	0.0468	0.165	0.153	0.0371	0.173	0.111	0.0893	0.0683	0.078	0.0557
Fluoranthene	**0.1**		7.66	0.955	0.119	1.38	0.639	0.837	1.62	1.96	0.301	1.34	0.871	0.544	0.405	0.446	0.352
Fluorene	**0.1**		0.511	0.112	0.0124	0.104	0.0498	0.038	0.144	0.297	0.0303	0.121	0.078	0.0445	0.0314	0.0404	0.0269
Indeno(123-c,d)pyrene	**0.1**		2.33	0.286	0.0996	0.515	0.454	0.253	0.791	0.772	0.203	1.05	0.643	0.524	0.408	0.487	0.328
Naphthalene	**0.1**		0.365	0.0156	0.0193	0.0633	0.0493	0.0509	0.302	0.244	0.0357	0.145	0.0792	0.0705	0.0486	0.0553	0.0418
Perylene	**0.1**		0.926	0.106	0.157	0.167	0.164	0.0844	0.248	0.254	0.0901	0.316	0.205	0.176	0.141	0.156	0.108
Phenanthrene	**0.1**		2.79	0.695	0.0625	0.771	0.255	0.21	0.649	1.92	0.14	0.698	0.45	0.219	0.149	0.179	0.141
Pyrene	**0.1**		5.66	0.75	0.113	1.09	0.593	0.594	1.3	1.72	0.255	1.19	0.766	0.505	0.363	0.416	0.317
Total Hydrocarbon Content	**0.1**		0.482	0.00678	0.0172	0.462	0.0305	0.156	0.643	0.458	0.147	0.195	0.0969	0.169	0.0224	0.198	0.153
PCB 101			<0.00008	<0.00008	0.00019	0.00042	0.00108	0.00075	0.00063	0.00083	0.00013	0.00059	0.00059	0.00062	0.00053	0.00059	0.00035
PCB 105			<0.00008	<0.00008	0.00009	0.00014	0.00017	0.00016	0.00026	0.00029	<0.00008	0.00022	0.00019	0.00026	0.00022	0.00019	0.00015
PCB 110			0.00011	0.00009	0.00033	0.00059	0.00164	0.00087	0.00085	0.00120	0.00018	0.00078	0.0009	0.00083	0.00084	0.00093	0.00051
PCB 118			<0.00008	<0.00008	0.00024	0.00030	0.00070	0.00066	0.00075	0.00097	0.00011	0.0005	0.00047	0.00041	0.00048	0.0005	0.00029
PCB 128			<0.00008	<0.00008	0.00010	0.00010	0.00023	0.00029	0.00016	0.00008	<0.00008	0.00016	0.00023	0.00022	0.00026	0.00026	0.00012
PCB 138			0.00009	0.00009	0.00040	0.00043	0.00119	0.00173	0.00080	0.00044	0.00017	0.00068	0.00078	0.00126	0.00083	0.00123	0.00087
PCB 141			<0.00008	<0.00008	<0.00008	<0.00008	<0.00008	0.00052	0.00008	0.00012	<0.00008	0.00008	0.00013	0.00016	0.00009	0.00011	<LOD
PCB 149			0.00009	<0.00008	0.00027	0.00035	0.00128	0.00167	0.00066	0.00060	0.00018	0.00063	0.00068	0.00056	0.00057	0.00065	0.00045
PCB 151			<0.00008	<0.00008	<0.00008	0.00016	0.00036	0.00057	0.00018	0.00016	<0.00008	0.00015	0.0001	0.00018	0.0002	0.00024	0.00013
PCB 153			0.00012	<0.00008	0.00031	0.00055	0.00233	0.00211	0.00091	0.00076	0.00025	0.00101	0.00124	0.00112	0.00099	0.00104	0.00055
PCB 156			<0.00008	<0.00008	<0.00008	<0.00008	0.00010	0.00020	0.00012	0.00009	<0.00008	0.00009	0.00014	0.00011	0.00009	0.00011	<LOD
PCB 158			<0.00008	<0.00008	<0.00008	<0.00008	0.00016	0.00031	0.00015	<0.00008	<0.00008	0.00017	0.00018	0.00009	0.00015	0.0002	0.0001
PCB 170			<0.00008	<0.00008	0.00010	0.00017	0.00040	0.00104	0.00017	0.00016	<0.00008	0.00018	0.00028	0.00023	0.00022	0.00023	<LOD
PCB 18			<0.00008	<0.00008	<0.00008	0.00024	0.00021	0.00014	0.00033	0.00024	<0.00008	0.00016	0.00016	0.00018	0.00011	0.00017	<LOD
PCB 180			<0.00008	<0.00008	0.00014	0.00033	0.00093	0.00205	0.00037	0.00038	0.00013	0.00053	0.00058	0.00063	0.00066	0.00062	0.00035
PCB 183			<0.00008	<0.00008	<0.00008	0.00008	0.00022	0.00034	0.00009	0.00013	<0.00008	0.00014	0.00013	<LOD	0.00015	0.00013	<LOD
PCB 187			<0.00008	<0.00008	0.00011	0.00020	0.00065	0.00090	0.00024	0.00022	0.00015	0.00031	0.00039	0.00044	0.00031	0.00034	0.00021
PCB 194			<0.00008	<0.00008	<0.00008	0.00009	0.00035	0.00031	<0.00008	0.00014	<0.00008	0.00013	0.00013	0.00015	0.00017	0.00018	0.0001

Determinand	AL1 (mg/kg)	AL2 (mg/kg)	S13	S14	S15	Subtidal 7	Subtidal 8	Subtidal 9	Subtidal 10	Subtidal 11	Subtidal 12	Intertidal 1	Intertidal 2	Intertidal 3	Intertidal 4	Intertidal 5	Intertidal 6
PCB 28			<0.00008	<0.00008	0.00014	0.00050	0.00064	0.00037	0.00083	0.00058	0.00012	0.00041	0.00041	0.00048	0.00034	0.00044	0.00025
PCB 31			<0.00008	<0.00008	0.00009	0.00042	0.00049	0.00027	0.00073	0.00049	0.00009	0.00031	0.00028	0.00033	0.00024	0.00031	0.00014
PCB 44			<0.00008	<0.00008	<0.00008	0.00039	0.00069	0.00031	0.00056	0.00048	0.00011	0.00031	0.00026	0.00035	0.00027	0.00035	0.00014
PCB 47			<0.00008	<0.00008	<0.00008	0.00016	0.00045	0.00013	0.00025	0.00018	<0.00008	0.00015	0.00012	0.00018	0.00011	0.00015	<LOD
PCB 49			<0.00008	<0.00008	0.00009	0.00043	0.00091	0.00031	0.00057	0.00046	0.00009	0.00031	0.00026	0.00037	0.00024	0.00034	0.00018
PCB 52			<0.00008	<0.00008	0.00014	0.00060	0.00129	0.00049	0.00087	0.00089	0.00016	0.00046	0.00046	0.0005	0.00039	0.00052	0.00026
PCB 66			<0.00008	<0.00008	0.00012	0.00062	0.00120	0.00050	0.00081	0.00071	0.00011	0.00056	0.00048	0.00062	0.00043	0.00059	0.00022
Sum of PCBs (25 congeners)	**0.02**	**0.2**	0.00041	0.00018	0.00286	0.00727	0.01767	0.01700	0.01137	0.01060	0.00198	0.00902	0.00957	0.01028	0.00889	0.01042	0.00537
AHCH			<0.0001	<0.0001	<0.0001		<0.0001	<0.0001	<0.0001		<0.0001						
BHCH			<0.0001	<0.0001	<0.0001		<0.0001	<0.0001	<0.0001		<0.0001						
GHCH			<0.0001	<0.0001	<0.0001		<0.0001	<0.0001	<0.0001		<0.0001						
DIELDRIN	**0.001**		<0.0001	<0.0001	0.0002		<0.0001	0.0003	0.0002		<0.0001						
HCB			<0.0001	<0.0001	<0.0001		<0.0001	<0.0001	<0.0001		<0.0001						
PPTDE			<0.0001	<0.0001	0.0001		0.0009	0.0005	0.0016		<0.0001						
PPDDE			<0.0001	<0.0001	0.0002		0.0014	0.0004	0.0006		<0.0001						
PPDDT	**0.001**		<0.0001	0.0006	<0.0001		0.0004	0.0002	<0.0001		0.0018						
BDE17			<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005						
BDE28			<0.00005	<0.00005	<0.00005	<0.00005	0.000127	<0.00005	<0.00005	<0.00005	<0.00005						
BDE47			<0.00005	<0.00005	0.00008	0.00006	0.00042	0.00011	0.00015	0.00008	<0.00005						
BDE66			<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005						
BDE85			<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005						
BDE99			<0.00005	<0.00005	0.00007	<0.00005	0.00015	<0.00005	<0.00005	<0.00005	<0.00005						
BDE100			<0.00005	<0.00005	<0.00005	<0.00005	0.00007	<0.00005	<0.00005	<0.00005	<0.00005						
BDE138			<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005						
BDE153			<0.00005	<0.00005	<0.00005	<0.00005	0.00007	<0.00005	<0.00005	<0.00005	<0.00005						
BDE154			<0.00005	<0.00005	<0.00005	<0.00005	0.000124	<0.00005	<0.00005	<0.00005	<0.00005						
BDE183			<0.00005	<0.00005	<0.00005	<0.00005	0.000281	<0.00005	<0.00005	<0.00005	<0.00005						
BDE209			0.0023	0.0004	0.0282	0.013	0.158	0.032	0.033	0.004	0.013						

=Results in excess of Action Level 1
=Results in excess of Action Level 2

Annex D

CORY CCUS SEDIMENTS - CANADIAN STANDARDS

Annex D - Cory Decarbonisation Project - Sediment Results - Canadian Sediment Guideline Screen

