Immingham Green Energy Terminal

Environmental Impact Assessment

Preliminary Environmental Information Report

Volume II – Main Report

Chapter 17: Marine Water and Sediment Quality

Associated British Ports

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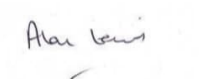
Signed		Date	20/12/2022
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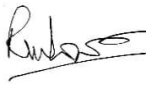
Signed		Date	20/12/2022
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17 Marine Water and Sediment Quality

17.1 Introduction

17.1.1 This chapter presents the preliminary findings of the assessment of the likely effects of the Project on Marine Water and Sediment Quality.

17.1.2 There may be interrelationships related to the potential effects on Marine Water and Sediment Quality and other disciplines. Therefore, also refer to the following chapters:

a. **Chapter 9: Nature Conservation (Marine Ecology)**;

b. **Chapter 16: Physical Processes**; and

c. **Chapter 22: Major Accidents and Disasters**.

17.1.3 This chapter is also supported by the following figures (PEI Report, Volume III):

a. **Figure 17.1** Water Framework Directive (WFD) water bodies;

b. **Figure 17.2**: WFD protected areas; and

c. **Figure 17.3**: Water sampling location.

17.1.4 Relevant aspects of the Marine Water and Sediment Quality assessment presented in this chapter will inform the Water Framework Directive (WFD) Compliance Assessment and also the Habitats Regulations Assessment (HRA) which will be prepared and included in the Environmental Statement (ES).

17.2 Approach to Assessment

Scope and Methods

17.2.1 A scoping exercise was undertaken in August 2022 to establish the form and nature of the Marine Water and Sediment Quality assessment, and the approach and methods to be followed.

17.2.2 The Scoping Report (**Appendix 1.A** of PEI Report, Volume IV) records the findings of the scoping exercise and details the technical guidance, standards, best practice and criteria being applied in the assessment to identify and evaluate the likely significant effects of the Project on Marine Water and Sediment Quality.

17.2.3 Following receipt of the Scoping Opinion (**Appendix 1.B** of the PEI Report, Volume IV) as to the information to be provided in the Environmental Statement (ES), the requirements set out in **Table 17.1** have been identified by the Planning Inspectorate as those to be taken account of as part of the ongoing marine water and sediment quality assessment.

Table 17.1 Scoping Opinion comments on marine water and sediment quality

Consultee	Reference, Date	Summary of Response	How comments have been addressed in this chapter
Planning Inspectorate	Scoping Opinion, October 10th 2022	The Scoping Report seeks to scope changes to levels of contaminants in water (construction and operation) out of the assessment on the grounds that the Project would not directly introduce contaminants to the marine environment and good practice measures would be used to minimise and mitigate the potential for accidental spillages during dredging and disposal. The Scoping Report does not specify what these measures would be although reference is made to 'Guidance for Pollution Prevention: Works and maintenance in or near water'). However, no other detail on the likely measures has been provided. Furthermore, the Scoping Report refers to accidental spillages during dredging and disposal but makes no mention of the potential for accidental spillages during operational activities (e.g. water discharges to the Humber, accidental spillages of fuel and cargo of liquid bulk vessels). In the absence of information such as evidence demonstrating clear agreement with relevant statutory bodies, the Inspectorate is not in a position to agree to scope these matters from the assessment. Accordingly, the ES should include an assessment of these matters or the information referred to demonstrating agreement with the relevant consultation bodies and the absence of a likely significant effect. This should cross reference to Chapter 21 Major Accidents and Disasters.	A preliminary assessment of the risk of accidental spillages and associated potential impacts on water quality is provided in **Section 17.5**. Further information on mitigation measures that would be applied to minimise the risk of accidental spillages during construction and operational phases has been provided in **Section 17.4**. This also details the measures that would be in place were a spill to occur. Further information on mitigation will be provided as part of the DCO application.
	Scoping Opinion, October 10th 2022	In addition to the data sources listed in paragraph 16.2.1, the Applicant is directed to water quality data available on the Open WIMS database at https://environment.data.gov.uk/water-quality/view/landing	Environment Agency water quality monitoring data has been used to characterise the marine water quality baseline.

Consultee	Reference, Date	Summary of Response	How comments have been addressed in this chapter
	Scoping Opinion, October 10th 2022	The ES should assess the potential for chemical contamination to accumulate at the dredge disposal sites.	A preliminary assessment of potential changes to water quality from redistribution of sediment-bound contaminants based on available relevant information is presented in **Section 17.5**. Sediment contamination sampling will be carried out for the Project in 2023. Once obtained these data will be compared with Cefas Guideline Action Levels and the results summarised in the ES. This analysis will determine the suitability of sediments for disposal at sea and will inform the assessment of the impacts from redistribution of sediment-bound contaminants.
	Scoping Opinion, October 10th 2022	The methodology does not describe how the significance of effects would be determined, or how the general methodology described in Chapter 4 of the Scoping Report would be applied to this aspect specifically. The ES should clearly explain how likely significant marine water and sediment quality effects have been identified.	The assessment of impacts in the PEI Report follows IEMA and CIEEM guidelines and is detailed in **Chapter 5: EIA Approach**. Further detail on the assessment methodology will be provided in the ES.
	Scoping Opinion, October 10th 2022	Paragraph 16.6.3 indicates that contaminant concentrations in sediments would be compared to Cefas Guideline Action Levels for the Disposal of Dredged Material. These don't exist for all of the contaminants which could potentially be observed. The Applicant should consider if there is any potential to explore alternative guidance levels (e.g. those used by other agencies/countries) for contaminants not covered by the Cefas Guidelines.	Where Cefas Action Levels are not defined for certain contaminants, reference is made to other relevant thresholds/guidance as appropriate - this is noted in **Section 17.3**.

Consultee	Reference, Date	Summary of Response	How comments have been addressed in this chapter
Environment Agency	Scoping Opinion, October 10th 2022	In addition to the data sources listed in paragraph 16.2.1, we would direct the Applicant to water quality data, which is available on the Open WIMS database at https://environment.data.gov.uk/water-quality/view/landing. The Report does not specifically discuss water discharges to the Humber. Paragraph 16.4.8 states that "Changes to levels of contaminants in water (including accidental spillages) during operation" is scoped out. Under the COMAH regulations, the site will be required to complete an unmitigated assessment of the environmental impact in the event of incidents. As such, undertaking this assessment of potential impact now may provide an early indication if the project will be required to go beyond best practice. If the project intends to discharge directly to the Humber it will need to follow this guidance Surface water pollution risk assessment for your environmental permit - GOV.UK (www.gov.uk) in support of its permit application. Paragraph 16.6.3 indicates that contaminant concentrations in sediments would be compared to Cefas Guideline Action Levels. These don't exist for all of the contaminants which could potentially be observed. The Applicant should consider if there is any potential to explore alternative guidance levels (e.g. those used by other agencies/countries).	Environment Agency water quality monitoring data has been used to characterise the marine water quality baseline in **Section 17.3**. Discharges into the Humber Estuary are discussed in **Chapter 18: Water Quality, Coastal Protection, Flood Risk and Drainage**. Any changes to, or potential impacts, on discharges will also be considered within the WFD Compliance Assessment. A preliminary assessment of the risk of accidental spillages and associated potential impacts on water quality is provided in **Section 17.5**. Noted. Where Cefas Action Levels are not defined for certain contaminants, reference is made to other relevant thresholds/guidance as appropriate - this is noted in **Section 17.3**.

17.2.4 To facilitate the impact assessment process and ensure consistency in the terminology of significance, a standard assessment methodology will be applied to determine the significance of effects within the ES. This methodology has been developed from a range of sources, including relevant Environmental Impact Assessment (EIA) Regulations, the EIA Directive (2014/52/EU), statutory and non-statutory guidance, consultations and ABPmer's previous (extensive) EIA project experience. The assessment also follows the principles of relevant guidance, including Institute of Environmental Management and Assessment (IEMA) guidelines (Ref 17-1), and the latest Chartered Institute of Ecology and Environmental Management (CIEEM) guidelines for ecological impact assessment in the UK and Ireland (which combine advice for terrestrial, freshwater and coastal environments) (Ref 17-2). The methodology adopted is considered to be 'best practice'. The overall assessment approach is described in detail in **Chapter 5: EIA Approach** including definitions of sensitivity/importance of receptors and magnitude of change.

17.2.5 Site-specific marine sediment samples will be collected in 2023 within the vicinity of the Project to inform the assessment. This will be conducted in line with a sediment sample plan that will be requested from the MMO. Sediments will be tested for a suite of chemical contaminants and particle size analysis completed as specified in the sediment sample plan.

Legislation, Policy and Guidance

17.2.6 **Table 17.2** presents the legislation, policy and guidance relevant to the Marine Water and Sediment Quality assessment and details how their requirements will be met in the assessment.

Table 17.2 Relevant legislation, policy and guidance regarding Marine Water and Sediment Quality

Legislation / Policy / Guidance	Consideration within the PEI Report
The Planning Act 2008 (PA2008) (Ref 17-9)	
Whilst the MCAA regulates marine licensing for works at sea, section 149A of the Planning Act 2008 enables an applicant for a DCO to include within the Order a Marine Licence which is deemed to be granted under the provisions of the MCAA.	Information relevant to the marine licensing process is provided in the PEI Report including characterisation of the marine water and sediment quality baseline (**Section 17.3**) and a preliminary assessment of impacts (**Section 17.5**).
The Marine and Coastal Access Act 2009 (MCAA) (Ref 17-8)	
The MCAA provides the legal mechanism to help ensure clean, healthy, safe, productive, and biologically diverse oceans and seas by putting in place a new system for improved management and protection of the marine and coastal environment. The MCAA established the Marine Management Organisation (MMO) as the	Information relevant to the marine licensing process is provided in the PEI Report including characterisation of the marine water and sediment quality baseline (**Section 17.3**) and a preliminary assessment of impacts (**Section 17.5**).

