Lighthouse GREEN FUELS

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Abbreviations

Abbreviation	In full
25YEP	25 Year Environmental Plan
ADCP	Acoustic Doppler Current Profiler
AL	action levels
Cefas	Centre for Environment, Fisheries and Aquaculture Science
CSIP	Cetacean Strandings Investigation Programme
CIEEM	Chartered Institute of Ecology and Environmental Management
CHP	Combined Heat and Power
CCI	Community Conservation Index
CL	Conservation Limits
CIRIA	Construction Industry Research and Information Association
OSPAR	Oslo-Paris Convention for the Protection of the Marine Environment of the North-East Atlantic
CBD	Convention on Biological Diversity
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CMS	Convention on Migratory Species
CRoW	Countryside and Rights of Way
Defra	Department for Environment, Food & Rual Affairs
EcIA	Ecological Impact Assessment
EPC	Engineering, Procurement and Construction
EQS	Environmental Quality Standard
ES	Environmental Statement
fCEMP	framework Construction Environmental Management Plan
GPP	Guidance for Pollution Prevention
HoPI	Habitats of Principal Importance
HGV	Heavy Goods Vehicle
IFCA	Inshore Fisheries and Conservation Authorities
IMO	International Maritime Organisation
IUCN	International Union for Conservation of Nature
INNS	Invasive Non-Native Species
JNCC	Joint Nature Conservation Committee
LBAP	Local Biodiversity Action Plan
LNR	Local Nature Reserve
LSO	long sea outfall
MCZ	Marine Conservation Zones

MMO	Marine Management Organisation
MMObs	Marine Mammal Observer
MOF	Marine Off-loading Facility
MSFD	Marine Strategy Framework Directive EU
MHWS	Mean High Water Springs
MAGiC	Multi-Agency Geographic Information for the Countryside
NNR	National Nature Reserve
NPPF	National Planning Policy Framework
NPS	National Policy Statement
NSIP	Nationally Significant Infastructure Project
NE	Natural England
NERC	Natural Environment and Rural Communities
nm	nautical miles
NASCO	North Atlantic Salmon Conservation Organization
NWL	Northumbiram Water Limited
OWF	Offshore Wind Farm
PAH	polycyclic aromatic hydrocarbons
RCBC	Redcar and Cleveland Borough Council
RMS	Root Mean Square
SOPEP	Shipboard Oil Pollution Emergency Plan
SSSI	Site of Special Scientific Interest
SEL	Sound Exposure Level
SPL	Sound Pressure Level
SAC	Special Area of Conservation
SPA	Special Protection Area
STBC	Stockon-on-Tees Borough Council
SBP	sub-bottom profiler
SSC	Suspended Sediment Concentration
SAF	Sustainable Aviation Fuel
TSRP	Tees Seals Research Programme
TTS	Temporary threshold shift
WCA	The Wildlife and Countryside Act 1981
UXO	unexploded ordnance
UNCLOS	United Nations Convention on the Law of the Sea
WwTW	Wastewater Treatment Works
WFD	Water Framework Directive
ZOI	Zone of Influence

11 Freshwater and Marine Ecology

11.1 Introduction

Background

11.1.1 This chapter of the Environmental Statement (ES) reports the assessment of likely significant effects of the Proposed Development on freshwater and marine ecology during construction and operation. This chapter describes the relevant legislation, guidance and policy context and presents the methodology used in the assessment of the Proposed Development. It assesses the existing baseline conditions in the vicinity of the Proposed Development and the likely impacts and effects that would arise as a result of the construction and operational phases. Mitigation measures are proposed which would be implemented to reduce the impact of the Proposed Development on freshwater and marine ecology.

11.1.1 The freshwater and marine ecology assessment considers potential impacts arising from marine works at the Main Site and in relation to the Wider Site encompassing freshwater bodies, the Tees estuary and marine environment. Further information on the description of the Proposed Development can be found in **Chapter 3: Site and Surrounding Area (ES Volume I, Application Document Ref. 6.1)**.

11.1.2 Based on scoping exercises, field surveys and assessments completed to date, this chapter considers all possible freshwater and marine ecology features for the various Study Areas defined for the Proposed Development. The ecological features identified include statutory and non-statutory designated sites, habitats of conservation importance, a range of protected and notable species, and invasive non-native species (INNS).

11.1.3 The ecological assessments for the Proposed Development have been split into two distinct and separate parts: Terrestrial Ecology, and Freshwater and Marine Ecology. This assessment does not duplicate information set out in **Chapter 10: Terrestrial Ecology (ES Volume I, Application Document Ref. 6.1)**.

11.1.4 This Chapter is intended to be read as part of the wider ES, with particular reference to the following (**ES Volume I, Application Document Ref. 6.1)**:

- **Chapter 3: Site and Surrounding Area**;
- **Chapter 4: Proposed Development**;
- **Chapter 5: Construction**;
- **Chapter 10: Terrestrial Ecology**;

- **Chapter 12: Water Environment**;
- **Chapter 19: Major Accidents and Disasters**;
- **Chapter 20: Marine Navigation**; and
- **Chapter 22: Cumulative and Combined Effects**.

11.1.5 This chapter is supported by the following documentation:

- **Figure 11.1 to 11.11 (ES Volume II, Application Document Ref. 6.2)**.

Works with potential impacts on freshwater and marine ecology receptors

11.1.6 The description of the Proposed Development is detailed in **Chapter 4: Proposed Development** and **Chapter 5: Construction Programme and Management (ES Volume I, Application Document Ref. 6.1)**. Works with potential to impact on marine and freshwater receptors are set out in Table 11.1.

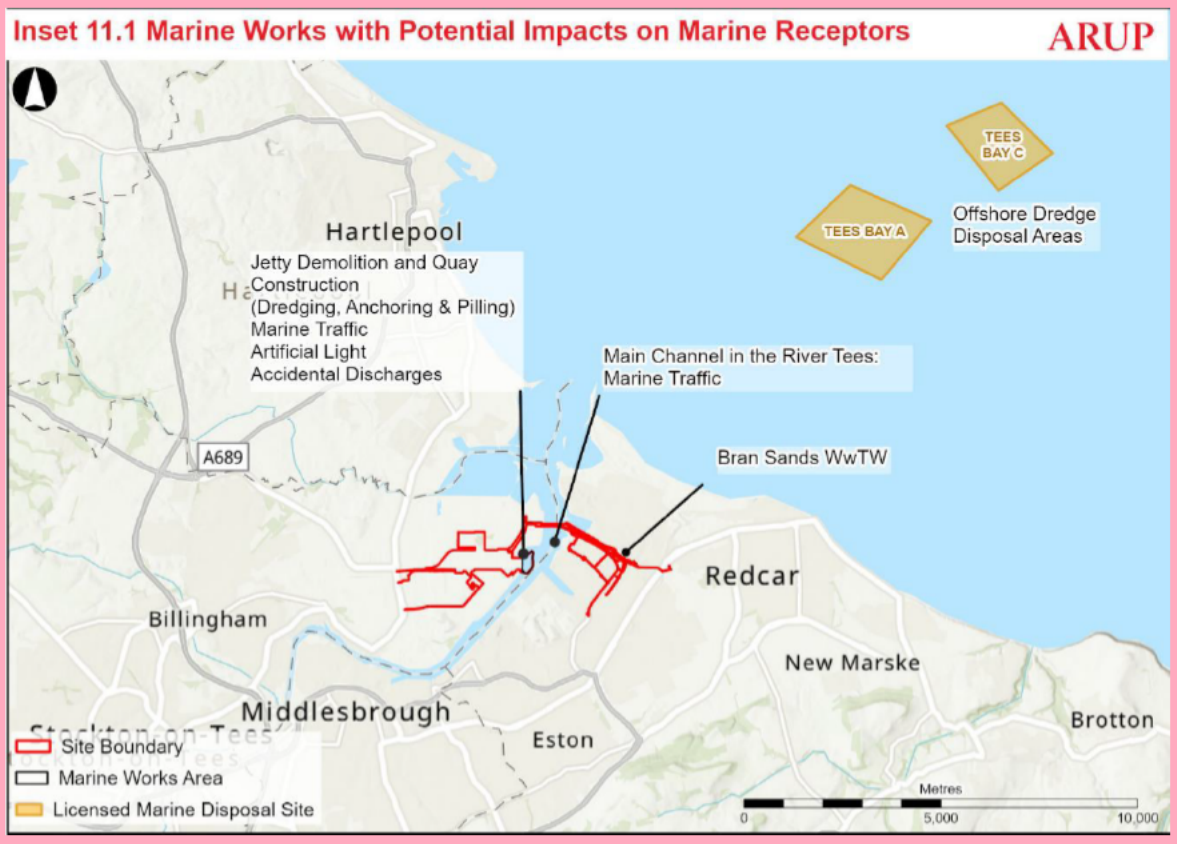
Table 11.1 Works with potential impacts on marine and freshwater receptors

Receptor	Phase	Works and potential impacts
Marine receptors	Construction	• New quay construction: • Demolition of two existing jetties and adjacent redundant infrastructure; - Capital dredging; - Offshore disposal (Tees Bay C licensed area or other such disposal area as may be approved in writing by the MMO) - Piling; - Anchoring vessels in use for construction; • Marine traffic • Use of new quay for import of construction materials and modular plant for construction of the SAF plant; • Continued discharge of clean surface water drainage to the River Tees (as at present); • Use of artificial lighting along the banks of the River Tees; • Commissioning of pipelines; and • Accidental spillage of fuel or other chemicals.
	Operation	• Marine traffic associated with import of biomass and waste wood; • Export treated industrial wastewater to Bran for discharge to the North Sea via the proposed Northumbrian Water long sea outfall;

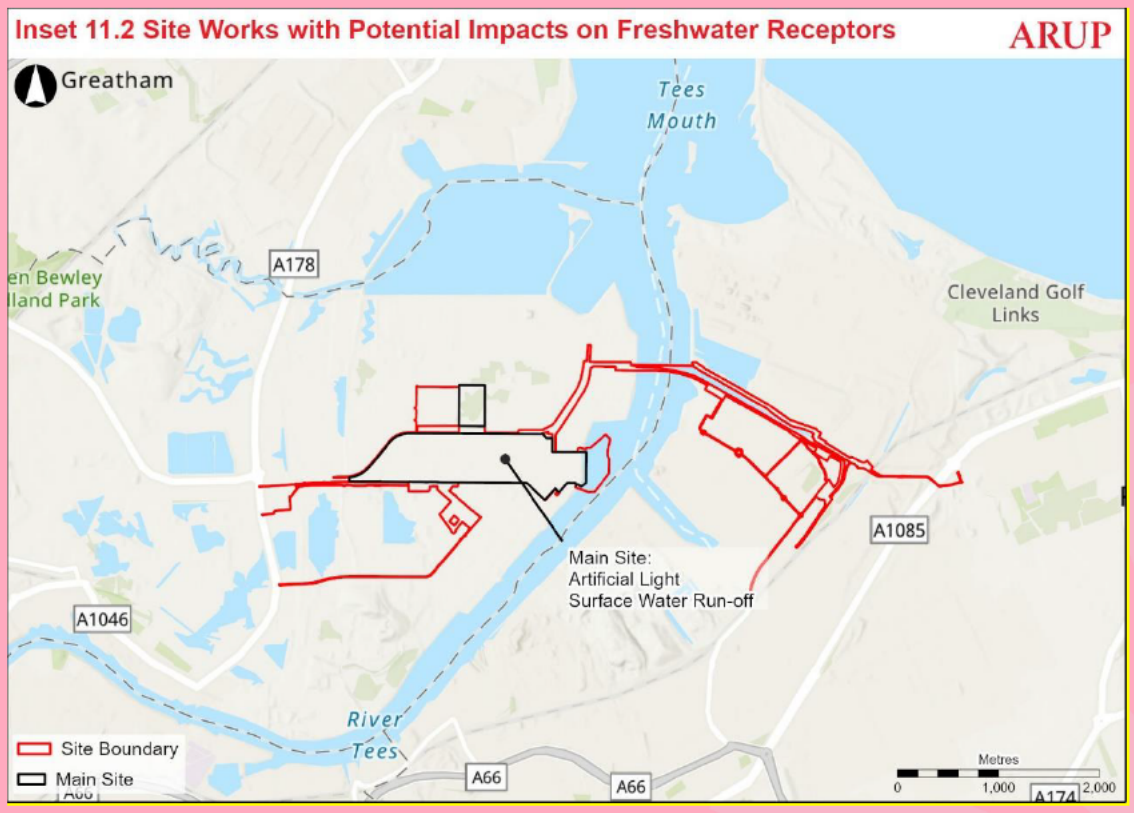
Receptor	Phase	Works and potential impacts
		• Discharge of uncontaminated stormwater runoff to the River Tees; • Maintenance dredging; • Offshore disposal (Tees Bay A or C licensed areas or other such disposal area as may be approved in writing by the MMO) • Accidental spillage of fuel or other chemicals[i]; and • Use of artificial lighting along the banks of the River Tees.
Freshwater receptors	Construction	• Use of artificial lighting either permanent or temporary along access routes to the Site and pipeline maintenance works, particularly around ponds and other surface water features; • Chemical discharges from surface water run-off; and. • Installation and/or widening of culverts to accommodate larger vehicles on access roads/tracks if required.
	Operation	• Use of artificial lighting either permanent or temporary on both the Main Site and the Wider Site, e.g. pipeline maintenance works, particularly around ponds and other surface water features; • Chemical discharges from surface water run-off.

11.1.7 Inset 11.1 and Inset 11.2 show the location of the works which can potentially impact on marine and freshwater receptors.

[i] Note that any accidental spillage of fuel or other chemicals will be controlled and managed under the Environmental Permit.



Inset 11.1 Marine works with potential impacts on marine receptors



Inset 11.2 Site works with potential impacts on freshwater receptors (UK waterbodies in blue)

11.1.8 The detailed design of marine works will be informed as required by appropriate updates to environmental and geotechnical surveys undertaken in advance of construction.

11.1.9 The construction programme will last approximately three to four years in duration from 2028 to 2031. Operation is planned commence during 2031.

11.1.10 At the end of its operating life, the most likely scenario is that the SAF Production Facility of the Proposed Development will be decommissioned. No decommissioning activities are proposed in relation to the quay infrastructure as this is intended to remain in place and continue serving other future operational purposes beyond the operational phase of the Proposed Development. The impacts associated with demolition cannot be assessed in detail at this stage and will be scoped accurately at the time of decommissioning, when freshwater and marine ecology receptors will be identified and assessed, in accordance with legislation relating to development in the marine environment. It is assumed that such impacts will be no worse than those associated with construction and will require similar mitigation or less; effects will be controlled through a Decommissioning Environmental Management Plan (DEMP). Decommissioning requirements will be defined at time of decommissioning and any marine receptors to be identified following confirmation of the decommissioning proposal.

Quay construction

11.1.11 During demolition of the existing jetties and adjacent redundant infrastructure, piles would be either extracted or cut off below a level at which any remaining stumps would not pose a risk. The activity will be supported by spud leg barge or jack up barge.

11.1.12 Following the description in **Chapter 5: Construction Programme and Management (ES Volume I, Application Document Ref. 6.1)**, the quay wall would be constructed in one of two ways, either from marine plant upon vessels such as jack-up barges operating in the Tees estuary (a marine build) or plant operating from the landside at the top of the embankment following creation of a temporary bund (a terrestrial build).

11.1.13 Under a marine build method, the quay would be constructed from jack-up or spud-leg barges with piling being carried out within the estuary waters. Once constructed, fill material would be used to back fill between piles and the land and the area in front of the quay would be dredged to the required depths for vessel access during construction and operation

11.1.14 Under a terrestrial build method, the quay would be constructed by importing fill material to create a construction bund in the River Tees in front

of the existing embankment. This would allow the quay wall to be constructed predominantly using land-based piling rigs and avoid the need to utilise jack-up barges to construct the quay wall. The fill would be imported by ship or by heavy goods vehicles (HGV) and discharged in front of the existing embankment. When the quay wall is completed the imported material in front of the quay wall would be excavated and dredged and used to raise ground levels on the Main Site. Alternatively, the material would be removed by vessel for reuse or disposal at sea or at an on-shore landfill site. The steel piles for the quay wall would be imported by ship.

11.1.15 For the crane beam, the construction of the piled support and the crane beam would be a landside operation. Tie rods, where required, would be placed in trenches excavated through the land.

11.1.16 The quay is proposed to receive modules and materials during construction. Vessels using the quay will be heavy-lift ocean going vessels such as MC Class vessel, bulk vessels and barges of various sizes supplying construction materials.

Dredging

11.1.17 Capital dredging will be required to form the berthing pocket and access channel for ships using the quay during construction. It is estimated that between 400,000 and 800,000m^3 of material would be dredged depending on which quay construction option is selected. The area comprises a dredged pocket in front of the quay approximately 300m long and 55m wide, an approach channel between the nearby existing turning circle in the River Tees and the dredged pocket which would be tidally restricted, subject to vessel draft, with side slopes between the dredged areas to prevent collapse of shallower areas into deeper and scour protection in front of the quay wall (see **Marine Works Plans Application Document Ref. 2.8**).

11.1.18 A proportion of bund material (if the terrestrial build method is used) would also be removed by dredging and is anticipated that it would also be disposed of at sea. The dredged material will be disposed under a deemed Marine Licence in licensed offshore disposal areas, such as Tees Bay C, if this is acceptable to the licensing authorities. Any material that does not meet the acceptance test of the disposal area will be disposed of at an onshore permitted landfill site.

11.1.19 Periodic maintenance dredging of the berthing pocket and approach channel is expected to be required to maintain required depths during operation.

11.1.20 Dredging equipment is expected to comprise up to two backhoe dredgers each with self-propelled hopper barges and a tug or a cutter suction

dredger and self-propelled hopper barges or possibly a trailing suction dredger for the softer riverbed material.

11.1.21 Dredge operations are anticipated to be continuous and operate 24 hours a day and seven days a week during the period of works. Dredging could take around five months to carry out, depending on the final dredged volume, the dredging equipment selected and the ease of dredging.

11.1.22 Dredging has been well regulated since the Convention for the Prevention of Marine Pollution by Dumping from Ships and Aircraft (Oslo Convention) [Ref 128] was adopted in 1972 and was broadened to cover land-based sources of marine pollution and the offshore industry by the Paris Convention of 1974 [Ref 129]. These two conventions were unified, updated and extended by The Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR Convention) [Ref 92].

11.1.23 In the UK, dredging and disposal activities are regulated under the Marine and Coastal Access Act 2009 [Ref 95], which implements the requirements of international conventions such as OSPAR through a marine licensing regime overseen by the relevant competent authorities.

Piling

11.1.24 Percussive piling will be required for both sheet piles and tubular plies during the quay construction works. The depth of piling will be confirmed through ground investigation to be undertaken prior to finalising the construction and foundation design. A Piling Risk Assessment will be undertaken in accordance with CL:AIRE guidance [Ref 126] and pollution prevention controls in accordance with the Environment Agency's (EA) Groundwater Protection Guidance [Ref 127] to consider and mitigate the risks of causing new pollutant linkages and/or worsening existing linkages with respect to risks to controlled waters during construction of the Proposed Development. Piling is controlled by a requirement in the **draft DCO (Application Document Ref. 3.1).**

11.1.25 As the final quay construction methodology has not yet been confirmed, both marine-based construction and construction from a temporary bund are being considered. If a marine construction method is progressed, the piling operations will result in full transmission of noise into the marine environment whereas a terrestrial (bunded) construction method would result in partial transmission of noise into the marine environment. A marine construction option is considered the reasonable worst case scenario with regard to underwater noise and is considered below.

Vessel movements

11.1.26 The construction and operation of the Proposed Development will generate a direct increase in the number of vessels and transit counts in the River Tees. During the demolition of jetties and construction of the quay, vessels will be used to transport materials. Once constructed, the quay will serve as a MOF for import of modular plant and construction materials to the Main Site. Types of vessels expected to be used include jack-up barges, flat top barges, multi-cat or tugs, Heavy Lift Vessels, North Sea Barges and general workboats.

11.1.27 During operations, vessel traffic will be related to the offloading of biomass feedstock and waste wood. Final vessel types and number of transits will be confirmed by the operator and/or contractor in due course, preliminary number of vessels are detailed in the Preliminary Navigation Risk Assessment in **Appendix 20A (ES Volume III, Application Document Ref. 6.3)** and summarised in Table 11.2.

Table 11.2 Estimated number of vessel movements

Function	Work Phase	Estimated number of trips	Period
Jetty Demolition	Construction	233	3 months
Construction of new quay	Construction	85	12 months
Transport of modules	Construction	200	18 months
Capital dredging	Construction	830	5 months
Feedstock import	Operation	93	annual

Source **Appendix 20A: Navigation Risk Assessment (ES Volume III, Application Document Ref. 6.3)**

Industrial wastewater discharge

11.1.28 For discharge of treated industrial wastewater, a pipeline will connect the Main Site to Northumbrian Water Limited (NWL)'s Bran Sands wastewater treatment works (WwTW). The pipeline will run north from the Main Site following existing pipeline routes, through an existing tunnel under the Tees, and along the north bank of Dabholm Gut before it connects to NWL's Bran Sands WwTW. Therefore, there will be no works in the marine environment associated with the construction and use of the industrial wastewater pipeline.

11.1.29 Currently, Bran Sands WwTW discharges treated wastewater to Dabholm Gut, which in turn drains to the Tees Estuary. However, the Proposed Development will use NWL's proposed Long Sea Outfall (LSO) for discharge of treated wastewater to the North Sea to reduce nutrient nitrogen concentrations within the Tees Transitional Waterbody and Tees Bay [Ref 2].

Surface water discharge

11.1.30 An extension of the existing surface water outfall will also be constructed as part of the quay works with the outfall relocated to the southern wing wall of the quay, to allow discharge of clean surface water to the River Tees.

Construction utilities

11.1.31 It is anticipated that the use of some diesel generators will be required for construction power generation, where wired electrical supply is not practicable. Use of these systems means that a potential for fuel and oil spillages exists.

Lighting

11.1.32 Temporary lighting is proposed to enable safe working during construction in hours of darkness. Lighting will be designed to minimise any potential light disturbance to ecological receptors.

Management of surface water runoff and drain water

11.1.33 The Framework Drainage Strategy (appended to the **Flood Risk Assessment, Application Document Ref. 5.7**) sets out the management of rainfall runoff from contaminated and non contaminated areas, ensuring that surface water flows are safely conveyed, attenuated and discharged.

Installation of culverts

11.1.34 Access into the Linkline corridor area from the west may in the worst case scenario require works to the roads/tracks to accommodate heavy plant haulage including replacement/upgrading of culverts.

11.1.35 If necessary, existing culverts will be upgraded to accepted Environment Agency standards to facilitate water flows, fish passage and sediment dynamics, and in adherence with the Environment Agency Policy Regarding Culverts: Technical Guidance on Culverting Proposals [Ref 3].

Marine and freshwater receptors

11.1.36 This chapter sets out a review of the existing marine and freshwater ecological baseline conditions and assesses the potential impacts of the Proposed Development.

11.1.37 The freshwater and marine ecological receptors that have been identified are as follows, these are discussed further in Section 11.4:

- designated sites (statutory and not statutory sites, such as Special Areas of Conservation (SAC), Sites of Special Scientific Interest (SSSI),

and Marine Conservation Zones (MCZ), and National Nature Reserves (UK) (NNR)[ii] (freshwater and marine receptors);

- plankton (phytoplankton and zooplankton) (marine receptors);
- benthic ecology (marine receptors);
- fish and shellfish (including marine, freshwater and migratory fish species) (freshwater and marine receptors);
- commercial fisheries (marine receptors);
- marine mammals (marine receptors); and
- native species and ecosystems (freshwater and marine receptors).

11.1.38 Impact pathways to coastal seabirds and associated designated sites are considered in **Chapter 10: Terrestrial Ecology (ES Volume I, Application Document Ref. 6.1)**. An assessment of nutrient neutrality is included in **Chapter 12: Water Environment (ES Volume I, Application Document Ref. 6.1)**.

11.2 Legislation and Planning Policy Context

Overview

11.2.1 This ES Chapter has been prepared in accordance with relevant national and local planning policies, guidance documents, and legislative frameworks. A summary of the National Policy Statement (NPS) and other policy compliance of the Proposed Development with regard to freshwater and marine ecology is provided in Table 11.3.

Table 11.3 Summary of key Legislation, Policy and Guidance

Legislation/Policy/Guidance	Summary
Legislation/Conventions	
Conservation of Seals Act 1970 [Ref 84]	Controls the taking and disturbance of seals to protect vulnerable populations in UK waters.
Ramsar Convention 1971 [Ref 85]	Promotes the conservation and wise use of internationally important wetlands.
Salmon and Freshwater Fisheries Act 1975 (as amended) [Ref 86]	Provides legal protection for salmon and freshwater fish, including controls on fishing and habitat disturbance.
Bern Convention 1979 [Ref 87]	Aims to conserve wild flora and fauna and their habitats across Europe.
Bonn Convention 1979 [Ref 88]	Encourages coordinated conservation of migratory species across their range states.

[ii] SPA and Ramsar designated sites are assessed in Chapter 10 – Terrestrial Ecology.

Legislation/Policy/Guidance	Summary
Wildlife and Countryside Act 1981 [Ref 89]	Protects native species and habitats and underpins UK nature conservation law.
Environmental Protection Act 1990 [Ref 90]	Establishes duties for pollution control and waste management.
ASCOBANS 1991 [Ref 91]	Agreement on the Conservation of Small Cetaceans of the Baltic, North East Atlantic, Irish and North Seas (ASCOBANS) supports the conservation of small cetaceans around northern Europe.
OSPAR Convention 1992 [Ref 92]	Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR) coordinates international efforts to protect the marine environment of the North-East Atlantic.
Countryside and Rights of Way (CRoW) Act 2000 [Ref 93]	Enhances public access to nature and strengthens wildlife protection measures.
Natural Environment and Rural Communities (NERC) Act 2006 [Ref 94]	Places a duty on public bodies to conserve biodiversity in decision-making.
The Marine Works (Environmental Impact Assessment) Regulations 2007 [Ref 138]	Regulates marine activity where an EIA is required.
The Marine and Coastal Access Act 2009 [Ref 95]	Provides a framework for the sustainable management and protection of marine and coastal environments, including the designation of Marine Conservation Zones (MCZs), the implementation of marine spatial planning, and the promotion of public access to the coast. Provides the legal framework for managing the UK's marine environment, assigning responsibility for fisheries within 0–6 nautical miles to Inshore Fisheries and Conservation Authorities (IFCAs), and from 6–200 nautical miles to the Marine Management Organisation (MMO).
The Eels (England and Wales) Regulations 2009 [Ref 96]	Ensures sustainable management and conservation of European eel populations.
The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 [Ref 98]	Regulates EIAs for Nationally Significant Infrastructure Projects (NSIPs) in England, Wales, and part of Scottish waters.
The Water Environment Regulations 2017 (England and Wales) [Ref 99]	Transposes European Water Framework Directive (WFD) into UK law. Focusses on ensuring water bodies achieve good ecological and chemical status.
The Conservation of Habitats and Species Regulations 2017 (amended by The Conservation of Habitats and Species (Amendment) (EU Exit)	Implements EU Habitats and Birds Directives in UK law, protecting designated sites and species. Projects affecting designated sites require specific assessment.

Legislation/Policy/Guidance	Summary
Regulations 2019) [Ref 99] [Ref 100]	
The Invasive Alien Species (Enforcement and Permitting) Order 2019 [Ref 101]	Implements and enforces the EU Regulation 1143/2014 on the prevention and management of the introduction and spread of INNS species in England and Wales.
Environment Act 2021 [Ref 102]	Introduces legally binding environmental targets and mandates Local Nature Recovery Strategies.
Policy	
The UK Marine Policy Statement 2011 [Ref 103]	Directs sustainable use of marine resources and coastal development.
Tees Valley Local Biodiversity Action Plan (LBAP) (updated) 2012 [Ref 104]	Identifies local priority habitats and species, and outlines conservation actions to support biodiversity in the Tees Valley.
Redcar and Cleveland Borough Council (RCBC) Local Plan 2018 [Ref 105]	Provides the spatial planning framework for the borough, including policies for conserving natural habitats and managing coastal change, N4 Biodiversity and Geological Conservation.
Stockton-on-Tees Borough Council (STBC) – Local Plan 2019 [Ref 106]	Sets out local planning policies for development, including environmental protection and biodiversity within the borough.
North East Marine Plans 2021 [Ref 107]	Guides sustainable use of marine resources in the Northeast Inshore and Offshore areas, supporting marine biodiversity and coastal development.
Government's 25-Year Environment Improvement Plan 2023 [Ref 108]	This plan review 25 Year Environmental Plan (25YEP) was published in 2018 to support clean growth and innovation in low-carbon technologies, supporting projects akin to SAF's production and its role in decarbonising aviation.
Overarching National Policy Statement for Energy (NPS) (EN-1) 2025 [Ref 109]	Sets out the primary policy framework for assessing nationally significant energy infrastructure projects, including environmental and ecological considerations.
National Planning Policy Framework (NPPF) 2026 [Ref 110]	Requires planning authorities to conserve and enhance the natural environment whilst also supporting nature recovery through the protection, restoration and enhancement of ecological networks, biodiversity and natural capital, including strengthened policies on biodiversity net gain, climate resilience, and sustainable development, including support for renewable and low-carbon energy projects like SAF.
Guidance	
Construction Industry Research and Information Association (CIRIA) 2001. Control of Water Pollution from Construction Sites: Guidance for Consultants	Guidance for consultants and contractors on the control of water pollution from construction sites

Legislation/Policy/Guidance	Summary
and Contractors. CIRIA Report C532 [Ref 111]	
Environment Agency. 2010. Culvert design and operation guide [Ref 112]	EA guidance on the installation and operation of culverts.
British Standards Institution 2013 BS 42020:2013 Biodiversity, Code of Practice for Planning and Development. BSI Standards [Ref 113]	Makes recommendations and provides guidance ensuring that actions and decisions taken at each stage of the planning process are informed by appropriate and sufficient ecological information.
OSPAR Commission 2014. Guidelines for the Management of Dredged Material at Sea (Agreement 2014-06). [Ref 114]	Guidelines for the assessment and management of dredged material to be disposed of at sea.
Environment Agency. 2017. Clearing the Waters for All: Guidance for Discharges to Surface Water and Groundwater. [Ref 115]	EA guidance for discharges to surface water and groundwater.
Chartered Institute of Ecology and Environmental Management (CIEEM) 2018 [Ref 116]	Guidelines for Ecological Impact Assessment (EcIA) in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Version 1.3 updated September 2024. This Guideline combines the Guidelines for EcIA in the UK and Ireland: Terrestrial, Freshwater and Coastal, 2nd edition (2016) and the Guidelines for EcIA in Britain and Ireland: Marine and Coastal (2010).
UK Guidance: Dredging 2019 [Ref 117]	Explains when dredging activities may need a marine licence from the Marine Management Organisation.
North East Inshore and North East Offshore Marine Plan (Marine Management Organisation, 2021) [Ref 118]	Sets out that proposals that result in the generation of impulsive sound must contribute data to the UK Marine Noise Registry as per any currently agreed requirements. Public authorities must take account of any currently agreed targets under the Marine Strategy Part One Descriptor 11. Proposals that result in the generation of impulsive or non-impulsive noise must demonstrate that they will, in order of preference: a) avoid b) minimise c) mitigate adverse impacts on highly mobile species so they are no longer significant. If it is not possible to mitigate significant adverse impacts, proposals must state the case for proceeding.
Pollution prevention for businesses. 2016. [Ref 119]	Guidance for businesses and organisations detailing how they can avoid causing pollution from oil and chemical storage, car washing, construction and other activities.

Legislation/Policy/Guidance	Summary
North Atlantic Salmon Conservation Organization (NASCO) fourth cycle (2026-2032) [Ref 120]	NASCO support the adoption of a Ten-Year Strategy to address the decline of wild Atlantic salmon populations. The main components are conservation commitments and performance indicators.
Centre for Environment, Fisheries and Aquaculture Science (Cefas) PREMIAM – Pollution Response in Emergencies – Marine Impact Assessment and Monitoring: Post-incident monitoring guidelines [Ref 122]	Guidelines concerning monitoring pollution events post-incident to ensure marine impacts are minimised as far as practicable.
Joint Nature Conservation Committee (JNCC) 2010 Statutory nature conservation agency protocol for minimising the risk of injury to marine mammals from piling noise [Ref 123]	Standard mitigation guidelines to minimise the potential impacts from impulsive noise generated by piling upon marine mammals.
JNCC 2017 Guidelines for minimising the risk of injury to marine mammals from geophysical surveys (seismic survey guidelines) [Ref 124]	Standard mitigation guidelines to minimise the potential impacts to marine mammals from impulsive noise sources such as seismic surveys.
U.S. National Oceanographic Atmospheric Association guidance (2024) Marine mammal noise exposure criteria: Updated scientific recommendations for residual hearing effects. [Ref 70; Ref 71]	Guidance on how to assess hearing injury thresholds with regard to marine mammals and sources of underwater noise.
JNCC 2025 Guidelines for minimising the risk of injury to marine mammals from explosive use in the marine environment [Ref 125]	Standard mitigation guidelines to minimise the potential impacts to marine mammals from noise generated by the use of explosives e.g. unexploded ordnance (UXO) clearance.

11.3 Assessment Methodology and Significance Criteria

Introduction

11.3.1 The criteria to assess environmental sensitivity of the marine and freshwater receptors is summarised in the following table (Table 11.4) and follows **Chapter 2 Assessment Methodology (ES Volume I, Application Document Ref. 6.1)**.