Determinand	ISQG/TEL (mg/kg)	PEL (mg/kg)	S13	S14	S15	Subtidal 7	Subtidal 8	Subtidal 9	Subtidal 10	Subtidal 11	Subtidal 12	Intertidal 1	Intertidal 2	Intertidal 3	Intertidal 4	Intertidal 5	Intertidal 6
Arsenic (As)	**7.24**	**41.6**	33.7	11.6	9.9	7.40	12.0	7.50	8.40	6.60	6.00	10	11.3	11	9	11.4	7.7
Cadmium (Cd)	**0.7**	**4.2**	0.32	0.50	0.15	0.28	0.36	0.23	0.26	0.20	0.32	0.3	0.3	0.29	0.23	0.3	0.2
Chromium (Cr)	**52.3**	**160**	69.2	32.8	19.6	19.6	44.9	19.2	19.9	15.6	12.6	32.1	33.7	35.5	29.9	38.7	22.1
Copper (Cu)	**18.7**	**108**	78.6	28.0	11.8	27.8	45.6	23.9	25.8	20.1	20.6	31.7	31.4	32.6	27.1	33.6	21.1
Mercury (Hg)	**0.13**	**0.7**	4.71	0.10	0.18	0.44	0.53	0.36	0.43	0.28	0.40	0.35	0.39	0.37	0.33	0.4	0.25
Nickel (Ni)			21.5	49.5	14.2	10.5	25.1	10.7	12.0	10.4	6.70	19	20.6	21.2	17	22.8	14
Lead (Pb)	**30.2**	**112**	320	17.4	35.7	60.1	72.1	49.7	64.5	37.0	46.3	54.8	59.4	58.5	56.7	62.7	38.5
Zinc (Zn)	**124**	**271**	216	86.4	63.0	75.4	145	81.4	78.2	61.2	53.0	121	133	135	108	142	87.6
Dibutyltin (DBT)			<0.005	<0.005	<0.005	<0.005	<0.005	0.010	0.012	0.031	0.012	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD
Tributyltin (TBT)			<0.005	<0.005	<0.005	<0.005	<0.005	0.059	0.014	0.072	<0.005	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD
Acenaphthene	**0.00671**	**0.0889**	0.425	0.125	0.0095	0.0964	0.0452	0.0449	0.131	0.225	0.0239	0.102	0.0535	0.033	0.0251	0.0291	0.0163
Acenaphthylene	**0.00587**	**0.128**	0.21	0.0244	0.019	0.0659	0.0614	0.0407	0.129	0.133	0.0301	0.142	0.0971	0.0767	0.0678	0.0797	0.0486
Anthracene	**0.0469**	**0.245**	1.16	0.116	0.0233	0.233	0.0973	0.096	0.302	0.444	0.0614	0.195	0.138	0.0906	0.0692	0.0757	0.0532
Benz(a)anthracene	**0.0748**	**0.693**	3.35	0.408	0.0654	0.594	0.302	0.275	0.983	1.06	0.149	0.685	0.433	0.287	0.208	0.235	0.199
Benzo(a)pyrene	**0.0888**	**0.763**	3.99	0.494	0.113	0.73	0.484	0.296	1.08	1.17	0.222	1.08	0.673	0.515	0.386	0.453	0.335
Benzo(b)fluoranthene			3.24	0.387	0.104	0.596	0.454	0.272	0.896	0.906	0.204	0.969	0.6	0.481	0.374	0.42	0.307
Benzo(g,h,i)perylene			2.23	0.26	0.0948	0.445	0.41	0.207	0.635	0.674	0.166	0.874	0.545	0.45	0.348	0.417	0.28
Benzo(e)pyrene			2.27	0.28	0.0812	0.421	0.332	0.186	0.594	0.659	0.139	0.69	0.426	0.345	0.261	0.304	0.218
Benzo(k)fluoranthene			3.05	0.361	0.101	0.588	0.424	0.259	0.876	0.848	0.189	0.88	0.552	0.441	0.348	0.403	0.284
C1-Naphthalenes			0.384	0.0177	0.0477	0.0772	0.0953	0.093	0.392	1.21	0.0429	0.219	0.104	0.0915	0.0698	0.0908	0.0575
C1-Phenanthrenes			1.39	0.251	0.0661	0.331	0.166	0.176	0.577	2.65	0.0798	0.384	0.243	0.149	0.103	0.131	0.0917
C2-Naphthalenes			0.393	0.0369	0.0558	0.0817	0.0913	0.0804	0.331	1.17	0.0491	0.216	0.122	0.102	0.0787	0.0884	0.0565
C3-Naphthalenes			0.377	0.0655	0.0499	0.0968	0.0899	0.0838	0.306	1.06	0.0381	0.194	0.0984	0.0924	0.0671	0.0811	0.0498
Chrysene	**0.108**	**0.846**	3.55	0.416	0.0798	0.635	0.356	0.285	0.923	1.14	0.177	0.78	0.467	0.352	0.235	0.277	0.22
Dibenz(a,h)anthracene	**0.00622**	**0.135**	0.575	0.0701	0.0179	0.103	0.0809	0.0468	0.165	0.153	0.0371	0.173	0.111	0.0893	0.0683	0.078	0.0557
Fluoranthene	**0.113**	**1.494**	7.66	0.955	0.119	1.38	0.639	0.837	1.62	1.96	0.301	1.34	0.871	0.544	0.405	0.446	0.352
Fluorene	**0.0212**	**0.144**	0.511	0.112	0.0124	0.104	0.0498	0.038	0.144	0.297	0.0303	0.121	0.078	0.0445	0.0314	0.0404	0.0269
Indeno(123-c,d)pyrene			2.33	0.286	0.0996	0.515	0.454	0.253	0.791	0.772	0.203	1.05	0.643	0.524	0.408	0.487	0.328
Naphthalene	**0.0346**	**0.391**	0.365	0.0156	0.0193	0.0633	0.0493	0.0509	0.302	0.244	0.0357	0.145	0.0792	0.0705	0.0486	0.0553	0.0418
Perylene			0.926	0.106	0.157	0.167	0.164	0.0844	0.248	0.254	0.0901	0.316	0.205	0.176	0.141	0.156	0.108
Phenanthrene	**0.0867**	**0.544**	2.79	0.695	0.0625	0.771	0.255	0.21	0.649	1.92	0.14	0.698	0.45	0.219	0.149	0.179	0.141
Pyrene	**0.153**	**1.398**	5.66	0.75	0.113	1.09	0.593	0.594	1.3	1.72	0.255	1.19	0.766	0.505	0.363	0.416	0.317
Total Hydrocarbon Content			0.482	0.00678	0.0172	0.462	0.0305	0.156	0.643	0.458	0.147	0.195	0.0969	0.169	0.0224	0.198	0.153
PCB 101			<0.00008	<0.00008	0.00019	0.00042	0.00108	0.00075	0.00063	0.00083	0.00013	0.00059	0.00059	0.00062	0.00053	0.00059	0.00035
PCB 105			<0.00008	<0.00008	0.00009	0.00014	0.00017	0.00016	0.00026	0.00029	<0.00008	0.00022	0.00019	0.00026	0.00022	0.00019	0.00015
PCB 110			0.00011	0.00009	0.00033	0.00059	0.00164	0.00087	0.00085	0.00120	0.00018	0.00078	0.0009	0.00083	0.00084	0.00093	0.00051
PCB 118			<0.00008	<0.00008	0.00024	0.00030	0.00070	0.00066	0.00075	0.00097	0.00011	0.0005	0.00047	0.00041	0.00048	0.0005	0.00029
PCB 128			<0.00008	<0.00008	0.00010	0.00010	0.00023	0.00029	0.00016	0.00008	<0.00008	0.00016	0.00023	0.00022	0.00026	0.00026	0.00012
PCB 138			0.00009	0.00009	0.00040	0.00043	0.00119	0.00173	0.00080	0.00044	0.00017	0.00068	0.00078	0.00126	0.00083	0.00123	0.00087
PCB 141			<0.00008	<0.00008	<0.00008	<0.00008	<0.00008	0.00052	0.00008	0.00012	<0.00008	0.00008	0.00013	0.00016	0.00009	0.00011	<LOD
PCB 149			0.00009	<0.00008	0.00027	0.00035	0.00128	0.00167	0.00066	0.00060	0.00018	0.00063	0.00068	0.00056	0.00057	0.00065	0.00045
PCB 151			<0.00008	<0.00008	<0.00008	0.00016	0.00036	0.00057	0.00018	0.00016	<0.00008	0.00015	0.0001	0.00018	0.0002	0.00024	0.00013
PCB 153			0.00012	<0.00008	0.00031	0.00055	0.00233	0.00211	0.00091	0.00076	0.00025	0.00101	0.00124	0.00112	0.00099	0.00104	0.00055
PCB 156			<0.00008	<0.00008	<0.00008	<0.00008	0.00010	0.00020	0.00012	0.00009	<0.00008	0.00009	0.00014	0.00011	0.00009	0.00011	<LOD
PCB 158			<0.00008	<0.00008	<0.00008	<0.00008	0.00016	0.00031	0.00015	<0.00008	<0.00008	0.00017	0.00018	0.00009	0.00015	0.0002	0.0001
PCB 170			<0.00008	<0.00008	0.00010	0.00017	0.00040	0.00104	0.00017	0.00016	<0.00008	0.00018	0.00028	0.00023	0.00022	0.00023	<LOD
PCB 18			<0.00008	<0.00008	<0.00008	0.00024	0.00021	0.00014	0.00033	0.00024	<0.00008	0.00016	0.00016	0.00018	0.00011	0.00017	<LOD
PCB 180			<0.00008	<0.00008	0.00014	0.00033	0.00093	0.00205	0.00037	0.00038	0.00013	0.00053	0.00058	0.00063	0.00066	0.00062	0.00035
PCB 183			<0.00008	<0.00008	<0.00008	0.00008	0.00022	0.00034	0.00009	0.00013	<0.00008	0.00014	0.00013	<LOD	0.00015	0.00013	<LOD
PCB 187			<0.00008	<0.00008	0.00011	0.00020	0.00065	0.00090	0.00024	0.00022	0.00015	0.00031	0.00039	0.00044	0.00031	0.00034	0.00021
PCB 194			<0.00008	<0.00008	<0.00008	0.00009	0.00035	0.00031	<0.00008	0.00014	<0.00008	0.00013	0.00013	0.00015	0.00017	0.00018	0.0001
PCB 28			<0.00008	<0.00008	0.00014	0.00050	0.00064	0.00037	0.00083	0.00058	0.00012	0.00041	0.00041	0.00048	0.00034	0.00044	0.00025