Legislation / Policy / Guidance	Consideration within the PEI Report
organisation responsible for marine planning and licensing. The Project will require a Marine Licence for the elements of the works below Mean High Water Springs including dredging, disposal and placing or removing objects on or from the seabed. For NSIPs the Development Consent Order (DCO) where granted may include provision deeming a marine licence to have been issued under Part 4 of the Marine and Coastal Access Act 2009. The MMO is responsible for enforcing, post-consent monitoring, varying, suspending, and revoking any deemed marine licence(s) as part of the DCO.	
The Water Environment (WFD) (England and Wales) Regulations 2017 (Ref 17-10)	
The Water Framework Directive (2000/60/EEC) is transposed into UK law through the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 as amended, known as the Water Framework Regulations[1]. In terms of water and sediment quality, "Good ecological status/potential" has regard to physico-chemical quality elements, and specific pollutants. The Good ecological status/potential assessment also considers biological and hydromorphological elements. "Good chemical status" has regard to a series of priority substances and priority hazardous substances.	**Section 17.3** identifies the relevant WFD water bodies (the Project lies within the Lower Humber water body in the Humber River Basin District) and Section 17.5 provides a preliminary assessment of potential impacts on water bodies. A WFD Compliance Assessment will be undertaken to determine whether the Project complies with the objectives of the WFD.
WFD (Standards and Classification) Directions (England and Wales) 2015 (Ref 17-11)	
The Direction provide the allowable thresholds (Environmental Quality Standards (EQS)) for surface and groundwater bodies in England and Wales. This sets annual average (AA) concentrations and/or maximum allowable concentrations (MAC)) for priority substances and priority hazardous substances that are controlled under the Water Framework Regulations.	Reference is made to AA and MAC in **Section 17.5** where available baseline water and sediment quality data are compared with guideline thresholds.
Bathing Water Regulations 2013 (Ref 17-12)	
The revised Bathing Water Directive (2006/7/EC) is implemented in England and Wales under the Bathing Water Regulations 2013 (as amended).	**Section 17.3** identifies relevant bathing waters (the nearest is located approximately 11.5 km south east of the Project).

[1] Following the UK leaving the EU, the main provisions of the WFD have been retained in English law through The Floods and Water (Amendment etc.) (EU Exit) Regulations 2019. (Ref 17-39)

Legislation / Policy / Guidance	Consideration within the PEI Report
Nitrate Pollution Prevention Regulations 2015 (Ref 17-13)	
The Nitrate Pollution Prevention Regulations 2015 implement the Nitrates Directive (91/676/EEC) in England and Wales.	**Section 17.3** identifies relevant Nitrate Vulnerable Zones (NVZ). As the NVZ is landside this is considered in **Chapter 21: Ground Conditions and Land Quality**. NVZs will also be considered in the WFD Compliance Assessment.
Urban Waste Water Treatment (England and Wales) Regulations 1994 (Ref 17-14)	
The Urban Waste Water Treatment Directive (91/271/EEC) is implemented in England and Wales through the Urban Waste Water Treatment (England and Wales) Regulations 1994 (as amended). It aims to protect the environment from the adverse effects of the collection, treatment, and discharge of urban waste water.	**Section 17.3** identifies relevant Sensitive Areas. There are no sensitive areas designated under the Urban Waste Water Treatment Regulations in the vicinity of the Site.
Shellfish Water Protected Areas Directions 2016 (Ref 17-15)	
The Shellfish Water Protected Areas (England and Wales) Directions 2016 require that the Environment Agency (in England) endeavour to observe a microbial standard in all 'Shellfish Water Protected Areas'. The microbial standard is 300 or fewer colony forming units of *E. coli* per 100 ml of shellfish flesh and intravalvular liquid. The Directions also require the Environment Agency to assess compliance against this standard to monitor microbial pollution (75% of samples taken within any period of 12 months below the microbial standard and sampling/analysis in accordance with the Directions).	There are no Shellfish Water Protected Areas in the vicinity of the Project. **Section 17.3** explains that the nearest is the West Wash Shellfish Water Protected Area, located over 65 km south.
The Conservation of Habitats and Species Regulations 2017 (Ref 17-16)	
The Habitats Directive and Birds Directive are transposed into UK law through the Conservation of Habitats and Species Regulations 2017 as amended, known as the "Habitats Regulations"[2]. The Habitats Regulations provide for the designation and protection of 'European sites', the protection of 'European protected species' and the adaptation of planning and other controls for the protection of European Sites. The Regulations also require the compilation and maintenance of a	**Section 17.3** characterises the baseline for water and sediment quality. A preliminary consideration of impacts on these receptors is described in **Section 17.5** which has informed the preliminary assessment of impacts on protected habitats and species presented in **Chapter 9:** Marine Ecology and **Chapter 10:** Ornithology. A Habitats Regulations Screening report has been produced and is provided in **Appendix 9.C** (PEI Report Volume IV)**.** This report will inform the

[2] Following the UK leaving the EU, the Conservation of Habitats and Species Regulations 2017 (Ref 17-16) have been modified by the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 (Ref 17-40).

Legislation / Policy / Guidance	Consideration within the PEI Report
register of European sites, to include SACs (classified under the Habitats Directive) and SPAs (classified under the Birds Directive). These sites form the Natura 2000 network. These regulations also apply to Ramsar sites (designated under the 1971 Ramsar Convention for their internationally important wetlands), candidate SACs (cSAC), potential Special Protection Areas (pSPA), and proposed and existing European offshore marine sites.	consultation process and will aid the Competent Authorities[3] in determining whether the Project has the potential for a likely significant effect (LSE) on the interest features and/or supporting habitat of a European/Ramsar site either alone or in-combination with other plans, projects and activities and, if so, will inform the requirement to undertake an Appropriate Assessment (AA) of the implications of the proposals in light of the site's conservation objectives.
National Policy Statement for Ports (NPSfP) (Ref 17-17)	
The NPSfP provides the policy framework for nationally significant infrastructure projects involving new port development (Ref 17-17). In order to meet the requirements of the Government's policies on sustainable development, the NPSfP requires that new port infrastructure should also, amongst other things, assess the impact on the water environment, including transitional and coastal waters. Section 5.6 of the NPSfP advises that applicants should assess the existing status and impacts of the Project on water quality, water resources and physical characteristics of the water environment as part of the ES. The ES should describe: • The existing quality of waters affected by the Project and the impacts of the Project on water quality, noting any relevant existing discharges, proposed new discharges and proposed changes to discharges; • Existing water resources affected by the Project and the impacts of the proposed project on water resources, noting any relevant existing abstraction rates, proposed new abstraction rates and proposed changes to abstraction rates; • Existing physical characteristics of the water environment (including quantity and dynamics of flow) affected by the Project and any impact of physical modifications to these characteristics; • Any impacts of the Project on water bodies or protected areas under the WFD and	A Marine water and sediment quality chapter has been prepared for the PEI Report. A preliminary consideration of impacts to marine water and sediment quality are presented in **Section 17.5**. The mitigation measures that are proposed to be implemented as standard good practice to manage water quality impacts are presented in **Section 17.4**. An outline Construction Environmental Management Plan (CEMP) will be prepared and provided with the DCO application which will set out the mitigation measures considered necessary to manage environmental effects. A preliminary consideration of surface water discharges is presented in **Chapter 18: Water Quality, Coastal Protection, Flood Risk and Drainage**. A preliminary consideration of groundwater and surface water abstractions is presented in **Chapter 21: Ground Conditions and Land Quality**. A preliminary consideration of the physical characteristics of the water environment is presented in **Chapter 16: Physical Processes**. A preliminary consideration of impacts on WFD water bodies is provided in **Section 17.5**. This will also be assessed in the WFD Compliance Assessment which will be submitted with the DCO application. A preliminary assessment of any cumulative water and sediment quality effects that could arise from the Project alone, as well as through other plans, projects and ongoing activities within the study

[3] The MMO and North East Lincolnshire are Competent Authorities for the HRA. However it is noted that ABP is also a Competent Authority under the UK Habitats Regulations.

Legislation / Policy / Guidance	Consideration within the PEI Report
source protection zones (SPZs) around potable groundwater abstractions; and • Any cumulative effects.	area is considered in **Chapter 25: Cumulative Effects and In-Combination Assessment**.
UK Marine Policy Statement (MPS) (Ref 17-18)	
The MPS (Ref 17-18) is the framework for preparing marine plans and taking decisions affecting the marine environment. The MPS also sets out the general environmental, social, and economic considerations that need to be taken into account in marine planning and provides guidance on the pressures and impacts that decision makers need to consider when planning for and consenting development in the UK marine areas. Section 2.6.4 of the MPS is relevant to the Marine Water and Sediment Quality assessment. In particular, paragraph 2.6.4.3 states, amongst other things, that - "*The marine plan authority should satisfy itself where relevant that any development will not cause a deterioration in status of any water to which the WFD applies... Decision makers should also take into account impacts on the quality of designated bathing waters and shellfish waters from any proposed development.*"	A marine water and sediment quality chapter has been prepared for the PEI Report. A preliminary consideration of impacts to marine water and sediment quality is presented in **Section 17.5**. A WFD Compliance Assessment will be undertaken to determine whether the Project complies with the objectives of the WFD.
UK Marine Strategy (Ref 17-19)	
The aim of the UK Marine Strategy is to protect the UK's marine environment. The Strategy sets out a comprehensive framework for assessing, monitoring, and taking action to achieve the UK's shared vision for clean, healthy, safe, productive, and biologically diverse seas (Ref 17-20). It aims to achieve good environmental status of marine waters by 2020 (followed by a six-year review) and then to protect the resource base upon which marine-related economic and social activities depend. The Strategy constitutes a vital environmental component of future maritime policy, designed to achieve the full economic potential of oceans and seas in harmony with the marine environment. The UK Marine Strategy applies to the landward boundary of coastal waters as defined under the WFD (i.e., from mean high water springs (MHWS)) to the outer limit of the UK Exclusive Economic Zone (EEZ), as well as the area of UK continental shelf beyond the EEZ. Government reporting	The Project is not located within a UK Marine Strategy region (it lies within the Lower Humber WFD transitional (estuarine) water body). The anticipated pressures exerted on the marine environment by the Project are considered to be of small magnitude in the context of UK Marine Regions such that they are unlikely to be a significant issue. The Strategy is, therefore, not considered further in this PEI Report with regards to the Marine Water and Sediment Quality assessment.