Table 11.4 Environmental sensitivity of marine and freshwater ecological receptors

Sensitivity	Criteria
High	Statutory sites designated or classified under international conventions or European legislation, for example: • World Heritage Sites; • Biosphere Reserves; • Wetlands of International Importance (Ramsar sites); • Special Areas of Conservation (SAC); and • Special Protection Areas (SPA). Species classified as 'endangered' or 'critically endangered' according to the International Union for Conservation of Nature (IUCN) Red List (IUCN, 2019).
Medium	Statutory sites designated under national legislation, for example: • Sites of Special Scientific Interest (SSSI); • Marine Conservation Zones (MCZ); • National Nature Reserves (UK) (NNR); and Species classified as 'vulnerable' or 'near threatened' according to the IUCN Red List.
Low	Locally designated wildlife sites, for example Local Nature Reserves (LNR) (UK). Those species considered to be of 'least concern' (according to the IUCN Red List.
Negligible	Habitats and species of low conservation importance in UK, without designated sites or designated wildlife sites.

11.3.2 Magnitude of impact is defined by the level of change from the identified baseline conditions, irrespective of the value/sensitivity of receptors. The magnitude criteria is outlined in Table 11.5.

Table 11.5 Magnitude of marine and freshwater impacts

Magnitude	Criteria
High	Total loss or major alteration to key elements/features of the baseline (i.e., pre-development) conditions.
Medium	Partial loss or alteration to one or more key elements/features of the baseline (i.e., pre-development) conditions
Low	Minor shift away from baseline (i.e., pre-development) conditions.
Negligible	Very slight change from baseline (i.e., pre-development) conditions

11.3.3 The overall significance of the effect is assigned by the combination of both sensitivity of the receptor and magnitude of impact, as presented in Table 11.6.

Table 11.6 Significance of marine and freshwater effects

		Magnitude			
		High	Medium	Low	Negligible
Sensitivity	High	Major	Major	Moderate	Minor
	Medium	Major	Moderate	Minor	Negligible
	Low	Moderate	Minor	Negligible	Negligible
	Negligible	Minor	Negligible	Negligible	Negligible

11.3.4 Typically, moderate or major effects are considered 'significant' in EIA terms, and negligible or minor effects are 'not significant'. The conclusion of the significance of each effect considers embedded design, good practice and additional mitigation measures which are required to reduce potential impacts that could otherwise result in significant effects.

11.3.5 Where significant impacts are predicted, the assessment then identifies measures to avoid or reduce the impact. Where necessary, monitoring is also proposed. This study follows the mitigation hierarchy, where the sequential process should be adopted to avoid, mitigate and compensate negative impacts.

11.3.6 Adverse effects can be insignificant when acting in isolation from a single source but become significant when concentrated spatially or temporally. The cumulative effects are assessed in **Chapter 22: Cumulative and Combined Effects (ES Volume I, Application Document Ref. 6.1)**.

Consultation

11.3.6.1 The following consultations were carried out regarding the Proposed Development:

- MMO;
  i. Written correspondence 6 November 2026 regarding sampling plan for sediment quality survey.
  ii. Meeting held on 13 November 2025 to discuss scoping and baseline survey requirement.
  iii. Meeting held on 10 June 2026 with Cefas to discuss MMO Scoping response and notify of baseline survey plan.
  iv. Written correspondence on 22 January 2026 regarding updated sampling plan for sediment quality.
- Natural England;

i. Meeting held on 27 October 2025 to discuss the Environmental Impact Assessment (EIA) Scoping Report and baseline survey requirements;

ii. Written consultation regarding the EIA Scoping Report received on 30 October 2025;

iii. Written consultation regarding the Preliminary Environmental Information Report (PEIR) received on 13 January 2026;

iv. Meeting held on 5 March 2026 to discuss the PEIR; and

v. Written consultation regarding the PEIR addendum received on 13 May 2026.

- Environment Agency;

i. Written consultation regarding the EIA Scoping Report received on 30 October 2025;

ii. 12 November 2025 meeting to discuss Environment Agency scoping response and baseline survey requirements.

iii. Written consultation regarding the PEIR received on 13 January 2026; and

iv. Written consultation regarding the PEIR addendum received on 13 May 2026.

Scoping opinion

11.3.6.2 An **EIA Scoping Opinion (Appendix 2B, ES Volume III, Application Document Ref. 6.3)** was received on 11 November 2025 from the Planning Inspectorate. Refer to Table 11.7 for a summary of the scoping opinion comments relevant to this chapter received from statutory environmental bodies and the Applicant's responses.

Table 11.7 Scoping response

Stakeholder	Scoping comment	Applicant response
Environment Agency	Wastewater treatment - A scheme of nutrient neutrality mitigation will likely be necessary considering nitrogen loading to the Tees Estuary Transitional Waterbody.	A **Nutrient Neutrality Assessment (Application Document Ref. 5.9)** has been undertaken to assess the implications of increased nitrogen loading to the Tees Estuary Transitional Waterbody from land use change as a result of construction of the Proposed Development and to identify the mitigation required to ensure no adverse effect on designated sites. This includes consideration of

Stakeholder	Scoping comment	Applicant response
		appropriate nutrient neutrality mitigation measures which will need be agreed in consultation with the LPA and Natural England.
Environment Agency	**Migratory Fish** Underwater noise has the potential to impact migratory fish. Therefore, where possible piling should be avoided: • Between 1 March and 30 November inclusive, in any given year, no piling should take place for 3 hours following low water. • During the month of May, no piling of any type must take place for the first five hours of the ebbing tide.	The need for seasonal restrictions on piling has been reviewed and assessed, in consultation with Environment Agency specialists. Piling noise assessment and mitigation are presented in the ES.
Environment Agency	**Intertidal habitat** The Environment Agency does not permit works that encroaches onto the intertidal foreshore which would result in significant harm to the intertidal habitats. Where such alternatives are not an option, adequate mitigation and compensation must be provided. Where this is not possible and works would result in significant harm to biodiversity interests which cannot be prevented, mitigated or compensated for then planning permission should be refused.	The need for adequate mitigation and compensation has been reviewed and assessed depending on the impact occurring to intertidal habitats outwith the revetment. No works are expected to be required on the intertidal foreshore outwith the revetment. Those works associated with construction of the quay and removal of the revetment are not considered to have the potential to result in considerable harm to intertidal habitats or a reduction in biodiversity.
Environment Agency	**Migratory fish** As temperature increases during the summer months, oxygen becomes much less soluble in water and as such the risk of hypoxia to fish increases. During the summer months, not only is this the most likely time for dissolved oxygen to be naturally low, but also when the salmon's metabolic rate is at its highest and demand is greatest. If possible, dredging should be avoided during the warm summer months (1 July to 1 September inclusive) when background	The potential for avoidance of dredging works during the summer months (1 July to 1 September inclusive) has been considered and reported in the ES.

Stakeholder	Scoping comment	Applicant response
	conditions are likely to be most stressful for fish.	
Environment Agency	**Eels** The ES should consider the impacts to Eels. Under Regulation 17(4) of the Eels (England and Wales) Regulations 2009, on or after 1 January 2015, a responsible person must ensure an eel screen is placed in a diversion structure that: 1. is capable of abstracting at least 20 cubic metres of water through any one point in any 24-hour period; or 2. returns water to a channel, bed or sea The ES should consider the level of risk to eels from the proposed dredging works and if the works require an eel screen or any alternative risk reduction measures, or if the activity can be exempted by the Environment Agency. You may need to provide a method statement outlining details of the proposed dredging technique and equipment to be used (e.g., pump specifications) and dredging methodology, timings, duration, and location.	The requirements of the Eels (England and Wales) regulations has been complied with. The Framework Construction Environmental Management Plan (fCEMP) (**Appendix 5A CEMP, Application Document Ref. 6.3**) outlines good industry practice measures relating to dredging techniques.
EA	No details regarding the standard mitigation measures are provided within the Scoping Report. In the absence of confirmation that Northumbrian Water Limited (NWL) is redirecting effluent from Bran Sands WwTW from Dabholm Gut to the North Sea, the proposed development may result in increased nitrogen nutrient loading within the Tees estuary. The Inspectorate is not in a position to scope this matter out at this stage. The ES should assess the potential for likely significant effects to occur on phytoplankton or the information referred to demonstrating agreement with the relevant consultation bodies and the	Nutrient neutrality mitigation has been assessed in the **Nutrient Neutrality Assessment (Application Document Ref. 5.9)**

Stakeholder	Scoping comment	Applicant response
	absence of a likely significant effect.	
Natural England	Direct and indirect habitat loss within the designated site In-River Works The project includes extensive works within the River Tees, which lies within the Teesmouth and Cleveland Coast SPA/ Ramsar/SSSI. This includes all works associated with demolishing two existing jetties, constructing and maintaining a new quay, and dredging to facilitate access. River Crossing The project involves crossing the River Tees, which lies within the Teesmouth and Cleveland Coast SPA/ Ramsar/ SSSI. We note that the method of crossing the River Tees and that the Applicant's preferred option is to utilise existing tunnel infrastructure. The viability of this option should be confirmed. If the viability of using existing tunnel infrastructure cannot be confirmed then the ES should consider a worst-case scenario for crossing the River Tees.	It is confirmed that the Proposed Development will utilise existing infrastructure for the Tees Crossing. Impact from marine works within the SSSI have been assessed in this chapter, while impacts on the SPA and Ramsar sites have been considered in **Chapter 10: Terrestrial Ecology (ES Volume I, Application Document Ref. 6.1)**.
Natural England	Water quality impacts Construction, operational and decommissioning The proposed development has the potential to result in water quality impacts on the designated sites through discharges from the proposed development, either directly or indirectly into designated sites. This may be in the form of wastewater, effluent or surface water. We advise that all discharges from the site are assessed for their potential to result in water quality impacts on designated sites. This should include impacts associated with pollutants to be discharged during operation,	Details on how contamination from construction activities, maintenance and repair works activities will be controlled and mitigated have been provided in this chapter (see also **Chapter 16: Materials and Waste (ES Volume I, Application Document Ref. 6.1)**). Operational wastewater will, where necessary, be directed to Bran Sands WwTW for any necessary treatment prior to discharge. Only clean surface water runoff will be discharged into the Tees Estuary.

Stakeholder	Scoping comment	Applicant response
	temperature changes and impacts from contaminants from surface water. Details on how contamination from construction activities, maintenance and repair works and decommissioning activities should also be provided.	
Natural England	Water Quality – Nutrient Impacts The Teesmouth and Cleveland Coast SPA/Ramsar is subject to Natural England's advice on elevated nutrient levels. See here for further information: Strategic Solutions: Nutrient Neutrality. As a result, the Applicant should assess the potential for additional Total Nitrogen to be discharged to the catchment of the River Tees, directly or indirectly by the proposed development. Natural England is currently finalising guidance for industrial developers on how to calculate and assess the potential for nutrient impacts. Although this is not yet published, we welcome direct discussions with the Applicant to advise on this matter.	A **Nutrient Neutrality Assessment (Application Document Ref. 5.9)** has been undertaken to assess the implications of increased nitrogen loading to the Tees Estuary Transitional Waterbody from land use change as a result of construction of the Proposed Scheme and to identify the mitigation required to ensure no adverse effect on designated sites. This includes consideration of appropriate nutrient neutrality mitigation measures which will need be agreed in consultation with the LPA and Natural England.
Natural England	Natural England notes that the proposal does not include carbon capture at present. However, if this changes, we have the following advice about potential impacts relating to carbon capture technology: Amine solvents are a potential source of nitrogen if they are released into the atmosphere by air or water, and may contribute to the degradation/ damage of designated site features. Sufficient information should therefore be provided on the carbon capture system, how it is closed loop and how the release of amines will be prevented, both in normal operating conditions and during maintenance/ repair activities. This information is required for the Habitat Regulations Assessment for air and water quality impacts on	Noted. Post Combustion Carbon Capture does not form part of the Proposed Development. No amine emissions are proposed.

Stakeholder	Scoping comment	Applicant response
	SPA/Ramsar features, and for the SSSI assessment.	
Natural England	Natural England advise that the type of noise that could be generated from a project should be clearly defined. This is to ensure that noise evidence is reported using the most relevant metrics for understanding the worst-case scenario. Some types of piling works produce impulsive loud noises, and potential impacts should be established following analysis of the maximum possible sound levels in decibels. For works with less impulsive noises, modelling to understand any increases in average noise levels should be used to understand possible impacts on areas used by SPA/Ramsar/SSSI birds.	Underwater noise modelling has been undertaken to inform the assessment of noise impacts from construction works on marine receptors. Effects of disturbance on birds have been assessed in the Terrestrial Ecology chapter of the ES (**Chapter 10 Terrestrial Ecology, ES Volume 1, Application Document Ref. 6.1**)
Natural England	We advise that seal surveys are carried out in the vicinity of the quay works to determine when and how many of which species pass the development site. Further, we advise that underwater and above water noise modelling is carried out as these pressures can cause disturbance to and a barrier to seals. Mitigation may be necessary to carry out quay works minimising impacts to seals.	A marine mammal observation (MMObs) survey was carried out from the existing quay during July 2026. Seal observations will be carried out in the vicinity of the quay works during piling. See later response on seal surveys and Natural England Discretionary Advice Service (DAS) engagement. The potential for adverse effects from underwater noise on seal and other aquatic receptors has been assessed in the ES and appropriate mitigation measures proposed.
Natural England	Magic maps appears to show a small amount of intertidal mudflat within the Red Line Boundary as well as being adjacent. Larger mudflats are in close proximity to the development area. We note that in section 8.9.4, the applicant commits to further surveys. We advise these surveys should be used to clarify the location of mudflats.	No intertidal mudflat (Priority Habitat Inventory Mudflats (England) or Intertidal Substrate Foreshore (England and Scotland)) is visible on MAGiC [Ref 7] within the Site. The only category of intertidal substrata that intersects the Site is 'made ground'. The mudflat to the north of the turning circle 'Vopak/Navigator foreshore' was surveyed for birds only (see **Chapter 10: Terrestrial Ecology (ES Volume I, Application Document Ref. 6.1)**).

Stakeholder	Scoping comment	Applicant response
Natural England	Benthic communities We advise that benthic communities will be present within the quay and dredge areas.	Subtidal survey has been carried out to identify macrobenthic communities in the dredging area and Zone of Influence (ZOI).
Natural England	Surveys for PEIR: We welcome the applicants intention to carry out further surveys. We advise the applicant engages with Natural England (through our DAS contract) to agree the scope and methodology of marine surveys such that the reports fulfil the requirements of the project and environmental assessments.	The intended surveys were discussed during a meeting with Natural England 05/03/2026.
Natural England	Saltmarsh / seagrass surveys There is a conflict between these two sections. Section 8.9.4 states surveys will be carried out to confirm saltmarsh and seagrass. Section 8.9.5 states that these are not necessary. We advise clarity is provided on this point. Further we advise that the baseline data used to support the application is up-to-date and relevant to the project. We advise the applicant engages with us through DAS to confirm whether or not surveys are required and the scope of those surveys.	The reference in Section 8.9.4 was an error. The previous salt marsh surveys were undertaken in support of a previous DCO application[iii] which included survey of a pond outside the current Proposed Development boundary but which is close to the site. The aquatic survey was carried out in September 2024 which identified several saltmarsh plants, although in poor condition.
Natural England	Seal surveys It is stated that there is sufficient seal data which focusses on haul-outs. Therefore seal surveys have been deemed unnecessary by the applicant. We advise that the baseline data used to support the application is up-to-date and relevant to the project. We advise the applicant engages with us through DAS to confirm whether or not surveys	A site-specific MMObs survey was undertaken in July 2026. The results are available in **Appendix 11A: Marine Ecology Survey and Results (ES Volume III, Application Document Ref. 6.3)**. Following correspondence with the LER, additional MMObs surveys will be undertaken post-submission of the DCO to provide further characterisation of marine mammal use of the estuary adjacent to the site.

[iii] The application for development consent for the Proposed Development supersedes a previous application that was being progressed by Lighthouse Green Fuels Limited centred on a site off Huntsman Drive in Seal Sands, TS2 1TT (PINS ref. EN010150). Statutory consultation on that application took place between 16 May 2024 and 20 June 2024. As shown on the PINS website, that application is discontinued.
See
https://national-infrastructure-consenting.planninginspectorate.gov.uk/projects/EN010150

Stakeholder	Scoping comment	Applicant response
	are required and the scope of those surveys.	
Natural England	Mitigation and enhancement We advise the applicant engages with us through DAS to develop further mitigation and enhancement measures.	An underwater noise assessment has been carried out for a marine piling scenario and appropriate mitigation measures have been proposed. If a bunded construction solution is adopted those mitigations will be reduced or removed. Potential impacts from dredging will be highly localised.
Natural England	Dredge disposal We advise that thorough sampling and analysis of the dredged area is undertaken to determine whether the spoil if suitable for at-sea disposal. We further advise that if sediment is deemed unsuitable for at-sea disposal, we may require a closed system dredge technique to be used to prevent damage to designated features.	Sediment sampling has been undertaken and results were received in June 2026. The results are presented in the ES. Onshore disposal will be considered where results determine contaminant determinand loads are too high for at sea disposal of dredge material. The appropriate dredging technique to mitigate against liberation of contaminated spoil into the marine environment will be agreed with regulatory bodies to ensure suitable handling of material in areas of concern.
Natural England	Summary of impacts and effects and receptors We advise clarity is provided that birds are included within this analysis. Furthermore, birds which are not designated or notified features of protected sites have their own protections (e.g. Wildlife and Countryside Act 1981) and should be assessed for impacts.	The impact on seabirds, waders and waterbirds is presented in **Chapter 10: Terrestrial Ecology (ES Volume 1, Application Document Ref. 6.1)**.
Natural England	Likely impacts We advise that the following impacts are added to these tables and assessed for all fauna receptors: • Disturbance to communities due to above water noise and visual stimuli (movement of people, plant and vessels). • Changes to water quality due to contamination from disturbed sediments.	Likely impacts from visual stimuli , underwater noise and changes to water quality associated with contamination from disturbed sediments are described in this chapter as part of the ES.

Stakeholder	Scoping comment	Applicant response
Natural England	Scoping marine plants and macroalgae Natural England advise marine plants and macroalgae are scoped in to assessments.	Marine plants and macroalgae are described in this chapter.
Natural England	Magnitude of impacts We advise the applicant uses evidence based parameters and discusses levels of magnitude with us to reach agreement for assessment.	The magnitude of impacts has been assessed against available site-specific information or based on results from similar projects where site-specific information is not yet available.
Natural England	We advise that in addition to the surveys noted within this section, additional bird and seal surveys may be required.	Noted
Natural England	Natural England is aware of concerns around potential links between dredging within the Tees estuary and shellfish die-offs along the northeastern and North Yorkshire coastlines.	A meeting has been held with Natural England to discuss this issue. Impacts associated with dredging activities have been assessed within in the respective ZOI.
Natural England	Natural England defer to Cefas and the Environment Agency for further detailed advice on sediment sampling requirements and impacts related to contaminated sediments.	MMO and Cefas have reviewed the sediment sampling plan.
MMO	The ES should assess the potential for likely significant effects to occur on all interest features of the Teesmouth and Cleveland Coast SSSI or the evidence to demonstrate the absence of a likely significant effect such as agreement from relevant consultant bodies.	Impacts on marine receptors have been assessed within the respective ZOI.
MMO	The ES should assess the potential for likely significant effects to occur on all interest features of the Teesmouth NNR or provide the evidence to demonstrate the absence of a likely significant effect.	Impact on marine receptors have been assessed within the respective ZOI.
MMO	Invertebrates The Scoping Report proposes to scope this matter out on the basis that there would be no impact on invertebrates from changes in water quality or sediment suspension as the Tees barrage (about 10km upstream) separates most of the non-mobile	A freshwater survey was carried out on a small pond to the south of the Site under a previous DCO submission [Ref 27] and results presented. No protected/notable species or high-quality habitats were identified.

Stakeholder	Scoping comment	Applicant response
	freshwater species from the site. The Scoping Report identifies the closest freshwater feature within 250m is an artificial lake. The Inspectorate agree to scope this matter out provided that the ES should demonstrate no protected species or high-quality habitat are observed, with agreement from the relevant consultees.	
MMO	Macrophytes The Scoping Report proposes to scope this matter out on the basis that there would be no impact on macrophytes from changes in water quality or sediment suspension as the Tees barrage separates most of the non-mobile freshwater species from the site. Paragraph 8.6.17 states that no protected or notable species were recorded in the macrophyte surveys undertaken by the Environment Agency in 2013 and 2016. The Inspectorate agree to scope this matter out provided that the ES should demonstrate no protected species or high-quality habitat are observed, with agreement from the relevant consultees.	A freshwater survey was carried out on a small pond south of the Site during a previous DCO application [Ref 27]. The results of this are utilised in this ES. No protected/notable species or high-quality habitats were identified.
MMO	Considering saltmarsh and seagrass habitats are interest feature of internationally and nationally designated sites within the Tee Estuary the Inspectorate would expect this impact pathway to be assessed within the ES. Paragraph 8.6.38 states that data regarding marine plants and macroalgae in the study area is limited. In the absence of further information including the specific location of habitats ad proposed mitigation measures for reducing impacts to water quality, the Inspectorate is not in a position to scope this matter out at this stage. The ES should assess the impact of the proposed	Noted. Potential saltmarsh and seagrass impacts were assessed against the ZOI of the Proposed Development. Occurrences of both receptors are outside of the ZOI and it was determined that neither receptor would be impacted by the marine works required.

Stakeholder	Scoping comment	Applicant response
	development on marine plants and macroalgae during construction and operation, particularly operational impacts resulting from nitrogen loading from wastewaters or the information demonstrating agreement with the relevant consultation bodies and the absence of LSE. The applicant's attention is drawn to the consultation response from Environment Agency (EA) (appendix 2 of this Scoping Opinion) in this regard.	
MMO	Marine mammals in the Greater North Sea Ecoregion Impacts to harbour seals, grey seals, and harbour porpoises are proposed to be assessed within the ES due to their presence within the Tees Estuary. Other marine mammals withing the Greater North Sea Ecoregion (namely minke whale, bottlenose dolphin, whitebeaked dolphin, orca, Atlantic white-sided dolphin, long-finned pilot whale, Risso's dolphin and short-beaked common dolphin) are proposed to be scoped out due to their unlikely presence in the estuary. Considering the nature of these species and the location of the proposed development, the Inspectorate is content to scope this matter out of further assessment on the basis that significant effects are unlikely to occur.	Impacts to harbour seal, grey seal, and harbour porpoise have been assessed within this chapter due to their presence within the Tees Estuary.
MMO	Decommissioning. The Scoping Report states that the potential significant impacts associated with decommissioning would likely be similar to those listed for construction. However, the Scoping Report does not indicate if there are any assessment for the decommissioning phase. Please refer to the Inspectorate's	When decommissioning of the SAF plant takes place, the quay infrastructure will not be included and will remain in place post-decommissioning. This is discussed in paragraph 11.6.172.

Stakeholder	Scoping comment	Applicant response
	comments at ID 2.1.10 in this regard.	
MMO	Study area The Inspectorate's comments at ID 3.3.2 about study area for terrestrial ecology apply equally to study area for freshwater and marine ecology.	Works with the potential to affect marine receptors are anticipated to include dredging, piling, potential chemical discharge, vessel collision, *visual stimuli* and others. These works are associated with the new quay area and not the whole Site boundary. However, when applicable, the study area will apply equally for freshwater ecology.
MMO	Surveys The ES should ensure a robust baseline has been established based on up-to-date data wherever possible. The applicant should agree the scope, timing and extent of survey effort with relevant consultation bodies prior to survey work commencing. Evidence of any agreement should be presented in the ES. The applicant's attention is drawn to the consultation response from NE (appendix 2 of this Scoping Opinion) in this regard.	The scope, timing and extent of survey were agreed with MMO and Cefas prior to commencement.
MMO	Impact pathways The potential likely impacts during the construction and operational phases listed in tables 8.9 and 8.10 does not refer to the potential for changes in air quality and deposition of pollutants. This impact pathway should be assessed where there is the potential for likely significant effects. The applicant's attention is drawn to the consultation response from NE (Appendix 2 of this Opinion) which highlights that coastal dune and grassland habitats are sensitive to air quality impacts.	Potential impacts from air quality have been evaluated against project-specific modelling and presented in Chapter 8: Air Quality (ES Volume 1). Where the dispersal area impacts coastal dune and grassland habitats, these receptors are included for consideration.
MMO	Assessment methodology The Inspectorate's comments at ID 3.3.5 about assessment methodology for terrestrial ecology apply equally to study area for freshwater and marine ecology.	Works with the potential to affect marine receptors are anticipated to include dredging, piling, potential chemical discharge, vessel collision and others. These works are associated with the new quay area and not the whole site boundary.

Stakeholder	Scoping comment	Applicant response
		However, where applicable, the same buffer areas have been applied to define the Zone of Influence (ZOI) for designated sites.
ID 3.35	The Scoping Report states that the assessment methodology would follow the CIEEM Guidelines for Ecological Impact Assessment in the UK and Ireland (Terrestrial, Freshwater and Coastal). Paragraph 7.16.4 states that the significance of residual effects will be assessed following the implementation of embedded mitigation, with additional mitigation and compensation measures identified thereafter to offset significant residual effects. This approach does not appear to align with the CIEEM Guidelines. Residual effects should be assessed after all feasible mitigation measures, including both embedded and additional have been implemented. To avoid of doubt, the ES should clearly explain the impact assessment process with reference to the relevant guidelines, including how mitigation measures are considered when determining the significance of residual effect.	The ES assesses the significance of all effects as advised by this comment.

Statutory Consultation

11.3.7 The PEIR was published for statutory consultation on 2 December 2025 and the consultation period ended on 13 January 2026.

11.3.8 An addendum to the PEIR was published for targeted consultation on 13 April 2026 and the consultation period ended 13 May 2026.

11.3.9 Refer to Table 11.8 for a summary of the statutory consultation comments relevant to this chapter received from statutory environmental bodies and the Applicant's responses.

Table 11.8 Statutory consultation response

Statutory Consultation ID (PEIR Reference)	Comment Description	Applicant Response
Stakeholder: MMO		
12.1.3	The MMO notes that overall, the section of the PEIR relating to Commercial Fisheries is small and the MMO further notes that there is no reference to European Lobster (*Homarus Gammarus*), Edible Crab (*Cancer Pagurus*) or Velvet Crab (*Necora puber*) as possible receptors throughout this section. The MMO notes that fishing for these species is commercially important to many fishers in the Teesside area and that this should be considered.	A meeting with NEIFCA was arranged and catch information was provided for European lobster and edible/brown crab. Velvet crab was not considered an important target species for local fisheries and information was not provided. Commercial fisheries are considered in the following sections 11.4.98; 11.4.104
12.1.4	The MMO notes the precautionary position that there is the potential for two significant adverse effects to freshwater and marine ecology from construction works of the Proposed Development. The MMO expects this to be addressed further in the ES.	The potential for significant effects has been refined according to available information for submission.
12.2.2.1	The MMO notes the commitment to conduct site specific surveys "to determine the presence of priority marine habitats or species and any marine Invasive Non-Native Species (INNS)". Providing appropriate survey to determine marine habitats, species and INNS, the MMO consider the assessment of benthic ecology proportionate to fully identify and assess potential impacts.	Site-specific surveys were completed in April 2026. Where data have become available, these are presented and considered against activities associated with the Proposed Development.
12.2.2.2	The MMO recommends that the potential for colonisation by INNS of project infrastructure during the operation stage of the development to be considered. The construction of the new quay in support of the SAF production facility, will likely provide suitable habitat for INNS to settle and become established, and this should be assessed appropriately and inform marine biodiversity monitoring.	The presence of INNS has been interrogated from macrobenthic, scrape and environmental DNA (eDNA) sample results. These results have been compared with archive data and an appropriate monitoring strategy proposed.

Statutory Consultation ID (PEIR Reference)	Comment Description	Applicant Response
12.3.1	The MMO note that the assessment of the potential impacts to fish is high level for a PEIR however, given that the final design of the project is not yet known, it will not be possible to fully assess the magnitude and significance of each impact until the extent of construction, piling and dredging activity has been determined. The MMO would expect the ES to provide more detailed justification when determining the significance of each impact.	The ZOI has been determined for underwater noise and sediment dispersion. These have been compared against relevant taxa and potential effects examined.
12.3.2	The assessment of impacts from underwater noise cites Popper and Hawkins (2019) to identify fish injury thresholds from impulsive pile driving sources. Whilst the sound exposure thresholds presented in Table 6-5 (on page 81) are appropriate, the MMO recommend that Popper et al. (2014) is referred to for more complete guidance on noise generating activities and hearing thresholds in fishes from underwater noise exposure.	Reference to Popper et al has been made within the UXO consideration. National Oceanic and Atmospheric Administration (NOAA) guidance (NOAA, 2024), which uses data from both sources has been considered for thresholds.
12.3.3	In reference to Table 6-5 (on page 82) 'Calculated behavioural change distances for fish for impulsive and non-impulsive sound sources', this table only provides distances for fish without a swim bladder, and a swim bladder that is not involved in hearing. The table should also provide distances for fish with a swim bladder that is involved in hearing (e.g. herring and cod). Injurious effects should be categorised as per Popper et al. (2014) as follows: 'mortality and potential mortal injury', 'recoverable injury', and 'temporary threshold shift' (TTS). The source type in this table is only described as impulsive or non-impulsive, so it lacks necessary information as to the	Fish with swim bladders involved in hearing have been included due to the presence of cod. Popper categories of mortality and potential mortal injury have been used in place of PTS. Sources have been specified as type rather than category. Peak and SEL_{cum} have been provided in addition to hammer energy levels. Tables have been updated to specify injurious effects as opposed to behavioural responses.

Statutory Consultation ID (PEIR Reference)	Comment Description	Applicant Response
	nature of the impulsive/non-impulsive noise type. For example, if percussive piling is referred to for impulsive noise, it needs to be stated that it is percussive piling as opposed to other forms of impulsive noise such as explosions (e.g. unexploded ordnance clearance), or seismic airguns. Similarly, non-impulsive noise i.e. continuous noise, can refer to a variety of sources including vibro-piling, dredging noise and vessel noise. The nature of the continuous noise source and the energy level being generated must be clearly stated. The cumulative Sound Exposure level (SELcum) and Peak metric values should be provided, as well as the hammer energy used in modelling. The MMO also wish to highlight that the title of Table 6-5 (on page 82) needs changing because the distances calculated are for injurious effects, not behavioural responses (which is what the table implies).	
12.3.4	The PEIR assumes that as a 'worst case scenario, up to three impact piling rigs will simultaneously drive a total of 30 piles over a 24-hour period with each pile taking 330 strikes to insert. The piling is assumed to occur over a three-hour period'. This wording in paragraph 6.2.62 is unclear as it suggests piling over a 24-hour period but also over a three-hour period. Further information should be provided in the ES, for example, is all piling for the project expected to be completed within a 24-hour period? Or will it be 3 hours of piling carried out within each 24-hour period. If it is the latter, the total number of days when piling will be carried out over a 3-hour period should be stated in the ES, together with an expected timeline	Two impact piling rigs within the water are now considered to be the worst-case. A worse-case scenario of continuous piling over an 8 hour working day (within any 24 hour period) has now been considered due to no confirmation that less than this has been performed.

Statutory Consultation ID (PEIR Reference)	Comment Description	Applicant Response
	for the month(s) when piling will occur.	
12.3.5	It is noted that no 3D modelling was carried out when creating the Zone of Influence (ZOI) for underwater piling noise impacts, and therefore the specific ray patterns (and thus shadow zones and caustics within the water column), absorption due to the sediment, tidal conditions, sound speed changes due to temperature/salinity/depth, bathymetry data in the local environment, or the confirmed schedule of the construction works are not taken into account. For the ES, site-specific underwater noise modelling should be based on the worst-case scenario of simultaneous impact piling by three rigs. The modelling should be based on the maximum expected hammer energy and pile diameter. It should also be confirmed whether it is intended to carry out construction activities including piling and dredging during hours of darkness. The modelled/calculated range of effect over which injurious effects are predicted to occur, should be discussed not just in terms of distance in metres/kilometres, but in the context of the width of the river Tees to determine whether underwater noise will cause an acoustic 'barrier' to fish movement and migration.	A 3D modelling exercise was undertaken for underwater noise providing a more constrained ZOI whilst considering the realistic bathymetric features of the Teesside locale. This included the analysis of specific ray patterns, absorption due to sediment, sound speed changes due to temperature, salinity, and depth, bathymetry, hammer energy, pile diameter, and location of the sources within the locale. The width of the river is considered within the discussion of the results.
12.3.6	The zone of ZOI for the cumulative effects assessment is stated as 5km for ecology and biodiversity topics. Please note that for the effects of underwater noise and vibration on fish receptors, e.g. from drilling or piling below water, the ZOI may be to be greater than 5km. Hence, the ZOI should be reviewed when the final project design details and construction methods have been decided.	The 3D modelling exercise has constrained the predicted ZOI for cumulative effects of noise to <2.4km based upon a reasonable worst-case scenario.

Statutory Consultation ID (PEIR Reference)	Comment Description	Applicant Response
12.3.7	Although the potential impacts of light on fish are noted, the description of light intensity, duration and location are not detailed in the PEIR. The impact of water turbidity, although identified is also not detailed in its expected extent, as modelling of sediment dispersion has not been carried out. Although sediment sampling is proposed, it has not yet been carried out. It should be ensured that the impact of light pollution on fish species from the development is clearly assessed within the ES.	The duration and location of light will be described in the detailed CEMP, however this impact was assessed based on relevant literature.
12.4.1	It is noted that shellfisheries species have been identified based on recent surveys, however the surveying method used does not use a shellfish specific fishing gear and consequently does not provide an accurate representation of the shellfish present. The MMO would expect to see additional evidence used to identify the baseline conditions.	Shellfishery information was provided by NEIFCA following consultation.
12.4.2	It is noted that ICES catch data has been used to support the characterisation of the baseline. This is supported; however, ICES catch data does not cover small artisanal boats which make up a large proportion of the shellfisheries fleet. The MMO would expect to see evidence of consultation with the Northeastern Inshore Fisheries Conservation Society (NEIFCA) to ensure all relevant species have been captured within the baseline.	Shellfishery information was provided by NEIFCA following consultation. Fin-fish were not considered an important target for the local inshore fisheries.
12.4.3	The MMO note that several mass shellfish die-off's have taken place in the area within the last 5 years. Therefore, consideration should be given to ensure conditions are not exasperated for shellfish within the area. Noting, the potential impacts proposed for shellfish are suitable for covering the concerns raised in this comment, however currently	Contaminant determinand levels will be assessed and evaluated against shellfish life-history strategies. It is noted that investigations of the mass mortality events did not identify a particular contaminant as cause and considered a novel pathogen or toxicity resulting from a harmful algal bloom as more likely cause for the mass-mortality events.