Determinand	ISQG/TEL (mg/kg)	PEL (mg/kg)	S13	S14	S15	Subtidal 7	Subtidal 8	Subtidal 9	Subtidal 10	Subtidal 11	Subtidal 12	Intertidal 1	Intertidal 2	Intertidal 3	Intertidal 4	Intertidal 5	Intertidal 6
PCB 31			<0.00008	<0.00008	0.00009	0.00042	0.00049	0.00027	0.00073	0.00049	0.00009	0.00031	0.00028	0.00033	0.00024	0.00031	0.00014
PCB 44			<0.00008	<0.00008	<0.00008	0.00039	0.00069	0.00031	0.00056	0.00048	0.00011	0.00031	0.00026	0.00035	0.00027	0.00035	0.00014
PCB 47			<0.00008	<0.00008	<0.00008	0.00016	0.00045	0.00013	0.00025	0.00018	<0.00008	0.00015	0.00012	0.00018	0.00011	0.00015	<LOD
PCB 49			<0.00008	<0.00008	0.00009	0.00043	0.00091	0.00031	0.00057	0.00046	0.00009	0.00031	0.00026	0.00037	0.00024	0.00034	0.00018
PCB 52			<0.00008	<0.00008	0.00014	0.00060	0.00129	0.00049	0.00087	0.00089	0.00016	0.00046	0.00046	0.0005	0.00039	0.00052	0.00026
PCB 66			<0.00008	<0.00008	0.00012	0.00062	0.00120	0.00050	0.00081	0.00071	0.00011	0.00056	0.00048	0.00062	0.00043	0.00059	0.00022
Sum of PCBs (25 congeners)	**0.0215**	**0.189**	0.00041	0.00018	0.00286	0.00727	0.01767	0.01700	0.01137	0.01060	0.00198	0.00902	0.00957	0.01028	0.00889	0.01042	0.00537
AHCH	**0.00032**	**0.00099**	<0.0001	<0.0001	<0.0001		<0.0001	<0.0001	<0.0001		<0.0001						
BHCH	**0.00032**	**0.00099**	<0.0001	<0.0001	<0.0001		<0.0001	<0.0001	<0.0001		<0.0001						
GHCH	**0.00032**	**0.00099**	<0.0001	<0.0001	<0.0001		<0.0001	<0.0001	<0.0001		<0.0001						
DIELDRIN	**0.00071**	**0.0043**	<0.0001	<0.0001	0.0002		<0.0001	0.0003	0.0002		<0.0001						
HCB			<0.0001	<0.0001	<0.0001		<0.0001	<0.0001	<0.0001		<0.0001						
PPTDE	**0.00122**	**0.00781**	<0.0001	<0.0001	0.0001		0.0009	0.0005	0.0016		<0.0001						
PPDDE	**0.00207**	**0.374**	<0.0001	<0.0001	0.0002		0.0014	0.0004	0.0006		<0.0001						
PPDDT	**0.00117**	**0.00477**	<0.0001	0.0006	<0.0001		0.0004	0.0002	<0.0001		0.0018						
BDE17			<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005						
BDE28			<0.00005	<0.00005	<0.00005	<0.00005	0.000127	<0.00005	<0.00005	<0.00005	<0.00005						
BDE47			<0.00005	<0.00005	0.00008	0.00006	0.00042	0.00011	0.00015	0.00008	<0.00005						
BDE66			<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005						
BDE85			<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005						
BDE99			<0.00005	<0.00005	0.00007	<0.00005	0.00015	<0.00005	<0.00005	<0.00005	<0.00005						
BDE100			<0.00005	<0.00005	<0.00005	<0.00005	0.00007	<0.00005	<0.00005	<0.00005	<0.00005						
BDE138			<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005						
BDE153			<0.00005	<0.00005	<0.00005	<0.00005	0.00007	<0.00005	<0.00005	<0.00005	<0.00005						
BDE154			<0.00005	<0.00005	<0.00005	<0.00005	0.000124	<0.00005	<0.00005	<0.00005	<0.00005						
BDE183			<0.00005	<0.00005	<0.00005	<0.00005	0.000281	<0.00005	<0.00005	<0.00005	<0.00005						
BDE209			0.0023	0.0004	0.0282	0.013	0.158	0.032	0.033	0.004	0.013						

=Result in excess of ISQG/TEL value
=Result in excess of PEL value

Annex E

COMBINED

Annex E - Cory Decarbonisation Project - Water Quality Data (21 September 2023)

Site No.	Time	TDS (mg/l)	Temperature	Dissolved Oxygen (%)	Dissolved Oxygen (mg)	Salinity	pH	SPC	C	Water Depth (m)	Secchi depth (cm)
S14a	11:00	7241	19.8	60.5	5.25	6.44	7.69	11302	10230	9.3	50
S14b	12:00	6396	19.7	62.5	5.52	5.62	7.69	10290	9266	10.1	60
S14c	13:00	7423	19.7	63.9	5.61	6.55	7.69	11497	10326	10.18	70
S14d	14:00	11466	19.7	66	5.65	10.47	7.72	17716	15941	11.59	30
S14e	15:00	13552	19.7	66.9	5.68	12.51	7.75	20815	18690	13.1	25
S14f	16:00	14950	19.5	67.6	5.71	13.92	7.76	22999	20551	12.6	50

Annex F - Cory Decarbonisation Project - Total Suspended Solids Data (21 September 2023)

Determinand	S14 A	S14 B	S14 C	S14 D	S14 E	S14 F
Total Suspended Solids (ug/L)	89600	29500	29300	68200	236000	93900

Annex F

MMO TEMPLATE

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Advanced Chemistry and Research, Etwall House, Bretby Business Park, Ashby Road, Burton-upon-Trent DE15 0YZ

Test Report ID MAR01896

Issue Version: 1

Customer: WSP UK Ltd, London Square, 2 Cross Lanes, Guildford, GU1 1UN

Customer Reference: Post-Survey MMO Analysis

Date Sampled: 18-May-23

Date Samples Received: 22-May-23

Test Report Date: 16-Jun-23

Condition of samples: Ambient Satisfactory

Opinions and Interpretations expressed herein are outside the scope of our UKAS accreditaion
The results reported relate only to the sample tested
The results apply to the sample as received

[redacted]

Authorised by: Katherine Smith

Position: Customer Services Co-ordinator

UKAS TESTING
1252

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Advanced Chemistry and Research, Etwall House, Bretby Business Park, Ashby Road, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR01896
Issue Version	1
Customer Reference	Post-Survey MMO Analysis

		Units	% M/M	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)
		Method No	WSLM59*	*SUB_01	*SUB_01	*SUB_01	*SUB_01	*SUB_01	*SUB_01
		Accreditation	UKAS/MMO	MMO	MMO	MMO	MMO	MMO	MMO
			Total Organic Carbon	45mm	31.5mm	22.4mm	16mm	11.2mm	8mm
Client Reference:	SOCOTEC Ref:	Matrix	-	-5.5	-5.0	-4.5	-4.0	-3.5	-3.0
Subtidal 7	MAR01896.001	Sediment	0.88	0.00	0.00	0.00	0.00	0.00	0.00
Subtidal 8	MAR01896.002	Sediment	2.37	0.00	0.00	0.00	0.00	0.00	0.00
Subtidal 9	MAR01896.003	Sediment	1.38	0.00	0.00	0.00	0.00	0.00	0.00
Subtidal 10	MAR01896.004	Sediment	1.48	0.00	0.00	0.00	0.00	0.00	0.06
Subtidal 11	MAR01896.005	Sediment	0.91	0.00	0.00	0.00	0.00	0.00	0.00
Subtidal 12	MAR01896.006	Sediment	0.76	0.00	0.00	0.00	0.00	0.00	0.00

* See Report Notes

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Advanced Chemistry and Research, Etwall House, Bretby Business Park, Ashby Road, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR01896
Issue Version	1
Customer Reference	Post-Survey MMO Analysis

		Units	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)
		Method No	*SUB_01	*SUB_01	*SUB_01	*SUB_01	*SUB_01	*SUB_01	*SUB_01
		Accreditation	MMO	MMO	MMO	MMO	MMO	MMO	MMO
			5.6mm	4mm	2.8mm	2mm	1.4mm	1mm	707µm
Client Reference:	SOCOTEC Ref:	Matrix	-2.5	-2.0	-1.5	-1.0	-0.5	0.0	0.5
Subtidal 7	MAR01896.001	Sediment	0.00	0.00	0.00	0.00	0.00	0.00	0.01
Subtidal 8	MAR01896.002	Sediment	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Subtidal 9	MAR01896.003	Sediment	0.00	0.01	0.02	0.03	0.02	0.03	0.32
Subtidal 10	MAR01896.004	Sediment	0.08	0.05	0.18	0.25	0.24	0.44	0.99
Subtidal 11	MAR01896.005	Sediment	0.07	0.07	0.20	0.47	0.56	0.51	4.77
Subtidal 12	MAR01896.006	Sediment	0.00	0.00	0.09	0.25	0.46	0.54	0.11

* See Report Notes

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Advanced Chemistry and Research, Etwall House, Bretby Business Park, Ashby Road, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR01896
Issue Version	1
Customer Reference	Post-Survey MMO Analysis

		Units	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)
		Method No	*SUB_01	*SUB_01	*SUB_01	*SUB_01	*SUB_01	*SUB_01	*SUB_01
		Accreditation	MMO	MMO	MMO	MMO	MMO	MMO	MMO
			500µm	353.6µm	250µm	176.8µm	125µm	88.39µm	63µm
Client Reference:	SOCOTEC Ref:	Matrix	1.0	1.5	2.0	2.5	3.0	3.5	4.0
Subtidal 7	MAR01896.001	Sediment	0.78	1.43	2.58	3.98	12.50	9.70	6.26
Subtidal 8	MAR01896.002	Sediment	0.00	0.00	0.04	1.33	4.80	4.76	5.52
Subtidal 9	MAR01896.003	Sediment	1.12	1.64	2.50	22.86	39.99	21.46	4.37
Subtidal 10	MAR01896.004	Sediment	1.20	6.02	10.74	20.03	17.30	6.70	3.07
Subtidal 11	MAR01896.005	Sediment	4.28	4.96	3.02	12.67	29.26	22.18	6.00
Subtidal 12	MAR01896.006	Sediment	2.32	5.45	4.02	15.39	23.87	14.09	4.48

* See Report Notes

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Advanced Chemistry and Research, Etwall House, Bretby Business Park, Ashby Road, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR01896
Issue Version	1
Customer Reference	Post-Survey MMO Analysis

		Units	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)
		Method No	*SUB_01	*SUB_01	*SUB_01	*SUB_01	*SUB_01	*SUB_01	*SUB_01
		Accreditation	MMO	MMO	MMO	MMO	MMO	MMO	MMO
			44.2µm	31.3µm	22.1µm	15.6µm	11µm	7.8µm	5.5µm
Client Reference:	SOCOTEC Ref:	Matrix	4.5	5.0	5.5	6.0	6.5	7.0	7.5
Subtidal 7	MAR01896.001	Sediment	6.43	6.35	6.20	5.46	5.65	6.62	6.72
Subtidal 8	MAR01896.002	Sediment	6.75	7.72	7.91	7.19	7.30	8.27	8.68
Subtidal 9	MAR01896.003	Sediment	1.00	0.68	0.50	0.37	0.45	0.46	0.39
Subtidal 10	MAR01896.004	Sediment	2.37	2.85	3.26	3.62	4.01	4.02	3.65
Subtidal 11	MAR01896.005	Sediment	1.83	1.15	1.14	0.88	0.96	1.14	1.07
Subtidal 12	MAR01896.006	Sediment	2.49	2.56	2.67	2.79	3.05	3.27	3.21