Legislation / Policy / Guidance	Consideration within the PEI Report
against the Strategy is a cyclical process, and the most recent assessments and Marine Strategy documents were updated in 2019.	
East Inshore and East Offshore Marine Plans (Ref 17-21)	
The first Marine Plans include the East Inshore and East Offshore Marine Plans, which are collectively referred to as 'the East Marine Plans'. These were formally adopted on 2 April 2014 (Defra, 2014). There is one policy within the East Marine Plans specifically related to water and sediment quality: Policy ECO2 - "*The risk of release of hazardous substances as a secondary effect due to any increased collision risk should be taken account of in proposals that require an authorisation":* There are also several references to the importance of water quality in supporting a healthy ecosystem and the potential for pollutants to affect the environment as well as people (from marine as well as riverine and terrestrial sources).	The potential risk of vessel collisions as a result of the Project are considered in **Chapter 12: Marine Transport and Navigation**. The risks, consequences and mitigation measures relating to potential accidental release of hazardous substances is presented in **Chapter 22: Major Accidents and Disasters**. The impacts of the Project on Marine Water and Sediment Quality are assessed at this preliminary stage in **Section 17.5** of this chapter. **Chapter 9: Nature Conservation (Marine Ecology)** also provides a preliminary assessment of the impacts to marine habitats and species due to changes in water and sediment quality.
North East Lincolnshire Local Plan 2013 to 2032 (Ref 17-22)	
The North East Lincolnshire Local Plan was adopted in 2018 and covers the period 2013 to 2032. Within its Spatial Portrait, the Local Plan highlights the importance of the 'Estuary Zone' of the local authority area, which includes the 'nationally important port' of Immingham. When considering the detail of how the economy of the area will be developed, the Plan specifically identifies at the outset that there are good expectations of growth within the ports and logistics sector. On the policies map which accompanies the Local Plan, the Site is shown as being located within an area identified as 'Employment – Operational Port'. In addition, Policy 34 of the plan makes clear that: *"Water management* *1. Development proposals that have the potential to impact on surface and ground water should consider the objectives and programme of measures set out in the Humber River Basin Management Plan."* The Humber River Basin Management Plan provides a framework for protecting and	The Project is located largely within the administrative area of North East Lincolnshire, although elements of the marine infrastructure fall beyond the local Council's administrative boundary. A preliminary consideration of impacts on WFD water bodies is provided in **Section 17.5**. This will also be assessed in the WFD Compliance Assessment which will be submitted with the DCO application and will consider WFD objectives as outlined in the Humber River Basin Management Plan.

Legislation / Policy / Guidance	Consideration within the PEI Report
enhancing the benefits provided by the water environment within the Humber River Basin District and informs decisions on land-use planning. The Humber River Basin District covers an area of 26,100 km² and extends from the West Midlands in the south, northwards to North Yorkshire and from Staffordshire in the west to part of Lincolnshire and the Humber Estuary in the east	
Clearing the Waters for All (Ref 17-23)	
In 2016, the Environment Agency published guidance, referred to as "Clearing the Waters for All", regarding how to assess the impact of activities in WFD transitional and coastal water bodies (Ref 17-23). The guidance sets out the following three discrete stages for WFD compliance assessments to follow: Screening: excludes any activities that do not need to go through the scoping or impact assessment stages; Scoping: identifies the receptors and quality elements that are potentially at risk from an activity and need further detailed assessment; and Assessment: considers the potential impacts of an activity, identifies ways to avoid/minimise impacts, and indicates if it may cause deterioration or jeopardise the water body achieving good status.	The WFD Compliance Assessment for the Project will follow the format specified in this guidance.
PINS Advice Note Eighteen: The Water Framework Directive (Ref 17-24)	
Advice Note Eighteen (Ref 17-24) explains the information that the Inspectorate considers an applicant must provide with their Nationally Significant Infrastructure Project (NSIP) application in order to clearly demonstrate that the WFD and the Water Environment (WFD) (England and Wales) Regulations 2017 have been appropriately considered. The Advice Note also refers to Environment Agency guidance (as described above) in terms of the WFD process and the information required. Furthermore, the guidance describes the relevant bodies to be consulted in the pre-application process, and the presentation of information.	The WFD Compliance Assessment for the Project will contains the information specified in this guidance as appropriate.

Stakeholder Engagement

17.2.7 A range of stakeholders have been engaged as part of the scoping process to obtain their views on the Project and the scope of the Marine Water and

Sediment Quality assessment, the results of which are presented within the Scoping Opinion (**Appendix 1.B** of the PEI Report, Volume IV) and in **Table 17.1**.

Limitations and Assumptions

17.2.8 The information presented in this preliminary assessment reflects that obtained and evaluated at the time of reporting and is based on an emerging design for the Project and the maximum likely extent of land required for its construction and operation.

17.2.9 This preliminary assessment has been undertaken based on the following assumptions:

a. Dredging is undertaken by a combination of backhoe dredger (e.g. Mannu Pekka or similar) and potentially trailing suction hopper dredger (TSHD) (e.g. Cork Sand and Long Sand or similar). The backhoe dredging will involve the excavated material being loaded directly to attendant barges for disposal. Dredge operations will be continuous and operate 24 hours a days and seven days a week;

b. There will be subsequent transit of material and disposal at existing licensed disposal sites, Clay Huts disposal site (HU060) or the Holme Channel (HU056) disposal site;

c. That barge access to the disposal sites can be achieved throughout the full tidal cycle (this is considered to be a conservative, worst-case assumption for dredging and disposal operations and the subsequent plume development);

d. The dredge volumes assumed are a total of approximately 100,000 m^3. This value (including a split across material type) will be confirmed by sediment sampling carried out in line with OSPAR[4] requirements; and

e. Assessment of sediment release rates are based on modelling outputs presented in **Chapter 16: Physical Processes**.

17.2.10 The assessment within this PEI Report has been undertaken considering the anticipated worst-case scenario in respect of water and sediment quality receptors at the dredge, piling and disposal locations.

17.2.11 The findings of this preliminary assessment may be subject to change as the design of the Project is developed and refined further through the assessment and consultation processes, and as further research and investigative surveys are completed to fully understand its potential effects. The finalised assessment will be presented in the ES.

Study Area

17.2.12 The study area for this assessment is the area over which potential direct and indirect effects of the Project are predicted to occur during the construction and

[4] OSPAR' relates to the Convention for the Protection of the Marine Environment of the North-East Atlantic.

operational periods. The direct effects on water and sediment quality are those that may arise due to accidental releases during construction or disturbance of sediments into the water column and increases in turbidity. Indirect effects are those that may arise due to sediment that is disturbed and released into the water column during the marine works resulting in changes in water quality through changes in the levels of dissolved oxygen or the release of sediment-bound contaminants.

17.2.13 The study area for the water and sediment quality topic is considered to be the Site and the adjacent Immingham coastline, the existing jetties across the near-field and the central part of the Humber Estuary, generally between Sunk Chanel and Halton Middle. Within the far-field region, the study area includes the wider Humber Estuary from the mouth up to estuary of the Hull Bend.

17.3 Baseline Conditions

Current Baseline

Water quality

Water Framework Directive

17.3.1 Water quality standards and objectives are implemented through a range of legislation including the Water Framework Regulations, the Bathing Water Regulations, and the UK Marine Strategy (see **Table 17.1**).

17.3.2 The Environment Agency published River Basin Management Plans (RBMPs), which set out measures through which compliance with WFD objectives will be achieved. The Humber River Basin District RBMP identifies the Humber Lower water body (ID: GB530402609201) within and surrounding the Project (including Humber Estuary disposal sites) (Ref 17-25) (**Figure 17.1** (PEI Report, Volume III)). It is recorded as a heavily modified water body (HMWB) due to coastal protection use, flood protection use, and navigation use. This means 'ecological potential' is applied rather than 'ecological status'. The current (2019) overall status of this waterbody is 'moderate', with an ecological potential of 'moderate', and a chemical status of 'fail'. The reason for the 'fail' chemical status is based on priority substances cypermethrin and dichlorvos, and priority hazardous substances polybrominated diphenyl ethers (PBDE), perfluorooctane sulphonate (PFOS), benzo(b)fluoranthene, benzo(g-h-i)perylene, mercury and its compounds, and tributyltin compounds. The source of contaminants is not known but may relate to historical industrial and maritime activities on the Humber. Surface water bodies overlapping the landside works are detailed in **Chapter 18: Water Quality** and **Chapter 21: Ground Conditions and Land Quality**.

Bathing Waters

17.3.3 Cleethorpes designated bathing waters is located approximately 11.5 km south east of the Project, and Humberston Fitties is located approximately 15 km south east (**Figure 17.2** (PEI Report, Volume III)). Cleethorpes was assessed as having 'good' bathing water quality in 2021 (Ref 17-26), declining from an

'excellent' classification in 2019. Humberston Fitties was assessed as having 'good' bathing water quality in 2021 (Ref 17-26), remaining consistent with a 'good' classification in 2019.

Shellfish Water Protected Areas

17.3.4 There are no Shellfish Water Protected Areas in the vicinity of the Project (Ref 17-27). The nearest is the West Wash Shellfish Water Protected Area, located over 65 km south.

Nitrate Vulnerable Zones

17.3.5 The landside extent of the Project is located on land included in the North Beck Drain NVZ, covering Immingham as well as South Killingholme and Healing, as designated under the Nitrates Pollution Prevention Regulations (Ref 17-28) (**Figure 17.2** (PEI Report, Volume III)).

Sensitive Areas

17.3.6 There are no sensitive areas designated under the Urban Waste Water Treatment Regulations in the vicinity of the Site (Ref 17-29)

17.3.7 The main watercourses in the vicinity of the Site (within 5 km) are South Killingholme Haven which drains to the north-west corner of the Port of Immingham (but is defined as part of the Humber Estuary water body), North Killingholme main drain, Habrough Marsh drain and the Humber Estuary itself.