Statutory Consultation ID (PEIR Reference)	Comment Description	Applicant Response
	some species affected by the mass die-off events have not been identified within the baseline characterisation for shellfish and therefore are not scoped in as a potential receptor.	
12.4.4	The MMO note that no specific mitigation measures have been identified in relation to shellfish species. This is considered appropriate as no shellfish receptors have yet been assessed as significantly negatively impacted by the proposed works. The method for identifying mitigation measures is appropriate and follows the standard practice for doing so.	Shellfish highlighted as commercially significant to local fishers will be assessed and appropriate mitigation measures proposed if required.
Chapter 11: Paragraph 6.2.7 and 7.3.6	Colonisation of the new quay structure is noted as having the potential to deliver positive effects through habitat creation and increased biodiversity. Natural England highlight that, if considered during the design and construction process, there are opportunities to maximise the potential for habitat enhancement. We encourage the developer to explore options for incorporating habitat enhancing features into the quay design, following nature by design principles. This could include the creation of microhabitats through the use of textured or varied surface treatments, as well as the incorporation of features such as vertipools to promote colonisation by marine organisms.	The preparation of detailed Landscape and Biodiversity Mitigation Enhancement Strategy in accordance with the Framework Landscape and Biodiversity Mitigation and Enhancement Strategy **(Application Document Ref. 5.8)** is controlled by reference to a requirement in the **draft DCO (Application Document Ref. 3.1)** . These features will be explored further at the detailed design stage when design of the proposed quay are available.
Stakeholder: Environment Agency		
	We are content with the baseline conditions, the mitigation and enhancement measures, and the impacts presented to date. However, further information is required in relation to the quayside works and its impact.	Noted

Statutory Consultation ID (PEIR Reference)	Comment Description	Applicant Response
6.1.1	Paragraph states that the activity of construction of the proposed quay has the potential to result in loss of intertidal habitat.	The current revetment area will be lost but this does not represent intertidal habitat of ecological value. No other intertidal habitats will be lost through construction activities.
Table 9-1 Summaries of the potential significant effects during construction,	References in and assess the potential impact of, 'Change of intertidal habitats and species from construction works'. The 'change' of intertidal habitat is assessed as being limited to the 'Loss of species in the existing jetty' with a 'minor adverse impact'. This information should also be included in a WFD assessment and appropriate mitigation determined at the ES stage. While the footprint of any such loss is relatively small, the proposed development is within an already heavily modified waterbody where 90% of intertidal habitats have been lost through development over time. The entirety of the remaining estuary and intertidal habitats are designated as a WFD Protected Area (SPA). The cumulative effect of such losses from this and other developments could represent a deterioration unless appropriately mitigated.	The current revetment area will be lost but this does not represent intertidal habitat of ecological value. No other intertidal habitats will be lost through construction activities (refer to the **Water Environment Regulations Assessment, Application Document Ref. 5.10).**
Stakeholder: Natural England		
6.2.27	Modelling of sediment dispersal from capital dredging associated with the Proposed Development has not been undertaken at the PEIR stage. Instead, sediment modelling from the South Bank Quay has been presented as a proxy; however, these data are from around 2020 and are neither site specific nor project specific. Natural England advise that the Environmental Statement must be informed by up-to-date modelling outputs, and the current reliance on older, spatially misaligned datasets does not meet this expectation.	Sediment dispersal modelling was completed July 2026. Results are discussed in Section 11.6 to more accurately describe the ZOI alongside the potential for changes to subtidal habitats, species composition and water quality associated with activities in the Marine Works area.

Statutory Consultation ID (PEIR Reference)	Comment Description	Applicant Response
4.1.16 and Table 4-1	ZOIs for several receptors appear to be underestimated. For example, a ZOI of 500 m has been assigned for benthic communities, yet limited justification is provided for this assumption, and it does not appear to be supported by project specific evidence such as sediment dispersal modelling or other baseline data. Natural England advise that ZOIs should be underpinned by robust, site-specific information, and that assumed ZOIs may need to be revised for inclusion in the Environmental Statement to ensure that all relevant impact pathways are appropriately assessed.	A baseline marine survey was completed in April 2026. Sediment dispersal modelling was completed in July 2026. 3D underwater noise modelling was completed in June 2026 and incorporated to inform ZOI. ZOI
2.2.3, Table 2-1	Baseline data for several topic areas remains incomplete or is reliant on older or non-site-specific information. While most of the additional survey work previously requested has not yet been undertaken, there is an indication that these requirements will be addressed. The assessment draws on regular monitoring surveys undertaken by INCA, and there is a stated commitment to conduct seal observations during the piling works. However, Natural England has previously advised that site specific surveys should be carried out in the immediate vicinity of the quay works to determine how and when seals use the proposed development area or pass within close proximity. Natural England advise that site specific surveys should be undertaken in the vicinity of the proposed development to determine how seal species from the nearby Seal Sands haulout make use of the area. This includes understanding the presence and movements of breeding Harbour Seals (Phoca	A site-specific MMObs survey was undertaken in July 2026. The results are provided in **Appendix 11A: Marine Ecology Survey and Results (ES Volume III, Application Document Ref. 6.3)**.

Statutory Consultation ID (PEIR Reference)	Comment Description	Applicant Response
	vitulina), which are a notified feature of the Teesmouth and Cleveland Coast SSSI.	
Table 4-2	Inconsistencies with list of designated features. Waterbird assemblage is not referenced as an SPA or Ramsar feature. Sandwich terns are also not listed as a Ramsar feature. Invertebrate and geological features are not correctly listed as a SSSI designated feature. 'Seabirds: same as SPA' is incorrect as the waterbird species lists are different for SSSI and SPA. Ensure that the correct designated features are listed in all chapters.	Birds are assessed in **Chapter 10: Terrestrial Ecology (ES Volume I, Application Document Ref. 6.1)** and as such are not assessed in this chapter. All bird receptors have been removed from tables in this chapter.
6.2.61	Background SPL measurements used as baseline are >10yrs old (Ref 39 - Collett, A.; Mason, I. (2014). York Potash Project Harbour Facilities: Underwater Noise Impact Assessment. Subacoustech Environmental report number E473R0205). Natural England advise that assessments should be based on up to date, site specific data. Natural England recommend that updated background SPL surveys should be carried out to provide contemporary data regarding background noise levels.	Undertaking sound pressure level (SPL) measurements was not feasible. The SPL values used in the underwater noise model were of a more conservative magnitude than Mason et al. (2014) and are therefore considered appropriate.
	Natural England have previously advised that Priority Habitat, specifically intertidal mudflats, may be present within the zone of influence of the red-line boundary. However, the intertidal surveys required to confirm the presence and extent of these habitats remain outstanding. Natural England acknowledge the commitment to undertake intertidal surveys to identify priority habitats within the red-line boundary and zone of influence. They advise that these surveys should be completed and their outputs used to inform the environmental	The small area of intertidal mud to the north of the Site is not expected to be adversely affected by construction or operation of the Proposed Development. Sediment dispersal modelling has been undertaken to verify this (see **Appendix 12A, Coastal and Estuary Processes, ES Volume III, Application Document Ref. 6.3)).**

Statutory Consultation ID (PEIR Reference)	Comment Description	Applicant Response
	baselines and subsequent assessments presented in the Environmental Statement.	
4.6.6; 4.6.12 Fig 11.2	The survey data used to inform the benthic community baseline is limited and shows minimal overlap with the red-line boundary and the proposed zone of influence (ZOI). The most recent dataset referenced is from 2022. As illustrated in Figure 11.2, the majority of survey locations fall outside both the red-line boundary and the proposed ZOI, reducing confidence in the applicability of these data for baseline characterisation. Natural England advise that the Environmental Statement must be informed by up-to-date survey outputs, and the current reliance on older, spatially misaligned datasets does not meet this expectation.	The baseline marine survey was completed in April 2026 and is reported in this chapter. Sediment dispersal modelling has also been completed and is reported in **Appendix 12A: Coastal and Estuary Processes (ES Volume III, Application Document Ref. 6.3)**.
6.2.75	The conclusion assumes a low likelihood of impact on marine mammals (and fish) exposed to underwater noise on the basis that animals are expected to exhibit avoidance behaviour before entering zones where injurious effects may occur. However, the potential for such avoidance behaviour is highly dependent on the correct application of JNCC guidance and the implementation of appropriate mitigation measures. For example, soft start procedures during piling provide a gradual increase in noise levels, giving animals the opportunity to move away before sound levels reach thresholds associated with injury. This assumption is not applicable to instantaneous noise sources, such as UXO clearance, where no warning period exists and avoidance behaviour cannot be relied upon. In addition, the conclusion does not address the broader consequences of	3D underwater noise modelling has been carried out and the results show that the ZOI extends up to 1.3km upstream and 2.4km downstream. However, the predicted extent is non-linear and varies with water depth and acoustic attenuation due to water characteristics. The application of a uniform 1.3km or 2.4km radius buffer exceeds the modelled results. These results have been assessed against the site-specific MMObs survey results in this chapter. JNCC guidelines will be followed as embedded mitigation (see Section 11.5 of this chapter).

Statutory Consultation ID (PEIR Reference)	Comment Description	Applicant Response
	underwater noise disturbance, including the potential displacement of animals from important foraging areas, which may have significant energetic and ecological implications even in the absence of direct injury. Natural England acknowledge that underwater noise modelling has not yet been completed, and that, on a precautionary basis, the impact is currently assessed as being of major significance in Section 6.2.76, with major adverse residual effects identified in Table 9-1. In line with Section 6.2.76, Natural England welcome continued engagement on the scope of the underwater noise modelling and the assessment requirements to be presented within the ES. The assessment should also consider the potential impacts arising from UXO clearance, should this activity be required, and the wider consequences of spatial disturbance resulting from impulsive underwater noise.	
6.2.76 and Table 9-1	Impacts relating to disturbance from underwater noise have been assessed on a precautionary basis pending completion of the underwater noise modelling. As a result, they are currently considered to be of major significance within the PIER chapter, with Major Adverse residual effects identified. However, this assessment appears to focus primarily on the potential for injurious effects to marine mammals (and fish), without fully considering the broader consequences of disturbance, including the potential for displacement from important foraging or transit areas. These wider behavioural impacts can be significant even where injury thresholds are not exceeded and should be incorporated into the	3D underwater noise modelling has been carried out and results. The ZOI extends up to 1.3km upstream and 2.4km downstream but is non-linear i.e. a 1.3km radius range ring would be too large. These results are assessed against the site-specific MMObs survey results in this chapter. JNCC guidelines will be followed as embedded mitigation (see Section 11.5 of this chapter).

Statutory Consultation ID (PEIR Reference)	Comment Description	Applicant Response
	final assessment once detailed modelling is available. As noted above, Natural England advise that this assessment should be revisited once appropriate underwater noise modelling has been completed, and that the ES should consider broader disturbance impacts, not solely the potential for injurious effects.	
5.2.5 and 6.2.91	Assessments conclude a minor adverse effect on intertidal habitats and a moderate adverse effect on benthic habitats; however, as noted above, these conclusions are based on incomplete information, including outstanding intertidal habitat surveys and sediment dispersal modelling that is neither site-specific nor project-specific. Natural England advise that these conclusions, and the assessments underpinning them, should be revisited once appropriate, up-to-date data have been obtained to inform the baseline and support a robust impact assessment.	The baseline marine survey was completed April 2026 and is reported in this chapter. Sediment dispersal modelling has also been undertaken (see **Appendix 12A: Coastal and Estuary Processes, ES Volume III, Application Document Ref. 6.3**).
5.2.8	Note commitments to undertake activities that generate impulsive underwater sound in accordance with JNCC guidelines to minimise impacts on marine mammals. Natural England welcome and encourage adherence to JNCC guidance to minimise impacts to marine mammals.	Noted
6.2.58	UXO clearance is recognised as a significant additional source of underwater noise. The method described, using a donor charge to initiate detonation of the UXO, constitutes a high order deflagration, which typically generates intense, impulsive acoustic energy. However, alternative low order techniques are available that neutralise the device without producing a full detonation, thereby substantially	Noted. If UXO clearance is found to be necessary the use of NAS and other appropriate mitigation methods will be agreed with the relevant stakeholders and the Applicant will seek a separate marine licence for any UXO clearance activities.

Statutory Consultation ID (PEIR Reference)	Comment Description	Applicant Response
	reducing the acoustic output. In addition, a range of noise abatement measures can be applied, such as bubble curtains or confined charge systems, to further reduce the overall noise levels generated during clearance activities. Should UXO clearance be required as part of the proposed development, Natural England advises that all feasible low order deflagration techniques are explored, alongside the use of Noise Abatement Systems (NAS). These measures are encouraged to minimise the potential impacts associated with impulsive underwater noise.	
6.2.4 - 6.2.9 and Table 9-1	Construction impacts with the potential to cause direct loss of intertidal habitats and species are acknowledged; however, the assessment focuses predominantly on the loss of colonising species associated with quay demolition works. It does not adequately consider potential impacts on priority habitats that may occur within the red-line boundary or the wider zone of influence. Natural England advise that, pending the outcomes of the proposed intertidal surveys, a more detailed consideration of potential impacts on intertidal priority habitats may be required.	An intertidal survey was not undertaken, as the revetment was considered too dangerous to survey and photography from low tide indicated extremely an depauperate assemblage with sparse, small fucoids the only visible taxa. The baseline marine survey was completed April 2026 and included scrape sampling of the jetty piles. Sediment dispersal modelling has also been undertaken (see **Appendix 12A, Coastal and Estuary Processes, ES Volume III, Application Document Ref. 6.3**).
	It is noted that a Framework Construction Environmental Management Plan (fCEMP) will be submitted alongside the DCO application (Section 5.2.1), including measures to prevent accidental spillages and the spread of INNS. Section 5.2.5 outlines measures intended to control INNS, and Section 6.2.91 identifies activities with the potential to facilitate their spread. While “incorrect placement of rock armour associated with quay construction works” is listed, the	Noted. The fCEMP (**Appendix 5A, ES Volume III, Document Ref. 6.3)** isincluded as part of the DCO application submission and the Applicant welcomes Natural England’s review and any comments they may have on it.

Statutory Consultation ID (PEIR Reference)	Comment Description	Applicant Response
	assessment should also consider the potential introduction of INNS via any imported rock materials used during construction. Natural England have not yet had sight of the fCEMP and would welcome the opportunity to review and comment. We would expect the document to translate the outline commitments into a comprehensive biosecurity management plan covering construction, operation, and decommissioning. In addition to the vectors already identified, it should set out how the potential introduction of INNS via imported rock materials will be avoided.	
6.2.7 and 7.3.6	Colonisation of the new quay structure is noted as having the potential to deliver positive effects through habitat creation and increased biodiversity. Natural England highlight that, if considered during the design and construction process, there are opportunities to maximise the potential for habitat enhancement. We encourage the developer to explore options for incorporating habitat enhancing features into the quay design, following nature by design principles. This could include the creation of microhabitats through the use of textured or varied surface treatments, as well as the incorporation of features such as vertipools to promote colonisation by marine organisms.	Noted. The **Framework Landscape and Biodiversity Mitigation and Enhancement Strategy** (fLBMES) **(Application Document Ref. 5.8)** identifies opportunities for enhancement that do not compromise construction or operation of the Site.
6.2.62	An assumed WCS for piling activities is presented within the preliminary Underwater Noise Assessment (UWNA); however, the basis for this WCS is not clearly explained. The parameters used in the assessment appear to assume that: • Up to three impact piling rigs may operate simultaneously,	The summary comment necessarily presents a more simplistic outline of the PEIR assumptions. These assumptions have been updated in this chapter in line with the latest information on proposed construction methodologies meaning the updated 3D underwater noise model assumptions are based upon a reasonable worst-case scenario for a combi-wall quay design installed in water with approximately 420 tubular piles.

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	• A total of 30 piles will be installed, • Each pile will require 330 hammer strikes. From the information provided, it is unclear whether these activities are assumed to take place over a 3-hour period, or a 24-hour period. Without clarity on the assumptions underpinning the WCS, it is not possible to determine whether the predicted underwater noise levels represent a realistic or appropriately precautionary scenario. Natural England acknowledge that the piling requirements will ultimately be determined by the preferred final quay wall design and construction option. However, clarification is required on how the assumed WCS parameters used in the preliminary UWNA have been derived. Future iterations of the UWNA should be based on a WCS that reflects the preferred quay wall design and construction method. If the design has not yet been finalised, the assessment should instead adopt the option with the greatest anticipated piling requirement, to ensure that underwater noise predictions remain robust and precautionary.	
6.2.55- 6.2.58	Construction activities with potential to create underwater noise with potential to impact fish and marine mammals are outlined and include: • Geophysical surveys (if required), and • UXO detonation (if required). However, requirements for the above activities are not fully explained and potential impacts are not assessed. Should a requirement for these activities be identified then Natural England would expect potential impacts to be fully described and assessed as part of the ES.	Those construction activities that have the potential to produce injurious noise which could impact fish and marine mammal species present in the Tees estuary have been assessed. Construction activities are listed and secured within the deemed marine license (DML) (within the **draft DCO (Application Document Ref. 3.1)**) and appropriate mitigation will be discussed with relevant stakeholders prior to construction.

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1.2.1 and Table 1-2	Construction phase vessel requirements and transits have not yet been confirmed. Consequently, it is not currently possible to fully assess the potential impacts associated with increased vessel activity during the construction of the proposed development. Natural England advise that vessel requirements and transits should be defined and reported in the ES.	Updated vessel numbers have been provided in the **Preliminary Navigational Risk Assessment at Appendix 20A (ES Volume III, Application Document Ref. 6.3**) with a <5% increase from current traffic volume.
1.2.1	Jack up barges are included in the list of the type of vessels expected to be used during the construction phase. Such vessels often require ground stabilisation works to ensure that underlying sediments are suitable to support them while they are operating with jack up legs deployed. Natural England advise that should a need for ground stabilisation works be identified then this should be assessed in the ES or under a separate Marine Licence Application.	Noted. Ground stabilisation works are assumed not to be necessary but if required the activities will be applied for under an additional marine licence, where they are not already consented under the DML (within the **draft DCO (Application Document Ref. 3.1)**).

Assumptions and Limitations

11.3.10 Given that there are notable and protected species, as well as sensitive habitats capable of supporting these species within the ZOI, site-specific surveys were carried out. The findings and updated assessments will be submitted as they become available, post-DCO submission.

11.3.11 The following surveys have been undertaken to inform the ES and consenting requirements:

- vibrocore and 0.1m^2 Day grab survey for sediment quality within proposed capital dredging area to confirm any exceedance of Cefas Action Levels for contaminant determinants indicating historic contamination;
- subtidal benthic survey (0.1m^2 Day grab, towed freshwater lens camera and 2 m scientific beam trawl) to determine presence of marine priority habitats or species and any marine INNS;
- intertidal scrape survey determine presence of marine priority species and any marine INNS;

- eDNA sampling to indicate migratory fish status (presence); and
- MMObs from the existing revetment.

11.3.12 The assessment is based on the following assumptions:

- The industrial wastewater pipeline will use new or repurpose existing infrastructure to connect into NWL's Bran Sands WwTW using an existing tunnel under the Tees.
- The Proposed Development will ensure adequate treatment and appropriate disposal of the industrial wastewater, in particular considering nutrient neutrality targets for the Tees Transitional Waterbody by utilising the proposed Bran Sands LSO for discharge; and
- The construction of the new quay will require the demolition of the two existing jetties, surrounding revetment and associated redundant infrastructure. The quay construction works will also include capital dredging for the berthing pocket at the quay and access channel. Quay construction will also involve percussive piling.
- Material dredged from new quay construction area will be disposed offshore in licensed disposal sites in the UK Economic Exclusive Zone (EEZ) if this is acceptable to the licensing authorities based on the sediment quality. Otherwise, it would be disposed of at an onshore permitted landfill site. Due to the depth required for the berth pocket and the comparable thickness of mud deposits, it is likely that some of the dredged material includes previously undisturbed and uncontaminated glaciolacustrine and till deposits as well as potential shallow Mercia mudstone bedrock.

11.4 Baseline Conditions

Overview

11.4.1 The Site includes the area for the proposed SAF production facility, west of the Tees Estuary and the new quay (which together are referred to as the Main Site). To facilitate the assessment of marine ecology impacts, a Marine Works Area has been defined, encompassing the jetty demolition works, the new quay and berth area, and associated marine activities, including dredging and piling.

11.4.2 This assessment does not duplicate information set out in **Chapter 10: Terrestrial Ecology (ES Volume I, Application Document Ref. 6.1)** where baseline information for the terrestrial ecology assessment, including seabirds, can be found.

Zone of Influence (ZOI)

11.4.3 The Study Area for the Proposed Development includes freshwater, estuarine and marine areas where changes arising from construction and/or operation could potentially lead to significant effects on receptors.

11.4.3.1 The nearest designated watercourse to the Site is the River Tees (designated by the Environment Agency as a Main River), which is located alongside the east of the Main Site. The quay will be constructed within the River Tees. The industrial gas and industrial wastewater connections to South Tees also pass under the river.

11.4.3.2 The concept of marine area in this chapter is based on the area within the MMO's jurisdiction, which covers the inshore and offshore area below Mean High Water Springs (MHWS). The inshore area extends from the MHWS limit to 12 nautical miles and offshore from 12 miles up to 200 nautical miles [Ref 5].

11.4.3.3 The River Tees is a tidal estuary from Teesmouth upstream to the Tees Barrage in Stockton-on-Tees. Marine ecological receptors are associated with the Tees Estuary. Upstream of the Tees Barrage, the tidal influence of the estuary is limited and the river is considered freshwater.

11.4.3.4 The study area for freshwater ecology includes all surface waterbodies within the Draft Order limits as well as those in hydraulic connection based on the potential pathways and impacts on aquatic ecology receptors associated with the Project. Given the distance of the Tees Barrage from the Site, approximately 10km, and potential impacts to the River Tees to be mitigated for within the estuary, the River Tees upstream of the Barrage is not considered within the ZOI for the Proposed Development. The following watercourses, ditches and ponds are considered:

- Several unnamed land drains, located immediately adjacent to the north, east, south and west of the Proposed Development;
- Dorman's Pool and Saltholme West Pool and several unnamed ponds;
- Greatham Creek (Main River);
- Dabholm Beck flowing into Dabholm Gut (an Ordinary Watercourse);
- Knitting Wife Beck (an Ordinary Watercourse);
- Mill Race (an Ordinary Watercourse);
- The Fleet (an Ordinary Watercourse); and
- Holme Fleet (Main River); and

- Ormesby and Normanby Beck (Ordinary Watercourses).

11.4.4 The Tees Barrage is located more than 10km west of the marine works.

11.4.5 The nearest offshore dredge disposal area, Tees Bay A, is located approximately 10km from the Marine Works area and has historically been used for maintenance dredging spoil disposal. Tees Bay C disposal site is located approximately 15km from the Marine Works area and is the target area for disposal of spoil from capital dredging activities.

11.4.6 The CIEEM Guidelines [Ref 6] propose that the zone of influence varies depending on the ecological feature, reflecting its sensitivity to environmental change. For the purposes of this assessment, these will hereafter be referred to as the ZOI for each receptor.

11.4.7 The proposed ZOI for freshwater and marine ecology is determined by the type of activity, the impact pathway and the sensitivity of the receptor. . Marine activities (including dredging, piling, and vessel transit) are primarily associated with impacts on marine ecological receptors. In addition, activities such as artificial lighting and surface water run-off can reach marine and freshwater ecological receptors.

11.4.8 Potential impacts on air quality have been assessed in **Chapter 8: Air Quality (ES Volume I, Application Document Ref. 6.1)**.

11.4.9 The proposed ZOI and respective receptors are presented in Table 11.9. Where data are identified outside the defined ZOI, but are considered relevant to the assessment, these data will be included in the baseline. This approach ensures a robust and comprehensive characterisation of the baseline, taking into account the potential influence of wider environmental processes and connectivity between areas.

Table 11.9 Freshwater and marine receptors

Receptor	Criteria
Internationally designated sites	Within 10km radius from the Marine Works area and dredge disposal area, extended if there is a designated feature(s) of a particular site that is highly mobile or hydrological connection could be present.
Nationally designated sites	Within 5km of the Marine Works area, extended if there is a designated feature(s) of a particular site that is highly mobile and could be present.
Non-Statutory Sites	Within 2km of the Marine Works area, extended if there is a designated feature(s) of a particular site that is highly mobile and could be present within the vicinity of the Proposed Development.
Habitats (Subtidal and Intertidal)	Within 1km of the Marine Works area.

Receptor	Criteria
Benthic Communities	Within 1km of the Marine Works area.
Marine Plants	Within 1km of the Marine Works area.
Plankton	Within 1km of the Marine Works area and proposed sewage discharge area in the River Tees.
INNS	Within 1km of the Marine Works area.
Fish	Within 5km of the Marine Works area.
Marine Mammals	Within 20km of the Marine Works area.
Hydrodynamic conditions	Within 20km of the Marine Works area.
Ponds and other surface water features	Within 500m of the Site.
Other marine users	Within 2km of the Marine Works.

Data Sources

11.4.10 The baseline condition informs an understanding of the marine biodiversity before any proposed activities associated with the Proposed Development. The impact assessment will determine the changes in condition to this baseline to facilitate the understanding of the effects of the Proposed Development.

Available open data

11.4.11 The following publicly available sources were used to inform the baseline:

- Department for Environment, Food & Rual Affairs (Defra)'s Multi-Agency Geographic Information for the Countryside (MAGiC) online map application [Ref 7];
- Joint Nature Conservation Committee (JNCC) [Ref 8];
- Open source 1:25,000 scale Ordnance Survey datasets [Ref 9];
- Environment Agency Catchment Data Explorer [Ref 10];
- Environment Agency Ecology and Fish Data Explorer [Ref 11];
- International Union for Conservation of Nature (IUCN) Red List [Ref 12];
- Cefas database [Ref 13];
- Environmental Information Data Centre [Ref 14];
- UK Biodiversity Action Plan (UKBAP) [Ref 15];
- Offshore Strategic Environmental Assessment (SEA) Area 1 North Sea [Ref 16];
- International Council for the Exploration of the Sea (ICES) [Ref 17];

- Small Cetaceans in European Atlantic waters and the North Sea (Scan III) data for marine mammals [Ref 18];
- Tees Seals Project [Ref 19];
- UK Cetacean Strandings Investigation Programme (CSIP) [Ref 20];
- Natural England Open Data Geoportal [Ref 21]; and
- Available 'grey' literature[iv] and technical reports for projects on the Tees Estuary and surrounding inshore areas.

11.4.12 A summary of the baseline conditions is presented below.

11.4.13 This chapter assessment does not duplicate information. The seabird assessment and baseline are set out in **Chapter 10: Terrestrial Ecology (ES Volume I, Application Document Ref. 6.1)**, which also considers small mammals associated with aquatic environments such as otter and water vole.

Survey data source

11.4.14 Site characterisation was based on open data and site-specific surveys detailed in Table 11.10

Table 11.10 Survey and modelling data source

Parameter	Source	Reference
Water quality survey	Environment Agency	Ref 22
Sediment quality survey	South Bank Quay EIA Report	Ref 23
Metocean (current)) Water quality survey (turbidity, temperature, salinity)	South Bank Quay EIA Report	Ref 24
Sediment quality survey	Net Zero Teesside (NZT) Environmental Statement	Ref 25
Sediment quality survey	The Northern Gateway Container Terminal Geophysical Survey Report	Ref 26
Sediment quality survey	Lighthouse Green Fuels Project Preliminary Environmental Information Report Chapter 8: Freshwater and Marine Ecology The Inspectorate Reference: EN010150 May 2024	
Fish survey and benthic survey	WSP carried out fish (eDNA) and benthic surveys for Lighthouse Green Fuels Ltd in 26/06/2024, 27/06/2024 and 16/10/2024 for previous development area	Ref 27; Ref 28
ICES	Fishing data	Ref 29

[iv] Grey literature refers to unpublished or non-peer-reviewed sources, such as technical reports, environmental assessments, and monitoring reports. Most Government publications are considered grey literature.

Parameter	Source	Reference
Aquatic Survey for saltmarsh and aquatic species	WSP carried out aquatic surveys for Alfanar in 2024	Ref 30
Aquatic habitat survey	Preliminary Ecological Appraisal (PEA) and supplement habitat information	Ref 30
Fish eDNA	eDNA For Pd Ports Teesside	Ref 31; Ref 32; Ref 33; Ref 34; Ref 35; Ref 36
Sediment dispersion modelling	See **Appendix 12A: Coastal and Estuary Processes (ES Volume III, Application Document Ref. 6.3)**	N/A
Site-specific survey: Benthic survey (macrobenthos and PSA)	Survey completed April 2026 and reported in this chapter	N/A
Site-specific survey: Fish survey (eDNA)	Survey completed April 2026 and reported in this chapter	N/A
Site-specific survey: Fish survey (Trawl and video)	Survey completed April 2026 and reported in this chapter	N/A
Site-specific survey: Sediment Quality (chemical analysis)	Survey completed April 2026 and reported in this chapter	N/A
Site-specific survey: Marine Mammal Observation	Survey completed July 2026 and reported in this chapter	N/A

11.4.15 Metocean data acquisition and water and sediment quality surveys are presented in **Figure 11.3: Sediment Quality Survey Stations** and Ecology surveys for benthos, fish, macroalgae and phytoplankton in **Figure 11.4: Marine Ecology Survey Stations (ES Volume II, Application Document Ref. 6.2)**.

Designated sites

11.4.16 Designated sites have been considered if they include features relating to marine and freshwater habitats and species.

11.4.17 Records of designated sites within 10km of the proposed quay have been obtained. This distance was extended to 20km to identify if there is a potential direct and functional connection between the marine works and mobile species such as marine mammals.

11.4.18 Hydrological connectivity was determined using data on the MAGiC website [Ref 7]. Natural and man-made water bodies in North Tees pools near the Site are freshwater, with controlled connectivity with the Tees Estuary.

11.4.19 A summary of the designated sites relevant to marine biodiversity is provided below (Table 11.11).

Table 11.11 Designated sites for marine receptors

Type of Designated Area / ZOI Buffer	Designated Area with marine components	Key features identified
Internationally designated sites/10km buffer	Teesmouth and Cleveland Coast SPA/Ramsar: detailed in **Chapter 10 Terrestrial Ecology (ES Volume I, Document Ref. 6.1)**	• Detailed in **Chapter 10 Terrestrial Ecology (ES Volume I, Document Ref. 6.1)**
Nationally designated site/ 5km buffer	Teesmouth and Cleveland Coast SSSI (Marine Works within the SSSI) Minimum distances: • Marine Works Area: within SSSI • Main Site: adjacent to the SSSI • Dredge disposal area: 5km to the SSSI	Marine mammals: • Harbour seal (*Phoca vitulina*) Seabirds: detailed in **Chapter 10 Terrestrial Ecology (ES Volume I, Document Ref. 6.1)** Protected habitats: • Sand dunes • Saltmarsh • Intertidal mudflats • Grazing marsh • Freshwater wetlands • Lowland open water and margins
	Teesmouth NNR Minimum distances: • Marine Works Area: 1.5km to the NNR • Main Site: 0.5km to the NNR • Dredge disposal area: 7km to the NNR	Marine mammals: • Harbour seal (*Phoca vitulina*) • Grey seal (*Halichoerus grypus*) Protected habitats • Intertidal mudflats • Saltmarsh • Coastal sand dunes • Grazing marsh • Saline lagoons • Reedbeds
Local or Non-Statutory Sites/ 2km buffer	RSPB Saltholme Nature Reserve Minimum distances: • Marine Works Area: 2.4km • Main Site: adjacent	Birds/seabirds (detailed in **Chapter 10 Terrestrial Ecology (ES Volume I, Document Ref. 6.1)**)

11.4.20 There are no internationally designated sites important for marine mammals within 20km of the Marine Works area or offshore dredge disposal area

(**Figure 11.1: Marine and Freshwater Ecology Assessment Area (ES Volume II, Application Document Ref. 6.2)**).

11.4.21 The closest internationally designated site supporting marine mammals, including nationally important breeding colonies of grey seals, is Berwickshire and North Northumberland Coast SAC 80km north.

11.4.22 Two nationally designated areas, Teesmouth and Cleveland Coast SSSI, and Teesmouth NNR, contain seals as designated features.

11.4.23 The nearest international designations are Teesmouth and Cleveland SPA which comprises the entire Tees Estuary and coastal area and Flamborough Head SAC 86km south-east. Neither site is designated for marine mammals.

11.4.24 There are no nationally designated fully marine sites within 10km of the proposed marine works. The closest is Runswick Bay Marine Conservation Zone, which lies 24km distant to the south-east and 14km from the offshore dredging disposal site. This MCZ is designated for subtidal habitats and Ocean quahog (*Arctica islandica*), a species of bivalve which is afforded protection due to its potential to live for over 200 years.