* See Report Notes

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Advanced Chemistry and Research, Etwall House, Bretby Business Park, Ashby Road, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR01896
Issue Version	1
Customer Reference	Post-Survey MMO Analysis

		Units	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)
		Method No	*SUB_01	*SUB_01	*SUB_01	*SUB_01	*SUB_01	*SUB_01	*SUB_01
		Accreditation	MMO	MMO	MMO	MMO	MMO	MMO	MMO
			3.9µm	2.75µm	1.95µm	1.38µm	0.98µm	0.69µm	0.49µm
Client Reference:	SOCOTEC Ref:	Matrix	8.0	8.5	9.0	9.5	10.0	10.5	11.0
Subtidal 7	MAR01896.001	Sediment	5.45	3.63	2.18	1.51	1.26	1.12	1.03
Subtidal 8	MAR01896.002	Sediment	7.47	5.29	3.37	2.43	2.07	1.90	1.77
Subtidal 9	MAR01896.003	Sediment	0.29	0.20	0.17	0.18	0.20	0.19	0.16
Subtidal 10	MAR01896.004	Sediment	2.75	1.73	0.94	0.58	0.48	0.47	0.45
Subtidal 11	MAR01896.005	Sediment	0.82	0.52	0.33	0.31	0.30	0.24	0.15
Subtidal 12	MAR01896.006	Sediment	2.62	1.78	1.04	0.65	0.51	0.46	0.43

* See Report Notes

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Advanced Chemistry and Research, Etwall House, Bretby Business Park, Ashby Road, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR01896
Issue Version	1
Customer Reference	Post-Survey MMO Analysis

		Units	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)
		Method No	*SUB_01	*SUB_01	*SUB_01	*SUB_01	*SUB_01	*SUB_01	*SUB_01
		Accreditation	MMO	MMO	MMO	MMO	MMO	MMO	MMO
			0.34µm	0.24µm	0.17µm	0.12µm	0.09µm	0.06µm	0.04µm
Client Reference:	SOCOTEC Ref:	Matrix	11.5	12.0	12.5	13.0	13.5	14.0	14.5
Subtidal 7	MAR01896.001	Sediment	0.92	0.79	0.60	0.45	0.28	0.11	0.01
Subtidal 8	MAR01896.002	Sediment	1.61	1.37	1.03	0.75	0.45	0.18	0.02
Subtidal 9	MAR01896.003	Sediment	0.13	0.10	0.08	0.06	0.04	0.02	0.00
Subtidal 10	MAR01896.004	Sediment	0.42	0.36	0.28	0.21	0.14	0.06	0.01
Subtidal 11	MAR01896.005	Sediment	0.08	0.04	0.02	0.01	0.00	0.00	0.00
Subtidal 12	MAR01896.006	Sediment	0.39	0.34	0.27	0.20	0.13	0.05	0.01

* See Report Notes

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Advanced Chemistry and Research, Etwall House, Bretby Business Park, Ashby Road, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR01896
Issue Version	1
Customer Reference	Post-Survey MMO Analysis

		Units	% (at 0.5phi intervals)
		Method No	*SUB_01
		Accreditation	MMO
			<0.04µm
Client Reference:	SOCOTEC Ref:	Matrix	>14.5
Subtidal 7	MAR01896.001	Sediment	0.00
Subtidal 8	MAR01896.002	Sediment	0.00
Subtidal 9	MAR01896.003	Sediment	0.00
Subtidal 10	MAR01896.004	Sediment	0.00
Subtidal 11	MAR01896.005	Sediment	0.00
Subtidal 12	MAR01896.006	Sediment	0.00

* See Report Notes

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Advanced Chemistry and Research, Etwall House, Bretby Business Park, Ashby Road, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR01896
Issue Version	1
Customer Reference	Post-Survey MMO Analysis

		Units	mg/Kg (Dry Weight)							
		Method No	ICPMSS*							
		Limit of Detection	0.5	0.04	0.5	0.5	0.01	0.5	0.5	2
		Accreditation	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Arsenic (As)**	**Cadmium (Cd)**	**Chromium (Cr)**	**Copper (Cu)**	**Mercury (Hg)**	**Nickel (Ni)**	**Lead (Pb)**	**Zinc (Zn)**
Subtidal 7	MAR01896.001	Sediment	7.40	0.28	19.6	27.8	0.44	10.5	60.1	75.4
Subtidal 8	MAR01896.002	Sediment	12.0	0.36	44.9	45.6	0.53	25.1	72.1	145
Subtidal 9	MAR01896.003	Sediment	7.50	0.23	19.2	23.9	0.36	10.7	49.7	81.4
Subtidal 10	MAR01896.004	Sediment	8.40	0.26	19.9	25.8	0.43	12.0	64.5	78.2
Subtidal 11	MAR01896.005	Sediment	6.60	0.20	15.6	20.1	0.28	10.4	37.0	61.2
Subtidal 12	MAR01896.006	Sediment	6.00	0.32	12.6	20.6	0.40	6.70	46.3	53.0
Certified Reference Material SETOC 768 (% Recovery)			96	102	98	101	86	95	97	99
QC Blank			<0.5	<0.04	<0.5	<0.5	<0.01	<0.5	<0.5	<2

* See Report Notes

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Advanced Chemistry and Research, Etwall House, Bretby Business Park, Ashby Road, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR01896
Issue Version	1
Customer Reference	Post-Survey MMO Analysis

		Units	mg/Kg (Dry Weight)	
		Method No	ASC/SOP/301	
		Limit of Detection	0.001	0.001
		Accreditation	UKAS/MMO	UKAS/MMO
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Dibutyltin (DBT)**	**Tributyltin (TBT)**
Subtidal 7	MA01896.001	Sediment	<0.005	<0.005
Subtidal 8	MA01896.002	Sediment	<0.005	<0.005
Subtidal 9	MA01896.003	Sediment	0.010	0.059
Subtidal 10	MA01896.004	Sediment	0.012	0.014
Subtidal 11	MA01896.005	Sediment	0.031	0.072
Subtidal 12	MA01896.006	Sediment	0.012	<0.005
Certified Reference Material BCR-646 (% Recovery)			59	66
QC Blank			<0.001	<0.001

* See Report Notes

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Advanced Chemistry and Research, Etwall House, Bretby Business Park, Ashby Road, Burton-upon-Trent DE15 0YZ

Test Report ID MAR01896
Issue Version 1
Customer Reference Post-Survey MMO Analysis

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304
		Limit of Detection	1	1	1	1	1	1	1	1
		Accreditation	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	MMO*
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**ACENAPTH**	**ACENAPHY**	**ANTHRACN**	**BAA**	**BAP**	**BBF**	**BENZGHIP**	**BEP**
Subtidal 7	MA01896.001	Sediment	96.4	65.9	233	594	730	596	445	421
Subtidal 8	MA01896.002	Sediment	45.2	61.4	97.3	302	484	454	410	332
Subtidal 9	MA01896.003	Sediment	44.9	40.7	96.0	275	296	272	207	186
Subtidal 10	MA01896.004	Sediment	131	129	302	983	1080	896	635	594
Subtidal 11	MA01896.005	Sediment	225	133	444	1060	1170	906	674	659
Subtidal 12	MA01896.006	Sediment	23.9	30.1	61.4	149	222	204	166	139
Certified Reference Material Nist 1941b (% Recovery)			94	104	65	65	61	81	69	76
QC Blank			<1	<1	<1	<1	<1	<1	<1	<1

~ Indicates result is for an In-house Reference Material as no Certified Reference Materials are available.

For full analyte name see method summaries.

*See report notes

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Advanced Chemistry and Research, Etwall House, Bretby Business Park, Ashby Road, Burton-upon-Trent DE15 0YZ

Test Report ID MAR01896
Issue Version 1
Customer Reference Post-Survey MMO Analysis

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304
		Limit of Detection	1	1	1	1	1	1	1	1
		Accreditation	UKAS/MMO	MMO	MMO	MMO	MMO	MMO	UKAS/MMO	UKAS/MMO
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**BKF***	**C1N**	**C1PHEN**	**C2N**	**C3N**	**CHRYSENE***	**DBENZAH**	**FLUORANT**
Subtidal 7	MA01896.001	Sediment	588	77.2	331	81.7	96.8	635	103	1380
Subtidal 8	MA01896.002	Sediment	424	95.3	166	91.3	89.9	356	80.9	639
Subtidal 9	MA01896.003	Sediment	259	93.0	176	80.4	83.8	285	46.8	837
Subtidal 10	MA01896.004	Sediment	876	392	577	331	306	923	165	1620
Subtidal 11	MA01896.005	Sediment	848	1210	2650	1170	1060	1140	153	1960
Subtidal 12	MA01896.006	Sediment	189	42.9	79.8	49.1	38.1	177	37.1	301
Certified Reference Material Nist 1941b (% Recovery)			81	75	80	103	114	89	119	80
QC Blank			<1	<1	<1	<1	<1	<1	<1	<1

~ Indicates result is for an In-house Reference Material as no Certified Reference Materials are available.

For full analyte name see method summaries.

*See report notes

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Advanced Chemistry and Research, Etwall House, Bretby Business Park, Ashby Road, Burton-upon-Trent DE15 0YZ

Test Report ID MAR01896
Issue Version 1
Customer Reference Post-Survey MMO Analysis

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	mg/Kg
		Method No	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/305
		Limit of Detection	1	1	1	1	1	1	1
		Accreditation	UKAS/MMO	UKAS/MMO	UKAS/MMO	MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**FLUORENE**	**INDPYR**	**NAPTH**	**PERYLENE**	**PHENANT**	**PYRENE**	**THC**
Subtidal 7	MA01896.001	Sediment	104	515	63.3	167	771	1090	462
Subtidal 8	MA01896.002	Sediment	49.8	454	49.3	164	255	593	30.5
Subtidal 9	MA01896.003	Sediment	38.0	253	50.9	84.4	210	594	156
Subtidal 10	MA01896.004	Sediment	144	791	302	248	649	1300	643
Subtidal 11	MA01896.005	Sediment	297	772	244	254	1920	1720	458
Subtidal 12	MA01896.006	Sediment	30.3	203	35.7	90.1	140	255	147
Certified Reference Material Nist 1941b (% Recovery)			52	66	57	50	77	71	98~
QC Blank			<1	<1	<1	<1	<1	<1	<1

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For full analyte name see method summaries.