Water quality monitoring

17.3.8 The Environment Agency's 'Water Quality Archive' (Ref 17-30) provides data on water quality measurements taken at sampling points around England. These can be from coastal or estuarine waters, rivers, lakes, ponds, canals or groundwaters. They are taken for a number of purposes including compliance assessment against discharge permits, investigation of pollution incidents or environmental monitoring.

17.3.9 The nearest saline water sampling point to the Project (with adequate temporal coverage and a reasonable amount of determinands measured) is Clean Site - Ti02 Monitoring Point, 1985 (sampling ID: AN-CLNMON1). This is shown on **Figure 17.3** (PEI Report, Volume III). Contaminant concentrations measured in the water at this location are shown in **Table 17.3**. These are compared against environmental quality standards (EQS) as described under the WFD (Standards and Classification) Directions (England and Wales) 2015, specifically annual average (AA) concentrations and/or maximum allowable concentrations (MAC) to provide an indication of the water quality measured at the sampling point. As indicated below in **Table 17.3**, metal concentrations reported between 2015 and 2022 were typically below respective EQSs. There were some exceedances related to the AA EQS for tributyl tin (TBT) and the Humber Estuary transitional water body was failing chemical status due to excessive concentrations of TBT in 2019. Benzo(a)pyrene and benzo(g,h,i)perylene were failing their respective MAC EQSs between 2015 and 2021. Benzo(b)fluoranthene was also failing its MAC EQSs in 2015 to 2021 (with the exception 2019), and benzo(k)fluoranthene

were also failing its MAC EQSs in 2016 to 2018. The Humber Lower transitional water body was failing chemical status due to benzo(b)fluoranthene and benzo(g-h-i)perylene in 2019.

Table 17.3 Concentration range, mean and number of water samples collected between 2015 and 2022 by the Environment Agency for contaminants measured near the Project

Parameter	Unit	EQS	2015	2016	2017	2018	2019	2020	2021	2022
Arsenic	µg/l	25 (AA)	1.9 – 2.39 $\bar{x}$ = 2.10 (n = 3)	2.32 (n = 1)	-	1.94 – 2.59 $\bar{x}$ = 2.276667 (n = 3)	1.95 (n = 1)	-	-	-
Cadmium	µg/l	0.2 (AA)	0.044 – 0.101 $\bar{x}$ = 0.077 (n = 9)	0.041 – 0.066 $\bar{x}$ = 0.04875 (n = 4)	0.062 – 0.063 $\bar{x}$ = 0.063 (n = 2)	0.046 – 0.14 $\bar{x}$ = 0.089 (n = 9)	0.0408 – 0.0706 $\bar{x}$ = 0.055433 (n = 3)	-	0.058 – 0.12 $\bar{x}$ = 0.084 (n = 8)	0.051 – 0.079 $\bar{x}$ = 0.066 (n = 8)
Chromium (VI)	µg/l	0.6 (AA); 32 (MAC)	<0.3 (n = 1)	<0.3 (n = 1)	-	<0.3 (n = 3)	<0.3 (n = 1)	-	-	-
Copper	µg/l	3.76 (AA)	1.7 – 2.62 $\bar{x}$ = 2.01 (n	2.35 – 2.96 $\bar{x}$ = 2.85 (n = 2)	2.35 – 2.96 $\bar{x}$ = 2.66 (n = 2)	1.99 – 2.52 $\bar{x}$ = 2.2 (n = 3)	1.59 (n = 1)	-	1.7 – 3.2 $\bar{x}$ = 2.19 (n = 8)	1.7 – 2.3 $\bar{x}$ = 1.96 (n = 8)
Lead	µg/l	1.3 (AA); 14 (MAC)	<0.04 – 0.074 $\bar{x}$ = 0.056 (n = 9)	0.04 – 0.098 $\bar{x}$ = 0.07 (n = 3)	-	<0.04 – 0.088 $\bar{x}$ = 0.053189 (n = 9)	0.0656 – 0.108 $\bar{x}$ = 0.0798 (n = 3)	-	0.046 – 0.12 $\bar{x}$ = 0.069 (n = 8)	0.04 – 0.084 $\bar{x}$ = 0.065 (n = 8)

Parameter	Unit	EQS	2015	2016	2017	2018	2019	2020	2021	2022
Mercury	µg/l	0.07 (MAC)	<0.01 (n = 9)	<0.01 (n = 3)	-	<0.01 (n = 9)	<0.01 (n = 3)	-	-	-
Nickel	µg/l	8.6 (AA); 34 (MAC)	1.25 – 2.29 $\bar{x}$ = 1.69 (n = 9)	1.14 – 2.11 $\bar{x}$ = 1.61 (n = 4)	1.79 – 2.11 $\bar{x}$ = 1.95 (n = 2.11)	1.4 – 2.00 $\bar{x}$ = 1.71 (n = 8)	1.35 – 1.8 $\bar{x}$ = 1.54 (n = 3)	-	1.4 – 7.8 $\bar{x}$ = 2.43 (n = 8)	1.3 – 1.6 $\bar{x}$ = 1.41 (n = 8)
Zinc	µg/l	7.9 (AA)	2.2 – 4.7 $\bar{x}$ = 3.79 (n = 3)	3.47 – 4.86 $\bar{x}$ = 4.165 (n = 2)	4.22 – 4.86 $\bar{x}$ = 4.54 (n = 2)	2.21 – 4.32 $\bar{x}$ = 3.15 (n = 3)	4.05 (n = 1)	-	1.9 – 5.7 $\bar{x}$ = 3.29 (n = 8)	1.9 – 3.4 $\bar{x}$ = 2.93 (n = 8)
Tributyltin (TBT)	µg/l	0.0002 (AA); 0.0015 (MAC)	0.00021 – 0.00096 $\bar{x}$ = 0.00044 (n = 9)	<0.0002 – 0.0008 $\bar{x}$ = 0.00041 (n = 12)	0.00029 – 0.00092 $\bar{x}$ = 0.00052 (n = 3)	<0.0002 – 0.00081 $\bar{x}$ = 0.00030 (n = 10)	0.00025 – 0.00032 $\bar{x}$ = 0.00029 (n = 2)	-	0.0002 – 0.00023 $\bar{x}$ = 0.0002 (n = 8)	0.0002 – 0.00036 $\bar{x}$ = 0.00023 (n = 8)
Benzo(a)pyrene	µg/l	0.00017 (AA); 0.0027 (MAC)	>0.002 - <0.01 $\bar{x}$ = 0.0087 (n = 12)	>0.002 – 0.22 $\bar{x}$ = 0.042 (n = 12)	0.00055 – >0.05 $\bar{x}$ = 0.026 (n = 0.026)	<0.0004 – 0.0874 $\bar{x}$ = 0.033 (n = 8)	0.015 – 4.05 $\bar{x}$ = 1.02 (n = 4)	-	0.0004 – 0.033 $\bar{x}$ = 0.013 (n = 8)	0.0005 – 0.026 $\bar{x}$ = 0.007 (n = 8)
Benzo(g,h,i)perylene	µg/l	0.00082 (MAC)	>0.002 – <0.01 $\bar{x}$ = 0.0087 (n = 12)	>0.002 – 0.24 $\bar{x}$ = 0.042 (n = 12)	0.00063 – >0.05 $\bar{x}$ -= 0.025 (n = 3)	0.00057 – 0.091 $\bar{x}$ = 0.026 (n = 8)	0.015 – 0.018 $\bar{x}$ = 0.017 (n = 2)	-	0.0004 – 0.03 $\bar{x}$ = 0.011 (n = 8)	0.0005 – 0.024 $\bar{x}$ = 0.006 (n = 8)

Parameter	Unit	EQS	2015	2016	2017	2018	2019	2020	2021	2022
Benzo(b)fluoranthene	µg/l	0.017 (MAC)	>0.002 – 0.20 $\bar{x}$ = 0.038 (n = 12)	>0.002 – 0.20 $\bar{x}$ = 0.038 (n = 12)	0.00056 - >0.05 $\bar{x}$ = 0.024 (n = 3)	0.00045 – 0.074 $\bar{x}$ = 0.028 (n = 8)	0.013 – 0.014 $\bar{x}$ = 0.013 (n = 2)	-	0.0005 – 0.03 $\bar{x}$ = 0.011 (n = 8)	0.0005 – 0.021 $\bar{x}$ = 0.006 (n = 8)
Benzo(k)fluoranthene	µg/l	0.0063 (AA); 0.017 (MAC)	>0.002 – <0.01 $\bar{x}$ = 0.0087 (n = 12)	>0.002 – 0.11 $\bar{x}$ = 0.024 (n = 12)	<0.0004 – >0.05 $\bar{x}$ = 0.021 (n = 3)	<0.0004 – 0.038 $\bar{x}$ = 0.015 (n = 8)	0.0070 – 0.0075 $\bar{x}$ = 0.0072 (n = 2)	-	0.0004 – 0.016 $\bar{x}$ = 0.006 (n = 8)	0.0004 – 0.012 $\bar{x}$ = 0.004 (n = 8)
Fluoranthene	µg/l	0.12 (MAC)	>0.002 - <0.01 $\bar{x}$ = 0.0087 (n = 12)	>0.002 – 0.14 $\bar{x}$ = 0.036 (n = 12)	0.00103 - >0.05 $\bar{x}$ = 0.027 (n = 3)	<0.0004 – 0.095 $\bar{x}$ = 0.031 (n = 8)	0.016 – 0.019 $\bar{x}$ = 0.018 (n = 3)	-	0.0015 – 0.026 $\bar{x}$ = 0.012 (n = 8)	0.0012 – 0.023 $\bar{x}$ = 0.009 (n = 8)
Hexachlorobenzene	µg/l	0.05 (MAC)	<0.001 (n = 12)	<0.0001 – 0.001 $\bar{x}$ = 0.00049 (n = 7)	<0.0001 – 0.005 $\bar{x}$ = 0.0020 (n = 3)	-	-	-	-	-
Hexachlorobutadiene	µg/l	0.6 (MAC)	<0.003 (n = 12)	<0.0001 – <0.001 $\bar{x}$ = 0.00049 (n = 7)	<0.0001 – <0.005 $\bar{x}$ = 0.0020 (n = 3)	-	-	-	-	-