11.4.25 The proposed marine works are situated within the Teesmouth and Cleveland Coast SPA/SSSI and 1.5km from Teesmouth NNR (Table 11.9). These designated sites are an important area for seabirds, as detailed in **Chapter 10: Terrestrial Ecology, (ES Volume I, Document Ref. 6.1)** and a range of coastal habitats including intertidal sandflats and mudflats, rocky shore, saltmarsh, freshwater marsh and sand dunes. Current delimitation was approved in 2020.

11.4.26 Teesmouth NNR is characterised by sand dunes, grazing marsh, intertidal sand and mudflats. Harbour seals and grey seals bask beside the tidal channels. The colony of harbour seals haul out on the sand banks at low tide and use the area as a pupping ground during the summer making Seal Sands a unique regular breeding colony on England's north-east coast.

11.4.27 There are no LNRs within 2km of the proposed marine works. Seaton Dunes and Common LNR is the closest, 4km to the north.

11.4.28 RSPB Saltholme Nature Reserve forms part of the Ramsar site and SPA, and comprises multiple water bodies and associated nature reserves, including Dorman's Pool, Saltholme East Pool, Saltholme West Pool, and Paddy's Pool. Dorman's Pool is situated approximately 2.4km from the proposed marine works and lies adjacent to the Proposed Development. Other water bodies which may be affected by the Proposed development include a water course running parallel to the proposed SAF export pipeline

to Navigator North Tees Inland Terminal and the Dabholm Gut and other small ponds (including Eston Pumping Station LWS) in South Tees.

11.4.29 Designated sites in the Study Area are shown in **Figure 11.2: Designated Sites (ES Volume II, Application Document Ref. 6.2)**.

WFD Designated Waterbodies

11.4.30 The Marine Works include a quay construction in the River Tees (Tees Water Body, ID GB510302509900) which is classified as heavily modified. The area surrounding the proposed quay development is tidally influenced within the Tees Estuary. The Tees Barrage is >11km upstream from the quay and the river flows approximately 5km north before reaching the North Sea at Teesmouth.

11.4.31 The WFD ecological status of this water body was classified as Moderate Ecological Status overall. Poor nutrient management, pollution including sewage and heavy metals, and channel modifications are one of many stressors and reasons for the Tees failing to achieve Good overall status. The following biological quality elements are monitored in the Tees and results from 2019 and 2022 were: fish (moderate), invertebrates (good), saltmarsh (moderate), phytoplankton (good) and macroalgae (2019 moderate and 2022 good).

11.4.32 Water resource receptors including the WFD have been assessed in more detail in **Chapter 9: Water Environment and Flood Risk (ES Volume I, Application Document Ref. 6.1)**.

Freshwater Ecology Condition

Desk study data source

11.4.33 A review of Environment Agency' Ecology and Fish Data was undertaken and identified two freshwater survey sites on Dabholm Gut; EA site ID 183148 (NGR NZ5657023772) adjacent to the Site , and Environment Agency site ID 215311 (NGR NZ5950621726) approximately 3.5km upstream (southeast) of the Site.

11.4.34 Environment Agency site (ID 183148) adjacent to the Site was surveyed for aquatic macroinvertebrates in spring and autumn of 2016 and 2019 [Ref 11]. Species recorded across all surveys have been screened for protected and notable species and none were identified. The Community Conservation Index (CCI), an estimate of the conservation value of the invertebrate community, suggested that the site had low conservation value, supporting only common species and/or a community of low taxon richness. New Zealand mud snail (*Potamopyrgus antipodarum)*, an invasive non-native species, was recorded. New Zealand mud snail is however

considered widespread and common within many watercourses in the UK. The WHPT score, an index used to assess water quality, was indicative of a polluted or impacted watercourse. Diversity of the macroinvertebrate community was low across both sample years.

11.4.35 Environment Agency site (ID 215311), 3.5 km upstream (southeast) of the Site, was surveyed for both macroinvertebrates (2023, 2024, and 2025) and aquatic macrophytes (2024 and 2025). Macroinvertebrate samples were collected in spring and autumn each year with the exception of 2023 where a single summer season sample was collected. Species recorded across all surveys have been screened for protected and notable species and none were identified. CCI suggested that the site had moderate conservation value, supporting at least one species of restricted distribution and/or a community of moderate taxon richness. New Zealand mud snail and the amphipod C*rangonyx pseudogracilis/floridanus*, invasive non-native species, were recorded. Both species are however considered widespread and common within many watercourses in the UK. Whilst diversity was greater than observed at Environment Agency site ID 183148, the WHPT score was indicative of a polluted or impacted watercourse [Ref 11 and Ref 30].

11.4.36 The aquatic macroinvertebrate species assemblage was dominated by mosses and liverwort, with common flowing plants, associated with the riparian zone. No protected or notable species were recorded. No INNS were recorded [Ref 30].

Survey data source

11.4.37 The freshwater environment within the Proposed Development boundary and surrounding area comprised a mosaic of artificially modified watercourses, drainage ditches and ponds. Watercourses and bodies were connected through a series of culverts, many of which were blocked [Ref 19]. Substate comprised mainly silt and mud, with slow flowing or ponded water. Filamentous algae and common duckweed (*Lemna minor*) were noted across the site.

11.4.38 A former firewater pond, largely infilled and drained by a third party, was recorded (Ref 19) approximately 400m southwest of the Proposed Development. Fennel pondweed *Potomogeton pectinatus* and Bristly stonewort *Chara hispida* were the only species found within the pond. Sea club-rush *Bolboschoenus maritimus* and common reedmace *Typha latifolia* were noted along the northern and southern edges along with common reed *Phragmites australis*. Hemp agrimony *Eupatorium cannabium*, Great willowherb *Epilobium hirsutum* and common ragwort *Senecio jacobaea* were also present around the pond edges [Ref 30].

11.4.39 A freshwater channel (NGR NZ 51894 23008) described as straightened [Ref 19] was recorded approximately 600m southwest of the Site. Channel dimensions were approximately 400m in length and 1m wide, with a water depth of 0.3m. Filamentous algae was recorded, but aquatic macrophytes were absent. The channel substrate comprised a mix of gravels, sand and silt. Flow was barely perceptible and entered from a culvert connecting to Dorman's Pool within the RSPB reserve, which is adjacent to the Proposed Development.

11.4.40 Water from Dorman's Pool flows through a series of freshwater channels and culverts before discharging into the River Tees through a non-return tidal flap valve south of the Site.

11.4.41 Stickleback (Gasterosteidae) were observed in the freshwater channel during the aquatic habitat survey, though the species was not determined. Following an eDNA sample conducted by WSP in 2024 [Ref 38] the DNA of European eel (*Anguilla Anguilla*), three-spined stickleback (G*asterosteus aculeatus*), nine-spined stickleback (*Pungitius pungitius*) and common carp (*Cyprinus carpio*) were detected.

11.4.42 It is likely that European eel enter Greatham Creek located to the northwest of the Proposed Development and could potentially move through a series of connected watercourses and drainage ditches into Dormans Pool.

11.4.43 Other than European eel, diadromous fish of importance and/or protected species of relevance to this assessment recorded within the River Tees Estuary are described within the below sectioned titled 'Marine Environmental Condition' to avoid duplication.

Marine Environmental Condition

Metocean Condition

11.4.44 The River Tees originates in the North Pennines and flows eastward for approximately 137km, eventually reaching the North Sea at Teesmouth between North Gare and South Gare breakwaters.

11.4.45 Air temperature varies from 5.1°C in January to 16.9°C in July [Ref 37].

11.4.46 Metocean data acquired for a similar project in July 2020 during spring and neap tides and 500m from the Proposed Development presented water temperature around 16°C at the surface and 14°C at the bottom, with a temperature variability (thermocline) between 2-3m depth. Salinity is lower at the surface (approximately 28 to 32 psu[v]), to 34 at the bottom [Ref 24].

[v] practical salinity units

11.4.47 Environment Agency data from within the Tees Estuary [Ref 22] shows similar values (see Table 11.12), water temperature ranged from 4.9°C to 17.9°C from January 2022 and May 2025. Higher values are observed in the summer and lower in the winter. Salinity varies from 9.3 to 34.2 (psu), with the lowest variability in the Tees at Teesmouth (the Gares, i.e. between North and South Gare), the most estuarine station. Dissolved oxygen values ranged from 6.69mg l^{-1} to 11.9mg l^{-1}, with lower values associated with summer and higher values in winter. Turbidity was highest in the Tees at Smiths Dock Station, the most upstream station, reaching a maximum of 116ftu[vi]. These values represent intermediate turbidity in the WFD and increases in the lower tide [Ref 24].

Table 11.12 Physical parameters for the Tees Estuary between 2022 and 2025

Parameter	Tees at Smiths Dock (surface)	Tees at Teesport (bottom)	Tees at Teesport (surface)	Tees at the Gares (surface)
Temperature (°C)	10.6 (4.9–17.9)	11.2 (6.0–16.6)	10.6 (5.0–16.0)	10.4 (5.9–16.4)
Salinity (psu)	26.9 (9.5–33.8)	29.7 (9.3–33.8)	29.2 (16.4–33.0)	32.6 (27.6–34.2)
Dissolved Oxygen (mg l^{-1})	9.0 (6.2–11.6)	8.7 (6.7–10.3)	8.8 (6.7–11.1)	9.2 (7.2–10.4)
Turbidity (ftu)	12.8 (1.8–116.1)	9.8 (1.8–66.8)	9.2 (2.6–57.6)	10.2 (1.4–52.1)

11.4.48 Tidal heights in the Tees Estuary range up to 5.55m at MHWS, with the highest recorded tide reaching 7.15m relative to chart datum (CD) [Ref 47].

11.4.49 The Tees Barrage regulates the fluvial flow and is located approximately 11km upstream of the Proposed Development. Within the ZOI tidal forces dominate the river flow. Current speed data measured with Acoustic Doppler Current Profiler (ADCP) onboard of a vessel is presented in Table 11.13. Maximum speeds are associated with spring tide and flood flow, maximum 0.40m s^{-1} in transect 8 [Ref 24].

Table 11.13 Current speed in the River Tees

Transect and distance	Tide Condition	Speed (m s^{-1})		
		Minimum	Average	Maximum
Transect 8 (1.2km upstream from the LGF)	Neap – ebb	0.00	0.11	0.23
	Neap – flood	0.00	0.16	0.23
	Spring – ebb	0.01	0.28	0.40
	Spring – flood	0.01	0.21	0.33

[vi] Formazin Turbidity Unit (FTU) is a generic unit used to measure the cloudiness or haziness of a fluid caused by suspended particles

Transect and distance	Tide Condition	Speed (m s^{-1})		
		Minimum	Average	Maximum
Transect 11 (500m upstream from the LGF)	Neap – ebb	0.00	0.08	0.18
	Neap – flood	0.00	0.13	0.18
	Spring – ebb	0.01	0.21	0.31
	Spring – flood	0.01	0.18	0.28

Water Quality

11.4.50 Results from the Environment Agency monitoring stations are presented in Table 11.14 [Ref 40].

11.4.51 Results for metals presented arsenic (As), cadmium (Cd), cooper (Cu), mercury (Hg), nickel (Ni), lead (Pb) and zinc (Zn) and chromium was not detected. Cadmium (Cd) and mercury (Hg) had most of data presented values bellow the quantified limit. Two days with peak concentrations of arsenic (As), cooper (Cu), nickel (Ni), lead (Pb) were observed in November 2022 and November 2023, maximum values are 1.8µg l^{-1}, 1.6µg l^{-1}, 0.86µg l^{-1} and 1.1µg l^{-1} respectively.

11.4.52 Most of the results for organic pollutants such as polycyclic aromatic hydrocarbons (PAHs) and organotin compounds like tributyl tin (TBT) were below the limit of detection. An exception was fluoranthene, which showed a maximum concentration of 0.05µg l^{-1}. This value exceeds the UK Environmental Quality Standard (EQS) for transitional (estuarine) waters.

Table 11.14 Water quality results for the River Tees representing average (minimum - maximum) values

Station	Tees at Smiths	Tees at Teesport	Tees at the Gares
Arsenic (As) (µg l^{-1})	1.2 (1–1.6)	1.34 (1–1.8)	1.46 (1.3–1.8)
Cadmium (Cd) (µg l^{-1})	0.03 (0.03–0.04)	0.03 (0.03–0.03)	<0.03
Chromium (Cr) (µg l^{-1})	<0.50	<0.50	<0.50
Copper (Cu) (µg l^{-1})	0.96 (0.5–3)	0.84 (0.36–1.6)	0.54 (0.31–1.2)
Mercury (Hg) (µg l^{-1})	0.01 (0.01–0.03)	0.01 (0.01–0.02)	<0.01 (<0.01–<0.01)
Nickel (Ni) (µg l^{-1})	0.74 (0.35–1.6)	0.65 (0.34–1.1)	0.41 (0.3–0.82)
Lead (Pb) (µg l^{-1})	0.46 (0.1–1.6)	0.38 (0.11–2)	0.13 (0.04–0.61)
Zinc (Zi) (µg l^{-1})	3.58 (1.4–8.6)	3.16 (1.8–5.2)	1.82 (0.71–3.7)
Benzo(a)pyrene (µg kg^{-1})	-	<0.10	-
Benzo(b)fluoranthene (µg kg^{-1})	0	0 (0–0.01)	0
Benzo(g-h-i)perylene (µg kg^{-1})	0 (0–0.01)	0 (0–0.01)	0
Benzo(k)fluoranthene (µg kg^{-1})	0	0 (0–0.01)	0

Station	Tees at Smiths	Tees at Teesport	Tees at the Gares
Fluoranthene (µg kg^{-1})	0.02 (0–0.04)	0.02 (0.01–0.05)	0.01 (0–0.02)
Tributyl Tin (TBT) (µg kg^{-1})	0	0	0
2,4,4-TribromoDiphenylEther (µg kg^{-1})	<0.00	<0.00	<0.00
2,2,4,4-Tetrabromodiphenyl ether (µg kg^{-1})	<0.00	<0.00	<0.00
2,2,4,4,5-Pentabromodiphenyl ether (µg kg^{-1})	<0.00	<0.00	<0.00
2,2,4,4,6-Pentabromodiphenyl ether (µg kg^{-1})	<0.00	<0.00	<0.00
2,2,4,4,5,5-Hexabromodiphenyl ether (µg kg^{-1})	<0.00	<0.00	<0.00
2,2,4,4,5,6-Hexabromodiphenyl ether (µg kg^{-1})	<0.00	<0.00	<0.00

Sediment Quality

11.4.53 A geophysical seismic survey was conducted by Fugro for PD Ports in 2022 and identified the ZOI as highly dredged area composed of clay and sandy gravelly clay. The surficial layer is represented by the recent seabed sediments which overlay Triassic bedrock. The Triassic Bedrock varies in depth from exposed at the seafloor to a maximum depth of 3.8m below seafloor [Ref 26].

11.4.54 Sediment quality analysis was undertaken on contaminant analysis results of sediment samples from the site-specific sediment quality survey (**Appendix 11A: Marine Ecology Survey and Results (ES Volume III, Application Document Ref. 6.3)**), South Bank Quay [Ref 23] and NZT projects [Ref 25]. NZT samples within the Tees Estuary are classified as sandy mud. The same result was found in South Bank Quay grab sample results from stations GS-01 to GS-04, within the ZOI.

11.4.55 The primary data source for sediment contamination assessment was the results of the site-specific survey of the proposed capital dredging area. Sediment contamination was also compared to results from stations targeted by other developments proximal to the Proposed Development, results were extracted and summarised in Table 11.15, Table 11.16 and Table 11.17. Data from South Bank Quay correspond to vibrocorer stations 1 to 5, located within the ZOI, and data from the NZT project are from subtidal stations 1 and 2, 1.5km downstream from the Marine Works proposed area.

11.4.56 Trace metal concentrations were assessed against Cefas action levels (AL) to determine the contaminant loading of the material and its suitability for disposal at sea [Ref 40]. A site-specific sediment quality survey was undertaken in the River Tees close to the proposed quay during April 2026.

11.4.57 Analysis of existing sediment samples indicated elevated metal and PAH concentrations. Most of metal values exceeding AL1, but none exceeding AL2. Results for the organotins dibutyltin and tributyltin were below the limit of detection or below Cefas AL1. All total PCB concentrations sampled were below Cefas AL1 in NZT station 1 and higher in station 2.

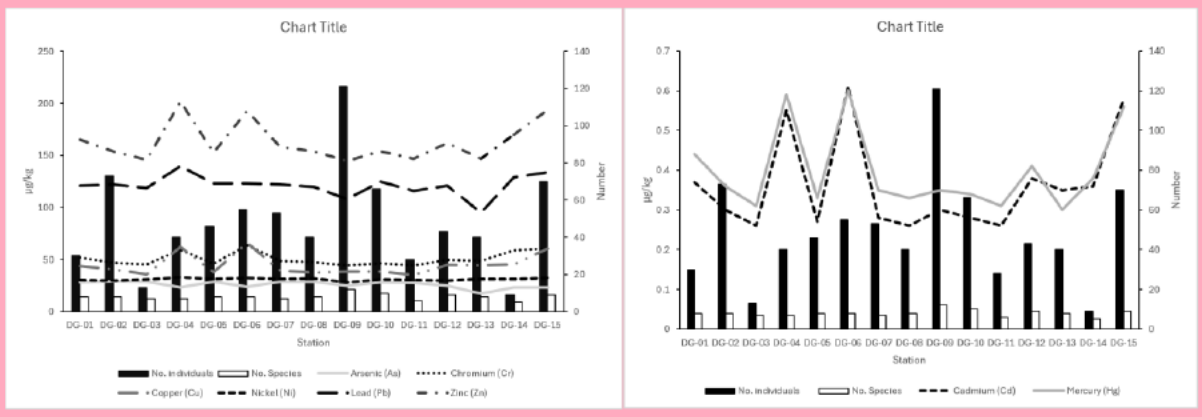
11.4.58 Within the site-specific samples it was found that one station (VC-18; 1m-2m below surface) contained sediment concentrations of cadmium and mercury which exceeded Cefas AL2 (Table 11.15). This was confirmed following testing of a reserve sample. Additional sampling to understand the limits of this area of elevated contamination is planned and will help inform the dredge and disposal strategy which is yet to be agreed.

11.4.59 Some stations contained levels for the SUM PCB 7 and SUM PCB 26 aggregated values above Cefas AL1, no samples exceed AL2.

11.4.60 Concentrations of organotins were all below AL1.

11.4.61 Values for PAH concentrations were higher than Cefas AL1 (100µg/kg) from at least one sample in all stations. Whilst PAH concentrations are mostly elevated across site-specific sampling area, the majority of stations exhibit peaks in PAH concentrations at the 1m – 2m below surface sub-sample. This indicates a band of legacy contaminant was encountered.

11.4.62 The results indicate that sediment contamination within the ZOI is low to moderate with one pocket of markedly elevated legacy contamination adjacent to the Proposed Development. As demonstrated by Table 11.15 and Table 11.16, the minimum values for contaminants are mostly much lower from the site-specific samples compared to those from neighbouring developments. However, the maximum values are similarly much higher than those results from neighbouring developments. The large range of identified contamination in the sediments of the proposed capital dredging area indicate a considered dredging and disposal strategy is required. No pattern between concentration of heavy metals in sediments and macrobenthos was found (Inset 11.3).



Inset 11.3 Numbers of species and individuals from Day grab samples with associated heavy metal concentrations

Table 11.15 Minimum and maximum heavy metal concentrations in River Tees sediments

Parameter (µg kg^{-1})	NZT Baseline	South Bank Quay	LGF proposed dredging area	Cefas AL1	Cefas AL2
Arsenic (As)	25.5-26.7*	23-27.1*	5.6-38.3*	20	100
Cadmium (Cd)	0.24-0.26	0.36-0.72*	0.16 – 5.60**	0.4	5.0
Chromium (Cr)	41.6-45.9*	46.2-57.5*	28.1-352	40	400
Copper (Cu)	36.3-37.7	46.1-63.8*	16.0-265*	40	400
Mercury (Hg)	0.26-0.27	0.38-0.58*	0.02-5.52**	0.3	3.0
Nickel (Ni)	26-27.1*	30.7-33.4*	26.9-46.0*	20	200
Lead (Pb)	78.1-81*	124-153*	13.0-289.0*	50	500
Zinc (Zn)	132-141*	184-238*	53.2-782.0*	130	800

Source: [(South Bank Quay [Ref 23] and NZT projects [Ref 25].

Note: NZT stations 1 and 2; South Bank Quay Stations VC-01, VC-02, VC-03, VC-04 and VC-05; * contain values higher than Cefas Action Level 1 (AL1) and ** higher than Cefas AL2

Table 11.16 Minimum and maximum PAH‡ concentrations in River Tees sediments

Parameter (µg kg^{-1})	NZT Baseline		South Bank Quay Baseline		LGF proposed dredging area	
	Min	Max	Min	Max	Min	Max
Acenaphthene	158	172	213	274	4	2160
Acenaphthylene	80.9	85.3	155	227	2	1860
Anthracene	228	230	264	373	4	2630
Benzo[a]anthracene	455	461	562	823	13	5320
Benzo[a]pyrene	461	476	557	835	16	5630
Benzo[b]fluoranthene	439	470	540	800	16	5530
Benzo[ghi]perylene	450	463	576	782	26	4710
Benzo[e]pyrene	469	486	509	666	19	4890
Benzo[k]fluoranthene	239	258	251	381	9	4200
C1-naphthalenes	3520	4020	2980	3670	2	29300
C1-phenanthrene	1590	1730	1460	1720	75	16600
C2-naphthalenes	2870	3220	2300	2840	73	25700
C3-naphthalenes	2690	2900	2090	2320	72	23400
Chrysene	491	515	639	865	21	6380
Diben[ah]anthracene	69.9	82.4	102	133	4	1090
Fluoranthene	812	838	995	1350	21	10800

Parameter (µg kg^{-1})	NZT Baseline		South Bank Quay Baseline		LGF proposed dredging area	
	Min	Max	Min	Max	Min	Max
Fluorene	268	296	344	429	13	3520
Indeno[1,2,3-cd]pyrene	319	322	389	559	8	4130
Naphthalene	1190	1410	1020	1260	1	9470
Perylene	117	120	146	240	6	2330
Phenanthrene	1310	1440	1310	1510	52	11900
Pyrene	782	810	999	1450	25	10400
Total Hydrocarbon*	334	581	85.7	231	11	2473

Source South Bank Quay [Ref 23] and NZT projects [Ref 25].

Note: NTZ stations 1 and 2; South Bank Quay Stations VC-01, VC-02, VC-03, VC-04 and VC-05; AL1 for Total Hydrocarbons is 100 (mg/kg). ‡ All LGF stations contained samples that exceeded Cefas AL 1

Table 11.17 Minimum and maximum organotin and PCB concentrations in River Tees sediments

Parameter (µg kg^{-1})	NZT Baseline	South Bank Quay	LGF proposed dredging area	Cefas AL1	Cefas AL2
Dibutyltin (DBT)	LOD	14-24	LOD-0.018	0.1	1.0
Tributyltin (TBT)	LOD	LOD	LOD-0.099	0.1	1.0
Total PCBs	0.00672-0.01098*	LOD-17.4	0.00200-0.06842*	0.02	0.2

Source South Bank Quay [Ref 23] and NZT projects [Ref 25].

Note: NTZ stations 1 and 2; South Bank Quay Stations VC-01, VC-02, VC-03, VC-04 and VC-05; LOD is value lower than detection method.

Other marine users in the Tees Estuary

11.4.63 The ZOI includes other marine users in the Tees Estuary. It is a high density navigation area. The North East Marine Plan (2021) classifies the area in the Tees Estuary from the Tees Barrage in Stockton-on-Tees to the northern North Sea as a high-density navigation route [Ref 41]. The weekly average for vessel transits includes 200 vessels or around 10,000 vessels per year. Most of the shipping is related to cargo vessels and port service craft.

11.4.63.1 The **Preliminary Navigation Risk Assessment in Appendix 20A (ES Volume III, Application Document Ref. 6.3)** reported a total of 13,926 vessel transits observed in the Study Area between October 2024 and September 2025. Up to 73% of the transits intersecting the Study Area were

workboats, serving Teesport commercial vessel terminals as well as terminals outside the Study Area, such as Able Seaton Port and Norsea Oil Terminal.

11.4.64 PD Ports is the Statutory Harbour Authority for Teesport and the Port of Hartlepool. The area subject to maintenance dredging is currently in the ZOI. In the Tees Estuary, the annual average volume of dredged material from the main channel was approximately 740,266m³ over the period 2001-2019 [Ref 42] together with an average of 183,980m³ from the Tees berths making an average combined volume of 924,247m³ of dredged material per annum for the Tees as a whole. Notwithstanding this, the total volume of maintenance dredged material has decreased in recent years [Ref 42].

11.4.65 Most of the maintenance dredge material is mud and the remainder is 80% typically clean, fine sand and 20% typically is silty sand [Ref 42].

11.4.66 The active disposal sites present in Tees Bay are Tees Bay A (TY160) and Tees Bay C (TY150), used for maintenance and capital dredging respectively. Tees Bay B (TY110) and Tees Bay Foreshore (TY170) are closed.

11.4.67 The Tees Estuary is an industrial area, with an important manufacturing heritage [Ref 41]. On the northern bank of the mouth of the Tees Estuary, there is the Hartlepool power station operated by EDF. The station has been connected to the grid since 1983 with operational lifetime expected to extend to 2030.

11.4.68 Teesside Offshore Wind Farm (OWF) is operated by EDF Energy Renewables, jointly owned by EDF Energy & EDF Energies Nouvelles. Teesside OWF opened in 2014 and is North East England's first large scale commercial wind farm.

11.4.69 Oil and gas pipelines connect Coatham Beach and Seaton Carew Beach to offshore infrastructure. An active oil pipeline operated by ConocoPhillips connects Area 2/4J to Teesside. Other active pipelines include PL2768.2 and PL2769.2, operated by the INEOS Group, which transports natural gas from the North Sea, and the CATS Pipeline, operated by Wood Group, which also transports gas.

Marine Ecology Condition

Benthic Ecology and associated habitats

11.4.70 The ZOI extends 2km up and downstream from the vicinity of the Marine Works area. This area contains mud and made ground, which describes artificial substrata present. Multiple anthropogenic features (sea defences, quays) constrain the High-Water Mark (i.e. flood defences) resulting in a

restricted intertidal zone. Within the Tees Estuary, the extent of intertidal habitat has been significantly reduced as the banks of the estuary have been developed.

11.4.71 Intertidal mudflats are the only priority intertidal habitat within the ZOI. Intertidal mudflats are recognised as UK Biodiversity Action Plan (UKBAP) priority habitat, legally protected as a Habitat of Principal Importance (HoPI) under Section 41 of the NERC Act 2006. Additionally, this habitat type is listed in the OSPAR Convention as a threatened and/or declining habitat in Region II (the Greater North Sea). These areas are also classified as a WFD Lower Sensitivity Habitat, specifically under the categories Intertidal Soft Sediment – Sand, Mud & Mixed Sediment. Existing areas of intertidal habitat, especially intertidal mudflat, within the Tees Estuary are fragmented and intertidal areas are a sensitive resource. Although classified as undesignated/non-priority mudflat, the northern part of the Marine Works Area is actually revetment and hard made ground which has previously been developed for use as a port area. Whilst the revetment and jetties are not in active use, they do not represent sensitive intertidal habitats.

11.4.72 Saltmarsh is classified as a WFD Higher Sensitivity Habitat, reflecting its ecological importance and vulnerability to environmental pressures. Coastal saltmarsh and coastal sand dunes are present within the Tees Estuary, with the closest area being Seal Sands, approximately 1.8km downstream from the Marine Works proposed area. Both habitats are recognised as UK Biodiversity Action Plan (UKBAP) Priority Habitats and are listed as HoPI under Section 41 of the NERC.

11.4.73 An aquatic habitat survey conducted in September 2024 under a previous DCO submission [Ref 38] identified an area within 2km of the Proposed Development that was able to support various saltmarsh plants. However, these were noted to be in poor condition with stunted growth forms of marsh samphire and common reed saltmarsh habitat. The area of saltmarsh vegetation recorded during the aquatic habitat survey was not considered to meet the criteria for Coastal Saltmarsh HoPI, but was indicative of Inland Salt Meadows, which is an Annex I habitat type designated under the Habitats Regulations 2017 (as amended). The area of potential Inland Salt Meadow is 240m from adjacent access roads and pipelines of the Main Site.

11.4.74 A summary of findings is presented in Table 11.18.

Table 11.18 Aquatic survey results in 2024

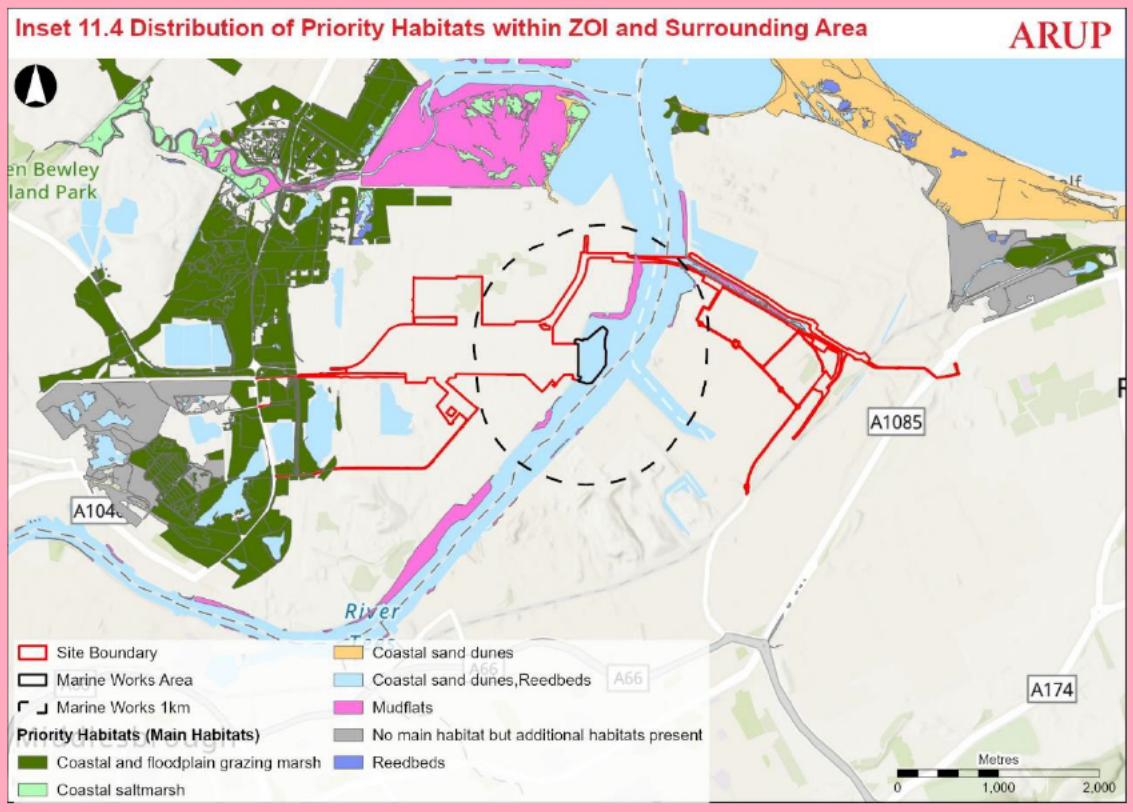
Parameter	Tees at Smiths Dock (surface)
Saltmarsh	Sea clubrush (*Bolboschoenus maritimus*) Spear-leaved orache (*Atriplex prostrata*) Marsh samphire (*Salicornia europaea* agg.) Herbaceous seepweed (*Suaeda maritima*) Sea aster (*Aster tripolium*) Saltmarsh rush (*Juncus gerardii*) Weeping alkaligrass (*Puccinellia distans*) Salt sand-spurrey (*Spergularia marina*)

Source Ref 30

11.4.75 Coastal and floodplain grazing marsh were identified 1.9km downstream of the Proposed Development in a previous DCO submission [Ref 38]. This habitat is recognised as a UK Biodiversity Action Plan (UKBAP) Priority Habitat and is listed as a HoPI under Section 41 of the NERC Act, reflecting its ecological value and susceptibility to hydrological and land-use changes.

11.4.76 Saltmarsh, coastal sand dunes and Coastal and floodplain grazing marsh are also listed as Reasons for Notification for the Teesmouth and Cleveland Coast SSSI.

11.4.77 Inset 11.4 presents the priority habitats within and surrounding the ZOI of marine construction activities. ZOI The Priority Habitat Inventory is a spatial dataset that maps priority habitats identified in the UK Biodiversity Action Plan and listed as being of principal importance for the purpose of conserving or enhancing biodiversity, under Section 41 of the NERC Act (2006) [Ref 21].



Inset 11.4 Distribution of priority habitats within the ZOI and surrounding area.

The south-western extension of the nearest mudflat to the north of the Marine Works area is considered erroneous. All observational evidence indicates that this is man-made revetment.

The subtidal biotope characterised from the Tees Estuary in the NZT baseline is A5.331 (SS.SMu.ISaMu.Nhom Mac) - *Nephtys hombergii and Macoma balthica in infralittoral sandy mud* [Ref 25]. This was observed 1.5km downstream of the Proposed Development.

11.4.78 Ecology and fish data were collected by the Environment Agency, the most recent data reviewed here are from 2019 and 2022 [Ref 11]. Benthic grab samples at stations NZ5303322477, NZ5413026370 and NZ5444626476 were located approximately 2.5km downstream of the river mouth. At station NZ5444626476, the macrofaunal community was dominated by annelids, which accounted for 83.2% of the total abundance. Molluscs comprised 7.9%, roundworms (Nematoda) constituted 7.4%, and crustaceans represented 1.2%. Other taxonomic groups, including flatworms, bony fish, and various minor invertebrate groups, each contributed less than 0.1%. Although annelids were the most abundant group overall, the most common taxon recorded was the roundworm Nematoda (nematodes), representing 3.86% of all individuals. This was followed by the Tubificid sludge worm (*Tubificoides benedii)* and fragile bristleworm (*Mediomastus fragilis*), each contributing approximately 3.3%.