*See report notes

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Advanced Chemistry and Research, Etwall House, Bretby Business Park, Ashby Road, Burton-upon-Trent DE15 0YZ

Test Report ID MAR01896
Issue Version 1
Customer Reference Post-Survey MMO Analysis

		Units	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)
		Method No	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302
		Limit of Detection	0.00008	0.00008	0.00008	0.00008	0.00008	0.00008	0.00008
		Accreditation	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**PCB 101**	**PCB 105**	**PCB 110**	**PCB 118**	**PCB 128**	**PCB 138**	**PCB 141**
Subtidal 7	MA01896.001	Sediment	0.00042	0.00014	0.00059	0.00030	0.00010	0.00043	<0.00008
Subtidal 8	MA01896.002	Sediment	0.00108	0.00017	0.00164	0.00070	0.00023	0.00119	<0.00008
Subtidal 9	MA01896.003	Sediment	0.00075	0.00016	0.00087	0.00066	0.00029	0.00173	0.00052
Subtidal 10	MA01896.004	Sediment	0.00063	0.00026	0.00085	0.00075	0.00016	0.00080	0.00008
Subtidal 11	MA01896.005	Sediment	0.00083	0.00029	0.00120	0.00097	0.00008	0.00044	0.00012
Subtidal 12	MA01896.006	Sediment	0.00013	<0.00008	0.00018	0.00011	<0.00008	0.00017	<0.00008
Certified Reference Material Nist 1941b (% Recovery)			96	72	104	103	109	99	106~
QC Blank			<0.00008	<0.00008	<0.00008	<0.00008	<0.00008	<0.00008	<0.00008

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Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Advanced Chemistry and Research, Etwall House, Bretby Business Park, Ashby Road, Burton-upon-Trent DE15 0YZ

Test Report ID MAR01896
Issue Version 1
Customer Reference Post-Survey MMO Analysis

		Units	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)
		Method No	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302
		Limit of Detection	0.00008	0.00008	0.00008	0.00008	0.00008	0.00008	0.00008
		Accreditation	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	MMO*
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**PCB 149**	**PCB 151**	**PCB 153**	**PCB 156**	**PCB 158**	**PCB 170**	**PCB 18**
Subtidal 7	MA01896.001	Sediment	0.00035	0.00016	0.00055	<0.00008	<0.00008	0.00017	0.00024
Subtidal 8	MA01896.002	Sediment	0.00128	0.00036	0.00233	0.00010	0.00016	0.00040	0.00021
Subtidal 9	MA01896.003	Sediment	0.00167	0.00057	0.00211	0.00020	0.00031	0.00104	0.00014
Subtidal 10	MA01896.004	Sediment	0.00066	0.00018	0.00091	0.00012	0.00015	0.00017	0.00033
Subtidal 11	MA01896.005	Sediment	0.00060	0.00016	0.00076	0.00009	<0.00008	0.00016	0.00024
Subtidal 12	MA01896.006	Sediment	0.00018	<0.00008	0.00025	<0.00008	<0.00008	<0.00008	<0.00008
Certified Reference Material Nist 1941b (% Recovery)			78	104~	87	88	107	110	73
QC Blank			<0.00008	<0.00008	<0.00008	<0.00008	<0.00008	<0.00008	<0.00008

~ Indicates result is for an In-house Reference Material as no Certified Reference Materials are available.

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Advanced Chemistry and Research, Etwall House, Bretby Business Park, Ashby Road, Burton-upon-Trent DE15 0YZ

Test Report ID MAR01896
Issue Version 1
Customer Reference Post-Survey MMO Analysis

		Units	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)
		Method No	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302
		Limit of Detection	0.00008	0.00008	0.00008	0.00008	0.00008	0.00008	0.00008
		Accreditation	UKAS/MMO	MMO*	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**PCB 180**	**PCB 183**	**PCB 187**	**PCB 194**	**PCB 28**	**PCB 31**	**PCB 44**
Subtidal 7	MA01896.001	Sediment	0.00033	0.00008	0.00020	0.00009	0.00050	0.00042	0.00039
Subtidal 8	MA01896.002	Sediment	0.00093	0.00022	0.00065	0.00035	0.00064	0.00049	0.00069
Subtidal 9	MA01896.003	Sediment	0.00205	0.00034	0.00090	0.00031	0.00037	0.00027	0.00031
Subtidal 10	MA01896.004	Sediment	0.00037	0.00009	0.00024	<0.00008	0.00083	0.00073	0.00056
Subtidal 11	MA01896.005	Sediment	0.00038	0.00013	0.00022	0.00014	0.00058	0.00049	0.00048
Subtidal 12	MA01896.006	Sediment	0.00013	<0.00008	0.00015	<0.00008	0.00012	0.00009	0.00011
Certified Reference Material Nist 1941b (% Recovery)			95	59	93	94	70	100	101
QC Blank			<0.00008	<0.00008	<0.00008	<0.00008	<0.00008	<0.00008	<0.00008

~ Indicates result is for an In-house Reference Material as no Certified Reference Materials are available.

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Advanced Chemistry and Research, Etwall House, Bretby Business Park, Ashby Road, Burton-upon-Trent DE15 0YZ

Test Report ID MAR01896
Issue Version 1
Customer Reference Post-Survey MMO Analysis

		Units	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)
		Method No	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302
		Limit of Detection	0.00008	0.00008	0.00008	0.00008
		Accreditation	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**PCB 47**	**PCB 49**	**PCB 52**	**PCB 66**
Subtidal 7	MA01896.001	Sediment	0.00016	0.00043	0.00060	0.00062
Subtidal 8	MA01896.002	Sediment	0.00045	0.00091	0.00129	0.00120
Subtidal 9	MA01896.003	Sediment	0.00013	0.00031	0.00049	0.00050
Subtidal 10	MA01896.004	Sediment	0.00025	0.00057	0.00087	0.00081
Subtidal 11	MA01896.005	Sediment	0.00018	0.00046	0.00089	0.00071
Subtidal 12	MA01896.006	Sediment	<0.00008	0.00009	0.00016	0.00011
Certified Reference Material Nist 1941b (% Recovery)			104~	101	116	106
QC Blank			<0.00008	<0.00008	<0.00008	<0.00008

~ Indicates result is for an In-house Reference Material as no Certified Reference Materials are available.

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Advanced Chemistry and Research, Etwall House, Bretby Business Park, Ashby Road, Burton-upon-Trent DE15 0YZ

Test Report ID MAR01896
Issue Version 1
Customer Reference Post-Survey MMO Analysis

		Units	mg/Kg (Dry Weight)							
		Method No	ASC/SOP/302							
		Limit of Detection	0.0001							
		Accreditation	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**AHCH**	**BHCH**	**GHCH**	**DIELDRIN**	**HCB**	**PPTDE**	**PPDDE**	**PPDDT**
Subtidal 8	MA01896.002	Sediment	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0009	0.0014	0.0004
Subtidal 9	MA01896.003	Sediment	<0.0001	<0.0001	<0.0001	0.0003	<0.0001	0.0005	0.0004	0.0002
Subtidal 10	MA01896.004	Sediment	<0.0001	<0.0001	<0.0001	0.0002	<0.0001	0.0016	0.0006	<0.0001
Subtidal 12	MA01896.006	Sediment	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0018
Certified Reference Material Nist 1941b (% Recovery)			103~	54~	51~	94~	100	102	87	34
QC Blank			<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

~ Indicates result is for an In-house Reference Material as no Certified Reference Materials are available.

For full analyte name see method summaries.

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Advanced Chemistry and Research, Etwall House, Bretby Business Park, Ashby Road, Burton-upon-Trent DE15 0YZ

Test Report ID MAR01896
Issue Version 1
Customer Reference Post-Survey MMO Analysis

		Units	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)
		Method No	ASC/SOP/308	ASC/SOP/308	ASC/SOP/308	ASC/SOP/308	ASC/SOP/308	ASC/SOP/308	ASC/SOP/308	ASC/SOP/308
		Limit of Detection	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005
		Accreditation	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	MMO*	UKAS/MMO	UKAS/MMO
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**BDE17**	**BDE28**	**BDE47**	**BDE66**	**BDE85**	**BDE99**	**BDE100**	**BDE138**
Subtidal 7	MA01896.001	Sediment	<0.00005	<0.00005	0.00006	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Subtidal 8	MA01896.002	Sediment	<0.00005	0.000127	0.00042	<0.00005	<0.00005	0.00015	0.00007	<0.00005
Subtidal 9	MA01896.003	Sediment	<0.00005	<0.00005	0.00011	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Subtidal 10	MA01896.004	Sediment	<0.00005	<0.00005	0.00015	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Subtidal 11	MA01896.005	Sediment	<0.00005	<0.00005	0.00008	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Subtidal 12	MA01896.006	Sediment	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Certified Reference Material QBC063MS (% Recovery)			88~	132	102	89~	97~	66	99	114~
QC Blank			<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005

* See Report Notes

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Advanced Chemistry and Research, Etwall House, Bretby Business Park, Ashby Road, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR01896
Issue Version	1
Customer Reference	Post-Survey MMO Analysis

		Units	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)
		Method No	ASC/SOP/308	ASC/SOP/308	ASC/SOP/308	ASC/SOP/308
		Limit of Detection	0.00005	0.00005	0.00005	0.0001
		Accreditation	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**BDE153**	**BDE154**	**BDE183**	**BDE209**
Subtidal 7	MA01896.001	Sediment	<0.00005	<0.00005	<0.00005	0.013
Subtidal 8	MA01896.002	Sediment	0.00007	0.000124	0.000281	0.158
Subtidal 9	MA01896.003	Sediment	<0.00005	<0.00005	<0.00005	0.032
Subtidal 10	MA01896.004	Sediment	<0.00005	<0.00005	<0.00005	0.033
Subtidal 11	MA01896.005	Sediment	<0.00005	<0.00005	<0.00005	0.004
Subtidal 12	MA01896.006	Sediment	<0.00005	<0.00005	<0.00005	0.013
Certified Reference Material QBC063MS (% Recovery)			97	111	78~	102
QC Blank			<0.00005	<0.00005	<0.00005	<0.0002

* See Report Notes

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Advanced Chemistry and Research, Etwall House, Bretby Business Park, Ashby Road, Burton-upon-Trent DE15 0YZ

Test Report ID MAR01896
Issue Version 1
Customer Reference Post-Survey MMO Analysis