Parameter	Unit	EQS	2015	2016	2017	2018	2019	2020	2021	2022
BDE 28	µg/l	-	<0.0006 (n = 7)	<0.0006 (n = 7)	<0.0006 (n = 3)	-	-	-	-	-
BDE 47	µg/l	-	<0.0006 - 0.0001 $\bar{x}$ = 0.000065 (n = 7)	<0.0006 (n = 7)	<0.0006 (n = 3)	-	-	-	-	-
BDE 99	µg/l	-	<0.0006 – 0.00017 $\bar{x}$ = 0.000076 (n = 7)	<0.0006 (n = 7)	<0.0006 (n = 3)	-	-	-	-	-
BDE 100	µg/l	-	<0.0006 – 0.00017 $\bar{x}$ = 0.000076 (n = 7)	<0.0006 (n = 7)	<0.0006 (n = 3)	-	-	-	-	-
BDE 153	µg/l	-	<0.0006 – 0.0007 $\bar{x}$ = 0.000061 (n = 7)	<0.0006 (n = 7)	<0.0006 (n = 3)	-	-	-	-	-
BDE 154	µg/l	-	<0.0006 (n = 7)	<0.0006 (n = 7)	<0.0006 (n = 3)	-	-	-	-	-

Parameter	Unit	EQS	2015	2016	2017	2018	2019	2020	2021	2022
$\bar{x}$ = mean n = number of water samples Data from sampling point 'Clean Site - Ti02 Monitoring Point, 1985, ID: AN-CLNMON1)' in the Humber Estuary, obtained from the Environment Agency's 'Water Quality Archive' (Ref 17-25)										

Sediment quality

17.3.10 The UK has not adopted formal quantitative EQS for sediments. In the absence of any quantified UK standards, therefore, common practice for characterising baseline sediment quality conditions is to compare against the Cefas Guideline Action Levels for the disposal of dredged material (Ref 17-31).

17.3.11 Cefas Guideline Action Levels are used as part of a 'weight of evidence' approach to assessing material suitability for disposal at sea. Cefas guidance indicates that, in general, contaminant levels below Action Level 1 (AL1) are of no concern. Material with contaminant levels above Action Level 2 (AL2), however, is generally considered unsuitable for disposal at sea whilst dredged material with contaminant levels between AL1 and AL2 requires further consideration before a decision can be made as to disposal. Consequently, the Action Levels should not be viewed as pass/fail thresholds, and it is also recognised that these guidelines are not statutory requirements. Cefas Action Levels are not available for every determinand and where appropriate comparisons may be made to other alternative guidance levels, e.g. Canadian Sediment Quality Guidelines or thresholds from other European/OSPAR[5] nations, to provide context. It is also noted that Action Levels in the UK are currently being reviewed but have yet to be formally adopted (Ref 17-32). The latest adopted guidelines will be used to inform the assessment of effects in the ES.

17.3.12 Borehole logs were collected in 2001 to inform the dredge and disposal of material for the development of Immingham Outer Harbour (IOH) (Ref 17-33). These were taken to the west of the Project between Immingham Bulk Terminal and Western Jetty. Four borehole samples were analysed for trace metals, organotins, polycyclic aromatic hydrocarbons (PAHs), and polychlorinated biphenyls (PCBs) (BH206, BH209, BH210 and BH212). This information is relevant given that contamination of sediments at depth is very unlikely to have changed over this time as they remain in situ and are not remobilised in contrast to surface sediments. Information has been used to provide context to the preliminary assessment.

17.3.13 Considering all contaminants and samples together, the sediments within the top 4 m of the alluvium in the area of the IOH dredge were considered to have slight to moderate levels of contamination. The levels were approximately in line with that experienced throughout the estuary during the time they were sampled. Anthropogenic pollution of heavy metals and organochlorides/ organotins have only been in existence for the last 200 years and from port activity at Immingham since the early 1900s. Pollution inputs to the estuary were likely to have been highest in the 1950s through to the 1970s, with a general trend towards cleaner inputs and thereby cleaner sediments since the early 1990s (Ref 17-33).

17.3.14 Recent sediment sampling has also been undertaken in the vicinity of the proposed marine works in October 2021. Sediment samples were collected from

[5] Countries signed up to the OSPAR Convention for the Protection of the Marine Environment of the North-East Atlantic.

ten stations, including subsurface samples, and tested for trace metals, organotins, PAHs, PCBs, polybrominated diphenyl ethers (PBDEs) and organochloride pesticides (OCPs). The results showed that contaminant concentrations were generally low, with most values below the respective AL1 or marginally exceeding AL1. There were no instances where the concentration exceeded the respective AL2 (or a sample concentration was close to exceeding this threshold). In general, concentrations were also typically higher in surface samples compared to those obtained at depth, supporting the conclusions drawn from the borehole logs collected for the IOH development summarised above.

17.3.15 Site-specific marine sediment samples will be collected in early 2023 within the vicinity of the Project to inform the assessment. This will be conducted in line with a sediment sample plan that will be requested from the MMO. Sediments will be tested for PSA and a suite of chemical contaminants as specified in the sediment sample plan.

Future baseline

17.3.16 In the absence of the Project, water and sediment quality will continue to be influenced by natural and human-induced variability, ongoing cyclic patterns, and trends (e.g. changes in prevalence of chemicals in marine sediments in response to legislative controls, degradation of some contaminants, ongoing maintenance dredging and disposal, and existing discharge licences in the area). The future baseline will also be influenced by climate change, such as changes in sea pH and temperature, which in turn can have an impact on water quality (e.g. dissolved oxygen concentrations).

17.4 Design, Mitigation and Enhancement Measures

Embedded Mitigation Measures

17.4.1 The Project has been designed, as far as possible, to avoid and minimise impacts and effects to marine water and sediment quality through the process of design development, and by embedding mitigation measures into the design, such as minimising the dredge requirements as far as possible.

Standard Mitigation Measures

17.4.2 Standard mitigation measures will be undertaken to manage commonly occurring environmental effects. Although these are not likely to alter the assessment conclusions, they are considered to be standard good practice. In terms of water and sediment quality, the potential risk from accidents and spillages/leaks during construction will be avoided or minimised by ensuring that the construction methods, proposed design, and the contractual arrangements follow environmental management best practice. In particular, the following guidance will be adopted:

a. ‘Pollution prevention for businesses’ Guidance in England (Ref 17-34);

b. Pollution Prevention Guidance (PPG), or Guidance for Pollution Prevention (GPP) in the UK (Ref 17-35);

i Understanding Your Environmental Responsibilities – Good Environmental Practices (PPG1);

ii Works and maintenance in or near water (GPP5);

iii Working at construction and demolition sites (PPG6); and

iv Safe storage and disposal of used oils (GPP8).

c. The Oil Care Code; and

d. CIRIA's Environmental Good Practice on Site (Ref 17-36).

17.4.3 In adhering to this guidance, a number of good practice measures will be followed. All wastes generated on site will be removed in a timely manner and any materials and containers giving rise to possible spills or contamination of the surrounding environment will be taken from site to be processed at a licensed facility. Liquid oils/chemicals required for use during construction will be stored in suitable containers/bunded storage areas. In the event of a pollution incident measures to report, manage, and minimise any impacts will be pursued, with construction spill response procedures to contain any accidental spills. In addition, an oil spill contingency plan is currently in place for the Port of Immingham to minimise any impacts in the event of a spill entering the water and these measures would also be applicable to the Project.

17.4.4 Plant will also be maintained regularly, and spill kits will be available for use in the event of a spill onsite. Refuelling will be in designated areas to limit the potential for spillages. Fuel will be stored in the site compound overnight, limiting the potential for fuel theft and vandalism which could cause pollution. Should any pollution incidents occur, they will be reported immediately to the relevant authorities. The workforce will be trained in preventing and dealing with pollution incidents.

17.4.5 The Outline CEMP that will be provided with the DCO application will set out the mitigation measures to manage environmental effects during construction as described above.

17.5 Potential Impacts and Effects

17.5.1 The preliminary assessment has identified potential likely effects on marine water and sediment quality receptors as a result of the construction and subsequent operation of the Project.

17.5.2 The Physical Processes assessment (**Chapter 16: Physical Processes**) has informed the outcomes of the Marine Water and Sediment Quality assessment.

Construction

17.5.3 This section contains a preliminary assessment of the potential impacts to water and sediment quality receptors as a result of the construction phase of the Project. The following impact pathways have been identified as having potential for significant effects and have been assessed:

a. Changes to dissolved oxygen concentrations as a result of increased Suspended Sediment Concentrations (SSC) during piling, capital dredging and disposal activities;

b. Changes to chemical water quality as a result of potential sediment-bound contaminants being released during piling, capital dredging and disposal activities;

c. Redistribution of sediment-bound contaminants during piling, capital dredging and disposal activities; and

d. Changes to marine water quality from accidental spillages or leaks during construction.

17.5.4 The construction of the Project may be completed in a single stage, or it may be sequenced such that construction of Berth 2 takes place at the same time as operation of Berth 1 (see **Chapter 2: The Project**). However, in any case, all capital dredging (and associated disposal activity) will be undertaken together at one time, before operation of Berth 1 commences. In the case of a sequenced construction, the duration of piling will be extended but it will not increase the magnitude of change and therefore would not change the predicted overall effect. Furthermore, piling and construction activities associated with Berth 2 will not be undertaken at the same time as maintenance dredging and disposal during operation (see 'Operational phase' section) of Berth 1 (i.e., piling and construction will pause whilst any maintenance dredging and disposal activities are being undertaken). Therefore, the below impact pathway assessments are considered the worst case and will not be altered by a sequenced construction period.