The most abundant taxa were bristle worms (Ophryotrocha), capitellid worm (*Capitella capitata*), and *Ophryotrocha hartmanni*.

11.4.79 NZT samples presented similar results, where Annelida were the most abundant fauna recorded, representing 75.3% of the total average abundance across all the samples. Crustacea were the next most abundant fauna (11.1%; 87.2 ind. m^{-2}) followed by Mollusca (11.1%; 86.8 ind. m^{-2}) [Ref 25]. Survey from 2022 recorded protected species Ocean quahog and the INNS species crustacean Australian barnacle (*Austrominius modestus*). Ocean quahog is on the OSPAR List of threatened and/or declining species and habitats and is also a Feature of Conservation Importance (FOCI) in England and Wales.

11.4.80 The South Bank Quay benthic grab survey presented macrobenthic faunal groups in the Tees Estuary a range of taxa with no dominance of a single taxa. The polychaetes *Chaetozone gibber* and *Dialychone* contributed most (11% and 9% respectively) [Ref 23].

11.4.81 Site-specific macrobenthic Day grab survey results demonstrated that the proposed capital dredging area supports a depauperate estuarine assemblage mostly comprised of polychaetes and bivalve molluscs. Dominated by *Abra* spp. (65%), only 26 taxa were identified from grab sample stations with *Melinna palmata* and *Scalibregma inflatum* the next most abundant taxa. Individuals of two INNS were found, *Austrominius modestus* and *Yoldia limatula*, comprising <1% species abundance for the surveyed area.

Table 11.19 Macrobenthic taxa from 0.1m² Day grab samples, their abundance and relative contribution to the number of individuals recorded

Taxon	Abundance	Percentage contribution
PLATYHELMINTHES	1	0.14
NEMERTEA	1	0.14
NEMATODA	1	0.14
Eteone longa	1	0.14
Podarkeopsis capensis	2	0.28
Nephtys	14	1.93
Nephtys hombergii	29	3.99
Nephtys incisa	2	0.28
Nephtys kersivalensis	1	0.14
Aonides paucibranchiata	1	0.14
Chaetozone gibber	2	0.28
Chaetozone setosa	2	0.28
Ophelina acuminata	2	0.28
Scalibregma inflatum	44	6.05
Melinna palmata	90	12.38
Terebellides	14	1.93
Euchone limnicola	32	4.40
Austrominius modestus	1	0.14
Bathyporeia elegans	1	0.14
Yoldia limatula	1	0.14
MYTILOIDEA	1	0.14
Kurtiella bidentata	6	0.83
Abra	194	26.69
Abra alba	272	37.41
Abra nitida	10	1.38
Barnea candida	2	0.28

11.4.82 Regarding species of conservation interest, juvenile specimens of the ocean quahog were identified near Tees Estuary, 2km from the Marine Works in 2019 but not in 2020 [Ref 23]. The Ross worm (*Sabellaria spinulosa*) was identified, however visual inspection concluded that it does not comprise biogenic reef habitat.

Plankton

11.4.83 Phytoplankton is regularly monitored in the Tees Estuary by the Environment Agency, with one monitoring site located within the Study Area (Tees Estuary at the Gares). Two more are in the vicinity, they are NZ5288222198 and NZ5482424953. The Environment Agency collects monthly samples from these locations [Ref 11].

11.4.84 The most abundant taxa between April 2021 and March 2025 were diatoms (Centrales and Pennales), with dinoflagellates, euglenophytes and cyanobacteria also found in high abundance. This composition is typical of phytoplankton communities in UK estuaries. The greatest abundance typically occurs between May and September, with lower abundance observed in winter months (December and January).

11.4.85 During the same period, taxa known to cause harmful algal blooms in UK coastal waters were present, including *Pseudo-nitzschia* spp. and *Dinophysis acuminata*. Additionally, several taxa known to cause fish mortality were also recorded, including *Gymnodinium* spp., *Dictyocha speculum*, and *Chaetoceros* spp.

11.4.86 No protected or INNS taxa were identified during Environment Agency surveys in the same dataset between April 2002 and March 2025.

Plants and Macroalgae

11.4.87 Data regarding marine plants and macroalgae (both marine and freshwater) in the ZOI is limited. However, the NZT Project surveyed the intertidal habitats in the Bran Sands and Coatham Sands areas [Ref 25]. Bladder wrack (*Fucus vesiculosus*) was recorded in sheltered environments (Paddy's Hole), and horned wrack (*Fucus ceranoides*), sea lettuce (*Ulva spp.*), and purple laver (*Porphyra umbilicalis*) were recorded on more exposed boulder habitats at Bran Sands and South Gare Breakwater. Additionally, the INNS wakame (*Undaria pinnatifida*) were observed sporadically in low abundance at South Gare Breakwater, indicating limited establishment within the area.

11.4.88 Macroalgae were sampled from scrape samples on South Bank Quay jetty [Ref 23]. Chlorophyta were the most frequently occurring taxa at all tidal levels. The Chlorophyta, *U. intestinalis* was the most frequently occurring being recorded in 90.0 % of scrape samples, followed by *Prasiola stipitata*, *Ulva prolifera*, *Rhizoclonium riparium*. From Rhodophyta, *Rhodochorton purpureum* and *Erythrotrichia carnea* were the most frequently occurring and within the Phaeophyceae, *Elachista fucicola* was the most frequently occurring.

11.4.89 Native seagrass is a priority habitat predominantly comprised of common eelgrass (*Zostera marina*). Although this habitat is present within the Tees Estuary, it is considered unlikely to occur in the ZOI. The ZOI is consists of a heavily modified intertidal and subtidal environment.

11.4.90 A seagrass restoration project is located at Seal Sands, approximately 1.5km downstream of the Proposed Development [Ref 43].

Fish Ecology and Commercial Fisheries

11.4.91 The ZOI extends up to 5km from the Marine Works proposed area, encompasses the Tees Estuary and the adjacent coastal water of the North Sea. International Council for the Exploration of the Sea (ICES) data from outside the ZOI [Ref 44] and an offshore station from Environment Agency [Ref 11] were included to characterise the proposed offshore dredge disposal area. The River Tees is tidal downstream of the Tees Barrage which is over 10km upstream of the Marine Works proposed area.

11.4.92 The baseline includes pelagic fish (open water), demersal fish (bottom dwelling), elasmobranch (sharks and rays) and migratory fish (migrate between the sea and freshwater to spawn or opposite), as well as shellfish. The baseline was divided between important and protected fish species and commercially important fish.

Important and Protected Fish Species

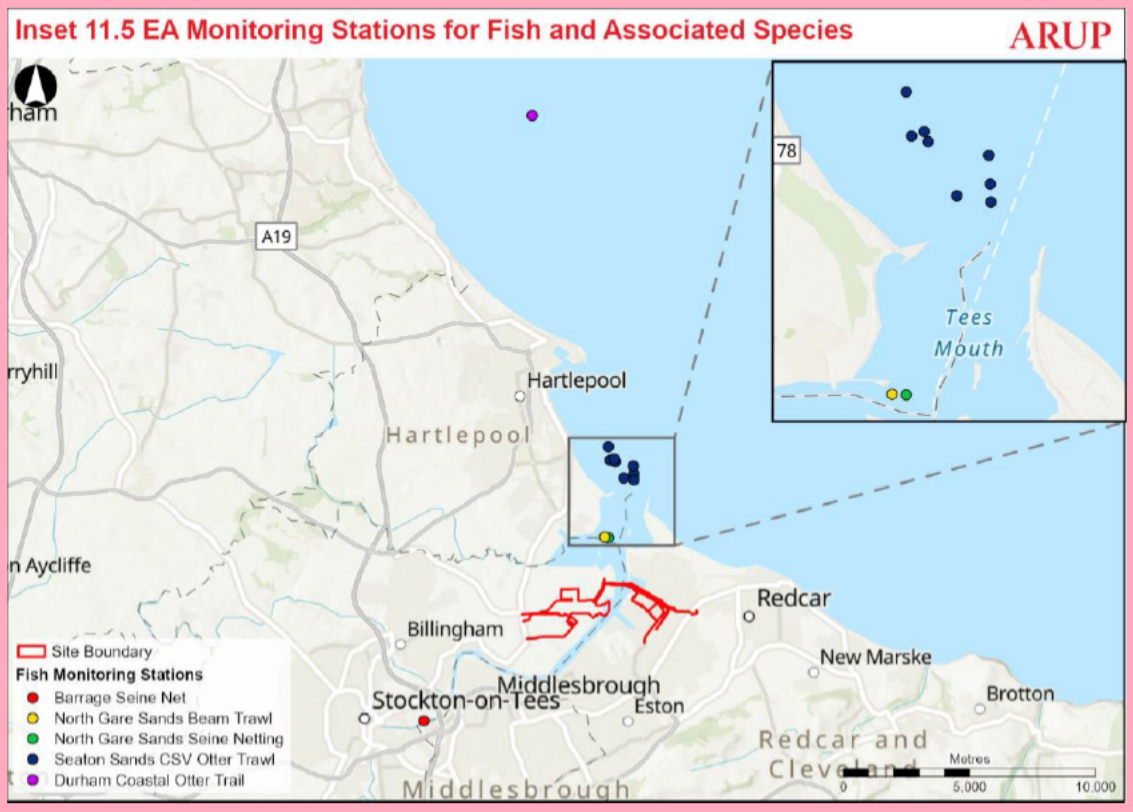
11.4.93 The River Tees and Tees Estuary lie within the Strategic Environmental Assessment (SEA) Area 1 as defined by the Department for Energy Security & Net Zero and support demersal and pelagic fish species typical of the North Sea [Ref 16].

11.4.94 The offshore area is represented by fish species published by ICES between 2020 and 2025. ICES uses statistical rectangles to grid marine areas, enabling simplified analysis and visualisation of fish population data. The ZOI lies within subrectangle 38E8, however trawling data available is in 38E9 (29km from the dredge disposal area). Approximately 1,500 catches were registered on ICES, with the highest proportion attributed to herring (*Clupea harengus*), sprat (*Sprattus sprattus*) and plaice (*Pleuronectes platessa*) [Ref 44].

11.4.95 The Tees Estuary provides an important habitat for fish species, where freshwater from the river mixes with saltwater from the sea. Fish populations in the estuary exhibit high temporal and spatial variability. To better understand habitat use, Farinloye et al. (2025) Fish species diversity and evenness in River Tees Estuary, North Yorkshire, United Kingdom. [Ref 44], classified fish species in Tees Estuary into the following guilds:

- marine stragglers - marine species that occasionally enter estuarine environments,
- marine migrants - regularly utilise estuaries, often for feeding or as part of their life cycle,
- estuarine species - principally inhabit estuarine areas,
- anadromous species - migrate from the sea into freshwater to spawn,
- catadromous species - migrate from freshwater to the sea to reproduce, and,
- unassigned - used for species that do not clearly fit into any of the established guilds.

11.4.96 Fish and associated species are regularly monitored by the Environment Agency in the Tees Estuary [Ref 11]. Data collected from 2015 to 2025, are presented in Inset 11.5 and were grouped in Table 11.20 to represent freshwater, marine and estuarine habitats. Durham Coastal (Site ID 81044) was classified as offshore, North Gare Sands Beam (Site ID 30387), North Gare Sands Seine (Site ID 37446) and Seaton Sands (Site ID 60884) were classified as estuarine, while Barrage Seine (Site ID 20271) was classified as a freshwater station. North Gare Sands and Seaton Sands are withing the ZOI, others were used to complement the analysis and represent different habitats. The Durham Coastal station is located 8km from Marine Works works and 5.7km from dredge disposal area.



Inset 11.5 Environment Aency monitoring stations for fish and associated species in the Tees Estuary and nearby marine area

Source [Ref 11]

11.4.97 Most of the species recorded were classified as marine migrants, indicating regular use of estuarine habitats for feeding or as part of their life cycle. The highest numbers of individuals captured in marine and estuarine habitats were sprat, herring, dab (*Limanda limanda*), plaice, lesser sandeel (*Ammodytes tobianus*), whiting (*Merlangius merlangus*), and sand goby (*Pomatoschistus minutus*). All these species were recorded at multiple stations, highlighting their widespread presence across the study area. From the offshore station, haddock and whiting were the most captured species. Plaice was the only species recorded at all sampling stations, highlighting its broad ecological range within the ZOI.

Table 11.20 Number of fish individuals captured in offshore, estuarine and freshwater stations. *Zeros do not mean absence but indicate no record in the sample

Species	Guild	Individuals in offshore station	Individuals in estuarine station	Individuals in freshwater station
Hooknose / Pogge (*Agonus cataphractus*)	Marine straggler		36	0
Lesser sandeel (*Ammodytes tobianus*)	Marine migrant	0	599	0
Five-bearded rockling (*Ciliata mustela*)	Marine migrant		3	0
Herring (*Clupea harengus*)	Marine migrant		779	285
Lesser weever (*Echiichthys vipera*)	Marine straggler		9	0
Snake pipefish (*Entelurus aequoreus*)	Marine migrant		1	0
Grey gurnard (*Eutrigla gurnardus*)	Marine migrant		2	0
Cod (*Gadus morhua*)	Marine migrant		87	0
Three-spined stickleback (*Gasterosteus aculeatus*)	Estuarine		1	0
Dab (*Limanda limanda*)	Marine migrant	3	771	5
Haddock (*Melanogrammus aeglefinus*)	Marine migrant	37		
Whiting (*Merlangius merlangus*)	Marine migrant	26	167	1
Lemon Sole (*Microstomus kitt*)	Marine migrant	2	2	0
Red mullet (*Mullus surmuletus*)	Marine straggler	1		
Flounder (*Platichthys flesus*)	Anadromous		52	121
Plaice (*Pleuronectes platessa*)	Marine migrant	3	623	290
Pollack (*Pollachius pollachius*)	Marine migrant		10	
Common goby (*Pomatoschistus microps*)	Estuarine		0	57
Sand goby (*Pomatoschistus minutus*)	Marine migrant		122	52
Turbot (*Psetta maxima*)	Marine migrant		1	0
Thornback ray (*Raja clavata*)	Marine migrant		1	0
Brown /sea trout (*Salmo trutta*)	Anadromous			1
Dover sole (*Solea solea*)	Marine migrant		7	1
Sprat (*Sprattus sprattus*)	Marine migrant		940	5

Species	Guild	Individuals in offshore station	Individuals in estuarine station	Individuals in freshwater station
Greater pipefish (*Syngnathus acus*)	Marine migrant		3	0
Lesser (Nillsons) pipefish (*Syngnathus rostellatus*)	Marine migrant		3	0
Long-spined sea scorpion (*Taurulus bubalis*)	Marine straggler		2	0
Scad / Horse mackerel (*Trachurus trachurus*)	Marine migrant	1	0	0

Source [Ref 11]

11.4.98 Fish eDNA survey between June 2023 and April 2024 in four stations from the lower course (estuarine area) to the upper course of the River Tees [Ref 44]. Total of 11,935 individuals were enumerated, representing 25 finfish species. The most abundant species in the Tees Estuary are brown/sea trout (*Salmo trutta*), Atlantic salmon (*Salmo salar*), and chub (*Leuciscus cephalus*), accounting for 10.0%, 8.2%, and 6.9% of total capture, respectively. Typically associated with freshwater, chub can enter brackish waters and inhabit upper estuaries [Ref 45, Ref 44].

11.4.99 A study comparing fish assemblages detected via eDNA and conventional fishing gear in Tees Estuary during early summer and autumn resulted in large amounts of information on fish biodiversity [Ref 46]. Fish species registered through eDNA and conventional sampling were herring, cod, three-spined stickleback, whiting, plaice, common goby, brown trout, European sprat and sandeel. Species from this study which were not recorded in ICES data were European eel (*Anguilla anguilla*), Channel minnow (*Phoxinus phoxinus*) and flounder (*Platichthys flesus*). Salmon was observed by [Ref 44] and [Ref 46].

11.4.100 The River Tees is designated as one of the 64 ‘principal salmon rivers’ in England and Wales. There is currently a Salmon Action Plan that aims to manage the performance of salmon stocks within the River Tees against Conservation Limits. The Conservation Limit is a standard determining how well the stocks in a river are performing. Currently, the River Tees is not achieving its Conservation Limit and is projected to remain ‘at risk’ of not complying with the salmon management objectives. Within an ‘at risk’ river such as the River Tees it is stipulated that urgent steps must be taken to reduce exploitation by all fisheries to zero.

11.4.101 Marine fish surveys were undertaken on 26/07/2024 and 27/07/2024 to represent summer conditions, and on 16/10/2024 to represent autumn

conditions [Ref 27, Ref 28]. Trawl surveys were conducted approximately 1km upstream of the Marine Works area . Summer results include eight fish species recorded and anchovy (*Engraulis encrasicholus)* was the only species not recorded in ICES or Environmental Agency databases. Common to other studies are cod, dab, goby, flounder, gurnard spp., plaice, sprat and whiting. During autumn cod, goby, flounder and whiting were identified. Flounder, goby and whiting were the most recorded species, and the majority of recorded flounder in summer were juvenile. Other taxa recorded in the trawls, in addition to fish species, included common starfish (*Asterias rubens*), green shore crab (*Carcinus maenas*), Atlantic bobtail (*Sepiola atlantica*), common squid (*Loligo vulgaris*), sea gooseberries (*Pleurobrachia pileus*), brown shrimp (*Crangon crangon*), common hermit crab (*Pagurus bernhardus*), velvet swimming crab (*Necora puber*) and common cockle (*Cerastoderma edule*).

11.4.102 The biodiversity baseline monitoring study at PD Ports Teesport uses eDNA sampling to monitor INNS. However, the eDNA results are not limited to INNS and also provide information on protected species and commercially important fish. Sampling has been undertaken at Billington Reach and South Gare, representing upriver and downriver locations, respectively, relative to the PD Teesport facilities, over the period 2022 to 2025 [Ref 31, Ref 32, Ref 33, Ref 34, Ref 35 and Ref 36]. The three most frequently reported species in the surveys were European eel (Anguilla anguilla), Atlantic herring (Clupea harengus), and brown/sea trout (Salmo trutta). Harbour porpoise was also detected in January 2025 sample. Results are presented in Table 11.21 including the reason for detection.

11.4.103 Project-specific eDNA samples were also collected in July 2026, primarily to assist in identification of potential presence of migratory fish and marine mammals [Ref 80]. The samplers were moored on buoys either side of the turning circle area, North Tees Winkler buoy and Navigator No. 3 Winkler buoy, and on one of the existing jetties within the development site, INEOS berth pocket. The results indicated the presence of a range of taxa previously identified in the study area. To minimise the risk of cross-contamination and over-identification, only fish species associated with high-confidence detections have been included in this ES. These are: Atlantic herring, European sprat and gobies.

Table 11.21 Number of species identified in eDNA sampling in the River Tees at PD Ports Teesport

Species	Reason for detection[vii]	Survey date
African catfish (*Clarias gariepinus*)	INNS	April 2025
American mink (*Neovison vison*)	INNS	January and April 2024
European eel (*Anguilla* spp.)	Protected	April 2025
Atlantic herring (*Clupea harengus*)	Commercial	January and April 2024; October 2024; January 2025; April 2025
Australian tubeworm (*Ficopomatus enigmaticus*)	INNS	2023
Barnacle (*Austrominius modestus*)	INNS	2022
Blue mussel (*Mytilus edulis*)	Commercial	January and April 2024; April 2025
Brown/Sea trout (*Salmo trutta*)	Commercial	January 224 and April 2024; October 2024; January 2025
Chinese mitten crab (*Eriocheir sinensis*)	INNS	2023
Cod	Commercial	January 2025
Common bream (*Abramis brama*)	Protected	2022
Common dab (*Limanda limanda*)	Commercial	January and April 2024; January 2025
European eel (*Anguilla anguilla*)	Protected	2023; January and April 2024; October 2024; January 2025
European perch (*Perca fluviatilis*)	Commercial	January and April 2024
European sprat (*Sprattus sprattus*)	Commercial	October 2024; January 2025; April 2025
Haddock (*Melanogrammus aeglefinus*)	Protected	January and April 2024; January 2025
Harbour porpoise (*Phocoena phocoena*)	Protected	January 2025
Norway pout (*Trisopterus esmarkii*)	Commercial	January 2025
Pacific saury (*Cololabis saira*)	INNS	January and April 2024
Phytoplankton (*Coscinodiscus wailesii*)	INNS	2023
Rainbow trout (*Oncorhynchus mykiss*)	INNS	January and April 2024
Roach minnow (*Rutilus rutilus*)	Protected	2022

[vii] Reason for detection indicates the driver for the taxa being included in the requested analyses. INNS = invasive non-native species that requires notification; Protected = Protected species that requires notification; Commercial = recording presence of species of commercial importance for monitoring recovery of the Tees estuary.

Species	Reason for detection[vii]	Survey date
Sardine (*Sardina pilchardus*)	Protected	2022
White bream (*Blicca bjoerkna*)	Protected	2022
Whiting (*Merlangius merlangius*)	Commercial	January and April 2024; January 2025

Source [Ref 31; Ref 32; Ref 33; Ref 34; Ref 35; and Ref 36]

Commercially important fish

11.4.104 The Marine and Coastal Access Act 2009 establishes the management of fisheries. North Eastern Inshore Fisheries and Conservation Authority (NEIFCA) is responsible for the sustainable management of fisheries and fisheries activities out to a distance of six nautical miles (nm) of the Northeast coast of England, including the Tees. MMO is the responsible authority beyond 6nm from the coast.

11.4.105 The main area for spawning and nursery grounds for commercially important fish in British waters was mapped [Ref 48] and updated [Ref 49]. The species mapped and updated in the area for nursey and/or spawning are anglerfish, cod, herring, lemon sole, plaice, whiting, spurdog and sprat and are presented in Table 11.22. Norway lobster (*Nephrops norvegicus*) also uses the area for nursery and spawning.

Table 11.22 Number of species identified in eDNA sampling in the River Tees at PD Ports Teesport

Species	Nursery Ground	Spawning period
Anglerfish (*Lophius piscatorius*)	Low intensity [Ref 48; Ref 49]	N/A
Cod (*Gadus morhua*)	High intensity [Ref 48; Ref 49]	N/A
Herring (*Clupea harengus*)	High intensity [Ref 48; Ref 49]	Aug-Oct [Ref 49]
Lemon sole (*Microstomus kitt*)	Yes [Ref 49]	Apr-Sep [Ref 49]
Plaice (*Pleuronectes platessa*)	Low intensity [Ref 48; Ref 49]	Peak Jan-Feb [Ref 48]
Whiting (*Merlangius merlangus*)	High intensity [Ref 48; Ref 49]	N/A
Spurdog (*Squalus acanthias*)	Low intensity [Ref 48]	N/A
Sprat (*Sprattus sprattus*)	Yes [Ref 49]	N/A

Protected Fish Species

11.4.106 The UK is a signatory to global and regional conventions to protect fish species. At the global level, the United Nations Convention on the Law of the Sea (UNCLOS) [Ref 130] sets out how the countries should manage the oceans and fish stocks. Other agreements include the Convention on Biological Diversity (CBD) [Ref 131], the Convention on Migratory Species (CMS) or Bonn Convention [Ref 88] and the Convention on International

Trade in Endangered Species of Wild Fauna and Flora (CITES) to protect endangered species [Ref 137].

11.4.107 At the regional level, there are the Bern Convention [Ref 87], which protects European wildlife, and others focussed on specific seas like the OSPAR Convention (North-East Atlantic) [Ref 92]. The UK Marine Strategy [Ref 133], the Marine Strategy Framework Directive EU (MSFD) [Ref 134] and Common Fisheries Policy (CFP) [Ref 135] provide the main framework for conserving marine life and fisheries management.

11.4.108 In England, Species of Principal Importance refers to a list of species identified under Section 41 of the NERC Act 2006. These protected species are considered especially important for conserving biodiversity.

11.4.109 Based on the previous references, the protected species likely to be identified in the ZOI based on IUCN Red List [Ref 12], EU Habitats Directive [Ref 136], OSPAR [Ref 92], CITES [Ref 137], CMS [Ref 88] and the NERC Act 2006 list of Species of Principal Importance are listed in Table 11.23.

Table 11.23 Vulnerable (VU), or protected species likely to be registered in the ZOI. CR = Critically Endangered; DD = data deficient; EN = Endangered; LC = Least Concern; NT = Near-Threatened.

Specie	IUCN Red List (Status)	IUCN Red List (Status) – Europe	Other conservation listings
Lesser sandeel (*Ammodytes tobianus*)	DD	DD	
European eel (*Anguilla anguilla*)	CR	CR	Bonn; Bern; OSPAR; NERC
Cod (*Gadus morhua*)	VU	EN	OSPAR; NERC
Turbot (*Scophthalmus maximus*)	LC	VU	
Thornback ray (*Raja clavata*)	NT	VU	OSPAR; NERC
Atlantic salmon (*Salmo salar*)	NT	VU	Bonn; Bern; OSPAR; NERC; Habitat Regulation Annex II species
Dover sole (*Solea solea*)	LC	DD	
Spurdog (*Squalus acanthias*)	VU	EN	Bonn (Migratory species of concern); OSPAR; NERC

Marine Mammals

11.4.110 Marine mammals are highly mobile and transient, therefore, a ZOI of 20km around the Marine Works area has been defined to characterise the

baseline. This area includes the proposed offshore dredged material disposal site.

11.4.111 The Tees Estuary connects the River Tees to the southern North Sea and is located in the Offshore Energy Regional Sea 1. The central and northern areas of the Southern North Sea have moderate to high diversity and density of cetaceans, decreasing at lower latitudes. Coastal waters have large numbers of grey and harbour seals [Ref 16].

11.4.112 The Wildlife and Countryside Act 1981 (WCA) [Ref 89] was endorsed primarily to implement the Birds Directive [Ref 99] and Bern Convention [Ref 87] in Great Britain. All cetaceans, including harbour porpoise are protected under Annex II and Annex IV of the EU Habitats and Species Directive (1992) [Ref 136] and under WCA in Schedule 5 (animals protected) and Schedule 6 (animals may not be killed) [Ref 89]. Harbour and grey seals are listed under Annex II and IV of the EU Habitats and Species Directive (1992) [Ref 136] and under the Conservation of Seals Act 1970 and WCA [Ref 89]. Species listed in Annex II require the designation of SAC to protect their habitats, listed in Annex IV are subject to strict protection and species in Annex V may be exploited, but only under regulated management to ensure their conservation.

11.4.113 The Bern Convention [Ref 87] protects natural habitats in Europe. Appendix II accords strict protection to cetacean species such as harbour porpoise and Appendix III lists species of wild fauna that may be exploited so long as regulation keeps the populations out of danger.

11.4.114 The Convention on the Conservation of Migratory Species (adopted 1979) or Bonn Convention [Ref 88] has multilateral agreements for the conservation and management of migratory species listed in Appendix II.

11.4.115 The protection status for grey seal and harbour seal is detailed in Table 11.24.

Table 11.24 Marine mammal protection lists

Common Name	WCA	EC Habitats Directive (Annex)	Bern Convention (Appendix)	Bonn Convention (Appendix)	OSPAR threatened and/or declining species	ASCOBANS
Harbour Porpoise	✓	II, IV	II	II	✓	✓
Harbour Seal	✓	II, V	III			
Grey Seal	✓	II, V	III			

11.4.116 As presented, the sensitivity of cetaceans (e.g. dolphins and harbour porpoise) and pinnipeds (e.g. seals) differ. The following text describes each of them and likely presence within the ZOI.

Cetaceans

11.4.117 Within the Greater North Sea Ecoregion, four species of cetaceans occur commonly or are resident: harbour porpoise (*Phocoena Phocoena*) and white-beaked dolphin (*Lagenorhynchus albirostris*) are most common, occurring throughout the year. Minke whale (*Baleanoptera acutorostrata*) are summer visitors, while bottlenose dolphin (*Tursiops truncatus*) and orca or killer whale (*Orcinus orca*) are present in the north of North Sea. Occasional visitors are Atlantic white sided dolphin (*Lagenorhynchus acutus*), Risso's dolphin (*Grampus griseus*) and long-finned pilot whale (*Globicephala melas*) [Ref 16].

Harbour porpoise

11.4.118 Harbour porpoise is the most abundant cetacean in coastal areas within the North Sea. Annual densities of harbour porpoise in the south-eastern North Sea are relatively low with few sightings in the English Channel. The regular period for sightings is during the first four months of the year [Ref 16].

11.4.119 The total population in the North Atlantic is estimated at 466,569 [Ref 50]. Tees Estuary is within the Scan III Survey Block O, resulting in density of 0.888 per km². Scan III data in the Study Area indicates a density of 1.00 harbour porpoise per km² [Ref 51].

11.4.120 Harbour porpoise preference areas have been modelled and are associated with waters between 40m and 200m depth, with the highest likelihood of observation during summer [Ref 51]. It is unlikely that harbour porpoise will be present within the vicinity of the Proposed Development due to a lack of favourable foraging areas close to the Site and the volume of shipping and associated noise within the Tees estuary.

11.4.121 The Southern North Sea SAC is the nearest designated site of importance for harbour porpoise. This SAC supports high densities of harbour porpoise identified through data modelling over an 18-year period. However, this SAC lies approximately 110km distant from the Marine Works area.

11.4.122 Harbour porpoise was recorded in two separate fish surveys within the ZOI: one through direct observation in June 2024 [Ref 27] and one via eDNA detection in January 2025 [Ref 35].

Pinnipeds

11.4.123 Two species of seal live and breed in UK waters: grey seal (*Halichoerus grypus*) and harbour (common) seal (*Phoca vitulina*). Grey seal only occurs

in the North Atlantic, Barents and Baltic Sea with their main concentrations on the east coast of Canada and United States of America and in north-west Europe. Harbour seal has a circumpolar distribution in the Northern Hemisphere and are divided into five sub-species. The population in European waters represents one subspecies (*Phoca vitulina vitulina*) [Ref 53].

11.4.124 Harbour seal are counted while they are on land during their August moult, giving a minimum estimate of population size. The minimum population estimate for England's harbour seal population was based on counts during the moult between 2015 and 2018 resulting in a total of 5,100 [Ref 53].

11.4.125 The two pinniped species have been present at the mouth of the Tees Estuary for hundreds of years.

11.4.126 The Tees Seals Research Programme (TSRP) was initiated in 1998 by INCA (the Industry Nature Conservation Association) and focusses on harbour seal. The primary purpose is to determine the total number of pups born each year and the peak in local population size, particularly during breeding season from mid-June to mid-September [Ref 54].

11.4.127 A small resident population of harbour seal is present within the Tees Estuary and haul out at Seal Sands and Greatham Creek, approximately 1.7km from the Study Area. Breeding harbour seal is listed as a Reason for Notification for the Teesmouth and Cleveland Coast SSSI.

11.4.128 The maximum number of harbour seal recorded from a single observation in 2024 was 131 during the pupping season and not, as expected, during the moulting season.

11.4.129 Although present throughout the year, grey seal numbers reduce significantly over winter, coinciding with the return to their breeding grounds. Grey seal pups are left on land for around three weeks after being born, with the mother returning to feed them.

11.4.130 Grey seals are less numerous, the maximum recorded was 125 in 2024. They are usually more prevalent during the late summer and pup in October or November followed by a moulting in March.

11.4.131 Fish surveys were carried out during summer and autumn of 2024, under the previous DCO application[iii] [Ref 27] and seals were recorded within the ZOIZOI. The seal species was not described..

Strandings

11.4.132 The pressure on marine mammals is studied by UK Cetacean Strandings Investigation Programme (CSIP), a collaborative initiative funded by UK governments.

11.4.133 According to the 2020 Annual report, 1102 cetacean strandings were reported to the CSIP comprising at least 16 species. Of these, 122 reported causes of death and two were related to physical injuries due to ship strike [Ref 20].

11.4.134 Regarding harbour porpoise, 37 strandings were examined in UK and 15 were in England. Of these, four were associated with physical trauma of unknown cause and one was recorded in Hartlepool, where injuries to the harbour porpoise were associated with physical trauma due to grey seal attack.

11.4.135 Between November 2015 and March 2016, a total of 125 dead seals were reported along the English coastline, comprising 104 grey seals, 7 harbour seals and 14 indeterminate identity seals. Post-mortem investigation was conducted on 27 individuals, with two cases showing physical trauma of unknown origin. Within the ZOI, only one harbour seal was registered, and the cause of death was related to gastric and pulmonary parasitism.

11.4.136 In summer 2025, 21 harbour seal pups were born at Seal Sands, Tees Bay [Ref 54]. Following weaning, at least 19 pups were recorded stranded along the Tees Bay coastline, with additional cases further north. Stranded individuals were consistently underweight and exhibited oral tissue degradation commonly (referred to as “mouth rot”). Laboratory analysis of tissue samples from 13 pups identified anaerobic bacteria, including *Escherichia coli*, indicating potential sewage contamination.

Invasive Non-Native Species

11.4.137 The biodiversity baseline monitoring study undertaken at PD Ports Teesport using eDNA identified the presence of INNS from 2022 to 2025 African catfish, American mink, Australian tubeworm, Barnacle *Austrominius modestus*, Chinese mitten crab, Pacific saury, Phytoplankton *Coscinodiscus wailesii* and Rainbow trout.

Future Environmental Scenarios

11.4.138 Climate change is the most prevalent factor when attempting to predict the potential change of an ecosystem, species distribution or assemblage composition. Climate change is projected to lead to warmer, wetter winters and hotter, drier summers in the U.K., with an increase in the intensity and frequency of extreme events such as heatwaves, drought, extreme rainfall leading to flash flooding, storms and wind events. Further information is provided in **Chapter 12: Water Environment and Flood Risk** and **Chapter 15: Climate Change Resilience (ES Volume I, Application Document Ref. 6.1)**.