REPORT NOTES

Method Code	Sample ID	The following information should be taken into consideration when using the data contained within this report
*SUB_01	MAR01896.001-006	Analysis was conducted by an approved subcontracted laboratory.
WSLM59*	MAR01896.001-006	Analysis was conducted by an internal SOCOTEC laboratory. UKAS accredited analysis by this laboratory is under UKAS number 1252.
ICPMSS*	MAR01896.001-006	Analysis was conducted by an internal SOCOTEC laboratory. UKAS accredited analysis by this laboratory is under UKAS number 1252.
ASC/SOP/301	MAR01896.001, .002, .006	The matrix of this sample has been found to interfere with the result for this test. The sample has therefore been diluted, but in doing so, the detection limit for this test has been elevated.
ASC/SOP/302	MAR01896.001-006	The Primary process control data associated with this Test has not wholly met the requirements of the Laboratory Quality Management System QMS with one or more target analytes falling outside acceptable limits. The remaining data gives the Laboratory confidence that the test has performed satisfactorily and that the validity of the data may not have been significantly affected.However in line with our QMS policy we have removed accreditation, where applicable, from the affected analytes (PCB18, PCB183) . These circumstances should be taken into consideration when utilising the data.
ASC/SOP/303/304	MAR01896.001-006	Benzo[k]fluoranthene is known to coelute with Benzo[j]fluoranthene and these peaks can not be resolved. It is believed Benzo[j]fluoranthene is present in these samples therefore it is suggested that the Benzo[k]fluoranthene results should be taken as a Benzo[k]fluoranthene (inc. Benzo[j]fluoranthene). Benzo[j]fluoranthene is not UKAS accredited. This should be taken into consideration when utilising the data.
ASC/SOP/303/304	MAR01896.001-006	Chrysene is known to coelute with Triphenylene and these peaks can not be resolved in the PAHSED UKAS accredited method. Chrysene and Triphenylene are resolved for MMO but this is currently not UKAS accredited therefore Chrysene is reported without this acccreditation.
ASC/SOP/303/304	MAR01896.001-006	The Primary process control data associated with this Test has not wholly met the requirements of the Laboratory Quality Management System QMS with one or more target analytes falling outside acceptable limits. The remaining data gives the Laboratory confidence that the test has performed satisfactorily and that the validity of the data may not have been significantly affected.However in line with our QMS policy we have removed accreditation, where applicable, from the affected analytes (BEP) . These circumstances should be taken into consideration when utilising the data.
ASC/SOP/308	MAR01896.001-006	The Primary process control data associated with this Test has not wholly met the requirements of the Laboratory Quality Management System QMS with one or more target analytes falling outside acceptable limits. The remaining data gives the Laboratory confidence that the test has performed satisfactorily and that the validity of the data may not have been significantly affected.However in line with our QMS policy we have removed accreditation, where applicable, from the affected analytes (PBDE99) . These circumstances should be taken into consideration when utilising the data.
ASC/SOP/308	MAR01896.001-006	The Primary process control blank data associated with this Test has not wholly met the requirements of the Laboratory Quality Management System QMS with BDE209 falling above acceptable reporting limits. The remaining data gives the Laboratory confidence that the test has performed satisfactorily and that the validity of the data may not have been significantly affected.However in line with our QMS policy the report limit for this compound has been raised and samples have been blank subtracted.

DEVIATING SAMPLE STATEMENT

Deviation Code	Deviation Definition	Sample ID	Deviation Details. The following information should be taken into consideration when using the data contained within this report
D1	Holding Time Exceeded	N/A	N/A
D2	Sample Contaminated through Damaged Packaging	N/A	N/A
D3	Sample Contaminated through Sampling	N/A	N/A
D4	Inappropriate Container/Packaging	N/A	N/A
D5	Damaged in Transit	N/A	N/A
D6	Insufficient Quantity of Sample	N/A	N/A
D7	Inappropriate Headspace	N/A	N/A
D8	Retained at Incorrect Temperature	N/A	N/A
D9	Lack of Date & Time of Sampling	N/A	N/A
D10	Insufficient Sample Details	N/A	N/A
D11	Sample integrity compromised or not suitable for analysis	N/A	N/A

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Advanced Chemistry and Research, Etwall House, Bretby Business Park, Ashby Road, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR01896
Issue Version	1
Customer Reference	Post-Survey MMO Analysis

Method	Sample and Fraction Size	Method Summary
Particle Size Analysis	Wet Sediment	Wet and dry sieving followed by laser diffraction analysis.
Total Organic Carbon (TOC)	Air dried	Carbonate removal and sulphurous acid/combustion at 1600°C/NDIR.
Metals	Air dried	Aqua-regia extraction followed by ICP analysis.
Organotins	Wet Sediment	Solvent extraction and derivatisation followed by GC-MS analysis.
Polyaromatic Hydrocarbons (PAH)	Wet Sediment	Solvent extraction and clean up followed by GC-MS analysis.
Total Hydrocarbon Content (THC)	Wet Sediment	Ultra-violet fluorescence spectroscopy
Polychlorinated Biphenyls (PCBs)	Air dried and seived to <2mm	Solvent extraction and clean up followed by GC-MS-MS analysis.
Organochlorine Pesticides (OCPs)	Air dried and seived to <2mm	Solvent extraction and clean up followed by GC-MS-MS analysis.
Brominated Flame Retardants (PBDEs)	Air dried and seived to <2mm	Solvent extraction and clean up followed by GC-MS-MS analysis.

Analyte Definitions

Analyte Abbreviation	Full Analyte name	Analyte Abbreviation	Full Analyte name	Analyte Abbreviation	Full Analyte name
ACENAPTH	Acenaphthene	C2N	C2-naphthalenes	THC	Total Hydrocarbon Content
ACENAPHY	Acenaphthylene	C3N	C3-naphthalenes	AHCH	alpha-Hexachlorocyclohexane
ANTHRACN	Anthracene	CHRYSENE	Chrysene	BHCH	beta-Hexachlorocyclohexane
BAA	Benzo[a]anthracene	DBENZAH	Dibenzo[ah]anthracene	GHCH	gamma-Hexachlorocyclohexane
BAP	Benzo[a]pyrene	FLUORANT	Fluoranthene	DIELDRIN	Dieldrin
BBF	Benzo[b]fluoranthene	FLUORENE	Fluorene	HCB	Hexachlorobenzene
BEP	Benzo[e]pyrene	INDPYR	Indeno[1,2,3-cd]pyrene	PPDDE	p,p'-Dichlorodiphenyldichloroethylene
BENZGHIP	Benzo[ghi]perylene	NAPTH	Naphthalene	PPDDT	p,p'-Dichlorodiphenyltrichloroethane
BKF	Benzo[k]fluoranthene	PERYLENE	Perylene	PPTDE	p,p'-Dichlorodiphenyldichloroethane
C1N	C1-naphthalenes	PHENANT	Phenanthrene		
C1PHEN	C1-phenanthrene	PYRENE	Pyrene		

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Advanced Chemistry and Research, Etwall House, Bretby Business Park, Ashby Road, Burton-upon-Trent DE15 0YZ

Test Report ID **MAR02044**

Issue Version: 1

Customer: WSP UK Limited, First Floor, 3 Wellington Place, Leeds, LS1 4AP

Customer Reference: Post Survey

Date Sampled: 21-Sep-23

Date Samples Received: 25-Sep-23

Test Report Date: 23-Oct-23

Condition of samples: Cold Satisfactory

Opinions and Interpretations expressed herein are outside the scope of our UKAS accreditaion
The results reported relate only to the sample tested
The results apply to the sample as received

[redacted]

Authorised by: Jane Colbourne

Position: Customer Service Specialist

UKAS TESTING
1252

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Advanced Chemistry and Research, Etwall House, Bretby Business Park, Ashby Road, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR02044
Issue Version	1
Customer Reference	Post Survey

		Units	% M/M	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)
		Method No	WSLM59*	*SUB_01	*SUB_01	*SUB_01	*SUB_01	*SUB_01	*SUB_01
		Accreditation	UKAS/MMO	MMO	MMO	MMO	MMO	MMO	MMO
			Total Organic Carbon	**45mm**	**31.5mm**	**22.4mm**	**16mm**	**11.2mm**	**8mm**
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**-**	**-5.5**	**-5.0**	**-4.5**	**-4.0**	**-3.5**	**-3.0**
S13	MAR02044.001	Sediment	2.04	0.00	0.00	0.00	0.00	0.00	0.00
S14	MAR02044.002	Sediment	0.70	0.00	0.00	0.00	0.00	0.00	0.00
S15	MAR02044.003	Sediment	1.42	0.00	0.00	7.81	21.24	7.10	3.82

* See Report Notes

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Advanced Chemistry and Research, Etwall House, Bretby Business Park, Ashby Road, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR02044
Issue Version	1
Customer Reference	Post Survey

		Units	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)
		Method No	*SUB_01	*SUB_01	*SUB_01	*SUB_01	*SUB_01	*SUB_01	*SUB_01
		Accreditation	MMO	MMO	MMO	MMO	MMO	MMO	MMO
			5.6mm	**4mm**	**2.8mm**	**2mm**	**1.4mm**	**1mm**	**707µm**
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**-2.5**	**-2.0**	**-1.5**	**-1.0**	**-0.5**	**0.0**	**0.5**
S13	MAR02044.001	Sediment	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S14	MAR02044.002	Sediment	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S15	MAR02044.003	Sediment	2.58	1.72	0.65	0.38	0.28	0.22	0.00

* See Report Notes

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Advanced Chemistry and Research, Etwall House, Bretby Business Park, Ashby Road, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR02044
Issue Version	1
Customer Reference	Post Survey

		Units	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)
		Method No	*SUB_01	*SUB_01	*SUB_01	*SUB_01	*SUB_01	*SUB_01	*SUB_01
		Accreditation	MMO	MMO	MMO	MMO	MMO	MMO	MMO
			500µm	**353.6µm**	**250µm**	**176.8µm**	**125µm**	**88.39µm**	**63µm**
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**1.0**	**1.5**	**2.0**	**2.5**	**3.0**	**3.5**	**4.0**
S13	MAR02044.001	Sediment	0.00	0.16	2.66	4.30	7.24	4.36	3.70
S14	MAR02044.002	Sediment	0.00	0.00	0.01	1.52	5.23	2.85	7.05
S15	MAR02044.003	Sediment	0.00	0.02	0.22	2.37	2.50	2.30	5.02

* See Report Notes

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Advanced Chemistry and Research, Etwall House, Bretby Business Park, Ashby Road, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR02044
Issue Version	1
Customer Reference	Post Survey