Changes to dissolved oxygen concentrations as a result of increased SSC

Capital dredging

17.5.5 The increase in chemical and biological oxygen demand associated with elevated SSC in the water column during capital dredging may have the potential to reduce dissolved oxygen concentrations. PSA will be undertaken as part of the site-specific marine sediment sampling and included in the respective ES chapter. At this preliminary stage, the material within the proposed dredge area is considered likely to range from coarse sediments (sands and gravel) which are unlikely to influence dissolved oxygen concentrations, to clays including alluvium deposits containing organic material for which organic content can result in reduced dissolved oxygen concentrations. For the use of backhoe, it should be noted that the majority of material disturbed during capital dredging works will be lifted from the bed to the hopper/barge, with only a small proportion raised into suspension and remaining in the water column (i.e., through abrasion pressure from the bucket). The use of a TSHD will transfer the material quickly and directly to a hopper via suction pipe, with only a small proportion raised into suspension by the action of the draghead on the seabed.

17.5.6 The proposed dredge area is situated within the Humber Lower transitional water body. The physico-chemical quality element 'Dissolved oxygen' is currently, based on the 2019 interim classification, at high status for this water body,

despite the area being subject to regular maintenance dredging activities. It is, therefore, considered unlikely that dissolved oxygen concentrations will fall below the standards set under the WFD as a result of the proposed capital dredging.

17.5.7 Numerical modelling has been carried out to inform the assessment of the impacts of capital dredging on SSC and this indicates that increases in SSC will be short-term and localised to the dredging activity (see **Chapter 16: Physical Processes**). It is anticipated that any reduction in dissolved oxygen concentration will be short-lived and replenished over the subsequent tidal cycle. Based on the available information provided above, the potential impact at this preliminary stage has been assessed as **not significant**.

Piling

17.5.8 The increase in chemical and biological oxygen demand associated with elevated SSC in the water column during piling activity may, as with dredging, have the potential to reduce dissolved oxygen concentrations. However, numerical modelling has shown that the effects are highly localised (see **Chapter 16: Physical Processes**). The piling activity is proposed to occur within the Humber Lower transitional water body, for which the physico-chemical quality element 'Dissolved oxygen' is currently, based on the 2019 interim classification, at high status. The seabed in the area is already subject to regular disturbance (e.g., maintenance dredging) and, therefore, it is considered unlikely that dissolved oxygen concentrations will fall below the standards set under the WFD as a result of piling.

17.5.9 Based on the available information provided above, the potential impact at this preliminary stage has been assessed as **not significant**.

Disposal activities

17.5.10 The disposal of dredged material at sea associated with the Project will be fulfilled at licensed disposal sites HU056 (for any inerodible boulder/glacial clay) and HU060 (for any sand/silt (alluvium) material) (see **Chapter 2: The Project**). Numerical modelling has been carried out to inform the assessment of the impacts of disposal on SSC (see **Chapter 16: Physical Processes**).

17.5.11 During the placement of dredged material at the licensed disposal sites, the potential for reduction in dissolved oxygen concentrations in the water column is considered to be low based on modelling of the sediment plume dispersal which indicates that SSC levels are likely to become immeasurable above baseline within 1 km of the disposal site. The measurable plume from each disposal operation is only likely to persist for a single tidal cycle (less than 6 hours from disposal). After this time, the dispersion under the peak flood or ebb tidal flows means concentrations will have reverted to background levels (see **Chapter 16: Physical Processes**). Any changes would be localised and short-lived given the dynamic nature of the site, which would rapidly be re-oxygenated. Both HU056 and HU060 licensed disposal sites are located within the Humber Lower transitional water body for which the physico-chemical quality element 'Dissolved oxygen' is currently, based on the 2019 interim classification, at high status,

despite routinely receiving maintenance dredging material from the ports within the Humber Estuary.

17.5.12 Based on the available information provided above, the potential impact at this preliminary stage has been assessed as **not significant**.

Changes to chemical water quality as a result of potential sediment-bound contaminants

Capital dredging

17.5.13 The proposed dredge area is situated within the Humber Lower transitional water body. This water body is currently, based on a 2019 interim classification, failing chemical status due to cypermethrin and dichlorvos, PBDEs, perfluorooctanesulfonic acid (PFOS), benzo(b)fluoranthene, benzo(g-h-i)perylene, mercury and its compounds and tributyl tin (TBT) compounds.

17.5.14 As sediment is disturbed and re-distributed into the water column, any sediment-bound contaminants may be partitioned from the solid phase (i.e. bound to sediments or suspended matter), to the dissolved or aqueous phase (i.e. dissolved in pore water or overlying water) (Ref 17-37). To determine the maximum dissolved fraction of contaminants released into the water column, it is necessary to consider the relative potential for each contaminant to change from one phase to another (i.e. contaminant adsorbed to sediment surfaces to dissolved in the water), referred to as the partition coefficient. Partition coefficients describe the ratio between the freely dissolved concentration in water and another environmental phase (e.g. sediment-bound) at equilibrium. It should be noted that desorption rates of contaminants from suspended sediments into the water column are highly regulated by hydrodynamics, biogeochemical processes, and environmental conditions (redox, pH, salinity, and temperature) (Ref 17-38). Due to the variability in environmental conditions, a wide range of partition coefficients are reported in the literature.

17.5.15 There is potential for sediment-bound contaminants to be re-mobilised in the water column following an increase in SSC during the proposed capital dredging. Sediment disturbance will be caused at the bed by abrasion pressure from the dredging equipment (i.e. bucket or draghead). As noted in **Chapter 16: Physical Processes**, maximum SSCs are associated with the disposal activities (with relatively small increases in SSC arising from the dredge itself). Peak excess SSC levels resulting from the disposal activities are predicted, at this preliminary stage, to be around 600 to 800 mg/l at HU060 licensed disposal site (this site is likely to receive the vast majority of the more unconsolidated dredged material, whereas HU056 will be used for any inerodible boulder/glacial clay, see **Chapter 2: The Project**). Increased SSCs arising from the dredge operations will be of lower magnitude and persist for a shorter distance (and time) than that from the disposal. Therefore, while a different activity, the estimated maximum incremental SSC for disposal activities is considered here on a precautionary basis.

17.5.16 A detailed consideration of the potential uplift in contaminant concentrations in the water column following disturbance of contaminated sediments in estuarine

and marine waters cannot be undertaken at this preliminary stage as site-specific sediment sampling and analysis has not yet been completed. However, once the data on sediment contamination has been obtained, a Microsoft Excel Spreadsheet tool developed by APEM Ltd, referred to as SeDiChem, will be used for the assessment in the ES.

17.5.17 However, based on existing evidence on the level of contamination in sediments within the vicinity of the Project (summarised in **Section 17.3**), and the predicted maximum incremental SSC at this preliminary stage (600 to 800 mg/l), the uplift in contaminant concentrations is anticipated to be minimal, and unlikely to present a significant issue at the water body level.

17.5.18 Furthermore, the proposed works will not directly introduce contaminants to the marine environment and good practice measures (Ref 17-34) will be used to prevent/reduce the potential for accidental spillages throughout the dredging process.

17.5.19 Based on the available information provided above, the potential impact at this preliminary stage has been assessed as **not significant**.

Piling

17.5.20 As discussed for capital dredging above and in **Chapter 16: Physical Processes**, maximum SSCs are associated with the disposal activities. Peak excess SSC levels resulting from the disposal activities are predicted, at this preliminary stage, to be around 600 to 800 mg/l at the HU060 licensed disposal site. Increased SSCs arising from the dredge operations will be of lower magnitude and persist for a shorter distance (and time) than that from the disposal. The anticipated increased SSC concentration related to piling will be less than that of dredging and disposal, as compaction will occur in the sediment rather than complete disturbance. Given this, the proposed piling works are considered unlikely to result in significant water quality impacts from sediment-bound contaminants.

17.5.21 Based on the available information provided above, the potential impact at this preliminary stage has been assessed as **not significant**.

Disposal activities

17.5.22 As discussed for capital dredging above and in **Chapter 16: Physical Processes** maximum SSCs are associated with the disposal activities. Peak excess SSC levels resulting from the disposal activities are predicted, at this preliminary stage, to be around 600 to 800 mg/l at the HU060 licensed disposal site. Based on existing evidence on the level of contamination in sediments within the vicinity of the Project (summarised in **Section 17.3**), and the precited maximum incremental SSC at this preliminary stage (600 to 800 mg/l), the uplift in contaminant concentrations is anticipated to be minimal during disposal, and unlikely to present a significant issue at the water body level.

17.5.23 Based on the available information provided above, the potential impact at this preliminary stage has been assessed as **not significant**.

Redistribution of sediment-bound contaminants

Capital dredging

17.5.24 The potential to impact the marine environment as a result of any sediment-bound contaminants arises primarily when the sediment that is released into the water column disperses and deposits elsewhere. However, it should be noted that the majority of material disturbed during capital dredging works will be lifted from the bed to the hopper/barge, with only a small proportion raised into suspension and remaining in the water column (i.e., through abrasion pressure from the bucket/ draghead).

17.5.25 The material within the proposed dredge area is likely to range from coarse sediments (sands and gravel) which are generally unlikely to comprise high contaminant levels due to the material characteristics, to muds, silts and clays which are more typically associated with sediment-bound contaminants. The site-specific sediment sampling and analysis that will be undertaken to inform the ES has not been completed at this preliminary stage. However, based on existing evidence on the level of contamination in sediments within the vicinity of the Project, the overall level of contamination in the proposed dredge area is likely to be low (see **Section 17.3**). Furthermore, sedimentation in relation to the dredging of the berth pocket is predicted to be relatively localised (see **Chapter 16: Physical Processes**). It is, therefore, unlikely that sediment quality will decline elsewhere, as a result of the redistribution and deposition of material during capital dredging.

17.5.26 Based on the available information provided above, the potential impact at this preliminary stage has been assessed as **not significant**.

Piling

17.5.27 Similar to capital dredging (see above), the potential to impact the marine environment as a result of any sediment-bound contaminants arises primarily when the sediment that is released into the water column disperses and deposits elsewhere.

17.5.28 However, based on existing evidence on the level of contamination in sediments within the vicinity of the Project, the overall level of contamination in the proposed dredge area is likely to be low (see **Section 17.3**). Furthermore, sedimentation away from the piling locations is predicted to be highly localised (see **Chapter 16: Physical Processes**). It is, therefore, unlikely that sediment quality will decline elsewhere, as a result of the redistribution and deposition of material during piling.