11.4.139 Impacts of climate change on species are considered to include changes in distribution and abundance; the timing of seasonal events and habitat use. A consequence of these changes would likely be modification to the composition of plant and animal assemblages. Habitats and ecosystems are also likely to change in character.

11.4.140 The information presented below illustrates how climate change might impact upon freshwater and marine receptors during the operation of the Proposed Development.

Marine Habitats

11.4.141 Coastal squeeze (barrier to preventing landward transgression in response to sea level rise that results in loss of natural habitats) might cause the loss of intertidal habitats, such as saltmarsh and intertidal mudflat, which will have an impact on the associated intertidal species associated with reduced or loss of habitat.

Benthic Assemblages (Subtidal and Intertidal)

11.4.142 Rising sea levels, acidification, lower dissolved oxygen, increased storm frequencies and increasing water temperatures might result in a species regime shift due to northward range expansion of ‘southern species’ and a retreat of ‘northern species’. Increased water temperatures might also result in increased habitat viability for INNS, which might cause the degradation or loss of native benthic species. Rising sea levels might also result in an increase in the habitat available for subtidal species and a reduction for species adapted to intertidal environments.

Marine Plants and Macroalgae

11.4.143 Rising sea level and coastal squeeze have the potential to result in reduced habitat viability for saltmarsh species and seagrass due to increased immersion times and increased water depths. Sea level rise might also increase the amount of habitat available for saltmarsh and intertidal algal species and resulting in increased colonisation of the river wall.

Fish

11.4.144 Rising sea levels and increasing water temperatures could result in a regime shift due to northward range expansion of ‘southern species’ and a retreat of ‘northern species’. Alterations to habitat types, including coastal squeeze might also result in changes in fish community composition.

Marine Mammals

11.4.145 Changes to benthic assemblages and fish caused by rising sea level and increased water temperatures might have indirect impacts upon marine mammals through changes in prey availability and the subsequent

distribution of marine mammals. If availability of suitable prey diminishes a direct impact on marine mammals through reduced breeding success and population viability is possible.

11.4.146 Climate change can affect indirectly marine mammals due to change prey distribution and/or availability or increases in harmful algal blooms or increased disease prevalence. Recent genetic data from the Baltic grey seals studied the effects due to moving the boundaries between the North Sea and Baltic subspecies of grey seal [Ref 55].

Invasive Non-Native Species

11.4.147 The effects of climate change, including rising sea levels and increasing water temperatures, might facilitate the spread and establishment of INNS through increased habitat viability and reduced competition/predation.

Freshwater Habitats and Species

Macrophytes

11.4.148 Climate change resulting in drought, flooding, pollution and subsequent changes in land management has the potential to impact on macrophytes species occurring in freshwater habitats. Changes in species composition, abundance and distribution, as well as loss of aquatic plants would also impact on invertebrates and animals higher up the food chain that depend on them.

Aquatic Macroinvertebrates

11.4.149 Similarly for freshwater invertebrates, climate change effects have the potential to adversely affect invertebrates with changes in community composition, abundance and distribution and especially for those that are sensitive to drying.

Freshwater Fish

11.4.150 Higher water temperatures and drought are main stressors on freshwater fish. Increased temperature reduces the maximum concentration of dissolved oxygen in the water as well as increasing biological and chemical oxygen demand, and fish respiration. This may result in physiological and behavioural changes, as well as changes in species distribution. Such reductions in water quality may also lead to a decline in invertebrates and reduce the main food source of many fish species. Furthermore, drought and consequently low water flow

Sensitive Receptors

11.4.151 The likely sensitive freshwater and marine receptors within the Proposed Development's ZOI have been identified in Table 11.25 following desk-

based research and information provided by stakeholders during scoping and statutory consultation.

Table 11.25 Environmental sensitivity of marine and freshwater receptors likely to be present in the ZOI

Receptor	Type	Name	Sensitivity
Designated sites	Internationally designated site	Teesmouth and Cleveland Coast SPA and Teesmouth and Cleveland Coast Ramsar	High
	Nationally designated site	Teesmouth and Cleveland Coast SSSI	Medium
Marine ecology	Marine habitat	Nationally protected habitats such as Intertidal Mudflats, Coastal Saltmarsh and Seagrass Meadows	Medium
		Other marine habitats	Low
	Benthic assemblages	OSPAR or UK protected species including ocean quahog and Ross worm	Medium
		Other non-protected species	Low
	Phytoplankton	A range of species	Low
	Marine plants and Macroalgae	A range of species	Low
	Fish	Protected/notable species, including Atlantic salmon, brown trout and European eel species	High
		Other fish species	Low
	Marine Mammals	Cetaceans such as harbour porpoise	High
		Other marine mammals such as harbour seal and grey seal	Medium

11.5 Development Design and Impact Avoidance

Overview

11.5.1 The components with potential impacts on marine receptors are associated with:

- Construction Phase:
  i. new quay construction, including jetty demolition, dredging, piling, ship anchoring and marine traffic;
  ii. use of new quay for import of modular plant and construction materials;
  iii. discharge of clean surface water in the drainage system and then the River Tees

iv. commissioning and pressure testing of pipelines required for operation of the Site;

v. use of artificial light along the banks of the River Tees; and

vi. accidental spillage of fuel or other chemicals.

- Operation Phase

i. marine traffic associated with delivery of feedstock for SAF production;

ii. export industrial wastewater to Bran Sands Wastewater Treatment plant by pipeline for treatment or discharge to the North Sea via Bran Sands LSO;

iii. discharge of uncontaminated stormwater to the River Tees;

iv. maintenance dredging;

v. use of artificial lighting along the banks of the River Tees; and

vi. accidental spillage of fuel or other chemicals;

11.5.2 The components with potential impacts on freshwater receptors are associated with:

- Construction Phase:

i. use of artificial lighting along the Site, particularly around ponds and other surface water features; and

ii. chemical discharges from accidental spillage of fuel and other chemicals into surface water run-off.

- Operation Phase

i. use of artificial lighting along the Site, particularly around ponds and other surface water features; and

ii. chemical discharges from surface water run-off.

11.5.3 The following design and impact avoidance measures are those that are embedded in the design of the Proposed Development. The measures proposed have considered the reasonable worst-case scenarios during construction and operation.

Construction phase

11.5.4 The DCO application contains a **Framework Construction Environmental Management Plan** (fCEMP) (**Appendix 5A, ES Volume III, Application Document Ref. 6.3)** which sets out the key measures to be employed

during the construction of the Proposed Development, to control and minimise the impacts on the environment, including how impacts upon marine and freshwater ecology receptors will be managed during construction.

11.5.5 Detailed CEMP(s) will be prepared by the Engineering, Procurement and Construction (EPC) contractor who has not yet been appointed. The submission, approval, and implementation of detailed CEMP(s) is secured by a Requirement of the **draft DCO (Application Document Ref. 3.1)**.

11.5.6 The detailed CEMP will include all mitigation measures necessary to avoid, prevent and reduce adverse effects where possible upon the local surface water (and groundwater) environment during construction.

11.5.7 The CEMP will also outline temporary drainage and runoff strategies during construction phases, a pollution prevention plan, and an emergency response plan.

11.5.8 The **fCEMP** (**Appendix 5A, ES Volume III, Application Document Ref. 6.3)** includes measures to avoid marine and freshwater ecological impacts, including:

- Jetty demolition and quay construction - The jetty demolition would include extraction of existing or, if not feasible, cutting piles down to a level where the stumps could not pose a risk;
- Main Site construction - suitably bunded and lined locations will be identified as storage areas for any hazardous or polluting materials and chemicals, to control the risk of pollution;
- The drainage systems will incorporate pollution control systems designed in line with the Control of Water Pollution from Construction Sites agreed with the relevant authorities (see Framework Drainage Strategy (appended to the **Flood Risk Assessment (Application Document Ref. 5.7)**);
- Storage areas for flammable/toxic corrosive materials will be located in a separate, locked, bunded and fenced off area within the Site;
- On site fuel storage will be appropriately bunded and located away from watercourses and drains. Filling points will be contained in drip trays or kerbed areas.
- Core construction working hours will be between 07:00 and 19:00 Monday to Friday (except bank holidays), Saturday 07:00 to 16:00 and Sunday 08:00 to 17:00. Construction temporary lighting will be arranged so that glare is minimised outside the construction site. Lighting will be

designed so as to minimise any potential nuisance (as far as practicable) outside of the Proposed Development in relation to views from residential receptors or light disturbance to ecological receptors;

- Commissioning of pipelines will involve pressure testing using water or nitrogen. If no additives are used, following testing to confirm safety, water will be discharged to the surface water drainage system and then the River Tees if clean and with the consent of the Environment Agency. If the water is contaminated with additives such as glycol it will be tankered and transferred to an appropriate treatment facility for disposal.
- Biosecurity management measures will be implemented in accordance with the detailed CEMP (see **Appendix 5A: fCEMP (ES Volume III, Application Document Ref. 6.3**)) to prevent the spread of INNS activities associated with the Proposed Development in accordance with standard international guidance, including managing ballast water and hull foiling in accordance with the Ballast Water Management and Biofouling Guidelines [Ref 57]. The Ballast Water Management Convention requires all ships in international trade to manage their ballast water and sediments, according to a ship-specific ballast water management plan. All ships must carry a ballast water record book and an International Ballast Water Management Certificate. All project vessels shall adhere to the International Convention for the Control and Management of Ships' Ballast Water and Sediments with the aim of preventing the spread of marine INNS. All vessels used during construction and operation shall adhere to the International Maritime Organisation (IMO) 2023 Guidelines for the control and management of ships' biofouling to minimize the transfer of invasive aquatic species (Biofouling Guidelines), following inspection and cleaning procedures [Ref 57].
- Dredging will use the most appropriate methods to reduce sediment resuspension and where applicable, contain contaminated sediments to prevent liberation into the marine environment such as closed bucket clamshell dredging. Timing of dredging will also be scheduled to avoid spring tides and the ebb flow to reduce potential sediment distribution.
- Turbidity monitoring will be employed to ensure turbidity remains within acceptable levels during dredging activities.
- Adherence to relevant Environmental Permits, good practice guidance and Regulations, British Standards and any relevant species licences (for example marine wildlife licence for activities effecting a protected species).

- Implementation of reduced vessel speeds (instructed by the Statutory Harbour Authority) in proximity to the quay to reduce potential for vessel collision with marine mammals and potential damage to intertidal habitats from wave wash. This is further clarified in **Chapter 20: Marine Navigation (ES Volume I, Application Document Ref. 6.1)**;
- Risk analysis and inclusion of preventative measures to minimise the risk of changes to water quality associated with accidental chemical or fuel discharges into surface water run-off.
- Any accidental fuel, oil or chemical spillages must be reported as soon as practicable to the relevant authorities, including PD Ports and the Environment Agency, and responded to in accordance with the Shipboard Oil Pollution Emergency Plan (SOPEP) and local emergency response plans. The implementation of these regulatory requirements and best practice measures will ensure that the risk of fuel or harmful substance spillage, and any associated environmental impact on the Tees Estuary, is reduced as far as reasonably practicable.
- Use of sensitive lighting where any night work is required, with light spill onto marine environment minimised.

Operation phase

11.5.9 The Proposed Development will be required to adhere to relevant consents and licences (e.g. DCO Requirements relating to mitigation, compensation and enhancement), the Environmental Permit, industry good practice, UK legislation and regulations, and British Standards.

11.5.9.1 As set out above for construction, operational vessels will also be required to adhere to Statutory Harbour Authority requirements to implement reduced vessel speeds in proximity to the quay to reduce potential for vessel collision with marine mammals and potential damage to intertidal habitats from wave wash.

11.5.10 The environmental permit will enable key measures to be employed during the operation of the Proposed Development, which will control and minimise the impacts on the environment during operation. The Environmental Permit will include measures to avoid accidental spillage and spread of marine INNS, similar to those set out in the fCEMP.

Other documents, regulations, guidance and good practice

11.5.11 Other relevant regulations, guidance documents and good practice measures include:

- **Preliminary Navigation Risk Assessment (Appendix 20A, ES Volume III, Application Document Ref. 6.3**);

- Coordination with harbour/port authorities for vessel movements and berth operations;
- International Convention for the Control and Management of Ships' Ballast Water and Sediments with the aim of preventing the spread of marine INNS [Ref 56];
- International Maritime Organisation (IMO) Guidelines for the control and management of ships' biofouling to minimize the transfer of invasive aquatic species (Biofouling Guidelines) [Ref 57];
- International Regulations for Preventing Collisions at Sea [Ref 58] and regulations relating to International Convention for the Prevention of Pollution from Ships (the MARPOL Convention 73/78) with the aim of preventing and minimising pollution from ships; and
- All vessels shall have a contingency plan for marine oil pollution.
- An **Outline Lighting Strategy (Appendix 13C, ES Volume III, Application Document Ref. 6.3)** to minimise and control the impacts of artificial lighting on the marine environment.
- The detailed CEMP will include detailed information relating to access, and maintenance surface water features avoiding spillage to Tees Estuary.
- Activities that generate impulsive underwater sound must be carried out in accordance with JNCC guidelines to minimise impacts on marine mammals [Ref 59, Ref 60, Ref 61] and fish are considered indirectly.
- Dredging is regulated by Dumping from Ships and Aircraft (Oslo Convention) [Ref 92], OSPAR published Guidelines for the Management of Dredged Material at Sea in 2014 (Agreement 2014-06, latest update 2024) [Ref 65] with controlling and reducing sources of contamination; maximising reuse of dredged material; and minimising the volumes of sediment that must be dredged by using improved Best Environmental Practices (BEP) [Ref 62]. The quay components of Proposed Development sit within the PD Teesport estate and maintenance dredging during operation will be included as an extension of PD Ports maintenance activities that are ongoing around the Proposed Development.

11.6 Likely Impact and Effects of the Proposed Development

Overview

11.6.1 The impacts affecting marine and freshwater ecological receptors differ between the construction and operation phases. Table 11.26 and Table

11.27 describe the likely impact on freshwater and marine receptors during construction and operation respectively. The quay and associated infrastructure is located within the Teesmouth and Cleveland Coast SSSI, designated for its coastal and intertidal habitats and associated species, including harbour seals. Potential effects on the SSSI have been considered where impact pathways, including those affecting intertidal habitats and the water column, may influence its designated features.

11.6.2 The Proposed Development also sits within the Teesmouth and Cleveland Coast SPA and Teesmouth and Cleveland Coast Ramsar designations. However, as outlined when considering the ZOI these sites do not contain freshwater of marine receptors which are anticipated to be impacted by the activities required for construction and operation of the proposed development.

Table 11.26 Summary potential impacts on marine and freshwater receptors during construction

Works	Potential Impact	Receptor
Demolition of two existing jetties, revetment and surrounding disused infrastructure to enable construction of the new quay	Change of intertidal habitats and species associated with jetty demolition	Designated site (Teesmouth and Cleveland Coast SSSI) Marine intertidal habitat/species
	Change of subtidal habitats and species from demolition works	Marine subtidal habitat/species
	Changes to water quality associated with existing jetty demolition and quay construction works (piling, dredging and navigation)	Designated site (Teesmouth and Cleveland Coast SSSI and Teesmouth NNR) Fish and shellfish Commercial fisheries Marine mammals (cetaceans and pinnipeds)
Marine traffic associated with construction works	Change of intertidal habitats and species associated with increase in marine traffic from construction works	Designated site (Teesmouth and Cleveland Coast SSSI) Marine intertidal habitat/species
	Changes to water quality associated with existing jetty demolition and quay construction works (piling, dredging and navigation)	Designated site (Teesmouth and Cleveland Coast SSSI and Teesmouth NNR) Fish and shellfish Commercial fisheries Marine mammals (cetaceans and pinnipeds)
	Disturbance to marine mammals and fish associated with underwater noise	Fish and shellfish Marine mammals (cetaceans and pinnipeds)

Works	Potential Impact	Receptor
	Increase in vessel collision risk associated with increase in marine traffic	Designated site (Teesmouth and Cleveland Coast SSSI and Teesmouth NNR) Commercial fisheries Marine mammals (cetaceans and pinnipeds)
	Introduction and spread of marine INNS	Designated site (Teesmouth and Cleveland Coast SSSI and Teesmouth NNR) Marine intertidal habitat/species Marine subtidal habitat/species Fish and shellfish Commercial fisheries Marine mammals (cetaceans and pinnipeds)
Capital dredging for construction of the new quay	Change of subtidal habitats and species associated with dredging activities	Marine subtidal habitat/species
	Changes to water quality associated with existing jetty demolition and quay construction works (piling, dredging and navigation)	Designated site (Teesmouth and Cleveland Coast SSSI and Teesmouth NNR) Fish and shellfish Commercial fisheries Marine mammals (cetaceans and pinnipeds)
	Disturbance to marine mammals and fish associated with underwater noise	Fish and shellfish Marine mammals (cetaceans and pinnipeds)
Work construction of new quay	Change of subtidal habitats and species from marine construction works	Marine subtidal habitat/species
Piling for construction of the new quay	Changes to water quality associated with existing jetty, revetment and associated infrastructure demolition and quay construction works (piling, dredging and navigation)	Designated site (Teesmouth and Cleveland Coast SSSI) Fish and shellfish Commercial fisheries Marine mammals (cetaceans and pinnipeds)
	Disturbance to marine mammals and fish associated with underwater noise	Fish and shellfish Marine mammals (cetaceans and pinnipeds)
Geophysical surveys for construction of the new quay	Disturbance to marine mammals and fish associated with underwater noise (if survey is required)	Fish and shellfish Marine mammals (cetaceans and pinnipeds)

Works	Potential Impact	Receptor
Anchoring of vessels associated with new quay construction	Change of subtidal habitats and species associated with anchoring	Marine subtidal habitat/species
	Changes to water quality associated with existing jetty demolition and quay construction works (piling, dredging and navigation)	Designated site (Teesmouth and Cleveland Coast SSSI) Fish and shellfish Commercial fisheries Marine mammals (cetaceans and pinnipeds)
Commissioning of pipelines	Changes to water quality associated with chemical spillages into surface water run-off	Designated site (Teesmouth and Cleveland Coast SSSI and Teesmouth NNR) Fish and shellfish Commercial fisheries Marine mammals (cetaceans and pinnipeds)
Accidental spillage of fuel or other chemicals associated with marine construction vessels	Changes to water quality associated with spillage of fuels	Designated site (Teesmouth and Cleveland Coast SSSI and Teesmouth NNR) Fish and shellfish Commercial fisheries Marine mammals (cetaceans and pinnipeds)
Use of temporary artificial lighting along the banks of the River Tees and adjacent waters during construction	Disturbance to marine mammals and fish associated with changes in *visual stimuli* (artificial light at night [ALAN])	Fish and shellfish Commercial fisheries Marine mammals (cetaceans and pinnipeds)
Discharge of the surface water from the construction drainage system and then the River Tees	Changes to water quality associated with chemical spillages into surface water run-off	Freshwater
Discharge of contaminated surface water	Introduction and spread of INNS	Freshwater
Spillage of artificial lighting on to surface water features such as ditches and ponds.	Lighting effects from working at night	Freshwater
Installation of culverts	Installation of culverts	Freshwater

Table 11.27 Summary of potential impacts on marine and freshwater receptors arising during operation

Works	Likely Impact	Receptor
Marine traffic associated with biomass and waste wood import	Increase in turbidity associated with higher	Designated site (Teesmouth and Cleveland Coast SPA, Ramsar and SSSI and Teesmouth NNR)

Works	Likely Impact	Receptor
	number of vessels and/or transit count;	Marine intertidal habitat and species Marine subtidal habitat and species Fish and shellfish Commercial fisheries Marine mammals (cetaceans and pinnipeds)
	Disturbance to marine mammals and fish associated with underwater noise	Fish and shellfish Commercial fisheries Marine mammals (cetaceans)
	Increase in vessel collision risk associated with operational vessel traffic	Designated site (Teesmouth and Cleveland Coast SPA, Ramsar and SSSI and Teesmouth NNR) Fish and shellfish Commercial fisheries Marine mammals (cetaceans and pinnipeds)
	Introduction and spread of marine INNS	Designated site (Teesmouth and Cleveland Coast SPA, Ramsar and SSSI and Teesmouth NNR) Marine intertidal habitat and species Marine subtidal habitat and species Fish and shellfish Commercial fisheries Marine mammals (cetaceans and pinnipeds)
Maintenance dredging	Increase in turbidity associated with higher number of vessels and/or transit count;	Designated site (Teesmouth and Cleveland Coast SPA, Ramsar and SSSI and Teesmouth NNR) Intertidal habitat and species Subtidal habitat and species Fish and shellfish Commercial fisheries Marine mammals (cetaceans and pinnipeds)
	Increase in turbidity associated with removal of seabed sediment during maintenance dredging	Designated site (Teesmouth and Cleveland Coast SPA, Ramsar and SSSI and Teesmouth NNR) Intertidal habitat and species Subtidal habitat and species Fish and shellfish Commercial fisheries Marine mammals (cetaceans and pinnipeds)
	Disturbance to marine mammals and fish	Fish and shellfish

Works	Likely Impact	Receptor
	associated with underwater noise	Commercial fisheries Marine mammals (cetaceans)
Export of treated industrial effluent to Bran Sands Wastewater Treatment plant by pipeline for discharge to sea via LSO	Changes to water quality associated with wastewater and discharge of effluents	Designated site (Teesmouth and Cleveland Coast SPA, Ramsar and SSSI and Teesmouth NNR) Intertidal habitat and species Fish and shellfish Commercial fisheries Marine mammals (cetaceans and pinnipeds)
Discharge of uncontaminated stormwater to the River Tees	Changes to water quality associated with spillage of fuels or other harmful chemicals	Designated site (Teesmouth and Cleveland Coast SPA, Ramsar and SSSI and Teesmouth NNR) Intertidal habitat and species Subtidal habitat and species Fish and shellfish Commercial fisheries Marine mammals (cetaceans and pinnipeds)
Accidental chemical discharges from surface water run-off and accidental spillage of fuel or other chemicals	Changes to water quality associated with spillage of fuels or other harmful chemicals	Designated site (Teesmouth and Cleveland Coast SPA, Ramsar and SSSI and Teesmouth NNR) Intertidal habitat and species Subtidal habitat and species Fish and shellfish Commercial fisheries Marine mammals (cetaceans and pinnipeds)
Use of increased artificial lighting along the banks of the River Tees	Changes in visual stimuli associated with work at night (ALAN)	Fish and shellfish Commercial fisheries Marine mammals (cetaceans and pinnipeds)
Use of increased artificial lighting in the Site onto surface water features, such as ditches, ponds and lakes.	Changes in visual stimuli associated with work at night (ALAN)	Freshwater
Storage of hazardous or polluting materials and chemicals, to control the risk of pollution	Changes to water quality associated with spillage of fuels or other harmful chemicals	Freshwater
Discharge of contaminated surface water	Introduction and spread of INNS	Freshwater

Likely impacts and effects during Construction Phase

11.6.3 The construction phase includes jetty demolition, vessel movements and anchoring, dredging, piling, potential accidental spillage of fuel or chemicals

Marine receptors

Change of intertidal habitats and species associated with jetty demolition

11.6.4 The removal of existing jetties may cause impacts on intertidal habitat. The removal may cause loss of actual intertidal habitat (e.g. revetment) and species (recognising that, subject to design, the proposed quay may offer opportunities for marine habitat creation).

11.6.5 The new quay will be an artificial structure, which, may have an opportunity for enhancement through habitat creation to enhance biodiversity. However, there is also the potential for adverse impacts arising from biofouling, particularly if colonisation by INNS occurs [Ref 64].

11.6.6 The baseline is based on macrofaunal scrape samples from the existing jetties and that assessed for the South Bank Quay project located approximately 1.5km upstream from the proposed marine infrastructure [Ref 42]. The species identified for that project, tubificid worms and limited bivalves, are typical of a disturbed, low-quality intertidal environment and no species are of conservation interest.

11.6.7 Following removal of the existing jetty structures, the worst-case scenario is the loss of all species currently colonising these structures. Although the jetty structures are a relatively small feature within the River Tees and will be replaced by a new quay, the impact is expected to be of medium magnitude, representing a partial loss or alteration of the existing intertidal communities and a shift from baseline conditions.

11.6.8 Removal of the existing revetment to enable construction of the new quay will remove the habitat and species associated with the gabion cages. This area was considered too dangerous to survey. Review of photographs of the revetment surface from the existing jetties during a spring low tide revealed no taxa of note. The only identifiable taxa on the revetment were incredibly sparse, isolated fucoid algae. The impact is expected to be of medium magnitude.

11.6.9 The marine works are located within the Teesmouth and Cleveland Coast SSSI (a nationally designated site), which would typically indicate a medium sensitivity. However, as the existing intertidal assemblages observed on the jetties are not considered of conservation interest, and the SSSI designation relates to habitats not present in the jetty and revetment areas, receptor sensitivity is reduced to low.

11.6.10 Overall, this results in **minor adverse** and **not significant** effect.

Change of intertidal habitats and species associated with increase in marine traffic from construction works

11.6.11 Increased vessel traffic will likely result in greater wave wash effects on intertidal habitats and species.

11.6.12 The proposed Marine Works is located within a predominantly man-made environment, therefore no loss of intertidal habitats from wave wash is anticipated in this area. However, protected habitats, including mudflats and saltmarsh, are present downstream of the river, approximately 1.8km from the proposed Marine Works.

11.6.13 The Tees Estuary is already a high-density navigation route, with 13,926 vessel transits recorded between October 2024 and September 2025 (**Appendix 20A, Preliminary Navigational Risk Assessment, ES Volume III , Application Document Ref. 6.3),** equivalent to an average of approximately 1,160 transits per month.

11.6.14 Across all construction activities, and assuming works are undertaken sequentially, the Proposed Development is expected to generate a total of 1,988 additional round trips over a 38 month period (approximately 52 additional round trips per month). This represents an increase of less than 5% in vessel traffic within the estuary, resulting in a low magnitude of impact, corresponding to a minor change from baseline conditions.

11.6.15 The marine works are located within the Teesmouth and Cleveland Coast SSSI (a nationally designated site). The presence of protected features susceptible to wave wash effects results in a receptor sensitivity of medium.

11.6.16 This results in a **minor adverse** effect which is **not significant**.

Change of subtidal habitats and species from construction works

11.6.17 Several construction activities associated with the marine works have the potential to cause direct loss, physical disturbance and sediment quality of marine subtidal habitats and species. These activities include:

- removal of seabed sediment associated with capital dredging;
- smothering of seabed due to sediment dispersal during dredging operations
- removal of seabed sediment associated with demolition of jetties;
- removal of substrata associated with the revetment;
- loss of subtidal habitat associated with increased footprint of new quay construction;

- disturbance of sediment associated with anchoring of vessels allocated to construction works; and
- smothering of seabed sediment following creation of the bund if a bunded construction method is used.

11.6.18 The proposed dredging area lies within the existing maintenance dredging zone managed by PD Ports. However, maintenance dredging has not been carried out for some time due to the berths being inactive.

11.6.19 Capital dredging is necessary to allow the berthing of Panamax sized vessels. A maximum of 800,000m³ of material will be dredged between the area in front of the proposed new quay and the existing turning circle and maintained channel if a bunded approach is used for construction. The bund would comprise clean material as required for introduction of material into the marine environment. Therefore, when disposed of the bund material will be considered clean and suitable for marine disposal if not re-used on the Site. If the quay is constructed using marine piling methods, and does not require scour protection, the volume of material will be reduced.

11.6.20 Capital dredging and demolition of jetties will result in removal of existing estuarine sediments, glacial till and potentially Mercia Mudstone bedrock, from the Marine Works area. The anchoring of vessels and barges could also result in sediment removal in the Marine Works area and disturbance to the subtidal habitat and species. In addition, capital dredging may generate temporary sediment plumes, which could smother benthic organisms and result in physical impacts to benthic habitats and associated benthic assemblages [Ref 63].

11.6.21 The impact assessment of the dredging works on subtidal habitat and species is based on the changes in bed thickness across the River Tees based on site-specific modelling sediment modelling. The modelling report was prepared by ABPMer and it is presented in **Appendix 12A: Coastal and Estuary Processes, ES Volume III, Application Document Ref. 6.3**.

11.6.22 The coastal process modelling presented in Appendix 12A represented hydrodynamic conditions with Danish Hydraulic Institute (DHI) MIKE3 Hydrodynamic (HD) module to assess water levels and flows, used as input in the associated MIKE Mud Transport (MT) module. The model was calibrated with the data collected in 2005 to support the Northern Gateway Container Terminal project (NGCT) development and validated with South Bank Quay project data [Ref 42]. Mud model input included:

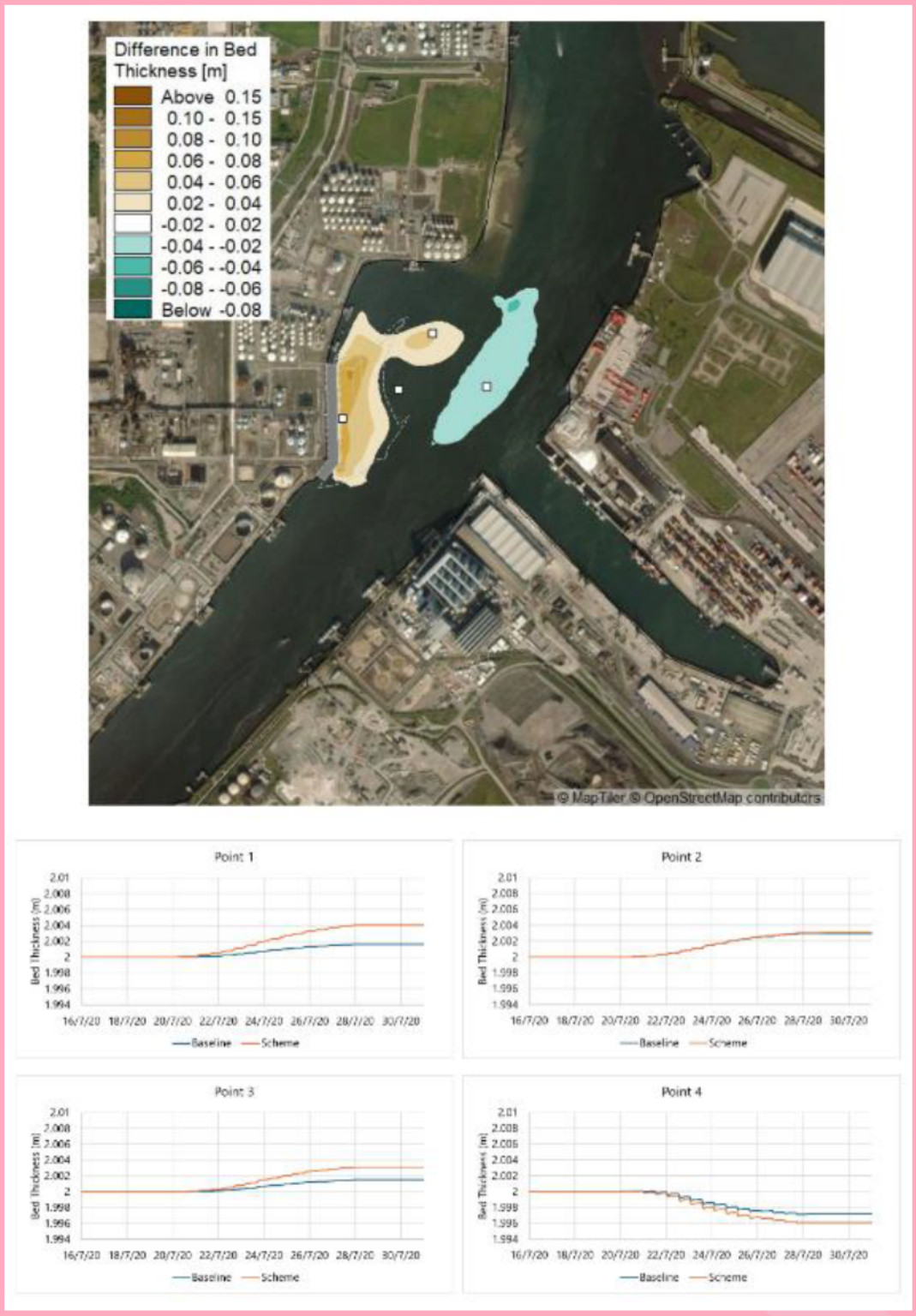
- Silty material, assuming that all material released comprises a single sediment fraction, represented by the finest sediment type identified within the proposed dredging area;
- Settling velocity 0.00026 m/s;
- Dredging type: backhoe dredger with an excavation rate of 600 m^3/h for dredged material;
- Dredging works are to be carried out 24/7;
- Two dredging scenarios: 331,200m^3 released in 23 days, representing the longest dredging period and a complete tidal cycle, and 201,600m^3, released in 14 days, representing the suspended sediments settle after the cessation of dredging.

11.6.23 Inset 11.6 presents the extraction locations for the timeseries plots. The maximum predicted changes in riverbed thickness caused by sediment deposition from dredging plumes are presented in Inset 11.7, Inset 11.8, and Inset 11.9 representing low flow, mean flow and high flow scenarios respectively. The spatial plots have been scaled up to indicated differences in bed thickness over the course of the year, and the timeseries plot represent the modelled spring-neap cycle (16/07/2020 to 30/07/2020).