		Units	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)
		Method No	*SUB_01	*SUB_01	*SUB_01	*SUB_01	*SUB_01	*SUB_01	*SUB_01
		Accreditation	MMO	MMO	MMO	MMO	MMO	MMO	MMO
			44.2µm	**31.3µm**	**22.1µm**	**15.6µm**	**11µm**	**7.8µm**	**5.5µm**
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**4.5**	**5.0**	**5.5**	**6.0**	**6.5**	**7.0**	**7.5**
S13	MAR02044.001	Sediment	6.64	6.66	7.16	7.03	6.85	7.68	8.10
S14	MAR02044.002	Sediment	11.19	9.46	7.75	6.13	4.88	5.73	7.00
S15	MAR02044.003	Sediment	5.44	4.09	3.65	3.94	4.44	4.74	4.46

* See Report Notes

Issuing Laboratory SOCOTEC, Marine Department, Advanced Chemistry and Research, Etwall House, Bretby Business Park, Ashby Road, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR02044
Issue Version	1
Customer Reference	Post Survey

		Units	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)
		Method No	*SUB_01	*SUB_01	*SUB_01	*SUB_01	*SUB_01	*SUB_01	*SUB_01
		Accreditation	MMO	MMO	MMO	MMO	MMO	MMO	MMO
			3.9µm	**2.75µm**	**1.95µm**	**1.38µm**	**0.98µm**	**0.69µm**	**0.49µm**
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**8.0**	**8.5**	**9.0**	**9.5**	**10.0**	**10.5**	**11.0**
S13	MAR02044.001	Sediment	6.97	4.94	3.10	2.16	1.84	1.73	1.64
S14	MAR02044.002	Sediment	6.83	5.31	3.89	3.21	2.66	2.14	1.82
S15	MAR02044.003	Sediment	3.39	2.10	1.13	0.71	0.62	0.62	0.60

* See Report Notes

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Advanced Chemistry and Research, Etwall House, Bretby Business Park, Ashby Road, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR02044
Issue Version	1
Customer Reference	Post Survey

		Units	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)
		Method No	*SUB_01	*SUB_01	*SUB_01	*SUB_01	*SUB_01	*SUB_01	*SUB_01
		Accreditation	MMO	MMO	MMO	MMO	MMO	MMO	MMO
			0.34µm	**0.24µm**	**0.17µm**	**0.12µm**	**0.09µm**	**0.06µm**	**0.04µm**
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**11.5**	**12.0**	**12.5**	**13.0**	**13.5**	**14.0**	**14.5**
S13	MAR02044.001	Sediment	1.50	1.28	0.97	0.70	0.43	0.17	0.02
S14	MAR02044.002	Sediment	1.64	1.40	1.02	0.70	0.40	0.15	0.02
S15	MAR02044.003	Sediment	0.55	0.46	0.35	0.26	0.16	0.06	0.01

* See Report Notes

Issuing Laboratory SOCOTEC, Marine Department, Advanced Chemistry and Research, Etwall House, Bretby Business Park, Ashby Road, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR02044
Issue Version	1
Customer Reference	Post Survey

		Units	% (at 0.5phi intervals)
		Method No	*SUB_01
		Accreditation	MMO
			<0.04µm
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**>14.5**
S13	MAR02044.001	Sediment	0.00
S14	MAR02044.002	Sediment	0.00
S15	MAR02044.003	Sediment	0.00

* See Report Notes

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Advanced Chemistry and Research, Etwall House, Bretby Business Park, Ashby Road, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR02044
Issue Version	1
Customer Reference	Post Survey

		Units	mg/Kg (Dry Weight)							
		Method No	ICPMSS*							
		Limit of Detection	0.5	0.04	0.5	0.5	0.01	0.5	0.5	2
		Accreditation	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Arsenic (As)**	**Cadmium (Cd)**	**Chromium (Cr)**	**Copper (Cu)**	**Mercury (Hg)**	**Nickel (Ni)**	**Lead (Pb)**	**Zinc (Zn)**
S13	MAR02044.001	Sediment	33.7	0.32	69.2	78.6	4.71	21.5	320	216
S14	MAR02044.002	Sediment	11.6	0.50	32.8	28.0	0.10	49.5	17.4	86.4
S15	MAR02044.003	Sediment	9.9	0.15	19.6	11.8	0.18	14.2	35.7	63.0
Certified Reference Material SETOC 768 (% Recovery)			102	105	106	101	111	104	104	106
QC Blank			<0.5	<0.04	<0.5	<0.5	<0.01	<0.5	<0.5	<2

* See Report Notes

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Advanced Chemistry and Research, Etwall House, Bretby Business Park, Ashby Road, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR02044
Issue Version	1
Customer Reference	Post Survey

		Units	mg/Kg (Dry Weight)	
		Method No	ASC/SOP/301	
		Limit of Detection	0.001	0.001
		Accreditation	UKAS/MMO	UKAS/MMO
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Dibutyltin (DBT)**	**Tributyltin (TBT)**
S13	MAR02044.001	Sediment	<0.005	<0.005
S14	MAR02044.002	Sediment	<0.005	<0.005
S15	MAR02044.003	Sediment	<0.005	<0.005
Certified Reference Material BCR-646 (% Recovery)			59	57
QC Blank			<0.001	<0.001

* See Report Notes

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Advanced Chemistry and Research, Etwall House, Bretby Business Park, Ashby Road, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR02044
Issue Version	1
Customer Reference	Post Survey

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304
		Limit of Detection	1	1	1	1	1	1	1	1
		Accreditation	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**ACENAPTH**	**ACENAPHY**	**ANTHRACN**	**BAA**	**BAP**	**BBF**	**BENZGHIP**	**BEP**
S13	MAR02044.001	Sediment	425	210	1160	3350	3990	3240	2230	2270
S14	MAR02044.002	Sediment	125	24.4	116	408	494	387	260	280
S15	MAR02044.003	Sediment	9.50	19.0	23.3	65.4	113	104	94.8	81.2
Certified Reference Material Nist 1941b (% Recovery)			103	119	72	68	64	85	80	82
QC Blank			<1	<1	<1	<1	<1	<1	<1	<1

~ Indicates result is for an In-house Reference Material as no Certified Reference Materials are available.

For full analyte name see method summaries.

*See report notes

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Advanced Chemistry and Research, Etwall House, Bretby Business Park, Ashby Road, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR02044
Issue Version	1
Customer Reference	Post Survey

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304
		Limit of Detection	1	1	1	1	1	1	1	1
		Accreditation	UKAS/MMO	MMO	MMO	MMO	MMO	MMO	UKAS/MMO	UKAS/MMO
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**BKF***	**C1N**	**C1PHEN**	**C2N**	**C3N**	**CHRYSENE***	**DBENZAH**	**FLUORANT**
S13	MAR02044.001	Sediment	3050	384	1390	393	377	3550	575	7660
S14	MAR02044.002	Sediment	361	17.7	251	36.9	65.5	416	70.1	955
S15	MAR02044.003	Sediment	101	47.7	66.1	55.8	49.9	79.8	17.9	119
Certified Reference Material Nist 1941b (% Recovery)			83	82	92	110	120	89	109	82
QC Blank			<1	<1	<1	<1	<1	<1	<1	<1

~ Indicates result is for an In-house Reference Material as no Certified Reference Materials are available.

For full analyte name see method summaries.

*See report notes

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Advanced Chemistry and Research, Etwall House, Bretby Business Park, Ashby Road, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR02044
Issue Version	1
Customer Reference	Post Survey

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	mg/Kg
		Method No	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/305
		Limit of Detection	1	1	1	1	1	1	1
		Accreditation	UKAS/MMO	UKAS/MMO	UKAS/MMO	MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**FLUORENE**	**INDPYR**	**NAPTH**	**PERYLENE**	**PHENANT**	**PYRENE**	**THC**
S13	MAR02044.001	Sediment	511	2330	365	926	2790	5660	482
S14	MAR02044.002	Sediment	112	286	15.6	106	695	750	6.78
S15	MAR02044.003	Sediment	12.4	100	19.3	157	62.5	113	17.2
Certified Reference Material Nist 1941b (% Recovery)			55	76	60	54	80	70	89~
QC Blank			<1	<1	<1	<1	<1	<1	<1

~ Indicates result is for an In-house Reference Material as no Certified Reference Materials are available.

For full analyte name see method summaries.

*See report notes

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Advanced Chemistry and Research, Etwall House, Bretby Business Park, Ashby Road, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR02044
Issue Version	1
Customer Reference	Post Survey

		Units	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)
		Method No	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302
		Limit of Detection	0.00008	0.00008	0.00008	0.00008	0.00008	0.00008	0.00008
		Accreditation	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**PCB 101**	**PCB 105**	**PCB 110**	**PCB 118**	**PCB 128**	**PCB 138**	**PCB 141**
S13	MAR02044.001	Sediment	<0.00008	<0.00008	0.00011	<0.00008	<0.00008	0.00009	<0.00008
S14	MAR02044.002	Sediment	<0.00008	<0.00008	0.00009	<0.00008	<0.00008	0.00009	<0.00008
S15	MAR02044.003	Sediment	0.00019	0.00009	0.00033	0.00024	0.00010	0.00040	<0.00008
Certified Reference Material Nist 1941b (% Recovery)			88	90	92	78	94	100	100~
QC Blank			<0.00008	<0.00008	<0.00008	<0.00008	<0.00008	<0.00008	<0.00008

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Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Advanced Chemistry and Research, Etwall House, Bretby Business Park, Ashby Road, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR02044
Issue Version	1
Customer Reference	Post Survey

		Units	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)
		Method No	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302
		Limit of Detection	0.00008	0.00008	0.00008	0.00008	0.00008	0.00008	0.00008
		Accreditation	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	MMO*	UKAS/MMO
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**PCB 149**	**PCB 151**	**PCB 153**	**PCB 156**	**PCB 158**	**PCB 170**	**PCB 18**
S13	MAR02044.001	Sediment	0.00009	<0.00008	0.00012	<0.00008	<0.00008	<0.00008	<0.00008
S14	MAR02044.002	Sediment	<0.00008	<0.00008	<0.00008	<0.00008	<0.00008	<0.00008	<0.00008
S15	MAR02044.003	Sediment	0.00027	<0.00008	0.00031	<0.00008	<0.00008	0.00010	<0.00008
Certified Reference Material Nist 1941b (% Recovery)			83	105~	95	62	85	73	85
QC Blank			<0.00008	<0.00008	<0.00008	<0.00008	<0.00008	<0.00008	<0.00008

~ Indicates result is for an In-house Reference Material as no Certified Reference Materials are available.