17.5.29 Based on the available information provided above, the potential impact at this preliminary stage has been assessed as **not significant**.

Disposal activities

17.5.30 The disposal of dredged material at sea associated with the Project will be fulfilled at licensed disposal sites HU056 and HU060 within the Humber Estuary (see **Chapter 2: The Project**).

17.5.31 During the placement of dredged material at the licensed disposal sites, any sediment-bound contaminants within the dredge material will effectively be dispersed and redistributed by the disposal activity. However, based on existing evidence on the level of contamination in sediments within the vicinity of the Project (see **Section 17.3**), it is anticipated that the sediment will be suitable for disposal in the marine environment. It is also noted that disposal site HU060 routinely receives maintenance dredging material from ports within the Humber Estuary. These disposal sites, located within the Humber Estuary, will have similar levels of contamination to the dredge material and therefore disposal activity is not expected to lead to elevated concentrations of contaminants above prevailing background levels.

17.5.32 Based on the available information provided above, the potential impact at this preliminary stage has been assessed as **not significant**.

Changes to marine water quality from accidental spillages or leaks during construction

17.5.33 Accidental spillages of oil and other substances have the potential to occur during construction from both land and marine-based plant and vessels. Depending on the source, spillages and leaks can potentially introduce contaminants which could reduce marine water quality. A range of best practice pollution prevention guidelines have been outlined in **Section 17.4** and will be followed to minimise the risk of accidental spillages and the risk of introduction of contaminants throughout construction. This not only reduces the potential risk from accidents and spillages/leaks during construction but also outlines the response if were such an event to occur.

17.5.34 Given the low likelihood of this impact occurring and the measures in place to address an incident if one were to occur, the potential impact at this preliminary stage has been assessed as **not significant**. Risks associated with major incidents are considered in **Chapter 22: Major Accidents and Disasters**.

Operation

17.5.35 This section contains an assessment of the potential impacts to water and sediment quality receptors as a result of the operational phase of the Project. The following impact pathways have been assessed:

a. Changes to dissolved oxygen concentrations as a result of increased SSC during the maintenance dredging and disposal activities;

b. Changes to chemical water quality as a result of potential sediment-bound contaminants being released during maintenance dredging and disposal activities; and

c. Redistribution of sediment-bound contaminants during maintenance dredging and disposal activities.

Changes to dissolved oxygen concentrations as a result of increased SSC

Maintenance dredging

17.5.36 Maintenance dredging of the Project berth pocket will be carried out periodically throughout operation if required. The volumes of material from maintenance dredging will be lower than those from the original capital dredge. Furthermore, the density of the newly settled material will be less than that from the consolidated bed dredged during the capital dredge campaign. Rather than a maintenance dredge campaign involving the removal of the full annual maintenance dredge requirement, future maintenance dredge activity will likely involve more frequent smaller individual dredging events (as required for operational requirements of the terminal). As a result, maintenance dredge arisings and disposal will have a notably lower magnitude and the dredged material being deposited will be more dispersive than the impacts described above for the capital works during construction.

17.5.37 The increase in chemical and biological oxygen demand associated with elevated SSC in the water column during maintenance dredging may have the potential to reduce dissolved oxygen concentrations. The material within the proposed dredge area is likely to range from coarse sediments (sands and gravel) which are unlikely to influence dissolved oxygen concentrations, to clays including alluvium deposits for which organic content can result in reduced dissolved oxygen concentrations. That said, it should be noted that the material to be removed during the maintenance dredging campaign will have been recently deposited and in reduced volumes compared to the capital dredge. Furthermore, the majority of material disturbed during maintenance dredging works will be lifted from the bed to the hopper, with only a small proportion raised into suspension and remaining in the water column (i.e., through abrasion pressure from the bucket/ draghead).

17.5.38 The dredge area is situated within the Humber Lower transitional water body. The physico-chemical quality element ‘Dissolved oxygen’ is currently, based on the 2019 interim classification, at high status for this water body, despite the area being subject to regular disturbance from dredging. It is, therefore, considered unlikely that dissolved oxygen concentrations will fall below the standards set under the WFD as a result of the proposed maintenance dredging.

17.5.39 Numerical modelling of the capital dredge has shown that increases in SSC will be short-term and localised to the dredging activity and therefore as the maintenance dredging volumes are smaller the change in SSC would be lower than that of the capital dredge (see **Chapter 16: Physical Processes**). It is anticipated that any reduction in dissolved oxygen concentration will be short-lived and replenished over the subsequent tidal cycle. Based on the available information provided above, the potential impact at this preliminary stage has been assessed as **not significant**.

Disposal activities

17.5.40 Volumes of material from maintenance dredging of the Project berth pocket will be lower than those from the original capital dredge. Whilst the overall

maintenance dredge volume will increase slightly as a result of the Project, the amount will not exceed the current overall annual licenced volume for Immingham. Of particular importance in relation to potential effects, the frequency and volume of material deposited from each load will not change compared with current maintenance dredging activities as the same plant and methods are proposed to be used. Future disposal of maintenance dredge arisings will, therefore, result in the same changes in SSC within the disposal plumes as existing maintenance dredging activities undertaken for the port.

17.5.41 During operation the disposal of dredged material (which would be sand/silt (alluvium)) at sea associated with the Project will be fulfilled at licensed disposal site HU060 (see **Chapter 2: The Project**).

17.5.42 During the placement of dredged material at the Clay Huts licensed disposal site (HU060), the potential for reduction in dissolved oxygen concentrations in the water column is considered to be low. Any changes would be localised and short-lived given the dynamic nature of the site, which would rapidly be re-oxygenated. HU060 is located within the Lower Humber water body for which the physico-chemical quality element 'Dissolved oxygen' is currently, based on the 2019 interim classification, at high status, despite routinely receiving maintenance dredging material from ports within the Humber Estuary. It should be noted that material to be disposed during the maintenance dredging campaign would be recently deposited and in reduced volumes compared to the capital dredge.

17.5.43 Based on the available information provided above, the potential impact at this preliminary stage has been assessed as **not significant**.

Changes to chemical water quality as a result of potential sediment-bound contaminants

Maintenance dredging

17.5.44 As discussed for capital dredging above, the proposed maintenance dredging activities are considered unlikely to result in significant water quality impacts. The level of contamination of the material that will be removed through maintenance dredging is anticipated to be similar to the existing surficial sediment samples collected within the vicinity of the Project (see **Section 17.3**). Based on the available information provided above, the potential impact at this preliminary stage has been assessed as **not significant**.

Disposal activities

17.5.45 As discussed for the proposed disposal of capital dredge material above, the proposed disposal activities for maintenance dredging are considered unlikely to result in significant water quality impacts. Maximum SSCs are associated with the disposal activities and peak excess SSC levels resulting from the disposal activities are predicted, at this preliminary stage, to be around 600 to 800 mg/l at the HU060 licensed disposal site. The level of contamination of the material that will be removed through maintenance dredging is anticipated to be similar to the existing surficial sediment samples collected within the vicinity of the Project (see

Section 17.3). It should also be noted that this disposal site is already used and has been used by the Port of Immingham for the disposal of maintenance dredge material for over 30 years.

17.5.46 Based on the available information provided above, the potential impact at this preliminary stage has been assessed as **not significant**.

Redistribution of sediment-bound contaminants

Maintenance dredging

17.5.47 The potential to impact the marine environment as a result of any sediment-bound contaminants arises primarily when the sediment that is released into the water column disperses and deposits elsewhere.

17.5.48 The material within the proposed dredge area is likely to range from coarse sediments (sands and gravel) which are generally unlikely to comprise high contaminant levels, to muds, silts and clays which are more typically associated with sediment-bound contaminants. The level of contamination of the material that will be removed through maintenance dredging is anticipated to be similar to the existing surficial sediment samples collected within the vicinity of the Project (see **Section 17.3**). Furthermore, sedimentation in relation to dredging of the berth pocket is predicted to be relatively localised (see **Chapter 16: Physical Processes**). It is, therefore, unlikely that sediment quality will decline elsewhere, as a result of the redistribution of material during maintenance dredging. In addition, maintenance dredging of the Project berths will be carried out in line with the existing regime across the Port which requires regular sediment sampling and testing to ensure the material remains suitable for disposal at sea.

17.5.49 Based on the available information provided above, the potential impact at this preliminary stage has been assessed as **not significant**.

Disposal activities

17.5.50 The disposal of maintenance dredged material at sea associated with the Project will be fulfilled at licensed disposal site HU060 (see **Chapter 2: The Project**).

17.5.51 During the placement of dredged material at the Clay Huts licensed disposal site (HU060), any sediment-bound contaminants within the dredge material will effectively be redistributed by the disposal activity. As discussed in the preceding sections, material types more typically associated with sediment-bound contaminants are muds, silts and clays. Material removed during the maintenance dredging campaign would be recently deposited alluvium and in reduced volumes compared to the capital dredge. Existing sediment sampling data in the vicinity of the Project generally showed low levels of contaminant concentrations within surficial sediments. The proposed HU060 licensed disposal site has received maintenance dredge arisings from the Port of Immingham (and other ports within the Humber Estuary) for more than 30 years and periodic sediment sampling to assess the suitability for disposal at sea will continue in accordance with the conditions of the Port's existing maintenance dredge licences. This will ensure the material remains suitable for disposal at sea.

17.5.52 Based on the available information provided above, the potential impact at this preliminary stage has been assessed as **not significant**.

17.6 Preliminary Assessment of Residual Effects

17.6.1 The following sections summarise the likely effects on Marine Water and Sediment Quality receptors.

Construction

17.6.2 The assessment considered three impact pathways in detail during construction as a result of the capital dredging, piling and disposal activities. These addressed the potential for impacts as a result of the potential changes to dissolved oxygen concentrations, changes to chemical water quality as a result of potential sediment-bound contaminants, and redistribution of sediment-bound contaminants.