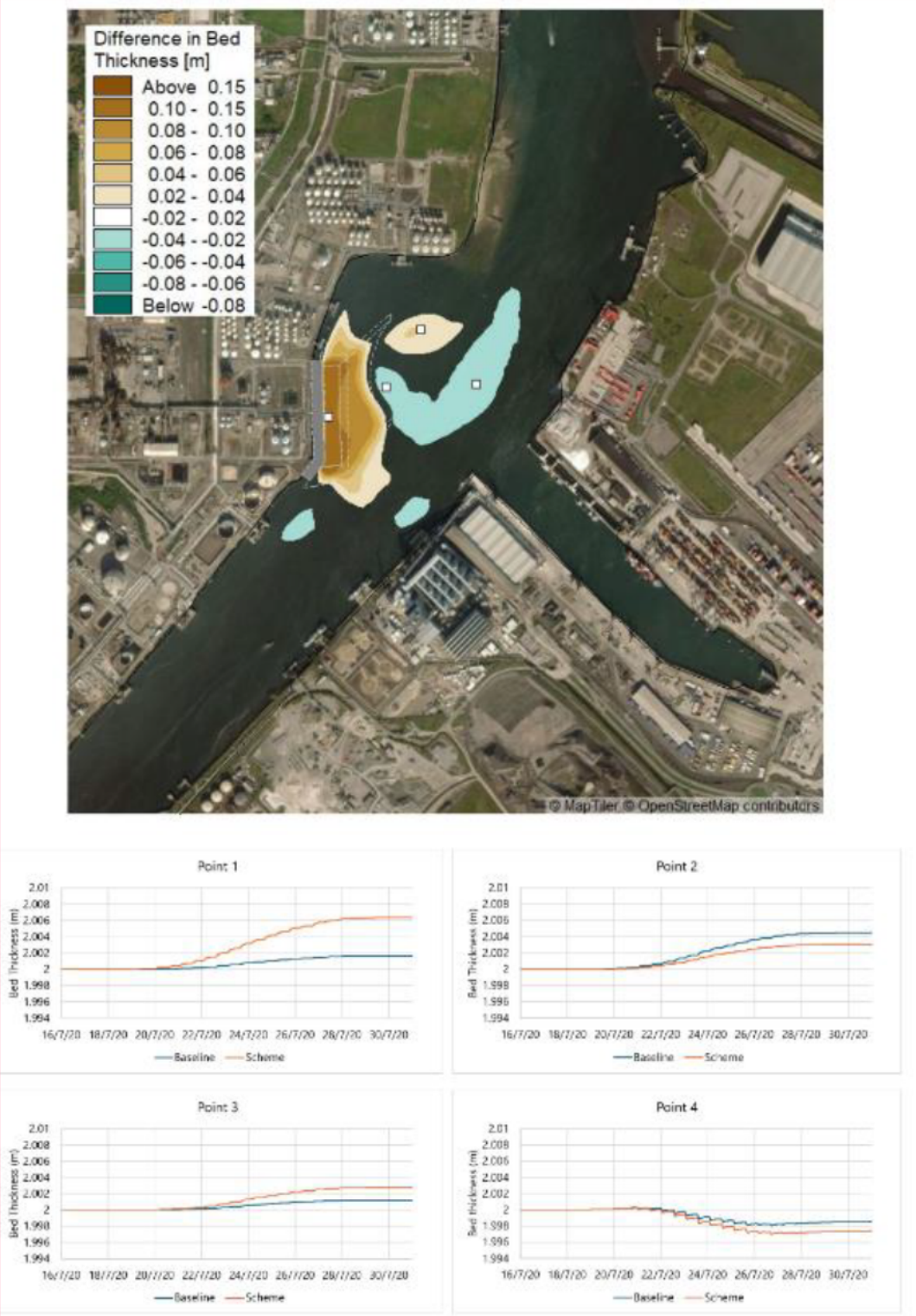
11.6.24 The low flow scenario (Inset 11.7) shows an increase in bed thickness of up to 8cm immediately in front of the dredged area, reducing to 2cm in approximately 150m east of the dredged area. There is a reduction in bed thickness of up to 3.5cm in the outer channel, extending for approximately 500m and mainly limited to the area south of the turning circle. In the mean flow scenario (Inset 11.8) the maximum increase is 4cm in the north of the turning circle. The high flow scenario (Inset 11.9) is the worst-case scenario, with an increase of 19cm immediately adjacent to the dredge area. Overall, the predicted changes are localised and limited to an area of approximately 1km^2.



Inset 11.6 Time series extraction locations for bed thickness change



Inset 11.7 Spatial plot of bed thickness change scaled over the year (top image), time series of bed thickness for baseline and scheme for the full model run period (bottom four images) – Low Flow



Inset 11.8 Spatial plot of bed thickness change scaled over the year (top image), time series of bed thickness for baseline and scheme for the full model run period (bottom four images) – Mean Flow



Inset 11.9 Spatial plot of bed thickness change scaled over the year (top image), time series of bed thickness for baseline and scheme for the full model run period (bottom four images) – High Flow

11.6.26 The site-specific modelling is compared with similar project, South Bank Quay to support the current impact assessment [Ref 42]. The South Bank Quay project involved dredging in two locations, one within the ZOI for the Proposed Development where the turning circle was deepened and another 1.5km upriver. The model represented a total dredged volume of 1,800,000m³ over a four-month period, which is higher than the estimated volume for the Proposed Development. Sediment dispersion and hydrodynamic condition were modelled using the MIKE model.

11.6.27 The results of the South Bank modelling show that majority of sediment settles within the dredged areas while deposition in other parts of the river is significantly lower, typically less than 5 centimetres.

11.6.28 The removal of jetties and anchoring of construction vessels has the potential to temporarily disturb the subtidal habitats and species immediately adjacent and would result in the permanent loss of species currently present.

11.6.29 In the short term, the benthic community would be removed from areas where dredging will be carried out. However, based on site-specific modelling subtidal habitat is expected to recover following dredging activities.

11.6.30 The marine works are located within the Teesmouth and Cleveland Coast SSSI (a nationally designated site), which is a receptor of medium sensitivity. However, as the existing subtidal species within the footprint are not considered of conservation interest, receptor sensitivity is initially reduced to low. Notwithstanding this, a precautionary approach assumes that potential effects may extend up to 2km both upstream and downstream from the works, where ocean quahog (*Arctica islandica*) has been recorded. Although the bivalve mollusc, ocean quahog, is not currently assessed on the IUCN Red List, it is recognised as a threatened and/or declining species under the OSPAR Convention and is considered a feature of conservation importance in UK waters due to its ability to live >200 years. On this basis, the overall receptor sensitivity is assessed as medium.

11.6.31 Considering the footprint of dredging activities, the magnitude of impact on the subtidal benthic community and habitats is assessed as medium, reflecting a partial loss or alteration of baseline conditions. This results in a **moderate adverse (significant)** effect.

Changes to water quality associated with existing jetty demolition and quay construction works (piling, dredging and navigation)

11.6.32 Several construction activities associated with the marine infrastructure works have the potential to cause changes to water quality. These activities include increase in turbidity associated with:

- removal of seabed sediment during demolition of two jetties;
- removal of the revetment;
- increase of marine traffic;
- potential creation of the temporary bund
- piling for new quay construction; and
- anchoring of vessels, and,
- removal of seabed sediment during capital dredging;

11.6.33 Additionally, dredging and anchoring can potentially release legacy contaminants to the water column (such as heavy metals and TBT) if present, which together with temporary increases in turbidity could increase the availability of contaminants to the food chain [Ref 65].

11.6.34 The larger (2km) footprint for sediment dispersal is to assess the potential area of effect that remobilisation of legacy contaminants that might result from capital dredging activities might extend to.

11.6.35 Dredging has been well regulated in the OSPAR Convention. OSPAR published Guidelines for the Management of Dredged Material at Sea in 2014 (Agreement 2014-06, latest update 2024) [Ref 62]. Reducing adverse effects on the marine environment can be accomplished through the following three activities: controlling and reducing sources of contamination; maximising reuse of dredged material; and minimising the volumes of sediment that must be dredged by using improved Best Environmental Practices (BEP) [Ref 62].

11.6.36 The OSPAR guidelines recommend options for dredged material management [Ref 62]. If sediment is uncontaminated, options include reuse at sea (including habitat restoration, beach nourishment and shoreline stabilisation), disposal at sea or engineering uses. If sediment is contaminated, material can be disposed at sea or treated for specific purposes. Dredged materials are excluded from the scope of the Waste Framework Directive where they are not managed on land.

11.6.37 UK guidance requires chemical analysis of representative samples to support a dredging licence application and depending on the dredging

method used, permission for the disposal of waste to sea may be required as part of the licence [Ref 40].

11.6.38 The material to be dredged consists primarily of mud, fine sand and silty sand. Baseline data from nearby developments indicates the presence of metal contamination with elevated levels, with most of the values higher than the Cefas AL 1 and lower than AL2, which is indicative of wider sediment contamination within the ZOI. Turbidity in the Tees Estuary is intermediate, with higher values at low tide.

11.6.39 In the capital dredged area, the effect is anticipated to be local, temporary and recoverable. The removal and dispersal of contaminated sediment within the Tees Estuary is anticipated to result in minor change to the baseline conditions. The magnitude of this impact is therefore classified as low.

11.6.40 The offshore disposal area is also anticipated to be affected. All dredged material will be disposed of at designated and licensed offshore disposal sites, such as Tees Bay Tees Bay C, with works undertaken in compliance with the Deemed Marine Licence within the DCO. Should elevated contaminant levels be identified in the sediment, use of the offshore disposal sites may not be permitted and onshore disposal may be required.

11.6.41 If concentrations of contaminant determinands exceed Cefas Action Level 2 then the material is not considered suitable for disposal at sea. When concentrations are between Action Level 1 and Action Level 2, disposal at sea is still possible but additional consideration will be given to the concentrations relative to the Action Level thresholds and could result in remediation and disposal of material on land.

11.6.42 Given the low sensitivity of the disposal area, the effect of the disposal of dredge material to Tees Bay C is considered **negligible (not significant)** where contaminant determinands are below or slightly above Cefas Action Level 1.

11.6.43 The habitats and species to be affected by sediment disturbance by dredging were assessed based on experience of similar projects in the River Tees. The total concentration of suspended solids in the water column varies depending on the environment and the dredging method used. The sedimentation is typically rapid and usually confined to the immediate vicinity of the discharge. In areas characterised by sand-sized material, background levels are typically reached within 200 - 500 metres from the point of release [Ref 66]. Finer sediments will remain in suspension for a longer period and background levels are expected to be reached within 1.5km – 2.0km from the area being dredged. This could extend up to 5km

from the disposal site along a north-west – south-east axis associated with local tidal currents.

11.6.44 Site-specific modelling was prepared by ABPMer and it is presented in **Appendix 12A: Coastal and Estuary Processes (ES Volume III, Application Document Ref. 6.3)**. The modelled Suspended Sediment Concentration (SSC) plume presents higher dispersion during low flow condition and is predicted to extend to small areas of mudflat upriver from the Marine Works area. The maximum distance from the Marine Works area is approximately 2.8km upriver or 1.4km downriver. The results of this assessment indicated no significant effects (and by implication no deposition effects) above background values occurring in areas beyond the ZOI, such as in the Tees Dock, Seal Sands, Bran Sands, North Gare Sands and the adjacent coastlines of Seaton Sands and Coatham Sands.

11.6.45 Adopting a precautionary approach, it is assumed that during capital dredging activities, suspended sediment has the potential to reach saltmarsh areas located up to 2km from the works. The resulting increased turbidity and potential remobilisation of contaminants associated with those sediments could have adverse effects on saltmarsh assemblages. Coastal saltmarsh is a UK priority habitat and a notified feature of the Teesmouth and Cleveland Coast SSSI, and is therefore considered to be of medium sensitivity. However, the shortest pathway achievable in an overtopping event to the closest area of saltmarsh downstream of the proposed development is 2.2km. The pathway for fluvial linkage is 3.6km.

11.6.46 The intertidal mudflats are identified as a habitat supporting various birds species listed in the Teesmouth and Cleveland Coast Ramsar site citation. Of the 2,085.21ha that the Ramsar site covers, the mudflats that will be intersected by dispersed sediments arising from the Marine Works area represent 2ha or <1% of available habitat for the supported bird species. Combined with a very small change in bed thickness predicted, due to minimal deposition, the magnitude of impact on the mudflats is considered low.

11.6.47 Within the dredging area, this results in an overall effect of **minor adverse** which is **not significant**.

11.6.48 The anticipated volume of dredged material falls within the OSPAR dredge material guidance bracket of 500,000m³ – 2,000,000 m³. To enable identification of contaminant determinands and their relative concentrations through contaminant analysis 18 vibracore stations were distributed evenly across the planned area and successful samples to refusal at a competent strata were achieved.

Changes to water quality associated with chemical spillages into surface water run-off during construction and operation

11.6.49 Several construction activities associated with the Proposed Development have the potential to cause changes to water quality if not mitigated. These activities include:

- chemical contamination associated with commissioning of pipelines; and
- turbidity and chemical contamination associated with uncontrolled surface water run-off to the river Tees.

11.6.50 Commissioning of pipelines will involve pressure testing. In certain circumstances such as prolonged periods of below freezing temperatures, water may contain additives such as glycol or other substances. If the use of additives was required the resulting wastewater will be transferred to a local treatment facility for appropriate treatment and disposal.

11.6.51 For clean surface water run-off, if the water meets the acceptable contamination thresholds, it will be discharged to the surface water drainage system and ultimately to the Tees Estuary.

11.6.52 Rainfall runoff from areas where there is a risk of contamination will be managed using temporary drainage systems and/or tankered offsite for treatment (including settlement of suspended solids and or oil interceptors) prior to discharge to local watercourses with the approval of the Environment Agency pursuant to a discharge licence.

11.6.53 **ES Chapter 19: Major Accidents and Disasters (ES Volume I, Application Document Ref. 6.1**) identified the risk of contamination due to extreme weather, and the risk was reduced through construction planning, temporary works design and environmental management controls.

11.6.54 The volume of discharged contaminated effluent would influence the affected area although the control measures proposed are expected to keep volumes to a minimum. Unmitigated contaminated run-off reaching the Tees Estuary either directly or via freshwater drains would have a medium magnitude impact on the Teesmouth and Cleveland Coast SSSI.

11.6.55 Mitigation measures to prevent contaminated run-off from reaching controlled waters will be applied during construction, as set out in the **fCEMP (Appendix 5A, ES Volume III, Application Document Ref. 6.3)**, including use of impermeable surfacing, bunding of hazardous material storage and a preventative maintenance regime, will reduce the impact to low magnitude, so the assessment concludes the effect of contaminated run-off is **minor adverse (not significant)**.

Changes to water quality associated with spillage of fuels

11.6.56 The spillage of fuels from vessels or site vehicles both during construction and operation could result in oils entering the River Tees if unmitigated. The scale of spill impacts can range from little detectable effect lasting only a few hours or days, to significant with longer-term effects.

11.6.57 The use of vessels for construction activities also presents a risk for the accidental release of fuels and oils. An accidental release of fuels and oils has the potential to negatively affect water quality, with subsequent impacts to marine habitats and species (see also the hazard identification record (construction) in **ES Chapter 19: Major Accidents and Disasters (ES Volume I, Application Document Ref. 6.1**).

11.6.58 Fuels and other hydrocarbons tend to float on the water surface; however, dispersed oil droplets can bind to suspended solids which changes their characteristics and which can sediment out of suspension. Ecological and biological factors influence sensitivity, resilience and recoverability of individual species to pollution with consequent effects on communities and ecosystems [Ref 67].

11.6.59 The most vulnerable components of the ecosystem to oil spills in offshore and coastal environments are marine mammals associated with their presence at the sea surface [Ref 67]. The sensitivity of harbour porpoise and seal species to accidental spills is high.

11.6.60 This risk will be controlled by mitigation measures in the Hazard identification record, such as Navigation Risk Assessment (see **Appendix 20A, ES Volume III, Application Document Ref. 6.3**) and coordination with PD Ports, as the Statutory Harbour Authority, for vessel movements and berth operations.

11.6.61 Any accidental spillage must be reported immediately to the relevant authorities, including PD Ports and the Environment Agency, and responded to in accordance with the Shipboard Oil Pollution Emergency Plan (SOPEP) and local emergency response plans. The implementation of these regulatory requirements and best practice measures will ensure that the risk of fuel or harmful substance spillage, and any associated environmental impact on the Tees Estuary, is reduced as far as reasonably practicable.

11.6.62 On site fuel storage will be appropriately bunded and located away from watercourses and drains. Filling points will be contained in drip trays or kerbed areas. Preventative measures are included in the **fCEMP** (**Appendix 5A, ES Volume III, Application Document Ref. 6.3)** to minimise the risk of spillages reaching surface water.

11.6.63 Given the design measures in place, and the good practice applied to on-site works and vessels in the Tees Estuary, the likelihood of occurrence is very low resulting in negligible impact magnitude. Therefore, effects to marine ecology receptors associated with changes in water quality from accidental spills are predicted to be **minor adverse (not significant)**.

Disturbance to marine mammals and fish associated with underwater noise

11.6.64 The following construction activities associated with the Proposed Development will create underwater noise within the marine environment which has the potential to impact fish and marine mammals:

- geophysical surveys (if required);
- UXO detonation (if required);
- marine vessel movements;
- dredging; and
- impact and vibratory piling.

11.6.65 Geophysical surveys using sub-bottom profiler (SBP) transducers generate underwater noise that may cause auditory injury (e.g. hearing damage) to marine mammals such as cetaceans and seals. In contrast, geotechnical investigations that involve physical sampling and testing of seabed sediments do not produce significant underwater noise. Noise data of SBP transducers in the water column are not commonly provided, instead presenting the estimated noise level in the sediment.

11.6.66 SBP techniques are used to characterise the sediment in advance of quay design. SBP is also essential for identifying potential buried objects such as UXO within the construction area. Acoustic pulses are emitted into the seabed and recording the time taken for each energy wave to bounce back. SBP uses lower sound pressure, focussed on shallower seabed layer depth and high-resolution data.

11.6.67 Another potential source of noise is UXO clearance if required. UXO are often cleared by detonating a small charge next to the device, burning the active charge in the larger device in a controlled manner, reducing the size and force of the resulting detonation. While the noise level produced by explosives is high, it is transient and temporary. If UXO are found on site, charge sizes (and therefore source levels) should be considered at the time and clearance discussed with the MMO as part of a separate marine licence application [Ref 59]. Additional possible forms of mitigation include

noise mitigation via bubble curtains and effect mitigation via passive acoustic modelling or active noise deterrents prior to detonation.

11.6.68 Pile driving involves forcing a supporting or retaining structure into the seabed using a hydraulic hammer or vibratory rig, generating levels of underwater noise being transmitted directly into the water column and the seabed. The level of noise generated will vary depending mainly on the pile diameter and length (or sheet dimensions in the case of vibratory sheet piling), hammer energy and seabed conditions and without mitigation is likely to produce noise levels capable of causing injury and disturbance to marine mammals [Ref 59].

11.6.69 Anthropogenic noise levels are presented as Sound Pressure Level (SPL). Sound Exposure Level (SEL) is related to the total acoustic energy over a period, and the Root Mean Square (RMS) gives an average noise level. All units are presented in dB with reference to 1 µPa.

11.6.70 The background SPL was measured in 2014 to the north-east of the opening to Tees Dock [Ref 68]. Background levels were generally between 103 dB and 115 dB re 1 µPa[viii] SPLRMS[ix], in the absence of any clear anthropogenic noise sources and increase to between 130 and 150 dB SPLRMS with passing vessels.

11.6.71 Third-octave band sound power data for impact and vibratory piling rigs can be found in the ‘E&P Review on existing data on underwater sounds from pile driving activities’ [Ref 69]. A hydraulic impact hammer (IHC S-800, 412kJ hammer energy, 1.8m diameter piles) piling a steel pin pipe with the sound power averaged over 40 strikes in a minute was used as a representative source level for this assessment. Octave band sound pressure data at 10m was used as a basis for the vibratory sheet piling rig (APE 400B King Kong) driving in steel sheet piles [Ref 69]. Soft dredging is assumed to be performed by a trailing suction hopper dredger (Sospan Dau), while hard dredging is assumed to be performed by a backhoe dredger (Odin), both at seabed level [Ref 69]. Table 11.28 presents the raw data presented in Ref 78 and Ref 79 and the data used in the calculations following our worst-case construction assumptions. It is assumed that as a worst case up to two impact piling rigs in the estuary plus a third operating on land will simultaneously continuously drive piles over an 8-hour working day.

[viii] Underwater noise is conventionally measured in micropascals (µPa), with 1 µPa used as the standard reference pressure level in underwater acoustics. As depth increases, sound propagation is affected by changes in pressure, temperature, and salinity. To standardise measurements, sound pressure levels are typically expressed in decibels relative to 1 µPa (dB re 1 µPa), referenced to surface conditions

[ix] SPLRMS is Sound Pressure Level Root Mean Square and represents the average acoustic pressure of underwater noise over time

11.6.72 There is potential for work during hours of darkness during winter months however, work performed overnight to directly facilitate quay construction will be limited to activities associated with unloading vessels. The majority of dredging works will take place once the quay is constructed and will require 24 hour working.

Table 11.28 Underwater sound power levels for percussive and vibratory piling

Sound power characteristic	SEL_{ss} /dB	RMS /dB	Peak /dB	SEL_{cum} /dB
Percussive - reference – 750m	166	157	173	200
Percussive - calculated – 1m	213	211	232	254
Vibratory – reference – 10m	N/A	163	177	208
Vibratory – calculated – 1m	N/A	182	196	227
Soft dredging	N/A	180	N/A	225
Hard dredging	N/A	185	N/A	230

11.6.73 Initial behavioural response values in marine mammals for severity levels and reductions in auditory sensitivity changes, including temporary threshold shifts (TTS) and auditory injury (including permanent threshold shifts (PTS)) have been proposed [Ref 70]. The updated methodology incorporates marine mammal hearing group classifications and introduces empirically based auditory weighting functions. It aligns injury thresholds with guidance from the National Marine Fisheries Service (NMFS), part of the NOAA, using SPL_{peak} and SEL_{cum} [Ref 70; Ref 71]. SPL_{peak} measures the highest instantaneous unweighted sound pressure from a single event (e.g. pile driving), and SEL_{cum} accounts for weighted cumulative sound energy from repeated exposures (e.g. vessel noise).

Exposure levels exceeding specified thresholds are interpreted as resulting in predicted TTS or PTS in marine mammals. Thresholds for groups likely to be present in the ZOI are summarised in

11.6.74 Table 11.29.

Table 11.29 TTS- and PTS-onset thresholds for marine mammals exposed to impulsive noise: SEL thresholds in dB re 1 µPa² s and peak SPL thresholds in dB re 1 µPa under water

Group	Species	TTS		Auditory injury	
		SEL_{cum} Weighted	SPL_{peak} Unweighted	SEL_{cum} Weighted	SPL_{peak} Unweighted
Very high-frequency cetaceans (VHF)	Harbour porpoise	144	196	159	202
Phocid carnivores in water (PCW)	Harbour seal Grey seal	168	217	183	223

Source Ref 71

Table 11.30 TTS- and PTS-onset thresholds for marine mammals exposed to non-impulsive noise: SEL thresholds in dB re 1 µPa² s and peak SPL thresholds in dB re 1 µPa under water

Group	Species	TTS		Auditory injury	
		SEL_{cum} Weighted	SPL_{peak} Unweighted	SEL_{cum} Weighted	SPL_{peak} Unweighted
Very high-frequency cetaceans (VHF)	Harbour porpoise	161	224	181	230
Phocid carnivores in water (PCW)	Harbour seal Grey seal	175	212	195	218

Source Ref 71

11.6.75 Fish use a variety of sensory systems to learn about their environments. Both high and low sound levels can affect fish: high levels can result in death or mortal injury to fish and lower levels may result in temporary hearing impairment, physiological changes, changes in behaviour and the masking of biologically important sounds [Ref 72]. Proposed threshold for fish is summarised in Table 11.31.

Table 11.31 Fish injury threshold from impulsive pile driving sources (N - Near field, I - Intermediate field, F - Far field). Peak and rms sound pressure levels in dB re 1 µPa; and SEL in dB re 1 µPa2 s−1

Type of Fish	Mortality & potential mortal injury	Recoverable injury	TTS	Masking	Behaviour
No swim bladder	>219 dB SEL_{cum} or >213 dB peak	>216 dB SEL_{cum} or >213 dB peak	>186 dB SEL_{cum}	(N) Moderate (I) Low (F) Low	(N) High (I) Moderate (F) Low
Swim bladder is not involved in hearing	>210 dB SEL_{cum} or >207 dB peak	203 dB SEL_{cum} or >207 dB peak	>186 dB SEL_{cum}	(N) Moderate (I) Low (F) Low	(N) High (I) Moderate (F) Low
Swim bladder is involved in hearing	>207 dB SEL_{cum} or >207 dB peak	203 dB SEL_{cum} or >207 dB peak	186 dB SEL_{cum}	(N) High (I) High (F) Low	(N) High (I) High (F) Moderate

Source Ref 72

11.6.76 Fish likely to be present in the ZOI have been assessed based on their hearing sensitivity to underwater sound as described below.

- High hearing sensitivity fish: species in which hearing involves a swim bladder or other gas volume (e.g. Atlantic cod and herring). These species are susceptible to barotrauma and detect sound pressure as well as particle motion;
- Medium hearing sensitivity fish: species with swim bladders in which hearing does not involve the swim bladder or other gas volume (e.g. Atlantic salmon, sea trout and European eel). These species are susceptible to barotrauma although hearing only involves particle motion, not sound pressure; and
- Low hearing sensitivity fish – species with no swim bladder or other gas chamber (e.g. dab and other flatfish and elasmobranchs) are less susceptible to barotrauma detecting particle motion rather than sound pressure.

11.6.77 Due to the lack of scientific evidence on the injury thresholds of fish to non-impulsive noise, ZOI are provided in Table 11.32 based on the impulsive noise thresholds.

11.6.78 Standardising exposure metrics to include the effects of particle-motion is an ongoing research objective of the scientific community. At this time no consensus has been reached on suitable particle-motion noise exposure criteria.

11.6.79 Distance calculations for ZOI were undertaken using 3D modelling taking into account propagation losses, bathymetry, ray patterns (including shadow zones and caustics), water properties (depth, temperature, and salinity), water absorption, seabed properties (density and speed of sound in the medium), sediment absorption, and hearing weighting groups.

11.6.80 The results are considered worst-case and the actual impact (and ZOI) are likely to be lower/smaller.

11.6.81 The distances at which each behavioural change could occur are shown in Table 11.32 and Table 11.33 for marine mammals and Table 11.34 and Table 11.35 for fish. Fish could potentially suffer temporary hearing impairment is 2200m, 2400m, and 2100m respectively. The distance at which VHF cetaceans, Phocid carnivores, and fish could suffer a permanent injury is up to 1300m, 1300m, and 800m respectively. Distances above approximately 300m could cause an 'acoustic barrier' across the river tees due to the width of the river.

Table 11.32 Calculated injurious change distances for marine mammals for impulsive and non-impulsive sound sources - Downstream

Hearing group	Source type	Distance at which TTS is a risk		Distance at which auditory injury is a risk	
		SEL_{cum}	Peak	SEL_{cum}	Peak
VHF cetaceans	Impact piling	1,400m	<50m	1,000m	<50m
Phocid carnivores in water	Impact piling	1,300m	<50m	1,000m	<50m
VHF cetaceans	Vibratory piling	800m	<50m	100m	<50m
Phocid carnivores in water	Vibratory piling	800m	<50m	<50m	<50m
VHF cetaceans	Soft dredging	100m	N/A	<50m	N/A
Phocid carnivores in water	Soft dredging	200m	N/A	<50m	N/A
VHF cetaceans	Hard dredging	200m	N/A	<50m	N/A
Phocid carnivores in water	Hard dredging	500m	N/A	<50m	N/A

Table 11.33 Calculated injurious change distances for marine mammals for impulsive and non-impulsive sound sources - Upstream

Hearing group	Source	Distance at which TTS is a risk		Distance at which auditory injury is a risk	
		SEL_{cum}	Peak	SEL_{cum}	Peak
VHF cetaceans	Impact piling	2,200m	<50m	1,300m	<50m
Phocid carnivores in water	Impact piling	2,400m	<50m	1,300m	<50m
VHF cetaceans	Vibratory piling	500m	<50m	100m	<50m

Phocid carnivores in water	Vibratory piling	600m	<50m	<50m	<50m
VHF cetaceans	Soft dredging	400m	N/A	<50m	N/A
Phocid carnivores in water	Soft dredging	500m	N/A	<50m	N/A
VHF cetaceans	Hard dredging	500m	N/A	<50m	N/A
Phocid carnivores in water	Hard dredging	600m	N/A	<50m	N/A

Table 11.34 Calculated injurious change distances for fish for impulsive and non-impulsive sound sources - Downstream

Hearing group	Source	Distance at which mortality and potential mortal injury is a risk		Distance at which recoverable injury is a risk		Distance at which TTS is a risk
		SEL_{cum}	Peak	SEL_{cum}	Peak	SEL_{cum}
No swim bladder	Impact piling	400m	<50m	600m	<50m	1,200m
Swim bladder is not involved in hearing	Impact piling	800m	<50m	900m	<50m	1,200m
Swim bladder is involved in hearing	Impact piling	800m	<50m	900m	<50m	1,200m
No swim bladder	Vibratory piling	<50m	<50m	<50m	<50m	600m
Swim bladder is not involved in hearing	Vibratory piling	<50m	<50m	<50m	<50m	600m
Swim bladder is involved in hearing	Vibratory piling	<50m	<50m	<50m	<50m	600m
No swim bladder	Soft dredging	<50m	N/A	<50m	N/A	200m
Swim bladder is not involved in hearing	Soft dredging	<50m	N/A	<50m	N/A	200m
Swim bladder is involved in hearing	Soft dredging	<50m	N/A	<50m	N/A	200m
No swim bladder	Hard dredging	<50m	N/A	<50m	N/A	400m
Swim bladder is not involved in hearing	Hard dredging	<50m	N/A	<50m	N/A	400m
Swim bladder is involved in hearing	Hard dredging	<50m	N/A	<50m	N/A	400m

Table 11.35 Calculated injurious change distances for fish for impulsive and non-impulsive sound sources - Upstream

Hearing group	Source	Distance at which mortality and potential mortal injury is a risk		Distance at which recoverable injury is a risk		Distance at which TTS is a risk
		SEL_{cum}	Peak	SEL_{cum}	Peak	SEL_{cum}
No swim bladder	Impact piling	300m	<50m	400m	<50m	2,100m
Swim bladder is not involved in hearing	Impact piling	500m	<50m	500m	<50m	2,100m
Swim bladder is involved in hearing	Impact piling	500m	<50m	600m	<50m	2,100m
No swim bladder	Vibratory piling	<50m	<50m	<50m	<50m	400m
Swim bladder is not involved in hearing	Vibratory piling	<50m	<50m	<50m	<50m	400m
Swim bladder is involved in hearing	Vibratory piling	<50m	<50m	<50m	<50m	400m
No swim bladder	Soft dredging	<50m	N/A	<50m	N/A	500m
Swim bladder is not involved in hearing	Soft dredging	<50m	N/A	<50m	N/A	500m
Swim bladder is involved in hearing	Soft dredging	<50m	N/A	<50m	N/A	<50m
No swim bladder	Hard dredging	<50m	N/A	<50m	N/A	600m
Swim bladder is not involved in hearing	Hard dredging	<50m	N/A	<50m	N/A	600m
Swim bladder is involved in hearing	Hard dredging	<50m	N/A	<50m	N/A	<50m

11.6.82 An assessment was performed of running vessels of sizes 19m to 173m (165dB to 178dB) in the estuary and shallow water (Ref 81, Ref 82). It was found that the TTS threshold was reached at a maximum distance of 100m from an hour-long exposure (in accordance with the predicted vessel movements in the Navigation Risk Assessment).

11.6.83 The marine mammal baseline indicates that the species most likely to occur in the area are harbour seal and grey seal. Although the Southern North Sea SAC is a recognised concentration area for harbour porpoise, it is located over 100km from the Proposed Development. As such, harbour porpoise may occasionally transit through Tees Bay, but their presence

within the area affected by underwater noise, 2.2km from sound sources, is considered unlikely. Any effects would represent a negligible change from baseline conditions and would not influence the population. Therefore, the effect cetaceans is considered **negligible (not significant)**.

11.6.84 Pinnipeds (seals) are expected to be present in the affected area, 2.2km from the sound source. Sensitivity of seals is medium. It is expected that the magnitude of noise and vibration impacts on seals is considered medium resulting in a **moderate adverse (significant)** effect.

11.6.85 There are protected and unprotected fish species in the River Tees. In a worst-case scenario, considering protected species of fish (high sensitivity), and without mitigation, the magnitude of noise and vibration impacts is considered medium (partial alteration to one or more key elements) and, the overall significance without mitigation measures being applied is considered **major adverse (significant).**

Disturbance to marine mammals and fish associated with changes in visual stimuli (artificial light at night)

11.6.86 Artificial light at night (ALAN) is recognised as a pervasive stressor in coastal and estuarine environments. During the construction phase, sources of artificial light are vessels and onshore construction works at the proposed SAF facilities, particularly during night-time operations.

11.6.87 Fish and marine mammals within the ZOI are likely to be exposed to elevated levels of artificial light likely to alter behaviour and may also be affected by associated changes in prey availability or altered foraging efficiency. However, evidence of direct behavioural disruption in marine mammals associated with ALAN remains limited and largely inferred from changes in ecosystem dynamics.

11.6.88 Behavioural responses to artificial light vary among taxa. Some species are attracted to light, such as herring, and others, e.g. Atlantic cod, are known to avoid light [Ref 73].

11.6.89 Given the temporary nature of construction lighting and the likelihood of habituation in some species, the impact is anticipated very slight change from baseline, resulting in negligible magnitude.

11.6.90 However, the ZOI identified protected species of fish, such as herring and Atlantic salmon, resulting in a high sensitivity.