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Advanced Chemistry and Research, Etwall House, Bretby Business Park, Ashby Road, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR02044
Issue Version	1
Customer Reference	Post Survey

		Units	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)
		Method No	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302
		Limit of Detection	0.00008	0.00008	0.00008	0.00008	0.00008	0.00008	0.00008
		Accreditation	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**PCB 180**	**PCB 183**	**PCB 187**	**PCB 194**	**PCB 28**	**PCB 31**	**PCB 44**
S13	MAR02044.001	Sediment	<0.00008	<0.00008	<0.00008	<0.00008	<0.00008	<0.00008	<0.00008
S14	MAR02044.002	Sediment	<0.00008	<0.00008	<0.00008	<0.00008	<0.00008	<0.00008	<0.00008
S15	MAR02044.003	Sediment	0.00014	<0.00008	0.00011	<0.00008	0.00014	0.00009	<0.00008
Certified Reference Material Nist 1941b (% Recovery)			86	60	81	86	60	91	79
QC Blank			<0.00008	<0.00008	<0.00008	<0.00008	<0.00008	<0.00008	<0.00008

~ Indicates result is for an In-house Reference Material as no Certified Reference Materials are available.

Issuing Laboratory SOCOTEC, Marine Department, Advanced Chemistry and Research, Etwall House, Bretby Business Park, Ashby Road, Burton-upon-Trent DE15 0YZ

Test Report ID MAR02044
Issue Version 1
Customer Reference Post Survey

		Units	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)
		Method No	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302
		Limit of Detection	0.00008	0.00008	0.00008	0.00008
		Accreditation	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**PCB 47**	**PCB 49**	**PCB 52**	**PCB 66**
S13	MAR02044.001	Sediment	<0.00008	<0.00008	<0.00008	<0.00008
S14	MAR02044.002	Sediment	<0.00008	<0.00008	<0.00008	<0.00008
S15	MAR02044.003	Sediment	<0.00008	0.00009	0.00014	0.00012
Certified Reference Material Nist 1941b (% Recovery)			99~	92	85	95
QC Blank			<0.00008	<0.00008	<0.00008	<0.00008

~ Indicates result is for an In-house Reference Material as no Certified Reference Materials are available.

Issuing Laboratory SOCOTEC, Marine Department, Advanced Chemistry and Research, Etwall House, Bretby Business Park, Ashby Road, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR02044
Issue Version	1
Customer Reference	Post Survey

		Units	mg/Kg (Dry Weight)							
		Method No	ASC/SOP/302							
		Limit of Detection	0.0001							
		Accreditation	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**AHCH**	**BHCH**	**GHCH**	**DIELDRIN**	**HCB**	**PPTDE**	**PPDDE**	**PPDDT**
S13	MAR02044.001	Sediment	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
S14	MAR02044.002	Sediment	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0006
S15	MAR02044.003	Sediment	<0.0001	<0.0001	<0.0001	0.0002	<0.0001	0.0001	0.0002	<0.0001
Certified Reference Material Nist 1941b (% Recovery)			99~	75~	57~	97~	109	43	97	91
QC Blank			<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

~ Indicates result is for an In-house Reference Material as no Certified Reference Materials are available.

For full analyte name see method summaries.

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Advanced Chemistry and Research, Etwall House, Bretby Business Park, Ashby Road, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR02044
Issue Version	1
Customer Reference	Post Survey

		Units	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)
		Method No	ASC/SOP/308	ASC/SOP/308	ASC/SOP/308	ASC/SOP/308	ASC/SOP/308	ASC/SOP/308	ASC/SOP/308	ASC/SOP/308
		Limit of Detection	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005
		Accreditation	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**BDE17**	**BDE28**	**BDE47**	**BDE66**	**BDE85**	**BDE99**	**BDE100**	**BDE138**
S13	MAR02044.001	Sediment	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
S14	MAR02044.002	Sediment	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
S15	MAR02044.003	Sediment	<0.00005	<0.00005	0.00008	<0.00005	<0.00005	0.00007	<0.00005	<0.00005
Certified Reference Material Quasimeme Sed56 (% Recovery)			93~	102	108	99~	97~	91	103	88~
QC Blank			<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005

* See Report Notes

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Advanced Chemistry and Research, Etwall House, Bretby Business Park, Ashby Road, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR02044
Issue Version	1
Customer Reference	Post Survey

		Units	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)
		Method No	ASC/SOP/308	ASC/SOP/308	ASC/SOP/308	ASC/SOP/308
		Limit of Detection	0.00005	0.00005	0.00005	0.0001
		Accreditation	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**BDE153**	**BDE154**	**BDE183**	**BDE209**
S13	MAR02044.001	Sediment	<0.00005	<0.00005	<0.00005	0.0023
S14	MAR02044.002	Sediment	<0.00005	<0.00005	<0.00005	0.0004
S15	MAR02044.003	Sediment	<0.00005	<0.00005	<0.00005	0.0282
Certified Reference Material Quasimeme Sed56 (% Recovery)			101	117	96	89
QC Blank			<0.00005	<0.00005	<0.00005	<0.0001

* See Report Notes

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Test Report ID MAR02044
Issue Version 1
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REPORT NOTES

Method Code	Sample ID	The following information should be taken into consideration when using the data contained within this report
*SUB_01	MAR02044.001-003	Analysis was conducted by an approved subcontracted laboratory.
WSLM59*	MAR02044.001-003	Analysis was conducted by an internal SOCOTEC laboratory. UKAS accredited analysis by this laboratory is under UKAS number 1252.
ICPMSS*	MAR02044.001-003	Analysis was conducted by an internal SOCOTEC laboratory. UKAS accredited analysis by this laboratory is under UKAS number 1252.
ASC/SOP/301	MAR02044.001-003	The matrix of this sample has been found to interfere with the result for this test. The sample has therefore been diluted, but in doing so, the detection limit for this test has been elevated.
ASC/SOP/302	MAR02044.001-003	The Primary process control data associated with this Test has not wholly met the requirements of the Laboratory Quality Management System QMS with one or more target analytes falling outside acceptable limits. The remaining data gives the Laboratory confidence that the test has performed satisfactorily and that the validity of the data may not have been significantly affected.However in line with our QMS policy we have removed accreditation, where applicable, from the affected analytes (PCB170) . These circumstances should be taken into consideration when utilising the data.
ASC/SOP/303/304	MAR02044.001-003	Benzo[k]fluoranthene is known to coelute with Benzo[j]fluoranthene and these peaks can not be resolved. It is believed Benzo[j]fluoranthene is present in these samples therefore it is suggested that the Benzo[k]fluoranthene results should be taken as a Benzo[k]fluoranthene (inc. Benzo[j]fluoranthene). Benzo[j]fluoranthene is not UKAS accredited. This should be taken into consideration when utilising the data.
ASC/SOP/303/304	MAR02044.001-003	Chrysene is known to coelute with Triphenylene and these peaks can not be resolved in the PAHSED UKAS accredited method. Chrysene and Triphenylene are resolved for MMO but this is currently not UKAS accredited therefore Chrysene is reported without this acccreditation.

DEVIATING SAMPLE STATEMENT

Deviation Code	Deviation Definition	Sample ID	Deviation Details. The following information should be taken into consideration when using the data contained within this report
D1	Holding Time Exceeded	N/A	N/A
D2	Sample Contaminated through Damaged Packaging	N/A	N/A
D3	Sample Contaminated through Sampling	N/A	N/A
D4	Inappropriate Container/Packaging	N/A	N/A
D5	Damaged in Transit	N/A	N/A
D6	Insufficient Quantity of Sample	N/A	N/A
D7	Inappropriate Headspace	N/A	N/A
D8	Retained at Incorrect Temperature	N/A	N/A
D9	Lack of Date & Time of Sampling	N/A	N/A
D10	Insufficient Sample Details	N/A	N/A
D11	Sample integrity compromised or not suitable for analysis	N/A	N/A

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Method	Sample and Fraction Size	Method Summary
Particle Size Analysis	Wet Sediment	Wet and dry sieving followed by laser diffraction analysis.
Total Organic Carbon (TOC)	Air dried	Carbonate removal and sulphurous acid/combustion at 1600°C/NDIR.
Metals	Air dried	Aqua-regia extraction followed by ICP analysis.
Organotins	Wet Sediment	Solvent extraction and derivatisation followed by GC-MS analysis.
Polyaromatic Hydrocarbons (PAH)	Wet Sediment	Solvent extraction and clean up followed by GC-MS analysis.
Total Hydrocarbon Content (THC)	Wet Sediment	Ultra-violet fluorescence spectroscopy
Polychlorinated Biphenyls (PCBs)	Air dried and seived to <2mm	Solvent extraction and clean up followed by GC-MS-MS analysis.
Organochlorine Pesticides (OCPs)	Air dried and seived to <2mm	Solvent extraction and clean up followed by GC-MS-MS analysis.
Brominated Flame Retardants (PBDEs)	Air dried and seived to <2mm	Solvent extraction and clean up followed by GC-MS-MS analysis.

Analyte Definitions

Analyte Abbreviation	Full Analyte name	Analyte Abbreviation	Full Analyte name	Analyte Abbreviation	Full Analyte name
ACENAPTH	Acenaphthene	C2N	C2-naphthalenes	THC	Total Hydrocarbon Content
ACENAPHY	Acenaphthylene	C3N	C3-naphthalenes	AHCH	alpha-Hexachlorocyclohexane
ANTHRACN	Anthracene	CHRYSENE	Chrysene	BHCH	beta-Hexachlorocyclohexane
BAA	Benzo[a]anthracene	DBENZAH	Dibenzo[ah]anthracene	GHCH	gamma-Hexachlorocyclohexane
BAP	Benzo[a]pyrene	FLUORANT	Fluoranthene	DIELDRIN	Dieldrin
BBF	Benzo[b]fluoranthene	FLUORENE	Fluorene	HCB	Hexachlorobenzene
BEP	Benzo[e]pyrene	INDPYR	Indeno[1,2,3-cd]pyrene	PPDDE	p,p'-Dichlorodiphenyldichloroethylene
BENZGHIP	Benzo[ghi]perylene	NAPTH	Naphthalene	PPDDT	p,p'-Dichlorodiphenyltrichloroethane
BKF	Benzo[k]fluoranthene	PERYLENE	Perylene	PPTDE	p,p'-Dichlorodiphenyldichloroethane
C1N	C1-naphthalenes	PHENANT	Phenanthrene		
C1PHEN	C1-phenanthrene	PYRENE	Pyrene		

DECARBONISATION

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