17.6.3 All of the potential impacts on water and sediment quality receptors during construction were, at this preliminary stage, assessed as not significant. Given this, no specific mitigation measures have been identified as being likely to be required, and residual effects remain unchanged. However, standard mitigation measures will be undertaken to manage commonly occurring environmental effects. As noted in **Section 17.4**, an Outline CEMP will be drafted and submitted with the DCO application and the measures finalised in the CEMP which will set out in full the mitigation measures needed to manage environmental effects and which will be implemented prior to works commencing and during works as relevant.

17.6.4 The final outcomes of the assessment of impacts and the conclusion in respect of the likely significant effects of the Project on Marine Water and Sediment Quality will be reported within the ES.

Operation

17.6.5 The assessment considered three impact pathways in detail during operation as a result of maintenance dredging and disposal activities. These addressed the potential for impacts as a result of the potential changes to dissolved oxygen concentrations, changes to chemical water quality as a result of potential sediment-bound contaminants, and redistribution of sediment-bound contaminants.

17.6.6 As for impacts during construction, all of the potential impacts on water and sediment quality receptors during operation were, at this preliminary stage, assessed as not significant. Given this, no specific mitigation measures have been identified as being likely to be required, and residual effects remain unchanged. However, standard mitigation measures will be undertaken to manage commonly occurring environmental effects.

Decommissioning

17.6.7 The Project DCO would not make any provision for the decommissioning of the marine infrastructure above and below water level. This is because the

development would, once constructed, become part of the fabric of the Immingham port estate and would, in simple terms, continue to be maintained so that it can be used for port related activities to meet a long-term need. On this basis, potential effects on marine water and sediment quality receptors from decommissioning have been scoped out.

17.7 Summary of Preliminary Assessment

17.7.1 A summary of the impact pathways that have been assessed at this preliminary stage, together with the identified residual impacts and level of confidence is presented in **Table 17.4**.

Table 17.4 Summary of potential impact, mitigation measures and residual impacts

Receptor	Impact Pathway	Impact Significance	Mitigation Measure	Residual Effect	Confidence
Construction Phase					
Marine water and sediment quality	Changes to dissolved oxygen concentrations as a result of increased SSC during piling, capital dredging and disposal activities	Not significant	N/A	Not significant	Medium
	Changes to chemical water quality as a result of potential sediment-bound contaminants being released during piling, capital dredging and disposal activities	Not significant	N/A	Not significant	Medium
	Redistribution of sediment-bound contaminants during piling, capital dredging and disposal activities	Not significant	N/A	Not significant	Medium
	Changes to marine water quality from accidental spillages of leaks	Not significant	N/A	Not significant	High
Operational Phase					
Marine water and sediment quality	Changes to dissolved oxygen concentrations as a result of increased SSC during the maintenance dredging and disposal activities	Not significant	N/A	Not significant	Medium
	Changes to chemical water quality as a result of potential contaminants in the seabed sediment being released during maintenance dredging and disposal activities	Not significant	N/A	Not significant	Medium
	Redistribution of sediment-bound contaminants during maintenance dredging and disposal activities	Not significant	N/A	Not significant	Medium

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17.9 Abbreviations and Glossary of Terms

Table 17.5 Glossary and Abbreviations

Term	Acronym	Meaning
Appropriate Assessment	AA	The assessment of the impact on the integrity of a European site of a project or plan, either alone or in combination with other projects or plans, with respect to the site's structure and function and its conservation objectives.
Associated British Ports	ABP	One of the UK's leading and best-connected ports groups, owning and operating 21 ports across England, Wales and Scotland.
Action Level	AL	Cefas Guideline Action Levels are used as part of a 'weight of evidence' approach to assessing material suitability for disposal at sea.
Centre for Environment, Fisheries and Aquaculture Science	Cefas	The Centre for Environment, Fisheries and Aquaculture Science is an executive agency of the United Kingdom Government Department for Environment, Food and Rural Affairs.
Construction Environmental Management Plan	CEMP	A Construction Environmental Management Plan describes the specific mitigation measures to be followed by the appointed construction contractor to reduce potential nuisance impacts.
Chartered Institute of Ecology and Environmental Management	CIEEM	The leading professional membership body representing and supporting ecologists and environmental managers in the UK, Ireland and abroad.
Candidate Special Area of Conservation	cSAC	A site proposed for designation under EU legislation for the protection of habitats and species considered to be of European interest.
Development Consent Order	DCO	The consent for a Nationally Significant Infrastructure Project required under the Planning Act 2008.
Department for Environment, Food and Rural Affairs	Defra	The Government department responsible for policy and regulations on environmental, food and rural issues. The department's priorities are to grow the rural economy, improve the environment and safeguard animal and plant health.
Exclusive Economic Zone	EEZ	-An area of coastal water and seabed within a certain distance of a country's coastline, to which the country claims exclusive rights for fishing, drilling, and other economic activities.

Term	Acronym	Meaning
Environmental Impact Assessment	EIA	The statutory process through which the likely significant effects of a development project on the environment are identified and assessed.
Environmental Quality Standards	EQS	The maximum permissible concentration of a potentially hazardous chemical.
Environmental Statement	ES	A statutory document which reports the EIA process, produced in accordance with the EIA Directive as transposed into UK law by the EIA Regulations.
European Union	EU	An economic and political union of 28 countries which operates an internal (or single) market which allows the free movement of goods, capital, services and people between member states.
Guidance for Pollution Prevention	GPP	GPPs provide environmental good practice guidance for the whole of the UK.-
Heavily Modified Water Body	HMWB	Significant water bodies that have changed water category due to modifications.
Habitats Regulations Assessment	HRA	An assessment of projects (or plans) potentially affecting European Sites in the UK, required under the Habitats Directive and Regulations. Also known as an assessment of implications on European Sites.
Institute of Environmental Management and Assessment	IEMA	A professional body for practitioners working in the fields of environmental management and assessment.
Immingham Outer Harbour	IOH	Immingham Outer Harbour is an area which partly makes up infrastructure located at the Port of Immingham.
Likely Significant Effect	LSE	Schedule 4 of the Regulations requires an environmental statement to include a description of the likely significant effects of the development on the environment.
Maximum Allowable Concentrations	MAC	The threshold limit value of a pollutant, not to be exceeded. The threshold is based off dose-response effects of human or animal exposure for each substance.
Marine and Coastal Access Act 2009	MCAA	The Act introduces a new system of marine management. This includes a new marine planning system, which makes provision for a statement of the Government's general policies, and the general policies of each of the developed administrations, for the marine environment, and also for marine plans which will set out in more detail what is to happen in the different parts of the areas to which they relate.
Mean High Water Springs	MHWS	The height of Mean Water High Springs is the average throughout the year, of two successive high waters, during a

Term	Acronym	Meaning
		24-hour period in each month when the range of the tide is at its greatest.
Marine Management Organisation	MMO	The Marine Management Organisation is an executive non-departmental public body in the United Kingdom established under the Marine and Coastal Access Act 2009, with responsibility for English waters.
Marine Policy Statement	MPS	The UK Marine Policy Statement provides the framework for preparing Marine Plans and is key when making decisions directly affecting the marine environment.
National Policy Statement for Ports	NPSfP	The National Policy Statement for Ports provides the framework for decisions on proposals for new port development.
Nationally Significant Infrastructure Projects	NSIP	A type of project listed in the Planning Act 2008, which must be consented by a Development Consent Order.
Nitrate Vulnerable Zone	NVZ	Areas covering 62% of England designated as a result of the EU's Nitrates Directive in order to reduce the level of nitrates in surface and groundwater. Farmers with land in nitrate vulnerable zones have to follow mandatory rules to tackle nitrate loss from agriculture.
Organochlorine pesticides	OCP	Organochlorine pesticides are chlorinated hydrocarbons used extensively from the 1940s through the 1960s in agriculture and mosquito control
Polycyclic Aromatic Hydrocarbons	PAH	A polycyclic aromatic hydrocarbon is a chemical compound containing only carbon and hydrogen that is composed of multiple aromatic rings.
Polybrominated Diphenyl Ethers	PBDE	Polybrominated diphenyl ethers are a group of man-made organobromine compounds.
Preliminary Environmental Information Report	PEI Report	A report that compiles and presents the Preliminary Environmental Information gathered for a project.
Perfluorooctane Sulphonate	PFOS	Perfluorooctane sulfonate belongs to a large, diverse group of man-made substances known collectively as perfluoroalkyl and polyfluoroalkyl substances.
Planning Inspectorate	PINS	An executive agency with responsibilities for planning appeals, national infrastructure planning applications, local plan examinations and other planning-related casework in England and Wales.
Planning Practice Guidance	PPG	A series of guidance documents which support the content of the National Planning Policy Framework.

Term	Acronym	Meaning
Particle Size Analysis	PSA	Particle size analysis is used to characterise the size distribution of particles in a given sample.
Potential Special Protection Area	pSPA	-
River Basin Management Plan	RBMP	A regional plan that sets out how organisations, stakeholders and communities would work together to improve the water environment and fulfil the requirements of the Water Framework Directive.
Special Area of Conservation	SAC	A designated area protecting habitats and species identified in Annexes I and II of the Habitats Directive
Special Protection Area	SPA	A designated area protecting one or more rare, threatened, or vulnerable bird species listed in Annex I of the Birds Directive
Source Protection Zone	SPZ	Zones defined by the Environment Agency to protect groundwater sources such as wells, boreholes and springs from potential contamination.
Suspended Sediment Concentrations	SSC	Suspended sediment concentration is the total value of both mineral and organic material carried in suspension by a river.
Tributyl Tin	TBT	Umbrella term for a class of organotin compounds which contain the $_3$Sn group.
Trailing Suction Hopper Dredger	TSHD	Trailing Suction Hopper Dredgers are oceangoing vessels that can collect sand and silt from the seabed and transport it over large distances.
United Kingdom	UK	-
Water Framework Directive	WFD	A European Union Directive which commits member states to achieve good status of all waterbodies (both surface and groundwater), and also requires that no such waterbodies experience deterioration in status. Good status is a function of good ecological and good chemical status, defined by a number of elements.