11.6.91 Accordingly, the overall effect significance is assessed as **minor adverse (not significant)**. Most current conservation strategies are focussed on terrestrial habitat, marine turtles and seabirds rather than marine mammals and fish. No mitigation measures are proposed beyond the implementation

of good practice during construction works presented in the **fCEMP (Appendix 5A, ES Volume III, Application Document Ref. 6.3)**.

Increase in vessel collision risk associated with vessel traffic

11.6.92 The increase in vessel movements associated with construction works within the Marine Works area has the potential to increase the risk of vessel collisions.

11.6.93 The Tees Estuary is already a high-density navigation route, with 13,926 vessel transits recorded between October 2024 and September 2025 **(Appendix 20A: Preliminary Navigational Risk Assessment, ES Volume III, Application Document Ref. 6.3)**, equivalent to an average of approximately 1,160 transits per month.

11.6.94 Vessels anticipated during the proposed construction phase are associated with the demolition of jetties, quay construction and capital dredging. These activities will contribute to the vessel traffic increase of less than 5% within the River Tees in the proposed marine work area.

11.6.95 Marine mammals within the ZOI are likely to be habituated to vessel presence. Consequently, it is expected that they can detect and avoid vessels.

11.6.96 The number of marine mammals with severe injury associated with vessel collision can be derived from data on strandings caused by physical trauma. The UK Cetacean Strandings Investigation Programme (CSIP) data is presented in the baseline. Within the ZOI, only one death of a harbour (common) seal was registered, and the cause of death was related to gastric and pulmonary parasitism and therefore unrelated to vessel collision. Regarding harbour porpoises, one mortality was recorded in Hartlepool, where the cause of death was associated with physical trauma due to grey seal attack, again not related to vessel collision [Ref 74].

11.6.97 Harbour (common) and grey seals are the most abundant marine mammals within the immediate vicinity of the Proposed Development. However, most vessels will be operating close to the Proposed Development in the Tees Estuary where abundances of harbour and grey seals are expected to be lower, rather than adjacent to the Seal Sands haul-out site (approximately 1.7km as the crow flies, transit distance is approx. 4.5km),.

11.6.98 The embedded mitigation measures to avoid collision with marine mammals within the ZOI ensure that the magnitude of impact is low. The overall ecological sensitivity of receptor group comprising the three marine mammal species potentially present, is assessed as medium. However, no collision events have been recorded or verified. The effect is therefore

assessed to be **minor adverse (not significant)** during temporary activities.

11.6.99 PD Ports has implemented a series of operational controls to reduce navigational risks during periods of low visibility in the Tees Estuary, which indirectly contribute to minimising the potential for vessel collisions with marine mammals. These include limiting vessel movements to a maximum of three within the Vessel Traffic Services (VTS) area when visibility falls below 1000 metres, requiring dynamic risk assessments for tug-assisted transits, and activating port-specific navigational support for vessels under pilotage. These measures, embedded within the Port Marine Safety Code and local passage plans, help maintain safe navigation and reduce the likelihood of adverse interactions with sensitive marine receptors.

11.6.100 No further mitigation measures are required.

Introduction and spread of marine INNS

11.6.101 The incorrect management of ballast water and hull fouling has the potential to introduce or spread marine INNS.

11.6.102 Ballast water is important for ships' stability and structural integrity. It can contain thousands of aquatic microbes, algae and animals, which are then carried across the world's oceans and released into ecosystems where they could establish as INNS [Ref 56].

11.6.103 Marine INNS can also be spread through hull fouling [Ref 57]. The potential for invasive aquatic species transferred through biofouling to cause harm has been recognized by the IMO, the CBD, and several regional organizations for the protection of the marine environment.

11.6.104 During the construction phase, untreated ballast water released into the Tees Estuary could potentially introduce new invasive aquatic species, and result in consequences for the local ecosystem, economy and infrastructure.

11.6.105 For the baseline, INNS recorded in the ZOI between 2022 and 2025 included African catfish, American mink, Australian tubeworm, Barnacle (*Austrominius modestus)*, Chinese mitten crab, Pacific saury, Phytoplankton (*Coscinodiscus wailesii)* and Rainbow trout. African catfish are unable to survive in U.K. waters and the recorded presence is likely from a discarded food source. Pacific saury are sold locally as angling bait and similarly, the recorded presences are likely from a dead specimen(s) introduced to the water course.

11.6.106 The study area supports protected and notable fish species, including Atlantic salmon, brown/sea trout and European eel, which are of high sensitivity.

11.6.107 The majority of vessels involved in construction will be offloading meaning that they would be expected to take on ballast water rather than discharge it. Embedded mitigation measures will result in negligible magnitude of impact, by limiting the opportunities for INNS introduction, these measures include:

- adherence to the International Maritime Organisation (IMO) 2023 Guidelines for the control and management of ships' biofouling to minimize the transfer of invasive aquatic species (Biofouling Guidelines); and
- manage ballast water exchange and biofouling.

11.6.108 The effect on marine receptors is assessed as **minor adverse** and **not significant**.

Freshwater Receptors

Changes to water quality associated with chemical spillages into surface water run-off

11.6.109 Water pollution may occur during construction as run-off from the Proposed Development into existing watercourses/waterbodies. Pollutants and sediments may be carried within this run-off which may impact water quality of the receiving watercourses and those hydrologically connected to them. Without mitigation, this could cause impacts to habitats and species sensitive to pollution.

11.6.110 For clean surface water run-off, if the water meets the acceptable contamination thresholds, it will be discharged to the surface water drainage system and ultimately to the Tees Estuary.

11.6.111 The Main Site will be designed to segregate potentially contaminated surface water from clean surface water. Surface water will be attenuated and discharged in line with environmental permit requirements. Further details are provided in the drainage strategy (Application Document Ref. 5.7A).

11.6.112 Additional mitigation measures to stop contaminated run-off from reaching controlled water and to reduce the impact of chemical/fuel spills will be applied during construction, as set out in the fCEMP and Drainage Strategy submitted with the DCO application. Use of impermeable surfacing, bunding of hazardous material storage and a preventative maintenance regime will

be included in the CEMP. See **Chapter 12: Water Environment (ES Volume I, Application Document Ref. 6.1)** for more information.

11.6.113 No freshwater protected or notable species were recorded other than fish, described in the marine receptors. This results in low sensitivity. With the implementation of the embedded mitigation measures, the magnitude of impact is considered to be low and the overall effect is assessed to be **negligible (not significant)**.

Introduction and spread of INNS

11.6.114 There is potential to introduce and spread INNS during the Construction phase of the Proposed Development.

11.6.115 Embedded mitigation within the INNS management plan, as part of the fCEMP, will include measures to control the introduction and spread of floral and faunal INNS during construction and reduce their prevalence in the local area.

11.6.116 No freshwater protected or notable species were recorded other than fish, described in the marine receptors. This results in low sensitivity.

11.6.117 The implementation of the embedded mitigation measures is expected to minimise the magnitude to low and the overall effect is assessed to be **negligible (not significant)**.

Lighting effects from working at night

11.6.118 Artificial lighting using during construction would be focused on works areas or those used by personnel working on the Proposed Development. Sources of artificial light include onshore construction works at the proposed SAF facilities, particularly during night-time operations where lighting levels are required to be high enough for safe transit and working as required under HSE guidance.

11.6.119 There is the potential that light spill from artificial lighting could affect freshwater receptors, particularly fish. Fish within the ZOI are likely to be exposed to elevated levels of artificial light likely to alter behaviour and may also be affected associated with changes in prey availability or altered foraging efficiency. Protected fish species are described in the marine receptors,

11.6.120 Embedded mitigation is detailed in the **Outline Lighting Strategy (Appendix 13C, ES Volume III, Application Document Ref.6.3)** and includes sensitive use of artificial lighting to minimise light spill into adjacent watercourses/waterbodies and reduction of unnecessary lighting in areas that are not being utilised for construction purposes.

11.6.121 Given the embedded mitigation, the temporary nature of construction lighting, and the poor suitability of habitat to support notable species, the magnitude of impact is considered low. Surface water features potentially impacted by the Proposed Development are considered to have a low sensitivity. This results in an effect assessed to be **negligible (not significant)**.

11.6.122 This assessment excludes the Tees Estuary, which is considered separately above under Marine receptors.

Installation of culverts

11.6.123 Works associated with widening access roads and tracks to accommodate construction vehicles could require installation of culverts and/or extension/replacement of existing culverts.

11.6.124 Culverts fragment habitat continuity of watercourses with adverse ecological impact, particularly on fish passage. Installation of culverts can also result in sediment release with further adverse ecological impacts.

11.6.125 Whilst watercourses and ditches potentially impacted by the Proposed Development are considered to have poor habitat suitability to support notable freshwater fish species of conservation interest, the e-DNA of European eel was recorded in the freshwater ditch during the aquatic habitat survey [Ref 30].

11.6.126 Given the potential for hydraulic connectivity of various watercourses and ditches associated with the Proposed Development, and the proximity of the Proposed Development to the Tees Estuary, it is likely European eel will be present in watercourses, ditches and ponds across the Proposed Development. In the absence of data from various watercourses and across the Site, European eel abundance is assumed to be high. It is also assumed that the presence of European eel in a culverted ditch suggests that they navigate a small number of culverts on the Site as part of a wider network. Whilst several culverts were observed to be blocked (Ref 19), which would limit eel movement around the site, eel would be able to move through gaps they could access within the culverts. European eel is ‘critically endangered’ according to the International Union for Conservation of Nature (IUCN) Red List (IUCN, 2019). European eel are considered to have high sensitivity.

11.6.127 If required, upgraded culverts will be installed to accepted Environment Agency standards as outlined in the IFM Fish Pass Manual to facilitate water flows, fish passage and sediment dynamics [Ref 76], and in adherence with the Environment Agency Policy Regarding Culverts [Ref 77].

11.6.128 Sediment management mitigation associated with installation of culverts will be detailed in the CEMP.

11.6.129 The extension of existing and/or installation of new culverts, if required, given the embedded mitigation and existing baseline conditions of the Site, is considered to have a negligible magnitude of impact, resulting in a **minor adverse** effect and is **not significant**.

Likely impacts and effects of operation phase

11.6.130 The operation of the Proposed Development has the potential for likely significant effects on marine and freshwater receptors.

Marine Receptors

Changes to water quality associated with wastewater and discharge of effluents

11.6.131 Industrial wastewater is anticipated to be discharged to Bran Sands WwTW for to discharge to Tees Bay. To meet their requirements under the Levelling-Up and Regeneration Act, NWL have committed to constructing a LSO from Bran Sands WwTW to 4.5km off the coast of the Tees Estuary [Ref 2].

11.6.132 The LSO is expected to become operational before the Proposed Development, with a planning application anticipated to be submitted after 2027 [Ref 2]. When operational the LSO will be the primary discharge for treated effluent from Teesside industries, including the Proposed Development.

11.6.133 No impacts on water quality are anticipated during operation of the LSO and industrial waste water discharge in the North Sea.

Changes to water quality associated with spillage of fuels or other harmful chemicals

11.6.134 Several operational activities associated with the Proposed Development have the potential to cause changes to water quality. These activities include:

- accidental spillage of chemicals;
- accidental spillage of fuel from working vessels delivering feedstock.

11.6.135 SAF and renewable naphtha will be directed via pipelines to bulk liquid storage. The storage will be at a local marine export facility with above ground and bunded storage tanks of steel construction.

11.6.136 Should an incident occur where surface water is contaminated near processing and operational areas of the Proposed Development, the water

either will be treated on site before export by pipeline to Bran Sands WwTW for discharge or taken by tanker for off-site treatment.

11.6.137 In the event of an accident, the magnitude of the impact will vary dependent on contaminant type and the volume of spillage. If the accident reaches the Tees Estuary, the sensitivity of the Teesmouth and Cleveland Coast SSSI is assessed as medium and the presence of important species as migratory fish results in high sensitivity.

11.6.138 Any accidental spillage must be reported immediately to the relevant authorities, including the Statutory Harbour Authority and the Environment Agency, and responded to in accordance with the SOPEP and local emergency response plans. The implementation of these regulatory requirements and best practice measures ensures that the risk of fuel or harmful substance spillage, and any associated environmental impact on the Tees Estuary is minimised as far as reasonably practicable.

11.6.139 In the event of spillages from loading of delivery tankers to chemical storage areas, these spillages will be contained in bunded areas and/ or directed to closed drains. Preventative measures, bunding, kerbing and drain isolation will be required by the Environment Agency when determining whether to issue an environmental permit for the operation of the Proposed Development in accordance with the use of Best Available Techniques (BAT).

11.6.140 Given the design measures in place, and the good practice applied to on-site works and vessels in the Tees Estuary, the likelihood of spillage occurrence is very low (negligible). Therefore, effects to marine ecology receptors associated with changes in water quality from accidental spills are predicted to be **minor adverse (not significant)**.

Increase in turbidity associated with higher number of vessels and/or transit count.

11.6.141 A minimum water depth will be required in the berthing pocket at the new quay to facilitate the import of feedstock required by the Proposed Development. The depth of the berthing pocket will be maintained by the operator.

11.6.142 PD Ports, as the Statutory Harbour Authority for the Tees Estuary, is responsible for maintaining navigable depths through routine maintenance dredging. Any potential increase in dredging requirement resulting from the new quay is expected to be minimal with the area already part of PD Ports maintenance schedule. Following construction, the area will be assessed annually for inclusion in the PD Ports maintenance dredging campaign. All maintenance dredging activities would be managed within the existing

maintenance dredging and offshore disposal regimes regulated by the MMO.

11.6.143 As such, the magnitude of water quality effects associated within increased turbidity beyond those typically experienced during routine maintenance dredging operations is predicted to be negligible.

11.6.144 Given the medium sensitivity of the Teesmouth and Cleveland Coast SSSI, the overall effect is assessed as **negligible (not significant)**.

11.6.145 No additional mitigation measures are required.

Disturbance to marine mammals and fish associated with underwater noise

11.6.146 Several activities associated with the operational Proposed Development have the potential to cause changes to underwater noise. These activities include:

- Increase in underwater noise level associated with maintenance dredging; and
- Increase in underwater noise level associated with higher number of vessels and/or transit count.

11.6.147 Underwater noise predicted to be generated from maintenance dredging is far less than during the construction phase and of shorter duration than the capital dredging activities. No additional mitigation measures are required.

11.6.148 The magnitude of impact in all species is assessed to be very low based on the maximum number of animals that could be impacted as a result of underwater noise during the maintenance dredging works. The sensitivity of protected species that could potentially be present such as harbour porpoise, grey seal and harbour (common) seal and various fish is high**.** The effect of maintenance activities has been assessed as **minor adverse (not significant)**.

Changes in visual stimuli associated with work at night (ALAN)

11.6.149 As described for the construction phase, ALAN is recognised as stressor in coastal and estuarine environments. Fish and marine mammals within the ZOI are likely to be exposed to elevated levels of artificial light likely to alter behaviour and may also be affected associated with changes in prey availability or altered foraging efficiency.

11.6.150 The wider Teesport area has highly elevated levels of ALAN suggesting that additional lighting from the Proposed Development would not have a disproportionate impact on the ALAN environment. However, due to the Main Site currently being out of use, there are no local light sources emitting light onto the estuary which could provide a refuge to some species

at night. Addition of required light sources associated with the new quay will increase ALAN locally but the distribution and habitat use of resident and migratory taxa is unknown.

11.6.151 Results from eDNA analysis will be used to assess taxon presence and indicate whether migratory fish, in particular, deviate from the main river channel to the area proximal to the Proposed Development. These results will be presented in a post-submission addendum to the chapter.

11.6.152 The impact is associated to negligible magnitude. In the ponds, the receptor has low sensitivity, resulting in a **negligible (not significant)** effect. However, in the Tees Estuary the lights may affect the behaviour known protected species within the area, such as herring and Atlantic salmon, resulting in a high sensitivity. Accordingly, the effect is assessed as **minor adverse** (**not significant)**.

11.6.153 Through the use of appropriately designed lighting systems in accordance with the **Outline Lighting Strategy (Appendix 13C, ES Volume III, Application Document Ref. 6.3)**, it is considered that potentially significant effects can be prevented.

Increase in vessel collision risk associated with operational vessel traffic

11.6.154 As presented in the construction phase, the Tees Estuary is classified as high-density navigation route, with approximately 1,160 transits per month recorded between October 2024 and September 2025 **Appendix 20A: Preliminary Navigation Risk Assessment (ES Volume III, Application Document Ref. 6.3)**. The same appendix presents approximately eight round trips per month for feedstock import. The increase in vessel movements is predicted to result in a negligible magnitude of impact, representing a very slight change from the baseline**.**

11.6.155 Within the Marine Works area, the presence of harbour porpoise is considered to be unlikely; however, a precautionary approach has been adopted. Harbour porpoise is a European Protected Species, and the sensitivity of this receptor is therefore considered to be high. The magnitude of impact on harbour porpoise of the proposed Development is considered to be negligible in magnitude and the overall effect is assessed as **minor adverse (not significant)**.

Introduction and spread of marine INNS

11.6.156 Incorrect management of ballast water and hull fouling associated with the operation of the Proposed Development has the potential to introduce or spread marine INNS.

11.6.157 As presented in the construction phase, the introduction of marine INNS is a world-wide concern subject to international regulations and guidance. To avoid this impact, embedded mitigation measures include:

- adherence to the International Maritime Organisation (IMO) 2023 Guidelines for the control and management of ships' biofouling to minimize the transfer of invasive aquatic species (Biofouling Guidelines); and
- manage ballast water exchange and biofouling.

11.6.158 The existing INNS within the vicinity of the Proposed Development are limited, i.e. Darwins barnacle and *Yoldia hyperborea,* and none appear to be detrimental to native species, diversity or ecosystem functioning. Bioturbation by Yoldia could have some effect on seabed mud habitats although it is already established.

11.6.159 Embedded mitigation will reduce the risk of introduction and spread of INNS As a result the probability of transmission is very low resulting in the adverse effect being **minor adverse (not significant)**.

Freshwater Receptors

Changes to water quality associated with spillage of fuels or other harmful chemicals

11.6.160 Several operational activities associated with the Proposed Development have the potential to cause changes to water quality, such as accidental spillage of chemicals, run-off or wastewater from the Proposed Development. Pollutants and sediments have the potential to impact water quality of watercourses and those hydrologically connected to them. Without mitigation, this could cause major impacts to habitats and species that are sensitive to water pollution.

11.6.161 An appropriate surface water drainage system will be implemented that will incorporate appropriate pollution control and maintenance measures to mitigate the risk of pollution during operation. The operation of the Proposed Development will also include appropriate preventative measures, monitoring and control of environmental risks through the environmental permit.

11.6.162 Process water produced by the facility will either be piped to the Bran Sands WwTW for treatment and will be discharged to Tees Bay using a new LSO or it will be treated on-site before being piped to Bran Sands WwTW and will be discharged into the River Tees using their current outfall into Dabholm Gut. Mitigation measures to compensate for additional nutrient nitrogen emissions to the Tees from Bran Sands WwTW will be agreed with

Natural England and the Environment Agency. Refer to **Chapter 12: Water Environment (ES Volume I, Application Document Ref. 6.1)** for further information.

11.6.163 Therefore, with embedded mitigation, the impacts of the Proposed Development relating to water pollution are considered to be negligible magnitude resulting in a **minor adverse (temporary) (not significant)** effect.

Introduction and spread of INNS

11.6.164 The potential for introduction and spread of freshwater INNS during operation is considered to be low. Watercourses and waterbodies within the vicinity of the Proposed Development are considered to have a low sensitivity.

11.6.165 Therefore, the overall effect significance is assessed to be **negligible (not significant)**.

Changes in visual stimuli (Artificial Light at Night) associated with work at night

11.6.166 Overspill of artificial lighting at night used during operation within the Site could affect freshwater receptors, particularly fish, which may result in an altered behaviour response, affect prey availability or alter foraging efficiency (see the **framework Lighting Strategy (Appendix 13C, ES Volume III, Application Document Ref. 6.3)**).

11.6.167 There are no natural surface water features (ponds, lakes, ditches) on the Site. Surface water features proposed for the Site include ponds for attenuation and treatment of surface water as part of surface water drainage system only.

11.6.168 Surface water features within the ZOI have poor habitat suitability to support notable freshwater fish species of conservation interest, with the exception of European eel. As these water features are not within the Site, they will not receive direct lighting from artificial sources. Fish and eel are therefore only likely to be exposed to subdued levels of artificial light.

11.6.169 Embedded mitigation will be detailed in the final lighting strategy and will include sensitive use of artificial lighting to minimise light spill into surrounding watercourses/waterbodies and reduction of unnecessary lighting in areas that are not being utilised for operation purposes.

11.6.170 .The magnitude and sensitivity of impact are therefore considered low, resulting in an **negligible (not significant)** effect.

11.6.171 This assessment of artificial lighting excludes the Tees Estuary, which is considered separately above under Marine receptors.

Likely Impacts and Effects on Decommissioning phase

11.6.172 While the SAF Production Facility will be decommissioned at the end of its operational life, no decommissioning activities are proposed in relation to the quay infrastructure. The quay and associated maritime components are intended to remain in place and potentially continue serving other operational purposes beyond the operational phase of the Proposed Development for future occupiers of the Main Site. No impact from the quay and associated infrastructure during decommissioning phase is therefore anticipated for marine ecology receptors.

11.6.173 During decommissioning of the SAF Production Facility infrastructure, excluding the quay and supporting infrastructure, potential impacts on freshwater and marine ecology receptors cannot be entirely eliminated. A DEMP will be prepared, typically around 18 months before any potential decommissioning activities will commence. The DEMP and will incorporate the environmental requirements relevant at the time of decommissioning and will state that that the applicant is required to comply with good practice measures such as including measures to reduce inventories of hazardous materials and prevent accidental spillages or loss of containment.

11.6.174 Methods of prevention and minimising predicted impacts during decommissioning will be identified and addressed through the DEMP and are expected to reduce the potential significance of effects during decommissioning activities to **minor adverse (not significant)**.

11.7 Mitigation and Enhancement Measures

Overview

11.7.1 Following the application of embedded mitigation as set out in Section 11.5, the only potentially significant adverse impact to marine ecology predicted for the construction phase relates to the potential loss of subtidal habitats and species from construction works, subject to the final design of the quay. The area for proposed capital and maintenance dredging is currently subject to maintenance dredging by the Statutory Harbour Authority.

11.7.2 During construction it is proposed that water quality monitoring is carried out to enable management and mitigation of potential effects from construction methodologies on marine ecological receptors. Monitoring would assess the following criteria: Water Quality (standard WFD parameters for Tees Transitional Waterbody).

11.7.3 No significant adverse effects to marine or freshwater ecology during the operational phase are predicted to occur.

Mitigation Measures

11.7.4 Mitigation details will be developed on an iterative basis following broad stakeholder engagement. The following mitigation hierarchy will be followed:

- priority will be given to avoiding negative effects;
- followed by reduction of remaining negative effects; and,
- targeted mitigation where necessary.

Construction Phase

11.7.5 Mitigation during the construction phase will include:

- a minimised construction footprint where feasible, through the selection of options which require less intrusion into the marine environment. This includes construction works at the quay seeking to minimise underwater noise and loss of habitat resulting from piling and dredging;
- alternative dredging methods, avoiding dredging during ebb and spring tides and implementing turbidity monitoring;
- use of JNCC guidelines for minimising impacts from piling (and also geophysical surveys and UXO detonation if required), to reduce the risk of injury to marine mammals [Ref 59, Ref 60, Ref 61] - such as piling location restrictions, marine mammal visual monitoring, passive acoustic monitoring (PAM), a soft start and other alternative measures as appropriate – details of the methods to be employed will be agreed with relevant stakeholders at the detailed design stage as part the detailed CEMP. The priority should be placed on quieter piling methods such as vibropiling where feasible. Guidelines highlight that PAM systems are not suitable for detecting seals and some cetaceans. In this case, monitoring measures will be focussed on visual monitoring; and
- construction activity that may cause direct disturbance to the marine environment (such as piling) will not commence unless an Ecological Clerk of Works (ECoW) is present to monitor seals in the vicinity of the works.

11.7.6 Mitigation measures will be included in the detailed CEMP which is secured by a Requirement to the **draft DCO (Application Document Ref. 3.1)**.

Operation Phase

11.7.7 No significant effects were identified for the operational phase and no further mitigation is considered to be required.

Enhancement Measures

11.7.8 Marine Net Gain policy is currently under development and no measures are therefore proposed for the Proposed Development.

11.8 Residual Effects and Conclusions

Overview

11.8.1 Having taken into account the design, good practice mitigation and additional information described in the preceding sections; at this stage until further works are completed, this ES chapter has concluded on a precautionary basis that there is potential for two significant adverse effects to freshwater and marine ecology from construction works of the Proposed Development based on current assumptions. No significant impacts are anticipated during the operation phase.

11.8.2 The significant effects identified in Section 11.6 were:

- a loss of subtidal habitats and species during construction;
- disturbance to marine mammals and migrations of diadromous fish due to underwater noise arising from construction works (marine piling and also geophysical surveys and UXO detonation if required); and

11.8.3 The mitigation measures set out in Section 11.7 will reduce all these effects to **minor adverse (not significant)**:

- Subtidal habitats: Despite the relatively low species richness and population size of the sedimentary macrofauna assemblage, the removal of sediment and fauna as a result of capital dredging will fundamentally change the local benthic environment, even if temporarily. However sediment dispersal modelling demonstrates that sediments liberated by the dredging activities fall out of suspension within 24 hours of being resuspended. This combined with the relatively small ZOI of dredging activities and the adoption of embedded mitigation measures to reduce potential impacts including appropriate dredging methods, avoiding dredging during ebb and spring tides and implementing turbidity monitoring result in the residual effect of dredging being of **minor adverse** or **not significant**.
- Disturbance of marine mammals and fish due to underwater noise: Despite the medium sensitivity of marine mammals and fish and high sensitivity of some fish listed as designated features likely to be

exposed to the underwater noise during marine construction works, the likelihood of the magnitude of impact with mitigation measures applied and associated behaviour is negligible and the residual effect considered to be **minor adverse (not significant)**. It is expected that marine mammals and fish will exhibit avoidance behaviours before coming within range of injurious effects from underwater noise and vibration.

11.9 Summary of Significant Effects

11.9.1 Summaries of the potential significant effects associated with the construction and operation of the Proposed Development are presented in Table 11.36 and Table 11.37.

Table 11.36 Summary of the potential significant effects during construction

Potential Impact	Receptor	Sensitivity	Magnitude of Impacts	Likely Significant Effects	Summary of Mitigation	Residual Effects
Change of intertidal habitats and species associated with jetty demolition	Designated site (Teesmouth and Cleveland Coast SSSI) Marine intertidal habitat/species	Low	Medium	Minor adverse (not significant)	N/A	Minor adverse (not significant)
Change of intertidal habitats and species associated with increase in marine traffic from construction works	Designated site (Teesmouth and Cleveland Coast SSSI) Marine intertidal habitat/species	Low	Medium	Minor adverse (not significant)	N/A	Minor adverse (not significant)
Change of subtidal habitats and species from construction works	Marine subtidal habitat/species	Medium	Medium	Moderate adverse (significant)	Alternative dredging methods, avoiding dredging during ebb and spring tides and implementing turbidity monitoring	Minor adverse (not significant)
Changes to water quality associated with existing jetty demolition and quay construction works (piling, dredging and navigation)	Designated site (Teesmouth and Cleveland Coast SSSI and Teesmouth NNR) Fish and shellfish Commercial fisheries	Medium	Low	Minor adverse (not significant)	N/A	Minor adverse (not significant)

Potential Impact	Receptor	Sensitivity	Magnitude of Impacts	Likely Significant Effects	Summary of Mitigation	Residual Effects
	Marine mammals (cetaceans and pinnipeds)					
Changes to water quality associated with chemical spillages into surface water run-off	Designated site (Teesmouth and Cleveland Coast SSSI and Teesmouth NNR) Fish and shellfish Commercial fisheries Marine mammals (cetaceans and pinnipeds)	Medium	Low	Minor adverse (not significant)	N/A	Minor adverse (not significant)
Changes to water quality associated with spillage of fuels	Designated site (Teesmouth and Cleveland Coast SSSI and Teesmouth NNR) Fish and shellfish Commercial fisheries Marine mammals (cetaceans and pinnipeds)	High	Negligible	Minor adverse (not significant)	N/A	Minor adverse (not significant)
Disturbance to marine mammals and fish associated	Fish and shellfish Marine mammals (cetaceans and pinnipeds)	High (cetaceans) Medium (pinnipeds)	Negligible (cetaceans)	Minor adverse (not significant) (cetaceans)	Follow JNCC guidelines [Ref 59, Ref 60, Ref 61] such as piling location restrictions, marine	Minor adverse (not significant) (cetaceans,

Potential Impact	Receptor	Sensitivity	Magnitude of Impacts	Likely Significant Effects	Summary of Mitigation	Residual Effects
with underwater noise		High (protected fish)	Medium (pinnipeds and protected fish)	Moderate adverse (significant) (pinnipeds) Major adverse (significant) (protected fish)	mammal visual monitoring, passive acoustic monitoring (PAM), a soft start and other alternative measures as appropriate. Visual monitoring of seals during marine construction works.	pinnipeds and protected fish)
Disturbance to marine mammals and fish associated with changes in *visual stimuli* (artificial light at night)	Fish and shellfish Commercial fisheries Marine mammals (cetaceans and pinnipeds)	High	Negligible	Minor adverse (not significant)	N/A	Minor adverse (not significant)
Increase in vessel collision risk associated with vessel traffic	Designated site (Teesmouth and Cleveland Coast SPA, Ramsar and SSSI and Teesmouth NNR) Marine mammals (cetaceans and pinnipeds)	Medium (pinnipeds) Medium (cetaceans)	Low (pinnipeds) Negligible (cetaceans)	Minor adverse (not significant) (pinnipeds) Negligible (not significant) (cetaceans)	N/A	Minor adverse (not significant) (pinnipeds) Negligible (not significant) (cetaceans)
Introduction and spread of marine INNS	Designated site (Teesmouth and Cleveland Coast SPA, Ramsar and	High	Negligible	Minor adverse (not significant)	N/A	Minor adverse (not significant)

Potential Impact	Receptor	Sensitivity	Magnitude of Impacts	Likely Significant Effects	Summary of Mitigation	Residual Effects
	SSSI and Teesmouth NNR) Marine intertidal habitat and species Marine subtidal habitat and species Fish and shellfish Commercial fisheries Marine mammals (cetaceans and pinnipeds)					
Changes to water quality associated with chemical spillages into surface water run-off	Freshwater	Low	Low	Negligible (not significant)	N/A	Negligible (not significant)
Introduction and spread of INNS	Freshwater	Low	Low	Negligible (not significant)	N/A	Negligible (not significant)
Lighting effects from working at night	Freshwater	Low	Low	Negligible (not significant)	N/A	Negligible (not significant)
Installation of culverts	Freshwater	High	Negligible	Minor adverse (not significant)	N/A	Minor adverse (not significant)

Table 11.37 Summary of the potential significant effects during operation

Potential Impact	Receptor	Sensitivity	Magnitude of Impacts	Likely Significant Effects	Summary of Mitigation	Residual Effects
Changes to water quality associated with spillage of fuels or other harmful chemicals	Designated site (Teesmouth and Cleveland Coast SPA, Ramsar and SSSI and Teesmouth NNR) Intertidal habitat and species Subtidal habitat and species Fish and shellfish Commercial fisheries Marine mammals (cetaceans and pinnipeds)	Medium (seals, and Teesmouth and Cleveland Coast SSSI) High (protected fish)	Negligible	Negligible (not significant) (seals and Teesmouth and Cleveland Coast SSSI) Minor adverse (not significant) (protected fish)	N/A	Minor adverse (not significant)
Increase in turbidity associated with higher number of vessels and/or transit count	Designated site (Teesmouth and Cleveland Coast SPA, Ramsar and SSSI and Teesmouth NNR) Marine intertidal habitat and species Marine subtidal habitat and species Fish and shellfish Commercial fisheries	Medium	Negligible	Negligible (not significant)	N/A	Negligible (not significant)

Potential Impact	Receptor	Sensitivity	Magnitude of Impacts	Likely Significant Effects	Summary of Mitigation	Residual Effects
	Marine mammals (cetaceans and pinnipeds)					
Disturbance to marine mammals and fish associated with underwater noise	Fish and shellfish Commercial fisheries Marine mammals (cetaceans)	Medium	Negligible	Negligible (not significant)	N/A	Negligible (not significant)
Changes in visual stimuli associated with work at night (ALAN)	Fish and shellfish Commercial fisheries Marine mammals (cetaceans and pinnipeds)	High	Negligible	Minor adverse (not significant)	N/A	Minor adverse (not significant)
Increase in vessel collision risk associated with operational vessel traffic	Designated site (Teesmouth and Cleveland Coast SPA, Ramsar and SSSI and Teesmouth NNR) Fish and shellfish Commercial fisheries Marine mammals (cetaceans and pinnipeds)	High	Negligible	Minor adverse (not significant)	N/A	Minor adverse (not significant)
Introduction and spread of marine INNS	Designated site (Teesmouth and Cleveland Coast SPA, Ramsar and SSSI and Teesmouth NNR) Fish and shellfish	High	Negligible	Minor adverse (not significant)	N/A	Minor adverse (not significant)

Potential Impact	Receptor	Sensitivity	Magnitude of Impacts	Likely Significant Effects	Summary of Mitigation	Residual Effects
	Commercial fisheries Marine mammals (cetaceans and pinnipeds)					
Changes to water quality associated with spillage of fuels or other harmful chemicals	Freshwater	Low	Negligible	Minor adverse (not significant)	N/A	Minor adverse (not significant)
Introduction and spread of INNS	Freshwater	Low	Low	Negligible (not significant)	N/A	Negligible (not significant)
Changes in *visual stimuli* (Artificial Light at Night) associated with work at night	Freshwater	Low	Low	Negligible (not significant)	N/A	Negligible (not significant)

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